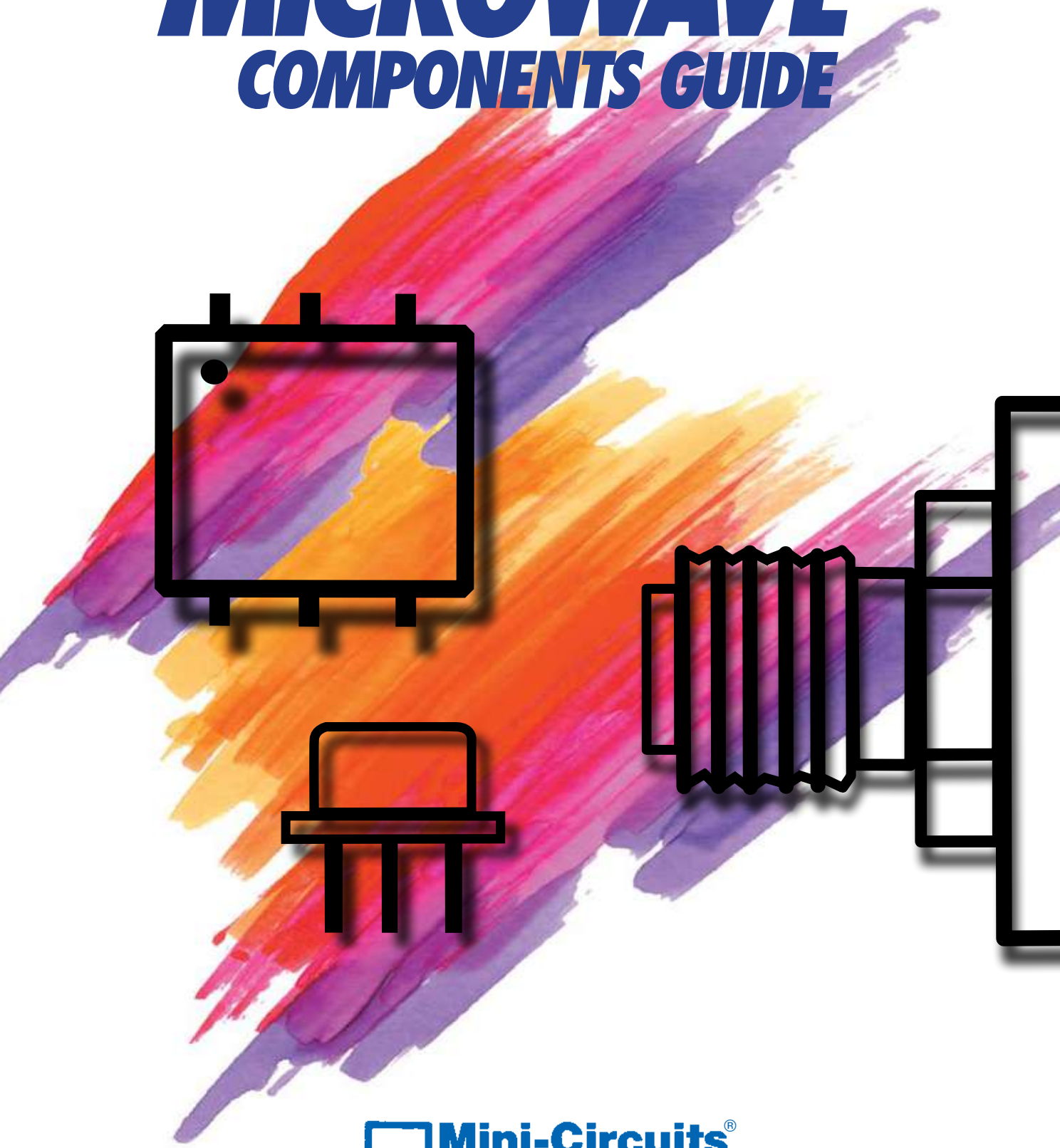
SF/2010

IF/RF & MICROWAVE COMPONENTS GUIDE



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ISO 9001 ISO 14001 AS 9100 CERTIFIED

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Signal Processing Solutions For:

Communications • Wireless & Cellular Products • Medical
Test Instrumentation • Satellite Links • Receivers • PC Assemblies
Computer • Digital & Analog Data Acquisition
UHF/VHF Transmitters • Telephony • Cable/TV Broadcasting
• Military • Aircraft & Aerospace • Radar

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microwave components...Mini-Circuits

Commitment to Quality & Customer Satisfaction

New

AS 9100 provides the framework to help ensure that all aspects of the design, manufacture and support of our aerospace products meet their design specifications and intended functions.

ISO 9001 enhances our devotion to quality. Through a process of planning and prevention, it helps assure customer satisfaction today and in the future.

ISO 14001 is the centrepiece of Mini-Circuits commitment to compliance with environmental regulations. It assures conformance with our stated environmental policies, and demonstrates our passion to implement, maintain, and continually improve our environmental management system.

The Design Engineers Search Engine *finds the model you need, Instantly.*

For pricing/availability, complete specifications, data sheets, RoHS compatibility, performance data/curves, pcb layouts, outline drawings & shopping online, see minicircuits.com

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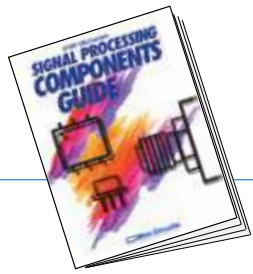

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Over 750 New Models Added

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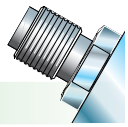

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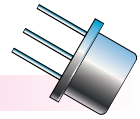

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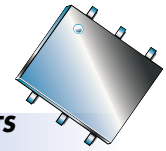

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You already know that these are just some of the ways that Mini-Circuits components add value to your assemblies. But did you also know that consecutive, annual purchases from Mini-Circuits add value to your budget, too? It's all part of our commitment to bringing you the best value in the industry. Through our one-of-a-kind Partner Program, you'll have the opportunity to receive pricing discount based on lifetime purchase volume.

*Only Mini-Circuits offers discounts based on lifetime purchase volume.**

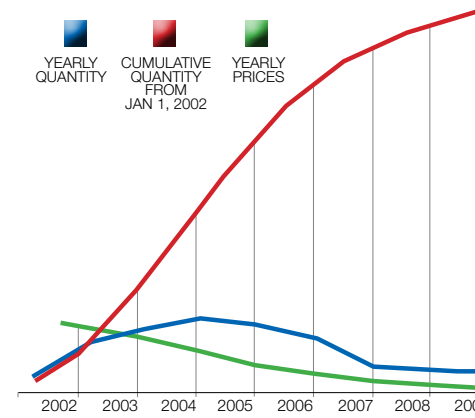
How the program works:
With the Partner Program, all of your past purchases add-up to earn higher base quantity and correspondingly lower prices on the quantity you purchase now (see graph).

Here is how we do it:
Our computers are programmed so that each consecutive year you purchase a quantity of a particular Mini-Circuits model (blue bar), those quantities are automatically added-up. The price you pay today (green bar) is based on the cumulative total of all your previous annual purchases of the particular model plus your current purchase of that model[1] (red bar).

You can enjoy a lifetime of base quantity discounts on all of our catalog models and most of our custom products. At the end of each year a statement for all your model base points will be available.

How to join the Partner Program
The program is available, at no cost or obligation, to qualified customers. Simply make a purchase from Mini-Circuits or any Mini-Circuits authorized representative and we'll take care of the rest.

Overview of Partner Program Dynamics
(inter-relationship between annual purchases and lower model price)



Red of previous year + blue of present year = base quantity of next year.

[1]The base year quantity equals the total cumulative consecutive annual quantity purchases of a particular model in preceding years as of Jan. 1, 2002. However, if the quantity purchased for a model in a year is less than 2% of the quantity purchased in the previous year, then the cumulative total for the previous years shall revert to zero.

*For a full statement of Mini-Circuits Partner Program terms and conditions visit our web site at www.minicircuits.com

Mini-Circuits...

QUALITY POLICY Mini-Circuits quality policy is to provide products and services to our internal and external customers that will:

- *Meet Stated Requirements*
- *Exceed Expectations*
- *Continuously Be Improved*

ENVIRONMENTAL COMMITMENT Mini-Circuits has developed an environmental policy that commits to the following:

- *Regulatory Compliance*
- *Pollution Prevention*
- *Continual Improvement*

CORPORATE VISION To continue to be a world preferred company for IF/RF Microwave products.

MISSION STATEMENT Our mission is to provide our customers with products of superior value while promoting growth and prosperity for our members, suppliers, community, and company.

Harvey Kaylie

HARVEY KAYLIE
President
Mini-Circuits Worldwide

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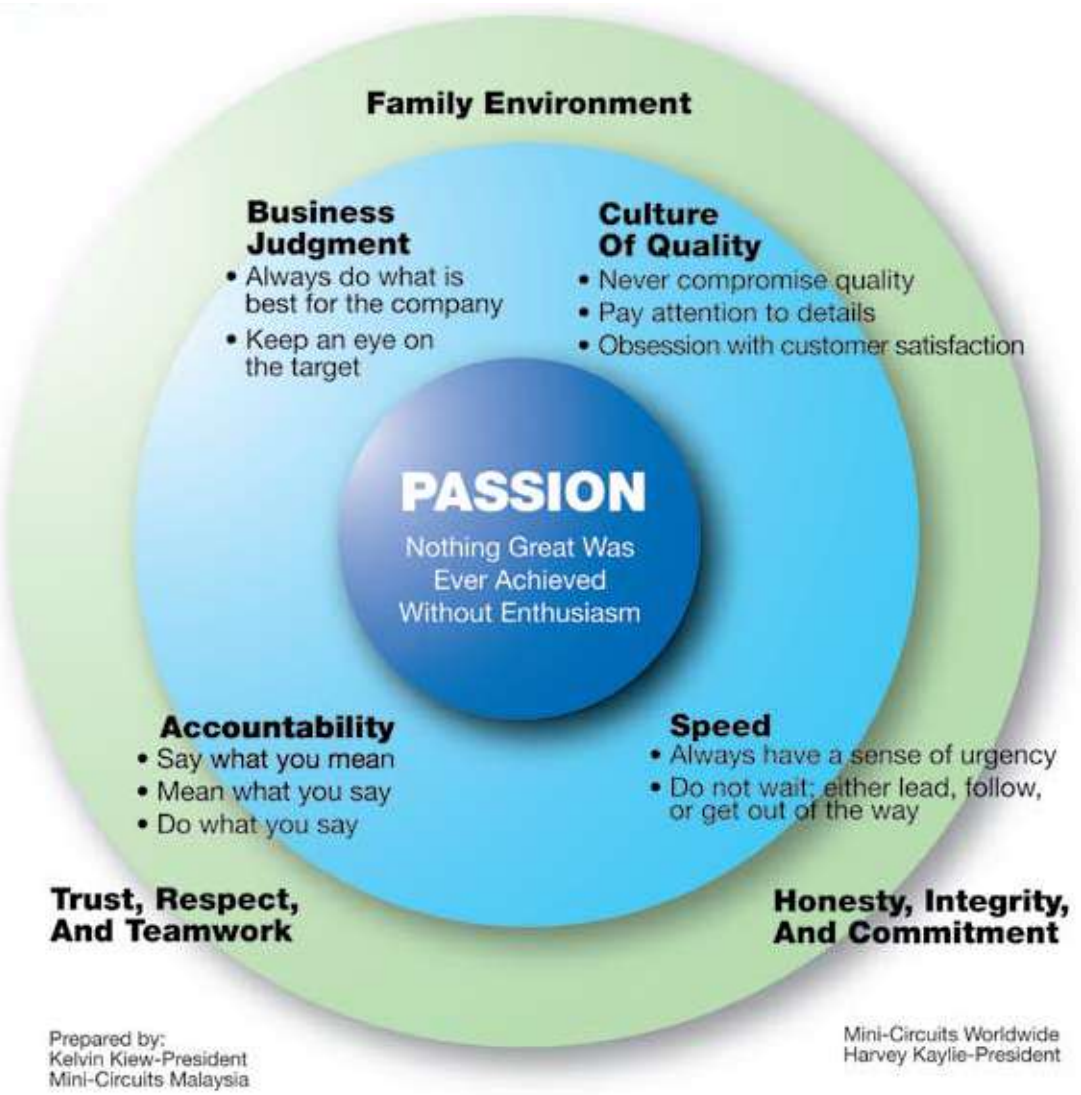
a commitment to total satisfaction

Our Guiding Principles



Our Commitment To You Never Ends

Our customers say it best!

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MINI-CIRCUITS…honored by these and numerous other satisfied customers.

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YONI2™ Patent Pending
The Design Engineers Search Engine *Find The Model You Need, Instantly.*
For pricing/availability, complete specifications, data sheets, RoHS compatibility, performance data/curves, pcb layouts, outline drawings & shopping online, see minicircuits.com

Mini-Circuits Cares,

Building community partnerships is a cornerstone value at Mini-Circuits. We're dedicated to making a positive impact on the communities in which we are doing business by using our unique resources to support neighborhood activities and non-profit organizations. As a leader in promoting continuing education, Mini-Circuits offers a number of programs that enable our members to further their training and professional skills. We also sponsor an educational scholarship fund for engineering students in the wireless communications field. By promoting continuing educational opportunities for Mini-Circuits members and the community, we help prepare for the future of the company, and industry as well.

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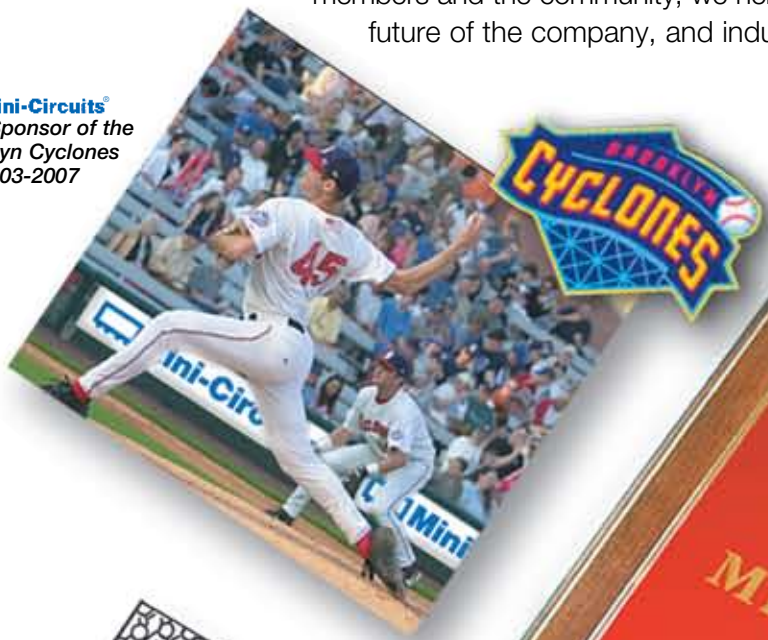

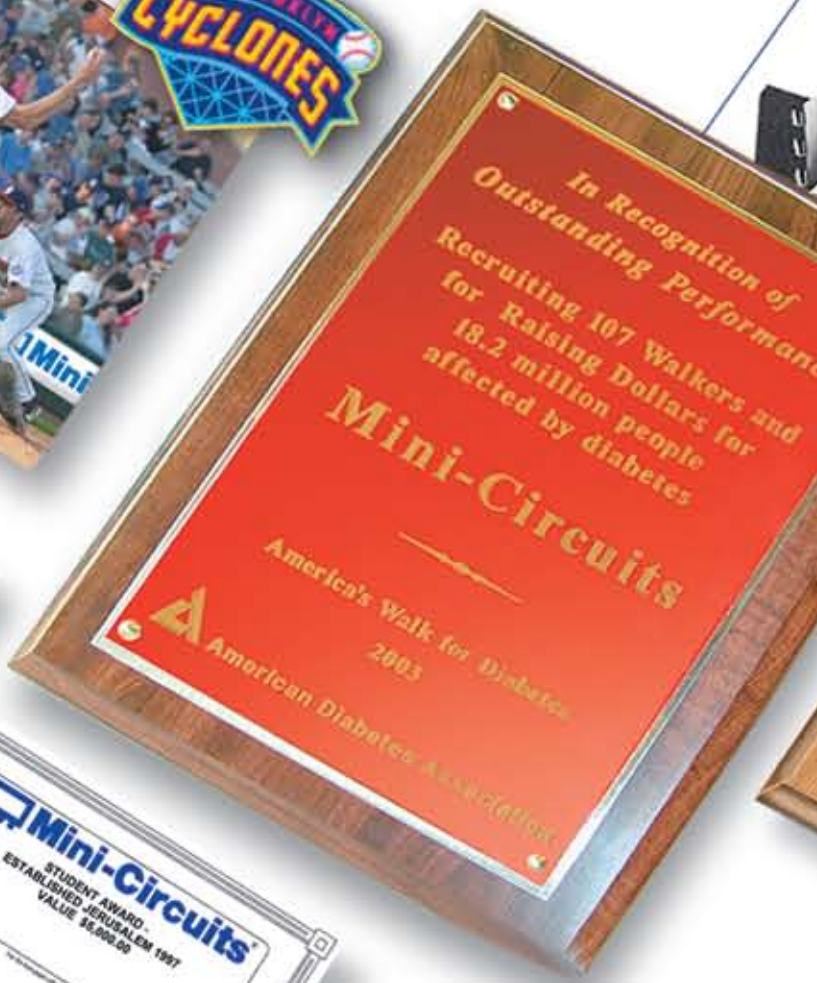

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Brooklyn, NY

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After School Youth Soccer Sponsorship
Penang, Malaysia

Mini-Circuits Employees Generously Contributed To China Earthquake Relief Fund

Mini-Circuits Employees Generously Contributed To Tsunami Relief Fund

Mini-Circuits Funds Wisma Yatim Orphanages Ability To House More Children

Mini-Circuits Penang Donates
To Cerebal Palsy Children's Association

Factory donates RM100,000 to group

CARING CORPORATE ... Mini-Circuits Technology (M) Sdn Bhd president Kelvin Kiew *(left)* presenting a donation of RM100,000 to Penang Cerebral Palsy (Spastics) Children's Association vice-president Saw Hock Eng.

Looking on are Mini-Circuits Corporation president Harvey Kaylie *(second left)* and Penang Chief Minister Tan Sri Dr Koh Tsu Koon.

Four other organisations in Penang also received donations in conjunction with the ground-breaking ceremony of Mini-Circuits' manufacturing facility at Bayan Lepas Free Industrial Zone yesterday.

The Salvation Army received (RM40,000) while the Lions Club of Georgetown Mutiara, Wisma Yatim Pulau Pinang and Ramakrisna Orphanage each received RM20,000.

Mini-Circuits Incorporated of the United States plans to invest RM500mil to set up Malaysia's first radio frequency and microwave design centre in Penang.

Mini-Circuits Yoni2™

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Site Speeds Search For RF/Microwave Components

This upgraded search function supports parametric selection of components based on actual measured data, allowing engineers to quickly match a component to an application.

Matching a component to an application can be tedious and even unnerving at times. No matter how well versed a high-frequency engineer is in terms of the latest components, few if any can understand how some components can fit into a circuit or system better than others. Fortunately, the ready availability of the World Wide Web and high-speed Internet access, coupled with ever-improving high-frequency websites, has made the component search somewhat easier. And with the latest generation of component search tools from Mini-Circuits, the Yoni2 engine, designers can even select specific subbands and performance parameters within a component's total range of operation for that optimum match of component to application.

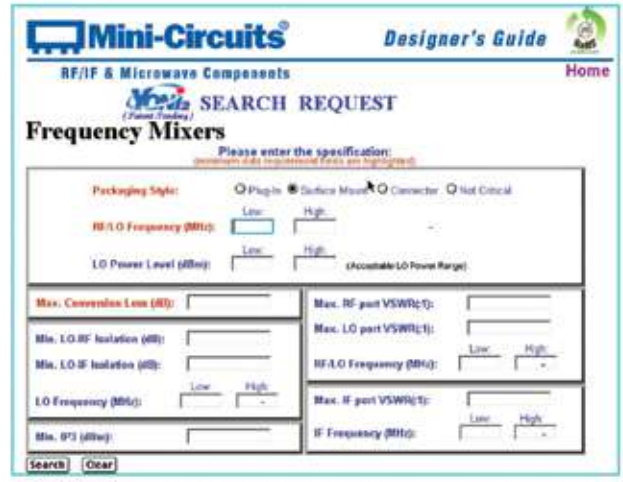
Rather than sorting though copies of data sheets, Yoni2 ***(Fig. 1)*** allows engineers to search through an enormous amount of actual data to find the best component for a particular requirement. In fact, the algorithms with which Yoni2 sorts through the data are so efficient that they represent the unique instance in which one of the functions of a high-frequency website is patent-pending.

1. The opening page of Yoni2 lists the current product lines that are available for a parametric search.

According to Mini-Circuits' president Harvey Kaylie, the development of Yoni2 was spurred by an awareness of how customers were using the company's parts. In some cases, rather than simply selecting, for example, a double-balanced mixer with RF and intermediate-frequency (IF) ranges to translate a desired signal band, engineers were using broader-band mixers over narrower portions of their range to meet a required linearity specification, or conversion-loss level, or optimum local-oscillator (LO) drive level. "Sometimes you don't need the entire usable bandwidth of a component, but just a portion of it, especially where that segment of its operating range gives you better performance than

you might get with a narrow-band solution," says Kaylie.

Constructing the Yoni2 database and search functions was not simply a matter of copying data-sheet files of compiling specifications from existing catalogues. When the Yoni2 search tool triggers on a user's input parameters, it begins a high-speed sort through actual measured data for each component in a category, attempting to match performance limits or a performance window to a customer's request. Collecting this amount of measured data, of course, is extremely time consuming and would have been impractical if not for a major investment on the part of Mini-Circuits in new RF/microwave test systems which include high-performance vector network analyzers and fast-switching synthesized signal sources. Kaylie notes, "We worked very closely with a major international supplier of RF and microwave test equipment, installing quite a few of these test stations in support of Yoni2. It required a cooperative effort to achieve the test performance levels we needed." Kaylie adds, "These are literally millions of points of test data that were compiled in a short time on our existing product lines. And this will be done for all new products—full characterization of performance under different conditions, including temperature, to allow engineers to search for components meeting very specific requirements."



2. The Yoni2 frequency mixer search request screen can be activated with a few simple data entries.

Many companies offer product category searches or the capability of searching for a specific model number. The Yoni2 search tool allows uses to perform a search within a given product category based on their own specifications. How well does it work? During an evaluation of the firm's next-generation website, Yoni2 was used to find components for several typical applications including a microwave mixer.

Although Mini-Circuits is associated with RF components, the firm also offers component beyond 10 GHz for microwave applications. In attempting to find a broadband microwave mixer for applications covering 4 to 12 GHz, Yoni2 was used with its mixer search request screen ***(Fig. 2)*** to search for a mixer that would provide no worse than 10 dB conversion loss and operate with LO drive level of +7 dBm. A word of caution when entering search data: Yoni2 is not all knowing, and upon entering LO drive level in its familiar +7 and +10 configurations (for +7 and +10 dBm), Yoni2 flagged the entry as incorrect (not a number) because of the "plus" sign. Once the plus sign was removed, the search engine quickly jumped to the next screen ***(Fig. 3)***, indicating that a perfect match was not available but that the search would continue based on one or two priorities, such as conversion loss, LO-RF isolation, LO-IF isolation, IP3, VSWR, or none. By leaving the default setting of conversion loss, the search tool quickly found a model MCA1-12GL mixer with LO/RF range of 3.8 to 12.0 GHz and IF range of DC to 1.5 GHz ***(Fig. 4)***.

From the results screen of a mixer search, an operator can click on the model number to show a screen that offers a data sheet as well as choices to view graphs or view data ***(Fig. 5)***. It also shows details about the package, circuit layout, environmental ratings, even information about an evaluation board. Clicking on "View Graphs" brings up on-screen performance plots ***(Fig. 6)*** that include conversion loss, input IP3, LO-to-RF isolation, LO-to-IF isolation, and

3. When Yoni2 cannot find an exact match for a set of requirements, it shows this screen, prompting a user to enter priorities when looking for the next best thing.

4. This screen shows search results for a mixer usable from 4 to 12 GHz with +7 dBm LO power.

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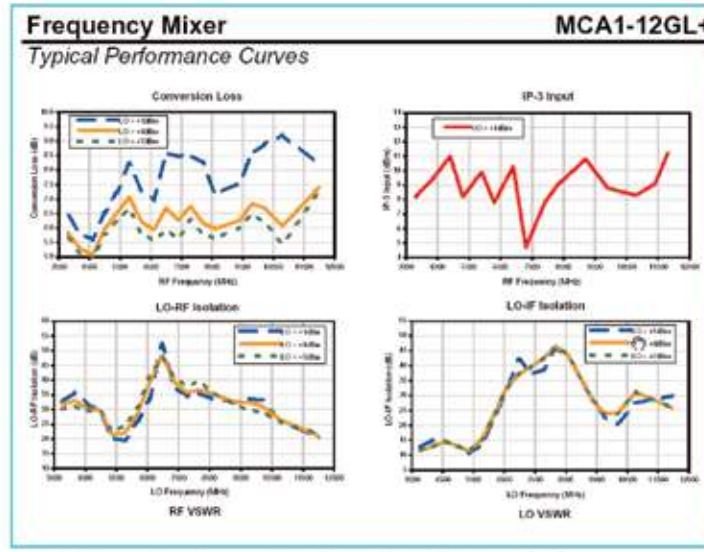
VSWR for the LO, RF, and IF ports.

Similar searches were performed using Yoni2 for a voltage-controlled oscillator (VCO), broadband amplifier, and bandpass filter. Each "Search Request" screen is different, customized for the particular component. During the VCO search, for example, the screen permits search parameters to be entered for oscillator frequency range, supply voltage, phase noise at four different offset frequencies (although only one or two of these entries need be completed for a successful search), minimum/maximum output power, minimum/maximum tuning sensitivity, and even harmonic levels.

Using simple search parameters of 1500 to 1600 MHz and phase noise of –86 dBc/Hz offset 1 kHz from the carrier and –140 dBc/Hz offset 1 MHz from the carrier, Yoni2 found a model ROS-EDR5630 VCO. The search engine even shows the elapsed time of the search, in this case a mere 0.02 s. As with the mixer, a user can then save or print a data sheet and quickly view performance data or plots that include tuning linearity, harmonics, output power versus tuning voltage, frequency pushing, and phase noise. Additional information is provided about tape-and-reel packaging, housing dimensions, circuit-board mounting, and an evaluation board.

In the case of an amplifier, search parameters include package style, frequency range, minimum gain and isolation, minimum output power, and maximum noise figure. As with the other search mechanisms within Yoni2, a minimum number of these parameters need be entered for a search to be successful. For example, in performing a search by just entering the amplifier frequency range of 2 to 5000 MHz and minimum gain of 10 dB, Yoni2 came up with a model GALI-74 amplifier, although the listed frequency range on the "Search Results" page was DC to 1000 MHz. But clicking on the menu choice to view performance brought up several screens full of actual performance data from 1 to 8835 MHz, complete with measured S-parameters. Plots were also available for power gain, input and output return loss, and isolation. Such S-parameter data are invaluable for modeling commercial components in popular commercial circuit simulators, such as the Advanced Design System (ADS) software simulation suite from Agilent Technologies (www.agilent.com) and Ansoft Designer from Ansoft (www.ansoft.com). Having the actual measured S-parameter data (rather than general parameters) improves simulation accuracy and can reduce the time needed for achieving meaningful simulation results.



6. By clicking on the "View Graphs" choice, detailed plots of performance are available for the MCA1-12GL+ mixer.

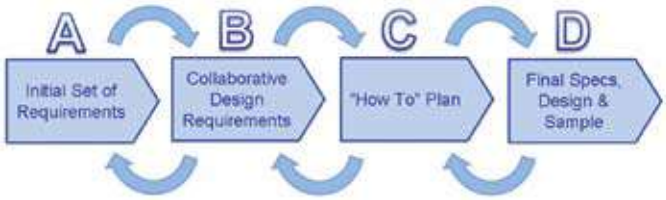
Finally, Yoni2 was used to track down a bandpass filter that could be used around a GPS signal at 1575 MHz. Entering a few simple parameters, such as the upper and lower limits of the passband and maximum passband insertion loss, and relaxing the packaging requirement by selecting the "Not Critical" choice, the Search Results screen shows four candidates. Interestingly, the search tool selected Engineering Development Models for these requirements, including the model VBFZ-EDR8448U SMA bandpass filter with a center frequency of 1600 MHz and passband loss of less than 2 dB. Information on the filter notes that it is a non-catalog model, although full information and pricing is available upon request. As with the other searched items, response plots of filter insertion loss and return loss were also available.

At present, Yoni2 supports searches across amplifiers, directional couplers, mixers, power splitters and combiners, RF transformers, VCOs, and filters. Even with the new test equipment, characterization of the company's many product lines takes time, and search capability must still be added for the firm's extensive lines of coaxial adapters, analog and digital attenuators, DC blocks, RF switches, terminations, and test cables. Eventually, all product lines will be supported by the powerful Yoni2 search tool. **Mini-Circuits, P.O. Box 350166, Brooklyn, NY 11235-0003; (718) 934-4500, FAX: (718) 332-4661, Internet: www.mini-circuits.com.**

5. This screen provides choices for more detailed information on the searched-for mixer, including options to save or print a data sheet, show performance lots, and study a package style.

The Design and Development Process

The ABC Process is a straight forward method of defining and planning a custom module development effort.



Working Face-to-Face with customers in a close cooperative relationship, ensures that Mini-Circuits provides optimal State-of-the-Art solutions to our customers needs.

A ***The Initial Set of Requirements***

These are typically the requirements from the system engineer for the module or sub-assembly. These requirements are often in the form of a specification document which defines

- *Specification parameters*
- *min, max or typical limits*
- *operating and storage environment*
- *quality and reliability requirements*

B ***Collaborative set of Design Requirements***

A set of completed requirements that include feedback from the system needs, priorities and trade-off's and the design capability. This is the result of an iterative process between Mini-Circuits and the Customer, to "fill-in-the-blanks" around an initial set of requirements, including:

- *A system block diagram in which the module resides*
- *Details of the source and load circuits around the module*
- *Details about the physical environment such as the PCB in an SMT application, EMI environment, etc.*
- *System Trade-off and sensitivities*
- *Critical performance requirements*
- *Performance areas where the system has flexibility ("need to have" vs. "nice to have")*
- *Alternative system approaches and competitive options under consideration*
- *Project Timeline*
- *Product Cost Target*

Mini-Circuits communication is coordinated by Technical Marketing and Applications Engineering bringing Design Engineering and the Customer together to create a complete set of design requirements

C ***Customer approval of specs and simulation performance***

"C" defines how Mini-Circuits will meet the project Objectives and includes:

Circuit Concept and Plan

- *Principals of Operation*
- *Baseline design(s) used in the product*
- *Critical Product Design Parameters and Considerations*
- *Design Analysis (cascaded system analysis, circuits analysis, supporting prototype test data, etc)*
- *Design Options made and supporting Trade-Off s in the decision process*
- *Critical Components used within the product (and areas of criticality)*
- *Project Plan (Critical milestones)*

D ***Finalized Specifications, Design and Customer Sample***

Based upon the foundation built in the A-B-C stages, all specifications are finalized, the detail design is documented and Engineering units are built and validated. Deliverables to the customer include:

- *Finalized Specifications for Approval*
- *Engineering Units*
- *Validation Test Data*

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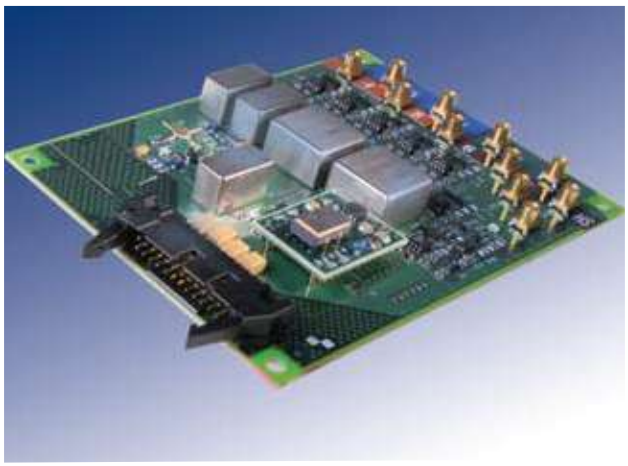
Products Designed & Manufactured



Clock Generation Module
Features 11 controlled outputs that maintain a tight phase unbalance (2º) and amplitude unbalance (<1dB) between all ports, both within a single module and from module to module.

Integrated L Band Up Converter
Satellite Communication Up Converter module, which converts IF frequencies of 40 – 180 MHz to L-Band output of 950-1750MHz while suppressing spurs of > 65dBc over the entire L-Band Frequency. Features phase noise of >100 dBc/Hz at 100kHz offset and an ACPR of -55 dBc. Incorporates monitoring ports for L-Band and IF, as well as a Mux-Tee that allows combining of 10 MHz reference and DC to be placed on the L-Band signal.

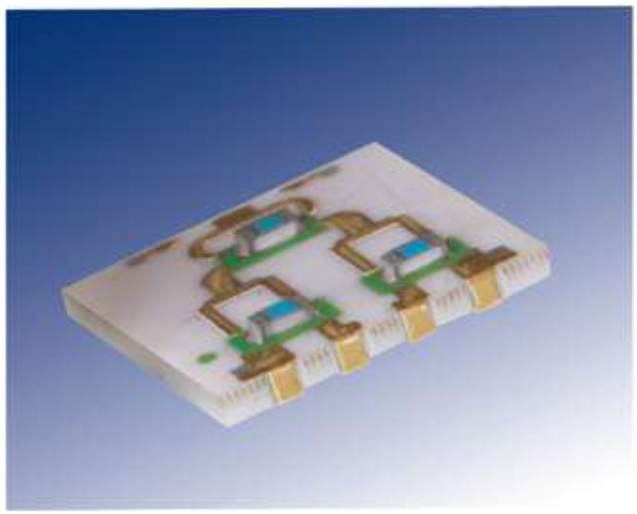
Integrated Vector Control Module
Integrated Vector Control Module for use in Military and Commercial Aircraft Communications covering 118 –137 MHz. This module consists of 3 I/Q Modulators/ Demodulators, 1 active with conversion gain of 13 dB, while all have performance of >30 dBc carrier rejection, with (2º) phase unbalance and .3 dB amplitude unbalance.

Integrated High Dynamic Range Active Mixer Module
Integrated, LO and IF amplifier mixer assembly with high output IP3 >31dBm, requiring LO drive of only 0dBm and providing gain of 9dB. For use in GSM 900 and 1800MHz basestations.

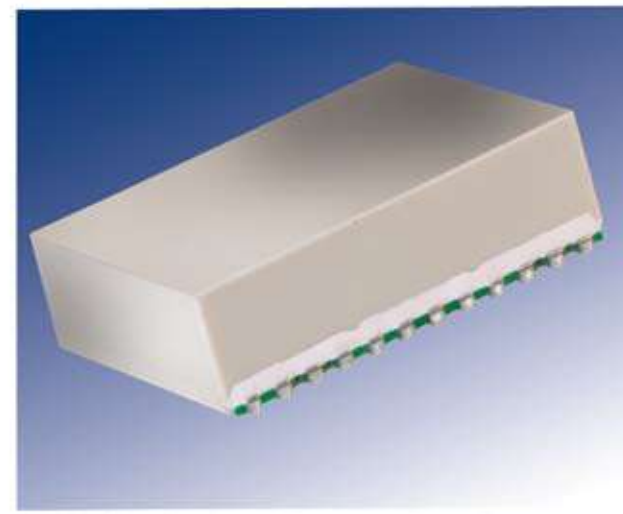
Products Designed & Manufactured

Variable High Gain Amplifier Module
A BroadBand Amplifier module covering 500 – 2000 MHz having a very high gain > 60 dB with gain control of 31.5dB in 0.5dB increments. It has a noise figure of 2.8dB while giving an output IP3 of >30dBm. This product is ideal for a variable gain stage following the LNA in a Cellular, PCS and DCS Basestations as well as wideband receivers.

VHF/UHF Integrated Receiver Front End
Tunable over the range of 100 to 450 MHz, this module includes an integrated X4 LO Multiplier and 70 dB input gain control to operate over a dynamic range set by 4 dB noise figure and input IP3 of +40 dBm.
Image is selectable upper or lower on command.



KA Band Ultra Small 4 Way 0° Splitter
Satellite communications four-way splitter, supporting KA band 13.5 to 14.5GHz with insertion loss of 1.5dB, isolation of 20dB, and an ultra-small footprint of 0.25" x 0.25".



CDMA-IS95 Baseband Frequency Filter Module
CDMA-IS95 baseband frequency filter module. Features three, low-pass Bessel filters with a passband of 1-630kHz, ripple of 0.5dB peak-to-peak, absolute group delay of 410-435 nanoseconds, and 44dB rejection at 1.86MHz.

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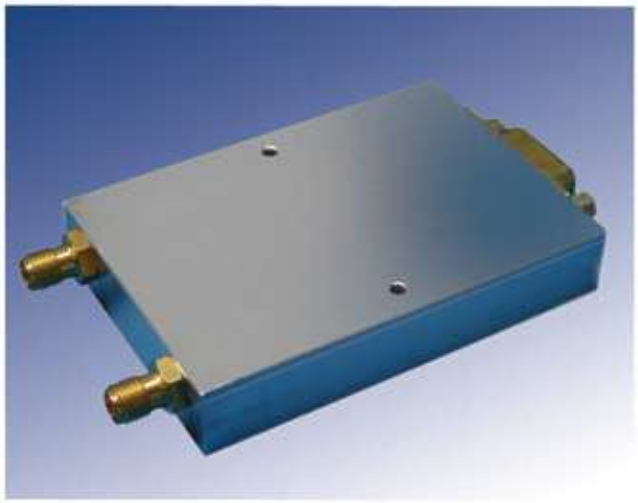
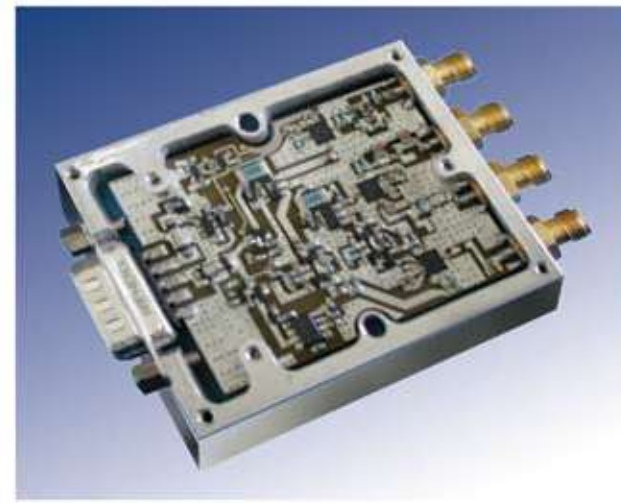
Products Designed & Manufactured

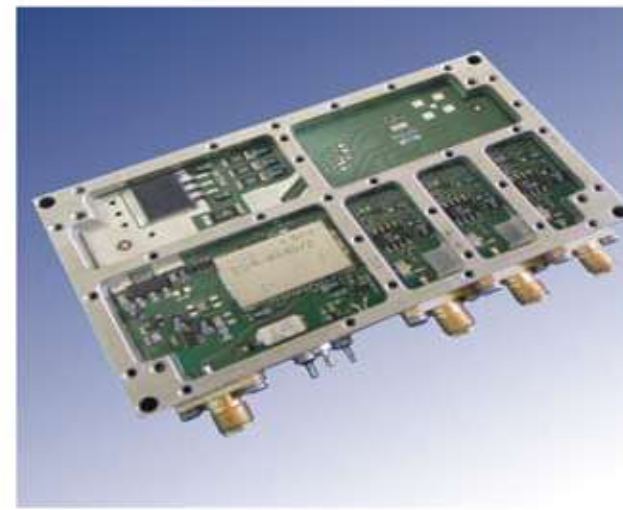


FM Modulation 8 GHz Synthesizer
8GHz synthesizer including an internal crystal oscillator reference with a separate port for applying FM modulation to the carrier frequency. Features 20 ms settling time to within +/- 100 kHz of final frequency, stability +/- 7 ppm and output power 10 +/- 2 dBm for use in EW applications.



Amplifier Switch Filter Matrix
Amplified switch filter matrix creating three discrete bands (.01-20, 20-1000, and 1000-2000MHz) from a single composite band. Features 25dB of gain control, gain flatness over each band of +/-0.5dB, and 40dB isolation between each band. For use in military applications.

Base Station Switch Matrix
Active reference signal switch matrix for base station synchronization. Features two inputs feeding any one of four outputs. 3dB of gain and 60ns switching speed. Supports threshold detection with alarm function and manual bypass mode.



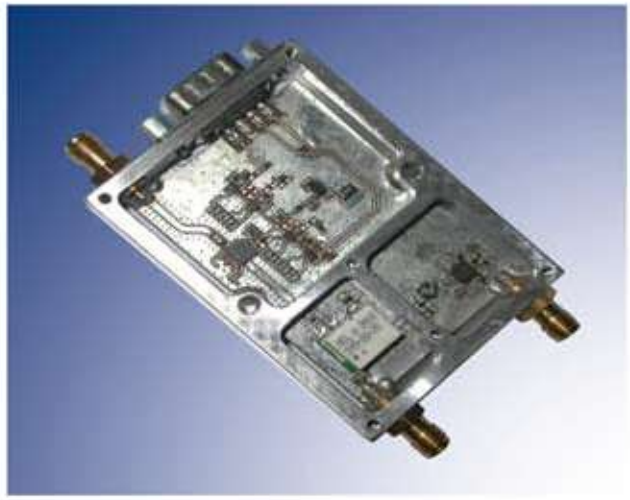
Micro Controller 3 Output Synthesizer
A fixed frequency synthesizer including a microcontroller that keeps the frequency lock within the range of 1050 to 1450 MHz. The signal is split into three separate outputs with >70 dB isolation between each output. This module was designed to be used in Commercial and Military Applications.

CUSTOM PRODUCTS

Products Designed & Manufactured

150W PCS/Cellular Power Combiner
PCS & Cellular, 1930-1990MHz & 824-894 MHz, high-power combiner featuring low loss (<0.2dB), average power handling of 150 Watts, and peak power of 1000 Watts. Constructed with inputs supplied via semi-rigid cables.

Cell Band Dual high IP3, Low Noise Amplifier
Dual Low Noise Amplifier module featuring two amplifiers with a noise figure of 1.1 dB, high output IP3 of +32 dBm and integrated manually controlled attenuators. Attenuators can be configured for up to 24 states with a minimum ½ dB attenuation up to 12 dB. The supply voltage is supplied via an RJ45 connector, which allows for ease of installation. This module was designed for use in the front end of a Cell Band (824-849) basestation.



Automatic Power Control Module
A wideband module, available in two frequency bands 2 to 30 MHz & 30 to 3000 MHz. The module monitors power and generates a DC voltage which is proportional to the input signal level. Power output control is achieved by feeding the generated DC Voltage to control the internal digital step attenuator, which has 5 Steps: 5, 10, 15, 20 & 31. The module features an insertion loss of 2.0 dB max.

Base Station 3 Way Active GPS Splitter
Active GPS, 1545-1605 MHz, three-way splitter for use in synchronizing base stations. Features 5dB, 0dB, and 0dB on each respective output port. Powered from outputs drawing 10mA and passing 100mA to the input with integrated, diode short-circuit protection on all outputs.

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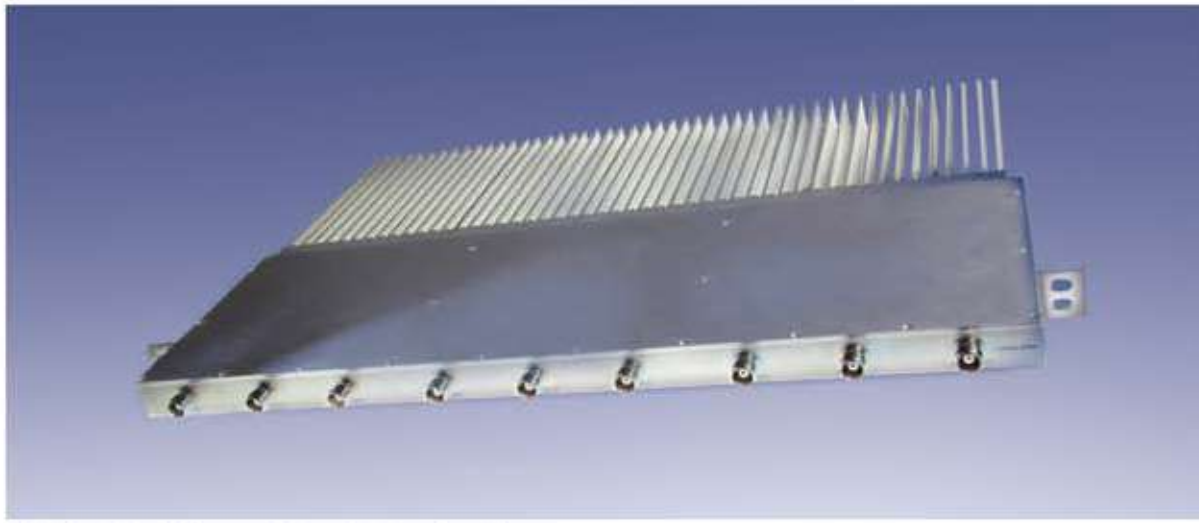
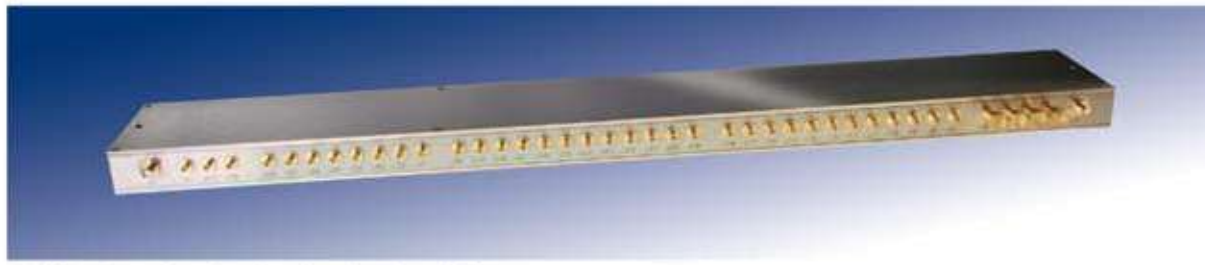
Products Designed & Manufactured

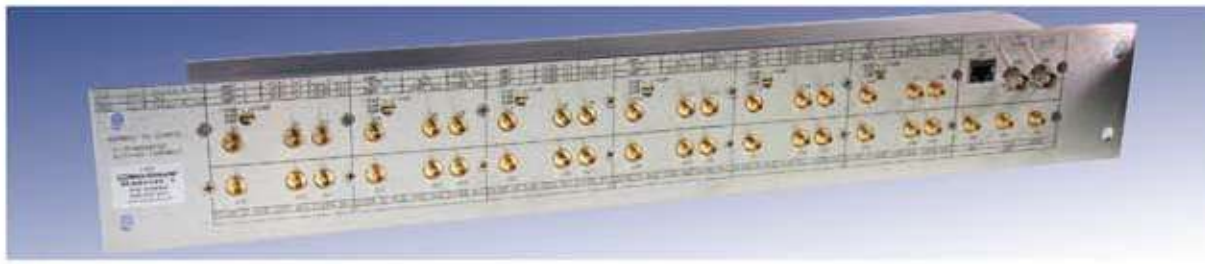


300 Watt Rack Mounted Base Station Combiners
High-power, rack-mounted combiners. Features three, integrated, low-loss, 0.3dB high-power combiners with combined rating of 80 & 100 Watts and a total of 240 & 300 Watts per module. For use in 900MHz & 1900MHz cellular and PCS basestations.



41 Way Base Station Synchronization Splitter
41-way unbalanced splitter for reference signal, 14-16MHZ, basestation synchronization. Features losses between 14dB and 26dB with integrated, low-pass filters that reject 800-2000MHz by 30dB and 40dB isolation between outputs ports.

Emergency Location Signal Monitoring Module
Provides signal monitoring for emergency location services. Designed with six, separate 10dB couplers, one for each sector of the base station with a low loss of 0.8dB, all mounted in 1/2 U rack-mounted case.



Multi-function Base Station Module
Multi-functional module combining 6 manually controlled attenuators, 6 cellular band splitters and a GPS splitter which provide signal conditioning and control for 900 MHz basestations. Attenuators have 4 discrete steps between 3 dB and 20 dB allowing for adjustments of varying cable lengths, while maintaining a VSWR 1.4/1.

OUTPUT
+24V
GND
Mini-Circuits
OUTPUT
+15V
GND
Mini-Circuits
15542
ZN2PD-20
0.0203

COAXIAL

With the proliferation of new wireless products on the market today, the demand for coaxial IF/RF Microwave components for use in design, test, R&D, laboratory, and manufacturing environments is at an all time high! To meet this demand, Mini-Circuits offers the world's widest array of high quality, high performance, highly reliable solutions immediately available off-the-shelf. Our products are built to meet or surpass our customer's stringent requirements for commercial, industrial, and military applications.

STANDARD PRODUCTS

Adapters 24-25
Amplifiers 26-29
Attenuators. 30-34
Bias Tees 35
Cables, Test 36-37
Directional Couplers 38-39
DC Blocks 39
Filters 40-46
Limiters 47
Matching Pads, Impedance 52
Mixers, Frequency 48-50
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Multipliers Frequency 53
Phase Detectors 54
Phase Shifters 54
Power Detectors 55
Power Sensor, USB 69
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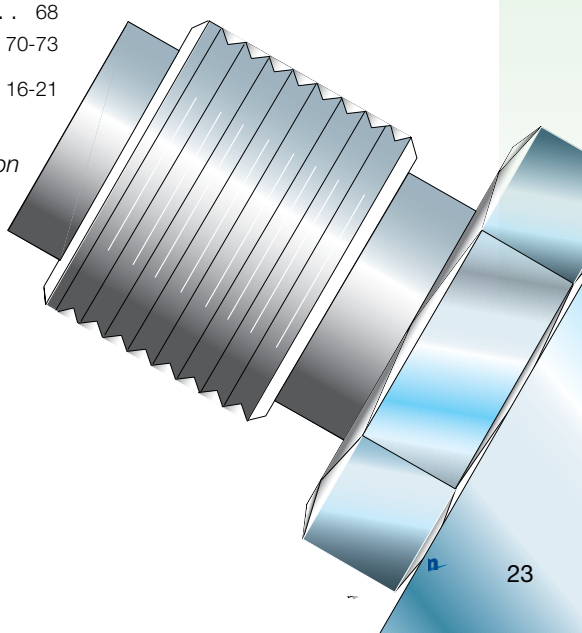
Switches 65-67
Mechanical 65
Semiconductor 66-67
Terminations 68
Transformers 68
Voltage Controlled Oscillators. 70-73

CUSTOM PRODUCTS 16-21

Mini-Circuits designs and manufactures products for specific customer requirements. These products are based on Mini-Circuits extensive technical expertise and cover a wide range of applications, utilizing IF, RF, Microwave and Digital components. These products are designed and manufactured to meet our customer requirements. Examples of the various products are shown on the custom module section. For more details, please contact our applications department apps@minicircuits.com



ADAPTERS 50 Ω

DC to 18 GHz

SMA to SMA

Quick Connect

SF-SF50 Case DJ952 | SM-SM50 Case DJ951 | SF-SM50 Case DJ836 | SF-MQK50 Case DJ836

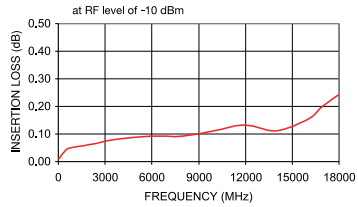
SMA to BNC

SM-BM50 Case DJ1022 | SF-BM50 Case DJ1023 | SM-BF50 Case DJ1024 | SF-BF50 Case DJ1025

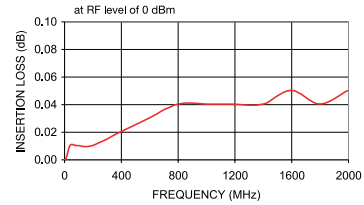
MODEL PREFIX	CONNECTOR TYPE		FREQUENCY RANGE (MHz)	INSERTION LOSS (dB)	VSWR Typ. (:1)
	CONNECTOR 1	CONNECTOR 2	f_L-f_U	Typ.	
SMA/SMA					
SF-SF50	SMA-Female	SMA-Female	DC-18000	0.1	1.10
SM-SM50	SMA-Male	SMA-Male	DC-18000	0.05	1.10
SF-SM50	SMA-Female	SMA-Male	DC-18000	0.1	1.05
Quick Connect					
SF-MQK50	SMA-Female	SMA-Male	DC-18000	0.1	1.10
SMA/BNC					
SM-BM50	SMA-Male	BNC-Male	DC-2000	0.05	1.04
SF-BM50	SMA-Female	BNC-Male	DC-2000	0.05	1.04
SM-BF50	SMA-Male	BNC-Female	DC-2000	0.05	1.04
SF-BF50	SMA-Female	BNC-Female	DC-2000	0.05	1.04

INSERTION LOSS vs. F˝

SMA/SMA
INSERTION LOSS



SMA/BNC
INSERTION LOSS



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Type-N to SMA

NF-SF50
Case DJ827

NF-SM50
Case DJ826

NM-SF50
Case DJ825

NM-SM50
Case DJ824

Type-N to Type-N

NF-NF50
Case DJ1092

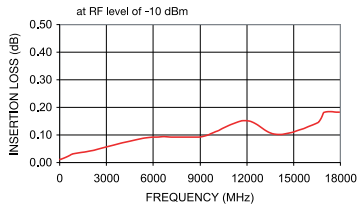
Type-N to BNC

NF-BM50
Case DJ1011

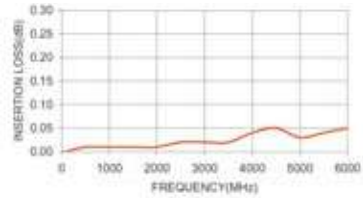
MODEL PREFIX	CONNECTOR TYPE		FREQUENCY RANGE (MHz)	INSERTION LOSS (dB)	VSWR Typ. (:1)
	CONNECTOR 1	CONNECTOR 2	f_L-f_U	Typ.	
TYPE-N/SMA					
NF-SF50	N-Female	SMA-Female	DC-18000	0.1	1.10
NF-SM50	N-Female	SMA-Male	DC-18000	0.1	1.10
NM-SF50	N-Male	SMA-Female	DC-18000	0.1	1.05
NM-SM50	N-Male	SMA-Male	DC-18000	0.15	1.05
TYPE-N/TYPE-N					
NF-NF50	N-Female	N-Female	DC-6000	0.05	1.05
TYPE-N/BNC					
NF-BM50	N-Female	BNC-Male	DC-2000	0.06	1.15

INSERTION LOSS vs. FREQUENCY

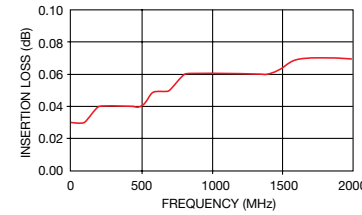
TYPE-N/SMA
INSERTION LOSS



TYPE-N/TYPE-N
INSERTION LOSS



TYPE-N/BNC
INSERTION LOSS



AMPLIFIERS *Broadband, Linear 50 Ω*

50 kHz to 21 GHz

ZX60 Case GC957 | ZEL Case EEE132 | ZJL Case BW459 | ZFL Case Y39/Y460 | ZKL Case BY493 | ZX60 Case GA955 | ZQL Case CW686 | ZRL Case FJ893 | ZQLSC Case GZ1067

MODEL PREFIX	FREQUENCY (MHz) f_L-f_U	GAIN, (dB) Min.	GAIN, (dB) Flatness Max.	MAXIMUM POWER (dBm) Typ. Output (1 dB Comp.) Total Range	MAXIMUM POWER (dBm) Typ. Input (no damage)	NOISE FIGURE (dB) Typ.	IP3 (dBm) Typ.	VSWR Typ. (:1) In	VSWR Typ. (:1) Out	ACTIVE DIRECTIVITY (dB) Typ. Midband	DC OPERATING POWER VOLT (V) Nom.	DC OPERATING POWER CURRENT (mA) Max.
ULTRA LOW NOISE *up to +20 dBm output NF 0.55 dB to 1 dB*												
ZX60-0916LN	824-960	16.5	±1.2	16.5	+10	0.55	+30.0	1.2	1.4	6.5	5.0	45
ZX60-242LN	1710-2400	10.0	±2.5	16.5	+10	0.75	+33.5	1.2	1.6	8	5.0	46
ZX60-242GLN	1710-2400	26.0	±1.2	20.0	+17	1.0	+36.0	1.4	1.6	12	5.0	150
ZX60-272LN	2300-2700	11.5	±1.5	18.0	+17	0.90	+32.0	1.3	1.3	7	5.0	70
ZX60-362LN	3300-3600	9.0	±1.0	10.5	0	0.90	+22.0	1.4	1.4	8	5.0	30
ZX60-362GLN	3300-3600	18.0	±0.6	16.0	+15	0.90	+29.0	1.2	1.4	22	5.0	140
LOW NOISE *up to +26 dBm output NF 0.4 dB to 2.0 dB*												
ZRL-700	250-700	27.0	±1.0	+24.8	+10	2.0	+46.0	1.20	1.10	16	12	575
ZQL-900LN	824-849	15.0	±0.5	+21.0	+10	0.9	+35.0	1.2	1.1	7	15	160
ZQL-900MLN	824-849	25.5	±0.5	+24.5	+3	1.2	+41.0	1.3	1.4	22	15	230
ZQL-900LNW	800-900	13.0	±1.6	+21.0	+10	0.9	+35.0	1.2	1.1	7	15	160
ZQL-900MLNW	800-900	22.0	±2.2	+23.0	+3	1.2	+41.0	1.3	1.4	24	15	230
ZQLSC-1100	600-1100	15.0	±2.5	+19.0	+10	0.6	+35.0	1.5	1.5	11	24	185
ZEL-0812LN	800-1200	20.0	±1.0	+8.0	+13	1.3	+18.0	1.8	1.6	11	15	70
ZHL-0812HLN	800-1200	30.0	±1.0	+26.0	+10	1.2	+36.0	1.8	1.6	27	15	725
ZHL-0812MLN	800-1200	28.0	±1.0	+20.0	0	1.4	+33.0	1.4	1.7	35	15	300
ZRL-1200	650-1200	25.0	±1.0	+24.3	+10	2.0	+46.0	1.2	1.2	17	12	575
ZRL-1150LN	650-1400	25.0	—	+24.0	+10	0.8	+40.0	1.2	1.2	17	12	500
ZX60-1215LN	800-1400	11.0	±3.0	+12.5	+13	0.4	+26.7	1.65	1.4	13	12	50
ZX60-1614LN	1217-1620	11.0	±2.0	+13.5	+13	0.5	+30.0	1.3	1.3	11.7	12	50
ZEL-1217LN	1200-1700	20.0	±1.0	+8.0	+13	1.5	+25.0	2.0	1.4	11	15	70
ZHL-1217HLN	1200-1700	30.0	±1.0	+26.0	+10	1.2	+36.0	1.8	1.4	20	15	725
ZHL-1217MLN	1200-1700	30.0	±1.0	+20.0	0	1.5	+34.0	1.8	1.4	34	15	300
ZQL-1900LN	1850-1910	15.0	±0.5	+19.0	+10	1.3	+37.0	1.15	1.25	10	15	160
ZQL-1900MLN	1850-1910	25	±0.7	+26.0	+3	1.15	+41.0	1.25	1.2	19	15	310
ZQL-1900LNW	1700-2000	14.0	±1.8	+18.5	+10	0.8	+37.0	1.15	1.25	10	15	160
ZQL-1900MLNW	1800-2000	23.0	±2.0	+25.0	+3	1.2	+41.0	1.4	1.25	17	15	310
ZRL-2150	950-2150	22.5	±1.8	+22.0	+10	1.5	+33.0	1.3	1.2	26	12	300
ZEL-1724LN	1700-2400	20.0	±1.0	+8.0	+13	1.5	+22.0	1.6	1.6	12	15	70
ZHL-1724HLN	1700-2400	30.0	±1.0	+26.0	+10	1.2	+36.0	1.6	1.6	17	15	725
ZHL-1724MLN	1700-2400	28.0	±1.0	+20.0	0	1.1	+32.0	1.6	1.6	32	15	300
ZQLSC-2400	1400-2400	10.5	—	+20.0	+10	1.1	+36.0	1.5	1.6	9	24	185
ZRL-2400LN	1000-2400	23.0	±4.0	+23.0	+10	1.0	+44.0	1.5	1.35	15	12	500
ZQL-2700MLNW	2200-2700	25.0	±3.0	+25.0	+3	1.0	+38.0	1.25	1.15	31	15	325
ZX60-33LN	50-3000	13.0	—	+17.0	+13	1.1	+32.0	2.0	1.6	10	5.0	80
ZX60-3011	400-3000	7.5	—	+19.5	+15	1.6	+31.0	1.7	1.6	11	12	120
ZX60-3800LN	3300-3800	19.0	±1.0	+18.0	+1	0.9	+36.0	1.35	1.35	17	5.0	110
LOW POWER *up to +12 dBm output*												
ZFL-500	0.05-500	20.0	±1.0	+9.0	+5	5.3	+18.0	1.9	1.9	16	15	80
ZFL-500LN	0.1-500	24.0	±0.5	+5.0	+5	2.9	+14.0	1.5	1.6	25	15	60
ZFL-750	0.2-750	18.0	±0.5	+9.0	+5	6.0	+18.0	1.5	2.0	22	15	90
ZFL-1000	0.1-1000	17.0	±0.7	+9.0	+5	6.0	+18.0	1.5	2.1	23	15	105
ZFL-1000LN	0.1-1000	20.0	±0.5	+3.0	+5	2.9	+14.0	1.5	2.0	23	15	60
ZFL-2AD	2-1000	9.0	±0.5	-3.5	+10	6.5	+14.0	2.0	2.0	21	15	22
ZFL-11AD	2-2000	8.0	±1.3	-3.5	+10	6.5	+14.0	2.5	2.0	18	15	22
ZKL-2R5	10-2700	20.0	±0.7	+12.0	+13	5.0	+30.0	1.3	1.4	11	12	120
ZJL-3G	20-3000	14.0	±2.9	+8.0	+13	3.8	+22.0	1.4	1.6	3	12	45
ZJL-4G	20-4000	10.0	±0.6	+12.0	+20	5.5	+30.5	1.4	1.6	6	12	75
ZJL-6G	20-6000	10.0	±1.9	+10.0	+15	4.5	+24.0	1.5	1.4	6	12	50
ZJL-7G	20-7000	7.5	±1.2	+9.0	+15	5.0	+24.0	1.5	1.5	7	12	50
ZX60-8008E	20-8000	8.4	—	+10.8	+15	4.1	+24.0	1.5	1.9	8	12	50
ZX60-14012L	0.3-14000	9.0	±2.0	+11.0	+10	5.5	+20.0	1.3	1.7	5	12	68

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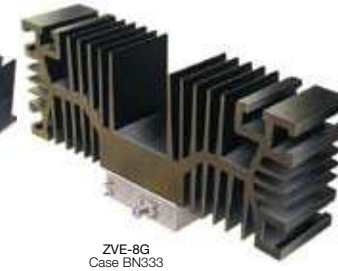
ZFL
Case SS98

ZRON, Case AV243
ZVA, Case AV1280

ZHL
Case S32

ZHL-HLN, ZHL-1042J
Case NN92

ZHL-42
Case U36


ZVE-8G
Case BN333

MODEL PREFIX	FREQUENCY (MHz) f_L-f_U	GAIN, (dB) Min.	Flatness Max.	MAXIMUM POWER (dBm) Typ. Output (1 dB Comp.) Total Range	Input (no damage)	NOISE FIGURE (dB) Typ.	IP3 (dBm) Typ.	VSWR Typ. (:1) In	Out	ACTIVE DIRECTIVITY (dB) Typ. Midband	DC OPERATING POWER VOLT (V) Nom.	CURRENT (mA) Max.
MEDIUM POWER *up to +21 dBm output*												
ZFL-1HAD	10-500	10.0	±1.0	+20.0	+17	7.5	+30.0	1.3	1.35	33	15	115
ZFL-500HLN	10-500	19.0	±0.4	+16.0	+15	3.8	+30.0	2.0	2.0	15	15	110
ZFL-1000H	10-1000	28.0	±1.0	+20.0	+5	5.0	+33.0	2.0	2.0	15	15	160
ZFL-2HAD	50-1000	11.0	±1.0	+20.0	+15	5.0	+33.0	2.0	2.0	25	15	110
ZKL-1R5	10-1500	36.0	±1.2	+15.0	+13	3.0	+31.0	1.4	1.6	7	12	115
ZFL-2000	10-2000	20.0	±1.5	+16.0	+5	7.0	+25.0	2.0	2.0	12	15	120
ZKL-2	10-2000	29.0	±1.5	+15.0	+13	4.0	+31.0	1.4	1.4	10	12	120
ZKL-2R5	10-2500	26.0	±1.5	+13.0	+13	5.0	+31.0	1.4	1.4	10	12	120
ZFL-2500	500-2500	28.0	±1.5	+15.0	+5	8.0	+27.0	2.5	2.5	32	5	220
ZX60-2510M	500-2500	12.9	—	+16.2	+10	5.4	+28.8	1.5	1.6	20	5	95
ZX60-2514M	500-2500	16.4	—	+17.5	+10	4.8	+30.3	1.5	1.7	17	5	90
ZX60-2522M	500-2500	23.5	—	+19.2	+10	3.0	+30.6	1.5	1.7	17	5	95
ZX60-2531M	500-2500	31.0	—	+18.2	+10	3.5	+28.4	1.3	1.6	25	5	130
ZX60-2534M	500-2500	34.0	—	+18.0	+10	3.1	+30.0	1.3	1.5	20	5	185
ZX60-3018G	20-3000	18.0	—	+12.8	+13	2.7	+25.0	1.3	1.4	4	12	45
ZJL-4HG	20-4000	13.0	±2.4	+15.0	+13	4.5	+30.5	1.5	1.4	5	12	75
ZX60-4016E	20-4000	15.7	—	+17.4	+13	3.9	+30.0	1.25	1.3	4	12	75
ZX60-43	0.5-4000	17.0	—	+17.3	+13	5.4	+33.0	1.2	2.0	8	5	110
ZHL-1042J	10-4200	25.0	±1.5	+20.0	+10	6.0	+30.0	2.5	2.5	26	15	330
ZX60-V83	20-4700	16.8	—	17.0	+20	6.0	+31.0	1.25	1.7	10	5	82
ZJL-5G	20-5000	7.0	±0.55	+15.0	+20	8.5	+32.0	1.6	1.3	8	12	80
ZX60-5916M	1500-5900	17.2	—	+15.7	+10	6.4	+28.3	2.2	1.2	22	5	96
ZX60-V81	20-6000	8.5	—	18.5	+20	8.0	+36.0	1.2	1.25	13	5	115
ZX60-V82	20-6000	13.5	—	20.0	+20	6.8	+35.0	1.3	1.5	11	5	120
ZX60-6013E	20-6000	13.0	—	+13.4	+15	3.3	+28.7	1.4	1.2	6	12	50
ZRON-8G	2000-8000	20.0	±1.5	+20.0	+10	6.0	+30.0	2.0	2.0	43	15	310
MEDIUM HIGH POWER *up to +30 dBm output*												
ZHL-32A	0.05-130	25.0	±1.0	+29.0	+10	10.0	+38.0	2.0	2.0	13	24	600
ZHL-3A	0.4-150	24.0	±1.0	+29.5	+10	11.0	+38.0	2.0	2.0	12	24	600
ZRL-400	150-400	27.0	±1.0	+25.0	+10	2.5	+42.0	1.25	1.35	19	12	575
ZHL-6A	.0025-500	21.0	±1.2	+22.0	+10	9.5	+34.0	1.8	2.0	30	24	350
ZHL-1A	2-500	16.0	±1.0	+28.0	+20	11.0	+38.0	2.0	2.0	14	24	600
ZHL-211	800-950	20.0	±0.4	+29.0	+15	8.0	+38.0	1.8	1.8	24	24	600
ZFL-1000VH	10-1000	20.0	±1.0	+25.0	+15	4.5	+38.0	2.0	2.5	17	15	320
ZFL-1000VH2	10-1000	26.0	±1.0	+25.0	+15	5.0	+38.0	2.0	2.5	17	15	320
ZHL-2	10-1000	16.0	±1.0	+29.0	+15	9.0	+38.0	2.0	2.0	27	24	600
ZHL-2-8	10-1000	27.0	±1.0	+29.0	+5	10.0	+38.0	2.0	2.0	31	24	600
ZHL-1010	50-1000	9.5	±0.6	+26.0	+22	3.5	+46.0	2.0	2.0	7	12	525
ZHL-1010-75	50-1000	9.5	±0.7	+26.0	+20	3.5	+47.0	1.5	1.5	6	12	525
ZHL-2010	50-1000	20.0	±0.8	+26.0	+11	3.7	+46.0	2.0	2.0	11	12	900
ZHL-3010	50-1000	30.0	±1.0	+26.0	-3	5.5	+46.0	2.5	2.0	16	12	1000
ZHL-2-12	10-1200	24.0	±1.0	+29.0	+10	4.0	+38.0	2.0	2.0	25	24	750
ZRL-2300	1400-2300	21.0	±1.0	+24.6	+10	2.5	+42.0	1.2	1.16	21	12	575
ZX60-2411BM	800-2400	9.0	±2.2	+24.0	+14	3.5	+46.5	1.2	1.2	9	5	360
ZFL-2500VH	10-2500	20.0	±1.5	+23.0	+10	5.5	+35.0	1.7	2.0	15	15	300
ZRL-3500	700-3500	11.0	—	+24.0	+10	2.4	+45.0	1.40	1.30	22	12	575
ZHL-42W	0-4200	30.0	±1.5	+28.0	0	8.0	+38.0	2.5	2.5	26	15	880
ZHL-4240W	10-4200	40.0	±1.5	+28.0	-5	8.0	+38.0	2.5	2.5	19	15	900
ZHL-42	700-4200	30.0	±1.0	+28.0	+5	10.0	+38.0	2.5	2.5	31	15	880
ZHL-4240	700-4200	40.0	±1.5	+28.0	-5	8.0	+38.0	2.5	2.5	18	15	900
ZVE-8G	2000-8000	30.0	±2.0	+30.0	+20	4.0	+40.0	2.0	2.0	17	12	1200
ZVA-183	700-18000	24.0	±1.0	+24.0	+4	3.0	+33.0	1.35	1.25	50	12	400
ZVA-213	800-21000	20.0	±1.0	+24.0	+4	3.0	+33.0	1.35	1.25	50	12	400

AMPLIFIERS *Broadband, Linear 50 Ω*

2.5 kHz to 8 GHz

(WITHOUT HEATSINK)

ZHL-03-SWFX
ZHL-1-2WX
ZHL-1000-3WX
ZHL-30W-252
Case BT1344

LZY-1X Case BT1312
LZY-2X Case BT451
ZHL-10W-2GX Case BT1204
ZHL-50W-52X Case BT1165
ZHL-100W-52X Case BT1165

LZY-1 Case BT1312
LZY-2 Case BT451
ZHL-10W-2G Case BT1204
ZHL-50W-52 Case BT1165
ZHL-100W-52 Case BT1165
ZHL-30W-252 Case BT1344

ZFL
Case Y39

TIA-1000-1R8
Case AP175

TIA-1000-4
Case AP176

MODEL PREFIX	FREQUENCY (MHz) f_L-f_U	GAIN, (dB) Min.	Flatness Max.	MAXIMUM POWER (dBm) Output (1 dB Comp.) Min.	Input (no damage)	NOISE FIGURE (dB) Typ.	IP3 (dBm) Typ.	VSWR Typ. (:1) In	Out	ACTIVE DIRECTIVITY (dB) Typ. Midband	DC OPERATING POWER VOLT (V) Nom.	CURRENT (mA) Max.
HIGH POWER *above +30 dBm output NF from 3.0 dB*												
ZHL-03-5WF	60-300	30.0	±1.0	+36.0	+10	3.0	+49.0	1.4	1.5	29	24	2800
ZHL-03-5WFX	60-300	30.0	±1.0	+36.0	+10	3.0	+49.0	1.4	1.5	29	24	2800
ZHL-5W-1	5-500	40.0	±1.7	+37.0	0	4.0	+49.0	2.0	2.5	16	24	3300
ZHL-1-2W	5-500	29.0	±1.0	+33.0	+10	12.0	+44.0	2.0	2.0	20	24	900
ZHL-1-2WX	5-500	29.0	±1.0	+33.0	+10	12.0	+44.0	2.0	2.0	20	24	900
ZHL-50W-52	50-500	46.0	±2.8	+43.0	+2	6.0	+55.0	1.6	2.0	24	24	9300
ZHL-50W-52X	50-500	46.0	±2.8	+43.0	+2	6.0	+55.0	1.6	2.0	24	24	9000
ZHL-100W-52	50-500	47.0	±1.8	+45.0	+3	6.5	+57.0	1.45	2.5	28	24	10500
ZHL-100W-52X	50-500	47.0	±1.8	+45.0	+3	6.5	+57.0	1.45	2.5	28	24	10200
LZY-1	20-512	39.0	±1.5	+44.0	+10	8.6	+54.0	2.0	—	20	26	7300
LZY-1X	20-512	39.0	±1.5	+44.0	+10	8.6	+54.0	2.0	—	20	26	7300
ZHL-900A-10W	480-900	24.0	±1.0	+39.0	+25	10.0	+50.0	1.3	1.3	35	24	3500
ZHL-20W-13	20-1000	46.0	±1.8	+39.0	0	3.5	+50.0	1.7	2.5	20-30	24	2800
ZHL-20W-13X	20-1000	46.0	±1.8	+39.0	0	3.5	+50.0	1.7	2.5	5-19	24	2800
LZY-2	500-1000	40.0	±1.5	+43.0	+10	8.0	+54.0	2.0	3.5	6	26	8000
LZY-2X	500-1000	40.0	±1.5	+43.0	+10	8.0	+54.0	2.0	3.5	6	26	8000
ZHL-1000-3W	500-1000	38.0	±1.5	+35.0	0	3.5	+45.0	2.0	2.5	36	24	2250
ZHL-1000-3WX	500-1000	38.0	±1.5	+35.0	0	3.5	+45.0	2.0	2.5	36	24	2250
ZHL-5W-2G	800-2000	40.0	±2.1	+36.0	+1	8.0	+44.0	1.7	1.5	40	24	2000
ZHL-5W-2GX	800-2000	40.0	±2.1	+36.0	+1	8.0	+44.0	1.7	1.5	40	24	2000
ZHL-10W-2G	800-2000	40.0	±2.0	+39.0	+1	7.0	+50.0	1.3	1.3	40	24	5000
ZHL-10W-2GX	800-2000	40.0	±2.0	+39.0	+1	7.0	+50.0	1.3	1.3	40	24	5000
ZHL-30W-252	700-2500	45.0	±2.0	+43.0	0	5.5	+52.0	1.3	1.2	30	28	6300
ZHL-30W-252X	700-2500	45.0	±2.0	+43.0	0	5.5	+52.0	1.3	1.2	30	28	6300
ZVE-3W-83	2000-8000	30.0	±2.0	+33.0	+20	5.8	+42.0	1.5	1.4	45	15	1500
ZVE-3W-83X	2000-8000	30.0	±2.0	+33.0	+20	5.8	+42.0	1.5	1.4	45	15	1500
VARIABLE GAIN *up to +13 dBm output NF from 12 dB, Control Range 30 dB*												
ZFL-1000G	10-1000	17.0	±1.5	+3.0	+10	12.0	+13.0	2.0	2.0	30	15	100
ZFL-1000GH	10-1200	24.0	±1.5	+13.0	+10	15.0	+25.0	2.2	2.0	24	15	170

MODEL PREFIX	FREQUENCY (MHz) f_L-f_U	GAIN, (dB) Min.	Flatness Max.	MAXIMUM POWER (dBm) Output (1 dB Comp.) Min.	Input (no damage)	NOISE FIGURE (dB) Typ.	IP3 (dBm) Typ.	VSWR Typ. (:1) In	Out	ACTIVE DIRECTIVITY (dB) Typ. Midband	AC OPERATING POWER (50/60 Hz) VOLT (V)	CURRENT (mA) Max.
RF INSTRUMENT												
TIA-1000-1R8	0.50-1000	35.0	±2.0	+32.0	+7	8.0	+45.0	1.9	2.5	44	110	1300
TIA-1000-1R8-2	0.50-1000	35.0	±2.0	+32.0	+7	8.0	+45.0	1.9	2.5	44	220	650
TIA-1000-4	100-1000	19.0	±1.5	+36.0	+25	12.0	+48.0	2.5	2.5	38	110	3700
TIA-1000-4-2	100-1000	19.0	±1.5	+36.0	+25	12.0	+48.0	2.5	2.5	38	220	1850

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ZHL-03-5WF
Case CP641

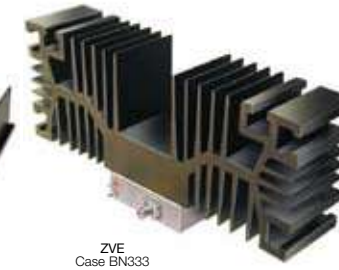
ZHL-1-2W
Case T35

ZHL-5W-1
ZHL-1000-3W
ZHL-5W-2G
Case DDD131

ZHL-900-10W Case DDD338

ZHL-5W-2GX
Case DDD131 (no heatsink)

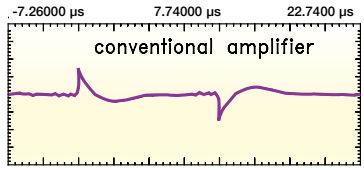
ZPUL
Case S32



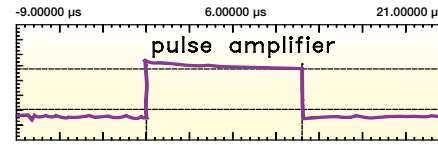
ZVE
Case BN333

MODEL PREFIX	FREQUENCY (MHz) f_L-f_U	GAIN, (dB) Min.	Flatness Max.	RISE/ FALL TIME (ns) Max.	PULSE WIDTH (µs) Max.	MAXIMUM POWER (dBm) Typ. Output (1 dB Comp.)	Input (no damage)	NOISE FIGURE (dB) Typ.	IP3 (dBm) Typ.	VSWR Typ. (:1) In	Out	ACTIVE DIRECTIVITY (dB) Typ. Midband	DC OPERATING POWER VOLT (V) Nom.	CURRENT (mA) Max.
PULSE AMPLIFIERS *Inverting and Non-Inverting +22 dBm output NF from 7.2 dB*														
ZPUL-21	0.0025-700	21	±1.0	1.5	6	22.0	+10	7.3	+34.0	2.0	2.0	27	24	350
ZPUL-30P	0.0025-700	29	±1.0	1.5	6	22.0	+10	7.2	+34.0	2.0	2.0	37	24	400

TYPICAL AMPLIFIER RESPONSE TO PULSE INPUT



Ch.1=500.0 mvolts/div
Timebase=3.00 µs/div
offset=8.200 volts
Delay=7.74000 µs



Ch.1=500.0 mvolts/div
Timebase=3.00 µs/div
Start=0.00000 µs
Vmarker1-193.0 mvolts
Stop-10.7400 µs
Vmarker2=1.577 volts
offset=1.190 volts
Delay=6.00000 µs
Delta T=10.7400 µs
Delta V=1.384 volts

ADAPTENUATORS *Attenuators, between different series connectors*

DC to 2 GHz 3, 6, 10, 20 dB 50 Ω

SF-BM Case DJ870 | SM-BM Case DJ869 | SF-BF Case DJ872 | SM-BF Case DJ871

MODEL PREFIX	CONNECTOR TYPE		FREQ. RANGE (MHz)	ATTENUATION (dB)							VSWR (:1)						INPUT POWER (W)
					Flatness												
					L		M		U		L		M		U		
	CONNECTOR 1	CONNECTOR 2	f_L-f_U	Nom.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Max.
SMA to BNC Connectors																	
SF-BM-3	SMA-Female	BNC-Male	DC-2000	3±0.3	0.05	0.15	0.10	0.20	0.15	0.25	1.1	1.2	1.1	1.2	1.2	1.25	0.5
SF-BM-6	SMA-Female	BNC-Male	DC-2000	6±0.3	0.05	0.15	0.10	0.20	0.15	0.25	1.1	1.2	1.1	1.2	1.2	1.25	0.5
SF-BM-10	SMA-Female	BNC-Male	DC-2000	10±0.3	0.05	0.15	0.10	0.15	0.10	0.20	1.1	1.2	1.1	1.3	1.2	1.25	0.5
SM-BM-3	SMA-Male	BNC-Male	DC-2000	3±0.3	0.05	0.15	0.10	0.20	0.15	0.25	1.1	1.2	1.1	1.2	1.2	1.25	0.5
SM-BM-6	SMA-Male	BNC-Male	DC-2000	6±0.3	0.05	0.15	0.10	0.20	0.15	0.25	1.1	1.2	1.1	1.2	1.2	1.25	0.5
SM-BM-10	SMA-Male	BNC-Male	DC-2000	10±0.3	0.05	0.10	0.10	0.15	0.10	0.20	1.1	1.2	1.1	1.3	1.2	1.25	0.5
SF-BF-3	SMA-Female	BNC-Female	DC-2000	3±0.3	0.05	0.15	0.10	0.20	0.15	0.25	1.1	1.2	1.1	1.2	1.2	1.25	0.5
SF-BF-6	SMA-Female	BNC-Female	DC-2000	6±0.3	0.05	0.15	0.10	0.20	0.15	0.25	1.1	1.2	1.1	1.2	1.2	1.25	0.5
SF-BF-10	SMA-Female	BNC-Female	DC-2000	10±0.3	0.05	0.10	0.10	0.15	0.10	0.20	1.1	1.2	1.1	1.3	1.2	1.25	0.5
SM-BF-3	SMA-Male	BNC-Female	DC-2000	3±0.3	0.05	0.15	0.10	0.20	0.15	0.25	1.1	1.2	1.1	1.2	1.2	1.25	0.5
SM-BF-6	SMA-Male	BNC-Female	DC-2000	6±0.3	0.05	0.15	0.10	0.20	0.15	0.25	1.1	1.2	1.1	1.2	1.2	1.25	0.5
SM-BF-10	SMA-Male	BNC-Female	DC-2000	10±0.3	0.05	0.15	0.10	0.15	0.10	0.20	1.1	1.2	1.1	1.3	1.2	1.25	0.5

NF-BM Case DJ867 | NM-BM Case DJ865 | NF-BF Case DJ868 | NM-BF Case DJ866 | NM-SF Case DJ1208

TYPE-N to BNC Connectors																	
NF-BM-3	N-Female	BNC-Male	DC-2000	3±0.3	0.05	0.15	0.10	0.25	0.17	0.25	1.1	1.2	1.1	1.2	1.2	1.25	0.5
NF-BM-6	N-Female	BNC-Male	DC-2000	6±0.3	0.05	0.15	0.10	0.20	0.15	0.25	1.1	1.2	1.1	1.2	1.2	1.25	0.5
NF-BM-10	N-Female	BNC-Male	DC-2000	10±0.3	0.05	0.15	0.10	0.25	0.15	0.30	1.1	1.2	1.1	1.3	1.2	1.25	0.5
NM-BM-3	N-Male	BNC-Male	DC-2000	3±0.3	0.10	0.20	0.20	0.25	0.20	0.30	1.1	1.2	1.1	1.2	1.2	1.30	0.5
NM-BM-6	N-Male	BNC-Male	DC-2000	6±0.3	0.05	0.15	0.15	0.25	0.20	0.25	1.1	1.2	1.1	1.2	1.2	1.25	0.5
NM-BM-10	N-Male	BNC-Male	DC-2000	10±0.3	0.05	0.15	0.15	0.25	0.20	0.25	1.1	1.2	1.1	1.3	1.2	1.25	0.5
NF-BF-3	N-Female	BNC-Female	DC-2000	3±0.3	0.05	0.15	0.10	0.20	0.15	0.25	1.1	1.2	1.1	1.2	1.2	1.25	0.5
NF-BF-6	N-Female	BNC-Female	DC-2000	6±0.3	0.05	0.15	0.10	0.20	0.15	0.25	1.1	1.2	1.1	1.2	1.2	1.25	0.5
NF-BF-10	N-Female	BNC-Female	DC-2000	10±0.3	0.05	0.15	0.10	0.15	0.10	0.20	1.1	1.2	1.1	1.3	1.2	1.25	0.5
NM-BF-3	N-Male	BNC-Female	DC-2000	3±0.3	0.05	0.15	0.10	0.20	0.15	0.25	1.1	1.2	1.1	1.2	1.2	1.25	0.5
NM-BF-6	N-Male	BNC-Female	DC-2000	6±0.3	0.05	0.15	0.10	0.20	0.15	0.25	1.1	1.2	1.1	1.2	1.2	1.25	0.5
NM-BF-10	N-Male	BNC-Female	DC-2000	10±0.3	0.05	0.15	0.15	0.25	0.20	0.30	1.1	1.2	1.1	1.2	1.2	1.25	0.5
TYPE-N to SMA Connectors																	
NM-SF-20	N-Male	SMA-Female	DC-3000	20±0.3	0.05	0.15	0.10	0.30	0.60	1.0	1.01	1.20	1.04	1.20	1.09	1.25	0.5

L = low range (DC to 500 MHz) M = mid range (DC to 1000 MHz) U = upper range (DC to f_U MHz)

What is an Adaptenuator? *Our new line of Adaptenuators is simply an attenuator with different connector types at the input and output. The benefits of using Mini-Circuits Adaptenuators are, improved interface matching and eliminating the hassle of working with, misplacing and stocking all different types of adapters to fit your attenuators. Based on the* ***attenuation*** *value you require you can now order the attenuator you need with the* ***connectors*** *you need. These are the new Adaptenuators from Mini-Circuits, designed with an ultra wideband frequency response, usable to 4 GHz with a super flat frequency response. Durably built with solid unibody construction.*

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ATTENUATORS, ELECTRONIC 50 Ω

3.5 dB to 40 dB

ZX73-M
Case GD1163

ZX73
Case GD958

ZFAT
Case SSS173

ZSAT
Case AR214

ZX76
Case HK1149, HK1172

MODEL PREFIX	FREQUENCY RANGE (MHz) Min.	Max.	INSERTION LOSS (dB) @ 15 V control voltage Typ.	Max.	ATTENUATION (dB) @ 0 V control voltage Typ.	Min.	IP3 (dBm) Typ.	RETURN LOSS (dB) Typ.	POWER SUPPLY Voltage (V)	Current (mA) Max.	CONTROL Voltage (V)	Current (mA) Max.
VOLTAGE VARIABLE *10 MHz to 2500 MHz*												
ZX73-2500M	10	2500	3.3	6.2	40	25	+43	20	+3 to +5	5	0-17	30
ZX73-2500	10	2500	3.3	6.2	40	25	+43	20	+3 to +5	5	0-17	30

MODEL PREFIX	FREQUENCY (MHz) f_L	f_U	PRIMARY ATTENUATION STEPS (dB) @TTL CONTROL PORT #1	#2	#3	ATTENUATION (dB) Typ. Attenuation Above insertion loss at (1,1,1) state	Max. Insertion loss at (0,0,0) state	VSWR (:1) Max. L	M	U
DIGITAL STEP *PIN DIODE 10 MHZ TO 1000 MHz*										
ZFAT-R512	10	1000	0.5±0.18	1±0.25	2±0.25	3.5	4.0	1.6	1.4	1.5
ZFAT-124	10	1000	1±0.25	2±0.25	4±0.3	7.0	4.0	1.6	1.4	1.5
ZFAT-3610	10	1000	3±0.3	6±0.4	10±0.4	19.0	4.0	1.6	1.4	1.5
ZFAT-4816	10	1000	4±0.4	8±0.4	16±0.5	28.0	4.0	1.6	1.4	1.5
ZFAT-51020	10	1000	5±0.4	10±0.4	20±0.5	35.0	4.0	1.6	1.4	1.5
			SIX CONTROL PORTS			LOGIC STATE (1,1,1,1,1,1)	(0,0,0,0,0,0)			
ZSAT-31R5	10	1000	(1) 0.5±0.18 (4) 4±0.3	(2) 1±0.25 (5) 8±0.4	(3) 2±0.25 (6)16±0.5	31.5	7.0	2.0	1.5	1.6

L = low range (10 to 100 MHz) M = mid range (100 to 500 MHz) U = upper range (500 to 1000 MHz)

MODEL PREFIX	FREQUENCY RANGE (MHz)	TOTAL STEP ATTENUATION (dB) Typ.	LOWEST ATTENUATION STEP (dB) Typ.	INPUT IP3 (dBm) Typ.	SINGLE POWER SUPPLY Typ. (V_{DD})	DUAL POWER SUPPLY Typ. (V_{DD}, V_{SS})	SWITCHING SPEED (µSec.) Typ.	INPUT PWR. @ 0.2 dB COMPRESSION Typ. dBm	CONTROL INTERFACE	No. OF BITS
DIGITAL STEP *CMOS DC-2400 MHz*										
ZX76-31R5-PN	DC-2400	31.5	0.5	+52	—	+3 V, -3 V	1.0	+24	Parallel	6
ZX76-31R5-PP	DC-2400	31.5	0.5	+52	+3 V	— —	1.0	+24	Parallel	6
ZX76-31R5-SN	DC-2400	31.5	0.5	+52	—	+3 V, -3 V	1.0	+24	Serial	6
ZX76-31R5-SP	DC-2400	31.5	0.5	+52	+3 V	— —	1.0	+24	Serial	6
ZX76-31-PN	DC-2400	31.0	1.0	+52	—	+3 V, -3 V	1.0	+24	Parallel	5
ZX76-31-PP	DC-2400	31.0	1.0	+52	+3 V	— —	1.0	+24	Parallel	5
ZX76-31-SN	DC-2400	31.0	1.0	+52	—	+3 V, -3 V	1.0	+24	Serial	5
ZX76-31-SP	DC-2400	31.0	1.0	+52	+3 V	— —	1.0	+24	Serial	5
ZX76-15R5-PN	DC-4000	15.5	0.5	+52	—	+3 V, -3 V	1.0	+24	Parallel	5
ZX76-15R5-PP	DC-4000	15.5	0.5	+52	+3 V	— —	1.0	+24	Parallel	5
ZX76-15R5-SN	DC-4000	15.5	0.5	+52	—	+3 V, -3 V	1.0	+24	Serial	5
ZX76-15R5-SP	DC-4000	15.5	0.5	+52	+3 V	— —	1.0	+24	Serial	5

ATTENUATORS, FIXED General Response / DC Passing

DC to 6 GHz, 1 dB to 30 dB

VAT Case FF704
SMA

VAT Case DC1066
SMA (2W)

UNAT Case FF779
Type N

MODEL PREFIX	FREQ. RANGE (MHz) f_L-f_U	ATTENUATION (dB) Nom.	FLATNESS L Typ.	FLATNESS M Typ.	FLATNESS U Typ.	Total Band Typ.	VSWR (:1) TYP. L Typ.	VSWR (:1) TYP. M Typ.	VSWR (:1) TYP. U Typ.	INPUT POWER (W) Max.
SMA (VAT) 0.5 W 1 W 50 Ω										
VAT-1	DC-6000	1±0.3	0.20	0.20	0.20	0.60	1.05	1.10	1.40	1.0
VAT-2	DC-6000	2±0.3	0.20	0.20	0.25	0.65	1.05	1.20	1.50	1.0
VAT-3	DC-6000	3±0.3	0.20	0.15	0.15	0.45	1.05	1.15	1.40	1.0
VAT-4	DC-6000	4±0.3	0.20	0.15	0.20	0.55	1.05	1.15	1.45	1.0
VAT-5	DC-6000	5±0.3	0.10	0.10	0.10	0.25	1.05	1.15	1.40	1.0
VAT-6	DC-6000	6±0.3	0.15	0.10	0.20	0.45	1.05	1.15	1.50	1.0
VAT-7	DC-6000	7±0.3	0.10	0.10	0.10	0.10	1.05	1.15	1.40	1.0
VAT-8	DC-6000	8±0.3	0.10	0.10	0.15	0.20	1.05	1.20	1.60	1.0
VAT-9	DC-6000	9±0.3	0.10	0.10	0.10	0.10	1.05	1.15	1.60	1.0
VAT-10	DC-6000	10±0.3	0.10	0.20	0.15	0.35	1.05	1.20	1.90	1.0
VAT-12	DC-6000	12±0.3	0.10	0.10	0.10	0.30	1.05	1.20	1.65	1.0
VAT-15	DC-6000	15±0.3	0.20	0.30	0.30	0.80	1.05	1.40	1.75	1.0
VAT-20	DC-6000	20±0.3	0.45	0.55	0.35	0.85	1.05	1.20	1.30	0.5
VAT-30	DC-6000	30±0.3	1.10	0.70	0.35	1.30	1.05	1.15	1.25	0.5
SMA (VAT) 2 W 50 Ω										
VAT-1W2	DC-6000	1±0.3	0.20	0.20	0.20	0.60	1.10	1.30	1.55	2.0
VAT-2W2	DC-6000	2±0.3	0.20	0.20	0.25	0.65	1.10	1.30	1.50	2.0
VAT-3W2	DC-6000	3±0.3	0.20	0.15	0.15	0.45	1.05	1.30	1.45	2.0
VAT-4W2	DC-6000	4±0.3	0.20	0.15	0.20	0.55	1.05	1.30	1.50	2.0
VAT-5W2	DC-6000	5±0.3	0.20	0.10	0.15	0.35	1.10	1.40	1.65	2.0
VAT-6W2	DC-6000	6±0.3	0.20	0.10	0.20	0.45	1.10	1.30	1.50	2.0
VAT-7W2	DC-6000	7±0.3	0.25	0.15	0.10	0.45	1.10	1.25	1.40	2.0
VAT-8W2	DC-6000	8±0.3	0.15	0.10	0.15	0.25	1.10	1.25	1.60	2.0
VAT-9W2	DC-6000	9±0.3	0.15	0.10	0.10	0.15	1.10	1.15	1.50	2.0
VAT-10W2	DC-6000	10±0.3	0.10	0.20	0.15	0.35	1.15	1.35	1.60	2.0
VAT-12W2	DC-6000	12±0.3	0.10	0.15	0.10	0.30	1.20	1.50	1.70	2.0
VAT-15W2	DC-6000	15±0.3	0.20	0.30	0.30	0.80	1.30	1.60	1.75	2.0
VAT-20W2	DC-6000	20±0.3	0.50	0.45	0.20	1.05	1.35	1.70	1.95	2.0
VAT-30W2	DC-6000	30±0.3	0.70	0.45	0.20	1.30	1.25	1.45	1.60	2.0

VAT Models: L = low range (DC to 3000 MHz) M = mid range (3000 to 5000 MHz) U = upper range (5000 to 6000 MHz)

TYPE-N (UNAT) 0.5 W 1 W 50 Ω										
UNAT-1	DC-6000	1±0.3	0.20	0.15	0.10	0.45	1.10	1.40	1.0	1.0
UNAT-2	DC-6000	2±0.3	0.20	0.25	0.15	0.50	1.07	1.22	1.50	1.0
UNAT-3	DC-6000	3±0.3	0.20	0.10	0.10	0.35	1.05	1.22	1.50	1.0
UNAT-4	DC-6000	4±0.3	0.15	0.15	0.10	0.40	1.05	1.10	1.50	1.0
UNAT-5	DC-6000	5±0.3	0.15	0.15	0.10	0.35	1.05	1.10	1.50	1.0
UNAT-6	DC-6000	6±0.3	0.15	0.15	0.15	0.40	1.05	1.20	1.50	1.0
UNAT-7	DC-6000	7±0.3	0.10	0.10	0.15	0.20	1.05	1.10	1.50	1.0
UNAT-8	DC-6000	8±0.3	0.10	0.10	0.10	0.10	1.05	1.10	1.50	1.0
UNAT-9	DC-6000	9±0.3	0.15	0.10	0.10	0.15	1.05	1.10	1.50	1.0
UNAT-10	DC-6000	10±0.3	0.10	0.20	0.20	0.40	1.15	1.20	1.50	1.0
UNAT-12	DC-6000	12±0.3	0.15	0.20	0.15	0.35	1.15	1.20	1.80	1.0
UNAT-15	DC-6000	15±0.3	0.20	0.35	0.20	0.60	1.15	1.20	1.70	1.0
UNAT-20	DC-6000	20±0.3	0.45	0.45	0.40	0.75	1.15	1.20	1.30	0.5
UNAT-30	DC-6000	30±0.3	1.20	0.70	0.40	2.30	1.04	1.07	1.10	0.5

UNAT Models: L = low range (DC to 3000 MHz) M = mid range (3000 to 4500 MHz) U = upper range (4500 to 6000 MHz)

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HAT Case FF747
BNC

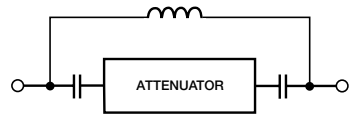
NAT Case FF57
Type N

MODEL PREFIX	FREQ. RANGE (MHz) f_L-f_U	ATTENUATION (dB) Nom.	FLATNESS L Typ.	FLATNESS M Typ.	FLATNESS U Typ.	Total Band Typ.	VSWR (:1) TYP. L Typ.	VSWR (:1) TYP. M Typ.	VSWR (:1) TYP. U Typ.	INPUT POWER (W) Max.
BNC (HAT) 0.5 W 1 W 50 Ω						Max.				
HAT-1	DC-2000	1±0.2	0.05	0.10	0.15	0.25	1.05	1.10	1.10	1.0
HAT-2	DC-2000	2±0.2	0.05	0.10	0.15	0.25	1.05	1.10	1.10	1.0
HAT-3	DC-2000	3±0.2	0.05	0.10	0.15	0.25	1.05	1.10	1.10	1.0
HAT-4	DC-2000	4±0.2	0.05	0.10	0.15	0.25	1.05	1.10	1.10	1.0
HAT-5	DC-2000	5±0.2	0.05	0.10	0.15	0.25	1.05	1.10	1.10	1.0
HAT-6	DC-2000	6±0.2	0.05	0.10	0.15	0.25	1.05	1.10	1.10	1.0
HAT-7	DC-2000	7±0.2	0.05	0.10	0.15	0.25	1.05	1.10	1.10	1.0
HAT-8	DC-2000	8±0.2	0.05	0.10	0.15	0.25	1.05	1.10	1.10	1.0
HAT-9	DC-2000	9±0.2	0.05	0.10	0.15	0.25	1.05	1.10	1.10	1.0
HAT-10	DC-2000	10±0.2	0.05	0.10	0.10	0.25	1.05	1.10	1.10	1.0
HAT-12	DC-2000	12±0.2	0.05	0.10	0.10	0.25	1.05	1.10	1.15	1.0
HAT-15	DC-2000	15±0.2	0.05	0.10	0.20	0.30	1.05	1.10	1.15	1.0
HAT-20	DC-2000	20±0.2	0.05	0.15	0.25	0.40	1.05	1.10	1.15	0.5
HAT-30	DC-2000	30±0.2	0.30	0.60	0.80	1.30	1.05	1.10	1.15	1.0
BNC (HAT) 0.5 W 75 Ω										
HAT-3-75	DC-2000	3±0.2	0.05	0.10	0.15	0.30	1.05	1.15	1.22	0.5
HAT-6-75	DC-2000	6±0.2	0.05	0.10	0.15	0.3	1.03	1.05	1.15	0.5
HAT-10-75	DC-2000	10±0.2	0.05	0.05	0.05	0.15	1.03	1.04	1.10	0.5
HAT-15-75	DC-2000	15±0.2	0.05	0.05	0.05	0.15	1.03	1.04	1.10	0.5
HAT-20-75	DC-2000	20±0.2	0.05	0.05	0.05	0.15	1.03	1.04	1.10	0.5

HAT Models: L = low range (DC to 500 MHz) M = mid range (DC to 1000 MHz) U = upper range (DC to 2000 MHz)

MODEL PREFIX	FREQUENCY (MHz)	ATTENUATION (dB) Nom.	ATTENUATION (dB) Flatness, Max.	VSWR (:1) Max.	POWER (mW) Max.	DC CURRENT (AMPS) Max.	DC BREAKDOWN (Volts) Max.
TYPE-N (NAT) DC Passing 50 Ω							
NAT-3DC	200-2500	3±0.5	±0.8	1.25	500	1	60
NAT-6DC	200-2500	6±0.5	±0.8	1.40	375	1	60
NAT-10DC	200-2500	10±0.3	±1.0	1.60	600	4	125
NAT-20DC	500-2300	20±0.5	±1.2	1.80	400	4	125
NAT-3DC-1A	650-3500	3±0.5	±0.7	1.6	1000	1	50
NAT-3DC-2A	1000-3500	3±0.5	±0.8	1.7	1000	2	50
NAT-3DC-3A	1700-3300	3±0.7	±0.7	1.6	1000	3	50
NAT-6DC-1A	600-4000	6±0.7	±0.8	1.7	1000	1	50
NAT-6DC-2A	1000-3750	6±0.7	±0.8	1.6	1000	2	50
NAT-6DC-3A	1700-3500	6±0.5	±0.8	1.5	1000	3	50
NAT-10DC-1A	600-4000	10±0.6	±0.6	1.6	1000	1	50
NAT-10DC-1.5A	1000-4000	10±0.5	±0.6	1.6	1000	1.5	50
NAT-10DC-2.5A	1700-4000	10±0.5	±0.6	1.6	1000	2.5	50
NAT-15DC-1A	650-4000	15±0.7	±0.8	1.7	1000	1	50
NAT-15DC-1.5A	950-4000	15±0.7	±0.6	1.6	1000	1.5	50
NAT-15DC-2.5A	1700-4000	15±0.8	±0.6	1.5	1000	2.5	50

ELECTRICAL SCHEMATIC DC PASSING



ATTENUATORS, FIXED PRECISION 50 Ω

DC to 18 GHz, 1 to 40 dB

BW-SW2 Case FF658/FF659
SMA, 2 W

BW-S50W2 Case FF1048
SMA, 2 W

BW-SW5 Case DC737
SMA, 5 W

BW-NW5 Case DC736
Type N, 5 W

BW-40N100W Case GH986
Type N, 100 W

MODEL PREFIX	FREQUENCY RANGE (MHz) f_L-f_U	ATTENUATION (dB) Nominal	Accuracy	VSWR (:1) Max. L	M	U
SMA 2 W						
BW-S1W2	DC-18000	1	±0.40	1.20	1.25	1.30
BW-S2W2	DC-18000	2	±0.40	1.20	1.25	1.30
BW-S3W2	DC-18000	3	±0.40	1.20	1.25	1.30
BW-S4W2	DC-18000	4	±0.40	1.20	1.25	1.30
BW-S5W2	DC-18000	5	±0.40	1.20	1.25	1.30
BW-S6W2	DC-18000	6	±0.40	1.20	1.25	1.30
BW-S7W2	DC-18000	7	-0.4, +0.9	1.20	1.25	1.30
BW-S8W2	DC-18000	8	±0.60	1.20	1.25	1.30
BW-S9W2	DC-18000	9	-0.4, +0.8	1.20	1.25	1.30
BW-S10W2	DC-18000	10	±0.60	1.20	1.25	1.30
BW-S12W2	DC-18000	12	±0.60	1.20	1.25	1.30
BW-S15W2	DC-18000	15	±0.60	1.20	1.25	1.30
BW-S20W2	DC-18000	20	-0.5, +0.8	1.20	1.25	1.30
BW-S30W2	DC-18000	30	±0.85	1.20	1.25	1.30
BW-S40W2	DC-18000	40	-1.0, +1.5	1.20	1.25	1.30
BW-S50W2	DC-18000	50	±0.1.5	1.15	1.20	1.25
SMA 5 W						
BW-S1W5	DC-18000	1	±0.40	1.20	1.25	1.30
BW-S2W5	DC-18000	2	±0.40	1.20	1.25	1.30
BW-S3W5	DC-18000	3	±0.40	1.20	1.25	1.30
BW-S4W5	DC-18000	4	±0.40	1.20	1.25	1.30
BW-S5W5	DC-18000	5	±0.40	1.20	1.25	1.30
BW-S6W5	DC-18000	6	±0.40	1.20	1.25	1.30
BW-S7W5	DC-18000	7	-0.4, +0.9	1.20	1.25	1.30
BW-S8W5	DC-18000	8	±0.60	1.20	1.25	1.30
BW-S9W5	DC-18000	9	-0.4, +0.8	1.20	1.25	1.30
BW-S10W5	DC-18000	10	±0.60	1.20	1.25	1.30
BW-S12W5	DC-18000	12	±0.60	1.20	1.25	1.30
BW-S15W5	DC-18000	15	±0.60	1.20	1.25	1.30
BW-S20W5	DC-18000	20	-0.5, +0.8	1.20	1.25	1.30
BW-S30W5	DC-18000	30	±0.85	1.20	1.25	1.30
BW-S40W5	DC-18000	40	-1.0, +7.5	1.20	1.25	1.30
TYPE-N 5 W						
BW-N1W5	DC-18000	1	±0.40	1.20	1.25	1.30
BW-N2W5	DC-18000	2	±0.40	1.20	1.25	1.30
BW-N3W5	DC-18000	3	±0.40	1.20	1.25	1.30
BW-N4W5	DC-18000	4	±0.40	1.20	1.25	1.30
BW-N5W5	DC-18000	5	±0.40	1.20	1.25	1.30
BW-N6W5	DC-18000	6	±0.40	1.20	1.25	1.30
BW-N7W5	DC-18000	7	-0.4, +0.9	1.20	1.25	1.30
BW-N8W5	DC-18000	8	±0.60	1.20	1.25	1.30
BW-N9W5	DC-18000	9	-0.4, +0.8	1.20	1.25	1.30
BW-N10W5	DC-18000	10	±0.60	1.20	1.25	1.30
BW-N12W5	DC-18000	12	±0.60	1.20	1.25	1.30
BW-N15W5	DC-18000	15	±0.60	1.20	1.25	1.30
BW-N20W5	DC-18000	20	-0.5, +0.8	1.20	1.25	1.30
BW-N30W5	DC-18000	30	±0.85	1.20	1.25	1.30
BW-N40W5	DC-18000	40	-1.0, +1.5	1.20	1.25	1.30

L = low range (DC to 4000 MHz) M = mid range (4000 to 8000 MHz) U = upper range (8000 to 12400 MHz)

TYPE-N 100 W

BW-40N100W	DC-4000	40	±1.6	1.15	1.35	1.40

L = low range (DC to 500 MHz) M = mid range (500 to 2000 MHz) U = upper range (2000 to 4000 MHz)

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BIAS-TEE *Wideband, High DC Current 50 Ω*

100 kHz to 12 GHz

ZX85-12G
Case GC957

ZFBT
Case K18

ZFBT-FT
Case Y460

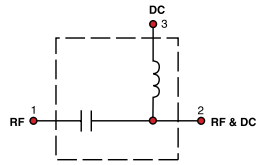
ZNBT
Case K558

MODEL PREFIX	FREQUENCY (MHz) f_L-f_U	INSERTION LOSS (dB) L Typ.	L Max.	M Typ.	M Max.	U Typ.	U Max.	ISOLATION, (dB) (RF port to DC port) (RF & DC port to DC port) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	VSWR (:1) L Typ.	M Typ.	U Typ.	RF POWER OPERATING Max. (dBm)	DC CURRENT OPERATING Max. (mA)
0.1 to 12000 MHz																		
ZFBT-352-FT	300-3500	—	—	0.5	0.9	0.6	1.1	—	—	20	15	25	19	1.12	1.10	1.4	30	400
ZFBT-4R2GW	0.1-4200	0.15	0.8	0.6	1.2	0.6	1.6	25	15	40	20	50	20	1.06	1.13	1.13	20	200
ZFBT-4R2GW-FT	0.1-4200	0.15	0.8	0.6	1.2	0.6	1.6	—	—	—	—	—	—	1.06	1.13	1.13	20	200
ZFBT-4R2G	10-4200	0.15	0.6	0.6	1.2	0.6	1.6	32	20	40	20	50	20	1.06	1.13	1.13	20	200
ZFBT-4R2G-FT	10-4200	0.15	0.6	0.6	1.2	0.6	1.6	—	—	—	—	—	—	1.06	1.13	1.13	20	200
ZFBT-6GW	0.1-6000	0.15	0.8	0.6	1.4	1.0	2.2	25	15	40	20	30	17	1.06	1.13	1.13	20	200
ZFBT-6GW-FT	0.1-6000	0.15	0.8	0.6	1.4	1.0	2.2	—	—	—	—	—	—	1.06	1.13	1.13	20	200
ZNBT-60-1W	2.5-6000	0.2	0.9	0.6	2.0	1.6	2.2	75	45	45	25	35	20	1.1	1.1	1.35	20	200
ZFBT-6G	10-6000	0.15	0.6	0.6	1.4	1.0	2.2	32	20	40	20	30	17	1.06	1.13	1.13	20	200
ZFBT-6G-FT	10-6000	0.15	0.6	0.6	1.4	1.0	2.2	—	—	—	—	—	—	1.06	1.13	1.13	20	200
ZX85-12G	0.2-12000	0.10	0.5	0.6	1.5	1.0	2.5	—	—	—	—	—	—	1.10	1.20	1.20	20	200

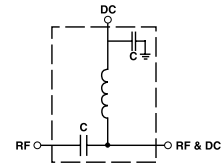
L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)

ELECTRICAL SCHEMATICS

For ZFBT models



For ZX85-12G, ZNBT-60-1W models



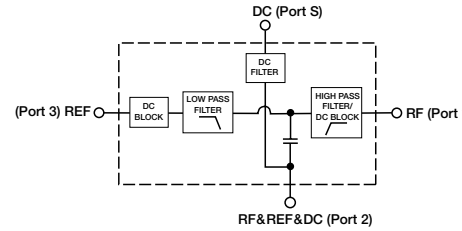
BIAS-TEE/DIPLEXER *Satellite Power Inserter 50 Ω*

10 to 2150 MHz

ZABT
Case CC51

MODEL PREFIX	FREQUENCY (MHz)	INSERTION LOSS (dB) Port 3 to Port 2 10 MHz Typ.	Port 3 to Port 2 10 MHz Max.	Port 1 to Port 2 950-2150 MHz Typ.	Port 1 to Port 2 950-2150 MHz Max.	ISOLATION, (dB) Port 3 to Port 1 10 MHz Typ.	Port 3 to Port 1 10 MHz Min.	Port 1 to Port 3 950-2150 MHz Typ.	Port 1 to Port 3 950-2150 MHz Min.	Port 1 to Port S, Port 2 to Port S, Port 3 to Port S 10 MHz Typ.	10 MHz Min.	950-2150 MHz Typ.	950-2150 MHz Min.	VSWR (:1) Port 2 & Port 3 10 MHz Typ.	Port 2 & Port 3 10 MHz Max.	Port 1 & Port 2 950-2150 MHz Typ.	Port 1 & Port 2 950-2150 MHz Max.
ZABT-2R15G	10-2150	0.5	0.8	0.4	1.5	90	70	65	35	40	27	50	30	1.4	1.8	1.2	1.6

FUNCTIONAL BLOCK DIAGRAM FOR ZABT



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For pricing/availability, complete specifications, data sheets, RoHS compatibility, performance data/curves, pcb layouts, outline drawings & shopping online, see minicircuits.com

CABLES, FLEXIBLE TEST 50 Ω

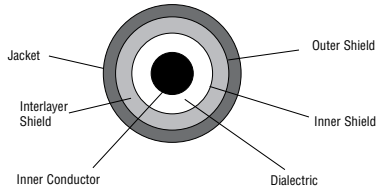
DC to 18 GHz

FLEX TEST™

RUGGED CABLES ***RUGGED QUICK TURN CABLES*** *TIME SAVERS!*

MODEL PREFIX	FREQ. (GHz)	LENGTH		INSERTION LOSS (dB)								RETURN LOSS (dB)							
				DC - 2.5 GHz		2.5 - 6 GHz		6 - 12 GHz		12 - 18 GHz		DC - 2.5 GHz		2.5 - 6 GHz		6 - 12 GHz		12 - 18 GHz	
	f_L-f_U	FT	M	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.
SMA Male to Male																			
CBL-1.5FT-SMSM	DC-18	1.5		0.25	0.6	0.4	0.85	0.7	1.2	1.0	1.4	30	23	30	20	27	17	27	17
CBL-2FT-SMSM	DC-18	2		0.4	0.6	0.7	0.95	1.1	1.35	1.4	1.75	30	23	30	20	27	17	27	17
CBL-3FT-SMSM	DC-18	3		0.6	0.8	1.0	1.3	1.5	1.9	1.9	2.45	30	23	30	20	27	17	27	17
CBL-4FT-SMSM	DC-18	4		0.7	0.9	1.3	1.65	1.95	2.45	2.55	3.15	30	23	30	20	27	17	27	17
CBL-6FT-SMSM	DC-18	6		1.2	1.4	2.0	2.35	3.0	3.5	3.8	4.55	30	23	30	20	27	17	22	17
CBL-10FT-SMSM	DC-18	10		1.8	2.1	3.1	3.8	4.8	5.7	6.1	7.4	30	23	30	20	27	17	22	17
CBL-12FT-SMSM	DC-18	12		2.0	2.45	3.8	4.4	5.9	6.7	7.3	8.7	30	23	30	20	27	17	22	17
CBL-15FT-SMSM	DC-18	15		2.5	2.95	4.7	5.5	7.3	8.35	9.25	10.8	30	23	30	20	27	17	22	17
CBL-5FT-SMSM	DC-18	5		1.0	1.2	1.6	1.93	2.5	2.92	3.4	3.78	30	23	30	20	27	17	22	17
CBL-25FT-SMSM	DC-18	25		4.1	4.8	7.8	9.0	11.7	13.7	15.0	17.8	30	23	30	20	27	17	22	17
CBL-0.5M-SMSM	DC-18		0.5	0.3	0.5	0.6	0.8	0.9	1.2	1.1	1.5	30	23	30	20	27	17	27	17
CBL-1M-SMSM	DC-18		1.0	0.7	0.8	1.1	1.4	1.6	2.1	2.0	2.6	30	23	30	20	27	17	27	17
CBL-1.5M-SMSM	DC-18		1.5	1.0	1.1	1.6	2.0	2.4	2.9	3.1	3.8	30	23	30	20	27	17	22	17
CBL-2M-SMSM	DC-18		2.0	1.1	1.4	2.1	2.5	3.1	3.8	4.0	4.9	30	23	30	20	27	17	22	17
SMA Male to Type-N Male																			
CBL-2FT-SMNM	DC-18	2		0.4	0.6	0.7	0.95	1.1	1.4	1.4	1.75	30	23	30	20	27	17	27	17
CBL-3FT-SMNM	DC-18	3		0.6	0.8	1.0	1.3	1.5	1.95	1.9	2.45	30	23	30	20	27	17	27	17
CBL-4FT-SMNM	DC-18	4		0.7	0.95	1.3	1.65	1.95	2.45	2.55	3.15	30	23	30	20	27	17	27	17
CBL-6FT-SMNM	DC-18	6		1.2	1.4	2.0	2.35	3.0	3.55	3.8	4.55	30	23	30	20	27	17	22	17
CBL-15FT-SMNM	DC-18	15		2.5	2.95	4.94	5.5	7.32	8.35	9.25	10.8	30	23	30	20	27	17	22	17
CBL-0.5M-SMNM	DC-18		0.5	0.4	0.5	0.6	0.8	0.9	1.2	1.2	1.5	30	23	30	20	27	17	27	17
CBL-1M-SMNM	DC-18		1.0	0.6	0.8	1.0	1.4	1.9	2.1	2.2	2.7	30	23	30	20	27	17	27	17
CBL-1.5M-SMNM	DC-18		1.5	0.9	1.1	1.6	2.0	2.5	2.9	3.2	3.8	30	23	30	20	27	17	22	17
CBL-2M-SMNM	DC-18		2.0	1.2	1.4	2.3	2.6	3.5	3.8	4.2	4.9	30	23	30	20	27	17	22	17
Type-N Male to Male																			
CBL-2FT-NMNM	DC-18	2		0.4	0.6	0.7	1.0	1.1	1.4	1.4	1.8	30	23	30	20	27	17	27	17
CBL-3FT-NMNM	DC-18	3		0.6	0.8	1.0	1.35	1.5	1.95	1.9	2.5	30	23	30	20	27	17	27	17
CBL-6FT-NMNM	DC-18	6		1.2	1.4	2.0	2.4	3.0	3.55	3.8	4.6	30	23	30	20	27	17	22	17
CBL-15FT-NMNM	DC-18	15		2.5	2.95	4.9	5.5	7.3	8.35	9.2	10.85	30	23	30	20	27	17	22	17
CBL-20FT-NMNM	DC-18	20		3.3	3.85	6.2	7.25	9.4	11.05	12.0	14.3	30	23	30	20	27	17	22	17
CBL-25FT-NMNM	DC-18	25		4.1	4.8	7.8	9.0	11.7	13.7	15.0	17.8	30	23	30	20	27	17	22	17
CBL-10FT-NMNM	DC-18	10		1.9	2.1	3.2	3.8	4.7	5.7	6.3	7.4	30	23	30	20	27	17	22	17
CBL-0.5M-NMNM	DC-18		0.5	0.3	0.5	0.6	0.9	0.9	1.2	1.2	1.5	30	23	30	20	27	17	27	17
CBL-1M-NMNM	DC-18		1.0	0.7	0.8	1.1	1.4	1.6	2.1	2.3	2.7	30	23	30	20	27	17	22	17
CBL-1.5M-NMNM	DC-18		1.5	1.0	1.1	1.6	2.0	2.4	3.0	3.4	3.8	30	23	30	20	27	17	22	17
CBL-2M-NMNM	DC-18		2.0	1.2	1.4	2.1	2.6	3.3	3.9	4.0	5.0	30	23	30	20	27	17	22	17
SMA Female to Male																			
CBL-3FT-SFSM	DC-18	3		0.6	0.8	1.0	1.3	1.5	1.9	1.9	2.45	30	23	30	20	27	17	27	17
SMA Female to Type-N Male																			
CBL-2FT-SFNM	DC-18	2		0.4	0.6	0.7	1.0	1.1	1.40	1.4	1.8	30	23	30	20	27	17	27	17
CBL-3FT-SFNM	DC-18	3		0.6	0.8	1.0	1.35	1.5	1.95	1.9	2.45	30	23	30	20	27	17	27	17
CBL-6FT-SFNM	DC-18	6		1.1	1.4	2.0	2.35	3.0	3.55	3.8	4.55	30	23	30	20	27	17	22	17
Quick Turn *Type-N Male to* ***Quick Turn*** *SMA Male*																			
CBL3NMQ-SMQ	DC-18	3		0.6	0.8	1.0	1.3	1.5	1.95	1.0	2.45	30	23	30	20	27	17	27	17
Quick Turn *SMA Male to SMA Male*																			
CBL1.5SMQ-SM	DC-18	1.5		0.25	0.6	0.4	0.85	0.7	1.2	1.01	1.4	30	23	30	20	27	17	27	17
CBL2SMQ-SM	DC-18	2		0.4	0.6	0.7	0.95	1.1	1.35	1.4	1.75	30	23	30	20	27	17	27	17
CBL3SMQ-SM	DC-18	3		0.6	0.8	1.0	1.3	1.5	1.9	1.9	2.45	30	23	30	20	27	17	27	17
CBL6SMQ-SM	DC-18	6		1.2	1.4	2.0	2.35	3.0	3.5	3.8	4.55	30	23	30	20	27	17	22	17
CBL10SMQ-SM	DC-18	10		1.8	2.1	3.1	3.8	4.8	5.7	6.1	7.4	30	23	30	20	27	17	27	17
Quick Turn *SMA Male to Type-N Male*																			
CBL2SMQ-NM	DC-18	2		0.4	0.6	0.7	0.95	1.1	1.4	1.4	1.75	30	23	30	20	27	17	27	17
Quick Turn *Type-N Male to Type-N Male*																			
CBL3NMQ-NM	DC-18	3		0.6	0.8	1.0	1.3	1.6	1.9	2.0	2.45	30	23	30	20	27	17	27	17
CBL6NMQ-NM	DC-18	6		1.2	1.4	2.0	2.4	3.0	3.55	3.8	4.6	30	23	30	20	27	17	27	17
Quick Turn *Type-N Male to SMA Male*																			
CBL3NMQ-SM	DC-18	3		0.6	0.8	1.0	1.3	1.5	1.95	1.95	2.45	30	23	30	20	27	17	27	17
CBL6NMQ-SM	DC-18	6		1.2	1.4	2.0	2.35	3.0	3.55	3.8	4.55	30	23	30	20	27	17	27	17

CABLE CROSS SECTION



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CABLES, ARMORED 50 Ω

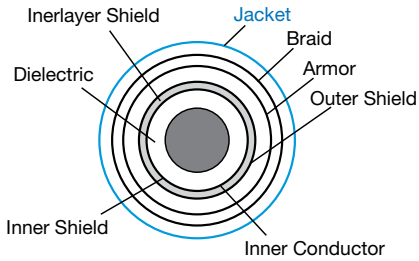
DC to 18 GHz

FLEX TEST™

ARMORED CABLES

MODEL PREFIX	FREQ. (GHz)	LENGTH		INSERTION LOSS (dB)								RETURN LOSS (dB)							
				DC - 2.5 GHz		2.5 - 6 GHz		6 - 12 GHz		12 - 18 GHz		DC - 2.5 GHz		2.5 - 6 GHz		6 - 12 GHz		12 - 18 GHz	
	f_L-f_U	FT	M	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.
TYPE-N Male to Male																			
APC-6FT-NMNM	DC-18	6		1.2	1.4	2.0	2.4	3.0	3.55	3.8	4.6	30	23	30	20	27	17	27	17
APC-10FT-NMNM	DC-18	10		1.9	2.1	3.2	3.8	4.7	5.7	6.3	7.4	30	23	30	20	27	17	27	17
APC-15FT-NMNM	DC-18	15		2.9	3.5	4.8	6.0	7.1	8.6	9.0	12.0	30	23	30	20	27	17	27	17

ARMORED CABLE CROSS SECTION



New! ***Tough Armored Cables*** *are steel triple shielded and qualified to at least 25,000 bends. They're so rugged they can even pass a crush test of a 600lb. nitrogen tank over the cable 1000 times, without any change in electrical performance.*

CABLE CONSTRUCTION

Inner Conductor
Solid Silver-Plated Copper Clad Steel

Dielectric
Solid PTFE

Shield
Silver-Plated Copper Flat Ribbon Braid
Aluminum-Polymide Tape Interlayer 36 GA
Silver-Plated Copper Braid (90%k)

Armor
Stainless Steel

Braid
Stainless Steel with Copper Wire Winding

Jacket
Clear FEP

CONNECTORS

- Passivated stainless steel
- Captive contact
- Thick wall interface (SMA)
- Gold plated beryllium copper center contacts
- PTFE dielectric

DIRECTIONAL COUPLERS *High Power, 6.7 to 40 dB Coupling*

5 kHz to 4.6 GHz

ZX30-BD
Case GW1052

ZX30
Case FL905

ZEDC
Case V37

ZFDC, Z30
Case K18

ZFBDC
ZFDC-20-1H
Case J17

ZFBDC20
Case JD1252

ZNDC
Case FM587

MODEL PREFIX	FREQUENCY (MHz)	COUPLING (dB)		MAINLINE LOSS (dB)						DIRECTIVITY (dB)						VSWR (:1)	POWER INPUT, W	
		Typ.		L		M		U		L		M		U			L	MU
	f_L-f_U	Nom.	Flatness	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Max	Max.
DIRECTIONAL COUPLERS 50 Ω																		
ZADC-6-2G-5W	800-2000	6.7±1.0	±1.3	1.6	1.9	1.6	1.9	1.6	1.9	25	17	25	17	25	17	1.15	5.0	5.0
ZX30-9-4	5-1200	8.9±0.5	±0.1	1.10	1.4	1.1	1.4	1.3	1.8	21	19	20	15	16	12	1.20	0.5	1.0
ZADC-10-17	1000-1700	9.8±0.5	±1.0	0.8	1.3	0.8	1.3	0.8	1.3	25	17	25	17	25	17	1.20	5.0	5.0
ZADC-10-10	800-1000	10±0.6	±1.0	0.8	1.2	0.8	1.2	0.8	1.2	22	17	22	17	22	17	1.16	5.0	5.0
ZADC-10-17W	800-1900	10.2±1.0	±1.5	0.8	1.3	0.8	1.3	0.8	1.3	24	14	24	14	24	14	1.20	5.0	5.0
ZFDC-10-1	1-500	10.5±0.25	±0.6	1.00	1.3	0.8	1.1	1.0	1.3	32	25	33	25	22	15	1.20	1.5	3.0
ZFDC-10-2	10-1000	10.75±0.5	±0.5	1.50	2.0	1.2	1.8	1.5	2.0	35	28	30	25	27	20	1.50	1.5	3.0
ZFDC-10-5	1-2000	10.8±0.5	±0.5	1.20	1.9	1.2	1.8	1.8	2.5	38	25	30	18	22	18	1.30	0.5	0.5
ZFDC-10-6	0.005-20	11±0.5	±0.5	0.40	1.2	0.4	0.8	0.4	1.0	40	30	40	30	35	25	1.30	1.5	3.0
ZFDC-10-22	1-750	11±0.5	±0.5	1.10	1.9	1.2	1.7	1.4	1.9	35	30	25	20	25	20	1.25	1.0	2.0
ZEDC-10-2B	1-1000	11±0.5	±0.75	1.30	1.8	1.5	1.8	1.5	1.8	35	30	30	20	18	13	1.30	1.5	3.0
ZFDC-10-21	1-1000	11±0.5	±0.5	1.20	2.1	1.2	1.7	1.60	2.0	40	30	25	20	25	20	1.20	1.0	2.0
ZDC-10-1	0.5-500	11.5±0.5	±0.6	0.85	1.3	0.6	1.0	0.85	1.3	32	25	32	25	22	15	1.20	1.5	3.0
ZMDC-10-1	0.5-500	11.5±0.5	±0.6	0.85	1.3	0.6	1.0	0.85	1.3	32	25	32	25	22	15	1.20	1.5	3.0
ZX30-12-4	5-1000	12.0±0.5	±0.3	0.70	1.0	0.75	1.0	0.90	1.2	35	28	25	20	20	13	1.15	0.5	1.0
ZX30-13-4	5-1200	13.0±0.5	±0.3	0.60	0.9	0.7	1.1	0.90	1.5	21	18	19	15	15	10	1.15	0.5	1.0
ZNDC-13-2G	800-2000	13.0±0.5	±0.35	0.8	1.3	0.8	1.3	0.8	1.3	20	14	20	14	20	14	1.20	3.0	3.0
ZFDC-15-6	0.03-35	15±0.5	±0.5	0.30	0.6	0.2	0.4	0.30	0.6	38	30	35	25	28	20	1.15	2.0	4.0
ZEDC-15-2B	1-1000	15±0.5	±0.5	0.50	1.4	0.8	1.2	1.00	1.4	35	30	30	20	25	15	1.15	1.5	3.0
ZFDC-15-10	800-1000	15±1.0	±1.0	0.3	0.7	0.3	0.7	0.3	0.7	23	17	23	17	23	17	1.20	5.0	5.0
ZNDC-15-2G	800-2000	15±0.5	±0.3	0.8	1.3	0.8	1.3	0.8	1.3	23	14	23	14	23	14	1.20	3.0	3.0
ZFDC-15-5	1-2000	15.5±0.5	±1.0	1.20	1.8	1.2	1.8	1.30	2.3	30	20	25	20	18	11	1.30	0.5	2.0
ZADC-17-14HP	500-1350	16.4±0.9	±1.3	0.8	1.5	0.8	1.5	0.8	1.5	29	16	29	16	29	16	1.06	10.0	10.0
ZX30-17-5	5-2000	17.5±0.9	±0.4	0.7	1.7	0.7	1.7	0.7	1.7	16	9	16	9	16	9	1.30	0.5	1.0
ZNDC-18-2G	800-2000	18.2±0.5	±0.4	0.5	1.1	0.5	1.1	0.5	1.1	25	14	25	14	25	14	1.20	3.0	3.0
ZDC-20-3	0.2-250	19.5±0.5	±0.5	0.35	0.6	0.2	0.5	0.35	0.6	36	30	33	25	25	20	1.20	1.5	4.0
ZFDC-20-3	0.2-250	19.5±0.5	±0.25	0.35	0.6	0.2	0.5	0.35	0.6	36	25	33	25	25	20	1.20	1.5	4.0
ZMDC-20-3	0.2-250	19.5±0.5	±0.5	0.35	0.6	0.35	0.5	0.35	0.6	36	30	33	25	25	20	1.20	1.5	4.0
ZFDC-20-4	1-1000	19.5±0.5	±0.5	0.40	1.2	0.4	0.8	0.80	1.5	36	28	27	20	23	18	1.10	0.5	2.0
ZFDC-20-5	0.1-2000	19.5±0.5	±0.5	0.30	1.0	0.7	1.4	1.50	2.3	30	20	27	20	22	10	1.20	0.5	2.0
ZFDC-20-50	20-2000	19.5±0.5	±0.8	0.80	1.3	0.7	1.3	1.00	1.6	30	20	25	20	22	10	1.25	1.0	1.0
ZDC-20-1	25-400	20±0.5	±0.5	0.20	0.25	0.3	0.35	0.35	0.5	25	20	35	25	25	20	1.25	3.0	5.0
ZNDC-20-2G	800-2000	20±0.5	±0.5	0.5	1.1	0.5	1.1	0.5	1.1	25	14	25	14	25	14	1.15	3.0	3.0
ZADC-20-10	800-1000	20±0.6	±1.2	0.4	0.7	0.4	0.7	0.4	0.7	21	17	21	17	21	17	1.18	5.0	5.0
ZADC-20-50DC	800-1600	20±1.0	±1.1	0.8	1.0	0.8	1.0	0.8	1.0	20	11	20	11	20	11	1.20	5.0	5.0
ZFDC-20-4L	10-1000	20.2±0.5	±0.5	0.20	0.5	0.3	0.7	0.70	1.2	40	20	30	16	20	14	1.10	1.0	1.0
ZX30-20-4	5-1000	20.5±0.6	±0.5	0.30	0.5	0.3	0.6	0.60	0.9	21	19	22	19	19	11	1.11	1.0	1.0
ZNDC-23-2G	800-2000	23.0±0.5	±0.4	0.5	1.1	0.5	1.1	0.5	1.1	25	14	25	14	25	14	1.20	3.0	3.0
ZMDC-30-1	0.1-250	30±0.5	±0.5	0.40	0.6	0.5	0.8	0.55	0.85	23	18	20	15	17	10	1.50	1.0	3.0
ZADC-30-10	800-1000	30±0.6	±1.4	0.4	0.7	0.4	0.7	0.4	0.7	21	16	21	16	21	16	1.15	5.0	5.0
DIRECTIONAL COUPLERS 75 Ω																		
ZDC-2375	50-100	10.5±0.3	±0.2	—	—	—	—	1.10	1.3	—	—	—	—	35	30	1.30	4.0	4.0
ZDC-10-1-75	1-250	10.5±0.5	±0.75	1.10	1.5	1.1	1.5	1.10	1.5	30	20	30	20	30	20	2.00	2.0	4.0
ZFDC-10-1-75	1-400	10.5±0.5	±0.5	1.00	1.7	1.1	1.5	1.10	1.6	46	30	44	28	34	20	1.30	2.0	4.0
Z30-10-4-75	5-1000	10.5±0.5	±0.3	1.50	2.5	1.5	2.3	1.50	2.2	22	16	21	14	19	—	1.30	0.5	1.0
ZADC-10-4-75	10-1000	10.7±0.5	±0.5	1.18	1.9	1.2	1.9	1.32	1.9	27	20	22	15	18	13	1.17	1.0	1.0
ZFDC-10-21-75	10-750	11±0.5	±0.75	1.50	1.8	1.5	1.9	1.70	2.1	36	30	30	20	26	20	1.40	1.0	2.0
Z30-13-5-75	5-1500	13.5±0.5	±0.7	0.85	1.4	0.9	2.2	1.00	1.7	22	17	20	14	19	—	1.30	0.5	1.0
Z30-16-5-75	5-1500	16.5±0.5	±0.9	1.10	2.0	1.1	1.1	1.20	1.9	22	16	24	—	24	—	1.30	0.5	1.0
Z30-18-4-75	5-1000	18.5±0.5	±0.5	0.80	1.5	0.85	1.5	0.95	1.6	28	17	23	16	15	—	1.30	1.0	1.0
ZDC-20-3-75-1	55-90	18.6±0.5	±0.3	0.40	0.6	0.4	0.6	0.40	0.6	35	30	35	30	35	30	1.20	4.0	4.0
ZFDC-20-3-75	10-250	19.3±0.5	±0.3	0.25	0.4	0.3	0.5	0.40	0.6	29	25	29	25	28	24	1.20	1.0	2.0
ZDC-20-3-75	1-150	19.5±0.5	±0.75	0.35	0.8	0.35	0.8	0.35	0.8	25	20	25	20	25	20	2.00	2.0	4.0
ZADC-20-18-75	800-1750	19.8±0.6	±0.7	0.4	0.9	0.4	0.9	0.4	0.9	22	13	22	13	22	13	1.20	4.0	1.0
ZADC-20-7550DC	800-1450	20±1.5	—	0.8	1.2	0.8	1.2	0.8	1.2	24	16	24	16	24	16	1.15	5.0	5.0
ZFDC-20-5-75	100-1500	20.5±0.5	±0.75	0.90	1.3	0.9	1.2	1.10	1.5	30	20	25	18	22	13	1.30	1.0	1.0

L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp.

ZADC
Case F14

ZADC
Case CC51-1

ZMDC
Case M21

ZDC
Case M22

ZABDC
Case DD477, DD477-1

ZBDC
Case HT1180

MODEL PREFIX	FREQUENCY (MHz)	COUPLING (dB)		MAINLINE LOSS (dB)						DIRECTIVITY (dB)						VSWR (:1)	POWER INPUT, W	
				L		M		U		L		M		U				
	f_L-f_U	Nom.	Typ. Flatness	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	L Max	MU Max.
BI-DIRECTIONAL COUPLERS 50 Ω																		
ZABDC10-25HP	1500-2500	10.0±1.0	±0.5	0.55	0.9	0.55	0.9	0.55	0.9	26	18	26	18	26	18	1.10	10	10
ZABDC20-2400	1500-2400	19.5±1.0	±1.0	0.3	0.5	0.3	0.5	0.3	0.5	25	18	25	18	25	18	1.20	10	10
ZFBDC20-62HP	10-600	20.0±0.5	±0.9	0.25	0.70	0.25	0.70	0.25	0.70	25	16	25	16	25	16	1.05	25	25
ZFBDC20-13HP	40-1000	20.0±0.5	±1.2	0.6	1.0	0.6	1.0	0.6	1.0	22	16	22	16	22	16	1.20	10	10
ZFBDC20-61HP	1-60	20.0±0.6	+0.3	0.1	0.25	0.1	0.25	0.1	0.25	30	20	30	20	30	20	1.07	15	15
ZABDC20-182HP	750-1800	20.0±1.0	±0.6	0.20	0.35	0.20	0.35	0.20	0.35	25	19	25	19	25	19	1.08	50	50
ZABDC20-252H	800-2500	20.0±2.0	—	0.20	0.35	0.20	0.35	0.20	0.35	28	20	28	20	28	20	1.05	50	50
ZFBDC20-970HP	860-970	20.4±0.6	±0.6	0.1	0.4	0.1	0.4	0.1	0.4	28	20	28	20	28	20	1.10	10	10
ZFDC-20-1H	30-400	20.5±0.5	±0.4	0.15	0.4	0.15	0.4	0.3	0.4	30	25	30	25	30	23	1.20	25	25
ZABDC20-322H	1700-3200	20.5±1.0	±1.3	0.25	0.35	0.25	0.35	0.25	0.35	21	13	21	13	21	13	1.10	50	50
ZFBDC20-900HP	800-900	20.7±0.6	±0.6	0.1	0.4	0.1	0.4	0.1	0.4	28	20	28	20	28	20	1.10	10	10
ZX30-20-20BD	500-2000	21.0±1.0	±2.2	0.2	0.5	0.2	0.5	0.2	0.5	21	14	21	14	21	14	1.20	2.0	2.0
ZBDC25-2575W	1270-2575	24.9±1.1	±0.8	0.3	0.5	0.3	0.5	0.3	0.5	28	20	28	20	28	20	1.05	20	20
ZBDC40-1450W	550-1450	39.9±1.5	±1.5	0.15	0.4	0.15	0.4	0.15	0.4	24	18	24	18	24	18	1.12	50	50
ZX30-20-462HP	2600-4600	19.3±0.8	±0.4	0.35	0.6	0.35	0.6	0.35	0.6	20	12	—	—	25	14	1.20	40	40
BI-DIRECTIONAL COUPLERS 75 Ω																		
ZABDC20-25H75	700-2500	20.0±0.8	±0.8	0.15	0.35	0.15	0.35	0.15	0.35	25	15	25	15	25	15	1.08	25	25

L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)

DC BLOCKS *Very Wideband, 50 & 75 Ω*

0.1 MHz to 18000 MHz

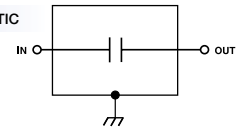
SMA
BLK-18, BLK-89
Case FF888

Type-N
BLK-6
Case FF779

BNC
BLK-222
Case FF747

MODEL PREFIX		FREQUENCY RANGE (GHz)	INSERTION LOSS (dB) Typ.	INSERTION LOSS (dB) Max.	RETURN LOSS (dB) Typ.	RETURN LOSS (dB) Min.
	50 Ω					
SMA	BLK-18	***0.01-18***				
		0.01-0.1	0.02	0.2	26	20
		0.1-1.0	0.07	0.3	36	20
		1.0-4.0	0.15	0.5	24	20
		4.0-8.0	0.38	1.0	18	15
		8.0-18	1.00	—	12	—
	BLK-89	***0.0001-8.0***				
		0.0001-0.1	0.010	0.09	40	20
		0.1-1.0	0.10	0.3	36	25
		1.0-4.0	0.15	0.8	24	18
		4.0-8.0	0.5	0.9	20	13
TYPE-N	BLK-6	***0.01-6.0***				
		0.01-1.0	0.05	0.20	45	30
		1.0-3.0	0.12	0.40	30	18
		3.0-4.0	0.25	0.60	22	14
		4.0-6.0	0.50	1.00	17	—
BNC	BLK-222	***0.01-2.2***	0.15	0.70	33	14
	75 Ω					
	BLK-222-75	***0.01-2.2***				
		0.01-0.1	0.02	0.10	44	33
		0.1-0.5	0.05	0.20	30	22
		0.5-1.0	0.08	0.30	25	17
		1.0-2.2	0.15	0.70	23	16

ELECTRICAL SCHEMATIC



FILTERS, LOW PASS 50 Ω

DC to 7.2 GHz

SMA VLF, VLP Case FF704

SMA VLFX Case FF1118

MODEL PREFIX	PASSBAND (MHz) (Loss <1 dB) Max.	fco, (MHz) NOMINAL (Loss 3 dB) Typ.	STOPBAND, (MHz) (loss, dB) f20 Min.	40 Typ.	fr20 Typ.	VSWR (:1) STOPBAND Typ.	PASSBAND Typ.	POWER INPUT (W) Max.
SMA								
VLF-80	DC-80	145	200	225-1550	4500	20	1.2	8.5
VLF-95	DC-95	165	230	225-1600	4500	20	1.2	8.5
VLF-105	DC-105	180	250	265-1650	4750	20	1.2	8.5
VLF-120	DC-120	195	280	300-1850	4750	20	1.2	8.5
VLF-160	DC-160	230	330	480-2700	6100	17	1.2	8.0
VLF-180	DC-180	270	370	525-2350	6400	17	1.2	8.0
VLF-190	DC-190	280	400	510-2850	6550	17	1.2	8.0
VLF-225	DC-225	350	460	510-2500	5500	20	1.2	8.5
VLF-320	DC-320	460	560	640-2500	5300	20	1.2	8.5
VLF-400	DC-400	560	660	680-3000	5500	20	1.2	8.5
VLF-490	DC-490	650	800	880-2500	6000	20	1.2	8.5
VLF-530	DC-530	700	820	945-3000	6000	20	1.2	8.5
VLF-575	DC-575	770	900	1050-3200	5500	20	1.2	8.5
VLF-630	DC-630	830	1000	1050-3500	6000	20	1.2	8.5
				30 dB Typ.				
VLF-800	DC-800	1075	1275	1350-4850	5100	20	1.2	10
VLF-1000	DC-1000	1300	1550	1900-5000	5500	20	1.3	10
VLF-1200	DC-1200	1530	1865	2000-5000	6200	20	1.2	10
VLF-1400	DC-1400	1700	2015	2100-6600	6800	20	1.2	10
VLF-1450	DC-1450	1825	2025	2050-6600	6700	20	1.2	10
VLF-1500	DC-1500	1825	2100	2150-6600	6800	20	1.2	10
VLF-1525	DC-1525	1750	2040	2120-6600	6700	20	1.2	10
VLF-1575	DC-1575	1875	2175	2225-6800	7100	20	1.2	10
VLF-1700	DC-1700	2050	2375	2500-6500	7000	20	1.2	10
VLF-1800	DC-1800	2125	2425	2500-7200	8600	20	1.2	10
VLF-2250	DC-2250	2575	2900	3000-5000	7200	20	1.2	10
VLF-2500	DC-2500	3075	3675	3800-6100	8000	20	1.2	10
VLF-2600	DC-2600	3125	3750	3900-6600	8400	20	1.2	10
VLF-2750	DC-2750	3150	4000	4150-6800	8400	20	1.2	10
VLF-2850	DC-2800	3300	4000	4200-7400	9000	20	1.2	10
VLF-3000	DC-3000	3600	4550	4780-7500	10000	20	1.2	10
VLF-3400	DC-3400	3950	4300	4600-7800	8300	17	1.2	8
VLF-3800	DC-3900	4850	6000	5700-8300	13000	17	1.3	8
VLF-4400	DC-4400	5290	6700	6280-9800	13000	17	1.2	8
VLF-5000	DC-5000	5580	6850	7050-10000	18000	20	1.2	9
VLF-5500	DC-5500	6200	7200	6770-9500	12100	17	1.3	8
VLF-5850	DC-5850	6540	7600	7100-9900	12500	17	1.3	8
VLF-6000	DC-6000	6800	8500	8700-10500	18000	20	1.3	9
VLF-6400	DC-6400	7200	8300	7770-10200	12500	17	1.2	8
VLF-6700	DC-6700	7600	9300	9500-11000	18000	20	1.3	9
VLF-7200	DC-7200	8150	9500	8850-9800	12300	17	1.3	8
	(Loss <1.2 dB Max.)			***40 dB Typ.***				
VLFX-80	DC-80	145	195	220-20000	—	10	1.2	10
VLFX-105	DC-105	165	250	400-20000	—	10	1.2	10
VLFX-225	DC-225	350	460	520-20000	—	10	1.15	10
VLFX-300	DC-300	450	580	650-20000	—	10	1.15	10
VLFX-400	DC-400	540	670	700-20000	—	10	1.15	10
VLFX-450	DC-450	640	800	900-20000	—	10	1.15	10
VLFX-470	DC-470	675	820	1000-20000	—	10	1.15	10
VLFX-500	DC-500	750	900	1100-20000	—	10	1.15	10
VLFX-540	DC-540	810	1000	1100-20000	—	10	1.2	10
VLFX-650	DC-650	1025	1275	1450-20000	—	10	1.2	10
VLFX-780	DC-780	950	1450	1600-20000	—	10	1.25	10
VLFX-825	DC-825	1275	1550	1850-20000	—	10	1.20	10
VLFX-950	DC-950	1400	1750	2250-20000	—	10	1.3	10
VLFX-1050	DC-1050	1675	1990	2100-20000	—	10	1.4	10
VLFX-1100	DC-1100	1750	2070	2300-20000	—	10	1.4	10
VLFX-1125	DC-1125	1825	2125	2300-20000	—	10	1.4	10
VLFX-1300	DC-1300	1925	2300	2500-20000	—	10	1.2	10
VLFX-1350	DC-1350	2050	2425	2600-20000	—	10	1.3	10
	(Loss <1 dB Max.)		***Loss > 20 dB***	***Loss > 40 dB***	***fr 20 dB Typ.***			
VLP-11	DC-850	1078	1500	2000-3500	5500	20	1.2	16
VLP-16	DC-1350	1550	2100	2700-4000	7000	20	1.1	15
VLP-20	DC-1700	1980	2700	3300-3880	7200	20	1.1	14
VLP-24	DC-2000	2430	3400	4400	8000	20	1.2	10
VLP-41	DC-3300	4100	5500	5600	10000	20	1.2	10
VLP-54	DC-4000	5400	7100	—	9500	20	1.2	10
VLP-64	DC-5400	6410	9000	—	18000	20	1.1	19

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SMA Case FF99
SLP, SBLP

BNC Case FF55
BBLP

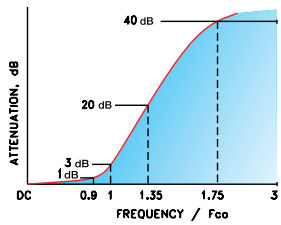
Type-N Case FF57
NBLP

MODEL PREFIX	PASSBAND, (MHz) (Loss <1 dB)	fco, (MHz) NOMINAL (Loss 3 dB)	STOPBAND, (MHz) (Loss >20 dB)	STOPBAND, (MHz) (Loss >40 dB)	VSWR PASSBAND Typ.	VSWR STOPBAND Typ.	POWER INPUT (W) Max.
SMA							
SLP-1.9	DC-1.9	2.5	3.4-4.7	4.7-200	1.7:1	18:1	0.5
SLP-2.5	DC-2.5	2.75	3.8-5.0	5.0-200	1.7:1	18:1	0.5
SLP-5	DC-5	6	8-10	10-200	1.7:1	18:1	0.5
SLP-10.7	DC-11	14	19-24	24-200	1.7:1	18:1	0.5
SLP-15	DC-15	17	23-32	32-200	1.7:1	18:1	0.5
SLP-21.4	DC-22	24.5	32-41	41-200	1.7:1	18:1	0.5
SLP-30	DC-32	35	47-61	61-200	1.7:1	18:1	0.5
SLP-50	DC-48	55	70-90	90-200	1.7:1	18:1	0.5
SLP-70	DC-60	67	90-117	117-300	1.7:1	18:1	0.5
SLP-90	DC-81	90	121-157	157-400	1.7:1	18:1	0.5
SLP-100	DC-98	108	146-189	189-400	1.7:1	18:1	0.5
SLP-150	DC-140	155	210-300	300-600	1.7:1	18:1	0.5
SLP-200	DC-190	210	290-390	390-800	1.7:1	18:1	0.5
SLP-250	DC-225	250	320-400	400-1200	1.7:1	18:1	0.5
SLP-300	DC-270	297	410-550	550-1200	1.7:1	18:1	0.5
SLP-450	DC-400	440	580-750	750-1800	1.7:1	18:1	0.5
SLP-550	DC-520	570	750-920	920-2000	1.7:1	18:1	0.5
SLP-600	DC-580	640	840-1120	1120-2000	1.7:1	18:1	0.5
SLP-750	DC-700	770	1000-1300	1300-2000	1.7:1	18:1	0.5
SLP-800	DC-720	800	1080-1400	1400-2000	1.7:1	18:1	0.5
SLP-850	DC-780	850	1100-1400	1400-2000	1.7:1	18:1	0.5
SLP-1000	DC-900	990	1340-1750	1750-2000	1.7:1	18:1	0.5
SLP-1200	DC-1000	1200	1620-2100	2100-2500	1.7:1	18:1	0.5
SLP-1650	DC-1400	1650	2300-2900	2900-6000	1.3:1	18:1	0.5
SLP-2400	DC-2200	2400	3150-4000	4000-6000	1.3:1	18:1	0.5
SLP-2950	DC-2700	2950	3700-4500	4500-6000	1.3:1	18:1	0.5

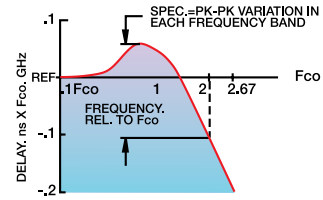
MODEL PREFIX	PASSBAND (MHz) (Loss <1.2 dB) Min.	fco, (MHz) NOMINAL (Loss 3 dB)	STOP BAND, (MHz) Loss >10 dB	STOP BAND, (MHz) Loss >20 dB	VSWR DC-0.2fco $\bar{X}$	VSWR DC-0.6fco $\bar{X}$	GROUP DELAY VARIATION, ns DC-fco $\bar{X}$	GROUP DELAY VARIATION, ns DC-2fco $\bar{X}$	GROUP DELAY VARIATION, ns DC-2.67fco $\bar{X}$	RF POWER INPUT (W) Max.
SMA *Flat Time Delay*										
SBLP-39	DC-23	39	78-117	117	1.3:1	2.3:1	0.70	4.00	5.00	0.5
SBLP-117	DC-65	117	234-312	312	1.3:1	2.4:1	0.35	1.40	1.90	0.5
SBLP-156	DC-94	156	312-416	416	1.3:1	1.1:1	0.30	1.10	1.50	0.5
SBLP-200	DC-120	200	400-534	534	1.6:1	1.9:1	0.40	1.30	1.60	0.5
SBLP-300	DC-180	300	600-801	801	1.25:1	2.2:1	0.20	0.60	0.80	0.5
SBLP-467	DC-280	467	934-1246	1246	1.25:1	2.2:1	0.15	0.40	0.55	0.5
SBLP-933	DC-560	933	1866-2490	2490	1.3:1	2.2:1	0.09	0.20	0.28	0.5
SBLP-1870	DC-850	1870	3740-5000	5000	1.45:1	2.9:1	0.05	0.10	0.15	0.5
TYPE-N *Flat Time Delay*										
NBLP-39	DC-23	39	78-117	117	1.3:1	2.3:1	0.70	4.00	5.00	0.5
NBLP-300	DC-180	300	600-801	801	1.25:1	2.2:1	0.20	0.60	0.80	0.5
BNC *Flat Time Delay*										
BBLP-39	DC-23	39	78-117	117	1.3:1	2.3:1	0.70	4.00	5.00	0.5

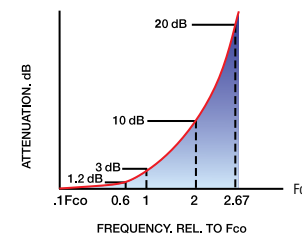
TYPICAL FREQUENCY RESPONSE

SLP SERIES



BLP SERIES





Additional Low Pass Filters, see page 42.

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FILTERS, LOW PASS

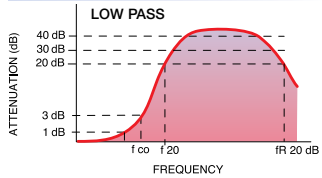
DC to 7.2 GHz

BNC BLP Case FF55

Type-N NLP Case FF57

MODEL PREFIX	PASSBAND, (MHz) (Loss <1 dB)	fco, (MHz) NOMINAL (Loss 3 dB)	STOPBAND, (MHz) (Loss > 20 dB)	STOPBAND, (MHz) (Loss > 40 dB)	VSWR (:1) PASSBAND Typ.	VSWR (:1) STOPBAND Typ.	POWER INPUT (W) Max.
BNC 50 Ω							
BLP-1.9	DC-1.9	2.5	3.4-4.7	4.7-200	1.7	18	0.5
BLP-2.5	DC-2.5	2.75	3.8-5.0	5.0-200	1.7	18	0.5
BLP-5	DC-5	6	8-10	10-200	1.7	18	0.5
BLP-10.7	DC-11	14	19-24	24-200	1.7	18	0.5
BLP-15	DC-15	17	23-32	32-200	1.7	18	0.5
BLP-21.4	DC-22	24.5	32-41	41-200	1.7	18	0.5
BLP-30	DC-32	35	47-61	61-200	1.7	18	0.5
BLP-50	DC-48	55	70-90	90-200	1.7	18	0.5
BLP-70	DC-60	67	90-117	117-300	1.7	18	0.5
BLP-90	DC-81	90	121-157	157-400	1.7	18	0.5
BLP-100	DC-98	108	146-189	189-400	1.7	18	0.5
BLP-150	DC-140	155	210-300	300-600	1.7	18	0.5
BLP-200	DC-190	210	290-390	390-800	1.7	18	0.5
BLP-250	DC-225	250	320-400	400-1200	1.7	18	0.5
BLP-300	DC-270	297	410-550	550-1200	1.7	18	0.5
BLP-450	DC-400	440	580-750	750-1800	1.7	18	0.5
BLP-550	DC-520	570	750-920	920-2000	1.7	18	0.5
BLP-600	DC-580	640	840-1120	1120-2000	1.7	18	0.5
BLP-750	DC-700	770	1000-1300	1300-2000	1.7	18	0.5
BLP-800	DC-720	800	1080-1400	1400-2000	1.7	18	0.5
BLP-850	DC-780	850	1100-1400	1400-2000	1.7	18	0.5
BLP-1000	DC-900	990	1340-1750	1750-2000	1.7	18	0.5
BLP-1200	DC-1000	1200	1620-2100	2100-2500	1.7	18	0.5
BNC 75 Ω							
BLP-7-75	DC-7	8	11-15	15-200	1.7	18	0.5
BLP-10.7-75	DC-11	14	19-24	24-200	1.7	18	0.5
BLP-15-75	DC-15	17	23-32	32-200	1.7	18	0.5
BLP-21.4-75	DC-22	24.5	32-41	41-200	1.7	18	0.5
BLP-30-75	DC-32	35	47-61	61-200	1.7	18	0.5
BLP-50-75	DC-48	55	70-90	90-200	1.7	18	0.5
BLP-70-75	DC-60	67	90-117	117-300	1.7	18	0.5
BLP-100-75	DC-98	108	146-189	189-400	1.7	18	0.5
BLP-600-75	DC-580	640	840-1120	1120-2000	1.7	18	0.5
BLP-850-75	DC-750	850	1150-1490	1490-2000	1.7	18	0.5
TYPE-N 50 Ω							
NLP-1.9	DC-1.9	2.5	3.4-4.7	4.7-200	1.7	18	0.5
NLP-2.5	DC-2.5	2.75	3.8-5.0	5.0-200	1.7	18	0.5
NLP-5	DC-5	6	8-10	10-200	1.7	18	0.5
NLP-10.7	DC-11	14	19-24	24-200	1.7	18	0.5
NLP-15	DC-15	17	23-32	32-200	1.7	18	0.5
NLP-21.4	DC-22	24.5	32-41	41-200	1.7	18	0.5
NLP-30	DC-32	35	47-61	61-200	1.7	18	0.5
NLP-50	DC-48	55	70-90	90-200	1.7	18	0.5
NLP-70	DC-60	67	90-117	117-300	1.7	18	0.5
NLP-90	DC-81	90	121-157	157-400	1.7	18	0.5
NLP-100	DC-98	108	146-189	189-400	1.7	18	0.5
NLP-150	DC-140	155	210-300	300-600	1.7	18	0.5
NLP-200	DC-190	210	290-390	390-800	1.7	18	0.5
NLP-250	DC-225	250	320-400	400-1200	1.7	18	0.5
NLP-300	DC-270	297	410-550	550-1200	1.7	18	0.5
NLP-450	DC-400	440	580-750	750-1800	1.7	18	0.5
NLP-550	DC-520	570	750-920	920-2000	1.7	18	0.5
NLP-600	DC-580	640	840-1120	1120-2000	1.7	18	0.5
NLP-750	DC-700	770	1000-1300	1300-2000	1.7	18	0.5
NLP-800	DC-720	800	1080-1400	1400-2000	1.7	18	0.5
NLP-850	DC-780	850	1100-1400	1400-2000	1.7	18	0.5
NLP-1000	DC-900	990	1340-1750	1750-2000	1.7	18	0.5
NLP-1200	DC-1000	1200	1620-2100	2100-2500	1.7	18	0.5
NLP-1750	DC-1500	1750	2400-3000	3000-6000	1.3	18	0.5
NLP-2400	DC-2200	2400	3150-4000	4000-6000	1.3	18	0.5
NLP-2950	DC-2700	2950	3700-4500	4500-6000	1.3	18	0.5

TYPICAL FREQUENCY RESPONSE



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FILTERS, BANDPASS

9 MHz to 7 GHz

Mini-Circuits® 2010

SMA Case FF99
SBP, SIF

SMA Case FF704
VBF

BNC Case FF55
BBP

Type-N Case FF57
NBP

SMA Case FF1145
VBFZ

SMA ZFB Case H16
BNC ZFBP

SMA Case HY1238, HY1239
ZX75

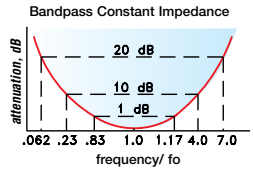
MODEL PREFIX	CENTER FREQUENCY MHz	PASSBAND (MHz) (Loss <1 dB)	STOP BANDS (Loss > 10 dB) at MHz	STOP BANDS (Loss > 20 dB) at MHz	VSWR 1.3:1, TYP. TOTAL BAND (MHz)	RF POWER INPUT (W) Max.
BANDPASS *Constant Impedance* 50 Ω						
SIF-21.4	21.4	18-25	4.9 & 85	1.3 & 150	DC-220	0.5
SIF-30	30	25-35	7 & 120	1.9 & 210	DC-330	0.5
SIF-40	42	35-49	10 & 168	2.6 & 300	DC-400	0.5
SIF-50	50	41-58	11.5 & 200	3.1 & 350	DC-440	0.5
SIF-60	60	50-70	14 & 240	3.8 & 400	DC-500	0.5
SIF-70	70	58-82	16 & 280	4.4 & 490	DC-550	0.5

MODEL PREFIX	CENTER FREQUENCY MHz	PASSBAND Loss < 1.5 dB MHz	3 dB BANDWIDTH TYPICAL MHz	STOP BANDS #1 (Loss > 20 dB) at MHz	STOP BANDS #2 (Loss > 35 dB) at MHz	VSWR (:1) PASSBAND Max.	VSWR (:1) STOP BAND Typ.	RF POWER INPUT (W) Max.
BANDPASS *Elliptic Response* 50 Ω								
BBP-10.7	10.7	9.5-11.5	8.9-12.7	7.5 & 15	0.6 & 50-1000	1.7	16	0.5
BBP-21.4	21.4	19.2-23.6	17.9-25.3	15.5 & 29	3.0 & 80-1000	1.7	16	0.5
BBP-30	30	27.0-33.0	25-35	22 & 40	3.2 & 99-1000	1.7	16	0.5
BBP-60	60	55.0-67.0	49.8-70.5	44 & 79	4.6 & 190-1000	1.7	16	0.5
BBP-70	70	63.0-77.0	58.0-82.0	51 & 94	6.0 & 193-1000	1.7	16	0.5
NBP-10.7	10.7	9.5-11.5	8.9-12.7	7.5 & 15	0.6 & 50-1000	1.7	16	0.5
NBP-70	70	63.0-77.0	58.0-82.0	51 & 94	6.0 & 193-1000	1.7	16	0.5
SBP-10.7	10.7	9.5-11.5	8.9-12.7	7.5 & 15	0.6 & 50-1000	1.7	16	0.5
SBP-21.4	21.4	19.2-23.6	17.9-25.3	15.5 & 29	3.0 & 80-1000	1.7	16	0.5
SBP-30	30	27.0-33.0	25-35	22 & 40	3.2 & 99-1000	1.7	16	0.5
SBP-60	60	55.0-67.0	49.8-70.5	44 & 79	4.6 & 190-1000	1.7	16	0.5
SBP-70	70	63.0-77.0	58.0-82.0	51 & 94	6.0 & 193-1000	1.7	16	0.5

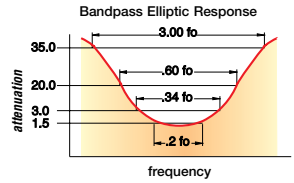
MODEL PREFIX	CENTER FREQUENCY MHz	PASSBAND (MHz) F1 - F2	LOSS (dB)	STOP BANDS #1 (Loss > 20 dB) @ MHz F3	STOP BANDS #1 F4	STOP BANDS #2 (Loss > 30 dB) @ MHz F5	STOP BANDS #2 F6	VSWR (:1) PASSBAND Typ.	VSWR (:1) STOP BAND Typ.	RF POWER INPUT (W) Max.
BANDPASS SMA 50 Ω										
ZFBP-70	70	69-71	7.0	66	75	64	78-1000	1.35	18	0.5
VBFZ-780	780	710-850	2.5	460	1300	440	1320-16000	1.6	20	7.0
VBFZ-925	925	800-1050	2.4	530	1550	500	1620-18000	1.6	20	7.0
VBFZ-1065	1065	980-1150	2.3	630	1800	600	1800-16000	1.4	20	7.0
VBFZ-1400	1400	1350-1450	2.6	890	1965	870	1965-6600	1.6	20	7.0
VBF-1560	1560	1560-1620	5.0	1100	2100	1040	2105-4200	1.7	20	1.5
VBFZ-1690	1690	1455-1925	2.3	930	2600	860	2600-9000	1.5	20	7.0
VBFZ-2000	2000	1730-2270	2.3	1210	2960	1200	2960-16000	1.6	20	7.0
VBFZ-2130	2130	2000-2260	2.6	1420	2950	1400	2950-18000	1.6	20	7.0
VBFZ-2340	2340	2020-2660	2.2	1450	3750	1400	3800-8500	1.5	20	7.0
VBF-2555	2555	2500-2610	7.0	1970	3200	2000	3250-5500	1.6	20	1.5
VBFZ-2575	2575	2350-2800	2.2	1390	3850	1275	3900-9000	1.9	20	7.0
VBF-2900	2900	2700-3100	3.0	1850	4200	1800	4900-7000	2.3	20	1.5
VBFZ-3590	3590	3000-4300	2.0	2250	5950	2200	5950-14000	1.3	20	7.0
VBFZ-4000	4000	3500-4500	1.8	2550	5700	2750	5720-16000	1.6	20	7.0
VBF-4440	4440	4200-4700	2.0	2000	6750	2000	6650-12000	1.6	20	1.5
VBFZ-5500	5500	4900-6200	2.0	3600	8600	3500	8600-17000	1.3	20	7.0
VBFZ-6260	6260	5600-7000	2.0	4200	9300	4100	9300-18000	1.4	20	7.0
ZX75-12	12	9-15	3.5	7.5	18	7	20-3000	1.5	30	0.25
ZX75-12M	12	9-15	3.5	7.5	18	7	20-3000	1.5	30	0.25
BANDPASS BNC 75 Ω						(Loss > 40 dB)				
ZFBP-13-75	13	12.3-13.8	4.0	10.6	16	10	17.5-300	1.4	18	0.5

TYPICAL FREQUENCY RESPONSE

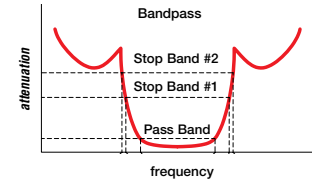
Bandpass Constant Impedance



Bandpass Elliptic Response



Bandpass



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FILTERS, HIGH PASS 50 Ω

27.5 MHz to 13 GHz

SHP
Case FF99
SMA

BHP
Case FF55
BNC

NHP
Case FF57
Type N

ZFHP
Case H16
SMA

MODEL PREFIX	STOPBAND, (MHz) (Loss > 40 dB)	STOPBAND, (MHz) (Loss > 20 dB)	fco, (MHz) NOMINAL (Loss 3 dB)	PASSBAND, (MHz) (Loss <1 dB)	VSWR (:1) STOPBAND Typ.	VSWR (:1) PASSBAND Typ.	RF POWER (W) Max.
BNC							
BHP-25	DC-13	13-19	25	27.5-800	18	1.7	0.5
BHP-50	DC-20	20- 26	37	41-800	17	1.5	0.5
BHP-100	DC-40	40- 55	82	90-2000	17	1.5	0.5
BHP-150	DC-70	70- 95	120	133-1000	17	1.8	0.5
BHP-175	DC-70	70-105	140	160-1200	17	1.5	0.5
BHP-200	DC-90	90-116	164	185-3000	17	1.6	0.5
BHP-250	DC-100	100-150	205	225-3000	17	1.3	0.5
BHP-300	DC-145	145-190	245	290-3000	17	1.7	0.5
BHP-400	DC-210	210-290	360	395-3200	17	1.7	0.5
BHP-500	DC-280	280-365	454	500-3200	17	1.9	0.5
BHP-600	DC-350	350-440	545	600-3000	17	2.0	0.5
BHP-700	DC-400	400-520	640	700-3000	17	1.6	0.5
BHP-800	DC-445	445-570	710	780-3000	17	2.1	0.5
BHP-900	DC-520	520-660	820	910-3000	17	1.8	0.5
BHP-1000	DC-550	550-720	900	1000-3000	17	1.9	0.5
TYPE-N							
NHP-25	DC-13	13- 19	25	27.5-800	18	1.7	0.5
NHP-50	DC-20	20- 26	37	41-800	17	1.5	0.5
NHP-100	DC-40	40- 55	82	90-2000	17	1.5	
NHP-150	DC-70	70- 95	120	133-1000	17	1.8	0.5
NHP-175	DC-70	70-105	140	160-1200	17	1.5	0.5
NHP-200	DC-90	90-116	164	185-3000	17	1.6	0.5
NHP-250	DC-100	100-150	205	225-3000	17	1.3	0.5
NHP-300	DC-145	145-190	245	290-3000	17	1.7	0.5
NHP-400	DC-210	210-290	360	395-3200	17	1.7	0.5
NHP-500	DC-280	280-365	454	500-3200	17	1.9	0.5
NHP-600	DC-350	350-440	545	600-3000	17	2.0	0.5
NHP-700	DC-400	400-520	640	700-3000	17	1.6	0.5
NHP-800	DC-445	445-570	710	780-3000	17	2.1	0.5
NHP-900	DC-520	520-660	820	910-3000	17	1.8	0.5
NHP-1000	DC-550	550-720	900	1000-3000	17	1.9	0.5
SMA							
SHP-25	DC-13	13- 19	25	27.5-800	18	1.7	0.5
SHP-50	DC-20	20- 26	37	41-800	17	1.5	0.5
SHP-100	DC-40	40- 55	82	90-2000	17	1.5	0.5
SHP-100A	DC-77	77-82	92	110-3000	13	1.6	0.1
SHP-150	DC-70	70- 95	120	133-1000	17	1.8	0.5
SHP-175	DC-70	70-105	140	160-1200	17	1.5	0.5
SHP-200	DC-90	90-116	164	185-3000	17	1.6	0.5
SHP-250	DC-100	100-150	205	225-3000	17	1.3	0.5
SHP-300	DC-145	145-190	245	290-3000	17	1.7	0.5
SHP-400	DC-210	210-290	360	395-3200	17	1.7	0.5
SHP-500	DC-280	280-365	454	500-3200	17	1.9	0.5
SHP-600	DC-350	350-440	545	600-3000	17	2.0	0.5
SHP-700	DC-400	400-520	640	700-3000	17	1.6	0.5
SHP-800	DC-445	445-570	710	780-3000	17	2.1	0.5
SHP-900	DC-520	520-660	820	910-3000	17	1.8	0.5
SHP-1000	DC-550	550-720	900	1000-3000	17	1.9	0.5
ZFHP-2100	DC-900	1925	2100	2500-6800	20	1.3	0.5

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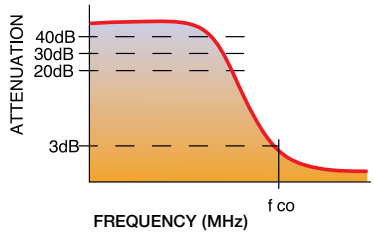
VHP, VHF
Case FF704

SMA

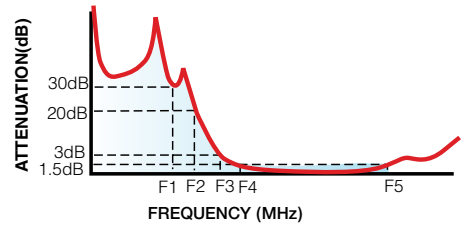
MODEL PREFIX	STOP BAND, (MHz) (Loss > 40 dB)	STOP BAND, (MHz) (Loss > 20 dB)	fco, (MHz) NOMINAL (Loss 3 dB) Typ.	PASSBAND, (MHz) (Loss <1.3 dB) Max.	PASSBAND, (MHz) (Loss <2 dB) Typ.	VSWR (:1) Stopband Typ.	VSWR (:1) Passband Typ.	POWER INPUT (W) Max.
SMA MINIATURE PACKAGE								
VHP-9R5	DC-600	750	950	1300-3500	_	18	1.5	14
VHP-16	DC-1030	1300	1580	1900-2700	_	18	1.5	14
VHP-19	DC-1450	1650	1995	2300-5500	_	18	1.5	10
VHP-26	DC-1500	2000	2570	3000-7000	_	18	1.4	10
VHP-39	DC-2000	3050	3900	4600-5500	_	18	1.5	10
VHF-440	230	350	440	600-1700	500-2500	20	1.5	7
VHF-650	390	480	650	850-2000	710-2490	20	1.5	7
VHF-740	430	550	740	900-2200	780-2800	20	1.5	7
VHF-880	500	640	880	1060-2500	950-3200	20	1.5	7
VHF-1200	750	910	1180	1380-4000	1220-4600	20	1.5	7
VHF-1300	680	930	1300	1510-4000	1400-5000	20	1.5	7
VHF-1320	880	1060	1320	1700-3800	1400-5000	20	1.5	7
VHF-1500	1090-1060	1250	1550	1850-4400	1600-5500	20	1.5	7
VHF-1600	1090	1290	1600	1950-4000	1650-5000	20	1.5	7
VHF-1760	950	1230	1760	2100-5200	1900-5500	20	1.5	7
VHF-1810	1100	1480	1810	2250-4000	1900-4750	20	1.5	7
VHF-1910	1075	1400	1910	2200-4400	2000-5200	20	1.5	7
VHF-2000	1300	1530	2000	2410-5550	2260-6250	20	1.5	7
VHF-2100	1050	1530	2100	2500-5000	2200-6000	20	1.5	7
VHF-2275	1400	1770	2275	2640-6230	2450-7000	20	1.5	7
VHF-2700	1500	1800	2500	3000-5700	2650-6500	20	1.5	7
	Loss >30 dB Typ.			***Loss <1.5 dB Max.***	***Loss <2 dB Max.***			
VHF-2700A	2270	2150	2700	3070-8500	2900-8700	20	1.5	7
VHF-3100	2500	2450	3100	3500-9500	3400-9900	20	1.5	7
VHF-3500	2900	2800	3500	4000-8800	3900-9800	20	1.5	7
VHF-3800	3100	3200	3800	4500-9000	4250-10000	20	1.5	7
VHF-4400	3600	3500	4400	5000-9900	5000-10100	20	1.5	6
VHF-4600	3700	3800	4600	5200-10500	5000-11000	20	1.5	7
VHF-5500	4000	4500	5500	6600-11000	6000-11500	20	1.5	7
VHF-5050	3600	4200	5050	5650-9700	5500-10000	20	1.5	7
VHF-6010	5190	5200	6010	6350-13000	6300-15000	20	1.5	7
VHF-7150	5100	6150	7150	8500-10500	7900-11000	20	1.5	6
				Loss <2.5 dB Max.	***Loss <3 dB Max.***			
VHF-8400	5700	6000	8400	9500-13000	9000-13000	20	1.5	7

TYPICAL FREQUENCY RESPONSE

VHF *(except VHF-2700A Thru -8400)*



VHF *(For VHF-2700A Thru -8400)*



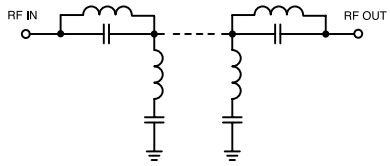
FILTERS, BAND STOP 50 Ω

88 MHz to 108 MHz

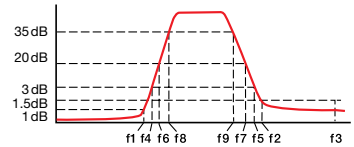
NSBP
Case FF967

MODEL PREFIX	STOP BAND, (MHz)		Loss 3 dB	PASSBAND, (MHz)		VSWR (:1)	
	(Loss > 20 dB) f6-f7	(Loss > 35 dB) f8-f9	Typ. f4, f5	(Loss <1 dB) f1	(Loss <1.5 dB) f2, f3	Stopband Typ.	Passband Typ.
NSBP-108	88-108	89-105	81 & 120	65	140-1000	3.4	1.3

FUNCTIONAL SCHEMATIC



TYPICAL FREQUENCY RESPONSE



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LIMITERS Broadband 50 Ω

10 MHz to 3000 MHz

VLM
Case FF704

MODEL PREFIX	FREQUENCY (MHz)	LOW INPUT POWER INSERTION LOSS (dB)	INPUT POWER (dBm) Min.	INPUT POWER (dBm) Max.	OUTPUT POWER (dBm) Typ.	LIMITING Input Power Range (dBm)	LIMITING △Output 1 dB △Input dB/dB
VLM-52	10-500	0.5	+10	+20	+9.5	+9.5 to +12.5 +12.5 to +15 +15 to +20	0.30 0.20 0.14
VLM-33	30-3000	1.05	+15	+30	+11.5	+15 to +20 +20 to +25 +25 to +30	0.20 0.20 0.20

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MIXERS, FREQUENCY 50 Ω

500 Hz to 15 GHz

ZX05 Case FL905 | ZMX Case BU413 | ZEM Case V37 | ZFM Case K18 | ZAM Case F14

MODEL PREFIX	FREQUENCY (MHz) LO/RF f_L-f_U	IF	CONVERSION LOSS (dB) $\bar{x}$	MID-BAND m σ	Max.	TOTAL RANGE Max.	LO-RF ISOLATION (dB) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	LO-IF ISOLATION (dB) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	SCHEMATIC
LEVEL 3	**+3 dBm LO**	**up to 0 dBm RF**																	
ZX05-1L	2-500	DC-500	5.2	0.1	7.2	8.0	68	50	55	30	44	30	55	40	45	30	35	25	1
LEVEL 4	**+4 dBm LO**	**up to +1 dBm RF**																	
ZX05-10L	10-1000	DC-800	7.2	0.1	8.2	8.8	70	55	60	40	47	37	40	26	37	20	24	13	1
ZX05-73L	2400-7000	DC-3000	6.2	0.2	—	8.3			30	16					20	12			1
LEVEL 7	**+7 dBm LO**	**up to +1 dBm RF**																	
ZAD-8	0.0005-10	DC-10	5.79	0.05	7.5	8.5	60	50	50	40	45	35	60	50	50	40	45	35	1
ZAD-6	0.003-100	DC-100	4.65	0.08	7.5	8.5	60	50	45	30	35	25	60	45	40	25	30	20	1
ZLW-6	0.003-100	DC-100	4.58	0.05	7.5	8.5	60	50	45	30	35	25	60	45	40	25	30	25	1
ZAD-3	0.025-200	DC-200	4.61	0.06	7.5	8.5	60	50	45	35	35	25	45	35	40	30	30	20	1
ZLW-3	0.025-200	DC-200	4.61	0.06	7.5	8.5	60	50	45	35	35	25	45	35	40	30	30	20	1
ZFM-3	0.04-400	DC-400	4.78	0.03	7.0	8.0	60	50	50	35	35	25	55	40	45	30	35	25	1
ZP-3	0.15-400	DC-400	4.70	0.10	7.0	8.0	60	50	46	30	35	25	60	40	47	25	35	20	1
ZAD-1-1	0.1-500	DC-500	4.83	0.04	7.5	8.5	50	45	45	30	35	25	45	30	40	25	30	20	1
ZLW-1-1	0.1-500	DC-500	4.82	0.07	7.5	8.5	50	45	45	30	35	25	45	30	40	25	30	20	1
ZP-10514	0.2-500	DC-500	5.18	0.10	7.0	8.5	55	45	50	35	35	30	50	40	36	30	30	20	1
ZAD-1	0.5-500	DC-500	5.24	0.10	7.0	8.5	50	45	45	30	35	25	45	35	40	25	30	20	1
ZLW-1	0.5-500	DC-500	5.81	0.08	7.0	8.5	50	45	45	30	35	25	45	35	40	25	30	20	1
ZX05-1	0.5-500	DC-500	5.00	0.10	6.5	7.8	70	50	55	35	45	30	65	45	40	25	30	20	1
ZP-1	2-600	DC-600	5.85	0.10	7.0	8.0	60	50	42	30	37	25	60	45	47	30	36	22	1
ZLW-1W	1-750	DC-750	5.74	0.05	7.5	8.5	50	45	45	30	35	25	45	30	40	25	30	20	1
ZFM-1W	10-750	DC-750	5.42	0.14	7.0	8.0	50	45	45	30	35	25	45	40	40	25	27	20	1
ZAD-2	1-1000	0.5-500	5.66	0.07	7.5	8.5	45	30	35	20	30	20	45	30	35	20	30	20	1
ZFM-2	1-1000	DC-1000	5.72	0.06	7.5	8.5	50	45	40	25	30	25	45	40	35	25	25	20	1
ZLW-2	1-1000	DC-1000	5.68	0.08	7.5	9.5	55	45	40	25	35	20	50	40	40	25	30	20	1
ZX05-2	5-1000	DC-1000	6.67	0.26	8.0	9.5	65	50	47	25	35	22	62	35	45	25	32	20	1
ZEM-2B	10-1000	DC-1000	5.74	0.07	7.0	8.5	55	50	30	25	25	20	55	45	30	20	25	20	1
ZX05-10	10-1000	DC-800	6.80	0.10	7.8	8.3	80	50	60	40	47	37	40	26	33	20	24	13	1
ZP-2	50-1000	DC-1000	5.85	0.10	7.5	9.0	58	40	47	30	42	25	50	35	44	20	29	18	1
ZFM-4	5-1250	DC-1250	5.70	0.34	7.5	8.5	50	45	40	30	30	25	45	40	35	25	25	20	1
ZFM-12	800-1250	50-90	5.67	0.12	—	7.5	35	25	35	25	35	25	30	20	30	20	30	20	1
ZFM-5X	1-1500	1-1000	5.90	0.10	7.0	9.0	60	40	40	20	28	17	60	45	45	25	38	20	1
ZP-5X	1-1500	1-1000	5.90	0.10	7.0	9.0	60	40	40	20	28	17	60	45	45	25	38	20	1
ZLW-5	5-1500	10-600	5.81	0.08	7.5	8.5	55	40	35	25	30	20	50	40	35	25	30	20	1
ZX05-5	5-1500	DC-1000	6.60	0.10	7.5	9.3	50	40	40	25	33	23	50	40	30	20	20	10	1
ZP-5	20-1500	DC-1000	5.70	0.10	9.0	9.0	54	40	42	30	39	25	40	25	32	18	23	8	1
ZFM-11	1-2000	5-600	7.03	0.17	8.5	9.0	50	45	35	25	25	20	45	40	27	20	25	20	1
ZAD-11	5-2000	10-600	7.12	0.12	8.5	9.0	50	45	35	25	30	20	45	40	30	20	25	15	1
ZLW-11	5-2000	10-600	6.85	0.10	8.5	9.0	50	45	35	25	30	20	45	40	30	20	25	15	1
ZX05-11X	10-2000	5-1000	7.10	0.10	8.2	9.8	62	45	36	20	27	18	60	45	37	20	38	20	1
ZFM-2000	100-2000	DC-600	7.49	0.20	9.5	9.5	37	20	37	20	37	20	30	20	30	20	30	20	1
ZX05-C24	300-2400	DC-700	6.10	0.10	8.9	—			40	25					25	15			1
ZX05-30W	300-4000	DC-950	6.80	0.20	9.0	9.8			35	17					16	7			1
ZX05-43	750-4200	DC-1500	6.1	0.1	—	8.9			35	22					21	9			1
ZX05-C42	1000-4200	DC-1500	6.10	0.10	—	8.9			35	23					20	12			1
ZAM-42	1500-4200	DC-500	5.67	0.11	—	8.5	25	14	25	14	25	14	18	10	18	10	18	10	1
ZFM-4212	2000-4200	DC-1300	5.44	0.088	—	8.5	25	17	25	17	25	17	18	10	18	10	18	10	1
ZEM-4300	300-4300	DC-1000	6.65	0.06	—	9.5	40	20	—	—	30	17	15	8	—	—	15	8	1
ZX05-C60	1600-6000	DC-2000	6.20	0.30	—	8.5			28	17					18				1
ZX05-83	2300-8000	DC-3000	6.0	0.2	—	8.5			29	15					24	8			1
ZMX-7GR	3700-7000	DC-1000	5.00	0.30	—	8.2			30	20					36	20			1
ZMX-10G	3700-10000	DC-2000	5.00	0.10	—	8.5			30	20					17	8			1
ZX05-14	3700-10000	DC-4000	6.7	0.3	—	10.0			38	25					16	9			1
ZX05-153	3400-15000	DC-4000	6.8	0.7	—	13.5			36	16					23	9			1

L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)
m = mid band ($2f_L$ to $f_U/2$)

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ZP
Case GG60

ZLW
Case M21

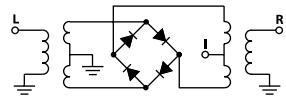
ZAD
Case M22

MODEL PREFIX	FREQUENCY (MHz) LO/RF f_L-f_U	IF	CONVERSION LOSS (dB) $\bar{x}$	MID-BAND m σ	Max.	TOTAL RANGE Max.	LO-RF ISOLATION (dB) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	LO-IF ISOLATION (dB) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	SCHEMATIC
LEVEL 10 +10 dBm LO up to +5 dBm RF																			
ZP-3LH	0.15-400	DC-400	4.8	0.37	7.0	8.0	67	50	51	30	40	25	67	40	45	25	34	20	1
ZP-1LH	2-600	DC-600	6.0	0.17	7.0	8.0	70	50	50	30	42	25	65	45	50	30	41	22	1
ZX05-1LHW	2-750	DC-750	5.3	0.10	6.8	8.5	66	50	52	35	46	27	64	40	50	27	40	20	1
ZP-5LH	20-1500	DC-1000	6.9	0.27	8.5	9.0	53	40	42	30	38	25	40	25	30	18	22	8	1
ZP-11ALH	1400-1900	40-500	7.0	0.20	8.6	8.6			36	20					28	15			1
ZFM-150	10-2000	DC-1000	6.05	0.12	8.0	8.0	32	25	35	25	35	20	33	20	30	20	25	20	2
ZX05-C24LH	300-2400	DC-700	6.5	0.10	—	8.9			40	25					30	15			1
ZFM-15	10-3000	10-800	6.13	0.14	8.0	8.5	35	25	35	25	35	25	30	20	30	20	30	20	2
ZX05-43LH	824-4200	DC-1500	6.1	0.1	—	8.8			35	23					21	7			1
ZX05-C42LH	1000-4200	DC-1500	6.0	0.10	—	8.9			38	23					20	11			1
ZX05-63LH	750-6000	DC-1000	6.2	0.2	—	9.6			34	20					20	10			1
ZX05-C60LH	1600-6000	DC-2000	6.1	0.10	8.5	—			30	20					21	—			1
ZMX-7GLHR	3700-7000	DC-1500	5.4	0.30	—	9.8	33	20	33	20	33	20	35	20	35	20	35	20	1
ZX05-83LH	1700-8000	DC-3000	6.0	0.2	—	8.5			28	16					23	8			1
ZMX-8GLH	3700-8000	DC-2000	5.5	0.20	—	9.8	40	20	40	20	40	20	18	8	18	8	18	8	1
ZX05-14LH	3700-10000	DC-4000	6.7	0.3	—	9.5			38	25					17	9			1
ZX05-153LH	3200-15000	DC-4000	6.6	0.4	—	14.2			36	15					18	9			1
LEVEL 13 +13 dBm LO up to +9 dBm RF																			
ZP-3MH	0.15-400	DC-400	5.0	0.33	7.0	8.0	60	50	46	30	35	25	60	40	42	25	35	20	1
ZX05-1MHW	0.5-600	DC-600	5.2	0.10	6.9	8.0	63	50	53	32	43	20	56	40	44	25	30	20	1
ZP-1MH	2-600	DC-600	6.3	0.12	7.0	8.0	68	50	50	30	43	25	65	45	48	30	37	22	1
ZP-2MH	50-1000	DC-1000	6.0	0.25	7.5	9.0	58	40	47	30	37	25	55	35	47	20	32	18	1
ZX05-12MH	10-1200	DC-1200	6.3	0.10	8.0	9.3	62	45	45	32	40	26	68	40	42	27	30	20	1
ZP-5MH	20-1500	DC-1000	7.0	0.25	8.5	9.0	50	40	41	30	35	25	38	25	28	18	20	8	1
ZEM-M2TMH	10-2400	10-1000	6.9	0.10	9.0	9.5	49	40	43	35	42	35	49	40	44	30	40	30	2
ZX05-C24MH	300-2400	DC-700	6.1	0.10	—	8.6			40	20					25	14			1
ZLW-186MH	2-2500	2-1000	6.	0.11	8.5	9.5	33	25	35	25	30	20	42	25	49	25	32	20	2
ZX05-25MH	5-2500	5-1500	6.9	0.10	8.8	9.8	47	28	34	23	34	23	34	23	32	18	23	17	2
ZX05-42MH	5-4200	5-3500	7.5	0.20	9.8	11.8	47	28	29	20	30	15	34	23	26	17	23	17	2
ZX05-43MH	824-4200	DC-1500	6.1	0.1	—	9.8			35	22					22	7			1
ZX05-C42MH	1000-4200	DC-1500	6.2	0.10	—	8.9			35	15					20	10			1
ZEM-4300MH	300-4300	DC-1000	6.42	0.15	—	8.5	40	20	—	—	40	20	14	7	—	—	12	7	1
ZX05-C60MH	1600-6000	DC-2000	6.4	0.10	—	8.5			28	18					17	—			1
ZMX-7GMH	3700-7000	DC-2000	4.7	0.20	—	8.0	37	20	37	20	40	20			17	8			1
ZX05-153MH	3200-15000	DC-4000	6.5	0.4	—	13.6			36	14					18	9			1

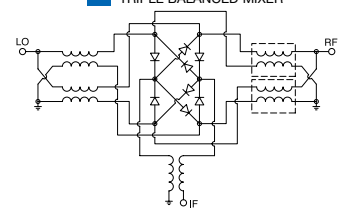
L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)
m = mid band ($2f_L$ to $f_U/2$)

ELECTRICAL SCHEMATICS

1 DOUBLE BALANCED MIXER



2 TRIPLE BALANCED MIXER



MIXERS, FREQUENCY 50 Ω

50 kHz to 10 GHz

ZX05
Case FL905

ZMX
Case BU413

ZFM, ZFY
Case K18

ZP
Case GG60

ZLW, ZMY
Case M21

ZAD, ZAY
Case M22

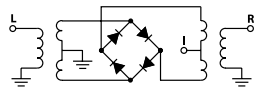
MODEL PREFIX	FREQUENCY (MHz) LO/RF f_L-f_U	IF	CONVERSION LOSS (dB) MID-BAND m $\bar{x}$	σ	Max.	TOTAL RANGE Max.	LO-RF ISOLATION (dB) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	LO-IF ISOLATION (dB) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	SCHEMATIC
LEVEL 17 +17 dBm LO up to +14 dBm RF																			
ZAD-3H	0.05-200	DC-200	4.89	0.09	7.0	7.5	55	45	45	30	35	25	45	35	40	30	30	2	1
ZFM-3H	0.05-300	DC-300	5.18	0.11	7.0	8.5	55	45	40	30	30	25	50	40	35	25	25	20	1
ZP-3H	0.15-400	DC-400	5.00	0.33	7.0	8.0	60	50	50	35	40	30	60	40	45	25	35	20	1
ZAD-1H	0.5-500	DC-500	6.16	0.08	7.5	8.5	50	45	45	30	35	25	45	35	40	30	30	20	1
ZLW-1H	0.5-500	DC-500	6.13	0.08	7.5	8.5	55	45	45	30	35	25	45	35	40	30	30	20	1
ZLW-1SH	2-500	DC-500	5.9	0.08	7.5	8.5	50	40	40	30	30	25	45	35	35	25	25	20	1
ZFM-1H	2-500	DC-500	6.14	0.11	7.5	8.5	50	45	40	30	30	25	45	35	35	25	25	20	1
ZP-1H	2-600	DC-600	5.90	0.18	7.0	8.0	68	50	50	30	43	25	62	45	48	30	33	22	1
ZLW-1WSH	5-750	DC-750	5.83	0.07	7.5	9.0	50	45	40	30	30	20	45	40	35	25	30	20	1
ZX05-1HW	5-750	DC-750	6.0	0.10	8.6	9.0	64	45	48	35	42	28	50	35	40	30	30	20	1
ZLW-2H	2-1000	DC-1000	6.34	0.14	7.5	10.0	50	40	35	25	35	25	45	35	30	20	25	20	1
ZFM-2H	5-1000	DC-1000	6.12	0.12	7.0	10.0	50	40	40	30	30	20	45	40	35	25	25	17	1
ZX05-10H	10-1000	DC-800	7.0	0.10	8.5	9.5	68	52	55	38	47	25	46	30	32	20	26	13	1
ZP-2H	50-1000	DC-1000	6.20	0.22	7.5	9.0	58	40	47	30	42	25	58	35	44	25	28	18	1
ZFM-4H	5-1200	DC-1200	4.97	0.11	8.0	9.0	50	40	35	25	30	20	50	40	35	20	30	20	1
ZP-5H	20-1500	DC-1000	7.50	0.17	8.5	9.0	62	55	50	40	38	25	40	25	29	18	20	8	1
ZX05-17H	100-1700	50-1500	7.2	0.10	8.5	9.5	32	20	—	—	36	22	32	20	—	—	37	22	2
ZP-11AH	1400-1900	40-500	7.30	0.28	9.0	9.0			35	25					30	15			1
ZX05-20H	1500-2000	DC-300	5.2	0.20	7.8	7.8			31	22					34	20			1
ZAD-11H	10-3000	10-1000	6.83	0.09	10.0	12.0	27	20	25	18	23	16	27	20	25	18	23	16	2
ZLW-11H	10-3000	10-1000	6.83	0.09	10.0	12.0	27	20	25	18	23	16	27	20	25	18	23	16	2
ZX05-43H	1000-4000	DC-1500	6.1	0.1	—	9.6			35	25					21	7			1
ZMX-7GHR	3700-7000	DC-1000	5.3	0.30	—	8.5			33	20					34	20			1
ZX05-762H	2300-7600	DC-3000	6.0	0.2	—	8.5			30	16					25	11			1
ZMX-8GH	3700-8000	DC-2000	5.8	0.30	—	8.5			40	20					18	8			1
ZX05-14H	3700-10000	DC-4000	7.0	0.3	—	10.8			38	27					15	9			1
LEVEL 23 +23 dBm LO up to +20 dBm RF																			
ZAY-3	0.07-200	DC-200	5.53	0.08	7.5	8.0	55	45	40	30	30	25	55	45	40	30	30	20	1
ZMY-3	0.07-200	DC-200	5.53	0.08	7.5	8.0	55	45	40	30	30	25	55	45	40	30	30	20	1
ZFY-1	0.1-500	0.01-500	4.85	0.18	6.0	7.5	40	20	46	35	40	30	37	23	46	35	40	30	2
ZAY-1	5-500	DC-500	6.57	0.09	7.5	8.5	55	45	40	30	30	25	55	45	40	30	30	20	1
ZMY-1	5-500	DC-500	6.62	0.10	7.5	8.5	55	45	40	30	30	25	55	45	40	30	30	20	1
ZFY-2	0.1-1000	0.01-500	5.40	0.24	7.5	9.5	40	20	40	30	30	25	37	23	40	25	25	15	2
ZAY-2	10-1000	DC-1000	6.89	0.22	8.5	10.0	50	35	40	30	35	25	50	35	35	25	25	20	1
ZMY-2	10-1000	DC-1000	6.89	0.22	8.5	10.0	50	35	40	30	35	25	50	35	35	25	25	20	1
ZFY-11	10-2400	5-1000	7.40	0.09	8.5	10.0	28	20	25	20	25	20	28	20	26	20	25	20	2

MODEL PREFIX	LO LEVEL (dBm)	RF IN @ 1 dB compr. Typ. (dBm)	FREQUENCY (MHz) IF (IN)	LO	RF (OUT)	CONVERSION LOSS (dB) Typ.	σ	Max.	LO-IF (IN) ISOLATION (dB) Typ.	Min.	LO-RF (OUT) ISOLATION (dB) Typ.	Min.	IP3 @ centerband (dBm) Typ.	SCHEMATIC
UP CONVERTERS 0.1 to 7100 MHz														
ZX05-U63	7	+1	1600-2500	3100-5700	3800-6000	7.0	0.3	8.6	17	13	40	28	10	1
ZX05-U742MH	13	+9	0.1-3300	2300-7400	2300-7400	8.3	0.2	9.9	23	10	25	11	20	1
ZX05-U432H	17	+14	0.1-800	1100-4250	1100-3900	7.5	0.2	9.8	24	13	35	26	26	1
ZX05-U712H	17	+14	2600-7100	10-1780	2600-7100	7.5	0.3	9.2	30	17	24	15	27	1

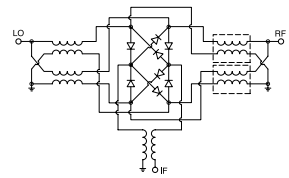
L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)
m = mid band ($2f_L$ to $f_U/2$)

ELECTRICAL SCHEMATICS

1 DOUBLE BALANCED MIXER



2 TRIPLE BALANCED MIXER



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MODULATORS/DEMODULATORS 50 Ω

9 MHz to 10.5 GHz QPSK, I&Q

ZFMIQ
Case J17

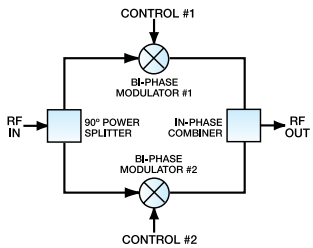
ZMQ, ZAMIQ
Case HHH141

MODEL PREFIX	FREQUENCY (MHz)	INSERTION LOSS (dB) Typ.	INSERTION LOSS (dB) Max.	AMPLITUDE UNBALANCE (dB) Typ.	AMPLITUDE UNBALANCE (dB) Max.	PHASE UNBALANCE (Deg.)± With reference to 90° Typ.	PHASE UNBALANCE (Deg.)± With reference to 90° Max.	1dB COMPR. (dBm) Typ.	VSWR (:1) TYP. In	VSWR (:1) TYP. Out
QPSK MODULATORS *wideband 360° in 90° steps Control current ±20 mA*										
ZMQ-1050	800-1050	5.5	7.5	0.5	1.0	3	7	4	2.0	2.0

MODEL PREFIX	FREQUENCY (MHz) RF (signal)/ LO (carrier) f_L-f_U		FREQUENCY (MHz) I&Q Min.	FREQUENCY (MHz) I&Q Max.	CONVERSION LOSS (dB) $\bar{x}$	CONVERSION LOSS (dB) σ	CONVERSION LOSS (dB) Max.	CARRIER REJECTION (-dBc) Typ.	CARRIER REJECTION (-dBc) Min.	SIDEBAND REJECTION (-dBc) Typ.	SIDEBAND REJECTION (-dBc) Min.	HARMONIC SUPPRESSION (-dBc) 3XI/Q Typ.	HARMONIC SUPPRESSION (-dBc) 3XI/Q Min.	HARMONIC SUPPRESSION (-dBc) 5XI/Q Typ.	HARMONIC SUPPRESSION (-dBc) 5XI/Q Min.
I&Q MODULATORS *High Rejection of Carrier and Sideband LO = 10 dBm IF up to 0 dBm*															
ZFMIQ-10M	9	11	DC	2	5.8	0.20	7.0	41	30	40	30	58	45	68	58
ZFMIQ-70ML	66	73	DC	5	5.7	0.10	6.5	38	30	38	30	48	43	58	55
ZFMIQ-91M	86	95	DC	5	5.5	0.17	6.5	38	30	38	30	48	45	58	55
ZFMIQ-100M	95	105	DC	5	5.5	0.17	6.5	38	30	38	30	48	45	58	55
ZAMIQ-895M	868	895	DC	5	8.0	0.10	10.5	40	30	40	30	52	35	58	50

MODEL PREFIX	FREQUENCY (MHz) RF (signal)/ LO (carrier) f_L	f_U	FREQUENCY (MHz) I&Q Min.	FREQUENCY (MHz) I&Q Max.	CONVERSION LOSS (dB) $\bar{X}$	CONVERSION LOSS (dB) σ	CONVERSION LOSS (dB) Max.	AMPLITUDE UNBALANCE (dB) Typ.	AMPLITUDE UNBALANCE (dB) Max.	PHASE UNBALANCE (Deg.)± With reference to 90° Typ.	PHASE UNBALANCE (Deg.)± With reference to 90° Max.	HARMONIC SUPPRESSION (-dBc) 3XI/Q Typ.	HARMONIC SUPPRESSION (-dBc) 3XI/Q Min.	HARMONIC SUPPRESSION (-dBc) 5XI/Q Typ.	HARMONIC SUPPRESSION (-dBc) 5XI/Q Min.
I&Q DEMODULATORS *LO = 10 dBm RF up to 4 dBm*															
ZFMIQ-10D	9	11	DC	2	6.0	0.10	7.0	0.15	0.3	1.0	3.0	50	35	35	55
ZFMIQ-70D	66	73	DC	2	6.2	0.10	7.0	0.15	0.5	0.7	3.0	56	45	58	55
ZAMIQ-895D	868	895	DC	5	8.0	0.20	10.5	0.15	0.3	1.5	4.0	52	35	58	50

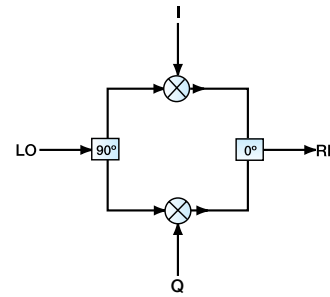
QPSK Block Diagram



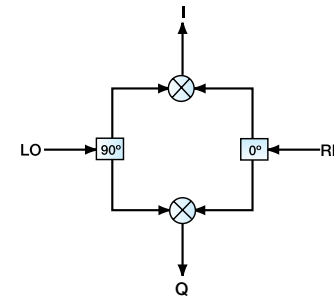
Phase Shift VS. Control Current

Cont-1 (mA)	Cont-2 (mA)	Phase Shift (Deg.)
+20	+20	0
+20	-20	90
-20	-20	180
-20	+20	270

I&Q Modulator Block Diagram



I&Q Demodulator Block Diagram



MATCHING PADS, IMPEDANCE 50 to 75 Ω

DC to 3 GHz Resistive minimum loss

BMP
Case FF55

UNMP
Case FF779

MODEL PREFIX	FREQUENCY RANGE (MHz) f_L - f_U	ATTENUATION (dB) Nom.	Flatness Max. L	M	U	VSWR (:1) Max. L	M	U	CONNECTORS Impedance	Type
BMP-5075	DC-2000	5.7±0.1	0.2	0.3	0.4	1.06	1.22	1.4	75 Ω 50 Ω	Male BNC Female BNC
BMP-5075R	DC-2000	5.7±0.1	0.2	0.3	0.4	1.06	1.22	1.4	75 Ω 50 Ω	Female BNC Male BNC
UNMP-5075	DC-3000	5.7±0.15	0.2	0.3	0.4	1.10	1.30	1.5	75 Ω 50 Ω	Male Type-N Female Type-N

L = low range (DC to 100 MHz) M = mid range (100 to 1000 MHz) U = upper range (1000 MHz to f_U)

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MULTIPLIERS, FREQUENCY 50 Ω

0.1 MHz to 10 GHz

FK
Case H16

MK
Case L19

GK
Case L20

FD
Case FF55

ZX90
Case JA1242

ZX90
Case BY1298

MODEL PREFIX	FREQUENCY (MHz) Input	FREQUENCY (MHz) Output	RF INPUT POWER (dBm) Min.	RF INPUT POWER (dBm) Max.	CONVERSION LOSS (dB) Typ.	CONVERSION LOSS (dB) Max.	HARMONIC OUTPUT (dBc) F1 Typ.	F1 Min.	F3 Typ.	F3 Min.	F4 Typ.	F4 Min.
X 2							BELOW F2					
MK-3	0.05-50	0.1-100	0	13	11.0	17.0	40	28	45	30	16	12
	50-150	100-300	0	13	11.5	15.0	35	20	40	20	16	12
FD-2	5-100	10-200	1	15	13.0	16.0	40	30	50	40	16	12
	100-300	200-600	1	15	13.5	15.5	25	20	40	30	16	12
	300-500	600-1000	1	15	14.0	16.5	20	15	30	25	16	12
MK-2	5-100	10-200	1	15	13.0	16.0	40	30	50	40	16	12
	100-300	200-600	1	15	13.5	15.5	25	20	40	30	16	12
	300-500	600-1000	1	15	14.0	16.5	20	15	30	25	16	12
ZX90-2-13	10-500	20-1000	4	10	11.0	14.5	45	21	45	25	21	12
FK-5	10-600	20-1200	10	20	13.0	15.0	20	10	26	20	15	10
	600-1000	1200-2000	10	20	14.0	17.0	20	10	25	20	25	15
GK-5	10-600	20-1200	10	20	13.0	15.0	20	10	26	20	15	10
	600-1000	1200-2000	10	20	14.0	17.0	20	10	25	20	25	15
MK-5	10-600	20-1200	10	20	13.0	15.0	20	10	26	20	15	10
	600-1000	1200-2000	10	20	14.0	17.0	20	10	25	20	25	15
FK-3000	70-1000	140-2000	12	15	11.0	14.0	31	20	40	25	15	10
	1000-1500	2000-3000	12	15	12.0	17.5	22	15	30	20	30	14
ZX90-2-11	500-1100	1000-2200	5	10	10.5	13.5	27	21	34	25	21	12
	550-750	1100-1500	5	10	10.0	13.5	30	21	34	25	21	12
ZX90-2-19	1100-1900	2200-3800	5	10	10.5	14.5	27	20	30	23	17	11
ZX90-2-36	1700-3600	3400-7200	8	13	11.0	15.0	18	11	32	22	17	10
	2100-2700	4200-5400	8	13	10.0	14.0	23	14	35	22	17	10
ZX90-2-50	3500-5000	7000-10000	7	12	12.5	17.0	15	7	28	17	30	17

							F1 Typ.	F1 Min.	F2 Typ.	F2 Min.	F4 Typ.	F4 Min.
X 3							BELOW F3					
ZX90-3-122	300-400	900-1200	0	6	16.0	20.0	48	30	60	40	70	40
ZX90-3-452	1000-1500	3000-4500	10	16	14.7	18.0	40	30	55	40	55	38
ZX90-3-692	1700-2300	5100-6900	9	13	14.7	20.0	40	29	40	25	40	25
ZX90-3-812	2000-2700	6000-8100	0	5	15.0	22.0	30	21	48	30	48	27

							F1 to F3 Typ.	F1 to F3 Min.	F4 Typ.	F4 Min.	F5 to F9 Typ.	F5 to F9 Min.	F10 to F16 Typ.	F10 to F16 Min.
X 12							BELOW F12							
ZX90-12-63	375-500	4500-6000	-4	0	6.5	12.0	65	50	34	23	48	33	26	20

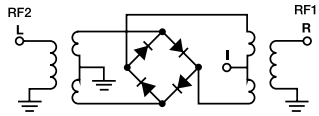
PHASE DETECTORS *High Output 50 Ω*

1 MHz to 100 MHz

ZRPD
Case M22

MODEL PREFIX	FREQUENCY (MHz) RF1 RF2	FREQUENCY (MHz) I	POWER IN RF1 RF2 (dBm)	SCALE FACTOR mV/deg.	IMPEDANCE (OHMS) output load I	ISOLATION (dB) RF1-RF2 Min.	OUTPUT POLARITY RF1/RF2 In-phase	DC OUTPUT (mV) note 2 Typ.	DC OUTPUT (mV) note 2 Max. Min.	DC OUTPUT (mV) note 2 Offset Typ.	DC OUTPUT (mV) note 2 Offset Max.	FIGURE-OF-MERIT M Typ.
ZRPD- 1	1- 100	DC- 50	7	8	500	40	neg.	1000	700	0.2	1	143

ELECTRICAL SCHEMATIC



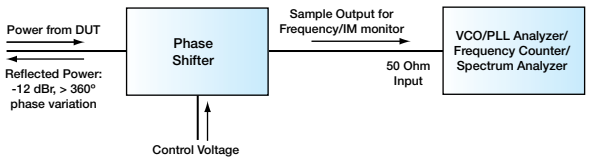
PHASE SHIFTERS *360° VOLTAGE VARIABLE 50 Ω*

80 MHz to 1300 MHz

ELS
Case K18

MODEL PREFIX	FREQUENCY RANGE, (MHz) f_L-f_U	INPUT POWER (dBm) Max.	PHASE RANGE Degrees Min.	RETURN LOSS (dB) Typ.	CONTROL VOLTAGE (V)
FIXED MAGNITUDE MISMATCH	***RF up to 13 dBm***				
ELS-210	80-210	10	360	10-12	0.5-25
ELS-450	180-450	10	360	10-12	0.5-25
ELS-950	400-950	10	360	10-12	0.5-25
ELS-1300	750-1300	10	360	10-12	1-25

APPLICATION BLOCK DIAGRAM VCO (DUT) Load Pull Test



Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp.

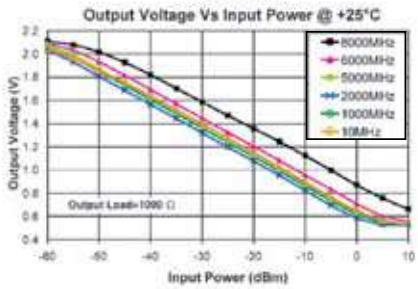
POWER DETECTORS 50 Ω

10 MHz to 8 GHz -60 dBm to +20 dBm

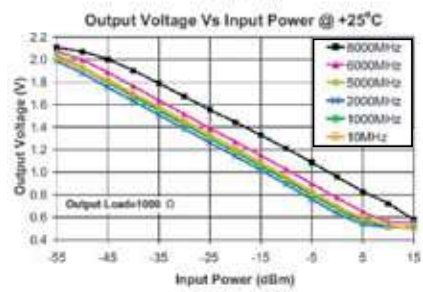
ZX47
Case HN1173

MODEL PREFIX	FREQUENCY (MHz) Min.	FREQUENCY (MHz) Max.	DYNAMIC RANGE @ ± 1dB Error (dBm) Typ.	OUTPUT VOLTAGE RANGE (V) Typ.	SLOPE (mV/dB) Typ.	VSWR (:1) Typ.	PULSE RESPONSE TIME Rise (nsec) Typ.	PULSE RESPONSE TIME Fall (nsec) Typ.	TEMP. SENSOR OUTPUT SLOPE (mV/°C) Typ.	DC OPERATING POWER Vcc (volts) Min.	DC OPERATING POWER Vcc (volts) Typ.	DC OPERATING POWER Vcc (volts) Max.	DC OPERATING POWER Current (mA) Typ.
ZX47-60	10 1000 5000 6000	1000 5000 6000 8000	-55 to 0 -60 to -5 -55 to +5 -50 to +5	0.50-2.10	-25	1.1 1.8 1.7 1.4	400	10	2.00	4.5	5.0	5.5	100
ZX47-60LN	10 1000 5000 6000	1000 5000 6000 8000	-55 to 0 -60 to -5 -55 to +5 -50 to +5	0.50-2.10	-25	1.1 1.8 1.7 1.4	800	400	2.00	4.5	5.0	5.5	100
ZX47-55	10 1000 5000 6000	1000 5000 6000 8000	-50 to +5 -55 to 0 -50 to +5 -45 to +10	0.50-2.10	-25	1.05 1.40 1.50 1.30	400	10	2.00	4.5	5.0	5.5	100
ZX47-55LN	10 1000 5000 6000	1000 5000 6000 8000	-50 to +5 -55 to 0 -50 to +5 -45 to +10	0.50-2.10	-25	1.05 1.40 1.50 1.30	800	400	2.00	4.5	5.0	5.5	100
ZX47-50	10 1000 5000 6000	1000 5000 6000 8000	-45 to +10 -50 to +5 -45 to +10 -40 to +15	0.50-2.10	-25	1.05 1.20 1.30 1.20	400	10	2.00	4.5	5.0	5.5	100
ZX47-50LN	10 1000 5000 6000	1000 5000 6000 8000	-45 to +10 -50 to +5 -45 to +10 -40 to +15	0.50-2.10	-25	1.05 1.20 1.30 1.20	800	400	2.00	4.5	5.0	5.5	100
ZX47-40	10 1000 5000 6000	1000 5000 6000 8000	-40 to +20 -40 to +15 -35 to +20 -30 to +20	0.50-2.10	-25	1.03 1.10 1.20 1.40	400	10	2.00	4.5	5.0	5.5	100
ZX47-40LN	10 1000 5000 6000	1000 5000 6000 8000	-40 to +20 -40 to +15 -35 to +20 -30 to +20	0.50-2.10	-25	1.03 1.10 1.20 1.40	800	400	2.00	4.5	5.0	5.5	100

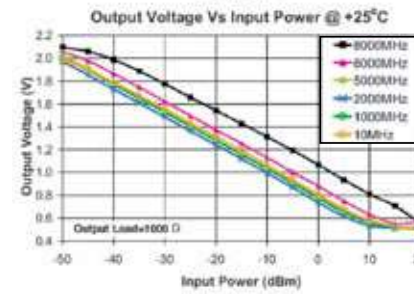
ZX47-60



ZX47-55



ZX47-50



POWER SPLITTERS/COMBINERS 50 Ω & 75 Ω

DC to 18 GHz

ZX10 Case FL905 | ZX10Q Case GW1052 | ZESC-2 Case V37 | IZY2PD, ZFRSC Case JJJ245 | ZFSC, ZFSCJ, ZFRSC, ZFSC-2 Case K18 | ZC2PD Case F183 | ZN2PD Case VVV180, VVV845

MODEL PREFIX	FREQUENCY RANGE (MHz)	ISOLATION (dB)						INSERTION LOSS, (dB)						PHASE UNBAL., degrees			AMPLITUDE UNBAL. (dB)			RF POWER MAX (W)	
		L		M		U		L		M		U		L	M	U	L	M	U	Sum Port (Matched output ports)	Internal Dissipation
	f_L-f_U	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Max.	Max.	Max.	Max.	Max.	Max.		
2 WAY - 0°								*Insertion Loss Above 3 dB*													
ZFSC-2-6	0.002-60	27	20	30	20	27	20	0.3	0.6	0.3	0.6	0.6	1.0	2	3	4	0.15	0.20	0.30	1.0	0.125
ZMSC-2-2	0.002-60	27	20	30	20	27	20	0.3	0.6	0.3	0.6	0.6	1.0	2	3	4	0.15	0.25	0.30	1.0	0.125
ZSC-2-2	0.002-60	25	20	30	20	27	20	0.3	0.6	0.3	0.6	0.6	1.0	2	3	4	0.15	0.25	0.30	1.0	0.125
ZMSC-2-1	0.1-400	20	15	25	20	25	20	0.2	0.5	0.4	0.75	0.6	1.0	2	3	4	0.15	0.20	0.30	1.0	0.125
ZSC-2-1	0.1-400	20	15	25	20	25	20	0.2	0.5	0.4	0.75	0.6	1.0	2	3	4	0.15	0.20	0.30	1.0	0.125
ZFSC-2-1	5-500	30	25	28	20	25	20	0.2	0.5	0.3	0.6	0.6	0.8	2	4	4	0.15	0.15	0.30	1.0	0.125
ZMSC-2-1W	1-650	25	20	35	20	25	20	0.3	0.5	0.5	0.8	0.7	1.0	2	3	4	0.15	0.20	0.30	1.0	0.125
ZSC-2-1W	1-650	25	20	35	25	25	20	0.3	0.5	0.5	0.8	0.7	1.0	2	3	4	0.15	0.20	0.30	1.0	0.125
ZFSC-2-1W	1-750	30	20	28	20	25	20	0.2	0.5	0.4	0.8	0.8	1.0	2	4	4	0.15	0.15	0.30	1.0	0.125
ZAPD-900-5W	100-900	23	18	23	18	23	18	0.3	1.0	0.3	1.0	0.3	1.0	3	3	3	0.30	0.30	0.30	5.0	1.000
ZC2PD-900	800-900	30	20	30	20	30	20	0.1	0.4	0.1	0.4	0.1	0.4	2	2	2	0.20	0.20	0.20	10.0	0.125
ZN2PD-920	800-920	30	20	30	20	30	20	0.15	0.4	0.15	0.4	0.15	0.4	2	2	2	0.20	0.20	0.20	10.0	0.125
ZFSC-2-4	0.2-1000	20	15	25	20	23	18	0.2	0.8	0.5	1.0	0.9	1.2	2	4	4	0.15	0.15	0.30	1.0	0.125
ZAPD-1	500-1000	25	19	25	19	25	19	0.25	0.6	0.25	0.6	0.25	0.6	2	2	2	0.20	0.20	0.20	10.0	0.125
ZFSC-2-2	10-1000	30	20	25	20	23	18	0.2	0.5	0.5	1.0	0.9	1.2	2	4	4	0.15	0.15	0.30	1.0	0.125
ZSC-2-4	10-1000	25	20	35	20	25	20	0.2	0.5	0.5	0.8	0.7	1.3	2	4	6	0.15	0.20	0.30	1.0	0.125
ZN2PD-920W	700-1050	22	15	22	15	22	15	0.15	0.5	0.15	0.5	0.15	0.5	3	3	3	0.30	0.30	0.30	10.0	0.125
ZX10-2-12	2-1200	21	16	21	16	21	16	0.5	1.5	0.5	1.5	0.5	1.5	3	3	3	0.50	0.50	0.50	0.5	0.125
ZFSC-2-5	10-1500	25	15	30	20	25	18	0.25	0.6	0.5	1.0	0.8	1.5	2	3	4	0.15	0.20	0.50	1.0	0.125
ZAPD-1750	950-1750	30	22	30	22	30	22	0.2	0.4	0.2	0.4	0.2	0.4	4	4	4	0.50	0.50	0.50	10.0	0.125
ZN2PD-1900	1600-1900	30	20	30	20	30	20	0.18	0.4	0.18	0.4	0.18	0.4	2	2	2	0.20	0.20	0.20	10.0	0.125
ZESC-2-11	10-2000	19	10	18	13	20	11	0.5	0.9	0.5	1.0	0.6	1.2	1	3	6	0.20	0.30	0.50	1.0	0.125
ZFSC-2-11	10-2000	14	10	16	14	20	15	1.2	1.5	1.2	1.5	1.0	2.0	1	2	4	0.20	0.30	0.50	1.0	0.125
ZX10-2-20	200-2000	20	16	20	16	20	16	0.8	2.2	0.8	2.2	0.8	2.2	6	6	6	4.00	4.00	4.00	0.5	0.125
ZAPD-21	500-2000	25	18	25	18	25	18	0.25	1.0	0.25	1.0	0.25	1.0	3	3	3	0.20	0.20	0.20	10.0	0.125
ZAPD-20	700-2000	30	20	30	20	30	20	0.30	0.7	0.30	0.7	0.30	0.7	3	3	3	0.40	0.40	0.40	10.0	0.125
ZAPD-23	700-2000	27	20	27	20	27	20	0.4	0.8	0.4	0.8	0.4	0.8	2	2	2	0.20	0.20	0.20	10.0	0.5
ZN2PD-20	750-2000	18	15	25	20	18	15	0.2	0.5	0.2	0.5	0.2	0.5	4	4	4	0.30	0.30	0.30	5.0	0.725
ZAPD-2	1000-2000	25	19	25	19	25	19	0.25	0.6	0.25	0.6	0.25	0.6	2	2	2	0.20	0.20	0.20	10.0	0.125
ZN2PD-1900W	1500-2000	24	15	24	15	24	15	0.2	0.5	0.2	0.5	0.2	0.5	3	3	3	0.30	0.30	0.30	10.0	0.125
ZAPD-2DC	950-2150	22	18	22	18	22	18	0.3	0.7	0.3	0.7	0.3	0.7	5	5	5	0.30	0.30	0.30	10.0	0.125
ZN2PD1-222	600-2200	21	14	21	14	21	14	0.3	0.8	0.3	0.8	0.3	0.8	3	3	3	0.40	0.40	0.40	10.0	0.250
ZX10-2-222	800-2200	24	17	24	17	24	17	0.8	1.5	0.8	1.5	0.8	1.5	4	4	4	0.20	0.20	0.20	1.5	0.75
ZFSC-2-2500	10-2500	16	11	17	14	17	14	0.5	0.8	0.6	1.4	0.8	1.5	1	4	8	0.20	0.30	0.40	1.0	0.125
ZX10-2-252	500-2500	22	10	22	10	22	10	0.9	1.7	0.9	1.7	0.9	1.7	4	4	4	0.20	0.20	0.20	1.5	0.75
ZX10-2-25	1000-2500	20	14	20	14	20	14	1.2	2.2	1.2	2.2	1.2	2.2	10	10	10	1.20	1.20	1.20	1.0	0.125
ZAPD-30	20-3000	14	12	16	12	20	14	1.1	1.5	1.1	1.8	1.4	2.3	3	5	9	0.30	0.40	0.80	1.0	0.125
ZX10-2-332	1600-3300	24	17	24	17	24	17	0.8	1.5	0.8	1.5	0.8	1.5	5	5	5	0.20	0.20	0.20	1.5	0.75
ZX10-2-42	1900-4200	23	10	23	10	23	10	0.2	1.0	0.2	1.0	0.2	1.0	3	3	3	0.30	0.30	0.30	1.0	0.10
ZAPD-4	2000-4200	25	19	25	19	25	19	0.4	0.8	0.4	0.8	0.4	0.8	6	6	6	0.40	0.40	0.40	10.0	0.125
ZX10-2-442	1500-4400	11	20	11	20	11	20	1.0	2.1	1.0	2.1	1.0	2.1	6	6	6	0.30	0.30	0.30	1.5	0.75
ZN2PD2-50	500-5000	25	15	25	15	25	15	0.8	1.4	0.8	1.4	0.8	1.4	4	4	4	0.50	0.50	0.50	10.0	0.250
ZAPD-50	4400-5000	26	20	26	20	26	20	0.3	0.8	0.3	0.8	0.3	0.8	5	5	5	0.50	0.50	0.50	10.0	0.125
ZN2PD2-63	350-6000	25	15	25	15	25	15	0.6	1.6	0.6	1.6	0.6	1.6	4	4	4	0.50	0.50	0.50	10.0	1.0
ZN2PD-63	1800-6000	24	19	24	19	24	19	0.4	0.7	0.4	0.7	0.4	0.7	4	4	4	0.30	0.30	0.30	10.0	0.250
ZAPD-50W	4200-6000	26	16	26	16	26	16	0.3	0.8	0.3	0.8	0.3	0.8	5	5	5	0.70	0.70	0.70	10.0	0.125
ZX10-2-622	2900-6200	24	16	24	16	24	16	0.9	1.5	0.9	1.5	0.9	1.5	9	9	9	0.30	0.30	0.30	1.5	0.75
IZY2PD-64	5800-6400	35	24	35	24	35	24	0.2	0.5	0.2	0.5	0.2	0.5	5	5	5	0.30	0.30	0.30	1.0	0.125
ZX10-2-71	2950-7100	23	10	23	10	23	10	0.25	0.9	0.25	0.9	0.25	0.9	3	3	3	0.40	0.40	0.40	1.0	0.125
ZX10-2-722	2800-7200	22	11	22	11	22	11	0.8	1.6	0.8	1.6	0.8	1.6	10	10	10	0.40	0.40	0.40	1.5	0.75
IZY2PD-86	7000-8600	30	18	30	18	30	18	0.1	0.5	0.1	0.5	0.1	0.5	6	6	6	0.25	0.25	0.25	1.0	0.125
ZN2PD-9G	1700-9000	22	15	22	15	22	15	0.5	1.4	0.5	1.4	0.5	1.4	4	4	4	0.60	0.60	0.60	10.0	0.125
ZFSC-2-9G	3500-9000	18	12	—	—	20	12	0.5	1.5	—	—	0.6	1.2	7	—	10	0.30	—	0.50	1.0	0.125
ZX10-2-98	4750-9800	23	10	23	10	23	10	0.3	1.2	0.3	1.2	0.3	1.2	9	9	9	0.50	0.50	0.50	1.0	0.125
ZFSC-2-10G	2000-10000	15	9	—	—	20	12	0.5	1.5	—	—	0.6	1.6	7	—	12	0.60	—	0.50	1.0	0.125
ZX10-2-126	7400-12600	23	10	23	10	23	10	0.3	1.3	0.3	1.3	0.3	1.3	10	10	10	0.50	0.50	0.50	1.0	0.100

■ *75 Ω*

L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)

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ZAPD, ZAPO, ZAOQ, ZAPOJ
Case F14, F53

ZMSC-2, ZMSC-J, ZMSC-Q
Case M21

ZSC-2
Case M22

ZN2PD1
Case AB762

MODEL PREFIX	FREQUENCY RANGE (MHz) f_L-f_U	ISOLATION (dB) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	INSERTION LOSS, (dB) L Typ.	L Max.	M Typ.	M Max.	U Typ.	U Max.	PHASE UNBAL., degrees L Max.	M Max.	U Max.	AMPLITUDE UNBAL. (dB) L Max.	M Max.	U Max.	RF POWER MAX (W) Sum Port (Matched output ports)	Internal Dissipation
2 WAY - 0°								*Insertion Loss Above 3 dB*													
■ ZSC-2-2-75	0.002-60	25	20	30	20	27	20	0.3	0.6	0.3	0.6	0.6	1.0	2.0	3.0	4.0	0.15	0.25	0.30	1.0	0.125
■ ZFSC-2-6-75	0.004-60	30	20	35	20	25	20	0.5	0.8	0.4	0.8	0.7	1.0	1.0	2.0	3.0	0.15	0.20	0.30	1.0	0.125
■ ZSC-2375	55-85	35	25	35	25	35	25	0.3	0.5	0.3	0.5	0.3	0.5	1.0	1.0	1.0	0.10	0.10	0.10	1.0	0.125
■ ZFSC-2-1-75	0.25-300	20	15	30	25	25	20	0.4	0.75	0.4	0.75	0.4	1.0	2.0	3.0	5.0	0.15	0.20	0.30	1.0	0.125
■ ZSC-2-1-75	0.25-300	20	15	30	20	20	15	0.4	0.75	0.4	0.75	0.4	1.0	2.0	3.0	5.0	0.15	0.20	0.30	1.0	0.125
■ ZFSC-2-1W-75	5-600	44	26	45	30	31	20	0.22	0.6	0.27	0.7	0.46	0.9	1.0	2.0	3.0	0.20	0.30	0.40	1.0	0.125
■ ZAPD-2-22-75	910-2150	30	20	30	20	30	20	0.2	0.7	0.2	0.7	0.2	0.7	2.0	2.0	2.0	0.40	0.40	0.40	5.0	0.250
■ ZAPD-162-75	600-1600	32	20	32	20	32	20	0.3	0.7	0.3	0.7	0.3	0.7	2.0	2.0	2.0	0.30	0.30	0.30	10.0	0.125
■ ZAPD-2-252-75	5-2500	20	12	26	16	23	14	0.4	0.8	0.6	1.7	1.1	1.7	2.0	3.0	5.0	0.20	0.40	0.40	1.0	0.04
2 WAY - 0° *Resistive*								*Insertion Loss Above 6 dB*													
ZFRSC-2050	DC-2000	6.2	6.2	6.6	6.6	7.0	7.0	0.1	0.2	0.3	0.6	0.5	1.4	1.0	2.0	5.0	0.1	0.2	0.5	0.75	0.375
ZFRSC-42	DC-4200	6.2	6.2	6.5	6.6	7.0	7.0	0.1	0.2	0.1	0.5	0.4	1.4	1.0	3.0	5.0	0.1	0.2	0.5	0.75	0.375
ZFRSC-123	DC-12000	19.5	—	—	—	19.5	—	3.5	4.0	—	—	3.5	4.0	3.0	—	5.0	0.25	—	0.4	0.16	0.08
ZFRSC-183	DC-18000	6.2	—	6.5	—	7.0	—	0.3	0.7	0.7	1.25	1.0	—	4.0	7.0	10.0	0.2	0.5	0.5	0.16	0.08
ZX10R-14	DC-10000	6.0	—	6.0	—	6.0	—	0.1	0.2	0.5	1.0	1.5	1.8	1.0	3.0	6.0	0.1	0.2	0.3	0.16	0.08
■ ZFRSC-2075	DC-2000	6.2	6.2	6.6	6.6	7.0	7.0	0.1	0.2	0.3	0.6	0.5	1.4	1.0	2.0	5.0	0.1	0.2	0.5	0.75	0.375
2 WAY - 90°								*Avg. of Coupled Outputs less 3 dB*													
ZMSCQ-2-50	25-50	27	20	27	20	27	20	0.3	0.7	0.3	0.7	0.3	0.7	3.0	3.0	3.0	1.5	1.5	1.5	1.0	0.125
ZMSCQ-2-90	55-90	30	20	30	20	30	20	0.3	0.7	0.3	0.7	0.3	0.7	3.0	3.0	3.0	1.2	1.2	1.2	1.0	0.125
ZSCQ-2-90	55-90	30	20	30	20	30	20	0.3	0.7	0.3	0.7	0.3	0.7	3.0	3.0	3.0	1.2	1.2	1.2	1.0	0.125
ZMSCQ-2-120	80-120	21	18	21	18	21	18	0.3	0.7	0.3	0.7	0.3	0.7	3.0	3.0	3.0	1.5	1.5	1.5	1.0	0.125
ZMSCQ-2-180	120-180	23	15	23	15	23	15	0.3	0.7	0.3	0.7	0.3	0.7	4.0	4.0	4.0	1.2	1.2	1.2	1.0	0.125
ZX10Q-2-3	220-470	24	18	24	18	24	18	0.6	0.8	0.6	0.8	0.6	0.8	8.0	8.0	8.0	1.3	1.3	1.3	15.0	▲
ZX10Q-2-5	330-580	22	14	22	14	22	14	0.4	0.9	0.4	0.9	0.4	0.9	5.0	5.0	5.0	1.3	1.3	1.3	20.0	▲
ZX10Q-2-7	425-675	17	11	17	11	17	11	0.4	1.0	0.4	1.0	0.4	1.0	8.0	8.0	8.0	1.0	1.0	1.0	20.0	▲
ZX10Q-2-12	800-1250	17	13	17	13	17	13	0.35	0.7	0.35	0.7	0.35	0.7	5.0	5.0	5.0	0.8	0.8	0.8	20.0	▲
ZX10Q-2-19	1100-1925	26	19	26	19	26	19	0.4	0.9	0.4	0.9	0.4	0.9	4.0	4.0	4.0	1.1	1.1	1.1	20.0	▲
ZAPDQ-2	1000-2000	22	16	22	16	22	16	0.4	1.4	0.4	1.4	0.4	1.4	6.0	6.0	6.0	0.8	0.8	0.8	1.0	▲
ZX10Q-2-25	1350-2450	25	17	25	17	25	17	0.4	0.9	0.4	0.9	0.4	0.9	5.0	5.0	5.0	1.1	1.1	1.1	20.0	▲
ZX10Q-2-27	1700-2700	23	18	23	18	23	18	0.4	0.7	0.4	0.7	0.4	0.7	5.0	5.0	5.0	1.0	1.0	1.0	20.0	4.3
ZX10Q-2-34	2500-3400	29	20	29	20	29	20	0.4	0.7	0.4	0.7	0.4	0.7	4.0	4.0	4.0	1.2	1.2	1.2	20.0	4.3
ZAPDQ-4	2000-4200	22	16	22	16	22	16	0.4	0.9	0.4	0.9	0.4	0.9	8.0	8.0	8.0	1.0	1.0	1.0	1.0	0.125
2 WAY - 180°								*Insertion Loss Above 3 dB*													
ZFSCJ-2-2	0.01-20	35	25	30	25	25	18	0.3	0.8	0.2	0.5	0.3	0.6	1.0	2.0	2.5	0.1	0.1	0.2	1.0	0.125
ZMSCJ-2-2	0.01-20	35	25	30	25	25	18	0.3	0.8	0.2	0.5	0.3	0.6	1.0	2.0	2.5	0.1	0.1	0.2	1.0	0.125
ZSCJ-2-2	0.01-20	35	25	30	25	25	18	0.3	0.8	0.2	0.5	0.3	0.6	1.0	2.0	2.5	0.1	0.1	0.2	1.0	0.125
ZMSCJ-2-1	1-200	35	30	35	25	30	23	0.75	1.0	0.6	0.8	0.75	1.2	2.0	2.5	4.0	0.3	0.15	0.3	1.0	0.125
ZSCJ-2-1	1-200	35	30	35	25	30	23	0.75	1.0	0.6	0.8	0.75	1.2	2.0	2.5	4.0	0.3	0.15	0.3	1.0	0.125
ZFSCJ-2-3	5-300	30	20	33	25	30	18	1.0	1.5	1.0	1.5	1.0	1.5	2.0	4.0	6.0	0.15	0.2	0.5	1.0	0.125
ZFSCJ-2-1	1-500	30	20	33	25	30	18	1.0	1.5	1.0	1.5	1.0	1.5	2.0	4.0	7.0	0.5	0.2	0.5	1.0	0.125
ZFSCJ-2-4	50-1000	30	20	—	—	25	18	1.2	1.9	—	—	1.6	2.4	6.0	—	7.0	0.6	—	0.6	1.0	0.125
ZAPDJ-2	1000-2000	22	18	22	18	22	18	1.3	1.8	1.3	1.8	1.3	1.8	6.0	6.0	6.0	0.8	0.8	0.8	1.0	0.125

■ *75 Ω*

▲ Total power into output ports not to exceed max sum port power.

L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)

POWER SPLITTERS/COMBINERS 50 Ω & 75 Ω

2 kHz to 8.4 GHz

ZCSC-3
Case UU233

ZB3PD1
Case UU188-1

ZFSC-3
Case J17

ZMSC-3
Case P26

ZSC-3
Case P25

ZA3PD
Case CC51

ZN3PD
Case UU181

ZB3PD
Case UU182

MODEL PREFIX	FREQUENCY RANGE (MHz)	ISOLATION (dB)						INSERTION LOSS, (dB)						PHASE UNBAL., degrees			AMPLITUDE UNBAL. (dB)			RF POWER MAX (W)	
		L		M		U		L		M		U		L	M	U	L	M	U	Sum Port (Matched output ports)	Internal Dissipation
	f_L-f_U	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Max.	Max.	Max.	Max.	Max.	Max.		
3 WAY - 0°								*Insertion Loss Above 4.8 dB*													
ZSC-3-2	0.01-30	35	30	40	25	30	25	0.25	0.45	0.15	0.45	0.45	0.75	1	2	4	0.2	0.3	0.4	1.0	0.375
ZFSC-3-13	1-200	45	30	48	35	37	30	0.25	0.5	0.35	0.6	0.35	0.6	1	3	5	0.1	0.2	0.2	1.0	0.375
ZMSC-3-1	1-200	45	35	40	25	40	25	0.3	0.5	0.4	0.7	0.6	1.0	1	2	4	0.15	0.2	0.3	1.0	0.375
ZSC-3-1	1-200	45	30	40	25	40	25	0.3	0.5	0.4	0.7	0.6	1.0	1	2	4	0.15	0.2	0.3	1.0	0.375
ZCSC-3-R3	2-300	32	28	31	28	32	22	0.3	0.8	0.4	1.0	0.8	1.2	1	2	3	0.1	0.3	0.3	1.0	0.375
ZFSC-3-1	1-500	30	20	30	20	25	18	0.4	0.75	0.5	0.9	0.8	1.2	2	3	4	0.2	0.3	0.4	1.0	0.375
ZFSC-3-1W	2-750	30	20	30	20	25	18	0.4	0.75	0.5	1.0	1.0	1.6	3	5	7	0.2	0.3	0.5	1.0	0.5
ZN3PD-900	800-900			30	20					0.2	0.4				—			0.5		10.0	0.375
ZFSC-3-4	1-1000	35	20	20	18	20	17	0.2	0.5	0.7	1.4	1.0	2.0	3	6	10	0.2	0.4	0.9	1.0	0.375
ZA3PD-1	500-1000	20	14	20	14	20	14	0.3	0.6	0.3	0.6	0.3	0.6	—	—	—	0.4	0.4	0.4	10.0	0.375
ZN3PD-900W	650-1050	22	15	22	15	22	15	0.3	0.8	0.3	0.8	0.3	0.8	—	—	—	0.8	0.8	0.8	10.0	0.375
ZA3PD-1.5	750-1500	20	14	20	14	20	14	0.3	0.7	0.3	0.7	0.3	0.7	—	—	—	0.4	0.4	0.4	10.0	0.375
ZA3PD-2	1000-2000	20	15	20	15	20	15	0.3	0.6	0.3	0.6	0.3	0.6	—	—	—	0.3	0.3	0.3	10.0	0.375
ZB3PD1-222	500-2200	25	14	25	14	25	14	0.3	1.0	0.3	1.0	0.3	1.0	—	—	—	0.7	0.7	0.7	10.0	0.5
ZB3PD-2400W	700-2400	25	17	25	17	25	17	0.5	1.2	0.5	1.2	0.5	1.2		8		0.9	0.9	0.9	1.0	0.25
ZA3PD-4	2000-4200	18	14	18	14	18	14	0.7	1.0	0.7	1.0	0.7	1.0	—	—	—	0.9	0.9	0.9	10.0	0.375
■ZSC-3-1-75	1-200	35	30	35	25	35	25	0.6	1.0	0.4	0.7	0.6	1.0	2	3	4	0.15	0.2	0.3	1.0	0.375
■ZFSC-3-4-75	1-1000	34	22	27	17	23	15	0.2	0.5	0.4	1.2	1.2	2.0	3	6	10	0.5	0.7	0.9	1.0	0.5

■ *75 Ω*

L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)

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ZX10-4
Case GR1026

ZX10-4A
Case GY1065

ZN4PD
Case UU182

ZFSC-4
Case G15

ZMSC-4
Case N24

ZSC-4
Case N27

ZA4PD
Case DD52

ZB4PD Case Z54
ZB4PD1 Case UU188

ZBSC-4
Case UU102

ZC4PD
Case Z184

ZN4PD1
Case UU846

MODEL PREFIX	FREQUENCY RANGE (MHz) f_L-f_U	ISOLATION (dB) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	INSERTION LOSS, (dB) L Typ.	L Max.	M Typ.	M Max.	U Typ.	U Max.	PHASE UNBAL., degrees L Max.	M Max.	U Max.	AMPLITUDE UNBAL. (dB) L Max.	M Max.	U Max.	RF POWER MAX (W) Sum Port (Matched output ports)	Internal Dissipation
4 WAY - 0°								*Insertion Loss Above 6 dB*													
ZMSC-4-2	0.002-20	30	20	33	25	33	25	0.45	0.75	0.3	0.5	0.7	1.0	4	6	8	0.15	0.20	0.25	1.0	0.25
ZSC-4-2	0.002-20	30	20	33	25	33	25	0.45	0.75	0.3	0.5	0.7	1.0	4	6	8	0.15	0.20	0.25	1.0	0.25
ZMSC-4-1	0.1-200	33	20	30	20	27	20	0.4	0.6	0.5	0.75	0.7	1.0	4	6	8	0.15	0.20	0.25	1.0	0.25
ZSC-4-1	0.1-200	33	20	30	20	27	20	0.4	0.6	0.5	0.75	0.7	1.0	4	6	8	0.15	0.20	0.25	1.0	0.25
ZMSC-4-3	0.25-250	33	20	30	20	27	20	0.4	0.7	0.5	0.75	0.7	1.2	4	6	10	0.15	0.20	0.25	1.0	0.25
ZSC-4-3	0.25-250	33	20	30	20	27	20	0.4	0.7	0.5	0.75	0.7	1.2	4	6	10	0.15	0.20	0.25	1.0	0.25
ZFSC-4-3	10-300	32	28	38	30	38	30	0.5	0.8	0.6	0.9	0.9	1.2	4	6	8	0.10	0.10	0.20	1.0	0.25
ZB4PD1-500	5-500	34	20	34	20	28	20	0.4	1.0	0.5	0.9	0.9	1.5	1	3	6	0.20	0.20	0.40	1.0	0.25
ZFSC-4-1W	10-500	23	20	23	20	23	20	0.6	1.5	0.6	1.5	0.6	1.5	4	8	8	0.20	0.30	0.40	1.0	0.25
ZBSC-413	10-800	26	20	18	15	18	15	0.6	1.0	1.0	1.5	1.6	2.0	4	8	8	0.20	0.40	0.60	1.0	0.25
ZC4PD-900	800-900	30	20	30	20	30	20	0.3	0.6	0.3	0.6	0.3	0.6	3	3	3	0.20	0.20	0.20	10.0	0.375
ZN4PD-920	800-920	30	20	30	20	30	20	0.25	0.5	0.25	0.5	0.25	0.5	2	2	2	0.20	0.20	0.20	10.0	0.375
ZB4PD1-930	850-930	30	20	30	20	30	20	0.3	0.5	0.3	0.5	0.3	0.5	5	5	5	0.25	0.25	0.25	10.0	0.375
ZFSC-4-1	1-1000	25	20	23	18	20	15	0.4	1.2	0.6	1.5	1.6	2.5	4	8	8	0.20	0.40	0.70	1.0	0.250
ZN4PD-920W	670-1000	22	15	22	15	22	15	0.3	0.6	0.3	0.6	0.3	0.6	3	3	3	0.20	0.20	0.20	10.0	0.375
ZB4PD1-930W	725-1050	22	15	22	15	22	15	0.3	0.8	0.3	0.8	0.3	0.8	5	5	5	0.40	0.40	0.40	10.0	0.375
ZX10-4-11	800-1125	20	15	20	15	20	15	0.6	1.3	0.6	1.3	0.6	1.3	3	3	3	0.70	0.70	0.70	2.5	0.24
ZX10-4A-11	800-1125	20	14	20	14	20	14	0.6	1.1	0.6	1.1	0.6	1.1	4	4	4	0.70	0.70	0.70	2.5	0.24
ZX10-4-14	1100-1450	20	15	20	15	20	15	0.8	1.3	0.8	1.3	0.8	1.3	7	7	7	0.80	0.80	0.80	2.5	0.24
ZX10-4A-14	1100-1450	25	16	25	16	25	16	0.6	1.0	0.6	1.0	0.6	1.0	4	4	4	0.70	0.70	0.70	2.5	0.24
ZC4PD-18	1000-1800	32	18	32	18	32	18	0.3	0.8	0.3	0.8	0.3	0.8	6	6	6	0.40	0.40	0.40	10.0	0.375
ZX10-4-19	1425-1900	20	16	20	16	20	16	0.75	1.0	0.75	1.0	0.75	1.0	6	6	6	0.90	0.90	0.90	2.5	0.24
ZX10-4A-19	1425-1900	20	16	20	16	20	16	0.75	1.1	0.75	1.1	0.75	1.1	5	5	5	0.70	0.70	0.70	2.5	0.24
ZB4PD1-2000	800-2000	25	18	25	18	25	18	0.6	1.2	0.6	1.2	0.6	1.2	—	—	—	0.30	0.30	0.30	10.0	0.375
ZA4PD-2	1000-2000	25	16	25	16	25	16	0.3	1.0	0.3	1.0	0.3	1.0	6	6	6	0.70	0.70	0.70	10.0	0.375
ZN4PD-20	1800-2000	31	20	31	20	31	20	0.3	0.7	0.3	0.7	0.3	0.7	4	4	4	0.50	0.50	0.50	10.0	0.375
ZX10-4-24	1675-2350	20	17	20	17	20	17	0.9	1.1	0.9	1.1	0.9	1.1	5	5	5	0.70	0.70	0.70	2.5	0.24
ZX10-4A-24	1675-2350	20	18	20	18	20	18	0.8	1.2	0.8	1.2	0.8	1.2	7	7	7	0.60	0.60	0.60	2.5	0.24
ZX10-4-27	2225-2700	20	16	20	16	20	16	1.0	1.5	1.0	1.5	1.0	1.5	9	9	9	1.20	1.20	1.20	2.5	0.24
ZX10-4A-27	2225-2700	20	16	20	16	20	16	1.0	1.3	1.0	1.3	1.0	1.3	6	6	6	0.90	0.90	0.90	2.5	0.24
ZB4PD-42	1700-4200	23	16	23	16	23	16	0.5	1.4	0.5	1.4	0.5	1.4	8	8	8	0.80	0.80	0.80	10.0	0.375
ZA4PD-4	2000-4200	25	16	25	16	25	16	0.5	1.0	0.5	1.0	0.5	1.0	16	16	16	0.80	0.80	0.80	10.0	0.375
ZB4PD-4	3700-4200	24	15	24	15	24	15	0.6	1.1	0.6	1.1	0.6	1.1	8	8	8	0.80	0.80	0.80	10.0	0.375
ZN4PD1-50	500-5000	23	13	23	13	23	13	0.9	1.8	0.9	1.8	0.9	1.8	8	8	8	0.60	0.60	0.60	10.0	0.75
ZB4PD1-5.8	4600-5800	25	16	25	16	25	16	0.4	0.9	0.4	0.9	0.4	0.9	5	5	5	0.40	0.40	0.40	10.0	0.375
ZN4PD1-63	2000-6000	26	17	26	17	26	17	0.7	1.3	0.7	1.3	0.7	1.3	5	5	5	0.40	0.40	0.40	10.0	1.0
ZB4PD-6.4	5400-6800	25	18	25	18	25	18	0.6	1.2	0.6	1.2	0.6	1.2	9	9	9	0.90	0.90	0.90	10.0	0.375
ZB4PD1-8.4	6700-8400	29	18	29	18	29	18	0.5	1.3	0.5	1.3	0.5	1.3	9	9	9	0.90	0.90	0.90	10.0	0.375
■ ZFSC-4375	50-90	34	30	34	30	34	30	0.3	0.8	0.3	0.8	0.3	0.8	4	4	4		0.15		1.0	0.25
■ ZSC-4-1-75	1-200	30	20	25	20	25	20	0.4	0.7	0.5	0.8	0.7	1.2	4	6	10	0.15	0.20	0.30	1.0	0.25
■ ZSC-4-3-75	0.25-250	28	20	30	20	27	20	0.4	0.8	0.3	0.7	0.5	1.0	1	2	3	0.15	0.20	0.25	1.0	0.25
■ ZB4PD1-32-75	0.25-300	34	20	36	25	28	22	0.2	0.6	0.3	0.6	0.5	1.0	1	2	3	0.15	0.20	0.25	1.0	0.25
■ ZB4PD1-500-75	5-500	34	20	34	20	30	20	0.45	1.0	0.6	0.9	1.0	1.5	1	3	6	—	0.20	—	1.0	0.25

■ *75 Ω*

L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)

POWER SPLITTERS/COMBINERS 50 Ω & 75 Ω

500 kHz to 8.4 GHz

ZFSC-5
Case G1170

ZBSC-5
Case UU102

MODEL PREFIX	FREQUENCY RANGE (MHz) f_L-f_U	ISOLATION (dB) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	INSERTION LOSS, (dB) L Typ.	L Max.	M Typ.	M Max.	U Typ.	U Max.	PHASE UNBAL., degrees L Max.	M Max.	U Max.	AMPLITUDE UNBAL. (dB) L Max.	M Max.	U Max.	RF POWER MAX (W) Sum Port (Matched output ports)	Internal Dissipation
5 WAY - 0°								*Insertion Loss Above 7 dB*													
ZFSC-5-1	1-300	25	20	23	18	20	17	0.2	0.5	0.6	1.0	1.5	2.0	2	4	8	0.20	0.30	0.60	1.0	0.5
ZBSC-5-1	120-520	25	18	25	18	25	18	1.0	2.0	1.0	2.0	1.0	2.0	8	8	8	—	0.90	—	1.0	0.625

ZBSC-6
Case UU102

ZB6PD-17
Case UU586

ZFSC-6
Case Q28

ZB6PD1
Case UU187

ZC6PD
Case AB185

ZB6PD-1700
Case AB1232

ZB6PD-2
Case Z59

6 WAY - 0°								*Insertion Loss Above 7.8 dB*													
ZFSC-6-1	1-175	27	22	26	20	26	20	0.75	1.0	0.75	1.2	0.8	1.2	2	6	12	0.20	0.40	0.60	1.0	0.5
ZBSC-611	10-200	28	22	26	20	23	20	0.5	0.8	0.7	1.0	0.9	1.2	4	5	6	0.20	0.30	0.50	1.0	0.5
ZBSC-615	1-500	30	25	26	18	24	18	0.5	0.8	0.7	1.2	1.0	2.2	4	8	20	0.20	0.40	1.20	1.0	0.5
ZFSC-6-110	1-500	35	25	26	20	25	20	0.5	0.8	0.6	1.1	1.0	1.7	2	6	12	0.30	0.30	0.80	1.0	0.5
ZB6PD1-900	800-900	32	20	32	20	32	20	0.3	0.7	0.3	0.7	0.3	0.7	—	—	—	0.50	0.50	0.50	10.0	0.5
ZB6PD1-960	890-960	35	20	35	20	35	20	0.3	0.8	0.3	0.8	0.3	0.8	—	—	—	0.60	0.60	0.60	10.0	0.5
ZC6PD-960	890-960	30	20	30	20	30	20	0.4	0.8	0.4	0.8	0.4	0.8	—	—	—	0.40	0.40	0.40	10.0	0.875
ZC6PD-960W	700-1000	28	15	28	15	28	15	0.4	1.0	0.4	1.0	0.4	1.0	—	—	—	0.60	0.60	0.60	10.0	0.875
ZB6PD-17	600-1700	25	18	25	18	25	18	0.35	0.9	0.35	0.9	0.35	0.9	—	7	—	0.50	0.50	0.50	10.0	0.875
ZB6PD-1700	1500-1700	30	20	30	20	30	20	0.5	1.0	0.5	1.0	0.5	1.0	—	—	—	0.60	0.60	0.60	10.0	0.750
ZB6PD1-1900	1700-1900	32	20	32	20	32	20	0.4	0.8	0.4	0.8	0.4	0.8	—	—	—	0.60	0.60	0.60	10.0	0.5
ZC6PD-1900	1700-1900	30	20	30	20	30	20	0.4	0.8	0.4	0.8	0.4	0.8	—	—	—	0.50	0.50	0.50	10.0	0.875
ZB6PD-2	800-2000	27	17	27	17	27	17	0.7	1.7	0.7	1.7	0.7	1.7	—	—	—	0.70	0.70	0.70	10.0	0.875
ZC6PD-1900W	1500-2000	30	15	30	15	30	15	0.5	1.0	0.5	1.0	0.5	1.0	—	—	—	0.60	0.60	0.60	10.0	0.875
■ ZFSC-6-1-75	1-200	30	25	30	22	20	18	0.75	1.0	0.75	1.0	0.9	1.2	2	6	12	0.20	0.40	0.60	1.0	0.5

■ *75 Ω*

L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp.

ZBSC-8 Case UU1268 | ZCSC-8 Case UU215 | ZFSC-8 Case R29 | ZC8PD Case AB186 | ZB8PD Case Z41 | ZN8PD1 Case JN1359 | ZC8PD1 Case DE749

MODEL PREFIX	FREQUENCY RANGE (MHz) f_L-f_U	ISOLATION (dB) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	INSERTION LOSS, (dB) L Typ.	L Max.	M Typ.	M Max.	U Typ.	U Max.	PHASE UNBAL., degrees L Max.	M Max.	U Max.	AMPLITUDE UNBAL. (dB) L Max.	M Max.	U Max.	RF POWER MAX (W) Sum Port (Matched output ports)	Internal Dissipation
8 WAY - 0°								***Insertion Loss Above 9 dB***													
ZFSC-8-1	0.5-175	30	25	30	20	25	18	0.8	1.2	0.8	1.2	1.0	1.6	1.0	2.5	5.0	0.2	0.2	0.3	1.0	0.62
ZCSC-8-1	2-250	37	27	30	20	24	18	0.65	1.2	0.8	1.2	1.0	1.6	2.0	4.0	8.0	0.2	0.3	0.5	1.0	0.62
ZFSC-8-4	5-700	35	20	25	17	20	17	0.8	1.2	1.2	1.8	1.8	2.5	2.0	5.0	15.0	0.2	0.4	0.7	1.0	0.62
ZBSC-8-82	10-800	28	25	26	22	25	20	0.6	1.0	0.9	1.5	1.8	2.8	2.0	4.0	9.0	0.2	0.3	0.5	1.0	1.0
ZC8PD-900	800-900	30	20	30	20	30	20	0.4	0.7	0.4	0.7	0.4	0.7	5.0	5.0	5.0	0.4	0.4	0.4	10.0	0.875
ZB8PD-1	800-960	30	20	30	20	30	20	0.4	0.9	0.4	0.9	0.4	0.9	8.0	8.0	8.0	0.4	0.4	0.4	10.0	0.875
ZCSC-8-13	5-1000	34	20	22	18	20	16	0.5	1.5	1.2	2.2	1.8	3.0	5.0	10.0	15.0	1.0	0.7	1.3	0.5	0.875
ZFSC-8-43	10-1000	23	20	25	20	26	20	1.0	1.6	1.4	2.1	2.1	2.9	5.0	10.0	20.0	0.4	0.4	0.7	1.0	0.62
ZC8PD1-10	300-1000	27	17	27	17	27	17	0.6	1.4	0.6	1.4	0.6	1.4	8.0	8.0	8.0	0.7	0.7	0.7	10.0	2.0
ZCSC-8-152	0.5-1550	48	40	38	35	35	32	20.0	23.0	20.5	21.5	22.0	24.5	7.0	6.0	11.0	1.5	0.8	1.3	0.5	3.0
ZB8PD-2000	800-2000	26	18	26	18	26	18	0.8	1.7	0.8	1.7	0.8	1.7	—	—	—	0.7	0.7	0.7	10.0	0.875
ZB8PD-2	1000-2000	24	17	24	17	24	17	0.8	1.3	0.8	1.3	0.8	1.3	18.0	18.0	18.0	0.8	0.8	0.8	10.0	0.875
ZB8PD-4	2000-4200	23	16	23	16	23	16	0.8	1.8	0.8	1.8	0.8	1.8	10.0	10.0	10.0	1.2	1.2	1.2	10.0	0.875
ZB8PD-6.4	5600-6800	26	18	26	18	26	18	0.8	1.7	0.8	1.7	0.8	1.7	15.0	15.0	15.0	0.7	0.7	0.7	10.0	0.875
ZB8PD-622	3200-6200	26	16	26	16	26	16	0.8	1.8	0.8	1.8	0.8	1.8	6.0	6.0	6.0	0.7	0.7	0.7	10.0	0.875
ZB8PD-8.4	7200-8400	25	20	25	20	25	20	0.9	1.6	0.9	1.6	0.9	1.6	15.0	15.0	15.0	0.8	0.8	0.8	10.0	0.875
ZN8PD1-53	500-5000	20	17	20	17	20	17	1.5	2.0	1.5	2.0	1.5	2.0	14.0	14.0	14.0	0.5	0.5	0.5	10.0	1.5
■ ZFSC-8375	50-90	30	25	30	25	30	25	1.0	1.3	1.0	1.3	1.0	1.3	2.0	2.0	2.0	0.2	0.2	0.2	1.0	0.62
■ ZFSC-8-1-75	0.5-175	25	20	30	20	25	20	0.5	1.0	0.6	1.1	0.7	1.3	1.0	2.5	5.0	0.2	0.3	0.5	1.0	0.62
■ ZFSC-84-75	1-300	26	20	30	25	30	23	0.8	1.5	0.7	1.1	0.9	1.5	4.0	3.0	8.0	0.2	0.2	0.4	1.0	0.62
■ ZFSC-8-4-75	5-1000	35	20	25	16	20	15	0.4	1.0	0.6	1.6	1.6	2.7	2.0	7.0	13.0	0.3	0.5	1.2	1.0	0.62
■ ZB8PD-22-75	950-2200	24	16	24	16	24	16	0.7	1.6	0.7	1.6	0.7	1.6	—	—	—	0.7	0.7	0.7	10.0	0.875

■ *75 Ω*

L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)

POWER SPLITTERS/COMBINERS 50 Ω & 75 Ω

10 kHz to 2.6 GHz

ZC9PD
Case AB204

MODEL PREFIX	FREQUENCY RANGE (MHz) f_L-f_U	ISOLATION (dB) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	INSERTION LOSS, (dB) L Typ.	L Max.	M Typ.	M Max.	U Typ.	U Max.	PHASE UNBAL., degrees L Max.	M Max.	U Max.	AMPLITUDE UNBAL. (dB) L Max.	M Max.	U Max.	RF POWER MAX (W) Sum Port (Matched output ports)	Internal Dissipation
9 WAY - 0°								*Insertion Loss Above 9.6 dB*													
ZC9PD-1000	800-1000	30	20	30	20	30	20	0.6	1.2	0.6	1.2	0.6	1.2	—	—	—	0.6	0.6	0.6	10.0	1.5

ZC10PD
Case AB204

ZFSC-10
Case RR93

10 WAY - 0°								*Insertion Loss Above 10 dB*													
ZFSC-10-1	0.5-100	28	20	30	24	27	20	0.5	0.8	0.4	1.0	0.8	1.5	3	6	10	0.2	0.3	0.4	1.0	0.87
ZC10PD-900W	750-900	30	20	30	20	30	20	0.4	1.0	0.4	1.0	0.4	1.0	—	—	—	0.6	0.6	0.6	10.0	1.5
ZC10PD-900	800-900	25	20	25	20	25	20	1.5	2.0	1.5	2.0	1.5	2.0	—	—	—	0.8	0.8	0.8	10.0	1.5
ZC10PD-26	2300-2600	35	20	35	20	35	20	0.7	1.9	0.7	1.9	0.7	1.9	15	15	15	1.1	1.1	1.1	10.0	0.80

ZN12PD
Case UU589

ZFSC-12
Case R67

12 WAY - 0°								*Insertion Loss Above 10.8 dB*													
ZFSC-12-1	1-200	30	25	35	20	28	20	0.8	1.2	1.1	1.4	1.3	1.6	4	8	16	0.3	0.2	0.3	1.0	0.87
ZFSC-12-11	10-300	28	20	33	25	28	20	1.1	1.3	1.1	1.5	1.5	1.8	2	4	6	0.2	0.3	0.4	1.0	0.87
ZN12PD-17	800-1700	30	18	30	18	28	20	0.45	1.2	0.45	1.2	0.45	1.2	14	14	14	0.7	0.7	0.7	10.0	2.0
■ ZFSC-12-1-75	10-200	35	27	—	—	27	20	0.5	0.8	—	—	0.8	1.3	—	—	—	0.25	—	0.4	1.0	0.87
■ ZFSC-12-175	10-500	23	20	24	20	22	18	0.9	1.2	1.0	1.3	1.2	2.0	—	—	—	0.4	0.5	0.8	1.0	0.87
■ ZFSC-12-1W-75	5-860	33	22	30	20	26	18	0.5	1.2	0.8	2.5	1.6	4.2	2	8	20	0.7	0.8	1.5	1.0	0.87

■ *75 Ω*

L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)

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ZC16PD
Case UU179, UU640, UU573

ZFSC-16
Case R30

MODEL PREFIX	FREQUENCY RANGE (MHz) f_L-f_U	ISOLATION (dB) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	INSERTION LOSS, (dB) L Typ.	L Max.	M Typ.	M Max.	U Typ.	U Max.	PHASE UNBAL., degrees L Max.	M Max.	U Max.	AMPLITUDE UNBAL. (dB) L Max.	M Max.	U Max.	RF POWER MAX (W) Sum Port (Matched output ports)	Internal Dissipation
16 WAY - 0°								*Insertion Loss Above 12 dB*													
ZFSC-16-3	1-30	45	28	45	28	45	28	0.5	0.9	0.5	0.9	0.5	0.9	1	2	3		0.1		1.0	0.87
ZFSC-16-1	0.5-125	30	24	25	18	20	15	1.0	1.2	1.1	1.3	1.2	1.4	1	3	5	0.3	0.2	0.5	1.0	0.87
ZFSC-16-12	0.1-200	33	20	27	20	26	20	0.6	1.5	0.7	1.0	0.9	1.5	2	6	9	0.4	0.2	0.4	1.0	0.87
ZC16PD-900	800-900	30	20	30	20	30	20	0.5	1.0	0.5	1.0	0.5	1.0	—	—	—	0.5	0.5	0.5	10.0	2.4
ZC16PD-960	890-960	28	20	28	20	28	20	0.5	1.0	0.5	1.0	0.5	1.0	—	—	—	0.5	0.5	0.5	10.0	2.4
ZC16PD-960W	700-1000	26	15	26	15	26	15	0.5	1.3	0.5	1.3	0.5	1.3	—	—	—	0.6	0.6	0.6	10.0	2.4
ZC16PD-1900	1700-1900	30	20	30	20	30	20	0.5	1.0	0.5	1.0	0.5	1.0	—	—	—	0.8	0.8	0.8	10.0	2.4
ZC16PD-1900W	1500-2100	30	15	30	15	30	15	0.7	1.4	0.7	1.4	0.7	1.4	—	—	—	0.8	0.8	0.8	10.0	2.4
ZC16PD-23	1500-2300	32	20	32	20	32	20	0.8	1.4	0.8	1.4	0.8	1.4	11	11	11	0.6	0.6	0.6	10.0	2.0
ZC16PD-24	650-2400	25	14	25	14	25	14	0.8	2.25	0.8	2.25	0.8	2.25	14	14	14	0.9	0.9	0.9	10.0	2.4
ZC16PD-252	10-2500	25	20	17	14	16	14	1.5	2.8	3.2	4.5	5.5	6.5	2	10	18	0.7	0.7	1.0	1.0	0.75
ZC16PD-2185	1800-2600	30	16	30	16	30	16	0.5	1.4	0.5	1.4	0.5	1.4	6	6	6	0.7	0.7	0.7	10.0	1.75
■ ZFSC-16-675	0.01-25	25	20	40	25	25	20	0.8	1.1	0.4	0.8	1.0	1.6	4	3	5	0.4	0.2	0.4	1.0	0.87
■ ZFSC-16-1-75	1-150	30	25	30	25	25	20	0.8	1.1	0.7	1.1	1.0	1.3	3	6	10	0.4	0.2	0.4	1.0	0.87

ZFSC-24
Case AB204, R31

24 WAY - 0°								*Insertion Loss Above 13.8 dB*													
ZFSC-24-1	0.2-100	—	—	25	20	—	—	—	—	1.0	2.0	—	—	—	—	—	0.6	0.4	0.5	1.0	0.87
ZFSC-24-11	1-200	33	25	22	20	20	17	0.9	1.7	1.0	1.8	1.3	2.2	—	—	—	0.6	0.8	0.8	1.0	0.87
■ ZFSC-24-11-75	1-200	35	25	33	20	27	20	0.6	1.3	0.8	1.5	1.1	2.0	—	—	—	0.6	0.4	0.6	1.0	0.87

ZFSC-48-1
Case HH68

48 WAY - 0°								*Insertion Loss Above 16.8 dB*													
ZFSC-48-1	10-300	30	25	28	20	23	20	1.2	2.0	2.1	2.5	2.8	4.0	—	—	—	0.8	0.9	1.2	1.0	0.87

■ *75 Ω*

L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)

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POWER SPLITTERS/COMBINERS *High Power 50 Ω*

2 MHz to 2300 MHz up to 50 Watts

2 WAY

ZAPD-2-21-3W Case F53 | ZA2CS Case AW254

3 WAY

ZA3CS-400-3W Case CC51 | ZA3CS Case AX255 | ZB3CS-920-15W Case AW256 | ZB3CS-900-6W Case Z667

MODEL PREFIX	FREQUENCY RANGE (MHz) f_L-f_U	ISOLATION (dB) Typ.	ISOLATION (dB) Min.	INSERTION LOSS (dB) Typ.	INSERTION LOSS (dB) Max.	PHASE UNBALANCE Degrees Typ.	PHASE UNBALANCE Degrees Max.	AMPLITUDE UNBALANCE (dB) Typ.	AMPLITUDE UNBALANCE (dB) Max.	INPUT RF Power Max (W) Output ports - Total (Matched sum port)	INPUT RF Power Max (W) Sum Port (Matched output ports)
2 WAY				***Insertion Loss Above 3.0 dB***							
ZA2CS-500-15W	200-500	31	20	0.3	1.0	0.3	3.0	0.10	0.4	15.0	15
ZA2CS-600-10W	100-600	27	15	0.4	1.3	0.4	3.0	0.15	0.5	10.0	10
ZA2CS-10-20W	900-1000	38	20	0.2	0.5	0.5	3.0	0.11	0.3	20.0	20
ZAPD-2-21-3W	700-2100	25	20	0.4	1.2	0.7	3.0	0.05	0.3	2.5	10
3 WAY				***Insertion Loss Above 4.8 dB***							
ZA3CS-400-3W	2-400	25	17	0.5	1.2	0.2	3.0	0.15	0.5	3.0	10
ZA3CS-450-9W	100-450	22	15	0.9	1.8	2.5	8.0	0.20	0.7	9.0	12
ZB3CS-900-6W	440-900	24	17	0.2	1.0	3.0	6.0	0.10	0.4	6.0	20
ZB3CS-920-15W	825-920	27	17	0.2	0.8	1.7	6.0	0.11	0.5	15.0	15

4 WAY

ZB4CS-440-12W ZB4CS-870-12W Case AW256 | ZB4CS-700-10W Case Z689 | ZB4PD-232-50W Case BV278

4 WAY				***Insertion Loss Above 6.0 dB***							
ZB4CS-440-12W	100-440	27	17	0.6	1.2	0.8	4.0	0.15	0.5	12.0	10
ZB4CS-700-10W	400-700	25	20	0.35	0.8	0.6	4.0	0.10	0.3	10.0	20
ZB4CS-870-10W	570-870	28	20	0.35	0.8	0.6	3.0	0.10	0.3	10.0	20
ZB4CS-960-12W	820-960	28	17	0.3	0.8	2.0	6.0	0.20	0.6	12.0	12
ZB4PD-232-50W	600-2300	19	16	1.1	2.0	0.9	10.0	0.05	0.7	50.0	50

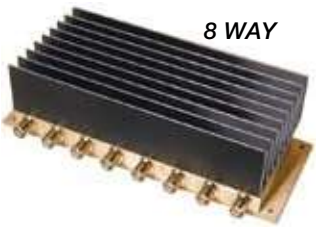
5 WAY

ZB5PD Case BV278 | ZB5CS-920-10W Case Z668

6 WAY

ZB6CS-150-12W Case Z259

8 WAY



ZB8CS Case AW257

5 WAY				***Insertion Loss Above 7.0 dB***							
ZB5PD-894-50W	800-894	32	20	0.4	0.8	—	—	0.15	0.45	50.0	50
ZB5CS-920-10W	450-920	26	18	0.4	1.0	2.0	7.0	0.10	0.6	10.0	20
6 WAY				***Insertion Loss Above 7.8 dB***							
ZB6CS-150-12W	50-150	32	20	0.5	1.2	3.0	9.0	0.15	0.5	12.0	10
8 WAY				***Insertion Loss Above 9.0 dB***							
ZB8CS-950-32W	800-950	30	18	0.4	1.0	2.0	6.0	0.10	0.5	32.0	32

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SWITCHES, MECHANICAL 50 Ω

DC to 18 GHz **Xtra long life up to 100 Million cycles**

MSP2T-18XL
Case FK811

MSP2TA-18XL
Case FP914

MTS-18XL-B
Case DS810

MODEL PREFIX	FREQUENCY (MHz) f_L-f_U	INSERTION LOSS (dB) Typ.	INSERTION LOSS (dB) Max.	ISOLATION (dB) Typ.	ISOLATION (dB) Min.	VSWR (:1) Typ.	VSWR (:1) Max.	DC CURRENT @+24 V (mA) Typ.	DC CURRENT @+24 V (mA) Max.	RF POWER (W) Cold Switching (W) Max.	RF POWER (W) Hot Switching (W) Max. Note 1	RF POWER (W) Hot Switching (W) Max. Note 2
SPDT *DC to 18000 MHz*												
MSP2T-18XL *(reflective)*	DC-1000	0.10	0.15	100	85	1.05	1.10	80	115	10	0.1	1
	1000-8000	0.20	0.30	90	75	1.20	1.35					
	8000-12000	0.25	0.35	80	70	1.20	1.35					
	12000-18000	0.30	0.45	66	60	1.15	1.40					
MSP2TA-18XL *(absorptive)*	DC-1000	0.10	0.15	100	85	1.05	1.10	175	215	10	0.1	1
	1000-8000	0.15	0.30	90	70	1.20	1.30					
	8000-12000	0.25	0.40	80	70	1.20	1.35					
	12000-18000	0.30	0.50	66	60	1.25	1.40					
TRANSFER *DC to 18000 MHz*												
MTS-18XL-B	DC-1000	0.10	0.15	100	85	1.05	1.10	175	215	10	0.1	1
	1000-8000	0.10	0.25	90	75	1.15	1.20					
	8000-12000	0.20	0.36	86	70	1.15	1.25					
	12000-18000	0.25	0.45	76	60	1.15	1.30					

1. To achieve specified life, hot switching Rf power must not exceed this level.
2. Degradation in life (min) typically 3 million switch cycles for hot switching at this power level.

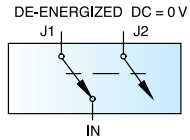
ADDITIONAL SPECIFICATIONS	
Operating Voltage Range	24V (nom) ±1V
Switching Time (typ.)	20 ms
Life* (Min.)	1 year/10 million cycles

*tested at dBm RF power

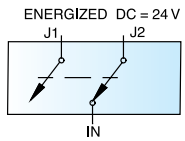
SWITCHING STATES

MSP2T-18XL

DE-ENERGIZED DC = 0 V

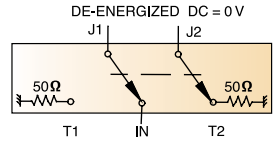


ENERGIZED DC = 24 V

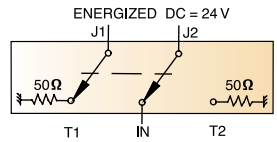


MSP2TA-18XL

DE-ENERGIZED DC = 0 V

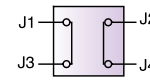


ENERGIZED DC = 24 V

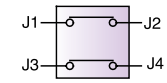


MTS-18XL-B

DE-ENERGIZED DC = 0 V



ENERGIZED DC = 24 V



SWITCHES, PIN DIODE 50 Ω

1 to 3 GHz

ZMSW
Case JJ77

ZSDR-230
Case CCC127

ZSDR-425
Case GGG126

MODEL PREFIX	FREQUENCY (MHz) f_L-f_U		TYPE	TTL DRIVER	INSERTION LOSS (dB) Low-band l w Typ.	Low-band l w Max.	Upper band U Typ.	Upper band U Max.	IN-OUT ISOLATION (dB) Frequency Band L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	RISE TIME (µsec) Typ.	SWITCHING TIME (µsec) Typ.	SWITCHING TIME (µsec) Max.	CONTROL LOGIC	SUPPLY VOLTAGE (V)
SPDT/SP4T *With TTL Drivers*																			
ZSDR-230	10-3000		SPDT	•	1.3	1.9	1.8	2.7	60	40	40	28	35	22	—	2.0	4.0	G	+5
ZSDR-425	10-2500		SP4T	•	1.1	1.7	1.5	2.5	60	40	40	30	35	22	—	2.0	4.0	H	+5
SPST/SPDT *Without TTL Drivers*																			
ZMSW-1111	10-2500		SPST		1.1	1.9	1.9	2.7	50	45	35	28	28	22	2	—	4.0	I	—
ZMSW-1211	10-2500		SPDT		1.1	1.9	1.9	2.7	50	45	35	28	28	22	2	—	4.0	J	—

L = low range (f_L to $10f_L$) l w = low band (f_L to $f_U/2$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)

CONTROL LOGIC

G

SPDT Switch: ZSDR-230

TTL	RF Out port 1	RF Out port 2
Low	ON	OFF
High	OFF	ON

Low: 0 to 0.8 V
High: 2 to 5 V

H

SP4T Switch: ZSDR-425

TTL-1	TTL-2	RF Out port 1	2	3	4
High	Low	ON	OFF	OFF	OFF
High	High	OFF	ON	OFF	OFF
Low	High	OFF	OFF	ON	OFF
Low	Low	OFF	OFF	OFF	ON

Low: 0 to 0.8 V
High: 2 to 5 V

I

SPST Switch: ZMSW-1111

Control Ports 1	2	RF Out port 2
1	2	
0	V	ON
V	0	OFF

V = 5 V

J

SPDT Switch ZMSW-1211

Control Ports 1	2	RF Out port 1	2
0	V	OFF	ON
V	0	ON	OFF

V = 5 V

ZFAS
Case K18

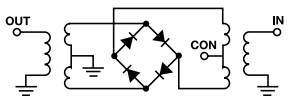
ZMAS
Case M21

ZAS
Case M22

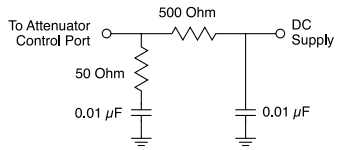
MODEL PREFIX	FREQUENCY (MHz) IN f_L	CON f_U	INSERTION LOSS, dB (±20 mA) Mid-Band m Typ.	Mid-Band m Max.	Total Range Typ.	Total Range Max.	MAX. INPUT PWR (dBm) (±20 mA) 1 dB compr.	no damage	IN-OUT ISOLATION, dB (0 mA) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	BI-PHASE $\overline{X}$ (±20 mA) Typ. Δ AMP, dB m	Δ AMP, dB Total Range	Phase (deg) deviation from 180° m	Phase (deg) deviation from 180° Total Range
BI-PHASE																		
ZAS-3	1-200	DC-0.05	1.4	2.0	1.6	2.5	15	30	65	50	50	40	50	35	0.10	0.1	0.5	1.0
ZMAS-3	1-200	DC-0.05	1.4	2.0	1.6	2.5	15	30	65	50	50	40	50	35	0.10	0.1	0.5	1.0
ZAS-1	5-450	DC-0.05	3.5	4.0	3.5	4.7	20	30	65	50	55	40	35	25	0.10	0.1	0.5	1.2
ZMAS-1	5-450	DC-0.05	3.5	4.0	3.5	4.7	20	30	65	50	55	40	35	25	0.10	0.1	0.5	1.2
ZFAS-2000	100-2000	DC-0.5	4.2	6.5	5.4	7.5	19	25	30	22	—	—	26	20	0.30	0.4	5.0	8.0

L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) m = mid band ($2f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)

ELECTRICAL SCHEMATIC



SUGGESTED CONTROL PORT BIASING CONFIGURATION



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SWITCHES, GaAs 50 Ω

DC to 6 GHz Fast Switching

ZYSW, ZYSWA
Case ZZ121

ZFSW, ZFSWA
Case G144

ZSWA
Case CV665

ZFSWHA
Case J17

ZASW, ZASWA
Case CY353

ZX80-DR230
Case HL1162

MODEL PREFIX	FREQUENCY (MHz) f_L-f_U	ABSORPTIVE	REFLECTIVE	INSERTION LOSS (dB) Typ.	INSERTION LOSS (dB) Max.	1 dB COMPR. (dBm) Typ.	1 dB COMPR. (dBm) Min.	IN-OUT ISOLATION (dB) Typ.	IN-OUT ISOLATION (dB) Min.	RISE/FALL TIME (10% TO 90%), ns Typ.	RISE/FALL TIME (10% TO 90%), ns Max.	SWITCHING TIME 50% OF CONTROL TO: 90% RF (Turn-on), ns Typ.	90% RF (Turn-on), ns Max.	10% RF (Turn-off), ns Typ.	10% RF (Turn-off), ns Max.	CONTROL LOGIC
SPDT	***With/Without TTL Drivers***															
ZFSW-2-46	DC-4600		•	1.0	2.8	17	—	50	28	2	—	—	—	—	—	K
ZFSWA-2-46	DC-4600	•		0.9	2.6	17	—	50	25	2	—	—	—	—	—	K
ZYSW-2-50DR	DC-5000		•	1.3	2.4	23	15	38	22	6	12	20	40	20	40	M
ZYSWA-2-50DR	DC-5000	•		1.4	2.1	20	13	31	19	6	12	20	40	20	40	M
SP4T	***With TTL Drivers***															
ZSWA-4-30DR	DC-3000	•		1.5	3.9	25	—	37	26	25	—	45	—	45	—	N
SPST	***High Isolation Without TTL Drivers***															
ZFSWHA-1-20	DC-2000	•		1.3	1.7	19	—	65	58	3	5	7	10	3	10	L
SPDT	***High Isolation With TTL Drivers***															
ZASW-2-50DR	DC-5000		•	1.8	4.5	20	—	82	46	5	15	10	20	10	20	M
ZASWA-2-50DR	DC-5000	•		1.8	4.5	20	—	82	46	5	15	10	20	10	20	M
SPDT	***With CMOS Drivers***															
ZX80-DR230	DC-3000	•		0.9	1.8	31	28	60	37	—	—	2000	—	2000	—	P
ZFSWA2-63DR	500-6000	•	•	1.4	1.7	24	—	50	43	25	—	35	—	35	—	M

CONTROL LOGIC

K

SPDT Switches: ZFSW, ZFSWA

Control Ports		RF outputs	
1	2	1	2
-V	0	ON	OFF
0	-V	OFF	ON

V = 5 to 8 V

L

SPST Switch: ZFSWHA

Control Ports		RF outputs
1	2	
-V	0	ON
0	-V	OFF

V = 5 to 8 V

M

SPDT Switch with Drivers: ZYSW, ZYSWA, ZASW, ZASWA

Control Port	RF outputs 1	RF outputs 2
Low	ON	OFF
High	OFF	ON

Low: 0 to 0.8 V
High: 2 to 5 V

N

SP4T Switch: ZSWA-4-30DR

Control Ports				RF outputs			
1	2	3	4	1	2	3	4
Low	High	High	High	ON	OFF	OFF	OFF
High	Low	High	High	OFF	ON	OFF	OFF
High	High	Low	High	OFF	OFF	ON	OFF
High	High	High	Low	OFF	OFF	OFF	ON

Low: 0 to 0.8 V
High: 2 to 5 V

P

SPDT Switch: ZX80-DR230

STATE	Control Input: Control 1	Control Input: Control 2	RF Input/Outport: RF1 to RF COMMON	RF Input/Outport: RF2 to RF COMMON
1	Low	Low	OFF	OFF
2	Low	High	OFF	ON
3	High	Low	ON	OFF
4	High	High	N/A	N/A

General notes:

1. When either of the RF1 or RF2 ports is closed (**ON** state), the closed port is connected to the RF Common port.
2. When either of the RF1 or RF2 ports is open (**OFF** state), the open port is connected to an internal 50Ω termination.
3. When either of the RF1 or RF2 ports is open (**OFF** state), all three RF ports are connected to an internal 50Ω termination.

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TERMINATIONS

DC to 20 GHz

ROSE
Case LL604

LOUIS
Case LL987

ANNE
Case LL561

ANNE-50CN Case LL561

BTRM
Case LL85

KARN
Case LL718

KARN-50CN
Case LL718

MODEL PREFIX	FREQUENCY RANGE (MHz)	RETURN LOSS, dB (MHz) Min.								POWER RATING (W)	CONNECTOR
		DC-1000	DC-2000	DC-4000	DC-6000	DC-8000	DC-12000	DC-18000	DC-20000		
50 Ω											
BTRM-50	DC-2000	30	21	—	—	—	—	—	—	0.5	Male-BNC
LOUIS-50	DC-2000	28	21	—	—	—	—	—	—	0.125	DIN Male w/retaining sleeve
KARN-50	DC-8000	30	29	27	—	20	—	—	—	2.0	Male-TYPE N
KARN-50CN	DC-8000	30	29	27	—	20	—	—	—	2.0	Male-TYPE N
KARN-50-18	DC-18000	35	30	30	—	26	20	18	—	2.0	Male-TYPE N
ROSE-50	DC-6000	33	30	23	20	—	—	—	—	0.5	SMB-PLUG
ANNE-50	DC-18000	30	30	30	27	27	23	21	—	1.0	Male-SMA
ANNE-50CN	DC-18000	30	30	30	28	28	26	20	—	1.0	Male-SMA
ANNE-50L	DC-12000	26	26	26	21	21	18	—	—	1.0	Male-SMA
ANNE-50X	DC-20000	30	30	30	30	30	30	26	20	1.0	Male-SMA
75 Ω											
BTRM-75	DC-1000	20	—	—	—	—	—	—	—	0.5	Male-BNC, 75Ω

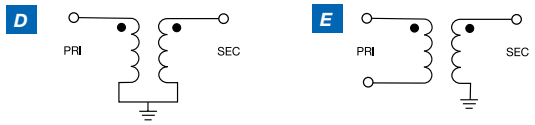
TRANSFORMERS, IF/RF

10 kHz to 500 MHz

FT, FTB
Case H16

MODEL PREFIX	Ω RATIO (Secondary/Primary)	FREQUENCY (MHz)	INSERTION LOSS (dB) 3 dB (MHz)	2 dB (MHz)	1 dB (MHz)
D *Unbalanced to Unbalanced 50 Ω*					
FT-1.5-1	1.5	0.1-400	0.1-400	0.5-200	1-100
E *Balanced to Single-ended 50 Ω*					
FTB-1-1	1.0	0.2-500	0.2-500	0.5-300	1-100
FTB-1-6	1.0	0.01-125	0.01-125	0.05-50	0.1-25
E *Balanced to Single-ended 75 Ω*					
FTB-1-1-75	1.0	0.5-500	0.5-500	5-300	10-100

ELECTRICAL SCHEMATICS



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USB POWER SENSOR 50 Ω Wide Dynamic Range

1 MHz to 6 GHz

PWR-6G+	***USB Power Sensor plus Accessories***
PWR-SEN-6G+	Power Sensor Head
USB-CBL+	Data Cable with USB Type-A plug connector
NF-SM50+	N-Type Female to SMA-Male Adapter
PWR-6GCD	Installation CD

MODEL PREFIX	FREQ. (MHz)	VSWR (:1)		LINEARITY (dB) @25°C	AVERAGING RANGE		MEASUREMENT SPEED (mSec)	UNCERTAINTY OF POWER MEASUREMENT (dB) @25°C (Typ.)					
								1-3000 MHz			3000-6000 MHz		
	f_L-f_U	Typ.	Max.	Typ.	Min.	Max.	Typ.	A	B	C	A	B	C
PWR-6G	1-6000	1.1	1.3	±0.10	1	999	200	±0.10	±0.15	±0.20	±0.15	±0.15	±0.20
								@0°C to 50°C					
								±0.25	±0.20	±0.35	±0.25	±0.20	±0.30

A = @ -30 to +5 dBm
B = @ +5 to +12 dBm
C = @ +12 to +20 dBm

Product Features

- 50 dB Dynamic range, -30 to +20 dBm
- Good VSWR, 1.1:1 typ.
- Low cost replacement solution for conventional power meters
- Easy installation and operation
- Turns your laptop into a power meter
- No need for a reference calibrator
- No need for an external power supply
- Temperature compensated
- Fully loaded software for power data analysis
- Averaging of measurements
- Scheduled Data recording
- Multi-Sensor support software

Typical Applications

- Lab Test equipment
- Portable Test capability
- Remote location testing

General Description

Mini-Circuits PWR-6G+ USB Power Sensor has a 50 dB dynamic range and is used with a PC via USB interface. The PWR-6G+ does not require any reference signal calibration. All specifications provided in the data sheet apply to continuous wave (CW) signals. The Mini-Circuits USB Power Sensor comes with Power Meter software that turns the PC into a Power Meter. It also comes with an N-Type female to SMA male adapter for enhanced utility.

Mini-Circuits Power Meter Program for USB Power Senser

VOLTAGE CONTROLLED OSCILLATORS 50 Ω

50 MHz to 5.2 GHz

ZX95
Case GB956

MODEL PREFIX	FREQUENCY (MHz)		POWER OUTPUT (dBm)	TUNING VOLTAGE RANGE (V)		PHASE NOISE (dBc/Hz) SSB@ offset frequencies (kHz): Typ.				PULLING pk-pk @ 12 dBr (MHz)	PUSHING (MHz/V)	TUNING SENSITIVITY (MHz/V)	HARMONICS (dBc)		3 dB MODULATION BANDWIDTH (MHz)	DC OPERATING POWER	
	Min.	Max.	Typ.	Min.	Max.	1	10	100	1000	Typ.	Typ.	Typ.	Typ.	Max.	Typ.	Vcc (Volts)	Current (mA) Max.
LINEAR TUNING *Wideband*																	
ZX95-100	50	100	+10.0	0.5	17.0	-86	-110	-131	-151	0.4	0.1	3.5-4.5	-33	-24	0.18	12.0	20
ZX95-200	100	200	+10.0	1.0	17.0	-86	-106	-128	-148	0.5	0.2	7-10	-30	-20	0.12	12.0	20
ZX95-200A	144	200	+9.0	0.5	16.0	-97	-122	-142	-161	0.1	0.1	5.0	-20	-10	75	12.0	33
ZX95-310	240	305	+6.0	0.50	17.0	-89	-112	-133	-153	0.50	0.70	5.0-7.0	-24	-14	40	5.0	30
ZX95-330	244	340	+9.0	4.0	16.0	-91	-118	-139	-158	0.20	0.20	7.0-10	-23	-10	1.50	12.0	31
ZX95-400	200	380	+10.0	0.5	17.0	-83	-104	-125	-145	0.5	0.2	10-18	-25	-18	0.13	12.0	21
ZX95-535	300	520	+6.0	1.0	17.0	-79	-101	-120	-140	0.5	0.2	12.0-23	-25	-15	0.18	12.0	21
ZX95-675	500	750	+6.0	0.5	28.0	-88	113	-136	-156	0.8	1.5	5-14	-20	—	25	5.0	37
ZX95-730A	655	730	+1.2	0.5	9.0	-89	-113	-133	-153	0.40	0.10	11-15	-23	-14	45	5.0	25
ZX95-753	734	753	+3.0	1.0	9.0	-94	-121	-141	-161	0.3	0.2	8.0	-25	—	40	5.0	35
ZX95-765	485	765	+8.0	1.0	16.0	-77	-98	-118	-138	1.0	0.5	28-33.0	-35	-24	0.60	12.0	22
ZX95-780	720	780	+10.0	0.5	12.0	-99	-114	-135	-155	1.0	0.7	11-14	-21	-15	20	12.0	26
ZX95-850	750	850	+5.0	0.0	10.0	-86	-110	-130	-150	1.0	0.5	18-21	-25	-15	100	5.0	30
ZX95-850W	400	850	+10.0	1.0	25.0	-71	-98	-119	-140	4.0	0.3	18-32	-22	-12	13	5.0	27
ZX95-890C	875	890	+6.2	0.5	11.0	-97	-125	-145	-164	0.10	0.20	5.0	-19	-12	60	8.0	35
ZX95-900	625	885	+5.8	0.5	18.0	-82	-106	-127	-147	1.50	0.40	15-26	-13	—	25	10.0	35
ZX95-928CA	902	928	+4.6	0.5	10.0	-92	-120	-141	-161	0.40	0.30	6.0	-20	-15	90	8.0	35
ZX95-1015	750	1010	+6.0	0.5	28.0	-85	-113	-134	-154	0.1	1.5	7-15	-20	-10	35	5.0	35
ZX95-1150C	1146	1154	+2.0	0.5	11.0	-99	-123	-143	-159	0.1	0.1	3.0	-20	-10	70	5.0	35
ZX95-1200W	612	1200	+10.0	0.5	18.0	-71	-96	-117	-139	11.0	0.9	35-50	-16	—	40	12.0	30
ZX95-1300	400	1300	+8.0	0.30	20.0	-65	-91	-120	-141	3.5	1.5	40-60	-12	—	30	5.0	40
ZX95-1303	1011	1270	+7.0	0.5	12.0	-82	-109	-130	-150	1.5	1.0	26-39	-24	-14	80	5.0	36
ZX95-1310C	1260	1310	+4.0	0.50	20.0	-93	-120	-139	-159	0.20	0.10	4.5	-19	-10	50	5.0	35
ZX95-1410	850	1410	+8.0	0.5	11.0	-74	-101	-123	-143	10.0	0.5	57-95	-17	-10	100	12.0	30
ZX95-1420	1230	1420	+6.0	0.5	28.0	-85	-111	-131	-151	1.5	0.5	10-15	-21	-10	50	5.0	35
ZX95-1480	670	1480	+6.0	0.50	12.5	-66	-97	-119	-140	3.50	2.50	72-100	-14	—	40	5.0	40
ZX95-1584	1555	1575	+5.0	1.0	12.0	-89	-114	-134	-153	0.7	0.1	5.0	-34	-20	65	5.0	35
ZX95-1600W	800	1600	+9.0	0.5	24.0	-72	-99	-122	-143	10.0	0.3	35-58	-22	-15	90	11.5	35
ZX95-1624	1400	1624	+1.0	0.50	9.50	-80	-104	-124	-144	1.50	1.20	29-35	-19	-10	40	5.0	40
ZX95-1640	1610	1640	+2.5	0.5	9.0	-86	-111	-131	-151	1.0	0.3	12	-25	-15	200	5.0	35
ZX95-1700A	950	1620	+6.0	0.5	10.0	-72	-100	-123	-144	0.20	0.50	70-110	-20	-11	60	10.0	30
ZX95-1700W	770	1700	+9.0	1.0	24.0	-74	-100	-121	-143	7.0	0.5	30-60	-25	-14	20	12.0	35
ZX95-1750W	950	1750	+6.0	0.5	12.0	-71	-99	-121	-143	0.3	0.2	71-103	-20	-10	50	10.0	35
ZX95-1900	1600	1900	0.0	1.0	12.0	-78	-104	-125	-145	1.0	0.3	34	-19	-10	60	8.0	35
ZX95-1900V	1450	1900	+8.0	0.5	20.0	-79	-104	-125	-145	10.0	1.0	25-41	-20	-10	70	5.0	25
ZX95-2041	1844	2042	5.0	1.0	10.0	-81	-106	-126	-146	0.3	0.3	29	-20	-13	120	5.0	40
ZX95-2130	1950	2120	+1.0	0.5	11.0	-83	-108	-128	-148	0.2	1.0	22-25	-16	—	130	5.0	37
ZX95-2150VW	970	2150	+4.0	0.5	25.0	-74	-99	-120	-140	4.0	1.5	32-78	-22	—	15	5.0	26
ZX95-2252C	2103	2252	-1.0	1.0	12.0	-81	-108	-129	-149	0.4	0.3	28	-17	-10	120	8.0	35
ZX95-2404C	2267	2404	+0.50	1.0	13.0	-85	-110	-131	-151	0.1	0.5	18-21	-24	-14	120	6.0	40
ZX95-2405C	2189	2405	+0.30	1.0	11.5	-78	-106	-128	-147	0.40	0.50	40-43	-25	-15	120	8.0	40
ZX95-2420	1220	2420	+5.0	0.5	20.0	-70	-95	-117	-138	1.5	1.5	50-82	-20	-10	90	5.0	47
ZX95-2425	2275	2425	+3.0	0.5	11.0	-80	-104	-124	-144	0.3	1.5	17-25	-22	-12	100	5.0	36
ZX95-2450C	2120	2450	+7.0	0.0	15.0	-80	-107	-128	-148	3.0	0.3	28-35	-23	-12	150	6.0	34
ZX95-2490	2280	2490	+8.0	0.5	10.0	-80	-104	-124	-144	1.0	1.0	30-37	-20	-11	140	5.0	38
ZX95-2490C	2020	2490	+7.2	0.25	16.0	-79	-107	-128	-149	2.5	0.4	30-40	-32	-15	45	8.0	40
ZX95-2500	1600	2500	+7.5	0.5	14.0	-64	-91	-112	-132	20.0	2.0	72-107	-17	—	4	12.0	28
ZX95-2632C	2434	2632	-0.30	1.0	12.0	-81	-108	-129	-149	0.40	0.10	27-31	-16	—	110	8.0	40
ZX95-2650	2165	2650	+5.0	0.5	19.0	-75	-101	-117	-142	3.0	1.0	29-40	-12	—	200	12.0	25
ZX95-2700	2500	2700	+6.0	0.5	8.0	-74	-98	-119	-139	2.0	4.5	40-45	-18	-10	30	5.0	36
ZX95-2705	1950	2705	+8.5	0.5	10.0	-64	-90	-112	-132	14.0	4.0	91-156	-27	-12	340	8.5	29

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp.

MODEL PREFIX	FREQUENCY (MHz)		POWER OUTPUT (dBm)	TUNING VOLTAGE RANGE (V)		PHASE NOISE (dBc/Hz) SSB@ offset frequencies (kHz): Typ.				PULLING pk-pk @ 12 dBr (MHz)	PUSHING (MHz/V)	TUNING SENSITIVITY (MHz/V)	HARMONICS (dBc)		3 dB MODULATION BANDWIDTH (MHz)	DC OPERATING POWER	
	Min.	Max.	Typ.	Min.	Max.	1	10	100	1000	Typ.	Typ.	Typ.	Typ.	Max.	Typ.	Vcc (Volts)	Current (mA) Max.
ZX95-2710C	2670	2700	+3.0	0.5	5.5	-80	-110	-131	-151	0.3	0.2	16	-14	—	140	5.0	35
ZX95-2729C	2490	2729	0.0	1.0	11.5	-80	-107	-127	-147	0.50	0.10	27-37	-16	-10	110	8.0	40
ZX95-2740	2700	2740	+3.5	0.5	5.5	-83	-106	-127	-146	0.7	2.0	17	-19	-12	150	5.0	36
ZX95-2745	2000	2745	+3.5	1.0	24.0	-71	-96	-117	-137	4.0	3.0	25-56	-25	-10	45	5.0	26
ZX95-2750	2350	2750	+5.5	0.5	14.5	-78	-105	-126	-146	2.0	0.3	32-42	-22	-12	120	6.0	35
ZX95-2750C	2720	2750	+4.0	0.25	5.5	-84	-110	-130	-150	0.8	0.4	16	-22	-12	120	5.0	35
ZX95-2755	2300	2755	+8.0	0.5	13.0	-74	-100	-120	-140	9.0	1.5	40-55	-17	-10	600	5.0	30
ZX95-2760	2660	2760	+5.5	0.5	12.0	-83	-107	-127	-147	1.0	1.5	16-19	-27	-20	200	8.0	41
ZX95-2760C	2660	2760	+4.0	0.50	18.0	-85	-113	-133	-153	0.80	0.30	12-16	-16	-9	60	8.0	37
ZX95-2770	1970	2770	+6.0	1.0	28.0	-74	-101	-122	-143	4.5	1.5	24-56	-27	-15	250	10.0	32
ZX95-2770A	1970	2770	+5.0	0.5	25.0	-75	-102	-123	-142	3.5	2.0	36-65	-16	—	45	8.0	35
ZX95-2795	2600	2795	+5.0	0.5	10.0	-76	-99	-120	-140	1.5	4.0	35-39	-32	-22	250	5.0	42
ZX95-2800	1400	2800	+3.5	0.5	25.0	-69	-95	-116	-137	6.0	2.5	42-107	-15	—	130	5.0	30
ZX95-2868C	2801	2868	+5.5	1.0	12.0	-78	-104	-125	-144	1.0	0.5	19-22	-22	-13	190	8.0	35
ZX95-2890	2700	2890	+5.0	0.5	16.0	-80	-106	-126	-146	3.0	0.7	24-34	-25	-15	170	5.0	40
ZX95-2920C	2500	2920	+7.0	0.5	16.0	-79	-107	-128	-147	2.0	0.2	34-42	-25	-15	150	8.0	38
ZX95-2952	2748	2952	+5.5	1.0	10.0	-73	-100	-121	-141	1.5	1.5	35	-30	-20	220	5.0	40
ZX95-3000W	2000	3000	+5.5	0.5	14.0	-71	-96	-117	-138	13.5	1.5	84-125	-22	-10	140	12.0	35
ZX95-3005	2850	3005	+5.5	0.5	10.0	-77	-100	-121	-142	2.0	1.5	37	-30	-20	10	5.0	42
ZX95-3015	2570	3015	+9.0	0.5	24.0	-72	-99	-120	-140	17.0	0.8	30-43	-14	—	60	10.0	35
ZX95-3050	2850	3050	+6.0	0.5	12.0	-73	-99	-120	-141	1.0	3.0	35-42	-21	-12	20	5.0	44
ZX95-3050A	2150	3050	+7.0	0.5	11.5	-69	-94	-114	-135	2.0	1.5	95-120	-20	-10	60	5.0	47
ZX95-3050C	2856	3050	+5.0	0.5	20.0	-80	-106	-127	-147	1.0	0.6	10-20	-23	-13	110	8.0	35
ZX95-3050CA	2635	3050	+6.5	0.50	16.0	-77	-104	-125	-145	4.5	0.20	35-47	-22	-12	100	8.0	40
ZX95-3060C	2920	3060	+3.2	0.25	18.0	-85	-112	-132	-152	1.2	0.50	8-14	-18	-10	70	8.0	36
ZX95-3075	2920	3075	+3.0	0.5	11.0	-78	-102	-123	-143	0.7	2.5	24-28	-19	-10	30	8.0	40
ZX95-3100	2300	3100	+9.0	0.5	11.0	-66	-92	-113	-133	5.0	4.0	92-124	-20	-10	160	10.0	46
ZX95-3100C	2875	3100	+1.2	0.50	11.0	-78	-105	-126	-146	0.6	0.3	29-37	-35	-20	100	8.0	37
ZX95-3150	2650	3150	+6.2	0.50	12.0	-69	-95	-117	-137	1.50	3.5	64-75	-22	-10	100	5.0	42
ZX95-3200C	3060	3200	+4.7	0.50	18.0	-85	-113	-133	-152	1.0	1.0	8-13	-15	—	65	8.0	36
ZX95-3245	3100	3245	+6.0	0.5	10.0	-72	-98	-119	-139	2.0	4.0	27-32	-26	-18	30	5.0	40
ZX95-3250	2550	3250	+2.0	0.5	24.0	-74	-99	-120	-140	0.6	3.0	27-46	-22	-12	160	5.0	42
ZX95-3250A	3000	3250	+6.5	1.0	10.0	-73	-98	-119	-139	1.5	2.5	35	-30	-20	80	5.0	40
ZX95-3323C	3192	3323	+1.0	1.0	13.0	-81	-106	-127	-147	0.7	0.2	19-27	-19	-10	300	6.0	40
ZX95-3350	3200	3350	+5.0	0.5	10.0	-73	-97	-118	-138	1.0	2.0	33	-30	-20	250	5.0	40
ZX95-3388	3080	3380	+5.0	0.5	13.0	-74	-99	-120	-140	1.5	2.0	30-37	-30	-20	60	5.0	42
ZX95-3360	2120	3360	+8.5	0.5	18.0	-68	-95	-116	-137	3.0	1.0	65-113	-26	-12	170	12.0	45
ZX95-3450	3250	3450	+5.0	0.5	10.0	-73	-98	-119	-139	1.8	1.7	28-36	-19	-13	12	5.0	40
ZX95-3490	3340	3490	0.0	0.5	12.0	-75	-98	-119	-139	0.8	1.0	28-32	-35	-22	220	8.0	40
ZX95-3500	3090	3500	+3.0	0.5	11.0	-70	-96	-117	-137	1.0	2.0	64-71	-24	-14	500	10.0	41
ZX95-3555	3000	3555	+5.0	0.5	15.0	-71	-97	-118	-138	1.5	3.0	60-70	-23	-15	600	5.0	41
ZX95-3600	2950	3600	+3.0	0.5	24.0	-73	-98	-119	-139	0.8	2.0	23-46	-33	-23	100	5.0	40
ZX95-3600A	3350	3600	+5.0	0.5	15.0	-75	-100	-120	-140	1.0	1.0	25-30	-29	-17	300	8.0	52
ZX95-3605	3300	3605	+8.5	0.5	8.0	-71	-97	-118	-138	3.5	0.6	47-64	-20	-15	550	5.0	46
ZX95-3760	3200	3760	+7.5	0.5	15.0	-69	-96	-117	-138	3.0	1.0	56-67	-28	-18	600	5.0	48
ZX95-3900	3750	3900	+4.5	0.5	10.0	-76	-97	-118	-138	2.0	3.5	25-40	-28	-18	260	5.0	40
ZX95-3900A	3650	3900	+4.5	0.5	12.0	-71	-94	-115	-135	2.0	4.0	32-37	-22	-12	100	5.0	40
ZX95-3960	3730	3920	+6.0	1.0	16.0	-71	-97	-118	-139	1.0	0.5	27-41	-20	-10	110	8.0	45
ZX95-4000	3850	4000	+5.0	0.5	10.0	-72	-96	-117	-137	3.0	2.5	26-36	-26	-15	20	5.0	40
ZX95-4040	3685	4040	+6.0	1.0	18.0	-70	-96	-117	-138	5.0	0.5	39-54	-20	-10	170	8.0	43
ZX95-4100	3950	4100	+5.5	0.5	10.0	-71	-96	-117	-137	2.0	1.5	25	-90	—	10	5.0	35
ZX95-4215	4014	4185	+6.0	1.0	10.0	-69	-95	-115	-135	2.5	2.0	37-46	-23	-15	150	5.0	45
ZX95-4415	4214	4415	+5.0	1.0	10.0	-71	-95	-116	-136	2.0	4.5	36-45	-27	-15	150	5.0	40
ZX95-4720	4680	4720	+7.5	0.5	11.0	-70	-96	-117	-138	2.5	0.7	15	-26	-16	120	5.0	50
ZX95-5200C	5194	5200	+3.5	0.25	4.75	-73	-103	-124	-145	1.0	3.0	90	—	-15	130	5.0	35

VOLTAGE CONTROLLED OSCILLATORS 50 Ω

25 MHz to 6840 MHz

MODEL PREFIX	FREQUENCY (MHz)		POWER OUTPUT (dBm)	TUNING VOLTAGE RANGE (V)		PHASE NOISE (dBc/Hz) SSB@ offset frequencies (kHz): Typ.				PULLING pk-pk @ 12 dBr (MHz)	PUSHING (MHz/V)	TUNING SENSITIVITY (MHz/V)	HARMONICS (dBc)		3 dB MODULATION BANDWIDTH (MHz)	DC OPERATING POWER	
	Min.	Max.	Typ.	Min.	Max.	1	10	100	1000	Typ.	Typ.	Typ.	Typ.	Max.	Typ.	Vcc (Volts)	Current (mA) Max.
5 V TUNING for PLL IC's *43 MHz to 6840 MHz*																	
ZX95-43	43	43	+2.0	0.5	5.0	-105	-130	-150	-170	0.002	0.1	1.0	-18	-10	3	5.0	30
ZX95-78	76	80	+4.0	0.5	5.0	-96	-122	-142	-162	0.001	0.1	4.0	-20	-10	5	5.0	25
ZX95-148	127	148	+3.5	0.5	5.0	-84	-110	-131	-152	0.3	1.5	5.0-11	-18	-10	20	4.5	25
ZX95-258	258	258	+4.5	0.5	5.0	-97	-120	-141	-160	0.15	0.10	5.3	-23	-15	45	5.0	25
ZX95-365	335	365	+6.0	0.5	5.0	-92	-119	-140	-159	0.2	0.2	13	-23	-16	5.0	5.0	30
ZX95-445	410	445	0	0.5	5.0	-91	-115	-135	-155	0.4	0.2	11-12	-20	-11	60	5.0	16
ZX95-470	435	470	-0.5	0.5	5.0	-89	-114	-135	-155	0.4	0.2	11-13	-21	-13	80	5.0	16
ZX95-485	450	485	-1.0	0.5	5.0	-91	-114	-134	-153	0.3	0.2	11	-21	-13	80	5.0	15
ZX95-485A	450	485	+4.0	0.5	5.0	-89	-119	-139	-159	0.2	0.4	12	-20	-10	20	5.0	28
ZX95-498	449	499	+5.0	0.5	5.0	-91	-118	-138	-158	0.5	0.3	13	-20	-10	22	5.0	22
ZX95-505	470	505	+0.5	0.5	5.0	-89	-114	-135	-154	0.2	0.3	11-13	-21	-13	80	5.0	17
ZX95-520	485	520	0	0.5	5.0	-90	-115	-135	-154	0.2	0.1	12	-22	-14	70	5.0	17
ZX95-530	500	530	-0.5	0.5	5.0	-90	-111	-132	-151	0.4	0.1	10-11	-23	-15	80	5.0	15
ZX95-540	390	540	-1.5	0.5	5.0	-78	-105	-125	-145	0.02	1.0	44-54	-30	-20	7	5.0	37
ZX95-550	515	550	-1.0	0.5	5.0	-90	-112	-132	-151	0.2	0.2	12-13	-23	-14	60	5.0	17
ZX95-570	535	570	-0.5	0.5	5.0	-90	-114	-135	-155	0.4	0.4	13	-18	-10	60	5.0	15
ZX95-585	550	585	0	0.5	5.0	-90	-114	-135	-152	0.4	0.2	13	-19	-11	50	5.0	16
ZX95-590	555	590	0	0.5	5.0	-87	-111	-132	-152	0.4	0.2	11-12	-18	-9	60	5.0	17
ZX95-595	560	595	-0.5	0.5	5.0	-89	-112	-132	-151	0.4	0.1	12-13	-19	-10	80	5.0	17
ZX95-615	580	615	-0.5	0.5	5.0	-90	-113	-133	-153	0.2	0.2	12-13	-21	-13	19	5.0	17
ZX95-630	595	630	0	0.5	5.0	-90	-113	-133	-153	0.4	0.1	11-12	-23	-15	80	5.0	18
ZX95-638	616	638	+7.0	0.5	5.0	-88	-113	-134	-154	0.7	0.6	18-20	-24	-18	70	5.0	25
ZX95-645	610	645	0	0.5	5.0	-88	-112	-132	-151	0.4	0.1	12-13	-24	-16	50	5.0	17
ZX95-665	630	665	0	0.5	5.0	-98	-113	-133	-153	0.4	0.1	12-13	-24	-16	60	5.0	18
ZX95-680	650	680	+0.5	0.5	5.0	-91	-114	-134	-154	0.3	0.2	11-12	-24	-16	50	5.0	18
ZX95-690	655	690	-1.0	0.5	5.0	-89	-111	-131	-151	0.4	0.4	12-13	-24	-16	50	5.0	17
ZX95-700	665	700	0	0.5	5.0	-89	-113	-133	-153	0.4	0.1	12-13	-21	-13	80	5.0	17
ZX95-715	680	715	-0.5	0.5	5.0	-90	-113	-133	-152	0.5	0.2	12-13	-22	-14	60	5.0	16
ZX95-720	700	720	+7.0	0.5	5.0	-89	-114	-134	-154	0.6	0.7	12	-23	-15	50	4.75	30
ZX95-730	695	730	0	0.5	5.0	-90	-114	-134	-153	0.5	0.2	11-12	-21	-13	90	5.0	18
ZX95-745	710	745	+1.0	0.5	5.0	-88	-113	-133	-153	0.8	0.3	12	-22	-14	60	5.0	17
ZX95-755	720	755	-0.5	0.5	5.0	-89	-113	-133	-147	0.4	0.1	12-13	-23	-15	80	5.0	17
ZX95-766	730	766	+0.5	0.5	5.0	-91	-113	-134	-154	0.5	0.1	12-13	-23	-15	80	5.0	18
ZX95-800	797	806	-0.5	0.5	5.0	-93	-118	-140	-162	0.2	0.2	7.0	-24	-18	115	5.0	35
ZX95-800C	798	803	+5.30	0.5	5.0	-97	-124	-145	-165	0.20	0.02	3.5	-28	-19	60	5.0	35
ZX95-808	770	808	+7.2	0.5	5.0	-84	-110	-130	-150	0.80	0.80	19	-30	-15	120	5.0	30
ZX95-810	775	810	+0.5	0.5	5.0	-88	-112	-131	-151	0.9	0.8	12-13	-19	-12	60	5.0	18
ZX95-835	800	835	-0.5	0.5	5.0	-89	-110	-130	-150	1.0	0.5	12-13	-21	-13	60	5.0	15
ZX95-850A	800	850	-0.5	0.5	5.0	-84	-110	-131	-151	0.2	0.4	18	-25	-15	160	5.0	24
ZX95-860	740	860	+6.0	0.5	5.0	-82	-110	-130	-150	1.30	0.30	32-50	-17	-10	50	5.0	30
ZX95-870	840	870	+1.0	0.5	5.0	-89	-111	-132	-151	1.1	1.0	11-12	-19	-12	90	5.0	17
ZX95-924	907	924	+0.80	0.5	5.0	-90	-114	-134	-154	0.10	0.30	12	-30	-20	155	5.0	25
ZX95-928C	902	928	+10.0	0.5	5.0	-89	-117	-138	-157	1.0	0.2	18.0	-22	-15	130	12.0	32
ZX95-930C	902	930	+5.5	0.5	5.0	-88	-117	-137	-157	0.5	0.2	18	-28	-20	140	5.0	30
ZX95-1000C	1000	1000	+1.0	0.5	5.0	-96	-126	-146	-162	0.1	0.04	5.0	-22	-14	150	6.0	35
ZX95-1005	995	1030	+0.5	0.5	5.0	-84	-109	-129	-149	0.5	0.5	27	-17	-10	120	5.0	32
ZX95-1012	925	1012	+4.5	0.5	5.0	-76	-104	-126	-146	2.0	1.5	55	-24	-13	80	5.0	35
ZX95-1185	1185	1185	+3.0	0.5	5.0	-83	-108	-128	-148	1.0	0.2	30	-20	-12	100	5.0	35
ZX95-1344	1296	1344	-2.0	0.5	5.0	-85	-111	-132	-151	0.2	0.1	19	-25	-15	110	5.0	35
ZX95-1357	1338	1357	0	0.5	5.0	-86	-110	-131	-151	0.3	0.4	12	-22	-13	400	5.0	37
ZX95-1505	1505	1505	-0.5	0.5	5.0	-85	-111	-132	-150	0.5	0.5	17	-19	-10	100	5.0	35
ZX95-1590	1590	1590	+0.5	0.5	5.0	-86	-112	-132	-151	0.4	0.6	17	-23	-15	100	5.0	33
ZX95-1660	1630	1660	+0.5	0.5	5.0	-83	-107	-127	-147	0.8	1.0	33	-19	-10	180	5.0	30
ZX95-1700	1690	1740	0	0.5	5.0	-86	-110	-130	-150	0.1	0.3	23	-20	-10	100	5.0	40
ZX95-1836	1824	1836	+4.0	0.5	5.0	-86	-112	-132	-152	0.20	0.20	18	-30	-20	90	5.0	40
ZX95-1850	1847	1850	+5.0	0.5	5.0	-85	-109	-130	-150	0.1	0.4	18	-18	-12	130	8.0	35
ZX95-1960	1960	1966	+5.0	0.5	5.0	-93	-121	-141	-161	0.50	0.05	8.0	-26	-17	190	5.0	40
ZX95-2000	2000	2000	+1.5	0.5	5.0	-81	-106	-127	-147	2.0	0.3	22	-20	-10	70	5.0	35
ZX95-2015	1975	2015	+7.5	0.5	5.0	-85	-108	-129	-149	0.6	1.0	16-18	-30	-20	100	5.0	35
ZX95-2045	1900	2000	+6.3	0.5	5.0	-74	-101	-122	-143	6.0	0.20	42-56	-20	-10	60	5.0	35
ZX95-2085	2095	2115	+4.0	0.5	5.0	-81	-106	-126	-146	3.0	0.3	30	-20	-10	60	5.0	35
ZX95-2210	2200	2240	+0.40	0.5	5.0	-83	-106	-126	-146	1.50	0.50	21-25	-20	-10	60	5.0	35
ZX95-2243C	2185	2243	+4.8	0.5	5.0	-86	-114	-135	-154	0.70	0.10	21	-29	-20	85	4.75	39
ZX95-2390	2320	2390	+4.5	0.5	5.0	-81	-106	-127	-147	1.0	0.2	31-35	-17	—	180	5.0	43
ZX95-2390A	2380	2420	+0.70	0.5	5.0	-80	-106	-127	-147	0.50	0.80	31-35	-20	-10	50	5.0	35
ZX95-2435	2425	2435	+5.5	0.5	4.5	-87	-115	-135	-156	1.0	0.04	16	-20	-10	200	8.0	32
ZX95-2500A	2200	2495	+4.5	0.5	5.0	-68	-96	-119	-139	6.0	2.0	130	-25	-15	100	5.0	35
ZX95-2500B	2497	2510	+6.0	0.5	5.0	-82	-103	-124	-144	1.5	1.0	18	-25	-15	30	8.0	37
ZX95-2550	2280	2550	+4.5	0.5	5.0	-68	-94	-115	-135	7.0	2.0	96-126	-20	-10	100	5.0	30
ZX95-2650A	2450	2650	-0.5	0.5	5.0	-69	-97	-118	-138	3.0	2.0	105	-25	-15	120	5.0	30
ZX95-2660	2620	2660	+2.5	0.5	5.0	-83	-108	-129	-148	0.4	0.3	17-20	-19	-10	200	5.0	45

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp.

ZOS
Case BR386

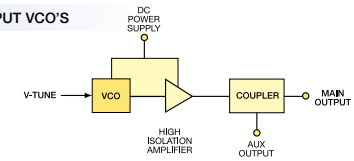
ZX95
Case GB956

MODEL PREFIX	FREQUENCY (MHz) Min.	FREQUENCY (MHz) Max.	POWER OUTPUT (dBm) Typ.	TUNING VOLTAGE RANGE (V) Min.	TUNING VOLTAGE RANGE (V) Max.	PHASE NOISE (dBc/Hz) SSB@ offset frequencies (kHz): Typ. 1	10	100	1000	PULLING pk-pk @ 12 dBr (MHz) Typ.	PUSHING (MHz/V) Typ.	TUNING SENSITIVITY (MHz/V) Typ.	HARMONICS (dBc) Typ.	HARMONICS (dBc) Max.	3 dB MODULATION BANDWIDTH (MHz) Typ.	DC OPERATING POWER Vcc (Volts)	DC OPERATING POWER Current (mA) Max.
ZX95-2770C	2715	2770	+0.4	0.5	5.0	-83	-110	-132	-152	0.30	0.70	28-32	-25	-15	90	5.0	38
ZX95-2840	2835	2860	+4.5	0.5	5.0	-79	-105	-126	-146	0.40	1.50	16	-25	-15	110	5.0	40
ZX95-2920	2820	2920	+4.0	0.5	5.0	-74	-101	-123	-143	1.0	1.0	53-56	-90	—	200	5.0	30
ZX95-2930	2840	2930	+7.0	0.5	5.0	-69	-96	-117	-138	1.3	2.7	85	-29	-20	450	5.0	40
ZX95-2940C	2935	2940	+3.8	0.5	5.0	-89	-116	-136	-156	0.3	0.7	14	-17	-10	75	7.0	40
ZX95-3000	2800	3000	+10.0	0.5	5.0	-74	-102	-123	-144	4.0	0.1	59-65	-25	-15	280	5.0	36
ZX95-3044	2885	3044	+8.0	0.5	5.0	-76	-104	-125	-145	4.5	1.0	64-72	-28	-18	80	5.0	40
ZX95-3080	2920	3080	+3.0	0.5	5.0	-71	-95	-116	-136	2.0	3.0	90	-22	-11	4	5.0	37
ZX95-3127C	3082	3127	+4.2	0.5	5.0	-84	-111	-133	-152	0.70	0.50	26-31	-26	-15	100	5.0	35
ZX95-3146	3000	3110	+9.0	0.5	5.0	-73	-102	-123	-144	4.5	2.5	56-64	-25	-15	200	5.0	43
ZX95-3214C	3074	3200	+2.0	0.5	5.0	-77	-102	-123	-143	2.5	0.3	45-57	-21	-15	20	5.0	40
ZX95-3220	3050	3220	+2.5	0.5	5.0	-71	-96	-117	-137	1.0	2.5	74	-20	-10	340	5.0	37
ZX95-3233	3008	3233	+3.0	0.5	5.0	-71	-97	-119	-140	1.0	2.5	84-91	-30	-20	350	5.0	40
ZX95-3267	3259	3267	+4.0	0.5	5.0	-86	-111	-132	-152	0.50	1.0	16	-14	—	100	5.0	40
ZX95-3270	3150	3270	+2.5	0.5	5.0	-71	-96	-116	-137	2.5	4.5	82	-20	-12	340	5.0	33
ZX95-3320C	3220	3320	+4.5	0.5	5.0	-76	-105	-127	-147	2.0	0.8	50-58	-14	—	120	5.0	45
ZX95-3360A	3160	3360	+3.5	0.5	5.0	-71	-98	-120	-140	1.0	1.0	82	-18	-10	650	5.0	45
ZX95-3412C	3312	3412	-0.60	0.5	5.0	-77	-105	-127	-148	0.80	0.20	50-65	-15	-10	110	5.0	40
ZX95-3432	3231	3432	+3.0	0.5	5.0	-72	-99	-120	-140	0.6	0.3	81-86	-20	-10	120	5.0	45
ZX95-3550	3350	3550	+3.5	0.5	5.0	-71	-97	-118	-139	1.5	0.7	77-82	-23	-13	720	5.0	42
ZX95-3600C	3500	3600	-0.2	0.5	5.0	-77	-105	-126	-146	1.0	0.30	52-66	-16	-10	105	5.0	40
ZX95-3610	3500	3610	+3.5	0.5	5.0	-73	-97	-118	-138	1.5	2.5	80	-19	-10	320	5.0	37
ZX95-3730C	3575	3730	+2.2	0.5	5.0	-77	-104	-126	-146	1.8	0.3	52-68	-16	-10	115	5.0	43
ZX95-3800	3630	3800	+5.0	0.5	5.0	-72	-97	-119	-139	1.5	2.0	73-78	-31	-22	500	5.0	40
ZX95-3877	3676	3877	+3.0	0.5	5.0	-71	-98	-119	-139	0.8	0.5	80-87	-20	-10	150	5.0	46
ZX95-3970	3790	3970	+3.5	0.5	5.0	-71	-96	-117	-137	1.5	4.0	77-85	-23	-16	30	5.0	31
ZX95-3997	3989	3997	+5.7	0.5	5.0	-78	-105	-129	-149	1.5	0.3	14	-19	-10	90	5.0	33
ZX95-4077	3876	4077	+4.0	0.5	5.0	-70	-97	-118	-138	1.5	2.0	72-78	-22	-14	120	5.0	48
ZX95-4300	4150	4300	+4.5	0.5	5.0	-65	-91	-112	-132	9.5	2.0	68-77	-26	-18	330	5.0	34
ZX95-4303	4195	4415	+4.6	0.5	5.0	-69	-96	-117	-137	3.0	0.50	78-90	-25	-15	180	5.0	50
ZX95-4403	4200	4360	+4.0	0.5	5.0	-71	-97	-118	-138	1.0	1.0	53-60	-25	-15	150	5.0	55
ZX95-4424	4424	4430	+7.5	0.5	5.0	-76	-99	-119	-139	6.0	1.4	21	-27	-17	100	5.0	51
ZX95-4540	4340	4540	+4.0	0.5	5.0	-66	-92	-113	-133	5.0	1.0	75-85	-28	-18	120	5.0	45
ZX95-4725	4585	4725	+2.50	0.5	5.0	-74	-104	-125	-144	2.0	4.0	73-92	-25	-14	80	5.0	30
ZX95-5150	4880	5150	+3.5	0.5	5.0	-69	-95	-116	-136	1.0	2.0	74-90	-30	-20	500	5.0	53
ZX95-5150A	5020	5145	+3.5	0.5	5.0	-73	-104	-126	-146	0.7	2.5	75-90	-35	-15	120	5.0	32
ZX95-5363C	5223	5363	0	0.5	5.0	-75	-102	-122	-140	0.5	1.0	55-70	-15	-14	180	5.0	32
ZX95-5490C	5340	5490	+0.5	0.5	5.0	-74	-102	-122	-142	0.5	1.5	58-76	-34	-15	150	5.0	35
ZX95-5540C	5340	5540	+0.50	0.5	5.0	-74	-103	-124	-144	0.40	0.80	64-83	-15	-15	100	5.0	35
ZX95-5580	5440	5580	-0.5	0.5	5.0	-75	-101	-123	-143	0.3	0.8	68-72	-34	-25	180	5.0	35
ZX95-5776	5726	5826	+1.5	0.5	5.0	-75	-102	-122	-142	0.5	3.0	59-78	-30	-21	130	5.0	33
ZX95-6030C	5890	6010	+2.0	0.5	5.0	-73	-102	-124	-144	0.7	2.0	62-90	-36	-22	220	5.0	28
ZX95-6520C	6385	6520	+1.3	0.5	5.9	-74	-103	-123	-143	0.70	2.50	62-95	—	-13	110	5.0	38
ZX95-6640C	6520	6640	+1.0	0.5	5.0	-72	-100	-121	-141	1.50	3.0	90-107	—	-12	150	5.0	38
ZX95-6740C	6640	6740	+2.0	0.5	5.0	-70	-97	-120	-140	1.0	3.0	75-90	-33	-17	300	5.0	35
ZX95-6840C	6740	6840	+1.0	0.5	5.0	-70	-97	-120	-140	1.0	3.5	90-102	—	-12	260	5.0	38

DUAL OUTPUT 25 MHz to 1025 MHz

MODEL PREFIX	FREQUENCY (MHz) Min.	FREQUENCY (MHz) Max.	POWER OUTPUT (dBm) Typ. Main.	POWER OUTPUT (dBm) Typ. Aux.	TUNE VOLTAGE (V) Min.	TUNE VOLTAGE (V) Max.	PHASE NOISE (dBc/Hz) SSB@ offset frequencies: Typ. 10 kHz	100 kHz	1 MHz	PULLING (MHz) pk-pk (open/short) Typ.	PUSHING (MHz/V) Typ.	TUNING SENSITIVITY (MHz/V) Typ.	HARMONICS (dBc) Typ.	HARMONICS (dBc) Max.	3 dB MOD. BANDWIDTH (MHz) Typ.	DC OPERATING POWER Vcc (Volts)	DC OPERATING POWER Current (mA) Max.
ZOS-50	25-50		+9.0	-12.0	1.0	16.0	-107	-126	-141	0.012	0.08	2.5	-22	-12	0.1	12	140
ZOS-75	37.5-75		+9.0	-12.0	1.0	16.0	-110	-128	-142	0.016	0.15	3.5	-26	-20	0.1	12	140
ZOS-100	50-100		+9.0	-12.0	1.0	16.0	-111	-131	-143	0.026	0.25	4.5	-29	-20	0.1	12	140
ZOS-150	75-150		+9.0	-12.0	1.0	16.0	-107	-127	-142	0.017	0.39	5.8	-23	-17	0.1	12	140
ZOS-200	100-200		+10.0	-11.0	1.0	16.0	-106	-126	-141	0.015	0.42	7.7	-25	-20	0.1	12	140
ZOS-300	150-280		+9.0	-13.0	1.0	16.0	-103	-123	-142	0.017	0.5	11.0	-27	-20	0.1	12	140
ZOS-400	200-380		+10.0	-13.0	1.0	16.0	-100	-120	-136	0.021	0.5	15.0	-24	-18	0.1	12	140
ZOS-535	300-525		+9.0	-13.0	1.0	16.0	-96	-118	-131	0.018	0.5	18.0	-27	-20	0.1	12	140
ZOS-765	485-765		+8.5	-14.0	1.0	16.0	-96	-117	-132	0.033	0.72	22.0	-27	-17	0.1	12	140
ZOS-1025	685-1025		+8.0	-13.0	1.0	16.0	-92	-112	-136	0.051	1.0	30.0	-25	-18	0.1	12	140

ELECTRICAL SCHEMATIC DUAL OUTPUT VCO'S



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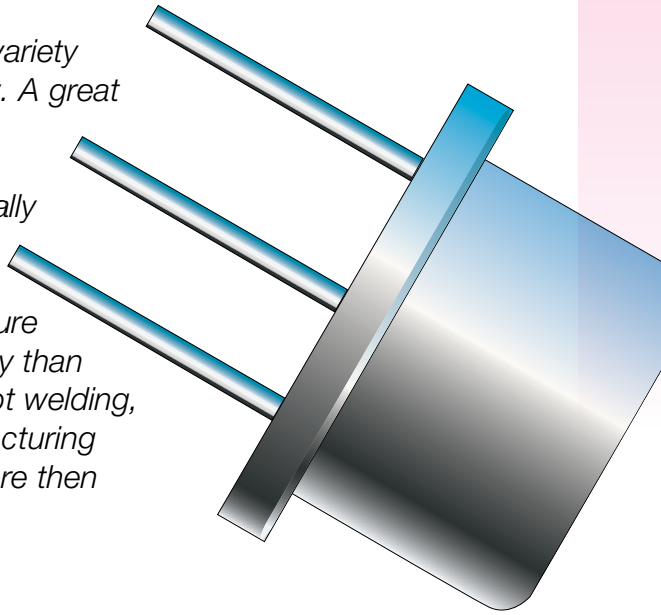
Mini-Circuits offers the world's largest assortment of Plug-in components in a variety of package styles for thru-hole assembly. A great majority of these products are shielded, and utilize our proprietary laser welding process to hermetically seal the package. This automated laser sealing procedure offers higher reliability than solder sealing or spot welding, and reduces manufacturing costs. The savings are then passed on to you!



AMPLIFIERS Broadband, Linear, 50 Ω (Hermetic)

500 kHz to 3 GHz

AMP Case PP120 | AMP-3G Case PP230 | TO, AMP-2000 Case QQ96 | MAN Case A05 | MAN-2AD, 11AD, 1HLN Case A06

MODEL PREFIX	FREQUENCY (MHz) f_L-f_U	GAIN (dB) Min.	GAIN (dB) Flatness Max.	MAXIMUM POWER (dBm) Output (1 dB Comp)	MAXIMUM POWER (dBm) Input (no damage)	NOISE FIGURE (dB) Typ.	IP3 (dBm) Typ.	VSWR Typ. (:1) In	VSWR Typ. (:1) Out	ACTIVE DIRECTIVITY (dB) Typ. Midband	DC OPERATING POWER VOLT (V)	DC OPERATING POWER CURRENT (mA) Max.
LOW POWER *up to +12 dBm output NF from 1.2 dB*												
MAN-1	0.5-500	28	±1.4	+8	+15	4.5	+18	1.8	1.8	11	12	60
MAN-1LN	0.5-500	28	±1.4	+7	+15	3.0	+18	1.8	1.8	10	12	60
AMP-75	5-500	19	±1.0	+12	+13	2.4	+28	2.0	2.0	2	15	31
MAN-1AD	5-500	16	±1.0	+7	+15	7.2	+20	1.6	1.7	31	12	85
MAN-2	0.5-1000	18	±1.5	+9	+15	6.0	+19	1.8	1.8	16	12	85
MAN-2AD	2-1000	9	±0.7	-2	+10	6.5	+14	2.0	2.0	20	15	22
AMP-15	5-1000	13	±1.2	+8	+13	2.8	+22	2.0	2.0	5	15	29
TO-0812LN	800-1200	20	±1.0	+8	+10	1.2	+22.5	2.5	2.5	21	15	70
TO-1217LN	1200-170	20	±1.0	+10	+13	1.6	+25	2.5	2.5	11	15	70
MAN-11AD	2-2000	8	±1.5	-2	+10	6.5	+14	3.0	2.0	16	15	22
TO-1724LN	1700-2400	20	±1.0	+10	+13	1.6	+22	2.5	2.5	15	15	70
AMP-3G	30-3000	8	±0.75	+9.5	+13	3.5	+20	2.6	2.5	9	15	55
MEDIUM POWER *up to +16 dBm output NF from 3.0 dB*												
AMP-76	5-500	26	±1.0	+13.5	+6	3.1	+28	2.0	2.0	9	15	71
AMP-77	5-500	15	±1.0	+16	+13	3.3	+32	2.0	2.0	2	15	56
MAN-1HLN	10-500	10	±0.8	+15	+15	3.7	+30	1.8	1.8	4	12	70
AMP-2000	10-2000	20	±1.5	+15	+5	5.0	+25	2.0	2.0	15	15	100
AMP-25G	10-2500	15	±1.6	+12.5	+13	3.0	+26	1.6	1.2	7	15	55

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ATTENUATORS, DIGITAL STEP

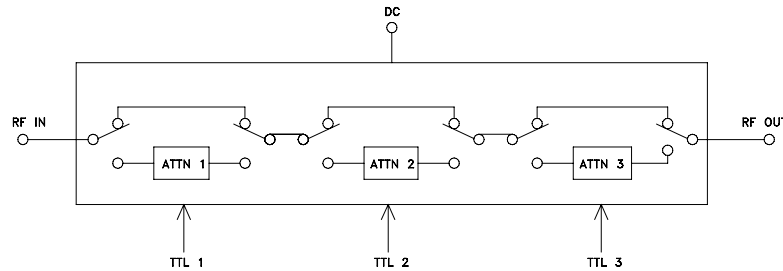
10 MHz to 1 GHz Precision 50 Ω *(Hermetic)*

TOAT
Case QQ96

MODEL PREFIX	FREQUENCY (MHz) f_L-f_U	PRIMARY ATTENUATION STEPS (dB) @TTL CONTROL PORT #1	#2	#3	ATTENUATION (dB) Attenuation Above insertion loss at (1,1,1) state Typ.	Max. Insertion loss at (0,0,0) state	VSWR (:1) Typ. L	M	U	DC OPERATING POWER VOLT (V)	CURRENT (mA)
DIGITAL STEP *Pin Diode, TTL Control*											
TOAT-R512	10-1000	0.5±0.18	1±0.25	2±0.25	3.5	4.0	1.6	1.4	1.5	5	12
TOAT-124	10-1000	1±0.25	2±0.25	4±0.3	7.0	4.0	1.6	1.4	1.5	5	12
TOAT-3610	10-1000	3±0.3	6±0.4	10±0.4	19.0	4.0	1.6	1.4	1.5	5	12
TOAT-4816	10-1000	4±0.4	8±0.4	16±0.5	28.0	4.0	1.6	1.4	1.5	5	12
TOAT-51020	10-1000	5±0.4	10±0.4	20±0.5	35.0	4.0	1.6	1.4	1.5	5	12

L = low range (10 to 100 MHz) M = mid range (100 to 500 MHz) U = upper range (500 to 1000 MHz)

ELECTRICAL SCHEMATIC



BIAS-TEES *Wideband, High DC Current 50 Ω (Hermetic)*

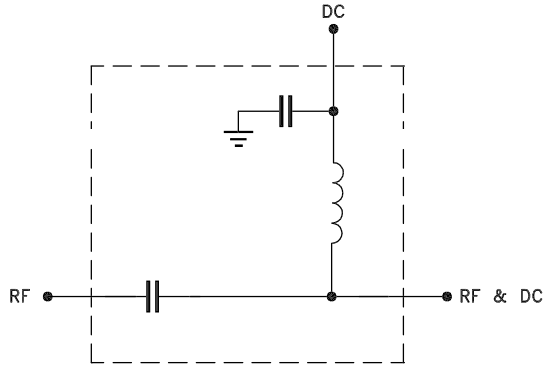
100 kHz to 3 GHz

PBTC
Case C07

MODEL PREFIX	FREQUENCY (MHz)	INSERTION LOSS (dB)						ISOLATION (dB) (RF port to DC port) (RF&DC port to DC port)						VSWR (:1)			DC CURRENT OPERATING (mA)	RF POWER OPERATING (dBm)
		L		M		U		L		M		U		L	M	U		
	f_L-f_U	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Typ.	Typ.	Max.	Max.
PBTC-1GW	0.1-1000	0.15	0.8	0.3	0.7	0.3	1.0	25	15	33	20	30	20	1.06	1.06	1.1	200	20
PBTC-1G	10-1000	0.15	0.7	0.3	0.7	0.3	0.7	27	20	33	20	30	20	1.06	1.06	1.1	200	20
PBTC-3GW	0.1-3000	0.15	0.8	0.3	1.5	1.0	2.5	25	15	30	20	35	20	1.06	1.13	1.6	200	20
PBTC-3G	10-3000	0.15	0.7	0.3	1.5	1.0	2.5	27	20	30	20	35	20	1.06	1.13	1.6	200	20

L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)

ELECTRICAL SCHEMATIC



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DIRECTIONAL COUPLERS *(Hermetic)*

5 kHz to 2 GHz, 6 to 30 dB Coupling

TDC
Case B02

PDC
Case A01

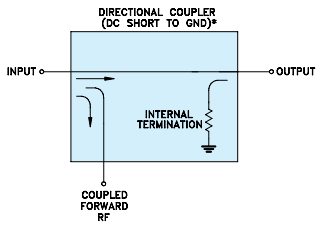
P4DC-30A-2
Case C07, C145

MODEL PREFIX	FREQUENCY (MHz)	COUPLING (dB)		MAINLINE LOSS (dB)						DIRECTIVITY (dB)						VSWR (:1)	POWER INPUT, W	
				L		M		U		L		M		U				
	f_L-f_U	Nom.	Flatness	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	L Max.	MU Max.
DIRECTIONAL 50 Ω																		
TDC-6-1	10-400	6.3±0.4	±0.4	2.0	2.4	2.0	2.4	2.0	2.5	36	30	30	25	20	15	1.5	1.0	2.0
TDC-10-1	1-400	10.0±0.5	±0.5	1.2	1.5	1.0	1.3	1.2	1.5	35	25	30	20	20	15	1.5	1.0	2.0
PDC-10-2	250-1000	10.5±0.5	±0.6	1.4	1.6	—	—	1.6	2.0	30	23	—	—	25	15	1.5	5.0	5.0
PDC-10-54	10-1500	10.5±0.5	±0.7	1.2	1.8	1.3	1.9	1.6	2.3	35	25	28	23	28	23	1.3	0.5	0.5
PDC-10-5	1-2000	10.5±0.5	±1.0	1.2	1.9	1.3	1.9	2.0	2.5	38	25	30	18	22	15	1.3	0.5	0.5
PDC-10-6	0.005-20	11.0±0.5	±0.5	0.4	1.2	0.4	0.8	0.4	1.0	40	30	40	30	35	25	1.3	1.5	3.0
PDC-10-22	5-750	11.0±0.5	±0.5	1.1	1.6	1.2	1.7	1.6	1.9	35	30	25	20	25	20	1.25	1.0	2.0
PDC-10-21	1-1000	11.0±0.5	±0.5	1.2	1.7	1.2	1.7	1.6	2.0	40	30	25	20	25	20	1.3	1.0	2.0
TDC-10-2	5-1000	11.0±0.5	±0.6	1.4	1.8	1.5	1.8	1.6	2.0	50	35	25	20	20	15	1.5	0.5	0.5
PDC-10-1	0.5-500	11.5±0.5	±0.6	0.85	1.3	0.65	1.0	0.85	1.3	32	25	32	25	22	15	1.2	1.5	3.0
PDC-15-21	1-500	14.7±0.5	±0.6	0.7	1.1	0.7	1.1	0.8	1.2	35	30	35	30	30	23	1.4	1.0	2.0
PDC-15-6	0.01-35	15.0±0.5	±0.5	0.3	0.6	0.2	0.4	0.3	0.6	38	30	35	25	28	20	1.15	2.0	4.0
PDC-20-1W	10-700	19.2±0.5	±0.5	0.25	0.5	0.4	0.7	0.7	1.1	34	30	27	23	23	20	1.4	1.0	2.0
PDC-20-3	0.2-250	19.5±0.5	±0.5	0.35	0.6	0.25	0.5	0.35	0.6	36	30	33	25	25	20	1.2	1.5	4.0
PDC-20A-5	0.1-2000	20.0±0.5	±1.0	0.6	1.5	0.6	1.5	1.9	2.9	34	20	25	15	20	10	1.5	0.5	2.0
PDC20-900HP	800-900	20.2±0.6	±0.5			0.25	0.5			24	20	24	20	24	20	1.1	5.0	5.0
PDC20-970HP	860-970	20.2±0.6	±0.5			0.25	0.5			24	20	24	20	24	20	1.1	5.0	5.0
PDC-20-1	25-400	21.0±0.75	±0.5	0.2	0.25	0.3	0.35	0.35	0.5	25	20	35	25	25	20	1.25	3.0	5.0
PDC20-400HP	40-400	21.5±0.5	±0.6	0.1	0.3	0.2	0.4	0.2	0.5	30	20	30	20	27	18	1.1	10.0	10.0
P4DC-30A-2	5-1000	30.5±0.5	±1.0	0.7	1.2	0.7	1.2	0.8	1.5	30	15	32	20	20	10	1.15	1.0	2.0
DIRECTIONAL 75 Ω																		
PDC-10-6-75	0.2-100	10.0±0.5	±0.2	1.2	1.6	0.9	1.2	0.9	1.3	50	30	40	25	37	25	1.5	1.0	2.0
PDC-10-1-75	1-250	10.5±0.5	±0.75	1.1	1.5	1.1	1.5	1.1	1.5	30	20	30	20	30	20	2.0	2.0	4.0
PDC-15-6-75	0.02-35	14.5±0.5	±0.5	0.3	0.7	0.3	0.7	0.3	0.7	35	20	35	20	35	20	1.3	1.5	4.0
PDC-20-3-75	1-150	19.5±0.5	±0.75	0.35	0.8	0.35	0.8	0.35	0.8	25	20	25	20	25	20	2.0	2.0	4.0
PDC-20-6-75	0.05-40	20.4±0.3	±0.25	0.1	0.25	0.1	0.2	0.1	0.3	45	35	35	20	25	18	1.2	1.5	3.0
BI-DIRECTIONAL 50 Ω																		
PDC-10-1BD	1-400	11.5±0.5	±0.5	0.6	0.9	0.8	1.1	0.9	1.3	55	35	35	20	22	15	1.2	2.0	4.0
PDC-20-1BD	0.5-200	19.2±0.5	±0.5	0.3	0.7	0.3	0.5	0.4	0.6	40	30	35	20	22	18	1.1	3.0	5.0
PDC-20-3BD	0.2-250	19.5±0.5	±0.5	0.3	1.0	0.25	0.9	0.35	0.7	47	25	40	25	30	20	1.1	1.5	4.0

L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)

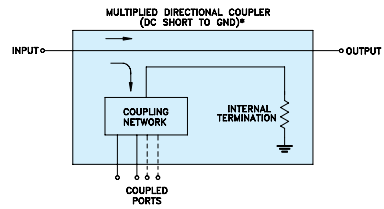
ELECTRICAL SCHEMATICS

Directional Couplers *(except P4DC-30A-2)*



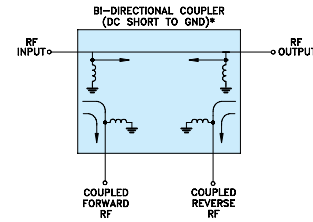
* Electrical Schematic Is For Directional Coupler With Internal Transformer (s) That Routes DC From RF Ports To Ground.

Model P4DC-30A-2



* Electrical Schematic Is For Multiplied Coupling With Internal Transformers That Routes DC From RF Ports To Ground.

Bi-Directional Couplers



* Electrical Schematic Is For Bi-Directional Coupler With Internal Transformer (s) That Routes DC From RF Ports To Ground.

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FILTERS (Hermetic)

DC to 2.2 GHz

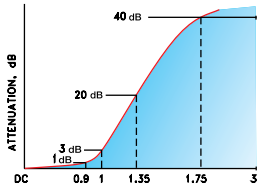
PLP, PBLP
Case A01

MODEL PREFIX	PASSBAND, (MHz) (Loss <1 dB)	fco, (MHz) NOMINAL (Loss 3 dB)	STOPBAND, (MHz) (Loss >20 dB)	STOPBAND, (MHz) (Loss >40 dB)	VSWR (:1) PASSBAND Typ.	VSWR (:1) STOPBAND Typ.	RF POWER Max. (W)
LOW PASS 50 Ω							
PLP-1.9	DC-1.9	2.5	3.4-4.7	4.7-200	1.7	18	0.5
PLP-2.5	DC-2.5	2.75	3.8-5.0	5.0-200	1.7	18	0.5
PLP-5	DC-5	6	8-10	10-200	1.7	18	0.5
PLP-10.7	DC-11	14	19-24	24-200	1.7	18	0.5
PLP-15	DC-15	17	23-32	32-200	1.7	18	0.5
PLP-21.4	DC-22	24.5	32-41	41-200	1.7	18	0.5
PLP-30	DC-32	35	47-61	61-200	1.7	18	0.5
PLP-50	DC-48	55	70-90	90-200	1.7	18	0.5
PLP-70	DC-60	67	90-117	117-300	1.7	18	0.5
PLP-90	DC-81	90	121-157	157-400	1.7	18	0.5
PLP-100	DC-98	108	146-189	189-400	1.7	18	0.5
PLP-150	DC-140	155	210-300	300-600	1.7	18	0.5
PLP-200	DC-190	210	290-390	390-800	1.7	18	0.5
PLP-250	DC-225	250	320-400	400-1200	1.7	18	0.5
PLP-300	DC-270	297	410-550	550-1200	1.7	18	0.5
PLP-450	DC-400	440	580-750	750-1800	1.7	18	0.5
PLP-550	DC-520	570	750-920	920-2000	1.7	18	0.5
PLP-600	DC-580	640	840-1120	1120-2000	1.7	18	0.5
PLP-750	DC-700	770	1000-1300	1300-2000	1.7	18	0.5
PLP-800	DC-720	800	1080-1400	1400-2000	1.7	18	0.5
PLP-850	DC-780	850	1100-1400	1400-2000	1.7	18	0.5
PLP-1000	DC-900	990	1340-1750	1750-2000	1.7	18	0.5
PLP-1200	DC-1000	1200	1620-2100	2100-2500	1.7	18	0.5
LOW PASS 75 Ω							
PLP-7-75	DC-7	8	11-15	15-200	1.7	18	0.5
PLP-10.7-75	DC-11	14	19-24	24-200	1.7	18	0.5
PLP-15-75	DC-15	17	23-32	32-200	1.7	18	0.5
PLP-21.4-75	DC-22	24.5	32-41	41-200	1.7	18	0.5
PLP-30-75	DC-32	35	47-61	61-200	1.7	18	0.5
PLP-50-75	DC-48	55	70-90	90-200	1.7	18	0.5
PLP-70-75	DC-60	67	90-117	117-300	1.7	18	0.5
PLP-100-75	DC-98	108	146-189	189-400	1.7	18	0.5
PLP-600-75	DC-580	640	840-1120	1120-2000	1.7	18	0.5
PLP-850-75	DC-750	850	1150-1490	1490-2000	1.7	18	0.5

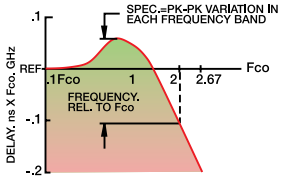
MODEL PREFIX	PASSBAND (MHz) (Loss <1.2 dB) Min.	fco, (MHz) NOMINAL (Loss 3 dB)	STOP BAND, (MHz) Loss > 10 dB	STOP BAND, (MHz) Loss > 20 dB	VSWR (:1) DC-0.2 fco $\bar{X}$	VSWR (:1) DC-0.6 fco $\bar{X}$	GROUP DELAY VARIATION (nsec) DC-fco $\bar{X}$	GROUP DELAY VARIATION (nsec) DC-2 fco $\bar{X}$	GROUP DELAY VARIATION (nsec) DC-2.67 fco $\bar{X}$	RF POWER Max. (W)
LOW PASS, Flat Time Delay 50 Ω										
PBLP-39	DC-23	39	78-117	117	1.3	2.3	0.70	4.0	5.00	0.5
PBLP-117	DC-65	117	234-312	312	1.3	2.4	0.35	1.4	1.90	0.5
PBLP-156	DC-94	156	312-416	416	1.3	1.1	0.30	1.1	1.50	0.5
PBLP-200	DC-120	200	400-534	534	1.6	1.9	0.40	1.3	1.60	0.5
PBLP-300	DC-180	300	600-801	801	1.25	2.2	0.20	0.6	0.80	0.5
PBLP-467	DC-280	467	934-1246	1246	1.25	2.2	0.15	0.4	0.55	0.5

TYPICAL FREQUENCY RESPONSE

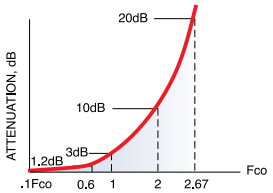
PLP



PBLP Typical Group Delay



PBLP Insertion Loss



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PIF, PBP, PHP
Case A01

BANDPASS Constant Impedance 50 Ω

MODEL PREFIX	CENTER FREQUENCY MHz	PASSBAND (MHz) (Loss <1 dB)	STOP BANDS (Loss > 10 dB) at MHz	STOP BANDS (Loss > 20 dB) at MHz	VSWR 1.3:1, TYP. TOTAL BAND MHz	RF POWER Max. (W)
PIF-21.4	21.4	18-25	4.9 & 85	1.3 & 150	DC-220	0.5
PIF-30	30	25-35	7 & 120	1.9 & 210	DC-330	0.5
PIF-40	42	35-49	10 & 168	2.6 & 300	DC-400	0.5
PIF-50	50	41-58	11.5 & 200	3.1 & 350	DC-440	0.5
PIF-60	60	50-70	14 & 240	3.8 & 400	DC-500	0.5
PIF-70	70	58-82	16 & 280	4.4 & 490	DC-550	0.5

BANDPASS Elliptic Response 50 Ω

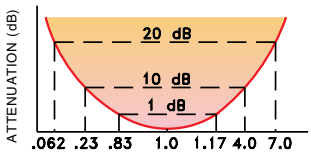
MODEL PREFIX	CENTER FREQUENCY MHz	PASSBAND I.L. 1.5 dB Max. MHz F1 F2	3 dB BANDWIDTH TYPICAL MHz	STOP BANDS (I. Loss > 20 dB) at MHz F3 F4	STOP BANDS (I. Loss > 35 dB) at MHz F5 F6	VSWR (:1) Passband Max.	VSWR (:1) Stop Band Typ.	RF POWER Max. (W)
PBP-10.7	10.7	9.5-11.5	8.9-12.7	7.5 & 15	0.6 & 50-1000	1.7	16	0.5
PBP-21.4	21.4	19.2-23.6	17.9-25.3	15.5 & 29	3.0 & 80-1000	1.7	16	0.5
PBP-30	30	27.0-33.0	25-35	22 & 40	3.2 & 99-1000	1.7	16	0.5
PBP-35N	35	30-40	—	21 & 58	19 & 66-1000	1.5	18	0.5
PBP-35W	35	25-45	—	16 & 70	4 & 80-1000	1.5	18	0.5
PBP-60	60	55.0-67.0	49.8-70.5	44 & 79	4.6 & 190-1000	1.7	16	0.5
PBP-70	70	63.0-77.0	58.0-82.0	51 & 94	6.0 & 193-1000	1.7	16	0.5

HIGH PASS 50 Ω

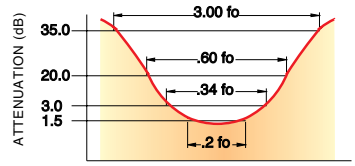
MODEL PREFIX	STOPBAND, (MHz) (Loss > 40 dB)	STOPBAND, (MHz) (Loss > 20 dB)	fco, (MHz) NOMINAL (Loss 3 dB)	PASSBAND, (MHz) (Loss <1 dB)	VSWR (:1) Stopband Typ.	VSWR (:1) Passband Typ.	RF POWER Max. (W)
PHP-25	DC-13	13-19	25	27.5-200	18	1.7	0.5
PHP-50	DC-20	20- 26	37	41-200	17	1.5	0.5
PHP-100	DC-40	40- 55	82	90-400	17	1.5	0.5
PHP-150	DC-70	70- 95	120	133-600	17	1.8	0.5
PHP-175	DC-70	70-105	140	160-800	17	1.5	0.5
PHP-200	DC-90	90-116	164	185-800	17	1.6	0.5
PHP-250	DC-100	100-150	205	225-1200	17	1.3	0.5
PHP-300	DC-145	145-190	245	290-1200	17	1.7	0.5
PHP-400	DC-210	210-290	360	395-1600	17	1.7	0.5
PHP-500	DC-280	280-365	454	500-1600	17	1.9	0.5
PHP-600	DC-350	350-440	545	600-1600	17	2.0	0.5
PHP-700	DC-400	400-520	640	700-1800	17	1.6	0.5
PHP-800	DC-445	445-570	710	780-2000	17	2.1	0.5
PHP-900	DC-520	520-660	820	910-2100	17	1.8	0.5
PHP-1000	DC-550	550-720	900	1000-2200	17	1.9	0.5

TYPICAL FREQUENCY RESPONSE

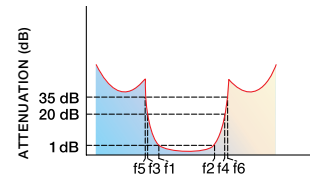
PIF Bandpass, Constant Impedance



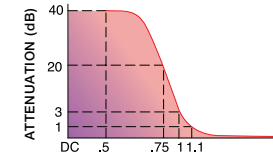
PBP Bandpass, Elliptical
(Except PBP-35N, PBP-35W)



PBP Bandpass, Elliptical
PBP-35N, PBP-35W



PHP High Pass



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LIMITERS Broadband, 50 Ω (Hermetic)

100 kHz to 900 MHz

PLS
Case A01

MODEL PREFIX	FREQUENCY (MHz)	INPUT POWER (dBm)		OUTPUT (dBm)	CONTROL CURRENT mA	LIMITING		
						Input range	△Output / △1 dB	
		Min.	Max.	Typ.	Typ.	dBm	amp	phase deg/dB
PLS-1	0.1 - 150	6	20	-4.0	3	6 to 10	0.10	0.8
						10 to 16	0.15	0.8
						16 to 20	0.15	0.7
PLS-2	100 - 900	3	15	-5.0	5	3 to 8	0.20	2.0
						8 to 12	0.40	2.0
						12 to 15	0.40	2.0

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MIXERS, ACTIVE 50 Ω (Hermetic)

10 MHz to 500 MHz

UNCL
Case A01

MODEL PREFIX	FREQUENCY (MHz) LO/RF f_L-f_U	FREQUENCY (MHz) IF	CONVERSION GAIN, (dB) MID-BAND m $\bar{x}$	σ	Min.	TOTAL RANGE Typ.	Min.	LO-RF ISOLATION, (dB) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	LO-IF ISOLATION, (dB) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	INPUT POWER (dBm) 1 dB Comp Typ.	DC POWER Volt	Current (mA)
LEVEL 7 +7 dBm LO up to -10 dBm RF Low Noise																						
UNCL-R1	10-500	DC-500	5.53	0.11	2.0	5.0	2.0	65	45	55	40	47	35	40	30	30	20	25	17	-10	12	35

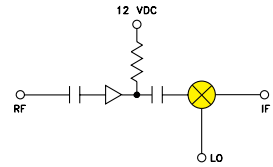
UNCL
Case A01

MODEL PREFIX	FREQUENCY (MHz) LO/RF f_L-f_U	FREQUENCY (MHz) IF	CONVERSION GAIN, (dB) MID-BAND m $\bar{x}$	σ	Min.	TOTAL RANGE Min.	LO-RF ISOLATION, (dB) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	LO-IF ISOLATION, (dB) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	INPUT POWER (dBm) 1 dB Comp Typ.	DC POWER Volt	Current (mA)
LEVEL -4 -4 dBm LO up to +1 dBm RF																					
UNCL-L1	10-500	DC-500	5.73	0.8	8.0	8.5	45	30	35	20	25	17	32	20	23	15	18	12	1	12	35
LEVEL 6 +6 dBm LO up to +14 dBm RF																					
UNCL-L1H	10-500	DC-500	5.73	0.07	8.0	8.5	45	25	36	20	24	17	32	18	25	15	18	10	14	12	60

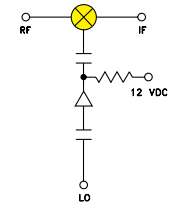
L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)
m = mid band ($2f_L$ to $f_U/2$)

ELECTRICAL SCHEMATICS

Mixer with RF Amplifier
UNCL-R1



Mixer with LO Amplifier
UNCL-L1, UNCL-L1H



MIXERS, FREQUENCY

50 Ω *(Hermetic and Non Hermetic)*

500 Hz to 4.3 GHz

TFM, TUF Case B02 | TFM Case B13 | (Non Hermetic) ASK Case X65 | TSM Case A11 | SAM Case A03 | ROK Case QQ96 | TAK Case A04, A05 | SBL, SRA, SIMA Case A06 | SAY, SRA, RAY, VAY Case A01

MODEL PREFIX	FREQUENCY (MHz)		CONVERSION LOSS (dB)				LO-RF ISOLATION (dB)						LO-IF ISOLATION (dB)						SCHEMATIC
	LO/RF	IF	MID-BAND m			TOTAL RANGE	L		M		U		L		M		U		
	f_L-f_U		$\bar{x}$	σ	Max.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	
LEVEL 7 +7 dBm LO up to +1 dBm RF																			
SRA-8	0.0005-10	DC-10	5.69	0.11	7.5	8.5	60	50	50	40	45	35	60	50	50	40	45	35	1
SRA-6	0.003-100	DC-100	4.58	0.05	7.5	8.5	60	50	45	30	35	25	60	45	40	25	30	20	1
SBL-3	0.025-200	DC-200	4.81	0.05	7.5	8.5	55	50	45	30	35	25	45	35	40	30	30	20	1
SRA-3	0.025-200	DC-200	4.61	0.06	7.5	8.5	60	50	45	35	35	25	45	35	40	30	30	20	1
TAK-5	0.01-250	DC-250	4.65	0.02	7.0	8.5	60	50	50	35	40	35	55	45	45	30	35	25	1
TFM-3	0.04-400	DC-400	4.70	0.06	7.0	8.0	60	50	50	35	35	25	55	40	45	30	35	25	1
SBL-1-1	0.1-400	DC-400	4.84	0.04	7.0	8.0	50	45	45	30	35	25	45	30	40	25	30	20	1
TUF-3	0.15-400	DC-400	4.7	0.02	7.0	8.0	60	50	46	30	35	25	60	40	47	25	35	20	1
SRA-1-1	0.1-500	DC-500	4.81	0.11	7.5	8.5	50	45	45	30	35	25	45	30	40	25	30	20	1
TSM-3	0.1-500	DC-500	4.75	0.04	7.5	8.5	60	50	50	35	35	25	55	45	45	30	35	25	1
SRA-1	0.5-500	DC-500	5.11	0.09	7.0	8.5	50	45	45	30	35	25	45	35	40	25	30	20	1
SBL-1	1-500	DC-500	5.60	0.09	7.0	8.0	60	45	45	35	40	25	45	35	40	25	30	20	1
TAK-6	0.5-600	DC-600	5.58	0.04	7.5	8.5	60	50	50	30	40	25	55	45	45	30	30	20	1
ASK-1-X65	1-600	DC-600	5.58	0.06	7.0	8.5	50	30	35	25	30	20	45	35	30	20	25	15	1
SAM-1	1-600	DC-600	5.67	0.05	7.0	8.5	55	45	45	30	35	20	50	40	40	25	30	20	1
TUF-1	2-600	DC-600	5.85	0.04	7.0	8.0	60	50	42	30	37	25	60	45	47	30	36	22	1
SRA-1W	1-750	DC-750	5.80	0.04	7.5	8.5	50	45	45	30	35	25	45	30	40	25	30	20	1
SRA-2	1-1000	0.5-500	5.66	0.07	7.5	8.5	45	30	35	20	30	20	45	30	30	20	30	20	1
TFM-2	1-1000	DC-1000	5.74	0.07	7.5	8.5	50	45	40	25	30	25	45	40	35	25	25	18	1
SRA-2CM	5-1000	DC-1000	5.27	0.04	7.0	8.5	60	50	35	30	30	25	50	45	30	25	25	20	1
SBL-1X	10-1000	5-500	5.88	0.10	7.5	8.0	50	40	40	30	30	20	50	45	40	35	35	25	1
TUF-2	50-1000	DC-1000	5.85	0.07	7.5	9.0	58	40	47	30	42	25	50	35	44	20	29	18	1
TFM-4	5-1250	DC-1250	6.47	0.05	7.5	8.5	50	45	40	30	30	25	45	40	35	25	25	20	1
SRA-12	800-1250	50-90	6.21	0.13	7.5	7.5			35	25					30	20			1
TFM-12	800-1250	50-90	5.71	0.14	—	7.5	35	25	35	25	35	25	30	20	30	20	30	20	
SRA-5	5-1500	10-600	6.69	0.07	8.0	8.5	50	45	35	30	30	20	45	40	30	25	25	15	1
TUF-5	20-1500	DC-1000	5.7	0.04	9.0	9.0	54	40	42	30	39	25	40	25	32	18	23	8	1
TFM-11	1-2000	5-600	7.16	0.07	8.5	9.0	50	45	35	25	25	20	45	40	27	20	25	20	1
SBL-11	5-2000	10-600	7.08	0.11	8.5	9.0	50	45	35	25	30	20	45	40	30	20	25	15	1
SRA-11	5-2000	10-600	6.72	0.07	8.5	9.0	50	45	35	25	30	20	45	40	30	20	25	15	1
SRA-2000	100-2000	DC-600	8.60	0.15	9.5	9.5	37	20	37	20	37	20	30	20	30	20	30	20	1
SRA-2400	750-2400	DC-400	5.95	0.26	9.0	9.0	30	20	30	20	30	20	30	8	30	8	30	8	1
TFM-2400	750-2400	DC-400	6.65	0.20	—	9.0	30	20	30	20	30	20	30	10	30	10	30	10	1
SRA-3500	500-3500	DC-1000	7.28	0.31	9.5	9.5	30	17	30	17	30	17	20	8	20	8	20	8	1
TFM-4300	300-4300	DC-800	5.87	0.13	—	10.5	30	20	—	—	30	17	15	7	19	7	10	7	1
LEVEL 10 +10 dBm LO up to +5 dBm RF																			
TUF-3LH	0.15-400	DC-400	4.8	0.37	7.0	8.0	67	50	51	30	40	25	67	40	45	25	34	20	1
TUF-1LH	2-600	DC-600	6.0	0.17	7.0	8.0	70	50	50	30	42	25	65	45	50	30	41	22	1
SBL-2LH	5-1000	DC-1000	5.9	0.09	7.5	9.5	67	45	61	30	57	30	68	40	54	30	43	20	1
SBL-1XLH	10-1000	5-500	6.0	0.12	7.5	8.5	50	40	40	25	30	20	70	45	55	40	45	30	1
TUF-2LH	50-1000	DC-1000	5.2	0.30	7.0	8.5	58	40	44	30	39	25	60	35	50	25	38	20	1
TUF-5LH	20-1500	DC-1000	6.9	0.27	8.5	9.0	53	40	42	30	38	25	40	25	30	18	22	8	1
SRA-220	0.05-2000	0.05-500	5.59	0.11	8.0	9.0	25	20	40	30	30	20	25	20	40	30	25	15	2
TFM-150	10-2000	DC-1000	6.19	0.11	8.0	8.0	32	25	35	25	35	25	33	20	30	20	30	20	2
TFM-15	10-3000	10-800	6.75	0.08	8.0	8.5	35	25	35	25	35	25	30	20	30	20	30	20	2

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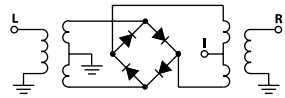
MODEL PREFIX	FREQUENCY (MHz) LO/RF f_L-f_U	IF	CONVERSION LOSS (dB) MID-BAND m $\bar{x}$	σ	Max.	TOTAL RANGE Max.	LO-RF ISOLATION (dB) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	LO-IF ISOLATION (dB) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	SCHEMATIC
LEVEL 13 +13 dBm LO up to +9 dBm RF																			
SRA-3MH	0.025-200	DC-200	4.77	0.07	7.5	8.5	60	50	45	35	35	25	45	35	40	30	30	20	1
TFM-3MH	1-250	DC-250	4.79	0.23	7.0	8.5	50	45	40	30	28	23	45	40	35	25	26	20	1
SRA-1MH	0.5-500	DC-500	5.65	0.04	7.0	8.5	50	45	45	30	35	25	45	35	40	25	30	20	1
SBL-1MH	1-500	DC-500	5.73	0.08	7.5	8.5	50	35	45	30	35	25	45	30	40	25	30	20	1
TFM-1MH	2-500	DC-500	5.80	0.05	7.5	8.5	50	45	40	30	30	20	45	40	35	25	25	20	1
TUF-1MH	2-600	DC-600	6.3	0.12	7.0	8.0	68	50	50	30	43	25	65	45	48	30	37	22	1
SBL-1ZMH	2-1100	DC-500	6.63	0.10	8.0	9.0	50	40	40	30	30	20	40	30	25	20	25	15	1
TUF-5MH	20-1500	DC-1000	7.0	0.25	8.5	9.0	50	40	41	30	35	25	38	25	28	18	20	8	1
TFM-12MH	0.5-2000	0.2-600	6.99	0.16	8.0	9.5	60	45	35	30	30	25	55	40	30	25	25	20	1
ROK-186MH	5-2500	10-1000	6.57	0.11	8.5	9.5	33	25	35	25	25	20	33	20	31	25	27	20	2
TFM-42MH	10-4200	10-1000	7.46	0.12	8.5	11.0	35	25	40	25	35	25	35	20	35	25	27	20	2
LEVEL 17 +17 dBm LO up to +14 dBm RF																			
SRA-3H	0.05-200	DC-200	5.18	0.05	7.0	7.5	50	45	40	30	35	25	45	35	40	30	30	20	1
TFM-3H	0.1-250	DC-250	4.58	0.11	7.0	8.5	50	45	40	30	28	23	45	40	35	25	26	20	1
TAK-3H	0.05-300	DC-300	4.82	0.09	7.0	8.5	55	45	40	30	30	25	50	40	35	25	25	20	1
SRA-1H	0.5-500	DC-500	6.01	0.08	7.5	8.5	55	45	45	30	35	25	45	35	40	30	30	20	1
TAK-1H	2-500	DC-500	5.93	0.08	7.5	8.5	50	40	40	30	30	25	45	35	35	25	25	20	1
TFM-1H	2-500	DC-500	6.14	0.11	7.5	8.5	50	45	40	30	30	20	45	40	35	25	25	20	1
TUF-1H	2-600	DC-600	5.90	0.18	7.0	8.0	68	50	50	30	43	25	62	45	48	30	33	22	1
SRA-1WH	1-750	DC-750	5.85	0.11	7.5	8.5	50	40	45	25	35	25	45	35	40	30	30	20	1
TAK-1WH	5-750	DC-750	5.71	0.08	7.5	9.0	50	40	40	30	30	25	45	35	35	25	30	20	1
SRA-2H	2-1000	DC-1000	6.34	0.14	7.5	10.0	50	40	35	25	35	25	45	30	30	20	25	20	1
TFM-2H	5-1000	DC-1000	6.12	0.12	7.0	10.0	50	45	40	30	30	20	45	40	35	25	25	17	1
SRA-173H	5-1200	DC-1200	5.38	0.05	7.0	8.5	40	35	35	25	35	20	40	35	35	20	30	20	2
SIMA-5H	2-1500	DC-1000	6.94	0.07	8.5	8.5	65	35	44	23	40	22	54	25	30	23	25	13	1
TUF-5H	20-1500	DC-1000	7.50	0.17	8.5	9.0	62	55	50	40	38	25	40	25	29	18	20	8	1
TUF-18DH	100-1800	50-750	7.3	0.15	8.5	9.0	41	23	41	23	41	23	33	20	33	20	33	20	2
SRA-11H	10-3000	10-1000	6.83	0.09	10.0	12.0	27	20	25	18	23	16	27	20	25	18	23	16	2
LEVEL 23 +23 dBm LO up to +20 dBm RF																			
RAY-6U	0.01-100	DC-100	5.09	0.15	7.0	8.0	60	50	50	40	40	30	50	45	40	30	35	25	1
RAY-3	0.07-200	DC-200	5.53	0.08	7.5	8.0	55	45	40	30	30	25	55	45	40	30	30	20	1
SAY-1	0.1-500	0.01-500	4.85	0.18	6.0	7.5	40	20	46	35	40	30	37	23	46	35	40	30	2
RAY-1	5-500	DC-500	6.57	0.09	7.5	8.5	55	45	40	30	30	25	55	45	40	30	30	20	1
SAY-11	0-2400	5-1000	7.40	0.09	8.5	10.0	28	20	26	20	25	20	28	20	26	20	25	20	2
RAY-11	100-2500	DC-500	6.23	0.21	9.0	9.0	35	25	32	25	32	25	14	10	20	10	20	10	1
LEVEL 27 +27 dBm LO up to +24 dBm RF																			
VAY-1	0.5-500	0.02-500	5.79	0.15	7.5	8.5	47	40	46	35	35	25	35	28	46	35	35	25	2

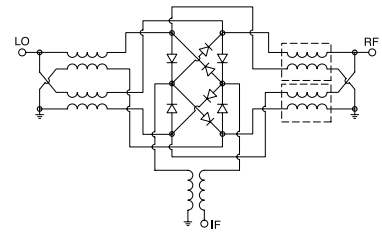
L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)
m = mid band ($2f_L$ to $f_U/2$)

ELECTRICAL SCHEMATICS

1 DOUBLE BALANCED MIXER



2 TRIPLE BALANCED MIXER



YONI2™ Patent Pending
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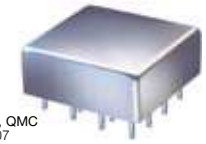
For pricing/availability, complete specifications, data sheets, RoHS compatibility, performance data/curves, pcb layouts, outline drawings & shopping online, see minicircuits.com

MODULATORS/DEMODULATORS 50 Ω (Hermetic)

9 MHz to 1880 MHz

MIQA
Case A06

MIQA
Case A01



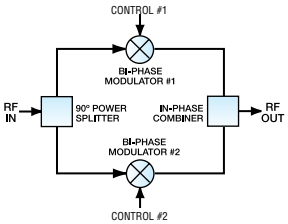
MIQC, MIQY, QMC
Case C07

MODEL PREFIX	FREQUENCY MHz	INSERTION LOSS (dB) Typ.	INSERTION LOSS (dB) Max.	AMPLITUDE UNBALANCE (dB) Typ.	AMPLITUDE UNBALANCE (dB) Max.	PHASE UNBALANCE (Deg.) ± WITH REFERENCE TO 90° Typ.	PHASE UNBALANCE (Deg.) ± WITH REFERENCE TO 90° Max.	1 dB COMPR. (dBm) Typ.	VSWR (:1) Typ. In	VSWR (:1) Typ. Out
QPSK MODULATORS *Wideband 360° in 90° steps 800 MHz to 1050 MHz*										
QMC-1050	800-1050	5.5	7.5	0.5	1.0	3	7	4	2.0	2.0

MODEL PREFIX	FREQUENCY (MHz) RF (signal)/ LO (carrier) f_L	f_U	I&Q Min.	I&Q Max.	CONVERSION LOSS, (dB) $\bar{X}$	σ	Max.	CARRIER REJECTION (-dBc) Typ.	Min.	SIDEBAND REJECTION (-dBc) Typ.	Min.	HARMONIC SUPPRESSION (-dBc) 3XI/Q Typ.	3XI/Q Min.	5XI/Q Typ.	5XI/Q Min.
I&Q MODULATORS *High rejection of carrier and sideband 9 MHz to 1880 MHz*															
MIQA-10M	9	11	DC	2	5.8	0.20	7.0	41	30	40	30	58	48	68	58
MIQA-21M	20	23	DC	3	6.2	0.14	7.0	50	40	40	30	48	40	65	55
MIQC-88M	52	88	DC	5	5.7	0.10	7.5	41	35	34	30	52	40	66	50
MIQA-70M	66	73	DC	5	6.2	0.10	7.0	38	30	48	30	48	45	58	55
MIQA-70ML	66	73	DC	5	5.7	0.10	6.5	38	30	38	30	48	43	58	55
MIQY-70M	67	73	DC	5	5.8	0.20	7.0	40	35	36	30	47	40	60	50
MIQA-91M	86	95	DC	5	5.5	0.10	6.5	38	30	38	30	48	45	58	55
MIQA-100M	95	105	DC	5	5.5	0.10	6.5	38	30	38	30	48	45	58	55
MIQC-176M	104	176	DC	5	5.5	0.10	7.0	38	30	36	30	47	35	70	50
MIQY-140M	137	143	DC	5	5.8	0.20	7.0	34	30	36	30	45	35	60	50
MIQA-195M	185	205	DC	5	5.6	0.10	6.5	38	30	38	30	48	45	58	55
MIQC-895M	868	895	DC	5	8.0	0.10	10.5	40	30	40	30	52	35	58	50
MIQC-1880M	1805	1880	DC	5	9.0	0.30	10.5	35	25	35	25	40	33	65	50

MODEL PREFIX	FREQUENCY (MHz) RF (signal)/ LO (carrier) f_L	f_U	I&Q Min.	I&Q Max.	CONVERSION LOSS, (dB) $\bar{X}$	σ	Max.	AMPLITUDE UNBALANCE (dB) Typ.	Max.	PHASE UNBALANCE (Deg.) WITH REFERENCE TO 90° Typ.	Max.	HARMONIC SUPPRESSION (-dBc) 3XI/Q Typ.	3XI/Q Min.	5XI/Q Typ.	5XI/Q Min.
I&Q DEMODULATORS *9 MHz to 143 MHz*															
MIQA-10D	9	11	DC	2	6.0	0.10	7.0	0.15	0.3	1.0	3.0	50	35	65	55
MIQA-21D	20	23	DC	3	6.1	0.15	7.0	0.15	0.6	0.7	3.0	64	35	67	50
MIQA-70D	66	73	DC	3	6.2	0.10	7.0	0.15	0.5	0.7	3.0	56	45	58	55
MIQC-60WD	20	60	DC	5	5.3	0.10	7.0	0.15	0.6	1.0	5.0	55	45	67	55
MIQY-70D	67	73	DC	5	5.5	0.25	7.0	0.10	0.6	0.5	3.0	52	40	66	50
MIQY-140D	137	143	DC	5	5.5	0.25	7.0	0.10	0.6	0.5	3.0	47	35	70	50

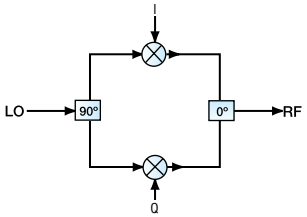
QPSK Modulation block diagram



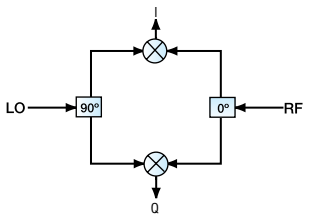
QPSK: Phase Shift vs. Control Current

CONT-1 (mA)	CONT-2 (mA)	PHASE SHIFT (Deg.)
+20	+20	0 (REF)
+20	-20	90
-20	-20	180
-20	+20	270

I&Q Modulator block diagram



I&Q Demodulator block diagram



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MULTIPLIERS, FREQUENCY 50 Ω (Hermetic)

0.05 MHz to 3 GHz

SK
Case B02

AK
Case A03

RK
Case A01

MODEL PREFIX	FREQUENCY (MHz)		INPUT POWER (dBm)		CONVERSION LOSS (dB)		HARMONIC OUTPUT (dBc)					
							F1		F3		F4	
	Input	Output	Min.	Max.	Typ.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.
X 2							***Below F 2***					
RK-3	0.05-50	0.1-100	0	13	11.0	17.0	40	28	45	30	16	8
	50-150	100-300	0	13	11.5	15.0	35	20	40	20	16	12
SK-2	1-100	2-200	1	10	13.0	15.0	40	30	50	40	16	12
	100-300	200-600	1	10	13.5	15.5	25	20	40	30	16	12
	300-500	600-1000	1	10	14.0	16.0	20	15	30	25	16	12
AK-2	1-100	2-200	1	10	13.0	15.0	40	30	50	40	16	12
	100-300	200-600	1	10	13.5	15.5	25	20	40	30	16	12
	300-500	600-1000	1	10	14.0	17.5	20	15	30	25	16	12
RK-2	5-100	10-200	1	15	13.0	16.0	40	30	50	40	16	12
	100-300	200-600	1	15	13.5	15.5	25	20	40	30	16	12
	300-500	600-1000	1	15	14.0	16.5	20	15	30	25	16	12
RK-5	10-100	20-200	10	20	13.0	15.0	20	12	25	20	15	12
	100-400	200-800	10	20	12.5	16.0	20	12	30	20	15	12
	400-800	800-1600	10	20	13.0	16.0	20	12	25	18	15	10
AK-3000	70-1000	140-2000	12	15	10.5	14.0	31	20	40	25	14	10
	1000-1500	2000-3000	12	15	11.5	16.0	22	15	30	20	30	14
RK-3000	70-1000	140-2000	12	15	11.0	14.0	31	20	40	25	15	10
	1000-1500	2000-3000	12	15	12.0	17.5	22	15	30	20	30	14

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PHASE DETECTORS 50 Ω (Hermetic)

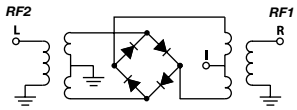
1 MHz to 400 MHz

MPD
Case A11

RPD
Case A01

MODEL PREFIX	FREQUENCY (MHz) RF1 RF2	FREQUENCY (MHz) I	POWER IN RF1 RF2 (dBm)	SCALE FACTOR mV/deg.	IMPEDANCE (ohms) output load I	ISOLATION (dB) RF1-RF2 Min.	OUTPUT POLARITY RF1/RF2 IN-PHASE	DC OUTPUT (mV) note 1 Max. Typ.	DC OUTPUT (mV) note 1 Max. Min.	Offset Typ.	Offset Max.
HIGH OUTPUT *up to 1000 mV DC output*											
MPD-1	1-100	DC- 50	7	8	500	40	neg.	1000	700	0.2	1
RPD-1	1-100	DC- 50	7	8	500	40	neg.	1000	700	0.2	1
RPD-2	5-150	DC- 50	7	8	500	40	neg.	1000	700	0.3	1
MPD-2	10-200	DC- 50	7	8	500	40	neg.	1000	700	0.3	1
MPD-21	50-400	DC- 50	7	7	500	40	neg.	800	500	0.5	1

ELECTRICAL SCHEMATIC



PHASE SHIFTERS 50 Ω (Hermetic)

13 MHz to 16 MHz

SPH
Case A01

MODEL PREFIX	FREQUENCY (MHz)	PHASE RANGE (DEGREES) Min.	INSERTION LOSS (dB) Typ.	INSERTION LOSS (dB) Max.	CONTROL VOLTAGE (V)	CONTROL BANDWIDTH (kHz) Typ.	VSWR (:1) Typ.	VSWR (:1) Max.	RF POWER (dBm) Max.
180° VOLTAGE VARIABLE									
SPH-16	13 - 16	180	1.2	2.5	0 - 7	DC- 50	1. 2	1. 7	0

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POWER SPLITTERS/COMBINERS (Hermetic)

DC to 2 GHz 50 Ω & 75 Ω

TSC Case B02 | MSC Case A03 | PMT Case A04 | PSCQ-2-1000 Case A05 | PQW, PSC, PSCJ, PSCQ Case A01 | PSC, PSCJ Case A06 | PRSC Case C145

MODEL PREFIX	FREQUENCY (MHz)	ISOLATION (dB)						INSERTION LOSS, (dB)						PHASE UNBALANCE DEGREES			AMPLITUDE UNBALANCE (dB)			RF POWER MAX (W)	
	f_L-f_U	L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	L Typ.	L Max.	M Typ.	M Max.	U Typ.	U Max	L Max.	M Max.	U Max.	L Max.	M Max.	U Max.	Sum Port (Matched output ports)	Internal Dissipation
2 WAY - 0°								*Insertion Loss Above 3 dB*													
PSC-2-2	0.004-60	27	20	30	20	27	20	0.3	0.6	0.3	0.6	0.6	1.0	2.0	3.0	4.0	0.15	0.25	0.3	1.0	0.125
PSC-2-1	0.1-400	20	15	25	20	25	20	0.2	0.6	0.4	0.75	0.6	1.0	2.0	3.0	4.0	0.15	0.20	0.3	1.0	0.125
TSC-2-1	1-400	30	25	30	25	30	20	0.25	0.5	0.4	0.75	0.8	1.0	2.0	3.0	4.0	0.15	0.20	0.6	1.0	0.125
MSC-2-1	0.1-450	20	15	30	20	30	20	0.3	0.5	0.4	0.75	0.6	1.0	2.0	3.0	4.0	0.15	0.20	0.3	1.0	0.125
PSC-2-1W	1-650	25	20	35	20	25	20	0.3	0.6	0.5	0.9	0.7	1.0	2.0	3.0	4.0	0.15	0.20	0.3	1.0	0.125
MSC-2-1W	2-650	22	18	30	20	22	18	0.3	0.5	0.5	0.8	0.8	1.2	1.0	2.0	4.0	0.30	0.20	0.3	1.0	0.125
PSC-2-45	700-900			20	17			0.2	0.4	0.2	0.4	0.2	0.4	3.0	3.0	3.0	0.20	0.20	0.20	1.0	0.125
PSC-2-4	10-1000	30	25	25	20	25	20	0.6	1.0	0.6	1.2	0.7	1.3	2.0	4.0	8.0	0.15	0.20	0.4	1.0	0.125
TSC-2-1W	200-1000	26	20	—	—	23	14	0.3	0.8	—	—	0.7	1.5	5.0	—	10.0	0.70	—	0.5	1.0	0.125
PSC-2-1000	400-1000	35	25	35	25	35	25	0.5	1.0	0.5	1.0	0.5	1.0	2.0	2.0	2.0	0.30	0.30	0.30	1.0	0.125
PSC-2-5	10-1400	28	18	22	17	24	17	0.3	0.6	0.6	1.0	0.9	1.6	2.0	3.0	4.0	0.15	0.20	0.4	1.0	0.125
MSC-2-5	5-1500	18	16	20	16	20	14	0.6	0.8	0.6	0.8	0.6	1.1	2.0	3.0	5.0	0.20	0.30	0.4	1.0	0.125
MSC-2-11	5-2000	18	16	20	16	18	11	0.6	0.8	0.6	0.8	1.2	1.8	2.0	3.0	5.0	0.20	0.30	0.5	1.0	0.125
PSC-2-11	5-2000	21	16	22	18	19	9	0.5	0.8	0.6	0.9	0.7	1.5	1.0	3.0	6.0	0.20	0.40	1.0	0.5	0.125
■ PSC-2-2-75	0.008-60	35	20	40	25	30	22	0.1	0.4	0.15	0.4	0.3	0.8	1.0	1.0	1.0	0.15	0.15	0.15	1.0	0.125
■ PSC-2375	55-85	35	25	35	25	35	25	0.3	0.5	0.3	0.5	0.3	0.5	1.0	1.0	1.0	0.10	0.10	0.10	1.0	0.125
■ PSC-2-1-75A	1-200	35	27	46	35	36	25	0.1	0.3	0.2	0.4	0.35	0.6	1.0	1.0	2.0	0.10	0.15	0.15	1.0	0.125
■ PSC-2-1-75	0.25-300	20	15	30	20	20	15	0.4	0.75	0.4	0.75	0.4	1.0	2.0	3.0	5.0	0.15	0.20	0.3	1.0	0.125
■ PSC-2-4-752	10-850	31	20	32	23	23	15	0.3	0.5	0.4	0.6	0.5	1.0	2.0	5.0	10.0	0.10	0.20	0.5	1.0	0.125
2 WAY - 0° Resistive								*Insertion Loss Above 6 dB*													
PRSC-2050	DC-2000	6.0		6.2		6.5		0.1	0.3	0.2	0.7	0.5	1.0	1.0	3.0	5.0	0.10	0.3	0.5	1.0	0.125
2 WAY - 180°								*Insertion Loss Above 3 dB*													
PSCJ-2-2	0.01-20	35	25	30	25	25	18	0.3	0.8	0.2	0.5	0.3	0.6	3.0	2.0	2.5	0.1	0.1	0.2	1.0	0.125
PSCJ-2-1	1-200	35	30	35	25	30	23	0.75	1.0	0.5	0.8	0.75	1.2	2.0	2.5	4.0	0.3	0.15	0.3	1.0	0.125
PSCJ-2-1W	100-600	30	20	30	20	30	20	1.0	1.9	1.0	1.9	1.0	1.9	6.0	6.0	6.0	0.5	0.5	0.5	0.5	0.125
■ PSCJ-2-1-75	1-200	35	30	31	25	26	20	0.6	1.2	0.8	1.2	1.2	1.8	2.0	4.0	6.0	0.25	0.2	0.5	1.0	0.125
2 WAY - 0°/180°								*Insertion Loss Above 3 dB*													
PMT-1	5-200	22	20	24	20	24	18	0.8	1.0	0.9	1.1	1.0	1.5	2	4	8	0.1	0.2	0.5	1.0	0.125
2 WAY - 90°								*Average Insertion Loss Above 3 dB* Typ.	Max.											Output ports (Other ports matched*)	
PSCQ-2-0.455	0.42-0.51			30	25			0.1	0.5					3.0			1.2			1.0	0.5
PSCQ-2-1.25	1.13-1.38			29	25			0.4	0.7					3.0			1.2			1.0	0.5
PSCQ-2-3.4	3.0-3.8			30	25			0.4	0.7					3.8			1.2			1.0	0.5
PSCQ-2-4	3.5-4.5			36	25			0.4	0.7					3.0			1.5			1.0	0.5
PSCQ-2-7.5	7-8			30	25			0.4	0.7					3.0			1.2			1.0	0.5
PSCQ-2-8	2-8			36	27			0.3	0.7					6.0			0.5			0.05	0.025
PSCQ-2-10.5	9-11			25	20			0.4	0.7					3.0			1.2			1.0	0.5
PSCQ-2-13	12-14			29	25			0.4	0.7					3.0			1.2			1.0	0.5
PSCQ-2-14	12-16			30	25			0.3	0.6					3.0			1.8			1.0	0.5
PSCQ-2-21.4	20-23			30	25			0.4	0.7					3.0			1.2			1.0	0.5
PSCQ-2-26	14-30			25	20			0.4	0.7					3.0			1.5			1.0	0.5
PSCQ-2-32	3.2-32			32	25			0.4	0.8					5.0			0.4			0.05	0.025
PSCQ-2-40	23-40			21	18			0.3	0.7					3.0			1.5			1.0	0.5
PSCQ-2-51W	5-50			41	30			0.5	1.0					5.0			0.5			0.5	0.125
PSCQ-2-50	25-50			30	20			0.3	0.7					3.0			1.5			1.0	0.5
PSCQ-2-70	40-70			30	20			0.3	0.7					3.0			1.5			1.0	0.5
PSCQ-2-70N	66-74			22	19			0.2	0.5					0.8			0.25			1.0	0.5
PSCQ-2-85A	55-85			35	20			0.3	0.6					3.0			0.6			1.0	0.5
PQW-2-90	30-90			27	20			0.3	0.6					3.0			1.0			1.0	0.5
PSCQ-2-90	55-90			30	20			0.3	0.7					3.0			1.2			1.0	0.5
PSCQ-2-120	80-120			25	18			0.3	0.7					3.0			1.5			1.0	0.5
PSCQ-2-160	100-160			24	19			0.3	0.7					3.0			1.5			1.0	0.5
PSCQ-2-180	120-180			23	15			0.3	0.7					4.0			1.2			1.0	0.5
PSCQ-2-250	150-250			30	22			0.4	0.8					4.0			1.5			1.0	0.5
PQW-2-270	90-270			20	17			0.4	0.7					4.0			1.4			1.0	0.5
PSCQ-2-400	250-400			23	16			0.5	0.9					4.0			1.5			1.0	0.5
PSCQ-2-450	350-450			23	16			0.5	0.9					5.0			1.5			1.0	0.5
PSCQ-2-550	450-550			19	15			0.4	0.7					5.0			1.5			1.0	0.5
PSCQ-2-1000	800-1000			27	20			0.28	0.6					3.0			1.3			1.0	0.5

■ *75 Ω*

* Limited by the rating of external termination.

L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)

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POWER SPLITTERS/COMBINERS *(Hermetic)*

10 kHz to 1 GHz 50 Ω & 75 Ω

MSC Case A03 | PSC, PSCJ Case A01 | PSC-4A, 5, 6 Case C07

MODEL PREFIX	FREQUENCY (MHz)	ISOLATION (dB)						INSERTION LOSS, (dB)						PHASE UNBALANCE DEGREES			AMPLITUDE UNBALANCE (dB)			RF POWER MAX (W)	
		L		M		U		L		M		U		L	M	U	L	M	U	Sum Port (Matched output ports)	Internal Dissipation
	f_L-f_U	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Max.	Typ.	Max.	Typ.	Max	Max.	Max.	Max.	Max.	Max.	Max.		
3 WAY - 0°								***Insertion Loss Above 4.8 dB***													
PSC-3-2	0.01-30	35	30	40	25	30	25	0.25	0.45	0.15	0.45	0.45	0.75	1	2	4	0.2	0.3	0.4	1.0	0.375
PSC-3-13-39	0.5-50	47	33	46	35	40	33	0.15	0.4	0.15	0.4	0.15	0.4	1	1	2	0.1	0.1	0.1	1.0	0.375
PSC-3-1	1-200	45	30	40	30	40	25	0.6	1.0	0.4	0.7	0.6	1.0	1	2	4	0.15	0.2	0.3	1.0	0.375
PSC-3-13	1-200	45	35	45	30	37	30	0.25	0.5	0.35	0.6	0.35	0.8	1	3	4	0.1	0.2	0.2	1.0	0.375
PSC-3-1A	1-300	38	30	33	23	29	22	0.2	0.5	0.2	0.7	0.6	1.5	1	3	5	0.2	0.3	0.6	1.0	0.375
PSC-3-1W	5-500	25	20	31	15	25	15	0.4	0.8	0.4	1.4	0.8	1.4	2	3	5	0.1	0.3	0.6	1.0	0.375
MSC-3-1W	50-750	22	18	—	—	22	17	0.4	1.0	—	—	0.9	1.5	4	—	7	0.4	—	0.7	1.0	0.18
■ PSC-3-1-75	1-200	35	23	35	25	35	25	0.6	1.0	0.3	0.7	0.6	1.0	2	3	4	0.15	0.2	0.3	1.0	0.375
4 WAY - 0°								***Insertion Loss Above 6 dB***													
PSC-4-6	0.01-40	35	18	32	25	25	18	0.4	0.8	0.3	0.5	0.5	1.0	2	2	2	0.1	0.15	0.2	1.0	0.250
PSC-4-1	0.1-200	33	20	30	20	27	20	0.4	0.6	0.5	0.75	0.7	1.0	4	6	8	0.15	0.2	0.25	1.0	0.250
PSC-4-3	0.25-250	33	20	30	20	27	20	0.4	0.7	0.5	0.75	0.7	1.2	4	6	8	0.15	0.2	0.25	1.0	0.250
PSC-4-1W	1-500	29	20	27	18	25	18	0.4	0.8	0.5	1.0	0.8	1.5	1	3	5	0.2	0.3	0.5	0.5	0.250
PSC-4-5	1-800	29	20	24	18	25	17	0.4	0.8	0.6	1.5	1.3	2.5	1	4	5	0.2	0.5	0.6	0.5	0.250
PSC-4A-4	10-1000	25	20	21	15	18	15	0.5	0.8	0.8	1.8	1.5	2.5	4	16	20	0.2	0.5	0.7	1.0	0.250
■ PSC-4-1-75	1-200	30	20	25	20	25	20	0.4	0.7	0.5	0.9	0.7	1.2	2	3	4	0.15	0.2	0.3	1.0	0.250
■ PSC-4A-1W-75	30-600	27	20	—	—	22	18	0.6	0.8	—	—	0.8	1.1	2	—	5	0.2	—	0.5	1.0	0.250
5 WAY - 0°								***Insertion Loss Above 7 dB***													
PSC-5-1	1-300	25	20	23	18	20	17	0.2	0.5	0.6	1.0	1.5	2.0	2	4	8	0.2	0.3	0.6	1.0	0.5
PSC-5-2	250-750	22	17	22	17	22	17	1.1	2.5	1.1	2.5	1.1	2.5	14	14	14	0.7	0.7	0.7	2.0	0.625
■ PSC-5-1-75	1-300	35	20	30	18	25	17	0.4	0.6	0.6	0.9	0.9	1.3	2	4	8	0.2	0.3	0.6	1.0	0.5
6 WAY - 0°								***Insertion Loss Above 7.8 dB***													
PSC-6-1	1-175	35	25	30	23	25	18	0.6	1.2	0.6	1.1	0.6	1.3	2	4	8	0.2	0.3	0.6	1.0	0.5
■ PSC-6-1-75	1-300	35	25	30	23	25	18	0.6	1.2	0.6	1.1	0.6	1.3	2	4	8	0.2	0.3	0.6	1.0	0.5

■ *75 Ω*

L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)

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PSC-8A, 9, 10, 12
Case E10

MODEL PREFIX	FREQUENCY (MHz)	ISOLATION (dB)						INSERTION LOSS, (dB)						PHASE UNBALANCE DEGREES			AMPLITUDE UNBALANCE (dB)			RF POWER MAX (W)	
		L		M		U		L		M		U		L	M	U	L	M	U	Sum Port (Matched output ports)	Internal Dissipation
	f_L-f_U	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Max.	Typ.	Max.	Typ.	Max	Max.	Max.	Max.	Max.	Max.	Max.		
8 WAY - 0°								*Insertion Loss Above 9 dB*													
PSC-8-6	0.01-10	40	20	40	25	28	23	0.3	1.0	0.5	1.0	0.6	1.1	4.0	2.5	4.0	0.4	0.2	0.3	1.0	0.62
PSC-8-1	0.5-175	30	25	30	20	25	18	0.8	1.2	0.8	1.2	1.0	1.6	1.0	2.5	5.0	0.2	0.3	0.5	1.0	0.62
PSC-8A-4	5-500	25	20	23	18	20	15	0.7	1.2	1.0	1.8	1.4	2.5	3.0	8.0	16.0	0.2	0.3	0.5	1.0	0.62
PSC-8-1W	10-600	25	20	23	16	20	16	1.0	1.8	1.2	2.2	1.7	2.8	2.0	4.0	10.0	0.3	0.6	0.9	1.0	0.62
■ PSC-8-1-75	0.5-175	25	20	30	20	25	20	0.5	1.1	0.6	1.1	0.7	1.3	2.0	2.5	5.0	0.2	0.2	0.3	1.0	0.62
■ PSC-8A4-75	1-300	26	20	30	25	30	23	0.8	1.2	0.7	1.1	0.9	1.3	1.0	3.0	8.0	0.2	0.2	0.4	1.0	0.62
9 WAY - 0°								*Insertion Loss Above 9.6 dB*													
PSC-9-1	2-300	38	25	26	20	22	15	0.6	1.1	0.9	1.4	1.5	2.0	2.0	5.0	10.0	0.2	0.3	0.8	0.5	1.5
10 WAY - 0°								*Insertion Loss Above 10 dB*													
PSC-10-1	1-150	36	23	27	23	23	18	0.3	0.6	0.4	0.8	1.0	1.3	3	6	10	0.2	0.3	0.4	1.0	0.87
12 WAY - 0°								*Insertion Loss Above 10.8 dB*													
PSC-12-1	1-200	35	30	27	20	21	18	0.5	0.8	0.8	1.2	1.0	1.4	4	8	16	0.2	0.4	0.7	1.0	0.87

■ *75 Ω*

L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)

SWITCHES, PIN DIODE *(Hermetic)*

1 MHz to 3 GHz

TOSW
Case QQ96

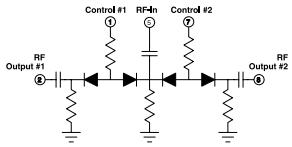
PSW
Case A06

MODEL PREFIX	FREQUENCY (MHz) f_L-f_U	TYPE	TTL DRIVER	INSERTION LOSS (dB) low-band lw Typ.	Max.	upper band U Typ.	Max.	IN-OUT ISOLATION (dB) Frequency Band L Typ.	Min.	M Typ.	Min.	U Typ.	Min.	RISE TIME (µsec) Typ.	SWITCHING TIME (µsec) Typ.	Max.
SPDT, SP4T																
PSW-1211	10-2500	SPDT		1.1	1.9	1.9	2.7	50	40	35	28	28	22	2	—	4
TOSW-230	10-3000	SPDT	•	1.3	1.9	1.8	2.7	60	40	40	28	35	22	—	2	4
TOSW-425	10-2500	SP4T	•	1.1	1.7	1.5	2.5	60	40	40	30	35	22	—	2	4

L = low range (f_L to $10f_L$) lw = low band (f_L to $f_U/2$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)

ELECTRICAL SCHEMATICS & TRUTH TABLES

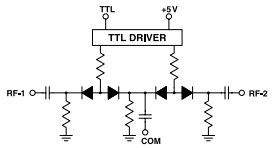
PSW-1211



Control Ports 1	2	RF Out port 1	2
0	V	OFF	ON
V	0	ON	OFF

V = 5 V

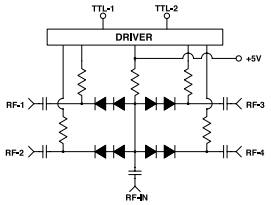
TOSW-230



TTL	RF Out port 1	2
Low	ON	OFF
High	OFF	ON

Low: 0 to 0.8 V
High: 2 to 5 V

TOSW-425



TTL-1	TTL-2	RF Out port 1	2	3	4
High	Low	ON	OFF	OFF	OFF
High	High	OFF	ON	OFF	OFF
Low	High	OFF	OFF	ON	OFF
Low	Low	OFF	OFF	OFF	ON

Low: 0 to 0.8 V
High: 2 to 5 V

TFAS
Case B02

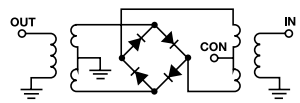
PAS-2000, GAS
Case A05

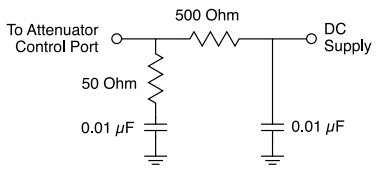
PAS
Case A01

MODEL PREFIX	FREQUENCY (MHz) In f_L	Con f_U	INSERTION LOSS (dB) (±20 mA) Mid-Band m Typ.	Max.	Total Range Typ.	Max.	MAXIMUM INPUT POWER (dBm) (±20 mA) 1 dB compr.	no damage	IN-OUT ISOLATION (0mA) Frequency Band L Typ.	Min.	M Typ.	Min.	U Typ.	Min.	BI-PHASE $\overline{X}$ (±20 mA) Typ. △ AMP (dB) m	Total Range	Phase (deg) deviation from 180° m	Total Range
BI-PHASE																		
GAS-1	5-450	DC-0.05	3.3	4.0	3.5	5.0	20	25	60	48	45	35	35	25	0.10	0.10	1.0	1.5
GAS-2	10-1000	DC-0.05	4.3	6.0	5.2	8.5	20	25	55	40	35	25	28	20	0.10	0.30	1.5	3.0
PAS-1	5-450	DC-0.05	3.5	4.0	3.5	4.7	20	29	65	50	45	35	35	25	0.10	0.10	0.5	1.2
PAS-2	10-1000	DC-0.05	4.0	6.0	6.5	8.5	20	29	50	40	40	30	35	25	0.10	0.30	0.5	1.0
PAS-3	1-200	DC-0.05	1.4	2.0	1.6	2.5	15	29	65	50	50	40	50	35	0.10	0.10	0.5	1.0
PAS-2000	100-2000	DC-0.50	4.2	6.5	5.4	7.5	19	25	30	22	—	—	26	20	0.30	0.40	5.0	8.0
TFAS-1	2-400	DC-0.05	1.4	2.0	1.6	3.0	20	25	65	45	45	33	35	25	0.10	0.10	1.0	2.0
TFAS-2	10-1000	DC-0.50	3.7	4.5	5.0	8.0	17	25	50	30	42	20	31	20	0.10	0.20	2.0	3.0

L = low range (f_L to $10f_L$) lw = low band (f_L to $f_U/2$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U) m = ($2f_L$ to $f_U/2$)

ELECTRICAL SCHEMATICS & SUGGESTED CONTROL PORT BIASING CONFIGURATION





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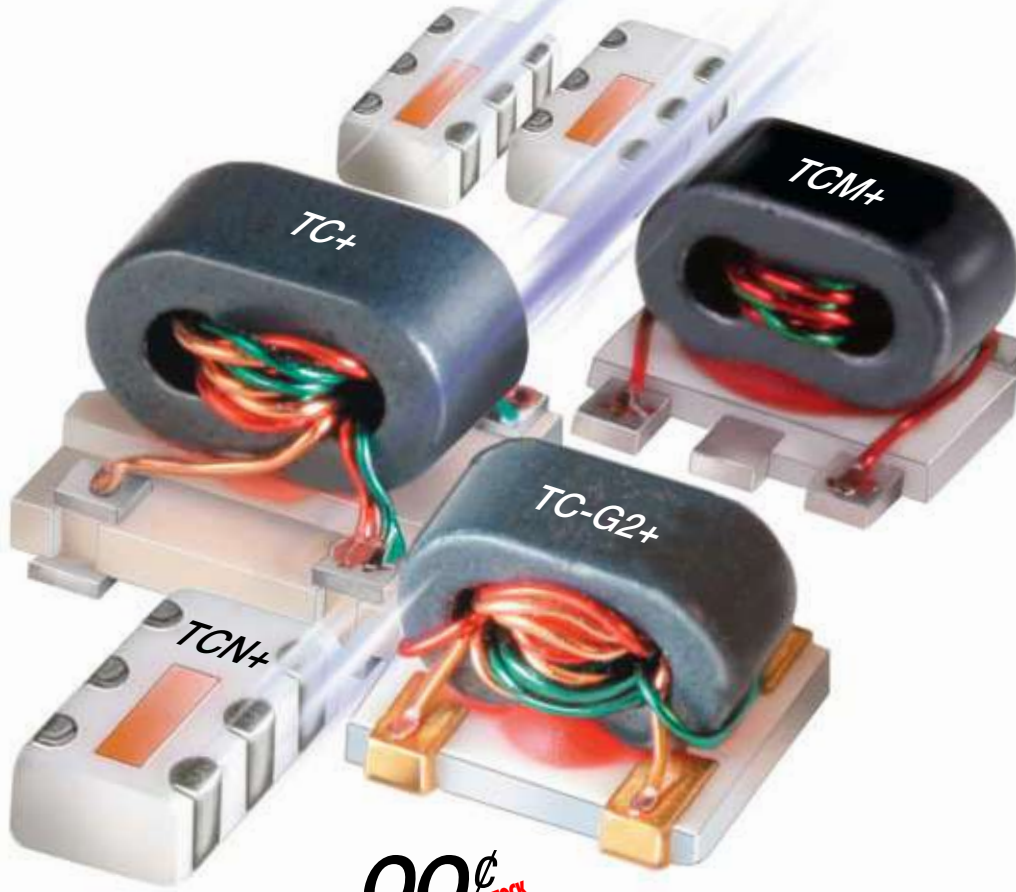
TINY RF & MICROWAVE TRANSFORMERS



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TRANSFORMERS, IF/RF 50 Ω (Hermetic & Non Hermetic)

4 kHz to 800 MHz

Non Hermetic T, TT Case X65 | TO Case PP94 | TMO Case A11 | TMO, TTMO Case A03

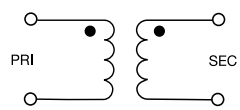
MODEL PREFIX	Ω RATIO (Secondary/Primary)	FREQUENCY (MHz)	INSERTION LOSS ABOVE MIDBAND LOSS 3 dB MHz	2 dB MHz	1 dB MHz
A *Unbalanced to Balanced Center Tap (50 Ω to 800 Ω)*					
TMO1-1T	1	0.05 - 200	0.05 - 200	0.08 - 150	0.2 - 80
T1-1T-X65	1	0.08 - 200	0.08 - 200	0.15 - 150	0.2 - 80
T1-6T-X65	1	0.015 - 300	0.015 - 300	0.21 - 150	0.03 - 50
T2-1T-X65	2	0.07 - 200	0.07 - 200	0.1 - 100	0.5 - 50
TMO2-1T	2	0.07 - 200	0.07 - 200	0.1 - 100	0.5 - 50
T2.5-6T-X65	2.5	0.01 - 100	0.01 - 100	0.02 - 50	0.50 - 20
TMO2.5-6T	2.5	0.01 - 100	0.01 - 100	0.02 - 50	0.05 - 20
T3-1T-X65	3	0.05 - 250	0.05 - 200	0.1 - 200	0.5 - 70
TMO3-1T	3	0.05 - 250	0.05 - 250	0.1 - 200	0.5 - 70
T4-6T-X65	4	0.02 - 250	0.02 - 250	0.05 - 150	0.1 - 100
TMO4-1	4	0.2 - 350	0.2 - 350	0.35 - 300	2 - 100
T4-1-X65	4	0.2 - 350	0.2 - 350	0.35 - 300	2 - 100
T4-1H-X65	4	10 - 350	10 - 350	15 - 300	25 - 200
T5-1T-X65	5	0.3 - 300	0.3 - 300	0.6 - 200	5 - 100
TMO5-1T	5	0.3 - 300	0.3 - 300	0.6 - 200	5 - 100
T8-1T-X65	8	0.3 - 140	0.3 - 140	0.7 - 90	1 - 60
T13-1T-X65	13	0.3 - 120	0.3 - 120	0.7 - 80	5 - 20
TMO13-1T	13	0.3 - 120	0.3 - 120	0.7 - 80	5 - 20
T16-6T-X65	16	0.03 - 75	0.03 - 75	0.06 - 30	0.1 - 20
B *Balanced to Balanced Center Tap at Primary/Secondary (50 Ω to 1250 Ω)*					
TTMO1-1	1	0.005 - 100	0.005 - 100	0.01 - 75	0.05 - 40
TT1-6-X65	1	0.004 - 300	0.004 - 300	0.02 - 200	0.1 - 50
TT1.5-1-X65	1.5	0.075 - 500	0.075 - 500	0.2 - 100	1 - 50
TT2.5-6-X65	2.5	0.01 - 50	0.01 - 50	0.025 - 25	0.05 - 10
TT4-1-X65	3	0.05 - 200	0.05 - 200	0.2 - 50	1 - 30
TT4-1A-X65	4	0.1 - 300	0.1 - 300	0.2 - 250	0.3 - 180
TTMO4-1A	4	0.1 - 300	0.1 - 300	0.2 - 250	0.3 - 180
TT16-1-X65	16	0.1 - 45	0.1 - 45	0.14 - 35	1 - 20
TT25-1-X65	25	0.02 - 30	0.02 - 30	0.05 - 20	0.1 - 10
TTMO25-1	25	0.02 - 30	0.02 - 30	0.05 - 20	0.1 - 10

SCHEMATICS

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp.

MODEL PREFIX	Ω RATIO (Secondary/Primary)	FREQUENCY (MHz)	INSERTION LOSS ABOVE MIDBAND LOSS 3 dB MHz	2 dB MHz	1 dB MHz
C *Balanced to Balanced (50 Ω to 1800 Ω)*					
T1-6-X65	1	0.01 - 150	0.01 - 150	0.02 - 100	0.05 - 50
T1-1H-X65	1	8 - 300	8 - 300	10 - 200	25 - 100
T1-1-X65	1	0.15 - 400	0.15 - 400	0.35 - 200	2 - 50
TMO1-1	1	0.15 - 400	0.15 - 400	0.35 - 200	2 - 50
TO-75	1	10 - 500	—	10 - 500	40 - 250
TMO1-02	1	1 - 800	1 - 800	2 - 500	—
T1.18-3-X65	1	0.01 - 250	0.01 - 250	0.02 - 200	0.03 - 50
T1.5-6-X65	1	0.02 - 100	0.02 - 100	0.05 - 50	0.1 - 25
T1.5-1-X65	1	0.1 - 300	0.1 - 300	0.2 - 150	0.05 - 80
T2-1-2W-X65	2	5 - 120	—	—	5 - 120
T2.5-6-X65	2	0.01 - 100	0.01 - 100	0.02 - 50	0.05 - 20
TMO-2.5-6	2	0.01 - 100	0.01 - 100	0.02 - 50	0.05 - 20
T4-6-X65	4	0.02 - 200	0.02 - 200	0.05 - 150	0.1 - 100
TMO4-6	4	0.02 - 200	0.02 - 200	0.05 - 150	0.1 - 100
T4-1-2W-X65	4	10 - 250	—	—	10 - 250
TMO6-1	6	0.3 - 200	0.3 - 200	0.5 - 150	5 - 50
T9-1H-X65	9	2 - 90	2 - 90	3 - 75	6 - 50
T9-1-X65	9	0.15 - 200	0.15 - 200	0.3 - 150	2 - 40
TMO9-1	9	0.15 - 200	0.15 - 200	0.3 - 150	2 - 40
T16-1H-X65	16	7 - 85	7 - 85	10 - 65	15 - 40
T16-1-X65	16	0.3 - 120	0.3 - 120	0.7 - 80	5 - 20
TMO16-1	16	0.3 - 120	0.3 - 120	0.7 - 80	5 - 20
T36-1-X65	36	0.03 - 20	0.03 - 20	0.05 - 10	0.1 - 5
D *Unbalanced to Unbalanced (50 Ω to 700 Ω)*					
T2-1-X65	2	0.050 - 600	0.050 - 600	0.1 - 400	0.5 - 200
TMO2-1	2	0.050 - 600	0.050 - 600	0.1 - 400	0.5 - 200
T3-1-X65	3	0.5 - 800	0.5 - 800	2.0 - 400	—
T4-2-X65	4	0.2 - 600	0.2 - 600	0.5 - 500	2 - 250
TMO4-2	4	0.2 - 600	0.2 - 600	0.5 - 500	2 - 250
T8-1-X65	8	0.15 - 250	0.15 - 250	0.25 - 200	2 - 100
T14-1-X65	14	0.2 - 150	0.2 - 150	0.5 - 100	2 - 50
TMO14-1	14	0.2 - 150	0.2 - 150	0.5 - 100	2 - 50
F *Single-ended to Balanced with Impedance Ratio Selection (50 Ω to 100 Ω)*					
T-622-X65	1:1:1	0.1 - 200	0.1 - 200	0.5 - 100	5 - 80
T-626-X65	1:1:1	0.01 - 10	0.01 - 10	0.02 - 5	0.04 - 2
T2-613-1-X65	1:1:2	0.07 - 200	0.07 - 200	0.1 - 100	0.5 - 50

C



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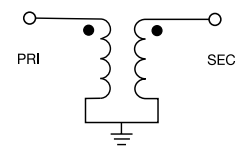

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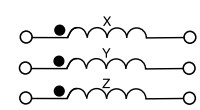

VOLTAGE CONTROLLED OSCILLATORS 50 Ω (Hermetic)

15 MHz to 2120 MHz

POS
Case A06

POSA
Case C07

MODEL PREFIX	FREQUENCY (MHz)		POWER OUTPUT (dBm)	TUNE VOLTAGE (V)		PHASE NOISE (dBc/Hz) SSB@ offset frequencies: Typ					PULLING (MHz) pk-pk @12 dBr	PUSHING (MHz/V)	TUNING SENSITIVITY (MHz/V)	HARMONICS (dBc)		3dB MOD. BANDWIDTH (kHz)	DC OPERATING POWER	
	Min.	Max.	Typ.	Min.	Max.	100 Hz	1 kHz	10 kHz	100 kHz	1 MHz	Typ.	Typ.	Typ.	Typ.	Max.	Typ.	V_{CC} Volts	Current (mA) Max.
LINEAR TUNING *Wideband 15 MHz to 2120 MHz*																		
POS-26	15	25	+7.0	1	11	—	-86	-105	-125	-145	0.06	0.04	1 – 4	-26	-15	60	12	20
POS-50	25	50	+8.5	1	16	—	-88	-110	-130	-150	0.06	0.04	2.0 – 2.6	-19	-12	100	12	20
POS-75	37.5	75	+8.0	1	16	—	-87	-110	-130	-150	0.15	0.11	3.1 – 3.8	-27	-16	100	12	20
POS-100	50	100	+8.3	1	16	—	-83	-107	-130	-150	0.6	0.2	4.2 – 4.8	-23	-18	100	12	20
POS-150	75	150	+9.5	1	16	—	-80	-103	-127	-147	0.8	0.3	5.8 – 6.7	-23	-17	100	12	20
POS-200	100	200	+10.0	1	16	—	-80	-102	-122	-142	1.0	0.2	7.1 – 8.6	-24	-20	100	12	20
POS-300	150	280	+10.0	1	16	—	-78	-100	-120	-140	1.8	0.3	9.5 – 13	-30	-20	100	12	20
POS-400	200	380	+9.5	1	16	—	-76	-98	-120	-140	1.8	0.3	13.7 – 16.9	-28	-20	100	12	20
POS-500W	250	500	+10.0	1	16	—	-79	-100	-120	-140	1.5	0.2	17 – 23	-25	-18	100	12	25
POS-535	300	525	+8.8	1	16	—	-70	-93	-116	-139	2.0	0.4	10.5 – 24	-26	-20	100	12	20
POS-765	485	765	+9.5	1	16	—	-61	-85	-108	-129	5.0	0.4	18 – 27	-21	-17	100	12	22
POS-800W	400	800	+8.0	0.5	18	—	-71	-93	-115	-137	3.0	0.5	18 – 50	-26	-18	100	10	25
POS-900W	500	900	+7.0	1	20	—	-75	-95	-115	-135	2.0	0.3	16 – 40	-26	-20	100	12	25
POS-1000W	500	1000	+7.0	1	16	—	-73	-93	-113	-133	6.0	1.5	30 – 42	-26	-20	100	12	20
POS-1025	685	1025	+9.0	1	16	—	-65	-84	-104	-124	5.0	0.6	21 – 36	-23	-18	100	12	22
POS-1060	750	1060	+12.0	1	20	—	-65	-90	-112	-132	50	3.0	18 – 32	-11	—	1000	8	30
POS-1400A	975	1400	+13.0	1	20	—	-65	-95	-115	-135	14	2.0	25 – 30	-16	—	4000	8	30
POS-2000A	1370	2000	+11.8	1	20	—	-73	-97	-117	-137	12	3.0	30 – 45	-24	-12	4000	8	30
POS-2120W	1060	2120	+8.0	0.5	20	—	-70	-97	-117	-137	27.0	2.5	35 – 120	-11	—	1000	12	28
POSA-138	118	138	+5.0	1	16	-72	-100	-125	-145	-163	0.07	0.03	2.3	-40	-30	2000	12	25
POSA-158	138	158	+5.0	1	16	-72	-100	-125	-145	-163	0.07	0.03	2.4	-40	-25	2000	12	25
POSA-960	800	960	+16.0	1	15	—	-84	-112	-130	-150	2.0	0.3	17 - 22	-30	-16	2000	15	50
5 V TUNING for PLL IC's *24 MHz to 755 MHz*																		
POS-50P	24	29	+10.0	0.5	5	—	-92	-113	-134	-151	0.06	0.04	2-2.5	-18	-12	50	12	20
POS-75P	35	43	+9.0	0.5	5	—	-91	-113	-135	-151	0.15	0.11	2.5-4	-25	-20	100	12	20
POS-100P	48	59	+9.0	0.5	5	—	-92	-112	-134	-151	0.8	0.2	3.5-5	-30	-18	100	12	20
POS-150P	72	91	+10.0	0.5	5	—	-84	-104	-126	-147	0.8	0.3	6-9	-25	-17	100	12	20
POS-200P	95	120	+10.0	0.5	5	—	-77	-102	-123	-146	1.0	0.2	7-10	-30	-20	100	12	20
POS-300P	148	174	+10.0	0.5	5	—	-83	-105	-125	-145	1.8	0.3	10-14	-27	-20	100	12	20
POS-400P	194	220	+10.5	0.5	5	—	-82	-103	-124	-142	1.8	0.3	13-18	-25	-20	100	12	20
POS-535P	278	325	+10.0	0.5	5	—	-66	-95	-120	-138	2.0	0.4	17-22	-30	-20	100	12	20
POS-765P	486	510	+9.5	0.5	5	—	-70	-92	-116	-135	5.0	0.4	20-30	-26	-20	100	12	22
POS-1025P	680	755	+8.5	0.5	5	—	-74	-96	-116	-135	5.0	0.6	30-40	-24	-18	100	12	22

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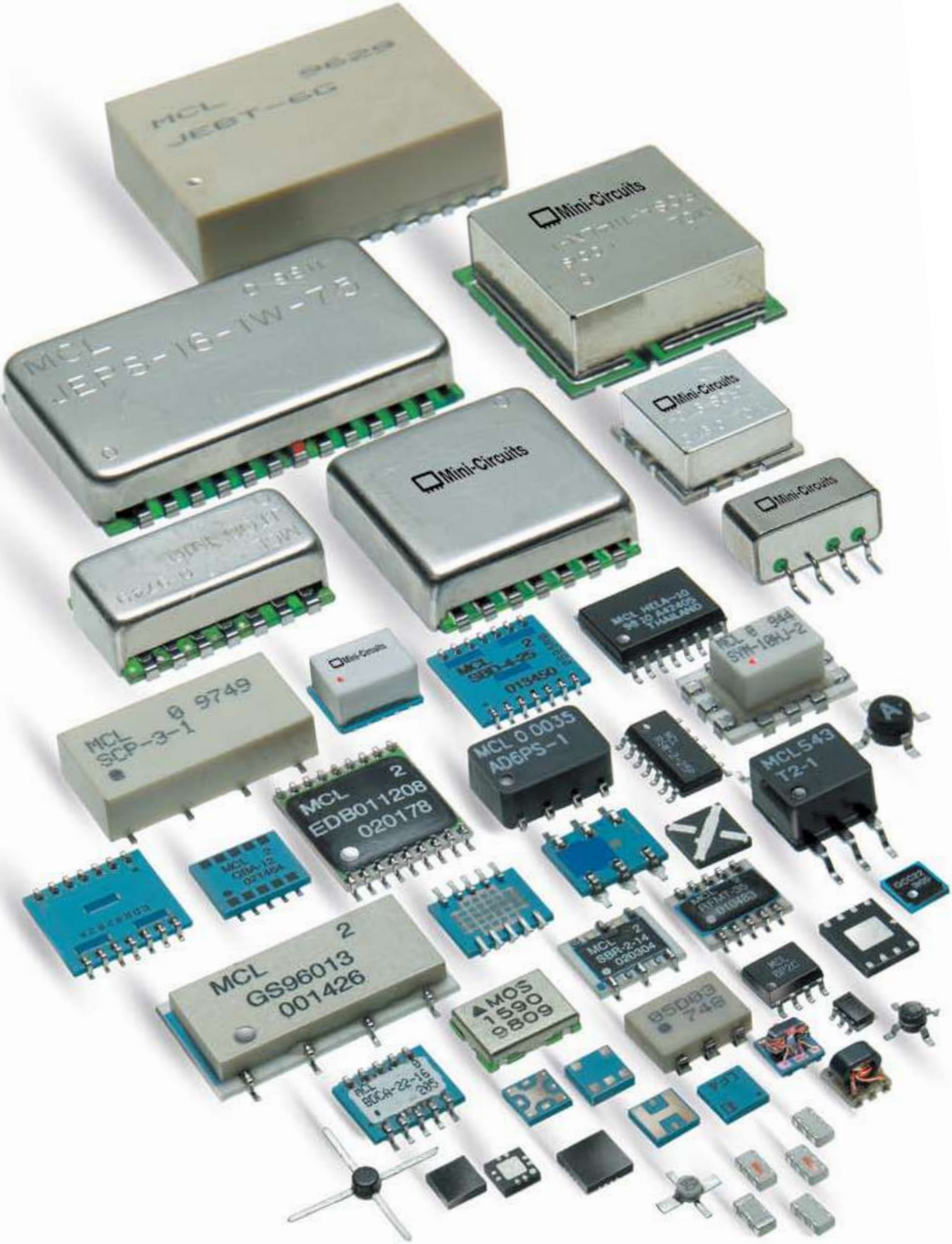
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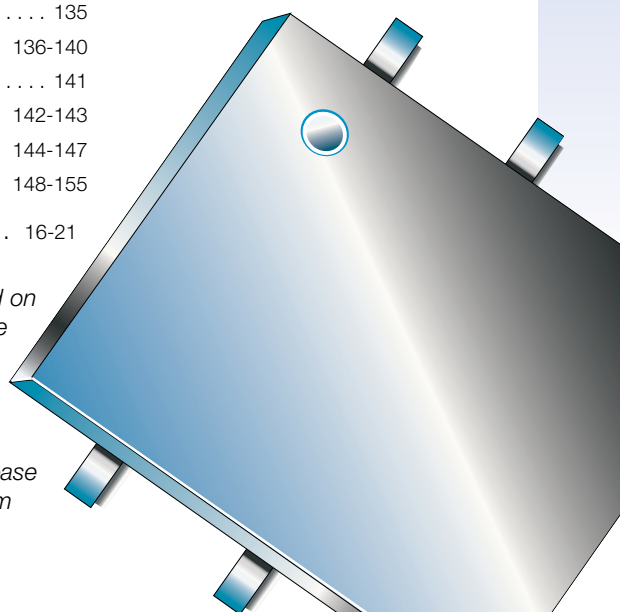


AMPLIFIERS *Monolithic, Broadband 50 Ω*

DC to 8 GHz

MICRO-X PLASTIC PACKAGE

ERA-SM
Case WW107

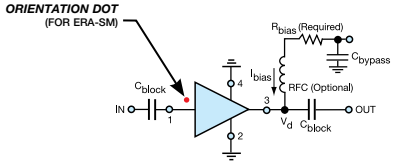
MODEL PREFIX	FREQ. (MHz) f_L-f_U	GAIN, TYPICAL (dB) OVER FREQUENCY, GHz 0.1	1	2	3	4	6	8	MAXIMUM POWER (dBm) Output (1 dB Comp.) Typ.	Input (no dmg)	DYNAMIC RANGE, NF(dB) Typ.	IP3 (dBm) Typ.	VSWR (:1) In DC-3 GHz	In 3-f_U GHz	Out DC-3 GHz	Out 3-f_U GHz	ABSOLUTE MAX. RATING I (mA)	P (mW)	DC OPERATING POWER Current (mA)	Device Volt Typ.
LOW POWER *up to +13.5 dBm output NF from 2.8 dB*									*@ 2 GHz*		*@ 2 GHz*									
ERA-8SM	DC-2000	31.5	25.0	19.0	15.0	12.0	—	—	+10.5	+13	3.1	+21.5	1.4	1.8	1.8	2.2	65	250	36	3.7
ERA-33SM	DC-3000	19.3	18.7	17.4	15.9	—	—	—	+13.5	+13	3.3	+30.3	1.2	—	1.25	—	75	330	40	4.3
ERA-3SM	DC-3000	22.1	21.0	18.7	16.4	—	—	—	+12.5	+13	2.8	+25.0	1.25	—	1.3	—	75	330	35	3.2
ERA-2SM	DC-6000	16.4	15.8	14.9	13.9	12.5	10.7	—	+13.0	+15	3.3	+29.0	1.4	1.2	1.2	1.4	75	330	40	3.4
ERA-1SM	DC-8000	12.3	12.1	11.8	10.9	9.7	7.9	8.2	+12.0	+15	4.3	+28.0	1.2	1.3	1.2	1.4	75	330	40	3.4
ERA-21SM	DC-8000	14.2	13.9	13.2	12.2	10.8	8.7	8.9	+12.6	+15	3.3	+28.0	1.1	1.6	1.3	1.9	75	330	40	3.5
MEDIUM POWER *up to +18.4 dBm output NF from 3.5 dB*									*@ 1 GHz*		*@ 1 GHz*									
ERA-50SM	DC-2000	20.7	19.4	18.3	—	—	—	—	+17.2	+13	3.5	+32.5	1.3	—	1.2	—	120	650	60	4.4
ERA-4SM	DC-4000	14.3	14.0	13.4	12.0	11.3	—	—	+17.3	+20	4.2	+34.0	1.2	1.2	1.3	1.8	100	650	65	4.5
ERA-51SM	DC-4000	18.0	17.4	16.1	14.8	12.5	—	—	+18.1	+13	4.1	+33.0	1.1	1.2	1.2	1.4	120	650	65	4.5
ERA-5SM	DC-4000	20.2	19.5	17.6	15.6	13.7	—	—	+18.4	+13	3.5	+33.0	1.3	1.3	1.2	1.3	120	650	65	4.9
ERA-6SM	DC-4000	12.6	12.5	11.7	11.7	10.3	—	—	+17.1	+20	4.5	+35.0	1.3	1.2	1.2	1.2	120	650	70	5.0
ERA-4XSM	DC-4000	14.7	14.2	13.5	12.0	11.3	—	—	+17.0	+20	4.2	+35.0	1.2	1.2	1.2	1.4	100	650	65	4.5
ERA-5XSM	DC-4000	20.5	19.5	17.6	15.5	13.7	—	—	+18.4	+13	3.5	+35.0	1.2	1.3	1.2	1.3	120	650	65	4.9

LOW PROFILE PLASTIC PACKAGE 3 mm x 3 mm

LEE
Case FG873

MODEL PREFIX	FREQ. (MHz) f_L-f_U	GAIN, TYPICAL (dB) OVER FREQUENCY, GHz 0.1	1	2	4	5	8	10	MAXIMUM POWER (dBm) Typ. Output (1 dB Comp.) 2 GHz	f_U	Input (no dmg)	DYNAMIC RANGE, NF(dB) Typ.	IP3 (dBm) Typ.	VSWR (:1) In DC-3 GHz	In 3-f_U GHz	Out DC-3 GHz	Out 3-f_U GHz	MAXIMUM CURRENT RATING I (mA)	DC OPERATING POWER Current (mA)	Device Volt Typ.
LOW POWER *up to +12 dBm output NF from 4.5 dB*																				
LEE-19	DC-8000	12.1	12.0	12.1	12.0	11.6	10.6	9.0	+12.0	+12.6	+15	6.5	+24.5	1.5	1.2	1.4	1.8	55	40	3.6
LEE-29	DC-8000	15.5	15.4	15.4	14.9	14.1	12.5	10.6	+11.9	+11.5	+15	5.5	+25.5	1.4	1.3	1.3	1.6	55	40	3.6
LEE-39	DC-8000	21.9	21.4	20.8	18.3	16.6	13.5	10.5	+11.6	+10.1	+13	4.5	+23.4	1.3	1.4	1.3	1.6	55	35	3.5
MEDIUM POWER *up to +17.3 dBm output NF from 4.5 dB*																				
LEE-49	DC-5000	14.0	13.9	14.3	14.0	13.1	7.8	—	+16.7	+10.7	+15	5.5	+33	1.6	1.2	1.4	1.4	85	65	4.9
LEE-59	DC-5000	20.6	20.3	19.7	15.8	13.8	7.6	—	+17.3	+11.5	+13	4.5	+33	1.5	1.5	1.5	1.6	85	65	4.8

ERA, LEE TYPICAL BIASING CONFIGURATION



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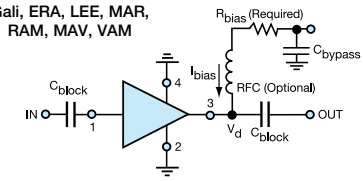
SOT-89 PLASTIC PACKAGE

Gali, GVA, PHA
Case DF782

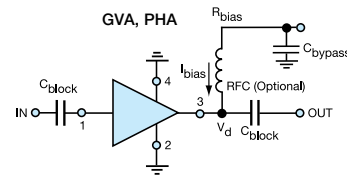
MODEL PREFIX	FREQ. (MHz) f_L-f_U	GAIN, TYPICAL (dB) OVER FREQUENCY, GHz 0.1	1	2	3	4	6	f_U	MAXIMUM POWER (dBm) @2 GHz Output (1 dB Comp.) Typ.	Input (no dmg)	DYNAMIC RANGE, @ 2 GHz NF (dB) Typ.	IP3 (dBm) Typ.	VSWR (:1) TYP In DC-3 GHz	In 3-f_U GHz	Out DC-3 GHz	Out 3-f_U GHz	ABSOLUTE MAX. RATING I (mA)	DC OPERATING POWER Current (mA)	Device Volt Typ.
LOW POWER *up to +13.4 dBm output NF from 2.7 dB*																			
Gali S66	DC-3000	22.0	20.3	17.3	15.5	—	—	—	+2.8	+13	2.7	+18.0	1.25	—	1.7	—	50	16	3.5
Gali 3	DC-3000	22.4	21.1	19.1	17.3	16.1	15.8	—	+12.5	+13	3.5	+25.0	1.5	—	1.2	—	55	35	3.3
Gali 33	DC-4000	19.3	18.7	17.5	16.3	15.5	15.8	—	+13.4	+13	3.9	+28.0	1.6	2.0	1.2	1.3	55	40	4.3
Gali 1	DC-8000	12.7	12.5	11.8	11.3	10.5	10.5	11.0	+12.2	+15	4.5	+27.0	1.3	1.7	1.4	1.8	55	40	3.4
Gali 2	DC-8000	16.2	15.8	14.8	13.7	12.7	13.2	15.1	+12.9	+15	4.6	+27.0	1.6	2.5	1.6	2.6	55	40	3.5
Gali 21	DC-8000	14.3	13.9	13.1	12.4	11.5	11.9	9.0	+12.6	+15	4.0	+27.0	1.1	1.5	1.3	2.5	55	40	3.5
									@ f_u										
Gali 19	DC-7000	12.1	11.7	11.6	10.7	10.8	10.1	11.0	+10.6	+15	6.5	+23.7	1.6	1.7	1.5	2.3	55	40	3.6
Gali 29	DC-7000	15.4	15.1	14.7	13.7	13.6	12.9	14.2	+11.2	+15	6.0	+24.7	1.5	1.6	1.5	2.3	55	40	3.6
Gali 39	DC-7000	20.8	21.1	19.7	17.7	17.0	16.1	17.6	+10.5	+13	4.9	+22.9	1.6	1.8	1.5	2.3	55	35	3.5
INTERMEDIATE POWER *up to +15.9 dBm output NF from 2.7 dB*																			
									@ 1 GHz		@ 1 GHz								
Gali 52	DC-2000	22.9	20.8	17.8	15.9	14.4	—	—	+15.5	+13	2.7	+32.0	1.35	—	1.4	—	65	50	4.4
Gali 4F	DC-4000	14.3	14.0	13.4	13.0	12.3	13.2	—	+15.3	+20	4.0	+32.0	1.2	1.2	1.5	1.8	65	50	4.4
Gali 51F	DC-4000	18.0	17.3	15.9	14.8	13.4	13.3	—	+15.9	+13	3.5	+32.0	1.2	1.3	1.5	1.7	65	50	4.4
Gali 55	DC-4000	21.9	20.6	18.5	17.0	15.5	15.7	—	+15.0	+13	3.3	+28.5	1.25	1.35	1.3	1.5	65	50	4.3
Gali 5F	DC-4000	20.4	19.3	17.4	16.0	14.8	15.1	—	+15.7	+13	3.5	+31.5	1.2	1.2	1.4	1.4	65	50	4.3
Gali 6F	DC-4000	12.1	12.0	11.6	11.4	10.9	12.3	—	+15.8	+20	4.5	+35.5	1.5	1.5	1.9	2.2	65	50	4.8
MEDIUM POWER *up to +18.3 dBm output NF from 2.7 dB*																			
								7 GHz											
Gali 4	DC-4000	14.4	14.1	13.5	12.9	12.5	13.1	—	+17.5	+20	4.0	+34.0	1.2	1.2	1.4	1.7	85	65	4.6
Gali 5	DC-4000	20.6	19.4	17.5	16.0	14.9	15.1	—	+18.0	+13	3.5	+35.0	1.2	1.2	1.4	1.4	85	65	4.4
Gali 51	DC-4000	18.1	17.5	16.1	14.7	13.7	—	—	+18.0	+13	3.5	+35.0	1.3	1.2	1.5	1.7	85	65	4.5
Gali 6	DC-4000	12.2	12.2	11.8	11.3	11.4	12.3	—	+18.2	+20	4.5	+35.5	1.5	1.4	1.8	2.0	85	70	5.0
Gali 49	DC-5000	14.0	13.7	13.6	13.7	13.3	13.1	10.7	+16.4	+20	5.5	+33.3	1.7	1.2	1.5	1.4	85	65	5.0
Gali 59	DC-5000	20.6	19.7	18.3	16.7	15.4	—	10.2	+17.6	+13	4.3	+33.3	1.6	1.5	1.5	1.7	85	65	4.8
											@ 0.1 GHz								
Gali 74	DC-1000	25.1	21.8	18.0	15.3	13.4	—	—	+18.3	+10	2.7	+38.0	1.2	—	1.6	—	130	80	4.8
HIGH POWER *up to +22.4 dBm output NF from 2.7 dB*																			
									@ 2 GHz		@ 2 GHz								
Gali 24	DC-6000	25.3	22.6	19.1	16.6	14.9	12.4	—	+19.4	+13	4.2	+36.3	1.25	1.4	1.9	2.2	160	80	5.8
Gali 84	DC-6000	25.6	22.7	19.2	16.7	15.0	11.8	—	+21.2	+13	4.4	+38.0	1.2	1.4	1.9	2.2	160	100	5.8
																		TYP	*NOM.*
GVA-81	DC-7000	10.5	10.5	10.0	9.3	8.7	8.1	7.6	+19.7	+20.0	7.4	+36.6	1.3	1.3	1.3	1.4	160	103	5.0
GVA-82	DC-7000	15.3	14.9	13.8	12.5	11.7	10.6	9.9	+20.6	+20.0	6.6	+36.0	1.3	1.3	1.6	1.6	160	106	5.0
GVA-83	DC-7000	20.5	19.3	17.1	15.2	13.8	12.3	11.2	+18.6	+20.0	6.2	+31.5	1.3	1.4	1.6	2.0	120	72	5.0
GVA-84	DC-7000	24.1	21.7	18.4	16.0	14.6	12.5	10.5	+20.6	+13.0	5.5	+36.6	1.2	1.3	2.0	3.0	160	108	5.0
PHA-1	50-6000	17.2	15.7	13.5	11.8	10.7	9.7	—	+22.4	+15.0	2.7	+42.0	1.35	2.0	1.4	1.9	210	168	5.0

RECOMMENDED APPLICATION CIRCUITS

Gali, ERA, LEE, MAR, RAM, MAV, VAM



GVA, PHA



AMPLIFIERS *Monolithic, Broadband 50 Ω*

DC to 2 GHz

RAM
Case AF190

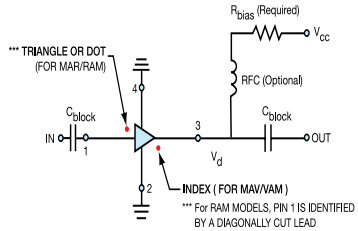
MAR-SM
Case WW107, WW107-1

MAV-SM
Case RRR137, RRR137-1

VAM
Case MMM168

MODEL PREFIX	FREQ. (MHz) f_L-f_U	GAIN (dB) TYPICAL at (MHz) 100	1000	2000	MAXIMUM POWER (dBm) Output (1 dB Comp.) Typ.	Input (no damage)	DYNAMIC RANGE NF (dB) Typ.	IP3 (dBm) Typ.	VSWR, (:1) Typ. In	Out	ABSOLUTE MAX. RATING (25°C) I (mA)	P (mW)	DC OPERATING POWER Current (mA)	Device Volt Typ.
CERAMIC MICRO-X PACKAGE *up to 12.5 dBm output NF from 2.8 dB*														
RAM-1	DC-1000	19.0	15.5	—	+1.5	+13	5.5	+14.0	1.3	1.3	40	200	17	5.00
RAM-2	DC-2000	12.5	11.8	11.0	+4.5	+13	6.5	+17.0	1.2	1.4	60	325	25	5.00
RAM-3	DC-2000	12.5	12.0	10.5	+10.0	+13	6.0	+23.0	1.6	1.7	80	425	35	5.00
RAM-4	DC-1000	8.5	8.0	—	+12.5	+13	6.5	+25.5	1.4	1.9	100	540	50	5.25
RAM-6	DC-2000	20.0	16.0	11.0	+2.0	+13	2.8	+14.5	1.4	1.3	50	200	16	3.50
RAM-7	DC-2000	13.5	12.5	11.0	+5.5	+13	4.5	+19.0	2.0	1.8	60	275	22	4.00
RAM-8	DC-1000	32.5	23.5	—	+12.5	+13	3.0	+27.0	#	#	65	420	36	7.80
MICRO-X PLASTIC PACKAGE *up to 18.5 dBm output NF from 3.0 dB*														
MAR-1SM	DC-1000	17.8	16.5	—	+2.5	+13	3.3	+14.0	1.3	1.2	40	200	17	5.00
MAR-2SM	DC-2000	12.5	12.0	11.0	+7.0	+13	3.7	+22.0	1.3	1.3	60	325	25	5.00
MAR-3SM	DC-2000	12.5	12.0	10.5	+10.0	+13	3.7	+28.0	1.3	1.3	70	400	35	5.00
MAR-4SM	DC-1000	8.3	8.0	—	+12.5	+13	6.0	+25.5	1.5	1.9	85	500	50	5.25
MAR-6SM	DC-2000	22.0	20.0	17.0	+3.0	+13	3.0	+14.5	1.3	1.3	50	200	16	3.50
MAR-7SM	DC-2000	13.5	12.5	11.0	+5.5	+13	3.5	+19.0	1.3	1.3	60	275	22	4.00
MAR-8ASM	DC-1000	31.5	25.0	—	+12.5	+13	3.1	+25.0	1.4	1.8	65	250	36	3.70
MAR-8SM	DC-1000	32.5	22.5	—	+12.5	+13	3.3	+27.0	#	#	65	500	36	7.80
MAV-11BSM	50-1000	12.7	11.3	9.5	+18.0	+13	4.4	+34.0	1.2	1.2	80	460	60	5.50
MAV-11SM	50-1000	12.7	10.5	—	+17.5	+13	3.6	+30.0	1.5	1.7	80	550	60	5.50
SOT PLASTIC PACKAGE *up to 9 dBm output NF from 3.0 dB*														
VAM-3	DC-2000	11.5	11.0	9.5	+9.0	+13	6.0	+22.0	1.5	1.7	60	240	35	4.70
VAM-6	DC-2000	19.5	15.0	10.0	+2.0	+13	3.0	+14.0	1.6	1.5	40	125	16	3.30
VAM-7	DC-2000	13.0	12.0	9.8	+5.5	+13	5.0	+18.0	1.5	1.5	50	175	22	3.80

RAM, MAR, MAV, VAM TYPICAL BIASING CONFIGURATION



AMPLIFIERS *Dual Matched 50 Ω*

DC to 4 GHz

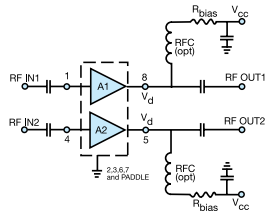
MERA
Case DL805

MERA
Case DL1020

MODEL PREFIX	FREQ. (MHz) f_L-f_U	GAIN TYPICAL, (dB) OVER FREQUENCY, GHz 0.1	1	2	3	4	MAXIMUM POWER (dBm) Output (1 dB Comp.) Typ. 0.1 GHz	1.0 GHz	2.0 GHz	Input (no dmg.)	DYNAMIC RANGE NF (dB) Typ.	IP3 (dBm) Typ. 0.1 GHz	0.5 GHz	1.0 GHz	VSWR (:1) TYP. In	Out	MAX. RATING I (mA)	P (mW)	MATCHING Amplitude Match* dB, Typ.	Phase Match* deg., Typ.	DC OPERATING POWER Current (mA)Typ.	Volt Min. Max.
MEDIUM POWER *up to +19.0 dBm output NF from 2.7 dB*																			DC-1 GHz / 1-4 GHz	DC-1 GHz / 1-4 GHz		
MERA-7456	DC-1000	25.1	22.5	18.6	14.2	9.4	+19.0	+18.2	+14.4	+10	2.7	+36	+35	+32	1.3	2.0	130	700	0.10 / 0.1	0.6 / 1.0	80	4.8
MERA-7433	DC-1000	25.0	22.4	19.0	16.2	13.4	+19.0	+18.3	+14.8	+10	2.7	+36	+35	+32	1.25	1.8	130	700	0.15 / 0.3	0.5 / 1.0	80	4.8
																			DC-2.2 GHz / 2.2-4 GHz	DC-2.2 GHz / 2.2-4 GHz		
MERA-556	DC-2200	20.5	20.2	19.0	16.7	13.0	+18.0	+17.6	+16.6	+13	3.5	+35	+35.5	+34	1.2	1.4	120	650	0.10 / 0.1	0.6 / 1.5	65	4.9
MERA-533	DC-4000	20.5	20.0	18.8	17.5	16.0	+17.9	+17.5	+16.7	+13	3.5	+35	+34	+33	1.4	1.5	120	650	0.05 / 0.1	0.7 / 2.0	65	4.9

*Matching between the 2 amplifiers

MERA TYPICAL BIASING CONFIGURATION



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AMPLIFIERS

High Directivity 50 Ω
500 MHz to 5.9 GHz Supplied Voltage 2.8 to 5.0 Volts, DC

SOIC-8 LEAD PLASTIC PACKAGE

VNA
Case XX211, XX211-1

MODEL PREFIX	FREQ. (MHz) f_L-f_U	GAIN (dB) TYPICAL OVER FREQUENCY, GHz 0.5	1.0	1.5	2.0	2.5	MAXIMUM POWER (dBm) Output (1 dB Comp.) Typ.	DYNAMIC RANGE NF(dB) @1 GHz Typ.	IP3 (dBm) Typ.	VSWR (:1) Typ. In	Out	DIRECTIVITY (dB) (Isolation-Gain) Typ.	DC OPERATING POWER Current (mA)Typ.	Volt Min.	Max.
up to 18.2 dBm output NF from 3.7 dB															
VNA-22	500-2500	10.3	13.3	13.8	13.3	12.2	+17.0	6.7	+29	1.6	1.4	17-27	80	5.0	
		9.6	12.3	12.6	11.9	10.8	+14.0	7.0	+26	1.6	1.5	17-29	72	2.8	
VNA-23	500-2500	15.1	18.6	18.3	16.9	14.6	+10.0	4.7	+21	1.5	1.3	15-20	32	5.0	
		14.6	17.6	17.1	15.9	13.9	+8.5	4.7	+19	1.5	1.5	14-21	29	2.8	
VNA-25	500-2500	15.5	18.0	18.6	17.8	16.0	+18.2	5.5	+29	1.5	1.6	18-24	85	5.0	
		14.5	16.7	17.4	17.0	15.5	+12.0	5.5	+24	1.5	1.6	16-25	80	2.8	
VNA-28	500-2500	18.1	22.4	22.8	21.6	18.3	+11.0	3.7	+22	1.6	1.5	16-20	33	5.0	
		17.5	21.1	21.0	20.1	17.5	+9.6	3.7	+19.6	1.6	1.6	15-21	30	2.8	

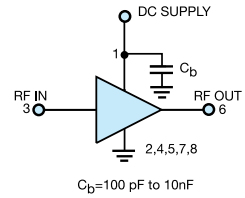
LOW PROFILE PLASTIC PACKAGE 3 mm x 3 mm

MNA
Case DQ849

MODEL PREFIX	FREQ. (MHz) f_L-f_U	GAIN (dB) TYPICAL OVER FREQUENCY, GHz 0.5	1.0	1.5	2.0	2.5	MAXIMUM POWER (dBm) Output (1 dB Comp.) Typ. f_L	f_U	DYNAMIC RANGE NF (dB) Typ. @1 GHz	IP3 (dBm) Typ. @1 GHz	@2 GHz	VSWR (:1) Typ. In	Out	DIRECTIVITY (dB) (Isolation-Gain) Typ.	DC OPERATING POWER Current (mA)Typ.	Volt Min.	Max.
up to 19.0 dBm output NF from 2.9 dB																	
MNA-2	500-2500	10.6	12.8	12.8	12.3	11.9	+17.7	+17.9	5.4	+26.5	+28.0	1.5	1.6	20	76	5.0	
		9.6	11.5	11.2	10.7	10.2	+12.9	+12.4	5.4	+23.2	+24.2	1.5	1.6	20	60	2.8	
MNA-3	500-2500	14.6	16.2	16.1	15.0	11.8	+11.4	+9.5	4.9	+19.6	+21.3	1.9	1.5	17	30	5.0	
		14.2	15.2	15.0	14.0	11.0	+9.7	+8.0	4.8	+18.0	+19.9	1.9	1.5	17	28	2.8	
MNA-4	500-2500	15.6	16.6	16.4	15.8	13.3	+19.0	+17.0	4.8	+28.4	+29.0	1.5	1.7	20	75	5.0	
		14.3	14.6	14.5	14.1	11.7	+13.4	+13.7	4.8	+23.9	+24.9	1.5	1.7	20	67	2.8	
MNA-5	500-2500	18.5	22.8	21.9	20.6	18.0	+12.2	+8.0	3.5	+19.4	+21.0	1.6	1.9	17	28	5.0	
		18.0	21.4	20.5	19.4	17.4	+10.1	+6.5	3.5	+18.0	+20.0	1.6	1.9	17	26	2.8	
MNA-6	500-2500	19.4	23.5	23.6	23.0	20.2	+18.0	+15.8	2.9	+27.1	+28.0	1.5	1.6	17	81	5.0	
		18.6	21.5	21.2	21.0	19.0	+14.1	+13.2	2.9	+23.4	+25.0	1.5	1.9	17	65	2.8	
		over frequency, GHz															
		1.5	**2.0**	**3.5**	**5.0**	**5.9**			**@2 GHz**	**@2 GHz**	**@5.9 GHz**						
MNA-7	1500-5900	15.9	17.2	17.4	17.2	10.8	+15.6	+15.9	6.9	+28.4	+28.6	2.0	1.5	20	73	5.0	
		13.7	15.4	15.8	16.7	9.8	+12.7	+13.1	6.9	+24.1	+23.8	2.0	1.5	24	65	2.8	

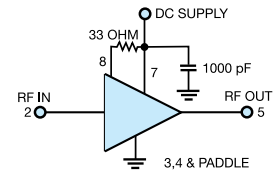
TYPICAL BIASING CONFIGURATIONS

VNA Models



C_b=100 pF to 10nF

MNA Models



AMPLIFIERS *High IP3 50 & 75 Ω*

5 MHz to 1 GHz

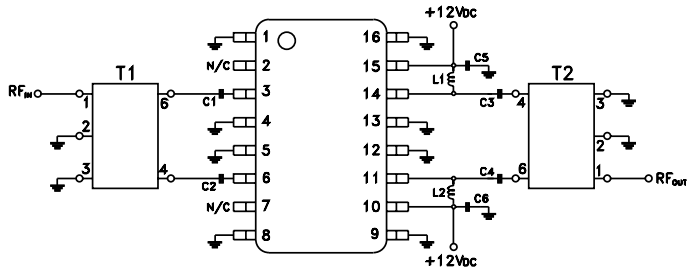
HELA
Case CM624

KIT No. PREFIX*	APPLICATION CHART	FREQUENCY (MHz) f_L-f_U	OHMS	GAIN (dB) TYPICAL at MHz Min.	Typ.	Max.	Typ. Flatness	MAXIMUM POWER (dBm) Output (1dB Comp.) Typ.	Min.	Input (no damage)	DYNAMIC RANGE NF (dB) Typ.	IP3 (dBm) Typ.	VSWR (:1) Typ. In	Out	DC OPERATING POWER Volt Typ.	Current (mA)
up to 30 dBm output NF from 3.5 dB																
HELA-10A	A	50-1000	75	9.5	12.0	13.0	±0.4	+30	+26	+20	3.5	+47	1.22	1.22	12	525
HELA-10B	B	50-1000	50	9.5	12.0	13.0	±0.4	+30	+26	+20	3.5	+47	1.22	1.22	12	525
HELA-10C	C	5-450	75	9.3	11.4	12.5	±0.4	+30	+26	+20	3.5	+48	1.30	1.22	12	525
HELA-10D	D	8-300	50	9.3	11.0	12.5	±0.4	+30	+26	+20	3.5	+48	1.20	1.20	12	525

***Kit Contains HELA-10 plus Transformers (T1 & T2)**

APPLICATION CIRCUIT	T1	T2	C1 to C6	L1, L2	PCB LAYOUT	EVALUATION BOARD
HELA-10A	ADTL1-18-75	ADTL1-18-75	0.01µF	0.75µH	B14-TB-30	TB-16
HELA-10B	ADTL1-12	ADTL1-12	0.01µF	0.75µH	B14-TB-17	TB-17
HELA-10C	ADT1-1WT	ADTL1-4-75	0.039µF	3.3µH	B14-TB-16	TB-30
HELA-10D	ADTL1.5-1	ADTL1.5-1	0.039µF	3.3µH	B14-TB-17	TB-45

APPLICATION SCHEMATIC DIAGRAM *(see table above for values C1 to C6, L1&L2)*



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AMPLIFIERS Ultra Low Noise 50 Ω

50 MHz to 6 GHz

RAMP
Case CK605

TAMP
Case JQ1382

PMA
Case DQ849
Note: (1)

PSA
Case CA1389
Note: (1)

MODEL PREFIX	FREQ. (MHz) f_L-f_U	NF (dB)	GAIN (dB)	OUTPUT POWER (dBm) Output (1 dB Compression)	IP3 (dBm)	VSWR (:1) In	VSWR (:1) Out	DIRECTIVITY (dB) (Isolation-Gain)	DC OPERATING POWER Voltage (V) Typ.	DC OPERATING POWER Current (mA)
Typical specifications unless other wise noted										
NF from 0.55 dB IP3 up to +38 dBm										
TAMP-960LN	824-960	0.55	18.0	+16.5	+30.0	1.1	1.4	6.5	5.0	40
TAMP-242LN	1710-2400	0.65	13.0	+17.0	+33.5	1.6	1.2	7.5	5.0	40
TAMP-362LN	3300-3600	0.90	12.0	+11.0	+26.0	1.3	1.3	7.5	5.0	20
TAMP-362GLN	3300-3600	0.90	20.0	+16.0	+29.0	1.3	1.3	20.0	5.0	100
TAMP-242GLN	1710-2400	0.85	30.0	+20.0	+39.0	1.2	1.4	11.0	5.0	120
TAMP-272LN	2300-2700	0.90	14.0	+18.0	+33.0	1.4	1.5	7.6	5.0	70
RAMP-33LN	50-3000	1.10	16.0	+16.5	+30.0	2.0	1.4	8.0	5.0	70
RAMP-72LN	470-700	0.90	19.5	+21.0	+37.0	1.5	1.3	5.0	5.0	90
PMA-545	50-6000	0.80	14.2	+20.3	+36.0	2.3	1.3	6.0	3.0	80
PMA-5451	50-6000	1.00	13.7	+16.8	+30.8	2.3	1.7	7.8	3.0	30
PMA-5452	50-6000	0.90	14.0	+18.3	+34.1	2.1	1.6	7.5	3.0	40
PMA-5453	50-6000	0.90	14.3	+19.6	+37.8	2.1	1.4	7.2	3.0	60
PMA-5454	50-6000	1.00	13.5	+15.2	+28.1	2.1	1.7	8.0	5.0	20
PMA-5455	50-6000	1.00	14.0	+19.1	+32.7	2.1	1.4	7.5	5.0	40
PMA-5456	50-6000	1.00	14.4	+21.5	+36.0	1.9	1.4	7.1	5.0	60
PSA-545	50-900	1.00	14.9	+20.2	+36.5	2.1	1.5	7.2	3.0	20
PSA-5451	50-4000	1.00	13.7	+16.8	+30.8	2.3	1.7	7.8	3.0	30
PSA-5452	50-4000	0.90	14.3	+19.6	+37.8	2.1	1.4	7.2	3.0	60
PSA-5453	50-4000	1.00	13.5	+15.2	+28.1	2.1	1.7	8.0	5.0	20
PSA-5454	50-4000	1.00	14.0	+19.1	+32.7	2.1	1.4	7.5	5.0	40

(1) Specifications at midband for PMA, PSA series.

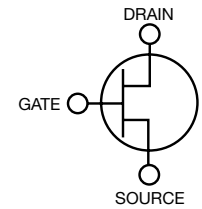
AMPLIFIERS Ultra Low Noise, E-PHEMT TRANSISTORS

450 MHz to 6 GHz

SAV
Case MMM1362
(SOT-343)

TAV
Case FG873
(3mm x 3mm)

MODEL PREFIX	FREQ. (MHz) f_L-f_U	NF (dB) @2000 MHz	GAIN (dB) OVER FREQUENCY, GHz 0.9	2.0	3.9	5.8	OUTPUT POWER (dBm) Output (1 dB Compression)	IP3 (dBm)	DC OPERATING POWER VDS (V)	DC OPERATING POWER IDS (mA)
Typical specifications unless other wise noted										
NF from 0.5 dB										
SAV-551	450-6000	0.5	20.9	15.9	11.2	7.6	+17.5	+24.3	3	15
SAV-581	450-6000	0.5	22.3	17.0	12.0	8.3	+19.0	+30.6	3	30
SAV-541	450-6000	0.5	23.2	17.6	12.5	8.7	+19.2	+33.1	3	60
TAV-551	450-6000	0.5	21.3	16.3	11.3	8.4	+17.5	+23.5	3	15
TAV-581	450-6000	0.5	22.9	17.3	12.1	8.8	+18.3	+30.3	3	30
TAV-541	450-6000	0.5	23.8	17.9	12.7	9.5	+19.1	+33.6	3	60



ATTENUATORS, FIXED 50 Ω

0 to 30 dB, DC to 8 GHz

LOW PROFILE PLASTIC PACKAGE 3 mm x 3 mm 1/2 W

GAT
Case FG873

MODEL PREFIX	FREQUENCY RANGE (MHz) f_L-f_U	ATTENUATION, (dB) Nom.	FLATNESS, Typ. L	M	U	VSWR (:1) TYP L	M	U	MAX. INPUT POWER, W 25°C
GAT-0	DC-8000	0+0.2	0.10	0.20	0.20	1.05	1.15	1.25	0.5
GAT-1	DC-8000	1±0.2	0.10	0.20	0.20	1.05	1.15	1.30	0.5
GAT-2	DC-8000	2±0.2	0.10	0.20	0.20	1.05	1.15	1.30	0.5
GAT-3	DC-8000	3±0.3	0.10	0.20	0.20	1.05	1.15	1.35	0.5
GAT-4	DC-8000	4±0.3	0.10	0.20	0.20	1.05	1.15	1.35	0.5
GAT-5	DC-8000	5±0.3	0.10	0.20	0.20	1.05	1.15	1.35	0.5
GAT-6	DC-8000	6±0.3	0.10	0.20	0.30	1.05	1.15	1.35	0.5
GAT-7	DC-8000	7±0.3	0.10	0.20	0.30	1.05	1.15	1.35	0.5
GAT-8	DC-8000	8±0.4	0.10	0.20	0.30	1.05	1.15	1.35	0.5
GAT-9	DC-8000	9±0.4	0.10	0.20	0.30	1.05	1.15	1.30	0.5
GAT-10	DC-8000	10±0.4	0.15	0.20	0.30	1.05	1.15	1.30	0.5
GAT-12	DC-8000	12±0.4	0.15	0.20	0.30	1.05	1.15	1.30	0.5
GAT-15	DC-8000	15±0.4	0.15	0.30	0.30	1.05	1.15	1.35	0.5
GAT-20	DC-8000	20±0.4	0.15	0.20	0.20	1.05	1.15	1.35	0.5
GAT-30	DC-3000	30±0.9	0.50	1.20	—	1.05	1.15	—	0.5

L = low range (DC to 1000 MHz) M = mid range (1000 to 5000 MHz) U = upper range (5000 to 8000 MHz)

SOT PLASTIC PACKAGE 1/2 W

LAT
Case MMM168

PAT
Case AF320

MODEL PREFIX	FREQUENCY RANGE (MHz) f_L-f_U	ATTENUATION, (dB) Nom.	FLATNESS, Max. L	M	U	VSWR (:1) Max. L	M	U	MAX. INPUT POWER, W 25°C
LAT-0	DC-2500	0±.15	0.3	0.4	0.6	1.2	1.3	1.5	0.5
LAT-1	DC-2500	1±0.3	0.3	0.4	0.7	1.2	1.3	1.5	0.5
LAT-2	DC-2500	2±0.3	0.3	0.4	0.7	1.2	1.3	1.5	0.5
LAT-3	DC-2500	3±0.3	0.3	0.4	0.7	1.2	1.3	1.5	0.5
LAT-4	DC-2500	4±0.3	0.3	0.4	0.7	1.2	1.3	1.5	0.5
LAT-5	DC-2500	5±0.3	0.3	0.4	0.7	1.3	1.3	1.5	0.5
LAT-6	DC-2500	6±0.3	0.3	0.4	0.7	1.3	1.4	1.5	0.5
LAT-7	DC-2500	7±0.3	0.3	0.4	0.7	1.3	1.4	1.5	0.5
LAT-8	DC-2500	8±0.4	0.3	0.5	0.8	1.3	1.4	1.5	0.5
LAT-9	DC-2500	9±0.4	0.3	0.5	0.8	1.3	1.4	1.5	0.5
LAT-10	DC-2500	10±0.5	0.3	0.5	0.8	1.3	1.4	1.5	0.5
LAT-12	DC-2500	12±0.8	0.3	0.5	0.8	1.3	1.4	1.6	0.5
LAT-15	DC-2500	15±0.8	0.3	0.5	0.9	1.3	1.4	1.6	0.5
LAT-20	DC-2500	20±1.5	0.3	0.5	0.9	1.3	1.4	1.6	0.5
LAT-30	DC-1000	30±1.7	0.5	1.2	—	1.2	1.3	—	0.5

L = low range (DC to 500 MHz) M = mid range (DC to 1000 MHz) U = upper range (DC to 2500 MHz)

CERAMIC MICRO-X PACKAGE 1 W

PAT-0	DC-5000	0±0.2	0.2	0.4	0.5	1.2	1.3	1.55	1.0
PAT-1	DC-7000	1±0.2	0.3	0.4	0.7	1.2	1.3	1.5	1.0
PAT-2	DC-7000	2±0.2	0.3	0.5	0.9	1.2	1.3	1.5	1.0
PAT-3	DC-7000	3±0.3	0.3	0.5	0.9	1.2	1.3	1.5	1.0
PAT-4	DC-7000	4±0.3	0.3	0.5	0.9	1.2	1.3	1.4	1.0
PAT-5	DC-7000	5±0.3	0.3	0.5	1.0	1.2	1.3	1.4	1.0
PAT-6	DC-7000	6±0.3	0.3	0.5	1.1	1.2	1.3	1.4	1.0
PAT-7	DC-7000	7±0.3	0.4	0.6	1.3	1.3	1.4	1.5	1.0
PAT-8	DC-7000	8±0.4	0.4	0.6	1.5	1.3	1.4	1.5	1.0
PAT-9	DC-7000	9±0.4	0.4	0.6	1.7	1.3	1.4	1.5	1.0
PAT-10	DC-7000	10±0.4	0.4	0.6	1.7	1.3	1.4	1.5	1.0
PAT-12	DC-7000	12±0.6	0.5	0.6	1.8	1.3	1.4	1.5	1.0
PAT-15	DC-7000	15±0.6	0.5	0.7	2.4	1.3	1.4	1.5	1.0
PAT-20	DC-7000	20±1.3	0.5	0.7	2.6	1.4	1.4	1.5	1.0
PAT-30	DC-7000	30±1.7	0.4	0.9	2.8	1.4	1.4	1.5	1.0

L = low range (DC to 1000 MHz) M = mid range (DC to 2500 MHz) U = upper range (DC to f_U MHz)

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ATTENUATORS, VOLTAGE VARIABLE

10 MHz to 3 GHz

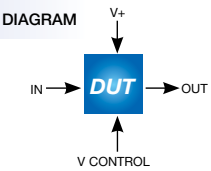
Mini-Circuits® 2010

SHIELDED METAL PACKAGE

MVA Case GP1212 · SVA Case FZ990 · EVA Case HE1135 · RVA Case DV874

MODEL PREFIX	FREQUENCY RANGE (MHz) Min. Max.	MIN. INSERTION LOSS (dB) @ control voltage Typ.	Max.	MAX. ATTENUATION (dB) @ 0 V control voltage Typ.	Min.	IP3 (dBm) Typ.	RETURN LOSS (dB) Typ.	POWER SUPPLY Voltage (V)	Current (mA) Max.	CONTROL Voltage (V)	Current (mA) Max.
50 Ω											
RVA-800	***50-800***	1.5	3.0	9	7.5	+45	23	+5	4	0-5	17
MVA-1000	***50-1000***	3.6	4.7	13	11.5	+52	20	+5	3	0-5	15
MVA-2000	***10-2000***										
	10-500	1.7	2.7	43	25	+43	23	+3 to +5	5	0-12	15
	500-1000	1.9	2.8	28	20	+48	23	+3 to +5	5	0-12	15
	1000-2000	2.1	3.0	23	15	+50	23	+3 to +5	5	0-12	15
RVA-2000V3	***50-2000***										
	50-1000	4.0	5.0	55	35	+48	25	+3	5	0-10	20
	1000-2000	4.5	6.0	40	30	+50	20	+3	5	0-10	20
RVA-2000V35	***50-2000***										
	50-1000	3.0	4.5	53	35	+50	20	+3 to +5	5	0-5	20
	1000-2000	3.5	5.0	40	30	+55	18	+3 to +5	5	0-5	20
SVA-2000	***50-2000***										
	50-500	1.5	2.0	35	26	+38	23	+5	2	0-12	5
	500-1000	1.6	2.2	29	21	+44	21	+5	2	0-12	5
	1000-2000	1.9	2.6	23	15	+47	20	+5	2	0-12	5
RVA-2000	***150-2000***										
	150-500	2.8	3.5	46	34	+53	23	+5	10	0-17	30
	500-1500	3.0	4.5	35	23	+56	22	+5	10	0-17	30
	1500-2000	3.5	5.0	29	20	+57	21	+5	10	0-17	30
RVA-2500	***10-2500***										
	10-500	3.0	4.6	55	41	+43	20	+3 to +5	5	0-17	30
	500-1500	3.3	5.0	40	30	+43	20	+3 to +5	5	0-17	30
	1500-2500	4.0	6.2	37	25	+44	20	+3 to +5	5	0-17	30
RVA-3000	***20-3000***										
	20-500	2.8	3.5	56	39	+48	23	+5	10	0-17	30
	500-1500	3.0	4.0	40	28	+56	26	+5	10	0-17	30
	1500-3000	3.6	5.0	29	22	+57	21	+5	10	0-17	30
EVA-3000	***50-3000***										
	50-1000	2.5	4.0	43	27	+41	21	+5	5	0-8	40
	1000-2000	3.0	4.5	29	21	+45	22	+5	5	0-8	40
	2000-3000	3.5	5.5	24	17	+44	18	+5	5	0-8	40
75 Ω											
EVA-23-75	***10-2000***										
	10-1000	4.5	5.5	40	25	+48	19	+3	4	0-8	15
	1000-2000	5.0	6.0	27	18	+52	14	+3	4	0-8	15
EVA-2-75	***50-2000***										
	50-1000	2.5	3.5	40	25	+48	27	+5	3	0-8	40
	1000-2000	3.0	4.7	24	20	+51	20	+5	3	0-8	40
RVA-2500-75	***10-2500***										
	10-500	2.8	3.6	60	40	+43	20	+3 to +5	5	0-15	20
	500-1500	3.2	5.0	40	30	+45	15	+3 to +5	5	0-15	20
	1500-2500	4.3	6.2	34	25	+50	13	+3 to +5	5	0-15	20

EVA, RVA, MVA FUNCTIONAL DIAGRAM

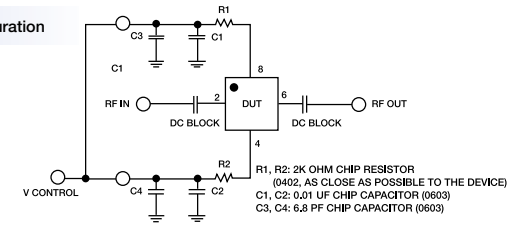


LTCC MINIATURE PACKAGE, 50 Ω

VACC Case GF995

MODEL PREFIX	FREQUENCY RANGE (MHz) Min. Max.	INSERTION LOSS (dB) @ 0 V control voltage Typ.	Max.	ATTENUATION (dB) Typ.	Min.	IP3 (dBm) Typ.	Min.	RETURN LOSS (dB) Input Typ.	Output Typ.	CONTROL Voltage (V)	Current (mA) Max.
VACC-09	600-1200	1.0	2.2	25	20	48	40	20	20	0-6	10
VACC-22	1600-2200	1.2	1.5	25	23	42	38	20	20	0-5	10

VACC Recommended Control Port Biasing Configuration



YONI2™ Patent Pending

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For pricing/availability, complete specifications, data sheets, RoHS compatibility, performance data/curves, pcb layouts, outline drawings & shopping online, see minicircuits.com

ATTENUATORS *Bi-Phase, Variable*

2 MHz to 1 GHz

RAS
Case TT240, 241

LRAS
Case QQQ130

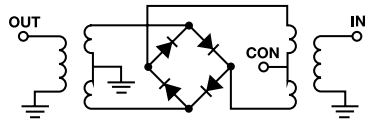
TFAS-SM
Case NNN150

SYAS
Case TTT166, TTT167

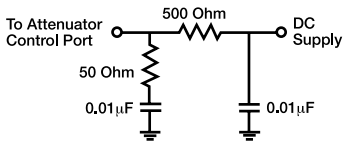
MODEL PREFIX	FREQUENCY (MHz)		INSERTION LOSS, (dB) (±20 mA)				MAX. INPUT PWR. (dBm), (±20 mA)		IN-OUT ISOLATION, (dB) (0 mA)						BI-PHASE $\overline{X}$, (±20 mA) Typ.			
			Mid-Band m		Total Range		1 dB compr.		L		M		U		Δ AMP (dB)		Phase (deg.) deviation from 180°	
	IN f_L-f_U	CON	Typ.	Max.	Typ.	Max.	Typ.	no damage	Typ.	Min.	Typ.	Min.	Typ.	Min.	m	Total Range	m	Total Range
50 Ω																		
TFAS-1SM	2-400	DC-0.05	1.4	2.0	1.6	3.0	20	25	65	45	45	33	35	25	0.10	0.1	1.0	2.0
TFAS-2SM	10-1000	DC-0.5	3.7	4.5	5.0	8.0	17	25	50	30	42	20	31	20	0.10	0.2	2.0	3.0
SYAS-1	2-400	DC-0.05	1.4	2.0	1.6	3.0	20	25	65	45	45	33	35	25	0.10	0.1	1.0	2.0
SYAS-2	10-1000	DC-0.05	4.0	6.0	4.5	7.0	17	25	59	40	42	28	28	20	0.10	0.3	2.0	3.0
SYAS-860	600-1000	DC-0.5	—	—	2.7	5.7	14	25			25	18			—	0.5	—	4.0
RAS-1	2-400	DC-0.05	1.4	2.4	1.6	3.2	20	25	65	45	45	28	32	22	0.10	0.1	1.0	2.0
75 Ω																		
RAS-2-75	10-1000	DC-0.05	4.1	6.0	4.5	7.5	20	25	58	40	42	28	39	20	0.15	0.3	1.5	3.0
LRAS-2-75	10-1000	DC-0.05	4.1	6.0	4.5	7.5	20	25	58	40	42	28	39	20	0.15	0.3	1.5	3.0

L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)
m = mid band ($2f_L$ to $f_U/2$)

ELECTRICAL SCHEMATIC



SUGGESTED CONTROL PORT BIASING CONFIGURATION



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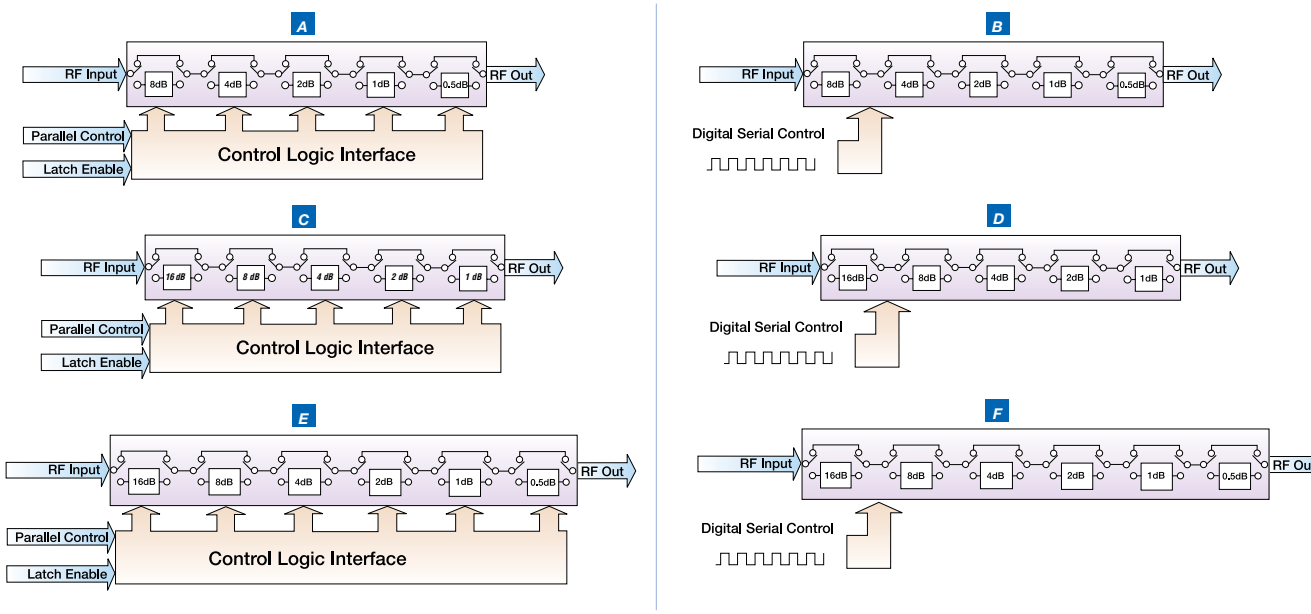
ATTENUATORS, DIGITAL STEP, CMOS

DC to 4 GHz

DAT
Case DG983-1

MODEL PREFIX	FREQUENCY RANGE (MHz)	ATTENUATION (dB) Typ.	ATTENUATION STEP (dB)	INPUT IP3 (dBm) Typ.	SINGLE POWER SUPPLY (V_{dd})	DUAL POWER SUPPLY (V_{dd}, V_{ss})	SWITCHING SPEED (µSec.) Typ.	INPUT PWR. 0.2 dB COMPRESSION dBm	CONTROL INTERFACE	No. OF BITS	SCHEMATIC
DC to 4000 MHz 50 Ω											
DAT-15R5-PN	DC-4000	15.5	0.5	+52	—	3 V, -3 V	1	+24	Parallel	5	A
DAT-15R5-PP	DC-4000	15.5	0.5	+52	3 V	—	1	+24	Parallel	5	A
DAT-15R5-SN	DC-4000	15.5	0.5	+52	—	3 V, -3 V	1	+24	Serial	5	B
DAT-15R5-SP	DC-4000	15.5	0.5	+52	3 V	—	1	+24	Serial	5	B
DAT-31-PN	DC-2400	31	1	+52	—	3 V, -3 V	1	+24	Parallel	5	C
DAT-31-PP	DC-2400	31	1	+52	3 V	—	1	+24	Parallel	5	C
DAT-31-SN	DC-2400	31	1	+52	—	3 V, -3 V	1	+24	Serial	5	D
DAT-31-SP	DC-2400	31	1	+52	3 V	—	1	+24	Serial	5	D
DAT-31R5-PN	DC-2400	31.5	0.5	+52	—	3 V, -3 V	1	+24	Parallel	6	E
DAT-31R5-PP	DC-2400	31.5	0.5	+52	3 V	—	1	+24	Parallel	6	E
DAT-31R5-SN	DC-2400	31.5	0.5	+52	—	3 V, -3 V	1	+24	Serial	6	F
DAT-31R5-SP	DC-2400	31.5	0.5	+52	3 V	—	1	+24	Serial	6	F
DC to 2000 MHz 75 Ω											
DAT-15575-PN	DC-2000	15.5	0.5	+52	—	3 V, -3 V	1	+24	Parallel	5	A
DAT-15575-PP	DC-2000	15.5	0.5	+52	3 V	—	1	+24	Parallel	5	A
DAT-15575-SN	DC-2000	15.5	0.5	+52	—	3 V, -3 V	1	+24	Serial	5	B
DAT-15575-SP	DC-2000	15.5	0.5	+52	3 V	—	1	+24	Serial	5	B
DAT-3175-PN	DC-2000	31	1	+52	—	3 V, -3 V	1	+24	Parallel	5	C
DAT-3175-PP	DC-2000	31	1	+52	3 V	—	1	+24	Parallel	5	C
DAT-3175-SN	DC-2000	31	1	+52	—	3 V, -3 V	1	+24	Serial	5	D
DAT-3175-SP	DC-2000	31	1	+52	3 V	—	1	+24	Serial	5	D
DAT-31575-PN	DC-2000	31.5	0.5	+52	—	3 V, -3 V	1	+24	Parallel	6	E
DAT-31575-PP	DC-2000	31.5	0.5	+52	3 V	—	1	+24	Parallel	6	E
DAT-31575-SN	DC-2000	31.5	0.5	+52	—	3 V, -3 V	1	+24	Serial	6	F
DAT-31575-SP	DC-2000	31.5	0.5	+52	3 V	—	1	+24	Serial	6	F

SIMPLIFIED ELECTRICAL SCHEMATICS



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BIAS-TEES *Wideband, High DC Current 50 Ω*

100 kHz to 6 GHz

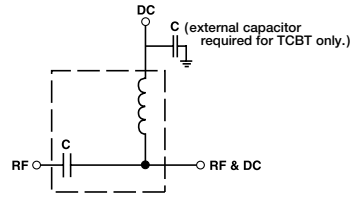
TCBT
Case GU1041

JEBT
Case BL301

MODEL PREFIX	FREQUENCY (MHz)	INSERTION LOSS (dB)						ISOLATION (dB) (RF port to DC port) (RF&DC port to DC port)						VSWR (:1)			DC CURRENT OPERATING (mA)	RF POWER OPERATING (dBm)
	f_L-f_U	L Typ.	L Max.	M Typ.	M Max.	U Typ.	U Max.	L Typ.	L Max.	M Typ.	M Max.	U Typ.	U Max.	L Typ.	M Typ.	U Typ.	Max.	Max.
TCBT-2R5G	20-2500	0.2	0.8	0.35	0.8	0.7	1.2	65	40	44	25	25	20	1.05	1.05	1.1	100	25
JEBT-4R2GW	0.1-4200	0.15	0.8	0.6	1.2	0.6	1.6	25	15	40	20	40	20	1.05	1.1	1.1	200	20
JEBT-4R2G	10-4200	0.15	0.6	0.6	1.2	0.6	1.6	32	20	40	20	40	20	1.05	1.1	1.1	200	20
TCBT-6G	50-6000	0.2	0.8	0.7	1.8	1.1	2.5	52	38	28	18	19	17	1.05	1.1	1.2	100	25

L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)

ELECTRICAL SCHEMATIC



CHOKES, RF *50 Ω*

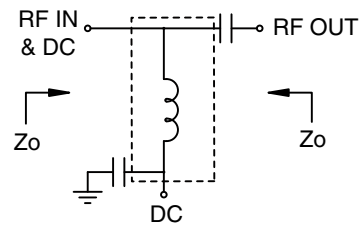
50 MHz to 10 GHz

TCCH
Case GU1041

ADCH
Case CD542

MODEL PREFIX	FREQUENCY (MHz)	INSERTION LOSS (dB)		VSWR (:1)		DC CURRENT (mA)	INDUCTANCE, µH (Typ.)		
		Typ.	Max.	Typ.	Max.	Max.	@ 0 mA	@ 50 mA	@ 100 mA
TCCH-80	50-8200	0.5	1.1	1.1	1.70	100	4.0	1.3	0.9
ADCH-80	50-8000	0.3	1.0	1.1	1.35	100	7.0	1.8	1.0
	50-10000	0.3	2.0	1.1	1.60	100	7.0	1.8	1.0
ADCH-80A	50-8000	0.3	1.0	1.1	1.35	100	7.0	1.8	1.0
	50-10000	0.3	2.0	1.1	1.60	100	7.0	1.8	1.0

ELECTRICAL SCHEMATIC



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DIRECTIONAL COUPLERS

2 MHz to 3 GHz

D Case CA531 | TCD Case DB714 | DBTC Case AT790-1 | DBTC-L Case AT1030 | JYDC-7-1HP Case BJ1051 | SYD Case AH202 | ADC Case CD542 | JDC Case BH292 | LRDC-J Case QQQ569 | SCDC Case YY161 | JYDC-23-1HP Case BJ937

MODEL PREFIX	FREQUENCY (MHz)	COUPLING (dB)		MAINLINE LOSS (dB)						DIRECTIVITY (dB)						VSWR (:1)	POWER INPUT, W	
				L		M		U		L		M		U				
	f_L-f_U	Nom.	Flatness	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	L Max.	MU Max.
6.2 to 26 dB Coupling 50 Ω																		
ADC-6-1R	5-200	6.2±0.3	±0.3	1.6	2.0	1.7	2.0	1.7	2.1	35	22	25	18	17	13	1.33	0.5	0.5
ADC-6-13	200-1300	6.2±0.5	±0.9	1.8	2.5	1.8	2.5	1.8	2.5	17	10	17	10	17	10	1.30	0.5	0.5
JDC-6-1	5-400	6.5±0.5	±0.5	1.6	2.0	1.7	2.4	2.0	2.4	35	30	25	20	20	15	1.25	0.5	0.5
JYDC-7-1HP	30-500	7.3±0.4	±0.2	1.3	1.6	—	—	1.4	1.9	30	22	—	—	20	15	1.25	5.0	5.0
TCD-9-1W	5-1000	8.9±0.5	±0.6	1.2	2.1	1.2	1.8	1.5	2.1	21	17	17	10	13	—	1.30	0.5	1.0
	1000-2000	8.9±0.5	±0.6	—	—	2.5	—	—	—	—	—	10	—	—	—	1.60	1.0	1.0
DBTC-9-4	5-1000	9.0±0.5	±0.5	1.2	2.0	1.2	1.8	1.5	2.0	21	17	18	13	15	—	1.20	0.5	1.0
JDC-10-2	5-750	10.0±0.5	±0.6	1.0	1.5	1.0	1.5	1.0	1.5	20	15	20	17	20	16	1.13	1.0	1.0
TCD-10-1W	10-750	10.3±0.5	±0.8	1.3	2.1	1.2	1.6	1.4	2.0	22	17	18	14	15	—	1.30	0.5	1.0
DBTC-10-13	5-1000	10.3±0.5	±0.8	1.3	2.0	1.4	1.8	1.6	2.0	21	17	18	13	15	10	1.30	0.5	1.0
ADC-10-1R	5-900	10.5±0.5	±0.5	0.7	1.2	0.8	1.2	0.9	1.5	40	25	30	20	18	12	1.30	1.0	1.0
ADC-10-4	5-1000	10.5±0.5	±1.0	0.8	1.3	0.8	1.2	1.0	1.5	40	23	40	20	25	13	1.20	1.0	1.0
JDC-10-4	5-1000	10.5±0.5	±0.6	1.0	1.5	1.0	1.5	1.3	1.8	23	18	23	18	24	15	1.15	1.0	1.0
LRDC-10-1J	5-500	10.7±0.5	±0.5	0.9	1.4	0.9	1.4	1.2	1.9	31	25	30	20	25	16	1.20	1.0	1.0
SCDC-11-2	500-1100	11.3±0.5	±0.6	1.1	1.8	1.1	1.8	1.1	1.8	17	10	17	10	17	10	1.40	2.0	2.0
DBTC-12-4	5-1000	12.2±0.5	±0.9	0.9	1.8	0.7	1.3	1.1	1.6	33	22	21	14	15	—	1.20	0.5	1.0
DBTC-13-4	5-1000	13.0±0.5	±0.6	0.7	1.3	0.7	1.3	1.1	1.6	21	17	18	13	13	—	1.20	0.5	1.0
TCD-13-4	5-1000	13.0±0.5	±0.6	0.7	1.3	0.7	1.3	0.8	1.5	21	17	18	12	15	—	1.20	0.5	1.0
ADC-15-4	5-1000	15.5±0.5	±0.5	0.6	1.0	0.6	1.0	0.8	1.2	23	20	24	20	28	17	1.20	1.0	1.0
D17I	2300-2600	17.5±1.3	—	0.5	0.8	0.5	0.8	0.5	0.8	14	9	14	9	14	9	1.30	1.0	1.0
DBTC-17-5	50-1000	17.0±0.7	±0.9	0.9	1.4	0.9	1.4	0.9	1.4	20	13	20	13	20	13	1.20	2.0	2.0
	000-1500	17.7±0.9	±1.0	1.0	1.5	1.0	1.5	1.0	1.5	20	10	20	10	20	10	1.20	2.0	2.0
	1500-2000	18.0±1.0	±0.8	1.1	1.6	1.1	1.6	1.1	1.6	14	—	14	—	14	—	1.20	2.0	2.0
TCD-18-4	5-1000	17.9±0.5	±0.6	0.7	1.3	0.7	1.1	1.0	1.4	22	11	20	15	18	—	1.20	1.0	1.0
D18P	1710-1990	18.0±1.8	—	0.3	0.5	0.3	0.5	0.3	0.5	15	10	15	10	15	10	1.20	1.0	1.0
D19G	1420-1660	18.2±1.2	—	0.3	0.5	0.3	0.5	0.3	0.5	15	10	15	10	15	10	1.20	1.0	1.0
D20C	810-960	19.4±1.4	—	0.3	0.5	0.3	0.5	0.3	0.5	15	7	15	7	15	7	1.10	4.0	4.0
JDC-20-1W	50-750	19.5±0.5	±0.5	0.5	0.9	0.5	0.9	0.5	0.9	22	15	22	15	22	15	1.20	0.5	0.5
ADC-20-4	5-1000	20.0±0.5	±0.8	0.4	0.8	0.5	1.0	0.7	1.3	20	18	21	17	21	15	1.10	1.0	1.0
TCD-20-4	5-1000	20.0±0.5	±0.8	0.3	0.9	0.4	0.8	0.7	1.1	20	11	21	15	15	—	1.20	1.0	1.0
ADC-20-12	100-1200	20.0±0.5	±0.7	0.5	1.1	0.5	1.1	0.5	1.1	26	13	26	13	26	13	1.17	1.0	1.0
DBTC-20-4	20-1000	20.4±0.5	±0.8	0.3	1.0	0.4	1.0	0.7	1.3	21	13	21	14	16	—	1.20	1.0	1.0
JDC-20-2	400-900	20.5±1.0	±1.0	0.2	0.6	0.2	0.6	0.2	0.6	19	13	19	13	19	13	1.15	2.0	2.0
LRDC-20-2J	300-1100	20.5±1.0	±1.3	0.25	0.6	0.25	0.6	0.25	0.6	17	10	17	10	17	10	1.20	2.0	2.0
JDC-20-5	50-1500	20.5±0.5	±0.75	0.4	0.8	0.5	0.9	1.0	1.5	25	18	22	16	20	13	1.20	0.5	0.5
SYD-20-33	30-3000	20.8±0.8	±1.4	1.6	2.5	1.6	2.5	1.6	2.5	15	9	15	9	15	9	1.2	—	1.0
JYDC-23-1HP	30-500	23.5±1.0	±1.2	0.1	0.3	—	—	0.2	0.4	26	20	—	—	23	19	1.10	10.0	10.0
ADC-26-52	10-500	26.0±0.5	±0.9	0.15	0.25	0.2	0.3	0.3	0.5	35	22	25	16	18	11	1.1	5.0	5.0
6.6 to 20.5 dB Coupling 75 Ω																		
ADC-6-10-75	20-1000	6.6±0.5	±0.5	2.10	2.8	2.1	2.5	2.2	2.8	15	12	15	12	15	9	1.33	0.5	0.5
DBTC-6-4-75	5-1000	6.8±0.3	±0.8	2.20	3.1	2.3	2.9	2.3	2.8	15	13	12	7	16	10	1.40	0.5	1.0
ADC-8-4-75	5-1000	7.9±0.5	±0.5	1.55	2.6	1.6	2.2	2.0	2.7	18	14	17	14	16	10	1.20	1.0	1.0
TCD-9-1W-75	5-1000	8.9±0.5	±0.6	1.30	2.1	1.3	2.0	1.8	2.4	21	17	15	—	10	—	1.30	0.5	1.0
	1000-2000	8.9±0.5	±0.6	—	—	2.5	—	—	—	—	—	10	—	—	—	1.60	—	1.0
LRDC-10-2-75J	30-1000	10.0±0.5	±0.6	1.00	1.5	1.1	1.5	1.3	1.8	21	17	22	17	19	15	1.30	1.0	1.0
LRDC-10-2W-75J	30-1200	10.0±0.5	±0.8	1.00	1.5	1.1	1.6	1.3	2.0	21	17	22	17	18	15	1.30	1.0	1.0
ADC-10-4-75	5-1000	10.5±0.5	±0.5	0.85	1.4	0.9	1.4	1.0	1.4	40	20	18	12	12	8	1.20	1.0	1.0
DBTC-10-4-75	5-1000	10.5±0.5	±0.7	1.50	2.2	1.4	2.0	1.5	2.0	21	16	20	13	16	—	1.30	0.5	1.0
TCD-10-1W-75	10-750	10.5±0.5	±0.7	1.60	2.1	1.4	1.9	1.5	2.0	22	17	18	14	14	—	1.30	0.5	1.0
JDC-10-4-75	10-1000	10.5±0.5	±0.5	1.20	1.6	1.4	1.7	1.6	2.0	27	18	25	18	28	18	1.30	1.0	1.0
LRDC-10-1-75J	5-600	10.7±0.5	±0.5	1.10	1.5	1.0	1.4	1.2	1.8	19	15	21	17	21	16	1.30	1.0	1.0
LRDC-12-1-75J	5-600	12.2±0.5	±0.6	0.40	0.8	0.5	1.0	0.8	1.5	20	17	21	18	20	12	1.30	1.0	1.0
ADC-12-4-75	20-1000	12.6±0.5	±0.5	0.80	1.2	0.9	1.3	1.2	1.8	28	20	23	15	17	10	1.20	1.0	1.0
TCD-13-4-75	5-1000	13.0±0.5	±0.9	1.00	1.8	0.8	1.3	1.1	1.5	22	17	15	—	12	—	1.20	0.5	1.0
DBTC-13-5-75	5-1000	13.2±0.5	±0.6	0.90	1.4	1.0	1.5	1.1	1.6	21	17	19	14	18	—	1.30	0.5	1.0
	1000-1500	13.6±0.5	±0.8	1.4	2.2	1.4	2.2	1.4	2.2	17	—	17	—	17	—	1.30	1.0	1.0
ADC-15-4-75	5-1000	15.5±0.5	±0.5	0.70	1.2	0.7	1.0	0.8	1.2	23	18	20	14	16	11	1.20	1.0	1.0
ADC-16-4-75	5-1000	16.2±0.5	±0.5	0.70	1.2	0.7	1.0	0.8	1.2	38	25	30	16	18	12	1.15	0.5	1.0
DBTC-16-5-75	5-1000	16.3±0.5	±0.7	1.20	2.0	1.0	1.5	1.1	1.6	22	16	21	13	20	—	1.30	1.0	1.0
	1000-1500	16.8±0.7	±0.7	1.3	1.9	1.3	1.9	1.3	1.9	19	—	19	—	19	—	1.30	1.0	1.0
ADC-18-4-75	20-1000	17.4±0.5	±0.5	0.40	0.8	0.4	1.0	0.5	1.2	17	14	18	14	17	12	1.15	1.0	1.0
TCD-18-4-75	10-1000	18.0±0.5	±0.9	0.90	1.3	0.7	1.2	0.8	1.3	20	15	22	15	18	—	1.20	1.0	1.0
DBTC-18-4-75	5-1000	18.2±0.5	±0.7	0.80	1.5	0.8	1.4	1.0	1.6	25	16	21	14	15	—	1.30	1.0	1.0
JDC-20-3-75	2-250	19.2±0.5	±0.5	0.40	0.8	0.3	0.7	0.4	0.7	24	16	30	20	20	15	1.10	0.5	1.0
JDC20-1W-75	50-750	19.5±0.5	±0.5	0.50	0.9	0.5	0.7	0.5	0.9	25	18	23	15	20	15	1.20	0.5	0.5
ADC-20-4-75	5-1000	19.7±0.5	±0.5	0.50	0.8	0.5	1.0	0.6	1.2	22	18	23	15	20	13	1.15	1.0	1.0
TCD-20-4-75	40-1200	20.0±1.5	—	0.6	1.1	0.6	1.1	0.6	1.1	20	14	20	14	20	14	1.15	—	1.0
DBTC-20-4-75	5-1000	20.5±0.5	±0.9	0.40	0.7	1.1	1.5	0.8	1.2	20	16	9	6	11	7	1.4	1.0	1.0

L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)

YONI2™ Patent Pending **The Design Engineers Search Engine** *finds the model you need, Instantly.*
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BI-DIRECTIONAL COUPLERS

High Power 50 Ω

1.5 MHz to 6 GHz up to 65 W

6.0 to 30 dB Coupling

LTCC
BDCN
Case FV1206-1

LTCC
BDCA/ BDCA1
Case DZ944

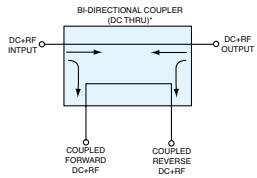
LTCC
BDCA-10-25
Case SM1L

MBD
Case JM1360

SYDC
Case AH202-1

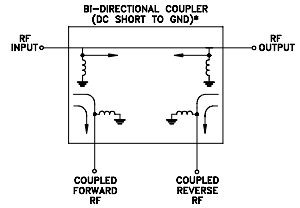
MODEL PREFIX	FREQUENCY (MHz)	COUPLING (dB)		MAINLINE LOSS (dB)		DIRECTIVITY (dB)		VSWR (:1)	POWER INPUT, W
	f_L-f_U	Nom.	Flatness	Typ.	Max.	Typ.	Min.	Typ.	Max.
up to 65 W *DC Pass*									
BDCA1-6-11	***600-1100***								
	600-700	6.3±0.5	±0.5	1.5	1.8	23	20	1.05	50
	700-1000	6.0±0.4	±0.3	1.8	2.0	27	19	1.08	42
	1000-1100	6.3±0.5	±0.5	1.8	2.0	21	15	1.10	38
BDCA-6-16	***800-1600***								
	800-960	6.7±0.5	±0.6	1.4	1.8	24	20	1.05	65
	960-1250	6.3±0.5	±0.4	1.6	2.0	23	19	1.05	55
	1250-1600	6.6±0.7	±0.9	1.6	2.0	21	14	1.05	45
BDCA1-6-22	***950-2200***								
	950-1400	6.9±1.0	±1.0	1.4	1.9	23	17	1.20	57
	1400-1900	6.0±0.5	±0.3	1.7	2.1	28	20	1.10	44
	1900-2200	6.5±0.7	±0.7	1.7	2.1	22	15	1.15	37
BDCA-7-25	***1200-2500***								
	1200-1700	7.1±0.8	±0.8	1.5	1.9	22	19	1.08	35
	1700-2100	6.5±0.5	±0.3	1.6	2.0	22	14	1.05	35
	2100-2500	7.0±0.8	±1.0	1.5	2.0	22	12	1.10	27
BDCA1-7-33	***1600-3300***								
	1600-2200	7.0±0.6	±1.0	1.6	1.9	27	22	1.10	32
	2200-2700	6.5±0.5	±0.3	1.6	1.9	23	18	1.15	32
	2700-3300	7.1±0.6	±0.7	1.6	1.9	21	17	1.15	24
BDCA-10-25	***800-2500***	10.1±2.0	±2.0	1.0	1.5	25	11	1.05	24
	800-1000	11.0±0.8	±1.2	0.6	1.0	32	20	1.05	50
	1700-2000	8.5±0.5	±0.6	1.1	1.5	23	16	1.05	34
	2000-2500	9.4±1.2	±1.5	1.0	1.5	22	11	1.05	24
BDCA1-10-40	***1600-4000***								
	1600-1800	10.1±0.7	±0.7	0.8	1.1	21	18	1.10	24
	1800-2200	9.5±0.7	±0.8	1.0	1.3	20	17	1.10	20
	2200-2900	9.1±0.5	±0.5	1.05	1.4	20	16	1.20	16
	2900-3500	9.6±0.9	±1.0	1.15	1.4	22	16	1.20	14
	3500-4000	10.8±1.0	±1.5	1.05	1.4	18	11	1.25	12
BDCN-15-25	***824-2525***	14.5±2.0	±3.0	0.6	0.9	13	8	1.20	16
	824-894	15.0±0.6	±0.6	0.4	0.8	12	8	1.20	16
	880-960	14.5±0.6	±0.6	0.5	0.9	13	8	1.20	16
	1710-1880	12.5±0.6	±0.4	0.6	0.9	22	16	1.20	16
	1850-1990	12.6±0.6	±0.4	0.5	0.9	22	16	1.20	16
	2110-2170	13.3±0.6	±0.5	0.6	1.0	22	16	1.20	16
	2375-2525	15.5±0.6	±1.5	0.6	1.0	12	8	1.20	16
BDCA-15-25	***800-2500***	15.0±1.7	±2.4	0.5	1.0	27	11	1.20	23
	800-1000	16.3±0.8	±1.1	0.35	0.6	27	19	1.15	40
	1800-2000	13.5±0.5	±0.3	0.55	1.0	17	12	1.35	28
BDCA-16-30	***1800-4200***								
	1800-3000	15.2±1.0	±1.2	0.5	0.9	23	13	1.30	24
	1800-2500	15.5±0.7	±1.0	0.4	0.9	22	14	1.30	27
	3000-4200	14.8±0.5	±1.0	0.7	1.2	18	13	1.30	18
BDCN-17-25	***824-2525***	16.8±2.0	±3.0	0.6	0.9	13	10	1.20	16
	824-894	18.3±0.6	±0.6	0.3	0.8	13	10	1.20	16
	880-960	17.6±0.6	±0.6	0.3	0.8	13	10	1.20	16
	1710-1880	14.3±0.6	±0.4	0.5	0.9	22	17	1.20	16
	1850-1990	14.3±0.6	±0.4	0.5	0.9	22	17	1.20	16
	2110-2170	14.3±0.6	±0.5	0.5	0.9	25	20	1.20	16
	2375-2525	15.0±0.6	±0.8	0.5	0.9	15	11	1.20	16
MBD-20-63HP	5000-6000	20.5±0.5	±0.4	0.18	0.25	20	14	1.10	20
up to 25 W *DC Blocked*									
SYDC-20-62HP	10-540	19.8±0.5	±0.8	0.2	0.6	28	16	1.10	25
SYDC-20-61HP	1.5-60	20.0±0.5	±0.3	0.1	0.4	35	20	1.05	15
SYDC-20-13HP	40-1000	20.0±1.0	±0.9	0.4	1.1	28	14	1.55	10
SYDC-30-12HP	20-100	29±1.0	±0.6	0.06	0.15	30	20	1.03	55

ELECTRICAL SCHEMATIC BDCA, BDCN, MBD AND SYBD SERIES



*ELECTRICAL SCHEMATIC IS FOR BI-DIRECTIONAL COUPLER WITHOUT INTERNAL TRANSFORMERS AND RESISTERS.

ELECTRICAL SCHEMATIC SYDC SERIES



* ELECTRICAL SCHEMATIC IS FOR BI-DIRECTIONAL COUPLER WITH INTERNAL TRANSFORMER(S) THAT ROUTES DC FROM RF PORTS TO GROUND.

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp.

SYBD
Case JB1233

10 to 33 dB Coupling

MODEL PREFIX	FREQUENCY (MHz)	COUPLING (dB)		MAINLINE LOSS (dB)		DIRECTIVITY (dB)		VSWR (:1)	POWER INPUT, W
	f_L-f_U	Nom.	Flatness	Typ.	Max.	Typ.	Min.	Typ.	Max.
up to 100 W *DC Pass*									
SYBD-10-63HP	***2700-6000***			***0.60***	***1.2***	***20***	***10***	***1.2***	
	2700-3000	12.5±0.8	±0.5	0.40	0.8	23	16	1.1	25
	3000-3600	11.8±0.8	±0.7	0.45	0.9	23	15	1.1	25
	3600-4500	10.8±0.7	±0.6	0.60	1.0	22	12	1.2	20
	4500-6000	10.3±0.7	±0.4	0.75	1.2	18	10	1.3	20
SYBD-13-63HP	***2700-6000***			***0.45***	***0.80***	***20***	***10***	***1.20***	
	2700-3000	15.3±0.8	±0.5	0.25	0.45	23	16	1.15	25
	3000-3600	14.3±0.8	±0.7	0.30	0.50	21	15	1.20	25
	3600-4500	13.3±0.7	±0.7	0.40	0.75	18	13	1.25	20
	4500-6000	12.6±0.7	±0.5	0.45	0.80	17	10	1.25	20
SYBD-14-272HP	***1750-2700***			***0.40***	***0.75***	***23***	***16***	***1.15***	
	1750-1950	15.1±0.7	±0.6	0.25	0.55	23	18	1.10	25
	1950-2300	14.5±0.8	±0.7	0.30	0.65	23	17	1.15	25
	2300-2700	13.5±0.8	±0.7	0.45	0.75	23	16	1.10	25
SYBD-16-172HP	***1400-1750***			***0.22***	***0.5***	***23***	***18***	***1.10***	
	1400-1580	17.0±0.7	±0.7	0.20	0.45	23	18	1.10	50
	1580-1750	16.0±0.7	±0.6	0.22	0.50	23	17	1.10	25
SYBD-16-272HP	***1750-2700***			***0.20***	***0.50***	***30***	***17***	***1.20***	
	1750-1950	18.0±0.7	±0.5	0.13	0.40	30	18	1.10	25
	1950-2300	17.1±0.8	±0.7	0.18	0.45	30	18	1.15	25
	2300-2700	16.1±0.8	±0.7	0.20	0.50	30	17	1.20	25
SYBD-16-53HP	***2700-5000***			***0.20***	***0.70***	***18***	***10***	***1.20***	
	2700-3000	18.1±0.8	±0.5	0.12	0.40	20	13	1.15	25
	3000-3600	17.4±0.8	±0.7	0.15	0.45	18	13	1.15	25
	3600-4500	16.3±0.7	±0.7	0.20	0.50	16	11	1.25	20
	4500-5000	15.7±0.7	±0.3	0.24	0.70	15	10	1.30	20
SYBD-18-142HP	***960-1400***			***0.15***	***0.40***	***26***	***18***	***1.10***	
	960-1240	19.5±0.8	±1.3	0.10	0.35	26	18	1.10	50
	1240-1400	18.0±0.8	±0.7	0.15	0.40	25	18	1.10	50
SYBD-18-172HP	***1400-1750***			***0.10***	***0.35***	***28***	***18***	***1.10***	
	1400-1580	19.5±0.7	±0.7	0.10	0.30	28	18	1.10	50
	1580-1750	18.5±0.7	±0.6	0.12	0.35	30	18	1.05	25
SYBD-20-13HP	***800-1000***	***20.8±0.8***	***±1.3***	***0.12***	***0.35***	***24***	***17***	***1.10***	***100***
	800-900	21.6±0.8	±0.7	0.12	0.35	24	18	1.10	100
	900-1000	20.6±0.8	±0.6	0.12	0.35	24	17	1.10	100
SYBD-20-272HP	***1750-2700***			***0.12***	***0.40***	***22***	***14***	***1.15***	
	1750-1950	20.7±0.7	±0.5	0.11	0.35	23	16	1.10	25
	1950-2300	19.8±0.8	±0.7	0.12	0.35	22	15	1.15	25
	2300-2700	18.8±0.8	±0.6	0.12	0.40	20	14	1.15	25
SYBD-22-82HP	***610-810***	22.8±0.8	±1.5	0.10	0.30	24	19	1.05	100
SYBD-22-172HP	***1400-1750***			***0.09***	***0.30***	***20***	***16***	***1.15***	
	1400-1580	22.3±0.7	±0.7	0.07	0.30	24	17	1.15	50
	1580-1750	21.5±0.7	±0.6	0.09	0.30	23	16	1.15	25
SYBD-23-13HP	***800-1000***	***23.5±0.8***	***±1.3***	***0.06***	***0.25***	***27***	***19***	***1.15***	***100***
	800-900	24.0±0.8	±0.7	0.06	0.25	27	19	1.15	100
	900-1000	23.0±0.8	±0.6	0.06	0.25	27	19	1.15	100
SYBD-24-142HP	***960-1400***			***0.04***	***0.30***	***25***	***17***	***1.15***	
	960-1240	24.8±0.8	±1.2	0.04	0.25	26	18	1.15	50
	1240-1400	23.2±0.8	±0.7	0.05	0.30	24	17	1.15	50
SYBD-25-82HP	***610-810***	***25.5±0.8***	***±1.5***	***0.05***	***0.20***	***28***	***20***	***1.10***	***100***
SYBD-26-62HP	***400-610***			***0.08***	***0.25***	***24***	***20***	***1.05***	
	400-470	27.2±0.8	±0.9	0.08	0.25	24	20	1.05	100
	470-610	25.3±0.8	±1.3	0.09	0.25	24	20	1.05	100
SYBD-26-13HP	***800-1000***	***26.3±0.8***	***±1.1***	***0.03***	***0.25***	***29***	***19***	***1.05***	***100***
	800-900	26.8±0.8	±0.7	0.03	0.20	31	20	1.05	100
	900-1000	25.8±0.8	±0.6	0.03	0.25	29	19	1.05	100
SYBD-28-62HP	***400-610***			***0.03***	***0.20***	***27***	***21***	***1.10***	
	400-470	29.8±0.8	±1.0	0.03	0.20	27	21	1.10	100
	470-610	27.8±0.8	±1.5	0.03	0.20	28	21	1.10	100
SYBD-28-82HP	***610-810***	***28.1±0.8***	***±1.4***	***0.02***	***0.20***	***33***	***21***	***1.05***	***100***
SYBD-30-62HP	***400-610***			***0.02***	***0.20***	***30***	***23***	***1.05***	
	400-470	32.5±0.8	±0.9	0.02	0.20	30	23	1.05	100
	470-610	30.8±0.8	±1.3	0.02	0.20	28	23	1.05	100

FILTERS, LOW PASS 50 Ω

DC to 1 GHz

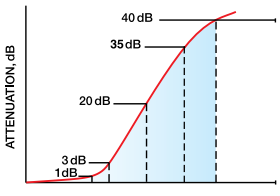
PLASTIC PACKAGE

SALF, SCLF
Case YY101, YY161

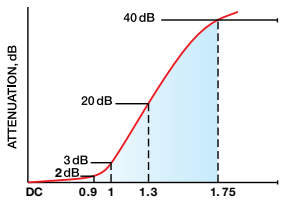
MODEL PREFIX	PASSBAND (MHz) (Loss < 1 dB)	fco (MHz) Nom. (Loss 3 dB)	STOPBAND (MHz) (Loss > 20 dB)	STOPBAND (MHz) (Loss > 40 dB)	VSWR (:1) PASSBAND Typ.
0.75" x 0.45" x 0.28" Max.					
SCLF-4.7	DC-4.7	5.6	6.6-7.4	7.4-600	1.25
SCLF-5	DC-5.0	5.8	8-10	10-200	1.70
SCLF-8	DC-8.0	9.2	12.5-16.5	16.5-200	1.70
SCLF-8.4	DC-8.4	9.4	11.4-12.6	12.6-210	1.25
SCLF-10	DC-10	12.2	14-16	16-230	1.20
SCLF-10.7	DC-11	14	19-24	24-200	1.70
SCLF-21.4	DC-22	24.5	32-41	41-200	1.70
SCLF-23	DC-23	25	31-34	34-320	1.50
SCLF-25	DC-25	28	36-47	47-200	1.70
SCLF-27	DC-27	30	36-41	41-480	1.30
SCLF-30	DC-30	35	47-61	61-200	1.70
SCLF-36	DC-36	40	50-57	57-390	1.30
SCLF-44	DC-44	48.5	59-65.5	65.5-420	1.30
SCLF-45	DC-45	55	70-90	90-200	1.70
SCLF-65	DC-65	71	86-96	96-510	1.30
SALF-78	DC-78	93	120-136	136-550	1.30
SCLF-95	DC-95	108	146-189	189-400	1.70
SALF-116	DC-116	142	178-220	220-825	1.30
SCLF-135	DC-135	155	210-300	300-600	1.70
SALF-146	DC-146	171	210-240	240-850	1.50
SCLF-190	DC-190	210	290-390	390-800	1.70
SCLF-225	DC-225	250	340-440	440-1200	1.70
SALF-265	DC-265	308	390-470	470-1100	1.20
SALF-325	DC-325	383	480-580	580-1300	1.30
				Loss > 35 dB	
SCLF-380	DC-380	440	580-750	750-1800	1.70
SALF-396	DC-396	458	550-620	620-1430	1.30
SCLF-420	DC-420	570	750-920	920-2000	1.70
SALF-490	DC-490	620	800-900	900-1600	1.30
SCLF-550	DC-550	605	800-1050	1050-2000	1.70
SALF-580	DC-580	720	1000-1300	1300-2100	1.50
SALF-680	DC-680	790	1090-1400	1400-2200	1.40
SCLF-700	DC-700	770	1000-1300	1300-2000	1.70
SALF-800	DC-800	935	1200-1300	1300-2550	1.60
SALF-865	DC-865	980	1300-1400	1400-2550	1.40
SCLF-1000	DC-1000	1200	1620-2100	2100-2500	1.70

TYPICAL FREQUENCY RESPONSE

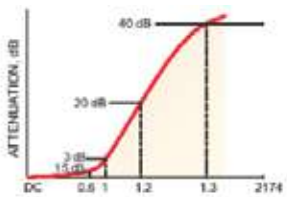
SXLP, SALF, SCLF MODELS



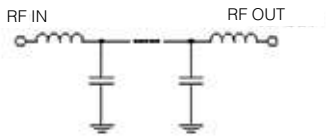
RLP MODELS



LPF MODELS



FUNCTIONAL SCHEMATIC



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SHIELDED METAL CASE

RPL
Case GP731

SXLP
Case HF1139

LPF
Case HZ1198

MODEL PREFIX	PASSBAND (MHz) (Loss < 1 dB)	fco (MHz) Nom. (Loss 3 dB)	STOPBAND (MHz) (Loss > 20 dB)	STOPBAND (MHz) (Loss > 40 dB)	VSWR (:1) PASSBAND Typ.
0.75" x 0.45" x 0.28" Max.					
SXLP-4.7	DC-4.7	5.6	6.6-7.4	7.4-600	1.25
SXLP-5	DC-5	5.8	8-11	11-600	1.70
SXLP-8	DC-8	9.2	12.5-16.5	16.5-1000	1.70
SXLP-8.4	DC-8.4	9.4	11.6-13	13-400	1.25
SXLP-10	DC-10	11.2	14-16	16-230	1.20
SXLP-10.7	DC-11	14	19-24	24-1600	1.40
SXLP-21.4	DC-22	24.5	32-41	41-2000	1.30
SXLP-23	DC-23	25	31-34	34-500	1.50
SXLP-25	DC-25	28	36-37	47-1000	1.70
SXLP-27	DC-27	30	36-41	41-810	1.30
SXLP-30	DC-30	35	47-61	61-1500	1.70
SXLP-36	DC-36	40	50-57	57-560	1.30
SXLP-40	DC-40	50	54-80	80-2750	1.30
SXLP-44	DC-44	48.5	59-65.5	65.5-600	1.40
SXLP-45	DC-45	54	70-90	90-1600	1.70
SXLP-65	DC-65	71	86-96	96-710	1.30
SXLP-90	DC-90	94	105-170	170-1000	1.20
SXLP-95	DC-95	108	146-189	189-1400	1.70
SXLP-135	DC-135	155	210-300	300-1600	1.30
SXLP-190	DC-190	210	290-390	390-1000	1.40
SXLP-225	DC-225	250	340-440	440-1600	1.40
				Loss > 35 dB	
SXLP-380	DC-380	440	580-750	750-2200	1.30
SXLP-420	DC-420	570	750-920	920-2000	1.70
SXLP-450	DC-450	465	495-545	545-3000	1.20
SXLP-550	DC-550	605	800-1050	1050-2000	1.20
SXLP-550A	DC-550	565	600-630	630-2300	1.20
SXLP-700	DC-700	770	1000-1300	1300-2000	1.70
SXLP-1000	DC-1000	1200	1620-2100	2100-2500	1.70
0.35" x 0.35" x 0.100"					
	Loss < 2 dB				
RLP-30	DC-30	37	47-53	53-3000	1.15
RLP-40	DC-40	56	70-80	80-800	1.10
RLP-50	DC-50	59	78-91	91-1000	1.10
RLP-70	DC-70	77	100-115	115-1000	1.10
RLP-83	DC-83	93	118-135	135-850	1.10
RLP-105	DC-105	116	145-165	165-1000	1.10
RLP-120	DC-120	132	170-205	205-1000	1.10
RLP-137	DC-137	150	190-215	215-1000	1.10
RLP-158	DC-158	172	220-255	255-1000	1.10
RLP-176	DC-176	191	245-285	285-1000	1.10
RLP-190	DC-190	220	264-300	300-1300	1.10
RLP-216	DC-216	232	295-340	340-1300	1.10
RLP-264	DC-264	288	265-425	425-1500	1.20
RLP-288	DC-288	310	390-455	455-1500	1.15
RLP-320	DC-320	345	440-510	510-1600	1.15
RLP-340	DC-340	365	475-560	560-1500	1.15
RLP-470	DC-470	510	650-780	780-2000	1.15
RLP-900	DC-900	1000	1300-1750	1750-2900	1.20

MODEL PREFIX	PASSBAND (MHz) (Loss < 1.5 dB)	fco (MHz) Nom. (Loss 3 dB)	STOPBAND (MHz) (Loss > 20 dB)	STOPBAND (MHz) (Loss > 40 dB)	VSWR (:1) Stopband Typ	VSWR (:1) Passband Typ.
0.47" x 0.83" x 0.22"						
LPF-BOR3	DC-0.30	0.46	0.56-0.61	0.61-1000	20	1.1
LPF-BOR5	DC-0.50	0.81	1.00-1.12	1.12-1000	20	1.2
LPF-BOR6	DC-0.60	0.88	1.08-1.23	1.23-1000	20	1.2
LPF-BOR7	DC-0.70	1.08	1.30-1.46	1.46-1000	20	1.2
LPF-BOR8	DC-0.80	1.25	1.55-1.75	1.75-1000	20	1.1
LPF-BOR35	DC-0.35	0.57	0.70-0.79	0.79-1000	20	1.2

FILTERS, LOW PASS 50 Ω CERAMIC (LTCC)

DC to 7.2 GHz

LFTC Case FR933

LFCV Case JV1210C

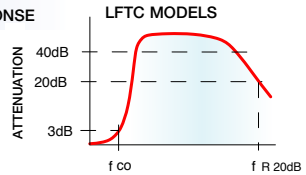
LFCN Case FV1206

MODEL PREFIX	PASSBAND (MHZ) (Loss < 1.3 dB) Typ.	fco (MHz) Nom. (Loss 3 dB) Typ.	STOPBAND (MHz) (Loss > 20 dB)	STOPBAND (MHz) (Loss > 40 dB)	STOPBAND (MHz) fr 20 dB Typ.	VSWR (:1) PASSBAND Typ.	POWER INPUT (W)	NUMBER OF SECTIONS
0.15" x 0.15" x 0.028"								
LFTC-850	DC-850	1078	1500	2000-3500	5500	1.2	16	7
LFTC-1350	DC-1350	1550	2100	2700-4000	7000	1.2	15	7
LFTC-1700	DC-1700	1980	2700	3300-3880	7200	1.2	14	7
LFTC-2000	DC-2000	2430	3450	4500-5400	8000	1.2	10	7
LFTC-3300	DC-3300	4100	5600	—	10000	1.2	10	7
LFTC-4000	DC-4000	5325	7250	—	9500	1.2	10	7
LFTC-5400	DC-5400	6410	9000-11000	—	12000	1.1	19	7
0.126" x 0.098" x 0.059"								
LFCV-45	DC-45	77	120	150-910	1100	1.2	8.5	7
LFCV-52	DC-52	93	140	170-1100	1200	1.2	8.5	7

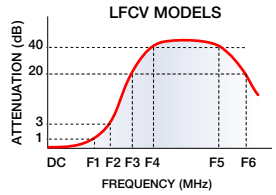
MODEL PREFIX	PASSBAND (MHz) (Loss < 1.5 dB) Max.	fco (MHz) Nom. (Loss 3 dB) Typ.	STOPBAND (MHz) (Loss, dB) f 20 Min.	STOPBAND (MHz) (Loss, dB) 40 Typ.	STOPBAND (MHz) (Loss, dB) fr 20 Typ.	VSWR (:1) PASSBAND Typ.	POWER INPUT (W) Max.	NUMBER OF SECTIONS
0.126" x 0.063" x 0.037"								
LFCN-80	DC-80	145	200	225-1550	4500	1.2	8.5	7
LFCN-95	DC-95	165	230	255-1600	4500	1.2	8.5	7
LFCN-105	DC-105	180	250	265-1650	4750	1.2	8.5	7
LFCN-120	DC-120	195	280	300-1850	4750	1.2	8.5	7
LFCN-160	DC-160	230	330	480-2700	6100	1.2	8	7
LFCN-180	DC-180	270	370	525-2350	6400	1.2	8	7
LFCN-190	DC-190	280	400	510-2800	6550	1.2	8	7
LFCN-225	DC-225	350	460	510-2500	5500	1.2	8.5	7
LFCN-320	DC-320	460	560	640-2500	5300	1.2	8.5	7
LFCN-400	DC-400	560	660	680-3000	5500	1.2	8.5	7
LFCN-490	DC-490	650	800	880-2500	6000	1.2	8.5	7
LFCN-530	DC-530	700	820	945-3000	6000	1.2	8.5	7
LFCN-575	DC-575	770	900	1050-3200	5500	1.2	8.5	7
LFCN-630	DC-630	830	1000	1050-3500	6000	1.2	8.5	7
				30 dB Typ.				
LFCN-800	DC-800	990	1400	1500-2000	4500	1.2	9	5
LFCN-900	DC-850	1075	1275	1350-4850	5100	1.2	10	7
LFCN-1000	DC-1000	1300	1550	1900-5000	5500	1.3	10	7
LFCN-1200	DC-1200	1530	1865	2000-5000	6200	1.2	10	7
LFCN-1325	DC-1325	1560	2100	2200	4250	1.4	9	5
LFCN-1400	DC-1400	1700	2015	2100-6600	6800	1.2	10	7
LFCN-1450	DC-1450	1825	2025	2050-6600	6700	1.2	10	7
LFCN-1500	DC-1500	1825	2100	2150-6600	6800	1.2	10	7
LFCN-1525	DC-1525	1750	2040	2120-6600	6700	1.2	10	7
LFCN-1575	DC-1575	1875	2175	2225-6800	7100	1.2	10	7
LFCN-1700	DC-1700	2050	2375	2500-6500	7000	1.2	10	7
LFCN-1800	DC-1800	2125	2425	2500-7200	8600	1.2	10	7
LFCN-2000	DC-2000	2275	3000	3100-3500	4600	1.3	9	5
LFCN-2250	DC-2200	2575	2900	3000-5000	7200	1.2	10	7
LFCN-2400	DC-2400	2800	3600	3700-4000	5000	1.2	9	5
LFCN-2500	DC-2500	3075	3675	3800-6100	8000	1.2	10	7
LFCN-2600	DC-2600	3125	3750	3900-6600	8400	1.2	10	7
LFCN-2750	DC-2750	3150	4000	4150-6800	8400	1.2	10	7
LFCN-2850	DC-2800	3300	4000	4200-7400	9000	1.2	10	7
LFCN-3000	DC-3000	3600	4550	4780-7500	10000	1.2	10	7
LFCN-3400	DC-3400	3950	4300	4600-7800	8300	1.2	8	5
LFCN-3800	DC-3900	4850	6000	5700-8300	13000	1.3	8	7
LFCN-4400	DC-4400	5290	6700	6280-9800	13000	1.2	8	7
LFCN-5000	DC-5000	5580	6850	7050	18000	1.2	9	7
LFCN-5500	DC-5500	6200	7200	6770-9500	12100	1.3	8	7
LFCN-5850	DC-5850	6540	7600	7100-9900	12500	1.3	8	7
LFCN-6000	DC-6000	6800	8500	8700-10500	18000	1.3	9	7
LFCN-6400	DC-6400	7200	8300	7770-10200	12500	1.2	8	7
LFCN-6700	DC-6700	7600	9300	9500-11000	18000	1.3	9	7
LFCN-7200	DC-7200	8150	9500	8850-9600	12300	1.3	8	7

TYPICAL FREQUENCY RESPONSE

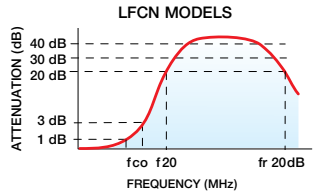
LFTC MODELS



LFCV MODELS



LFCN MODELS



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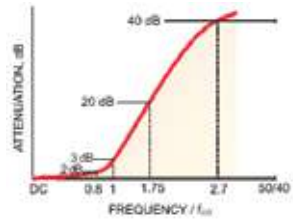
SHIELDED METAL CASE

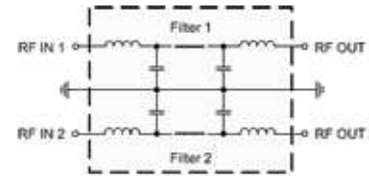
LPFD
Case DV874

MODEL PREFIX	STRUCTURE	PASSBAND (MHz) (Loss < 2.0 dB)	fco (MHz) Nom. (Loss 3 dB)	STOPBAND (MHz) (Loss > 20 dB)	STOPBAND (MHz) (Loss > 40 dB)	CROSSOVER ISOLATION (dB)	VSWR (:1) Passband Typ	VSWR (:1) Stopband Typ.
DUAL LOW PASS *High Rejection, 50 Ω* *DC to 30 MHz, DC to 80 MHz*								
LPFD-3040	Filter 1	DC-30	40	70-110	110-2000	60	1.2	20
	Filter 2	DC-40	49	85-130	130-2000	60	1.2	20
LPFD-7080	Filter1	DC-70	80	135-200	200-2500	60	1.2	20
	Filter2	DC-80	93	155-250	250-2500	60	1.2	20

TYPICAL FREQUENCY RESPONSE (for each filter)



FUNCTIONAL SCHEMATIC



FILTERS, HIGH PASS 50 Ω

18 MHz to 13 GHz

SCHF
Case YY161

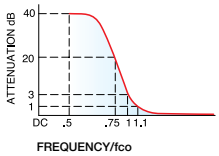
RHP
Case GP731

JCHP
Case BG291

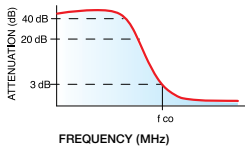
MODEL PREFIX	STOPBAND (MHz) (Loss > 40 dB)	STOPBAND (MHz) (Loss > 20 dB)	fco (MHz) Nom. (Loss 3 dB)	PASSBAND (MHz) (Loss < 1 dB)	VSWR (:1) STOPBAND Typ.	VSWR (:1) PASSBAND Typ.	POWER INPUT (W)
PLASTIC PACKAGE		**0.75" x 0.45" x 0.28"**					
SCHF-17	DC-9	9-13	16.5	18-200	18	1.25	0.5
SCHF-25	DC-13	13-19	25	27.5-200	18	1.30	0.5
SCHF-300	DC-145	145-190	245	290-1200	18	1.50	0.5
METAL SHIELDED CASE		**0.35" x 0.35" x 0.100"**					
RHP-44	DC-25	DC-32	44	95-2400	18	1.20	0.5
RHP-65	DC-37	DC-48	65	130-2000	18	1.20	0.5
RHP-73	DC-42	DC-55	73	140-2000	18	1.20	0.5
RHP-92	DC-50	DC-65	92	160-2500	18	1.20	0.5
RHP-110	DC-60	DC-75	110	185-2500	18	1.20	0.5
RHP-122	DC-65	DC-85	122	200-3000	18	1.20	0.5
RHP-139	DC-75	DC-100	139	225-3000	18	1.20	0.5
RHP-147	DC-80	DC-105	147	250-3000	18	1.20	0.5
RHP-180	DC-100	DC-135	180	300-3000	18	1.20	0.5
RHP-225	DC-125	DC-165	225	360-3000	18	1.20	0.5
RHP-250	DC-135	DC-180	250	400-3000	18	1.20	0.5
RHP-260	DC-145	DC-190	260	300-2200	20	1.30	0.5
RHP-290	DC-150	DC-210	290	430-3100	18	1.20	0.5
RHP-305	DC-160	DC-215	305	420-3200	18	1.20	0.5
RHP-395	DC-210	DC-290	395	650-2750	18	1.20	0.5
RHP-755	DC-350	DC-550	755	1200-3400	18	1.25	0.5
METAL CASE		**0.870" x 0.80" x 0.250"**					
JCHP-1200	DC-730	DC-1040	1200	*Loss < 2 dB* 1400-3000	20	1.50	0.5

TYPICAL FREQUENCY RESPONSE

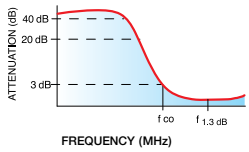
SCHF



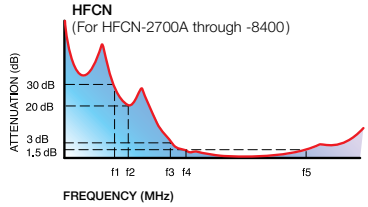
HFTC



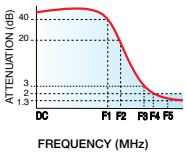
HFCN
(Except HFCN-2700A through -8400)



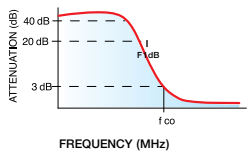
HFCN
(For HFCN-2700A through -8400)



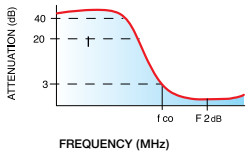
HFCV



RHP



JCHP



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CERAMIC (LTCC)

HFTC Case FR933

HFCV Case JV1210C

MODEL PREFIX	STOPBAND (MHz) (Loss > 40 dB)	STOPBAND (MHz) (Loss > 20 dB)	fco (MHz) Nom. (Loss 3 dB) Typ.	PASSBAND (MHz) (Loss < 1.3 dB)	VSWR (:1) STOPBAND Typ.	VSWR (:1) PASSBAND Typ.	No. SECTIONS	POWER INPUT (W)
0.15" x 0.15" x 0.028"								
HFTC-9R5	DC-600	750	950	1300-3500	18	1.3	7	14
HFTC-16	DC-1030	1300	1580	1900-2700	18	1.3	7	14
HFTC-19	DC-1450	1650	1995	2300-5500	18	1.3	7	10
HFTC-26	DC-1450	2000	2570	3000-7000	18	1.5	7	10
HFTC-39	DC-1900	3050	3900	4600-5500	18	1.4	7	10
0.126" x 0.098" x 0.059"								
HFCV-145	DC-80	115	132	145-1050	20	1.5	7	8.5

HFCN 650 thru 2700 Case FV1206

HFCN 2700A thru 8400 Case FV1206-1

MODEL PREFIX	STOPBAND (MHz) Min. (Loss > 40 dB) F1	STOPBAND (MHz) Min. (Loss > 20 dB) F2	fco (MHz) Nom. (Loss 3 dB) Typ. F3	PASSBAND (MHz) (Loss < 1.3 dB) Max. F4-F5	PASSBAND (MHz) (Loss < 2 dB) Typ.	VSWR Typ. STOPBAND (:1)	VSWR Typ. Frequency (MHz) 1.5:1	NO. SECTIONS	POWER INPUT (W) Max.
0.126" x 0.063" x 0.037"									
HFCN-650	390	480	650	850-2000	710-2490	20	760-1700	7	7
HFCN-740	430	550	740	900-2200	780-2800	20	780-1900	7	7
HFCN-880	500	640	880	1060-2500	950-3200	20	970-2400	7	7
HFCN-1200	750	910	1180	1380-4000	1220-4600	20	1300-3200	7	7
HFCN-1300	690	930	1300	1510-4000	1400-5000	20	1400-4000	7	7
HFCN-1320	880	1060	1320	1700-3800	1400-5000	20	1700-3700	7	7
HFCN-1500	1090	1250	1550	1850-4400	1600-5500	20	1620-3450	7	7
HFCN-1600	1090	1290	1600	1950-4000	1650-5000	20	1700-4000	7	7
HFCN-1760	950	1230	1760	2100-5200	1900-5500	20	2200-4500	7	7
HFCN-1810	1100	1480	1810	2250-3850	1950-4750	20	2250-3750	7	7
HFCN-1910	1075	1400	1910	2200-4400	2000-5200	20	2100-4500	7	7
HFCN-2000	1300	1530	2000	2410-5550	2260-6250	20	2400-5600	7	7
HFCN-2100	1050	1530	2100	2500-5000	2200-6000	20	2400-5200	7	7
HFCN-2275	1400	1770	2275	2640-6230	2450-7000	20	2580-6000	7	7
HFCN-2700	1500	1800	2500	3000-5700	2650-6500	20	2900-5500	7	7
	Loss > 30 dB Typ.			***Loss < 1.5 dB Max.***	***Loss < 2 dB Max.***				
HFCN-2700A	2270	2150	2700	3070-8500	2900-8700	20	3400-9000	5	7
HFCN-3100	2500	2450	3100	3500-9500	3400-9900	20	3100-10500	5	7
HFCN-3500	2900	2800	3500	4000-8800	3900-9800	20	3650-9500	5	7
HFCN-3800	3100	3200	3800	4500-9000	4250-10000	20	3950-10000	5	7
HFCN-4400	3600	3500	4400	5000-9900	5000-10100	20	4600-10100	5	7
HFCN-4600	3700	3800	4600	5200-10500	5000-11000	20	4720-11000	5	7
HFCN-5050	3600	4200	5050	5650-9700	5500-10000	20	5200-10000	5	7
HFCN-5500	4000	4500	5500	6600-11000	6000-11500	20	5600-11000	5	7
HFCN-6010	5190	5200	6010	6350-13000	6350-1500	20	6050-8000	5	7
HFCN-7150	5100	6150	7150	8500-10500	7900-11000	20	7250-11000	5	6
				Loss <2.5 dB Max.	***Loss <3 dB Max.***				
HFCN-8400	5700	6000	8400	9500-13000	9000-13000	20	9000-13000	5	7

FILTERS, BAND PASS 50 Ω

24 MHz to 8750 MHz

RBP
Case GP731

BPF-A
Case HQ1157

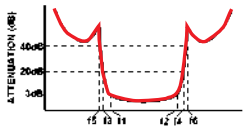
BPF-B
Case HZ1198

BPF-C
Case HU1186

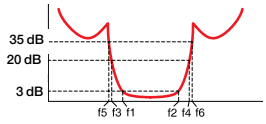
MODEL PREFIX	CENTER FREQUENCY (MHz)	PASSBAND (MHz)	LINEAR PHASE		STOPBANDS (MHz)				VSWR (:1)	
	F_C	(Loss < 3 dB) f1-f2	(MHz) Fc ±	Typ. (± deg.)	(Loss > 20 dB) f3	f4	(Loss > 40 dB) f5	f6	PASSBAND Max.	STOPBAND Typ.
SHIELDED METAL CASE										
RBP-75	75	60-90	15	8	37	122	30	155-2000	1.7	18
RBP-98	103	75-131	—	—	55	170	45	210-2000	1.7	18
RPB-130	130	95-180	—	—	50	280	48	310-2500	1.3	20
RBP-135	135	120-150	15	12	85	210	75	245-2000	1.8	18
RBP-160	165	120-210	—	—	85	280	70	340-2000	1.6	18
RBP-173	172.5	160-185	15	10	129	230	80	245-1500	1.8	18
RBP-204	204	175-237	—	—	135	300	115	350-2000	1.4	18
RBP-220	220	212-228	30	8	150	290	100	320-1000	1.7	18
RBP-220W	220	190-250	—	—	80	310	50	330-2000	1.8	18
RBP-253	253	186-340	—	—	140	440	120	500-3000	2.1	18
RBP-263	263.5	230-297	43	8	140	360	80	500-1000	1.7	18
RBP-275	275	268-282	30	8	209	350	120	370-1000	1.7	18
RBP-280	280	260-310	30	12	205	375	185	420-2000	1.6	30
RBP-400	391	292-490	—	—	230	620	200	700-2000	2.3	18
RBP-415	415	404-426	45	10	255	550	120	750-2000	1.7	18
RBP-440	440	410-470	30	6	320	650	200	850-1500	1.3	20
RBP-650	652	624-680	—	—	560	760	520	810-1000	2.8	18
BPF-A69	69	55-83	—	—	40	97	32	103-500	1.6	20
BPF-A75	75	72-78	—	—	65	88	62	95-750	1.2	20
BPF-A76	75.5	74-77	—	—	65	86	60	94-1000	1.8	20
BPF-A113	113	108-118	—	—	95	140	85	155-2000	1.7	20
BPF-A122	122	119-125	—	—	111	132	105	137-500	1.6	20
BPF-A175	122	119-125	—	—	111	132	105	137-500	1.7	20
BPF-A127	127	118-137	—	—	105	155	95	180-2200	1.3	20
BPF-A135	135	132-138	—	—	123	148	115	160-2000	1.2	20
BPF-A176	176	175-177	—	—	162	190	155	200-2000	1.4	20
BPF-A328	328	327-329	7.5	6	305	350	300	370-2000	1.7	20
BPF-A332	332	329-335	—	—	305	365	290	385-2200	1.8	20
BPF-A400	400	390-410	15	6	350	490	320	600-2000	1.9	20
BPF-A410	410	365-455	—	—	300	515	275	535-2200	1.5	20
BPF-A490	490	400-600	—	—	280	680	250	710-2000	2.0	20
BPF-A580	580	520-640	60	11	440	720	380	760-2500	1.9	20
BPF-A730	730	670-795	—	—	610	910	575	1100-1800	1.5	20
BPF-A800	800	795-805	7.5	1	700	900	660	1000-2500	1.8	20
BPF-A1340	1340	1000-1800	—	—	800	2300	750	2400-4300	2.0	20
BPF-B48	48	47-49	—	—	41	56	37	64-2400	1.5	20
BPF-B157	122	119-125	—	—	111	132	105	137-500	1.4	20
BPF-B177	122	119-125	—	—	111	132	105	137-500	1.7	20
BPF-B140N	140	137-143	—	—	126	154	119	165-1500	1.6	30
BPF-B140W	140	135-145	—	—	117	165	105	190-1500	1.4	30
BPF-B190	190	185-195	—	—	170	212	155	230-2000	1.5	30
BPF-B503	503	495-510	—	—	440	565	400	610-2600	1.5	30
BPF-C73	73	63-85	—	—	45	105	40	110-550	1.6	18
BPF-C75	75	60-90	—	—	46	102	42	108-1800	1.6	18
BPF-C138	138	105-180	—	—	87	201	70	220-750	1.5	18
BPF-C450	450	400-510	—	—	310	700	150	760-1200	1.7	18
BPF-C650	650	560-780	—	—	280	890	185	920-1600	1.8	18

TYPICAL FREQUENCY RESPONSE

BPF MODELS



RBP MODELS



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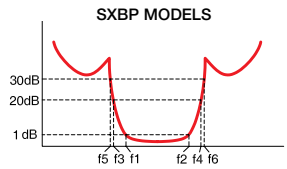
BFCN Case FV1206 | BFCN Case FV1206-1 | BFCN Case FV1206-4 | SXBP Case HF1139 | JCBP Case BG291

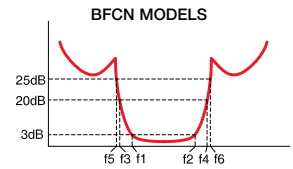
MODEL PREFIX	CENTER FREQUENCY (MHz) Fc	PASSBAND (MHz) (Loss < 3 dB) f1-f2	LINEAR PHASE (MHz) Fc ±	LINEAR PHASE Typ. (± deg.)	STOPBANDS (MHz) (Loss > 20 dB) f3	STOPBANDS (MHz) (Loss > 20 dB) f4	STOPBANDS (MHz) (Loss > 35 dB) f5	STOPBANDS (MHz) (Loss > 35 dB) f6	VSWR (:1) PASSBAND Max.	VSWR (:1) STOPBAND Typ.
SHIELDED METAL CASE					*0.75" x 0.45" x 0.28" Max*					
SXBP-35N	35	30-45	—	—	21	60	19	65-1350	1.5	18
SXBP-35W	35	24-46	—	—	16	73	5.0	81-1000	1.5	18
SXBP-70	70	63-77	7.5	7	50	95	19	195-1000	1.7	20
SXBP-140	140	130-150	—	—	110	185	100	210-2000	1.1	20
SXBP-150	150	140-160	—	—	120	190	100	250-2400	1.3	20
SXBP-157	157	150-164	—	—	131	187	115	215-2000	1.2	20
SXBP-162	162	155-169	—	—	138	200	127	280-1600	1.6	20
SXBP-169	169	164-174	—	—	137	205	122	240-2500	1.3	18
SXBP-178	178	170-186	—	—	150	210	135	240-2000	1.5	20
SXBP-240	240	238-242	—	—	220	260	210	275-2500	1.3	18
SXBP-350	350	330-375	—	—	280	435	245	520-2000	1.5	20
SXBP-425	425	410-440	15	11	385	470	360	510-2500	1.7	20
SXBP-507	507	460-560	—	—	300	615	220	635-2250	1.6	20
SXBP-615	615	565-670	—	—	380	720	250	740-2300	1.9	20
SXBP-640	640	600-680	45	16	500	750	425	785-2400	2.1	20
SXBP-707	707	650-770	—	—	450	830	400	840-5000	2.3	20
SXBP-1200	1200	800-1800	—	—	535	2220	530	2250-5000	2.1	20
SXBP-1430	1430	950-2150	—	—	575	2850	570	2850-5000	1.3	20
SXBP-1430-75	1430	950-2150	—	—	540	2950	530	3000-5000	1.3	20
					0.87" x 0.80" x 0.1100"					
		(Loss <2 dB)					*(Loss >40 dB)*			
JCBP-43	43	26-60	—	—	12.5	130	10	160-1500	1.6	20
JCBP-290	290	100-480	—	—	65	630	50	760-2000	2.2	20
JCBP-900	900	480-1320	—	—	380	1790	376	1800-3000	2.0	20
MINIATURE CERAMIC (LTCC)					*0.126" x 0.063" x 0.037"*					
							(Loss >30 dB)			
BFCN-1560	1560	1500-1620	—	—	1100	2100	1040	2150-4200	1.7	20
BFCN-2555	2555	2500-2610	—	—	1970	3200	2000	3250-5500	2.8	20
BFCN-2900	2900	2700-3100	—	—	1850	4200	1800	4900-7000	3.6	20
BFCN-4400	4440	4200-4700	—	—	2000	6750	2000	6650-12000	2.0	20
		(Loss <3.5 dB)			*(Loss 20 dB typ.)*		*(Loss >30 dB)*			
BFCN-1445	1445	1420-1470	—	—	1190	2050	1040	2850-3840	2.5	30
BFCN-1525	1525	1480-1570	—	—	1250	2180	1090	2960-3960	2.6	30
BFCN-1575	1575	1530-1620	—	—	1290	2220	1130	2990-3990	3.0	30
BFCN-1840	1840	1750-1930	—	—	1480	2860	1320	4110-5110	2.5	30
BFCN-1855	1855	1790-1920	—	—	1510	2810	1310	3880-4880	2.5	30
BFCN-1945	1946	1850-2040	—	—	1575	2900	1400	3880-4880	2.5	30
BFCN-2275	2275	2170-2380	—	—	1800	3430	1510	4390-5390	2.5	20
BFCN-2360	2360	2250-2470	—	—	1850	3600	1550	4470-5470	3.0	30
BFCN-2435	2435	2340-2530	—	—	1940	3580	1660	4390-5390	3.0	30
BFCN-2840	2840	2750-2930	—	—	1550	4000	1500	4050-6000	3.0	20
BFCN-2850	2850	2750-2950	—	—	1500	4300	1450	4350-5900	1.9	20
BFCN-2910	2910	2850-2970	—	—	1600	4200	1550	4250-6000	2.6	20
BFCN-3010	3010	2920-3100	—	—	1530	4450	1300	4650-6600	3.0	20
					(Loss 15 dB typ.)		*(Loss 20 dB typ.)*			
BFCN-7200	7200	7100-7300	—	—	6650	8100	6500	8500-14000	1.4	30
BFCN-7350	7350	7150-7550	—	—	6500	8500	6325	8700-14000	1.3	30
BFCN-7500	7500	7450-7650	—	—	6700	8800	6400	9300-14000	1.5	30
BFCN-7700	7700	7500-7900	—	—	6800	9000	6500	9600-14000	1.4	30
BFCN-7900	7900	7800-8100	—	—	6800	9300	6600	9600-15000	1.4	30
BFCN-8000	8000	7900-8100	—	—	7000	9300	6800	10000-15000	1.6	30
BFCN-8350	8350	8250-8450	—	—	7400	9600	7200	9700-15000	1.6	30
BFCN-8450	8450	8350-8550	—	—	7500	9800	7300	10000-15000	1.4	30
BFCN-8650	8650	8550-8750	—	—	7700	9900	7500	10000-15000	1.5	30

TYPICAL FREQUENCY RESPONSE

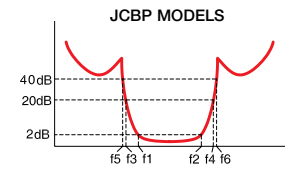
SXBP MODELS



BFCN MODELS



JCBP MODELS



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FILTERS, BAND STOP, DIPLEXERS

5 MHz to 1550 MHz

SHIELDED METAL CASE

BSF
Case HF1139

BSP
Case GP731

MODEL PREFIX	STOPBAND, (MHz) (Loss > 20 dB) f6-f7	STOPBAND, (MHz) (Loss > 35 dB) f8-f9	LOSS 3 dB Typ. f4, f5	PASSBAND, (MHz) (Loss < 1 dB) f1	PASSBAND, (MHz) (Loss <1.5 dB) f2, f3	VSWR (:1) PASSBAND Typ.	VSWR (:1) STOPBAND Typ.
BAND STOP, 50 Ω							
BSF-108	88-108	90-105	81&102	65	140-1000	1.3	6.0
BSP-255310	255-310	262-295	230&345	180	400-1000	1.6	12.0

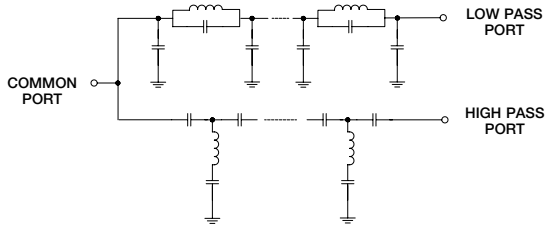
DPLX
Case HR1176

DPL
Case JK1226

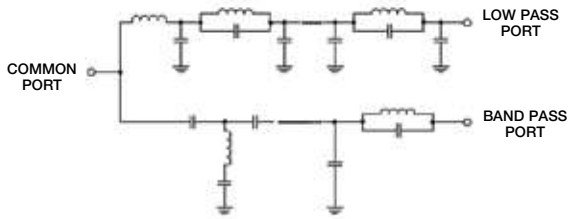
MODEL PREFIX	INSERTION LOSS (dB) PASSBAND (MHz) Typ.	Max.	Typ.	Max.	ISOLATION (dB) STOPBAND (MHz) Typ.	Min.	Typ.	Min.	CROSSOVER ISOLATION (dB) Typ.	Min.	RETURN LOSS (dB) Low Pass Port Typ.	Min.	High Pass Port Typ.	Min.	Common Port Typ.	Min.	Typ.	Min.
DIPLEXER, 75 Ω																		
	5-42 MHz		*54-870 MHz*		*54-870 MHz*		*5-42 MHz*		*42-54 MHz*		*5-42 MHz*		*54-870 MHz*		*5-42 MHz*		*54-870 MHz*	
DPLX-4254-75	0.5	1.2	0.5	1.4	50	40	60	35	30	17	25	18	20	11	30	22	23	11
			88-1000 MHz		*88-1000 MHz*				*42-88 MHz*				*88-1000 MHz*				*88-1000 MHz*	
DPLX-4288-75	0.5	1.0	0.5	1.0	60	38	60	50	60	45	25	17	20	13	25	17	20	13

MODEL PREFIX	INSERTION LOSS (dB) PASSBAND (MHz) 50-870 Typ.	Max.	960-1550 Typ.	Max.	ISOLATION (dB) STOPBAND (MHz) 960-1550 Typ.	Min.	50-870 Typ.	Min.	CROSSOVER ISOLATION (dB) 870-960 Typ.	Min.	RETURN LOSS (dB) Low Pass Port 50-870 MHz Typ.	Min.	Band Pass Port 960-1550 MHz Typ.	Min.	Common Port 50-870 MHz Typ.	Min.	960-1550 MHz Typ.	Min.
Band Pass Port																		
DPL-870-960-75	0.5	2.5	1.0	2.5	55	30	55	38	35	12	20	12	25	13	20	12	25	12

FUNCTIONAL SCHEMATIC, DPLX MODELS



FUNCTIONAL SCHEMATIC, DPL MODEL



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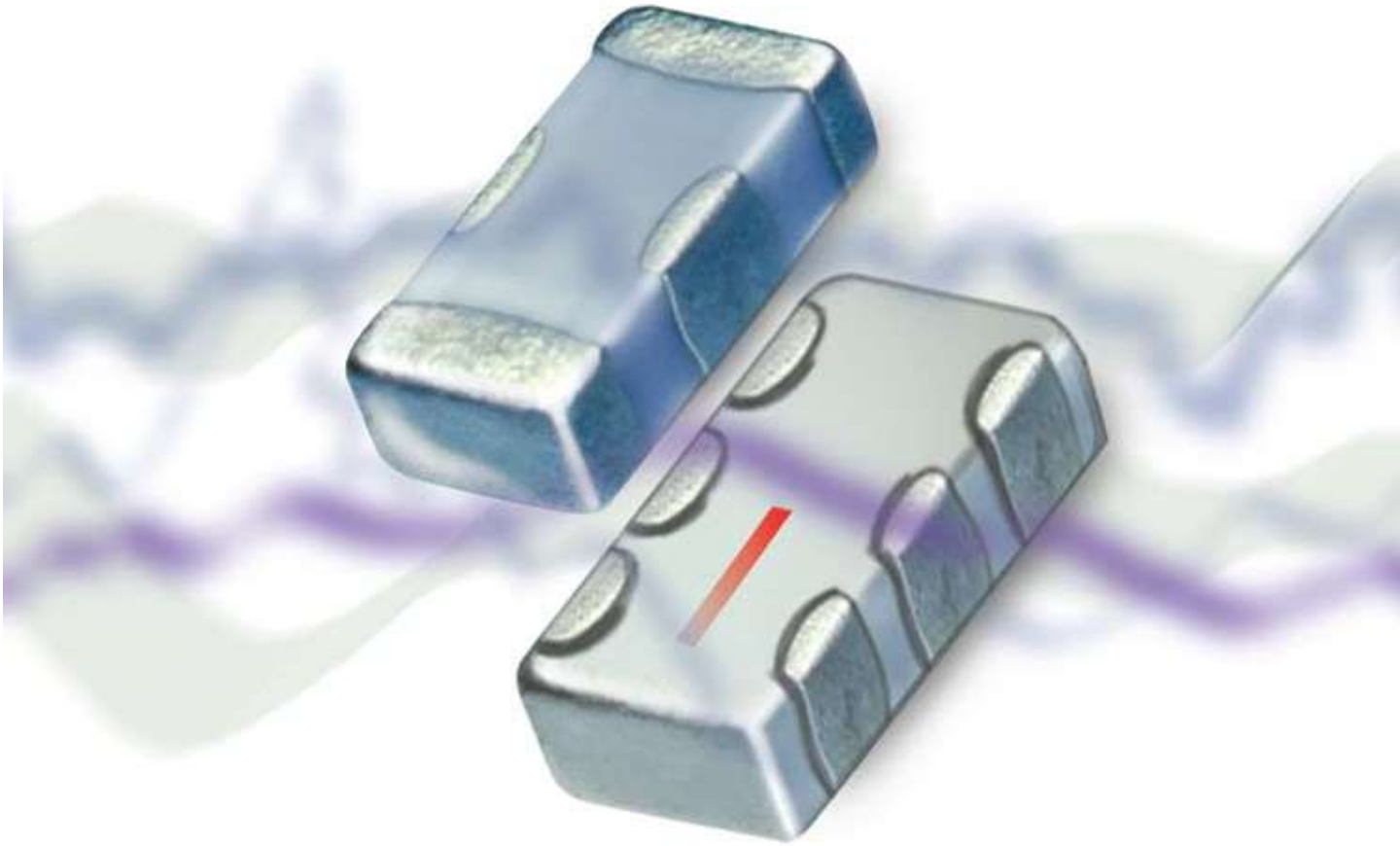

CERAMIC FILTERS

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MATCHING PADS, IMPEDANCE 50 to 75 Ω

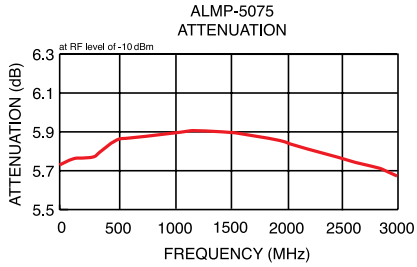
DC to 3 GHz Resistive minimum loss

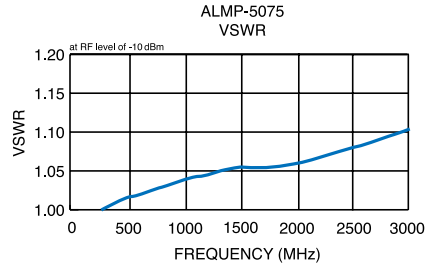
ALMP
Case CB518

MODEL PREFIX	FREQUENCY (MHz)	ATTENUATION (dB)				VSWR (:1) Max.		
	f_L-f_U	Nom.	Flatness Max L	Flatness Max M	Flatness Max U	L	M	U
ALMP-5075	DC-3000	5.7±0.2	0.2	0.4	0.4	1.06	1.4	1.45

L = DC to 100 MHz M = 100 MHz to 1000 MHz U = 1000 MHz to 3000 MHz

ATTENUATION & VSWR CURVES





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RLM
Case TT1224

MODEL PREFIX	FREQUENCY (MHz)	INPUT POWER (dBm) Min.	INPUT POWER (dBm) Max.	OUTPUT POWER (dBm) Typ.	LIMITING Input Power Range (dBm)	LIMITING △ Output / 1 dB △ Input dB/dB
RLM-33	30-3000	+12	+30	+11.5	+12 to +20	0.20
					+20 to +25	0.20
					+25 to +30	0.20

MIXERS, ACTIVE 50 Ω

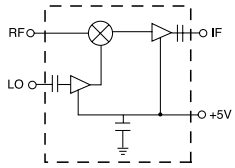
570 MHz to 6 GHz

MAX
Case BJ937

HIGH OUTPUT IP3

MODEL PREFIX	FREQUENCY (MHz) RF	LO	IF	OUTPUT IP3 (dBm) Typ.	RF INPUT @ 1 dB compression (dBm)	CONVERSION GAIN (dB) Min.	Max.	NOISE FIGURE (dB) Max.	LO-RF ISOLATION (dB) Typ.	Min.	LO-IF ISOLATION (dB) Typ.	Min.	DC POWER Volt	Current (mA) Max.
LEVEL 0	**LO Power 0 dBm**				**up to 8 dBm RF**									
MAX-9H	810-930	570-675	240-260	33	8	8.0	11	11	22	10	2	—	5	165
MAX-19H	1700-1940	1450-1675	240-260	32	7	7.5	10	11	19	10	6	—	5	165

ELECTRICAL SCHEMATIC — MAX MIXER/AMPLIFIER



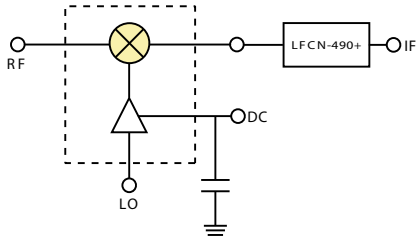
MACA
Case DZ1034

WIDEBAND

MODEL PREFIX	FREQUENCY (MHz) RF/LO	IF	OUTPUT IP3 (dBm) Typ.	RF INPUT @ 1 dB compression (dBm) Typ.	CONVERSION LOSS (dB) Min.	σ	Max.	LO-RF ISOLATION (dB) Typ.	Min.	LO-IF ISOLATION (dB) Typ.	Min.	DC POWER Volt	Max.
LEVEL 0	**LO Power 0 dBm**			**up to 10 dBm RF**									
MACA-63H	2000-6000	DC-1000	20	10	6.9	0.1	8.9	16	10	35	23	5	110
LEVEL -3	**LO Power -3 dBm**			**up to 10 dBm RF**									
MACA-242H	750-2400	DC-500	18	10	6.1	0.1	9.8	20	4	55	28	5	110

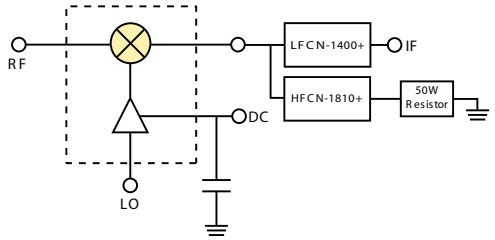
ELECTRICAL SCHEMATICS

MACA -242H



LFCN-490+ is added to improve L-I isolation.

MACA -63H



LFCN-1400+ & HFCN-1810+ is added to improve isolation.

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MIXERS, HI-REL 50 Ω

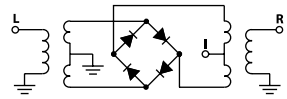
0.15 MHz to 4 GHz Hermetically Sealed Ceramic Quads

Plastic case
ADE
Case CD542

Hermetic metal case
TUF-SM
Case NNN150

MODEL PREFIX	LO LEVEL (dBm)	RF IN @ 1 dB comp. Typ. (dBm)	FREQUENCY (MHz) LO/RF	FREQUENCY (MHz) IF	CONVERSION LOSS (dB) MID-BAND x̄	CONVERSION LOSS (dB) MID-BAND σ	CONVERSION LOSS (dB) MID-BAND Max.	CONVERSION LOSS (dB) TOTAL RANGE Max.	LO-RF ISOLATION (dB) L Typ.	LO-RF ISOLATION (dB) L Min.	LO-RF ISOLATION (dB) M Typ.	LO-RF ISOLATION (dB) M Min.	LO-RF ISOLATION (dB) U Typ.	LO-RF ISOLATION (dB) U Min.	LO-IF ISOLATION (dB) L Typ.	LO-IF ISOLATION (dB) L Min.	LO-IF ISOLATION (dB) M Typ.	LO-IF ISOLATION (dB) M Min.	LO-IF ISOLATION (dB) U Typ.	LO-IF ISOLATION (dB) U Min.	IP3 (dBm) Typ.
PLASTIC PACKAGE																					
ADE-R1L	+3	0	2-500	DC-500	5.6	0.10	7.2	8.8	68	55	55	42	44	35	60	45	45	32	35	25	14
ADE-R6	+7	+1	0.15-250	DC-200	4.6	0.05	7.0	7.5	70	50	55	40	42	28	65	45	45	27	32	18	10
ADE-R1	+7	+1	1-500	DC-500	5.0	0.10	6.5	7.8	75	55	60	40	45	33	65	45	45	26	30	18	15
ADE-R2ASK	+7	+1	2-1000	Dc-1000	5.4	0.10	6.8	9.5	65	50	48	32	36	20	55	40	32	22	22	11	14
ADEX-R10	+7	+1	10-1000	DC-800	6.8	0.10	7.8	8.3	70	55	60	40	47	37	40	26	33	20	26	13	16
ADE-R901	+7	+1	300-1000	DC-200	5.9	0.10	7.5	—	38	25	38	25	38	25	28	20	28	20	28	20	13
ADEX-R11X	+7	+1	10-2000	10-1000	7.5	0.10	8.5	9.8	62	45	36	23	30	20	60	45	42	30	33	22	10
ADEX-R20	+7	+1	1500-2800	DC-500	5.8	0.10	8.0	—	30	22	30	22	30	22	28	15	28	15	28	15	12
ADEX-R30W	+7	+1	300-4000	Dc-950	6.8	0.20	9.0	9.8	35	18	35	18	35	18	16	6	16	6	16	6	12
ADE-R1LH	+10	+5	1-500	DC-500	5.2	0.10	6.5	8.2	70	55	60	45	47	32	65	45	45	28	34	20	15
ADE-R2ASKLH	+10	+5	2-1000	DC-1000	5.7	0.10	7.0	9.5	68	45	45	30	36	20	55	40	32	22	22	12	15
ADEX-R10LH	+10	+5	10-1000	DC-800	7.0	0.10	7.8	8.3	70	55	60	40	47	37	40	26	33	20	26	15	16
ADE-R901LH	+10	+5	300-1000	DC-800	6.4	0.10	7.8	—	42	32	42	32	42	32	35	20	35	20	35	20	18
ADE-R5LH	+10	+5	10-1500	DC-1000	7.2	0.10	8.2	9.5	65	50	55	40	42	27	50	37	40	28	30	20	15
ADE-R11XLH	+10	+5	10-2000	10-1000	7.5	0.10	8.6	9.8	55	40	36	23	28	18	65	50	45	30	38	22	11
ADE-R6LH	+10	+5	0.2-250	DC-200	4.9	0.05	7.0	8.4	70	54	50	37	40	28	65	45	45	31	33	20	16
ADE-R20LH	+10	+5	1500-2600	DC-300	6.0	0.10	8.2	—	35	23	35	23	35	23	26	15	26	15	26	15	14
ADE-R3GLH	+10	+4	2000-2700	DC-700	5.2	0.10	7.0	—	35	24	35	24	35	24	23	9	23	9	23	9	14
ADE-R18WLH	+10	+5	1750-3500	DC-700	5.4	0.30	8.9	—	33	22	33	22	33	22	12	7	12	7	12	7	11
ADE-R35LH	+10	+5	1800-3500	DC-1000	6.8	0.50	9.2	—	25	16	25	16	25	16	22	12	22	12	22	12	14
ADE-R30WLH	+10	+5	300-4000	DC-950	7.5	0.20	9.0	9.8	40	24	40	24	40	24	16	6	16	6	16	6	15
ADE-R1MHW	+13	+9	5-600	DC-600	5.2	0.10	6.9	8.0	63	50	53	35	43	27	56	40	44	28	30	20	18
ADE-R12MH	+13	+9	10-1200	DC-1200	6.8	0.10	8.2	9.5	62	48	50	38	40	28	68	40	42	30	30	21	22
ADE-R272MH	+13	+9	1300-2700	DC-600	5.6	0.10	9.5	—	34	24	34	24	34	24	25	11	25	11	25	11	18
SHIELDED METAL CASE																					
TUF-R3SM	+7	+1	0.25-400	DC-400	5.0	0.06	7.0	8.0	70	55	60	40	55	35	62	45	45	30	38	25	11
TUF-R1SM	+7	+1	5-600	DC-600	5.6	0.2	7.0	8.0	60	45	50	32	42	26	60	43	48	34	40	25	16
TUF-R2SM	+7	+1	50-1000	DC-1000	6.2	0.05	7.5	9.0	60	45	50	38	45	33	52	40	45	25	35	20	16
TUF-R5SM	+7	+1	20-1500	DC-1200	6.5	0.05	9.0	9.0	55	42	48	35	43	32	40	25	30	18	23	10	12
TUF-R3LHSM	+10	+5	0.3-400	DC-400	5.2	0.05	7.0	8.0	62	48	46	30	42	27	62	48	46	30	35	23	15
TUF-R1LHSM	+10	+5	5-600	DC-600	6.2	0.03	7.2	8.5	53	40	48	30	40	24	50	40	45	30	38	21	18
TUF-R2LHSM	+10	+5	50-1000	DC-1000	6.2	0.03	7.5	9.0	55	45	49	38	42	35	52	40	44	30	35	24	17
TUF-R5LHSM	+10	+5	20-1500	DC-650	6.9	0.2	8.8	9.3	55	42	47	35	42	30	40	25	28	16	22	9	13
TUF-R3MHSM	+13	+8	0.3-400	DC-400	5.0	0.03	7.0	8.0	65	50	50	33	43	28	62	48	50	33	38	25	18
TUF-R1MHSM	+13	+9	5-600	DC-600	6.0	0.07	7.0	8.5	55	43	45	33	37	28	55	42	43	32	34	23	20
TUF-R2MHSM	+13	+9	50-1000	DC-1000	6.0	0.1	7.5	9.0	58	40	50	33	42	28	52	38	42	28	32	20	19
TUF-R5MHSM	+13	+9	20-1500	DC-650	7.0	0.1	8.5	9.0	60	45	50	35	46	28	40	27	32	20	22	9	17

ELECTRICAL SCHEMATIC



MIXERS, FREQUENCY 50 Ω

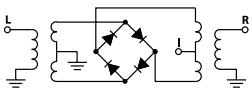
50 kHz to 20 GHz

SIM Case HV1195 | MCA1 Case DZ885 | MBA Case SM2 | SKY Case BJ398 | ADE /ADEX Cases CD541, CD542, CD636, CD637 | MCA Case DZ883 | RMS Case TT240 | JMS Case BH292

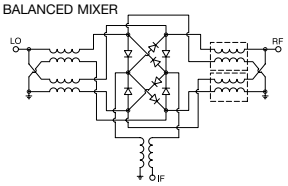
MODEL PREFIX	FREQUENCY (MHz) LO/RF f_L-f_U	IF	CONVERSION LOSS (dB) MID-BAND $\bar{x}$	m σ	Max.	TOTAL RANGE Max.	LO-RF ISOLATION (dB) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	LO-IF ISOLATION (dB) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	IP3@ center-band TYP. (dBm)	SCHEMATIC
LEVEL 3 +3 dBm LO up to 0 dBm RF																				
ADE-1L	2-500	DC-500	5.2	0.10	7.2	8.0	68	50	55	30	44	30	55	40	45	30	35	25	16	1
MBA-10L	800-1000	DC-200	8.0	0.10	—	9.5			20	13					15	8			9	1
RMS-5L	400-1400	DC-800	7.0	0.20	—	9.8			22	14					22	6			9	1
LEVEL 4 +3 dBm LO up to 1 dBm RF																				
ADEX-10L	10-1000	DC-800	7.2	0.10	8.2	8.8	75	55	60	40	47	37	40	26	33	20	24	13	16	1
MBA-15L	1200-2400	DC-600	6.5	0.10	—	8.5			27	15					20	10			10	1
MBA-25L	2000-3000	DC-600	6.2	0.15	—	8.6			28	18					15	7			10	1
MBA-591L	4950-5900	DC-1000	7.0	0.10	—	9.0			35	25					26	17			15	1
SIM-73L	2400-7000	DC-3000	6.3	0.20	—	8.5			32	17					26	11			12	1
MCA1-85L	2800-8500	DC-1200	6.0	0.30	8.4	—			35	20					38	7			11	1
MCA1-12GL	3800-12000	DC-1500	6.5	0.30	9.2	—			38	17					40	8			9	1
LEVEL 7 +7 dBm LO up to +1 dBm RF																				
ADE-6	0.05-250	DC-200	4.6	0.05	7.0	8.4	62	49	40	30	40	20	58	44	45	24	25	15	10	1
TUF-3SM	0.15-400	DC-400	4.7	0.02	7.0	8.0	60	50	46	30	35	25	60	40	47	25	35	20	11	1
ADE-1	0.5-500	DC-500	5.0	0.10	6.5	7.8	70	50	55	35	45	30	65	45	40	25	30	20	15	1
ASK-1-KK81	1-600	DC-600	5.58	0.06	7.0	8.5	50	30	35	25	30	20	45	35	30	20	25	15	14	1
ADE-1ASK	2-600	DC-600	5.3	0.10	6.5	7.5	55	45	50	30	40	25	50	40	45	24	35	18	16	1
TUF-1SM	2-600	DC-600	5.85	0.04	7.0	8.0	60	50	42	30	37	25	60	45	47	30	36	22	16	1
ADE-2ASK	1-1000	DC-1000	5.4	0.10	6.8	9.5	55	45	45	30	36	20	50	40	32	22	22	12	12	1
SYM-2	2-1000	DC-1000	5.4	0.10	7.2	9.5	70	45	50	30	40	25	63	40	48	24	37	20	17	1
ADE-2M	5-1000	DC-1000	6.67	0.26	8.0	9.5	60	40	40	20	25	18	55	30	30	20	20	12	17	6,7
ADE-2	5-1000	DC-1000	6.67	0.26	8.0	9.5	65	40	47	25	32	22	62	35	45	25	32	20	20	1
ADEX-10	10-1000	DC-800	6.8	0.10	7.8	8.3	80	55	60	40	47	37	40	26	33	20	24	13	16	1
ADE-12	50-1000	DC-1000	7.0	0.15	8.0	9.0	40	25	—	—	33	22	44	26	—	—	37	20	17	1
TUF-2SM	50-1000	DC-1000	5.85	0.07	7.5	9.0	58	40	47	30	42	25	50	35	44	20	29	18	16	1
ADE-4	200-1000	DC-800	6.8	0.10	—	8.5	60	45	53	40	45	30	45	30	40	22	35	20	15	1
ADE-14	800-1000	DC-200	7.4	0.20	—	8.9			32	22					34	20			17	1
ADE-901	800-1000	DC-200	5.9	0.10	—	7.3			32	22					26	18			13	1
SYM-12	5-1200	DC-1000	6.5	0.30	8.0	9.0	68	45	50	30	37	25	56	40	46	25	29	18	16	1
ADE-5	5-1500	DC-1000	6.6	0.10	7.5	9.3	50	40	40	25	33	23	50	40	30	20	20	10	15	1
TUF-5SM	20-1500	DC-1500	5.7	0.04	9.0	9.0	54	40	42	30	39	25	40	25	32	18	23	8	12	1
ADE-13	50-1600	50-1000	8.1	0.10	9.0	9.8	50	25	40	25	33	20	49	30	35	20	32	20	11	1
JMS-11X	5-1900	5-1000	6.7	0.15	8.2	9.8	58	45	35	20	27	18	56	45	37	20	27	20	9	1
ADE-11X	10-2000	5-1000	7.1	0.10	8.2	9.8	62	45	36	20	27	18	60	45	37	20	38	20	9	1
ADE-20	1500-2000	DC-300	5.4	0.10	—	7.8			31	22					28	20			14	1
MCA1-24	300-2400	DC-700	6.1	0.10	—	8.9			40	25					25	15			10	1
SYM-2500	1-2500	DC-500	6.5	0.10	8.5	9.8	70	50	50	25	36	20	60	45	30	10	16	8	12	1
MBA-12	800-2500	DC-500	7.5	0.10	—	9.0			30	20					15	8			12	1
ADE-3GL	2100-2600	DC-600	6.0	0.25	—	8.8			34	25					20	7			17	1
MBA-26	2200-2700	DC-500	5.7	0.10	—	8.0			40	32					33	18			9	1
ADE-3G	2300-2700	DC-400	5.6	0.10	—	7.0			36	25					26	17			13	1
ADE-30	200-3000	DC-1000	4.5	0.20	9.0	9.8			35	20					20	7			14	1
ADE-35	1600-3500	DC-1500	6.3	0.50	—	9.8			25	16					22	12			11	1
ADE-18W	1750 -3500	DC-700	5.4	0.30	—	8.9			33	20					12	7			11	1
ADE-30W	300-4000	DC-950	6.8	0.20	9.0	9.8			35	17					16	7			12	1
SIM-43	750-4200	DC-1500	6.3	0.20	—	8.6			37	25					24	11			12	1
MCA1-42	1000-4200	DC-1500	6.1	0.10	—	8.9			35	23					20	12			10	1
SKY-42	2000-4200	DC-1200	5.0	0.30	—	8.5			31	20					17	12			9	1
MBA-591	2800-5900	DC-1000	6.5	0.10	—	9.0			36	20					26	17			10	1
MCA1-60	1600-6000	DC-2000	6.2	0.30	—	8.5			32	17					18	—			8	1
MBA-671	2400-6700	DC-1000	6.5	0.10	—	9.2			36	20					26	17			10	1
SIM-83	2300-8000	DC-3000	6.0	0.20	—	8.9			32	17					28	7			15	1
MCA1-85	2800-8500	DC-1250	5.5	0.20	—	8.1			40	20					40	9			13	1
SIM-14	3700-10000	DC-4000	6.3	0.20	—	9.5			36	25					16	12			13	1
MCA1-12G	3800-12000	DC-1800	6.2	0.10	—	8.5			38	18					40	8			11	1
SIM-153	3400-15000	DC-4000	8.0	0.40	—	13.2			36	20					30	20			10	1

ELECTRICAL SCHEMATICS

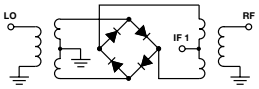
1 DOUBLE BALANCED MIXER



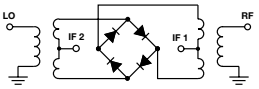
2 TRIPLE BALANCED MIXER



6 ADE-2M MIXER (Config. 1)



7 ADE-2M Bi-Phase Modulator (Config. 2)



Mini-Circuits® *IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED* *RoHS compliant*
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MODEL PREFIX	FREQUENCY (MHz) LO/RF f_L-f_U	FREQUENCY (MHz) IF	CONVERSION LOSS (dB) MID-BAND m $\bar{x}$	σ	Max.	TOTAL RANGE Max.	LO-RF ISOLATION (dB) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	LO-IF ISOLATION (dB) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	IP3 @ center-band TYP. (dBm)	SCHEMATIC
LEVEL 10 +10 dBm LO up to +5 dBm RF																				
ADE-1LH	0.5-500	DC-500	5.0	0.10	6.5	8.2	65	50	55	35	47	26	52	40	45	22	34	20	15	1
JMS-1LH	2-500	DC-500	5.75	0.10	7.0	8.0	55	50	45	30	40	25	55	45	45	25	30	20	16	1
RMS-1LH	2-500	DC-500	5.36	0.08	7.0	8.0	58	45	44	25	30	20	55	40	40	25	28	17	15	1
TUF-1LHSM	2-600	DC-600	6.0	0.17	7.0	8.0	70	50	50	30	42	25	65	45	50	30	41	22	17	1
RMS-2LH	5-1000	DC-1000	6.44	0.10	8.0	9.5	58	40	39	20	22	16	52	30	30	17	18	11	18	1
TUF-5LHSM	20-1500	DC-1000	6.9	0.27	8.5	9.0	53	40	42	30	38	25	40	25	30	18	22	8	14	1
SYM-11LH	1-2000	10-600	7.0	0.10	8.3	9.85	60	40	45	25	37	25	59	40	33	20	25	20	14	2
LRMS-20J	1500-2000	DC-500	5.0	0.15	—	7.5			35	22					26	18			18	1
MCA1-24LH	300-2400	DC-700	6.5	0.10	—	8.9			40	25					22	12			13	1
MBA-15LH	1200-2400	DC-600	5.6	0.10	—	8.5			26	17					22	10			15	1
SYM-25DLHW	40-2500	DC-1000	6.3	0.10	7.5	8.8	48	28	40	25	38	22	36	25	33	25	39	21	22	2
SCM-2500LH	500-2500	DC-500	5.6	0.20	6.8	10.0			36	22					18	10			16	1
LRMS-25J	750-2500	DC-600	5.2	0.15	—	9.5			35	17					20	7			18	1
SYM-30DLHW	5-3000	5-1500	6.5	0.15	8.4	9.2	36	28	37	29	33	23	41	32	45	37	47	31	19	2
MBA-18LH	1600-3200	DC-500	5.8	0.10	—	8.5			30	17					22	10			12	1
MCA-35LH	500-3500	10-1500	6.3	0.10	—	8.9			32	11					30	15			16	2
MBA-25LH	2200-3600	DC-500	7.0	0.10	—	9.2			32	21					20	10			12	1
SIM-43LH	824-4200	DC-1500	6.3	0.10	—	8.6			37	26					24	11			14	1
MCA1-42LH	1000-4200	DC-1500	6.0	0.10	—	8.9			38	23					20	11			12	1
MCA-50LH	1000-5000	10-1500	7.3	0.20	—	9.9			25	11					30	15			17	2
SKY-53LHR	2800-5300	DC-500	6.2	0.20	—	9.5			28	15					12	8			14	1
SYM-63LH	1-6000	DC-1000	7.5	0.15	9.5	10.0	65	45	35	30	29	20	60	40	25	14	19	12	14	1
SIM-63LH	750-6000	DC-1500	6.6	0.20	—	9.3			32	22					22	12			12	1
MCA1-60LH	1700-6000	DC-2000	6.4	0.10	—	8.3			35	20					21	—			13	1
SKY-60LH	2500-6000	DC-1500	6.2	0.20	—	9.7			28	17					14	8			15	1
SIM-83LH	1700-8000	DC-3000	6.0	0.20	—	8.4			31	16					28	8			18	1
MCA1-80LH	2800-8000	DC-1250	5.9	0.20	8.4	—			35	20					40	8			12	1
SIM-153LH	3200-15000	DC-4000	7.5	0.30	—	12.4			36	17					20	9			18	1
SIM-14LH	3700-10000	DC-4000	6.7	0.30	—	8.9			38	21					17	10			19	1
LEVEL 13 +13 dBm LO up to +9 dBm RF																				
TUF-3MHSM	0.15-400	DC-400	5.0	0.33	7.0	8.0	60	50	46	30	35	25	60	40	42	25	35	20	18	1
ADE-1MHW	0.5-600	DC-600	5.2	0.10	6.9	8.0	63	50	53	32	43	20	56	40	44	25	30	20	17	1
ADE-1MH	2-500	DC-500	5.2	0.10	6.5	8.0	60	45	50	35	48	25	55	40	45	30	40	22	17	1
JMS-1MH	2-500	DC-500	5.75	0.10	7.0	8.0	70	55	60	40	44	25	55	42	45	25	35	20	22	1
RMS-1MH	2-500	DC-500	5.65	0.08	7.0	8.0	58	45	44	25	30	20	55	40	36	25	28	17	26	1
ADE-12MH	10-1200	DC-1200	6.3	0.10	8.0	8.5	62	45	45	32	40	26	68	40	42	27	30	20	22	1
TUF-2MHSM	50-1000	DC-1000	6.0	0.25	7.5	9.0	58	40	47	30	37	25	55	35	47	20	32	18	19	1
ADE-10MH	800-1000	10-200	7.0	0.20	—	8.5			34	20					29	20			26	2
JMS-5MH	5-1500	DC-1000	5.7	0.10	8.0	9.5	67	40	57	25	35	20	60	40	35	18	15	8	19	1
RMS-5MH	10-1500	DC-900	5.67	0.09	9.0	9.5	58	40	40	20	26	18	50	30	38	18	17	8	17	1
MCA1-24MH	300-2400	DC-700	6.1	0.10	—	8.9			40	20					25	14			13	1
MBA-15MH	1400-2400	DC-600	5.5	0.10	—	8.5			28	16					16	8			18	1
ADE-25MH	5-2500	5-1500	6.9	0.10	8.5	9.8	47	28	34	23	34	23	34	23	32	20	23	17	18	2
RMS-25MH	5-2500	5-1500	7.0	0.20	8.5	9.8	54	28	32	23	32	20	34	23	32	25	28	17	17	2
SYM-25DMHW	40-2500	DC-1000	6.6	0.10	8.0	9.0	47	32	37	27	35	22	38	28	35	25	38	20	26	2
SYM-30DMHW	5-3000	5-1500	6.5	0.10	8.4	9.3	36	25	39	30	34	23	41	27	42	33	45	30	22	2
MBA-25MH	2000-3000	DC-500	6.5	0.10	—	8.6			36	18					20	7			18	1
ADE-35MH	5-3500	5-2500	6.9	0.10	9.3	10.5	47	28	33	23	38	18	34	23	28	18	23	17	18	2
MCA-35MH	500-3500	10-1500	6.9	0.10	—	8.7			29	11					29	15			20	2
ADE-42MH	5-4200	5-3500	7.5	0.20	9.8	11.8	47	28	29	20	30	15	34	23	26	17	23	17	17	2
RMS-42MH	800-4200	DC-800	5.3	0.20	9.0	10.8	35	25	—	—	28	17	18	10	—	—	15	7	19	1
SIM-43MH	824-4200	DC-1500	6.1	0.10	—	9.8			35	22					23	10			21	1
MCA1-42MH	1000-4200	DC-1500	6.2	0.10	—	8.9			35	20					20	10			16	1
MCA1T-42MH	1000-4200	DC-1500	6.2	0.10	—	8.9			35	20					20	10			16	1
MCA-50MH	1000-5000	10-1500	7.3	0.20	—	9.9			25	11					30	20			19	2
SKY-53MHR	2800-5300	DC-500	5.7	0.20	—	9.5			28	15					12	8			19	1
MCA1-60MH	1600-6000	DC-2000	6.2	0.10	—	8.5			28	18					15	—			15	1
SKY-60MH	2500-6000	DC-1500	6.2	0.20	—	9.5			28	17					14	8			19	1
SIM-722MH	2300-7200	DC-3000	6.5	0.20	—	9.3			26	14					22	10			20	1
MCA1-80MH	2800-8000	DC-1250	5.6	0.20	—	8.7			27	17					25	7			18	1
SIM-852MH	3700-8500	DC-4000	6.9	0.20	—	9.8			36	22					15	7			20	1
SIM-153MH	3200-15000	DC-4000	7.5	0.40	—	11.5			35	21					19	9			17	1
SIM-24MH	7300-20000	DC-7500	5.7	0.30	—	10.9			36	19					18	10			17	1

L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)
m = mid band ($2f_L$ to $f_U/2$)

MIXERS, FREQUENCY 50 Ω

150 kHz to 11 GHz

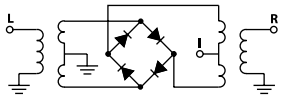
SIM Case HV1195 | MCA1 Case DZ885 | MCA Case DZ883 | SKY Case BJ398 | ADE /ADEX Cases CD541/542, CD636 | RMS Case TT240 | JMS Case BH292 | LRMS-J Case QQQ569 | TUF-SM Case NNN150 | SYM Case TTT166 | JYM Case BJ293

MODEL PREFIX	FREQUENCY (MHz) LO/RF f_L-f_U	FREQUENCY (MHz) IF	CONVERSION LOSS (dB) MID-BAND m $\bar{x}$	σ	Max.	TOTAL RANGE MAX.	LO-RF ISOLATION (dB) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	LO-IF ISOLATION (dB) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	IP3 @ center-band TYP. (dBm)	SCHEMATIC
LEVEL 17 +17 dBm LO up to +14 dBm RF																				
TUF-3HSM	0.15-400	DC-400	5.00	0.33	7.0	8.0	60	50	50	35	40	30	60	40	45	25	35	20	22	1
ADE-1H	0.5-500	DC-500	5.30	0.20	6.8	8.0	65	50	52	35	40	26	53	40	42	25	32	20	23	1
JMS-1H	2-500	DC-500	5.90	0.10	7.0	8.5	60	45	50	25	37	22	55	45	50	25	37	22	22	1
RMS-1H	2-500	DC-500	6.25	0.034	7.0	8.5	55	44	44	25	33	20	50	34	45	25	37	22	22	1
LRMS-1HJ	2-500	DC-500	6.25	0.034	7.0	8.5	55	44	44	25	33	20	50	34	45	25	37	22	25	1
TUF-1HSM	2-600	DC-600	5.90	0.18	7.0	8.0	68	50	50	30	43	25	62	45	48	30	33	22	26	1
ADE-1HW	5-750	DC-750	6.00	0.10	7.2	8.8	64	45	48	35	42	28	50	35	40	30	30	18	26	1
RMS-2H	5-1000	DC-900	6.98	0.054	8.5	9.3	55	40	39	22	33	20	52	30	45	22	30	17	23	1
ADEX-10H	10-1000	DC-800	7.00	0.10	8.5	9.5	68	55	55	40	47	31	46	30	32	20	26	13	22	1
JMS-2H	20-1000	DC-1000	7.00	0.15	8.4	9.5	63	40	50	28	35	20	56	30	47	22	37	20	24	1
SYM-10DHW	50-1000	20-800	7.00	—	8.5	9.8			45	30					29	20			25	2
TUF-2HSM	50-1000	DC-1000	6.20	0.22	7.5	9.0	58	40	47	30	42	25	58	35	44	25	28	18	21	1
ADE-10H	400-1000	DC-500	7.00	0.10	—	8.5			39	29					25	17			30	1
SYM-10DH	800-1000	20-200	7.60	—	—	9.3			45	34					29	20			31	2
SIM-14H	3700-1000	DC-4000	7.00	0.30	9.3				38	24					16	8			25	
ADE-12H	500-1200	DC-250	6.70	0.20	—	8.2			34	25					28	20			28	1
SYM-14H	100-1370	10-1000	6.50	0.20	7.4	8.9			36	28					30	24			30	2
JMS-5H	5-1500	DC-1000	5.90	0.10	8.0	9.5	70	50	50	25	35	20	60	40	35	18	20	8	22	1
LRMS-5HJ	10-1500	DC-900	6.36	0.05	8.0	9.8	65	40	36	20	22	15	50	30	30	18	17	7	22	1
RMS-5H	10-1500	DC-900	6.36	0.05	8.0	9.8	65	40	36	20	22	15	50	30	30	18	17	7	24	1
TUF-5HSM	20-1500	DC-1000	7.50	0.17	8.5	9.0	62	55	50	40	38	25	40	25	29	18	20	8	20	1
ADE-17H	100-1700	50-1500	7.20	0.10	8.5	9.5	32	20	—	—	36	22	32	20	—	—	37	22	25	2
SYM-18H	5-1800	10-1500	5.75	0.10	7.6	8.9	50	28	45	35	40	24	39	22	50	30	30	22	30	2
TUF-18DHSM	100-1800	50-750	7.30	0.15	8.5	9.0			41	23					33	20			27	2
SYM-20DHW	10-2000	10-1800	6.20	0.10	7.5	8.8	33	20	40	25	37	22	44	30	42	28	34	22	27	2
SYM-20DH	1700-2000	10-300	6.70	0.16	—	8.2			35	22					34	22			32	2
SYM-22H	1500-2200	DC-200	5.60	0.30	—	8.8			33	22					38	22			30	1
SYM-24DH	1400-2400	10-250	7.00	0.20	—	9.3			32	22					36	23			29	2
SYM-25DHW	80-2500	DC-1000	6.40	0.40	8.0	9.0	46	29	37	25	35	20	38	26	33	24	36	20	30	2
JYM-28H	400-2800	4-700	6.30	0.20	8.0	9.0			40	25					30	15			23	2
JYM-30H	2-3000	4-1400	6.00	0.20	8.9	10.6	40	30	40	25	30	25	40	35	30	20	22	15	24	2
SYM-30DHW	5-3000	5-1500	6.50	0.10	8.3	9.1	36	24	40	30	40	25	42	28	44	36	48	33	29	2
MCA-35H	500-3500	10-1500	6.90	0.10	8.9	—			30	11					27	14			24	2
SYM-36H	1500-3600	DC-600	6.30	0.40	—	9.0			30	20					34	20			25	1
SIM-43H	1000-4000	DC-1500	6.50	0.10	8.6				37	28					24	9			22	1
MCA-50H	1000-5000	10-1500	7.30	0.20	10.2	—			25	12					32	18			23	2
SKY-60H	2500-6000	DC-1500	6.20	0.20	—	9.7			28	17					14	8			23	1
SIM-762H	2300-7600	DC-3000	6.00	0.10	9.0				35	17					21	11			25	1
MCA1-80H	2800-8000	DC-1250	6.30	0.20	8.9	8.9			35	21					35	8			24	1
MCA1-113H	3800-11000	DC-1800	6.80	0.20	8.8	8.8			35	17					32	8			21	1

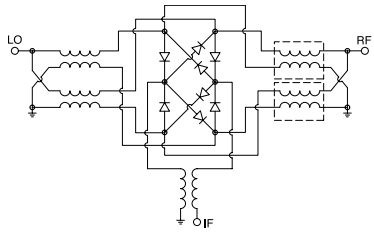
L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)
m = mid band ($2f_L$ to $f_U/2$)

ELECTRICAL SCHEMATICS

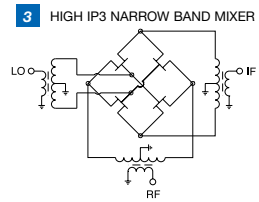
1 DOUBLE BALANCED MIXER



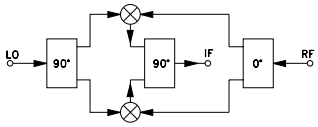
2 TRIPLE BALANCED MIXER



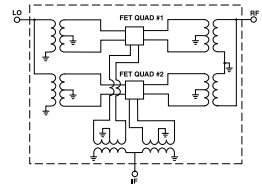
3 HIGH IP3 NARROW BAND MIXER



4 IMAGE REJECT MIXER



5 HIGH IP3 BROADBAND MIXER



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P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp.

HIGH IP3

HJK
Case TTT167, TTT881

LAVI
Case CK605

MODEL PREFIX	FREQUENCY (MHz) RF	LO	IF	IP3 (dBm) Typ.	RF @1 dB compr. (dBm) Typ.	CONVERSION LOSS (dB) Typ.	σ	Max.	LO-RF ISOLATION (dB) Typ.	Min.	LO-IF ISOLATION (dB) Typ.	Min.	SCHEMATIC
LEVEL 7 +7 dBm LO up to +10 dBm RF													
HJK-9	818-853	753-778	40-100	22	10	7.1	0.3	8.7	36	24	26	20	3
HJK-19	1850-1910	1780-1840	70-130	21	10	8.0	0.2	9.5	30	20	24	16	3
HJK-21	1850-1910	2090-2150	180-300	22	10	7.5	0.3	9.5	28	18	19	13	3
LEVEL 10 +10 dBm LO up to +13 dBm RF													
HJK-72LH	450-670	520-740	30-500	22	10	7.3	0.1	8.8	45	32	40	29	3
HJK-9LH	818-853	753-778	40-100	27	13	6.7	0.2	8.0	37	24	27	20	3
HJK-212LH	1800-2100	1660-1960	10-270	24	13	6.8	0.15	9.0	42	30	35	25	3
HJK-19LH	1850-1910	1750-1840	70-130	25	13	7.5	0.2	9.4	30	20	23	15	3
HJK-21LH	1850-1910	2090-2150	180-300	25	13	7.2	0.3	8.9	28	20	19	13	3
MCA-19FLH	1850-1910	1760-1820	70-130	25	10	6.9	—	8.8	40	22	39	20	3
MCA-30FLH	2960-3060	2780-2880	130-230	25	10	7.5	—	8.9	35	20	27	15	3
MCA-36FLH	3500-3600	3500-3170	380-480	25	10	8.4	—	9.4	40	20	28	15	3
LEVEL 13 +13 dBm LO up to +16 dBm RF													
HJK-9MH	818-853	753-778	40-100	31	16	6.7	0.2	8.0	37	24	27	20	3
HJK-19MH	1850-1910	1780-1840	70-130	30	16	7.4	0.2	8.9	30	20	23	15	3
HJK-21MH	1850-1910	2090-2150	180-300	29	16	7.2	0.2	8.9	29	20	19	13	3
MCA-19FMH	1850-1910	1760-1820	70-130	30	13	6.9	—	8.4	40	22	39	20	3
MCA-30FMH	2960-3060	2780-2880	130-230	30	13	7.4	—	8.9	35	20	27	15	3
MCA-36FMH	3500-3600	3070-3170	380-480	30	13	8.3	—	9.3	42	20	27	15	3
LEVEL 16 +16 dBm LO up to +19 dBm RF													
HJK-3H	140-180	160	0.5-20	37	19	8.0	0.1	9.2	44	35	44	30	3
LEVEL 17 +17 dBm LO up to +20 dBm RF													
LAVI-252H	200-2500	130-2430	50-2000	25	17	7.8	0.25	10.3	40	25	45	33	5
LAVI-711H	220-710	250-740	10-500	30	20	7.3	0.25	9.0	50	40	40	29	5
HJK-481H	345-480	395-530	30-150	32	20	6.5	0.1	8.0	55	43	38	28	3
HJK-72H	450-670	520-740	30-500	29	17	7.2	0.1	8.8	44	32	40	30	3
HJK-9H	818-853	753-778	40-100	33	20	6.7	0.2	8.0	35	24	31	23	3
HJK-212H	1800-2100	1660-1960	10-270	32	20	6.5	0.15	8.6	42	30	35	25	3
HJK-19H	1850-1910	1780-1840	70-130	32	20	8.0	0.2	8.9	26	20	22	16	3
HJK-21H	1850-1910	2090-2150	180-300	36	20	7.6	0.2	8.9	28	20	25	18	3
MCA-3851FH	1670-3850	1420-3290	250-500	30	17	7.5	—	9.2	40	23	35	20	3
MCA-19FH	1850-1910	1760-1820	70-130	35	17	6.9	—	8.5	40	22	39	20	3
MCA-325	2230-3490	2070-3330	10-330	30	17	7.5	—	9.5	40	25	30	18	3
MCA-2751FH	2430-2750	2780-3100	100-600	31	15	7.6	—	9.1	40	34	32	23	3
MCA-30FH	2960-3060	2780-2880	130-230	34	17	7.4	—	8.9	37	20	27	15	3
MCA-36FH	3500-3600	3070-3170	380-480	33	17	8.3	—	9.2	44	20	29	15	3
LEVEL 19 +19 dBm LO up to +23 dBm RF													
LAVI-9VH	820-870	990-1040	120-220	36	23	7.2	0.12	8.5	46	40	46	37	5
LEVEL 20 +20 dBm LO up to +15 dBm RF													
HJK-20VH	1090	1167-1950	77-870	30	15	7.2	0.2	8.5	32	26	34	26	3
LAVI-23VH	1200-2000	1270-2070	50-1000	30	20	8.4	0.25	9.8	58	40	40	30	5
LAVI-252VH	1850-2500	1920-2570	60-750	30	20	7.5	0.3	9.2	45	25	40	25	5
LEVEL 21 +21 dBm LO up to +20 dBm RF Wideband													
LAVI-971VH	270-970	340-1040	10-600	33	20	7.5	0.12	9.5	48	32	36	28	5
LAVI-10VH	300-1000	525-1175	60-875	33	20	6.3	0.12	8.0	50	40	45	30	5
LAVI-17VH	470-1730	600-1800	70-1000	32	20	6.8	0.20	8.9	52	38	50	36	5
LAVI-22VH	425-2200	525-2400	100-700	31	20	7.7	0.20	9.6	50	36	45	28	5
LEVEL 22 +22 dBm LO up to +20 dBm RF													
LAVI- 362VH	100-3100	1800-3600	500-2500	33	20	7.5	0.1	9.9	40	27	35	22	5
LEVEL 23 +23 dBm LO up to +23 dBm RF Wideband													
LAVI-25VH	400-2500	650-2800	70-1500	32	20	7.8	0.25	9.6	50	35	45	30	5
LAVI-2VH	2-1100	2-1100	2-1000	34	23	7.5	0.12	9.5	48	37	47	36	5

MIXERS, FREQUENCY 50 Ω

57 MHz to 2550 MHz

SIM Case HV1195 | HJK Case TTT167, TTT881 | LAVI Case CK605 | JCIR Case BG291

IMAGE REJECT

MODEL PREFIX	FREQUENCY (MHz) RF f_L-f_U	LO f_L-f_U	IF	CONVERSION LOSS (dB) $\bar{x}$	σ	Max.	IMAGE REJECTION (dBc) RF>LO	LO>RF	Typ.	Min.	LO-RF ISOLATION (dB) Typ.	Min.	LO-IF ISOLATION (dB) Typ.	Min.	RF-IF ISOLATION (dB) Typ.	Min.	IP3 @ centerband (dBm) Typ.	SCHEMATIC
LEVEL 13 +13dBm LO up to +1 dBm RF																		
JCIR-25	2490-2550	2420-2480	57-83	7.0	—	8.5		•	27	17	35	25	26	18	25	—	16	4
LEVEL 15 +15dBm LO up to +1 dBm RF																		
JCIR-4MH	430-930	500-1000	65-75	7.9	0.15	9.0	•		28	18	55	40	25	20	25	15	20	4
LEVEL 18 +18dBm LO up to +11 dBm RF																		
JCIR-152H	1000-1500	1080-1580	68-100	7.5	0.15	9.0	•		28	18	43	35	32	24	32	20	25	4

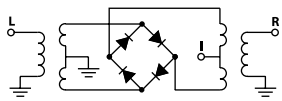
UP CONVERTERS 0.1 to 7400 MHz

MODEL PREFIX	LO LEVEL (dBm)	RF IN @ 1 dB compr. Typ. (dBm)	FREQUENCY (MHz) IF (IN)	LO	RF (OUT)	CONVERSION LOSS (dB) Typ.	σ	Max.	LO-IF (IN) ISOLATION (dB) Typ.	Min.	LO-RF (OUT) ISOLATION (dB) Typ.	Min.	IP3 @ centerband (dBm) Typ.	SCHEMATIC
SIM-U63	7	+1	1600-2500	3100-5700	3800-6000	6.9	0.3	8.4	16	10	39	29	10	1
SIM-U742MH	13	+9	0.1-3300	2300-7400	2300-7400	8.0	0.4	9.8	17	11	23	13	20	1
SIM-U432H	17	+14	0.1-800	1100-4250	1100-3900	7.5	0.2	9.8	24	13	36	28	26	1
SIM-U712H	17	+14	2600-7100	10-1780	2600-7100	7.3	0.3	9.5	27	14	19	11	27	1
HJK-U151H	17	+17	10-130	140-280	70-150	7.6	0.1	9.2	40	30	55	48	28	3
HJK-U232H	17	+20	850-1850	370-510	1220-2360	6.8	0.1	8.8	35	28	46	40	31	3
LAVI-U182H	19	+15	10-250	1490-1730	1560-1800	8.3	0.15	9.6	40	29	53	42	32	5
LAVI-U252VH	21	+16	10-1300	1800-2800	1500-2500	7.8	0.15	9.5	51	33	45	27	30	5

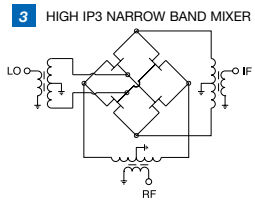
L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)
m = mid band ($2f_L$ to $f_U/2$)

ELECTRICAL SCHEMATICS

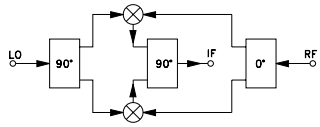
1 DOUBLE BALANCED MIXER



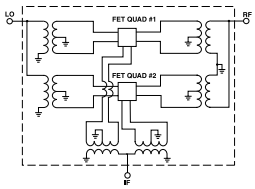
3 HIGH IP3 NARROW BAND MIXER



4 IMAGE REJECT MIXER



5 HIGH IP3 BROADBAND MIXER



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MODULATORS/DEMODULATORS 50 Ω

52 MHz to 2000 MHz

LTCC

IQBG Case SM20A

SYIQ Case TTT1289

JCIQ Case BG291

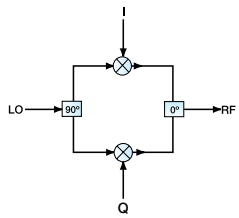
I&Q MODULATORS

MODEL PREFIX	FREQUENCY (MHz) RF (signal)/ LO (carrier) f_L-f_U	f_U	I&Q Min.	I&Q Max.	CONVERSION LOSS (dB) $\bar{X}$	σ	Max.	CARRIER REJECTION (-dBc) Typ.	Min.	SIDEBAND REJECTION (-dBc) Typ.	Min.	HARMONIC SUPPRESSION (-dBc) 3XI/Q Typ.	Min.	5XI/Q Typ.	Min.
High rejection of carrier and sideband 52 MHz to 2000 MHz I&Q up to 0 dBm LO Power 10 dBm															
JCIQ-88M	52	88	DC	5	5.6	0.1	7.0	40	32	35	30	45	35	65	50
JCIQ-176M	104	176	DC	5	5.6	0.1	7.0	35	30	35	30	45	35	65	50
SYIQ-895M	868	895	DC	5	6.4	0.1	7.5	38	30	39	30	45	35	64	50
IQBG-2000A	1800	2000	DC	10	7.5	—	9.0	30	20	34	28	50	45	70	50

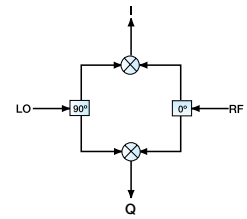
I&Q DEMODULATORS

MODEL PREFIX	FREQUENCY (MHz) RF (signal)/ LO (carrier) f_L-f_U	f_U	I&Q Min.	I&Q Max.	CONVERSION LOSS (dB) $\bar{X}$	σ	Max.	AMPLITUDE UNBALANCE (dB) Typ.	Max.	PHASE UNBALANCE (Degrees) Typ.	Max.	HARMONIC SUPPRESSION (-dBc) 3XI/Q Typ.	Min.	5XI/Q Typ.	Min.
104 MHz to 1880 MHz LO Power 10 dBm RF up to 4 dBm															
JCIQ-176D	104	176	DC	5	5.5	0.1	7.0	0.15	0.6	2	5	52	40	65	50
SYIQ-895D	868	895	DC	5	6.4	0.1	7.5	0.15	0.4	1.5	4	45	35	64	50
JCIQ-1880D	1805	1880	DC	5	8.0	0.2	10.5	0.2	0.6	2	5	50	35	65	50

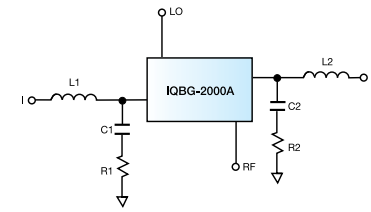
I&Q Modulation Block Diagram



I&Q Demodulation Block Diagram



Recommended IF Diplexer



L1, L2	33 nH	CHIP INDUCTOR (1206)
C1, C2	10 pF	NPO CHIP CAPACITOR (0603)
R1, R2	47 Ω	5% CHIP RESISTOR (0603)

YONI2™ Patent Pending
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For pricing/availability, complete specifications, data sheets, RoHS compatibility, performance data/curves, pcb layouts, outline drawings & shopping online, see minicircuits.com

MULTIPLIERS, FREQUENCY 50 Ω

10 MHz to 20 GHz

LTCC

KC2
Case DZ885

LTCC

KBA
Case SM2

LTCC

KSX
Case HV1195

AMK-2-13+ Case CD542
AMK-3-452+ Case CD636

LK
Case BB48

SYK
Case TTT167

RMK
Case TT1224

MODEL PREFIX	FREQUENCY (MHz)		RF INPUT POWER (dBm)		CONVERSION LOSS (dB)		HARMONIC OUTPUT (dBc)					
							F1		F3		F4	
	Input	Output	Min.	Max.	Typ.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.
X2							BELOW F 2					
AMK-2-13	10-500	20-1000	4	10	11.4	14.5	45	20	45	25	22	12
SYK-2R	10-500	20-1000	12	16	10.5	14.0	35	25	42	25	20	10
	500-1000	1000-2000	12	16	11.5	16.0	32	20	37	20	20	10
SYK-2-33	50-1500	100-3000	11	15	11.5	15.0	30	17	33	18	20	10
LK-3000	70-1000	140-2000	12	15	10.5	14.0	31	20	40	25	15	10
	1000-1500	2000-3000	12	15	11.5	16.0	22	15	35	20	20	14
KC2-11	500-1100	1000-2200	5	10	10.5	13.5	27	18	34	20	21	12
KC2-19	1100-1900	2200-3800	5	10	10.5	14.6	24	18	30	18	17	12
KSX2-442	600-1200	1200-2400	7	13	11.0	14.0	26	18	35	22	16	11
	1200-2200	2400-4400	10	15	11.0	14.5	18	11	36	22	25	14
KSX2-722	1300-2200	2600-4400	9	13	11.5	14.5	22	14	28	16	17	11
	2200-3600	4400-7200	9	13	13.0	15.5	18	9	28	13	28	16
KBA-20	1600-2200	3200-4400	11	15	12.0	15.8	12	7	20	13	23	10
KC2-36	1700-3600	3400-7200	8	13	11.0	15.5	18	9	30	17	17	8
KSX2-14	2500-3600	5000-7200	13	17	12.0	15.0	22	15	33	22	12	7
	3600-5000	72000-10000	13	17	12.0	15.0	22	15	29	20	19	12
KBA-40	2700-4800	5400-9600	10	16	12.3	17.6	18	10	26	15	24	14
	2700-4800	5400-9600	5	10	13.0	19.0	15	8	26	16	26	12
KC2-50	3500-5000	7000-10000	7	12	12.5	16.0	15	8	28	20	30	17
KSX2-24	5000-8000	10000-16000	13	16	11.5	15.0	30	18	35	23	25	15
			10	13	15.0	18.0	21	14	30	18	20	13
	8000-10000	16000-20000	13	16	12.0	15.0	33	20	27	17	50	35
			10	13	15.0	18.5	30	16	23	16	40	30
X3							BELOW F 3					
							F1		F2		F4	
RMK-3-451	100-150	300-450	12	17	13.2	16.0	4	-7	52	40	50	37
RMK-3-122	300-400	900-1200	0	6	14.5	18.0	6	-3	48	33	52	40
AMK-3-452	1000-1500	3000-4500	10	14	14.5	17.5	-2	-10	55	40	55	40
RMK-3-722	1525-2400	4575-7200	7	11	14.0	19.0	3	-7	55	35	55	35
RMK-3-662	1600-2200	4800-6600	9	13	15.0	19.5	6	-4	45	20	38	21
RMK-3-812	1800-2700	5400-8100	0	6	16.0	21.0	6	-6	40	22	37	24
RMK-3-14	2200-3335	6600-10005	13	17	14.5	19.5	6	-3	40	24	37	24
RMK-3-1052	2200-3500	6600-10500	7	11	14.5	19.5	6	-5	52	35	50	35
RMK-3-123	2200-4000	6600-12000	13	17	15.5	21.0	5	-5	33	22	45	24
RMK-3-1262	2250-4200	6750-12600	7	11	15.5	20.0	5	-7	45	31	50	35
RMK-3-153	2600-5000	7800-15000	7	11	17.0	21.0	1	-9	48	33	50	35

RKK
Case CK1246

X4							BELOW F 4							
							F1		F2		F3		F5	
RKK-4-23	320-500	1280-2000	11	15	24.5	30.0	27	21	34	20	38	23	30	24

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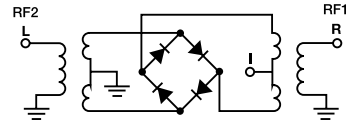
PHASE DETECTORS 50 Ω

1 MHz to 650 MHz

SYPD
Case TTT167

MODEL PREFIX	FREQUENCY (MHz) RF1 RF2	FREQUENCY (MHz) I	POWER IN RF1 RF2 (dBm)	SCALE FACTOR mV/deg.	IMPEDANCE (OHMS) output load I	ISOLATION (dB) RF1-RF2 Min.	OUTPUT POLARITY RF1/RF2 In-phase	DC OUTPUT (mV) Max. Typ.	DC OUTPUT (mV) Min.	DC OUTPUT (mV) Offset Typ.	DC OUTPUT (mV) Offset Max.	FIGURE-OF-MERIT M Typ.
HIGH OUTPUT												
SYPD-1	1-100	DC-50	7	8	500	40	neg.	1000	700	0.2	1	143
SYPD-2	10-200	DC-50	7	8	500	40	neg.	1000	700	0.3	1	143
SYPD-52	400-500	DC-50	7	8	500	30	neg.	900	700	0.7	1.2	129
SYPD-52W	300-650	DC-50	7	8	500	28	neg.	850	700	1.0	5.0	129

ELECTRICAL SCHEMATIC



PHASE SHIFTERS 50 Ω

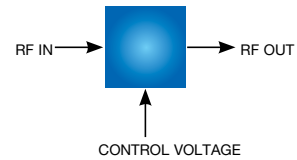
1.8 MHz to 2484 MHz

JCPHS Case BG419

JSPHS Case BK276

MODEL PREFIX	FREQUENCY (MHz)	PHASE RANGE (degrees) Min.	INSERTION LOSS (dB) Typ.	INSERTION LOSS (dB) Max.	CONTROL VOLTAGE (V)	CONTROL BANDWIDTH Typ.	VSWR (:1) Typ.	VSWR (:1) Max.
180° VOLTAGE VARIABLE								
JCPHS-2.5	1.8-25	180	0.9	2.7	0-18	DC-50 kHz	1.2	1.8
JSPHS-12	8-12	180	0.9	2.5	0-15	DC-50 kHz	1.2	1.8
JSPHS-16	12-16	180	1.2	2.5	0-7	DC-50 kHz	1.2	1.8
JSPHS-26	18-26	180	1.2	3.0	0-12	DC-50 kHz	1.2	1.7
JSPHS-32	26-32	180	1.2	2.5	0-12	DC-50 kHz	1.2	1.9
JSPHS-51	36-54	180	1.2	2.5	0-12	DC-50 kHz	1.2	1.8
JSPHS-150	100-150	180	1.2	2.5	0-12	DC-30 kHz	1.2	1.7
JSPHS-42	300-400	180	1.4	2.8	0-12	DC-50 kHz	1.3	1.9
JSPHS-446	366-446	180	1.2	2.5	0-12	DC-50 kHz	1.2	1.7
JSPHS-661	400-660	180	1.2	2.5	0-15	DC-50 kHz	1.2	2.2
JSPHS-1000	700-1000	160	1.2	2.3	0-15	DC-50 kHz	1.2	2.6
JSPHS-23	1700-2000	180	2.0	3.5	0-15	DC-50 kHz	1.5	2.9
JSPHS-2484	2150-2484	180	2.0	5.6	0-15	DC-50 kHz	1.5	2.0

ELECTRICAL SCHEMATIC



POWER SPLITTERS/COMBINERS 50 Ω & 75 Ω

100 kHz to 7.2 GHz

SCN, QCN Case FV1206-1 | SBB Case SM31 | SBA Case SM1 | SBA Case SM2 | BP2 Case XX211 | GP2 Case DQ1225 | TCP Case DB714 | SBTC Case AT790 | SBTC-L Case AT1029 | ADP, ADPQ Case CD636, CD542

MODEL PREFIX	FREQUENCY RANGE (MHz)	ISOLATION (dB)						INSERTION LOSS, (dB) Above 3 dB						PHASE UNBAL., degrees			AMPLITUDE UNBAL. (dB)			RF POWER MAX (W)	
	f_L-f_U	L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	L Typ.	L Max.	M Typ.	M Max.	U Typ.	U Max.	L Max.	M Max.	U Max.	L Max.	M Max.	U Max.	Sum Port (Matched output ports)	Internal Dissipation
2 WAY-0°																					
SCP-2-1	0.1-400	25	15	30	20	25	20	0.30	1.2	0.2	0.6	0.4	1.1	2.0	2.0	3.0	0.15	0.2	0.3	1.0	0.125
ADP-2-1	0.5-400	25	20	25	20	25	20	0.20	0.4	0.3	0.6	0.5	1.0	1.0	2.0	3.0	0.10	0.2	0.3	0.5	0.125
JPS-2-1	1-500	34	20	30	20	27	20	0.20	0.8	0.25	0.7	0.4	0.9	1.0	2.0	3.0	0.10	0.2	0.3	1.0	0.125
SYPS-2-1	2-500	40	20	32	20	30	20	0.20	0.6	0.3	0.75	0.6	1.0	2.0	3.0	4.0	0.20	0.3	0.5	1.0	0.125
LRPS-2-1J	5-500	50	25	33	24	30	23	0.25	0.5	0.3	0.6	0.5	1.2	1.0	2.0	3.0	0.15	0.2	0.3	1.0	0.125
SCP-2-1A	1-550	25	20	25	20	25	20	0.30	0.6	0.3	0.6	0.7	1.3	2.0	2.0	3.0	0.15	0.2	0.4	1.0	0.125
JPS-2-1N	350-550	30	20	30	20	30	20	0.25	0.5	0.25	0.5	0.25	0.5	3.0	3.0	3.0	0.3	0.3	0.3	1.0	0.125
ADP-2-1W	1-650	30	20	30	20	24	20	0.20	0.8	0.25	0.8	0.5	1.0	2.0	2.0	3.0	0.15	0.2	0.3	2.0	0.125
JPS-2-1W	3-750	36	20	28	17	19	16	0.50	0.8	0.4	1.0	0.9	1.4	1.0	2.0	4.0	0.20	0.3	0.4	1.0	0.125
ADP-2-9	200-900	27	20	27	20	27	20	0.4	0.8	0.4	0.8	0.4	0.8	2.0	2.0	2.0	0.3	0.3	0.3	0.5	0.125
JPS-2-900	400-900	24	18	24	18	24	18	0.5	1.2	0.5	1.2	0.5	1.2	3.0	3.0	3.0	0.4	0.4	0.4	1.0	0.125
SP-2C	780-960	28	17	28	17	28	17	0.4	0.6	0.4	0.6	0.4	0.6	2.0	2.0	2.0	0.2	0.2	0.2	1.5	0.75
BP2C	810-960	25	18	25	18	25	18	0.6	0.9	0.6	0.9	0.6	0.9	3.0	3.0	3.0	0.2	0.2	0.2	1.5	0.75
LRPS-2-980J	800-980	30	18	30	18	30	18	0.5	1.0	0.5	1.0	0.5	1.0	3.0	3.0	3.0	0.5	0.5	0.5	1.0	0.125
ADP-2-10	5-1000	25	15	23	15	20	15	0.30	0.9	0.4	0.9	0.6	1.2	2.0	2.0	3.0	0.20	0.2	0.3	0.5	0.125
SBTC-2-10	5-1000	29	20	25	18	21	16	0.30	0.7	0.3	0.8	0.5	1.4	3.0	3.0	5.0	0.60	0.5	0.5	0.5	0.125
TCP-2-10	5-1000	25	17	25	16	21	16	0.30	0.9	0.5	0.9	0.5	1.4	4.0	4.0	6.0	0.60	0.6	0.3	0.5	0.125
ADP-2-4	10-1000	25	20	23	16	19	14	0.30	0.5	0.4	0.9	0.8	1.5	1.0	3.0	5.0	0.15	0.2	0.4	1.0	0.125
LRPS-2-4J	10-1000	25	20	23	16	19	14	0.30	0.5	0.4	0.9	0.8	1.5	1.0	3.0	5.0	0.15	0.2	0.4	1.0	0.125
JPS-2-4	100-1000	22	16	22	16	22	16	0.5	1.4	0.5	1.4	0.5	1.4	5.0	5.0	5.0	0.4	0.4	0.4	1.0	0.125
SBB-2-10	800-1000	24	15	24	15	24	15	0.6	1.2	0.6	1.2	0.6	1.2	3.0	3.0	3.0	0.3	0.3	0.3	10.0	0.25
SP-2C1	640-1100	20	10	20	10	20	10	0.4	1.0	0.4	1.0	0.4	1.0	2.0	2.0	2.0	0.2	0.2	0.2	1.5	0.75
BP2C1	650-1100	20	10	20	10	20	10	0.4	1.2	0.4	1.2	0.4	1.2	3.0	3.0	3.0	0.2	0.2	0.2	1.5	0.75
SCN-2-11	800-1175	20	15	20	15	20	15	0.5	0.8	0.5	0.8	0.5	0.8	3.0	3.0	3.0	0.3	0.3	0.3	20.0	▲
SBB-2-13	950-1300	24	15	24	15	24	15	0.6	1.3	0.6	1.3	0.6	1.3	3.0	3.0	3.0	0.6	0.6	0.6	10.0	0.25
SCN-2-15	1100-1450	23	17	23	17	23	17	0.5	0.8	0.5	0.8	0.5	0.8	3.0	3.0	3.0	0.4	0.4	0.4	20.0	▲
SBA-2-14	1200-1600	16	10	16	10	16	10	0.6	1.0	0.6	1.0	0.6	1.0	5.0	5.0	6.0	0.5	0.5	0.5	2.0	0.125
BP2G	1420-1660	28	20	28	20	28	20	0.6	1.0	0.6	1.0	0.6	1.0	3.0	3.0	3.0	0.2	0.2	0.2	1.5	0.375
SP-2G	1420-1660	28	19	28	19	28	19	0.4	0.7	0.4	0.7	0.4	0.7	3.0	3.0	3.0	0.2	0.2	0.2	1.5	0.75
SBB-2-18	1425-1800	22	16	22	16	22	16	0.6	1.2	0.6	1.2	0.6	1.2	4.0	4.0	4.0	0.3	0.3	0.3	10.0	0.25
SCN-2-19	1425-1900	23	17	23	17	23	17	0.5	0.9	0.5	0.9	0.5	0.9	4.0	4.0	4.0	0.4	0.4	0.4	20.0	▲
BP2P	1710-1990	30	18	30	18	30	18	0.7	1.0	0.7	1.0	0.7	1.0	3.0	3.0	3.0	0.2	0.2	0.2	1.5	0.75
SP-2P	1710-1990	28	18	28	18	28	18	0.4	0.8	0.4	0.8	0.4	0.8	3.5	3.5	3.5	0.2	0.2	0.2	1.5	0.75
ADP-2-20	20-2000	18	15	18	15	18	15	0.50	0.8	0.7	1.0	0.8	1.5	2.0	3.0	5.0	0.2	0.3	0.7	1.0	0.125
LRPS-2-11J	20-2000	19	15	21	15	30	15	0.60	0.8	0.7	1.0	0.8	1.5	2.0	3.0	5.0	0.2	0.3	0.7	1.0	0.125
LRPS-2-11A	20-2000	19	15	21	15	30	15	0.6	0.8	0.7	1.0	0.8	1.5	2.0	3.0	5.0	0.2	0.3	0.7	1.0	0.125
SBTC-2-20	200-2000	20	14	20	14	20	14	0.8	2.2	0.8	2.2	0.8	2.2	10.0	10.0	10.0	0.8	0.8	0.8	0.5	0.125
BP2G1	1200-2000	21	10	21	10	21	10	0.6	1.3	0.6	1.3	0.6	1.3	3.0	3.0	3.0	0.3	0.3	0.3	1.5	0.75
SP-2G1	1200-2000	20	10	20	10	20	10	0.7	1.3	0.7	1.3	0.7	1.3	4.0	4.0	4.0	0.2	0.2	0.2	1.5	0.75
SBA-2-18	1600-2000	19	13	19	13	19	13	0.4	1.0	0.4	1.0	0.4	1.0	6.0	6.0	6.0	0.6	0.6	0.6	2.0	0.125
GP2S	80-2100	24	17	24	17	24	17	0.8	1.4	0.8	1.4	0.8	1.4	4.0	4.0	4.0	0.2	0.2	0.2	1.5	0.75
SBA-2-20	1800-2200	22	13	22	13	22	13	0.5	1.1	0.5	1.1	0.5	1.1	7.0	7.0	7.0	0.7	0.7	0.7	2.0	0.125
SCN-2-22	1850-2200	22	17	22	17	22	17	0.5	0.9	0.5	0.9	0.5	0.9	5.0	5.0	5.0	0.4	0.4	0.4	20.0	0.25
SP-2P1	1350-2250	20	9	20	9	20	9	0.5	1.1	0.5	1.1	0.5	1.1	4.0	4.0	4.0	0.2	0.2	0.2	1.5	0.75
SBB-2-23	2000-2300	24	17	24	17	24	17	0.6	1.0	0.6	1.0	0.6	1.0	3.0	3.0	3.0	0.3	0.3	0.3	10.0	0.25
SP-2U	2100-2300	24	18	24	18	24	18	0.5	0.7	0.5	0.7	0.5	0.7	3.0	3.0	3.0	0.2	0.2	0.2	1.5	0.75
BP2P1	1400-2350	20	10	20	10	20	10	0.5	1.3	0.5	1.3	0.5	1.3	4.0	4.0	4.0	0.3	0.3	0.3	1.5	0.75
SBB-2-21W	1425-2400	22	15	22	15	22	15	0.6	1.1	0.6	1.1	0.6	1.1	4.0	4.0	4.0	0.3	0.3	0.3	10.0	0.25
SYPS-2-252	5-2500	24	15	18	15	17	14	0.4	0.6	0.7	1.4	1.3	2.4	1.0	3.0	5.0	0.1	0.3	0.5	0.5	0.05
TCP-2-25	200-2500	18	10	18	10	18	10	0.8	1.3	0.8	1.3	0.8	1.3	6.0	6.0	6.0	0.8	0.8	0.8	0.5	0.125

▲ Total power on output ports not to exceed max sum port power.

L=low range (f_L to $10f_L$) M= mid range ($10f_L$ to $f_U/2$) U= upper range ($f_U/2$ to f_U)

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp.

SP Case CA531 | RPS Case TT240-1 | JPS Case BH292 | LRPS-A Case QQQ1358 | LRPS-J Case QQQ569 | SYPS Case TTT167 | SYPS Case AH202-2 | JYPS Case BJ293 | SCP Case YY101

MODEL PREFIX	FREQUENCY RANGE (MHz)	ISOLATION (dB)						INSERTION LOSS, (dB) Above 3 dB						PHASE UNBAL., degrees			AMPLITUDE UNBAL. (dB)			RF POWER MAX (W)	
	f_L-f_U	L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	L Typ.	L Max.	M Typ.	M Max.	U Typ.	U Max.	L Max.	M Max.	U Max.	L Max.	M Max.	U Max.	Sum Port (Matched output ports)	Internal Dissipation
2 WAY-0°																					
GP2S1	500-2500	20	9	20	9	20	9	0.9	1.8	0.9	1.8	0.9	1.8	5.0	5.0	5.0	0.2	0.2	0.2	1.5	0.75
SBTC-2-25	1000-2500	20	14	20	14	20	14	1.4	2.5	1.4	2.5	1.4	2.5	14.0	14.0	14.0	1.2	1.2	1.2	1.0	0.125
LRPS-2-25J	1700-2500	20	16	20	16	20	16	0.8	1.3	0.8	1.3	0.8	1.3	10.0	10.0	10.0	0.9	0.9	0.9	1.0	0.125
BP2U	2100-2500	30	19	30	19	30	19	0.5	0.8	0.5	0.8	0.5	0.8	2.0	2.0	2.0	0.2	0.2	0.2	1.5	0.75
SP-2U1	2300-2500	22	16	22	16	22	16	0.5	0.9	0.5	0.9	0.5	0.9	3.0	3.0	3.0	0.2	0.2	0.2	1.5	0.75
SBA-2-22	2000-2600	18	10	18	10	18	10	0.8	1.6	0.8	1.6	0.8	1.6	10.0	10.0	10.0	0.8	0.8	0.8	2.0	0.125
SCN-2-27	2225-2700	21	17	21	17	21	17	0.5	1.1	0.5	1.1	0.5	1.1	6.0	6.0	6.0	0.8	0.8	0.8	2.0	▲
SP-2U2	1720-2850	17	9	17	9	17	9	0.5	1.4	0.5	1.4	0.5	1.4	3.0	3.0	3.0	0.2	0.2	0.2	1.5	0.75
RPS-2-30	10-3000	19	12	22	15	15	9	0.6	1.0	0.9	1.5	1.2	2.5	2.0	4.0	8.0	0.3	0.6	1.2	0.5	0.125
TCP-2-33	1000-3000	18	15	18	15	18	15	0.8	1.9	0.8	1.9	0.8	1.9	5.0	5.0	5.0	0.9	0.9	0.9	0.5	▲
GP2Y	1600-3300	24	17	24	17	24	17	0.8	1.5	0.8	1.5	0.8	1.5	0.4	0.4	0.4	0.2	0.2	0.2	1.5	0.75
BP2U1	1750-3000	20	10	20	10	20	10	0.5	1.6	0.5	1.6	0.5	1.6	4.0	4.0	4.0	0.4	0.4	0.4	1.5	0.75
SCN-2-35	2825-3700	22	13	22	13	22	13	0.4	1.3	0.4	1.3	0.4	1.3	4.0	4.0	4.0	0.3	0.3	0.3	4.0	▲
SP-2W	3300-3800	25	16	25	16	25	16	0.5	0.9	0.5	0.9	0.5	0.9	7.0	7.0	7.0	0.2	0.2	0.2	0.75	0.375
SP-2L	2700-4000	18	10	18	10	18	10	0.75	1.4	0.75	1.4	0.75	1.4	8.0	8.0	8.0	0.3	0.3	0.3	0.75	0.375
SP-2W1	2875-4200	20	10	20	10	20	10	0.8	1.4	0.8	1.4	0.8	1.4	8.0	8.0	8.0	0.2	0.2	0.2	0.75	0.375
SCN-2-45	3700-4200	22	13	22	13	22	13	0.7	1.0	0.7	1.0	0.7	1.0	4.0	4.0	4.0	0.4	0.4	0.4	4.0	▲
GP2Y1	1550-4400	20	12	20	12	20	12	1.0	1.9	1.0	1.9	1.0	1.9	6.0	6.0	6.0	0.3	0.3	0.3	1.5	0.75
GP2X	2900-6200	24	15	24	15	24	15	0.6	1.5	0.6	1.5	0.6	1.5	9.0	9.0	9.0	0.3	0.3	0.3	1.5	0.75
SCN-2-65	5500-6500	17	11	17	11	17	11	0.8	1.1	0.8	1.1	0.8	1.1	5.0	5.0	5.0	0.4	0.4	0.4	4.0	▲
GP2X1	2800-7200	22	10	22	10	22	10	0.8	1.9	0.8	1.9	0.8	1.9	10.0	10.0	10.0	0.4	0.4	0.4	1.5	0.75
■ LRPS-2-1-75J	2-500	35	18	35	25	27	20	0.30	0.8	0.35	0.6	0.5	1.0	1.0	2.0	3.0	0.15	0.2	0.3	1.0	0.125
■ JPS-2-1-75	5-500	25	18	35	20	20	18	0.15	0.5	0.15	0.7	0.25	0.7	1.0	2.0	3.0	0.10	0.2	0.4	1.0	0.125
■ LRPS-2-1W-75J	10-650	28	22	29	24	30	20	0.50	1.0	0.6	0.75	0.6	1.2	1.0	2.0	3.0	0.15	0.2	0.3	1.0	0.125
■ ADP-2-10W-75	5-1000	24	14	23	18	24	18	0.20	0.6	0.3	0.9	0.5	1.1	1.0	3.0	5.0	0.10	0.2	0.3	0.5	0.125
■ JYPS-2-4-75	5-1000	24	17	25	20	30	18	0.40	0.8	0.4	1.0	0.8	1.5	3.0	4.0	5.0	0.20	0.3	0.4	0.5	0.125
■ TCP-2-10-75	5-1000	24	14	29	19	30	16	0.30	1.4	0.3	0.9	0.6	1.3	6.0	4.0	3.0	1.20	0.6	0.5	0.5	▲
■ SBTC-2-10-75	10-1000	35	20	28	20	21	17	0.70	1.2	0.6	1.2	0.7	1.4	3.0	3.0	5.0	0.70	0.6	0.6	0.5	0.125
■ JPS-2-4-75	20-1000	27	20	29	20	27	16	0.35	0.7	0.4	0.8	0.45	1.0	2.0	2.0	3.0	0.20	0.2	0.3	1.0	0.125
■ ADP-2-10-75	50-1000	26	20			22	18	0.60	1.0			0.8	1.4	2.0		3.0	0.15		0.3	0.5	0.125
■ SBTC-2-15-75	500-1500	28	18	28	18	28	18	0.8	1.5	0.8	1.5	0.8	1.5	5.0	5.0	5.0	0.9	0.9	0.9	0.5	0.125
■ ADP-2-20-75	5-2000	16	12	16	13	28	15	0.40	0.9	0.5	1.2	0.6	1.4	1.0	4.0	5.0	0.15	0.3	0.6	0.5	0.25
■ SYPS-2-282-75	5-2750	20	12	25	18	22	13	0.5	0.7	0.8	1.1	1.5	2.7	2.0	4.0	6.0	0.2	0.4	1.0	0.5	0.05

■ 75 Ω

▲ Total power on output ports not to exceed max sum port power.

Impedance Matching 50 to 75 Ω / 75 to 50 Ω

SBTC-2-10-7550	5-1000	23	13	24	20	26	20	0.50	1.3	0.6	1.1	0.7	1.5	6.0	3.0	5.0	0.80	0.5	0.5	0.5	0.125
SBTC-2-10-5075	50-1000	25	16	—	—	20	15	0.70	1.2	—	—	1.0	1.6	3.0	—	5.0	0.60	—	0.5	0.5	0.125

L=low range (f_L to $10f_L$) M= mid range ($10f_L$ to $f_U/2$) U= upper range ($f_U/2$ to f_U)

POWER SPLITTERS/COMBINERS

9 MHz to 7.2 GHz 50 Ω

JSPQ, JSPQW Case BK276 — SCPQ Case YY101

LTCC QCS Case GE0805C-1 — LTCC QCN Case FV1206-1 — LTCC QCC Case GF981 — LTCC QBA Case SM33 — LTCC QBA Case SM1L — HPQ Case AT577 — RPQ Case TT240 — LRPQ Case QQQ569 — LRPQ-J Case QQQ130 — ADPQ Case CD637 — ADQ Case CJ725 — SYPQ Case AH202 — JYPQ Case BJ293

MODEL PREFIX	FREQUENCY RANGE (MHz) f_L-f_U	ISOLATION (dB) Typ.	ISOLATION (dB) Min.	INSERTION LOSS (dB) Avg. of Coupled Outputs less 3 dB Typ.	INSERTION LOSS (dB) Avg. of Coupled Outputs less 3 dB Max.	PHASE UNBALANCE (Degrees) Max.	AMPLITUDE UNBALANCE (dB) Max.	INPUT RF Power Max (W) Sum Port (Matched output ports)	INPUT RF Power Max (W) Output ports (Other ports matched*)
2 WAY-90°									
SCPQ-10.5	9-11	31	20	0.15	0.70	3.0	1.20	1.0	0.50
JYPQ-16	10-16	43	25	0.20	0.60	4.0	0.90	1.0	0.50
SCPQ-21.4	20-23	32	25	0.15	0.50	2.5	1.00	1.0	0.50
JYPQ-30	16-30	28	20	0.20	0.70	3.0	1.50	1.0	0.50
SCPQ-50	25-50	25	20	0.15	0.70	3.0	1.50	1.0	0.50
SCPQ-60	30-60	30	20	0.15	0.70	3.0	1.50	1.0	0.50
JSPQ-65W	5-65	33	25	0.70	1.50	5.0	0.70	1.0	0.125
LRPQ-70J	65-75	30	20	0.10	0.50	3.0	1.00	1.0	0.50
SYPQ-70	65-75	31	24	0.10	0.40	3.0	1.10	1.0	0.50
JSPQ-80	10-80	44	30	0.45	1.40	6.0	0.60	1.0	0.125
SCPQ-85C	55-85	30	20	0.30	0.60	3.0	0.60	1.0	0.50
ADQ-90	55-90	26	20	0.20	0.70	4.0	1.20	0.5	0.25
SCPQ-90	55-90	26	20	0.20	0.70	3.0	1.20	1.0	0.50
JSPQW-100A	30-100	41	30	0.50	1.10	4.0	0.60	1.0	0.125
JSPQW-100	40-100	24	18	0.20	0.60	3.0	1.20	1.0	0.5
SCPQ-150	95-150	22	18	0.30	0.70	3.0	1.20	1.0	0.5
ADQ-22	95-200	28	24	0.30	0.60	6.0	1.60	0.5	0.25
JYPQ-160	105-160	24	17	0.25	0.60	3.0	1.50	1.0	0.5
ADQ-180	120-180	35	20	0.20	0.70	6.0	1.50	0.5	0.25
SCPQ-180	120-180	20	16	0.30	0.70	3.0	1.20	1.0	0.5
ADPQ-2-250	150-250	24	17	0.20	0.70	4.0	1.40	1.0	0.5
LRPQ-320J	270-320	21	18	0.30	0.60	3.0	1.20	1.0	0.5
ADQ-32	160-327	22	18	0.30	0.70	5.0	1.60	1.0	0.5
ADQ-32W	104-340	20	16	0.60	0.90	8.0	1.80	0.5	0.25
JSPQ-350	150-350	20	13	0.50	1.00	5.0	1.50	1.0	0.5
HPQ-04	315-395	24	18	0.20	0.45	3.0	1.60	1.0	0.5
SCPQ-400	250-400	20	16	0.30	0.70	3.0	1.00	1.0	0.5
HPQ-05	410-455	25	20	0.17	0.35	3.0	1.12	1.0	0.5
QCN-3	220-470	24	18	0.60	0.80	8.0	1.70	15.0	7.5
HPQ-05W	380-490	25	20	0.20	0.40	3.0	1.60	1.0	0.5
HPQ-06	510-570	26	18	0.20	0.40	3.0	1.20	1.0	0.5
QCN-5	330-580	20	14	0.40	0.90	5.0	1.10	15.0	3.50
HPQ-06W	480-600	26	18	0.20	0.40	3.0	1.60	1.0	0.50
QCN-7	425-675	17	11	0.40	1.00	8.0	1.00	15.0	7.5
QBA-07	340-680	22	16	0.80	0.80	7.0	2.00	21.0	10.5
LRPQ-700J	500-700	23	18	0.20	0.60	3.0	1.80	1.0	0.50
HPQ-07	580-690	24	18	0.20	0.40	3.0	1.60	1.0	0.50
HPQ-08	680-790	24	18	0.25	0.40	3.0	1.60	1.0	0.50
HPQ-09	730-800	25	20	0.20	0.40	3.0	1.20	1.0	0.50
HPQ-09W	690-830	24	20	0.20	0.40	3.0	1.60	1.0	0.50
RPQ-820	760-860	22	15	0.15	0.70	4.0	1.00	1.0	0.50
QBA-12N	800-900	28	20	0.25	0.30	3.0	1.00	50.0	25.0
HPQ-10	900-970	22	17	0.25	0.45	4.0	1.20	1.0	0.50
HPQ-10W	880-1030	22	16	0.28	0.50	4.0	1.60	1.0	0.50
HPQ-11	980-1070	23	18	0.25	0.50	3.5	1.20	1.0	0.50
HPQ-12	990-1100	21	16	0.25	0.45	4.0	1.20	1.0	0.50
HPQ-12W	940-1130	21	16	0.30	0.50	4.0	1.60	1.0	0.50
QBA-12	800-1200	23	14	0.25	0.44	6.0	1.20	50.0	25.0
QCN-12A	800-1250	17	13	0.30	0.70	5.0	0.80	15.0	7.5
QCN-12	800-1375	19	14	0.40	1.00	13.0	1.00	15.0	7.5
QCN-13D	675-1300	20	14	0.40	0.90	8.0	1.30	15.0	7.5
HPQ-15	1320-1430	19	15	0.30	0.50	5.0	1.20	1.0	0.5
HPQ-15W	1240-1460	19	15	0.30	0.60	5.0	1.60	1.0	0.5
RPQ-1495	1400-1600	18	14	0.30	0.80	5.0	1.00	1.0	0.5
JSPQ-1875W	1325-1875	28	18	0.20	0.50	6.0	1.00	1.0	0.5
QCN-19	1100-1925	26	19	0.40	0.90	4.0	1.10	15.0	7.5
QBA-20	1800-2000	23	18	0.47	0.54	4.0	0.70	25.0	12.5
QCC-20	1200-2200	32	16	0.40	0.90	5.0	1.00	17.5	8.7
QBA-20W	1500-2200	23	16	0.41	0.58	5.0	1.20	25.0	12.5
QBA-24W	1700-2400	21	15	0.49	0.71	6.0	1.20	20.0	12.5
QBA-24	1900-2400	21	17	0.54	0.71	6.0	0.80	20.0	10.0
QCN-25	1350-2450	25	18	0.40	0.90	5.0	1.10	15.0	7.5
QCC-22	1500-2500	28	15	0.40	0.80	4.0	1.30	17.5	8.7
QCN-27	1700-2700	30	18	0.40	0.90	6.0	1.00	15.0	7.5
QCS-312	1700-3100	25	17	0.50	0.80	7.0	1.20	15.0	7.5
QCS-332	1800-3300	18	17	0.50	0.80	5.0	1.20	15.0	7.5
QCN-34	2500-3400	32	20	0.40	0.70	4.0	1.20	15.0	7.5
QCS-442	2000-4400	23	16	0.50	0.80	7.0	1.10	15.0	7.5
QCN-45	2500-4500	19	15	0.50	0.80	6.0	2.10	15.0	7.5
QCS-592	3100-5900	25	16	0.70	1.0	5.0	1.40	15.0	7.5
QCS-722	4000-7200	23	13	0.60	1.1	10.0	1.40	15.0	7.5

* Limited by the rating of external termination.

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POWER SPLITTERS/COMBINERS

1 MHz to 6.5 GHz 50 Ω & 75 Ω

SCN Case FV1206-1 | BP Case XX211 | SCA Case DZ944 | SBD Case SM34 | SBTCJ Case AT790 | WP Case DQ1225 | AMT Case CD636 | SCA Case DZ943 | JPS Case BH292 | LRPSJ Case QQQ569 | AD3,4,5,6PS Case CJ725 | SYPS-3-12W Case AH202 | SCP Case YY101, YY161

MODEL PREFIX	FREQ. RANGE, (MHz) f_L-f_U	ISOLATION (dB) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	INSERTION LOSS (dB) L Typ.	L Max.	M Typ.	M Max.	U Typ.	U Max.	PHASE UNBALANCE (Degrees) L Max.	M Max.	U Max.	AMPLITUDE UNBALANCE (dB) L Max.	M Max.	U Max.	INPUT RF Power Max (W) Sum Port (Matched output ports)	Internal Dissipation
2 WAY-0°/180°								*Insertion Loss Above 3 dB*													
AMT-2	50-200	35	20	35	20	35	20	0.8	1.2	0.8	1.2	0.8	1.2	2	2	2	0.3	0.3	0.3	0.5	0.125
2 WAY-180°																					
SBTCJ-1W	1-750	23	20	22	20	24	20	0.6	1.7	0.6	1.2	0.9	1.8	3	7	10	0.2	0.4	0.9	0.5	0.125
SCPJ-2-750	30-750	24	18	21	16	20	16	0.7	1.5	1.5	2.2	1.5	2.2	3	4	6	0.8	0.8	0.8	0.5	0.125
SCPJ-2-9	200-900	—	—	24	17	—	—	1.0	1.8	1.0	1.8	1.0	1.8	6	6	6	0.7	0.7	0.7	1.0	0.125
■ SCPJ-2-1W-75	10-500	30	25	27	20	22	16	1.0	1.5	1.1	1.6	1.5	2.2	3	4	6	0.3	0.5	0.9	0.5	0.125
■ SCPJ-2-750-75	30-750	26	20	—	—	26	16	1.0	1.5	—	—	1.5	2.2	3	—	6	0.8	—	0.9	0.5	0.125
3 WAY-0°								*Insertion Loss Above 4.8 dB*													
AD3PS-1	1-300	40	23	35	20	27	18	0.3	0.8	0.4	1.0	0.8	1.5	1	4	6	0.2	0.3	0.5	0.5	0.25
SCP-3-1	1-300	30	25	25	20	20	15	0.3	0.6	0.4	0.8	0.7	1.5	1	2	4	0.1	0.15	0.5	1.0	0.375
JPS-3-1	5-300	34	25	33	23	32	20	0.3	0.6	0.3	0.7	0.5	1.4	2	4	6	0.4	0.4	0.6	1.0	0.375
LRPS-3-1J	10-300	25	20	25	20	25	20	0.2	0.6	0.3	0.8	0.5	1.2	2	3	4	0.1	0.3	0.7	1.0	0.375
JPS-3-1W	50-750	23	17	—	—	26	17	0.4	1.0	—	—	0.9	1.4	6	—	7	0.3	—	0.6	1.0	0.5
LRPS-3-850J	500-850	23	16	23	16	23	16	0.7	1.6	0.7	1.6	0.7	1.6	8	8	8	0.9	0.9	0.9	1.0	0.375
SCA-3-11	100-940	20	14	20	14	20	14	—	—	0.7	1.5	—	—	7	7	7	0.7	0.7	0.7	0.5	0.25
SYPS-3-12W	20-1200			22	15			1.2	2.9	1.2	2.9	1.2	2.9	6	6	6	0.9	0.9	0.9	1.0	0.15
SCN-3-13	750-1325	12	10	12	10	12	10	1.0	1.5	1.0	1.5	1.0	1.5	3	3	3	0.7	0.7	0.7	15.0	▲
SCN-3-16	950-1600	15	11	15	11	15	11	0.6	1.2	0.6	1.2	0.6	1.2	5	5	5	0.5	0.5	0.5	15.0	▲
SCN-3-28	1600-2800	12	10	12	10	12	10	0.8	1.2	0.8	1.2	0.8	1.2	8	8	8	0.6	0.6	0.6	15.0	▲
■ SYPS-3-12W-75	20-1200	22	17	22	17	22	17	1.2	2.2	1.2	2.2	1.2	2.2	5	5	5	0.8	0.8	0.8	1.0	0.15
4 WAY-0°								*Insertion Loss Above 6 dB*													
SCP-4-1	1-400	32	23	26	18	21	17	0.4	1.2	0.6	1.2	1.0	1.5	1	4	9	0.2	0.3	0.5	1.0	0.25
AD4PS-1	1-500	32	18	30	20	25	18	0.4	1.2	0.5	1.2	0.8	1.8	2	5	7	0.4	0.5	0.8	0.5	0.25
SCP-4-1W	10-650	34	28	23	18	21	15	0.7	1.0	0.9	1.5	1.1	1.9	3	7	12	0.2	0.4	0.7	1.0	0.25
JS4PS-1	80-750	36	20	36	20	36	20	0.8	1.5	0.8	1.5	0.8	1.5	5	5	5	0.5	0.5	0.5	0.75	0.5
WP4C	810-960	24	18	24	18	24	18	0.8	1.6	0.8	1.6	0.8	1.6	3	3	3	0.5	0.5	0.5	1.5	0.375
BP4C	810-960			22	18			0.7	1.6	0.7	1.6	0.7	1.6	8	8	8	0.6	0.6	0.6	1.5	0.375
SCP-4-4	800-1000	24	17	24	17	24	17	0.7	1.5	0.7	1.5	0.7	1.5	12	12	12	1.0	1.0	1.0	1.0	0.25
SCA-4-10	5-1000	25	15	25	15	25	15	0.8	2.5	0.8	2.5	0.8	2.5	11	11	11	0.9	0.9	0.9	0.5	0.375
JS4PS-1W	5-1000	29	20	26	18	20	15	0.3	1.1	0.8	1.5	1.5	2.4	5	5	12	0.8	0.7	0.7	0.5	0.375
WP4M	720-1125	22	15	22	15	22	15	0.7	1.7	0.7	1.7	0.7	1.7	3	3	3	0.5	0.5	0.5	1.5	0.375
WP4C1	800-1150	22	15	22	15	22	15	0.7	1.6	0.7	1.6	0.7	1.6	4	4	4	0.5	0.5	0.5	1.5	0.375
BP4C1	750-1200	20	13	20	13	20	13	0.7	1.4	0.7	1.4	0.7	1.4	14	14	14	0.6	0.6	0.6	1.5	0.375
WP4G	1400-1660	28	19	28	19	28	19	0.7	1.4	0.7	1.4	0.7	1.4	4	4	4	0.5	0.5	0.5	1.5	0.375
WP4N	1215-1900	23	14	23	14	23	14	0.7	1.9	0.7	1.9	0.7	1.9	5	5	5	0.5	0.5	0.5	1.5	0.375
BP4P	1710-1990	23	18	23	18	23	18	0.8	1.3	0.8	1.3	0.8	1.3	15	15	15	0.5	0.5	0.5	1.5	0.375
WP4G1	1300-2000	26	14	26	14	26	14	0.8	1.9	0.8	1.9	0.8	1.9	5	5	5	0.5	0.5	0.5	1.5	0.375
SCA-4-20	1000-2000	15	8	15	8	15	8	1.0	1.8	1.0	1.8	1.0	1.8	5	5	5	0.9	0.9	0.9	5.0	0.25
WP4P	1710-2025	29	19	29	19	29	19	0.7	1.4	0.7	1.4	0.7	1.4	4	4	4	0.4	0.4	0.4	1.5	0.375
WP4P1	1525-2375	26	15	26	15	26	15	0.9	2.0	0.9	2.0	0.9	2.0	4	4	4	0.5	0.5	0.5	1.5	0.375
WP4U	2100-2500	28	18	28	18	28	18	0.7	1.4	0.7	1.4	0.7	1.4	4	4	4	0.5	0.5	0.5	1.5	0.375
BP4U	2100-2500	23	17	23	17	23	17	0.7	1.2	0.7	1.2	0.7	1.2	20	20	20	1.1	1.1	1.1	1.5	0.375
BP4P1	1500-2500	21	15	21	15	21	15	0.8	1.6	0.8	1.6	0.8	1.6	25	25	25	0.8	0.8	0.8	1.5	0.375
SBD-4-25	1800-2600	20	12	20	12	20	12	1.0	1.9	1.0	1.9	1.0	1.9	8	8	8	0.7	0.7	0.7	10.0	0.375
WP4R	2300-2700	26	18	26	18	26	18	0.7	1.4	0.7	1.4	0.7	1.4	6	6	6	0.4	0.4	0.4	1.5	0.375
WP4U1	1875-2800	24	15	24	15	24	15	0.7	1.9	0.7	1.9	0.7	1.9	5	5	5	0.5	0.5	0.5	1.5	0.375
WP4R1	2000-3000	24	16	24	16	24	16	0.7	2.1	0.7	2.1	0.7	2.1	7	7	7	0.5	0.5	0.5	1.5	0.375
BP4U1	1850-3000	23	13	23	13	23	13	0.7	1.7	0.7	1.7	0.7	1.7	28	28	28	1.3	1.3	1.3	1.5	0.375
WP4L	2700-3800	24	16	24	16	24	16	0.7	2.1	0.7	2.1	0.7	2.1	9	9	9	0.5	0.5	0.5	1.5	0.375
WP4W	3300-3800	26	18	26	18	26	18	0.8	1.4	0.8	1.4	0.8	1.4	8	8	8	0.4	0.4	0.4	1.5	0.375
WP4W1	3000-4200	26	17	26	17	26	17	0.9	1.9	0.9	1.9	0.9	1.9	9	9	9	0.5	0.5	0.5	1.5	0.375
WP4S	3400-4600	30	16	30	16	30	16	0.8	1.8	0.8	1.8	0.8	1.8	9	9	9	0.6	0.6	0.6	1.5	0.375
WP4F	5150-5875	29	18	29	18	29	18	1.0	1.8	1.0	1.8	1.0	1.8	7	7	7	0.5	0.5	0.5	1.5	0.375
WP4F1	4750-6200	28	16	28	16	28	16	1.0	2.0	1.0	2.0	1.0	2.0	9	9	9	0.6	0.6	0.6	1.5	0.375
WP4A	5100-6500	25	15	25	15	25	15	0.9	2.0	0.9	2.0	0.9	2.0	8	8	8	0.5	0.5	0.5	1.5	0.375
■ JS4PS-1W-75	5-750	34	25	35	25	30	18	0.6	1.2	0.6	1.5	0.8	1.5	3	5	6	0.2	0.3	0.6	0.25	0.25
■ SCP-4-1W-75	10-750	36	20	32	20	24	15	0.5	1.0	0.65	1.3	0.8	2.0	1.5	3	6	0.2	0.4	0.9	0.50	0.375
■ JS4PS-9-75	50-860	25	16	25	16	25	16	0.6	1.9	0.6	1.9	0.6	1.9	5	5	5	0.8	0.8	0.8	0.50	0.05
■ SCA-4-10-75	10-1000	25	15	25	15	25	15	1.5	2.5	1.5	2.5	1.5	2.5	10	10	10	1.2	1.2	1.2	0.50	0.375
■ SCP-4-4-75	10-1000	36	20	32	18	24	14	0.5	1.0	0.65	1.3	0.8	2.0	3	6	12	0.2	0.4	0.9	1.00	0.375
■ SCA-4-15-75	10-1500	19	15	19	15	19	15	1.2	2.8	1.2	2.8	1.2	2.8	16	16	16	1.1	1.1	1.1	0.50	0.375
QUADRAPURE OUTPUT								*Insertion Loss Above 6 dB*													
SCQ-4-1650	1150-1650	22	18	22	18	22	18	1.5	2.0	1.5	2.0	1.5	2.0	8	8	8	1.0	1.0	1.0	1.0	0.20

■ 75 Ω

▲ Total power on output ports not to exceed sum port power.

L=low range (f_L to $10f_L$) M= mid range ($10f_L$ to $f_U/2$) U= upper range ($f_U/2$ to f_U)

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POWER SPLITTERS/COMBINERS 50 Ω & 75 Ω

1 MHz to 1 GHz

JS4PS
Case BJ360

JS4PS-1W
Case BK377

SCQ
Case HU1374

JCPS
Case BG291

JEPS
Case BL372

MODEL PREFIX	FREQUENCY RANGE, (MHz) f_L-f_U	ISOLATION (dB) L Typ.	L Min.	M Typ.	M Min.	U Typ.	U Min.	INSERTION LOSS (dB) L Typ.	L Max.	M Typ.	M Max.	U Typ.	U Max.	PHASE UNBALANCE (Degrees) L Max.	M Max.	U Max.	AMPLITUDE UNBALANCE (dB) L Max.	M Max.	U Max.	RF POWER MAX (W) Sum Port (Matched output ports)	Internal Dissipation
5 WAY-0°								*Insertion Loss Above 7 dB*													
SCP-5-1	2-200	30	20	29	20	30	20	0.2	0.5	0.3	0.75	0.6	1.5	1	3	5	0.2	0.30	0.6	1.0	0.625
AD5PS-1	1-400	35	18	25	20	27	20	0.15	0.5	0.3	1.0	0.8	1.8	1	6	9	0.3	0.40	0.6	0.5	0.4
6 WAY-0°								*Insertion Loss Above 7.8 dB*													
AD6PS-1	2-250	35	17	30	20	27	20	0.2	0.6	0.2	1.0	0.6	1.5	2	6	9	0.3	0.4	0.6	0.5	0.5
JCPS-6-3	75-425	23	18	23	18	23	18	0.9	1.8	0.9	1.8	0.9	1.8	9	9	9	0.7	0.7	0.7	0.25	0.5
8 WAY-0°								*Insertion Loss Above 9 dB*													
JCPS-8-850	10-850	34	20	25	17	20	15	0.8	1.5	1.0	2.5	1.8	3.0	5	10	15	0.6	0.7	1.0	1.0	0.875
JCPS-8-10	5-1000	34	20	22	16	20	15	0.5	1.5	1.2	2.2	1.8	3.0	5	10	15	1.0	0.7	1.3	0.5	0.875
■ JCPS-8-850-75	10-850	34	20	25	15	20	15	0.7	1.5	1.0	2.0	1.8	3.0	—	—	—	0.6	0.7	1.0	1.0	0.875
■ JCPS-8-10-75	5-1000	34	20	25	15	20	13	0.8	1.5	1.0	2.5	1.8	3.0	3	8	10	0.4	0.5	1.3	1.0	0.62
12 WAY-0°								*Insertion Loss Above 10.8 dB*													
JEPS-12-10	50-1000	25	16	—	—	23	14	1.6	2.5	—	—	2.2	4.0	10	—	23	0.7	—	1.4	0.5	0.87
16 WAY-0°								*Insertion Loss Above 12 dB*													
JEPS-16-1W	5-1000	36	23	23	17	20	15	0.8	2.0	1.5	2.5	3.0	4.2	8	13	20	1.5	1.2	1.8	0.5	1.875
■ JEPS-16-1W-75	10-800	32	20	23	15	20	15	1.6	3.5	1.9	3.5	2.2	4.0	10	15	30	0.8	1.2	2.1	0.5	0.275

■ *75 Ω*

L = low range (f_L to $10f_L$) M = mid range ($10f_L$ to $f_U/2$) U = upper range ($f_U/2$ to f_U)

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SWITCHES, SEMI-CONDUCTOR GaAs & CMOS 50 Ω

DC to 6 GHz

M3SW	SWM	CSWA2	HSWA2	MSW	KSW	RSW	GSWA	VSWA2
Case DL805	Case DL1020	Case DG1293	Case DG983-1	Case XX211-1	Case XX112	Case CL620	Case AN1102	Case DG1235

MODEL PREFIX	FREQUENCY (MHz) f_L-f_U	ABSORPTIVE	REFLECTIVE	INSERTION LOSS (dB) Frequency Band Typ.	Max.	1 dB COMPRESSION (dBm) Typ.	IN-OUT ISOLATION (dB) Frequency Band Typ.	Min.
SPST	**Without Drivers**			**DC to 2000 MHz**				
KSWHA-1-20	DC-2000	•		1.3	1.7	26	65	58
SPDT	**Without Drivers**			**DC to 4600 MHz**				
KSW-2-46	DC-4600		•	1.3	2.8	20	50	28
KSWA-2-46	DC-4600	•		1.5	2.6	20	50	25
RSW-2-25P	DC-2500		•	1.0	1.8	29	48	43
MSW-2-20	DC-2000		•	0.7	1.3	27	34	20
MSWA-2-20	DC-2000	•		1.2	1.5	27	37	25
SPDT	**With TTL Drivers**			**DC to 4500 MHz**				
M3SW-2-50DR	DC-4500		•	0.9	1.9	25	50	30
M3SWA-2-50DR	DC-4500	•		0.9	2.0	25	57	30
SWM-2-50DR	DC-4500		•	0.9	1.9	25	50	27
SWMA-2-50DR	DC-4500	•		0.9	1.9	25	55	27
	With CMOS Drivers			**DC to 6000 MHz**				
HSWA2-30DR	DC-3000	•		0.9	1.4	31	55	44
CSWA2-63DR	DC-6000	•		1.1	1.8	27	50	44
VSWA2-63DR	500-6000	•		1.2	1.9	27	46	38
TRANSFER	**Without Drivers**			**DC to 2000 MHz**				
MSWT-4-20	DC-2000		•	1.25	2.2	28	34	15
SP4T	**With TTL Drivers**			**DC to 3000 MHz**				
GSWA-4-30DR	DC-3000	•		2.0	3.9	25	40	26

CONTROL LOGIC

CSWA2-63DR, VSWA2-63DR

State of Control Voltage	Switch State - RF Common to RF1	RF2
Low	ON	OFF
High	OFF	ON

ON - low insertion loss state
OFF - Isolation state

HSWA2-30DR

CONTROL INPUT		RF INPUT/OUTPUT	
Control 1	Control 2	RF1 to RF Common	RF2 to RF Common
Low	Low	OFF	OFF
Low	High	OFF	ON
High	Low	ON	OFF
High	High	N/A	N/A

Low: 0 to 0.3 Vdd
High: 0.7 Vdd to Vd
Vdd: 2.7 to 3.3 V

MSWT-4-20

Control Ports 1	2	3	4	"On" Path (other paths are ("OFF")
0	-v	-v	-v	T_xJ_2
-v	0	-v	-v	T_xJ_1
-v	-v	0	-v	R_xJ_1
-v	-v	-v	0	R_xJ_2
0	-v	0	-v	T_xJ_2 & R_xJ_1
-v	0	-v	0	T_xJ_1 & R_xJ_2

V= 5 to 8 V

RSW-2-25

Control Ports 1	2	RF outputs 1	2
LOW	HIGH	ON	OFF
HIGH	LOW	OFF	ON

Low: 0+/-0.2 V
High: Vs -0.2 to Vs
Vs: 5 to 7 V

SPDT and SPST Switches without Drivers

		KSW-2-46 KSWA-2-46 MSW-2-20		MSWA-2-20		KSWHA-1-20
Control Ports		RF outports		RF outports		RF out
1	2	1	2	1	2	
-V	0	ON	OFF	ON	OFF	ON
0	-V	OFF	ON	OFF	ON	OFF

V= 5 to 8 V

SP4T Switch with Driver: GSWA-4-30DR

Control Ports 1	2	3	4	RF outputs 1	2	3	4
Low	High	High	High	ON	OFF	OFF	OFF
High	Low	High	High	OFF	ON	OFF	OFF
High	High	Low	High	OFF	OFF	ON	OFF
High	High	High	Low	OFF	OFF	OFF	ON

Low: 0 to 0.8 V
High: 2 to 5 V

SPDT Switches with TTL Drivers: M3SW-2-50DR, M3SWA-2-50DR, SWM-2-50DR and SWMA-2-50DR

Control Port	RF outports 1	2
Low	ON	OFF
High	OFF	ON

Low: 0 to 0.8 V
High: 2 to 5 V

YONI2™ Patent Pending
The Design Engineers Search Engine *finds the model you need, Instantly.*
For pricing/availability, complete specifications, data sheets, RoHS compatibility, performance data/curves, pcb layouts, outline drawings & shopping online, see minicircuits.com

SYNTHESIZERS

56 MHz to 6010 MHz

Let the Mini-Circuits design team create a custom frequency synthesizer tailored to your requirements. We will review your requirements and, following technical discussions between your engineers and Mini-Circuits designers, we will work closely with you to create final specifications that meet or exceed your requirements. To ensure high yields, we will factor in component tolerances and even variations in manufacturing processes. You will have full access to performance data from sample units, and can even evaluate sample units in your system to ensure that final production units fulfill your performance requirements.

To meet the needs of a wide range of systems and applications, Mini-Circuits offers seven different types of custom frequency synthesizers:

1 Fixed Frequency

For applications requiring a highly stable single frequency, Mini-Circuits engineering team can customize a low-noise synthesized source for any frequency from 56 MHz to 6010 MHz. Fixed-frequency synthesizers feature low phase noise with spurious performance of -90 dBc or better. They operate with low power consumption and are supplied in compact surface-mount or connectorized packages.

- *Settling times of typically 100 ms or better*
- *Harmonics of -20 dBc or better*

2 Tunable Narrow Bandwidth

For applications requiring tunable bandwidths of center frequency ± 10% (or less), Mini-Circuits custom narrowband frequency synthesizers can be specified to 6010 MHz with low phase noise, low harmonics, and spurious levels of -85 dBc or better. Available with customer-specified step sizes, these high-performance synthesizers are housed in compact surface-mount or connectorized packages.

- *Typical settling times of 30 ms or less*
- *Harmonics of -20 dBc or better*

3 Tunable Medium Bandwidth

Mini-Circuits medium-bandwidth frequency synthesizers can be specified for center frequency ±10% to ±30% over a frequency range of 56 MHz to 6010 MHz. They offer spurious performance of -90 dBc typical or better, with customer specified step sizes, low power consumption, and packaged in compact surface-mount or connectorized housings.

- *Typical settling times of 25 ms or less*
- *Harmonics of -20 dBc or better*

4 Tunable Wide Bandwidth

For tuning bandwidths of center frequency ±30% to ±50% Mini-Circuits wide-bandwidth frequency synthesizers can be specified from 56 MHz to 6010 MHz with custom step sizes.They feature outstanding spurious performance of -80 dBc or better with output levels to +9 dBm or more. Mini-Circuits wide-bandwidth frequency synthesizers are supplied in surface-mount or connectorized packages.

- *Bandwidths greater than 500 MHz*
- *Typical settling times of 25 ms or less*
- *Harmonics of -20 dBc or better*

5 Tunable Very Wide Bandwidth

For extremely wide tuning bandwidths up to 6 octave ex; 700 MHz to 4000 MHz, achieved in one model, Mini-Circuits very-wide-bandwidth frequency synthesizers can be specified with customer-specified step sizes. These broadband synthesizers boast output levels of +8 dBm typical spurious performance of -80 dBc or better, and low phase noise. Very-wide-bandwidth frequency synthesizers can be supplied in surface-mount or connectorized packages.

- *Typical settling times of 15μs or less*
- *Harmonics of -20 dBc or better*
- *Frequency 700 to 4000 MHz*

6 Tunable Fast Settling Time

Fast switching speed alone is not enough. Mini-Circuits custom fast-settling-time frequency synthesizers provide fast switching speed while also settling to a stable, new frequency quickly. Fast-settling-time frequency synthesizers settle within ±5.4 deg. of a new tuned frequency in microseconds even for large frequency steps.

- *Settling time of 25 μs or less*
- *Typical spurious of -65 dBc or better*
- *Frequency 714 to 1618 MHz*

7 Dual Frequency

For savings in cost and system real estate, Mini-Circuits can customize a single package containing two discrete, single frequency synthesizers, with any two frequencies. Both synthesizers are characterized by low phase noise and spurious levels of -90 dBc or less. These dual-frequency synthesizers can be supplied in compact surface-mount or connectorized packages.

- *Harmonics of -20 dBc or better*
- *Typical phase noise of -92 dBc/Hz or better at 1 kHz offset*
- *Programmable*

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Some Examples Of Custom Synthesizers Provided To Customers

KSN
0.800" x 0.584"x 0.154
(20.32 x 14.83 x 3.91mm)

DSN
1.25" x 1.00" x 0.20"
(31.75 x 25.40 x 5.08 mm)

RSN
0.91" x 0.91" x 0.252"
(23.11 x 23.11 x 6.40 mm)

SSN/SSND
0.60" x 0.60" x 0.138"
(15.24 x 15.24 x 3.50 mm)

WSN
1.75" x 1.25" x 0.22"
(44.45 x 31.75 x 5.99 mm)

ZSN
2.75" x 1.96" x 0.62"
(69.85 x 49.78 x 15.75 mm)

Model Package Style	Freq. Min. (MHz)	Freq. Max (MHz)	Ref. Freq. (MHz)	Step Size (kHz)	VCC PLL (V)	VCC VCO (V)	Output Power (dBm) Typ.	Harmonics (-dBc) Typ.	Reference Spurious (-dBc) Typ.	Comparison Spurious (-dBc) Typ.	Phase Noise 100 Hz (-dBc/Hz) Typ.	Phase Noise 1 K (-dBc/Hz) Typ.	Phase Noise 10 K (-dBc/Hz) Typ.	Phase Noise 100 K (-dBc/Hz) Typ.	Settling Time (mSec) Typ.	Case Style	Application
Fixed Frequency Synthesizers (with internal microcontroller)																	
KSN	144	144	52	N/A	3	5	3	25	95	90	95	105	106	134	100	99-01-1251	WIMAX 2.5 GHz
KSN	675	675	27	N/A	3	5	3	20	85	85	97	92	110	134	30	DK1042	BROADBAND ACCESS
KSN	768	768	52	N/A	3	5	6	25	85	90	75	96	103	129	35	99-01-1251	WIMAX 3.5 GHz
KSN	1024	1024	10.24	N/A	5	5	0	27	95	78.5	74	78	104	131	10	DK1042	CATV
ZSN *	4950	4950	26	N/A	15	15	-3	35	102	86	60	80	84	112	27	99-01-1336	MILITARY
Tunable Narrow Band Synthesizers (center frequency ±10% or less)																	
KSN	620	660	30	20	3.3	5	-0.5	40	90	75	70	74	106	129	15	DK801	CDMA
KSN	900	960	8	100	5	5	3	20	85	85	82	75	100	125	5	DK1042	RFID READER
KSN	1150	1160	20	250	5	5	2	30	100	80	86	81	104	130	5	DK801	CATV
KSN	1850	1970	76.8	1280	5	5	5	50	95	95	88	86	95	125	10	DK1042	TD-SCDMA
KSN	2110	2170	10	200	5	5	2	35	100	90	67	81	108	129	10	DK801	W-CDMA
KSN	2110	2170	4.8	200	5	5	5	45	100	90	62	75	106	126	30	DK801	UMTS 2.5
KSN	2090	2190	12.8	100	5	5	1	40	105	95	68	73	104	124	5	DK801	UMTS
KSN	2027	2222	52	125	3	5	4	25	90	95	77	87	104	129	20	99-01-1251	WIMAX 2.5 GHz
KSN	2045	2310	14.4	50	5	5	6	25	100	80	50	69	94	115	15	DK801	REPEATER
SSN	2495	2690	52	250	3	5	3	30	80	95	77	88	95	123	25	99-01-1367	WIMAX 2.5 GHz
DSN	2300	2700	10	250	12.5	5	5	25	95	90	56	67	97	119	25	99-01-942	POINT TO MULTIPOINT
ZSN *	2536	2736	26	200	12	12	9.5	27	87	80	70	89	94	123	27	99-01-1336	MILITARY
SSN	2932	3132	52	250	3	5	3	20	80	80	82	88	95	118	10	99-01-1367	WIMAX 3.5 GHz
Tunable Medium Band Synthesizers (center frequency ±10% to ±30%)																	
DSN	1100	1500	10	500	12	5	5	20	115	100	61	72	98	122	5	99-01-942	POINT TO MULTIPOINT
DSN	1200	2200	20	10000	22	10	9	20	75	75	84	97	99	106	0.5	99-01-1294	CABLE TV
DSN	1690	2310	10	250	12	5	5	25	100	95	58	68	97	121	10	99-01-942	POINT TO MULTIPOINT
DSN	1788	3019	10	100	15	5	2	11	85	75	51	60	81	106	20	99-01-942	RECEIVER
DSN	2700	3500	10	1000	16	5	3.5	25	92	85	83	84	85	105	0.22	99-01-1294	VSAT
Tunable Wide Band Synthesizer (center frequency ±30% to ±50%)																	
DSN	900	2000	10	250	19	10	-2	20	100	80	80	84	80	107	3	99-01-1294	SATELLITE
Tunable Very Wide Band Synthesizer (up to 6 octave)																	
WSN	700	4000	20	10000	22	10	8	30	97	82	89	101	101	100	0.015	99-01-1368	MILITARY
Tunable Fast Settling Time Synthesizers (less than 30 micro Sec)																	
RSN	714	749	52	200	3.3	5.5	4	25	100	90	95	100	104	106	0.025	99-01-1228	GSM 850
RSN	760.6	795.4	52	200	3.3	5.5	5	25	90	65	92	102	104	105	0.025	99-01-1228	GSM 900
RSN	1543	1618	52	200	3.3	5.5	4.5	25	85	61	88	94	98	106	0.025	99-01-1228	GSM 1800
Dual Band Frequency Synthesizers																	
SSND	600 1390	600 1390	10 10	2000 2000	2.5 2.5	3 3	-10 3	24 29	85 76	91 91	89 84	96 91	95 90	122 122	- -	99-01-1373	GPS
SSND	1000 1440	1000 1440	10 10	2000 2000	2.5 2.5	3 3	-9.7 3	31 31	77 102	96 97	85 82	92 89	90 89	119 119	- -	99-01-1373	GPS

* Available with & without external reference.

See our web site for RoHS Compliance methodologies and qualifications.

RoHS compliant in accordance with EU Directive (2002/95/EC)

TRANSFORMERS, IF/RF 50 & 75 Ω

4 kHz to 1.4 GHz Wideband 50 to 1800 Ω

TCM
Case DB714

TC
Case AT224-1, AT224-3

ADT
CD542/CD636/CD637

MODEL PREFIX	Ω RATIO (Secondary/Primary)	FREQUENCY (MHz)	INSERTION LOSS (dB) Above mid band 3 dB MHz	2 dB MHz	1 dB MHz
A *SCHEMATIC* *Unbalanced to Balanced center tap*					
ADT1-6T	1	0.03-125	0.03-125	0.04-75	0.05-50
T1-1T	1	0.08-200	0.08-200	0.15-150	0.2-80
T1-1T-KK81	1	0.08-200	0.08-200	0.15-150	0.2-80
T1-6T	1	0.015-300	0.015-300	0.021-150	0.03-50
T1-6T-KK81	1	0.015-300	0.015-300	0.021-150	0.03-50
■ ADT1-1WT-1	1	1-400	—	—	1-400
TC1-1T	1	0.4-500	0.4-500	0.5-300	1-100
TC1-1TG2	1	0.4-500	0.4-500	0.5-300	1-100
■ ADT1-1WT	1	0.4-800	0.4-800	0.5-700	1-400
TC1.5-52T	1.5	0.5-550	0.5-550	1-350	2-200
TC1.5-52TG2	1.5	0.5-550	0.5-550	1-350	2-200
ADT1.5-1	1.5	0.5-650	0.5-650	0.8-500	1-300
T2-1T	2	0.07-200	0.07-200	0.1-100	0.5-50
T2-1T-KK81	2	0.07-200	0.07-200	0.1-100	0.5-50
TC2-1T	2	3-300	—	—	3-300
TC2-1T G2	2	3-300	—	—	3-300
TCM2-1T	2	3-300	—	—	3-300
ADT2-1T	2	0.4-450	0.4-450	0.6-400	1-200
ADT2-1T-1P	2	8-600	8-600	10-400	13-300
■ JTX-2-10T	2	50-1000	—	—	50-1000
■ TX-2-5-1	2	30-1100	—	30-1100	100-800
JT-1975	2	0.04-80	0.04-80	0.05-60	0.1-30
T2.5-6T	2	0.01-100	0.01-100	0.02-50	0.50-20
T2.5-6T-KK81	2	0.01-100	0.01-100	0.02-50	0.50-20
T3-1T	3	0.05-250	0.05-200	0.1-200	0.5-70
T3-1T-KK81	3	0.05-250	0.05-250	0.1-200	0.5-70
TC3-1T	3	5-300	—	—	5-300
TC3-1TG2	3	5-300	—	—	5-300
ADT3-6T	3	0.06-400	0.06-400	0.1-290	0.2-250
ADT3-1T	3	1-500	—	1-500	2-300
TCM3-1T	3	2-500	—	2-500	5-300
T4-6T	4	0.02-250	0.02-250	0.05-150	0.1-100
T4-6T-KK81	4	0.02-250	0.02-250	0.05-150	0.1-100
ADT4-6T	4	0.06-300	0.06-300	0.08-250	0.15-200
TC4-1T	4	0.5-300	—	0.5-300	1.5-100
TC4-1TG2	4	0.5-300	—	0.5-300	1.5-100
T4-1	4	0.2-350	0.2-350	0.35-300	2-100
T4-1-KK81	4	0.2-350	0.2-350	0.35-300	2-100
T4-1H	4	10-350	10-350	15-300	25-200
T4-1H-KK81	4	10-350	10-350	15-300	25-200
ADT4-5WT	4	0.3-500	0.3-500	0.5-400	2-250
ADT4-6WT	4	0.5-600	0.5-600	0.7-475	2-300
TC4-6T	4	1.5-600	1.5-600	2-400	3-350
TC4-6TG2	4	1.5-600	1.5-600	2-400	3-350
TCM4-6T	4	1.5-600	1.5-600	2-400	3-350
ADT4-1T	4	9-625	9-625	10-550	14-500
ADT4-1WT	4	2-775	2-775	3-600	6-250
TC4-1W	4	3-800	3-800	5-400	10-100
TC4-1WG2	4	3-800	3-800	5-400	10-100
TCM4-1W	4	3-800	3-800	5-400	10-100
JTX-4-10T	4	50-1000	—	—	50-1000
TC4-14	4	200-1400	200-1400	300-1300	800-1100
TC4-14G2	4	200-1400	200-1400	300-1300	800-1100
TCM4-14	4	200-1400	200-1400	300-1300	800-1000
T5-1T	5	0.3-300	0.3-300	0.6-200	5-100
T5-1T-KK81	5	0.3-300	0.3-300	0.6-200	5-100
ADT8-1T	8	0.1-130	0.1-130	0.15-110	0.2-75
T8-1T	8	0.3-140	0.3-140	0.7-90	1-60
T8-1T-KK81	8	0.3-140	0.3-140	0.7-90	1-60
TCM8-1	8	2-500	2-500	5-400	10-100
TC8-1G2	8	2-500	2-500	5-400	10-100
TC8-1	8	2-500	2-500	5-400	10-100
TC9-1	9	2-200	2-200	3-100	5-40
TC9-1G2	9	2-200	2-200	3-100	5-40
ADT9-1T	9	1-250	—	1-250	2-150
TCM9-1	9	2-280	2-280	3-150	5-100
T13-1T	13	0.3-120	0.3-120	0.7-80	5-20
T13-1T-KK81	13	0.3-120	0.3-120	0.7-80	5-20
ADT16-6T	16	0.1-70	0.1-70	0.18-45	0.30-33
T16-6T	16	0.03-75	0.03-75	0.06-30	0.1-20
T16-6T-KK81	16	0.03-75	0.03-75	0.06-30	0.1-20
ADT16-1T	16	1.5-160	1.5-160	3-105	5-65
TC16-161T	16	0.6-160	0.6-160	1.5-120	3-80
TC16-161TG2	16	0.6-160	0.6-160	1.5-120	3-80
TC16-1T	16	20-300	20-300	30-200	50-150
TC16-1TG2	16	20-300	20-300	30-200	50-150
TX16-R3T	16	40-300	40-300	60-220	70-150

■ *75 Ω*

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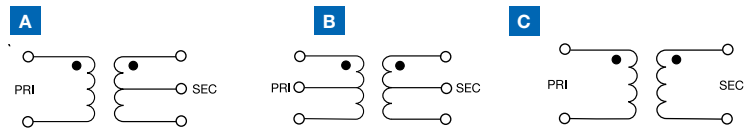
TX Case TT240 | JT/JTX Case BH292 | T/TT Case W38 | T Case KK81

MODEL PREFIX	Ω RATIO (Secondary/Primary)	FREQUENCY (MHz)	INSERTION LOSS (dB) Above midband loss 3 dB MHz	2 dB MHz	1 dB MHz
B *SCHEMATIC*	*Balanced to Balanced center tap at primary & Secondary*				
ADTT1-6	1	.015-100	.015-100	.02-50	.06-30
ADTT1-1	1	0.3-300	0.3-300	0.4-200	0.5-90
TT1-6-KK81	1	.004-300	.004-300	.02-200	.1-50
TT1-6	1	.004-300	.004-300	.02-200	.1-50
ADTT1.5-1	1.5	0.25-300	0.25-300	0.3-175	0.5-100
TT1.5-1-KK81	1.5	.075-500	.075-500	.2-100	1-50
TT1.5-1	1.5	.075-500	.075-500	.2-100	1-50
TT2.5-6-KK81	2.5	.01-50	.01-50	.025-25	.05-10
TT2.5-6	2.5	.01-50	.01-50	.025-25	.05-10
TT4-1-KK81	3	.05-200	.05-200	.2-50	1-30
TT4-1	3	.05-200	.05-200	.2-50	1-30
ADTT3-2	3	0.2-210	0.2-210	0.3-150	0.5-90
ADTT4-1	4	0.2-120	—	—	0.2-120
TT4-1A-KK81	4	0.1-300	0.1-300	0.2-250	0.3-180
TT4-1A	4	0.1-300	0.1-300	0.2-250	0.3-180
TTCM4-4	4	0.5-400	0.5-400	1.3-160	5-100
TT16-1-KK81	16	0.1-45	0.1-45	0.14-35	1-20
TT16-1	16	0.1-45	0.1-45	0.14-35	1-20
TT25-1-KK81	25	.02-30	.02-30	.05-20	.1-10
TT25-1	25	.02-30	.02-30	.05-20	.1-10
C *SCHEMATIC*	*Balanced to Balanced*				
T1-6-KK81	1	.01-150	.01-150	.02-100	.05-50
T1-6	1	.01-150	.01-150	.02-100	.05-50
T1-1H-KK81	1	8-300	8-300	10-200	25-100
T1-1H	1	8-300	8-300	10-200	25-100
TC1-6	1	0.15-350	0.15-350	0.25-250	0.3-125
ADT1-1	1	0.15-400	0.15-400	0.2-200	0.3-100
T1-1-KK81	1	0.15-400	0.15-400	.35-200	2-50
T1-1	1	0.15-400	0.15-400	.35-200	2-50
TC1-42	1	0.25-400	0.25-400	0.35-250	0.7-150
TX1-1	1	0.3-400	0.3-400	0.6-200	2-50
TCM1-1	1	1.5-500	1.5-500	2.5-400	5-350
TC1-1	1	1.5-500	1.5-500	2.5-400	5-350
TC1-1G2	1	1.5-500	1.5-500	2.5-400	5-350
TX1-R5	1	0.8-500	0.8-500	1.2-350	3.2-180
T1.18-3-KK81	1.18	0.01-250	0.01-250	0.02-200	0.03-50
T1.18-3	1.18	0.01-250	0.01-250	0.02-200	0.03-50
T1.5-6-KK81	1.5	.02-100	.02-100	.05-50	0.1-25
T1.5-6	1.5	.02-100	.02-100	.05-50	0.1-25
ADT1.5-2	1.5	0.3-225	0.3-225	0.5-140	0.7-80
T1.5-1-KK81	1.5	.1-300	.1-300	.2-150	.5-80
T1.5-1	1.5	.1-300	.1-300	.2-150	.5-80
TX1.5-1	1.5	0.25-300	0.25-300	0.3-150	0.5-80
T2-1-2W-KK81	2	5-120	—	—	5-120
T2-1-2W	2	5-120	—	—	5-120
T2.5-6-KK81	2.5	.01-100	.01-100	.02-50	.05-20
T2.5-6	2.5	.01-100	.01-100	.02-50	.05-20
T4-6-KK81	4	.02-200	.02-200	.05-150	.1-100
T4-6	4	.02-200	.02-200	.05-150	.1-100
ADT4-6	4	0.07-250	.07-250	0.1-220	0.15-150
T4-1-2W-KK81	4	10-250	—	—	10-250
T4-1-2W	4	10-250	—	—	10-250
T9-1H-KK81	9	2-90	2-90	3-75	6-50
T9-1H	9	2-90	2-90	3-75	6-50
T9-1-KK81	9	.15-200	.15-200	.3-150	2-40
T9-1	9	.15-200	.15-200	.3-150	2-40
TX9-1	9	1-200	1-200	1.5-160	3-70
T16-1H-KK81	16	7-85	7-85	10-65	15-40
T16-1H	16	7-85	7-85	10-65	15-40
ADT16-6	16	0.25-105	0.25-105	0.45-75	1-40
T16-1-KK81	16	.3-120	.3-120	.7-80	5-20
T16-1	16	.3-120	.3-120	.7-80	5-20
T36-1-KK81	36	.03-20	.03-20	.05-10	.1-5
T36-1	36	.03-20	.03-20	.05-10	.1-5

ELECTRICAL SCHEMATICS



TRANSFORMERS, IF/RF 50 & 75 Ω

10 kHz to 6.2 GHz Wideband 8 to 700 Ω

ADT Cases
CD542, CD636, CD637

TX
Case TT240

T
Case KK81

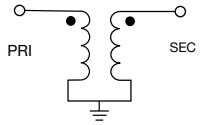
T
Case W38

MODEL PREFIX	Ω RATIO (Secondary/Primary)	FREQUENCY (MHz)	INSERTION LOSS (dB) Above midband 3 dB (MHz)	2 dB (MHz)	1 dB (MHz)
D SCHEMATIC	***Unbalanced to Unbalanced***				
ADT1.5-17	1.5	.5-1700	.5-1700	1-1500	2-1100
TC1.5-1	1.5	.5-2200	.5-2200	1-2000	2-1100
TC1.5-1G2	1.5	.5-2200	.5-2200	1-2000	2-1100
T2-1-KK81	2	.050-600	.050-600	.1-400	.5-200
T2-1	2	.050-600	.050-600	.1-400	.5-200
T3-1-KK81	3	.5-800	.5-800	2-400	—
T3-1	3	.5-800	.5-800	2-400	—
T4-2-KK81	4	.2-600	.2-600	.5-500	2-250
T4-2	4	.2-600	.2-600	.5-500	2-250
T8-1-KK81	8	.15-250	.15-250	.25-200	2-100
T8-1	8	.15-250	.15-250	.25-200	2-100
T14-1-KK81	14	.2-150	.2-150	.5-100	2-50
T14-1	14	.2-150	.2-150	.5-100	2-50
TC4-11	50/12.5	2-1100	—	2-1100	5-700
TC4-11G2	50/12.5	2-1100	—	2-1100	5-700
TC2-112G2	50/25	2-1100	—	2-1100	10-800
■ TC9-1-75	75/8	0.3-475	0.3-475	0.5-450	0.9-370
■ TC9-1-75G2	75/8	0.3-475	0.3-475	0.5-450	0.9-370
F SCHEMATIC	***Single-ended to balanced with Impedance ratio selection***				
T-626-KK81	1:1:1	0.01-10	0.01-10	0.02-5	.04-2
T-626	1:1:1	0.01-10	0.01-10	0.02-5	.04-2
T-622-KK81	1:1:1	0.1-200	0.1-200	0.5-100	5-80
T-622	1:1:1	0.1-200	0.1-200	0.5-100	5-80
T2-613-1-KK81	1:1:2	0.07-200	0.07-200	0.1-100	0.5-50
T2-613-1	1:1:2	0.07-200	0 07-200	0.1-100	0.5-50
G SCHEMATIC	***Balanced transmission line***				
■ ADTL1-4-75	1	0.5-1000	0.5-1000	1-600	5-400
TCN1-10	1	680-1050	—	—	680-1050
TCL1-11	1	600-1100	—	600-1100	700-1000
TCL1-11G2	1	600-1100	—	600-1100	700-1000
TCML1-11	1	600-1100	—	600-1100	700-1000
ADTL1-12	1	20-1200	—	20-1200	50-1000
TC1-15	1	350-1500	—	350-1000	800-1500
TC1-15G2	1	350-1500	—	350-1000	800-1500
■ ADTL1-18-75	1	5-1800	—	5-1800	25-1200
TCL1-19	1	800-1900	800-1900	—	800-1400
TCL1-19G2	1	800-1900	800-1900	—	800-1400
TCML1-19	1	800-1900	800-1900	—	800-1400
TCN1-23	1	1300-2300	—	—	1300-2300
■ TC1-1-13M-75	1	4.5-3000	2000-3000	1000-2000	4.5-1000
TC1-1-13M	1	4.5-3000	2000-3000	1000-2000	4.5-1000
TC1-1-13MG2	1	4.5-3000	2000-3000	1000-2000	4.5-1000
TCN2-14	2	700-1400	—	—	700-1400
ADTL2-18	2	30-1800	30-1800	—	100-1500
TCN2-26	2	1600-2600	—	—	1600-2600
TCN3-11	3	600-1100	—	—	600-1100
TCN4-13	4	650-1250	—	—	650-1250

■ *75 Ω*

ELECTRICAL SCHEMATICS

D



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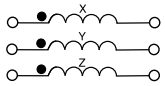

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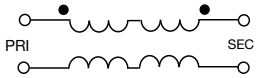

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LTCC LTCC

NCS
Case GE0805C-1

TCN
Case FV1206-1

TCM
Case DB714

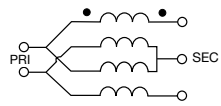
TC Cases
AT224-1, AT224-3

MODEL PREFIX	Ω RATIO (Secondary/Primary)	FREQUENCY (MHz)	INSERTION LOSS (dB) Above midband 3 dB (MHz)	2 dB (MHz)	1 dB (MHz)
H *SCHEMATIC*	*Balanced transmission line with secondary center tap*				
TCN-2-45	2	3300-4500	—	—	3300-4500
TC4-19	4	10-1900	10-1900	20-1000	30-700
TC4-19G2	4	10-1900	10-1900	20-1000	30-700
TCM4-19	4	10-1900	10-1900	20-1000	30-700
TC4-25	4	500-2500	500-2500	700-1500	750-1200
TC4-25G2	4	500-2500	500-2500	700-1500	750-1200
TCM4-25	4	500-2500	500-2500	700-1500	750-1200
J *SCHEMATIC*	*Unbalanced to Balanced*				
■ TCN1-152-75	1	950-1450	—	—	950-1450
NCS1-23	1	1300-2000	—	—	1300-2000
NCS1-292	1	1650-2850	—	—	1650-2850
NCS1-422	1	3300-4200	—	—	3300-4200
NCS1-63	1	4900-6000	—	—	4900-6000
TCN2-122	2	600-1200	—	—	600-1200
NCS2-222	2	1275-2200	—	—	1275-2200
NCS2-33	2	1500-3100	—	—	1500-3100
NCS2-392	2	3000-3900	—	—	3000-3900
NCS2-592	2	4900-5875	—	—	4900-5875
NCS2-622	2	5600-6200	—	—	5600-6200
NCS3-272	3	2250-2725	—	—	2250-2725
TCN4-162	4	720-1600	—	—	720-1600
TCN4-22	4	1200-2200	—	—	1200-2200
NCS4-232	4	1600-2300	—	—	1600-2300
NCS4-272	4	2400-2700	—	—	2400-2700
NCS4-442	4	3300-4400	—	—	3300-4400
NCS4-63	4	4500-6000	—	—	4500-6000
K *SCHEMATIC*	*Balanced Transmission Line*				
■ ADTL1-15-75	1	10-1500	—	10-1500	30-1000
■ TC1-33-75G2	1	5-3000	2000-3000	1200-2000	5-1200

■ *75 Ω*

ELECTRICAL SCHEMATICS

H



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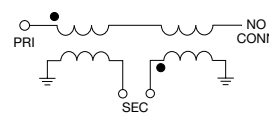

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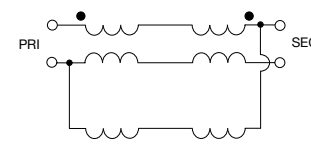

VOLTAGE CONTROLLED OSCILLATORS 50 Ω

12.5 MHz to 3 GHz

MOS Case CZ682 | ROS Case CK605, CK1113, CK829 | JTOS Case BK377 | JCOS Case BG419

MODEL PREFIX	FREQUENCY (MHz)		POWER OUTPUT (dBm)	TUNE VOLTAGE (V)		PHASE NOISE (dBc/Hz) SSB@ offset frequencies: Typ.				PULLING (MHz) pk-pk @12 dBr	PUSHING (MHz/V)	TUNING SENSITIVITY (MHz/V)	HARMONICS (dBc)		3dB MOD. BANDWIDTH (kHz)	POWER SUPPLY	
	Min.	Max.	Typ.	Min.	Max.	1 kHz	10 kHz	100 kHz	1 MHz	Typ.	Typ.	Typ.	Typ.	Max.	Typ.	Voltage (V) Nom.	Current (mA) Max.
LINEAR TUNING *Wideband*																	
JCOS-175LN	125	175	+3.7	1.0	17.0	-95	-118	-138	-158	0.08	0.05	3-5	-25	-20	2900	12.0	20
JCOS-820BLN	807	832	+3.0	1.0	14.0	-88	-112	-132	-151	0.4	0.4	6.0	-24	-20	2000	10.0	25
JCOS-820WLN	780	860	+9.0	0.0	20.0	-90	-112	-132	-150	4.5	0.3	8.0	-13	-8	2000	9.0	25
JCOS-1100LN	1079	1114	+8.5	0.0	20.0	-88	-110	-130	-150	7.5	0.5	4.5	-15	-10	2000	8.0	25
JTOS-25	12.5	25	+8.0	1.0	11.0	-95	-115	-135	-155	0.03	0.02	1.0-4.0	-26	-13	130	12.0	20
JTOS-50	25	47	+8.5	1.0	15.0	-88	-108	-127	-147	0.06	0.04	2.0-2.6	-19	-12	50	12.0	20
JTOS-75	37.5	75	+8.0	1.0	16.0	-89	-110	-130	-140	0.15	0.11	2.8-4.0	-27	-20	125	12.0	20
JTOS-100	50	100	+8.3	1.0	16.0	-83	-108	-128	-140	0.6	0.2	3.7-4.8	-35	-20	100	12.0	18
JTOS-150	75	150	+9.5	1.0	16.0	-82	-106	-127	-147	0.8	0.3	5.8-6.7	-23	-17	112	12.0	20
JTOS-200	100	200	+10.0	1.0	16.0	-84	-105	-124	-145	1.0	0.2	6-10	-25	-20	110	12.0	20
JTOS-300	150	280	+9.0	1.0	16.0	-82	-102	-122	-142	1.0	0.2	9-14	-28	-20	120	12.0	20
JTOS-400	200	380	+9.0	1.0	16.0	-82	-102	-122	-142	1.4	0.4	10.5-17.1	-25	-20	130	12.0	20
JTOS-535	300	525	+9.5	1.0	16.0	-75	-97	-117	-137	2.0	0.5	10-24	-28	-20	115	12.0	20
JTOS-765	485	765	+8.0	1.0	16.0	-75	-98	-118	-138	2.0	0.5	20-30	-30	-20	100	12.0	20
JTOS-850VW	400	850	+6.0	0.5	18.0	-74	-96	-116	-136	6.0	1.5	15-80	-20	—	185	5.0	20
JTOS-1000W	500	1000	+7.0	1.0	18.0	-73	-94	-114	-134	5.0	1.0	30-40	-26	-20	100	12.0	25
JTOS-1025	685	1025	+8.6	1.0	16.0	-70	-94	-114	-134	5.0	0.6	21-36	-28	-20	100	12.0	22
JTOS-1300	900	1300	+7.0	1.0	20.0	-70	-95	-115	-135	12.0	1.0	25-45	-28	-17	1000	12.0	30
JTOS-1550	1150	1550	+7.0	0.5	20.0	-73	-101	-121	-141	14.0	0.7	22-32	-20	-10	2700	12.0	30
JTOS-1650	1200	1650	+7.0	1.0	13.0	-70	-95	-115	-135	15.0	1.5	50-90	-20	-14	1000	12.0	30
JTOS-1750	1350	1750	+7.0	0.5	20.0	-73	-101	-121	-141	7.0	0.5	26-35	-16	-10	2700	12.0	30
JTOS-1910	1625	1910	+7.0	1.0	12.0	-69	-97	-117	-137	10.0	1.0	30-60	-20	-15	2500	12.0	20
JTOS-1950	1550	1950	+7.0	0.5	20.0	-75	-103	-125	-144	7.0	0.6	23-32	-14	-10	8000	12.0	30
JTOS-2000	1370	2000	+12.0	1.0	22.0	-70	-95	-115	-135	40.0	1.5	30-50	-11	-8	1000	8.0	30
JTOS-2700V	2050	2700	+8.0	0.5	18.0	-72	-94	-114	-134	5.0	1.0	46-56	-25	-10	8000	5.0	20
JTOS-3000	2300	3000	+10.0	0.5	12.0	-60	-90	-110	-130	50.0	5.0	50-150	-22	-12	20000	5.0	25
MOS-114	57	114	+7.0	0.5	14.0	-85	-110	-131	-152	0.3	0.1	6.0	-12	—	2000	15.0	22
MOS-1570	1250	1570	+3.5	2.0	20.0	-79	-105	-126	-146	1.5	0.5	26-38	-18	-10	35000	5.0	35
ROS-71-119	62	71	+4.5	0.5	6.0	-93	-114	-134	-154	0.5	0.5	3.0	-30	-20	200	5.0	15
ROS-100	50	100	+8.3	0.5	17.0	-75	-105	-125	-145	0.6	0.3	3.0-5.0	-30	-20	100	12.0	20
ROS-150	75	150	+9.5	1.0	18.0	-80	-103	-127	-144	0.8	0.3	4.0-6.8	-23	-16	100	12.0	20
ROS-200	100	200	+10.0	1.0	17.0	-80	-105	-125	-145	0.6	0.3	6-11	-30	-20	100	12.0	20
ROS-200-719	144	200	+9.0	0.5	16.0	-97	-122	-142	-161	0.1	0.1	5.0	-20	-10	75000	12.0	33
ROS-244	170	244	+10.0	2.0	16.0	-96	-123	-143	-162	0.1	0.1	6.0	-20	—	50000	12.0	32
ROS-300	150	280	+9.0	1.0	16.0	-80	-102	-122	-142	0.5	0.3	7-17	-28	-18	100	12.0	20
ROS-310-419	160	360	+7.5	0.5	18.0	-80	-102	-124	-145	0.3	0.4	9-18	-28	-19	1700	10.0	21
ROS-310-519	240	305	+6.0	0.5	17.0	-89	-112	-133	-153	0.5	0.7	5.0-7.0	-24	-14	40000	5.0	30
ROS-330-119	244	340	+9.0	4.0	16	-91	-118	-139	-158	0.20	0.20	7.0-10	-23	-10	1500	12.0	31
ROS-368-119	360	380	+2.5	0.5	10.0	-96	-120	-141	-160	0.1	0.03	6.0	-20	-13	50000	5.0	23
ROS-386-119	295	386	+9.5	4.0	16.0	-90	-117	-138	-158	0.2	0.4	10.0	-23	-12	18000	12.0	31
ROS-400	200	380	+9.5	0.5	17.0	-80	-100	-120	-140	0.2	0.3	9-22	-24	-18	100	12.0	20
ROS-400-1119	200	400	+6.5	0.5	20.0	-79	-102	-123	-145	0.6	1.0	10-17	-34	-20	200	5.0	20
ROS-470-319	460	470	+2.5	1.0	10.0	-94	-118	-138	-150	0.1	0.1	6.0	-21	-15	100000	5.0	22
ROS-480	386	480	+9.5	3.0	16.0	-90	-117	-137	-158	0.1	0.3	10.0	-20	-30	30000	12.0	31
ROS-535	300	525	+6.0	1.0	17.0	-75	-98	-118	-138	0.5	0.4	9-27	-20	-15	100	12.0	20
ROS-675-219	500	750	+6.0	0.5	28.0	-88	-113	-136	-156	0.8	1.5	5.0-14	-20	—	25000	5.0	37
ROS-730-319	655	730	+1.2	0.5	9.0	-89	-113	-133	-153	0.4	0.1	11-15	-23	-14	45000	5.0	25

Mini-Circuits® IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED RoHS compliant
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

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MODEL PREFIX	FREQUENCY (MHz)		POWER OUTPUT (dBm)	TUNE VOLTAGE (V)		PHASE NOISE (dBc/Hz) SSB@ offset frequencies: Typ.				PULLING (MHz) pk-pk @12 dBr	PUSHING (MHz/V)	TUNING SENSITIVITY (MHz/V)	HARMONICS (dBc)		3dB MOD. BANDWIDTH (kHz)	POWER SUPPLY	
	Min.	Max.	Typ.	Min.	Max.	1 kHz	10 kHz	100 kHz	1 MHz	Typ.	Typ.	Typ.	Typ.	Max.	Typ.	Voltage (V) Nom.	Current (mA) Max.
ROS-753-119	734	753	+3.0	1.0	9.0	-94	-121	-141	-161	0.3	0.2	8.0	-25	-15	40000	5.0	35
ROS-765	485	765	+6.0	1.0	16.0	-74	-95	-115	-135	2.0	0.5	10-40	-27	-14	100	12.0	22
ROS-780	720	780	+10.0	0.5	12.0	-88	-114	-135	-155	1.0	0.7	11-14	-21	-15	20000	12.0	26
ROS-810LN	760	810	+5.0	0.5	10.0	-90	-115	-135	-155	1.8	0.5	8-10	-24	-18	6000	8.0	20
ROS-824-119	540	824	+9.0	2.0	16.0	-77	-99	-120	-140	3.0	1.0	21-30	-30	-20	1500	10.0	25
ROS-850-719	750	850	+5.0	0.0	10.0	-86	-110	-130	-150	1.0	0.5	18-21	-25	-15	100000	5.0	30
ROS-850W-119	400	850	+10.0	1.0	25.0	-71	-98	-119	-140	4.0	0.3	18-32	-22	-12	13000	5.0	27
ROS-890C	875	890	+6.20	0.50	11.0	-97	-125	-145	-164	0.10	0.20	5.0	-19	-12	60000	8.0	35
ROS-900-519	625	855	+5.80	0.50	18.0	-82	-106	-127	-147	1.50	0.40	15-26	-13	—	25000	10	35
ROS-928C-519	902	928	+4.60	0.50	10.0	-92	-120	-141	-161	0.40	0.30	6.0	-20	-15	90000	8.0	35
ROS-950-219	850	950	+6.0	0.5	12.0	-89	-117	-139	-156	0.5	0.5	9-13	-20	-12	30000	5.0	30
ROS-1000V	900	1000	0.0	0.5	12.0	-74	-102	-122	-140	1.0	0.4	12-16	-30	-20	8000	5.0	25
ROS-1015-119	750	1010	+6.0	0.5	28.0	-85	-113	-134	-154	1.0	1.5	7-15	-20	-10	35000	5.0	35
ROS-1100V	1000	1100	0.0	0.5	12.0	-80	-103	-123	-142	1.5	1.5	12-16	-26	-20	8000	5.0	25
ROS-1120-119	610	1120	+13.0	0.5	18.0	-77	-102	-124	-145	9.0	0.5	40-56	-20	-10	30000	15.0	37
ROS-1121V	1060	1121	+2.5	1.0	11.0	-88	-111	-131	-149	0.7	0.7	8-13	-11	—	10000	5.0	30
ROS-1150-519	750	1150	+7.0	0.5	13.5	-78	-101	-121	-141	2.0	2.0	38-45	-20	-12	70000	5.0	35
ROS-1150C-119	1146	1154	+2.0	0.5	11.0	-98	-123	-143	-159	0.1	1.1	3.0	-20	-10	70000	5.0	35
ROS-1200W	612	1200	+10.0	0.5	18.0	-71	-97	-119	-139	9.0	0.45	26-68	-18	-10	20000	12.0	40
ROS-1275	1212	1275	0.0	0.5	12.0	-87	-112	-133	-153	0.02	1.5	8-13	-17	-11	14000	5.0	34
ROS-1300	400	1300	+8.0	0.3	20.0	-65	-91	-120	-141	3.5	1.5	40-60	-12	—	30000	5.0	40
ROS-1303-119	1011	1270	+7.0	0.5	12.0	-82	-109	-130	-150	1.5	1.0	26-39	-24	-14	80000	5.0	36
ROS-1310C	1260	1310	+3.0	0.50	20.0	-93	-120	-139	-159	0.20	0.10	4.50	-19	-10	50000	5.0	35
ROS-1340-119	1260	1340	+2.0	2.0	12.0	-86	-111	-132	-151	0.5	0.2	11-16	-33	-20	270000	5.0	30
ROS-1410	850	1410	+7.0	0.5	11.0	-73	-99	-119	-138	15.0	1.0	50-80	-8	—	1000	12.0	25
ROS-1420-419	1230	1420	+6.0	0.5	28.0	-85	-111	-131	-151	1.5	0.5	10-15	-21	-10	50000	5.0	35
ROS-1455	900	1455	+13.0	0.5	12.0	-72	-100	-126	-146	18.0	0.5	60-71	-15	—	75000	12.0	40
ROS-1480-119	1100	1480	+12.0	1.0	18.0	-79	-103	-123	-143	20.0	0.5	22-36	-30	-12	70000	15.0	45
ROS-1500	1000	1500	+8.0	0.5	20.0	-79	-104	-124	-144	10.0	1.2	25-40	-13	—	100000	10.0	26
ROS-1560-1PH19	1260	1560	+3.5	0.5	10.0	-77	-103	-124	-144	2.0	0.7	35-44	-29	-15	120000	5.0	31
ROS-1580-219	1450	1580	+1.5	0.5	11.0	-86	-109	-129	-149	1.0	0.3	17-22	-30	-23	180000	5.0	27
ROS-1584-219	1555	1575	+5.0	1.0	12.0	-89	-114	-134	-153	0.7	0.1	5.0	-34	-20	65000	5.0	35
ROS-1600W	800	1600	+9.0	0.5	24.0	-72	-99	-122	-143	10.0	0.3	35-58	-22	-15	90000	11.5	35
ROS-1624	1400	1624	+1.0	0.5	9.5	-80	-104	-124	-144	1.5	1.2	29-35	-19	-10	40000	5.0	40
ROS-1640-219	1610	1640	+2.5	0.5	9.0	-86	-111	-131	-151	1.0	0.3	12.0	-25	-15	200000	5.0	35
ROS-1645W-119	1200	1645	+8.0	0.5	16.0	-79	-106	-127	-147	4.0	0.2	26-43	-19	-10	80000	10.0	30
ROS-1700-919	950	1620	+6.0	0.50	10.0	-72	-100	-123	-144	0.20	0.50	70-110	-20	-11	60000	10.0	30
ROS-1700-1Q19	1645	1700	+1.5	0.5	3.0	-72	-95	-116	-137	6.0	1.0	75-83	-16	-10	270000	4.5	24
ROS-1700W	770	1700	+8.0	1.0	24.0	-73	-100	-121	-140	9.0	0.4	26-60	-25	-13	11000	12.0	40
ROS-1707-119	1033	1707	+8.0	0.5	22.0	-74	-100	-121	-142	10.5	2.0	32-59	-15	—	100000	10.0	35
ROS-1720	1550	1720	+7.0	0.5	12.0	-73	-101	-121	-141	11.0	1.3	28-34	-17	-10	18000	12.0	25
ROS-1740-519	1640	1740	+1.5	0.5	11.0	-85	-108	-128	-147	1.0	0.5	16-19	-28	-20	170000	5.0	27
ROS-1750W-619	950	1750	+6.0	0.5	12.0	-71	-99	-121	-143	0.3	0.2	71-103	-20	-10	50000	10.0	35
ROS-1770-1PH19	1710	1800	+3.0	0.5	8.0	-86	-111	-132	-152	0.1	0.2	18-21	-22	-13	120000	5.0	30
ROS-1790-519	1640	1790	+6.2	0.50	12.0	-82	-107	-127	-147	3.0	0.70	19.0	-28	-20	50000	5.0	31
ROS-1862-119	1524	1862	+7.0	1.0	24.0	-78	-104	-125	-146	4.0	0.5	25-37	-18	—	12000	8.0	30
ROS-1900	1450	1900	+7.0	0.5	20.0	-80	-106	-126	-146	7.0	0.7	22-34	-15	-7	100000	10.0	25
ROS-1900-919	1600	1900	0.0	1.0	12.0	-78	-104	-125	-145	1.0	0.3	34.0	-19	-10	60000	8.0	35

Additional Linear Tuning Wideband models, see pages 150-151

VOLTAGE CONTROLLED OSCILLATORS 50 Ω

970 MHz to 4720 MHz

ROS
Case CK605, CK1113, CK829

MODEL PREFIX	FREQUENCY (MHz)		POWER OUTPUT (dBm)	TUNE VOLTAGE (V)		PHASE NOISE (dBc/Hz) SSB@ offset frequencies: Typ.				PULLING (MHz) pk-pk @12 dBr	PUSHING (MHz/V)	TUNING SENSITIVITY (MHz/V)	HARMONICS (dBc)		3dB MOD. BANDWIDTH (kHz)	POWER SUPPLY	
	Min.	Max.	Typ.	Min.	Max.	1 kHz	10 kHz	100 kHz	1 MHz	Typ.	Typ.	Typ.	Typ.	Max.	Typ.	Voltage (V) Nom.	Current (mA) Max.
LINEAR TUNING *Wideband*																	
ROS-1900V	1450	1900	+8.0	0.5	20.0	-78	-104	-124	-144	7.0	0.7	22-34	-18	-10	100000	5.0	28
ROS-1950	1670	1950	+6.0	0.0	12.0	-76	-101	-122	-142	10.0	3.0	27-52	-17	—	110000	5.0	30
ROS-1950-519	1780	1950	+4.0	0.5	11.0	-84	-110	-130	-150	1.0	0.4	23-25	-18	—	7000	5.0	32
ROS-1990	1800	1990	+6.0	1.0	11.0	-75	-101	-122	-143	5.0	1.3	37-44	-30	-16	270000	8.0	30
ROS-2000	1350	2000	+7.0	0.5	20.0	-75	-100	-120	-140	9.0	1.3	30-50	-11	—	2000	12.0	25
ROS-2000-1419	1720	2000	+6.0	1.0	10.0	-78	-102	-123	-143	3.0	0.7	56-59	-14	—	100000	10.0	30
ROS-2030-119	1670	2030	+7.5	0.5	16.0	-77	-102	-123	-143	9.0	0.8	22-37	-19	—	25000	5.0	30
ROS-2041-119	1844	2042	+5.0	1.0	10.0	-81	-106	-126	-146	0.30	0.30	17.0	-29	-13	120000	5.0	40
ROS-2050-719	1020	1980	+4.5	0.5	15.0	-75	-100	-121	-141	0.40	0.30	57-1-5	-17	—	25000	10	37
ROS-2100-119	1350	2100	+8.5	0.5	18.5	-76	-102	-124	-144	8.5	0.5	46-72	-18	—	60000	8.0	35
ROS-2117	2063	2117	+6.0	0.5	6.0	-83	-106	-127	-147	0.7	1.0	19.0	-30	-22	160000	5.0	35
ROS-2130-719	1950	2120	+1.0	0.5	11.0	-83	-108	-128	-148	0.2	1.0	22-25	-16	—	130000	5.0	37
ROS-2150-1019	2000	2130	+5.0	0.5	10.0	-75	-101	-122	-142	4.5	0.2	21-27	-30	-23	300000	5.0	36
ROS-2150VW	970	2150	+4.0	0.5	25.0	-70	-96	-118	-138	7.0	2.5	30-70	-15	—	6000	5.0	25
ROS-2160W	1160	2160	+5.0	0.5	20.0	-70	-97	-117	-137	10.0	1.5	30-80	-11	—	12000	10.0	30
ROS-2180-419	2000	2180	+10.0	0.5	6.0	-73	-102	-124	-144	12.0	1.5	61-75	-21	-10	100000	5.0	40
ROS-2200	1200	2200	+7.0	0.5	17.0	-72	-97	-118	-138	13.0	1.0	57-86	-22	-11	200000	11.5	27
ROS-2230-119	1430	2230	+11.0	0.5	18.0	-70	-99	-120	-141	7.0	0.7	42-94	-30	—	150000	12.0	30
ROS-2250W-119	1220	2250	+3.5	0.0	20.0	-73	-99	-120	-142	5.0	1.0	50-75	-18	—	70000	5.0	25
ROS-2252C-119	2103	2252	-1.0	1.0	12.0	-81	-108	-129	-149	0.4	0.3	28.0	-17	-10	120000	8.0	35
ROS-2310	2290	2310	+7.0	0.5	5.0	-90	-116	-136	-157	1.0	0.1	7-9	-22	-12	180000	5.0	34
ROS-2345	2295	2345	+5.0	0.5	6.0	-83	-107	-127	-147	1.0	1.0	19.0	-22	-13	230000	4.75	35
ROS-2350	2160	2350	+5.5	0.5	10.0	-79	-101	-123	-143	1.0	4.0	27-33	-27	-19	200000	5.0	37
ROS-2350-519	1960	2350	+7.0	0.5	15.0	-81	-106	-127	-146	6.0	0.5	33-44	-23	-10	140000	6.0	40
ROS-2400-1019	2100	2400	+6.5	0.5	12.0	-75	-100	-121	-140	2.5	3.5	42-50	-30	-20	20000	5.0	42
ROS-2404C-119	2267	2404	+0.5	1.0	13.0	-85	-110	-131	-151	0.1	0.5	18-21	-24	-14	120000	6.0	40
ROS-2405C-119	2189	2405	-0.30	1.0	11.50	-78	-106	-128	-147	0.40	0.50	40-43	-25	-15	120000	8.0	40
ROS-2420	1220	2420	+0.5	0.5	20.0	-70	-95	-117	-138	1.5	1.5	50-82	-20	-10	90000	5.0	47
ROS-2425-119	2275	2425	+3.0	0.5	11.0	-80	-104	-124	-144	0.3	1.5	17-25	-22	-12	100000	5.0	36
ROS-2432-119	1662	2432	+5.5	1.0	28.0	-73	-100	-123	-143	6.5	1.0	23-49	-18	—	230000	10.0	30
ROS-2450C	2120	2450	+7.0	0.0	15.0	-80	-107	-128	-148	3.0	0.3	28-35	-23	-12	150000	6.0	34
ROS-2485	2050	2485	+6.5	0.5	16.0	-77	-105	-126	-146	3.0	0.3	31-59	-30	-15	150000	8.0	32
ROS-2490	2280	2490	+8.0	0.5	10.0	-80	-104	-124	-144	1.0	1.0	30-37	-20	-11	140000	5.0	38
ROS-2490C	2020	2490	7.20	0.25	16.0	-79	-107	-128	-149	2.5	0.4	30-40	-32	-15	45000	8.0	40
ROS-2500	1600	2500	+6.5	0.5	14.0	-66	-90	-113	-133	18.0	5.0	30-180	-14	-8	6000	12.0	25
ROS-2500-1419	2165	2475	+7.0	0.5	20.0	-80	-103	-124	-144	5.0	0.4	25-36	-28	-15	150000	5.0	40
ROS-2632C	2434	2632	-0.30	1.0	12.0	-81	-108	-129	-149	0.4	0.1	27-31	-16	—	110000	8.0	40
ROS-2650	2165	2650	+5.0	0.5	19.0	-75	-101	-121	-141	5.0	1.0	27-36	-12	—	200000	12.0	25
ROS-2700-819	1950	2700	+8.7	0.5	10.0	-64	-90	-112	-132	21.7	6.0	91-156	-27	-12	340000	8.5	29
ROS-2700-1419	2500	2700	+6.0	0.5	8.0	-74	-98	-119	-139	2.0	4.5	40-45	-18	-10	30000	5.0	36
ROS-2710C-119	2670	2700	+3.0	0.5	5.5	-80	-110	-131	-151	0.3	0.2	16.0	-14	—	140000	5.0	35
ROS-2729C	2490	2729	0.0	1.0	11.5	-80	-107	-127	-147	0.50	0.10	27-37	-16	-10	110000	8.0	40
ROS-2740-219	2700	2740	+3.5	0.5	5.5	-83	-106	-127	-146	0.7	2.0	17.0	-19	-12	150000	5.0	36
ROS-2750	2350	2750	+5.7	0.5	14.5	-78	-105	-127	-146	2.0	0.3	32-42	-23	-12	120000	6.0	35
ROS-2750C-119	2720	2750	+4.0	0.25	5.5	-84	-110	-130	-150	0.8	0.4	16.0	-22	-12	120000	5.0	35
ROS-2760-219	2660	2760	+5.5	0.5	12.0	-83	-107	-127	-147	1.0	1.5	16-19	-27	-20	200000	8.0	41
ROS-2760C-119	2600	2760	+4.0	0.50	18.0	-85	-113	-133	-153	-0.80	0.30	12-16	-16	-9	60000	8.0	37

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp.

MODEL PREFIX	FREQUENCY (MHz)		POWER OUTPUT (dBm)	TUNE VOLTAGE (V)		PHASE NOISE (dBc/Hz) SSB@ offset frequencies: Typ.				PULLING (MHz) pk-pk @12 dBr	PUSHING (MHz/V)	TUNING SENSITIVITY (MHz/V)	HARMONICS (dBc)		3dB MOD. BANDWIDTH (kHz)	POWER SUPPLY Voltage (V)	Current (mA)
	Min.	Max.	Typ.	Min.	Max.	1 kHz	10 kHz	100 kHz	1 MHz	Typ.	Typ.	Typ.	Typ.	Max.	Typ.	Nom.	Max.
ROS-2770	1970	2770	+5.0	0.5	25	-75	-102	-123	-142	3.5	2.0	36-65	-16	—	45000	8.0	35
ROS-2770-219	1970	2770	+6.0	1.0	28.0	-74	-101	-123	-143	4.5	1.5	24-56	-27	-15	250000	10.0	32
ROS-2793-119	2300	2700	+8.0	0.5	13.0	-74	-100	-120	-140	9.0	1.5	40-55	-17	-10	600000	5.0	30
ROS-2800-519	2000	2750	+3.5	1.0	24.0	-71	-96	-117	-137	4.0	3.0	25-56	-25	-10	45000	5.0	26
ROS-2800-719	1400	2800	+3.5	0.5	25.0	-69	-95	-116	-137	6.0	2.5	42-107	-15	—	130000	5.0	30
ROS-2800-819	2600	2800	+5.0	0.5	10.0	-76	-99	-120	-140	1.5	4.0	35-39	-32	-22	150000	5.0	42
ROS-2868C-119	2801	2868	+5.5	1.0	12.0	-76	-104	-125	-144	1.0	0.5	19-22	-22	-13	190000	8.0	35
ROS-2950-119	2700	2890	+5.0	0.5	16.0	-80	-106	-126	-146	3.0	0.7	22-36	-25	-15	170000	5.0	40
ROS-2952-119	2748	2952	+5.5	1.0	10.0	-73	-100	-121	-141	1.5	1.5	35.0	-30	-20	220000	5.0	40
ROS-2960C-119	2500	2920	+7.0	0.5	16.0	-79	-107	-128	-147	2.0	0.2	34-42	-25	-15	150000	8.0	38
ROS-3000V	2400	3000	+9.0	0.5	22.0	-70	-96	-116	-136	30.0	1.5	20-60	-18	—	20000	5.0	40
ROS-3000-819	2000	3000	+5.5	0.5	14.0	-71	-96	-117	-138	13.5	1.5	84-125	-22	-10	140000	12.0	35
ROS-3000-919	2850	3000	+5.5	0.5	10.0	-77	-100	-121	-142	2.0	1.5	37.0	-30	-20	10000	5.0	42
ROS-3050-819	2150	3050	+7.0	0.5	11.5	-69	-94	-114	-135	2.0	1.5	95-120	-20	-10	60000	5.0	47
ROS-3050C	2635	3050	+6.5	0.50	16.0	-77	-104	-125	-145	4.5	0.20	35-47	-22	-12	100000	8.0	40
ROS-3050C-119	2856	3050	+5.0	0.5	20.0	-80	-106	-127	-147	1.0	0.6	10-20	-23	-13	110000	8.0	35
ROS-3060C-119	2920	3060	+3.2	0.25	18.0	-85	-112	-132	-152	1.2	0.50	8-14	-18	-10	70000	8.0	36
ROS-3075-119	2920	3075	+3.0	0.5	11.0	-78	-102	-123	-143	0.7	2.5	24-28	-19	-10	30000	8.0	40
ROS-3100	2300	3100	+9.0	0.5	11.0	-66	-92	-113	-133	5.0	4.0	92-124	-20	-10	160000	10.0	46
ROS-3100C	2875	3100	+1.2	0.50	11.0	-78	-105	-126	-146	0.6	0.3	29-37	-35	-20	100000	8.0	37
ROS-3100-219	2850	3050	+6.0	0.5	12.0	-73	-99	-120	-141	1.0	3.0	35-42	-21	-12	20000	5.0	40
ROS-3150	2650	3150	+6.2	0.5	12.0	-69	-95	-117	-137	1.5	3.5	64-75	-22	-10	100000	5.0	42
ROS-3200-419	1750	3350	+11.0	0.5	20.0	-67	-93	-114	-135	2.0	3.0	47-130	-15	-9	40000	5.0	65
ROS-3200C-719	3060	3200	+4.7	0.50	18.0	-85	-113	-133	-152	1.0	1.0	8-13	-15	—	65000	8.0	36
ROS-3250-319	3100	3250	+6.0	0.5	10.0	-72	-98	-119	-139	2.0	4.0	27-32	-26	-18	30000	5.0	40
ROS-3250-519	2550	3250	+2.0	0.5	24.0	-74	-99	-120	-140	0.6	3.0	27-46	-22	-12	160000	5.0	42
ROS-3250-619	3000	3250	+6.50	1.0	10.0	-73	-98	-119	-139	1.50	2.50	35.0	-30	-20	80000	5.0	40
ROS-3323C-119	3192	3323	+1.0	1.0	13.0	-81	-106	-127	-147	0.7	0.2	19-27	-19	-10	300000	6.0	40
ROS-3350-219	3200	3350	+5.0	0.5	10.0	-73	-97	-118	-138	1.0	2.0	33.0	-30	-20	250000	5.0	40
ROS-3360	2120	3360	+8.5	0.5	18.0	-68	-95	-116	-136	3.0	1.0	65-113	-26	-12	170000	12.0	45
ROS-3388-219	3080	3380	+5.0	0.5	13.0	-74	-99	-120	-140	1.5	2.0	30-37	-30	-20	60000	5.0	42
ROS-3450-219	3250	3450	+5.0	0.5	10.0	-73	-98	-119	-139	1.8	1.7	28-36	-19	-13	12000	5.0	40
ROS-3500	3090	3500	+3.0	0.5	11.0	-70	-96	-117	-137	1.0	2.0	64-71	-24	-14	500000	10.0	41
ROS-3538-219	3340	3490	0.0	0.5	12.0	-75	-98	-119	-139	0.8	1.0	28-32	-35	-22	220000	8.0	40
ROS-3555	3000	3555	+5.0	0.5	15.0	-71	-97	-118	-138	1.5	3.0	60-70	-25	-15	600000	5.0	41
ROS-3600-419	3300	3600	+8.5	0.5	8.0	-71	-97	-118	-138	3.5	0.6	47-64	-20	-15	550000	5.0	46
ROS-3600-619	2950	3600	+3.0	0.5	24.0	-70	-98	-119	-139	0.8	2.0	23-46	-33	-23	110000	5.0	40
ROS-3600-919	3350	3600	+5.0	0.5	15.0	-75	-100	-120	-140	1.0	1.0	25-30	-29	-17	300000	8.0	52
ROS-3760	3200	3760	+7.5	0.5	15.0	-69	-96	-117	-138	3.0	1.0	56-67	-28	-18	600000	5.0	48
ROS-3900-219	3750	3900	+4.5	0.5	10.0	-76	-97	-118	-138	2.0	3.5	25-40	-28	-18	260000	5.0	40
ROS-3900-419	3650	3900	+4.5	0.5	12.0	-71	-94	-115	-135	2.0	4.0	32-37	-22	-12	100000	5.0	40
ROS-3960-119	3730	3920	+6.0	1.0	16.0	-71	-97	-118	-139	1.0	0.5	27-41	-20	-10	110000	8.0	45
ROS-4000-419	3850	4000	+5.0	0.5	10.0	-72	-96	-117	-137	3.0	2.5	26-36	-26	-15	20000	5.0	40
ROS-4040	3685	4040	+6.0	1.0	18.0	-70	-96	-117	-138	5.0	0.5	39-54	-20	-10	170000	8.0	43
ROS-4100-119	3950	4100	+5.5	0.5	10.0	-71	-96	-117	-137	2.0	1.5	25.0	-31	-20	30000	5.0	35
ROS-4215-119	4014	4185	+6.0	1.0	10.0	-69	-95	-115	-135	2.5	2.0	37-46	-23	-15	150000	5.0	45
ROS-4415-119	4214	4415	+5.0	1.0	10.0	-71	-95	-116	-136	2.0	4.5	36-45	-27	-15	150000	5.0	40
ROS-4720-119	4680	4720	+7.5	0.5	11.0	-70	-96	-117	-138	2.5	0.7	15.0	-26	-16	120000	5.0	50

VOLTAGE CONTROLLED OSCILLATORS 50 Ω

24 MHz to 2.6 GHz

WITH LEADS

MOS
Case CZ682

ROS
Case CK605, CK1113, CK829

JTOS
Case BK377

MODEL PREFIX	FREQUENCY (MHz)		POWER OUTPUT (dBm)	TUNE VOLTAGE (V)		PHASE NOISE (dBc/Hz) SSB@ offset frequencies: Typ.				PULLING (MHz) pk-pk @12 dBr	PUSHING (MHz/V)	TUNING SENSITIVITY (MHz/V)	HARMONICS (dBc)		3 dB MOD. BANDWIDTH (kHz)	POWER SUPPLY	
	Min.	Max.	Typ.	Min.	Max.	1 kHz	10 kHz	100 kHz	1 MHz	Typ.	Typ.	Typ.	Typ.	Max.	Typ.	Voltage (V) Nom.	Current (mA) Max.
5 V TUNING for PLL IC's																	
JTOS-50P	24	29	+9.5	0.5	5.0	-88	-108	-127	-147	0.06	0.04	2-2.5	-14	-12	50	12.0	20
JTOS-75P	35	43	+9.0	0.5	5.0	-89	-110	-130	-140	0.15	0.11	2.5-4	-25	-20	125	12.0	20
JTOS-100P	48	59	+9.0	0.5	5.0	-83	-108	-128	-140	0.6	0.2	3.5-4	-30	-20	100	12.0	18
JTOS-150P	72	91	+9.5	0.5	5.0	-82	-106	-127	-147	0.8	0.3	6-9	-30	-17	112	12.0	20
JTOS-200P	95	120	+8.8	0.5	5.0	-84	-105	-124	-145	1.0	0.2	7-10	-30	-20	110	12.0	20
JTOS-300P	148	174	+10.0	0.5	5.0	-82	-102	-122	-142	1.0	0.2	10-14	-27	-20	120	12.0	20
JTOS-400P	194	220	+11.0	0.5	5.0	-82	-102	-122	-142	1.4	0.4	13-18	-25	-20	130	12.0	20
JTOS-535P	278	325	+9.5	0.5	5.0	-75	-97	-117	-137	2.0	0.5	17-22	-30	-20	115	12.0	20
JTOS-765P	486	510	+9.0	0.5	5.0	-75	-98	-118	-138	2.0	0.5	20-30	-30	-20	100	12.0	20
JTOS-1025P	680	755	+9.0	0.5	5.0	-70	-94	-114	-134	5.0	0.6	30-40	-27	-20	100	12.0	22
JTOS-3000P	2300	2600	+11.0	0.5	5.0	-65	-92	-112	-132	50.0	5.0	120-160	-22	-12	20000	5.0	25
MOS-464	420	464	-5.0	0.5	5.0	-82	-108	-129	-149	0.3	2.0	20-30	-19	-12	8000	4.0	14
MOS-810-119	740	810	+2.0	0.5	5.0	-81	-110	-131	-151	0.6	1.0	29-33	-28	-14	30000	5.0	28
MOS-828-219	824	828	+2.0	0.5	5.0	-88	-112	-133	-153	0.7	0.1	11	-22	-15	50000	5.0	27
MOS-958-119	958	958	+2.0	0.5	5.0	-88	-113	-133	-153	0.8	0.1	13	-22	-12	60000	5.0	40
MOS-1400-119	1395	1400	-7.5	0.5	5.0	-82	-105	-125	-145	0.5	1.5	31	-18	-10	250000	2.84	15
MOS-1560-119	1520	1560	-8.5	0.5	5.0	-83	-110	-1`31	-151	3.0	0.5	27	-18	-10	60000	5.0	37
MOS-1632-119	1556	1632	+4.5	0.5	5.0	-83	-110	-130	-150	1.0	0.3	31-35	-19	-10	60000	5.0	36
MOS-1739-219	1690	1760	0.0	0.5	5.0	-74	-104	-124	-144	0.1	0.7	27-32	-25	-17	300000	5.0	32
MOS-1826PV	1766	1826	+2.0	0.5	5.0	-75	-101	-122	-142	8.0	1.0	21-35	-28	-15	10000	5.0	25
MOS-1890-119	1800	1890	+4.0	0.5	5.0	-79	-105	-126	-146	0.2	1.5	38-46	-22	-13	100000	5.0	44
MOS-2033-119	1933	2033	+3.0	0.4	5.0	-78	-103	-124	-144	0.2	0.6	42-47	-23	-13	200000	5.0	37
MOS-2133-219	2033	2133	+2.5	0.5	5.0	-78	-103	-124	-144	0.2	0.5	35-41	-21	-13	200000	5.0	40
MOS-2220-119	2060	2220	+0.5	0.5	5.0	-73	-99	-120	-140	3.0	1.0	69-73	-35	-20	50000	5.0	33
MOS-2360-119	2299	2360	+6.0	0.5	5.0	-78	-103	-123	-143	1.0	1.5	36-40	-25	-15	1000000	5.0	38
MOS-2545-119	2359	2545	+1.5	0.5	5.0	-73	-101	-122	-142	2.0	0.7	62-68	-24	-14	130000	5.0	35
ROS-43-119	43	43	+2.0	0.5	5.0	-105	-130	-150	-170	0.002	0.1	1	-18	-10	3000	5.0	30
ROS-70-119	65	75	+7.0	0.5	5.0	-93	-122	-143	-162	0.02	0.2	5	-24	-15	17000	5.0	30
ROS-70-219	50	70	-0.5	0.5	5.0	-90	-110	-130	-150	0.01	0.4	7	-11	—	200	5.0	23
ROS-78-219	76	80	+4.0	0.5	5.0	-96	-122	-142	-162	0.01	0.1	4	-20	-10	5000	5.0	25
ROS-80-7119	80	85	+0.5	0.5	5.0	-100	-124	-145	-165	0.005	0.1	3	-23	-15	6000	5.0	27
ROS-86-119	80.5	86	+2.0	0.5	5.0	-90	-110	-131	-151	0.05	0.05	7	-28	-20	500	4.6	15
ROS-95-419	91	95	+5.0	0.5	5.0	-97	-125	-146	-162	0.01	0.3	4	-19	-11	7000	5.0	25
ROS-102-919	96	102	+2.0	0.5	5.0	-98	-123	-143	-162	0.01	0.2	4.5	-21	-14	35000	5.0	21
ROS-148-119	127	148	+3.5	0.5	5.0	-84	-110	-131	-152	0.30	1.5	5.0-11	-18	-10	20000	4.5	25
ROS-190-219	170	190	+0.5	0.5	5.0	-87	-115	-136	-156	0.05	0.4	9-13	-21	-13	25000	5.0	20
ROS-200-619	155	200	+1.0	0.5	5.0	-90	-114	-134	-154	0.07	0.3	12-16	-17	—	4000	5.0	21
ROS-205PV	180	210	+2.0	0.5	5.0	-88	-110	-131	-151	0.4	0.4	10-15	-30	-20	2000	5.0	15
ROS-258-119	258	258	+4.5	0.5	5.0	-97	-120	-141	-160	0.15	0.10	5.30	-23	-15	45000	5.0	25
ROS-285PV	245	285	+3.0	0.5	5.0	-80	-100	-120	-140	2.0	0.2	10-20	-20	-10	100	5.0	20
ROS-355-219	381	355	+5.0	0.5	5.0	-87	-113	-133	-153	0.2	0.5	20	-23	-12	3000	5.0	22
ROS-365-119	335	365	+6.0	0.5	5.0	-92	-119	-140	-159	0.2	0.2	13	-23	-16	5000	5.0	30
ROS-369-319	370	400	+3.0	0.5	5.0	-90	-117	-138	-159	0.1	1.0	15	-25	-18	70000	5.0	25
ROS-404-219	375	410	+2.0	0.5	5.0	-87	-113	-133	-153	0.1	0.5	18	-23	-15	80000	5.0	25
ROS-425-319	390	425	+0.50	0.5	5.0	-93	-119	-140	-161	0.1	0.04	11	-21	-12	20000	5.0	22
ROS-445	410	445	-0.2	0.5	5.0	-91	-115	-135	-155	0.4	0.2	11-12	-20	-11	60000	5.0	16
ROS-470	435	470	-0.3	0.5	5.0	-89	-114	-135	-155	0.4	0.2	11-13	-21	-13	80000	5.0	16
ROS-470-519	340	470	+6.0	0.5	5.0	-79	-102	-123	-143	2.0	0.5	55	-35	-15	30000	5.0	35
ROS-481	461	481	+6.0	0.5	5.0	-88	-115	-136	-156	0.5	0.7	17	-21	-12	80000	4.75	25
ROS-485	450	485	-1.0	0.5	5.0	-91	-114	-134	-153	0.3	0.2	11	-21	-13	80000	5.0	15
ROS-485-119	450	485	+4.0	0.5	5.0	-89	-119	-139	-159	0.2	0.4	12	-20	-10	20000	5.0	28
ROS-498-119	449	499	+5.0	0.5	5.0	-91	-118	-138	-158	0.5	0.3	13.0	-20	-10	22000	5.0	22
ROS-505	470	505	+0.5	0.5	5.0	-89	-114	-135	-154	0.2	0.3	11-13	-21	-13	80000	5.0	17
ROS-520	485	520	-0.2	0.5	5.0	-90	-115	-135	-154	0.2	0.1	12.0	-22	-14	70000	5.0	17
ROS-530	500	530	-0.4	0.5	5.0	-90	-111	-132	-151	0.4	0.1	10-11	-23	-15	80000	5.0	15
ROS-540	390	540	-1.5	0.5	5.0	-78	-105	-125	-145	0.02	1.0	44-54	-30	-20	7000	5.0	37

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp.

MODEL PREFIX	FREQUENCY (MHz)		POWER OUTPUT (dBm)	TUNE VOLTAGE (V)		PHASE NOISE (dBc/Hz) SSB@ offset frequencies: Typ.				PULLING (MHz) pk-pk @12 dBr	PUSHING (MHz/V)	TUNING SENSITIVITY (MHz/V)	HARMONICS (dBc)		3 dB MOD. BANDWIDTH (kHz)	POWER SUPPLY Voltage (V) Current (mA)	
	Min.	Max.	Typ.	Min.	Max.	1 kHz	10 kHz	100 kHz	1 MHz	Typ.	Typ.	Typ.	Typ.	Max.	Typ.	Nom.	Max.
ROS-550PV	450	550	+6.0	0.5	5.0	-81	-104	-124	-144	3.0	0.5	30-60	-15	—	8000	5.0	15
ROS-550	515	550	-1.0	0.5	5.0	-90	-112	-133	-151	0.2	0.2	12-13	-23	-14	60000	5.0	17
ROS-570	535	570	-0.6	0.5	5.0	-90	-114	-135	-155	0.4	0.4	13	-18	-10	60000	5.0	15
ROS-585	550	585	+0.2	0.5	5.0	-90	-114	-135	-152	0.4	0.2	13	-19	-11	50000	5.0	16
ROS-590	555	590	0.0	0.5	5.0	-87	-111	-132	-152	0.4	0.2	11-12	-18	-9	60000	5.0	17
ROS-595	560	595	-0.7	0.5	5.0	-89	-112	-132	-151	0.4	0.1	12-13	-19	-10	80000	5.0	17
ROS-615	580	615	-0.6	0.5	5.0	-90	-113	-133	-153	0.2	0.2	12-13	-21	-13	19000	5.0	17
ROS-630	595	630	+0.1	0.5	5.0	-90	-113	-133	-153	0.4	0.1	11-12	-23	-15	80000	5.0	18
ROS-638	616	638	+7.0	0.5	5.0	-88	-113	-134	-154	0.7	0.6	18-20	-24	-18	70000	5.0	25
ROS-645	610	645	-0.1	0.5	5.0	-88	-112	-132	-151	0.4	0.1	12-13	-24	-16	50000	5.0	17
ROS-660PV	640	660	0.0	0.5	5.0	-85	-107	-127	-147	0.8	0.6	10-14	-17	-12	2000	5.0	15
ROS-665	630	665	+0.2	0.5	5.0	-90	-113	-133	-153	0.4	0.1	12-13	-24	-16	60000	5.0	18
ROS-675PV	655	675	0.0	0.5	5.0	-85	-107	-127	-145	1.0	0.5	10-14	-23	-10	5000	5.0	15
ROS-680	650	680	+0.5	0.5	5.0	-91	-114	-134	-154	0.3	0.2	11-12	-24	-16	50000	5.0	18
ROS-690	655	690	-1.0	0.5	5.0	-89	-111	-131	-151	0.4	0.4	12-13	-24	-16	50000	5.0	17
ROS-705-219	610	705	+3.0	0.5	5.0	-80	-105	-126	-146	0.4	1.5	28-35	-28	-13	120000	5.0	26
ROS-700	665	700	-0.1	0.5	5.0	-89	-113	-133	-153	0.4	0.1	12-13	-21	-13	80000	5.0	17
ROS-715	680	715	-0.5	0.5	5.0	-90	-113	-133	-152	0.5	0.2	12-13	-22	-14	60000	5.0	16
ROS-720	700	720	+7.0	0.5	5.0	-89	-114	-134	-154	0.6	0.7	12	-23	-15	50000	4.75	30
ROS-725PV	710	725	0.0	0.5	5.0	-85	-105	-126	-145	0.9	0.3	8-13	-19	-12	2000	5.0	15
ROS-730	695	730	+0.2	0.5	5.0	-90	-114	-134	-153	0.5	0.2	11-12	-21	-13	90000	5.0	18
ROS-740PV	720	740	0.0	0.5	5.0	-84	-106	-126	-145	1.0	0.8	10-14	-19	-12	5000	5.0	15
ROS-745	71	745	+1.2	0.5	5.0	-88	-113	-133	-153	0.8	0.3	12	-22	-14	60000	5.0	17
ROS-750	670	750	+3.0	0.5	5.0	-82	-107	-128	-148	0.3	1.0	27-32	-30	-20	110000	5.0	26
ROS-755	720	755	-0.5	0.5	5.0	-89	-113	-133	-147	0.4	0.1	12-13	-23	-15	80000	5.0	17
ROS-766	730	766	+0.4	0.5	5.0	-91	-113	-134	-154	0.6	0.1	12-13	-23	-15	80000	5.0	18
ROS-769-1G19	743	769	+1.0	0.5	5.0	-88	-112	-132	-152	0.5	0.2	14	-22	-15	90000	5.0	20
ROS-800-719	797	806	+0.5	0.5	5.0	-93	-118	-140	-162	0.2	0.2	7	-24	-18	115000	5.0	35
ROS-800C-119	798	803	+5.3	0.5	5.0	-97	-124	-145	-165	0.20	0.02	3.5	-28	-19	60000	5.0	35
ROS-808	770	808	+7.2	0.5	5.0	-84	-110	-130	-150	0.80	0.80	19	-30	-15	120000	5.0	30
ROS-810	775	810	+0.6	0.5	5.0	-88	-112	-131	-151	0.9	0.8	12-13	-19	-12	60000	5.0	18
ROS-835	800	835	-0.4	0.5	5.0	-89	-110	-130	-150	1.0	0.5	12-13	-21	-13	60000	5.0	15
ROS-850	800	850	+7.0	0.5	5.0	-86	-110	-130	-150	1.0	0.7	20	-24	-15	100000	5.0	27
ROS-850-319	800	850	-0.50	0.5	5.0	-84	-110	-131	-151	0.2	0.4	18	-25	-15	160000	5.0	24
ROS-860-319	740	860	+6.00	0.5	5.0	-82	-110	-130	-150	1.30	0.30	32-50	-17	-10	50000	5.0	30
ROS-870	840	870	+0.8	0.5	5.0	-89	-111	-132	-151	1.1	0.8	11-12	-19	-12	90000	5.0	17
ROS-892-119	835	892	+4.0	0.5	5.0	-86	-115	-135	-155	0.5	0.5	23-27	-16	-11	50000	5.0	26
ROS-900PV	810	900	+1.0	0.5	5.0	-80	-102	-122	-142	3.0	2.0	26-30	-25	-16	1000	4.5	12
ROS-924	907	924	+0.80	0.5	5.0	-90	-114	-134	-154	0.1	0.3	12	-30	-20	155000	5.0	25
ROS-928C-119	902	928	+10.0	0.5	5.0	-89	-117	-138	-157	1.0	0.2	18	-22	-15	130000	12.0	32
ROS-930C	902	930	+5.5	0.5	5.0	-88	-117	-137	-157	0.5	0.2	18	-25	-15	140000	5.0	30
ROS-970	830	970	+5.5	0.5	5.0	-80	-107	-128	-148	1.0	1.0	46	-23	-17	80000	5.0	35
ROS-960PV	890	960	0.0	0.5	5.0	-80	-102	-122	-142	2.0	0.2	25-28	-27	-18	1000	5.0	12
ROS-960-419	866	960	+4.0	0.5	5.0	-86	-113	-134	-154	0.8	0.6	25-29	-19	-10	155000	5.0	30
ROS-995-119	965	995	+4.5	0.5	5.0	-87	-111	-132	-152	0.8	0.5	16	-24	-10	90000	5.0	32
ROS-1000C-319	1000	1000	+1.0	0.5	5.0	-96	-126	-146	-162	0.1	0.04	5	-22	-14	150000	6.0	35
ROS-1000C-519	1000	1000	-1.0	0.5	5.0	-98	-125	-145	-164	0.06	0.01	5	-22	-14	80000	5.0	35
ROS-1000PV	900	1000	+6.0	0.5	5.0	-80	-104	-124	-144	2.0	0.7	27-38	-33	-20	1000	5.0	22
ROS-1005-119	995	1030	+0.5	0.5	5.0	-84	-109	-129	-149	0.5	0.5	27	-17	-10	1000	5.0	32
ROS-1012-1PH19	925	1012	+4.5	0.5	5.0	-76	-104	-126	-146	2.0	1.5	55	-24	-13	55000	5.0	35
ROS1074-119	1067	1074	-0.1	0.5	5.0	-81	-106	-127	-147	0.4	0.4	29	-17	-10	100000	5.0	35
ROS-1090-219	1030	1090	+3.5	0.5	5.0	-84	-111	-132	-151	1.0	1.0	24-30	-24	-12	90000	5.0	35
ROS-1135-119	1125	1145	+3.0	0.5	5.0	-86	-114	-135	-154	0.4	0.1	15	-30	-20	1000	5.0	32
ROS-1185-119	1185	1185	+3.0	0.5	5.0	-83	-108	-128	-148	1.0	0.2	30	-20	-12	120000	5.0	35
ROS-1215-119	1205	1260	+3.0	0.5	5.0	-84	-108	-129	-149	0.7	0.5	24	-28	-22	80000	5.0	30
ROS-1250W-119	830	1250	+0.5	0.5	5.0	-69	-94	-117	-138	0.5	4.5	74-152	-33	-15	70000	5.0	25

Additional 5V Tuning for PLL IC's models, see pages 154-155

VOLTAGE CONTROLLED OSCILLATORS 50 Ω

600 MHz to 6840 MHz

MODEL PREFIX	FREQUENCY (MHz)		POWER OUTPUT (dBm)	TUNE VOLTAGE (V)		PHASE NOISE (dBc/Hz) SSB@ offset frequencies: Typ.				PULLING (MHz) pk-pk @12 dBr	PUSHING (MHz/V)	TUNING SENSITIVITY (MHz/V)	HARMONICS (dBc)		3 dB MOD. BANDWIDTH (kHz)	POWER SUPPLY	
	Min.	Max.	Typ.	Min.	Max.	1 kHz	10 kHz	100 kHz	1 MHz	Typ.	Typ.	Typ.	Typ.	Max.	Typ.	Voltage (V) Nom.	Current (mA) Max.
5 V TUNING for PLL IC's																	
ROS-1270-1PH19	1150	1270	+3.0	0.5	5.0	-80	-105	-126	-146	3.0	0.5	34-40	-18	-10	120000	5.0	35
ROS-1330-1PH19	1210	1330	+3.0	0.5	5.0	-82	-106	-128	-145	2.5	0.5	39-43	-18	-10	100000	5.0	35
ROS-1344-119	1296	1344	+2.0	0.5	5.0	-85	-111	-123	-151	0.2	0.1	19	-25	-15	100000	5.0	35
ROS-1357	1338	1357	0.0	0.5	5.0	-86	-110	-131	-151	0.3	0.4	12	-22	-13	400000	5.0	37
ROS-1435PV	1375	1435	+3.0	0.5	5.0	-78	-101	-121	-141	4.0	1.7	20-30	-26	-18	5000	5.0	20
ROS-1505-519	1505	1505	-0.50	0.5	0.5	-85	-111	-132	-150	0.5	0.5	17	-19	-10	100000	5.0	35
ROS-1540-419	1505	1540	+4.0	0.5	5.0	-83	-110	-131	-152	1.0	0.5	20-30	-16	—	150000	5.0	35
ROS-1590-319	1590	1590	+0.5	0.5	5.0	-86	-112	-132	-151	0.4	0.6	17	-23	-15	100000	5.0	33
ROS-1600PV	1520	1600	+7.0	0.5	5.0	-75	-100	-120	-140	10.0	3.0	25-38	-26	-16	1000	5.0	25
ROS-1605PV	1500	1605	0.0	0.5	5.0	-74	-98	-118	-138	6.0	0.8	40-50	-17	-8	8000	3.3	16
ROS-1631-119	1460	1631	0.0	0.5	5.0	-74	-101	-122	-142	2.0	0.5	59-78	-21	-12	170000	5.0	28
ROS-1640-119	1580	1640	+1.0	0.5	5.0	-82	-106	-127	-147	0.5	0.5	35	-15	—	170000	5.0	30
ROS-1660	1630	1660	+0.5	0.5	5.0	-83	-107	-127	-147	0.5	1.0	33	-19	-10	180000	5.0	30
ROS-1700-819	1690	1740	0.0	0.5	5.0	-86	-110	-130	-150	0.1	0.3	23	-20	-10	100000	5.0	40
ROS-1750-919	1680	1750	+3.0	0.5	5.0	-81	-106	-126	-146	2.5	1.0	32-36	-16	-10	160000	5.0	22
ROS-1800	1700	1800	+3.0	0.5	5.0	-77	-101	-122	-142	1.5	0.7	40-57	-32	-20	170000	5.0	30
ROS-1836	1824	1836	+4.0	0.5	5.0	-86	-112	-132	-152	0.2	0.2	18	-30	-20	90000	5.0	40
ROS-1850-519	1830	1850	-0.5	0.5	5.0	-86	-111	-132	-146	0.1	0.5	17	-29	-20	145000	7.0	35
ROS-1850-819	1847	1850	+5.0	0.5	5.0	-85	-109	-130	-150	0.1	0.4	18	-18	-12	130000	8.0	35
ROS-1910-419	1855	1910	+3.5	0.5	5.0	-83	-107	-127	-147	0.5	1.0	25-29	-27	-18	160000	5.0	30
ROS-1960-219	1960	1966	+5.0	0.5	5.0	-93	-121	-141	-161	0.50	0.05	8.0	-26	-17	190000	5.0	40
ROS-2000-1619	2000	2000	+1.5	0.5	5.0	-81	-106	-127	-147	2.0	0.3	22	-20	-10	70000	5.0	35
ROS-2015	1975	2015	+7.5	0.5	5.0	-85	-108	-129	-149	0.6	1.0	16-18	-30	-20	110000	5.0	35
ROS-2045-219	1900	2000	+6.30	0.5	5.0	-74	-101	-122	-143	6.0	0.2	42-56	-20	-10	60000	5.0	35
ROS-2070	2020	2070	+6.0	0.5	5.0	-84	-107	-128	-148	0.8	0.6	21	-30	-20	110000	5.0	35
ROS-2082-119	1780	2082	+6.6	0.5	5.0	-69	-97	-118	-139	9.0	1.0	110-130	-24	-14	270000	5.0	27
ROS-2085-119	2095	2115	+4.0	0.5	5.0	-81	-106	-126	-146	3.0	0.3	30	-20	-10	60000	5.0	35
ROS-2168-119	2112	2168	+2.0	0.5	5.0	-82	-1.0	-125	-145	1.5	0.5	30-35	-32	-20	170000	5.0	33
ROS-2210-419	2200	2240	+0.4	0.5	5.0	-83	-106	-126	-146	1.50	0.50	21-25	-20	-10	60000	5.0	35
ROS-2243C	2185	2243	+4.8	O.5	5.0	-86	-114	-135	-154	0.70	0.10	21	-29	-20	85000	4.75	39
ROS-2252	2182	2245	+3.0	0.5	5.0	-84	-107	-128	-146	0.5	1.0	21-26	-30	-20	20000	4.75	35
ROS-2299-119	2265	2300	+4.0	0.5	5.0	-84	-109	-129	-149	0.6	0.6	20	-25	-15	200000	5.0	43
ROS-2310	2290	2310	+7.0	0.5	5.0	-90	-116	-136	-157	1.0	0.10	7-9	-22	-12	180000	5.0	34
ROS-2390	2320	2390	+4.5	0.5	5.0	-81	-106	-127	-147	1.0	0.2	31-35	-17	—	180000	5.0	43
ROS-2390-219	2380	2420	+0.70	0.5	5.0	-80	-106	-127	-147	0.50	0.80	31-35	-20	-10	50000	5.0	35
ROS-2420-219	2169	2420	-0.5	0.5	5.0	-70	-97	-118	-139	2.0	0.2	90-96	-25	-17	260000	5.0	30
ROS-2435	2425	2435	+7.0	0.5	4.5	-87	-115	-135	-156	1.0	0.04	16.0	-20	-10	200000	8.0	32
ROS-2470-119	2430	2470	+9.5	0.5	5.0	-81	-106	-126	-146	2.0	0.5	27-31	-22	-11	200000	8.0	40
ROS-2500-2119	2497	2510	+6.0	0.5	5.0	-82	-103	-124	-144	1.5	1.0	18	-25	-15	30000	8.0	37
ROS-2500-2319	2200	2495	+4.5	0.5	5.0	-68	-96	-119	-139	6.0	2.0	130	-25	-15	100000	5.0	35
ROS-2510-219	2250	2510	+4.5	0.5	5.0	-70	-96	-119	-139	5.0	1.5	100	-23	-12	400000	5.0	40
ROS-2550-519	2280	2550	+4.5	0.5	5.0	-68	-94	-115	-135	7.0	2.0	96-126	-20	-10	100000	5.0	30
ROS-2625-119	2370	2600	+4.0	0.5	5.0	-70	-98	-119	-139	4.0	0.6	101-111	-20	—	560000	5.0	30
ROS-2650-519	2450	2650	-0.50	0.5	5.0	-69	-97	-118	-138	3.0	2.0	105	-25	-15	120000	5.0	30
ROS-2660-319	2620	2660	+2.5	0.5	5.0	-83	-108	-129	-148	0.40	0.30	17-20	-19	-10	200000	5.0	45
ROS-2770C	2715	2770	+0.40	0.5	5.0	-83	-110	-132	-152	0.9	0.7	28-32	-25	-15	90000	5.0	38
ROS-2840-219	2835	2860	+4.5	0.5	5.0	-79	-105	-126	-146	0.4	1.5	16	-25	-15	110000	5.0	40
ROS-2920-219	2820	2920	+4.0	0.5	5.0	-74	-101	-123	-143	1.0	1.0	53-56	-23	-15	200000	5.0	30
ROS-2930	2840	2930	+7.0	0.5	5.0	-69	-96	-117	-138	1.3	2.7	85	-29	-20	450000	5.0	40
ROS-2940C	2935	2940	+3.8	0.5	5.0	-89	-116	-136	-156	0.3	0.7	14	-17	-10	75000	7.0	40
ROS-2952	2748	2952	+4.3	0.5	5.0	-70	-98	-119	-139	1.5	1.2	84-89	-25	-15	40000	5.0	40
ROS-3000-619	2800	2970	+10.0	0.5	5.0	-74	-102	-123	-144	4.0	0.1	59-65	-25	-15	280000	5.0	36
ROS-3044	2885	3044	+8.0	0.5	5.0	-76	-104	-125	-145	4.5	1.0	64-72	-28	-18	80000	5.0	40

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp.

SOS
Case FZ990

ROS
Case CK605, CK1113, CK829

MODEL PREFIX	FREQUENCY (MHz)		POWER OUTPUT (dBm)	TUNE VOLTAGE (V)		PHASE NOISE (dBc/Hz) SSB@ offset frequencies: Typ.				PULLING (MHz) pk-pk @12 dBr	PUSHING (MHz/V)	TUNING SENSITIVITY (MHz/V)	HARMONICS (dBc)		3 dB MOD. BANDWIDTH (kHz)	POWER SUPPLY	
	Min.	Max.	Typ.	Min.	Max.	1 kHz	10 kHz	100 kHz	1 MHz	Typ.	Typ.	Typ.	Typ.	Max.	Typ.	Voltage (V) Nom.	Current (mA) Max.
ROS-3080-1PH19	2920	3080	+3.0	0.5	5.0	-71	-95	-116	-136	2.0	3.0	90	-22	-11	4000	5.0	37
ROS-3146-119	3000	3110	+9.0	0.5	5.0	-73	-102	-123	-144	4.5	2.5	56-64	-25	-15	200000	5.0	43
ROS-3127C	3082	3127	+4.2	0.5	5.0	-84	-111	-133	-152	0.70	0.50	26-31	-26	-15	100000	5.0	35
ROS-3214-119	3074	3200	+2.0	0.5	4.5	-77	-102	-123	-143	2.5	0.3	45-57	-21	-15	20000	5.0	40
ROS-3220-319	3050	3220	+2.5	0.5	5.0	-71	-96	-117	-137	1.0	2.5	74	-20	-10	340000	5.0	37
ROS-3233	3008	3233	+3.0	0.5	5.0	-71	-97	-119	-140	1.0	2.5	84-91	-30	-20	350000	5.0	40
ROS-3267	3259	3267	+4.0	0.5	5.0	-86	-111	-132	-152	0.50	1.0	16	-14	—	100000	5.0	40
ROS-3270-119	3150	3270	+2.5	0.5	5.0	-71	-96	-116	-137	2.5	4.5	82	-20	-12	340000	5.0	33
ROS-3320C-219	3220	3320	+4.5	0.5	5.0	-76	-105	-127	-147	2.0	0.8	50-58	-14	—	120000	5.0	45
ROS-3360-319	3160	3360	+3.5	0.5	5.0	-71	-98	-120	-140	1.0	1.0	82	-18	-10	650000	5.0	43
ROS-3412C	3312	3412	-0.60	0.5	5.0	-77	-105	-127	-148	0.8	0.2	50-65	-15	-10	110000	5.0	40
ROS-3432-119	3231	3432	+3.0	0.5	5.0	-72	-99	-120	-140	0.6	0.3	81-86	-20	-10	120000	5.0	45
ROS-3550	3350	3550	+3.5	0.5	5.0	-71	-97	-118	-139	1.5	0.7	77-82	-22	-13	720000	5.0	42
ROS-3600	3500	3600	+3.5	0.5	5.0	-73	-97	-118	-138	1.5	2.5	80	-19	-10	320000	5.0	37
ROS-3600C	3500	3600	-0.20	0.5	5.0	-77	-105	-126	-146	1.0	0.30	52-66	-16	-10	105000	5.0	40
ROS-3730C	3575	3730	2.20	0.5	5.0	-77	-104	-126	-146	1.8	0.30	52-68	-16	-10	115000	5.0	43
ROS-3800	3630	3800	+5.0	0.5	5.0	-72	-97	-119	-139	1.5	2.0	73-78	-31	-22	500000	5.0	40
ROS-3877-119	3676	3877	+3.0	0.5	5.0	-71	-98	-119	-139	0.8	0.5	80-87	-20	-10	150000	5.0	46
ROS-3970-2PH19	3790	3970	+3.5	0.5	5.0	-71	-96	-117	-137	1.5	4.0	77-85	-23	-15	30000	5.0	31
ROS-3997	3989	3997	+5.7	0.5	5.0	-78	-105	-129	-149	1.5	0.30	14	-19	-10	90000	5.0	33
ROS-4077-119	3876	4077	+4.0	0.5	5.0	-70	-97	-118	-138	1.5	2.0	72-78	-22	-14	120000	5.0	48
ROS-4300-1PH19	4150	4300	+4.5	0.5	5.0	-65	-91	-112	-132	9.5	2.0	68-77	-26	-18	330000	5.0	34
ROS-4303-119	4195	4415	+4.6	0.5	5.0	-69	-96	-117	-137	3.0	0.5	78-90	-25	-15	180000	5.0	50
ROS-4424-119	4420	4430	+7.5	0.5	5.0	-76	-99	-119	-139	6.0	1.4	21	-27	-17	100000	5.0	51
ROS-4540-119	4340	4540	+4.0	0.5	5.0	-66	-92	-113	-133	5.0	1.0	75-85	-28	-18	120000	5.0	45
ROS-4725-119	4585	4725	+2.5	0.5	5.0	-74	-104	-125	-144	2.0	4.0	73-92	-25	-14	80000	5.0	30
ROS-5150-119	4880	5150	+3.5	0.5	5.0	-69	-95	-116	-136	1.0	2.0	74-90	-30	-20	50000	5.0	53
ROS-5150-319	5020	5145	+3.5	0.5	5.0	-73	-104	-126	-146	0.7	2.5	75-90	-30	-18	120000	5.0	32
ROS-5200C-119	5194	5200	+3.5	0.5	5.0	-73	-103	-124	-145	1.0	3.0	90	-35	-15	130000	5.0	35
ROS-5363C-119	5223	5363	0.0	0.5	5.0	-75	-102	-122	-140	0.5	1.0	55-70	-15	-14	180000	5.0	35
ROS-5490C-119	5340	5490	+0.5	0.5	5.0	-74	-102	-122	-142	0.5	1.5	58-76	-27	-18	175000	5.0	32
ROS-5540C-119	5340	5540	+0.5	0.5	5.0	-74	-103	-124	-144	0.4	0.8	64-83		-15	100000	5.0	35
ROS-5580-119	5440	5580	-0.5	0.5	5.0	-75	-101	-123	-143	0.3	0.8	68-72	-26	-19	180000	5.0	35
ROS-5776-119	5726	5826	+1.5	0.5	5.0	-75	-102	-122	-142	0.5	3.0	59-78	-28	-18	130000	5.0	33
ROS-6030C-219	5890	6010	+2.0	0.5	5.0	-73	-102	-124	-144	0.7	2.0	62-80	-36	-22	220000	5.0	28
ROS-6520C-119	6385	6520	+1.30	0.5	5.0	-74	-103	-123	-143	0.7	2.50	62-95	—	-13	110000	5.0	38
ROS-6640C-119	6520	6640	+1.0	0.5	5.0	-72	-100	-121	-141	1.0	3.0	90-107	—	-12	150000	5.0	38
ROS-6740C-119	6640	6740	+2.0	0.5	5.0	-70	-97	-120	-140	1.0	3.0	75-90	-30	-18	300000	5.0	35
ROS-6840C-119	6740	6840	+1.0	0.5	5.0	-70	-97	-120	-140	1.0	3.50	90-102	—	-12	260000	5.0	38
SOS-600-519	600	610	-6.5	0.5	5.0	-80	-106	-126	-146	0.2	0.1	40-47	-19	-10	140000	3.0	12
SOS-638PV-119	614	638	+1.0	0.5	5.0	-83	-112	-133	-152	0.2	0.5	21-22	-22	-14	140000	5.0	20
SOS-704PV-119	677	707	0.0	0.5	5.0	-89	-113	-133	-152	0.3	0.3	12-16	-13	—	30000	5.0	20
SOS-800PV-119	776	800	-0.50	0.5	5.0	-88	-112	-132	-152	0.30	0.30	11-15	-14	-10	10000	5.0	20
SOS-810	790	810	+2.5	0.5	5.0	-75	-97	-117	-137	1.5	0.6	57-60	-25	-15	30000	3.0	13
SOS-822PV-119	795	825	+1.0	0.5	5.0	-84	-107	-127	-147	0.4	0.2	27	-25	-15	130000	5.0	20
SOS-862PV-119	845	862	0.0	0.5	5.0	-83	-109	-129	-149	0.1	0.6	26	-30	-24	130000	5.0	18
SOS-915-119	832	998	+5.0	0.5	5.0	-66	-91	-117	-137	4.0	5.0	100	-19	-10	110000	4.0	32
SOS-1000-519	980	1050	-6.3	0.5	5.0	-74	-99	-120	-140	0.50	0.50	57-60	-35	-25	335000	3.0	14
SOS-1225-119	1185	1225	-0.20	0.5	5.0	-79	-105	-125	-145	2.0	0.70	42	-17	-10	75000	3.0	14
SOS-1400-219	1355	1430	+3.0	0.5	5.0	-74	-98	-119	-139	6.0	3.0	50-61	-35	-25	60000	3.0	15
SOS-1505-119	1430	1520	+3.5	0.5	5.0	-69	-94	-115	-136	1.5	1.0	69-75	-30	-17	160000	3.0	15
SOS-4250-119	4120	4280	+2.5	0.5	5.0	-69	-95	-116	-136	4.5	0.4	70-78	-22	-13	500000	5.0	40

National Stock Number (NSN) Guide

NSN	MCL No.
5985-01-483-0465	ADC-10-4
5895-01-514-0619	ADE-13
5950-01-483-0469	ADT1.5-1
5895-01-131-4569	AK-2
5996-01-350-9550	AMP-15
5996-01-350-9551	AMP-75
5996-01-350-9549	AMP-77
5985-01-466-1331	ANNE-50
5985-01-540-6469	ANNE-50L
5895-01-320-0366	ASK-1
5915-01-425-7519	BHP-25
5915-01-454-6890	BLP-5
5915-01-545-2709	BLP-50
5915-01-534-2133	BLP-100-75
5915-01-518-7960	BLP-550
5985-01-491-2925	BMP-5075
5985-01-498-2715	BMP-5075R
6625-01-325-7972	BTRM-50
5985-01-328-7420	BTRM-75
5985-01-534-3832	BW-N1W5
5985-01-538-2245	BW-S1W2
5985-01-538-2194	BW-S2W2
5985-01-535-7292	BW-S3W2
5985-01-538-2187	BW-S4W2
5985-01-538-1141	BW-S5W2
5985-01-535-7294	BW-S6W2
5985-01-524-5984	BW-S10W2
5985-01-525-0443	BW-S12W2
5985-01-525-0445	BW-S20W2
6150-01-567-7558	CBL-2FT-SMNM
5962-01-459-9075	ERA-1SM
5962-01-459-7410	ERA-2SM
5996-01-516-5438	ERA-3SM
5962-01-459-7410	ERA-4SM
5962-01-459-9314	ERA-5SM
5895-00-087-7925	FD-2
5985-01-204-9746	FK-5
5950-01-325-4686	FT1.5-1
5950-01-132-8034	FTB-1-1-75-A15
5950-01-225-8773	FTB-1-6-A15
5996-01-551-8291	GVA-84
5985-01-564-6815	HAT-5
5985-01-565-7083	HAT-9
5895-01-564-8825	IZY2PD-86
5955-01-483-0505	JTOS-200
5955-01-540-7761	JTOS-400P
5955-01-534-2738	JTOS-1025
5955-01-478-7347	JTOS-2000
5985-01-393-7219	KSW-2-46
5995-01-369-4224	KSWA-2-46
5996-01-551-8833	LEE-39
5996-01-551-8834	LEE-59
5995-01-477-4173	LRMS-1
5995-01-478-7342	LRPS-2-1
5962-01-414-8635	MAR-1SM
5962-01-417-4110	MAR-2
5962-01-339-2933	MAR-3
5962-01-423-1569	MAR-3SM
5962-01-414-8631	MAR-4
5962-01-416-1462	MAR-6
5962-01-460-6063	MAR-6SM
5998-01-360-6953	MAR-8A+
5895-01-360-6958	MAV-11
5996-01-365-2246	MAV-4
5895-01-361-7477	MK-3
5895-01-332-8582	MK-3BR
6625-01-294-6957	MPD-1
5895-01-389-3572	MPD-21
6625-01-124-8595	MSC-2-1
5985-01-437-3528	MSC-2-1W
5915-01-518-8028	NHP-1000
5915-01-492-3687	NLP-450
5985-01-282-2105	PAS-1
5985-01-192-0100	PAS-2
5895-01-067-3035	PAS-3

NSN	MCL No.
5985-01-460-6045	PAT-10
5985-01-460-6043	PAT-15
5985-01-460-6040	PAT-3
5985-01-460-6042	PAT-6
5985-01-178-4406	PDC-10-1
5985-01-294-3796	PDC-10-1-75
5985-01-130-0177	PDC-10-21
5985-01-190-7738	PDC-10-22
5985-01-389-9497	PDC-10-5
5985-01-394-6080	PDC-10-54
5985-01-147-0160	PDC-15-6
5985-01-076-8477	PDC-20-3
5915-01-332-1091	PLP-100
5915-01-389-3575	PLP-150
5915-01-355-9433	PLP-30
5915-01-450-7011	PLP-300
5915-01-389-8302	PLP-450
5995-01-105-7820	PLS-1
5895-01-390-0151	PLS-2
6625-01-230-0492	PSC-2-4
6625-01-015-6027	PSC-3-1
6625-01-249-8011	PSC-3-13
5985-01-295-5898	PSC-3-1W
5985-01-381-3835	PSC-3-2
5895-01-065-0106	PSC-4-1
5895-01-105-6189	PSC-4-3
5895-01-423-7929	PSC-4-5
5895-01-332-3086	PSC-4-6
5895-01-347-0205	PSC-4A-4
6625-01-255-3143	PSC-5-1
6625-01-249-8012	PSC-6-1
6625-01-365-5615	PSC-8-1
6625-01-413-2386	PSCJ-2-1
5985-01-332-3084	PSCJ-2-2
6625-01-186-4456	PSCQ-2-180
6625-01-415-3074	PSCQ-2-21.4
5895-01-448-4172	PSCQ-2-3.4
5895-01-374-0023	PSCQ-2-50
5895-01-347-0206	PSCQ-2-550
5985-01-292-8834	PSCQ-2-70
6625-01-160-0151	PSCQ-2-90
5985-01-328-8006	PSW-1211
5996-01-450-5504	RAM-6
5895-01-105-6188	RAY-1
5895-01-064-5082	RAY-3
5895-01-317-5882	RAY-6
5895-01-268-7337	RK-2
5895-01-143-3726	RK-3
5895-01-415-6798	RMS-1
5895-01-453-9218	RMS-1LH
5895-01-447-3489	RMS-2
5895-01-392-2276	ROK-186MH
5963-01-514-0616	ROS-1410
5895-01-250-8525	RPD-1
5895-01-117-2926	SAM-1
5895-01-199-3893	SAY-11
5895-01-126-4913	SBL-1
6625-01-441-8135	SBL-1-1
5895-01-514-0624	SBL-1MH
5895-01-179-8084	SBL-1X
5895-01-326-6030	SBL-3
6625-01-414-5823	SCM-1NL
5895-01-374-9561	SCM-1NL
6625-01-447-4768	SCM-2500NL
5985-01-178-4406	PDC-10-1
5915-01-441-6788	SHP-175
5915-01-458-5439	SHP-100
5915-01-360-0677	SHP-200
5915-01-530-2149	SHP-300
5915-01-464-8971	SIF-30
6625-01-247-8425	SK-2
5915-01-539-4795	SLP-1.9
5915-01-540-6150	SLP-10.7
5915-01-414-9165	SLP-21.4
5915-01-327-4692	SLP-30

NSN	MCL No.
5915-01-539-5208	SLP-300
5915-99-244-4808	SLP-450
5915-01-487-3147	SLP-550
5915-01-380-5534	SLP-70
5895-00-008-8272	SRA-1
5895-01-273-0883	SRA-11
5962-01-113-5431	SRA-1-1
5895-01-192-0173	SRA-11H
6625-00-594-0223	SRA-1H
5895-01-391-0113	SRA-1MH
5895-01-163-0433	SRA-1W
5895-01-268-1907	SRA-1W
5895-00-576-0716	SRA-1WH
5895-01-063-1078	SRA-2H
5895-01-021-5914	SRA-3
5895-01-117-4537	SRA-3H
5895-01-124-0117	SRA-6
5895-01-081-0977	SRA-8
5895-01-483-0503	SYM-18H
5950-01-128-3745	T1-1
5950-01-347-0310	T1-1- KK81
5950-01-409-2785	T1-1H
5950-01-153-0668	T1-1T
5950-01-431-4604	T1-1T- KK81
5950-01-340-7040	T1-1T-X65
5950-01-327-5916	T1-1-X65
5950-01-094-7439	T16-1
5950-01-336-0939	T16-6T
5950-01-258-2173	T1-6T
5950-01-450-2692	T2.5-6
5950-01-106-1218	T2-1
5950-01-375-9217	T2-1T
5950-01-347-0311	T2-1T- KK81
5950-01-153-0298	T3-1T
5950-01-024-7626	T4-1
5950-01-328-8975	T4-1H-X65
5950-01-460-5700	T4-1-KK81
5950-01-349-3181	T4-1-X65
5950-01-361-1794	T4-2
5950-01-516-0983	T4-6T-KK81
5950-01-489-1125	T4-6-X65
5950-01-105-8153	T9-1
5895-01-167-9721	TAK-1H
5895-01-282-0079	TAK-1WH
5895-01-274-2678	TAK-3H
5895-01-271-0842	TAK-5
5895-01-231-2372	TAK-6
5950-01-485-4115	TC4-1T
5950-01-537-9763	TC4-1W
5985-01-226-3428	TDC-10-1
5985-01-428-6828	TDC-6-1
5985-01-457-7382	TDC-6-1
5895-01-409-1158	TFM-11
5895-011-79-5686	TFM-12
5895-01-292-2759	TFM-15
5895-01-129-0110	TFM-1H
5895-01-135-1852	TFM-2
5895-01-235-1274	TFM-2H
5895-01-112-0031	TFM-3
5895-01-374-0022	TFM-3H
5895-01-302-7047	TFM-3MH
5895-01-317-9388	TFM-4
5895-01-408-6093	TFM-42MH
5950-01-326-2772	TM0-1-1T
5950-01-168-7512	TM0-13-1T
5950-01-215-8697	TM0-2.5-6T
5950-01-183-6414	TM0-2-1
5950-01-168-7512	TM0-3-1T
5950-01-091-3553	TM0-4-2
5950-01-132-8102	TM0-4-6
5950-01-442-8008	TM0-8-1
5950-01-141-0174	TM0-9-1
5950-01-213-3735	TMO-1-1
5950-01-138-4593	TMO-16-1
5950-01-364-7803	TMO-6-1

NSN	MCL No.
5985-01-416-9021	TOAT-124
5985-01-416-9020	TOAT-51020
5985-01-456-4751	TOSW-230
5985-01-457-4811	TOSW-425
5895-01-332-8100	TSC-2-1
5895-01-373-2444	TSM-3
5895-01-373-2444	TSM-3
4920-01-500-3406	TT1-6
5950-01-272-2298	TT1-6-X65
5950-01-331-7777	TT4-1A
5950-01-415-7145	TTM0-25-1
5985-01-564-6804	VAT-5
5985-01-519-7451	VAT-6
5895-01-232-5890	VAY-1
5915-01-550-7306	VLFX-950
5996-01-460-6044	VNA-25
1680-01-434-4480	ZA2CS-500-15W-N
5985-01-507-8816	ZA3CS-400-3W
5985-01-357-3919	ZA3PD-2
5985-01-288-9999	ZAD-11H
5985-00-280-7750	ZAD-1B
5895-01-491-7784	ZAD-2
5895-01-149-0771	ZAD-3H
5895-01-264-8994	ZAD-3SHB
5895-01-344-7843	ZAD-6B
5895-01-476-0831	ZAPD-2
5895-01-449-0825	ZAPD-2-N
5895-01-229-7431	ZAPD-2-S
5985-01-532-5461	ZAPD-20-N
6625-01-173-1887	ZAPD-4-N
5985-01-523-2508	ZAPD-900-5W-N
5985-01-412-9064	ZAPDQ-4
5985-01-267-2832	ZAS-3B
5985-01-507-7539	ZASWA-2-50DR
5895-01-518-3056	ZB4PD1-2000-S
5985-01-476-2218	ZB4PD1-500-S
6625-01-520-6448	ZB4PD-6.4-S
5895-01-533-4707	ZB6PD-2-S
5985-01-482-9739	ZB8PD-1-N
5895-01-499-6724	ZB8PD-2-S
5985-01-372-8880	ZB8PD-4-S
5985-01-451-1417	ZBSC-413
5985-01-370-6145	ZBSC-413-S
6625-01-391-5026	ZBSC-615
5895-01-565-8039	ZC16PD-24
5895-01-474-3455	ZCSC-3-R3
5895-01-495-8803	ZCSC-8-1
5985-01-125-3467	ZDC-10-1
5985-01-476-2130	ZDC-10-1-75BR
5985-01-391-5674	ZDC-10-1B
5985-01-178-4405	ZDC-20-1
5985-01-096-5007	ZDC-20-3
5985-01-264-9105	ZDC-20-3B
5985-01-373-0023	ZEDC-10-2B
5985-01-337-9981	ZEDC-15-2B
5986-01-450-0781	ZEL-1724LN
5895-01-235-7834	ZEM-2B
5895-01-535-6456	ZEM-4300
5985-01-381-9081	ZESC-2-11
5895-01-481-4754	ZFBT-4R2G
5895-01-514-2948	ZFBT-4R2GW
5895-01-495-8805	ZFBT-4R2GW-FT
5985-01-230-6676	ZFDC-10-1
5985-01-135-9780	ZFDC-10-1B
5985-01-208-5694	ZFDC-10-2
5985-01-253-0600	ZFDC-10-21
5985-01-476-2125	ZFDC-10-5
5985-01-417-0065	ZFDC-10-5-S
5985-01-473-9190	ZFDC-10-6
5985-01-298-0144	ZFDC-15-5
5985-01-330-6792	ZFDC-15-6
6130-01-383-9709	ZFDC-20-3-S
5985-01-266-9992	ZFDC-20-4
5985-01-097-2192	ZFDC-20-5
5985-01-542-1840	ZFDC-20-5-S

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp.

NSN	MCL No.	NSN	MCL No.
5985-01-495-8929	ZFDC-20-50B-S	5895-01-229-0156	ZFSC-8375
5996-01-532-1705	ZFL-500LN	5895-01-495-8801	ZFSC-8-43
5996-01-554-1059	ZFL-1000	5985-01-407-7391	ZFSWA-2-46-S
5996-01-464-8970	ZFL-1000G	5996-01-453-2464	ZHL-0812HLN
5996-01-299-5588	ZFL-1000H	5996-01-412-3038	ZHL-1042J
5996-01-412-3031	ZFL-1000LN	6130-01-088-2322	ZHL-1A
5996-01-454-6938	ZFL-1000VH	5996-01-123-0792	ZHL-1A
1680-01-536-4521	ZFL-1000VH2	5996-01-201-4500	ZHL-1A-S
5996-01-220-2213	ZFL-2000B	5996-01-494-6112	ZHL-2010-S
6625-01-415-2182	ZFM-11-S	5996-01-400-0753	ZHL-2-12
5895-01-412-3035	ZFM-15	5895-01-238-7973	ZHL-32A
5895-01-217-6878	ZFM-150-N	5895-01-194-1718	ZHL-3A
5895-01-412-3037	ZFM-1W	5996-01-263-5871	ZHL-4240
6625-01-343-0908	ZFM-2A	5996-01-253-2397	ZHL-42-S
5895-01-449-8028	ZFM-2A-S	6625-01-339-2539	ZHL-5W-1
5895-01-257-9523	ZFM-3	5996-01-330-3533	ZHL-6A
5895-01-381-9289	ZFM-3B	5996-01-459-9104	ZJL-4G
5895-01-290-0300	ZFM-3H	5996-01-495-8804	ZKL-2
5985-01-310-5748	ZFRSC-2050B	5895-01-394-4973	ZLW-1
5985-01-266-6144	ZFRSC-2075	5985-01-080-7637	ZLW-1H
5985-01-332-3083	ZFRSC-42-S	5895-00-607-7010	ZLW-1W
5985-01-516-5514	ZFSC-10-1	5962-01-045-7500	ZLW-1HB
5895-01-511-2022	ZFSC-12-1	5895-00-607-7010	ZLW-1W
5895-01-494-8035	ZFSC-12-11-S	5840-01-166-8398	ZLW-2B
5820-01-120-9321	ZFSC-16-1	5985-01-140-4291	ZMAS-1
6625-01-139-3499	ZFSC-2-1	5985-01-437-1502	ZMAS-3
5985-01-176-4551	ZFSC-2-1	4935-01-227-6945	ZMDC-10-1
5895-01-467-5372	ZFSC-2-10G	5985-01-193-8515	ZMDC-20-3
6625-01-415-2183	ZFSC-2-11-S	5895-01-204-1526	ZMSC-2-1
5895-01-325-4795	ZFSC-2-1-75	5985-01-338-9329	ZMSC-2-1BR
5895-01-494-8406	ZFSC-2-1B-N	5895-01-127-0232	ZMSC-2-1W
5985-01-421-7289	ZFSC-2-1B-S	6625-01-170-0102	ZMSC-3-1B-S
6625-01-213-6490	ZFSC-2-1-S	5895-01-451-0601	ZMSC-4-1BR
5895-01-348-3534	ZFSC-2-1W	5985-01-519-6910	ZMSC-4-2BR
5895-01-549-9844	ZFSC-2-1W-BNC	5985-01-394-4982	ZMSCQ-2-50
6625-01-200-5094	ZFSC-2-1W-S	5985-01-542-1882	ZMSCQ-2-90
5895-01-467-5374	ZFSC-2-2	5895-01-549-9844	ZFSC-2-1W-BNC
4920-01-538-0637	ZFSC-2-2500	5985-01-532-4273	ZMSCQ-2-180
5895-01-516-3575	ZFSC-2-2500B	5985-01-490-0201	ZMSW-1211
6625-01-546-1699	ZFSC-2-2500-S	5895-01-213-3888	ZMY-1B
5915-01-012-8162	ZFSC-2-2-75B	4935-01-080-7636	ZMY-2
5895-01-330-4416	ZFSC-2-2B	5895-01-522-3794	ZN2PD-920W-S
6625-01-362-1801	ZFSC-2-2B-S	5985-01-553-7542	ZN2PD-9G
6625-01-333-1127	ZFSC-2-2-S	5895-01-384-7453	ZP-10514
6625-01-291-3346	ZFSC-2-4	5985-00-105-9756	ZP-3
5895-01-446-1161	ZFSC-24-11-75	5996-01-493-6740	ZPUL-21
5895-01-446-1158	ZFSC-2-4B	5895-01-214-6032	ZSC-2-1
6625-01-253-2444	ZFSC-2-5	5895-01-036-6254	ZSC-2-1
6625-01-489-1805	ZFSC-2-5B-S	5895-01-136-8182	ZSC-2-1-75B
6625-01-419-4241	ZFSC-2-6	5895-01-476-2126	ZSC-2-1-75BR
5895-01-408-6857	ZFSC-2-6	5865-01-112-7719	ZSC-2-1B
5985-01-315-2869	ZFSC-2-6B	6625-00-270-3055	ZSC-2-1B
5895-01-524-8996	ZFSC-2-9G	6625-01-516-5515	ZSC-2-1BR
6625-01-235-6873	ZFSC-3-1	5895-01-283-0850	ZSC-2-1W
5895-01-335-1824	ZFSC-3-13	6625-01-264-8985	ZSC-2-1WB
5985-01-409-0884	ZFSC-3-13-S	5820-01-136-7245	ZSC-2-2B
5985-01-361-8520	ZFSC-3-1-S	5895-01-229-0157	ZSC-2375
5985-01-370-2096	ZFSC-3-1W	5895-01-523-0183	ZSC-2-4
5895-01-543-5886	ZFSC-3-1W-B-S	5895-01-467-5362	ZSC-2-4B
6625-01-454-7617	ZFSC-3-4	6625-01-327-4755	ZSC-3-1
6625-01-333-1126	ZFSC-3-4-S	6625-01-008-9566	ZSC-3-1B
5895-01-554-6217	ZFSC-4-1B-BNC	5985-01-462-0144	ZSC-3-1BR
6625-01-303-4623	ZFSC-4-1-S	5985-01-315-2870	ZSC-3-2BR
5895-01-509-6429	ZFSC-4-1W	5895-01-512-7671	ZSC-4-1
5985-01-364-1944	ZFSC-4-1WB-S	5998-01-228-8995	ZSC-4-1-75
5985-01-372-6418	ZFSC-4-1W-S	5985-01-476-2127	ZSC-4-1-75BR
5985-01-253-2843	ZFSC-4-3B-S	6625-00-270-3056	ZSC-4-1B
6625-01-225-6965	ZFSC-6-1	5820-01-120-5238	ZSC4-2B
6625-01-380-5299	ZFSC-6-1-75	6625-01-357-2227	ZSC-4-2BR
6625-01-263-9871	ZFSC-6-1-S	6625-01-038-8553	ZSC-4-3B
5895-01-547-2428	ZFSC-6-110-BNC	5895-01-340-7761	ZSCJ-2-2
5820-01-136-7244	ZFSC-8-1	5985-01-534-3836	ZSDR-230
5895-01-326-8664	ZFSC-8-1-75	6625-01-520-6532	ZX10-2-71-S
6625-01-223-1235	ZFSC-8-1-S	5895-01-464-8969	ZYSW-2-50DR
5895-01-550-8029	ZFSC-8-4	4920-01-530-0199	ZYSWA-2-50DR
		5985-01-467-3232	ZYSWA-2-50DRB

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Federal supply code: 15542

how to order

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terms

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Mini-Circuits Patent Guide

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ADC-10-1R	6,133,525
	6,140,887
ADC-10-4	6,133,525
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ADC-10-4-75R	6,133,525
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ADE-R12MH	6,133,525
ADE-R18WLH	6,133,525
ADE-R1L	6,133,525
ADE-R1LH	6,133,525
ADE-R1MHW	6,133,525
ADE-R20	6,133,525
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ADE-R272MH	6,133,525
ADE-R2ASK	6,133,525
ADE-R2ASKLH	6,133,525
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ADE-R30WLH	6,133,525
ADE-R35LH	6,133,525
ADE-R3GHLH	6,133,525
ADE-R5LH	6,133,525
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ADE-R6LH	6,133,525
ADE-R901	6,133,525
ADE-R901LH	6,133,525
ADEX-10	6,133,525
	6,947,717
ADEX-10H	6,133,525
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ADEX-10L	6,133,525
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ADEX-R10	6,133,525
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ADEX-R10LH	6,133,525
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ADP-2-1	6,133,525
ADP-2-10	6,133,525
ADP-2-10-75	6,133,525
ADP-2-10-75M	6,133,525
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ADP-2-1W-75	6,133,525
ADP-2-20	6,133,525
ADP-2-20-75	6,133,525
ADP-2-4	6,133,525
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ADPQ-2-250	6,133,525
ADQ-180	6,133,525
ADQ-90	6,133,525
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ADT1-1WT	6,133,525
ADT1-1WT-1	6,133,525
ADT1-6T	6,133,525
ADT1.5-1	6,133,525
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ADT1.5-122	6,133,525
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ADT16-6	6,133,525
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ADT2-1T	6,133,525
ADT2-1T-1P	6,133,525
ADT3-1T	6,133,525
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ADT4-1T	6,133,525
ADT4-1WT	6,133,525
ADT4-5WT	6,133,525
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ADT4-6T	6,133,525
ADT4-6WT	6,133,525
ADT8-1T	6,133,525
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ADTL1-15-75	6,133,525
ADTL1-18-75	6,133,525
ADTL1-4-75	6,133,525
ADTL2-18	6,133,525
ADTT1-1	6,133,525
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AMP-3G	6,943,629
AMT-2	6,133,525
BDCA-10-25	7,049,905
BDCA-15-25	7,049,905
BDCA-16-30	7,049,905
BDCA-6-16	7,049,905
BDCA-7-25	7,049,905
BDCA1-10-40	7,049,905
BDCA1-6-11	7,049,905
BDCA1-6-22	7,049,905
BDCA1-7-33	7,049,905
DBTC-10-4-75	6,140,887
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DBTC-12-4	6,140,887
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DBTC-13-4	6,140,887
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DBTC-13-5-75	6,140,887
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DBTC-16-5-75	6,140,887
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DBTC-17-5	6,140,887
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DBTC-18-4-75	6,140,887
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DBTC-20-4	6,140,887
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DBTC-9-4	6,140,887
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ELS-1300	6,479,977
ELS-210	6,479,977
ELS-450	6,479,977
ELS-950	6,479,977
ERA-1SM	6,943,629
ERA-21SM	6,943,629
ERA-2SM	6,943,629
ERA-33SM	6,943,629
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ERA-50SM	6,943,629
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Gali-3	6,943,629
Gali-33	6,943,629
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Gali-5F	6,943,629
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GVA-83	6,943,629
GVA-84	6,943,629
HFCN-2700A	Patent Pending
HFCN-3100	Patent Pending
HFCN-3500	Patent Pending
HFCN-3800	Patent Pending
HFCN-4400	Patent Pending
HFCN-4600	Patent Pending
HFCN-5050	Patent Pending
HFCN-5500	Patent Pending
HFCN-7150	Patent Pending
HFCN-8400	Patent Pending
HJK-3H	6,807,407
HJK-2911H	6,807,407
HJK-72LH	6,807,407
HJK-212H	6,807,407
HJK-212LH	6,807,407
HJK-U151H	6,807,407
HJK-U232H	6,807,407
JTOS-1750	6,549,084
JTOS-1950	6,549,084
JTOS-2000	6,549,084
JTOS-2700V	6,549,084
JYDC-23-1HP	6,140,887
JYDC-7-1HP	6,140,887
KBA-20	5,534,830
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LAVI-10VH	6,807,407
LAVI-17VH	6,807,407
LAVI-22VH	6,807,407
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LAVI-U252VH	6,807,407
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LFCN-105	6,943,646
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MAR-2SM	6,943,629
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MAR-4SM	6,943,629
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MAX-19H	6,959,180
MAX-9H	6,959,180
MBA-10L	5,534,830
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MBA-15L	5,534,830
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MBA-15MH	5,534,830
MBA-18LH	5,534,830
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MBA-591	5,534,830
MBA-591L	5,534,830
MBA-671	5,534,830
MCA-19FH	6,959,180
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MCA-19FMH	6,959,180
MCA-272FH	6,959,180
MCA-30FH	6,959,180
MCA-30FLH	6,959,180
MCA-30FMH	6,959,180
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MCA-3851FH	6,959,180
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MCA1-12G	7,027,795
MCA1-12GL	7,027,795
MCA1-113H	7,027,795
MCA1-24	7,027,795
MCA1-24LH	7,027,795
MCA1-24MH	7,027,795
MCA1-42	7,027,795
MCA1-42LH	7,027,795
MCA1-42MH	7,027,795
MCA1-60	7,027,795
MCA1-60LH	7,027,795
MCA1-60MH	7,027,795
MCA1-80H	7,027,795
MCA1-80LH	7,027,795

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MCA1-80MH	7,027,795
MCA1-85	7,027,795
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MERA-533	6,943,629
MERA-556	6,943,629
MERA-7433	6,943,629
MERA-7456	6,943,629
MSP2T-18XL	5,272,458
	6,414,577
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	7,633,361
	additional patents pending
MSP2TA-18XL	5,272,458
	6,414,577
	6,650,210
	7,633,361
	additional patents pending
MTS-18XL-B	5,272,458
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	7,633,361
	additional patents pending
PMQPW-150	4,673,898
POS-1400A	6,549,084
POS-2000A	6,549,084
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QBA-07	5,534,830
QBA-12	5,534,830
QBA-12N	5,534,830
QBA-20	5,534,830
QBA-20W	5,534,830
QBA-24	5,534,830
QBA-24W	5,534,830
QCC-20	7,030,713
QCC-22	7,030,713
RAM-1	6,943,629
RAM-2	6,943,629
RAM-3	6,943,629
RAM-4	6,943,629
RAM-7	6,943,629
ROS-1000V	6,424,241
ROS-1100V	6,424,241
ROS-1435PV	6,424,241
ROS-1500	6,549,084
ROS-1605PV	6,549,084
ROS-1720	6,549,084
ROS-1900	6,549,084
ROS-1900V	6,549,084
ROS-2000	6,549,084
ROS-2650	6,549,084
ROS-3000V	6,549,084
ROS-660PV	6,424,241
ROS-675PV	6,424,241
ROS-725PV	6,424,241
ROS-740PV	6,424,241
ROS-810LN	6,424,241
SBA-2-14	5,534,830
SBA-2-18	5,534,830
SBA-2-20	5,534,830
SBA-2-22	5,534,830
SBB-2-10	6,819,202
SBB-2-13	6,819,202
SBB-2-18	6,819,202
SBB-2-21W	6,819,202
SBB-2-23	6,819,202
SBD-4-25	6,819,202
SBTC-2-10	6,963,255
SBTC-2-10-5075	6,963,255
SBTC-2-10-75	6,963,255
SBTC-2-10-7550	6,963,255
SBTC-2-15-75	6,963,255
SBTC-2-20	6,963,255
SBTC-2-25	6,963,255
SBTCJ-1W	6,806,790
SCA-3-11	6,965,280
SCA-4-10	Patent Pending

Mini-Circuits Model	U.S. Patent
SCA-4-10-75	Patent Pending
SCA-4-15-75	Patent Pending
SCN-2 series	6,967,544
SIM-14	7,027,795
SIM-14H	7,027,795
SIM-14LH	7,027,795
SIM-24MH	7,027,795
SIM-43	7,027,795
SIM-43H	7,027,795
SIM-43LH	7,027,795
SIM-43MH	7,027,795
SIM-63LH	7,027,795
SIM-73L	7,027,795
SIM-83	7,027,795
SIM-83LH	7,027,795
SIM-153	7,027,795
SIM-153LH	7,027,795
SIM-153MH	7,027,795
SIM-722MH	7,027,795
SIM-762H	7,027,795
SIM-792LH	7,027,795
SIM-752MH	7,027,795
SIM-852MH	7,027,795
SIM-U432H	7,027,795
SIM-U63H	7,027,795
SIM-U712H	7,027,795
SIM-U742MH	7,027,795
TCBT-2R5G	7,012,486
TCBT-6G	7,012,486
TCCH-80	7,012,485
TCD-10-1W	6,140,887
TCD-10-1W-75	6,140,887
TCD-13-4	6,140,887
TCD-13-4-75	6,140,887
TCD-18-4	6,140,887
TCD-18-4-75	6,140,887
TCD-20-4	6,140,887
TCD-9-1W	6,140,887
TCD-9-1W-75	6,140,887
TIA-1000-1R8	5,101,171
	6,943,629
TIA-1000-1R8-2	5,101,171
	6,943,629
TIA-1000-4	5,101,171
TIA-1000-4-2	5,101,171
UNCL-L1	6,943,629
UNCL-L1H	6,943,629
UNCL-R1	6,943,629
VACC-09	7,030,713
VACC-22	7,030,713
VAM-3	6,943,629
VAM-7	6,943,629
VBFZ-780	6,943,646
VBFZ-925	6,943,646
VBFZ-1065	6,943,646
VBFZ-1400	6,943,646
VBFZ-1690	6,943,646
VBFZ-2000	6,943,646
VBFZ-2130	6,943,646
VBFZ-2340	6,943,646
VBFZ-2575	6,943,646
VBFZ-3590	6,943,646
VBFZ-4000	6,943,646
VBFZ-5500	6,943,646
VBFZ-6260	6,943,646
VLF-1000	6,943,646
VLF-105	6,943,646
VLF-120	6,943,646
VLF-1200	6,943,646
VLF-1400	6,943,646
VLF-1450	6,943,646
VLF-1500	6,943,646
VLF-1525	6,943,646
VLF-1575	6,943,646
VLF-160	6,943,646
VLF-1700	6,943,646

Mini-Circuits Model	U.S. Patent
VLF-180	6,943,646
VLF-1800	6,943,646
VLF-190	6,943,646
VLF-225	6,943,646
VLF-2250	6,943,646
VLF-2500	6,943,646
VLF-2600	6,943,646
VLF-2750	6,943,646
VLF-2850	6,943,646
VLF-3000	6,943,646
VLF-320	6,943,646
VLF-3400	6,943,646
VLF-3800	6,943,646
VLF-400	6,943,646
VLF-4400	6,943,646
VLF-490	6,943,646
VLF-5000	6,943,646
VLF-530	6,943,646
VLF-5500	6,943,646
VLF-575	6,943,646
VLF-5850	6,943,646
VLF-6000	6,943,646
VLF-630	6,943,646
VLF-6400	6,943,646
VLF-6700	6,943,646
VLF-7200	6,943,646
VLF-80	6,943,646
VLF-800	6,943,646
VLF-95	6,943,646
VLFX-105	6,943,646
VLFX-1050	6,943,646
VLFX-1100	6,943,646
VLFX-1125	6,943,646
VLFX-1300	6,943,646
VLFX-1350	6,943,646
VLFX-225	6,943,646
VLFX-300	6,943,646
VLFX-400	6,943,646
VLFX-450	6,943,646
VLFX-470	6,943,646
VLFX-500	6,943,646
VLFX-540	6,943,646
VLFX-650	6,943,646
VLFX-780	6,943,646
VLFX-80	6,943,646
VLFX-825	6,943,646
VLFX-950	6,943,646
Z30-10-4-75	6,140,887
	6,784,521
Z30-13-5-75	6,140,887
	6,784,531
Z30-16-5-75	6,140,887
	6,784,531
Z30-18-4-75	6,140,887
	6,784,531
ZADC-17-14HP	7,049,905
	7,218,186
ZFL-1000	6,943,629
ZFL-1000H	6,943,629
ZFL-1000LN	6,943,629
ZFL-2000	6,943,629
ZFL-2500	6,943,629
ZFL-500	6,943,629
ZFL-500LN	6,943,629
ZFL-750	6,943,629
ZHL-20W-13	7,348,854
ZHL-100W-52	7,348,854
ZHL-1000-3W	6,943,629
ZHL-1000VH2	6,943,629
ZHL-2500VH	6,943,629
ZHL-3010	6,943,629
ZHL-6A	6,943,629
ZJL-3G	6,943,629
ZJL-4G	6,943,629
ZJL-4HG	6,943,629
ZJL-5G	6,943,629

Mini-Circuits Model	U.S. Patent
ZJL-6G	6,943,629
ZJL-7G	6,943,629
ZKL-1R5	6,943,629
ZKL-2	6,943,629
ZKL-2R5	6,943,629
ZKL-2R7	6,943,629
ZOS-100	6,943,629
ZOS-1025	6,943,629
ZOS-150	6,943,629
ZOS-200	6,943,629
ZOS-300	6,943,629
ZOS-400	6,943,629
ZOS-50	6,943,629
ZOS-535	6,943,629
ZOS-75	6,943,629
ZOS-765	6,943,629
ZPUL-21	6,943,629
ZPUL-30P	6,943,629
ZX05-1	6,790,049
	6,133,525
ZX05-10	6,790,049
	6,133,525
	6,947,717
ZX05-10H	6,790,049
	6,133,525
	6,947,717
ZX05-10HW	6,790,049
ZX05-10L	6,790,049
	6,133,525
	6,947,717
ZX05-11X	6,790,049
	6,133,525
ZX05-12MH	6,790,049
	6,133,525
ZX05-14	6,790,049
	7,027,795
ZX05-14H	6,790,049
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ZX05-14LH	6,790,049
	7,027,795
ZX05-17H	6,790,049
	6,133,525
ZX05-1HW	6,790,049
	6,133,525
ZX05-1L	6,790,049
	6,133,525
ZX05-1LHW	6,790,049
	6,133,525
ZX05-1MHW	6,790,049
	6,133,525
ZX05-2	6,790,049
	6,133,525
ZX05-20H	6,790,049
	6,133,525
ZX05-25MH	6,790,049
	6,133,525
ZX05-30W	6,790,049
	6,133,525
ZX05-42MH	6,790,049
	6,133,525
ZX05-43	6,790,049
	7,027,795
ZX05-43H	6,790,049
	7,027,795
ZX05-43LH	6,790,049
	7,027,795
ZX05-43MH	6,790,049
	7,027,795
ZX05-5	6,790,049
	6,133,525
ZX05-63LH	6,790,049
	7,027,795
ZX05-73L	6,790,049
	7,027,795
ZX05-83	6,790,049
	7,027,795

Mini-Circuits Model	U.S. Patent
ZX05-83LH	6,790,049
	7,027,795
ZX05-153	6,790,049
	7,027,795
ZX05-153LH	6,790,049
	7,027,795
ZX05-153MH	6,790,049
	7,027,795
ZX05-762H	6,790,049
	7,027,795
ZX05-C24	6,790,049
	7,027,795
ZX05-C24LH	6,790,049
	7,027,795
ZX05-C24MH	6,790,049
	7,027,795
ZX05-C42	6,790,049
	7,027,795
ZX05-C42LH	6,790,049
	7,027,795
ZX05-C42MH	6,790,049
	7,027,795
ZX05-C60	6,790,049
	7,027,795
ZX05-C60LH	6,790,049
	7,027,795
ZX05-C60MH	6,790,049
	7,027,795
ZX05-U432H	6,790,049
	7,027,795
ZX05-U63	6,790,049
	7,027,795
ZX05-U712H	6,790,049
	7,027,795
ZX05-U742MH	6,790,049
	7,027,795
ZX10-2-12	6,790,049
	6,963,255
ZX10-2-20	6,790,049
	6,963,255
ZX10-2-25	6,790,049
	6,963,255
ZX10-2-42	6,790,049
	6,963,255
ZX10-2-71	6,790,049
	6,963,255
ZX10-2-98	6,790,049
	6,963,255
ZX10-2-126	6,790,049
	6,963,255
ZX10-4 series	6,790,049
ZX10Q-2 series	6,790,049
ZX30-12-4	6,140,887
	6,784,521
	6,790,049
ZX30-13-4	6,790,049
	6,140,887
	6,784,521
ZX30-17-5	6,790,049
	6,140,887
	6,784,521
ZX30-20-4	6,790,049
	6,140,887
	6,784,521
ZX30-20-20BD	6,790,049
ZX30-9-4	6,790,049
	6,140,887
	6,784,521
ZX47 series	6,790,049
ZX60 series	6,790,049
ZX73 series	6,790,049
ZX76 series	6,790,049
ZX85 series	6,790,049
ZX95 series	6,790,049

Quick Reference Case Style Dimensions (inches)

For complete case style dimensions see our website.

Case Number	Dimensions
A01	0.80x0.40x0.40
A03	0.50x0.23x0.41
A04	0.80x0.40x0.21
A05	0.80x0.40x0.25
A06	0.80x0.40x0.31
A11	0.50x0.23x0.26
AA46	0.83x0.58x0.27
AAA118	1.50x0.94x0.50
AB1232	7.06x3.13x0.88
AB185	4.76x3.00x0.53
AB186	4.76x3.00x0.53
AB204	6.13x3.00x0.53
AB762	2.88x2.00x0.53
AF190	0.18x0.18x0.07
AF190-1	0.18x0.18x0.07
AF320	0.20x0.20x0.06
AG191	0.40x0.40x0.10
AH202	0.50x0.38x0.25
AH202-1	0.50x0.38x0.25
AH202-2	0.50x0.38x0.25
AN1102	0.49x0.49x0.06
AN213	0.49x0.49x0.17
AP175	9.80x6.70x5.00
AP176	19.50x12.50x6.00
AR214	3.25x1.38x1.25
AT1029	0.17x0.15x0.16
AT1030	0.17x0.15x0.16
AT224	0.15x0.15x0.15
AT224-1	0.15x0.15x0.16
AT224-2	0.15x0.15x0.15
AT224-3	0.15x0.15x0.15
AT577	0.20x0.20x0.20
AT790	0.15x0.15x0.15
AT790-1	0.15x0.15x0.15
ATT224-2	0.15x0.15x0.15
ATT224-3	0.15x0.15x0.15
AU140	0.78x.1.11x0.32
AV1280	1.69x1.63x1.01
AV243	1.01x1.63x1.59
AW254	3.00x2.06x1.92
AW256	4.50x2.25x1.69
AW257	8.06x3.25x2.38
AX255	3.00x2.00x1.92
AY261	0.51x0.39x0.14
B02	0.50x0.23x0.26
B13	0.50x0.23x0.41
BB48	0.50x0.39x0.23
BBB123	0.49x0.15x0.12
BC251	1.16x0.64x0.19
BD205	0.42x0.40x0.22
BF267	0.50x0.40x0.16
BG291	0.87x0.80x0.25
BG419	0.87x0.80x0.40
BH292	0.31x0.28x0.23
BJ1051	0.50x0.40x0.23
BJ293	0.50x0.40x0.23
BJ360	0.80x0.45x0.25
BJ398	0.40x0.31x0.11
BJ850	0.70x0.32x0.07
BJ937	0.52x0.40x0.23
BJ937-1	0.52x0.40x0.23
BK276	0.80x0.45x0.25
BK343	0.77x0.12x0.46
BK377	0.80x0.50x0.25
BK551	0.79x0.50x0.20
BL301	1.26x0.94x0.39
BL372	1.43x0.94x0.25
BL372-1	1.42x0.93x0.25
BN1327	7.50x1.96x3.60
BN333	7.50x1.68x3.60
BR386	3.25x1.38x1.25
BT1165	9.80x7.30x6.30
BT1204	9.85x7.30x6.50
BT1312	9.85x7.30x6.30
BT1344	9.85x7.30x6.50
BT412	9.85x7.30x6.30
BT451	9.85x7.30x6.30
BU413	1.07x1.00x0.58
BV278	6.00x4.50x1.38
BW459	1.07x1.00x0.61
BY1298	2.75x2.00x0.62
BY493	1.38x1.05x0.75
BZ476	0.53x0.53x0.22
C07	0.81x0.81x0.41
C145	0.81x0.81x0.40
CA531	0.12x0.12x0.06
CA531-1	0.12x0.12x0.06
CB518	0.31x0.27x0.08
CB539	0.30x0.29x0.09
CC51	2.00x2.00x0.75
CC51-1	2.00x2.00x0.75
CCC127	3.25x1.38x1.24
CD541	0.31x0.27x0.08
CD542	0.31x0.27x0.11
CD636	0.31x0.27x0.16
CD637	0.31x0.27x0.21
CE556	14.90x12.60x7.30
CF564	0.38x0.38x0.07
CG581	0.38x0.50x0.23
CH513	0.50x0.50x0.20
CH549	0.50x0.50x0.17
CJ608	0.40x0.35x0.18
CJ725	0.40x0.35x0.22
CK1113	0.50x0.50x0.22
CK1246	0.50x0.50x0.18
CK605	0.50x0.50x0.18
CK829	0.50x0.50x0.10
CL620	0.34x0.24x0.07
CM624	0.41x0.41x0.10
CN633	1.88x0.63dia.
CP1328	4.18x4.18x4.13
CP641	4.75x3.36x4.24
CQ595	0.98x0.80x0.50
CR540	0.80x0.52x0.39
CS643	7.25x4.38x2.16
CT657	0.32x0.24x0.11
CV665	4.00x1.61x1.25
CW686	1.77x2.42x0.55
CW884	2.00x3.00x0.80
CY353	3.24x2.00x1.50
CZ682	0.38x0.38x0.13
D08	1.03x0.53x0.43
D09	1.03x0.53x0.28
DA680	0.63x0.49x0.23
DB714	0.16x0.15x0.16
DC1066	1.43x0.74dia.
DC736	1.90x0.61dia.
DC737	1.20x0.61dia.
DD477	2.00x2.00x0.75
DD52	2.00x2.00x0.75
DDD131	8.35x7.00x3.13
DDD338	8.35x7.00x3.13
DE749	8.50x4.00x0.50
DF782	0.18x0.17x0.06
DF782-1	0.18x0.17x0.06
DG1293	0.16x0.16x0.05
DG983	0.16x0.16x0.04
DG983-1	0.16x0.16x0.04
DG984	0.16x0.16x0.04
DH820	0.20x0.20x0.04
DJ1009	1.51x0.79 dia.
DJ1010	1.31x0.79 dia.
DJ1011	1.36x0.68 dia.
DJ1021	1.25x0.68 dia.
DJ1022	1.25x0.570 dia.
DJ1023	1.11x0.570 dia.
DJ1024	1.10x0.530 dia.
DJ1025	0.970x0.530 dia.
DJ1027	0.79x0.29 dia.
DJ1028	1.40x0.78 dia.
DJ1071	0.69x0.36 dia.
DJ1092	1.50x0.65 dia.
DJ1323	0.98x0.36 dia.
DJ824	1.28x0.94 dia.
DJ825	1.24x0.90 dia.
DJ826	1.28x0.70 dia.
DJ827	1.23x0.70 dia
DJ836	0.72x0.36 dia.
DJ861	1.99x0.88 dia
DJ862	1.79x0.88 dia.
DJ863	1.75x0.73 dia.
DJ864	1.54x0.73 dia.
DJ865	2.25x0.88 dia.
DJ866	2.03x0.88 dia.
DJ867	2.00x0.73 dia.
DJ868	1.79x0.73 dia.
DJ869	1.89x0.61 dia.
DJ870	1.69x0.61 dia.
DJ871	1.68x0.55 dia.
DJ872	1.47x0.55 dia.
DJ951	0.87x0.36 dia.
DJ952	0.87x0.36 dia.
DJ966	1.69x0.56 dia.
DK1042	0.80x0.58x0.15
DK801	0.80x0.58x0.15
DL1020	0.24 x0.19x0.04
DL805	0.13x0.13x0.04
DM842	0.30x0.30x0.20
DQ1225	0.02x0.01x0.05
DQ849	0.12x0.12x0.04
DS810	2.18x2.16x1.02
DU674	0.91x0.91x0.31
DV874	0.50x0.50x0.20
DV897	0.50x0.50x0.12
DZ1034	0.30x0.26x0.11
DZ1383-2	0.35x0.28x0.15
DZ883	0.30x0.27x0.19
DZ885	0.30x0.26x0.09
DZ885-2	0.31x0.29x0.10
DZ943	0.30x0.27x0.19
DZ944	0.30x0.27x0.05
DZ944-1	0.30x0.05x0.27
DZ944-2	0.35x0.28x0.06
E10	1.62x0.81x0.41
EEE132	1.34x0.90x0.68
F1104	3.50x2.13x0.88
F1110	2.00x2.00x1.18
F1164	2.00x1.75x0.75
F14	2.00x2.00x0.75
F183	1.26x1.00x0.70
F53	2.00x2.00x0.75
FF1003	1.43x0.39 dia.
FF1008	1.94x0.62 dia.
FF1048	1.49x0.36 dia.
FF1118	2.67x0.39 dia.
FF1145	1.91x.0.41 dia.
FF1269	1.30x0.39 dia.
FF55	2.59x0.54 dia.
FF56	1.70x0.43 dia.
FF57	2.90x0.67 dia.
FF58	2.59x.054 dia.
FF658	0.85x0.36 dia.
FF659	0.99x0.36 dia.
FF670	1.76x0.62 dia.
FF704	1.43x0.410 dia.
FF747	1.94x0.620 dia.
FF779	2.11x0.68 dia.
FF809	1.76x0.62 dia.
FF886	1.90x0.62 dia.
FF887	2.24x0.62 dia.

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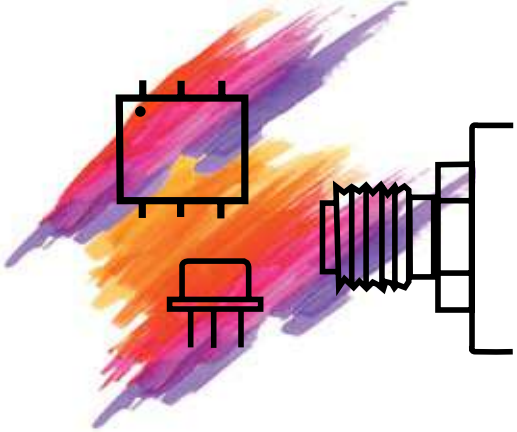

Case Number	Dimensions
FF888	1.18x0.41 dia.
FF967	2.43x0.68 dia.
FF968	2.27x0.62 dia.
FF969	1.75x0.55 dia.
FF99	1.98x0.67 dia.
FF1288	1.43x0.39 dia.
FFF122	0.83x0.83x0.18
FG873	0.12x0.12x0.04
FJ893	3.75x2.00x0.80
FK811	2.19x1.33x0.50
FL905	0.74x0.90x0.54
FM587	2.00x1.25x0.75
FN812	2.19x2.25x0.50
FP914	2.00x2.25x0.50
FR932	0.18x0.15x0.04
FR933	0.15x0.15x0.03
FS941	1.75x1.75x0.85
FV1206	0.13x0.06x0.04
FV1206-1	0.13x0.06x0.04
FW856	0.15x0.15x0.05
FZ802	0.30x0.30x0.07
FZ990	0.30x0.30x0.10
G1170	1.25x1.25x0.75
G144	1.25x1.25x0.75
G15	1.25x1.25x0.75
GA955	1.20x0.75x0.46
GB956	1.20x0.75x0.46
GC957	0.75x0.74x0.46
GD1163	1.20x0.75x0.46
GD958	1.20x0.75x0.46
GE0805C	0.08x0.05x0.03
GE0805C-1	0.08x0.05x0.03
GE0805C-2	0.08x0.05x0.04
GF981	0.15x0.15x0.03
GF995	0.15x0.15x0.07
GG60	2.31x1.20x.60
GGG126	3.25x1.38x1.24
GH986	6.36x3.46x3.46
GJ858	0.47x0.38x0.16
GK906	0.49x0.41x0.16
GL997	2.00x2.00x0.75
GP1212	0.35x0.35x0.15
GP731	0.35x0.35x0.10
GR1026	2.04x0.60x0.75
GT1031	0.76x0.26x0.28
GU1041	0.15x0.15x0.15
GW1052	1.04x0.60x0.75
GY1065	2.67x0.60x0.75
GZ1067	3.75x3.00x0.80
H16	1.25x1.25x0.75
HD1131	0.80x0.50x0.25
HE1135	0.39x0.39x0.15
HE1354	0.39x0.39x0.15
HF1138	0.74x0.44x0.27
HF1139	0.74x0.44x0.27
HF1317	0.74x0.44x0.19

Case Number	Dimensions
HG1140	3.00x2.00x0.70
HH68	9.31x1.60x3.57
HHH1315	2.60x2.30x0.88
HHH141	2.00x2.00x0.95
HK1149	1.20x1.18x0.46
HK1172	1.20x1.18x0.46
HL1162	1.78x0.75x0.61
HM1099	7.00x3.25x1.13
HN1173	1.20x1.12x0.46
HP1156	1.360x.730x0.35
HQ1157	1.360x.365x0.35
HR1176	1.20x1.20x0.370
HT1180	3.75x1.56x0.70
HU1186	0.87x0.80x0.25
HU1374	0.87x0.80x0.25
HV1195	0.20x0.18x0.09
HY1238	1.20x.1.20x0.46
HY1239	1.20x1.20x0.46
HZ1198	0.47x0.83x0.22
J17	1.25x1.25x0.75
JA1242	0.74x0.90x0.54
JB1233	0.70x0.32x0.13
JC0603C	0.06x0.03x0.02
JF1258	1.25x1.00x0.20
JH1286	0.84x0.52x0.29
JJ77	2.50x1.13x0.97
JJJ142	1.25x1.25x0.75
JJJ245	1.00x0.75x0.58
JK1226	1.18x0.61x0.38
JM1360	0.24x0.12x0.04
JN1359	8.25x5.00x0.63
JQ1382	0.59x0.39x0.12
JS1370	0.25x0.25x0.05
K18	1.25x1.25x0.75
K558	1.25x1.25x0.94
KK265	0.45x0.30x0.23
KK81	0.58x0.30x0.26
KKK155	0.45x0.45x0.09
L19	1.50x1.13x1.00
L20	2.25x1.38x1.24
LL1178	1.10x0.63dia.
LL1221	0.70x0.41dia.
LL561	0.58x0.37dia.
LL604	0.55x0.36dia.
LL718	1.18x0.56dia.
LL85	1.43x0.58dia.
LL86	1.19x0.58dia.
LL87	1.43x0.82dia.
LL88	1.43x0.61dia.
LL962	0.83x0.75dia.
LL987	0.94x0.25dia.
M21	1.50x1.13x1.00
M22	2.25x1.38x1.24
M23	2.25x1.38x1.24
MMM1362	0.09x0.09x0.04
MMM168	0.12x0.10x.047

Case Number	Dimensions)
N24	1.50x1.13x1.00
N27	2.25x1.38x1.24
NN92	3.66x3.25x2.13
NNN150	0.50x0.42x0.23
P25	2.25x1.38x1.24
P26	1.50x1.13x1.00
PP120	0.50x0.21dia.
PP163	0.36x0.25dia.
PP230	0.50x0.25dia.
PP94	0.36x0.25dia.
PPP83	0.75x0.38x0.20
Q28	4.06x1.60x1.50
QQ95	0.50x0.25dia.
QQ96	0.60x0.25dia.
QQQ130	0.40x0.31x0.20
QQQ1358	0.38x0.32x0.22
QQQ569	0.40x0.31x0.23
QQQ828	0.40x0.31x0.05
R29	4.06x1.60x1.50
R30	6.69x1.60x1.50
R31	9.31x1.60x1.50
R67	6.69x1.60x1.50
RR93	4.06x1.60x2.13
RRR137	0.28x0.28x0.13
RRR137-1	0.28x0.28x0.13
S32	3.75x2.60x1.80
SM1	0.30x0.29x0.07
SM11	0.20x0.29x0.09
SM12	0.40x0.42x0.09
SM15	0.30x0.29x0.16
SM16	0.81x0.51x0.14
SM18	0.51x0.43x0.10
SM1L	0.30x0.32x0.07
SM2	0.30x0.29x0.10
SM20	0.46x0.58x0.13
SM20A	0.46x0.58x0.10
SM25	0.30x0.29x0.09
SM26	0.30x0.29x0.10
SM27	0.30x0.29x0.24
SM30	0.30x0.29x0.07
SM31	0.28x0.20x0.07
SM33	0.31x0.30x0.05
SM34	0.42x0.40x0.07
SM6	0.30x0.29x0.20
SM6R	0.30x0.29x0.20
SS98	1.25x1.56x1.50
SSS173	1.25x1.25x0.75
T34	4.75x2.60x2.12
T35	4.75x5.00x2.37
TT100	0.25x0.31x0.20
TT240	0.25x0.31x0.20
TT240-1	0.31x0.25x0.20
TT241	0.25x0.31x0.27
TT1224	0.31x0.25x0.16
TTT1289	0.38x0.50x0.23
TTT166	0.38x0.50x0.15

Case Number	Dimensions
TTT166-1	0.38x0.50x0.15
TTT167	0.38x0.50x0.23
TTT167-1	0.38x0.50x0.23
TTT881	0.38x0.50x0.23
U111	7.00x3.25x3.13
U200	7.00x3.25x2.13
U36	7.00x3.25x2.13
UU102	3.50x2.00x0.50
UU1268	6.00x1.62x0.70
UU179	8.50x3.95x0.75
UU181	2.25x2.30x0.63
UU182	2.75x2.80x0.63
UU187	6.00x1.62x0.88
UU188	3.50x2.13x0.88
UU188-1	3.50x2.13x0.88
UU215	4.00x1.25x0.38
UU233	1.50x1.00x0.38
UU244	2.25x1.25x0.50
UU449	9.78x3.13x0.88
UU573	11.00x4.00x0.88
UU586	3.50x3.00x0.63
UU589	6.60x3.28x0.75
UU640	8.50x4.00x0.50
UU846	3.50x4.50x0.65
V1381	2.19x1.25x0.94
V37	1.25x0.83x0.75
V859	1.25x0.83x0.50
VV105	0.85x0.25x0.06
VVV180	1.80x1.75x0.66
VVV787	2.30x2.25x0.66
VVV845	4.50x2.50x0.67
W38	0.30x0.62x0.23
WW107	0.19x0.18x0.06
WW107-1	0.19x0.18x0.06
X65	0.35x0.30x0.38
XX112	0.40x0.18x0.07
XX211	0.25x0.22x0.08
XX211-1	0.25x0.21x0.08
XX746	0.25x0.22x0.07
Y39	1.25x1.25x0.75
Y460	1.25x1.25x0.75
Y726	1.25x1.25x0.55
Y882	1.25x1.25x0.75
YY101	0.75x0.45x0.20
YY109	0.75x0.72x0.20
YY161	0.75x0.45x0.28
Z184	2.26x2.00x0.70
Z259	7.06x3.13x0.88
Z41	7.06x3.13x0.88
Z54	3.50x2.13x0.88
Z667	7.06x3.13x1.00
Z668	7.06x3.13x1.00
Z689	7.06x3.13x1.00
ZZ121	1.25x1.25x0.75
ZZ1322	1.25x1.25x0.75

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