Mini-Circuits®

Hot New Products

www.minicircuits.com

CONTENTS

Hot New Products

MMIC PRODUCTS

Page

TEST SOLUTIONS

REFLECTIONLESS FILTERS

Page

NARROW-BAND CAVITY & SLABLINE FILTERS

STRIPLINE COUPLERS

VCOs

Ultra-Wideband 2-Way 0° Splitter/Combiner

EP2K1+

2 to 26.5 GHz

Case Style: DG1847
4 x 4 x 1mm

✓***Widest bandwidth in the industry in a single device***

Typical Performance

Parameter	Performance (typ.)
Insertion Loss	*2.4 dB*
Isolation	*20 dB*
Phase Unbalance	*5.4°*
Amplitude Unbalance	*0.3 dB*
Power Handling	*2.5W*
DC Current Passing	*1.2A*

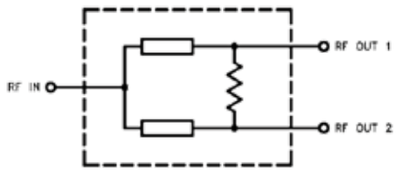
Features

- Manufactured using GaAs IPD techology
- 24-pad 4x4mm QFN package
- Excellent repeatability
- High ESD rating: HBM Class 2; MM Class M3
- Small quantity reels available (min. qty. 20)

Applications

- WIMAX
- ISM
- Instrumentation
- Radar
- WLAN
- Satellite communications
- LTE

Simplified Schematic



Ultra-Wideband 2-Way 0° Splitter/Combiner

EP2K+

5 to 20 GHz

Case Style: DG1847
4 x 4 x 1mm

Typical Performance

Parameter	Performance (typ.)
Insertion Loss	*2.1 dB*
Isolation	*20 dB*
Phase Unbalance	*4.2°*
Amplitude Unbalance	*0.1 dB*
Power Handling	*2.5W*
DC Current Passing	*1.2A*

Ultra-Wideband 2-Way 0° Splitter/Combiner

EP2C+

1.8 to 12.5 GHz

Case Style: DG1847
4 x 4 x 1mm

Typical Performance

Parameter	Performance (typ.)
Insertion Loss	*1.1 dB*
Isolation	*16 dB*
Phase Unbalance	*6.0°*
Amplitude Unbalance	*0.2 dB*
Power Handling	*2.5W*
DC Current Passing	*1.2A*

Ultra-Wideband LNA

PMA3-83LN+

0.5 to 8 GHz

Case Style: DQ1225
3 x 3 x 0.89mm

✓***Matched over entire bandwidth***

Typical Performance

Parameter	Performance (typ.)
Gain	*20 dB*
Gain Flatness	*±1.3 dB*
Noise Figure	*1.3 dB*
P1dB	*+20.7 dBm*
OIP3	*+35 dBm*
Supply Voltage	*5V/6V*

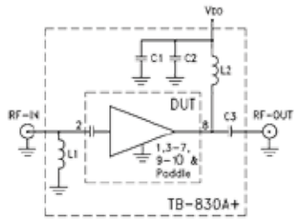
Features

- Low noise over wideband
- Manufactured using PHEMT technology
- 9-pad 3x3mm QFN package
- Excellent repeatability
- High ESD rating: HBM Class 1A; MM Class M1
- Small quantity reels available (min. qty. 20)

Applications

- WiFi
- WLAN
- UMTS
- LTE
- WiMAX
- S-Band Radar
- C-Band Satcom

Recommended Application and Characterization Circuit



Ultra-Wideband Mixer

MDB-24A+

5 to 21.5 GHz

Case Style: DG1847
4 x 4 x 1mm

Typical Performance

Parameter	Performance (typ.)
LO Power	*+15 dBm*
IF Bandwidth	*DC to 5 GHz*
Conversion Loss	*8.5 dB*
L-I Isolation	*44 dB*
L-R Isolation	*28.4 dB*
Input @ 1 dB Comp.	*+10 dBm*
Input IP3	*+21 dBm*

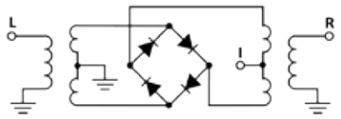
Features

- Ultra-wide bandwidth
- Manufactured using InGaP HBT technology
- Integrated LO and RF baluns
- 24-pad 4x4mm QFN package
- Excellent repeatability
- High ESD rating: HBM Class 1A
- Small quantity reels available (min. qty. 20)
- Footprint compatible with Hittite HMC144LC4

Applications

- Satellite up and down converters
- Defense radar and communication
- VSAT
- Line of sight links
- Federal fixed service
- WiFi
- ISM

Simplified Schematic



Ultra-Wideband Doubler

CY2-143+

4 to 14 GHz

Case Style: DG1847
4 x 4 x 1mm

Typical Performance

Parameter	Performance (typ.)
Multiplication Factor	*2*
Input Power Range	*+12 to +18 dBm*
Conversion Loss	*12 dB*
Fundamental Suppression	*F1, 30 dBc*
Harmonic Suppression	*F3, 32 dBc*

Features

- Wide output bandwidth
- Manufactured using GaAs HBT technology
- 24-pad 4x4mm QFN package
- Excellent repeatability
- Small quantity reels available (min. qty. 20)

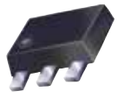
Applications

- Synthesizers
- Local oscillators
- EW and surveillance systems
- Test and measurement
- Radar
- Point-to-point radio

75Ω High-Dynamic-Range Amplifier

PGA-122-75+

40 to 1500 MHz



Case Style: DF782
0.17 x 0.18 x 0.06"

✓ ***Supports CATV upstream & downstream applications***

Typical Performance

Parameter	Performance (typ.)
Gain	*15.6 dB*
Gain Flatness	*±0.1 dB*
Noise Figure	*2.9 dB*
P1dB	*+24.3 dBm*
OIP3	*+43 dBm*
OIP2	*+54 dBm*
Supply Voltage	*9 V*

Features

- Covers DOCSIS® 3.1 downstream bandwidth
- Application circuit available for 5 – 200 MHz
- -59 dBc CSO and -80 dBc CTB
- Manufactured using PHEMT technology
- SOT-89 package
- Excellent repeatability
- High ESD rating: HBM Class 1A, MM Class M1

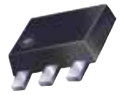
Applications

- CATV
- DOCSIS® 3.1 systems
- GPON
- MOCA
- DBS

High-Dynamic-Range Amplifier

PHA-1H+

50 to 6000 MHz



Case Style: DF782
0.17 x 0.18 x 0.06"

Typical Performance

Parameter	Performance (typ.)
Gain	*13.8 dB*
P1dB	*+22 dBm*
OIP3	*+40.4 dBm*
Noise Figure	*2.2 dB*
Supply Voltage	*5V*

Features

- Ultra-high dynamic range
- No external matching components required
- Manufactured using PHEMT technology
- SOT-89 Package
- May be used as replacement for WJ AH1
- Excellent reliability with Operating temperature from -40 to +105°C

Applications

- Base station infrastructure
- Portable wireless
- CATV & DBS
- MMDS & Wireless LAN
- LTE

High-Directivity Amplifier

MNA-4A+

500 to 2500 MHz

Case Style: DQ849
3 x 3 x 0.89mm

Typical Performance (1.5 ft. length)

Parameter	Performance (typ.)
Gain	*17 dB*
Directivity	*19 – 32 dB*
Noise Figure	*4.5 dB*
P1dB	*+19 dBm*
OIP3	*+29 dBm*
Supply Voltage	*+2.8 to +5V*

Features

- Integrated matching, DC blocks and RF Choke
- Wide operating voltage range
- Manufactured using PHEMT technology
- 8-pad 3 x 3mm QFN package
- Excellent repeatability
- High ESD rating: HBM Class 1A, MM Class M1
- Small quantity reels available (min. qty. 20)

Applications

- Buffer amplifier
- Cellular infrastructure
- SatCom
- Defense

High-Directivity Amplifier

MNA-4W+

500 to 4500 MHz

Case Style: DQ849
3 x 3 x 0.89mm

Typical Performance (25-inch length)

Parameter	Performance (typ.)
Gain	*17 dB*
Directivity	*19 – 35 dB*
Noise Figure	*4.5 dB*
P1dB	*+19 dBm*
OIP3	*+29 dBm*
Supply Voltage	*+2.8 to +5V*

Features

- Integrated matching, DC blocks and RF Choke
- Wide operating voltage range
- Manufactured using PHEMT technology
- 8-pad 3 x 3mm QFN package
- Excellent repeatability
- High ESD rating: HBM Class 1A, MM Class M1
- Small quantity reels available (min. qty. 20)

Applications

- Buffer amplifier
- Cellular infrastructure
- SatCom
- Defense

High-Directivity Amplifier

MNA-6A+

500 to 2500 MHz

Case Style: DQ849
3 x 3 x 0.89mm

Typical Performance

Parameter	Performance (typ.)
Gain	*25 dB*
Directivity	*13 – 22 dB*
Noise Figure	*2.7 dB*
P1dB	*+20 dBm*
OIP3	*+32 dBm*
Supply Voltage	*+2.8 to +5V*

Features

- Integrated matching, DC blocks and RF Choke
- Wide operating voltage range
- Manufactured using PHEMT technology
- 8-pad 3 x 3mm QFN package
- Excellent repeatability
- High ESD rating: HBM Class 1A, MM Class M1
- Small quantity reels available (min. qty. 20)

Applications

- Buffer amplifier
- Cellular
- PCN
- SatCom
- Defense

Wideband High-Directivity Amplifier

MNA-6W+

500 to 5500 MHz

Case Style: DQ849
3 x 3 x 0.89mm

Typical Performance

Parameter	Performance (typ.)
Gain	*24 dB*
Directivity	*13 – 22 dB*
Noise Figure	*2.7 dB*
P1dB	*+20 dBm*
OIP3	*+32 dBm*
Supply Voltage	*+2.8 to +5V*

Features

- Integrated matching, DC blocks and RF Choke
- Wide operating voltage range
- Manufactured using PHEMT technology
- 8-pad 3 x 3mm QFN package
- Excellent repeatability
- High ESD rating: HBM Class 1A, MM Class M1
- Small quantity reels available (min. qty. 20)

Applications

- Buffer amplifier
- Cellular
- PCN
- SatCom
- Defense

High-Directivity Amplifier

MNA-7A+

1500 to 6000 MHz

Case Style: DQ849
3 x 3 x 0.89mm

Typical Performance

Parameter	Performance (typ.)
Gain	*17 dB*
Directivity	*18 – 38 dB*
Noise Figure	*5.0 dB*
P1dB	*+17.4 dBm*
OIP3	*+27 dBm*
Supply Voltage	*+2.8 to +5V*

Features

- Integrated matching, DC blocks and RF Choke
- Wide operating voltage range
- Manufactured using PHEMT technology
- 8-pad 3 x 3mm QFN package
- Excellent repeatability
- High ESD rating: HBM Class 1A, MM Class M1
- Small quantity reels available (min. qty. 20)

Applications

- Buffer amplifier
- Cellular infrastructure
- SatCom
- Defense

High-Directivity Amplifier

MNA-2A+

500 to 2500 MHz

Case Style: DQ849
3 x 3 x 0.89mm

Typical Performance

Parameter	Performance (typ.)
Gain	*15 dB*
Directivity	*21 – 36 dB*
Noise Figure	*5.4 dB*
P1dB	*+17.9 dBm*
OIP3	*+31 dBm*
Supply Voltage	*+2.8 to +5V*

Features

- Integrated matching, DC blocks and RF Choke
- Wide operating voltage range
- Manufactured using PHEMT technology
- 8-pad 3 x 3mm QFN package
- Excellent repeatability
- High ESD rating: HBM Class 1A, MM Class M1
- Small quantity reels available (min. qty. 20)

Applications

- Buffer amplifier
- Cellular infrastructure
- SatCom
- Defense

Directional Coupler

D17IA+

2300 to 2600 MHz

Case Style: CA531
3.1 x 3.0 x 1.6mm

✓*4W power handling & low loss*

Typical Performance

Parameter	Performance (typ.)
Coupling	*17 dB*
Mainline Loss	*0.4 dB*
Power Handling	*4W*
Directivity	*14 dB*
Input/Output VSWR	*1.2:1*

Features

- Built-in termination on isolated port
- Manufactured using silicon IPD technology
- 6-lead 3.1 x 3.0mm package
- Excellent repeatability
- High ESD rating: HBM Class 1B, MM Class M3
- High operating temperature, -40 to +105°C
- Small quantity reels available (min. qty. 20)

Applications

- WLAN
- WiMAX
- Aeronautical

Directional Coupler

D17W+

700 to 3500 MHz

Case Style: CA531
3.1 x 3.0 x 1.6mm

✓*4W power handling & low loss*

Typical Performance

Parameter	Performance (typ.)
Coupling	*16 – 26 dB*
Mainline Loss	*0.2 – 0.6 dB*
Power Handling	*4W*
Directivity	*14 dB*
Input/Output VSWR	*1.25:1*

Features

- Built-in termination on isolated port
- Manufactured using silicon IPD technology
- 6-lead 3.1 x 3.0 x 1.6mm package
- Excellent repeatability
- High ESD rating: HBM Class 1B, MM Class M3
- High operating temperature, -40 to +105°C
- Small quantity reels available (min. qty. 20)

Applications

- WLAN
- WiMAX
- Aeronautical

Directional Coupler

D18PA+

1700 to 2000 MHz

Case Style: CA531
3.1 x 3.0 x 1.6mm

✓*4W power handling & low loss*

Typical Performance

Parameter	Performance (typ.)
Coupling	*19 dB*
Mainline Loss	*0.3 dB*
Power Handling	*4W*
Directivity	*16 dB*
Input/Output VSWR	*1.2:1*

Features

- Built-in termination on isolated port
- Manufactured using silicon IPD technology
- 6-lead 3.1 x 3.0 x 1.6mm package
- Excellent repeatability
- High ESD rating: HBM Class 1B, MM Class M3
- High operating temperature, -40 to +105°C
- Small quantity reels available (min. qty. 20)

Applications

- PCS

Directional Coupler

D19GA+

1400 to 1700 MHz

Case Style: CA531
3.1 x 3.0 x 1.6mm

✓*4W power handling & low loss*

Typical Performance

Parameter	Performance (typ.)
Coupling	*21 dB*
Mainline Loss	*0.3 dB*
Power Handling	*4W*
Directivity	*17 dB*
Input/Output VSWR	*1.1:1*

Features

- Built-in termination on isolated port
- Manufactured using silicon IPD technology
- 6-lead 3.1 x 3.0 x 1.6mm package
- Excellent repeatability
- High ESD rating: HBM Class 1B, MM Class M3
- High operating temperature, -40 to +105°C
- Small quantity reels available (min. qty. 20)

Applications

- GPS

MMIC Dice

To support your needs for MMIC components in unpackaged die form, Mini-Circuits now offers a broad selection of MMIC models off the shelf as unpackaged dice in gel-paks (10, 50 and100 KGD), and in partial and full wafers by request from authorized Mini-Circuits sales representatives. They're ideal for Tx/Rx modules where small size and light weight are required such as phase array radar systems, and they allow direct integration into customer modules such as amplifier modules, mixer modules, signal sources and more. Don't see what you need here? We're releasing more models! Get in touch with sales@minicircuits.com to discuss your needs.

Amplifiers

Model Number	Frequency Range (MHz)		Gain (dB) typ.	Max. Power Output @ 1 dB comp. (dBm) Typ.	N.F. (dB) Typ.	IP3 (dBm) Typ.	VSWR (:1) Typ.		Device DC Operating Power		Features
	Low	High					In	Out	Voltage (V)	Current (mA)	
AVA-24A-D+	5000	22000	13	19.2	5.8	25	1.3	1.9	5.0	126	Ultra Wideband
AVA-183A-D+	5000	20000	14.5	18.2	4.3	25	1.6	1.7	5.0	131	Ultra Wideband
AVM-273HP-D+	13000	26500	13.9	26.9	9.4	34.8	1.6	1.7	+5, -5	561, 0.5	Medium Power
GVA-62-D+	10	6000	15.7	19.4	5	32.8	1.4	1.4	5.0	82	Ultra Flat Gain
GVA-63-D+	10	6000	20.5	18.2	3.7	31.9	1.18	1.5	5.0	69	Wideband
GVA-123-D+	10	12000	16.7	15.9	3.9	29.1	1.2	1.2	5.0	48	Ultra Wideband
PGA-103-D+	50	4000	11.3	22.3	0.8	41.6	1.5	1.4	3.0/5.0	60/97	Low Noise
PGA-105-D+	40	2600	15.1	18.4	1.9	36.9	1.2	1.2	5.0	65	Low Noise
PHA-1-D+	50	6000	13.6	22.5	2.1	39	1.6	1.3	5.0	155	High IP3
PMA2-33LN-D+	400	3000	18.4	17.6	0.47	33.8	1.5	1.1	3.0	58	Low Noise
PMA2-43LN-D+	1100	4000	19.4	20.4	0.6	32.9	1.3	1.7	5.0	53	Low Noise
PMA3-83LN-D+	500	8000	21.9	21.2	1.2	35	1.4	1.8	6.0/5.0	60/77	Low Noise
PSA4-5043-D+	50	4000	18.4	19	0.8	34	1.7	1.5	3.0/5.0	33/58	Low Noise
TSS-53LNB-D+	500	6000	21.4	20.7	1.3	35	1.2	1.4	5.0	82	Bypass

Attenuators to 40 GHz

Model Number	Frequency Range (GHz)		Nom. (dB)	Attenuation (dB) typ.			VSWR (:1) typ.			Max Input Power (W)
	Low	High*		DC - 5	5 – 15	15 – 18	DC – 5	5 – 15	15 – 18	25°C
YAT-0-D+	DC	40*	0	0.05	0.18	0.26	1.20	1.34	1.60	2
YAT-1-D+	DC	40*	1	1.05	1.20	1.35	1.15	1.37	1.44	2
YAT-2-D+	DC	40*	2	2.06	2.24	2.45	1.15	1.40	1.60	2
YAT-3-D+	DC	40*	3	3.05	3.25	3.51	1.15	1.48	1.54	2
YAT-4-D+	DC	40*	4	4.00	4.40	4.50	1.04	1.29	1.40	2
YAT-5-D+	DC	40*	5	5.00	5.40	5.50	1.04	1.34	1.38	2
YAT-6-D+	DC	40*	6	6.06	6.33	6.71	1.15	1.42	1.50	2
YAT-7-D+	DC	40*	7	7.00	7.40	7.6	1.04	1.30	1.90	2
YAT-8-D+	DC	40*	8	8.00	8.40	8.7	1.04	1.35	1.40	2
YAT-9-D+	DC	40*	9	9.10	9.40	9.5	1.04	1.36	1.40	2
YAT-10-D+	DC	40*	10	10.06	10.41	10.87	1.154	1.48	1.97	2
YAT-12-D+	DC	40*	12	12.00	12.40	12.60	1.05	1.38	1.47	1.8
YAT-15-D+	DC	40*	15	15.00	15.50	15.70	1.05	1.43	1.46	1.6
YAT-20-D+	DC	40*	20	20.00	20.60	21.10	1.10	1.40	1.65	2
YAT-30-D+	DC	40*	30	30.00	30.50	30.90	1.06	1.47	1.42	1.3

Mixers

Model Number	RF in @ 1 dB Comp (dBm)	Frequency Range				Conversion Loss (dB)			LO-RF Isolation (dB)	LO-IF Isolation (dB)	IP3@ midband (dBm)
	Typ.	LO/RF		IF		Typ.	σ	Max.	Typ.	Typ.	Typ.
MDB-73H-D+	10	2200	7000	DC	1600	8.2	0.35	9.8	39	46	24
Coming Soon! MDB-24H-D+	10	5000	21500	DC	5000	7.9	0.18	11.7	35	44	23

T SOLUTIONS

Modular Test Systems Built to Order

Rack Mount Modular Test Systems

ZTM-Series

19" Rack-Mountable Chassis with 6 Hardware Windows

Compact Modular Test Systems

RCM-Series

Compact, Half-Rack Sized Benchtop Chassis with 3 Hardware Windows

✓***Ultra-fast turnaround – shipment within 2 weeks from order or less***

Features

Customizable hardware windows with your choice of:

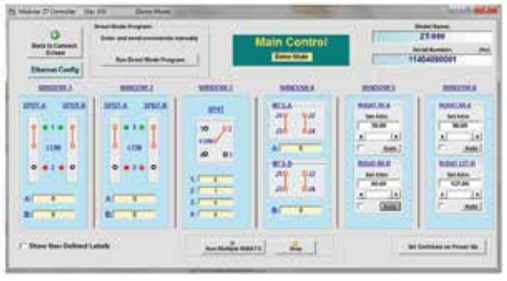
- Up to 2 SPDT mechanical switches (DC-18 GHz)
- Up to 2 mechanical transfer (DPDT) switches (DC-18 GHz)
- SP4T mechanical switch (DC - 18 GHz)
- SP6T mechanical switch (DC - 12 GHz)
- Up to 2 programmable attenuators (0 – 30, 60, 90, 110, and 120 dB)

- Control via USB and Ethernet-TCP/IP (HTTP and Telnet Protocols)
- User-friendly GUI software included
- DLLs and complete programming instructions also included
- Easy maintenance

Applications

- Automated production testing
- RF signal path routing
- Testing cellular systems
- Simulation of transmission loss
- Laboratory instrumentation
- Control systems

Mini-Circuits' Modular Test System GUI for Windows® Systems



Configure Your System on Our Website for a Fast Quote!

For more information visit:
http://www.minicircuits.com/products/RackMountedTestSystems.shtml

USB/Ethernet Programmable Attenuators

Hot New Products

RCDAT-Series

	Model	Frequency Range (MHz)	Attenuation Range (dB)	Step Size (dB)	Power Handling (W)
New	RCDAT-8000-30	1 – 8000	0 – 30	0.25	0.6
Coming Soon!	RCDAT-8000-60	1 – 8000	0 – 60	0.25	0.6
Coming Soon!	RCDAT-8000-90	1 – 8000	0 – 90	0.25	0.6
	RCDAT-6000-30	1 – 6000	0 – 30	0.25	0.1
	RCDAT-6000-60	1 – 6000	0 – 60	0.25	0.1
	RCDAT-6000-90	1 – 6000	0 – 90	0.25	0.1
	RCDAT-6000-110	1 – 6000	0 – 110	0.25	0.1
	RCDAT-4000-120	1 – 4000	0 – 120	0.25	0.1
New	RCDAT-3000-63W2+	1 – 3000	0 – 63	1.00	2.0

Visit minicircuits.com for complete list of models and detailed product information!

Features

- Coverage from 1 MHz to 8 GHz
- Attenuation range from 0 to 120 dB
- 0.25 dB step size
- Up to 2W power handling
- User-friendly GUI software included
- DLLs and programming instructions included

Overview

Mini-Circuits' USB and Ethernet controlled programmable attenuators provide precise level control with accurate, repeatable performance for a wide range of test applications. Available in models with a variety of attenuation ranges to meet your needs, our unique designs maintain linear attenuation change per dB over their entire range of attenuation settings up to 120 dB.

Small enough to fit in your pocket, they're perfect for use in the lab or in the field. Our Smart GUI software supplied with all models allows you to sweep or hop attenuation levels, and even and recall specific attenuation patterns for R&D and production test, reducing test time.

USB/Ethernet True RMS Power Sensor

PWR-6RMS-RC

4.48 x 1.74 x 0.96"

Power Sensor GUI Main-Control

Visit minicircuits.com for a complete list of models and detailed product information!

Features

- 50 to 6000 MHz
- -35 to +20 dBm dynamic range
- Measure CW and modulated signals
- Good VSWR, 1.1:1
- Fast measurement speed, 30ms
- User-friendly GUI software included
- DLLs and programming instructions included

Overview

Mini-Circuits' new PWR-6RMS-RC smart power sensor is a pocket-sized, precision measurement device that provides highly accurate measurements of CW as well as modulated and multi-tone signals from 50 to 6000 MHz. USB and Ethernet control options give you the freedom to manage your test setup remotely from your PC, and our user-friendly GUI provides comprehensive control capability, including data acquisition tools for reporting and data analysis. It even includes built-in measurement applications for measurement of RF components such as couplers, filters, amplifiers and more!

100W Rack Mount Amplifier

HPA-272+

700 to 2700 MHz

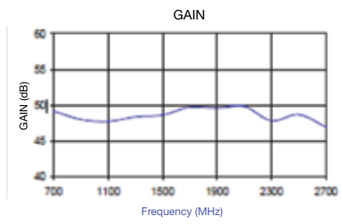
Functional Description

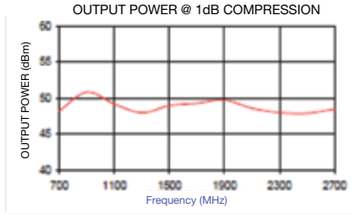
Mini-Circuits' HPA-272+ high power amplifier is capable of amplifying signals up to 100W across its entire operating bandwidth from 700 to 2700 MHz. It delivers 48 dB gain with ±1.7 dB gain flatness, supporting a wide variety of high power test applications including EMI, reliability testing, RF stress testing, and more. The amplifier operates on a self-contained 90 – 264V AC power supply, making setup quick and easy in most lab environments. Extensive safety features include over-temperature protection with automatic shut-off and the ability to handle open and short loads while delivering output power up to 3 dB compression point.

Typical Performance

PARAMETER	SPECIFICATIONS			
	Min.	Typ.	Max.	Unit
Frequency Range	700	-	2700	MHz
Gain	-	48	-	dB
Gain Flatness	-	±1.7	-	dB
Output P1dB	-	+49	-	dBm
Noise Figure	-	8.2	-	dB
Input VSWR	-	1.3	-	:1
Output VSWR	-	1.3	-	:1
AC Supply	90	-	264	V

HPA-272+ Curves



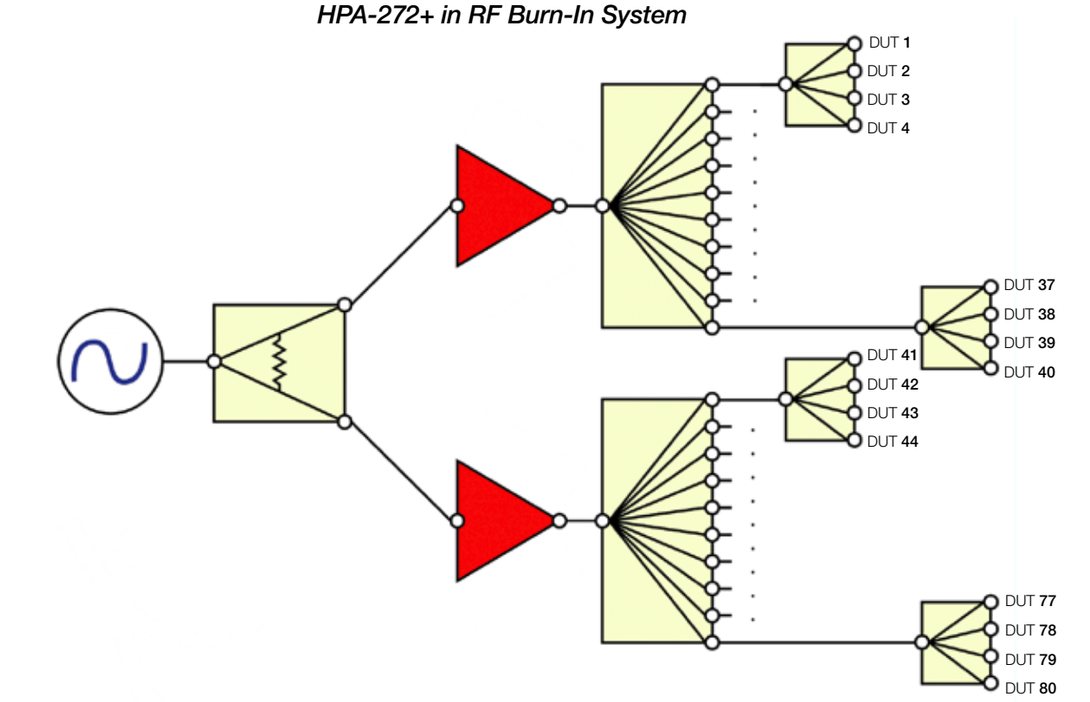


Test Setup for Multi-Channel High-Temperature Operating Life (HTOL) Testing

For cost-effective HTOL testing, it's often desirable to test large numbers of units simultaneously. This requires a system capable of distributing a test signal over many channels with a high power signal source used to overcome the inevitable splitter losses.

The HPA-272+ 100W amplifier can be used to drive 80 test channels in a configuration similar to that shown below. This setup is popular for use in high-throughput production testing applications where parallel processing of many DUTs is a requirement.

HPA-272+ in RF Burn-In System



SSG-6000-RC
Signal Generator

ZAPD-2-272-N+
2-Way Splitter

HPA-272+
100W Amplifier

ZT-10HPS-272+
100W 10-Way Splitter

ZT-184
40-Channel Splitter Rack

TEST SOLUTIONS

Instrument Amplifiers

Instrument Amplifier with Push-Button Gain Control

TVA-11-422A+

10 to 4200 MHz

Case Style: PJ2059-1
15.35 x 8.27 x 3.25"

✓ ***Digital gain control up to 15 dB***

Typical Performance

Parameter	Performance (typ.)
Gain	*39 dB*
Gain Flatness	*±1.3 dB*
Attenuation Range	*0 – 15 dB*
Attenuation Step Size	*1 dB*
P1dB	*+30 dBm*
OIP3	*+40 dBm*
Supply Voltage	*110/220V*

Features

- Built-in digital step attenuator provides push-button gain control up to 15 dB
- Built-in 110/220V power supply
- Thermally self-protected
- Lightweight chassis ideal for benchtop use
- 2 N-M to SMA-F adapters included
- CE marked

Applications

- Laboratory test instrument
- Signal generator output amplifier
- EMI testing
- Antenna testing

Wideband Instrument Amplifier

TVA-82-213A+

0.8 to 21 GHz

Case Style: PJ2059
15.35 x 8.27 x 3.25"

✓ ***Ultra-wideband & flat gain***

Typical Performance

Parameter	Performance (typ.)
Gain	*25 dB*
Gain Flatness	*±3.0 dB*
Reverse Isolation	*70 dB*
P1dB	*+24 dBm*
OIP3	*+30 dBm*
Supply Voltage	*110/220V*

Features

- Ultra-wideband, 0.8 to 21 GHz
- High reverse isolation, 70 dB
- Built-in 110/220V power supply
- Thermally self-protected
- Withstands open/short loads with P_{OUT} up to P1dB
- Unconditionally stable
- Lightweight chassis ideal for benchtop use
- CE marked

Applications

- Lab use
- Wideband test instrumentation

Instrument Amplifier

TVA-4-422A+

500 to 4200 MHz

Case Style: PJ2059-2
15.35 x 8.27 x 3.25"

✓ ***High dynamic range***

Typical Performance

Parameter	Performance (typ.)
Gain	*25 dB*
Gain Flatness	*±1.0 dB*
Reverse Isolation	*70 dB*
P1dB	*+34 dBm*
OIP3	*+44 dBm*
Supply Voltage	*110/220 V*

Features

- High reverse isolation, 70 dB
- Built-in 110/220V power supply
- Thermally self-protected
- Withstands open/short loads with P_{OUT} up to P1dB
- Unconditionally stable
- Lightweight chassis ideal for benchtop use
- 2 N-M to SMA-F adapters included
- CE marked

Applications

- Lab use
- Wideband test instrumentation

Instrument Amplifier

TVA-R5-13A+

0.5 to 1000 MHz

Case Style: PJ2059-2
15.35 x 8.27 x 3.25"

✓ ***High gain & high dynamic range***

Typical Performance

Parameter	Performance (typ.)
Gain	*38 dB*
Gain Flatness	*±1.4 dB*
Reverse Isolation	*80 dB*
P1dB	*+34 dBm*
OIP3	*+42 dBm*
Supply Voltage	*110/220 V*

Features

- 100% burn-in at +25°C, 48 hours
- High reverse isolation, 80 dB
- Built-in 110/220V power supply
- Thermally self-protected
- Lightweight chassis ideal for benchtop use
- 2 N-M to SMA-F adapters included
- CE marked
- Protected by US patent 5,101,171

Applications

- Lab use
- Wideband test instrumentation

Test Accessories

Hot New Products

Ultra-Flexible Test Cables

ULC-Series

DC to 18 GHz

Case Style: NS1992

✓ ***Stable performance vs. flexure***

Typical Performance (1.5 ft. length)

Parameter	Performance (typ.)
Insertion Loss	0.9 dB
Return Loss	20 dB
Power Handling @ 2 GHz	210W
Power Handling @ 18 GHz	67W
Minimum Bend Radius	2.0 in.
Connector Type	SMA-SMA (M)

Features

- Excellent stability of phase and insertion loss vs. flexure
- Performance qualified to 20,000 bend cycles
- Triple shielded cable construction
- Stainless steel SMA connectors
- Operating temperature from -55 to +85°C
- Available in a variety of lengths

Applications

- Test and measurement
- R&D labs
- Environmental & temperature test chambers
- Field RF testing

Ultra-Wideband Precision Fixed Attenuators

BW-K-Series

DC to 40 GHz

Case Style: FF1653
0.88(l) x 0.36 (dia.)"

✓ ***Precise attenuation to 40 GHz***

Typical Performance

Parameter	Performance (typ.)
Attenuation Values	*3, 6, 10, 20 dB*
Attenuation Accuracy	*±1.0 dB*
VSWR	*1.2:1 dB*
Power Handling	*2W*
Connector Type	*2.92mm (M-F)*

Features

- Ultra-wideband, DC to 40 GHz
- Precise attenuation
- Passivated stainless steel connectors
- Can interface with SMA, K, and 3.5mm connectors
- Operating temperature from -55 to +100°C

Applications

- Matching
- Instrumentation
- Test setups

Instrumentation Test Cables

VNAC-Series

DC to 40 GHz

Case Style: NE1922-2.1

✓ ***Pairs with your VNA***

Typical Performance (25-inch length)

Parameter	Performance (typ.)
Insertion Loss	1.5 dB
Return Loss	15.5 dB
Power Handling	10W
Connector Type	2.92mm (M – F)

Features

- Specially designed for use with VNA equipment
- Performance qualified to 20,000 bend cycles
- Extra rugged construction with protective shield and strain relief
- Crush and torque resistant
- PET monofilament yarn outer cover eliminates conductivity
- 40 GHz connector mates with 2.92mm, K, 3.5mm and SMA
- Cost-effective high-performance replacement for expensive OEM cables

Applications

- R&D labs
- Military and defense applications

Ultra-Wideband Termination

ANNE-50K+

DC to 40 GHz

Case Style: LL561
15.35 x 8.27 x 3.25"

✓ ***Excellent return loss to 40 GHz***

Typical Performance

Parameter	Performance (typ.)
Impedance	*50Ω*
Return Loss	*35 dB @ 4 GHz*
	20 dB @ 40 GHz
Power Handling	*1.0W*
Connector Type	*2.92mm (M)*

Features

- Ultra-wideband, DC to 40 GHz
- Excellent return loss up to 40 GHz
- Passivated stainless steel connector
- Can interface with SMA, K and 3.5mm connectors
- Operating temperature from -55 to +100°C

Applications

- Cellular communications
- Satellite communications
- Test setups
- Defense & radar

REFLECTIONLESS FILTERS

X Series Reflectionless Filters

High Pass, Low Pass and Band Pass Models

Passbands from DC to 21 GHz

Product Line Overview:

Mini-Circuits is proud to bring the industry a revolutionary breakthrough in the longstanding problem of signal reflections when embedding filters in RF systems. Whereas conventional filters are fully reflective in the stopband, our new X-Series reflectionless filters are matched to 50Ω in the passband, stopband and transition, eliminating intermods, ripples and other problems caused by reflections in the signal chain.

They're perfect for pairing with non-linear devices such as mixers and multipliers, significantly reducing unwanted signals generated due to non-linearity and for increasing system dynamic range by eliminating matching attenuators. They'll change the way you think about using filters in your design!

Key Features

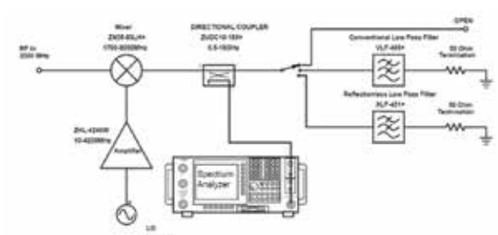
- Patented design eliminates in-band spurs
- Absorbs stopband signal power rather than reflecting it
- Good impedance match in passband, stopband, and transition
- Intrinsically cascadable
- Passbands from DC to 21 GHz
- Stopbands up to 35 GHz
- Tiny 3x3mm QFN package

Application Example:

Pairing Mixers with Reflectionless Filters to Improve System Performance

View full application note (AN-75-007) at minicircuits.com

An application circuit was assembled to measure the IF reflection spectrum at the output of a mixer when paired with a conventional filter versus a reflectionless filter.

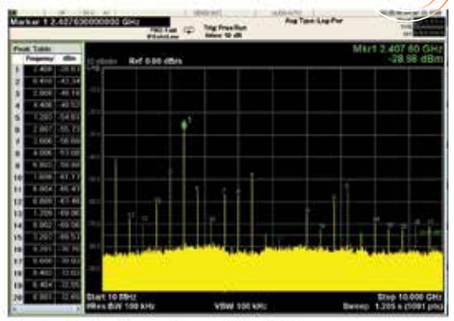


Application circuit test setup

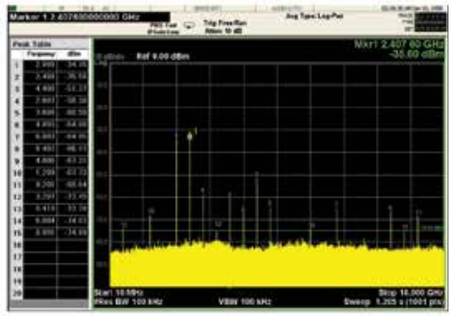
While the conventional filter reduces the reflections present when the mixer is used alone (no filter), the reflectionless filter virtually eliminates this reflections altogether.

The reflected signal at marker 1 (below) exhibits a reduction of more than 20 dB from -28.7 dBm to -50.3 dBm when the reflectionless filter us used as compared to the conventional filter, thus eliminating unwanted spurious mixing products and improving system dynamic range.

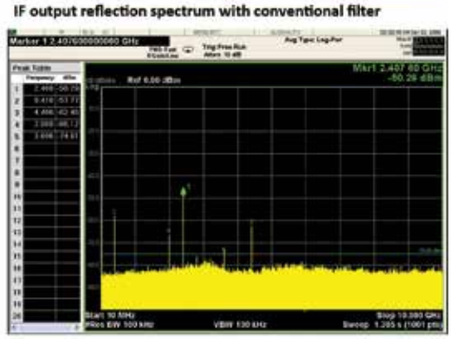
✓ *Real test results*



IF output reflection spectrum without filter



IF output reflection spectrum with conventional filter

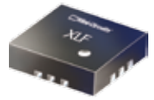


IF output reflection spectrum with reflectionless filter

Reflectionless Filters Models

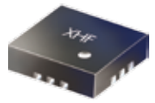
Hot New Products

Low Pass Models



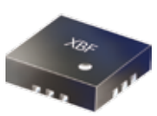
Model Number	Passband (MHz)	fco (MHz) Nom.	Stopband Frequency (MHz)		VSWR (:1)		Power Input (W)	
		(loss 3 dB)	(loss 14 dB) Typ.	(loss 20 dB) Typ.	Passband Typ.	Stopband Typ.	Passband	Stopband
XLF-151+	DC-150	280	460-2800	2800-16000	1.2	1.8	2	0.5
XLF-221+	DC-220	370	570-3500	3500-12000	1.2	1.7	2	0.5
XLF-421+	DC-420	610	900-5200	5200-18000	1.2	1.7	2	0.5
XLF-551+	DC-550	770	1140-5800	5800-18500	1.2	1.6	2	0.2
XLF-861+	DC-860	1150	1700-7500	7500-25000	1.2	2.3	2	0.2
XLF-122+	DC-1150	1510	2190-10000	10000-21000	1.2	1.5	2	0.5
XLF-192+	DC-1900	2400	3480-11200	11200-30000	1.2	2.1	2	0.2
XLF-252+	DC-2500	3220	4550-16000	16000-30000	1.3	1.8	2	0.5
XLF-332+	DC-3250	4120	5900-17000	17000-30000	1.2	2	2	0.2
XLF-63+	DC-6000	8100	9600-17800	-	1.3	1.5	2	0.15
XLF-732+	DC-7300	9800	14300-34000	-	1.2	3	2	0.2
XLF-73+	DC-7000	9900	11700-21300	-	1.3	2.2	2	0.1
XLF-762+	DC-7600	11000	13100-20000	-	1.3	2.7	2	0.1
XLF-962+	DC-9600	12400	14800-16000	16000-25200	1.2	2.4	2	0.08
XLF-982+	DC-9800	13100	19000-22000	22000-32500	1.2	3.4	2	0.2
XLF-14+	DC-10000	13200	15800-17000	17000-24200	1.3	2.2	2	0.05
XLF-123+	DC-12200	15000	18100-19000	19000-29000	1.3	2.5	2	0.05
XLF-133+	DC-13100	15800	19500-20000	20000-30000	1.3	2.7	2	0.05
XLF-173+	DC-17000	18000	23900-26000	26000-33000	1.2	2.7	2	0.05

High Pass Models



Model Number	Passband Frequency (MHz)	Stopband Frequency (MHz)	fco (MHz) Nom.	VSWR (:1)		Power Input (W)	
	(loss 1 dB) Typ.	(loss 14 dB) Typ.	(loss 3 dB) Typ.	Stopband Typ.	Passband Typ.	Stopband	Passband
XHF-23+	2010-10100	DC-1210	1650	1.2	2	0.5	2
XHF-252+	2460-10400	DC-1520	2030	1.2	1.7	0.5	2
XHF-392+	3940-11500	DC-2450	3220	1.4	1.7	0.5	2

Band Pass Models



Model Number	Center Frequency	Passband Frequency (MHz)		Stop Band (MHz)	VSWR (:1)	
	(MHz)	From	To	(loss 14 dB) Typ.	Passband Typ.	Stopband Typ.
XBF-282+	2750	2350	3150	DC-1810 & 3800-20000	1.2	1.5

Narrow-Band, High-Selectivity Band Pass Filters

Overview

Mini-Circuits' new ZVBP-series cavity band pass filters are designed for narrow-band, high selectivity applications. They can provide bandwidths as narrow as 1% with very high selectivity and excellent low noise floor. These filters include a unique mechanical feature that prevents accidental detuning that would otherwise require expensive replacement or return to factory for re-tuning. This makes them very handy for field and lab applications where hard use is common. They come in rugged packages with a special powder-coated finish, which not only looks great, but also provides excellent protection against corrosion, tarnishing, and scratching. ZVBP-series filters are tested for use in extreme temperatures up to 100°C. They're available in a wide range of passbands from 900 MHz to 12000 MHz. Contact apps@minicircuits.com for custom requirements!

Slabline Band Pass Filter *ZVBP-909+*

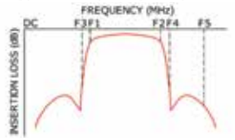
902 to 915 MHz

Case Style: KT1510
10.2 x 3.1 x 1.2"
SMA-F connectors

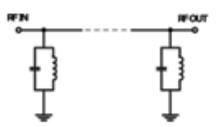
Typical Performance

Parameter		F#	Freq. (MHz)	Performance (typ.)
Passband	Insertion Loss	F1-F2	902-915	2.0 dB
	VSWR	F1-F2	902-915	1.2:1
Lower Stopband	Insertion Loss	DC-F3	10-895	33 dB
Upper Stopband	Insertion Loss	F4-F5	925-2300	34 dB

Typical Frequency Response



Simplified Schematic



Features

- Outstanding selectivity and high rejection
- >70 dB rejection @ 32 MHz from passband edge
- Wide operating temperature range, -55 to +100°C
- High power handling, 15W

Applications

- CDMA band rejection for GSM base stations

Cavity Band Pass Filter *ZVBP-4300+*

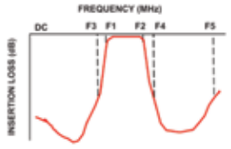
4250 to 4350 MHz

Case Style: ME1656
4.4 x 1.1 x 0.9"
SMA-F connectors

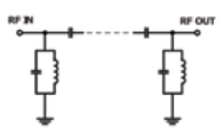
Typical Performance

Parameter		F#	Freq. (MHz)	Performance (typ.)
Passband	Insertion Loss	F1-F2	4250-4350	1.0 dB
	VSWR	F1-F2	4250-4350	1.3:1
Lower Stopband	Insertion Loss	DC-F3	DC-4140	29 dB
Upper Stopband	Insertion Loss	F4-F5	4480-8000	29 dB

Typical Frequency Response



Simplified Schematic



Features

- Outstanding selectivity and high rejection
- >95 dB rejection @500/7000 MHz
- High power handling, 10W

Applications

- C-band applications
- Aeronautical

Cavity Band Pass Filter *ZVBP-4900+*

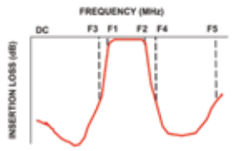
4840 to 4960 MHz

Case Style: ME1656
4.4 x 1.1 x 0.9"
SMA-F connectors

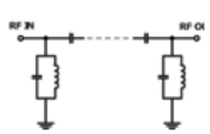
Typical Performance

Parameter		F#	Freq. (MHz)	Performance (typ.)
Passband	Insertion Loss	F1-F2	4840-4960	1.2 dB
	VSWR	F1-F2	4840-4960	1.22:1
Lower Stopband	Insertion Loss	DC-F3	DC-4670	29 dB
Upper Stopband	Insertion Loss	F4-F5	5100-9000	28 dB

Typical Frequency Response



Simplified Schematic



Features

- Outstanding selectivity and high rejection
- >95 dB rejection @ 2000/7500 MHz
- High power handling, 10W

Applications

- Wi-Fi
- Telecommunications & broadband

Cavity Band Pass Filter

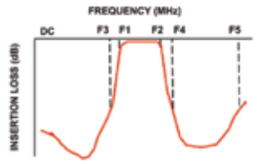
ZVBP-8250+

8025 to 8475 MHz

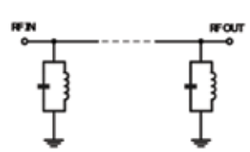
Typical Performance

Parameter		F#	Freq. (MHz)	Performance (typ.)
Passband	Insertion Loss	F1-F2	8025-8475	1.0 dB
	VSWR	F1-F2	8025-8475	1.5:1
Lower Stopband	Insertion Loss	DC-F3	DC-7650	28 dB
Upper Stopband	Insertion Loss	F4-F5	8925-11000	28 dB

Typical Frequency Response



Simplified Schematic



Case Style: PN2113
2.7 x 0.8 x 0.8"
SMA-F to SMA-M connectors

Features

- Outstanding selectivity and high rejection
- >95 dB rejection @ 500 MHz
- >64 dB rejection @ 11000 MHz
- High power handling, 10W

Applications

- X-band satellite and radar

Cavity Band Pass Filter

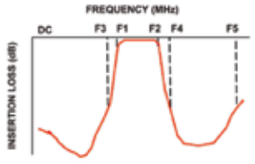
ZVBP-11G3+

11200 to 11400 MHz

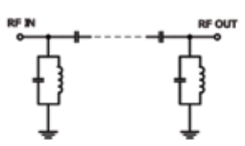
Typical Performance

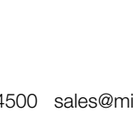
Parameter		F#	Freq. (MHz)	Performance (typ.)
Passband	Insertion Loss	F1-F2	11200-11400	2.0 dB
	VSWR	F1-F2	11200-11400	1.4:1
Lower Stopband	Insertion Loss	DC-F3	DC-11030	48 dB
Upper Stopband	Insertion Loss	F4-F5	11580-20000	48 dB

Typical Frequency Response



Simplified Schematic





Case Style: PU2164
4.5 x 0.75 x 1.2"
SMA-F connectors

Features

- Outstanding selectivity and high rejection
- >95 dB rejection @3000 MHz
- >72 dB rejection @20000 MHz
- High power handling, 10W

Applications

- X-band satellite and radar

Cavity Band Pass Filter

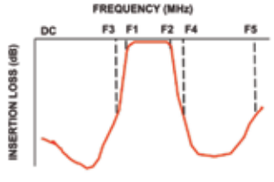
ZVBP-10R5G+

9750 to 11250 MHz

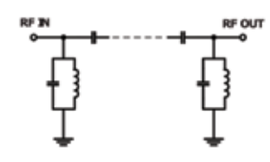
Typical Performance

Parameter		F#	Freq. (MHz)	Performance (typ.)
Passband	Insertion Loss	F1-F2	9750-11250	0.5 dB
	VSWR	F1-F2	9750-11250	1.33:1
Lower Stopband	Insertion Loss	DC-F3	DC-5950	51 dB
Upper Stopband	Insertion Loss	F4-F5	15100-18000	45 dB

Typical Frequency Response



Simplified Schematic



Case Style: PV2184
1.65 x 0.79 x 0.75"
SMA-F connectors

Features

- Outstanding selectivity and high rejection
- >84 dB rejection @ 500 MHz
- >53 dB rejection @ 18000 MHz
- Power handling, 1W

Applications

- X-band satellite and radar

High-Power Stripline Couplers

Overview

Mini-Circuits' MBD series of surface mount couplers utilizes stripline construction to achieve extremely high power handling – up to 300W – in miniature, low-profile devices with excellent coupling performance, high directivity, and excellent shielding. Available in a selection of bi-directional and dual directional models, these couplers are ideal for a wide variety of applications from power amplifiers and antenna feeds to military applications and more!

200W Bi-Directional Coupler

MBDA-30-451HP

225 to 450 MHz

Case Style: PQ2074
1.0 x 1.0 x 0.051"

Typical Performance

Parameter	Performance (typ.)
Coupling	30 dB
Power Handling	200W
Mainline Loss	0.15 dB
Input/Output Return Loss	33 dB
Directivity	28 dB

Features

- Very high power handling
- Constructed using stripline technology providing low profile and excellent shielding
- DC passing
- All ports interchangeable
- Wraparound terminations

Applications

- GSM
- R&D labs
- Military & defense

100W Bi-Directional Coupler

MBDA-35-252HP

225 to 2500 MHz

Case Style: PQ2074-1
1.0 x 1.0 x 0.128"

Typical Performance

Parameter	Performance (typ.)
Coupling	35 dB
Coupling Flatness	±1.0 dB
Power Handling	100W
Mainline Loss	0.3 dB
Input/Output Return Loss	19 dB
Directivity	18 dB

Features

- Very high power handling
- Constructed using stripline technology providing low profile and excellent shielding
- DC passing
- Wraparound terminations

Applications

- Digital communications Such as GSM, Wi-Fi, and Bluetooth
- RFID
- GPS
- Defense & military

300W Dual-Directional Coupler

MBDD-50-13HP

20 to 1000 MHz

Case Style: PQ2100
1.5 x 1.0 x 0.13"

Typical Performance

Parameter	Performance (typ.)
Coupling	50 dB
Coupling Flatness	±0.6 dB
Power Handling	300W
Mainline Loss	0.35 dB
Input/Output Return Loss	19 dB
Directivity	20 dB

Features

- Very high power handling
- Constructed using stripline technology providing low profile and excellent shielding
- DC passing
- Wraparound terminations
- Dual directional design allows simultaneous sampling of forward and reverse paths

Applications

- R&D labs
- Mobile SatCom
- Digital communications such as GSM, CDMA and LTE

300W Dual-Directional Coupler

MBDD-50-521HP

20 to 520 MHz

Case Style: PQ2100
1.5 x 1.0 x 0.13"

Typical Performance

Parameter	Performance (typ.)
Coupling	50 dB
Coupling Flatness	±0.6 dB
Power Handling	300W
Mainline Loss	0.25 dB
Input/Output Return Loss	19 dB
Directivity	20 dB

Features

- Very high power handling
- Constructed using stripline technology providing low profile and excellent shielding
- DC passing
- Wraparound terminations
- Dual directional design allows simultaneous sampling of forward and reverse paths

Applications

- GSM
- R&D labs
- Defense & military

100W Bi-Directional Coupler

MBDC-20-63HP

2000 to 6000 MHz

Case Style: PQ2099
0.56 x 0.20 x 0.05"

Typical Performance

Parameter	Performance (typ.)
Coupling	20 dB
Coupling Flatness	±2.0 dB
Power Handling	100W
Mainline Loss	0.15 dB
Input/Output Return Loss	22 dB
Directivity	23 dB

Features

- Very high power handling
- Constructed using stripline technology providing low profile and excellent shielding
- DC Passing
- Wraparound terminations

Applications

- Power amplifiers
- Antenna feeds
- Mobile SatCom
- Digital communications such as Wi-Fi, Bluetooth and Zigbee
- RFID

100W Bi-Directional Coupler

MBDC-13-63HP

2000 to 6000 MHz

Case Style: PQ2099
0.56 x 0.20 x 0.05"

Typical Performance

Parameter	Performance (typ.)
Coupling	13 dB
Coupling Flatness	±1.0 dB
Power Handling	100W
Mainline Loss	0.10 dB
Input/Output Return Loss	23 dB
Directivity	20 dB

Features

- Very high power handling
- Constructed using stripline technology providing low profile and excellent shielding
- DC Passing
- Wraparound terminations

Applications

- Power amplifiers
- Antenna feeds
- Mobile SatCom
- Digital communications Such as Wi-Fi, Bluetooth and Zigbee
- RFID

150W Bi-Directional Coupler

MBDB-15-272HP

700 to 2700 MHz

Case Style: PQ2098
1.5 x 1.0 x 0.13"

Typical Performance

Parameter	Performance (typ.)
Coupling	15 dB
Coupling Flatness	±0.75 dB
Power Handling	150W
Mainline Loss	0.25 dB
Input/Output Return Loss	19 dB
Directivity	20 dB

Features

- Very high power handling
- Constructed using stripline technology providing low profile and excellent shielding
- DC Passing
- Wraparound terminations

Applications

- R&D labs
- Mobile SatCom
- Digital communications such as TDMA,CDMA GSM and LTE
- DAS
- GPS

150W Bi-Directional Coupler

MBDB-25-272HP

700 to 2700 MHz

Case Style: PQ2098
1.5 x 1.0 x 0.13"

Typical Performance

Parameter	Performance (typ.)
Coupling	25 dB
Coupling Flatness	±0.75 dB
Power Handling	150W
Mainline Loss	0.25 dB
Input/Output Return Loss	19 dB
Directivity	20 dB

Features

- Very high power handling
- Constructed using stripline technology providing low profile and excellent shielding
- DC Passing
- Wraparound terminations

Applications

- R&D labs
- Mobile SatCom
- Digital communications such as TDMA,CDMA GSM and LTE
- DAS
- GPS

Voltage Controlled Oscillators

Hot New Products

5V Tuning for PLL ICs

MOS-400+

400 MHz

Case Style: CZ682
0.375 x 0.375 x 0.131"

Typical Performance

Parameter	Performance (typ.)
Output Power	+2.5 dBm
Phase Noise @ 10 kHz offset	-119 dBc/Hz
Pulling	0.4 MHz
Pushing	0.1 MHz/V
Harmonic Suppression	-32 dBc
Tuning Voltage Range	0.5 – 4.5V
Tuning Voltage Sensitivity	4 MHz/V

Features

- Fixed frequency
- Linear tuning characteristics
- Metal package provides excellent shielding against unwanted signals and noise
- Small size, 0.375 x 0.375 x 0.131"
- Robust design

Applications

- Wireless communications
- Military
- Environmental & temperature test chambers
- Field RF testing

Linear Tuning, Optimal for Loop Filter Design

MOS-980+

935 to 980 MHz

Case Style: CZ682
0.375 x 0.375 x 0.131"

Typical Performance

Parameter	Performance (typ.)
Output Power	+2.5 dBm
Phase Noise @ 10 kHz offset	-113 dBc/Hz
Pulling	0.7 MHz
Pushing	0.1 MHz/V
Harmonic Suppression	-27 dBc
Tuning Voltage Range	0.5 – 5.0 V
Tuning Voltage Sensitivity	15 MHz/V

Features

- Linear tuning characteristics
- Metal package provides excellent shielding against unwanted signals and noise
- Small size, 0.375 x 0.375 x 0.131"
- Robust design

Applications

- Wireless communications
- Military

Linear Tuning

MOS-2960+

2622 to 2960 MHz

Case Style: CZ682
0.375 x 0.375 x 0.131"

Typical Performance

Parameter	Performance (typ.)
Output Power	+2.5 dBm
Phase Noise @ 10 kHz offset	-102 dBc/Hz
Pulling	3 MHz
Pushing	1.5 MHz/V
Harmonic Suppression	-33 dBc
Tuning Voltage Range	0.5 – 19V
Tuning Voltage Sensitivity	18-29 MHz/V

Features

- Linear tuning characteristics
- Metal package provides excellent shielding against unwanted signals and noise
- Small size, 0.375 x 0.375 x 0.131”
- Robust design

Applications

- Wireless communications
- Military

Linear Tuning

MOS-2500C+

2000 to 2500 MHz

Case Style: CK1113
0.50 x 0.50 x 0.22”

Typical Performance

Parameter	Performance (typ.)
Output Power	+5.5 dBm
Phase Noise @ 10 kHz offset	-108 dBc/Hz
Pulling	1.3 MHz
Pushing	0.4 MHz/V
Harmonic Suppression	-22 dBc
Tuning Voltage Range	0 – 20V
Tuning Voltage Sensitivity	9-37 MHz/V

Features

- Linear tuning characteristics
- Metal package provides excellent shielding against unwanted signals and noise equipment
- Small size, 0.50 x 0.50 x 0.22”
- Robust design

Applications

- Wireless communications
- Test and measurement

5V Tuning for PLL ICs

MOS-980-119+

980 MHz

Case Style: CZ682
0.375 x 0.375 x 0.131"

Typical Performance

Parameter	Performance (typ.)
Output Power	+1.5 dBm
Phase Noise @ 10 kHz offset	-116 dBc/Hz
Pulling	0.4 MHz
Pushing	0.2 MHz/V
Harmonic Suppression	-18 dBc
Tuning Voltage Range	0.5 – 4.5V
Tuning Voltage Sensitivity	10 MHz/V

Features

- Fixed frequency
- Linear tuning characteristics
- Metal package provides excellent shielding against unwanted signals and noise
- Small size, 0.375 x 0.375 x 0.131"
- Robust design

Applications

- Wireless communications
- Military

5V Tuning for PLL ICs

MOS-1120+

1120 MHz

Case Style: CZ682
0.375 x 0.375 x 0.131"

Typical Performance

Parameter	Performance (typ.)
Output Power	+2.5 dBm
Phase Noise @ 10 kHz offset	-117 dBc/Hz
Pulling	0.5 MHz
Pushing	0.2 MHz/V
Harmonic Suppression	-19 dBc
Tuning Voltage Range	0.5 – 4.5V
Tuning Voltage Sensitivity	5 MHz/V

Features

- Fixed frequency
- Linear tuning characteristics
- Metal package provides excellent shielding against unwanted signals and noise
- Small size, 0.375 x 0.375 x 0.131"
- Robust design

Applications

- Wireless communications
- Military

Linear Tuning

ROS-3000C+

2500 to 3000 MHz

Case Style: CK1113
0.50 x 0.50 x 0.22"

Typical Performance

Parameter	Performance (typ.)
Output Power	+5.0 dBm
Phase Noise @ 10 kHz offset	-107 dBc/Hz
Pulling	3.0 MHz
Pushing	0.45 MHz/V
Harmonic Suppression	-20 dBc
Tuning Voltage Range	0.25 – 18.5V
Tuning Voltage Sensitivity	14-36 MHz/V

Features

- Linear tuning characteristics
- Metal package provides excellent shielding against unwanted signals and noise equipment
- Small size, 0.50 x 0.50 x 0.22"
- Robust design

Applications

- Wireless communications
- Test and measurement equipment

Linear Tuning

ROS-4608C+

4608 MHz

Case Style: CK1113
0.50 x 0.50 x 0.22"

Typical Performance

Parameter	Performance (typ.)
Output Power	+3.0 dBm
Phase Noise @ 10 kHz offset	-116 dBc/Hz
Pulling	0.6 MHz
Pushing	0.3 MHz/V
Harmonic Suppression	-18 dBc
Tuning Voltage Range	0.5 – 4.5V
Tuning Voltage Sensitivity	3-4 MHz/V

Features

- Fixed Frequency
- Linear tuning characteristics
- Metal package provides excellent shielding against unwanted signals and noise
- Small size, 0.50 x 0.50 x 0.22"
- Robust design

Applications

- Wireless communications
- Test and measurement
- CATV
- High speed DUCs (digital up-converters)

Want to see more?

We're continuously releasing innovative new products to our catalog to meet your needs.

Visit www.minicircuits.com

To stay up to date on our latest new model releases.

Need a custom design?

Get in touch with our sales and applications teams listed below to discuss your requirements. We're here to support you!

Direct Sales

- **Brooklyn**
  sales@minicircuits.com
  1 718-934-4500
- **Missouri**
  sales@minicircuits.com
  1 417-335-5935
- **Europe**
  sales@uk.minicircuits.com
  44 1252-832600
- **Taiwan**
  robert@min-kai.com.tw
  886 3 318 4450

Technical Support

- **NORTH AMERICA**
  apps@minicircuits.com
  (718) 934-4500
- **SINGAPORE, INDONESIA MALAYSIA, THAILAND**
  sales@minicircuits.com.my
  (604) 646-2828
- **ISRAEL**
  app@ravon.co.il
  972 4 8749100
- **TAIWAN & PHILIPPINES**
  robert@min-kai.com.tw
- **EUROPE**
  apps@uk.minicircuits.com
  44 1252 832600
- **INDIA**
  apps@minicircuits.com
  91 44 2 2622575
- **CHINA**
  sales@mitron.cn
  86 591-8787 0001
  Or
  yuanzhong@minicircuits.com
  86 020-8734 0992