

High Power Amplifier

ZHL-16W-43X-S+

50Ω 1800 to 4000 MHz



CASE STYLE: BT1344

The Big Deal:

- Broadband - High Power, 16 Watt
- Rugged
- Internal Protection from Load and Temperature

Product Overview:

Mini-Circuits ZHL-16W-43X-S+ offers high power (16W) with rugged reliability over a broad frequency range from 1800 to 4000 MHz. This model includes temperature sensing circuits for automatic shutdown and output load protection to operate into a short or an open load making it ideal for use in laboratory or field applications.

Summary Performance at 2 GHz

P_{OUT} @ 3dB (P_{SAT})	16	W, typ.
Gain	45	dB, typ.
IP3	+47	dBm, typ.
P_{OUT} (at 1dB)	+41	dBm, typ.
DC Current (at 28V)	4.3	A, max.
Operating Frequency: 1800 to 4000 MHz		

Key Features

Feature	Advantages
Combination of Power and Bandwidth	Offering a unique combination of output power over a broad frequency range, the ZHL-16W-43X-S+ is ideal for laboratory and other test applications which require a high degree of flexibility to delivery power over a wide array of applications including <ul style="list-style-type: none"> • PCS, UMTS, LTE and wireless • WiMAX • Radar • Microwave radio and ISM
Excellent Input and Output VSWR	With 1.3:1 output VSWR, the ZHL-16W-43X-S+ is designed for use in driving circuits with a variety of impedances and still provide consistent, reliable output power.
Over Temp Shutdown	The ZHL-16W-43X-S+ includes internal temperature monitoring circuits to automatically shut down the amplifier in the event of over temperature operation. Set for approximately +85°C shutdown (with auto recovery at 70°C), this feature ensures that users who have difficulty in controlling their thermal environment or need to operate in a remote mode and cannot monitor the amplifier real time, can function with the security that a thermal run-away condition will be avoided through this self management feature. Furthermore, the ZHL-16W-43X-S+ provides a TTL output to indicate thermal shutdown for remote automated systems.
Output Load Protection	A high root cause for damage to power amplifiers is the operation into highly reflective loads. The ZHL-16W-43X-S+ power amplifier includes circuits to enable the amplifier to operate without damage in the presence of an open or short over all phases.

Coaxial

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ZHL-16W-43X-S+

50Ω 16W 1800 to 4000 MHz

General Description

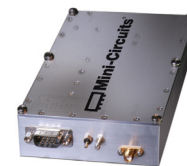
Mini-Circuits ZHL-16W-43X-S+, is a wide band High Power Amplifier providing 16W saturated output power over more than an octave up to 4000 MHz. It supports a variety of applications from communication or radar to critical test and measurement systems and includes over-temperature self-protect and alarming circuits as well as internal protection circuits to prevent damage due to operation into an open or short under full RF power.

Features

- High power, 16 Watt
- Low Current consumption, 3A typ.
- High IP3, +47 dBm typ.
- Usable over 800 to 4200 MHz
- Good gain flatness, ± 1.5 dB typ.
- No damage with an open or short output load under full CW output power
- Overheat-protection automatic shuts off when base plate temperature exceeds +80°C

Applications

- PCN
- GSM
- ISM
- WiMax
- Lab test



CASE STYLE: BT1344

Connectors	Model	Price	Qty.
SMA/D-Sub Male	Contact Sales Dept.		

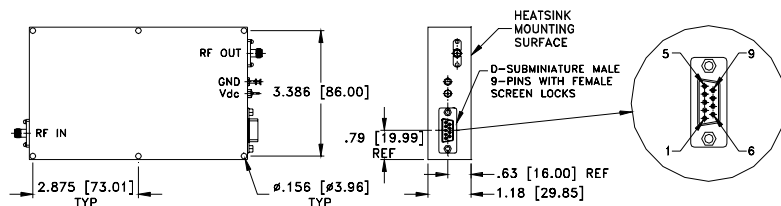
+RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

Electrical Specifications

Parameter				Units
	Min	Typ.	Max.	
Frequency Range	1800		4000	MHz
Gain	40	45	50	dB
Gain Flatness			± 2.0	dB
Output Power at 1dB compression	+39	+41		dBm
Saturated Output Power at 3dB compression	+40	+42		dBm
Noise Figure		6.0		dB
Output third order intercept point		+47		dBm
Input VSWR		1.5		:1
Output VSWR		1.3		:1
DC Supply Voltage		28	30	V
Supply Current			4.0	A

Outline Drawing



Weight: 580 grams

Maximum Ratings

Parameter	Ratings
Operating Base Plate Temperature ³	-20°C to 47°C
Storage Temperature	-55°C to 100°C
Input RF Power (no damage) ²	+9 dBm

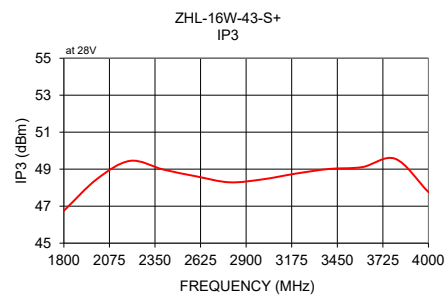
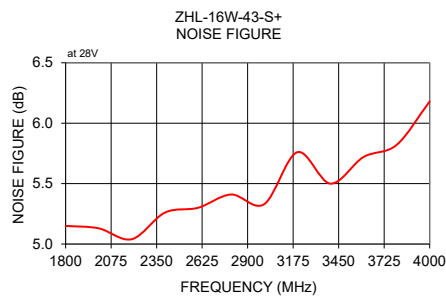
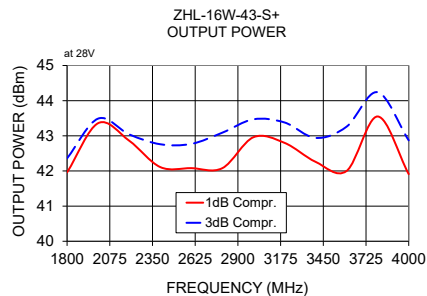
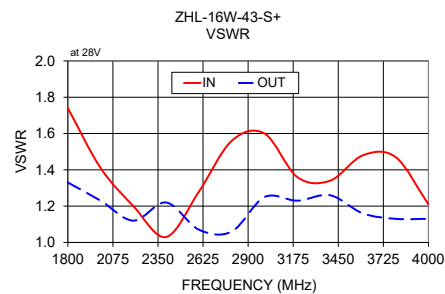
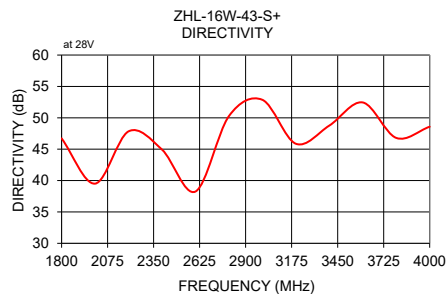
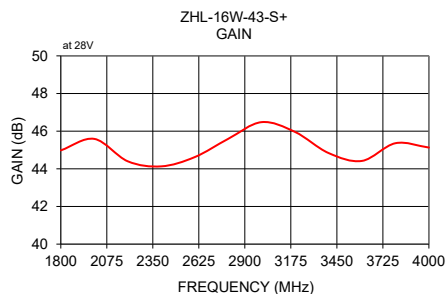
1. Permanent damage may occur if any of these limits are exceeded.
2. Peak envelop power. (Refer to Application Note AN-60-037 for PEP calculation).
3. Heat sink and fan not included. Alternative heat sinking and heat removal must be provided by the user to limit maximum base-plate temperature to 60°C, in order to ensure proper performance. For reference, this requires thermal resistance of user's external heat sink to be 0.109°C/W max. at 47°C ambient.

D-Sub Male Connector Pin Connections**

Pin Function	Label on unit	Pin #	Color	Gauge
None	N/C1, N/C2 N/C4, N/C5	1,2,4,5	None	None
Thermal Shut-Off Indication: Shut-Off: 2 to 5V Not Shut-Off: 0 to 0.8V	TTL Out	3	Orange	26 AWG
DC Input (+)	Vdc	6,7	Red	18 AWG
Ground	GND	8,9	Black	18 AWG

**Each amplifier will come packaged with an additional D-Sub connector for mating with the amplifier.

FREQUENCY (MHz)	GAIN (dB)	DIRECTIVITY (dB)	VSWR (:1)		NOISE FIGURE (dB)	POUT (dBm) at 28V		OUTPUT IP3 (dBm)
	28V	28V	IN	OUT		1 dB Compr.	3 dB Compr.	28V
1800.00	44.98	46.72	1.74	1.33	5.15	41.96	42.36	46.75
2000.00	45.59	39.51	1.41	1.23	5.13	43.36	43.49	48.47
2200.00	44.40	47.84	1.20	1.12	5.04	42.86	43.04	49.45
2400.00	44.13	44.94	1.03	1.22	5.26	42.11	42.76	48.98
2600.00	44.62	38.25	1.28	1.07	5.30	42.08	42.77	48.61
2800.00	45.59	50.27	1.56	1.06	5.41	42.08	43.09	48.29
3000.00	46.48	52.87	1.60	1.25	5.33	42.96	43.47	48.45
3200.00	45.96	45.87	1.36	1.23	5.76	42.80	43.38	48.76
3400.00	44.84	48.76	1.34	1.26	5.50	42.26	42.94	49.01
3600.00	44.42	52.45	1.48	1.16	5.72	42.00	43.26	49.11
3800.00	45.36	46.80	1.47	1.13	5.82	43.55	44.24	49.56
4000.00	45.13	48.58	1.21	1.13	6.18	41.91	42.87	47.76



Coaxial Amplifier

ZHL-16W-43+

Typical Performance Data

FREQ. (MHz)	GAIN (dB) 28V	DIRECTIVITY (dB) 28V	VSWR (:1)		NOISE FIGURE (dB) 28V	POUT @ 1 dB COMPRESSION (dBm) 28V	POUT @ 3 dB COMPRESSION (dBm) 28V	OUTUPUT IP3 (dBm) 28V
			IN 28V	OUT 28V				
1800.0	44.98	46.72	1.74	1.33	5.15	41.96	42.36	46.75
2000.0	45.59	39.51	1.41	1.23	5.13	43.36	43.49	48.47
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3000.0	46.48	52.87	1.60	1.25	5.33	42.96	43.47	48.45
3200.0	45.96	45.87	1.36	1.23	5.76	42.80	43.38	48.76
3400.0	44.84	48.76	1.34	1.26	5.50	42.26	42.94	49.01
3600.0	44.42	52.45	1.48	1.16	5.72	42.00	43.26	49.11
3800.0	45.36	46.80	1.47	1.13	5.82	43.55	44.24	49.56
4000.0	45.13	48.58	1.21	1.13	6.18	41.91	42.87	47.76



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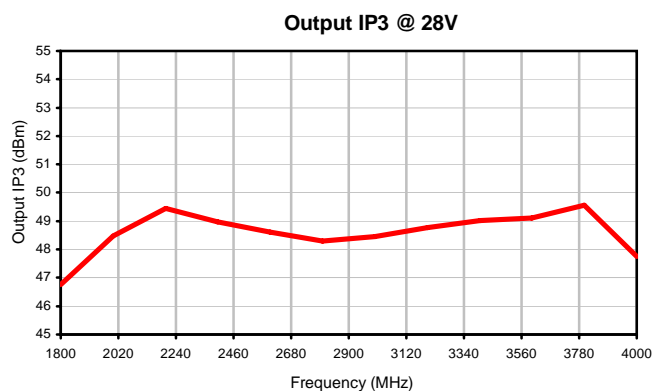
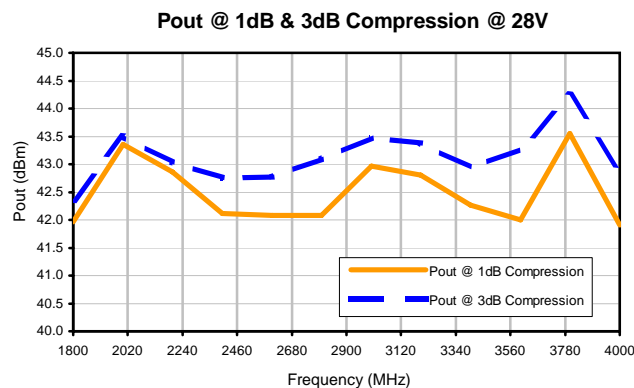
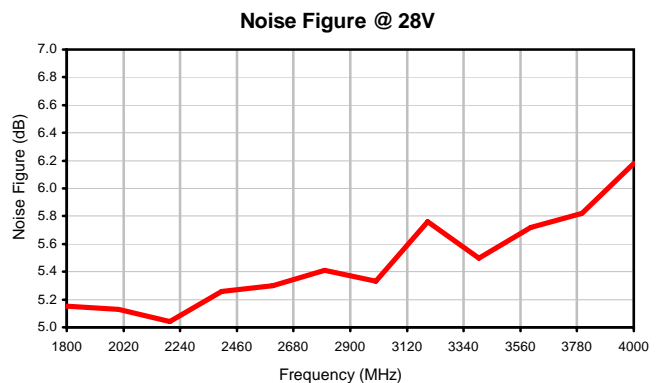
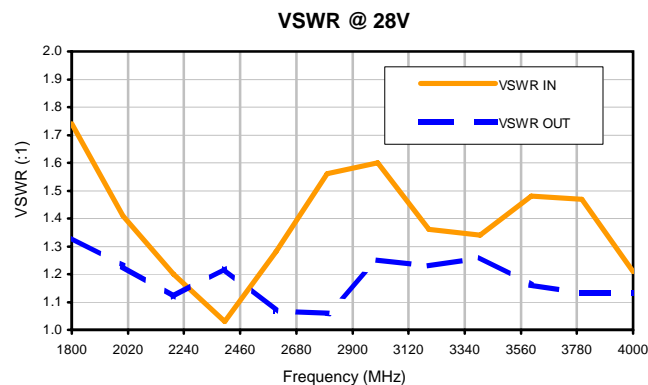
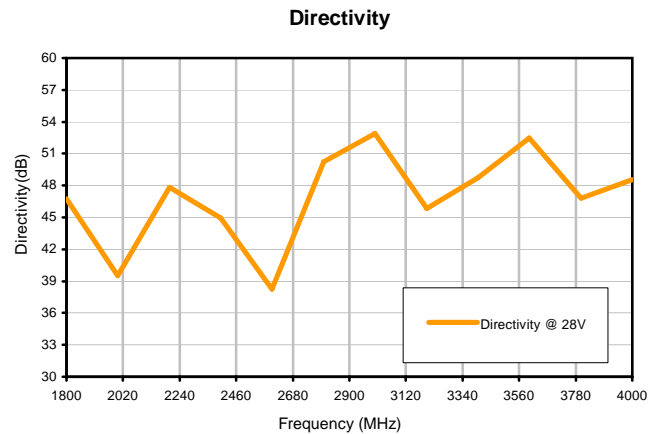
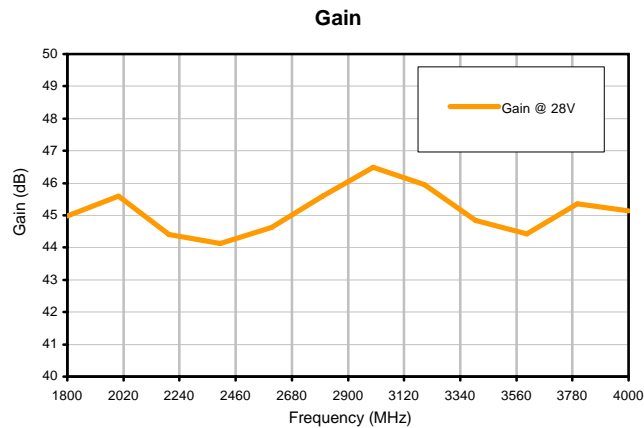
IF/RF MICROWAVE COMPONENTS

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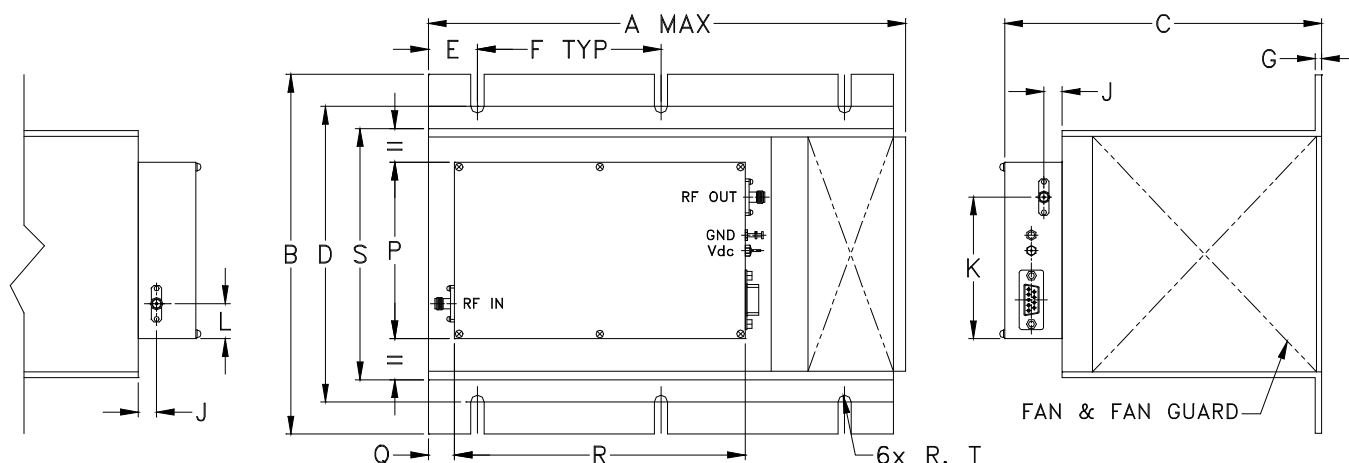
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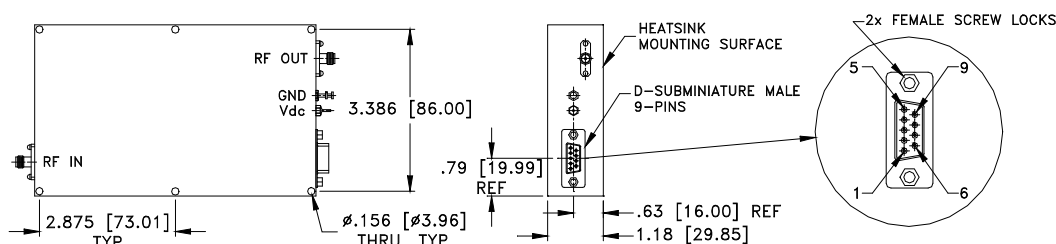
Typical Performance Curves



Outline Dimensions



MOUNTING INFORMATION FOR MODELS WITHOUT HEATSINK.



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
BT1344	9.85 (250.19)	7.3 (185.42)	6.5 (165.10)	6.00 (152.40)	1.00 (25.40)	3.75 (95.25)	.13 (3.30)	-	.37 (9.40)	2.87 (72.90)	.71 (18.03)	-	-

CASE#	P	Q	R	S	T	WT, GRAM	WT WITHOUT HEATSINK, GRAM
BT1344	3.58 (90.93)	.5 (12.70)	5.95 (151.13)	5.1 (129.54)	.135 (3.43)	4265	580

Dimensions are in inches (mm). Tolerances: 1 Pl. $\pm .1$; 2 Pl. $\pm .03$; 3 Pl. $\pm .015$

Notes:

- Case material: Aluminum alloy.
- Finish:
For RoHS Case Styles: Clear Chemical conversion coating, non-chrome or trivalent chrome based.
- Heatsink finish: Black anodize.
- Refer to the individual model data sheet for the type of connectors available.
- Recommended screws for mounting model without heat sink on 3/32" thick sheet: #6-32, 1.50" Length.



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RF/IF MICROWAVE COMPONENTS



All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-20° to 60°C Base Plate Temperature	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Stabilization Bake	(non-operating) 125°C, 24 hours	- - -
Burn-in at Elevated Temp.	(DC on) 160 hours at 60° C	MIL-STD-202, Method 108
Thermal Shock	-55° to 100°C, 5 cycles	MIL-STD-202, Method 107, Condition A, except 100°C