

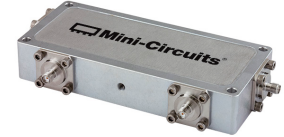
20dB DC Pass

# High Power Bi-Directional Coupler ZGBDC20-33H-S+

50Ω Up to 50W 300 to 3000 MHz

## The Big Deal

- High Power Handling: 50W
- Low Insertion Loss: 0.15 dB\*
- Rugged IP67 Weatherproof case



CASE STYLE: HT1761-2

## Product Overview

Mini-Circuits' ZGBDC20-33H-S+ broadband high power bi-directional coupler offers excellent performance across a wide range of popular frequency bands. Built using low loss suspended substrate construction, the ZGBDC20-33H-S+ can pass up to 3A of DC current from input to output and handle up to 50W CW. Rugged sealed construction makes this coupler ideal for use in field applications or remote monitoring sites; however, it is also ideal for high power lab testing.

## Key Features

Feature	Advantages
Excellent Insertion Loss , 0.15 dB Typ*	With extremely low insertion loss, this coupler is ideal for critical high power applications.
Ultra High Return Loss, 28 dB Typ	Outstanding Return loss makes this coupler ideal for sensitive power measurement and other signal distribution applications.
High Power Handling, 50W	Up to 50W CW power handling, combined with low insertion loss and excellent VSWR support operation in high power applications such as transmitters, base stations and high power device characterization.
Wide bandwidth	300-3000 MHz coverage includes many popular cellular, WiMAX, LTE, ISM, satellite, P2P, aviation, maritime, defense, and radar bands
Excellent Directivity and Coupling Flatness	Typical 23 dB directivity and $\pm 0.2$ dB of Coupling flatness provides accurate signal sampling of forward or reflected power.
Passes DC Current, 3A	Capable of passing 3A current, input to output; this coupler is suited for application using remote antenna control or other remote motorized requirements.
IP67 Weatherproof Case	With an Ingress Protection rating of IP67, the ZGBDC20-33H-S+ is designed to operate in harsh outdoor applications.

\*Does not include coupling loss

### Notes

- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.  
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.  
C. The parts covered by this specification document 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](http://www.minicircuits.com/MCLStore/terms.jsp)



20dB DC Pass

# High Power Bi-Directional Coupler ZGBDC20-33H-S+

50Ω Up to 50W 300 to 3000 MHz

## Maximum Ratings

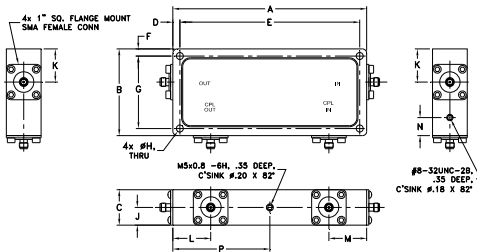
Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
DC Current	3A

Permanent damage may occur if any of these limits are exceeded

## Coaxial Connections

INPUT	IN
OUTPUT	OUT
COUPLED IN	CPL IN
COUPLED OUT	CPL OUT

## Outline Drawing



## Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H	
5.58	2.45	1.00	.20	5.175	.20	2.050	.200	
141.73	62.23	25.40	5.08	131.45	5.08	52.07	5.08	
J	K	L	M	N	P			wt
.50	.94	1.09	1.09	0.51	2.79			grams
12.70	23.88	27.69	27.69	12.95	70.87			700.0

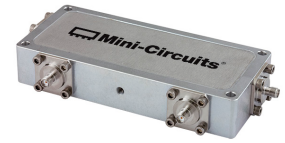
IP protection classification: IP67

## Features

- wide frequency range, 300-3000 MHz
- good coupling flatness, ±0.2 dB typ. full band
- high directivity, 25 dB typ.
- good VSWR, 1.10:1 typ.
- high power, up to 50W
- DC current pass through input to output
- IP67 weather proof case

## Applications

- cellular
- PCN
- lab use
- GSM
- WiMAX
- ISM



CASE STYLE: HT1761-2

Connectors Model  
SMA ZGBDC20-33H-S+

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

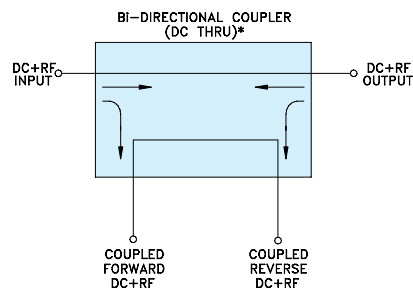
## Electrical Specifications at 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Units
Operating Frequency		300		3000	MHz
Coupling	300-700	—	22.9±2.7	—	
	700-2700	—	20.5±0.6	—	dB
	2700-3000	—	20.6±0.4	—	
Coupling Flatness	300-700	—	—	±3.0	dB
	700-2700	—	—	±0.75	
	2700-3000	—	—	±0.5	
Mainline Loss <sup>1</sup>	300-700	—	0.08	0.2	dB
	700-2700	—	0.15	0.3	
	2700-3000	—	0.2	0.35	
Directivity	300-700	20	28	—	dB
	700-2700	15	23	—	
	2700-3000	14	21	—	
Return Loss	300-700	—	26.4	—	dB
	700-2700	—	30.7	—	
	2700-3000	—	23.6	—	
Input Power <sup>2</sup>	300-700	—	—	50	W
	700-2700	—	—	50	
	2700-3000	—	—	50	

1. Does not include coupling loss.

2. At 25°C with no DC current. Derate linearly to 25W (380-2700 MHz) and to 15W (2700-3600 MHz) from 25°C to 100°C. Output load VSWR 2.0:1 max.

## Electrical Schematic



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

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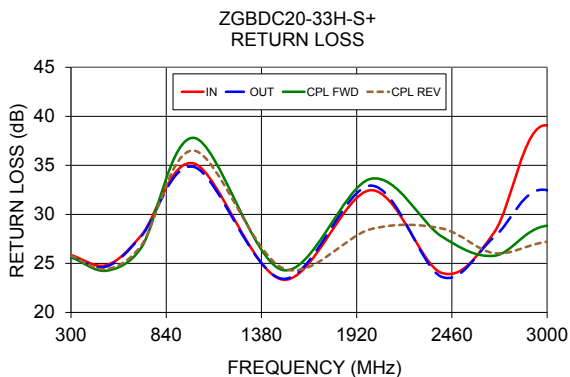
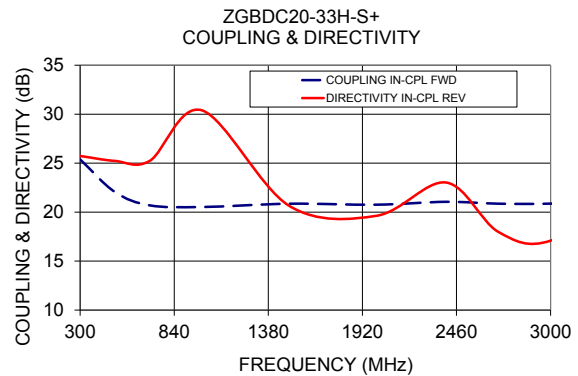
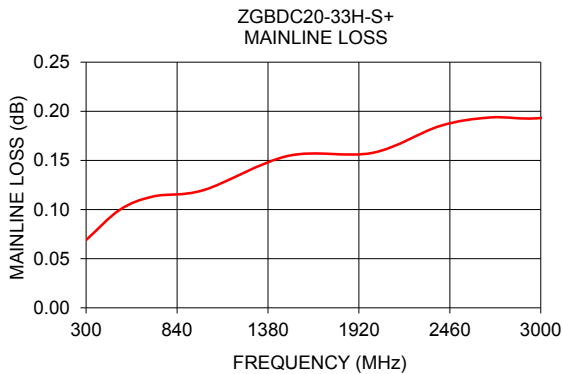


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M171494  
ZGBDC20-33H-S+  
WP/CP/AM  
190111  
Page 2 of 3

## Typical Performance Data

Frequency (MHz)	Mainline Loss (dB) In-Out	Coupling (dB)		Directivity (dB)		Return Loss (dB)			
		In-Cpl Fwd	Out-Cpl Rev	Out-Cpl Fwd	In-Cpl Rev	In	Out	Cpl Fwd	Cpl Rev
300.0	0.07	25.4	25.4	26.4	25.7	25.8	25.6	25.7	25.8
500.0	0.10	22.0	22.0	26.9	25.2	24.8	24.7	24.2	24.4
700.0	0.11	20.7	20.6	28.2	25.2	27.9	27.8	26.6	26.9
1000.0	0.12	20.5	20.5	33.9	30.4	35.2	34.8	37.8	36.5
1500.0	0.15	20.9	20.8	24.0	20.6	23.3	23.4	24.3	24.5
2000.0	0.16	20.8	20.7	23.6	19.6	32.5	32.9	33.6	28.5
2400.0	0.18	21.1	21.0	33.6	23.0	24.0	23.6	27.8	28.6
2700.0	0.19	20.9	20.7	20.8	18.0	28.2	27.7	25.8	26.0
3000.0	0.19	20.9	20.7	17.8	17.1	39.1	32.5	28.8	27.2
3500.0	0.21	21.2	21.1	27.2	22.6	25.3	24.3	27.5	28.3



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*Typical Performance Data*

FREQ. (MHz)	INSERTION LOSS <sup>(1)</sup>		COUPLING		DIRECTIVITY		RETURN LOSS			
	(dB)		(dB)		(dB)		(dB)			
	IN-OUT	FWD-REV	IN-FWD	OUT-REV	IN-REV	OUT-FWD	IN	OUT	FWD	REV
100	0.03	0.02	34.3	34.3	25.9	26.0	32.5	33.8	33.2	33.1
150	0.03	0.03	30.9	30.9	26.5	26.8	30.4	30.0	30.0	30.1
200	0.05	0.04	28.5	28.5	26.2	26.0	28.3	28.2	28.1	28.2
250	0.06	0.05	26.8	26.7	25.9	26.4	26.7	26.7	26.6	26.6
300	0.07	0.06	25.4	25.4	25.7	26.4	25.8	25.6	25.7	25.8
350	0.08	0.07	24.3	24.3	25.5	26.4	25.1	24.9	24.8	24.9
360	0.08	0.08	24.1	24.1	25.5	26.5	25.0	24.9	24.7	24.8
370	0.08	0.08	23.9	23.9	25.5	26.6	25.0	24.8	24.6	24.7
380	0.08	0.08	23.7	23.7	25.5	26.6	24.9	24.7	24.6	24.6
390	0.08	0.08	23.5	23.5	25.5	26.6	24.9	24.7	24.5	24.6
400	0.09	0.08	23.4	23.4	25.4	26.7	24.9	24.6	24.4	24.5
450	0.09	0.09	22.6	22.6	25.2	26.8	24.6	24.6	24.2	24.2
500	0.10	0.10	22.0	22.0	25.2	26.9	24.8	24.7	24.2	24.4
550	0.10	0.10	21.6	21.5	25.0	27.2	24.9	24.8	24.4	24.4
600	0.11	0.11	21.2	21.1	25.0	27.4	25.7	25.6	24.9	25.1
650	0.11	0.11	20.9	20.9	25.1	28.0	26.4	26.4	25.6	25.7
700	0.11	0.11	20.7	20.6	25.2	28.2	27.9	27.8	26.6	26.9
800	0.12	0.12	20.5	20.4	25.9	29.2	32.4	32.2	30.0	30.0
850	0.12	0.12	20.4	20.4	26.6	30.0	36.3	36.8	32.9	32.8
900	0.12	0.12	20.4	20.4	27.5	30.8	44.4	44.8	36.8	36.2
950	0.12	0.12	20.5	20.4	28.6	32.0	41.4	41.9	41.1	38.3
1000	0.12	0.12	20.5	20.5	30.4	33.9	35.2	34.8	37.8	36.5
1050	0.12	0.13	20.6	20.6	32.4	36.3	31.1	30.8	33.5	33.2
1100	0.13	0.13	20.7	20.6	34.8	42.2	28.5	28.4	30.8	30.5
1150	0.13	0.13	20.8	20.7	34.7	53.8	26.6	26.5	28.5	28.5
1200	0.14	0.14	20.8	20.8	32.5	41.0	25.3	25.1	27.1	27.1
1250	0.14	0.14	20.9	20.8	29.1	35.2	24.3	24.2	26.0	26.1
1300	0.14	0.14	20.9	20.9	26.8	31.2	23.5	23.4	25.3	25.3
1350	0.15	0.15	20.9	20.9	24.6	28.4	23.2	23.1	24.7	24.9
1400	0.15	0.15	20.9	20.9	23.0	26.6	23.0	23.0	24.3	24.6
1450	0.15	0.16	20.9	20.8	21.7	24.9	23.1	23.0	24.3	24.5
1500	0.15	0.15	20.9	20.8	20.6	24.0	23.3	23.4	24.3	24.5
1550	0.16	0.16	20.8	20.7	19.8	23.0	23.9	23.7	24.6	24.8
1600	0.16	0.16	20.8	20.7	19.3	22.6	24.7	24.7	25.0	25.1
1650	0.16	0.16	20.7	20.6	18.8	22.2	25.7	25.6	25.6	25.7
1700	0.16	0.16	20.7	20.6	18.5	21.9	26.8	27.2	26.3	26.1
1750	0.16	0.16	20.6	20.5	18.4	21.8	28.9	29.5	27.3	26.7
1800	0.15	0.16	20.6	20.5	18.4	21.9	30.9	32.4	28.3	27.2
1850	0.15	0.16	20.6	20.5	18.5	22.1	34.1	38.2	29.6	27.6
1900	0.15	0.17	20.7	20.5	18.8	22.4	36.6	55.0	31.0	28.0
1950	0.16	0.16	20.7	20.6	19.0	23.0	34.6	39.2	32.3	28.2
2000	0.16	0.17	20.8	20.7	19.6	23.6	32.5	32.9	33.6	28.5
2050	0.16	0.16	20.8	20.7	20.2	24.4	29.5	29.9	33.7	28.4
2100	0.16	0.17	20.9	20.8	21.2	25.6	28.1	27.6	33.4	28.7
2150	0.16	0.16	20.9	20.8	22.0	26.5	26.5	26.3	32.3	28.8
2200	0.17	0.17	21.0	20.9	23.0	28.3	25.6	25.2	31.3	29.1
2250	0.17	0.17	21.0	20.9	23.7	29.9	24.7	24.6	30.2	28.9
2300	0.18	0.18	21.0	21.0	24.1	32.5	24.4	24.0	29.3	29.0
2350	0.18	0.17	21.0	21.0	23.7	33.4	23.8	23.8	28.5	28.7
2400	0.18	0.18	21.1	21.0	23.0	33.6	24.0	23.6	27.8	28.6
2450	0.18	0.18	21.0	20.9	22.0	30.5	23.8	23.8	27.1	28.0
2500	0.19	0.19	21.0	20.9	21.0	28.2	24.4	24.0	26.7	27.6
2550	0.19	0.19	21.0	20.9	19.9	25.4	24.6	24.5	26.3	27.0
2600	0.19	0.20	20.9	20.8	19.2	23.7	25.7	25.3	26.1	26.7
2650	0.19	0.20	20.9	20.8	18.5	22.1	26.3	26.2	25.8	26.3
2700	0.19	0.20	20.9	20.7	18.0	20.8	28.2	27.7	25.8	26.0
2750	0.20	0.20	20.8	20.7	17.6	20.0	29.4	29.6	25.8	25.9
2800	0.20	0.21	20.8	20.6	17.2	19.2	31.7	31.2	26.1	25.8
2850	0.20	0.21	20.8	20.6	17.2	18.8	33.9	34.0	26.4	26.0
2900	0.20	0.21	20.8	20.6	17.0	18.2	37.1	34.4	27.1	26.3
2950	0.20	0.21	20.8	20.6	16.9	18.0	40.1	35.3	27.9	26.7
3000	0.19	0.20	20.9	20.7	17.1	17.8	39.1	32.5	28.8	27.2
3050	0.20	0.21	20.9	20.7	17.1	18.1	37.5	31.4	30.5	28.1
3100	0.19	0.19	20.9	20.8	17.4	18.3	34.1	28.9	32.3	28.8
3150	0.21	0.21	21.0	20.8	17.7	18.9	32.6	28.0	35.5	30.2
3200	0.20	0.19	21.0	20.9	18.0	19.6	30.5	26.8	39.5	31.2
3250	0.21	0.21	21.1	21.0	18.6	20.5	29.2	26.3	42.0	32.4
3300	0.20	0.20	21.1	21.0	18.9	21.4	27.7	25.6	37.7	32.6
3350	0.23	0.22	21.1	21.0	19.2	22.2	26.6	24.8	33.6	31.7
3400	0.30	0.27	20.6	22.2	22.3	17.3	28.8	24.9	31.4	33.9
3450	0.23	0.23	21.2	21.1	22.6	27.2	25.5	24.6	29.1	29.4
3475	0.21	0.21	21.2	21.1	22.7	27.2	25.4	24.4	28.2	28.8
3500	0.21	0.21	21.2	21.1	22.6	27.2	25.3	24.3	27.5	28.3

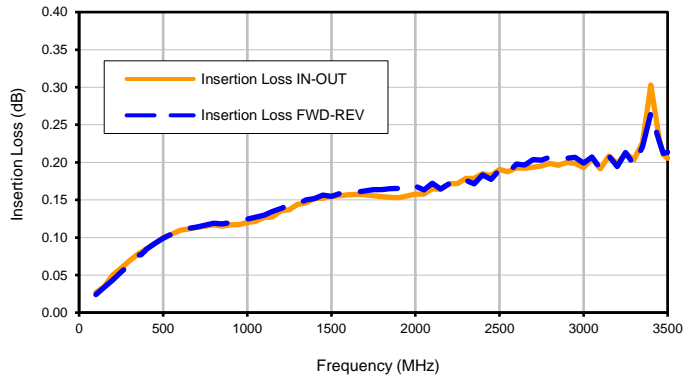
<sup>(1)</sup> Does not include coupling loss

# DC PASS Bi-Directional Coupler

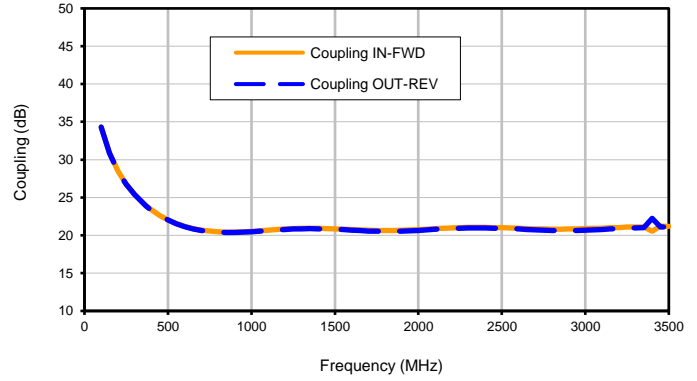
## ZGBDC20-33H-S+

### Typical Performance Curves

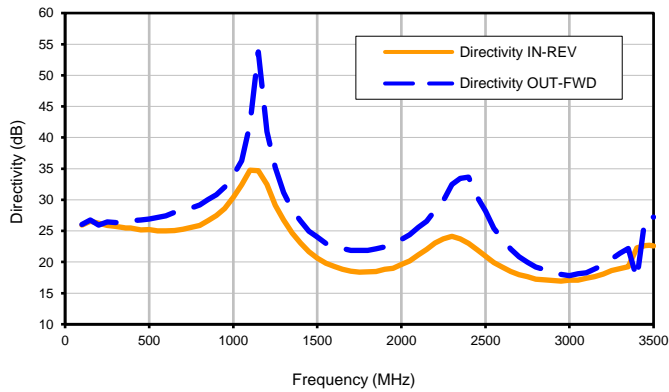
Insertion Loss



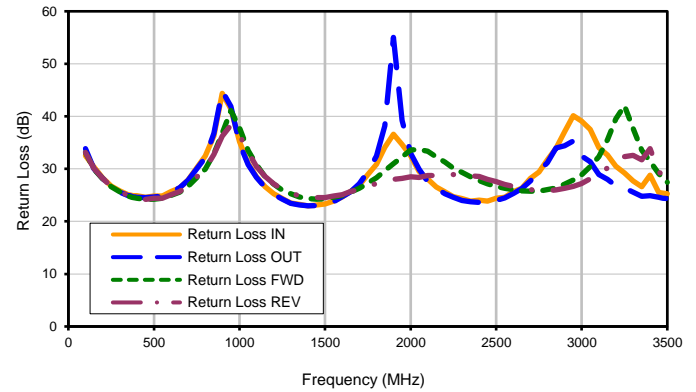
Coupling



Directivity



Return Loss

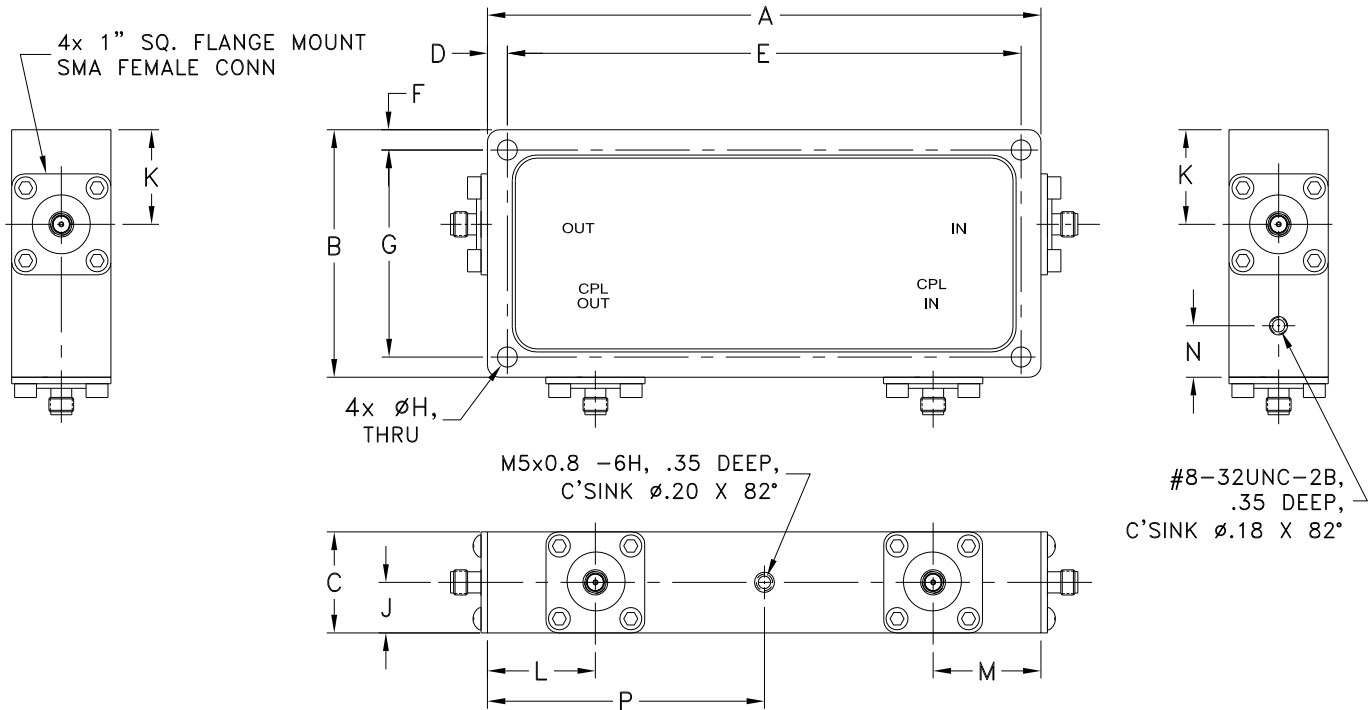


# Case Style

# HT

## Outline Dimensions

## HT1761-2



CASE #	A	B	C	D	E	F	G	H	J	K
HT1761-2	5.58 (141.73)	2.45 (62.23)	1.00 (25.40)	.20 (5.08)	5.175 (131.45)	.20 (5.08)	2.050 (52.07)	.200 (5.08)	.50 (12.70)	.94 (23.88)

CASE #	L	M	N	P	WT. GRAM
HT1761-2	1.09 (27.69)	1.09 (27.69)	.51 (12.95)	2.79 (70.87)	700.0

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

### Notes:

1. Case material: Aluminum alloy.
2. Case finish:

For RoHS Case Styles: Clear Chemical conversion coating, non-chrome or trivalent chrome based.

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ISO 9001 ISO 14001 CERTIFIED

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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	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Liquid Ingress	Immersion in 1 meter water, 1/2 hour	IP67, IEC60529
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Vibration (High Frequency)	20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	100g, 6ms sawtooth, 3 shocks each direction 3 axes (total 18)	MIL-STD-202, Method 213, Condition I