Coaxial Reflectionless

High Pass Filter

ZXHF Series

50Ω DC to 30 GHz

The Big Deal

- Patented design eliminates in band spurs
- Wideband performance up to 30 GHz

Product Overview

Mini-Circuits' ZXHF Series reflectionless filters employs a novel filter topology which absorbs and terminates stop band signals internally rather than reflecting them back to the source. Reflectionless filters eliminate stopband reflections, allowing them to be paired with sensitive devices and used in applications that otherwise require circuits such as isolation amplifiers or attenuators. This is developed in a new broadband, stable connectorized package.

Key Features

Feature	Advantages
Easy integration with sensitive reflective components, e.g. mixers, multipliers	Reflectionless filters absorb unwanted signals, preventing reflections back to the source. This reduces generation of additional unwanted signals without the need for extra components like attenuators, improving system dynamic range.
Cascadable	Reflectionless filters can be cascaded in multiple sections to provide sharper and higher attenuation, while also preventing any standing waves that could affect pass band signals.
Excellent stability over temperature	Minimal variation in electrical performance across temperature.
Operating temperature up to 105˚C	Suitable for operation close to high power components.
Broadband connectorized package	The connectorized package works well even in high frequencies and easy to interface with other devices. This is well suited for test setups.

Notes
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Coaxial Reflectionless

High Pass Filter

ZXHF-K143M+

50Ω 13900 to 19000 MHz

Generic photo used for illustration purposes only

CASE STYLE: UK3042

Connectors	Model
2.92mm-F	ZXHF-K143M+

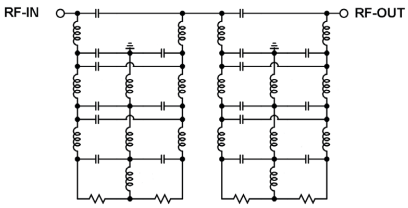
Features

- Match to 50Ω in the stop band, eliminates undesired reflections
- Cascadable
- Temperature stable, up to 105°C
- Protected by US Patent No. 8,392,495 ; 9,705,467, additional patent pending
- Protected by China Patent 201080014266.1
- Protected by Taiwan Patent I581494

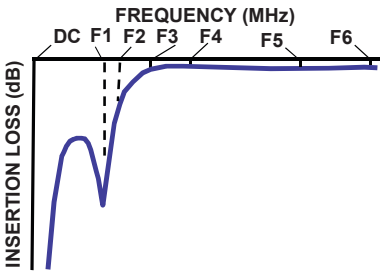
Applications

- Military/Defense
- Satellite communication
- Mobile
- Space research

Functional Schematic



Typical Frequency Response



+RoHS Compliant

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

Electrical Specifications at 25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Stop Band	Rejection	DC-F1	DC- 7000	24	27	-	dB
		F1-F2	7000 - 9000	21	24	-	dB
	Freq. Cut-Off	F3	11200	-	3.5	-	dB
	VSWR	DC-F1	DC- 7000	-	1.2	-	:1
		F1-F2	7000 - 9000		1.5	-	:1
Pass Band	Insertion Loss	F4-F5	13900 - 15000	-	2.2	3.0	dB
		F5-F6	15000 - 19000	-	2.0	4.0	dB
	VSWR	F4-F5	13900 - 15000	-	1.2	-	:1
		F5-F6	15000 - 19000	-	1.6	-	:1

Absolute Maximum Ratings[3]

Parameter	Ratings
Operating Temperature	-55°C to +105°C
Storage Temperature	-55°C to +105°C
RF Power Input, Passband (F4-F6)[1]	1W at 25°C
RF Power Input, Stopband (DC-F4)[2]	1.25W at 25°C

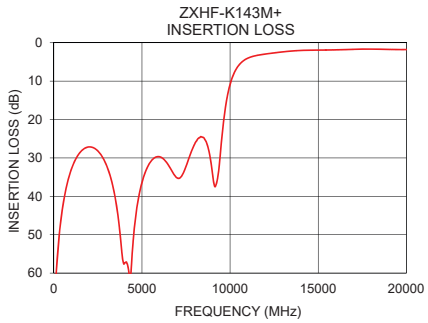
[1] Passband rating derates linearly to 0.5W at 105°C ambient
[2] Stopband rating derates linearly to 0.63W at 105°C ambient
[3] Permanent damage may occur if any of these limits are exceeded

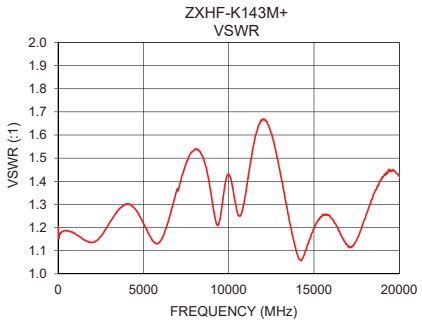
ESD rating

Human body model (HBM): Class 2(Pass 2000V) in accordance with ANSI/ESD 5.1-2001

Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)
1	69.00	1.18
100	62.85	1.17
500	42.86	1.19
3000	32.04	1.22
5000	36.44	1.22
7000	35.21	1.37
8000	26.31	1.54
9000	34.02	1.33
10000	10.84	1.43
10500	5.82	1.27
11200	3.67	1.45
13000	2.37	1.45
13500	2.14	1.25
13900	2.03	1.12
14000	2.01	1.09
14500	1.94	1.10
15000	1.92	1.20
17000	1.72	1.12
18000	1.65	1.24
19000	1.73	1.42





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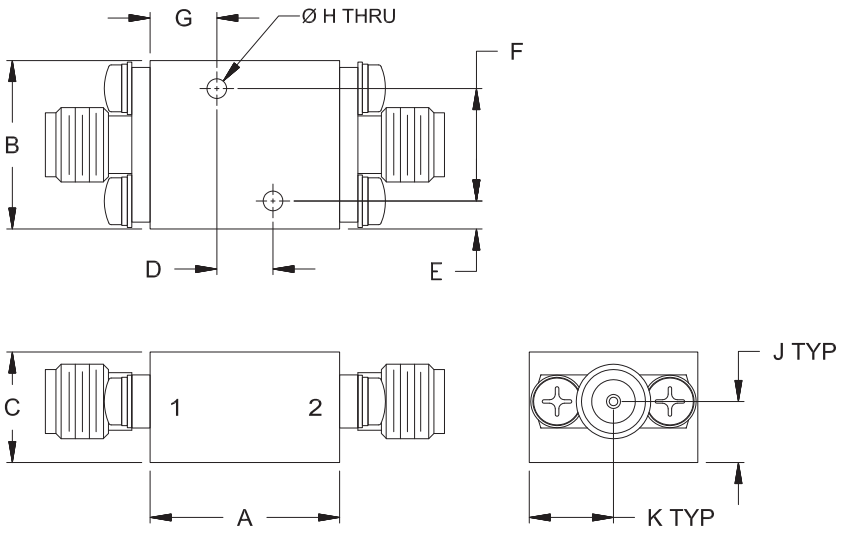
Coaxial Connections

PORT - 1	2.92mm-Female
PORT - 2	2.92mm-Female

Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	F
.68	**.60**	**.39**	**.200**	**.10**	**.400**
17.1	15.2	10.0	5.08	2.5	10.16

G	H	J	K		Wt.
.24	**.070**	**.22**	**.30**		grams
6.0	1.78	5.5	7.6		**24**

Note: Please refer to case style drawing for details

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Coaxial Reflectionless High Pass Filter ZXHF-K143M+

Typical Performance Data

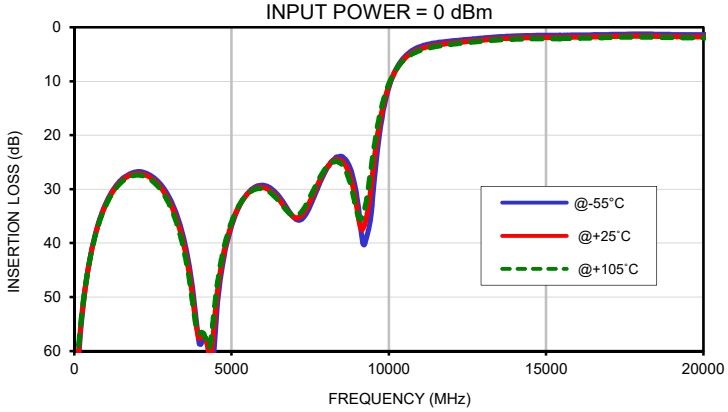
FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-55°C	@+25°C	@+105°C	@-55°C	@+25°C	@+105°C	@-55°C	@+25°C	@+105°C
1	73.43	69.00	65.82	23.21	21.74	20.59	23.40	21.91	20.74
50	69.84	66.65	64.18	24.61	22.90	21.53	24.39	22.67	21.35
100	64.56	62.85	61.26	23.50	22.14	20.94	23.44	22.02	20.84
400	46.26	46.22	46.13	22.64	21.37	20.28	22.65	21.43	20.36
500	42.81	42.86	42.88	22.63	21.39	20.32	22.74	21.47	20.40
600	40.01	40.13	40.20	22.66	21.40	20.38	22.89	21.62	20.57
750	36.68	36.84	36.96	22.82	21.60	20.59	23.18	21.91	20.88
800	35.74	35.92	36.05	22.76	21.57	20.53	23.31	22.04	21.03
1000	32.69	32.89	33.05	23.12	21.95	20.91	24.05	22.65	21.59
1200	30.46	30.69	30.87	23.68	22.39	21.39	24.98	23.44	22.37
1400	28.84	29.10	29.30	23.93	22.93	21.96	25.87	24.36	23.26
2000	26.77	27.13	27.40	24.51	23.97	23.43	25.31	25.25	24.80
2100	26.77	27.15	27.44	24.26	23.88	23.46	24.61	24.74	24.47
2200	26.88	27.26	27.56	24.37	23.55	23.27	24.30	24.02	23.88
2300	27.10	27.47	27.79	23.99	23.36	23.18	23.73	23.26	23.20
2400	27.37	27.78	28.12	23.15	22.92	22.84	22.60	22.49	22.49
2500	27.73	28.20	28.56	22.48	22.54	22.52	21.67	21.73	21.76
3000	31.31	32.04	32.58	19.83	20.12	20.12	18.38	18.57	18.57
3500	39.63	40.82	41.73	18.43	18.42	18.36	16.94	16.85	16.79
3800	50.14	51.74	52.67	17.80	17.85	17.76	16.46	16.48	16.40
4000	58.75	57.52	56.61	17.70	17.67	17.57	16.47	16.43	16.34
4100	57.92	57.13	56.73	17.69	17.64	17.53	16.61	16.50	16.40
4150	57.76	57.51	57.30	17.50	17.66	17.60	16.51	16.54	16.48
4200	57.95	58.23	58.10	17.74	17.67	17.57	16.80	16.63	16.52
4300	61.24	61.17	59.26	17.90	17.79	17.69	17.05	16.81	16.71
5000	36.85	36.44	36.08	20.17	20.19	20.21	20.10	19.90	19.85
5100	35.14	34.89	34.63	20.73	20.74	20.77	20.92	20.61	20.55
5200	33.73	33.59	33.42	21.28	21.25	21.29	21.80	21.33	21.26
5300	32.56	32.53	32.44	22.09	21.93	21.97	22.72	22.05	21.95
5400	31.60	31.65	31.63	22.99	22.55	22.60	23.47	22.69	22.54
5500	30.82	30.94	30.98	23.70	23.30	23.34	24.05	23.25	23.04
5600	30.21	30.39	30.48	24.05	23.76	23.75	24.27	23.65	23.36
5700	29.77	30.01	30.15	24.44	24.14	24.06	24.34	23.76	23.40
5800	29.46	29.77	29.95	24.60	24.26	24.09	24.28	23.55	23.15
5900	29.31	29.67	29.90	24.74	24.07	23.81	24.03	23.11	22.67
6000	29.27	29.69	29.96	24.33	23.53	23.21	23.54	22.52	22.06
6100	29.40	29.86	30.17	23.72	22.94	22.61	22.83	21.85	21.41
6200	29.66	30.19	30.51	22.92	22.12	21.77	22.03	21.11	20.68
6300	30.07	30.63	30.98	21.90	21.15	20.81	21.24	20.42	20.03
7000	35.36	35.21	34.92	16.45	16.19	16.04	17.37	17.00	16.88
8000	26.55	26.31	26.11	13.17	13.50	13.54	15.53	15.95	16.10
8500	23.93	24.73	25.36	13.48	13.96	14.10	15.96	16.56	16.80
9000	31.91	34.02	34.55	15.99	17.02	17.40	18.03	19.29	20.06
10000	11.20	10.84	10.49	14.36	15.01	15.26	17.30	17.88	18.16
11200	3.21	3.67	3.94	14.88	14.78	14.22	15.84	15.61	15.07
13000	1.99	2.37	2.57	13.71	14.79	15.56	13.33	14.31	14.95
13900	1.63	2.03	2.25	22.80	25.15	26.15	17.65	18.33	18.22
14000	1.61	2.01	2.22	24.98	27.49	27.39	17.94	18.48	18.15
14100	1.59	1.99	2.21	27.63	29.74	27.74	18.12	18.40	17.92
14200	1.57	1.97	2.19	31.45	30.70	27.16	18.19	18.32	17.71
14300	1.55	1.95	2.18	36.76	30.36	26.22	18.19	18.05	17.35
14400	1.53	1.95	2.17	40.44	28.47	24.78	18.05	17.73	16.99
14500	1.52	1.94	2.16	34.20	26.44	23.48	17.75	17.33	16.59
14600	1.51	1.93	2.15	30.69	24.75	22.34	17.49	16.94	16.21
15000	1.50	1.92	2.14	23.53	20.88	19.62	16.24	15.62	15.00
15500	1.46	1.89	2.10	20.23	18.88	18.22	15.45	14.77	14.38
16000	1.43	1.84	2.05	20.22	19.38	19.01	15.62	15.16	14.93
17000	1.34	1.72	1.91	26.14	25.04	23.78	21.52	21.55	21.29
18000	1.26	1.65	1.82	19.03	19.43	20.04	23.51	24.32	26.69
19000	1.34	1.73	1.90	14.05	15.24	16.28	14.65	15.72	16.72

Typical Performance Data

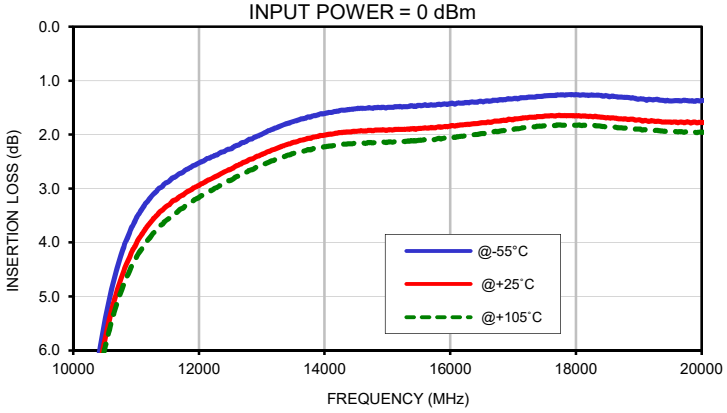
FREQ. (MHz)	GROUP DELAY (nsec)		
	@-55°C	@+25°C	@+105°C
13900	0.21	0.21	0.21
14000	0.21	0.21	0.21
14100	0.21	0.21	0.21
14200	0.21	0.21	0.21
14300	0.21	0.21	0.21
14400	0.21	0.21	0.21
14500	0.21	0.21	0.21
14600	0.21	0.21	0.21
14700	0.21	0.21	0.21
14800	0.21	0.20	0.21
14900	0.21	0.20	0.20
15000	0.21	0.20	0.20
15100	0.20	0.20	0.20
15200	0.20	0.20	0.20
15300	0.20	0.20	0.20
15400	0.20	0.20	0.20
15500	0.20	0.20	0.20
15600	0.20	0.20	0.20
15700	0.20	0.20	0.20
15800	0.20	0.20	0.20
15900	0.20	0.20	0.20
16000	0.20	0.20	0.20
16100	0.20	0.20	0.20
16200	0.20	0.20	0.20
16300	0.20	0.20	0.20
16400	0.20	0.20	0.20
16500	0.20	0.20	0.20
16600	0.20	0.20	0.20
16700	0.20	0.20	0.20
16800	0.20	0.19	0.20
16900	0.20	0.19	0.20
17000	0.20	0.19	0.20
17100	0.20	0.20	0.20
17200	0.19	0.19	0.20
17300	0.19	0.19	0.20
17400	0.19	0.20	0.20
17500	0.19	0.19	0.20
17600	0.19	0.19	0.20
17700	0.19	0.19	0.20
17800	0.19	0.19	0.20
17900	0.19	0.19	0.20
18000	0.19	0.19	0.20
18100	0.19	0.19	0.20
18200	0.19	0.19	0.19
18300	0.19	0.19	0.19
18400	0.19	0.19	0.19
18500	0.19	0.19	0.19
18600	0.19	0.19	0.19
18700	0.19	0.19	0.19
18800	0.19	0.19	0.19
19000	0.19	0.19	0.19

Typical Performance Curves

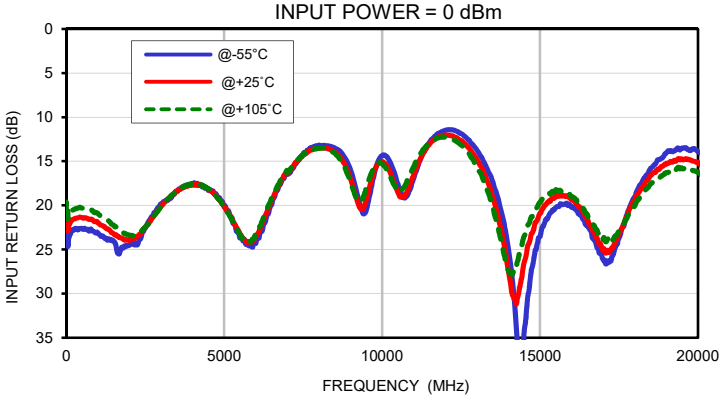
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



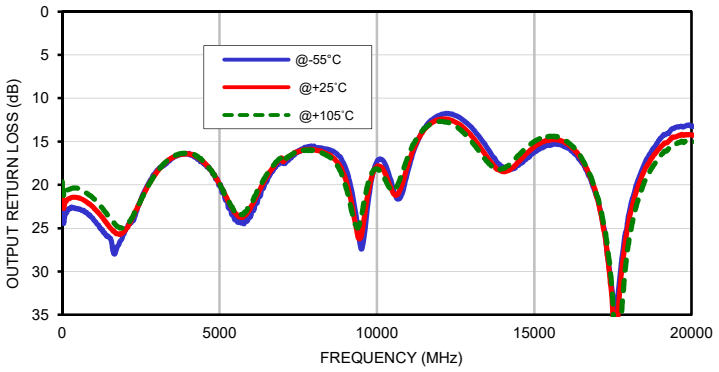
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



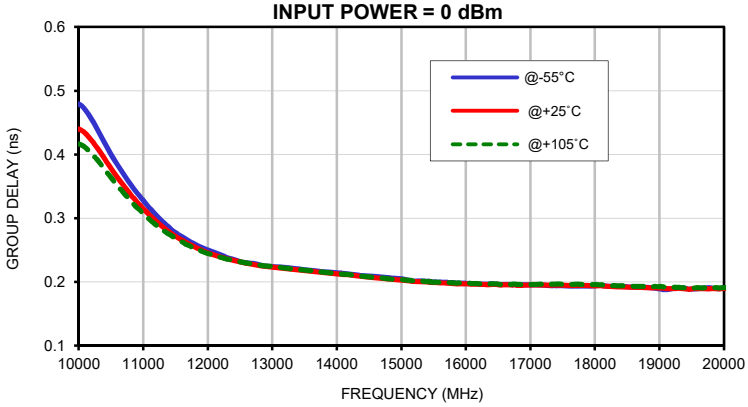
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



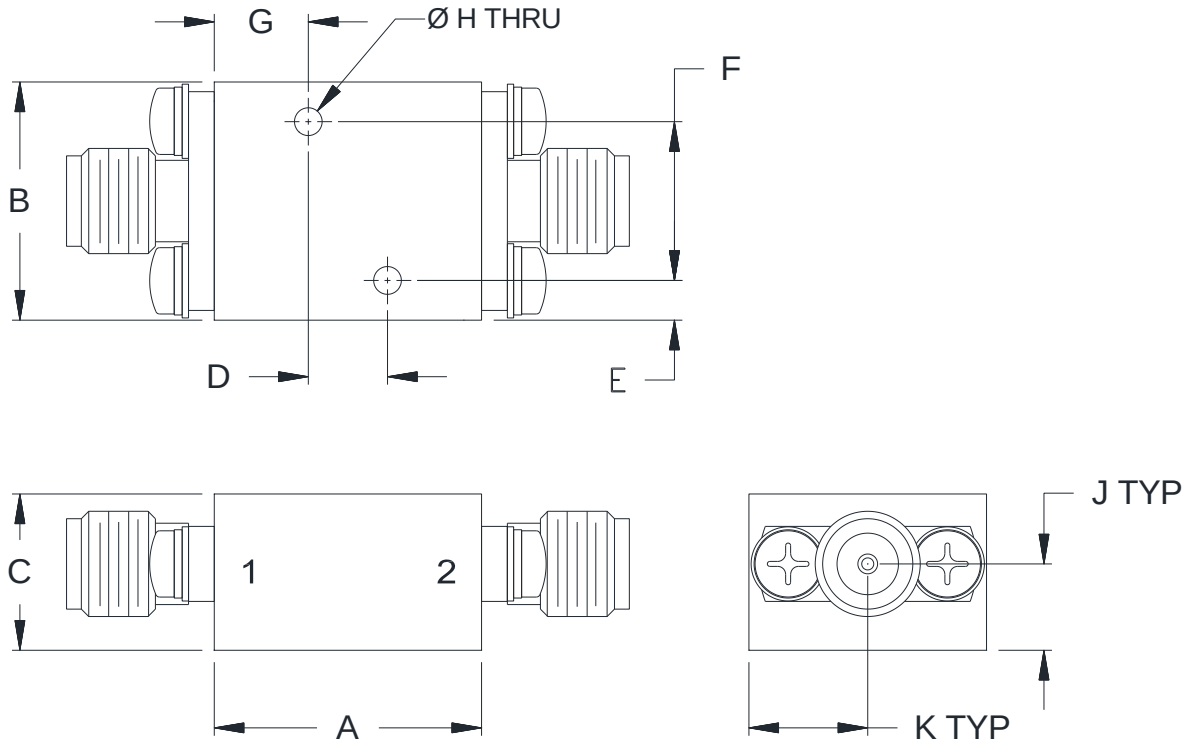
GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm



Case Style UK

Outline Dimensions

UK3042



CASE#	A	B	C	D	E	F
UK3042	.68 (17.1)	.60 (15.2)	.39 (10.0)	.200 (5.08)	.10 (2.5)	.400 (10.16)

CASE#	G	H	J	K	WT.GRAMS
UK3042	.24 (6.0)	.070 (1.78)	.22 (5.5)	.30 (7.6)	24

Dimensions are in inches (mm). Tolerances: 2 Pl. ± .050; 3 Pl. ± .015

Notes:

1. Case material: Brass alloy.
2. Case Finish:
   a. Case & Cover of the units –Gold plating.
3. Refer to the individual model data sheet for the type of connectors available.

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RF/IF MICROWAVE COMPONENTS

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Mini-Circuits

Environmental Specifications ENV002

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 105°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 105°C Ambient Environment	Individual Model Data Sheet

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