

Coaxial Reflectionless High Pass Filter

ZXHF Series

50Ω

DC to 20 GHz

The Big Deal

- Patented design terminates stopband signal internally
- Wideband performance upto 20 GHz
- Small In-line package size of 0.80" x 0.56"



CASE STYLE: RA2937

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	Ensures minimal variation in electrical performance across temperature.
Wide Operating temperature from -40 to +85°C.	Suitable for use in wide temperature range applications
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.



Coaxial Reflectionless High Pass Filter

50Ω 6.6 to 16 GHz

ZXHF-K652M+



Generic photo used for illustration purposes only

CASE STYLE: RA2937

Connectors	Model
2.92mm-F to 2.92mm-M	ZXHF-K652M+

+RoHS Compliant

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

Features

- Match to 50Ω in the stop band, eliminates undesired reflections
- Cascadable
- Temperature stable, up to 85°C
- Protected by US Patent No. 8,392,495

Applications

- Microwave Radio
- Military & Space

Electrical Specifications at 25°C

Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Stop Band	Rejection	DC-F'	DC - 4000	22	34	dB
		F'-F1	4000 - 5000	20	30	dB
	Freq. Cut-Off	F2	6150	-	3.0	dB
	VSWR	DC-F'	DC - 4000	-	1.2	:1
Pass Band		F'-F1	4000 - 5000	-	1.3	:1
	Insertion Loss	F3-F5	6600 - 16000	-	1.5	dB
	VSWR	F3-F5	6600 - 16000	-	1.3	:1

Absolute Maximum Ratings³

Parameter	Ratings
Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +100°C
RF Power Input, Passband (F3-F5) ¹	1.3W at 25°C
RF Power Input, Stopband (DC-F3) ²	1.6W at 25°C

¹ Passband rating derates linearly to 0.6W at 85°C ambient

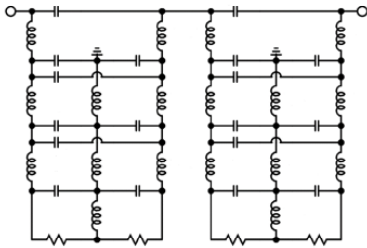
² Stopband rating derates linearly to 0.8W at 85°C ambient

³ Permanent damage may occur if any of these limits are exceeded

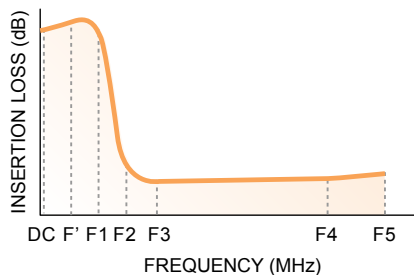
ESD rating

Human Body Model (HBM): Class 2 (Pass 2000V) in accordance with ANSI/ESD STM 5.1 - 2001

Functional Schematic

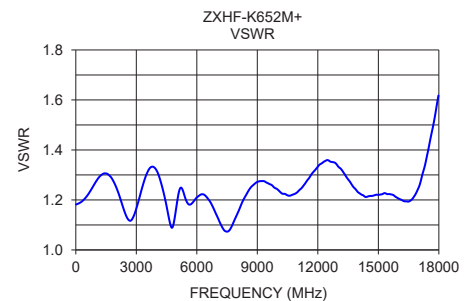
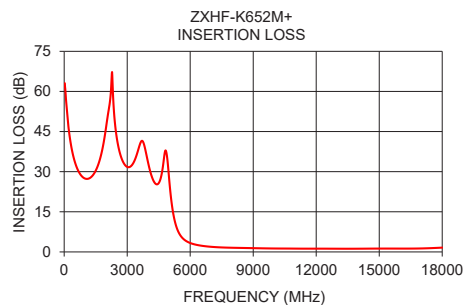


Typical Frequency Response



Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)
10	63.86	1.18
100	55.69	1.18
500	33.88	1.21
1000	27.41	1.27
1500	30.37	1.31
2000	46.89	1.25
2400	49.56	1.16
3000	31.79	1.17
3800	40.22	1.33
4500	25.72	1.18
5500	6.59	1.19
7000	1.91	1.14
8500	1.48	1.23
10000	1.29	1.24
11500	1.22	1.28
13000	1.20	1.33
14500	1.23	1.21
16000	1.25	1.21
18000	1.61	1.63



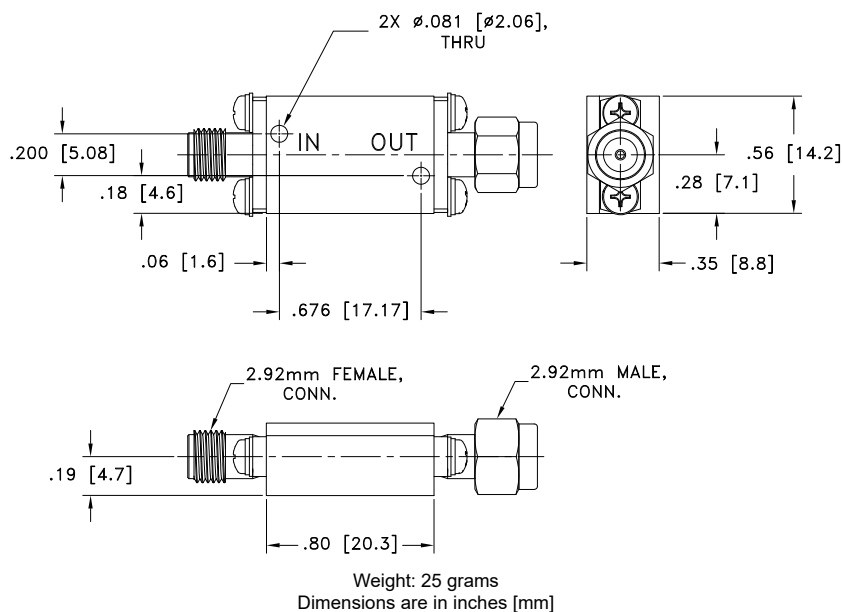
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REV. OR
ECO-004178
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Coaxial Connections

PORT - IN	2.92mm-Fem
PORT - OUT	2.92mm-Male

Outline Drawing



Additional Notes

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- 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

Coaxial Reflectionless High Pass Filter

ZXHF-K652M+

Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS (dB)			INPUT RETURN LOSS (dB)			OUTPUT RETURN LOSS (dB)		
	@ -40°C	@ +25°C	@ +85°C	@ -40°C	@ +25°C	@ +85°C	@ -40°C	@ +25°C	@ +85°C
10	67.93	63.86	62.62	23.10	21.58	20.67	23.05	21.55	20.64
50	62.97	61.06	59.53	22.98	21.53	20.64	22.90	21.45	20.56
100	56.57	55.69	55.07	22.77	21.47	20.63	22.71	21.35	20.49
200	47.20	47.00	46.86	22.42	21.30	20.53	22.29	21.09	20.29
300	41.11	41.15	41.13	22.26	21.07	20.31	21.87	20.77	20.03
400	36.83	36.95	37.04	21.96	20.78	20.06	21.50	20.42	19.72
500	33.72	33.88	33.98	21.50	20.44	19.77	21.12	20.05	19.40
600	31.39	31.58	31.71	21.05	20.05	19.45	20.68	19.67	19.07
700	29.67	29.89	30.03	20.58	19.63	19.07	20.17	19.26	18.73
800	28.43	28.67	28.83	20.04	19.20	18.70	19.66	18.88	18.40
900	27.61	27.86	28.03	19.50	18.78	18.36	19.22	18.55	18.12
1000	27.14	27.41	27.60	19.04	18.40	18.04	18.84	18.25	17.86
1200	27.23	27.54	27.75	18.32	17.82	17.51	18.41	17.92	17.60
1400	28.67	29.04	29.28	17.89	17.55	17.30	18.31	17.95	17.67
1600	31.74	32.19	32.49	17.87	17.63	17.41	18.63	18.36	18.11
1800	37.15	37.72	38.08	18.25	18.10	17.87	19.48	19.20	18.95
2000	46.35	46.89	47.18	19.16	19.04	18.82	20.81	20.49	20.25
2200	57.12	57.67	57.88	20.69	20.56	20.32	22.92	22.55	22.26
2400	50.95	49.56	48.72	22.95	22.76	22.48	25.99	25.41	25.04
2600	39.00	38.64	38.42	25.09	24.83	24.47	29.50	28.49	27.96
2800	33.76	33.73	33.71	24.88	24.68	24.36	28.80	27.88	27.45
3000	31.62	31.79	31.91	22.47	22.35	22.13	25.19	24.63	24.37
3200	31.88	32.23	32.44	20.16	19.99	19.88	22.28	21.88	21.69
3400	34.64	35.12	35.40	18.47	18.25	18.20	20.36	20.07	19.92
3600	39.94	40.09	40.08	17.49	17.24	17.22	19.27	19.09	18.96
3800	41.44	40.22	39.45	17.19	16.91	16.91	18.98	18.89	18.78
4000	34.11	33.22	32.70	17.56	17.24	17.22	19.47	19.47	19.38
4200	27.83	27.57	27.42	18.66	18.33	18.32	20.81	20.89	20.83
4400	24.99	25.28	25.48	20.59	20.33	20.26	23.24	23.42	23.45
4600	26.70	27.68	28.29	24.33	24.05	23.85	27.67	28.24	28.59
5000	30.29	27.09	25.37	23.14	21.68	21.13	30.05	28.97	28.19
5200	14.75	14.04	13.62	19.37	19.12	18.92	25.98	25.65	25.50
5400	8.18	8.18	8.17	20.41	20.28	19.95	27.61	26.70	26.24
5600	5.29	5.48	5.59	22.29	21.56	20.85	26.94	25.49	24.80
5800	3.88	4.12	4.25	22.08	21.23	20.52	24.17	23.52	23.06
6000	3.10	3.33	3.47	20.88	20.45	19.85	22.46	22.49	22.23
6150	2.74	2.97	3.10	20.35	20.13	19.65	21.95	22.29	22.19
6200	2.61	2.84	2.97	20.16	20.02	19.58	21.84	22.30	22.26
6400	2.28	2.50	2.62	20.05	20.12	19.79	22.20	23.01	23.22
6600	2.04	2.25	2.37	20.74	20.84	20.59	23.44	24.37	24.87
6800	1.86	2.06	2.17	22.05	22.06	21.91	25.19	25.92	26.54
7000	1.72	1.91	2.02	24.16	23.93	23.77	25.79	25.81	25.75
7200	1.61	1.80	1.91	27.33	26.44	26.10	24.15	23.69	23.05
7400	1.53	1.71	1.82	31.11	28.77	27.72	21.71	21.16	20.43
7600	1.47	1.65	1.75	31.93	28.59	27.21	19.64	19.06	18.38
7800	1.42	1.60	1.70	28.32	25.89	24.90	18.16	17.52	16.94
8000	1.38	1.56	1.66	25.27	23.52	22.95	17.04	16.38	15.90
8200	1.35	1.53	1.62	23.16	21.61	21.26	16.34	15.60	15.22
8400	1.32	1.50	1.59	21.71	20.31	20.11	15.95	15.14	14.85
8600	1.29	1.47	1.56	20.55	19.35	19.16	15.86	15.01	14.77
8800	1.26	1.44	1.53	19.90	18.79	18.61	16.00	15.11	14.91
9000	1.24	1.41	1.50	19.30	18.44	18.20	16.32	15.45	15.25
9200	1.21	1.38	1.47	19.02	18.34	18.01	16.83	16.00	15.79
9400	1.19	1.35	1.44	18.78	18.43	17.99	17.45	16.78	16.50
9600	1.17	1.32	1.41	18.82	18.68	18.12	18.26	17.73	17.37
9800	1.15	1.30	1.39	18.98	19.01	18.45	19.16	18.83	18.40
10000	1.13	1.29	1.37	19.24	19.33	18.78	20.18	20.04	19.53
10500	1.11	1.26	1.34	20.56	20.14	20.08	23.76	23.93	23.45
11000	1.09	1.24	1.31	20.31	19.65	19.82	25.85	25.37	25.48
11500	1.07	1.22	1.30	18.32	18.19	18.03	21.66	21.56	21.49
12000	1.07	1.22	1.30	16.56	16.90	16.58	18.21	18.65	18.42
12500	1.07	1.22	1.30	15.70	16.35	16.34	16.59	17.20	17.20
13000	1.04	1.20	1.27	16.54	16.87	17.61	16.62	16.81	17.36
13500	1.03	1.19	1.26	17.59	18.15	19.46	16.07	16.44	17.04
14000	1.05	1.20	1.29	18.35	19.72	20.62	14.66	15.46	15.53
14500	1.08	1.23	1.33	18.54	20.29	20.15	13.73	14.46	14.24
15000	1.09	1.25	1.34	19.01	20.06	19.99	14.64	14.77	14.72
15500	1.07	1.25	1.34	20.02	19.96	20.46	17.59	17.10	17.45
16000	1.05	1.25	1.33	21.39	20.61	21.50	23.38	22.86	24.20
16500	1.04	1.25	1.34	22.36	21.09	22.02	21.63	21.72	22.41
17000	1.07	1.30	1.40	20.93	19.09	19.47	16.19	15.59	15.83
17500	1.17	1.43	1.54	16.14	15.38	15.34	13.42	12.78	12.87
18000	1.33	1.61	1.74	12.68	12.45	12.24	12.24	11.58	11.54



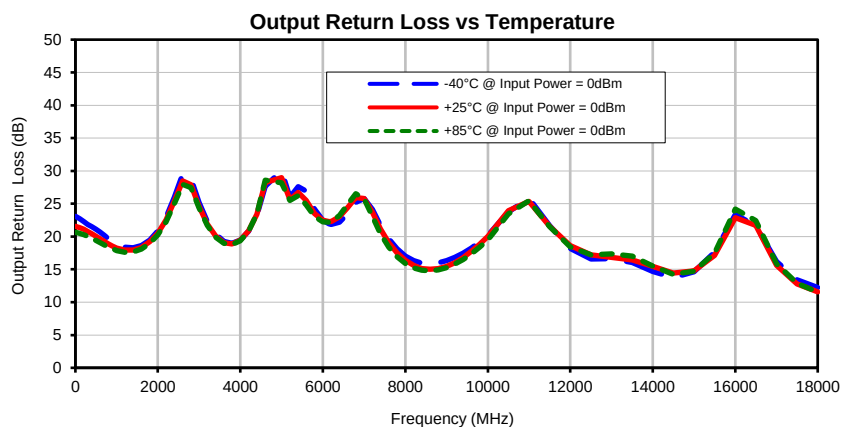
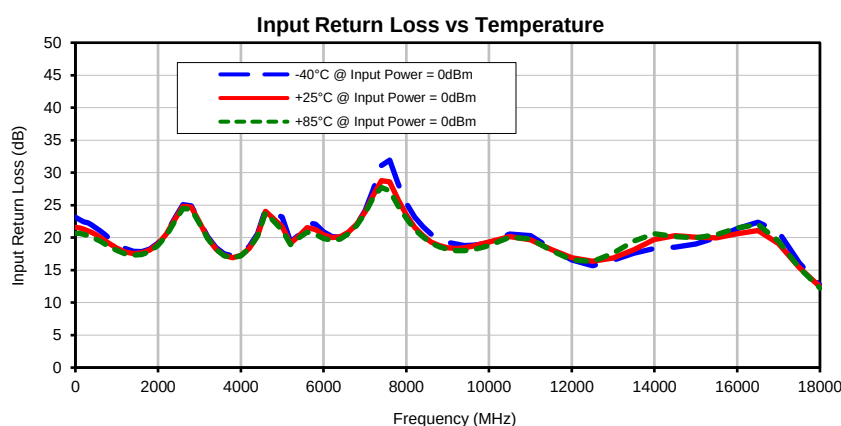
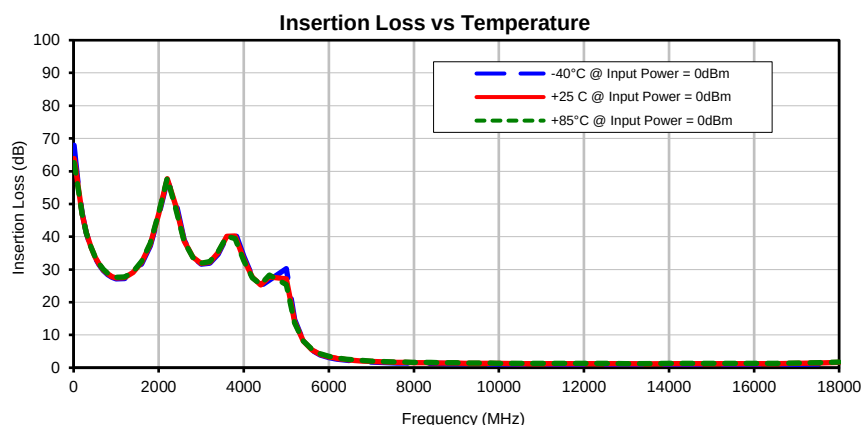
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IF/RF MICROWAVE COMPONENTS

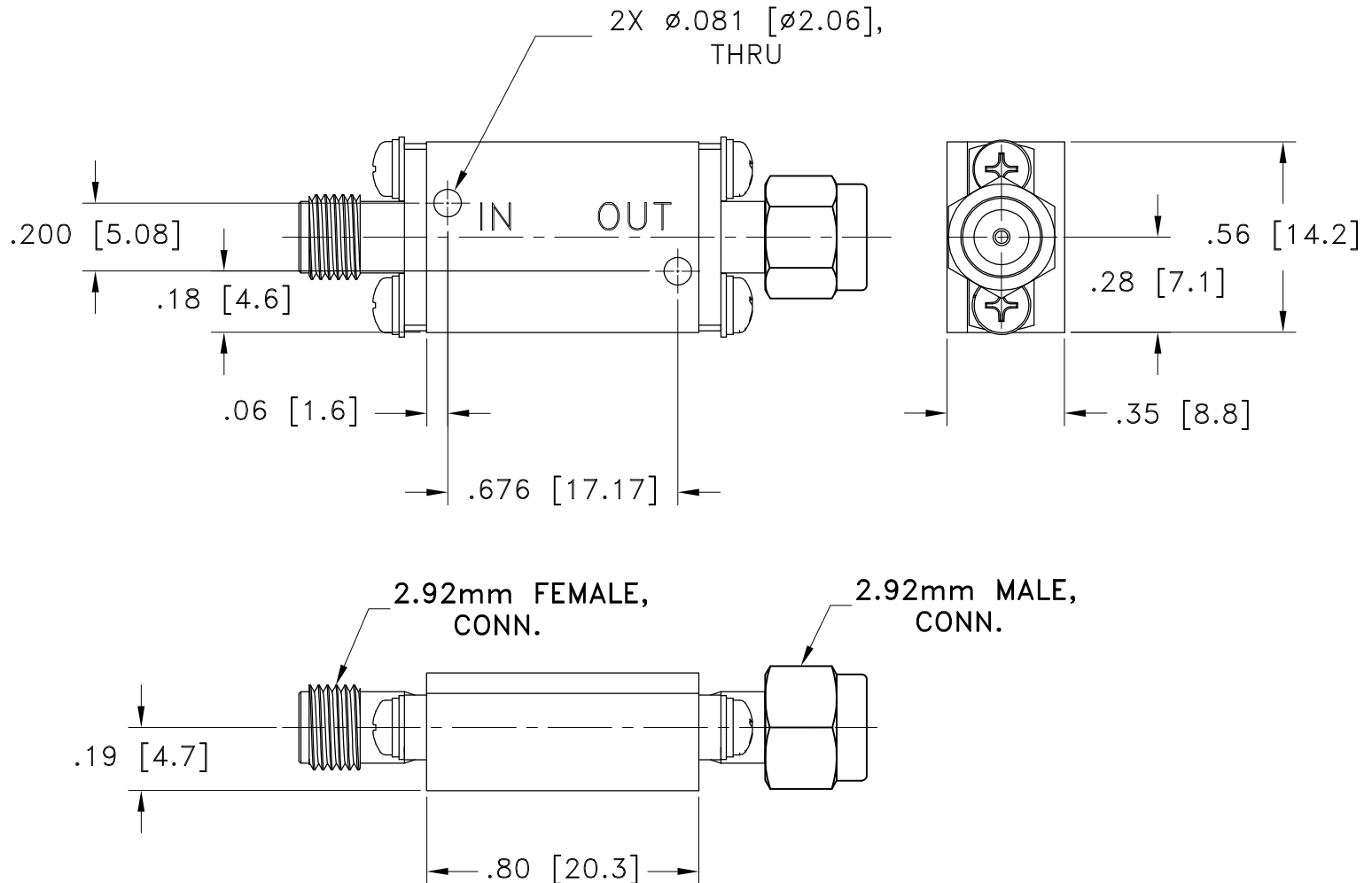
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Typical Performance Curves



Outline Dimensions

RA2937



Weight: 25 grams

Dimensions are in inches (mm). Tolerances: 2 Pl. $\pm$.015; 3 Pl. $\pm$.005

Notes:

1. Case material: Brass.
2. Case Finish: Gold plate.

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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	-40° to 85° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C