

Cavity Bandpass Filters

50Ω DC to 15 GHz



The Big Deal

- Very low insertion loss with excellent power handling
- Very fast roll-off with wide stopband
- Passbands up to 15 GHz
- Stopbands up to 20 GHz

Product Overview

Mini-Circuits' cavity filters are designed by implementing resonant structures with very high Q and are ideal for narrow-band, high-selectivity applications. These designs can provide bandwidths as narrow as 1% with very high selectivity and excellent low noise floor. Low insertion loss combined with excellent power handling makes them well-suited for transmitter and receiver front end. Advanced filter design and construction enables stopband width greater than 3x the center frequency.

Mini-Circuits' cavity filters feature a special protective assembly to prevent accidental de-tuning that would otherwise require expensive replacement or return to factory for re-tuning. Precise machining allows realization of cavity filters with small form factors for applications where size is critical. Excellent repeatability across units is achieved through precise tuning and process control.

Key Features

Feature	Advantages
Low insertion loss	Low signal loss results in better SNR in receiver front end and better power delivery to antenna in transmitter
Fast roll-off	Higher selectivity results in better adjacent channel rejection and dynamic range
Wide stopband	Wide spur free band results in better receiver sensitivity
High power handling	Well suited for transmitter application
Protective assembly	Prevents accidental de-tuning of precisely tuned resonant circuit

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



Cavity Bandpass Filter

ZVBP-9R6G-S+

50Ω 9550 to 9650 MHz



Generic photo used for illustration purposes only

CASE STYLE: UA2888

Connectors Model
SMA-F ZVBP-9R6G-S+

Features

- Low Insertion loss, 1.1 dB typ.
- Small connectorized package
- Broad stopband performance up to 20 GHz

Applications

- Test and measurements
- Lab use

Electrical Specifications at 25°C

Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Unit	
Pass Band	Center Frequency	-	-	9600	-	MHz	
	Insertion Loss	F1-F2	9550 - 9650	-	1.1	2.0	dB
	VSWR	F1-F2	9550 - 9650	-	1.24	1.5	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC - 9000	40	48	-	dB
		F3-F4	9000 - 9300	25	30	-	dB
	VSWR	DC-F4	DC - 9300	-	30	-	:1
Stop Band, Upper	Insertion Loss	F5-F6	9900 - 10200	25	33	-	dB
		F6-F7	10200 - 16000	40	52	-	dB
		F8-F9	18000 - 20400	30	46	-	dB
	VSWR	F5-F9	9900 - 20400	-	20	-	:1

Maximum Ratings

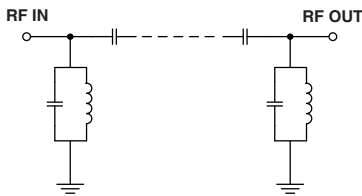
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	1 W Max.

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

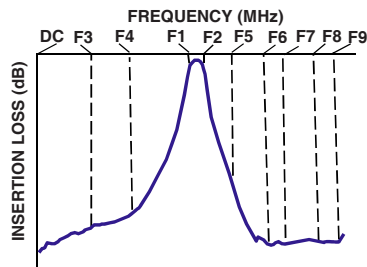
Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
100	86.58	801.33	9550	4.18
900	97.10	207.69	9555	4.04
1000	93.39	213.12	9560	3.93
3000	90.78	393.19	9565	3.85
4000	91.97	266.33	9570	3.79
9000	48.62	73.60	9575	3.76
9300	31.57	65.10	9580	3.73
9400	21.07	46.25	9585	3.72
9502	3.85	4.22	9590	3.72
9550	0.92	1.11	9595	3.72
9600	0.84	1.05	9600	3.73
9650	0.99	1.04	9605	3.74
9683	3.14	3.20	9610	3.76
9772	20.01	33.73	9615	3.79
9850	30.29	49.74	9620	3.83
9900	35.36	55.01	9625	3.89
10200	55.28	69.29	9630	3.97
16000	80.05	63.37	9635	4.08
18000	80.71	57.34	9640	4.22
20400	66.23	70.14	9650	4.61

Functional Schematic

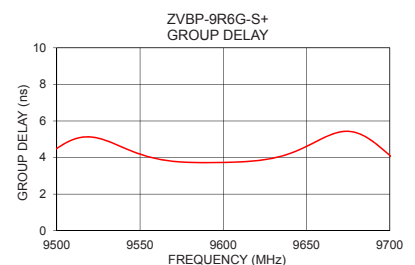
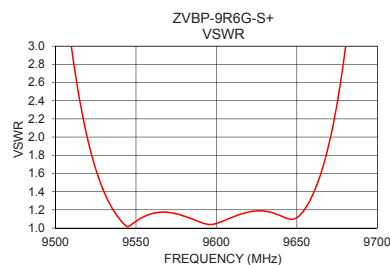
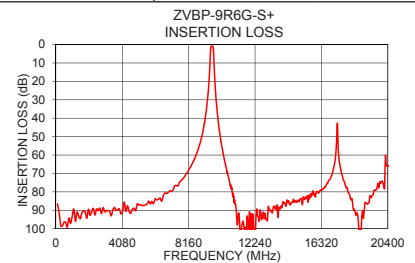
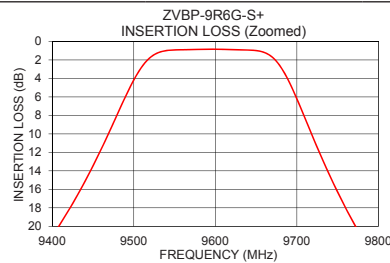


Typical Frequency Response



+RoHS Compliant

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



Notes

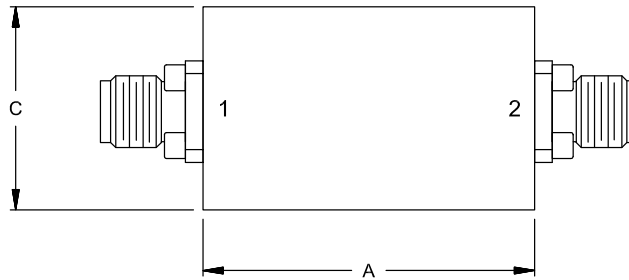
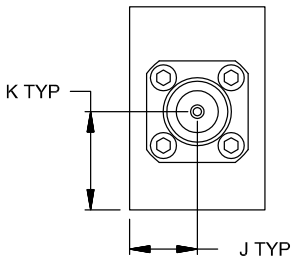
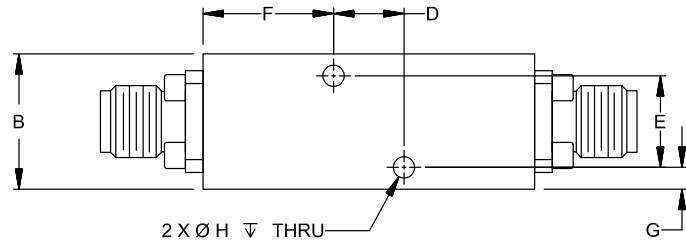
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Coaxial Connections

PORT 1	SMA-FEMALE
PORT 2	SMA-FEMALE

Outline Drawing



Outline Dimensions ($\frac{\text{inch}}{\text{mm}}$)

A	B	C	D	E	F
1.22	.50	.75	.260	.338	.48
31.1	12.7	19.1	6.60	8.59	12.2
G	H	J	K	Wt.	
.08	.079	.25	.36	grams	
2.1	2.00	6.4	9.2	57	

Note: Please refer to case style drawing for details

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Typical Performance Data

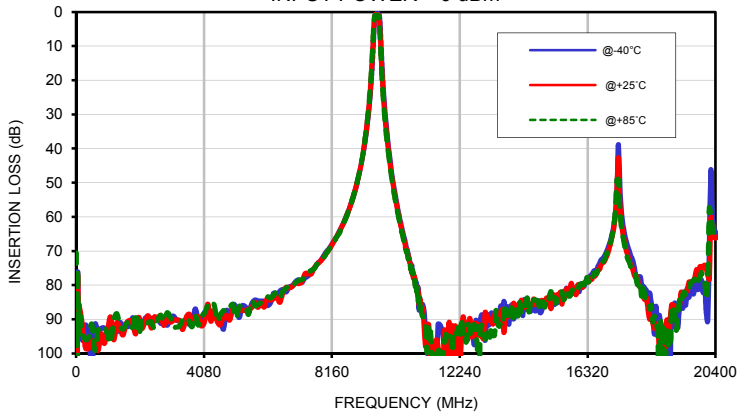
FREQ. (MHz)	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
100	86.73	86.58	85.83	0.01	0.01	0.02	0.02	0.02	0.03
200	96.14	91.60	94.29	0.04	0.04	0.04	0.04	0.05	0.05
300	91.70	98.48	96.00	0.05	0.05	0.06	0.05	0.07	0.07
400	93.53	98.54	95.36	0.06	0.06	0.07	0.06	0.08	0.08
500	103.94	96.41	91.42	0.05	0.07	0.07	0.06	0.08	0.09
600	91.55	96.63	99.17	0.06	0.07	0.08	0.05	0.09	0.09
700	93.92	99.16	93.21	0.06	0.07	0.08	0.05	0.09	0.09
800	92.68	94.24	92.17	0.05	0.07	0.08	0.05	0.09	0.09
1000	93.33	93.39	94.51	0.04	0.07	0.07	0.04	0.08	0.09
1000	93.33	93.39	94.51	0.04	0.07	0.07	0.04	0.08	0.09
1500	92.21	94.58	92.89	0.01	0.05	0.07	0.01	0.06	0.07
2000	90.79	89.46	94.50	0.02	0.04	0.06	0.02	0.05	0.06
2500	90.52	89.28	92.77	0.04	0.03	0.07	0.05	0.04	0.07
3000	90.36	90.78	89.26	0.05	0.03	0.09	0.06	0.04	0.08
3500	90.95	89.73	91.21	0.05	0.04	0.11	0.07	0.05	0.09
4000	89.94	91.97	89.25	0.05	0.06	0.13	0.06	0.07	0.12
4500	89.93	90.61	90.47	0.04	0.07	0.15	0.04	0.09	0.15
5000	85.73	86.55	85.76	0.02	0.09	0.17	0.02	0.11	0.18
5800	84.66	86.52	85.72	0.00	0.12	0.20	0.01	0.15	0.21
6000	84.79	86.44	84.53	0.01	0.13	0.21	0.00	0.15	0.22
6200	85.26	84.40	83.78	0.01	0.14	0.22	0.02	0.16	0.24
6400	83.51	83.35	81.76	0.02	0.14	0.22	0.02	0.18	0.25
6600	81.28	82.14	81.73	0.03	0.15	0.23	0.03	0.18	0.25
6800	80.56	80.85	79.95	0.03	0.15	0.24	0.03	0.18	0.26
7000	79.01	79.41	79.37	0.04	0.16	0.24	0.04	0.20	0.27
7200	79.30	79.06	78.45	0.05	0.17	0.25	0.04	0.20	0.27
7400	77.30	76.60	76.42	0.04	0.17	0.26	0.04	0.21	0.28
7600	75.03	74.82	75.15	0.05	0.18	0.26	0.04	0.22	0.29
7800	72.82	72.95	72.93	0.05	0.18	0.27	0.04	0.22	0.29
8000	70.04	70.41	70.46	0.06	0.19	0.27	0.04	0.21	0.29
8200	67.42	67.54	67.92	0.06	0.19	0.27	0.04	0.22	0.29
8400	64.18	64.25	64.68	0.06	0.20	0.28	0.04	0.22	0.29
8600	60.35	60.38	60.47	0.05	0.20	0.28	0.03	0.22	0.30
8800	55.32	55.34	55.32	0.06	0.20	0.30	0.02	0.22	0.30
9000	48.70	48.62	48.55	0.05	0.21	0.29	0.03	0.24	0.31
9200	39.09	38.78	38.52	0.07	0.23	0.32	0.02	0.25	0.30
9300	32.13	31.57	31.09	0.08	0.26	0.35	0.04	0.27	0.32
9400	22.12	21.07	20.18	0.14	0.38	0.47	0.12	0.38	0.44
9502	5.41	3.85	2.81	2.34	4.19	6.30	2.35	4.19	6.18
9550	0.75	0.92	1.02	24.76	28.97	22.00	22.92	25.34	20.56
9600	0.61	0.84	0.97	27.04	32.26	26.18	27.51	32.66	26.62
9650	0.66	0.99	1.23	25.98	25.38	18.16	26.04	34.52	20.05
9683	1.64	3.14	4.57	8.48	5.27	3.69	9.05	5.61	3.95
9772	17.98	20.01	21.47	0.30	0.41	0.48	0.35	0.52	0.57
9850	28.83	30.29	31.40	0.13	0.28	0.38	0.12	0.35	0.42
9900	34.10	35.36	36.31	0.10	0.25	0.37	0.08	0.32	0.39
10000	42.47	43.46	44.28	0.07	0.23	0.34	0.04	0.28	0.36
10200	54.55	55.28	55.98	0.05	0.22	0.33	0.00	0.25	0.32
11000	86.94	86.71	87.20	0.00	0.21	0.32	0.06	0.20	0.27
11500	101.53	95.99	113.98	0.03	0.20	0.32	0.07	0.17	0.24
12000	113.50	91.86	99.69	0.07	0.19	0.29	0.06	0.16	0.21
12500	93.07	95.90	91.61	0.13	0.16	0.22	0.06	0.15	0.18
13000	90.91	95.67	93.27	0.20	0.10	0.13	0.05	0.15	0.12
13500	89.49	88.01	92.08	0.23	0.01	0.01	0.00	0.16	0.08
15000	85.11	83.90	84.98	0.08	0.08	0.14	0.01	0.23	0.14
16000	80.18	80.05	81.75	0.11	0.16	0.30	0.05	0.27	0.31
17000	68.33	69.49	69.06	0.21	0.19	0.37	0.11	0.27	0.35
18000	77.57	80.71	80.28	0.33	0.18	0.37	0.08	0.30	0.40
20000	82.19	74.65	78.23	0.25	0.11	0.26	0.10	0.26	0.37
20400	64.57	66.23	64.86	0.23	0.10	0.21	0.15	0.25	0.41

Typical Performance Data

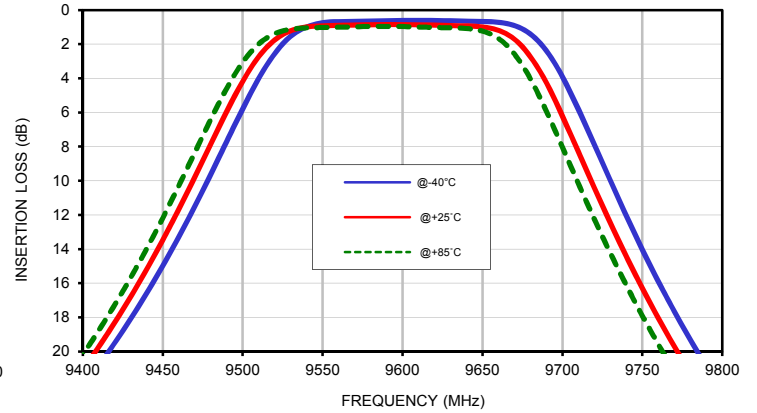
FREQ. (MHz)	GROUP DELAY		
	(nsec)		
	@-40°C	@+25°C	@+85°C
9550	4.58	4.18	3.96
9552	4.51	4.12	3.92
9554	4.43	4.07	3.89
9556	4.36	4.02	3.86
9558	4.29	3.97	3.83
9560	4.22	3.93	3.81
9562	4.16	3.90	3.79
9564	4.10	3.86	3.77
9566	4.04	3.84	3.76
9568	4.00	3.81	3.75
9570	3.95	3.79	3.74
9572	3.91	3.78	3.73
9574	3.88	3.76	3.73
9576	3.85	3.75	3.73
9578	3.82	3.74	3.73
9580	3.80	3.73	3.73
9582	3.78	3.73	3.73
9584	3.77	3.73	3.73
9586	3.75	3.72	3.73
9588	3.74	3.72	3.73
9590	3.74	3.72	3.73
9592	3.73	3.72	3.74
9594	3.72	3.72	3.74
9596	3.72	3.73	3.75
9598	3.72	3.73	3.75
9600	3.72	3.73	3.76
9602	3.72	3.74	3.77
9604	3.72	3.74	3.77
9606	3.73	3.75	3.79
9608	3.73	3.75	3.80
9610	3.73	3.76	3.81
9612	3.74	3.77	3.83
9620	3.76	3.83	3.93
9625	3.79	3.89	4.03
9628	3.81	3.93	4.11
9630	3.83	3.97	4.16
9632	3.85	4.01	4.23
9638	3.93	4.16	4.45
9640	3.97	4.22	4.53
9645	4.08	4.40	4.76
9650	4.21	4.61	5.00

Typical Performance Curves

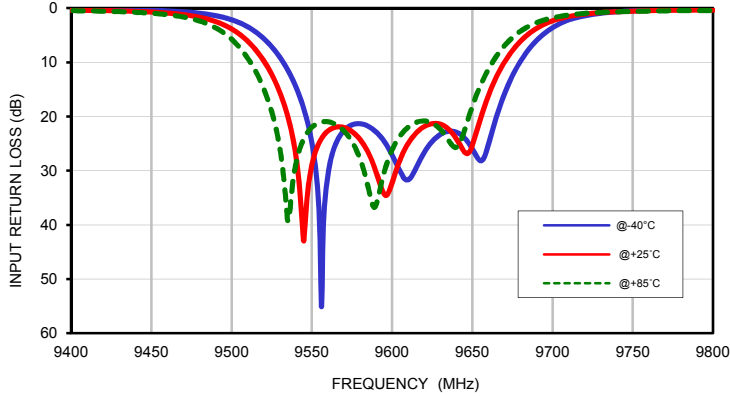
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



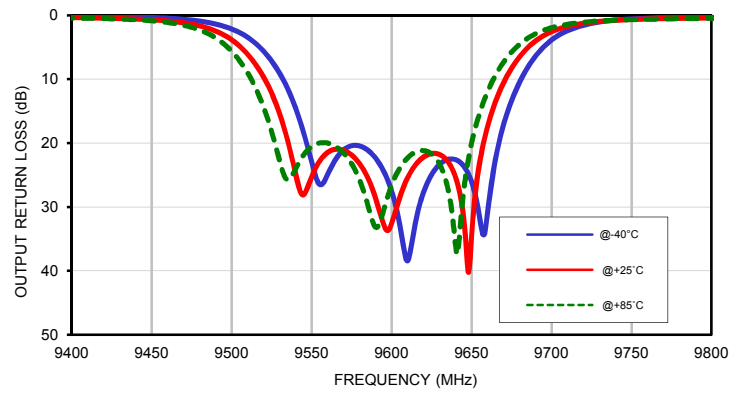
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



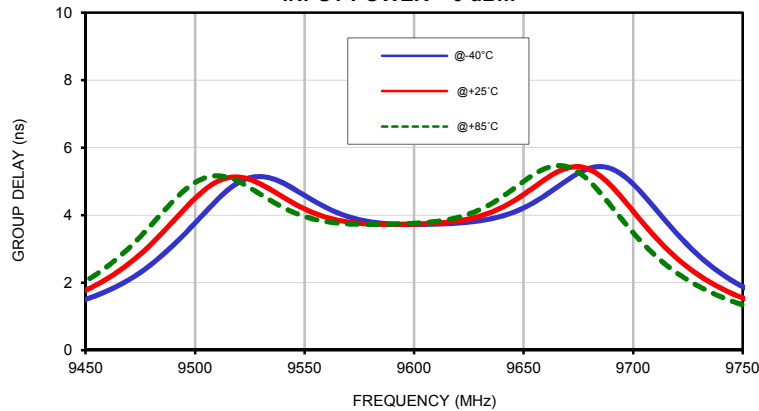
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm

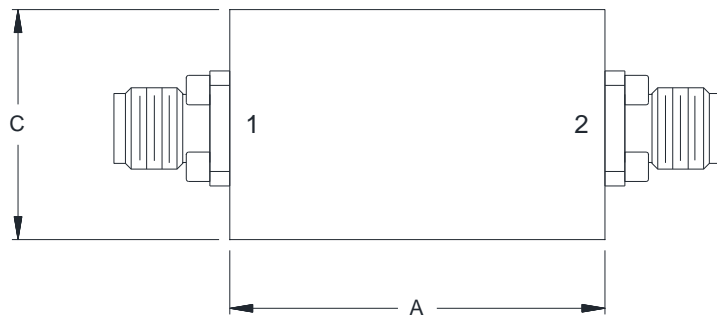
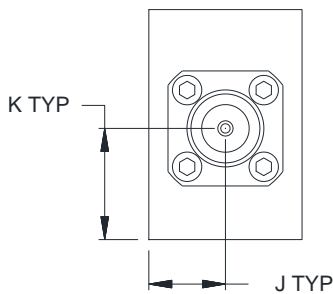
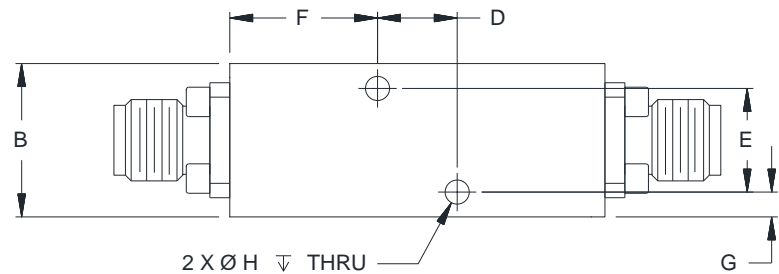


GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm



Outline Dimensions

UA2888



CASE#	A	B	C	D	E	F
UA2888	1.22 (31.1)	.50 (12.7)	.75 (19.1)	.260 (6.60)	.338 (8.59)	.48 (12.2)

CASE#	G	H	J	K	WT.GRAMS
UA2888	.08 (2.1)	.079 (2.00)	.25 (6.4)	.36 (9.2)	57

Dimensions are in inches (mm). Tolerances: 2 Pl. $\pm .100$; 3 Pl. $\pm .015$

Notes:

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



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

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
Humidity	90 to 95% RH, 40°C, 96 hours; Units may require bake-out after humidity to restore full performance.	MIL-STD-202, Method 103, Condition B
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	50g, 11ms half-sine, 3 shocks each direction 3 axes (total 18)	MIL-STD-202, Method 213, Condition A