

# Coaxial Frequency Mixer

Level 10 (LO Power +10 dBm) 10 to 3000 MHz

## ZFM-15+ ZFM-15



Generic photo used for illustration purposes only

CASE STYLE: K18

Connectors	Model
BNC	ZFM-15(+)
SMA	ZFM-15-S+
<b>BRACKET (OPTION "B")</b>	

**+RoHS Compliant**

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

### Maximum Ratings

Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
RF Power	50mW
IF Current	40mA

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

### Coaxial Connections

LO	1
RF	2
IF	3

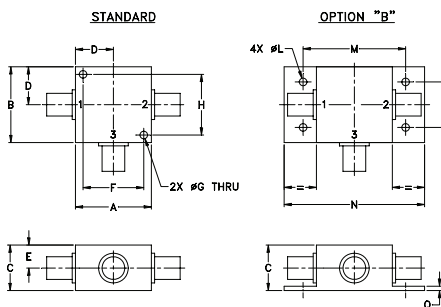
### Features

- low conversion loss, 6.13 dB typ.
- good L-R isolation, 35 dB typ, L-I, 30 dB typ.
- wideband, 10 to 3000 MHz
- rugged shielded case

### Applications

- cellular
- GPS
- MMDS
- ISM
- instrumentation

### Outline Drawing



### Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H
1.25	1.25	.75	.63	.38	1.00	.125	1.000
31.75	31.75	19.05	16.00	9.65	25.40	3.18	25.40

J	K	L	M	N	P	Q	wt
--	--	.125	1.688	2.18	.75	.07	grams
--	--	3.18	42.88	55.37	19.05	1.78	70.0

### Electrical Specifications

FREQUENCY (MHz)		CONVERSION LOSS (dB)				LO-RF ISOLATION (dB)						LO-IF ISOLATION (dB)					
LO/RF $f_L-f_U$	IF	Mid-Band		Total Range	Max.	L		M		U		L		M		U	
		$\bar{X}$	$\sigma$			Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.		
10-3000	10-800	6.13	0.14	8.0	8.5	35	25	35	25	35	25	30	20	30	20	30	20

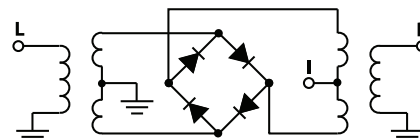
1 dB COMP.: +5 dBm typ.

L = low range [ $f_L$  to  $10 f_L$ ] M = mid range [ $10 f_L$  to  $f_U/2$ ] U = upper range [ $f_U/2$  to  $f_U$ ]  
m = mid band [ $2f_L$  to  $f_U/2$ ]

### Typical Performance Data

Frequency (MHz)		Conversion Loss (dB)	Isolation L-R (dB)	Isolation L-I (dB)	VSWR RF Port (:1)	VSWR LO Port (:1)
RF	LO	LO +10dBm	LO +10dBm	LO +10dBm	LO +10dBm	LO +10dBm
10.00	40.00	6.53	26.10	25.08	1.84	1.71
20.00	50.00	6.60	30.38	29.74	1.54	1.51
100.00	70.00	6.55	35.82	35.93	1.50	1.37
200.00	170.00	6.60	37.35	38.21	1.55	1.44
400.00	370.00	6.74	36.49	39.50	1.72	1.40
500.00	470.00	6.52	35.42	38.00	1.99	1.34
790.00	760.00	6.70	32.94	33.60	2.45	1.33
920.00	890.00	6.76	32.80	33.97	2.70	1.36
1180.00	1150.00	7.30	31.62	32.89	2.85	1.36
1310.00	1280.00	7.30	31.27	34.31	2.75	1.38
1500.00	1470.00	6.54	29.76	32.85	2.28	1.30
1700.00	1670.00	6.91	28.49	30.87	1.94	1.27
1830.00	1800.00	6.97	29.46	28.22	1.44	1.29
2000.00	1970.00	7.07	28.32	27.77	1.25	1.34
2200.00	2170.00	6.97	27.89	27.68	1.42	1.34
2480.00	2450.00	6.93	28.37	24.64	1.97	1.44
2610.00	2580.00	7.08	27.10	23.13	2.18	1.52
2740.00	2710.00	7.45	26.79	21.95	2.37	1.93
2870.00	2840.00	7.56	26.23	21.25	2.09	2.25
3000.00	2970.00	8.31	29.30	20.32	2.18	2.63

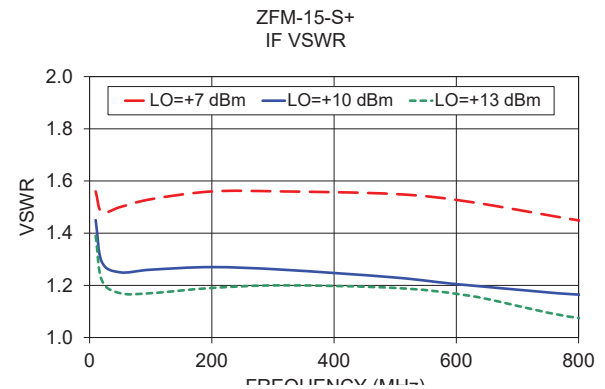
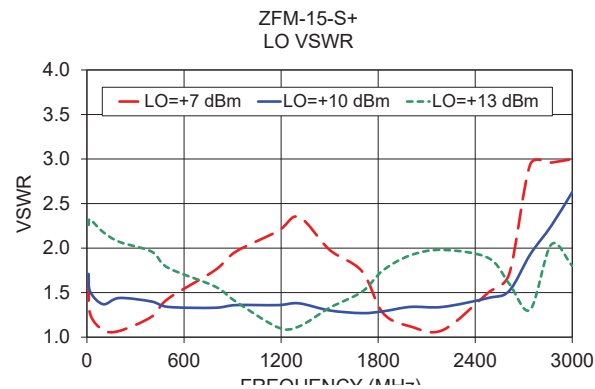
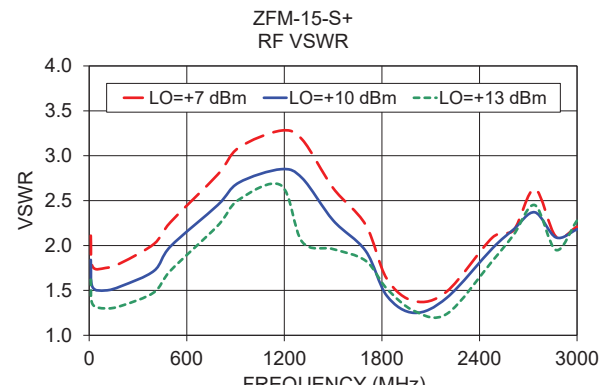
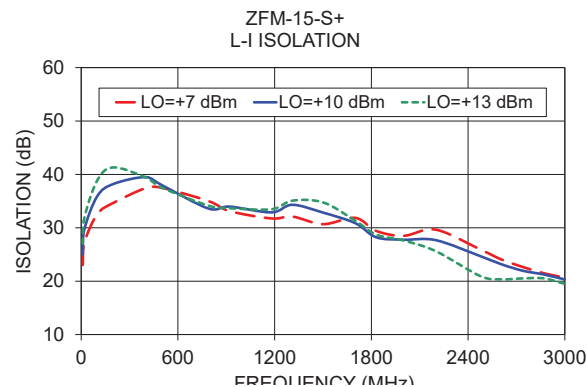
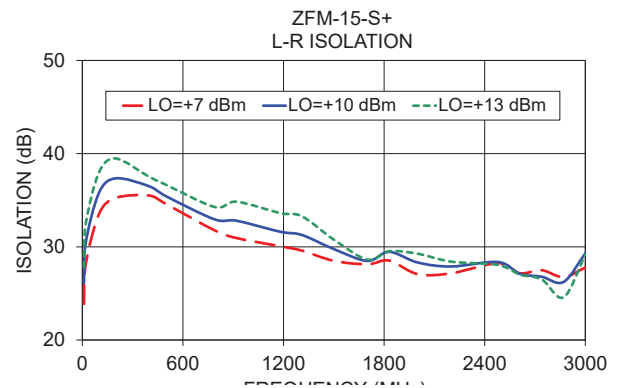
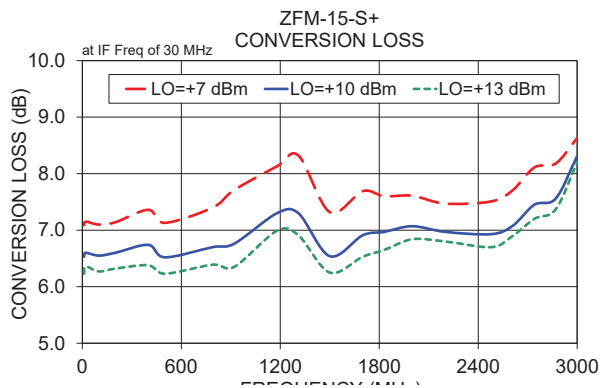
### Electrical Schematic



### 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.
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# Frequency Mixer

# ZFM-15+

## Typical Performance Data

RF (MHz)	LO (MHz)	CONVERSION LOSS (dB)			LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
		@LO (dBm)				@LO (dBm)			@LO (dBm)		
		+7	+10	+13		+7	+10	+13	+7	+10	+13
10.0	40.0	7.09	6.53	6.23	10.0	23.88	26.10	27.81	23.04	25.08	27.01
20.0	50.0	7.15	6.60	6.36	20.0	28.07	30.38	32.40	27.25	29.74	31.89
100.0	70.0	7.10	6.55	6.27	100.0	33.54	35.82	38.01	32.56	35.93	38.89
200.0	170.0	7.14	6.60	6.32	200.0	35.25	37.35	39.48	34.67	38.21	41.31
400.0	370.0	7.36	6.74	6.38	400.0	35.50	36.49	37.50	37.43	39.50	39.44
500.0	470.0	7.13	6.52	6.23	500.0	34.59	35.42	36.65	37.49	38.00	37.53
790.0	760.0	7.40	6.70	6.39	790.0	31.76	32.94	34.27	35.00	33.60	34.14
920.0	890.0	7.71	6.76	6.35	920.0	30.94	32.80	34.84	33.13	33.97	33.68
1180.0	1150.0	8.13	7.30	6.99	1180.0	30.06	31.62	33.62	31.75	32.89	33.47
1310.0	1280.0	8.32	7.30	6.91	1310.0	29.59	31.27	33.27	32.10	34.31	35.08
1500.0	1470.0	7.32	6.54	6.25	1500.0	28.50	29.76	30.77	30.68	32.85	34.76
1700.0	1670.0	7.69	6.91	6.53	1700.0	28.13	28.49	28.63	31.86	30.87	31.34
1830.0	1800.0	7.60	6.97	6.65	1830.0	28.52	29.46	29.52	29.41	28.22	28.72
2000.0	1970.0	7.61	7.07	6.84	2000.0	27.07	28.32	29.26	28.50	27.77	27.62
2200.0	2170.0	7.47	6.97	6.80	2200.0	27.16	27.89	28.41	29.65	27.68	25.61
2480.0	2450.0	7.51	6.93	6.70	2480.0	28.24	28.37	28.05	25.87	24.64	20.89
2610.0	2580.0	7.71	7.08	6.90	2610.0	27.17	27.10	27.02	24.02	23.13	20.35
2740.0	2710.0	8.11	7.45	7.20	2740.0	27.49	26.79	26.50	22.65	21.95	20.52
2870.0	2840.0	8.18	7.56	7.37	2870.0	26.75	26.23	24.58	21.48	21.25	20.52
3000.0	2970.0	8.63	8.31	8.20	3000.0	27.78	29.30	29.14	20.68	20.32	19.50



# Frequency Mixer

# ZFM-15+

## Typical Performance Data

RF/LO (MHz)	RF VSWR (:1)			LO VSWR (:1)			IF (MHz)	IF VSWR (:1)			LO/RF (MHz)	max. DC output (mV)	DC Offset (mV)
	@LO (dBm)			@LO (dBm)				@LO (dBm)			@LO (dBm)		
	+7	+10	+13	+7	+10	+13		+7	+10	+13	+10		
10.0	2.11	1.84	1.62	1.62	1.71	2.26	10.0	1.56	1.45	1.39	10.00	216.1	-2.26
20.0	1.77	1.54	1.35	1.26	1.51	2.32	20.0	1.48	1.29	1.22	20.00	216.7	-0.18
50.0	1.75	1.50	1.30	1.08	1.37	2.18	50.0	1.50	1.25	1.17	50.00	217.1	0.25
100.0	1.81	1.55	1.33	1.07	1.44	2.07	100.0	1.53	1.26	1.17	100.00	214.7	0.40
200.0	2.02	1.72	1.48	1.23	1.40	1.96	200.0	1.56	1.27	1.19	200.00	219.0	0.57
316.2	2.26	1.99	1.72	1.43	1.34	1.78	316.2	1.56	1.26	1.20	324.69	232.8	0.80
500.0	2.79	2.45	2.22	1.75	1.33	1.57	500.0	1.55	1.23	1.19	414.60	206.4	1.02
622.3	3.09	2.70	2.51	1.96	1.36	1.40	622.3	1.52	1.20	1.16	500.00	192.5	0.93
851.9	3.28	2.85	2.67	2.19	1.36	1.11	851.9	1.43	1.16	1.07	639.37	223.8	1.05
1000.0	3.18	2.75	2.04	2.35	1.38	1.12	1000.0	1.40	1.20	1.24	729.28	205.6	1.39
1200.0	2.64	2.28	1.96	1.98	1.30	1.33	1200.0	1.48	1.37	1.14	800.00	179.6	1.40
1311.1	2.23	1.94	1.83	1.74	1.27	1.51	1311.1	1.58	1.48	1.04	909.10	183.2	1.28
1500.0	1.63	1.44	1.52	1.27	1.29	1.75	1500.0	1.74	1.56	1.19	1000.00	190.3	1.27
1617.3	1.38	1.25	1.27	1.12	1.34	1.92	1617.3	1.76	1.52	1.37	1200.00	196.4	1.71
1770.4	1.49	1.42	1.24	1.08	1.34	1.98	1770.4	1.59	1.31	1.62	1500.00	178.7	3.01
2000.0	2.09	1.97	1.83	1.50	1.44	1.89	2000.0	1.34	1.14	1.87	1800.00	175.8	2.71
2200.0	2.17	2.18	2.12	1.71	1.52	1.60	2200.0	1.37	1.30	1.80	2000.00	195.0	1.08
2500.0	2.63	2.37	2.45	2.94	1.93	1.31	2500.0	2.37	2.66	1.72	2200.00	171.8	-0.67
2800.0	2.10	2.09	1.95	2.96	2.25	2.04	2800.0	3.68	3.79	3.80	2500.00	177.3	-2.90
3000.0	2.21	2.18	2.28	3.00	2.63	1.80	3000.0	3.82	4.88	3.98	2800.00	163.2	-5.28
											3000.00	180.1	-6.79

REV. X1  
ZFM-15+  
060614  
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IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED RoHS compliant  
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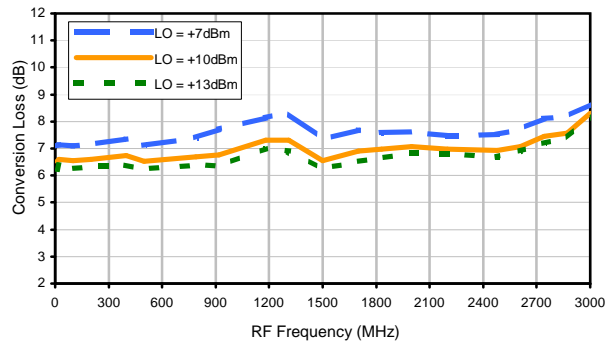


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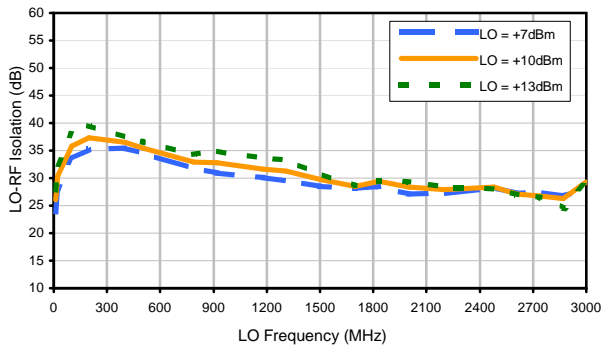


## Typical Performance Curves

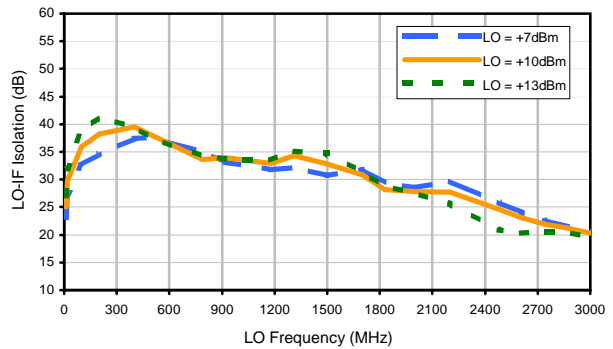
**Conversion Loss**



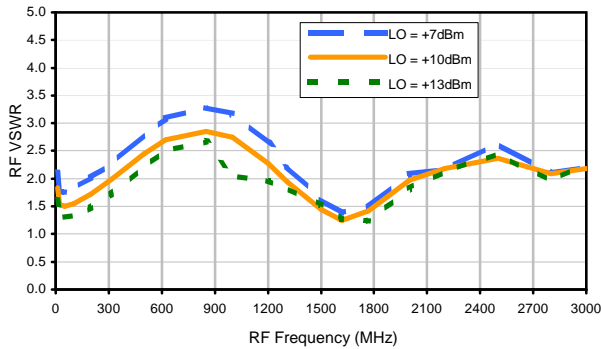
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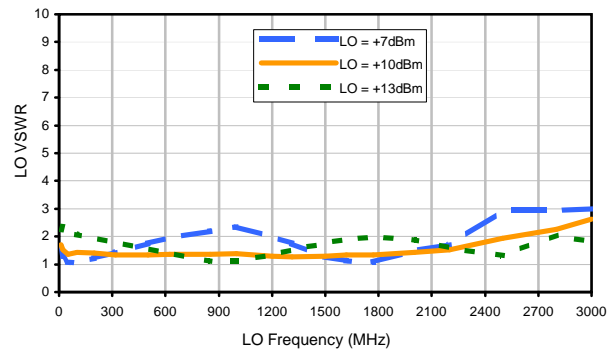
**LO-IF Isolation**



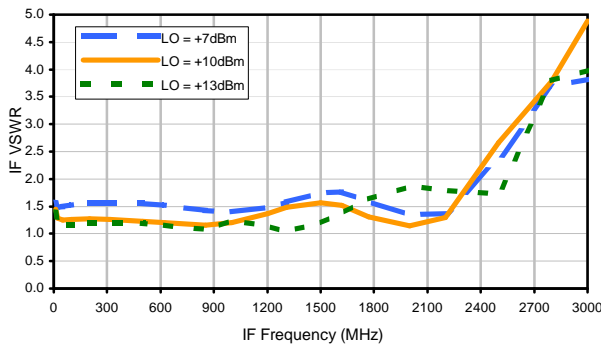
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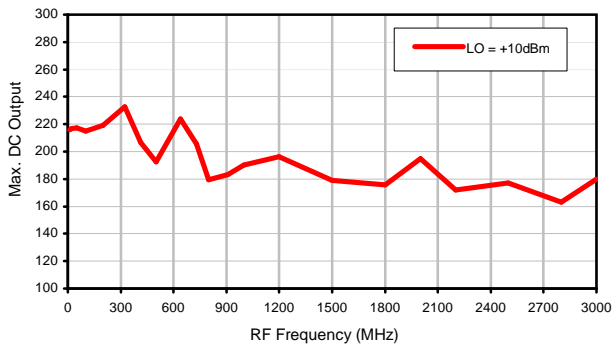
**LO VSWR**



**IF VSWR**



**Max. DC Output**

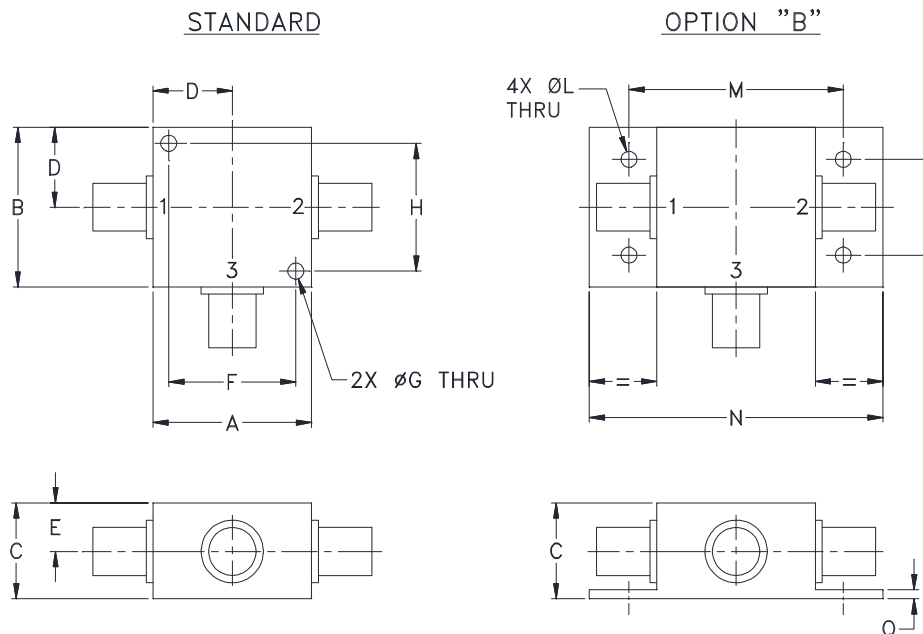


# Case Style

# K

## K18

### Outline Dimensions



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
K18	1.25 (31.75)	1.25 (31.75)	.75 (19.05)	.63 (16.00)	.38 (9.65)	1.000 (25.40)	.125 (3.18)	1.000 (25.40)	--	--	.125 (3.18)	1.688 (42.88)	2.18 (55.37)

CASE#	P	Q	WT. GRAMS
K18	.75 (19.05)	.07 (1.78)	70.0

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

#### Notes:

- Case material: Aluminum alloy.
- Case finish:  
For RoHS Case Styles: Clear chemical conversion coating, non-chrome or trivalent chrome based.
- Mounting bracket available on request. Add suffix B to part number.
- For port marking 1, 2, and 3 see specifications data sheet.
- For bracket version, option B, dimension "C" changes from .75 to .94 inches when connectors are type N.
- Refer to the individual model data sheet for the type of connectors available.



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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.

<b>Specification</b>	<b>Test/Inspection Condition</b>	<b>Reference/Spec</b>
Operating Temperature	-55° to 100°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Barometric Pressure	100,000 Feet	MIL-STD-202, Method 105, Condition D
Humidity	90% RH, 65°C Units may require bake-out after humidity to restore full performance.	MIL-STD-202, Method 103
Thermal Shock	-65° to 125°C, 5 cycles	MIL-STD-202, Method 107, Condition B
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