

Coaxial Frequency Mixer

Level 10 (LO Power +10 dBm) 2 to 600 MHz

NON-CATALOG

ZP-1LH+
ZP-1LH

Maximum Ratings

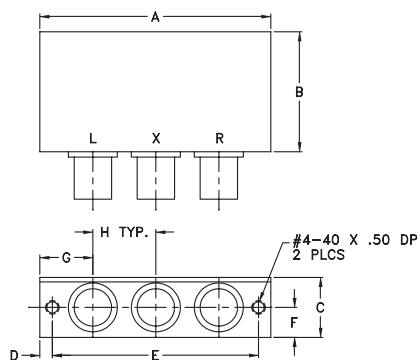
Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
RF Power	50mW
IF Current	40mA

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

Coaxial Connections

LO	L
RF	R
IF	X

Outline Drawing



Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H	wt
2.31	1.20	.60	.125	2.062	.30	.53	.63	grams
58.67	30.48	15.24	3.18	52.37	7.62	13.46	16.00	75.0

Features

- low conversion loss, 6.0 dB typ.
- high L-R isolation, 50 dB typ., L-I, 50 dB typ.
- rugged shielded case

Applications

- VHF/UHF
- instrumentation



BNC version shown

CASE STYLE: GG60

Connectors	Model
BNC	ZP-1LH+
SMA	ZP-1LH-S(+)

+RoHS Compliant

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

Electrical Specifications

FREQUENCY (MHz)		CONVERSION LOSS (dB)				LO-RF ISOLATION (dB)						LO-IF ISOLATION (dB)					
LO/RF	IF	Mid-Band m		Total Range		L		M		U		L		M		U	
f_L - f_U		$\bar{X}$	σ	Max.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.
2-600	DC-600	6.0	0.17	7.0	8.0	70	50	50	30	42	25	65	45	50	30	41	22

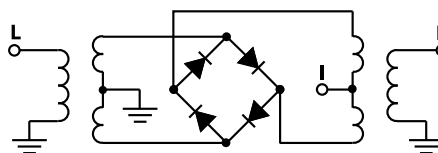
1 dB COMP.: +5 dBm typ.

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
2.00	32.00	6.28	67.01	84.01	1.47	2.80
4.00	34.00	5.95	65.93	80.03	1.27	2.68
5.00	35.00	5.89	65.47	78.57	1.23	2.65
10.00	40.00	5.80	63.93	73.13	1.14	2.48
20.00	50.00	5.82	61.72	68.22	1.12	2.53
50.00	80.00	5.82	56.12	60.69	1.11	2.47
59.87	89.87	5.78	54.83	59.50	1.11	2.35
100.00	70.00	5.77	51.13	55.91	1.12	2.37
117.74	87.74	5.79	50.12	55.10	1.15	2.32
175.61	145.61	5.69	47.32	52.30	1.18	2.26
200.00	170.00	5.73	46.57	51.26	1.21	2.33
233.48	203.48	5.70	45.24	49.36	1.25	2.27
291.36	261.36	5.69	43.94	46.68	1.27	2.24
300.00	270.00	5.68	43.65	46.00	1.31	2.29
349.23	319.23	5.71	42.63	43.46	1.35	2.28
407.10	337.10	5.70	41.85	41.86	1.40	2.28
464.97	434.97	5.72	40.61	39.52	1.45	2.29
522.84	492.84	5.77	39.23	37.60	1.49	2.33
580.71	550.71	5.84	38.82	36.92	1.51	2.33
600.00	570.00	5.87	38.87	36.44	1.53	2.31

Electrical Schematic



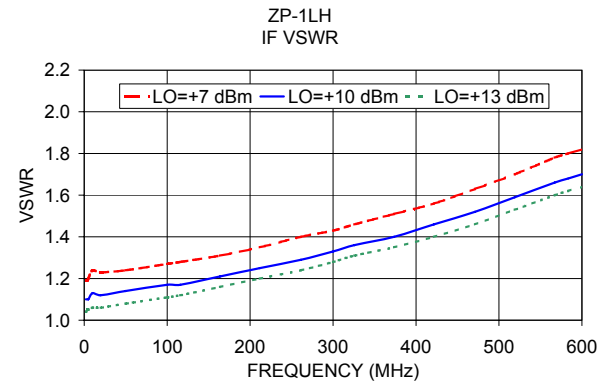
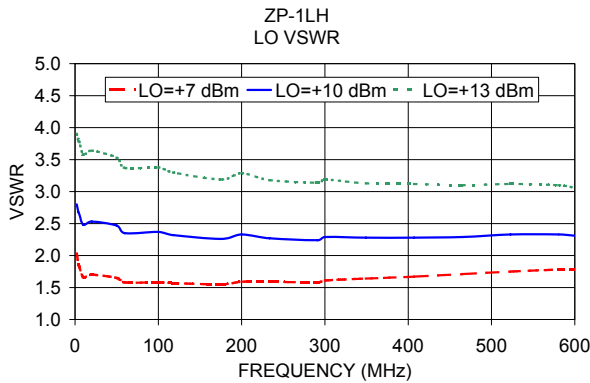
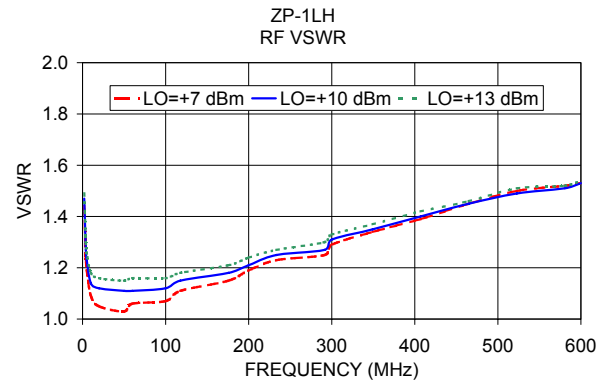
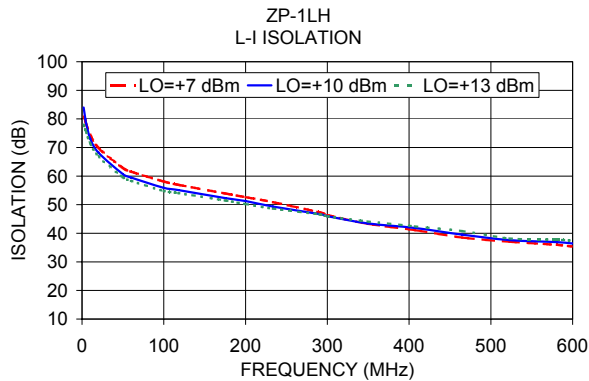
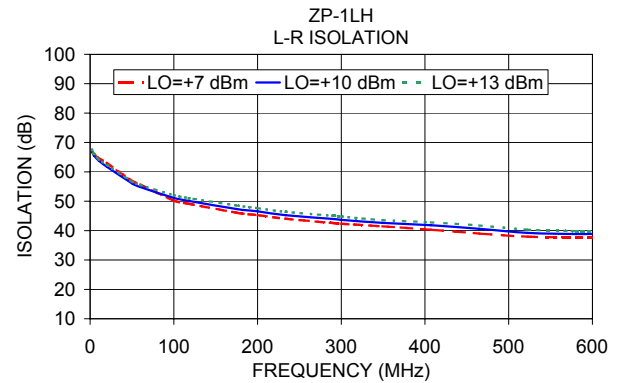
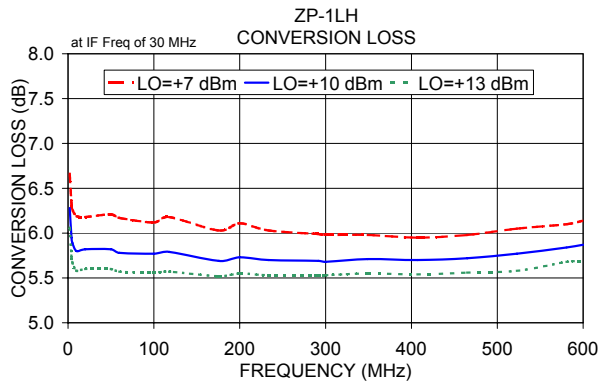
Notes

- 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



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Frequency Mixer

ZP-1LH+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB)		
		@LO (dBm)		
		+7	+10	+13
2.0	32.0	6.66	6.28	6.06
4.0	34.0	6.32	5.95	5.72
5.0	35.0	6.26	5.89	5.67
10.0	40.0	6.19	5.80	5.58
50.3	80.3	6.27	5.88	5.69
90.6	120.6	6.19	5.83	5.64
130.9	160.9	6.15	5.82	5.64
171.2	201.2	6.13	5.80	5.63
211.5	241.5	6.11	5.76	5.62
251.8	281.8	6.14	5.79	5.63
292.0	322.0	6.14	5.82	5.63
372.6	402.6	6.16	5.81	5.67
412.9	442.9	6.16	5.83	5.66
453.2	483.2	6.25	5.93	5.74
493.5	523.5	6.29	5.95	5.76
533.8	563.8	6.32	5.96	5.81
574.1	604.1	6.34	6.03	5.81
614.4	644.4	6.38	6.06	5.87
654.7	684.7	6.41	6.13	5.96
695.0	725.0	6.49	6.21	6.04
775.6	805.6	6.79	6.40	6.21
815.9	845.9	7.05	6.54	6.29
856.1	886.1	7.40	6.65	6.38
896.4	926.4	7.83	6.89	6.45
916.6	946.6	8.11	7.06	6.54
956.9	986.9	8.55	7.42	6.72
977.0	1007.0	8.77	7.64	6.86
1017.3	1047.3	9.18	8.02	7.19
1037.5	1067.5	9.37	8.25	7.37
1077.8	1107.8	9.62	8.58	7.71
1097.9	1127.9	9.73	8.71	7.86
1138.2	1168.2	9.88	8.97	8.17
1158.3	1188.3	9.94	9.09	8.31
1198.6	1228.6	10.07	9.32	8.59
1259.1	1289.1	10.25	9.56	8.91
1279.2	1309.2	10.30	9.65	9.02
1319.5	1349.5	10.44	9.81	9.22
1339.7	1369.7	10.50	9.89	9.34
1380.0	1410.0	10.70	10.18	9.72
1400.1	1430.1	10.78	10.35	9.90

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)		
		@LO (dBm)		
		+7	+10	+13
10.0	40.0	20.43	20.35	20.32
50.3	80.3	18.27	22.03	21.98
90.6	120.6	19.47	20.24	20.33
130.9	160.9	18.76	19.31	25.47
171.2	201.2	17.48	20.97	30.03
211.5	241.5	18.34	22.93	25.38
251.8	281.8	19.23	23.48	23.68
292.0	322.0	19.37	22.80	24.83
332.3	362.3	21.81	21.86	25.71
372.6	402.6	18.92	19.94	20.42
412.9	442.9	17.38	18.56	23.77
453.2	483.2	18.77	18.84	21.61
493.5	523.5	20.50	25.64	31.26
533.8	563.8	19.52	23.25	24.01
574.1	604.1	15.80	19.86	27.54
614.4	644.4	15.39	16.15	19.96
654.7	684.7	15.12	15.64	17.95
695.0	725.0	14.44	15.50	17.10
735.3	765.3	13.85	16.19	18.35
775.6	805.6	12.84	16.51	20.68
815.9	845.9	10.79	16.67	23.11
856.1	886.1	8.89	14.78	23.47
896.4	926.4	8.03	13.13	19.85
916.6	946.6	8.21	12.80	20.28
956.9	986.9	8.66	12.24	21.19
977.0	1007.0	9.06	12.31	19.86
1017.3	1047.3	9.99	12.65	18.70
1037.5	1067.5	10.44	13.06	17.45
1077.8	1107.8	10.92	13.41	16.60
1097.9	1127.9	10.84	13.21	15.84
1138.2	1168.2	10.94	12.51	14.53
1158.3	1188.3	11.12	12.05	14.09
1198.6	1228.6	11.14	11.63	12.95
1218.8	1248.8	11.29	11.42	12.78
1259.1	1289.1	11.56	11.43	12.78
1279.2	1309.2	11.42	11.53	12.88
1319.5	1349.5	11.96	12.28	14.23
1339.7	1369.7	12.13	12.91	15.18
1380.0	1410.0	13.13	14.38	16.62
1400.1	1430.1	13.51	15.02	16.50

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+5dBm (dB)		
		@LO (dBm)		
		+7	+10	+13
10.0	40.0	0.61	0.42	0.27
50.3	80.3	0.67	0.39	0.26
90.6	120.6	0.51	0.38	0.24
130.9	160.9	0.56	0.37	0.24
171.2	201.2	0.52	0.35	0.22
211.5	241.5	0.57	0.37	0.24
251.8	281.8	0.58	0.38	0.25
292.0	322.0	0.58	0.34	0.24
332.3	362.3	0.58	0.35	0.23
372.6	402.6	0.56	0.36	0.24
412.9	442.9	0.52	0.33	0.23
453.2	483.2	0.51	0.33	0.24
493.5	523.5	0.53	0.34	0.24
533.8	563.8	0.60	0.39	0.28
574.1	604.1	0.67	0.44	0.30
614.4	644.4	0.73	0.47	0.31
654.7	684.7	0.80	0.49	0.33
695.0	725.0	0.93	0.59	0.39
735.3	765.3	1.02	0.64	0.43
775.6	805.6	1.17	0.77	0.52
815.9	845.9	1.23	0.87	0.59
856.1	886.1	1.12	0.91	0.62
896.4	926.4	0.91	0.89	0.66
916.6	946.6	0.79	0.84	0.67
956.9	986.9	0.51	0.68	0.63
977.0	1007.0	0.40	0.59	0.61
1017.3	1047.3	0.21	0.43	0.54
1037.5	1067.5	0.11	0.33	0.48
1077.8	1107.8	-0.03	0.18	0.31
1097.9	1127.9	-0.05	0.11	0.26
1138.2	1168.2	0.03	0.08	0.21
1158.3	1188.3	0.00	0.03	0.19
1198.6	1228.6	0.05	0.02	0.12
1218.8	1248.8	0.12	0.05	0.14
1259.1	1289.1	0.20	0.11	0.17
1279.2	1309.2	0.22	0.12	0.18
1319.5	1349.5	0.30	0.21	0.25
1339.7	1369.7	0.31	0.24	0.28
1380.0	1410.0	0.34	0.28	0.31
1400.1	1430.1	0.32	0.29	0.30

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Frequency Mixer

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Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=300.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=10.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=600.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+10			+10			+10
290.0	10.1	5.96	10.0	20.1	5.83	590.0	10.1	6.29
282.8	17.3	5.97	24.9	35.0	5.67	575.1	25.0	6.23
275.6	24.5	5.92	39.7	49.8	5.68	560.3	39.8	6.21
268.5	31.6	5.93	54.6	64.7	5.73	545.4	54.7	6.19
261.3	38.8	5.89	69.5	79.6	5.72	530.5	69.6	6.16
254.1	46.0	5.92	84.4	94.5	5.78	515.6	84.5	6.15
246.9	53.2	5.89	99.2	109.3	5.75	500.8	99.3	6.10
239.7	60.4	5.90	114.1	124.2	5.75	485.9	114.2	6.05
232.6	67.5	5.86	129.0	139.1	5.75	471.0	129.1	5.99
225.4	74.7	5.86	143.8	153.9	5.78	456.2	143.9	5.99
218.2	81.9	5.84	158.7	168.8	5.80	441.3	158.8	6.02
211.0	89.1	5.83	173.6	183.7	5.83	426.4	173.7	6.01
203.8	96.3	5.84	188.5	198.6	5.82	411.5	188.6	5.97
196.7	103.4	5.82	203.3	213.4	5.83	396.7	203.4	5.95
189.5	110.6	5.81	218.2	228.3	5.82	381.8	218.3	5.97
182.3	117.8	5.79	233.1	243.2	5.83	366.9	233.2	5.98
175.1	125.0	5.78	247.9	258.0	5.85	352.1	248.0	5.98
167.9	132.2	5.75	262.8	272.9	5.86	337.2	262.9	5.97
160.8	139.3	5.77	277.7	287.8	5.86	322.3	277.8	5.99
153.6	146.5	5.73	292.6	302.7	5.86	307.4	292.7	5.98
146.4	153.7	5.74	307.4	317.5	5.86	292.6	307.5	5.96
139.2	160.9	5.74	322.3	332.4	5.89	277.7	322.4	5.96
132.1	168.0	5.76	337.2	347.3	5.88	262.8	337.3	5.97
124.9	175.2	5.75	352.1	362.2	5.88	247.9	352.2	6.00
117.7	182.4	5.75	366.9	377.0	5.93	233.1	367.0	6.00
110.5	189.6	5.75	381.8	391.9	5.92	218.2	381.9	6.02
103.3	196.8	5.75	396.7	406.8	5.92	203.3	396.8	6.04
96.2	203.9	5.76	411.5	421.6	5.89	188.5	411.6	6.05
89.0	211.1	5.75	426.4	436.5	5.94	173.6	426.5	6.05
81.8	218.3	5.74	441.3	451.4	5.98	158.7	441.4	6.05
74.6	225.5	5.74	456.2	466.3	5.96	143.8	456.3	6.07
67.4	232.7	5.75	471.0	481.1	5.95	129.0	471.1	6.06
60.3	239.8	5.74	485.9	496.0	5.95	114.1	486.0	6.04
53.1	247.0	5.75	500.8	510.9	5.98	99.2	500.9	6.01
45.9	254.2	5.73	515.6	525.7	5.97	84.4	515.7	6.00
38.7	261.4	5.76	530.5	540.6	5.99	69.5	530.6	6.00
31.5	268.6	5.77	545.4	555.5	6.02	54.6	545.5	6.00
24.4	275.7	5.79	560.3	570.4	6.05	39.7	560.4	6.01
17.2	282.9	5.80	575.1	585.2	6.06	24.9	575.2	6.02
10.0	290.1	5.90	590.0	600.1	6.05	10.0	590.1	6.14

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Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+7	+10	+13	+7	+10	+13
2.0	66.96	67.01	67.63	80.76	84.01	77.93
4.0	66.09	65.93	66.27	79.49	80.03	76.17
5.0	65.82	65.47	66.09	78.22	78.57	75.39
10.0	64.67	63.93	64.36	74.47	73.13	71.36
50.3	54.55	55.16	56.52	53.02	51.61	52.00
90.6	50.49	50.78	52.95	50.44	49.20	48.95
130.9	47.75	48.15	50.98	48.81	46.93	47.11
171.2	45.74	46.43	49.44	47.27	45.21	45.79
211.5	44.24	44.81	48.29	46.11	44.16	44.73
251.8	43.20	43.57	47.38	44.46	42.73	43.49
292.0	42.00	42.41	46.38	43.04	41.38	42.45
372.6	40.57	40.91	45.57	39.15	38.35	40.23
412.9	39.54	39.83	44.62	37.22	36.84	39.13
453.2	38.57	38.73	43.36	35.76	35.24	37.37
493.5	37.92	37.89	42.36	34.55	34.39	36.69
533.8	37.56	37.44	42.04	33.14	33.39	36.05
574.1	37.57	37.40	42.31	32.27	32.54	35.55
614.4	37.51	37.32	43.24	31.41	31.69	34.56
654.7	37.23	36.84	43.05	30.33	30.85	33.76
695.0	36.73	36.22	41.98	29.47	30.15	33.16
775.6	35.60	35.27	40.11	27.49	28.72	32.48
815.9	35.09	34.79	39.37	26.51	27.78	31.62
856.1	34.67	34.53	38.70	25.63	26.73	30.36
896.4	34.41	34.37	38.19	25.33	26.06	29.47
916.6	34.33	34.35	37.97	25.05	25.65	28.98
956.9	34.25	34.27	37.34	24.73	25.30	28.24
977.0	34.32	34.26	37.29	24.54	25.09	28.04
1017.3	34.59	34.53	36.97	24.23	24.86	27.55
1037.5	34.66	34.51	36.73	23.94	24.64	27.28
1077.8	35.11	34.95	36.76	23.91	24.63	27.21
1097.9	35.41	35.29	36.91	23.72	24.57	27.17
1138.2	35.79	35.73	36.99	23.51	24.61	27.30
1158.3	36.14	35.96	37.20	23.55	24.73	27.59
1198.6	36.71	36.44	37.24	23.30	24.77	27.92
1259.1	37.50	36.86	36.62	22.97	24.57	27.93
1279.2	37.81	37.03	36.45	22.80	24.37	27.80
1319.5	38.32	37.35	35.80	22.58	24.06	27.39
1339.7	38.85	37.84	35.77	22.35	23.79	27.03
1380.0	39.13	38.46	35.44	22.24	23.70	26.88
1400.1	39.69	38.97	35.32	22.08	23.49	26.63

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+7	+10	+13
10.0	40.0	41.47	39.88	42.73
50.3	80.3	35.71	35.83	36.00
90.6	120.6	31.16	31.48	31.83
130.9	160.9	28.67	28.81	29.16
171.2	201.2	27.02	27.27	27.54
211.5	241.5	25.99	26.32	26.71
251.8	281.8	25.43	25.63	25.99
292.0	322.0	25.39	25.74	26.11
332.3	362.3	25.31	25.84	26.36
372.6	402.6	25.44	26.04	26.67
412.9	442.9	26.47	26.76	27.31
453.2	483.2	27.73	27.80	28.03
493.5	523.5	28.43	28.72	29.35
533.8	563.8	27.14	27.78	29.44
574.1	604.1	24.79	25.38	27.07
614.4	644.4	22.61	22.92	24.01
654.7	684.7	20.84	20.78	21.48
695.0	725.0	19.57	19.21	19.63
735.3	765.3	18.48	17.98	18.25
775.6	805.6	17.61	17.03	17.17
815.9	845.9	16.91	16.32	16.45
856.1	886.1	16.33	15.77	15.99
896.4	926.4	15.85	15.39	15.65
916.6	946.6	15.58	15.26	15.50
956.9	986.9	15.24	15.04	15.35
977.0	1007.0	15.09	14.93	15.30
1017.3	1047.3	14.88	14.82	15.30
1037.5	1067.5	14.77	14.77	15.35
1077.8	1107.8	14.60	14.67	15.33
1097.9	1127.9	14.53	14.62	15.32
1138.2	1168.2	14.40	14.56	15.28
1158.3	1188.3	14.33	14.50	15.22
1198.6	1228.6	14.10	14.34	15.01
1218.8	1248.8	13.96	14.22	14.87
1259.1	1289.1	13.67	13.91	14.49
1279.2	1309.2	13.51	13.76	14.24
1319.5	1349.5	13.25	13.38	13.67
1339.7	1369.7	13.12	13.12	13.32
1380.0	1410.0	12.75	12.53	12.58
1400.1	1430.1	12.55	12.26	12.18

Frequency Mixer

ZP-1LH+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=600.1MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+7	+10	+13		+7	+10	+13		+7	+10	+13
2.0	32.0	1.44	1.47	1.49	2.0	2.03	2.80	3.90	2.0	1.19	1.10	1.04
4.0	34.0	1.23	1.27	1.30	4.0	1.86	2.68	3.79	4.0	1.19	1.10	1.05
5.0	35.0	1.19	1.23	1.26	5.0	1.83	2.65	3.78	5.0	1.20	1.10	1.05
10.0	40.0	1.09	1.14	1.18	10.0	1.66	2.48	3.58	10.0	1.24	1.13	1.06
50.3	80.3	1.09	1.03	1.08	50.3	1.47	2.24	3.24	25.1	1.66	1.43	1.22
90.6	120.6	1.11	1.06	1.10	90.6	1.43	2.12	3.03	40.3	1.67	1.40	1.22
130.9	160.9	1.13	1.09	1.13	130.9	1.44	2.16	3.10	55.4	1.64	1.41	1.23
171.2	201.2	1.16	1.13	1.16	171.2	1.44	2.12	3.00	70.5	1.67	1.42	1.25
211.5	241.5	1.18	1.16	1.19	211.5	1.46	2.13	3.00	85.6	1.67	1.44	1.26
251.8	281.8	1.22	1.20	1.22	251.8	1.48	2.15	3.02	100.8	1.71	1.46	1.27
292.0	322.0	1.25	1.23	1.25	292.0	1.50	2.13	2.96	115.9	1.71	1.47	1.28
332.3	362.3	1.27	1.26	1.29	332.3	1.54	2.18	3.03	131.0	1.73	1.48	1.29
372.6	402.6	1.29	1.28	1.31	372.6	1.57	2.18	2.99	146.2	1.73	1.48	1.30
412.9	442.9	1.31	1.30	1.33	412.9	1.61	2.21	3.01	161.3	1.72	1.48	1.31
453.2	483.2	1.35	1.34	1.35	453.2	1.64	2.23	3.02	176.4	1.74	1.49	1.32
493.5	523.5	1.39	1.38	1.40	493.5	1.69	2.24	3.01	191.5	1.76	1.51	1.34
533.8	563.8	1.42	1.42	1.44	533.8	1.74	2.28	3.03	206.7	1.78	1.53	1.36
574.1	604.1	1.44	1.44	1.47	574.1	1.78	2.29	3.01	221.8	1.78	1.53	1.36
614.4	644.4	1.45	1.46	1.48	614.4	1.83	2.34	3.05	236.9	1.78	1.53	1.37
654.7	684.7	1.45	1.46	1.47	654.7	1.88	2.35	3.04	252.1	1.79	1.54	1.38
695.0	725.0	1.44	1.44	1.45	695.0	1.92	2.36	3.03	267.2	1.81	1.57	1.40
735.3	765.3	1.44	1.43	1.43	735.3	1.98	2.38	3.03	282.3	1.84	1.60	1.43
775.6	805.6	1.45	1.42	1.42	775.6	2.03	2.38	2.99	297.4	1.85	1.60	1.44
815.9	845.9	1.51	1.46	1.45	815.9	2.08	2.41	2.99	312.6	1.85	1.61	1.44
856.1	886.1	1.62	1.55	1.54	856.1	2.16	2.47	3.01	327.7	1.86	1.62	1.45
896.4	926.4	1.78	1.68	1.64	896.4	2.21	2.52	3.05	342.8	1.88	1.64	1.48
916.6	946.6	1.87	1.77	1.71	916.6	2.22	2.55	3.07	357.9	1.91	1.66	1.51
956.9	986.9	2.06	1.93	1.85	956.9	2.25	2.59	3.11	373.1	1.93	1.69	1.54
977.0	1007.0	2.17	2.05	1.95	977.0	2.27	2.61	3.12	388.2	1.96	1.71	1.56
1017.3	1047.3	2.38	2.25	2.13	1017.3	2.30	2.62	3.14	403.3	1.98	1.73	1.57
1037.5	1067.5	2.50	2.36	2.24	1037.5	2.31	2.63	3.15	418.5	1.99	1.74	1.57
1077.8	1107.8	2.70	2.57	2.44	1077.8	2.34	2.64	3.15	433.6	1.98	1.74	1.58
1097.9	1127.9	2.79	2.67	2.53	1097.9	2.35	2.64	3.13	448.7	1.98	1.74	1.59
1138.2	1168.2	2.95	2.84	2.71	1138.2	2.36	2.63	3.11	463.8	2.02	1.78	1.63
1158.3	1188.3	3.01	2.92	2.78	1158.3	2.37	2.63	3.10	479.0	2.08	1.83	1.68
1198.6	1228.6	3.11	3.03	2.90	1198.6	2.39	2.60	3.04	494.1	2.13	1.88	1.72
1218.8	1248.8	3.14	3.06	2.94	1218.8	2.39	2.58	3.01	509.2	2.15	1.90	1.73
1259.1	1289.1	3.17	3.11	2.99	1259.1	2.40	2.55	2.96	524.4	2.14	1.89	1.72
1279.2	1309.2	3.18	3.13	3.02	1279.2	2.40	2.53	2.93	539.5	2.13	1.88	1.72
1319.5	1349.5	3.20	3.14	3.03	1319.5	2.40	2.48	2.86	554.6	2.14	1.90	1.74
1339.7	1369.7	3.21	3.15	3.04	1339.7	2.41	2.47	2.84	569.7	2.18	1.95	1.79
1380.0	1410.0	3.21	3.16	3.05	1380.0	2.42	2.46	2.83	584.9	2.25	2.00	1.85
1400.1	1430.1	3.21	3.16	3.06	1400.1	2.44	2.46	2.82	600.0	2.36	2.30	2.31

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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	24	37	32	47	35	49	46	60	53	68
1	-	20	+0	29	12	34	20	36	32	48	49	48
2	85	67	47	64	46	64	46	70	48	60	62	74
3	>100	54	53	61	57	66	47	59	53	77	51	58
4	>100	76	65	75	64	80	65	76	63	87	63	75
5	>100	77	75	67	60	65	56	63	54	69	52	64
6	>100	85	79	88	83	92	86	94	85	90	80	94
7	>100	91	77	85	77	86	83	81	81	80	79	81
8	>100	>94	93	>94	>94	93	>94	>94	>94	>94	90	>94
9	>100	>94	90	91	81	84	80	88	79	93	81	92
10	>100	>94	>94	>94	>94	>94	>94	>94	>94	>94	81	>94
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:

RF IN: 300.1 MHz; 0.00 dBm.

LO IN: 330.01 MHz; +10.00 dBm

IF OUT: 29.91 MHz; -5.99 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	16	28	19	38	22	34	32	50	34	47
1	-	20	+0	29	12	34	20	36	34	43	42	41
2	>100	69	52	69	53	70	52	84	54	67	66	79
3	>100	75	77	77	64	73	59	80	58	69	60	77
4	>100	>84	>84	>84	>84	>84	>84	>84	>84	>84	80	>84
5	>100	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84
6	>100	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84
7	>100	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84
8	>100	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84
9	>100	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84
10	>100	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:

RF IN: 300.1 MHz; -10.00 dBm.

LO IN: 330.01 MHz; +10.00 dBm

IF OUT: 29.91 MHz; -15.91 dBm

Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.

2. + entry denotes harmonics are in (dBc) above IF OUTPUT.

3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

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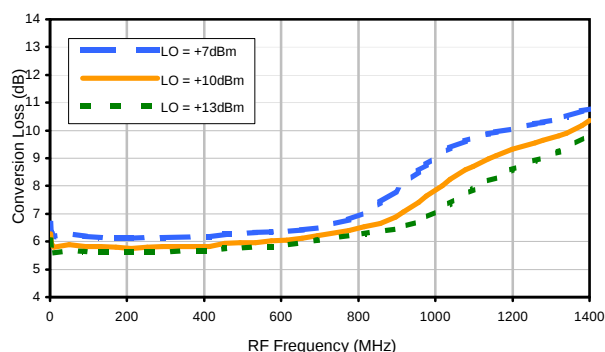


Frequency Mixer

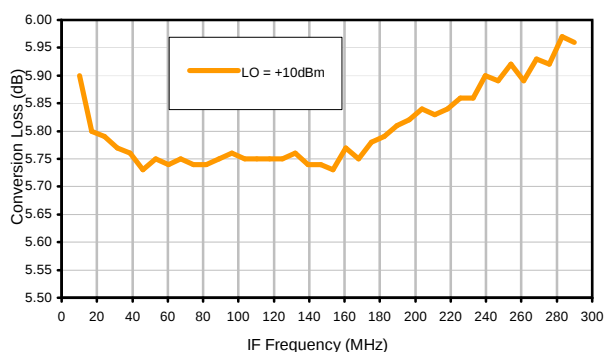
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Typical Performance Curves

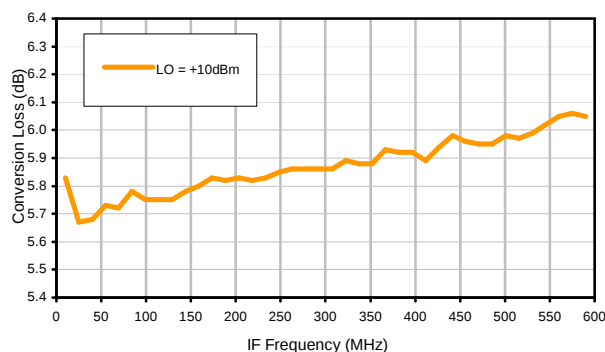
Conversion Loss @ IF=30MHz



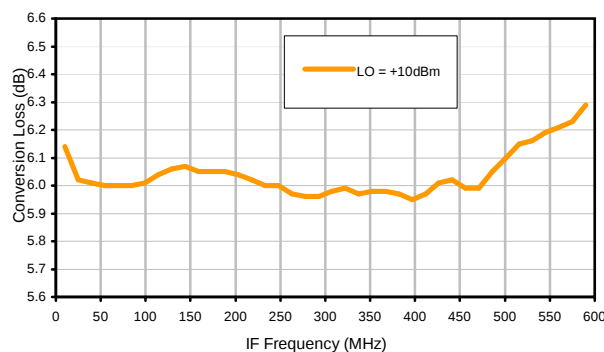
Conversion Loss vs. IF @ RF=300.1MHz



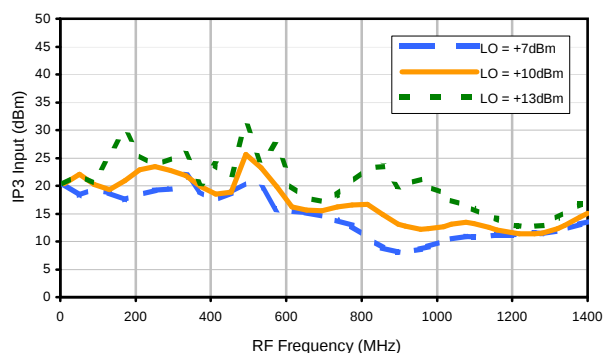
Conversion Loss vs. IF @ RF=10.1MHz



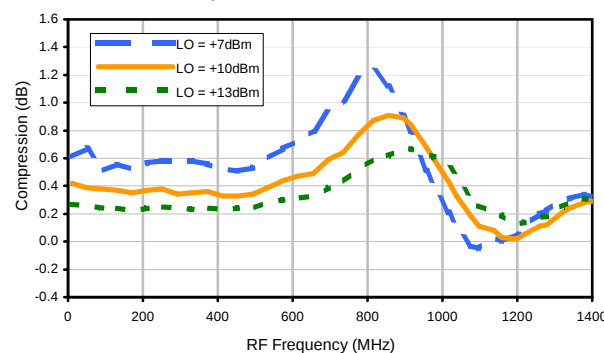
Conversion Loss vs. IF @ RF=600.1MHz



IP3 Input



Compression @ RF IN=+5dBm



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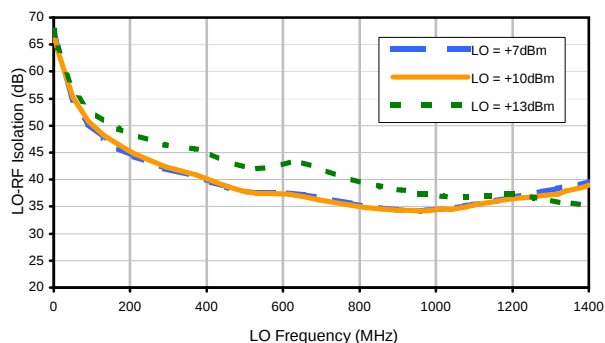


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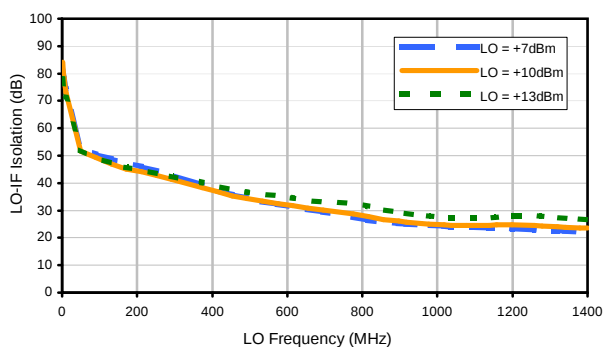


Typical Performance Curves

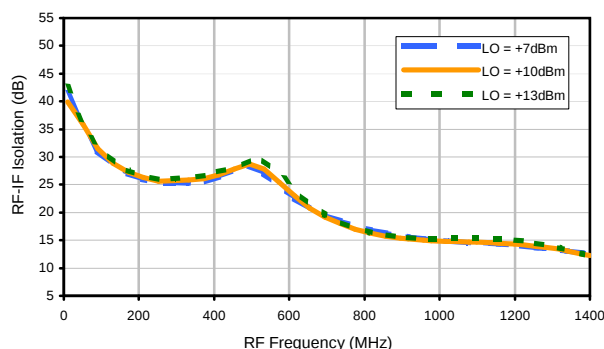
LO-RF Isolation



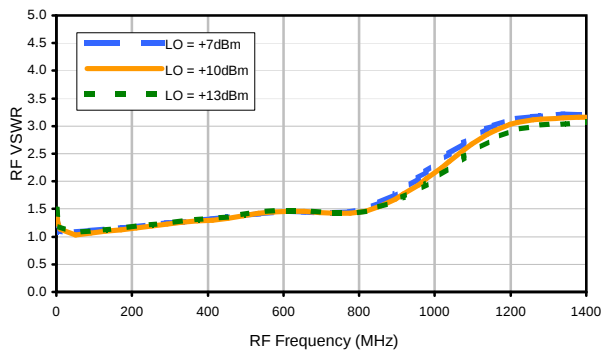
LO-IF Isolation



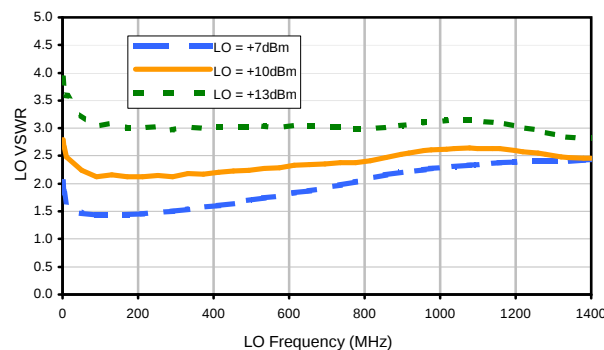
RF-IF Isolation



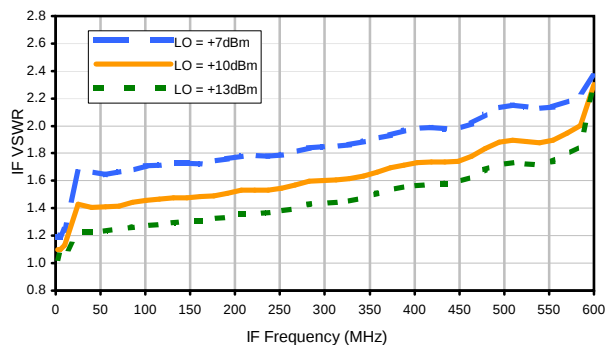
RF VSWR



LO VSWR



IF VSWR



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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	24	37	32	47	35	49	46	60	53	68
1	-	20	+0	29	12	34	20	36	32	48	49	48
2	85	67	47	64	46	64	46	70	48	60	62	74
3	>100	54	53	61	57	66	47	59	53	77	51	58
4	>100	76	65	75	64	80	65	76	63	87	63	75
5	>100	77	75	67	60	65	56	63	54	69	52	64
6	>100	85	79	88	83	92	86	94	85	90	80	94
7	>100	91	77	85	77	86	83	81	81	80	79	81
8	>100	>94	93	>94	>94	93	>94	>94	>94	>94	90	>94
9	>100	>94	90	91	81	84	80	88	79	93	81	92
10	>100	>94	>94	>94	>94	>94	>94	>94	>94	>94	81	>94
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:

RF IN: 300.1 MHz; 0.00 dBm.

LO IN: 330.01 MHz; +10.00 dBm

IF OUT: 29.91 MHz; -5.99 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	16	28	19	38	22	34	32	50	34	47
1	-	20	+0	29	12	34	20	36	34	43	42	41
2	>100	69	52	69	53	70	52	84	54	67	66	79
3	>100	75	77	77	64	73	59	80	58	69	60	77
4	>100	>84	>84	>84	>84	>84	>84	>84	>84	>84	80	>84
5	>100	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84
6	>100	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84
7	>100	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84
8	>100	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84
9	>100	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84
10	>100	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:

RF IN: 300.1 MHz; -10.00 dBm.

LO IN: 330.01 MHz; +10.00 dBm

IF OUT: 29.91 MHz; -15.91 dBm

Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.

2. + entry denotes harmonics are in (dBc) above IF OUTPUT.

3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

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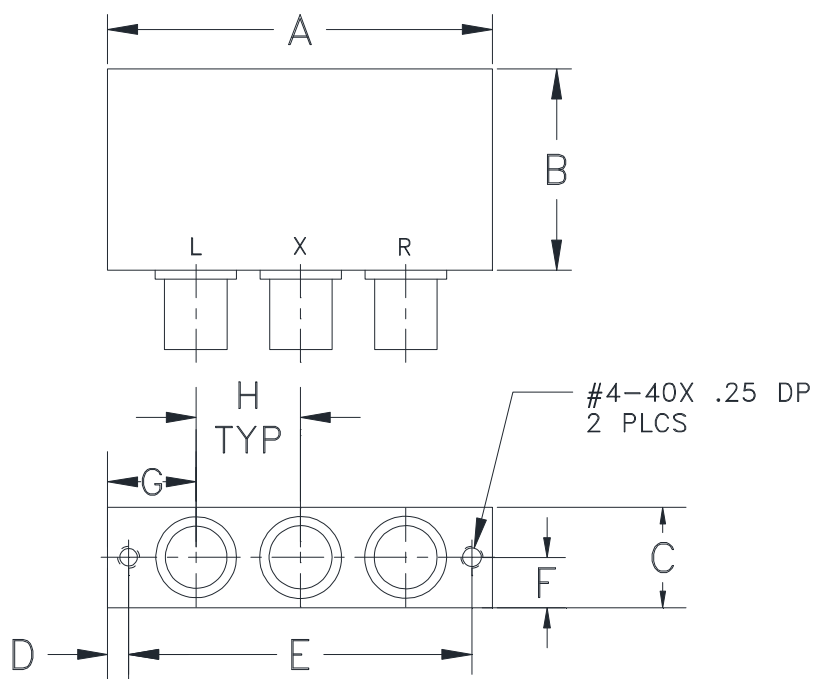
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Outline Dimensions

GG60



CASE #.	A	B	C	D	E	F	G	H	WT. GRAM
GG60	2.31 (58.67)	1.20 (30.48)	.60 (15.24)	.125 (3.18)	2.062 (52.37)	.30 (7.62)	.53 (13.46)	.63 (16.00)	75.0

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

Notes:

- Case material: Aluminum alloy.
- Case finish:
For RoHS Case Styles: Clear chemical conversion coating, non-chrome or trivalent chrome based.



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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.

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
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