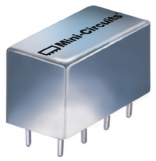
Plug-In

Frequency Mixer

RAY-11+

Level 23 (LO Power +23 dBm) 100 to 2500 MHz



CASE STYLE: A01

Maximum Ratings

Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
RF Power	350mW
IF Current	40mA

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

Pin Connections

LO	1
RF	8
IF	3
GROUND	2,5,6,7
CASE GROUND	2,5,6,7
DO NOT USE	4

Features

- excellent conversion loss, 6.23 dB typ.
- very wideband, 100 to 2500 MHz
- rugged welded construction
- hermetically sealed

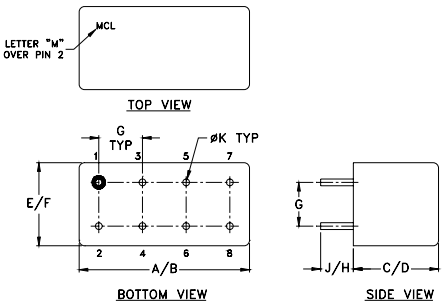
Applications

- wireless communication
- GPS
- ISM/PCS/UMTS
- satellite distribution

+RoHS Compliant

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

Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	F
.770	.800	.385	.400	.370	.400
19.56	20.32	9.78	10.16	9.40	10.16
G	**H**	**J**	**K**		**wt**
.200	.20	.14	.031		grams
5.08	5.08	3.56	0.79		5.2

Electrical Specifications

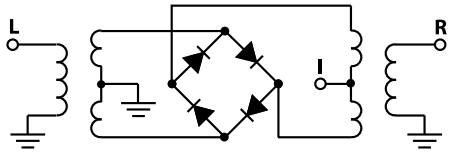
FREQUENCY (MHz)		CONVERSION LOSS (dB)				LO-RF ISOLATION (dB)						LO-IF ISOLATION (dB)					
		Mid-Band m			Total Range	L		M		U		L		M		U	
LO/RF f_L-f_U	IF	$\overline{X}$	σ	Max.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.
100-2500	DC-500	6.23	0.21	9.0	9.0	35	25	32	25	32	25	14	10	20	10	20	10

1 dB COMP.: +15 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 +23dBm	LO +23dBm	LO +23dBm	LO +23dBm	LO +23dBm
100.00	130.00	6.80	57.63	42.09	2.26	2.35
200.00	230.00	6.92	51.54	42.54	2.58	2.14
332.26	362.26	6.89	47.39	38.02	2.84	2.00
500.00	530.00	6.39	47.64	31.79	3.10	1.64
564.52	534.52	6.40	47.27	29.16	2.98	1.59
796.77	766.77	7.84	48.68	25.70	2.58	1.47
1000.00	970.00	7.12	43.65	20.91	2.08	2.39
1029.03	999.03	7.09	42.35	20.20	2.15	2.24
1200.00	1170.00	6.60	40.57	18.33	2.39	2.37
1250.00	1220.00	6.54	40.50	18.94	2.33	2.92
1261.29	1231.29	6.61	40.48	19.06	2.59	2.98
1416.13	1386.13	8.12	40.54	19.84	3.18	2.70
1570.97	1540.97	8.52	38.53	21.16	3.66	1.85
1803.23	1773.23	7.98	37.48	23.58	2.29	1.34
2000.00	1970.00	7.79	36.62	26.62	2.04	1.47
2035.43	2005.48	7.71	36.57	27.20	2.18	1.60
2200.00	2170.00	7.86	36.32	28.35	2.83	2.41
2345.16	2315.16	7.50	36.12	26.61	2.85	2.63
2472.58	2392.58	7.31	36.72	25.92	2.74	2.75
2500.00	2470.00	7.10	38.10	26.17	2.29	2.90

Electrical Schematic



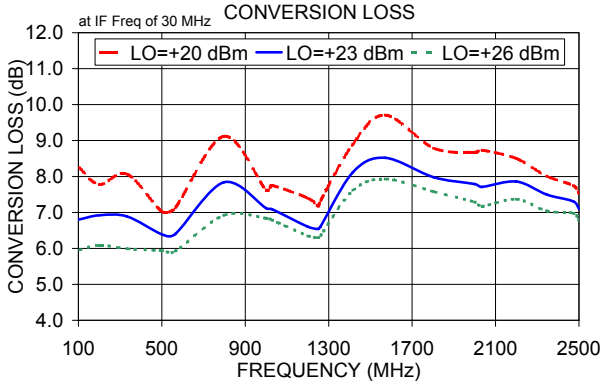
Notes

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

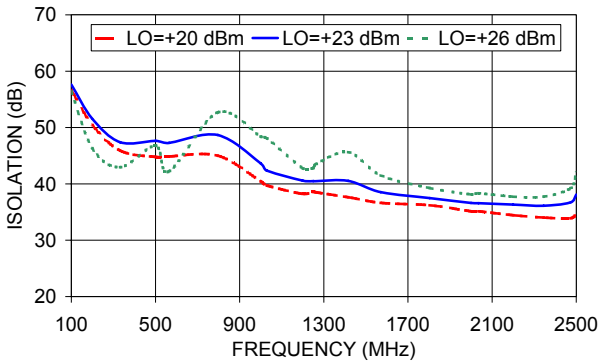
Performance Charts

RAY-11+

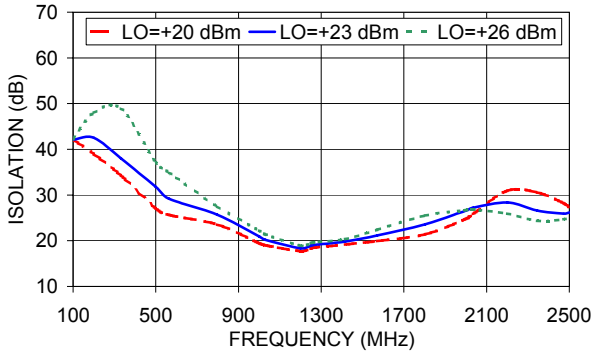
RAY-11+
CONVERSION LOSS
at IF Freq of 30 MHz



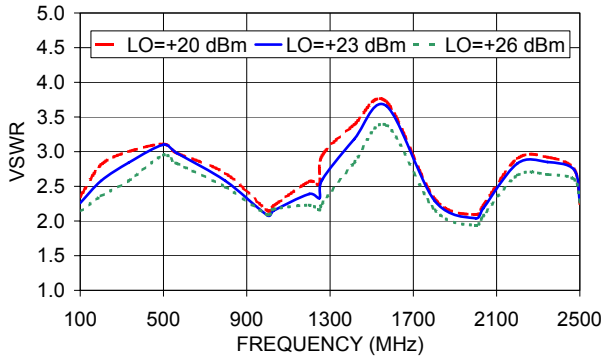
RAY-11+
L-R ISOLATION



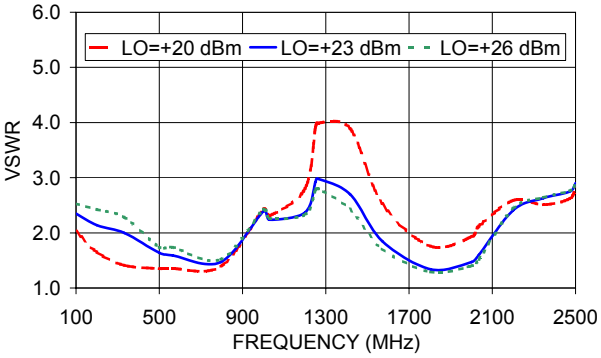
RAY-11+
L-I ISOLATION



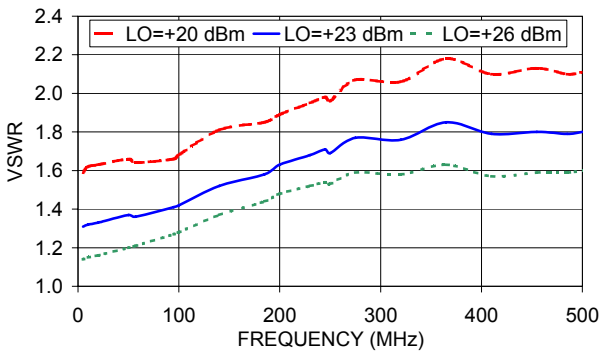
RAY-11+
RF VSWR



RAY-11+
LO VSWR



RAY-11+
IF VSWR



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

Frequency Mixer RAY-11+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB) @LO (dBm)		
		+20	+23	+26
10.1	40.1	6.62	6.10	5.83
30.1	60.1	5.99	5.68	5.50
50.1	80.1	5.70	5.47	5.34
75.1	105.1	5.70	5.43	5.29
100.1	130.1	5.86	5.53	5.34
140.1	170.1	5.63	5.39	5.22
180.1	210.1	5.72	5.42	5.25
220.1	250.1	5.81	5.49	5.28
260.1	290.1	5.69	5.41	5.22
300.1	330.1	5.99	5.60	5.31
350.1	380.1	5.68	5.41	5.22
400.1	430.1	5.89	5.51	5.27
450.1	480.1	5.71	5.48	5.30
500.1	530.1	5.65	5.45	5.32
550.1	580.1	5.47	5.32	5.24
600.1	630.1	5.62	5.40	5.26
700.1	730.1	6.12	5.71	5.45
800.1	830.1	6.52	6.06	5.77
900.1	930.1	6.77	6.38	6.15
1000.1	1030.1	6.81	6.53	6.40
1100.1	1130.1	6.62	6.51	6.44
1200.1	1230.1	6.31	6.26	6.29
1300.1	1330.1	6.10	6.03	6.07
1400.1	1430.1	6.78	6.56	6.48
1500.1	1530.1	7.46	7.18	6.95
1600.1	1630.1	7.34	7.13	7.02
1700.1	1730.1	7.22	6.98	6.91
1900.1	1930.1	7.66	7.14	6.96
2050.1	2080.1	7.84	7.42	7.20
2200.1	2230.1	7.63	7.38	7.23
2350.1	2380.1	7.84	7.28	7.01
2500.1	2530.1	7.90	7.12	6.77
2700.1	2730.1	7.28	6.89	6.62
2900.1	2930.1	7.01	6.64	6.50
3100.1	3130.1	7.16	6.76	6.64
3300.1	3330.1	7.46	7.01	6.85
3500.1	3530.1	7.85	7.48	7.34
3700.1	3730.1	8.37	8.15	8.05
3900.1	3930.1	9.32	9.01	8.81
4100.1	4130.1	10.47	10.04	9.92

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm) @LO (dBm)		
		+20	+23	+26
10.1	40.1	22.36	26.19	32.92
30.1	60.1	24.14	27.38	27.52
50.1	80.1	25.74	26.45	26.92
75.1	105.1	24.05	25.15	25.60
100.1	130.1	22.95	24.39	25.02
140.1	170.1	23.62	24.06	26.32
180.1	210.1	22.65	24.37	27.10
220.1	250.1	22.31	24.52	27.33
260.1	290.1	22.51	25.58	29.73
300.1	330.1	21.84	24.35	27.66
350.1	380.1	26.45	29.30	29.73
400.1	430.1	25.60	29.67	31.46
450.1	480.1	26.94	27.80	27.92
500.1	530.1	28.75	31.67	29.94
550.1	580.1	24.72	31.03	34.13
600.1	630.1	21.42	24.23	27.74
700.1	730.1	22.86	25.94	29.60
800.1	830.1	22.45	24.28	25.72
900.1	930.1	21.44	22.84	23.90
1000.1	1030.1	22.34	22.83	22.74
1100.1	1130.1	23.25	23.73	25.59
1200.1	1230.1	29.39	25.95	27.38
1300.1	1330.1	24.74	31.75	31.52
1400.1	1430.1	24.19	24.69	27.47
1500.1	1530.1	28.78	28.85	31.47
1600.1	1630.1	27.50	27.13	27.60
1700.1	1730.1	26.35	29.26	33.09
1900.1	1930.1	25.73	26.81	30.25
2050.1	2080.1	24.25	25.11	26.46
2200.1	2230.1	24.66	23.88	23.86
2350.1	2380.1	22.25	23.29	25.35
2500.1	2530.1	24.40	24.55	25.37
2700.1	2730.1	20.60	23.24	26.32
2900.1	2930.1	22.23	25.89	26.14
3100.1	3130.1	21.29	23.79	27.03
3300.1	3330.1	27.74	25.47	24.36
3500.1	3530.1	28.34	28.53	28.87
3700.1	3730.1	23.87	26.56	28.02
3900.1	3930.1	22.90	24.74	28.20
4100.1	4130.1	22.98	24.10	29.53

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+15dBm (dB) @LO (dBm)		
		+20	+23	+26
10.1	40.1	0.46	0.39	0.31
30.1	60.1	0.60	0.46	0.31
50.1	80.1	0.70	0.50	0.30
75.1	105.1	0.74	0.52	0.32
100.1	130.1	0.82	0.62	0.46
140.1	170.1	0.95	0.74	0.55
180.1	210.1	0.92	0.74	0.54
220.1	250.1	1.09	0.92	0.78
260.1	290.1	1.13	0.95	0.74
300.1	330.1	1.01	0.90	0.79
350.1	380.1	1.11	0.93	0.73
400.1	430.1	0.99	0.89	0.74
450.1	480.1	0.98	0.78	0.59
500.1	530.1	1.07	0.81	0.63
550.1	580.1	1.22	0.92	0.66
600.1	630.1	1.39	1.14	0.92
700.1	730.1	1.60	1.44	1.24
800.1	830.1	1.41	1.30	1.11
900.1	930.1	1.03	0.95	0.75
1000.1	1030.1	0.63	0.55	0.39
1100.1	1130.1	0.41	0.32	0.26
1200.1	1230.1	0.29	0.22	0.13
1300.1	1330.1	0.38	0.25	0.09
1400.1	1430.1	0.66	0.54	0.32
1500.1	1530.1	0.36	0.28	0.18
1600.1	1630.1	0.39	0.32	0.15
1700.1	1730.1	0.42	0.36	0.20
1900.1	1930.1	0.30	0.31	0.20
2050.1	2080.1	0.19	0.23	0.15
2200.1	2230.1	0.41	0.33	0.26
2350.1	2380.1	0.25	0.35	0.34
2500.1	2530.1	0.48	0.49	0.49
2700.1	2730.1	0.69	0.54	0.50
2900.1	2930.1	0.76	0.53	0.38
3100.1	3130.1	0.65	0.42	0.36
3300.1	3330.1	0.57	0.39	0.31
3500.1	3530.1	0.46	0.46	0.25
3700.1	3730.1	0.54	0.35	0.26
3900.1	3930.1	0.70	0.55	0.35
4100.1	4130.1	0.81	0.45	0.30

Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1250.1MHz (dB)
		@LO (dBm)
		+23
0.5	1249.6	6.33
0.8	1249.4	6.28
1.0	1249.1	6.26
2.0	1248.1	6.23
3.0	1247.1	6.24
4.0	1246.1	6.23
5.0	1245.1	6.23
6.0	1244.1	6.23
8.0	1242.1	6.24
10.0	1240.1	6.25
15.0	1235.1	6.27
20.0	1230.1	6.27
25.0	1225.1	6.29
30.0	1220.1	6.30
35.0	1215.1	6.31
40.0	1210.1	6.31
50.0	1200.1	6.33
65.0	1185.1	6.35
80.0	1170.1	6.39
100.0	1150.1	6.47
120.0	1130.1	6.49
140.0	1110.1	6.53
160.0	1090.1	6.60
180.0	1070.1	6.63
200.0	1050.1	6.73
220.0	1030.1	6.80
240.0	1010.1	6.83
260.0	990.1	6.97
280.0	970.1	7.03
300.0	950.1	7.14
320.0	930.1	7.19
340.0	910.1	7.35
360.0	890.1	7.46
380.0	870.1	7.53
400.0	850.1	7.69
420.0	830.1	7.78
440.0	810.1	7.98
460.0	790.1	8.04
480.0	770.1	8.18
500.0	750.1	8.27

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=100.1MHz (dB)
		@LO (dBm)
		+23
0.5	100.6	5.49
0.8	100.9	5.43
1.0	101.1	5.42
2.0	102.1	5.39
3.0	103.1	5.39
4.0	104.1	5.38
5.0	105.1	5.39
6.0	106.1	5.39
8.0	108.1	5.39
10.0	110.1	5.41
15.0	115.1	5.45
20.0	120.1	5.49
25.0	125.1	5.52
30.0	130.1	5.55
35.0	135.1	5.57
40.0	140.1	5.57
50.0	150.1	5.53
65.0	165.1	5.59
80.0	180.1	5.56
100.0	200.1	5.52
120.0	220.1	5.62
140.0	240.1	5.64
160.0	260.1	5.73
180.0	280.1	5.64
200.0	300.1	5.60
220.0	320.1	5.68
240.0	340.1	5.68
260.0	360.1	5.82
280.0	380.1	5.80
300.0	400.1	5.83
320.0	420.1	5.95
340.0	440.1	5.96
360.0	460.1	6.03
380.0	480.1	5.99
400.0	500.1	5.97
420.0	520.1	6.12
440.0	540.1	6.11
460.0	560.1	6.11
480.0	580.1	6.03
500.0	600.1	5.99

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=2500.1MHz (dB)
		@LO (dBm)
		+23
0.5	2499.6	7.18
0.8	2499.4	7.13
1.0	2499.1	7.11
2.0	2498.1	7.09
3.0	2497.1	7.08
4.0	2496.1	7.08
5.0	2495.1	7.08
6.0	2494.1	7.07
8.0	2492.1	7.08
10.0	2490.1	7.09
15.0	2485.1	7.11
20.0	2480.1	7.11
25.0	2475.1	7.13
30.0	2470.1	7.12
35.0	2465.1	7.15
40.0	2460.1	7.16
50.0	2450.1	7.18
65.0	2435.1	7.15
80.0	2420.1	7.18
100.0	2400.1	7.26
120.0	2380.1	7.29
140.0	2360.1	7.38
160.0	2340.1	7.39
180.0	2320.1	7.41
200.0	2300.1	7.45
220.0	2280.1	7.48
240.0	2260.1	7.50
260.0	2240.1	7.45
280.0	2220.1	7.46
300.0	2200.1	7.52
320.0	2180.1	7.58
340.0	2160.1	7.62
360.0	2140.1	7.68
380.0	2120.1	7.82
400.0	2100.1	7.88
420.0	2080.1	7.91
440.0	2060.1	7.93
460.0	2040.1	8.01
480.0	2020.1	8.11
500.0	2000.1	8.12

Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB) @LO (dBm)			LO-IF ISOLATION (dB) @LO (dBm)		
	+20	+23	+26	+20	+23	+26
10.1	85.12	85.54	84.02	81.21	73.09	59.57
30.1	70.99	70.97	74.24	52.79	53.40	54.66
50.1	65.25	65.17	68.68	52.16	53.71	55.59
75.1	61.09	61.05	65.92	52.87	55.00	56.98
100.1	58.12	58.10	63.09	55.03	58.09	59.60
140.1	55.02	55.00	58.17	58.91	72.77	63.02
180.1	52.86	52.85	58.03	58.80	56.06	51.65
220.1	51.09	51.08	55.17	51.04	50.22	48.13
260.1	50.29	50.27	54.90	46.56	46.70	45.61
300.1	48.70	48.69	53.18	42.74	42.29	41.02
350.1	47.63	47.62	51.12	40.46	40.92	40.76
400.1	46.23	46.22	51.25	37.15	37.11	36.41
450.1	46.28	46.27	50.33	35.64	36.39	36.50
500.1	45.39	45.38	49.87	33.51	33.66	33.29
550.1	45.20	45.20	51.29	32.65	33.66	33.90
600.1	43.89	43.88	48.79	30.58	31.01	30.95
700.1	41.37	41.36	46.07	28.14	28.71	28.95
800.1	41.81	41.79	46.38	26.75	27.14	27.41
900.1	43.57	43.55	50.31	25.40	25.83	26.13
1000.1	43.69	43.66	52.19	23.31	23.97	24.28
1100.1	42.51	42.48	48.28	21.51	21.92	22.14
1200.1	39.99	39.99	45.35	20.21	20.56	20.67
1300.1	38.62	38.61	42.77	19.51	19.82	19.94
1400.1	37.83	37.82	41.01	19.46	19.78	19.93
1500.1	38.06	38.05	41.69	19.63	20.06	20.32
1600.1	38.50	38.49	44.24	19.95	20.54	20.94
1700.1	37.69	37.69	43.91	20.30	21.10	21.66
1900.1	37.58	37.58	41.18	21.33	22.42	23.28
2050.1	38.52	38.51	41.59	22.47	23.66	24.56
2200.1	38.13	38.12	44.96	23.91	25.22	26.18
2350.1	37.48	37.47	43.26	25.66	26.47	26.96
2500.1	39.09	39.09	42.00	26.91	26.72	26.52
2700.1	39.06	39.06	39.80	27.20	27.28	27.48
2900.1	37.00	37.00	44.69	31.64	31.68	30.69
3100.1	37.62	37.60	45.64	34.28	34.51	33.46
3300.1	34.35	34.37	46.16	30.98	30.18	29.93
3500.1	33.72	33.69	42.20	27.59	26.29	25.31
3700.1	32.89	32.89	42.35	24.25	23.41	22.99
3900.1	31.35	31.34	36.81	22.40	22.18	22.22
4100.1	32.29	32.28	36.25	20.88	21.15	21.73

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB) @LO (dBm)		
		+20	+23	+26
10.1	40.1	60.52	48.98	37.10
30.1	60.1	65.19	60.28	44.61
50.1	80.1	56.21	55.34	49.33
75.1	105.1	54.08	57.61	54.94
100.1	130.1	53.73	54.79	42.66
140.1	170.1	50.69	49.60	49.04
180.1	210.1	47.21	48.64	50.11
220.1	250.1	41.75	42.80	44.77
260.1	290.1	41.54	42.84	41.74
300.1	330.1	41.70	42.29	39.99
350.1	380.1	40.15	40.62	39.82
400.1	430.1	38.65	41.18	41.92
450.1	480.1	37.79	38.04	37.03
500.1	530.1	37.99	38.74	40.19
550.1	580.1	34.56	34.55	33.74
600.1	630.1	32.11	32.61	34.40
700.1	730.1	28.75	29.33	29.89
800.1	830.1	27.53	28.21	28.99
900.1	930.1	27.86	27.82	28.18
1000.1	1030.1	29.27	28.94	29.05
1100.1	1130.1	28.50	27.97	28.29
1200.1	1230.1	27.84	27.45	27.50
1300.1	1330.1	28.82	28.80	28.73
1400.1	1430.1	30.27	30.53	30.84
1500.1	1530.1	30.46	30.57	30.81
1600.1	1630.1	31.13	31.28	31.42
1700.1	1730.1	32.36	32.38	32.49
1900.1	1930.1	35.82	35.63	35.64
2050.1	2080.1	38.46	38.42	38.38
2200.1	2230.1	40.82	40.15	39.92
2350.1	2380.1	41.75	41.31	41.02
2500.1	2530.1	40.38	40.34	40.42
2700.1	2730.1	34.60	34.69	35.50
2900.1	2930.1	33.87	34.81	36.04
3100.1	3130.1	39.18	41.75	40.83
3300.1	3330.1	48.63	56.52	53.22
3500.1	3530.1	40.97	38.45	37.13
3700.1	3730.1	33.94	33.37	32.88
3900.1	3930.1	29.81	29.02	28.55
4100.1	4130.1	29.19	27.93	26.83

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1) @LO (dBm)		
		+20	+23	+26
10.1	40.1	1.98	1.86	1.78
30.1	60.1	1.45	1.35	1.30
50.1	80.1	1.37	1.29	1.25
75.1	105.1	1.37	1.28	1.24
100.1	130.1	1.44	1.33	1.26
140.1	170.1	1.43	1.33	1.27
180.1	210.1	1.41	1.32	1.26
220.1	250.1	1.45	1.34	1.28
260.1	290.1	1.40	1.30	1.23
300.1	330.1	1.43	1.33	1.26
350.1	380.1	1.37	1.29	1.24
400.1	430.1	1.39	1.31	1.27
450.1	480.1	1.39	1.36	1.34
500.1	530.1	1.41	1.41	1.41
550.1	580.1	1.43	1.43	1.43
600.1	630.1	1.52	1.48	1.47
700.1	730.1	2.40	2.29	2.21
800.1	830.1	3.86	3.63	3.47
900.1	930.1	4.59	4.34	4.17
1000.1	1030.1	4.22	4.03	3.90
1100.1	1130.1	3.42	3.31	3.24
1200.1	1230.1	2.58	2.48	2.43
1300.1	1330.1	2.10	1.94	1.85
1400.1	1430.1	2.41	2.29	2.17
1500.1	1530.1	2.43	2.34	2.25
1600.1	1630.1	2.30	2.22	2.16
1700.1	1730.1	2.57	2.48	2.42
1900.1	1930.1	5.77	5.28	5.00
2050.1	2080.1	9.08	8.31	7.70
2200.1	2230.1	5.70	5.17	4.83
2350.1	2380.1	2.97	2.71	2.50
2500.1	2530.1	1.57	1.46	1.33
2700.1	2730.1	1.66	1.64	1.63
2900.1	2930.1	2.59	2.46	2.40
3100.1	3130.1	2.36	2.08	2.05
3300.1	3330.1	1.74	1.67	1.71
3500.1	3530.1	1.69	1.88	2.10
3700.1	3730.1	1.91	1.95	2.07
3900.1	3930.1	1.47	1.47	1.53
4100.1	4130.1	2.55	2.62	2.56

LO (MHz)	LO VSWR (:1) @LO (dBm)		
	+20	+23	+26
10.1	31.03	28.49	15.26
30.1	4.22	3.87	3.66
50.1	2.79	3.17	3.32
75.1	3.40	4.86	7.47
100.1	2.97	4.37	6.83
140.1	2.22	2.81	3.14
180.1	2.95	4.61	7.97
220.1	2.13	2.72	2.99
260.1	2.78	4.20	7.11
300.1	2.24	2.93	3.19
350.1	2.63	3.86	6.01
400.1	2.19	2.81	3.27
450.1	2.53	3.43	4.25
500.1	2.21	2.83	3.33
550.1	2.38	3.10	3.76
600.1	2.19	2.78	3.19
700.1	2.07	2.49	2.72
800.1	2.02	2.30	2.54
900.1	2.01	2.20	2.41
1000.1	2.02	2.18	2.35
1100.1	1.91	2.08	2.28
1200.1	1.66	1.80	2.03
1300.1	1.52	1.57	1.76
1400.1	1.38	1.42	1.55
1500.1	1.27	1.32	1.44
1600.1	1.18	1.28	1.41
1700.1	1.11	1.24	1.37
1900.1	1.08	1.28	1.40
2050.1	1.31	1.56	1.69
2200.1	1.65	1.97	2.20
2350.1	1.80	2.06	2.27
2500.1	1.87	2.08	2.21
2700.1	1.80	1.92	2.06
2900.1	2.01	2.03	2.10
3100.1	3.10	2.85	3.08
3300.1	3.25	2.72	2.52
3500.1	3.01	2.47	2.30
3700.1	2.78	2.59	2.60
3900.1	2.75	2.78	2.72
4100.1	3.30	3.56	3.58

IF (OUT) (MHz)	IF VSWR @LO=2500.1MHz (:1) @LO (dBm)		
	+20	+23	+26
0.5	1.31	1.46	1.68
0.8	1.10	1.25	1.47
1.0	1.10	1.15	1.38
2.0	1.18	1.08	1.29
3.0	1.17	1.09	1.30
4.0	1.15	1.10	1.31
5.0	1.14	1.11	1.32
6.0	1.13	1.11	1.33
8.0	1.12	1.12	1.34
10.0	1.11	1.12	1.34
15.0	1.12	1.13	1.34
20.0	1.13	1.13	1.34
25.0	1.14	1.14	1.34
30.0	1.16	1.15	1.34
35.0	1.17	1.16	1.34
40.0	1.18	1.17	1.35
50.0	1.21	1.19	1.36
65.0	1.24	1.23	1.39
80.0	1.27	1.27	1.43
100.0	1.32	1.34	1.48
120.0	1.37	1.40	1.55
140.0	1.42	1.46	1.61
160.0	1.47	1.53	1.69
180.0	1.52	1.61	1.77
200.0	1.57	1.67	1.83
220.0	1.63	1.74	1.92
240.0	1.68	1.81	2.00
260.0	1.72	1.87	2.07
280.0	1.77	1.94	2.15
300.0	1.81	2.01	2.24
320.0	1.84	2.06	2.29
340.0	1.88	2.12	2.37
360.0	1.90	2.16	2.42
380.0	1.92	2.18	2.46
400.0	1.96	2.24	2.54
420.0	1.95	2.25	2.55
440.0	1.95	2.25	2.55
460.0	1.95	2.28	2.59
480.0	1.94	2.28	2.60
500.0	1.91	2.25	2.57

Harmonics Tables

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	+9	33	18	47	28	36	18	33	25	33
1	-	24	+0	45	22	42	42	53	39	47	54	52
2	96	71	59	74	62	74	69	75	72	79	54	85
3	>122	91	75	87	67	104	79	91	88	93	88	84
4	>122	108	102	100	101	91	103	105	105	107	>119	104
5	>121	119	>120	120	113	115	96	>123	104	118	118	>120
6	>119	>123	>125	>125	>123	124	117	>118	>122	>124	>121	>121
7	>122	>121	>122	>123	>123	>121	>123	121	>122	>124	>123	>123
8	>121	>122	>123	>122	>122	>123	123	>124	>119	>122	>123	>123
9	>120	>122	>122	>122	>121	>124	>122	>122	124	>120	>122	>123
10	>119	>120	>124	>122	>122	>121	>122	>123	>123	>125	>120	>122
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:
RF IN: 1300.1 MHz; -.04.00 dBm.
LO IN: 1330.01 MHz; +23.00 dBm
IF OUT: 29.91 MHz; -6.09 dBm

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	1	43	28	58	37	47	31	44	53	45
1	-	23	+0	46	22	43	42	56	40	53	58	64
2	84	66	49	61	53	67	60	69	65	73	48	66
3	>120	75	57	62	47	68	60	72	69	75	65	66
4	>120	91	85	86	76	69	80	83	79	88	92	88
5	>122	89	101	84	93	76	69	90	77	86	89	91
6	>120	95	101	102	95	94	93	81	97	104	101	107
7	>119	100	98	105	102	104	103	96	80	111	87	102
8	>121	113	103	103	>129	117	98	102	98	87	105	101
9	>120	125	120	107	109	118	113	112	110	103	90	114
10	>120	119	132	129	121	115	128	127	109	115	103	98
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

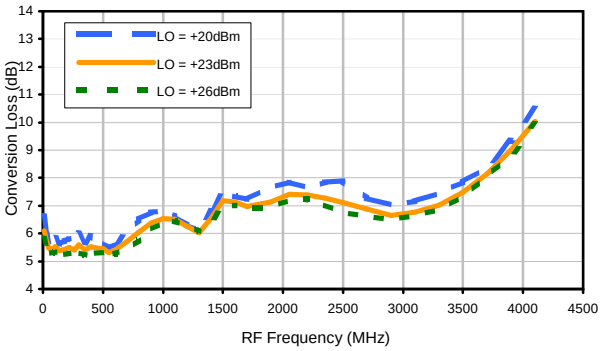
Test conditions:
RF IN: 1300.1 MHz; 9.99.00 dBm.
LO IN: 1330.01 MHz; +23.00 dBm
IF OUT: 29.91 MHz; 3.92 dBm

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.

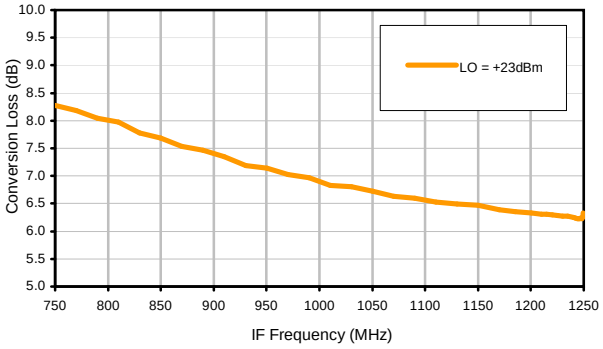
Frequency Mixer RAY-11+

Typical Performance Curves

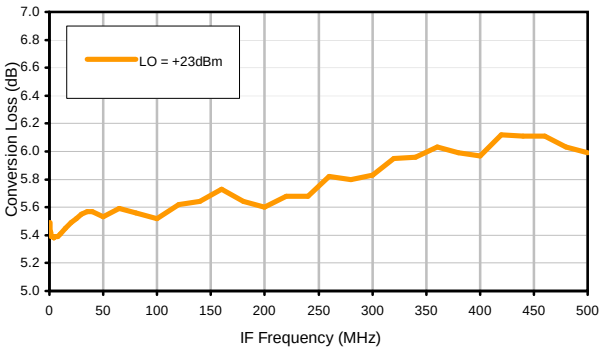
Conversion Loss @ IF=30MHz



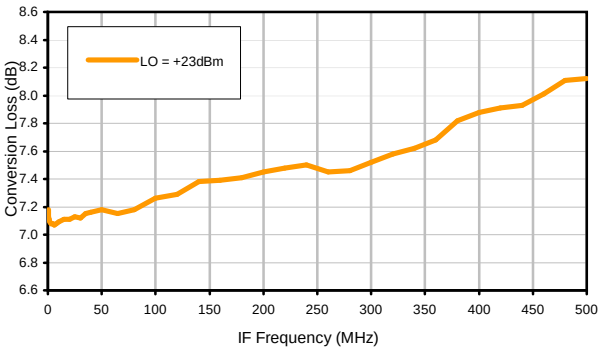
Conversion Loss vs. IF @ RF=1250.1MHz



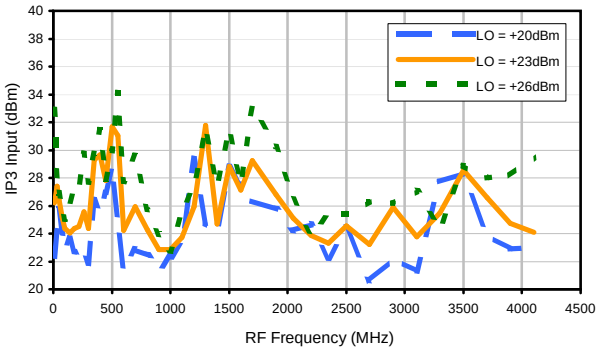
Conversion Loss vs. IF @ RF=100.1MHz



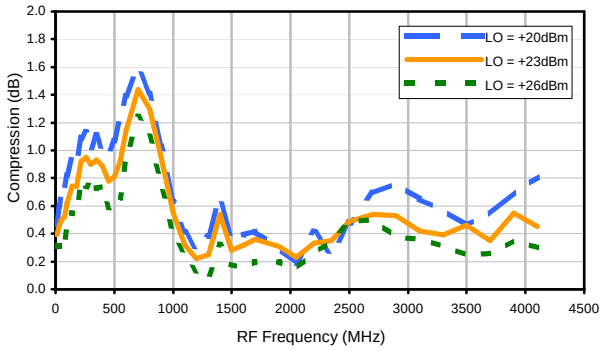
Conversion Loss vs. IF @ RF=2500.1MHz



IP3 Input

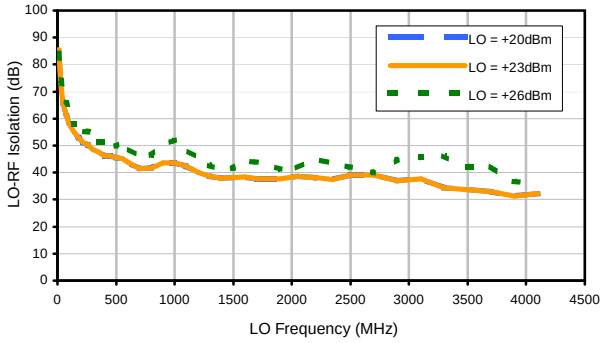


Compression @ RF IN=+15dBm

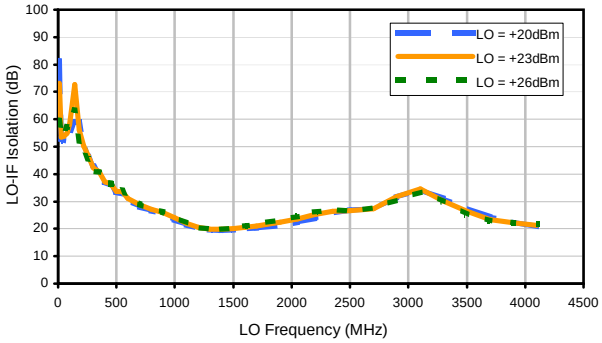


Typical Performance Curves

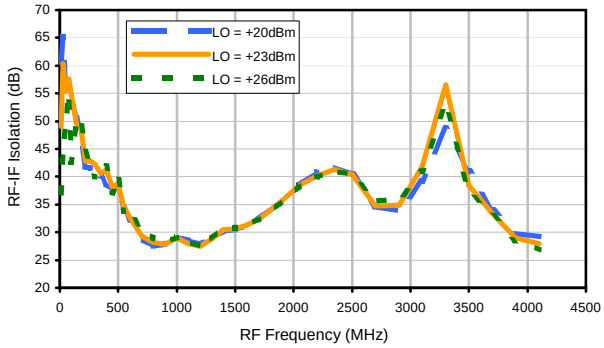
LO-RF Isolation



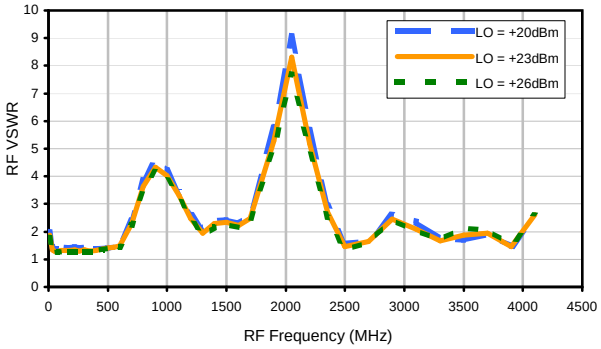
LO-IF Isolation



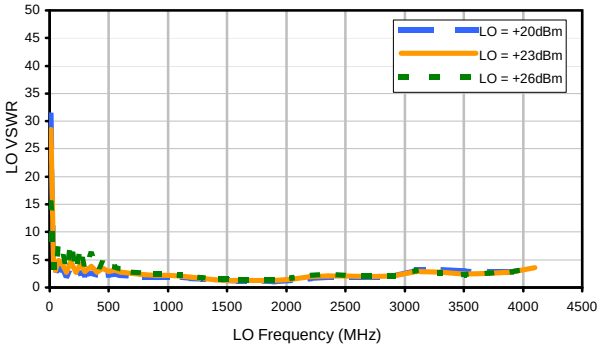
RF-IF Isolation



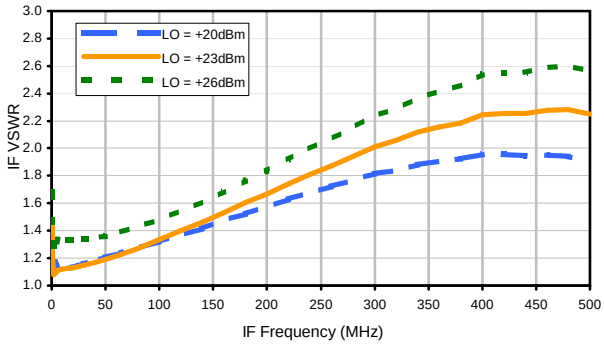
RF VSWR



LO VSWR



IF VSWR



Harmonics Tables

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	+9	33	18	47	28	36	18	33	25	33
1	-	24	+0	45	22	42	42	53	39	47	54	52
2	96	71	59	74	62	74	69	75	72	79	54	85
3	>122	91	75	87	67	104	79	91	88	93	88	84
4	>122	108	102	100	101	91	103	105	105	107	>119	104
5	>121	119	>120	120	113	115	96	>123	104	118	118	>120
6	>119	>123	>125	>125	>123	124	117	>118	>122	>124	>121	>121
7	>122	>121	>122	>123	>123	>121	>123	121	>122	>124	>123	>123
8	>121	>122	>123	>122	>122	>123	123	>124	>119	>122	>123	>123
9	>120	>122	>122	>122	>121	>124	>122	>122	124	>120	>122	>123
10	>119	>120	>124	>122	>122	>121	>122	>123	>123	>125	>120	>122
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:
RF IN: 1300.1 MHz; -.04.00 dBm.
LO IN: 1330.01 MHz; +23.00 dBm
IF OUT: 29.91 MHz; -6.09 dBm

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	1	43	28	58	37	47	31	44	53	45
1	-	23	+0	46	22	43	42	56	40	53	58	64
2	84	66	49	61	53	67	60	69	65	73	48	66
3	>120	75	57	62	47	68	60	72	69	75	65	66
4	>120	91	85	86	76	69	80	83	79	88	92	88
5	>122	89	101	84	93	76	69	90	77	86	89	91
6	>120	95	101	102	95	94	93	81	97	104	101	107
7	>119	100	98	105	102	104	103	96	80	111	87	102
8	>121	113	103	103	>129	117	98	102	98	87	105	101
9	>120	125	120	107	109	118	113	112	110	103	90	114
10	>120	119	132	129	121	115	128	127	109	115	103	98
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

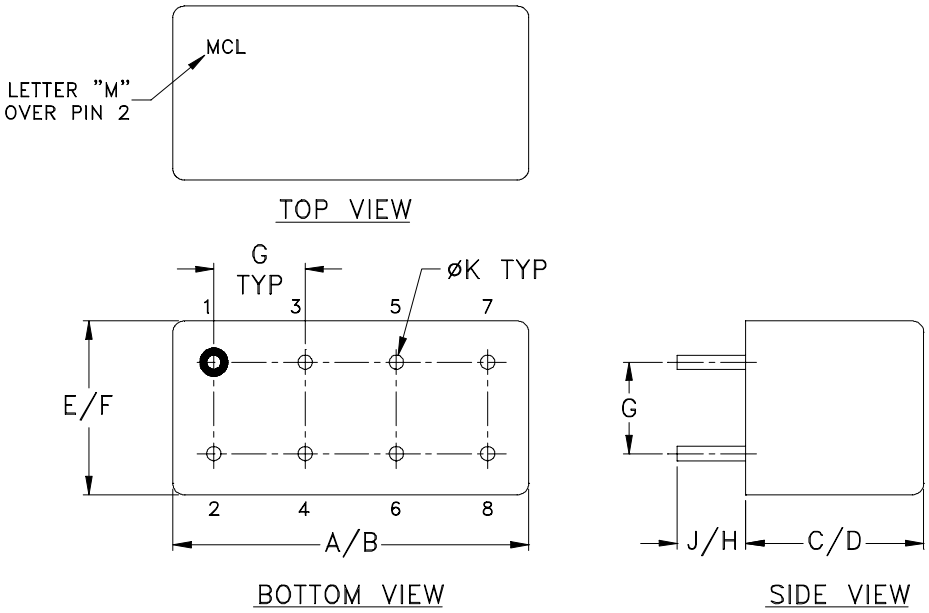
Test conditions:
RF IN: 1300.1 MHz; 9.99.00 dBm.
LO IN: 1330.01 MHz; +23.00 dBm
IF OUT: 29.91 MHz; 3.92 dBm

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.

Case Style A

A01
A04
A05
A06

Outline Dimensions



CASE#	A	B	C	D	E	F	G	H	J	K	WT, GRAM
A01	.770 (19.56)	.800 (20.32)	.385 (9.78)	.400 (10.16)	.370 (9.40)	.400 (10.16)	.200 (5.08)	.20 (5.08)	.14 (3.56)	.031 (.79)	5.2
A04			.200 (5.08)	.210 (5.33)							3.7
A05			.240 (6.10)	.250 (6.35)							3.7
A06			.285 (7.24)	.310 (7.87)							5.2

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

Notes:

1. Header material: C.R.S.
   Pin material: #52 alloy.
   Cover material: Cupro-Nickel.
2. Pin finish: Electro Tin-Silver.
3. Insulated spacer available. Request P/N B14-045-01.
4. Tolerance on pin diameter +/-.005 inch.
5. Glass meniscus 0.015 inch max.
6. Blue bead indicates Pin 1. Pin numbers do not appear on unit, for reference only.

Mini-Circuits®
INTERNET http://www.minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010
Mini-Circuits ISO 9001 & ISO 14001 Certified

Mini-Circuits

Environmental Specifications ENV01

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
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, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A
Moisture Resistance	10 cycles, 24 hours per cycle	MIL-STD-202, Method 106, Condition A, except 50°C and end point electrical test done within 12 hours
Solderability	10X Magnification	J-STD-002, 95% Coverage
Resistance to Solder Heat	260°C for 10 seconds	MIL-STD-202, Method 210, Condition B
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215
Terminal Strength	4 1/2 Pound Pull	MIL-STD-202, Method 211, Condition A

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
Gross Leak	125°C Bubble Test	MIL-STD-202, Method 112, Condition D
Barometric Pressure	100,000 Feet	MIL-STD-202, Method 105, Condition D