

Coaxial Frequency Mixer

Level 13 (LO Power +13 dBm) 20 to 1500 MHz

NON-CATALOG

ZP-5MH+
ZP-5MH

Maximum Ratings

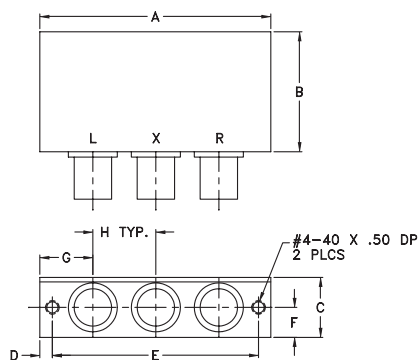
Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
RF Power	200mW
IF Current	40mA

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

Coaxial Connections

LO	L
RF	R
IF	X

Outline Drawing



Outline Dimensions (inch)

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, 7.0 dB typ.
- excellent L-R isolation, 41 dB typ.
- rugged shielded case

Applications

- VHF/UHF
- satellite distribution
- instrumentation



BNC version shown
CASE STYLE: GG60

Connectors	Model
BNC	ZP-5MH(+)
SMA	ZP-5MH-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 f_L - f_U	IF	Mid-Band m		Total Range		L		M		U		L		M		U	
		$\bar{X}$	σ	Max.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.
20-1500	DC-1000	7.0	0.25	8.5	9.0	50	40	41	30	35	25	38	25	28	18	20	8

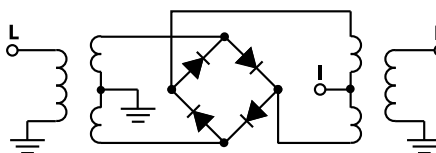
1 dB COMP.: +9 dBm typ.

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 +13dBm	LO +13dBm	LO +13dBm	LO +13dBm	LO +13dBm
20.00	50.00	5.87	65.81	50.21	1.57	2.60
50.00	80.00	5.57	58.31	42.94	1.38	2.52
100.00	70.00	5.41	52.44	37.15	1.37	2.40
158.75	128.75	5.37	48.96	34.29	1.48	2.28
200.00	170.00	5.43	47.29	32.96	1.56	2.37
297.50	267.50	5.51	45.30	30.09	1.77	2.30
436.25	406.25	5.79	45.57	27.35	2.15	2.34
500.00	470.00	5.90	45.56	26.32	2.23	2.33
575.00	545.00	6.21	44.68	25.44	2.70	2.39
713.75	683.75	6.95	43.61	24.34	3.13	2.40
750.00	720.00	7.16	43.15	24.17	3.17	2.43
760.00	730.00	7.15	43.01	24.16	3.31	2.44
852.50	822.50	7.16	41.36	23.95	3.52	2.50
991.25	961.25	7.16	39.32	22.75	3.65	2.58
1000.00	970.00	7.32	39.30	22.64	3.71	2.59
1130.00	1100.00	7.38	36.80	20.71	3.70	2.62
1222.50	1192.50	7.32	38.30	18.60	3.63	2.70
1361.25	1331.25	7.13	37.67	15.58	3.42	2.64
1453.75	1423.75	7.10	37.62	13.78	3.33	2.62
1500.00	1470.00	7.00	37.26	12.95	3.23	2.57

Electrical Schematic



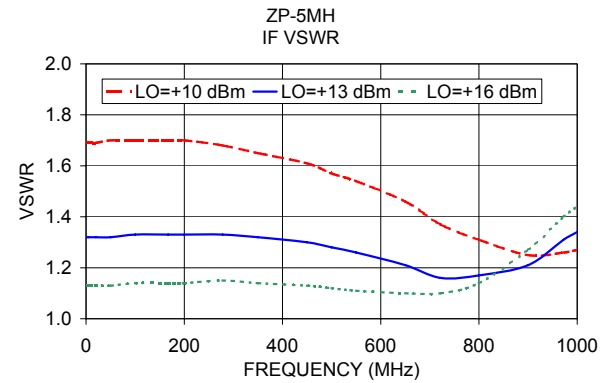
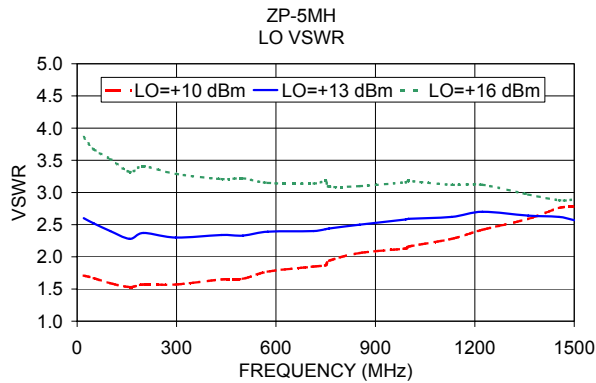
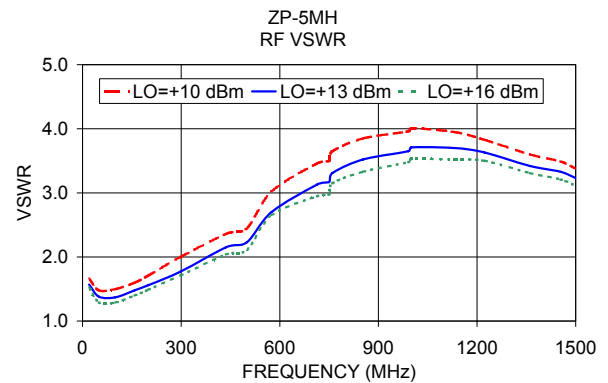
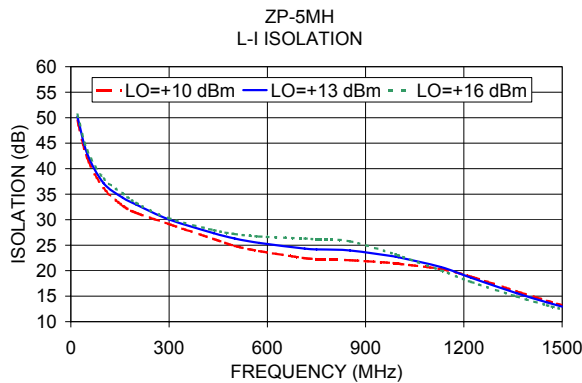
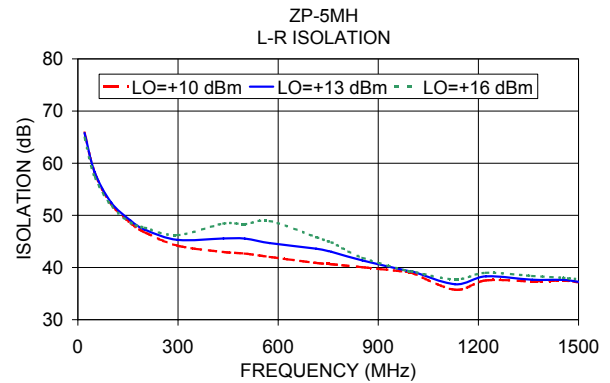
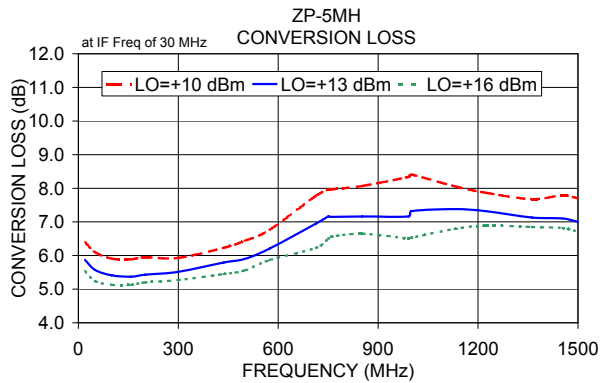
Notes

- 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-Circuits' applicable established test performance criteria and measurement instructions.
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Frequency Mixer

ZP-5MH+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB)		
		@LO (dBm)		
		+10	+13	+16
10.1	40.1	6.12	5.68	5.46
70.4	100.4	5.98	5.59	5.38
130.6	160.6	5.85	5.50	5.34
190.9	220.9	5.94	5.57	5.38
251.1	281.1	5.97	5.61	5.43
311.4	341.4	6.09	5.70	5.50
371.6	401.6	6.21	5.81	5.58
431.9	461.9	6.21	5.80	5.59
492.1	522.1	6.35	5.93	5.68
552.4	582.4	6.62	6.07	5.82
612.6	642.6	6.96	6.20	5.78
672.9	702.9	7.25	6.60	6.10
733.1	763.1	7.64	6.94	6.43
793.4	823.4	7.83	7.05	6.61
853.6	883.6	7.71	6.87	6.39
913.9	943.9	7.76	6.79	6.31
974.1	1004.1	7.86	6.94	6.36
1034.4	1064.4	7.61	6.97	6.45
1094.6	1124.6	7.40	6.93	6.49
1154.9	1184.9	7.37	6.89	6.51
1215.1	1245.1	7.30	6.90	6.55
1275.4	1305.4	7.14	6.76	6.50
1335.6	1365.6	7.23	6.76	6.49
1395.9	1425.9	7.32	6.81	6.48
1456.2	1486.2	7.23	6.67	6.29
1516.4	1546.4	7.23	6.48	6.12
1576.7	1606.7	7.21	6.31	6.11
1636.9	1666.9	6.84	6.26	6.12
1697.2	1727.2	6.96	6.35	6.17
1757.4	1787.4	7.77	6.54	6.26
1817.7	1847.7	8.31	6.81	6.39
1877.9	1907.9	8.76	7.05	6.56
1938.2	1968.2	10.07	7.35	6.71
1998.4	2028.4	11.26	7.70	6.82
2058.7	2088.7	11.25	7.94	6.94
2118.9	2148.9	12.50	8.36	6.99
2199.3	2229.3	13.59	8.91	7.21
2259.5	2289.5	15.67	9.75	7.53
2339.8	2369.8	15.06	9.71	7.74
2400.1	2430.1	17.75	10.61	7.97

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)		
		@LO (dBm)		
		+10	+13	+16
10.1	40.1	19.72	21.85	25.11
70.4	100.4	20.29	22.74	20.70
130.6	160.6	19.90	17.74	18.70
190.9	220.9	16.05	16.73	19.18
251.1	281.1	14.67	16.80	20.03
311.4	341.4	14.52	17.04	20.77
371.6	401.6	14.68	17.30	22.08
431.9	461.9	14.76	20.12	25.09
492.1	522.1	14.99	17.43	21.91
552.4	582.4	15.68	19.45	22.08
612.6	642.6	13.67	21.85	23.74
672.9	702.9	13.99	16.85	22.49
733.1	763.1	15.52	17.35	19.89
793.4	823.4	14.77	16.20	17.12
853.6	883.6	13.74	15.65	17.67
913.9	943.9	14.21	16.42	19.02
974.1	1004.1	15.29	15.54	16.77
1034.4	1064.4	16.32	15.87	15.96
1094.6	1124.6	16.65	16.24	15.38
1154.9	1184.9	17.36	16.32	15.43
1215.1	1245.1	17.46	16.43	14.80
1275.4	1305.4	17.19	15.72	14.85
1335.6	1365.6	16.02	16.38	15.55
1395.9	1425.9	15.06	16.67	19.56
1456.2	1486.2	15.07	20.63	17.99
1516.4	1546.4	16.10	16.79	18.30
1576.7	1606.7	15.19	17.56	21.01
1636.9	1666.9	15.01	20.21	22.15
1697.2	1727.2	14.67	20.06	21.02
1757.4	1787.4	13.46	20.69	23.37
1817.7	1847.7	15.86	18.91	23.99
1877.9	1907.9	19.16	17.87	21.09
1938.2	1968.2	13.43	17.28	19.38
1998.4	2028.4	10.17	16.83	18.34
2058.7	2088.7	10.31	16.25	17.71
2118.9	2148.9	8.04	16.24	16.64
2199.3	2229.3	6.79	16.86	15.54
2259.5	2289.5	4.35	16.62	16.21
2339.8	2369.8	5.41	17.56	16.72
2400.1	2430.1	3.09	14.25	17.68

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+9dBm (dB)		
		@LO (dBm)		
		+10	+13	+16
10.1	40.1	1.39	1.15	0.99
70.4	100.4	1.53	1.28	1.08
130.6	160.6	1.63	1.33	1.12
190.9	220.9	1.57	1.27	1.07
251.1	281.1	1.61	1.29	1.10
311.4	341.4	1.57	1.32	1.12
371.6	401.6	1.60	1.37	1.21
431.9	461.9	1.68	1.48	1.28
492.1	522.1	1.84	1.58	1.43
552.4	582.4	1.97	1.77	1.56
612.6	642.6	1.89	1.88	1.75
672.9	702.9	1.70	1.65	1.64
733.1	763.1	1.65	1.53	1.53
793.4	823.4	1.55	1.52	1.44
853.6	883.6	1.53	1.62	1.58
913.9	943.9	1.45	1.73	1.57
974.1	1004.1	1.21	1.47	1.48
1034.4	1064.4	1.23	1.28	1.32
1094.6	1124.6	1.25	1.20	1.17
1154.9	1184.9	1.32	1.17	1.14
1215.1	1245.1	1.36	1.12	1.07
1275.4	1305.4	1.33	1.15	1.06
1335.6	1365.6	1.47	1.18	1.08
1395.9	1425.9	1.53	1.15	1.05
1456.2	1486.2	1.38	1.13	0.99
1516.4	1546.4	1.66	1.28	0.89
1576.7	1606.7	2.04	1.26	0.73
1636.9	1666.9	2.05	1.09	0.64
1697.2	1727.2	2.16	1.10	0.69
1757.4	1787.4	2.22	1.35	0.81
1817.7	1847.7	1.82	1.38	0.84
1877.9	1907.9	1.53	1.35	0.90
1938.2	1968.2	0.97	1.38	0.91
1998.4	2028.4	0.21	1.39	1.00
2058.7	2088.7	0.19	1.28	1.03
2118.9	2148.9	-0.52	1.21	1.07
2199.3	2229.3	-1.35	0.99	1.01
2259.5	2289.5	-2.81	0.76	0.89
2339.8	2369.8	-2.28	0.76	0.80
2400.1	2430.1	-3.48	0.68	0.98

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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)=750.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=20.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1500.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+13			+13			+13
710.0	40.1	6.17	10.0	30.1	6.00	1000.0	500.1	7.54
692.1	58.0	6.24	30.2	50.3	5.84	979.8	520.3	7.44
674.1	76.0	6.34	50.4	70.5	5.84	959.6	540.5	7.37
656.2	93.9	6.31	70.6	90.7	5.91	939.4	560.7	7.33
638.2	111.9	6.39	90.8	110.9	5.83	919.2	580.9	7.27
620.3	129.8	6.38	111.0	131.1	5.81	899.0	601.1	7.25
602.3	147.8	6.46	131.2	151.3	5.80	878.8	621.3	7.18
584.4	165.7	6.48	151.4	171.5	5.84	858.6	641.5	7.18
566.4	183.7	6.59	171.6	191.7	5.78	838.4	661.7	7.22
548.5	201.6	6.59	191.8	211.9	5.76	818.2	681.9	7.22
530.5	219.6	6.59	212.0	232.1	5.76	798.0	702.1	7.24
512.6	237.5	6.53	232.2	252.3	5.72	777.8	722.3	7.19
494.6	255.5	6.58	252.4	272.5	5.77	757.6	742.5	7.20
476.7	273.4	6.55	272.7	292.8	5.74	737.3	762.8	7.03
458.7	291.4	6.64	292.9	313.0	5.73	717.1	783.0	7.04
440.8	309.3	6.65	313.1	333.2	5.73	696.9	803.2	7.05
422.8	327.3	6.60	333.3	353.4	5.71	676.7	823.4	6.95
404.9	345.2	6.52	353.5	373.6	5.76	656.5	843.6	6.92
386.9	363.2	6.53	373.7	393.8	5.73	636.3	863.8	6.88
369.0	381.1	6.52	393.9	414.0	5.73	616.1	884.0	6.79
351.0	399.1	6.62	434.3	454.4	5.75	575.7	924.4	6.64
333.1	417.0	6.61	454.5	474.6	5.78	555.5	944.6	6.64
315.1	435.0	6.60	494.9	515.0	5.78	515.1	985.0	6.52
297.2	452.9	6.61	515.1	535.2	5.74	494.9	1005.2	6.52
279.2	470.9	6.57	555.5	575.6	5.84	454.5	1045.6	6.58
261.3	488.8	6.71	575.7	595.8	5.79	434.3	1065.8	6.53
243.3	506.8	6.71	616.1	636.2	5.83	393.9	1106.2	6.66
225.4	524.7	6.74	636.3	656.4	5.90	373.7	1126.4	6.67
207.4	542.7	6.72	676.7	696.8	5.95	333.3	1166.8	6.69
189.5	560.6	6.70	696.9	717.0	6.02	313.1	1187.0	6.79
171.5	578.6	6.70	737.3	757.4	6.18	272.7	1227.4	6.85
153.6	596.5	6.73	757.6	777.7	6.16	252.4	1247.7	6.86
135.6	614.5	6.66	798.0	818.1	6.26	212.0	1288.1	6.88
117.7	632.4	6.68	818.2	838.3	6.23	191.8	1308.3	6.79
99.7	650.4	6.61	858.6	878.7	6.33	151.4	1348.7	6.79
81.8	668.3	6.82	878.8	898.9	6.37	131.2	1368.9	6.80
63.8	686.3	6.86	919.2	939.3	6.42	90.8	1409.3	6.80
45.9	704.2	6.92	939.4	959.5	6.58	70.6	1429.5	6.85
27.9	722.2	6.90	979.8	999.9	6.79	30.2	1469.9	6.73
10.0	740.1	7.09	1000.0	1020.1	6.84	10.0	1490.1	6.86

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Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+10	+13	+16	+10	+13	+16
10.1	77.50	78.21	78.42	58.38	59.85	60.55
70.4	59.26	60.45	61.43	41.84	43.45	44.89
130.6	54.21	55.74	56.91	37.17	39.32	41.16
190.9	51.12	52.65	53.75	34.71	37.03	38.43
251.1	49.01	50.68	52.00	33.29	35.27	36.47
311.4	47.29	49.13	50.59	31.91	33.74	34.93
371.6	46.36	48.18	49.51	30.83	32.57	33.91
431.9	45.26	47.22	48.85	29.45	31.35	32.89
492.1	44.22	46.15	47.66	28.29	30.53	32.45
552.4	43.51	45.36	46.71	27.47	29.72	31.74
612.6	42.65	44.60	46.25	26.80	29.18	31.23
672.9	41.53	43.82	45.43	25.95	28.39	30.73
733.1	40.93	43.12	44.84	25.64	27.77	29.84
793.4	40.76	42.84	44.70	25.71	27.57	29.10
853.6	40.54	42.37	43.99	25.26	26.64	27.69
913.9	40.31	42.11	43.61	24.76	25.84	26.19
974.1	40.74	42.47	43.93	24.38	24.82	24.60
1034.4	40.97	42.99	44.57	23.77	23.92	23.29
1094.6	40.62	43.40	45.49	23.22	23.19	22.16
1154.9	40.66	43.50	46.11	22.45	22.10	21.07
1215.1	40.99	44.12	47.51	21.66	21.08	20.03
1275.4	40.48	43.91	48.20	21.09	20.13	19.25
1335.6	40.23	43.03	46.76	20.02	19.11	18.21
1395.9	40.34	43.08	47.07	18.60	17.81	16.97
1456.2	40.49	43.22	47.43	17.47	16.72	15.63
1516.4	40.22	43.23	46.41	16.27	15.43	14.48
1576.7	41.49	45.93	47.78	14.94	14.14	13.54
1636.9	43.24	49.05	48.59	13.98	13.36	12.93
1697.2	43.87	50.05	47.65	13.23	12.68	12.41
1757.4	46.34	52.31	47.49	12.42	12.28	12.03
1817.7	46.60	57.56	48.79	11.87	11.83	11.59
1877.9	44.39	58.77	49.55	11.49	11.48	11.27
1938.2	43.93	60.16	51.05	11.04	11.09	11.02
1998.4	44.15	56.81	49.84	10.77	10.82	10.79
2058.7	43.58	52.56	46.79	10.62	10.67	10.58
2118.9	42.43	49.80	45.38	10.40	10.57	10.65
2199.3	41.55	46.48	42.19	10.31	10.37	10.64
2259.5	41.69	44.02	39.81	10.20	10.38	10.58
2339.8	40.26	42.11	38.13	10.22	10.41	10.60
2400.1	39.22	40.79	37.61	10.25	10.42	10.80

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+10	+13	+16
10.1	40.1	54.32	57.37	56.00
70.4	100.4	48.00	48.29	47.07
130.6	160.6	43.44	43.10	42.82
190.9	220.9	40.97	40.25	40.15
251.1	281.1	39.53	38.53	38.25
311.4	341.4	38.23	37.16	36.92
371.6	401.6	36.59	35.63	35.17
431.9	461.9	34.88	34.28	33.83
492.1	522.1	33.90	33.36	33.06
552.4	582.4	32.59	32.01	31.63
612.6	642.6	30.96	30.55	30.11
672.9	702.9	29.91	29.47	29.09
733.1	763.1	29.26	28.74	28.48
793.4	823.4	28.86	28.63	28.37
853.6	883.6	27.92	27.95	27.71
913.9	943.9	26.81	27.19	27.15
974.1	1004.1	25.68	26.19	26.47
1034.4	1064.4	24.62	24.83	25.20
1094.6	1124.6	23.73	23.84	24.16
1154.9	1184.9	23.15	23.22	23.37
1215.1	1245.1	22.44	22.54	22.66
1275.4	1305.4	21.95	22.11	22.27
1335.6	1365.6	21.50	21.79	21.89
1395.9	1425.9	21.01	21.51	21.71
1456.2	1486.2	21.21	21.69	22.05
1516.4	1546.4	21.66	22.28	22.58
1576.7	1606.7	22.39	23.09	23.31
1636.9	1666.9	23.54	24.06	24.21
1697.2	1727.2	24.32	24.97	25.29
1757.4	1787.4	24.65	25.67	26.19
1817.7	1847.7	25.03	26.40	26.98
1877.9	1907.9	25.52	27.01	27.74
1938.2	1968.2	25.69	27.48	28.46
1998.4	2028.4	26.06	28.26	29.32
2058.7	2088.7	27.23	29.56	30.99
2118.9	2148.9	28.16	31.21	33.48
2199.3	2229.3	30.14	34.40	38.84
2259.5	2289.5	31.76	37.79	45.58
2339.8	2369.8	37.84	54.88	40.60
2400.1	2430.1	43.43	42.71	35.03

Frequency Mixer

ZP-5MH+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=1500.1MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+10	+13	+16		+10	+13	+16		+10	+13	+16
10.1	40.1	1.61	1.55	1.53	10.1	1.48	2.19	3.06	10.0	1.80	1.52	1.27
70.4	100.4	1.20	1.09	1.05	70.4	1.58	2.36	3.37	30.2	1.55	1.24	1.06
130.6	160.6	1.19	1.08	1.04	130.6	1.59	2.42	3.47	50.4	1.40	1.15	1.15
190.9	220.9	1.26	1.15	1.12	190.9	1.56	2.33	3.31	70.6	1.37	1.09	1.11
251.1	281.1	1.32	1.23	1.20	251.1	1.58	2.35	3.33	90.8	1.42	1.14	1.11
311.4	341.4	1.40	1.32	1.28	311.4	1.57	2.32	3.25	111.0	1.49	1.19	1.03
371.6	401.6	1.50	1.41	1.37	371.6	1.68	2.46	3.41	131.2	1.53	1.22	1.06
431.9	461.9	1.60	1.51	1.46	431.9	1.69	2.40	3.29	151.4	1.46	1.16	1.06
492.1	522.1	1.73	1.64	1.57	492.1	1.70	2.37	3.19	171.6	1.41	1.12	1.09
552.4	582.4	1.92	1.80	1.74	552.4	1.81	2.48	3.30	191.8	1.48	1.18	1.06
612.6	642.6	2.20	2.03	1.90	612.6	1.87	2.47	3.19	212.0	1.53	1.22	1.04
672.9	702.9	2.53	2.36	2.20	672.9	1.87	2.46	3.16	232.2	1.48	1.18	1.08
733.1	763.1	2.87	2.68	2.53	733.1	1.94	2.51	3.19	252.4	1.46	1.18	1.12
793.4	823.4	3.14	2.91	2.77	793.4	2.03	2.53	3.15	272.7	1.48	1.19	1.09
853.6	883.6	3.29	2.99	2.82	853.6	2.07	2.48	3.04	292.9	1.48	1.18	1.06
913.9	943.9	3.41	3.07	2.90	913.9	2.12	2.51	3.05	313.1	1.48	1.19	1.10
974.1	1004.1	3.53	3.21	3.00	974.1	2.24	2.65	3.16	333.3	1.52	1.23	1.13
1034.4	1064.4	3.47	3.24	3.02	1034.4	2.29	2.72	3.19	353.5	1.50	1.21	1.10
1094.6	1124.6	3.35	3.17	2.98	1094.6	2.26	2.66	3.13	373.7	1.47	1.18	1.12
1154.9	1184.9	3.27	3.06	2.89	1154.9	2.34	2.73	3.17	393.9	1.50	1.23	1.15
1215.1	1245.1	3.16	2.96	2.78	1215.1	2.39	2.74	3.15	434.3	1.52	1.23	1.13
1275.4	1305.4	3.04	2.84	2.67	1275.4	2.39	2.69	3.08	454.5	1.52	1.25	1.16
1335.6	1365.6	2.99	2.77	2.57	1335.6	2.43	2.68	3.06	494.9	1.58	1.30	1.16
1395.9	1425.9	2.89	2.64	2.42	1395.9	2.45	2.67	3.01	515.1	1.55	1.28	1.18
1456.2	1486.2	2.70	2.39	2.18	1456.2	2.46	2.59	2.90	555.5	1.59	1.30	1.17
1516.4	1546.4	2.50	2.16	2.00	1516.4	2.44	2.51	2.81	575.7	1.59	1.31	1.17
1576.7	1606.7	2.35	1.99	1.87	1576.7	2.47	2.57	2.88	616.1	1.62	1.35	1.24
1636.9	1666.9	2.14	1.90	1.78	1636.9	2.66	2.70	2.93	636.3	1.57	1.30	1.19
1697.2	1727.2	2.11	1.88	1.75	1697.2	2.94	2.83	3.00	676.7	1.64	1.37	1.24
1757.4	1787.4	2.27	1.91	1.77	1757.4	3.21	3.02	3.14	696.9	1.66	1.39	1.26
1817.7	1847.7	2.33	1.92	1.77	1817.7	3.41	3.15	3.21	737.3	1.58	1.34	1.27
1877.9	1907.9	2.32	1.92	1.76	1877.9	3.70	3.31	3.29	757.6	1.60	1.36	1.25
1938.2	1968.2	2.47	1.94	1.77	1938.2	3.89	3.49	3.42	798.0	1.66	1.43	1.33
1998.4	2028.4	2.61	2.00	1.80	1998.4	3.97	3.58	3.47	818.2	1.64	1.43	1.36
2058.7	2088.7	2.56	2.02	1.81	2058.7	4.24	3.82	3.64	858.6	1.58	1.37	1.30
2118.9	2148.9	2.63	2.06	1.79	2118.9	4.37	3.95	3.73	878.8	1.64	1.42	1.35
2199.3	2229.3	2.60	2.04	1.76	2199.3	4.60	4.22	3.91	919.2	1.62	1.46	1.43
2259.5	2289.5	2.67	2.05	1.76	2259.5	4.82	4.40	4.14	939.4	1.56	1.42	1.43
2339.8	2369.8	2.53	1.99	1.79	2339.8	4.96	4.67	4.38	979.8	1.56	1.40	1.39
2400.1	2430.1	2.69	2.08	1.84	2400.1	5.13	4.79	4.51	1000.0	1.59	1.46	1.45

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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	12	52	34	50	27	55	42	70	50	76
1	-	24	+0	42	22	52	42	58	50	72	55	69
2	78	54	39	53	38	65	57	71	47	66	56	77
3	>100	56	37	53	35	56	43	64	42	74	58	75
4	>100	74	71	66	52	62	54	70	66	88	66	80
5	>100	65	57	72	55	74	51	83	59	79	56	74
6	>100	84	71	78	90	72	65	70	62	79	73	79
7	>100	89	76	92	66	85	59	73	55	75	66	85
8	>100	>97	>97	>97	79	91	87	88	67	79	68	88
9	>100	>97	>97	>97	96	90	80	96	72	84	71	>97
10	>100	>97	>97	>97	>97	>97	83	91	92	82	74	80
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions:

RF IN: 750.1 MHz; 4.00 dBm.

LO IN: 780.01 MHz; +13.00 dBm

IF OUT: 29.91 MHz; -2.91 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	1	36	26	42	14	44	33	60	39	61
1	-	25	+0	38	24	47	36	52	46	59	49	58
2	93	63	55	59	52	68	59	>87	57	73	56	80
3	>100	78	57	73	52	75	59	>87	58	76	71	85
4	>100	>87	>87	>87	86	>87	83	>87	>87	>87	78	>87
5	>100	>87	>87	>87	>87	>87	84	>87	>87	>87	86	>87
6	>100	>87	>87	>87	>87	>87	>87	>87	>87	>87	>87	>87
7	>100	>87	>87	>87	>87	>87	>87	>87	>87	>87	>87	>87
8	>100	>87	>87	>87	>87	>87	>87	>87	>87	>87	>87	>87
9	>100	>87	>87	>87	>87	>87	>87	>87	>87	>87	>87	>87
10	>100	>87	>87	>87	>87	>87	>87	>87	>87	>87	>87	>87
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions:

RF IN: 750.1 MHz; -6.00 dBm.

LO IN: 780.01 MHz; +13.00 dBm

IF OUT: 29.91 MHz; -13.18 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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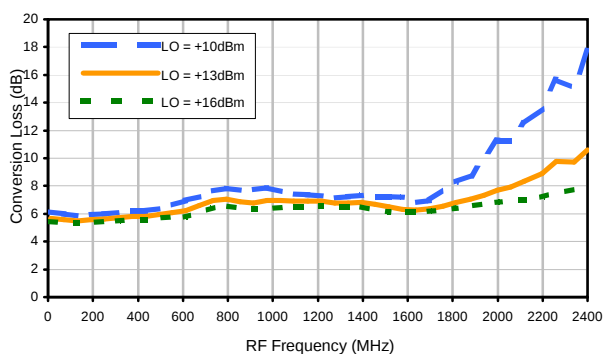


Frequency Mixer

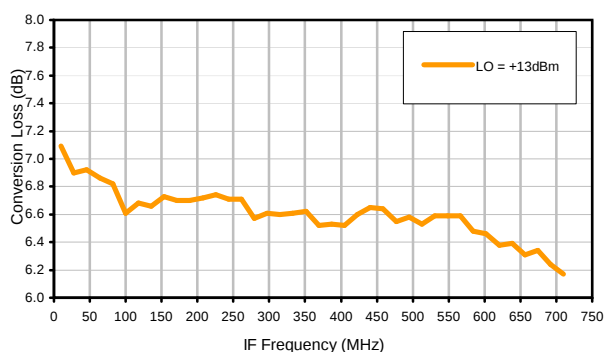
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Typical Performance Curves

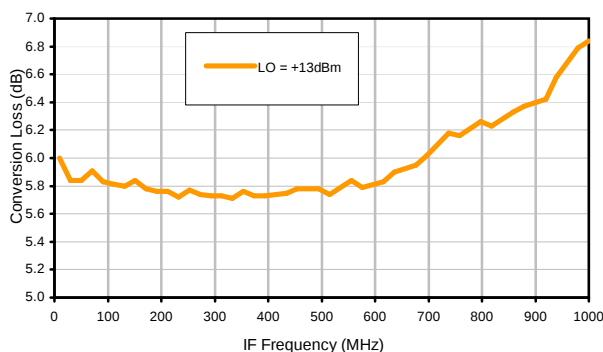
Conversion Loss @ IF=30MHz



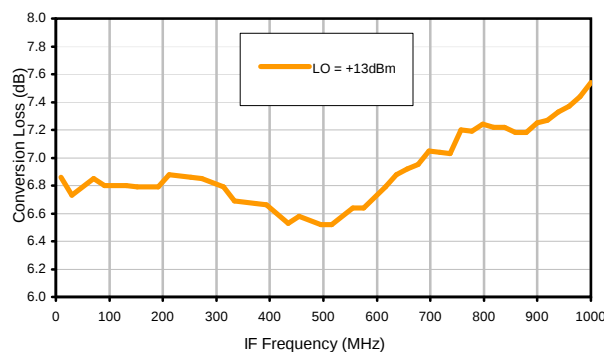
Conversion Loss vs. IF @ RF=750.1MHz



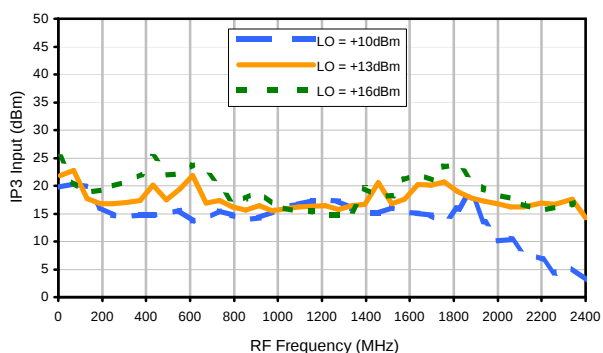
Conversion Loss vs. IF @ RF=20.1MHz



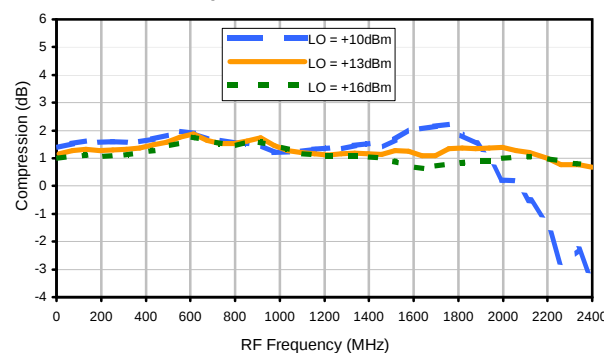
Conversion Loss vs. IF @ RF=1500.1MHz



IP3 Input



Compression @ RF IN=+9dBm



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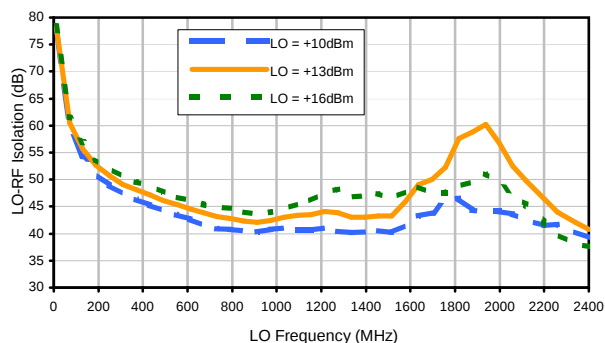


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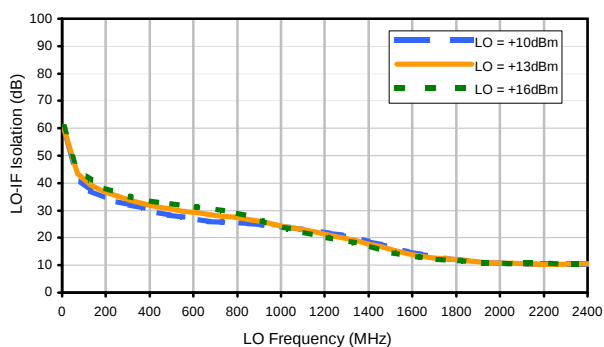


Typical Performance Curves

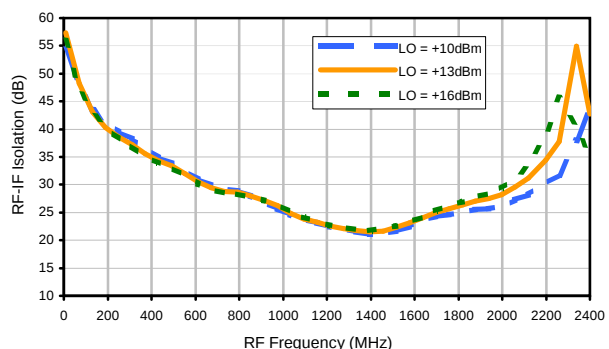
LO-RF Isolation



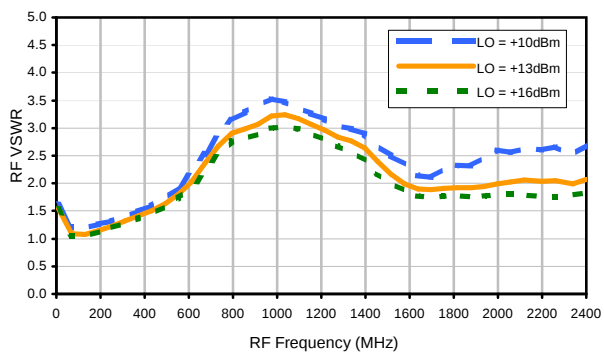
LO-IF Isolation



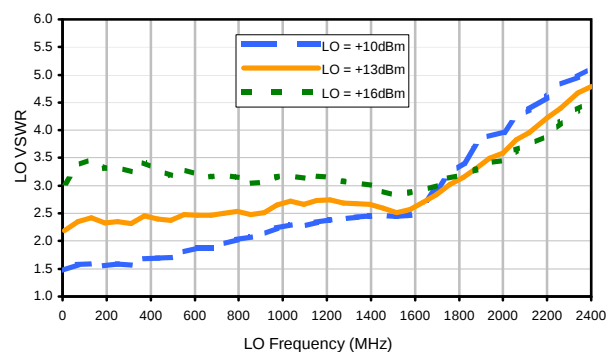
RF-IF Isolation



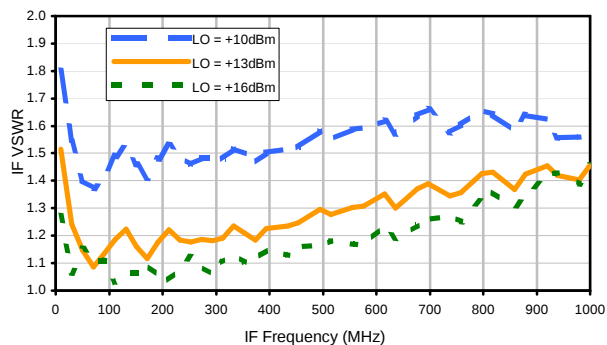
RF VSWR



LO VSWR



IF VSWR



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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	12	52	34	50	27	55	42	70	50	76
1	-	24	+0	42	22	52	42	58	50	72	55	69
2	78	54	39	53	38	65	57	71	47	66	56	77
3	>100	56	37	53	35	56	43	64	42	74	58	75
4	>100	74	71	66	52	62	54	70	66	88	66	80
5	>100	65	57	72	55	74	51	83	59	79	56	74
6	>100	84	71	78	90	72	65	70	62	79	73	79
7	>100	89	76	92	66	85	59	73	55	75	66	85
8	>100	>97	>97	>97	79	91	87	88	67	79	68	88
9	>100	>97	>97	>97	96	90	80	96	72	84	71	>97
10	>100	>97	>97	>97	>97	>97	83	91	92	82	74	80
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions:

RF IN: 750.1 MHz; 4.00 dBm.

LO IN: 780.01 MHz; +13.00 dBm

IF OUT: 29.91 MHz; -2.91 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	1	36	26	42	14	44	33	60	39	61
1	-	25	+0	38	24	47	36	52	46	59	49	58
2	93	63	55	59	52	68	59	>87	57	73	56	80
3	>100	78	57	73	52	75	59	>87	58	76	71	85
4	>100	>87	>87	>87	86	>87	83	>87	>87	>87	78	>87
5	>100	>87	>87	>87	>87	>87	84	>87	>87	>87	86	>87
6	>100	>87	>87	>87	>87	>87	>87	>87	>87	>87	>87	>87
7	>100	>87	>87	>87	>87	>87	>87	>87	>87	>87	>87	>87
8	>100	>87	>87	>87	>87	>87	>87	>87	>87	>87	>87	>87
9	>100	>87	>87	>87	>87	>87	>87	>87	>87	>87	>87	>87
10	>100	>87	>87	>87	>87	>87	>87	>87	>87	>87	>87	>87
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions:

RF IN: 750.1 MHz; -6.00 dBm.

LO IN: 780.01 MHz; +13.00 dBm

IF OUT: 29.91 MHz; -13.18 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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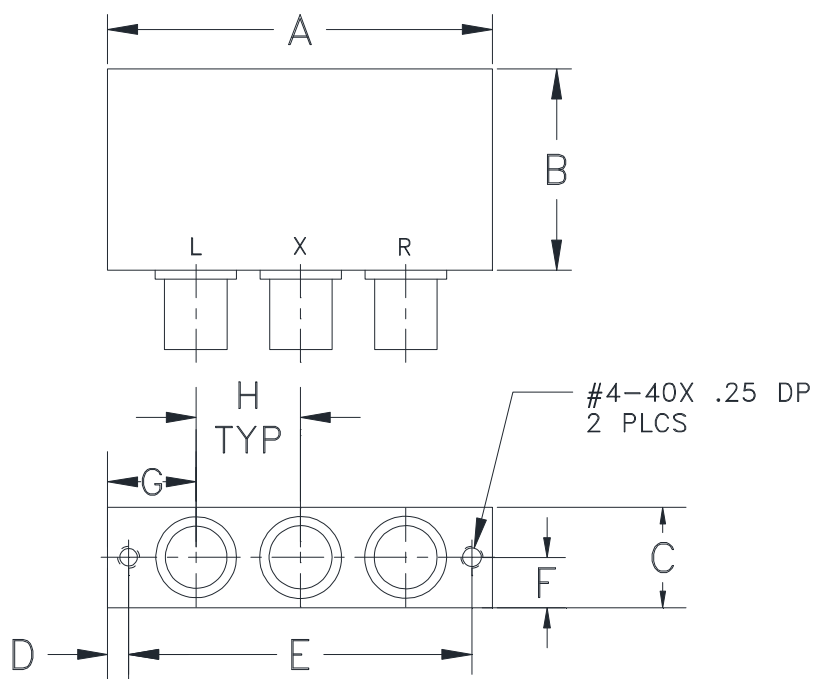


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Outline Dimensions

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