

Frequency Mixer

JMS-11X+

Level 7 (LO Power +7 dBm) 5 to 1900 MHz

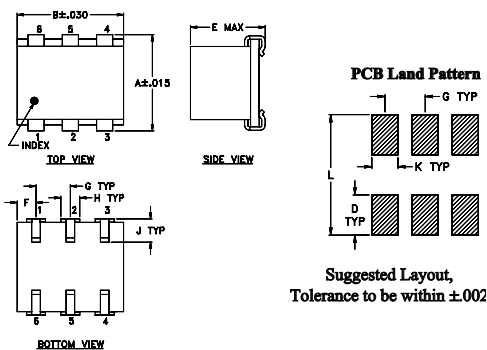
Maximum Ratings

Operating Temperature	-40°C to 85°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.	

Pin Connections

LO	6
RF	2
IF	3
GROUND	1,4,5

Outline Drawing

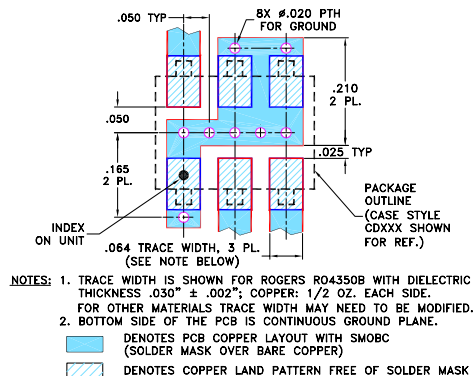


Outline Dimensions (inch)

A	B	C	D	E	F	G
.280	.310	--	.100	.225	.055	.100
7.11	7.87	--	2.54	5.72	1.40	2.54

H	J	K	L	wt
.047	.065	.065	.300	grams
1.19	1.65	1.65	7.62	0.45

Demo Board MCL P/N: TB-03 Suggested PCB Layout (PL-052)



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.
- The parts covered by this specification document are subject to Mini-Circuit's 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-Circuit's website at www.minicircuits.com/MCLStore/terms.jsp

Features

- excellent L-R isolation, up to 58 dB typ.
- miniature surface mount
- J-leads for strain relief and excellent solderability

Applications

- up & down converters for receivers & transmitters
- GPS
- satellite distribution



Generic photo used for illustration purposes only

CASE STYLE: BH292

+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)						IP3 at center band (dBm)
LO/RF	IF	Mid-Band m			Total Range Max.	L	M		U		L	M		U				
		$\bar{X}$	σ	Max.			Typ.	Min.	Typ.	Min.		Typ.	Min.	Typ.	Min.	Typ.	Min.	
5-1900	5-1000	6.7	.15	8.2	9.8	58	45	35	20	27	18	56	45	37	20	27	20	9

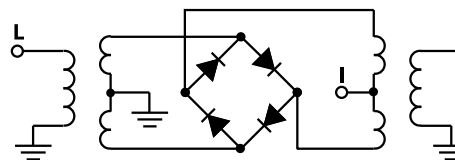
1 dB COMP: +1 dBm typ.

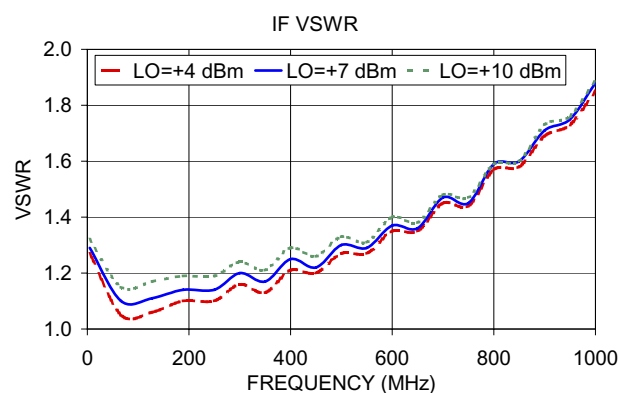
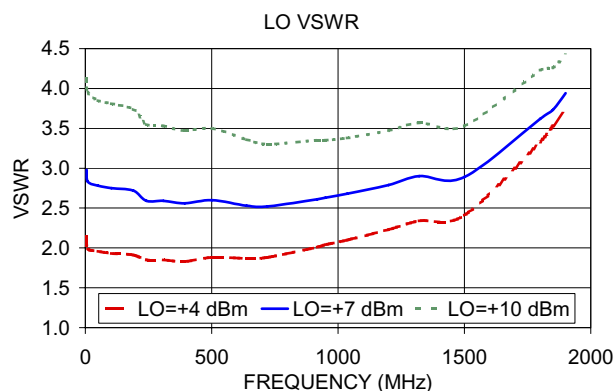
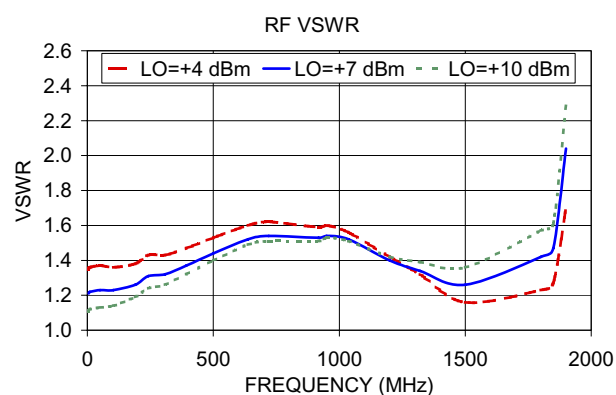
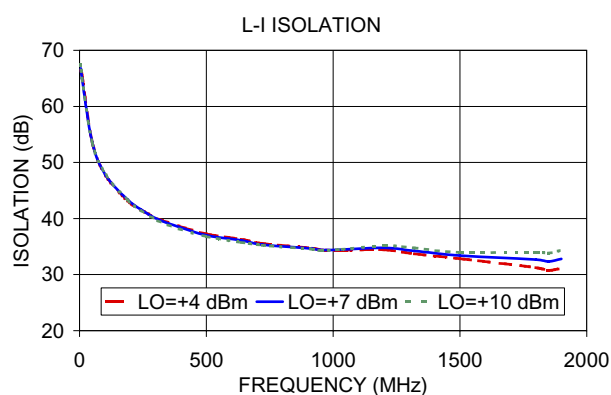
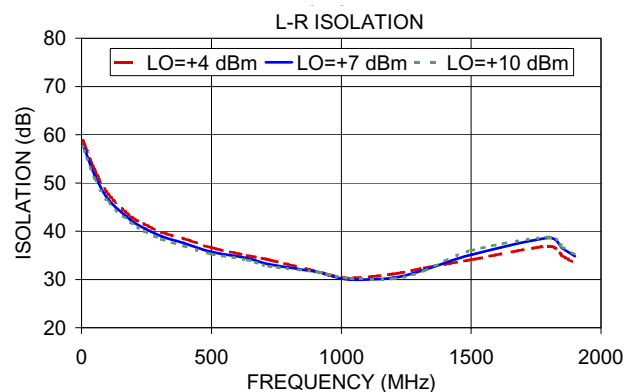
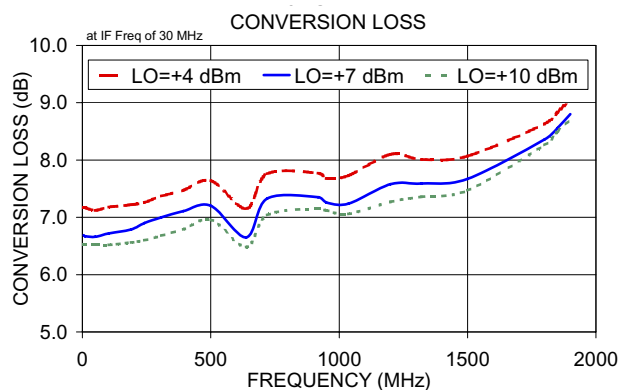
L = low range [f_L to $10 f_L$]
m = mid band [$2f_L$ to $f_U/2$]M = mid range [$10 f_L$ to $f_U/2$]
U = upper range [$f_U/2$ to f_U]

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 +7dBm	LO +7dBm	LO +7dBm	LO +7dBm	LO +7dBm
5.00	35.00	6.69	57.72	66.80	1.21	2.98
10.01	40.01	6.67	57.22	64.98	1.22	2.83
50.04	80.04	6.66	51.74	53.60	1.23	2.78
103.56	73.56	6.72	46.56	47.68	1.23	2.75
189.86	159.86	6.79	42.32	43.39	1.26	2.72
241.95	211.95	6.90	40.60	41.62	1.31	2.59
308.34	278.34	7.00	38.96	39.89	1.32	2.59
392.94	362.94	7.11	37.54	38.49	1.37	2.56
500.75	470.75	7.20	35.72	37.03	1.44	2.60
638.14	608.14	6.65	34.40	36.08	1.52	2.53
720.38	690.38	7.33	33.17	35.36	1.54	2.52
918.04	888.04	7.35	31.46	34.64	1.53	2.61
950.00	920.00	7.26	30.90	34.39	1.54	2.63
1036.36	1006.36	7.24	30.00	34.46	1.52	2.68
1200.00	1170.00	7.58	30.35	34.77	1.40	2.79
1320.71	1290.71	7.59	32.03	34.21	1.34	2.90
1500.00	1470.00	7.67	35.10	33.40	1.26	2.89
1800.00	1770.00	8.36	38.63	32.68	1.42	3.62
1850.00	1820.00	8.56	36.54	32.31	1.47	3.73
1900.00	1870.00	8.80	34.84	32.78	2.04	3.94

Electrical Schematic





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Frequency Mixer

JMS-11X+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB)			RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)			RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+1dBm (dB)		
		@LO (dBm)					@LO (dBm)					@LO (dBm)		
		+4	+7	+10			+4	+7	+10			+4	+7	+10
5.0	35.0	7.17	6.69	6.52	10.1	40.1	14.93	16.32	16.86	10.1	40.1	1.30	0.66	0.55
10.0	40.0	7.17	6.67	6.52	70.4	100.4	12.52	12.52	13.28	69.8	99.8	1.33	0.83	0.56
70.4	100.4	7.05	6.67	6.45	130.7	160.7	10.71	12.22	16.32	129.5	159.5	1.41	0.87	0.55
130.7	160.7	7.20	6.78	6.57	191.0	221.0	10.55	14.08	18.06	189.2	219.2	1.31	0.86	0.66
191.0	221.0	7.26	6.85	6.63	251.3	281.3	11.69	17.07	17.32	249.0	279.0	1.45	0.95	0.82
251.3	281.3	7.29	6.89	6.67	311.5	341.5	13.13	15.85	15.88	308.7	338.7	1.42	1.03	0.82
311.5	341.5	7.40	6.96	6.74	371.8	401.8	14.10	13.73	13.92	368.4	398.4	1.58	1.14	0.82
371.8	401.8	7.51	7.08	6.83	432.1	462.1	12.09	12.56	12.93	428.1	458.1	1.59	1.26	0.93
432.1	462.1	7.50	7.07	6.83	492.4	522.4	10.22	10.93	12.78	487.8	517.8	1.78	1.33	1.08
492.4	522.4	7.63	7.17	6.91	552.7	582.7	8.67	10.27	11.64	547.5	577.5	1.64	1.33	1.06
552.7	582.7	7.69	7.23	6.95	613.0	643.0	8.35	9.22	10.98	607.2	637.2	1.53	1.25	1.05
613.0	643.0	7.77	7.31	7.05	673.3	703.3	7.75	9.18	10.78	667.0	697.0	1.59	1.34	1.23
673.3	703.3	7.86	7.42	7.15	733.6	763.6	7.18	8.59	10.47	726.7	756.7	1.51	1.25	1.10
733.6	763.6	7.87	7.46	7.19	793.9	823.9	6.92	8.24	9.37	786.4	816.4	1.51	1.15	0.95
793.9	823.9	7.83	7.42	7.19	834.0	864.0	7.28	8.38	9.77	846.1	876.1	1.58	1.29	1.09
834.0	864.0	7.80	7.38	7.16	894.3	924.3	7.67	9.11	10.53	905.8	935.8	1.51	1.26	1.21
894.3	924.3	7.73	7.28	7.06	934.5	964.5	7.83	9.39	10.96	945.6	975.6	1.42	1.27	1.06
934.5	964.5	7.80	7.31	7.07	994.8	1024.8	8.67	9.79	11.02	1005.3	1035.3	1.38	1.29	1.00
994.8	1024.8	7.85	7.33	7.06	1035.0	1065.0	9.27	10.57	11.08	1045.1	1075.1	1.18	1.05	0.98
1035.0	1065.0	7.93	7.38	7.07	1095.3	1125.3	8.93	11.41	12.76	1104.9	1134.9	1.16	1.01	0.88
1135.5	1165.5	8.14	7.61	7.23	1135.5	1165.5	7.78	10.04	12.83	1144.7	1174.7	1.12	0.86	0.78
1195.8	1225.8	8.24	7.77	7.41	1195.8	1225.8	6.32	7.70	9.38	1204.4	1234.4	0.97	0.73	0.62
1236.0	1266.0	8.27	7.83	7.50	1236.0	1266.0	6.29	7.06	8.01	1244.2	1274.2	1.11	0.70	0.58
1296.3	1326.3	8.23	7.83	7.52	1296.3	1326.3	6.75	7.01	7.65	1303.9	1333.9	1.10	0.80	0.59
1336.4	1366.4	8.29	7.86	7.57	1336.4	1366.4	6.86	7.51	8.46	1343.7	1373.7	1.17	0.82	0.65
1396.7	1426.7	8.29	7.84	7.58	1396.7	1426.7	7.59	8.93	9.56	1403.4	1433.4	1.20	0.69	0.64
1436.9	1466.9	8.33	7.88	7.62	1436.9	1466.9	8.45	10.22	10.87	1443.2	1473.2	1.18	0.68	0.45
1497.2	1527.2	8.36	7.92	7.68	1497.2	1527.2	9.41	11.72	12.88	1503.0	1533.0	1.15	0.65	0.41
1537.4	1567.4	8.35	7.92	7.69	1537.4	1567.4	10.35	12.78	14.30	1542.8	1572.8	1.19	0.67	0.29
1597.7	1627.7	8.48	8.06	7.85	1597.7	1627.7	10.58	13.45	14.89	1602.5	1632.5	1.19	0.56	0.24
1637.9	1667.9	8.57	8.14	7.95	1637.9	1667.9	10.60	13.43	15.36	1642.3	1672.3	1.17	0.45	0.39
1698.2	1728.2	8.73	8.31	8.11	1698.2	1728.2	10.07	13.98	15.97	1702.0	1732.0	1.12	0.55	0.25
1738.4	1768.4	8.88	8.44	8.25	1738.4	1768.4	9.82	12.64	14.77	1741.8	1771.8	1.19	0.42	0.22
1798.7	1828.7	9.11	8.65	8.48	1798.7	1828.7	9.69	12.68	14.87	1801.5	1831.5	1.02	0.48	0.24
1838.9	1868.9	9.28	8.84	8.63	1838.9	1868.9	9.64	12.66	14.40	1841.3	1871.3	1.18	0.60	0.27
1899.1	1929.1	9.55	9.08	8.90	1899.1	1929.1	9.86	12.99	14.00	1901.1	1931.1	0.95	0.50	0.23
1939.3	1969.3	9.74	9.26	9.08	1939.3	1969.3	10.18	14.52	18.25	1940.9	1970.9	0.96	0.40	0.30
1999.6	2029.6	10.06	9.52	9.32	1999.6	2029.6	11.95	15.40	20.05	2000.6	2030.6	0.94	0.62	0.12
2039.8	2069.8	10.27	9.72	9.52	2039.8	2069.8	12.77	16.22	19.97	2040.4	2070.4	1.06	0.46	0.20
2100.1	2130.1	10.68	10.05	9.83	2100.1	2130.1	13.50	15.26	18.80	2100.1	2130.1	0.93	0.53	0.25

REV. X2

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Frequency Mixer

JMS-11X+

Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=950.1MHz (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)=1900.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+7			+7			+7
940.0	10.1	7.64	10.0	20.1	6.71	1000.0	900.1	8.60
920.2	29.9	7.63	30.2	40.3	6.53	979.8	920.3	8.55
900.4	49.7	7.69	50.4	60.5	6.61	959.6	940.5	8.54
880.6	69.5	7.66	70.6	80.7	6.56	939.4	960.7	8.49
860.9	89.2	7.61	90.8	100.9	6.60	919.2	980.9	8.49
841.1	109.0	7.62	111.0	121.1	6.62	899.0	1001.1	8.55
821.3	128.8	7.59	131.2	141.3	6.58	878.8	1021.3	8.52
801.5	148.6	7.57	151.4	161.5	6.55	858.6	1041.5	8.51
781.7	168.4	7.56	171.6	181.7	6.58	838.4	1061.7	8.51
761.9	188.2	7.51	191.8	201.9	6.56	818.2	1081.9	8.53
742.1	208.0	7.49	212.0	222.1	6.55	798.0	1102.1	8.53
722.3	227.8	7.47	232.2	242.3	6.53	777.8	1122.3	8.53
702.6	247.5	7.47	252.4	262.5	6.52	757.6	1142.5	8.52
682.8	267.3	7.44	272.7	282.8	6.53	737.3	1162.8	8.54
663.0	287.1	7.42	292.9	303.0	6.56	717.1	1183.0	8.55
643.2	306.9	7.40	313.1	323.2	6.56	696.9	1203.2	8.56
623.4	326.7	7.39	333.3	343.4	6.57	676.7	1223.4	8.56
603.6	346.5	7.41	353.5	363.6	6.52	656.5	1243.6	8.57
583.8	366.3	7.38	373.7	383.8	6.54	636.3	1263.8	8.56
564.0	386.1	7.39	393.9	404.0	6.53	616.1	1284.0	8.55
544.3	405.8	7.38	434.3	444.4	6.50	575.7	1324.4	8.56
524.5	425.6	7.39	454.5	464.6	6.49	555.5	1344.6	8.57
504.7	445.4	7.37	494.9	505.0	6.53	515.1	1385.0	8.61
484.9	465.2	7.38	515.1	525.2	6.53	494.9	1405.2	8.65
445.3	504.8	7.37	555.5	565.6	6.54	454.5	1445.6	8.67
425.5	524.6	7.43	575.7	585.8	6.58	434.3	1465.8	8.72
386.0	564.1	7.40	616.1	626.2	6.58	393.9	1506.2	8.77
366.2	583.9	7.39	636.3	646.4	6.61	373.7	1526.4	8.77
326.6	623.5	7.39	676.7	686.8	6.66	333.3	1566.8	8.83
306.8	643.3	7.35	696.9	707.0	6.74	313.1	1587.0	8.86
267.2	682.9	7.42	737.3	747.4	6.77	272.7	1627.4	8.90
247.4	702.7	7.46	757.6	767.7	6.77	252.4	1647.7	8.91
207.9	742.2	7.50	798.0	808.1	6.90	212.0	1688.1	8.97
188.1	762.0	7.52	818.2	828.3	6.87	191.8	1708.3	8.97
148.5	801.6	7.50	858.6	868.7	6.94	151.4	1748.7	9.00
128.7	821.4	7.47	878.8	888.9	6.98	131.2	1768.9	9.04
89.1	861.0	7.45	919.2	929.3	7.01	90.8	1809.3	9.06
69.4	880.7	7.41	939.4	949.5	7.07	70.6	1829.5	9.05
29.8	920.3	7.31	979.8	989.9	7.12	30.2	1869.9	9.05
10.0	940.1	7.22	1000.0	1010.1	7.14	10.0	1890.1	9.12

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Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+4	+7	+10	+4	+7	+10
5.0	58.78	57.72	57.53	66.40	66.80	67.41
10.0	58.07	57.22	56.74	65.60	64.98	65.00
70.4	53.92	53.11	52.32	58.05	58.18	59.42
130.7	48.71	48.27	47.83	53.32	53.87	54.78
191.0	46.33	45.74	45.24	51.17	51.70	52.27
251.3	44.63	44.05	43.48	49.56	50.53	50.68
311.5	43.34	42.67	42.12	49.03	49.41	49.44
371.8	42.26	41.64	41.17	48.35	48.61	48.34
432.1	41.36	40.78	40.36	47.74	47.72	47.47
492.4	40.48	40.00	39.71	47.05	47.01	46.71
552.7	39.83	39.25	38.82	46.31	46.15	45.93
613.0	39.28	39.11	38.86	45.14	45.18	45.13
673.3	38.36	38.20	38.21	43.71	43.84	44.02
733.6	37.23	36.98	36.90	42.27	42.62	42.86
793.9	36.46	36.34	36.11	41.23	41.69	42.11
854.0	36.02	36.23	36.14	40.54	41.11	41.63
894.3	35.06	35.63	35.94	39.54	40.14	40.76
934.5	34.59	35.25	35.72	38.85	39.48	40.16
994.8	33.98	34.54	35.13	37.81	38.47	39.16
1035.0	33.89	34.41	35.02	37.09	37.79	38.45
1135.5	33.73	34.09	34.57	34.95	35.82	36.55
1195.8	34.16	34.48	34.78	33.73	34.66	35.42
1236.0	34.53	34.93	35.13	33.00	33.91	34.68
1296.3	35.01	35.61	35.80	32.10	33.02	33.78
1336.4	35.02	35.66	35.79	31.61	32.56	33.35
1396.7	34.45	34.93	34.95	31.00	32.02	32.90
1436.9	33.68	33.93	33.86	30.76	31.88	32.85
1497.2	32.23	32.24	32.16	30.43	31.68	32.79
1537.4	31.35	31.27	31.19	30.30	31.64	32.84
1597.7	30.37	30.23	30.10	30.12	31.61	32.99
1637.9	29.95	29.79	29.63	29.95	31.50	32.94
1698.2	29.33	29.13	28.91	30.03	31.68	33.25
1738.4	28.92	28.71	28.49	30.12	31.80	33.39
1798.7	28.29	28.11	27.89	30.38	32.16	33.82
1838.9	27.74	27.59	27.39	30.62	32.53	34.30
1899.1	27.07	26.98	26.83	30.85	32.83	34.68
1939.3	26.55	26.52	26.39	31.27	33.37	35.27
1999.6	25.88	25.97	25.90	31.50	33.79	35.76
2039.8	25.43	25.58	25.54	31.92	34.33	36.15
2100.1	24.79	25.10	25.14	32.20	34.82	36.44

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	34.63	35.39	37.25
70.4	100.4	34.71	34.89	33.93
130.7	160.7	29.84	29.82	29.74
191.0	221.0	27.10	27.27	27.18
251.3	281.3	25.52	25.52	25.56
311.5	341.5	24.50	24.54	24.48
371.8	401.8	23.75	23.80	23.94
432.1	462.1	23.07	23.16	23.23
492.4	522.4	22.38	22.47	22.51
552.7	582.7	21.67	21.84	21.91
613.0	643.0	20.71	20.89	21.04
673.3	703.3	19.40	19.54	19.67
733.6	763.6	18.18	18.28	18.34
793.9	823.9	17.12	17.17	17.21
854.0	864.0	16.57	16.61	16.63
894.3	924.3	15.94	15.99	16.02
934.5	964.5	15.63	15.71	15.77
994.8	1024.8	15.32	15.42	15.56
1035.0	1065.0	15.13	15.29	15.45
1095.3	1125.3	14.93	15.10	15.29
1135.5	1165.5	14.77	14.92	15.08
1195.8	1225.8	14.67	14.84	14.94
1236.0	1266.0	14.60	14.81	14.94
1296.3	1326.3	14.54	14.82	15.02
1336.4	1366.4	14.38	14.71	14.94
1396.7	1426.7	14.12	14.47	14.69
1436.9	1466.9	13.86	14.16	14.36
1497.2	1527.2	13.31	13.54	13.65
1537.4	1567.4	12.91	13.03	13.08
1597.7	1627.7	12.21	12.21	12.18
1637.9	1667.9	11.74	11.66	11.58
1698.2	1728.2	11.04	10.86	10.72
1738.4	1768.4	10.62	10.37	10.20
1798.7	1828.7	9.98	9.65	9.43
1838.9	1868.9	9.62	9.24	9.00
1899.1	1929.1	9.03	8.60	8.35
1939.3	1969.3	8.67	8.22	7.96
1999.6	2029.6	8.26	7.75	7.48
2039.8	2069.8	8.05	7.52	7.24
2100.1	2130.1	7.73	7.17	6.89

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Frequency Mixer

JMS-11X+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=1900.1MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+4	+7	+10		+4	+7	+10		+4	+7	+10
5.0	35.0	1.35	1.21	1.11	5.0	2.14	2.98	4.12	5.0	1.27	1.29	1.32
10.0	40.0	1.36	1.22	1.12	10.0	1.99	2.83	3.95	10.1	1.08	1.10	1.14
70.4	100.4	1.16	1.01	1.11	70.4	1.88	2.69	3.75	29.9	1.10	1.05	1.12
130.7	160.7	1.17	1.03	1.08	130.7	1.88	2.69	3.74	49.7	1.04	1.08	1.19
191.0	221.0	1.22	1.09	1.05	191.0	1.88	2.67	3.67	69.5	1.04	1.13	1.17
251.3	281.3	1.24	1.11	1.03	251.3	1.88	2.65	3.65	89.3	1.04	1.10	1.18
311.5	341.5	1.30	1.16	1.07	311.5	1.91	2.67	3.67	109.1	1.02	1.08	1.14
371.8	401.8	1.36	1.23	1.13	371.8	1.94	2.73	3.73	128.9	1.02	1.09	1.15
432.1	462.1	1.43	1.29	1.20	432.1	1.94	2.71	3.67	148.7	1.04	1.10	1.17
492.4	522.4	1.54	1.40	1.30	492.4	1.95	2.69	3.62	168.5	1.06	1.11	1.16
552.7	582.7	1.60	1.45	1.36	552.7	2.01	2.78	3.73	188.3	1.05	1.09	1.15
613.0	643.0	1.65	1.50	1.40	613.0	2.01	2.74	3.64	208.1	1.04	1.08	1.13
673.3	703.3	1.72	1.58	1.49	673.3	2.03	2.74	3.62	227.9	1.02	1.07	1.13
733.6	763.6	1.74	1.63	1.56	733.6	2.11	2.84	3.74	247.7	1.02	1.09	1.16
793.9	823.9	1.71	1.62	1.58	793.9	2.11	2.80	3.65	267.5	1.04	1.11	1.18
834.0	864.0	1.75	1.65	1.61	834.0	2.17	2.88	3.73	287.3	1.06	1.12	1.19
894.3	924.3	1.70	1.60	1.59	894.3	2.17	2.83	3.63	307.1	1.05	1.13	1.18
934.5	964.5	1.71	1.59	1.56	934.5	2.26	2.93	3.74	326.9	1.06	1.13	1.19
994.8	1024.8	1.68	1.55	1.52	994.8	2.28	2.94	3.71	346.7	1.09	1.16	1.22
1035.0	1065.0	1.69	1.53	1.47	1035.0	2.35	3.01	3.79	386.3	1.12	1.18	1.24
1095.3	1125.3	1.70	1.55	1.46	1095.3	2.40	3.06	3.82	406.1	1.13	1.18	1.24
1135.5	1165.5	1.78	1.63	1.51	1135.5	2.43	3.08	3.84	445.7	1.14	1.20	1.26
1195.8	1225.8	1.67	1.57	1.48	1195.8	2.49	3.12	3.86	465.5	1.16	1.22	1.28
1236.0	1266.0	1.66	1.57	1.50	1236.0	2.53	3.17	3.91	505.1	1.20	1.26	1.31
1296.3	1326.3	1.55	1.47	1.43	1296.3	2.55	3.14	3.85	524.9	1.21	1.27	1.32
1336.4	1366.4	1.50	1.41	1.37	1336.4	2.60	3.19	3.90	564.5	1.25	1.31	1.36
1396.7	1426.7	1.38	1.31	1.30	1396.7	2.60	3.14	3.80	584.3	1.27	1.32	1.38
1436.9	1466.9	1.29	1.22	1.24	1436.9	2.66	3.18	3.85	623.9	1.33	1.39	1.44
1497.2	1527.2	1.21	1.17	1.23	1497.2	2.68	3.16	3.80	643.7	1.35	1.41	1.46
1537.4	1567.4	1.12	1.16	1.26	1537.4	2.74	3.21	3.85	683.3	1.40	1.46	1.50
1597.7	1627.7	1.07	1.17	1.27	1597.7	2.84	3.29	3.90	703.1	1.42	1.47	1.51
1637.9	1667.9	1.07	1.22	1.33	1637.9	2.95	3.36	3.95	742.7	1.49	1.54	1.58
1698.2	1728.2	1.08	1.25	1.36	1698.2	3.12	3.48	4.04	762.5	1.52	1.57	1.61
1738.4	1768.4	1.13	1.30	1.42	1738.4	3.28	3.60	4.14	802.1	1.56	1.61	1.65
1798.7	1828.7	1.19	1.34	1.46	1798.7	3.47	3.72	4.18	821.9	1.61	1.66	1.70
1838.9	1868.9	1.18	1.37	1.51	1838.9	3.66	3.86	4.30	861.5	1.73	1.78	1.81
1899.1	1929.1	1.23	1.42	1.56	1899.1	3.86	3.96	4.33	881.3	1.75	1.81	1.84
1939.3	1969.3	1.20	1.40	1.54	1939.3	4.07	4.12	4.46	920.9	1.83	1.88	1.92
1999.6	2029.6	1.21	1.42	1.56	1999.6	4.30	4.22	4.46	940.7	1.90	1.95	1.99
2039.8	2069.8	1.15	1.35	1.48	2039.8	4.52	4.39	4.61	980.3	1.99	2.04	2.07
2100.1	2130.1	1.16	1.37	1.51	2100.1	4.73	4.50	4.63	1000.1	2.01	2.07	2.10

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Patent Pending

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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	10	18	11	25	16	38	36	55	45	70
1	-	8	0	30	19	26	28	27	46	44	54	47
2	110	61	54	51	55	64	53	56	46	99	58	74
3	113	59	61	76	56	82	66	59	66	62	74	72
4	117	90	87	86	85	82	88	100	84	83	76	93
5	116	89	98	89	90	93	81	94	93	84	89	92
6	116	102	101	98	105	118	93	87	99	102	96	106
7	112	107	108	99	109	108	105	103	89	95	97	98
8	111	94	106	114	104	102	107	110	98	83	102	104
9	117	101	93	104	101	105	97	103	98	93	89	100
10	112	101	103	95	108	106	105	101	107	103	93	89
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions: RF IN: 950.1 MHz; -14.00 dBm.
LO IN: 980.01 MHz; +7.00 dBm
IF OUT: 29.91 MHz; -21.95 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	20	28	22	39	31	52	56	67	57	75
1	-	8	0	30	19	30	30	32	52	54	69	68
2	90	54	48	44	52	55	46	54	41	64	59	76
3	115	42	44	59	41	56	66	43	51	45	63	61
4	115	74	74	71	62	58	62	71	68	62	54	76
5	112	78	75	72	62	68	53	67	61	58	63	61
6	108	93	80	89	94	90	75	73	74	87	82	73
7	118	91	93	81	83	82	77	82	68	79	80	69
8	103	119	96	100	89	95	90	93	84	81	82	108
9	112	101	115	102	99	89	91	92	88	91	80	89
10	112	109	98	111	99	104	95	110	97	95	94	90
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions: RF IN: 950.1 MHz; -4.00 dBm.
LO IN: 980.01 MHz; +7.00 dBm
IF OUT: 29.91 MHz; -12.14 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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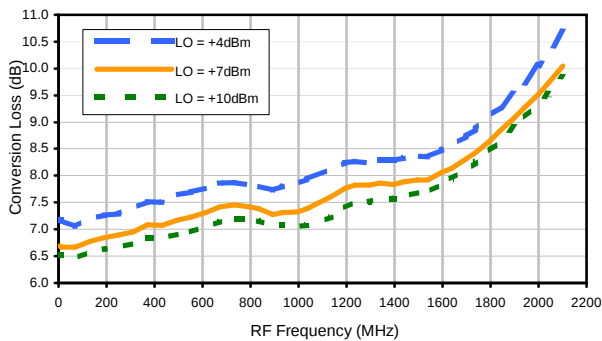


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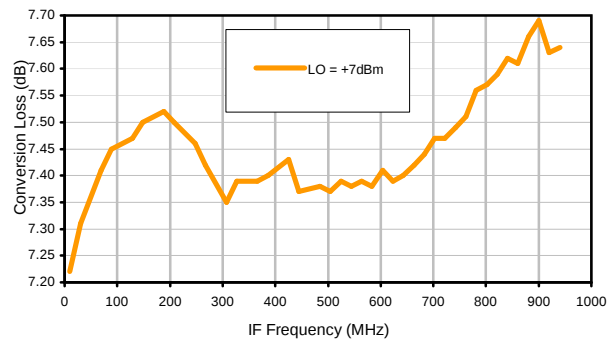


Typical Performance Curves

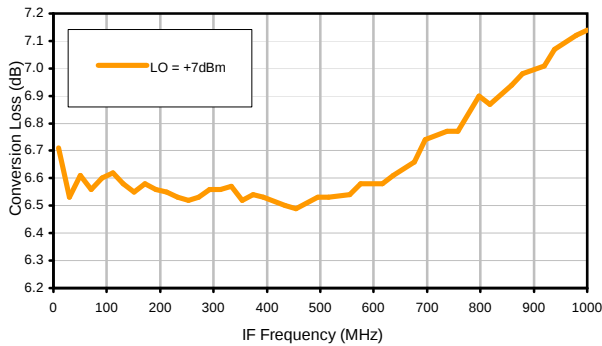
Conversion Loss @ IF=30MHz



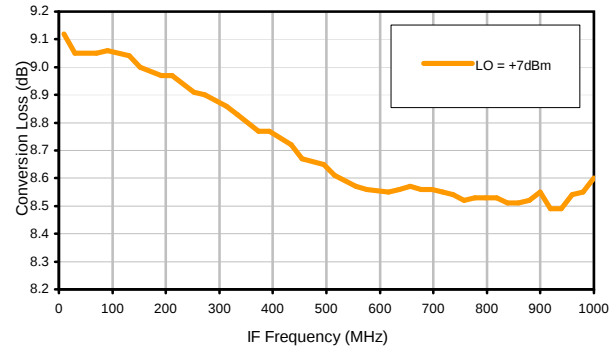
Conversion Loss vs. IF @ RF=950.1MHz



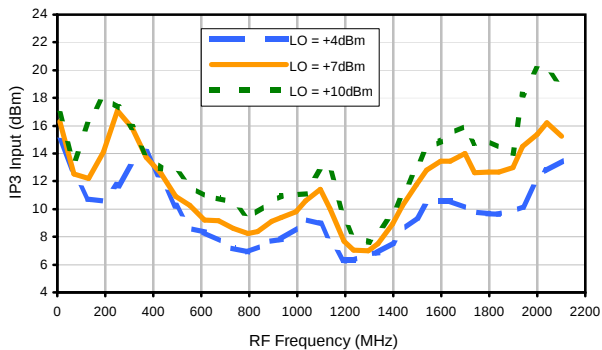
Conversion Loss vs. IF @ RF=10.1MHz



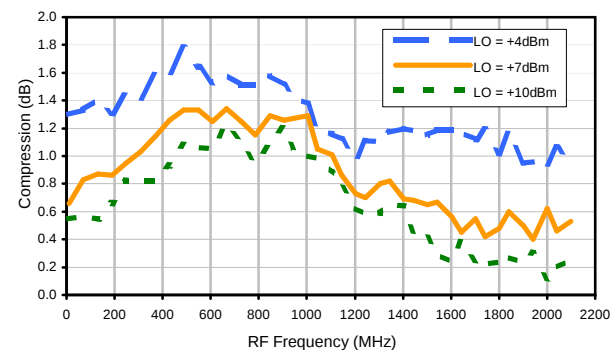
Conversion Loss vs. IF @ RF=1900.1MHz



IP3 Input

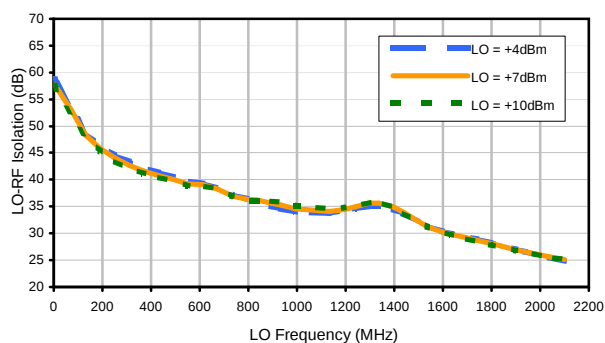


Compression @ RF IN=+1dBm

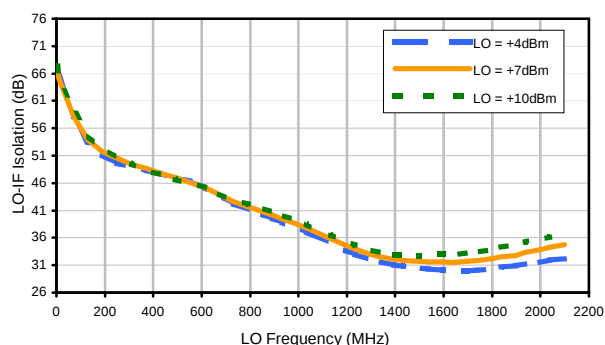


Typical Performance Curves

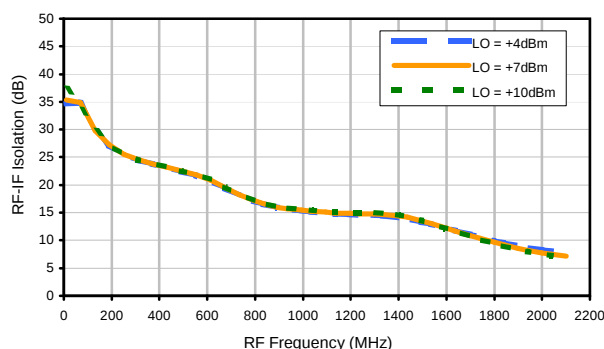
LO-RF Isolation



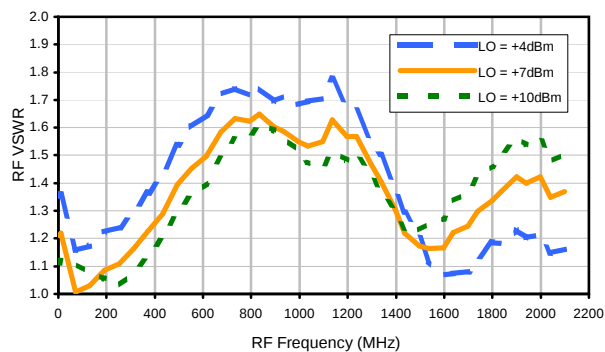
LO-IF Isolation



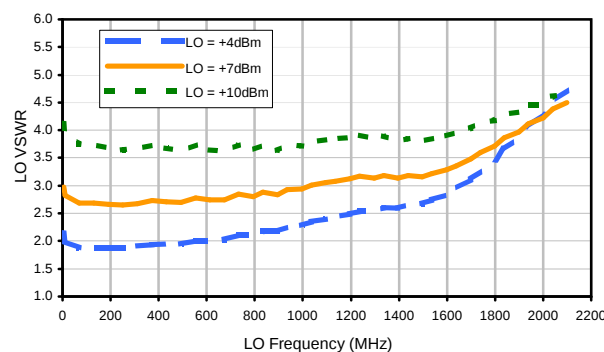
RF-IF Isolation



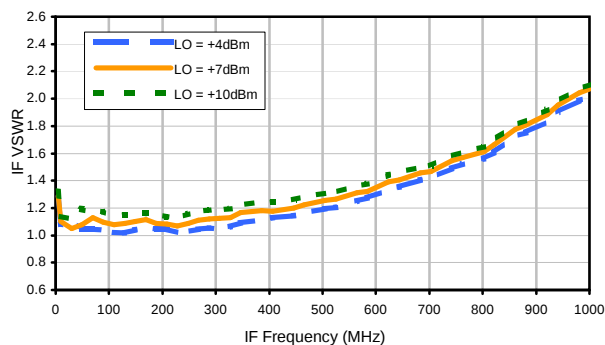
RF VSWR



LO VSWR



IF VSWR



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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	10	18	11	25	16	38	36	55	45	70
1	-	8	0	30	19	26	28	27	46	44	54	47
2	110	61	54	51	55	64	53	56	46	99	58	74
3	113	59	61	76	56	82	66	59	66	62	74	72
4	117	90	87	86	85	82	88	100	84	83	76	93
5	116	89	98	89	90	93	81	94	93	84	89	92
6	116	102	101	98	105	118	93	87	99	102	96	106
7	112	107	108	99	109	108	105	103	89	95	97	98
8	111	94	106	114	104	102	107	110	98	83	102	104
9	117	101	93	104	101	105	97	103	98	93	89	100
10	112	101	103	95	108	106	105	101	107	103	93	89
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions:

RF IN: 950.1 MHz; -14.00 dBm.

LO IN: 980.01 MHz; +7.00 dBm

IF OUT: 29.91 MHz; -21.95 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	20	28	22	39	31	52	56	67	57	75
1	-	8	0	30	19	30	30	32	52	54	69	68
2	90	54	48	44	52	55	46	54	41	64	59	76
3	115	42	44	59	41	56	66	43	51	45	63	61
4	115	74	74	71	62	58	62	71	68	62	54	76
5	112	78	75	72	62	68	53	67	61	58	63	61
6	108	93	80	89	94	90	75	73	74	87	82	73
7	118	91	93	81	83	82	77	82	68	79	80	69
8	103	119	96	100	89	95	90	93	84	81	82	108
9	112	101	115	102	99	89	91	92	88	91	80	89
10	112	109	98	111	99	104	95	110	97	95	94	90
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions:

RF IN: 950.1 MHz; -4.00 dBm.

LO IN: 980.01 MHz; +7.00 dBm

IF OUT: 29.91 MHz; -12.14 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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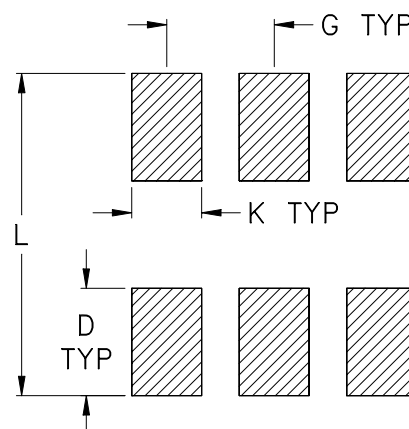
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Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within $\pm .002$

CASE #	A	B	C	D	E	F	G	H	J	K	L	WT. GRAM
BH292	.280 (7.11)	.310 (7.87)	- -	.100 (2.54)	.225 (5.72)	.055 (1.40)	.100 (2.54)	.047 (1.19)	.065 (1.65)	.065 (1.65)	.300 (7.62)	.45

Dimensions are in inches (mm). Tolerances: 2Pl. $\pm .01$; 3Pl. $\pm .005$

Notes:

- Case material: Ceramic.
- Termination finish:
For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.
For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.

Tape & Reel Packaging TR-F24



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
16	12	13	500

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

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THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
A	M101143	ADDED "gk" PIN CONNECTION, TT100 CASE STYLE & NOTE 2	10/10/05	MMG	DJ
B	M102713	ADDED "...WITH SMOBC"	01/17/06	MMG	IL
C	M108637	REMOVED "PIN 1", ADDED INDEX ON UNIT	12/01/06	MYG	FL

SUGGESTED MOUNTING CONFIGURATION
FOR BH292, CD541/542/636/637, TT100/240 CASE
STYLES, "gk", "ht", "hu", "nd", "w" PIN CONNECTIONS



- NOTES:** 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS $.030" \pm .002"$; COPPER: 1/2 OZ. EACH SIDE.
 FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
 2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



DENOTES PCB COPPER LAYOUT WITH SMOBC
 (SOLDER MASK OVER BARE COPPER)



DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED

INITIALS

DATE

DIMENSIONS ARE IN INCHES

TOLERANCES ON:

2 PL DECIMALS $\pm$ 3 PL DECIMALS $\pm .005$ ANGLES $\pm$ FRACTIONS $\pm$

DRAWN

MMG

07/17/02

CHECKED

WL

08/02/02

APPROVED

DJ

08/05/02



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13 Neptune Avenue
 Brooklyn NY 11235

PL, gk/ht/hu/nd/w, BH292,
 CD541/542/636/637, TT100/240, TB-03

SIZE

A

CODE IDENT

15542

DRAWING NO:

98-PL-052

REV:

C

FILE:

98PL052

SCALE:

8:1

SHEET:

1 OF 1

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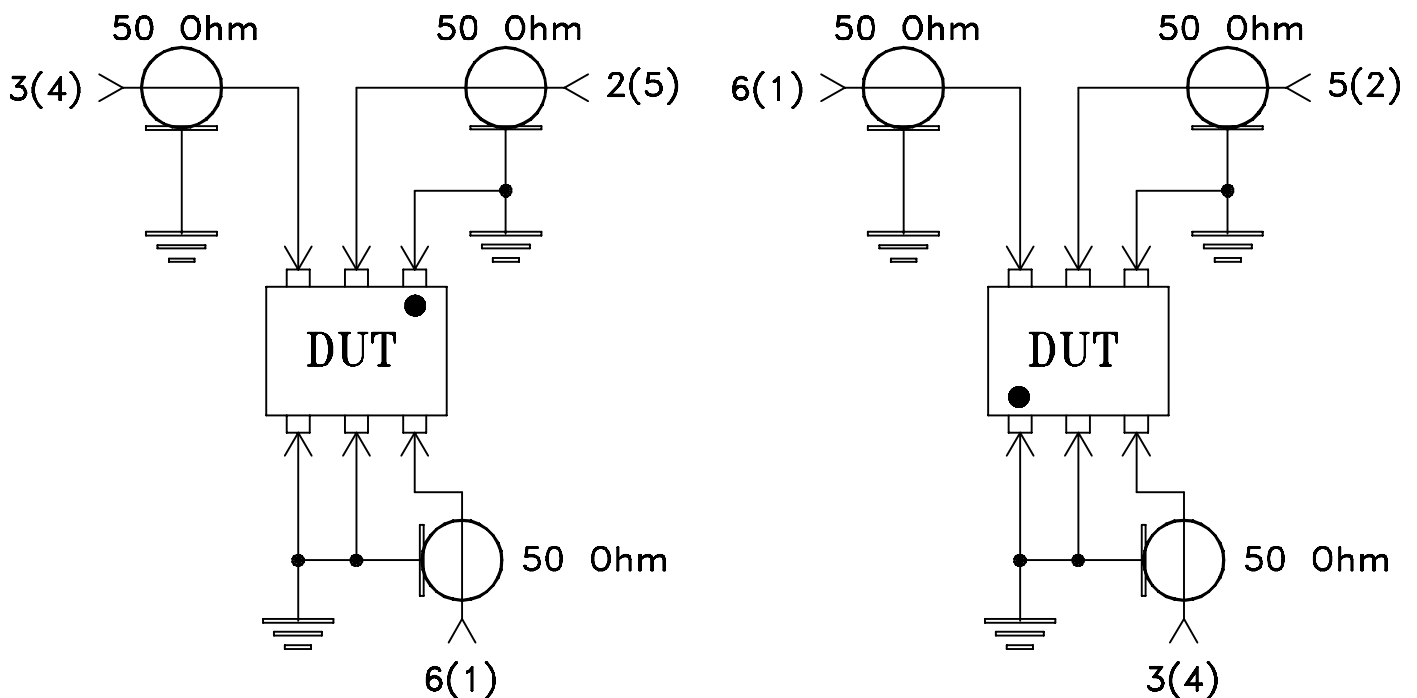
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Evaluation Board and Circuit

For Pin Connections and DUT Orientation Refer to
Data Sheet of the DUT



TB-03



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.030 inch.

 **Mini-Circuits®**



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	-40° to 85°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Humidity	90 to 95% RH, 240 hours, 50°C	MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutetic Process: 225°C peak Pb-Free Process 245° - 250°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, 95% Coverage
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
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