

Frequency Mixer

RMS-5+

Level 7 (LO Power +7 dBm) 5 to 1500 MHz

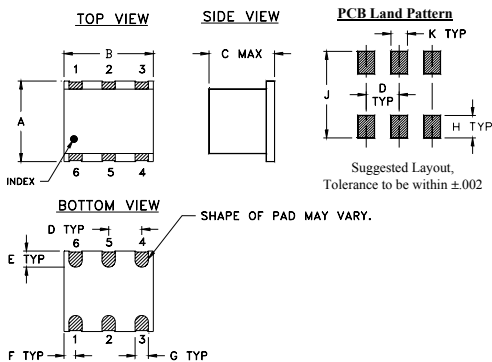
Maximum Ratings

Operating Temperature	-40°C to 85°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	

Pin Connections

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

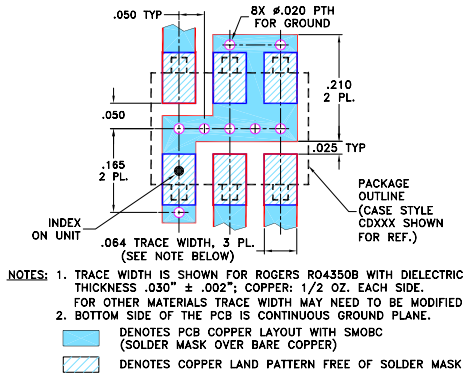
Outline Drawing



Outline Dimensions ($\frac{\text{inch}}{\text{mm}}$)

A	B	C	D	E	F
.250	.31	.20	.100	.050	.055
6.35	7.87	5.08	2.54	1.27	1.40
G	H	J	K		wt
.040	.070	.270	.050		grams
1.02	1.78	6.86	1.27		0.50

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



Features

- excellent L-R isolation, 40 dB typ.
- conversion loss, 5.92 dB typ.
- small size, 0.25"x0.31"x0.2"

Applications

- cellular
- satellite distribution
- GPS



Generic photo used for illustration purposes only

CASE STYLE: TT240

+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					L		M		U		L		M		U		
$f_L - f_U$		$\bar{X}$	σ	Max.	Total Range Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.
5-1500	DC-1000	5.92	.34	7.5	9.5	60	40	40	20	30	18	55	30	30	18	15	8	13

1 dB COMP: +1 dBm typ.

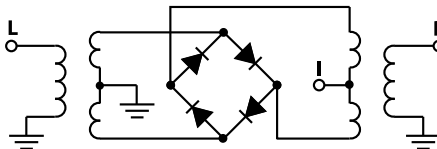
For phase detection, DC output positive with in-phase RF & LO.

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

Typical Performance Data

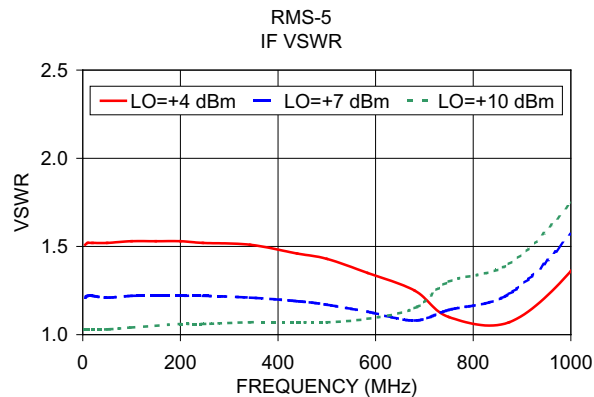
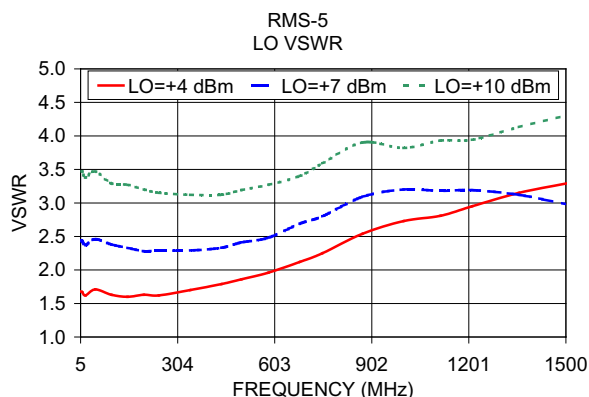
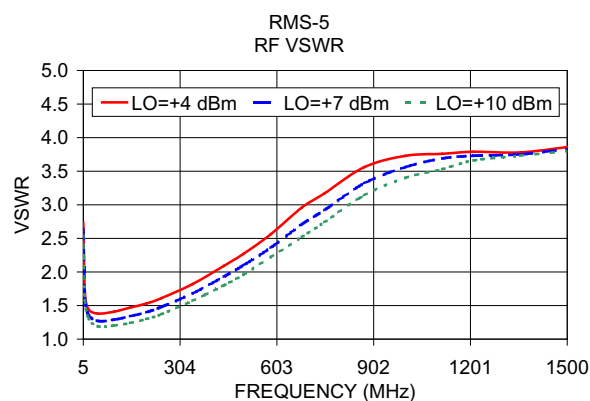
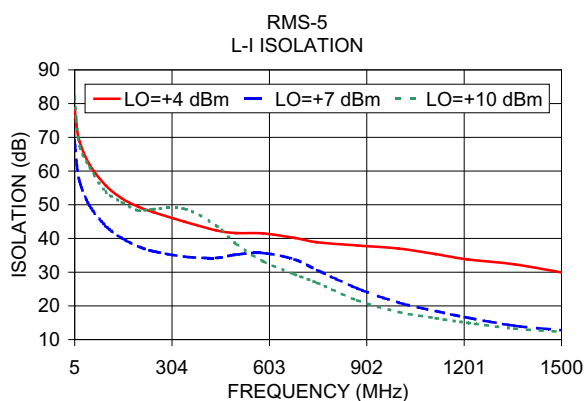
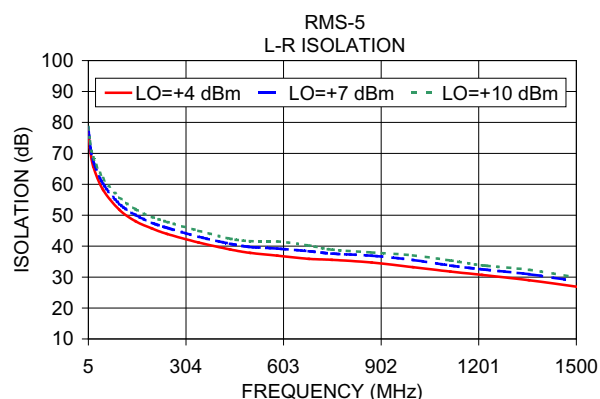
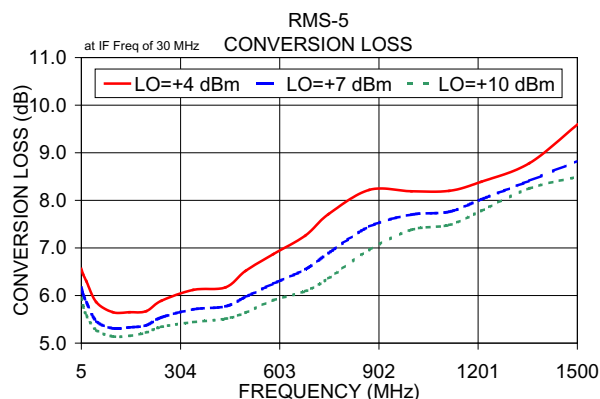
Frequency (MHz)		Conversion Loss (dB)	Isolation L-R (dB)	Isolation L-I (dB)	VSWR RF Port (:1)	VSWR LO Port (:1)
RF	LO	LO +7dBm	LO +7dBm	LO +7dBm	LO +7dBm	LO +7dBm
5.00	35.00	6.17	78.28	82.08	2.64	2.43
10.00	40.00	6.03	73.09	75.39	1.62	2.43
20.00	50.00	5.86	67.43	67.33	1.37	2.37
50.00	80.00	5.46	60.16	61.16	1.27	2.46
100.00	70.00	5.31	53.66	53.86	1.29	2.38
149.68	119.68	5.33	50.07	50.77	1.34	2.33
200.00	170.00	5.37	47.54	48.24	1.40	2.28
246.13	216.13	5.54	45.92	48.66	1.48	2.29
342.58	312.58	5.71	43.07	48.72	1.68	2.29
439.03	409.03	5.77	40.76	43.78	1.93	2.33
500.00	470.00	5.97	39.74	38.41	2.10	2.41
583.71	553.71	6.25	39.21	33.19	2.36	2.48
680.16	650.16	6.55	38.34	29.32	2.71	2.69
750.00	720.00	6.89	37.60	26.77	2.92	2.80
873.07	843.07	7.45	36.91	21.63	3.32	3.09
1000.00	970.00	7.70	35.50	18.14	3.56	3.20
1114.19	1084.19	7.76	33.72	16.32	3.69	3.18
1210.65	1180.65	8.02	32.50	14.96	3.73	3.19
1355.32	1325.32	8.41	30.92	13.25	3.75	3.12
1500.00	1470.00	8.83	28.64	12.28	3.83	2.98

Electrical Schematic



Notes

A. Performance and quality attributes and condition 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.
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Frequency Mixer

RMS-5+

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	+4	+7	+10			
5.0	35.0	6.56	6.17	5.95	10.1	40.1	15.78	17.28	16.97	10.1	40.1	0.50	0.35	0.24
10.0	40.0	6.45	6.03	5.79	69.6	99.6	19.05	17.08	16.26	69.6	99.6	0.87	0.66	0.46
69.6	99.6	6.38	5.96	5.76	129.0	159.0	16.58	15.18	19.12	129.0	159.0	1.06	0.84	0.62
129.0	159.0	6.21	5.82	5.65	188.5	218.5	13.70	14.50	21.04	188.5	218.5	1.12	0.81	0.62
188.5	218.5	6.14	5.79	5.61	248.0	278.0	13.27	17.48	21.90	248.0	278.0	1.13	0.80	0.63
248.0	278.0	6.12	5.79	5.61	307.4	337.4	12.91	21.84	20.29	307.4	337.4	1.04	0.80	0.64
307.4	337.4	6.16	5.83	5.65	366.9	396.9	14.69	22.14	22.59	366.9	396.9	1.13	0.87	0.71
366.9	396.9	6.25	5.88	5.68	426.4	456.4	15.11	20.75	18.32	426.4	456.4	1.24	0.97	0.80
426.4	456.4	6.25	5.89	5.69	485.9	515.9	16.77	25.35	18.04	485.9	515.9	1.28	1.02	0.86
485.9	515.9	6.33	5.96	5.75	545.3	575.3	17.83	20.52	16.59	545.3	575.3	1.48	1.22	1.04
545.3	575.3	6.43	6.03	5.80	604.8	634.8	17.14	18.51	19.67	604.8	634.8	1.66	1.38	1.21
604.8	634.8	6.53	6.07	5.79	664.3	694.3	17.06	18.88	14.74	664.3	694.3	1.68	1.46	1.27
664.3	694.3	6.64	6.17	5.87	723.7	753.7	16.25	12.47	10.93	723.7	753.7	1.84	1.56	1.38
723.7	753.7	6.75	6.26	5.96	783.2	813.2	13.45	11.53	9.69	783.2	813.2	1.89	1.63	1.45
783.2	813.2	6.89	6.31	5.99	842.7	872.7	13.11	12.85	11.13	842.7	872.7	1.86	1.66	1.45
842.7	872.7	6.97	6.30	5.97	902.1	932.1	13.08	13.78	12.91	902.1	932.1	1.79	1.64	1.43
902.1	932.1	7.15	6.41	6.03	961.6	991.6	10.58	13.79	14.05	961.6	991.6	1.56	1.54	1.37
961.6	991.6	7.46	6.71	6.24	1021.1	1051.1	8.68	11.35	13.03	1021.1	1051.1	1.46	1.38	1.30
1021.1	1051.1	7.65	6.97	6.50	1080.5	1110.5	7.50	10.12	12.27	1080.5	1110.5	1.25	1.15	1.11
1080.5	1110.5	7.85	7.27	6.83	1140.0	1170.0	6.77	8.05	9.58	1140.0	1170.0	1.07	0.93	0.90
1140.0	1170.0	7.99	7.59	7.24	1199.5	1229.5	6.93	7.54	8.19	1199.5	1229.5	1.05	0.83	0.77
1199.5	1229.5	8.02	7.71	7.45	1258.9	1288.9	7.40	7.14	8.11	1258.9	1288.9	1.06	0.78	0.67
1258.9	1288.9	7.97	7.72	7.59	1318.4	1348.4	8.26	8.04	8.67	1318.4	1348.4	1.03	0.74	0.58
1318.4	1348.4	8.00	7.78	7.71	1377.9	1407.9	8.96	9.15	9.48	1377.9	1407.9	1.04	0.71	0.53
1377.9	1407.9	8.08	7.85	7.78	1437.4	1467.4	9.71	10.67	10.60	1437.4	1467.4	1.03	0.70	0.53
1437.4	1467.4	8.12	7.84	7.75	1496.8	1526.8	10.40	12.00	12.23	1496.8	1526.8	1.06	0.68	0.50
1496.8	1526.8	8.12	7.79	7.68	1556.3	1586.3	9.97	12.19	13.07	1556.3	1586.3	1.07	0.63	0.48
1556.3	1586.3	8.19	7.80	7.67	1615.8	1645.8	10.00	12.57	15.22	1615.8	1645.8	1.02	0.60	0.44
1615.8	1645.8	8.28	7.85	7.71	1675.2	1705.2	10.55	12.99	14.27	1675.2	1705.2	1.00	0.58	0.42
1675.2	1705.2	8.40	7.90	7.74	1734.7	1764.7	10.20	13.86	15.72	1734.7	1764.7	1.03	0.58	0.46
1734.7	1764.7	8.58	7.97	7.79	1794.2	1824.2	9.77	12.03	14.87	1794.2	1824.2	1.02	0.61	0.44
1794.2	1824.2	8.86	8.07	7.83	1853.6	1883.6	10.42	12.68	15.05	1853.6	1883.6	0.95	0.62	0.42
1853.6	1883.6	9.30	8.17	7.84	1893.3	1923.3	9.95	12.99	14.79	1893.3	1923.3	0.89	0.63	0.43
1893.3	1923.3	9.69	8.34	7.90	1952.8	1982.8	11.51	11.65	16.10	1952.8	1982.8	0.74	0.64	0.42
1952.8	1982.8	10.01	8.51	7.99	1992.4	2022.4	13.21	11.43	13.97	1992.4	2022.4	0.67	0.62	0.40
1992.4	2022.4	10.69	8.89	8.23	2051.9	2081.9	16.54	13.05	12.94	2051.9	2081.9	0.39	0.50	0.36
2051.9	2081.9	11.16	9.16	8.41	2091.5	2121.5	13.76	17.33	15.93	2091.5	2121.5	0.24	0.49	0.36
2091.5	2121.5	12.06	9.60	8.67	2151.0	2181.0	8.25	17.02	17.02	2151.0	2181.0	-0.04	0.40	0.29
2151.0	2181.0	12.43	9.81	8.80	2190.6	2220.6	7.00	16.33	15.90	2190.6	2220.6	-0.25	0.38	0.29
2190.6	2220.6	13.10	10.11	8.93	2250.1	2280.1	5.54	12.34	14.38	2250.1	2280.1	-0.61	0.31	0.28

REV. X2

RMS-5+

100818

Page 1 of 5



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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)=10.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1500.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+7			+7			+7
740.0	10.1	6.33	10.0	20.1	6.55	1000.0	500.1	8.75
721.3	28.8	6.34	30.2	40.3	6.54	979.8	520.3	8.68
702.6	47.5	6.31	50.4	60.5	6.55	959.6	540.5	8.65
683.8	66.3	6.30	70.6	80.7	6.50	939.4	560.7	8.61
665.1	85.0	6.27	90.8	100.9	6.55	919.2	580.9	8.58
646.4	103.7	6.28	111.0	121.1	6.58	899.0	601.1	8.53
627.7	122.4	6.26	131.2	141.3	6.59	878.8	621.3	8.49
609.0	141.1	6.25	151.4	161.5	6.58	858.6	641.5	8.46
590.3	159.8	6.24	171.6	181.7	6.60	838.4	661.7	8.43
571.5	178.6	6.24	191.8	201.9	6.60	818.2	681.9	8.40
552.8	197.3	6.24	212.0	222.1	6.56	798.0	702.1	8.37
534.1	216.0	6.23	232.2	242.3	6.54	777.8	722.3	8.33
515.4	234.7	6.21	252.4	262.5	6.64	757.6	742.5	8.27
496.7	253.4	6.21	272.7	282.8	6.70	737.3	762.8	8.10
477.9	272.2	6.19	292.9	303.0	6.68	717.1	783.0	8.13
459.2	290.9	6.18	313.1	323.2	6.68	696.9	803.2	8.10
440.5	309.6	6.22	333.3	343.4	6.69	676.7	823.4	8.07
421.8	328.3	6.13	353.5	363.6	6.72	656.5	843.6	8.06
403.1	347.0	6.10	373.7	383.8	6.74	636.3	863.8	8.07
384.4	365.7	6.05	393.9	404.0	6.71	616.1	884.0	8.07
365.6	384.5	6.01	434.3	444.4	6.84	575.7	924.4	8.07
346.9	403.2	6.06	454.5	464.6	6.85	555.5	944.6	8.10
328.2	421.9	6.08	494.9	505.0	6.87	515.1	985.0	8.10
309.5	440.6	6.09	515.1	525.2	6.89	494.9	1005.2	8.08
290.8	459.3	6.09	555.5	565.6	6.92	454.5	1045.6	8.09
272.1	478.0	6.11	575.7	585.8	6.94	434.3	1065.8	8.08
253.3	496.8	6.12	616.1	626.2	6.95	393.9	1106.2	7.99
234.6	515.5	6.03	636.3	646.4	6.99	373.7	1126.4	7.96
215.9	534.2	6.10	676.7	686.8	7.04	333.3	1166.8	7.87
197.2	552.9	6.09	696.9	707.0	7.05	313.1	1187.0	7.85
178.5	571.6	6.06	737.3	747.4	7.21	272.7	1227.4	7.82
159.7	590.4	6.09	757.6	767.7	7.20	252.4	1247.7	7.84
141.0	609.1	6.09	798.0	808.1	7.27	212.0	1288.1	7.86
122.3	627.8	6.07	818.2	828.3	7.30	191.8	1308.3	7.86
103.6	646.5	6.09	858.6	868.7	7.38	151.4	1348.7	7.86
84.9	665.2	6.14	878.8	888.9	7.44	131.2	1368.9	7.87
66.2	683.9	6.15	919.2	929.3	7.62	90.8	1409.3	7.84
47.4	702.7	6.14	939.4	949.5	7.68	70.6	1429.5	7.81
28.7	721.4	6.15	979.8	989.9	7.87	30.2	1469.9	7.76
10.0	740.1	6.38	1000.0	1010.1	7.99	10.0	1490.1	7.94

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	77.61	78.28	78.52	69.01	82.08	77.02
10.0	71.70	73.09	73.85	63.30	75.39	72.75
69.6	70.11	67.48	64.59	52.04	59.19	49.56
129.0	64.54	65.46	60.68	46.87	52.46	43.80
188.5	60.53	64.14	59.25	43.27	49.43	41.27
248.0	59.16	63.14	57.20	41.52	46.62	38.37
307.4	57.95	63.12	55.16	39.89	44.72	36.49
366.9	57.48	63.39	53.76	39.94	42.88	34.48
426.4	58.51	60.48	52.11	40.58	39.55	32.34
485.9	60.52	55.89	49.50	41.45	37.39	30.72
545.3	61.55	53.43	47.41	45.81	34.55	28.83
604.8	60.24	51.58	46.13	49.62	31.94	26.89
664.3	55.87	48.54	44.16	44.69	29.67	25.19
723.7	51.96	45.51	41.71	37.54	27.58	23.59
783.2	50.21	44.53	40.80	33.82	25.99	22.46
842.7	48.01	43.12	39.70	29.87	24.09	20.94
902.1	46.57	42.15	38.96	26.63	21.88	19.22
961.6	45.75	42.56	39.43	24.42	20.38	18.06
1021.1	43.88	42.23	39.63	22.78	19.13	17.02
1080.5	42.51	41.94	39.79	21.29	18.05	16.03
1140.0	41.32	41.74	40.20	19.86	17.13	15.25
1199.5	39.94	40.67	39.90	18.72	16.22	14.52
1258.9	39.31	40.14	39.75	17.76	15.44	13.84
1318.4	38.69	39.85	39.69	16.84	14.75	13.27
1377.9	37.85	39.31	39.51	15.97	14.04	12.70
1437.4	37.08	39.02	39.53	15.23	13.50	12.11
1496.8	36.53	38.68	39.46	14.42	12.87	11.66
1556.3	36.30	38.41	39.00	13.64	12.31	11.23
1615.8	36.07	38.14	38.64	12.97	11.84	10.98
1675.2	35.92	37.85	37.93	12.44	11.50	10.62
1734.7	35.51	37.46	37.66	12.05	11.28	10.46
1794.2	35.29	37.25	37.58	11.56	11.07	10.39
1893.3	35.01	37.36	38.38	11.04	10.73	10.22
1952.8	34.87	37.30	38.65	10.72	10.51	10.00
1992.4	34.47	37.00	38.95	10.56	10.36	10.01
2051.9	34.14	36.66	39.01	10.36	10.20	9.83
2091.5	33.51	35.90	38.12	10.21	10.19	9.84
2151.0	32.97	35.40	37.41	10.16	10.12	9.91
2190.6	32.30	34.80	36.97	10.12	10.13	9.85
2250.1	31.85	34.45	36.80	10.08	10.16	9.95

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	50.32	56.78	53.39
69.6	99.6	40.41	39.52	39.41
129.0	159.0	35.90	35.44	35.11
188.5	218.5	33.53	32.83	32.56
248.0	278.0	31.90	31.23	30.85
307.4	337.4	30.61	29.94	29.53
366.9	396.9	29.48	28.86	28.43
426.4	456.4	28.36	27.82	27.49
485.9	515.9	26.95	26.50	26.17
545.3	575.3	25.71	25.26	24.88
604.8	634.8	24.47	24.09	23.81
664.3	694.3	23.27	23.01	22.85
723.7	753.7	22.28	22.04	21.89
783.2	813.2	21.50	21.20	21.07
842.7	872.7	21.05	20.77	20.66
902.1	932.1	20.86	20.74	20.66
961.6	991.6	20.71	20.83	20.82
1021.1	1051.1	20.36	20.76	20.92
1080.5	1110.5	20.19	20.68	21.06
1140.0	1170.0	19.86	20.46	20.95
1199.5	1229.5	19.58	20.18	20.74
1258.9	1288.9	19.56	20.12	20.67
1318.4	1348.4	19.67	20.27	20.85
1377.9	1407.9	19.81	20.45	21.15
1437.4	1467.4	20.14	20.86	21.47
1496.8	1526.8	20.55	21.29	22.01
1556.3	1586.3	21.05	21.78	22.50
1615.8	1645.8	21.81	22.54	23.21
1675.2	1705.2	22.50	23.29	23.98
1734.7	1764.7	23.37	24.24	25.00
1794.2	1824.2	24.08	25.22	26.03
1853.6	1883.6	24.54	25.99	27.02
1893.3	1923.3	24.68	26.19	27.46
1952.8	1982.8	24.57	26.02	27.37
1992.4	2022.4	24.49	25.77	26.91
2051.9	2081.9	24.21	25.31	26.20
2091.5	2121.5	24.21	25.19	26.00
2151.0	2181.0	24.28	25.10	25.70
2190.6	2220.6	24.33	25.04	25.51
2250.1	2280.1	24.63	25.26	25.55

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)		
		+4	+7	+10		+4	+7	+10		+4	+7	+10
5.0	35.0	2.73	2.64	2.55	5.0	1.68	2.43	3.47	5.0	1.51	1.21	1.03
10.0	40.0	1.68	1.62	1.58	10.0	1.67	2.43	3.47	10.0	1.52	1.22	1.03
69.6	99.6	1.18	1.17	1.19	69.6	1.89	2.67	3.70	49.6	1.22	1.02	1.15
129.0	159.0	1.11	1.07	1.10	129.0	1.88	2.67	3.69	89.0	1.23	1.06	1.13
188.5	218.5	1.09	1.01	1.06	188.5	1.83	2.57	3.52	128.5	1.23	1.05	1.13
248.0	278.0	1.09	1.03	1.06	248.0	1.88	2.64	3.60	168.0	1.22	1.06	1.16
307.4	337.4	1.11	1.06	1.07	307.4	1.88	2.62	3.54	207.4	1.24	1.07	1.15
366.9	396.9	1.15	1.10	1.09	366.9	1.92	2.65	3.54	246.9	1.23	1.08	1.17
426.4	456.4	1.18	1.14	1.13	426.4	1.97	2.69	3.56	286.4	1.25	1.09	1.16
485.9	515.9	1.22	1.18	1.16	485.9	2.01	2.70	3.52	325.8	1.23	1.08	1.16
545.3	575.3	1.28	1.23	1.21	545.3	2.07	2.74	3.54	365.3	1.24	1.11	1.19
604.8	634.8	1.38	1.32	1.28	604.8	2.12	2.77	3.52	404.8	1.28	1.12	1.15
664.3	694.3	1.51	1.43	1.38	664.3	2.17	2.79	3.50	444.2	1.26	1.09	1.14
723.7	753.7	1.65	1.57	1.52	723.7	2.23	2.83	3.52	483.7	1.27	1.11	1.15
783.2	813.2	1.82	1.73	1.66	783.2	2.27	2.84	3.48	523.2	1.29	1.13	1.14
842.7	872.7	2.02	1.90	1.82	842.7	2.35	2.87	3.48	562.6	1.28	1.12	1.14
902.1	932.1	2.24	2.10	2.01	902.1	2.41	2.91	3.47	602.1	1.29	1.12	1.14
961.6	991.6	2.46	2.31	2.19	961.6	2.48	2.96	3.49	641.6	1.30	1.11	1.12
1021.1	1051.1	2.62	2.49	2.37	1021.1	2.55	3.01	3.52	681.0	1.28	1.09	1.11
1080.5	1110.5	2.72	2.62	2.52	1080.5	2.58	3.02	3.49	720.5	1.29	1.08	1.10
1140.0	1170.0	2.76	2.71	2.64	1140.0	2.64	3.05	3.52	760.0	1.28	1.07	1.09
1199.5	1229.5	2.78	2.77	2.73	1199.5	2.66	3.03	3.45	799.4	1.28	1.07	1.10
1258.9	1288.9	2.80	2.80	2.79	1258.9	2.72	3.05	3.45	838.9	1.28	1.08	1.12
1318.4	1348.4	2.81	2.81	2.81	1318.4	2.73	3.02	3.38	878.4	1.27	1.10	1.15
1377.9	1407.9	2.82	2.81	2.81	1377.9	2.78	3.03	3.35	917.8	1.26	1.11	1.18
1437.4	1467.4	2.79	2.77	2.77	1437.4	2.83	3.03	3.33	957.3	1.28	1.16	1.22
1496.8	1526.8	2.77	2.74	2.73	1496.8	2.87	3.02	3.27	996.8	1.28	1.22	1.31
1556.3	1586.3	2.77	2.73	2.72	1556.3	2.97	3.06	3.30	1036.2	1.26	1.23	1.33
1615.8	1645.8	2.78	2.73	2.71	1615.8	3.04	3.09	3.29	1075.7	1.33	1.31	1.41
1675.2	1705.2	2.81	2.73	2.71	1675.2	3.17	3.16	3.33	1115.2	1.35	1.38	1.50
1734.7	1764.7	2.82	2.71	2.68	1734.7	3.33	3.26	3.38	1154.6	1.38	1.42	1.54
1794.2	1824.2	2.85	2.69	2.65	1794.2	3.47	3.35	3.38	1194.1	1.46	1.53	1.66
1853.6	1883.6	2.90	2.69	2.61	1853.6	3.67	3.46	3.48	1233.6	1.47	1.57	1.70
1893.3	1923.3	2.95	2.70	2.60	1893.3	3.78	3.52	3.52	1273.0	1.57	1.67	1.80
1952.8	1982.8	3.07	2.77	2.63	1952.8	3.97	3.67	3.62	1312.5	1.67	1.80	1.95
1992.4	2022.4	3.15	2.82	2.67	1992.4	4.05	3.72	3.59	1352.0	1.73	1.87	2.02
2051.9	2081.9	3.30	2.93	2.75	2051.9	4.26	3.86	3.72	1371.7	1.79	1.93	2.09
2091.5	2121.5	3.39	3.00	2.78	2091.5	4.31	3.89	3.70	1411.2	1.92	2.09	2.26
2151.0	2181.0	3.52	3.08	2.85	2151.0	4.50	4.03	3.78	1430.9	1.95	2.11	2.27
2190.6	2220.6	3.60	3.14	2.89	2190.6	4.54	4.05	3.78	1470.4	2.10	2.27	2.43
2250.1	2280.1	3.68	3.19	2.94	2250.1	4.67	4.16	3.90	1490.1	2.20	2.37	2.56

Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	+1	18	11	21	9	48	39	44	43	43
1	-	16	+0	38	18	41	35	47	38	56	42	60
2	>100	54	35	54	34	64	49	56	45	59	60	62
3	>100	72	62	65	65	66	66	73	68	70	65	75
4	>100	>80	>80	>80	>80	77	>80	>80	>80	>80	>80	>80
5	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
6	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
7	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
8	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
9	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
10	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 750.1 MHz; -14.00 dBm.
LO IN: 780.01 MHz; +7.00 dBm
IF OUT: 29.91 MHz; -20.17 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	6	28	21	35	21	61	53	59	45	61
1	-	16	+0	37	19	44	41	51	49	61	50	67
2	89	45	25	48	26	57	45	61	40	64	75	64
3	>100	47	44	47	40	54	46	63	58	68	57	83
4	>100	64	66	54	56	53	43	68	58	60	60	66
5	>100	71	67	65	54	59	58	62	59	76	62	69
6	>100	>90	73	73	85	>90	54	64	60	72	70	70
7	>100	>90	75	>90	78	81	72	75	64	68	71	77
8	>100	>90	>90	>90	80	85	88	78	72	81	69	84
9	>100	>90	>90	>90	86	>90	86	>90	83	81	71	81
10	>100	>90	>90	>90	>90	>90	88	>90	>90	85	82	85
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

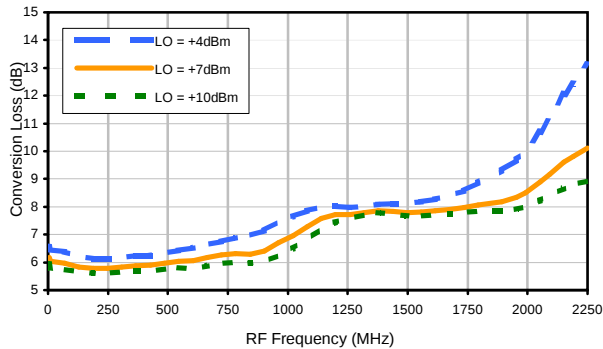
Test conditions: RF IN: 750.1 MHz; -4.00 dBm.
LO IN: 780.01 MHz; +7.00 dBm
IF OUT: 29.91 MHz; -10.31 dBm

- 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.

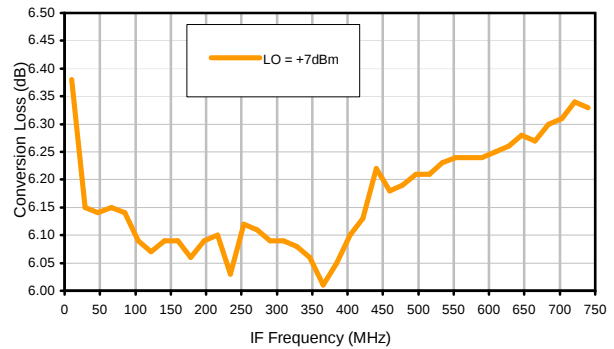
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Page 5 of 5

Typical Performance Curves

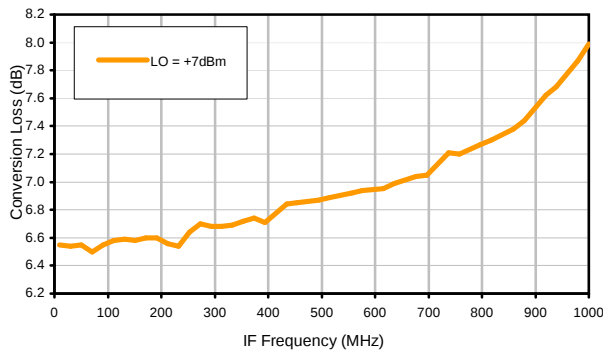
Conversion Loss @ IF=30MHz



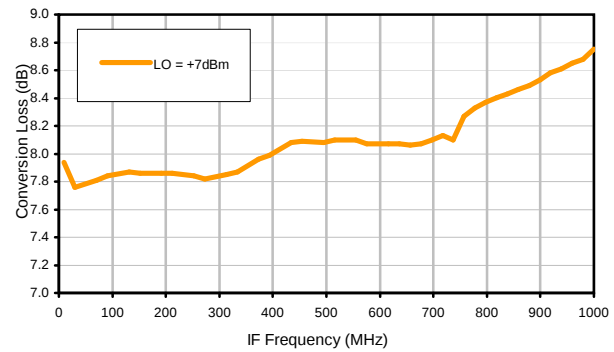
Conversion Loss vs. IF @ RF=750.1MHz



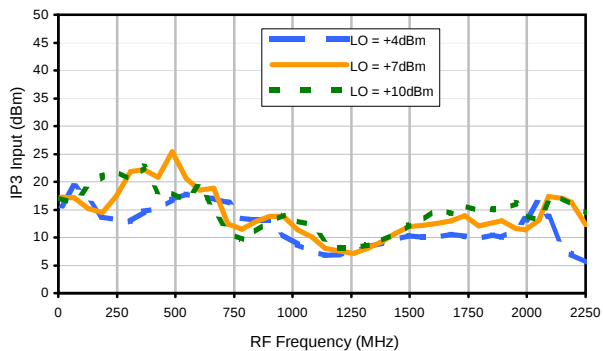
Conversion Loss vs. IF @ RF=10.1MHz



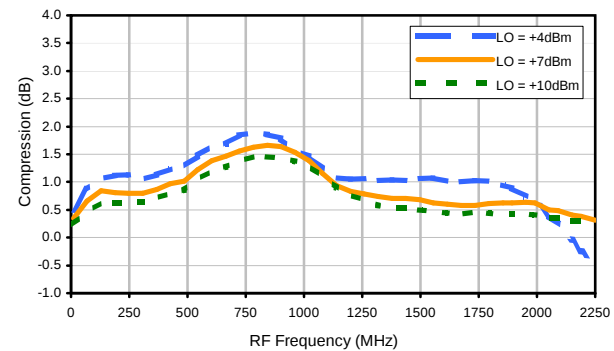
Conversion Loss vs. IF @ RF=1500.1MHz



IP3 Input

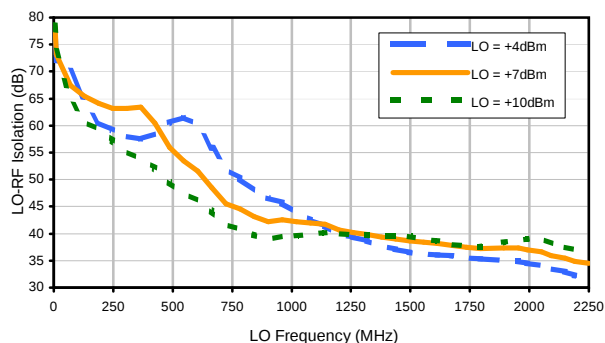


Compression @ RF IN=+1dBm

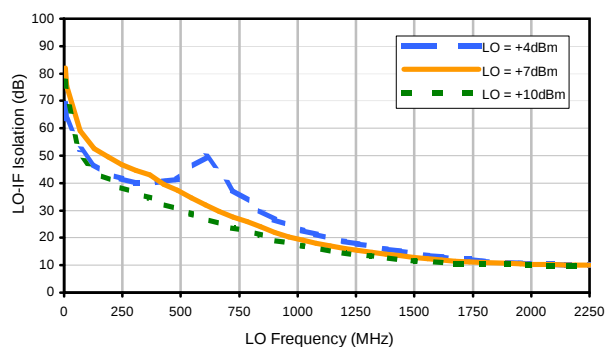


Typical Performance Curves

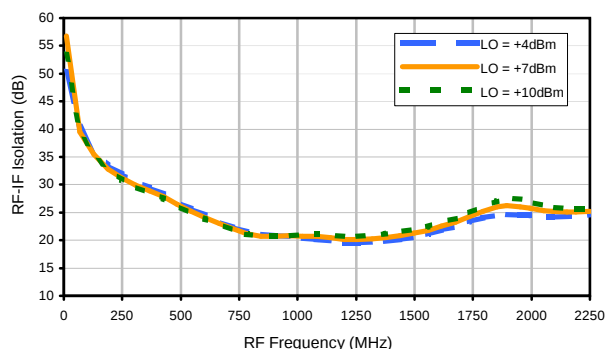
LO-RF Isolation



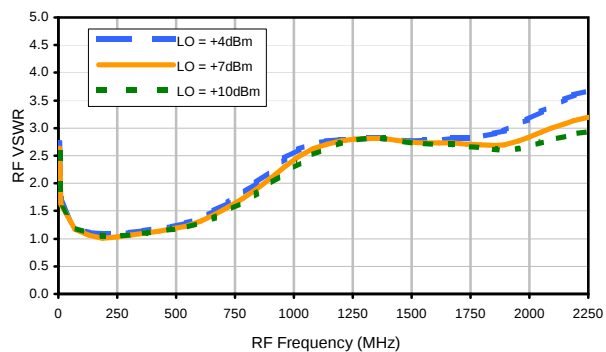
LO-IF Isolation



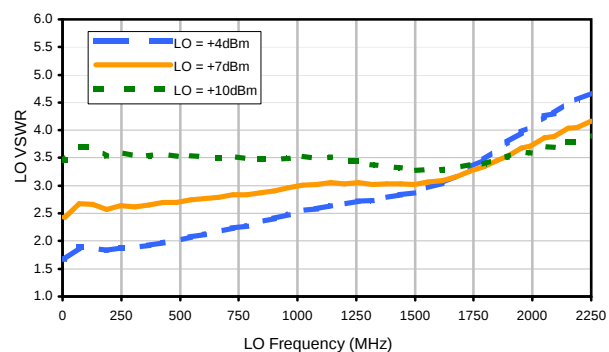
RF-IF Isolation



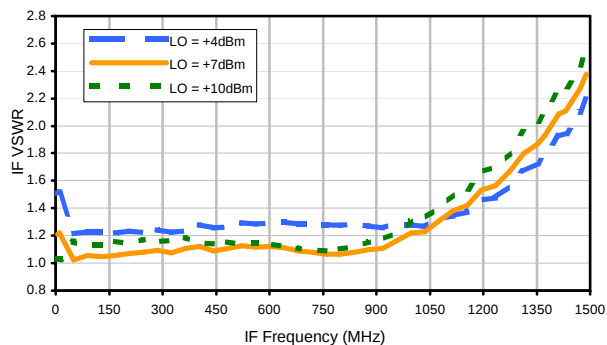
RF VSWR



LO VSWR



IF VSWR



REV. X2

RMS-5+

100818

Page 2 of 3



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED • RoHS compliant

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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	+1	18	11	21	9	48	39	44	43	43
1	-	16	+0	38	18	41	35	47	38	56	42	60
2	>100	54	35	54	34	64	49	56	45	59	60	62
3	>100	72	62	65	65	66	66	73	68	70	65	75
4	>100	>80	>80	>80	>80	77	>80	>80	>80	>80	>80	>80
5	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
6	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
7	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
8	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
9	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
10	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:

RF IN: 750.1 MHz; -14.00 dBm.
LO IN: 780.01 MHz; +7.00 dBm
IF OUT: 29.91 MHz; -20.17 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	6	28	21	35	21	61	53	59	45	61
1	-	16	+0	37	19	44	41	51	49	61	50	67
2	89	45	25	48	26	57	45	61	40	64	75	64
3	>100	47	44	47	40	54	46	63	58	68	57	83
4	>100	64	66	54	56	53	43	68	58	60	60	66
5	>100	71	67	65	54	59	58	62	59	76	62	69
6	>100	>90	73	73	85	>90	54	64	60	72	70	70
7	>100	>90	75	>90	78	81	72	75	64	68	71	77
8	>100	>90	>90	>90	80	85	88	78	72	81	69	84
9	>100	>90	>90	>90	86	>90	86	>90	83	81	71	81
10	>100	>90	>90	>90	>90	>90	88	>90	>90	85	82	85
	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; +7.00 dBm
IF OUT: 29.91 MHz; -10.31 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.

REV. X2

RMS-5+

100818

Page 3 of 3



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED • RoHS compliant

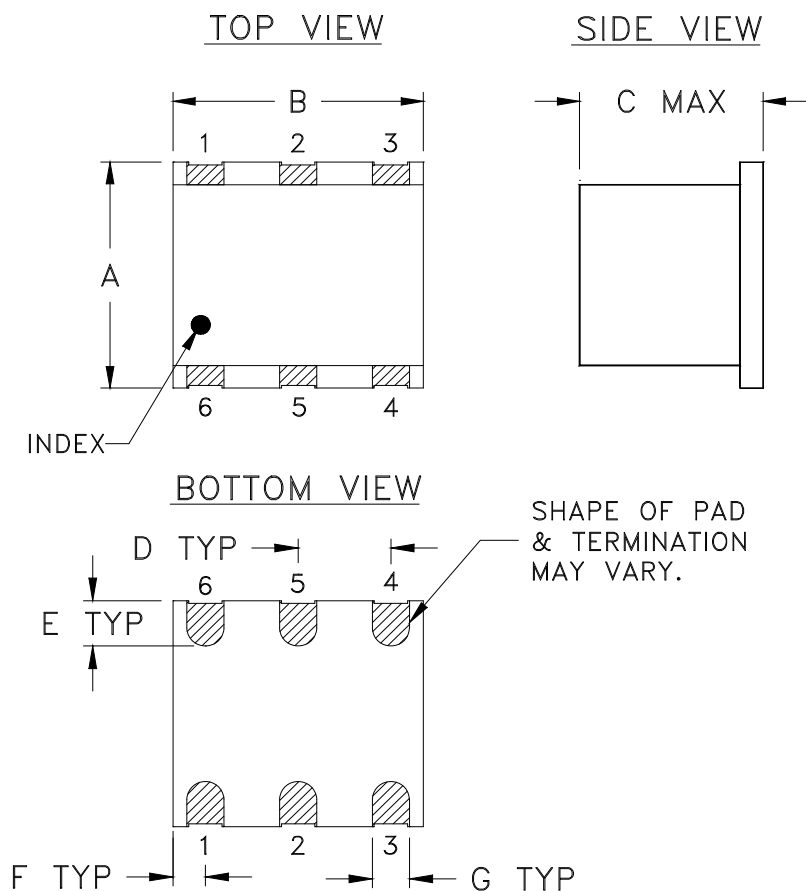
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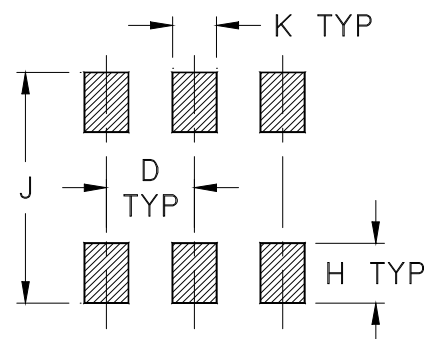
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Outline Dimensions



PCB Land Pattern



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

CASE #	A	B	C	D	E	F	G	H	J	K	WT. GRAM
TT240	.250 (6.35)	.31 (7.87)	.20 (5.08)	.100 (2.54)	.050 (1.27)	.055 (1.40)	.040 (1.02)	.070 (1.78)	.270 (6.86)	.050 (1.27)	.50

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

Notes:

- Case material: Ceramic.
- Termination finish:
 - For RoHS Case Styles: 2-10 μ inch (.05-.25 microns) Gold plate over 100-300 μ inch (2.54-7.62 microns) Nickel plate. All models, (+) suffix.
 - For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.



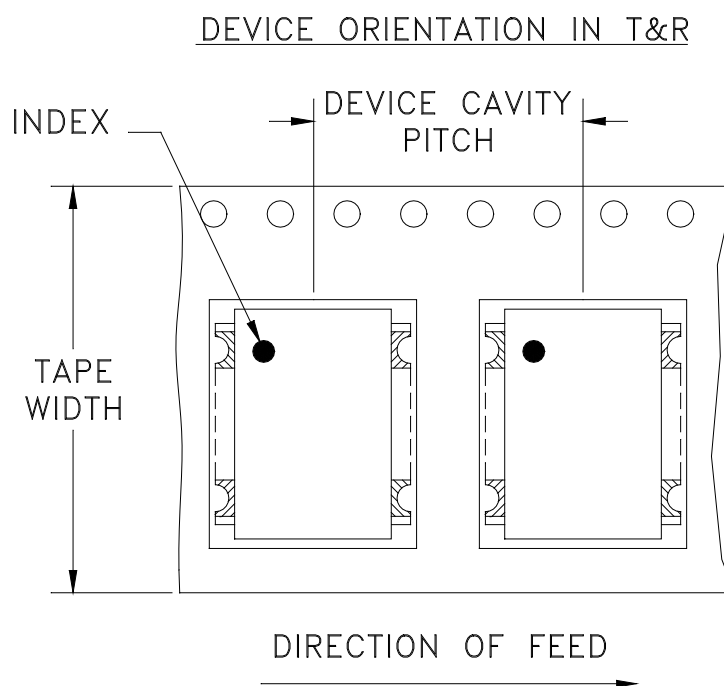
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RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F2



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel See note
16	12	7	10
			20
			50
			100
			200
		13	500
			1000

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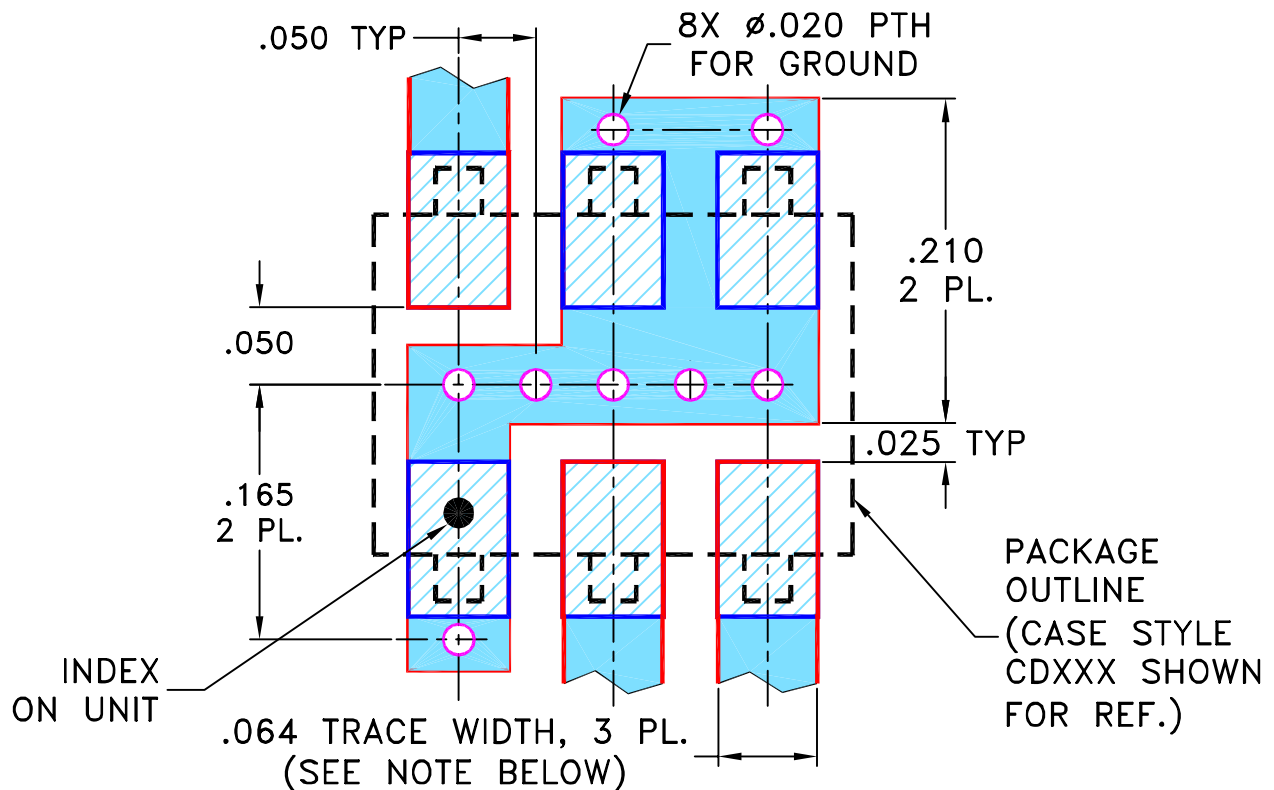
THIRD ANGLE PROJECTION



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 $\pm$.005ANGLES $\pm$ FRACTIONS $\pm$

DRAWN

MMG

07/17/02

CHECKED

WL

08/02/02

APPROVED

DJ

08/05/02



Mini-Circuits®

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

Mini-Circuits®

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Evaluation Board and Circuit

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



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