Surface Mount

Frequency Mixer

RMS-5H+

Level 17 (LO Power +17 dBm) 10 to 1500 MHz

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

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

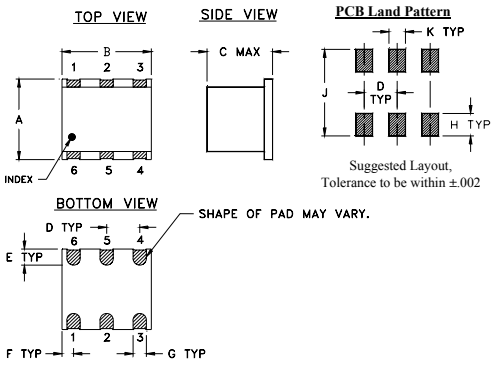
Features

- excellent L-R isolation, 36 dB typ.
- conversion loss, 6.36 dB typ.
- small size, 0.25”x0.31”x0.2”

Applications

- cellular
- satellite distribution
- GSM
- ISM

Outline Drawing

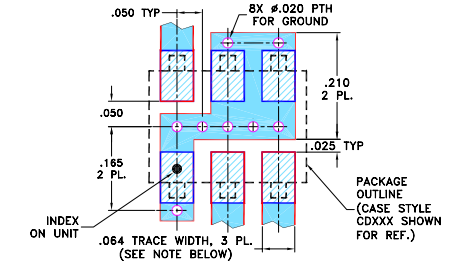


Outline Dimensions (inch / mm)

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)



NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .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

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		$\overline{X}$	σ	Max.	Total Range Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.
10-1500	DC-900	6.36	.05	8.0	9.8	65	40	36	20	22	15	50	30	30	18	17	7	24

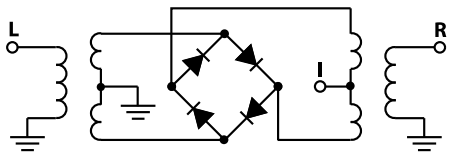
1 dB COMP.: +14 dBm typ.
For phase detection, DC output positive with in-phase RF & LO.

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 +17dBm	LO +17dBm	LO +17dBm	LO +17dBm	LO +17dBm
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 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.
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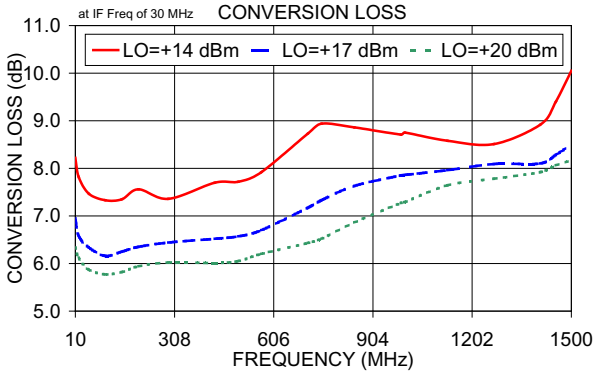
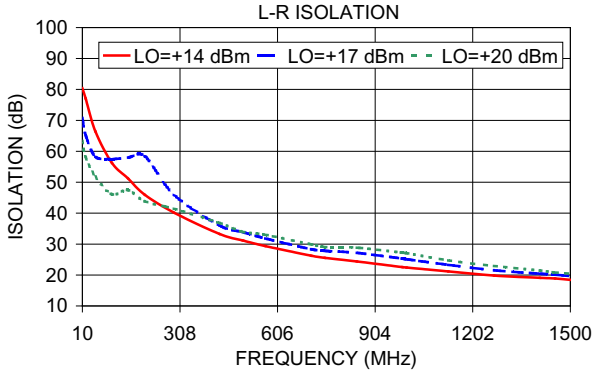
Performance Charts

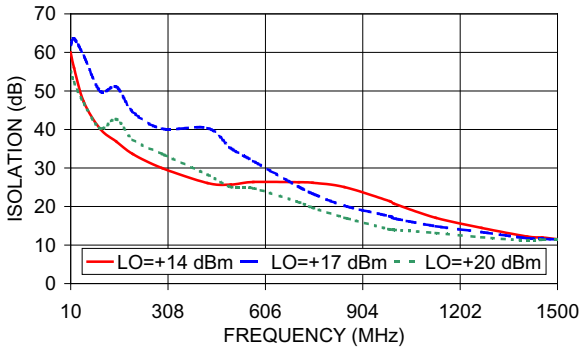
RMS-5H
at IF Freq of 30 MHz CONVERSION LOSS



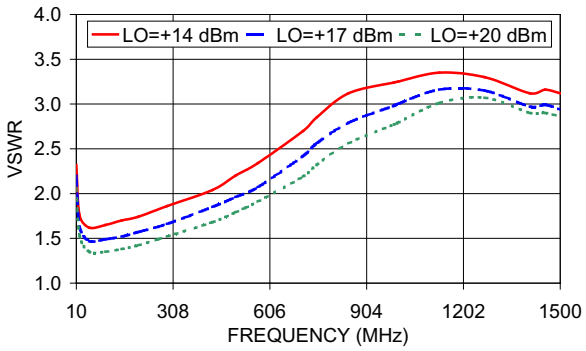
RMS-5H
L-R ISOLATION



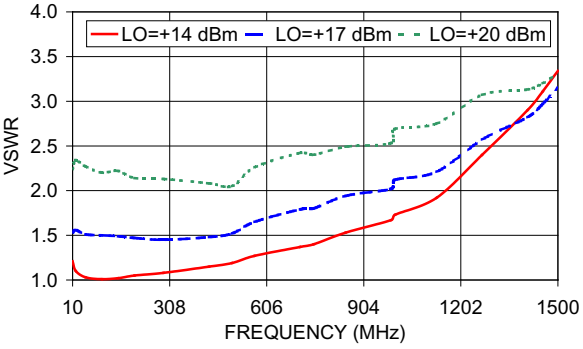
RMS-5H
L-I ISOLATION



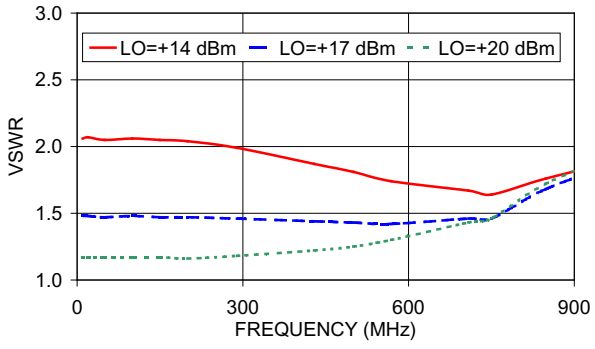
RMS-5H
RF VSWR



RMS-5H
LO VSWR



RMS-5H
IF VSWR



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Frequency Mixer RMS-5H+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB) @LO (dBm)		
		+14	+17	+20
10.1	40.1	7.16	6.32	5.90
50.7	80.7	6.94	6.11	5.69
91.4	121.4	6.85	5.96	5.59
132.0	162.0	6.70	5.87	5.56
172.7	202.7	6.70	5.88	5.60
213.3	243.3	6.62	5.88	5.60
254.0	284.0	6.59	5.93	5.65
294.6	324.6	6.60	5.98	5.69
335.3	365.3	6.70	6.08	5.74
375.9	405.9	6.75	6.14	5.80
416.6	446.6	6.84	6.17	5.82
477.5	507.5	6.97	6.26	5.84
518.2	548.2	7.10	6.35	5.94
579.1	609.1	7.18	6.40	5.97
619.8	649.8	7.26	6.45	5.98
680.7	710.7	7.39	6.46	5.98
721.4	751.4	7.57	6.55	6.04
782.4	812.4	8.03	6.66	6.08
823.0	853.0	8.44	6.82	6.14
884.0	914.0	8.80	7.14	6.26
924.6	954.6	8.97	7.39	6.41
985.6	1015.6	9.04	7.63	6.71
1026.2	1056.2	9.14	7.89	6.97
1087.2	1117.2	9.19	8.23	7.46
1127.8	1157.8	9.18	8.44	7.73
1188.8	1218.8	9.09	8.59	8.08
1229.5	1259.5	8.98	8.61	8.20
1290.4	1320.4	8.84	8.57	8.35
1331.1	1361.1	8.74	8.51	8.38
1392.0	1422.0	8.69	8.42	8.41
1432.7	1462.7	8.66	8.36	8.38
1493.6	1523.6	8.78	8.30	8.25
1534.3	1564.3	8.87	8.31	8.25
1595.3	1625.3	9.13	8.40	8.28
1635.9	1665.9	9.38	8.49	8.33
1696.9	1726.9	9.92	8.84	8.54
1737.5	1767.5	10.23	9.02	8.67
1798.5	1828.5	10.92	9.36	8.86
1839.1	1869.1	11.54	9.56	8.96
1900.1	1930.1	12.88	9.96	9.10

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm) @LO (dBm)		
		+14	+17	+20
10.1	40.1	22.18	25.48	27.19
50.7	80.7	22.32	25.77	27.78
91.4	121.4	22.65	25.52	29.14
132.0	162.0	23.78	28.25	23.62
172.7	202.7	24.54	23.69	23.30
213.3	243.3	25.43	21.82	23.40
254.0	284.0	22.06	21.67	24.20
294.6	324.6	20.78	21.71	24.74
335.3	365.3	19.96	21.64	25.94
375.9	405.9	20.00	22.20	26.42
416.6	446.6	19.98	23.52	30.09
477.5	507.5	19.65	22.94	32.05
518.2	548.2	19.72	23.18	25.92
579.1	609.1	21.05	31.80	32.33
619.8	649.8	21.18	25.50	25.61
680.7	710.7	20.71	25.13	22.91
721.4	751.4	20.24	34.88	25.34
782.4	812.4	20.02	23.35	30.53
823.0	853.0	20.15	22.26	26.00
884.0	914.0	21.23	23.47	24.10
924.6	954.6	20.68	25.54	24.79
985.6	1015.6	18.86	22.18	25.84
1026.2	1056.2	17.73	20.84	25.05
1087.2	1117.2	16.71	19.08	24.88
1127.8	1157.8	16.55	18.50	24.13
1188.8	1218.8	17.17	18.65	26.59
1229.5	1259.5	18.08	18.77	26.57
1290.4	1320.4	19.18	19.34	24.12
1331.1	1361.1	19.57	19.75	23.58
1392.0	1422.0	19.22	20.05	21.96
1432.7	1462.7	18.87	20.79	21.35
1493.6	1523.6	18.30	20.77	20.72
1534.3	1564.3	17.98	20.96	20.56
1595.3	1625.3	17.31	21.13	21.21
1635.9	1665.9	16.77	21.98	23.99
1696.9	1726.9	15.76	21.13	25.01
1737.5	1767.5	15.16	21.09	25.17
1798.5	1828.5	14.42	20.46	25.90
1839.1	1869.1	13.71	19.51	25.55
1900.1	1930.1	12.67	18.26	25.17

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+14dBm (dB) @LO (dBm)		
		+14	+17	+20
10.1	40.1	0.48	0.34	0.29
50.7	80.7	0.38	0.12	0.07
91.4	121.4	0.28	0.10	0.08
132.0	162.0	0.47	0.20	0.09
172.7	202.7	0.46	0.20	0.09
213.3	243.3	0.55	0.20	0.08
254.0	284.0	0.66	0.20	0.10
294.6	324.6	0.65	0.20	0.12
335.3	365.3	0.66	0.21	0.14
375.9	405.9	0.67	0.22	0.14
416.6	446.6	0.76	0.30	0.20
477.5	507.5	0.72	0.32	0.23
518.2	548.2	0.82	0.39	0.24
579.1	609.1	0.88	0.51	0.35
619.8	649.8	1.04	0.61	0.45
680.7	710.7	1.20	0.79	0.58
721.4	751.4	1.12	0.82	0.56
782.4	812.4	1.06	1.05	0.73
823.0	853.0	0.75	1.05	0.76
884.0	914.0	0.60	1.10	0.94
924.6	954.6	0.61	1.06	1.02
985.6	1015.6	0.67	1.02	1.01
1026.2	1056.2	0.59	0.82	0.85
1087.2	1117.2	0.68	0.64	0.64
1127.8	1157.8	0.67	0.44	0.46
1188.8	1218.8	0.87	0.35	0.33
1229.5	1259.5	0.93	0.29	0.23
1290.4	1320.4	1.23	0.37	0.25
1331.1	1361.1	1.29	0.39	0.24
1392.0	1422.0	1.75	0.62	0.36
1432.7	1462.7	1.86	0.66	0.32
1493.6	1523.6	1.95	0.77	0.47
1534.3	1564.3	1.91	0.77	0.46
1595.3	1625.3	2.05	0.89	0.49
1635.9	1665.9	2.03	0.95	0.49
1696.9	1726.9	2.31	1.14	0.60
1737.5	1767.5	2.44	1.23	0.63
1798.5	1828.5	2.54	1.45	0.69
1839.1	1869.1	2.54	1.69	0.75
1900.1	1930.1	2.05	1.85	0.86

Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=750.1MHz (dB) @LO (dBm) +17
730.0	20.1	6.64
711.5	38.6	6.57
693.1	57.0	6.57
674.6	75.5	6.60
656.2	93.9	6.56
637.7	112.4	6.49
619.2	130.9	6.46
600.8	149.3	6.44
582.3	167.8	6.45
563.8	186.3	6.46
545.4	204.7	6.52
526.9	223.2	6.54
508.5	241.6	6.56
490.0	260.1	6.59
471.5	278.6	6.59
453.1	297.0	6.62
434.6	315.5	6.64
416.2	333.9	6.60
397.7	352.4	6.58
379.2	370.9	6.47
360.8	389.3	6.58
342.3	407.8	6.56
323.8	426.3	6.59
305.4	444.7	6.58
286.9	463.2	6.59
268.5	481.6	6.60
250.0	500.1	6.62
231.5	518.6	6.59
213.1	537.0	6.64
194.6	555.5	6.65
176.2	573.9	6.65
157.7	592.4	6.66
139.2	610.9	6.64
120.8	629.3	6.62
102.3	647.8	6.59
83.8	666.3	6.61
65.4	684.7	6.60
46.9	703.2	6.60
28.5	721.6	6.59
10.0	740.1	6.72

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=10.1MHz (dB) @LO (dBm) +17
10.0	20.1	6.74
29.8	39.9	6.67
49.6	59.7	6.75
69.3	79.4	6.79
89.1	99.2	6.72
108.9	119.0	6.73
128.7	138.8	6.73
148.4	158.5	6.73
168.2	178.3	6.72
188.0	198.1	6.72
207.8	217.9	6.68
227.6	237.7	6.61
247.3	257.4	6.65
267.1	277.2	6.69
286.9	297.0	6.64
306.7	316.8	6.63
326.4	336.5	6.68
346.2	356.3	6.65
366.0	376.1	6.72
385.8	395.9	6.72
405.6	415.7	6.67
425.3	435.4	6.72
445.1	455.2	6.75
464.9	475.0	6.78
484.7	494.8	6.76
504.4	514.5	6.77
524.2	534.3	6.76
544.0	554.1	6.79
583.6	593.7	6.81
603.3	613.4	6.85
642.9	653.0	6.93
662.7	672.8	6.95
702.2	712.3	6.96
722.0	732.1	7.00
761.6	771.7	7.07
781.3	791.4	7.13
820.9	831.0	7.20
840.7	850.8	7.33
880.2	890.3	7.53
900.0	910.1	7.63

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1500.1MHz (dB) @LO (dBm) +17
900.0	600.1	9.79
879.3	620.8	9.77
858.6	641.5	9.75
837.9	662.2	9.73
817.2	682.9	9.62
796.5	703.6	9.58
775.8	724.3	9.51
755.1	745.0	9.50
734.4	765.7	9.34
713.7	786.4	9.36
693.0	807.1	9.35
672.3	827.8	9.34
651.6	848.5	9.38
630.9	869.2	9.40
610.2	889.9	9.39
589.5	910.6	9.38
568.8	931.3	9.34
548.1	952.0	9.28
527.4	972.7	9.19
506.7	993.4	9.10
486.0	1014.1	9.00
465.3	1034.8	8.91
444.7	1055.4	8.87
424.0	1076.1	8.79
403.3	1096.8	8.70
382.6	1117.5	8.66
361.9	1138.2	8.62
341.2	1158.9	8.57
320.5	1179.6	8.56
299.8	1200.3	8.53
279.1	1221.0	8.50
258.4	1241.7	8.52
217.0	1283.1	8.55
196.3	1303.8	8.56
154.9	1345.2	8.58
134.2	1365.9	8.58
92.8	1407.3	8.54
72.1	1428.0	8.53
30.7	1469.4	8.55
10.0	1490.1	8.64

Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB) @LO (dBm)			LO-IF ISOLATION (dB) @LO (dBm)		
	+14	+17	+20	+14	+17	+20
10.1	71.87	69.30	67.58	58.29	63.03	76.62
50.7	64.49	60.40	57.81	43.24	50.35	62.01
91.4	61.58	56.79	54.11	38.20	44.96	56.72
132.0	59.87	54.32	51.15	35.09	42.33	51.79
172.7	59.00	52.97	49.74	32.86	40.16	49.92
213.3	56.77	51.10	47.43	31.46	38.40	49.38
254.0	55.44	49.81	46.72	29.95	36.72	49.38
294.6	51.86	47.75	44.99	28.89	35.58	49.27
335.3	48.96	46.01	43.73	27.87	34.91	49.99
375.9	46.39	44.18	42.07	26.98	34.08	50.77
416.6	44.43	42.59	40.75	26.45	34.85	45.64
477.5	41.61	40.32	39.06	25.54	34.04	42.08
518.2	40.09	38.80	37.75	25.43	35.68	38.94
579.1	38.15	36.98	35.59	25.10	39.14	33.68
619.8	36.90	36.36	35.19	24.99	42.13	30.49
680.7	35.21	35.22	34.17	25.11	41.90	29.53
721.4	33.83	33.78	33.00	25.78	45.09	27.82
782.4	32.31	32.48	32.15	27.28	36.79	25.79
823.0	31.53	31.66	31.37	28.46	31.30	23.61
884.0	30.43	30.81	30.86	30.75	26.24	21.15
924.6	29.92	30.46	30.31	32.22	24.21	19.49
985.6	29.08	29.98	29.96	33.28	22.49	17.83
1026.2	28.57	29.65	29.79	30.81	21.35	16.93
1087.2	27.86	29.17	29.79	27.38	20.02	16.04
1127.8	27.36	28.85	29.88	25.41	19.22	15.57
1188.8	26.46	28.06	29.42	22.68	18.05	14.73
1229.5	25.82	27.43	28.97	20.93	17.09	14.15
1290.4	25.12	26.63	28.09	18.56	15.82	13.18
1331.1	24.77	26.23	27.64	17.12	14.84	12.56
1392.0	24.44	25.88	27.16	15.28	13.52	11.79
1432.7	24.32	25.76	26.95	14.40	12.93	11.34
1493.6	24.08	25.45	26.39	13.27	12.03	10.52
1534.3	23.80	25.18	26.23	12.57	11.49	10.37
1595.3	23.19	24.43	25.10	11.73	10.94	9.72
1635.9	22.68	23.88	24.56	11.06	10.39	9.27
1696.9	21.85	23.03	23.76	10.28	9.92	8.94
1737.5	21.40	22.50	23.27	9.85	9.55	8.78
1798.5	20.73	21.81	22.58	8.90	8.97	8.43
1839.1	20.63	21.60	22.32	8.46	8.69	8.27
1900.1	20.66	21.33	22.04	7.66	8.08	7.92

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB) @LO (dBm)		
		+14	+17	+20
10.1	40.1	59.18	52.86	48.69
50.7	80.7	46.05	44.30	42.85
91.4	121.4	41.54	40.16	39.08
132.0	162.0	38.87	37.64	37.01
172.7	202.7	37.17	35.92	35.35
213.3	243.3	35.84	34.71	34.07
254.0	284.0	34.54	33.69	33.15
294.6	324.6	33.85	32.90	32.42
335.3	365.3	33.25	32.52	32.08
375.9	405.9	32.58	31.67	31.37
416.6	446.6	31.74	31.17	30.61
477.5	507.5	29.71	30.02	29.79
518.2	548.2	28.40	28.69	28.68
579.1	609.1	26.50	26.41	26.18
619.8	649.8	25.54	25.27	25.10
680.7	710.7	24.23	23.68	22.97
721.4	751.4	23.04	22.78	22.39
782.4	812.4	21.53	21.53	21.87
823.0	853.0	20.73	20.94	21.28
884.0	914.0	19.74	19.98	20.11
924.6	954.6	19.43	19.65	19.72
985.6	1015.6	19.13	19.25	19.39
1026.2	1056.2	19.03	19.09	19.11
1087.2	1117.2	18.85	18.82	18.80
1127.8	1157.8	18.62	18.80	19.28
1188.8	1218.8	18.33	19.22	20.26
1229.5	1259.5	18.27	19.51	20.72
1290.4	1320.4	18.39	19.66	21.01
1331.1	1361.1	18.67	19.81	21.13
1392.0	1422.0	19.22	20.15	21.27
1432.7	1462.7	19.56	20.33	21.24
1493.6	1523.6	20.05	20.81	21.28
1534.3	1564.3	20.29	20.96	21.48
1595.3	1625.3	20.00	20.67	21.29
1635.9	1665.9	19.66	20.27	20.96
1696.9	1726.9	18.92	19.62	20.24
1737.5	1767.5	18.68	19.30	19.82
1798.5	1828.5	19.05	19.41	19.68
1839.1	1869.1	19.38	19.56	19.67
1900.1	1930.1	20.55	20.47	20.21

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1) @LO (dBm)		
		+14	+17	+20
10.1	40.1	2.00	1.84	1.76
50.7	80.7	1.50	1.29	1.18
91.4	121.4	1.48	1.25	1.12
132.0	162.0	1.44	1.21	1.09
172.7	202.7	1.44	1.20	1.08
213.3	243.3	1.42	1.18	1.08
254.0	284.0	1.38	1.18	1.09
294.6	324.6	1.37	1.18	1.10
335.3	365.3	1.37	1.20	1.13
375.9	405.9	1.37	1.21	1.15
416.6	446.6	1.39	1.23	1.17
477.5	507.5	1.42	1.28	1.21
518.2	548.2	1.46	1.33	1.26
579.1	609.1	1.54	1.40	1.33
619.8	649.8	1.61	1.48	1.40
680.7	710.7	1.77	1.62	1.51
721.4	751.4	1.92	1.74	1.61
782.4	812.4	2.17	1.92	1.76
823.0	853.0	2.35	2.06	1.87
884.0	914.0	2.59	2.28	2.05
924.6	954.6	2.72	2.43	2.18
985.6	1015.6	2.89	2.61	2.36
1026.2	1056.2	2.98	2.73	2.48
1087.2	1117.2	3.07	2.88	2.66
1127.8	1157.8	3.07	2.94	2.76
1188.8	1218.8	3.02	2.96	2.87
1229.5	1259.5	2.96	2.94	2.89
1290.4	1320.4	2.89	2.89	2.86
1331.1	1361.1	2.86	2.85	2.83
1392.0	1422.0	2.81	2.78	2.78
1432.7	1462.7	2.79	2.75	2.73
1493.6	1523.6	2.79	2.69	2.65
1534.3	1564.3	2.78	2.64	2.58
1595.3	1625.3	2.80	2.60	2.52
1635.9	1665.9	2.84	2.62	2.52
1696.9	1726.9	2.94	2.68	2.57
1737.5	1767.5	2.99	2.73	2.61
1798.5	1828.5	3.08	2.79	2.67
1839.1	1869.1	3.17	2.84	2.70
1900.1	1930.1	3.35	2.89	2.72

LO (MHz)	LO VSWR (:1) @LO (dBm)		
	+14	+17	+20
10.1	1.10	1.62	2.31
50.7	1.09	1.65	2.39
91.4	1.08	1.60	2.28
132.0	1.08	1.62	2.33
172.7	1.09	1.59	2.27
213.3	1.09	1.61	2.31
254.0	1.09	1.62	2.32
294.6	1.10	1.64	2.32
335.3	1.13	1.69	2.39
375.9	1.15	1.70	2.38
416.6	1.19	1.76	2.45
477.5	1.25	1.81	2.48
518.2	1.30	1.87	2.54
579.1	1.38	1.92	2.57
619.8	1.43	1.99	2.63
680.7	1.51	2.05	2.66
721.4	1.58	2.11	2.72
782.4	1.68	2.18	2.76
823.0	1.75	2.25	2.80
884.0	1.85	2.32	2.83
924.6	1.90	2.37	2.88
985.6	1.99	2.44	2.92
1026.2	2.04	2.48	2.95
1087.2	2.12	2.51	2.93
1127.8	2.18	2.54	2.95
1188.8	2.26	2.58	2.95
1229.5	2.33	2.62	2.97
1290.4	2.42	2.65	2.95
1331.1	2.49	2.68	2.96
1392.0	2.58	2.71	2.93
1432.7	2.66	2.74	2.93
1493.6	2.73	2.75	2.89
1534.3	2.83	2.81	2.91
1595.3	2.92	2.82	2.88
1635.9	2.97	2.85	2.89
1696.9	3.07	2.89	2.87
1737.5	3.16	2.96	2.90
1798.5	3.21	3.06	2.94
1839.1	3.33	3.12	3.01
1900.1	3.42	3.24	3.08

IF (OUT) (MHz)	IF VSWR @LO=1500.1MHz (:1) @LO (dBm)		
	+14	+17	+20
10.0	1.34	1.16	1.09
29.8	1.31	1.14	1.03
49.6	1.28	1.12	1.06
69.3	1.29	1.13	1.05
89.1	1.31	1.13	1.04
108.9	1.32	1.15	1.03
128.7	1.33	1.15	1.04
148.4	1.33	1.14	1.06
168.2	1.32	1.13	1.06
188.0	1.33	1.14	1.06
207.8	1.35	1.14	1.06
227.6	1.35	1.14	1.08
247.3	1.35	1.13	1.09
267.1	1.37	1.14	1.09
286.9	1.38	1.15	1.09
306.7	1.39	1.15	1.11
326.4	1.40	1.16	1.13
346.2	1.39	1.15	1.14
366.0	1.38	1.13	1.14
385.8	1.40	1.14	1.14
405.6	1.43	1.17	1.15
425.3	1.43	1.17	1.17
445.1	1.40	1.15	1.20
464.9	1.40	1.14	1.20
484.7	1.42	1.14	1.18
504.4	1.44	1.16	1.18
524.2	1.45	1.18	1.22
544.0	1.44	1.18	1.24
583.6	1.41	1.14	1.23
603.3	1.45	1.16	1.22
642.9	1.47	1.20	1.27
662.7	1.45	1.20	1.30
702.2	1.46	1.20	1.28
722.0	1.49	1.23	1.30
761.6	1.49	1.27	1.36
781.3	1.47	1.26	1.37
820.9	1.50	1.29	1.38
840.7	1.52	1.32	1.41
880.2	1.51	1.36	1.48
900.0	1.51	1.37	1.50

Harmonics Tables

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	11	18	5	30	14	31	22	36	35	38
1	-	16	+0	35	19	44	35	40	30	50	42	59
2	>100	45	31	44	29	54	44	51	53	56	57	58
3	>100	72	56	54	51	54	58	74	55	66	57	72
4	>100	83	81	71	61	65	59	68	78	71	77	79
5	>100	>92	>92	>92	76	77	69	75	74	86	76	81
6	>100	>92	>92	>92	>92	91	87	83	81	89	>92	>92
7	>100	>92	>92	>92	>92	>92	>92	91	90	90	>92	>92
8	>100	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92
9	>100	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92
10	>100	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: **RF IN: 750.1 MHz; -1.00 dBm.**
LO IN: 780.01 MHz; +17.00 dBm
IF OUT: 29.91 MHz; -7.78 dBm

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	22	30	17	48	29	48	37	53	52	59
1	-	15	+0	38	21	49	54	50	36	55	49	59
2	92	38	25	43	22	54	39	53	51	78	49	61
3	>100	53	43	42	49	46	44	59	48	57	52	68
4	>100	65	56	49	47	45	45	53	56	57	62	74
5	>100	67	59	72	55	54	54	52	61	65	56	60
6	>100	74	68	72	72	81	50	59	49	60	64	63
7	>100	80	68	77	66	76	60	67	54	61	61	69
8	>100	>102	78	97	72	85	86	71	68	73	63	74
9	>100	91	90	91	83	81	85	83	73	66	69	68
10	>100	94	102	102	89	88	86	79	81	72	75	67
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

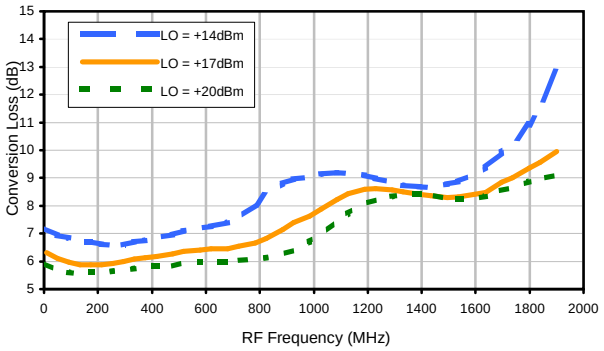
LO HARMONICS ORDER

Test conditions: **RF IN: 750.1 MHz; 9.00 dBm.**
LO IN: 780.01 MHz; +17.00 dBm
IF OUT: 29.91 MHz; 2.22 dBm

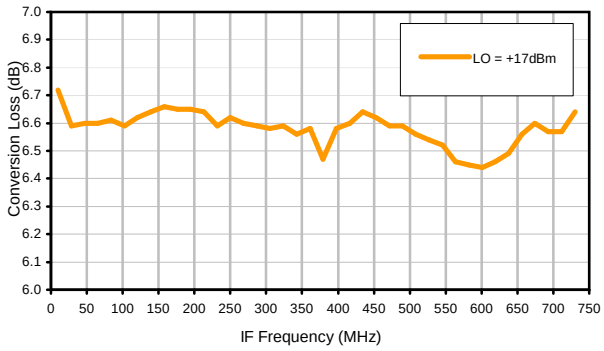
Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

Typical Performance Curves

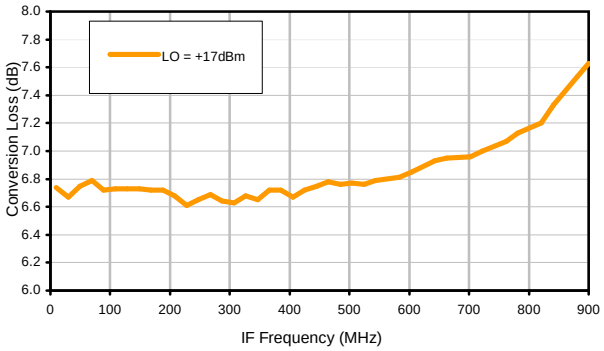
Conversion Loss @ IF=30MHz



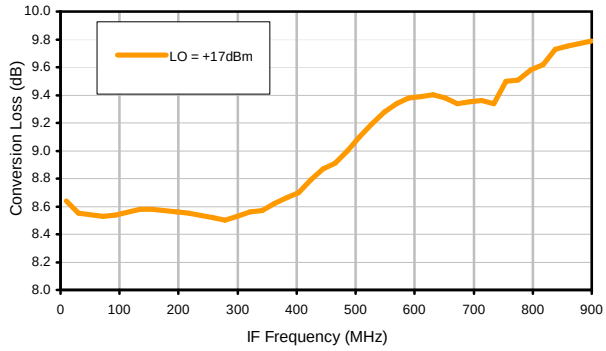
Conversion Loss vs. IF @ RF=750.1MHz



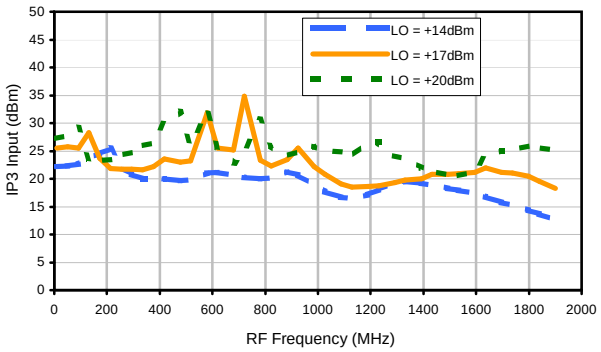
Conversion Loss vs. IF @ RF=10.1MHz



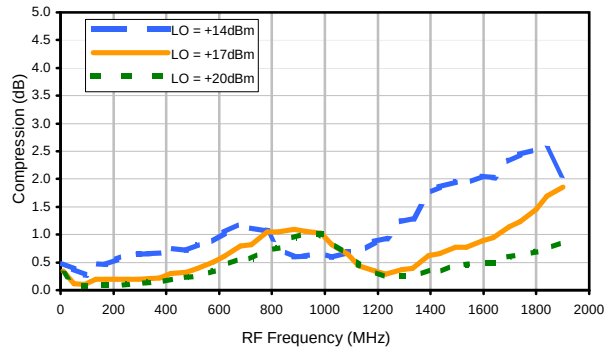
Conversion Loss vs. IF @ RF=1500.1MHz



IP3 Input

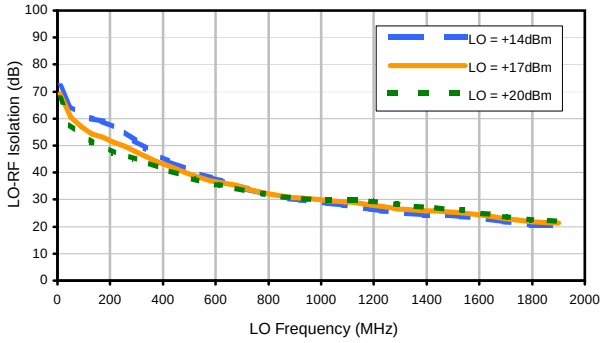


Compression @ RF IN=+14dBm

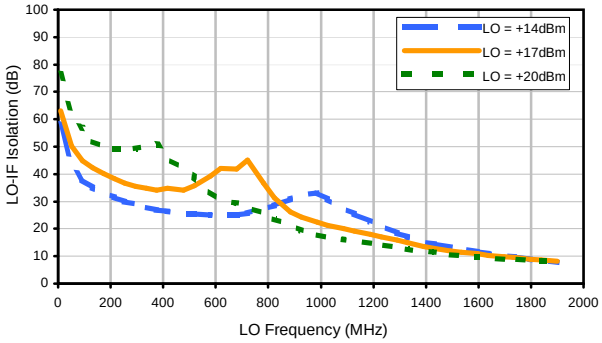


Typical Performance Curves

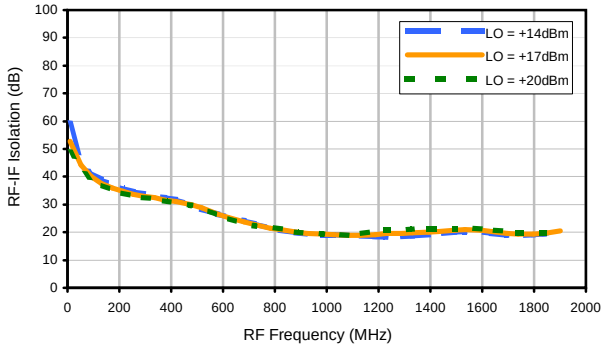
LO-RF Isolation



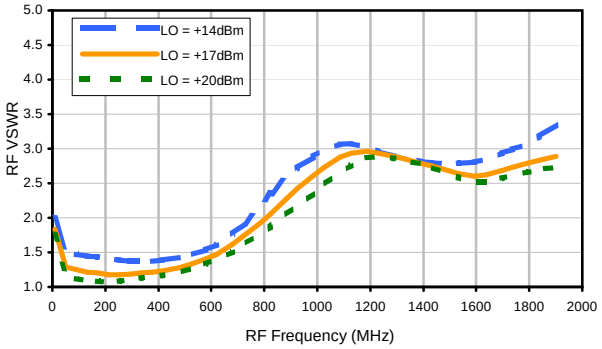
LO-IF Isolation



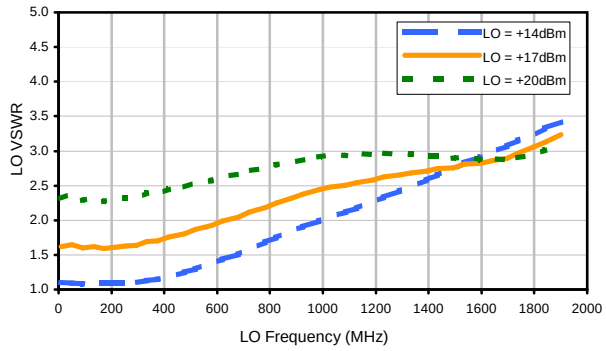
RF-IF Isolation



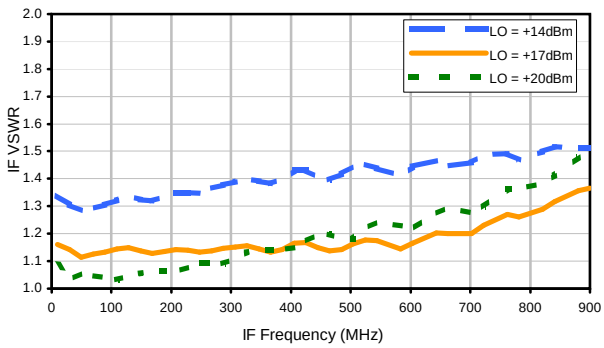
RF VSWR



LO VSWR



IF VSWR



Harmonics Tables

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	11	18	5	30	14	31	22	36	35	38
1	-	16	+0	35	19	44	35	40	30	50	42	59
2	>100	45	31	44	29	54	44	51	53	56	57	58
3	>100	72	56	54	51	54	58	74	55	66	57	72
4	>100	83	81	71	61	65	59	68	78	71	77	79
5	>100	>92	>92	>92	76	77	69	75	74	86	76	81
6	>100	>92	>92	>92	>92	91	87	83	81	89	>92	>92
7	>100	>92	>92	>92	>92	>92	>92	91	90	90	>92	>92
8	>100	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92
9	>100	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92
10	>100	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: **RF IN: 750.1 MHz; -1.00 dBm.**
LO IN: 780.01 MHz; +17.00 dBm
IF OUT: 29.91 MHz; -7.78 dBm

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	22	30	17	48	29	48	37	53	52	59
1	-	15	+0	38	21	49	54	50	36	55	49	59
2	92	38	25	43	22	54	39	53	51	78	49	61
3	>100	53	43	42	49	46	44	59	48	57	52	68
4	>100	65	56	49	47	45	45	53	56	57	62	74
5	>100	67	59	72	55	54	54	52	61	65	56	60
6	>100	74	68	72	72	81	50	59	49	60	64	63
7	>100	80	68	77	66	76	60	67	54	61	61	69
8	>100	>102	78	97	72	85	86	71	68	73	63	74
9	>100	91	90	91	83	81	85	83	73	66	69	68
10	>100	94	102	102	89	88	86	79	81	72	75	67
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

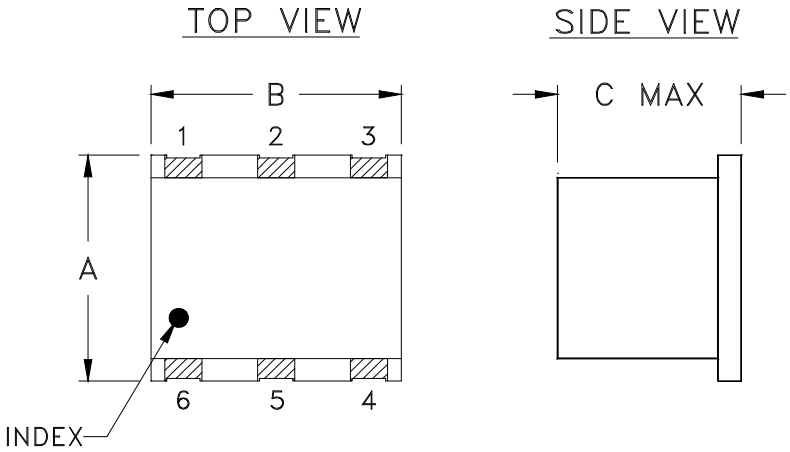
Test conditions: **RF IN: 750.1 MHz; 9.00 dBm.**
LO IN: 780.01 MHz; +17.00 dBm
IF OUT: 29.91 MHz; 2.22 dBm

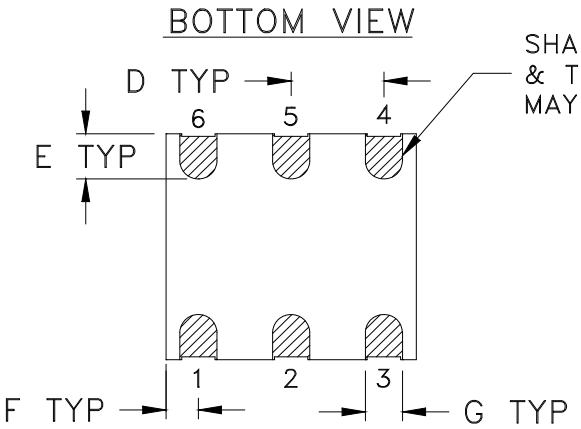
Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

Case Style TT

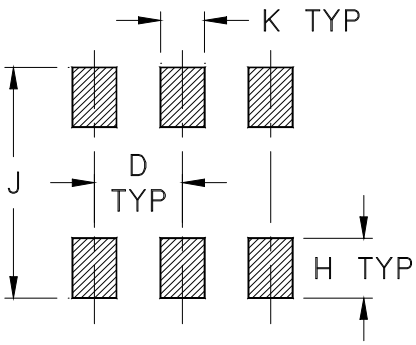
TT240

Outline Dimensions





PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

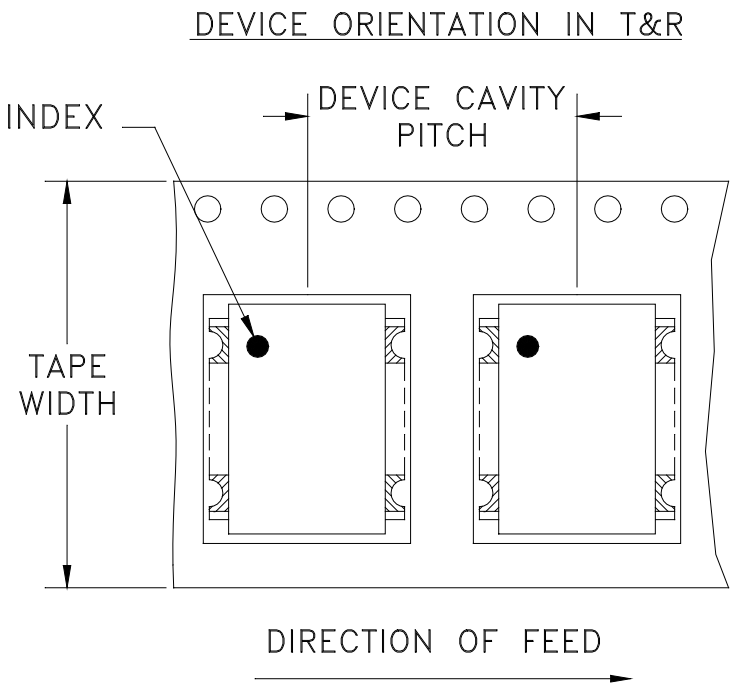
CASE #	A	B	C	D	E	F	G	H	J	K	WT. GRAM
TT240	.250 (6.35)	.31 (7.87)	.20 (5.08)	.100 (2.54)	.050 (1.27)	.055 (1.40)	.040 (1.02)	.070 (1.78)	.270 (6.86)	.050 (1.27)	.50

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

Notes:

1. Case material: Ceramic.
2. Termination finish:
   For RoHS Case Styles: 2-10µ 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.

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

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.

Go to: www.minicircuits.com/pages/pdfs/tape.pdf

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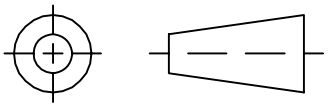
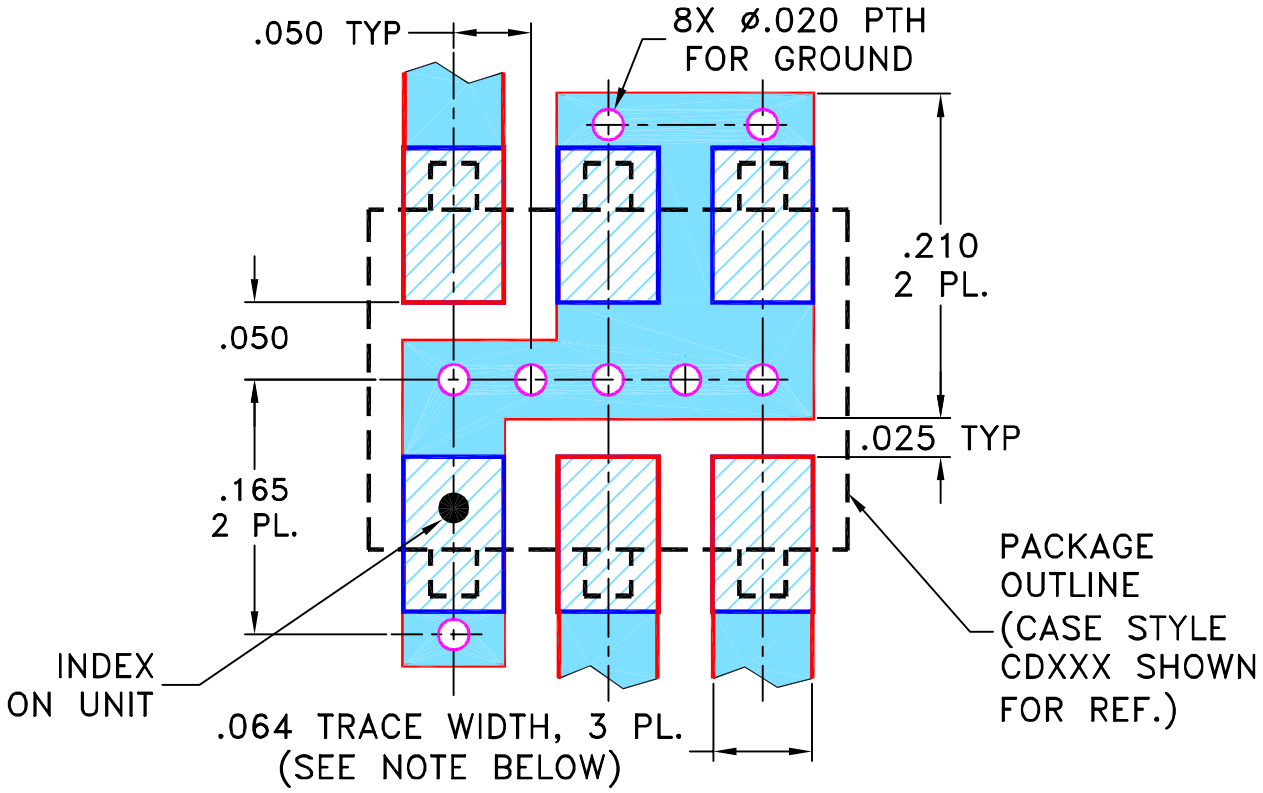
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
A	M101143	ADDED "gk" PIN CONNECTION,	10/10/05	MMG	DJ
		TT100 CASE STYLE & NOTE 2			
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 RO4350B WITH DIELECTRIC THICKNESS .030" ± .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	DRAWN	MMG	07/17/02
TOLERANCES ON:	CHECKED	WL	08/02/02
2 PL DECIMALS ±	APPROVED	DJ	08/05/02
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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ASHEETA1.DWG REV:A DATE:01/12/95

Mini-Circuits®
13 Neptune Avenue
Brooklyn NY 11235

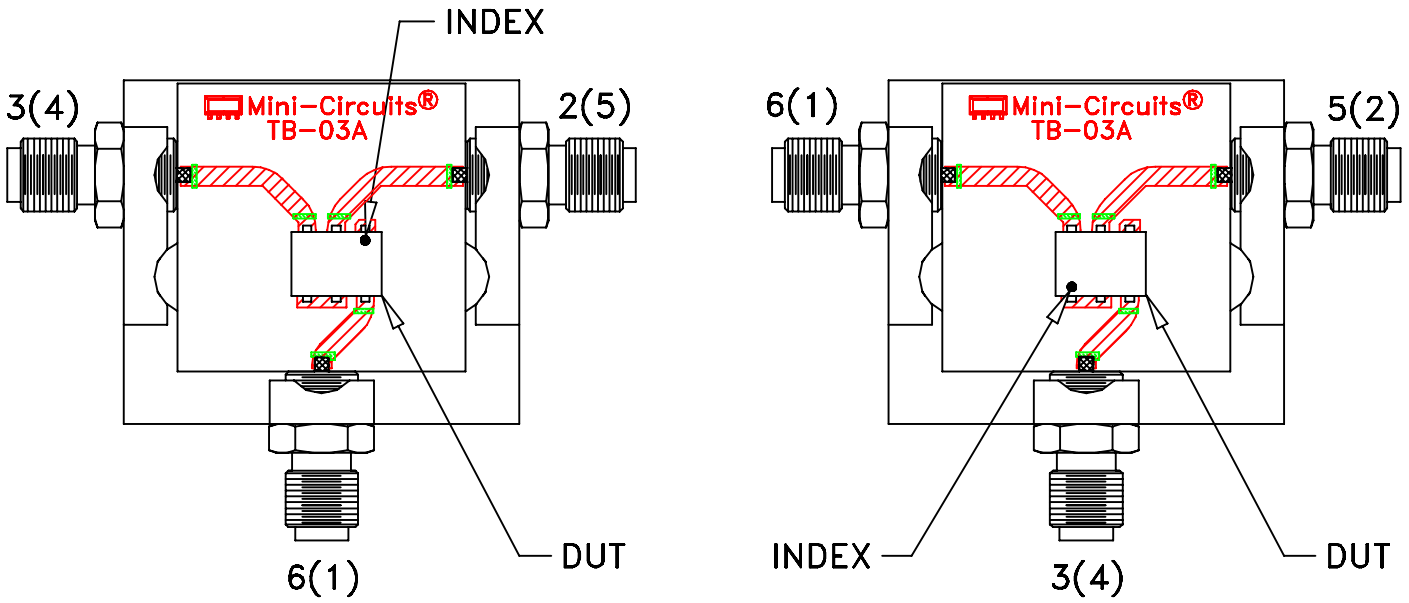
PL, gk/ht/hu/nd/w, BH292, CD541/542/636/637, TT100/240, TB-03

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-052	C

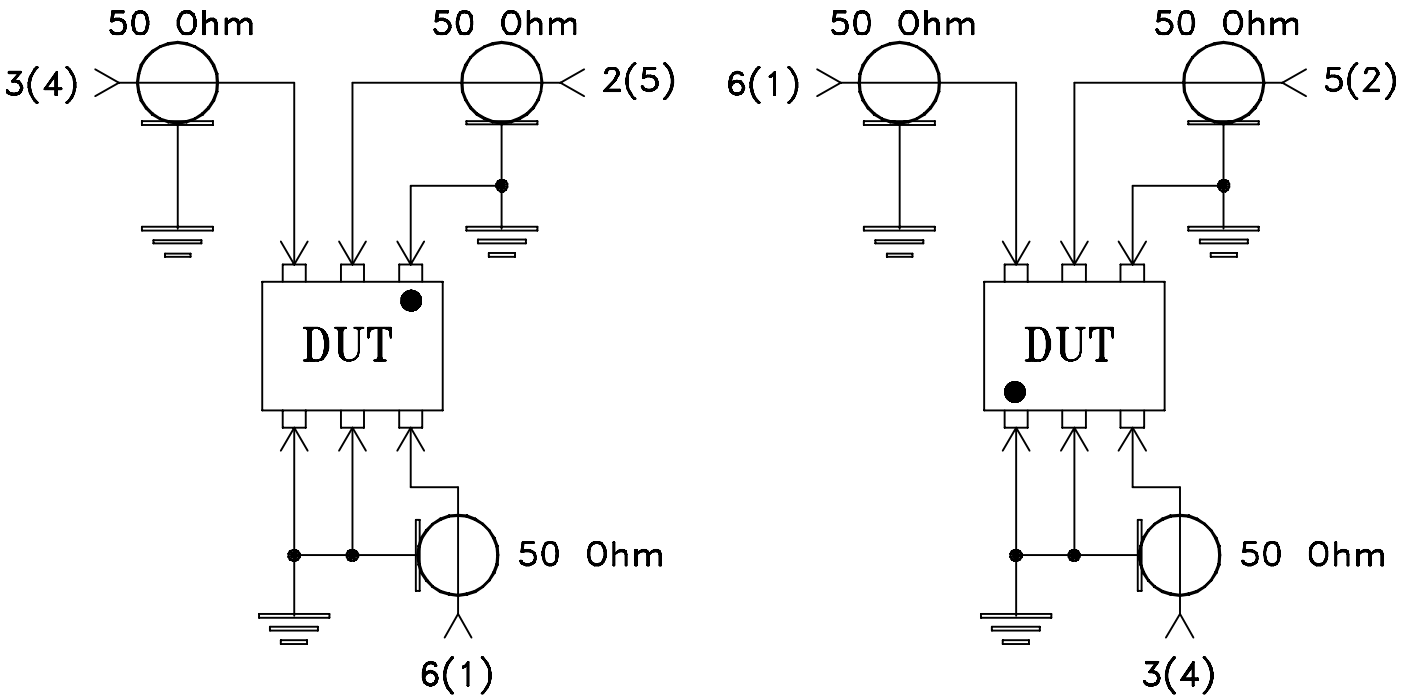
FILE:	SCALE:	SHEET:
98PL052	8:1	1 OF 1

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 RO4350 or equivalent, Dielectric Constant=3.5, Thickness=.030 inch.

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Environmental Specifications ENV02T1

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