

Frequency Mixer

Level 7 (LO Power +7 dBm) 5 to 1000 MHz

RMS-2+



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

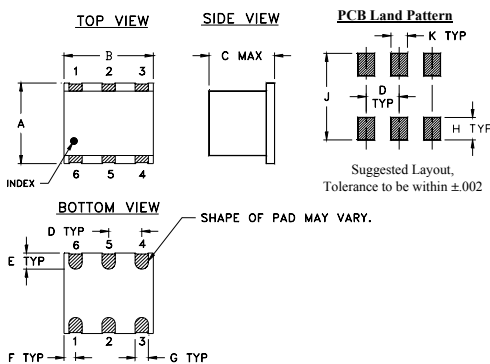
Maximum Ratings

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

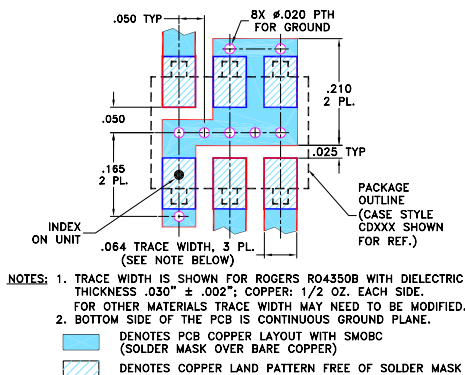
Outline Drawing



Outline Dimensions (inch)

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

- 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-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp

Features

- excellent L-R isolation, 40 dB typ.
- conversion loss, 6.67 dB typ.
- small size, 0.25"x0.31"x0.2"

Applications

- cellular
- GSM
- ISM

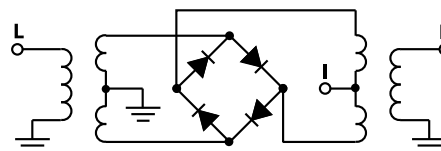
Electrical Specifications

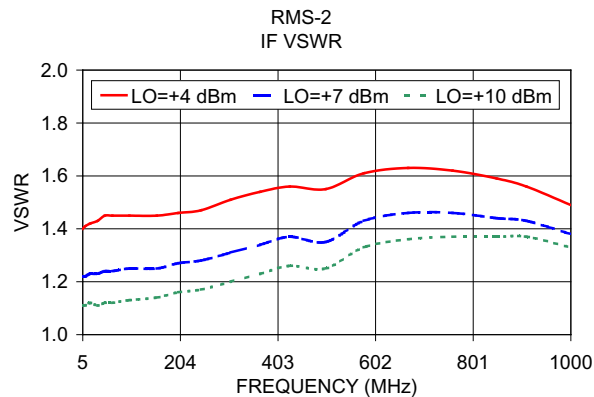
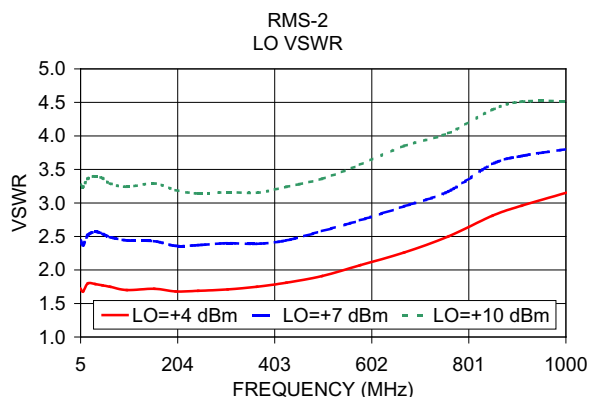
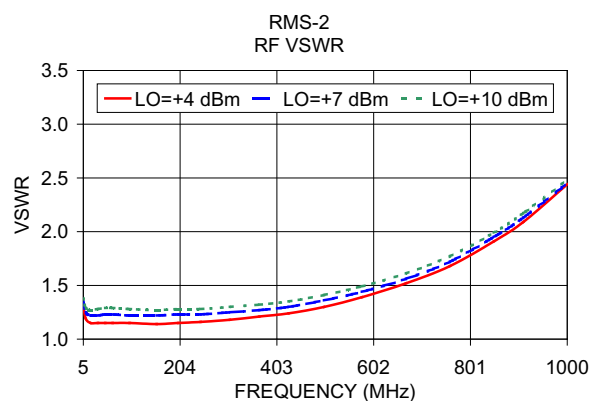
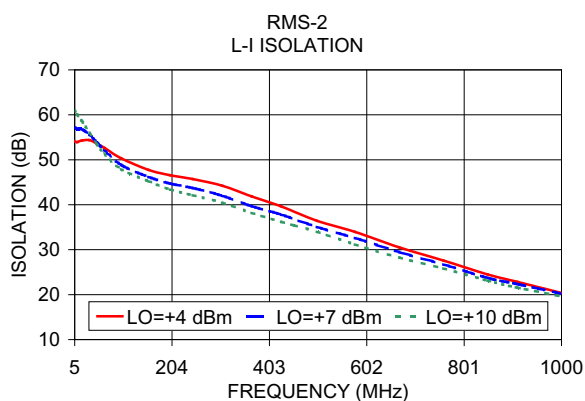
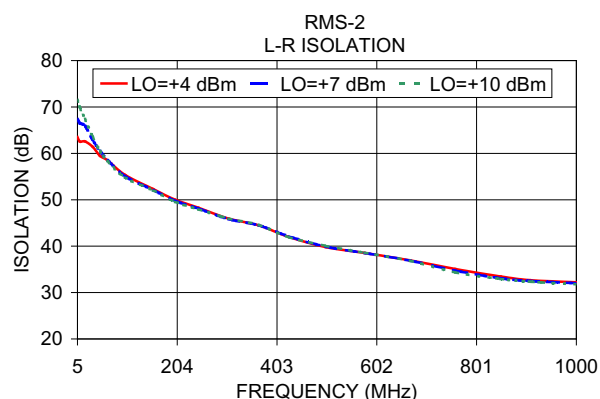
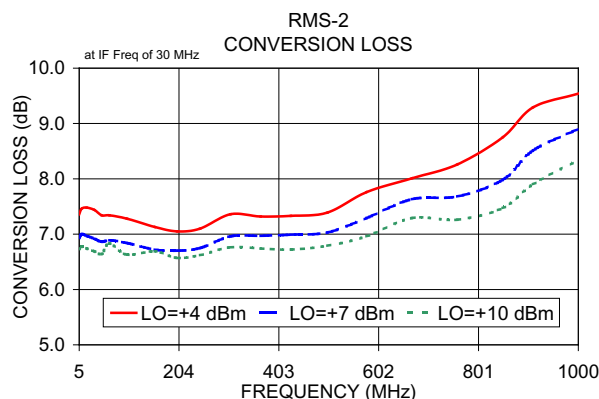
FREQUENCY (MHz)		CONVERSION LOSS (dB)				LO-RF ISOLATION (dB)						LO-IF ISOLATION (dB)						IP3 at center band (dBm)
LO/RF IF						L		M		U		L		M		U		
f _L -f _U		Total Range																
		X̄	σ	Max.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.
5-1000	DC-1000	6.67	.26	8.0	9.5	60	40	40	20	25	18	55	30	30	20	20	12	17
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 band [2f _L to f _L /2]																		
M = mid range [10 f _L to f _L /2] U = upper range [f _L /2 to f _L]																		

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	6.93	67.42	57.23	1.35	2.44
10.00	40.00	7.00	66.49	56.87	1.25	2.37
20.00	50.00	6.97	65.94	56.78	1.22	2.52
35.15	65.15	6.92	62.92	55.59	1.22	2.57
50.00	80.00	6.86	60.51	53.87	1.23	2.54
65.30	95.30	6.89	58.52	52.15	1.23	2.49
100.00	70.00	6.84	55.07	48.85	1.22	2.44
155.76	125.76	6.72	52.10	46.19	1.22	2.43
200.00	170.00	6.70	49.75	44.71	1.23	2.36
246.21	216.21	6.75	48.10	43.71	1.23	2.37
306.52	276.52	6.96	45.81	41.99	1.25	2.40
366.82	336.82	6.97	44.49	39.66	1.27	2.39
427.12	397.12	6.99	42.09	37.81	1.30	2.44
500.00	470.00	7.03	39.89	35.06	1.36	2.58
577.88	547.88	7.29	38.51	32.59	1.44	2.74
668.33	638.33	7.63	36.87	29.46	1.56	2.95
758.79	728.79	7.68	34.71	26.72	1.72	3.17
849.24	819.24	7.98	33.07	23.71	1.95	3.58
909.55	879.55	8.51	32.47	22.35	2.13	3.70
1000.00	970.00	8.90	32.02	20.21	2.45	3.80

Electrical Schematic





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Frequency Mixer

RMS-2+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB)		
		@LO (dBm)		
		+4	+7	+10
5.0	35.0	7.36	6.93	6.73
10.0	40.0	7.46	7.00	6.77
50.4	80.4	7.09	6.69	6.50
90.7	120.7	7.13	6.70	6.49
131.0	161.0	7.13	6.75	6.56
171.3	201.3	7.13	6.75	6.60
211.5	241.5	7.10	6.74	6.59
251.8	281.8	7.09	6.76	6.59
292.1	322.1	7.12	6.79	6.63
332.4	362.4	7.17	6.85	6.67
372.7	402.7	7.22	6.89	6.67
413.0	443.0	7.19	6.85	6.66
453.3	483.3	7.24	6.94	6.71
493.6	523.6	7.29	6.92	6.73
533.9	563.9	7.33	6.95	6.71
574.2	604.2	7.40	7.00	6.79
614.4	644.4	7.43	7.07	6.82
654.7	684.7	7.48	7.15	6.87
695.0	725.0	7.55	7.14	6.87
735.3	765.3	7.59	7.15	6.91
775.6	805.6	7.68	7.19	6.88
815.9	845.9	7.69	7.19	6.87
856.2	886.2	7.81	7.26	6.93
896.5	926.5	7.84	7.30	6.96
916.6	946.6	7.96	7.43	7.04
956.9	986.9	8.13	7.60	7.23
977.1	1007.1	8.19	7.65	7.28
1037.5	1067.5	8.35	7.94	7.61
1077.8	1107.8	8.49	8.13	7.82
1097.9	1127.9	8.55	8.21	7.93
1138.2	1168.2	8.67	8.37	8.17
1158.4	1188.4	8.74	8.45	8.25
1198.7	1228.7	8.89	8.61	8.48
1218.8	1248.8	8.95	8.75	8.56
1259.1	1289.1	9.20	8.94	8.87
1279.2	1309.2	9.34	9.10	9.02
1319.5	1349.5	9.64	9.42	9.36
1339.7	1369.7	9.78	9.58	9.50
1380.0	1410.0	10.17	9.96	9.90
1400.1	1430.1	10.33	10.15	10.08

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	21.64	26.66	28.69
50.4	80.4	25.39	23.47	20.43
90.7	120.7	19.60	18.11	19.96
131.0	161.0	20.28	23.29	21.80
171.3	201.3	27.91	23.27	27.19
211.5	241.5	24.35	20.62	28.15
251.8	281.8	23.83	23.81	23.25
292.1	322.1	25.83	22.09	20.85
332.4	362.4	23.80	28.71	26.80
372.7	402.7	23.69	20.31	23.74
413.0	443.0	25.09	19.57	23.49
453.3	483.3	23.42	25.41	24.86
493.6	523.6	22.11	24.21	23.45
533.9	563.9	21.07	23.90	21.42
574.2	604.2	23.18	22.37	24.80
614.4	644.4	29.05	23.55	23.90
654.7	684.7	29.70	21.83	30.67
695.0	725.0	22.00	22.66	23.31
735.3	765.3	20.92	20.14	21.40
775.6	805.6	19.04	23.66	25.50
815.9	845.9	25.61	20.90	21.63
856.2	886.2	25.61	23.23	19.78
896.5	926.5	21.08	19.67	22.24
916.6	946.6	23.46	25.24	21.83
956.9	986.9	24.63	21.89	20.62
977.1	1007.1	22.33	25.00	23.44
1017.3	1047.3	25.45	23.09	24.33
1037.5	1067.5	22.84	20.19	20.83
1077.8	1107.8	20.06	22.22	27.71
1097.9	1127.9	21.11	21.10	28.07
1138.2	1168.2	24.66	20.48	20.93
1158.4	1188.4	24.24	21.85	21.95
1198.7	1228.7	20.54	22.33	27.15
1218.8	1248.8	21.30	25.72	27.08
1259.1	1289.1	20.39	21.30	28.12
1279.2	1309.2	23.84	25.30	21.42
1319.5	1349.5	23.23	21.77	17.91
1339.7	1369.7	27.68	22.47	21.21
1380.0	1410.0	21.06	21.09	21.59
1400.1	1430.1	23.85	22.21	18.84

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+1dBm (dB)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	0.48	0.29	0.20
50.4	80.4	0.35	0.22	0.15
90.7	120.7	0.36	0.23	0.13
131.0	161.0	0.42	0.28	0.16
171.3	201.3	0.37	0.23	0.12
211.5	241.5	0.36	0.19	0.14
251.8	281.8	0.34	0.20	0.13
292.1	322.1	0.36	0.24	0.11
332.4	362.4	0.35	0.24	0.16
372.7	402.7	0.39	0.26	0.19
413.0	443.0	0.40	0.28	0.20
453.3	483.3	0.42	0.28	0.18
493.6	523.6	0.47	0.33	0.24
533.9	563.9	0.46	0.32	0.24
574.2	604.2	0.49	0.37	0.25
614.4	644.4	0.51	0.39	0.28
654.7	684.7	0.60	0.48	0.36
695.0	725.0	0.65	0.48	0.38
735.3	765.3	0.68	0.55	0.47
775.6	805.6	0.70	0.58	0.49
815.9	845.9	0.87	0.67	0.60
856.2	886.2	0.81	0.69	0.63
896.5	926.5	0.74	0.63	0.59
916.6	946.6	0.84	0.73	0.68
956.9	986.9	0.71	0.65	0.58
977.1	1007.1	0.80	0.71	0.69
1017.3	1047.3	0.73	0.65	0.68
1037.5	1067.5	0.64	0.56	0.57
1077.8	1107.8	0.65	0.53	0.57
1097.9	1127.9	0.64	0.51	0.56
1138.2	1168.2	0.66	0.53	0.52
1158.4	1188.4	0.69	0.51	0.52
1198.7	1228.7	0.67	0.53	0.52
1218.8	1248.8	0.73	0.56	0.56
1259.1	1289.1	0.70	0.56	0.61
1279.2	1309.2	0.72	0.57	0.58
1319.5	1349.5	0.71	0.55	0.63
1339.7	1369.7	0.76	0.64	0.71
1380.0	1410.0	0.70	0.62	0.68
1400.1	1430.1	0.72	0.52	0.72

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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)=510.1MHz (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)=1010.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+7			+7			+7
500.0	10.1	6.91	10.0	20.1	6.68	1000.0	10.1	7.98
487.4	22.7	6.90	30.0	40.1	6.59	979.8	30.3	7.95
474.9	35.2	6.85	50.0	60.1	6.61	959.6	50.5	7.88
462.3	47.8	6.83	70.0	80.1	6.63	939.4	70.7	7.83
449.7	60.4	6.83	90.0	100.1	6.65	919.2	90.9	7.82
437.2	72.9	6.80	110.0	120.1	6.66	899.0	111.1	7.76
424.6	85.5	6.77	130.0	140.1	6.63	878.8	131.3	7.69
412.1	98.0	6.73	150.0	160.1	6.66	858.6	151.5	7.69
399.5	110.6	6.72	170.0	180.1	6.68	838.4	171.7	7.66
386.9	123.2	6.72	190.0	200.1	6.74	818.2	191.9	7.63
374.4	135.7	6.68	210.0	220.1	6.72	798.0	212.1	7.59
361.8	148.3	6.69	230.0	240.1	6.72	777.8	232.3	7.55
349.2	160.9	6.68	250.0	260.1	6.77	757.6	252.5	7.40
336.7	173.4	6.67	270.0	280.1	6.80	737.3	272.8	7.51
324.1	186.0	6.68	290.0	300.1	6.82	717.1	293.0	7.49
311.5	198.6	6.68	310.0	320.1	6.83	696.9	313.2	7.42
299.0	211.1	6.67	330.0	340.1	6.89	676.7	333.4	7.41
286.4	223.7	6.67	350.0	360.1	6.86	656.5	353.6	7.39
273.8	236.3	6.68	370.0	380.1	6.93	636.3	373.8	7.37
261.3	248.8	6.69	390.0	400.1	6.97	616.1	394.0	7.37
248.7	261.4	6.69	430.0	440.1	6.97	575.7	434.4	7.30
236.2	273.9	6.69	450.0	460.1	7.01	555.5	454.6	7.29
223.6	286.5	6.70	490.0	500.1	7.06	515.1	495.0	7.25
211.0	299.1	6.71	510.0	520.1	7.07	494.9	515.2	7.23
198.5	311.6	6.71	550.0	560.1	7.12	454.5	555.6	7.22
185.9	324.2	6.70	570.0	580.1	7.17	434.3	575.8	7.26
173.3	336.8	6.73	610.0	620.1	7.20	393.9	616.2	7.22
160.8	349.3	6.75	630.0	640.1	7.17	373.7	636.4	7.23
148.2	361.9	6.75	670.0	680.1	7.20	333.3	676.8	7.24
135.6	374.5	6.76	690.0	700.1	7.17	313.1	697.0	7.23
123.1	387.0	6.77	730.0	740.1	7.19	272.7	737.4	7.22
110.5	399.6	6.77	750.0	760.1	7.21	252.4	757.7	7.26
97.9	412.2	6.78	790.0	800.1	7.23	212.0	798.1	7.27
85.4	424.7	6.80	810.0	820.1	7.22	191.8	818.3	7.26
72.8	437.3	6.81	850.0	860.1	7.31	151.4	858.7	7.36
60.3	449.8	6.82	870.0	880.1	7.36	131.2	878.9	7.37
47.7	462.4	6.82	910.0	920.1	7.46	90.8	919.3	7.44
35.1	475.0	6.85	930.0	940.1	7.54	70.6	939.5	7.51
22.6	487.5	6.87	970.0	980.1	7.69	30.2	979.9	7.67
10.0	500.1	6.94	990.0	1000.1	7.73	10.0	1000.1	7.79

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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	63.51	67.42	71.51	54.09	57.23	60.91
10.0	62.56	66.49	69.85	53.93	56.87	60.05
50.4	59.28	59.20	59.09	54.44	54.14	53.51
90.7	54.25	54.10	54.04	49.57	48.80	48.38
131.0	51.04	51.00	51.02	46.09	45.63	45.61
171.3	48.80	48.89	48.94	43.61	43.65	43.67
211.5	47.05	47.20	47.25	41.98	42.13	42.14
251.8	45.69	45.88	45.96	40.99	41.10	40.91
292.1	44.47	44.68	44.77	40.17	40.15	39.82
332.4	43.48	43.70	43.83	39.50	39.24	38.71
372.7	42.63	42.86	42.95	38.80	38.24	37.52
413.0	41.72	41.99	42.09	38.08	37.29	36.43
453.3	40.74	41.03	41.16	37.11	36.20	35.26
493.6	39.60	39.95	40.12	36.10	35.08	34.22
533.9	38.89	39.31	39.53	34.83	33.57	32.67
574.2	38.15	38.56	38.78	33.75	32.43	31.40
614.4	37.52	37.89	38.06	32.53	31.31	30.25
654.7	36.86	37.12	37.19	31.18	30.15	29.20
695.0	36.26	36.44	36.42	29.79	28.86	28.05
735.3	35.41	35.50	35.41	28.23	27.28	26.49
775.6	34.86	34.91	34.77	27.03	26.01	25.23
815.9	34.06	34.01	33.81	25.85	24.74	23.95
856.2	33.44	33.42	33.24	24.85	23.67	22.81
896.5	32.89	32.92	32.74	23.88	22.66	21.77
916.6	32.64	32.74	32.67	23.31	22.09	21.17
956.9	32.31	32.56	32.60	22.52	21.42	20.46
977.1	32.07	32.31	32.36	22.10	21.07	20.11
1037.5	31.83	32.35	32.77	20.65	19.84	18.94
1077.8	32.02	32.72	33.34	19.85	19.16	18.34
1097.9	32.27	33.12	33.91	19.28	18.60	17.78
1138.2	32.64	33.70	34.68	18.38	17.76	17.00
1158.4	32.95	34.04	34.93	17.94	17.34	16.60
1198.7	34.14	35.39	36.07	17.00	16.42	15.70
1218.8	34.63	35.92	36.45	16.58	16.03	15.32
1259.1	37.00	37.73	36.82	15.68	15.15	14.47
1279.2	38.47	38.28	36.37	15.29	14.75	14.07
1319.5	42.89	37.87	34.49	14.48	13.97	13.33
1339.7	43.87	36.90	33.56	14.13	13.62	13.00
1380.0	42.09	34.39	31.28	13.38	12.91	12.32
1400.1	39.81	33.26	30.36	13.03	12.59	12.02

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	38.70	36.19	40.37
50.4	80.4	38.62	37.87	38.62
90.7	120.7	33.40	33.56	33.56
131.0	161.0	30.83	30.71	30.94
171.3	201.3	28.86	29.04	29.15
211.5	241.5	27.62	27.72	27.81
251.8	281.8	26.72	26.93	27.03
292.1	322.1	26.15	26.34	26.48
332.4	362.4	25.61	25.89	26.05
372.7	402.7	25.19	25.46	25.65
413.0	443.0	24.97	25.26	25.54
453.3	483.3	24.97	25.37	25.72
493.6	523.6	24.94	25.45	25.85
533.9	563.9	24.76	25.27	25.61
574.2	604.2	23.73	24.04	24.19
614.4	644.4	22.29	22.38	22.43
654.7	684.7	20.59	20.57	20.51
695.0	725.0	19.19	19.10	19.01
735.3	765.3	18.03	17.91	17.80
775.6	805.6	17.06	16.96	16.89
815.9	845.9	16.40	16.34	16.34
856.2	886.2	15.86	15.86	15.91
896.5	926.5	15.42	15.50	15.64
916.6	946.6	15.22	15.33	15.51
956.9	986.9	14.80	14.95	15.17
977.1	1007.1	14.62	14.79	15.02
1017.3	1047.3	14.36	14.59	14.86
1037.5	1067.5	14.23	14.49	14.77
1077.8	1107.8	14.05	14.34	14.63
1097.9	1127.9	13.91	14.21	14.51
1138.2	1168.2	13.61	13.91	14.17
1158.4	1188.4	13.46	13.75	13.98
1198.7	1228.7	13.15	13.38	13.55
1218.8	1248.8	13.03	13.24	13.38
1259.1	1289.1	12.65	12.78	12.85
1279.2	1309.2	12.45	12.56	12.60
1319.5	1349.5	12.04	12.08	12.05
1339.7	1369.7	11.83	11.84	11.79
1380.0	1410.0	11.35	11.32	11.23
1400.1	1430.1	11.08	11.03	10.92

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=1010.1MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+4	+7	+10		+4	+7	+10		+4	+7	+10
5.0	35.0	1.30	1.35	1.38	5.0	1.72	2.44	3.27	5.0	1.40	1.22	1.11
10.0	40.0	1.19	1.25	1.29	10.0	1.68	2.37	3.24	10.0	1.41	1.22	1.11
50.4	80.4	1.18	1.26	1.33	50.4	1.85	2.65	3.70	30.3	2.12	1.80	1.54
90.7	120.7	1.18	1.26	1.33	90.7	1.85	2.63	3.65	50.5	2.09	1.77	1.51
131.0	161.0	1.19	1.27	1.32	131.0	1.83	2.63	3.63	70.7	2.08	1.77	1.53
171.3	201.3	1.20	1.28	1.33	171.3	1.84	2.62	3.60	90.9	2.11	1.77	1.52
211.5	241.5	1.21	1.28	1.33	211.5	1.85	2.60	3.56	111.1	2.13	1.79	1.54
251.8	281.8	1.21	1.28	1.33	251.8	1.87	2.64	3.60	131.3	2.09	1.77	1.52
292.1	322.1	1.22	1.29	1.34	292.1	1.89	2.65	3.60	151.5	2.08	1.75	1.52
332.4	362.4	1.22	1.29	1.34	332.4	1.92	2.70	3.65	171.7	2.10	1.77	1.52
372.7	402.7	1.23	1.30	1.35	372.7	1.99	2.78	3.74	191.9	2.09	1.76	1.53
413.0	443.0	1.24	1.31	1.37	413.0	2.00	2.78	3.73	212.1	2.09	1.76	1.51
453.3	483.3	1.26	1.33	1.38	453.3	2.07	2.86	3.81	232.3	2.07	1.74	1.50
493.6	523.6	1.28	1.35	1.41	493.6	2.05	2.80	3.70	252.5	2.01	1.70	1.47
533.9	563.9	1.31	1.38	1.44	533.9	2.09	2.85	3.76	272.8	1.99	1.69	1.46
574.2	604.2	1.33	1.40	1.46	574.2	2.13	2.87	3.76	293.0	1.99	1.68	1.47
614.4	644.4	1.36	1.43	1.49	614.4	2.20	2.95	3.85	313.2	1.92	1.63	1.43
654.7	684.7	1.39	1.46	1.52	654.7	2.28	3.04	3.93	333.4	1.90	1.62	1.43
695.0	725.0	1.44	1.50	1.57	695.0	2.33	3.08	3.95	353.6	1.89	1.62	1.44
735.3	765.3	1.49	1.56	1.62	735.3	2.41	3.16	4.03	373.8	1.87	1.61	1.44
775.6	805.6	1.56	1.63	1.70	775.6	2.43	3.14	3.97	394.0	1.88	1.63	1.46
815.9	845.9	1.66	1.73	1.80	815.9	2.48	3.19	4.00	434.4	1.83	1.59	1.45
856.2	886.2	1.77	1.84	1.91	856.2	2.54	3.22	4.00	454.6	1.82	1.60	1.47
896.5	926.5	1.91	1.98	2.05	896.5	2.58	3.26	4.01	495.0	1.80	1.59	1.47
916.6	946.6	1.97	2.04	2.10	916.6	2.67	3.37	4.14	515.2	1.80	1.59	1.48
956.9	986.9	2.12	2.18	2.25	956.9	2.69	3.37	4.11	555.6	1.77	1.57	1.48
977.1	1007.1	2.21	2.27	2.34	977.1	2.70	3.37	4.09	575.8	1.77	1.59	1.50
1017.3	1047.3	2.38	2.44	2.51	1017.3	2.78	3.44	4.17	616.2	1.74	1.57	1.49
1037.5	1067.5	2.48	2.54	2.60	1037.5	2.74	3.38	4.09	636.4	1.73	1.57	1.51
1077.8	1107.8	2.65	2.72	2.78	1077.8	2.73	3.34	4.01	676.8	1.70	1.56	1.50
1097.9	1127.9	2.73	2.81	2.88	1097.9	2.78	3.39	4.06	697.0	1.69	1.56	1.51
1138.2	1168.2	2.89	2.97	3.04	1138.2	2.80	3.39	4.03	737.4	1.65	1.53	1.50
1158.4	1188.4	2.97	3.05	3.12	1158.4	2.81	3.37	3.99	757.7	1.64	1.52	1.50
1198.7	1228.7	3.13	3.20	3.27	1198.7	2.80	3.34	3.91	798.1	1.59	1.49	1.48
1218.8	1248.8	3.21	3.29	3.35	1218.8	2.78	3.29	3.85	818.3	1.57	1.48	1.48
1259.1	1289.1	3.34	3.42	3.48	1259.1	2.80	3.27	3.79	858.7	1.54	1.46	1.47
1279.2	1309.2	3.43	3.50	3.56	1279.2	2.81	3.26	3.76	878.9	1.51	1.44	1.45
1319.5	1349.5	3.51	3.57	3.62	1319.5	2.80	3.21	3.68	919.3	1.47	1.41	1.43
1339.7	1369.7	3.57	3.62	3.68	1339.7	2.81	3.21	3.65	939.5	1.46	1.40	1.42
1380.0	1410.0	3.68	3.73	3.78	1380.0	2.80	3.15	3.55	979.9	1.44	1.38	1.41
1400.1	1430.1	3.72	3.76	3.80	1400.1	2.78	3.12	3.52	1000.1	1.41	1.36	1.40

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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	6	22	11	37	21	29	21	31	33	38
1	-	18	+0	32	13	37	25	38	38	38	49	38
2	111	66	46	67	48	66	49	75	56	67	60	61
3	128	73	75	73	65	71	62	75	78	74	67	77
4	117	96	104	95	91	81	87	92	97	93	88	92
5	116	101	106	103	96	90	84	103	102	96	101	102
6	108	114	110	98	101	102	93	94	96	99	117	107
7	112	109	99	111	102	101	103	94	85	98	106	98
8	113	118	103	117	110	116	107	104	94	92	98	100
9	112	97	103	110	99	105	105	112	107	94	98	99
10	119	117	103	102	106	104	108	105	103	95	86	98
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions:

RF IN: 500.1 MHz; -14.00 dBm.

LO IN: 530.01 MHz; +7.00 dBm

IF OUT: 29.91 MHz; -20.95 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	15	33	23	50	32	40	33	44	49	57
1	-	19	+0	30	13	40	26	42	37	42	53	44
2	96	56	38	53	38	58	41	62	53	69	51	56
3	113	54	56	60	53	57	46	59	60	57	54	56
4	125	80	70	78	62	75	67	70	58	90	63	71
5	117	80	79	76	60	67	58	67	57	69	64	73
6	133	88	85	90	78	79	73	75	69	77	73	81
7	114	85	85	88	82	86	77	89	82	90	96	92
8	111	103	114	104	99	102	98	93	102	100	93	91
9	120	124	106	116	108	103	101	101	100	99	92	96
10	114	106	114	114	115	105	108	120	101	101	100	97
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions:

RF IN: 500.1 MHz; -4.00 dBm.

LO IN: 530.01 MHz; +7.00 dBm

IF OUT: 29.91 MHz; -11.13 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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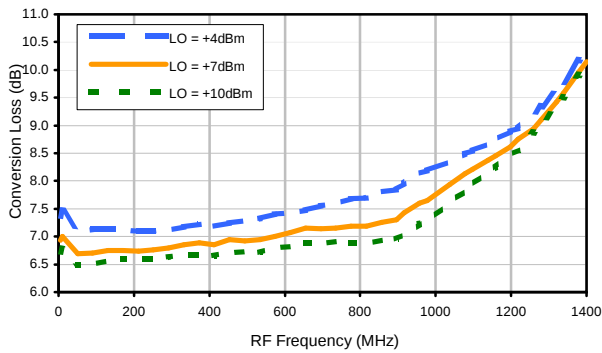


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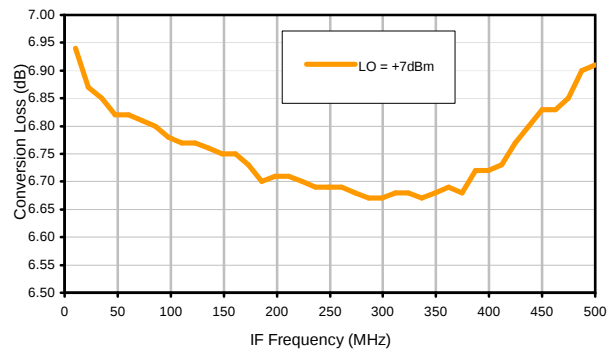


Typical Performance Curves

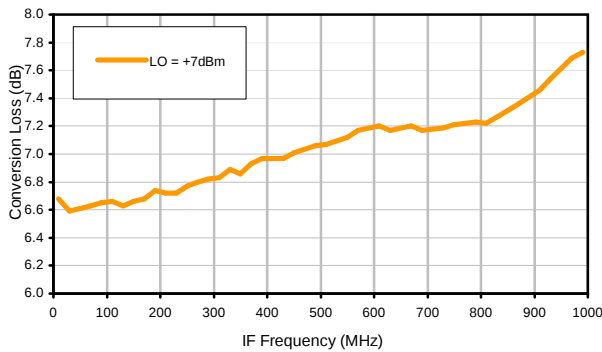
Conversion Loss @ IF=30MHz



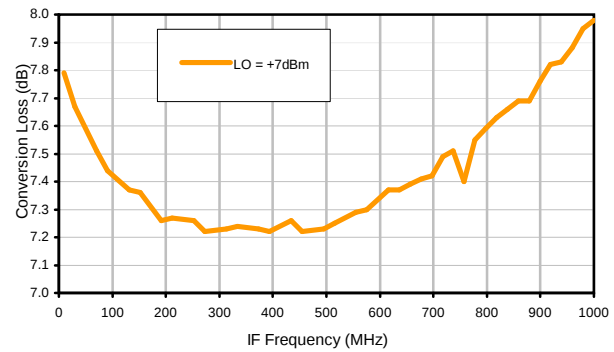
Conversion Loss vs. IF @ RF=510.1MHz



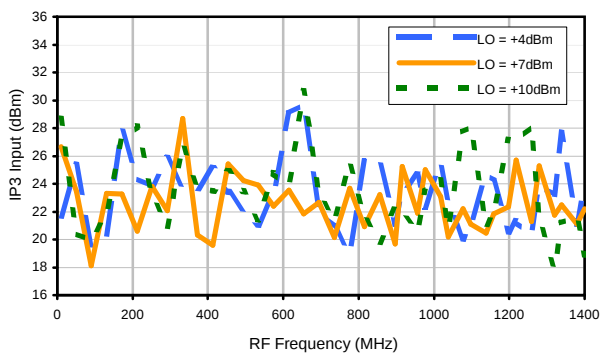
Conversion Loss vs. IF @ RF=10.1MHz



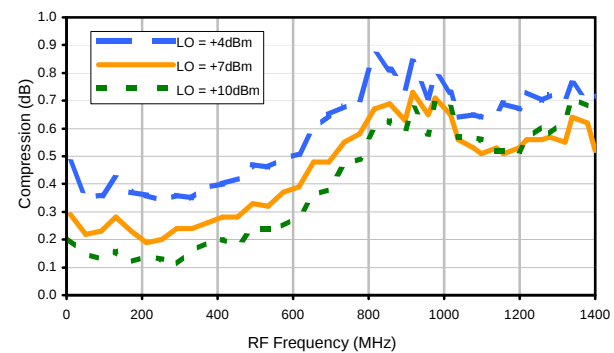
Conversion Loss vs. IF @ RF=1010.1MHz



IP3 Input

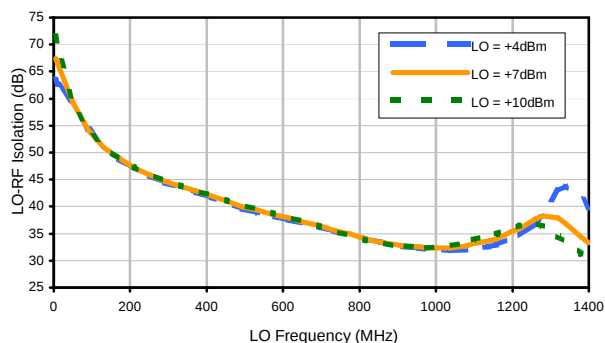


Compression @ RF IN=+1dBm

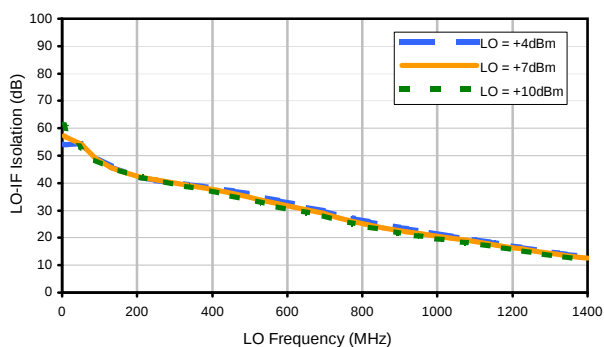


Typical Performance Curves

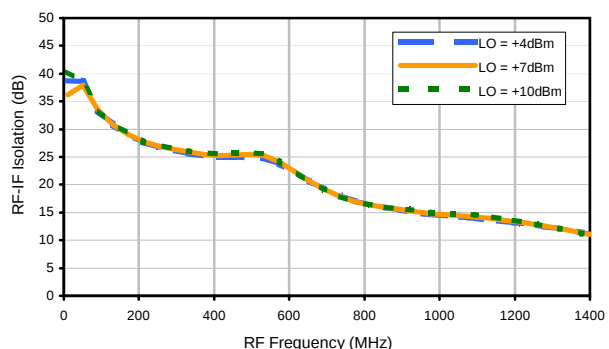
LO-RF Isolation



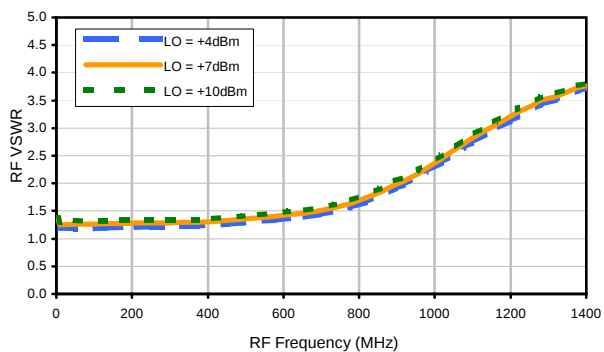
LO-IF Isolation



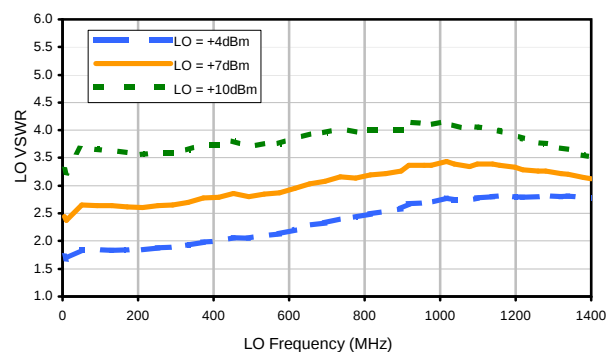
RF-IF Isolation



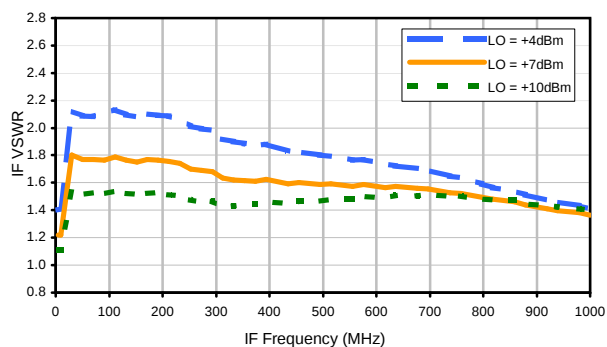
RF VSWR



LO VSWR



IF VSWR



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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	6	22	11	37	21	29	21	31	33	38
1	-	18	+0	32	13	37	25	38	38	38	49	38
2	111	66	46	67	48	66	49	75	56	67	60	61
3	128	73	75	73	65	71	62	75	78	74	67	77
4	117	96	104	95	91	81	87	92	97	93	88	92
5	116	101	106	103	96	90	84	103	102	96	101	102
6	108	114	110	98	101	102	93	94	96	99	117	107
7	112	109	99	111	102	101	103	94	85	98	106	98
8	113	118	103	117	110	116	107	104	94	92	98	100
9	112	97	103	110	99	105	105	112	107	94	98	99
10	119	117	103	102	106	104	108	105	103	95	86	98
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions:

RF IN: 500.1 MHz; -14.00 dBm.

LO IN: 530.01 MHz; +7.00 dBm

IF OUT: 29.91 MHz; -20.95 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	15	33	23	50	32	40	33	44	49	57
1	-	19	+0	30	13	40	26	42	37	42	53	44
2	96	56	38	53	38	58	41	62	53	69	51	56
3	113	54	56	60	53	57	46	59	60	57	54	56
4	125	80	70	78	62	75	67	70	58	90	63	71
5	117	80	79	76	60	67	58	67	57	69	64	73
6	133	88	85	90	78	79	73	75	69	77	73	81
7	114	85	85	88	82	86	77	89	82	90	96	92
8	111	103	114	104	99	102	98	93	102	100	93	91
9	120	124	106	116	108	103	101	101	100	99	92	96
10	114	106	114	114	115	105	108	120	101	101	100	97
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions:

RF IN: 500.1 MHz; -4.00 dBm.

LO IN: 530.01 MHz; +7.00 dBm

IF OUT: 29.91 MHz; -11.13 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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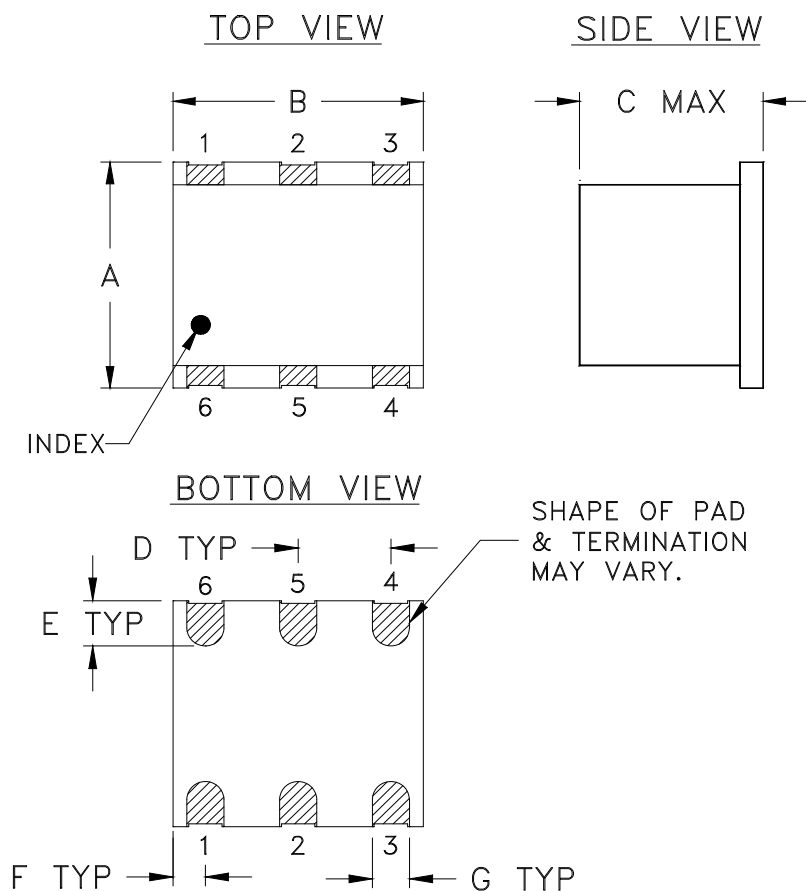
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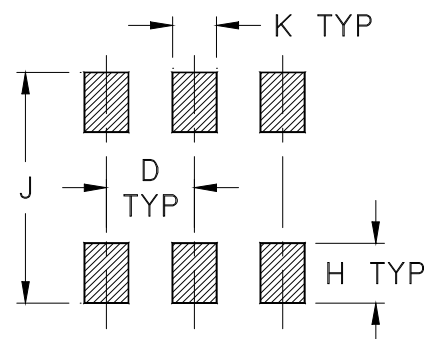
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Outline Dimensions



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.



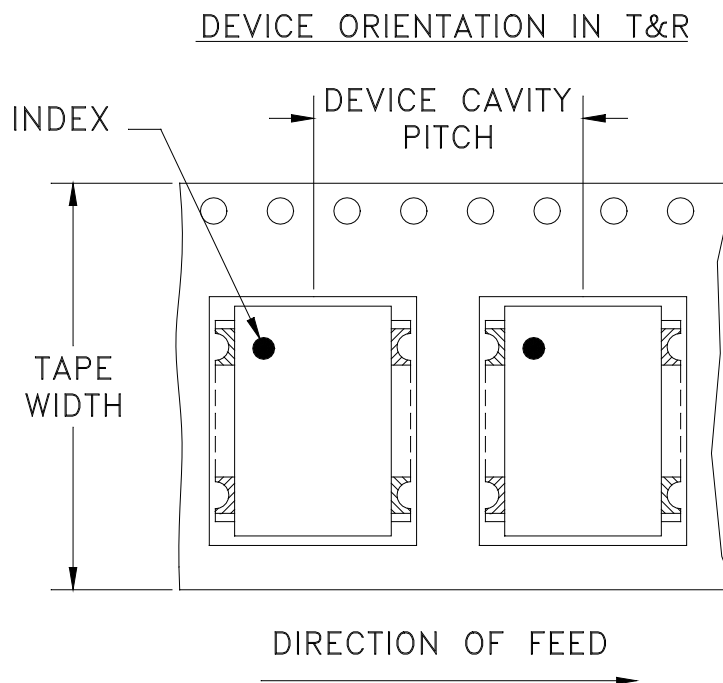
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Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel See note
16	12	7	10
			20
			50
			100
			200
		13	500
			1000

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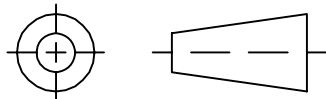
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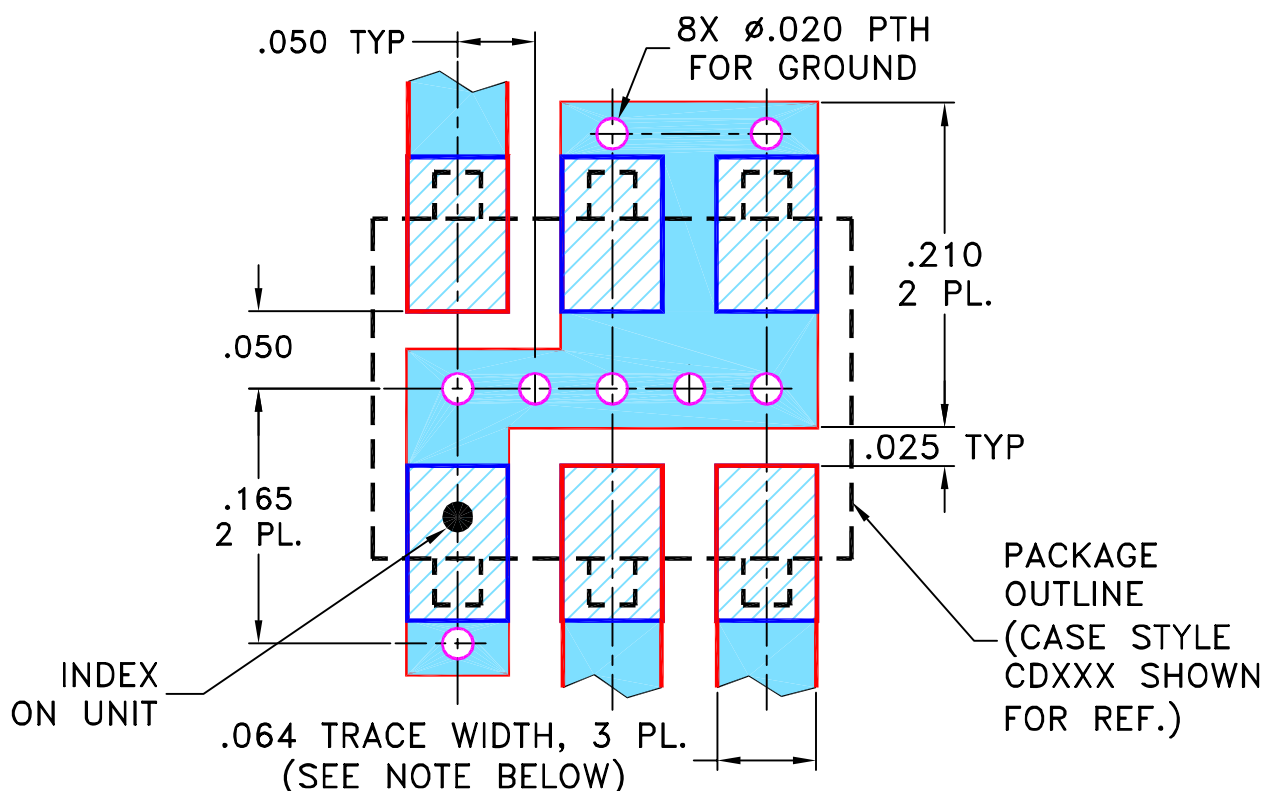
THIRD ANGLE PROJECTION



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:

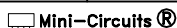
98PL052

SCALE:

8:1

SHEET:

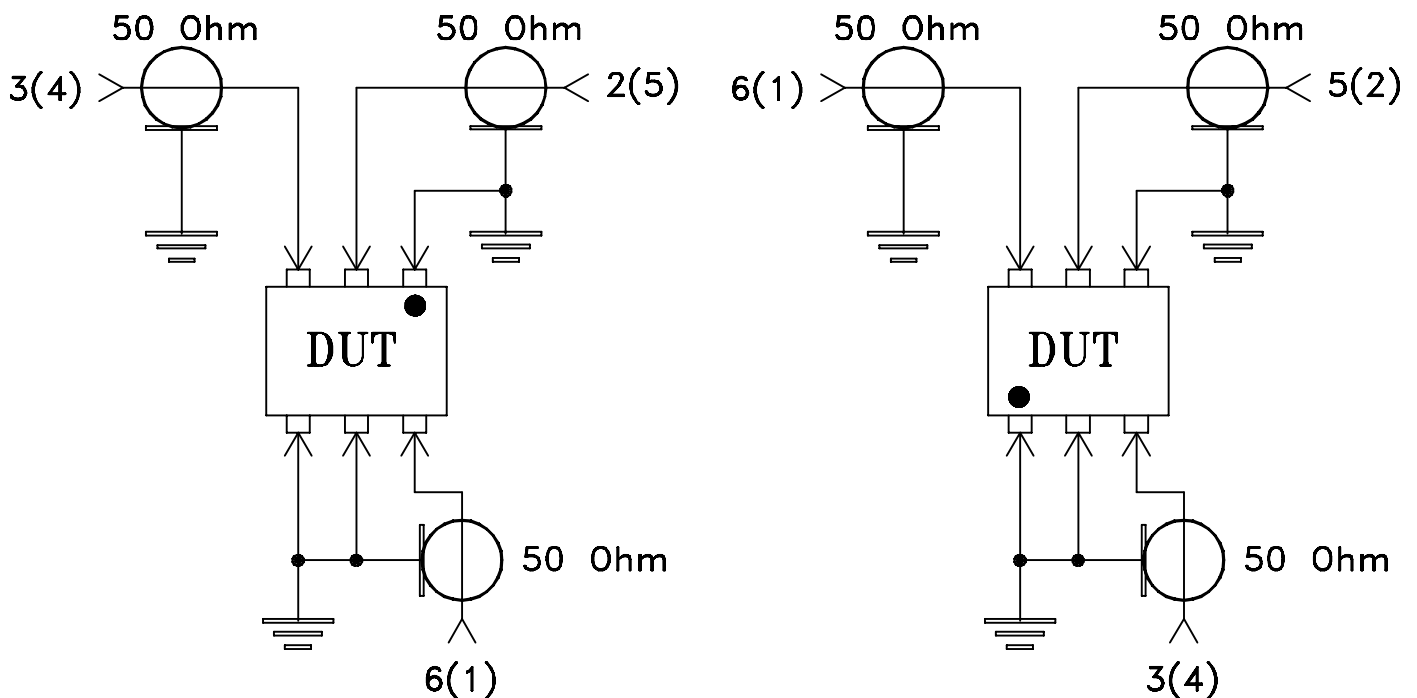
1 OF 1



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

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



Notes:

- 
- 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