

Frequency Mixer

Level 17 (LO Power +17 dBm) 5 to 1000 MHz

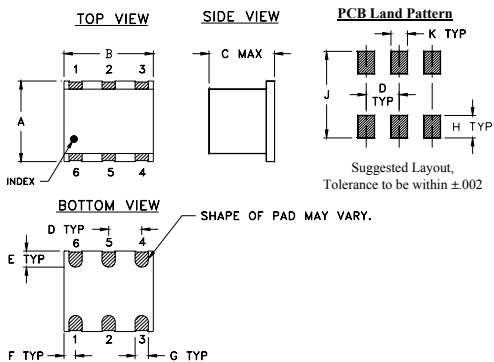
Maximum Ratings

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

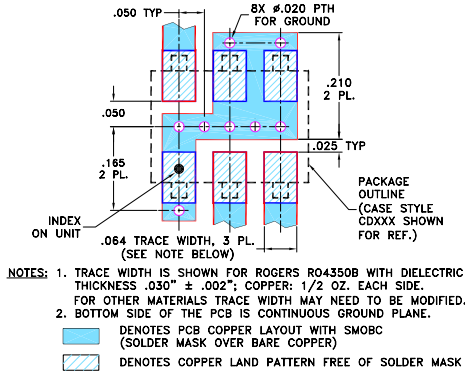
Outline Drawing



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)



Notes

A. Performance and quality attributes and conditions 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.

C. 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, 6.98 dB typ.
- small size, 0.25"x0.31"x0.2"

Applications

- UHF
- cellular/ISM/GSM

Electrical Specifications

FREQUENCY (MHz)		CONVERSION LOSS (dB)				LO-RF ISOLATION (dB)						LO-IF ISOLATION (dB)						IP3 at center band (dBm)
LO/Rf	IF	$f_L - f_U$				L		M		U		L		M		U		
			$\bar{X}$	σ	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	
			Total Range Max.			Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	
5-1000	DC-900	6.98	.054	8.5	9.3	55	40	39	22	33	20	52	30	45	22	30	17	23

1 dB COMP: +14 dBm typ.

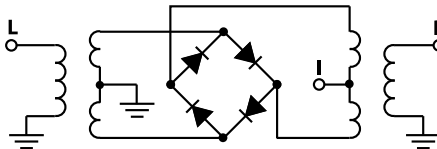
For phase detection, DC output positive with in-phase RF & LO.

L = low range [f_L to $10 f_L$]
M = mid range [$2f_U$ 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	7.85	66.33	72.89	1.54	1.95
10.00	40.00	7.64	63.63	68.70	1.49	1.85
20.00	50.00	7.69	58.93	63.79	1.47	1.79
50.00	80.00	7.55	52.00	56.89	1.45	1.91
95.45	65.45	7.54	46.41	50.84	1.44	1.79
100.00	70.00	7.53	46.04	50.67	1.43	1.79
185.91	155.91	7.51	40.70	46.79	1.43	1.69
200.00	170.00	7.37	40.02	46.99	1.42	1.68
276.36	246.36	7.35	37.35	44.46	1.40	1.56
366.82	336.82	7.22	35.28	42.69	1.34	1.47
457.27	427.27	7.11	33.66	39.45	1.25	1.36
487.42	457.42	7.17	33.17	37.61	1.24	1.34
500.00	470.00	7.07	33.04	37.36	1.21	1.34
547.73	517.73	7.11	32.95	35.68	1.11	1.28
638.18	608.18	7.46	32.78	31.60	1.06	1.29
728.64	698.64	7.45	31.90	30.61	1.27	1.46
819.09	789.09	7.76	30.74	28.78	1.54	1.81
909.55	879.55	8.24	29.67	27.10	1.90	2.21
969.85	939.85	8.54	29.46	25.48	2.06	2.34
1000.00	970.00	8.75	29.31	24.84	2.10	2.40

Electrical Schematic

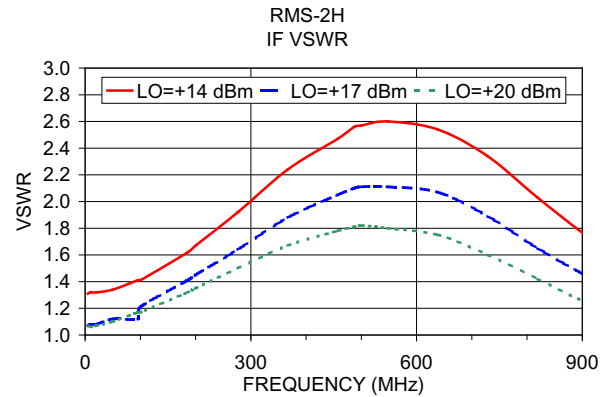
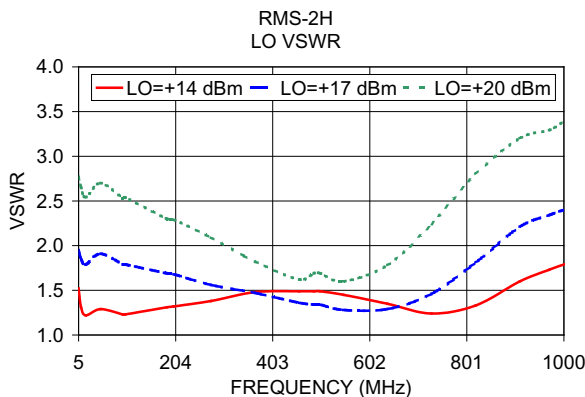
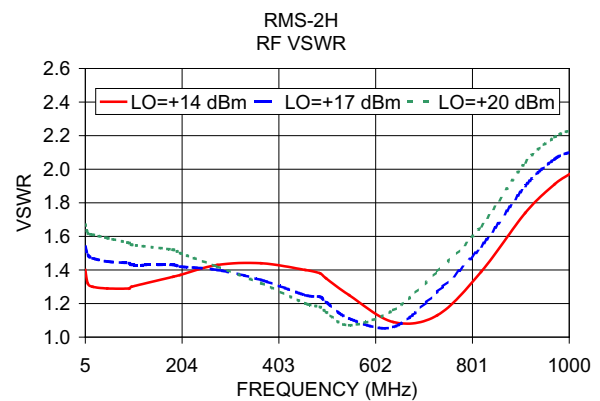
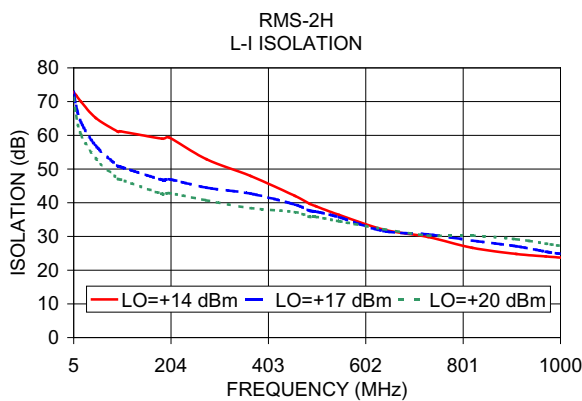
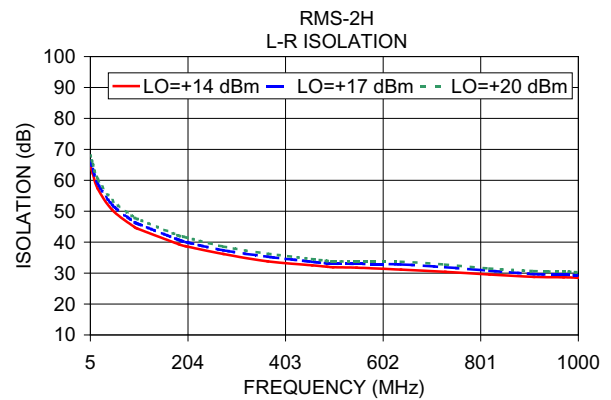
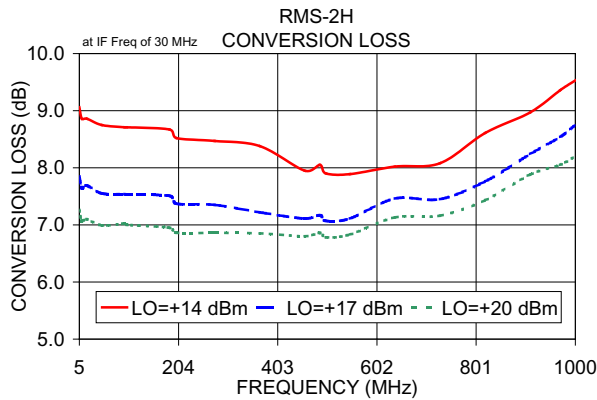


Generic photo used for illustration purposes only

CASE STYLE: TT240

+RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications



Notes

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Frequency Mixer

RMS-2H+

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=+14dBm (dB)		
		@LO (dBm)					@LO (dBm)					@LO (dBm)		
		+14	+17	+20			+14	+17	+20			+14	+17	+20
5.0	35.0	9.06	7.85	7.26	10.1	40.1	23.00	26.76	30.85	10.1	40.1	0.42	0.15	0.07
10.0	40.0	8.86	7.64	7.07	30.3	60.3	21.27	25.86	29.63	30.3	60.3	0.19	0.03	0.03
30.3	60.3	8.24	7.15	6.64	50.5	80.5	22.17	26.08	28.31	50.5	80.5	0.28	0.15	0.05
50.5	80.5	8.18	7.24	6.77	70.7	100.7	22.99	26.36	28.91	70.7	100.7	0.30	0.13	0.06
70.7	100.7	8.12	7.16	6.71	90.9	120.9	22.23	25.46	28.22	90.9	120.9	0.09	0.01	0.04
90.9	120.9	8.26	7.21	6.73	111.1	141.1	22.17	26.09	29.82	111.1	141.1	0.21	0.05	0.06
111.1	141.1	8.24	7.19	6.71	131.3	161.3	23.75	27.45	30.28	131.3	161.3	0.35	0.11	0.07
131.3	161.3	8.12	7.11	6.68	151.5	181.5	22.37	25.86	29.10	151.5	181.5	0.35	0.12	0.07
151.5	181.5	8.21	7.17	6.70	171.7	201.7	22.37	26.49	29.50	171.7	201.7	0.16	0.08	0.07
171.7	201.7	8.21	7.15	6.72	191.9	221.9	22.91	26.66	30.85	191.9	221.9	0.32	0.14	0.06
191.9	221.9	8.11	7.05	6.70	212.1	242.1	22.55	26.81	32.28	212.1	242.1	0.25	0.15	0.07
212.1	242.1	8.01	7.01	6.66	232.3	262.3	22.31	25.98	31.61	232.3	262.3	0.29	0.16	0.07
232.3	262.3	8.10	7.05	6.71	252.5	282.5	23.08	28.04	30.69	252.5	282.5	0.40	0.18	0.07
252.5	282.5	7.94	7.01	6.73	272.8	302.8	23.97	28.15	28.55	272.8	302.8	0.41	0.15	0.05
272.8	302.8	7.80	6.99	6.69	293.0	323.0	22.73	27.79	28.47	293.0	323.0	0.35	0.16	0.07
293.0	323.0	7.84	6.96	6.69	313.2	343.2	23.37	28.50	27.39	313.2	343.2	0.43	0.15	0.06
313.2	343.2	7.82	7.00	6.72	333.4	363.4	24.85	27.97	27.22	333.4	363.4	0.56	0.14	0.06
333.4	363.4	7.72	6.99	6.74	353.6	383.6	24.58	28.02	26.98	353.6	383.6	0.54	0.16	0.08
353.6	383.6	7.73	7.00	6.72	373.8	403.8	23.94	28.49	26.31	373.8	403.8	0.55	0.13	0.07
373.8	403.8	7.71	7.01	6.73	394.0	424.0	26.31	27.08	25.63	394.0	424.0	0.54	0.14	0.07
394.0	424.0	7.62	7.01	6.72	434.4	464.4	24.78	26.01	24.82	434.4	464.4	0.57	0.20	0.13
434.4	464.4	7.65	6.99	6.71	454.6	484.6	25.29	24.98	24.48	454.6	484.6	0.57	0.15	0.10
454.6	484.6	7.67	7.05	6.75	495.0	525.0	24.60	23.79	23.88	495.0	525.0	0.47	0.16	0.14
495.0	525.0	7.74	7.10	6.73	515.2	545.2	25.82	23.21	23.38	515.2	545.2	0.57	0.15	0.13
515.2	545.2	7.74	7.18	6.83	555.6	585.6	24.41	24.07	23.71	555.6	585.6	0.54	0.14	0.13
555.6	585.6	7.79	7.25	6.86	575.8	605.8	25.04	24.75	24.65	575.8	605.8	0.56	0.15	0.15
575.8	605.8	7.77	7.26	6.90	616.2	646.2	25.47	26.07	26.70	616.2	646.2	0.64	0.26	0.20
616.2	646.2	7.83	7.24	6.88	636.4	666.4	27.41	25.66	26.53	636.4	666.4	0.65	0.29	0.23
636.4	666.4	7.82	7.19	6.84	676.8	706.8	24.36	24.21	26.67	676.8	706.8	0.58	0.33	0.26
676.8	706.8	7.92	7.20	6.82	697.0	727.0	24.44	24.01	26.17	697.0	727.0	0.72	0.44	0.28
697.0	727.0	7.91	7.18	6.80	737.4	767.4	22.16	23.17	25.83	737.4	767.4	0.67	0.42	0.33
737.4	767.4	8.09	7.37	6.90	757.7	787.7	20.58	22.20	25.00	757.7	787.7	0.74	0.48	0.39
757.7	787.7	8.10	7.39	6.92	798.1	828.1	19.16	20.70	24.16	798.1	828.1	0.71	0.45	0.39
818.3	848.3	8.32	7.68	7.14	818.3	848.3	18.60	20.17	23.13	818.3	848.3	0.71	0.42	0.38
858.7	888.7	8.47	7.82	7.30	858.7	888.7	17.85	19.31	22.23	858.7	888.7	0.67	0.45	0.40
878.9	908.9	8.57	7.92	7.44	878.9	908.9	17.89	19.16	21.91	878.9	908.9	0.65	0.43	0.37
919.3	949.3	8.72	8.04	7.51	919.3	949.3	17.33	18.65	21.31	919.3	949.3	0.63	0.48	0.42
939.5	969.5	8.85	8.12	7.62	939.5	969.5	17.04	18.28	21.00	939.5	969.5	0.58	0.46	0.41
979.9	1009.9	8.94	8.14	7.56	979.9	1009.9	17.41	18.52	21.29	979.9	1009.9	0.62	0.54	0.49
1000.1	1030.1	9.04	8.13	7.58	1000.1	1030.1	17.46	18.56	21.97	1000.1	1030.1	0.61	0.58	0.53

REV. X2

RMS-2H+

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Frequency Mixer

RMS-2H+

Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=500.1MHz (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)=1000.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+17			+17			+17
490.0	10.1	7.11	10.0	20.1	7.18	900.0	100.1	7.13
477.7	22.4	7.05	29.8	39.9	6.92	880.2	119.9	7.02
465.4	34.7	7.06	49.6	59.7	7.00	860.4	139.7	6.98
453.1	47.0	7.07	69.3	79.4	7.02	840.7	159.4	6.91
440.8	59.3	7.09	89.1	99.2	6.98	820.9	179.2	6.87
428.5	71.6	7.01	108.9	119.0	6.97	801.1	199.0	6.80
416.2	83.9	7.03	128.7	138.8	6.93	781.3	218.8	6.77
403.8	96.3	6.98	148.4	158.5	6.93	761.6	238.5	6.74
391.5	108.6	6.97	168.2	178.3	6.96	741.8	258.3	6.74
379.2	120.9	6.96	188.0	198.1	6.97	722.0	278.1	6.75
366.9	133.2	6.82	207.8	217.9	6.96	702.2	297.9	6.70
354.6	145.5	6.81	227.6	237.7	6.93	682.4	317.7	6.69
342.3	157.8	6.77	247.3	257.4	6.96	662.7	337.4	6.71
330.0	170.1	6.79	267.1	277.2	7.03	642.9	357.2	6.78
317.7	182.4	6.76	286.9	297.0	7.04	623.1	377.0	6.76
305.4	194.7	6.69	306.7	316.8	7.04	603.3	396.8	6.76
293.1	207.0	6.63	326.4	336.5	7.05	583.6	416.5	6.77
280.8	219.3	6.62	346.2	356.3	7.05	563.8	436.3	6.81
268.5	231.6	6.60	366.0	376.1	7.10	544.0	456.1	6.84
256.2	243.9	6.63	385.8	395.9	7.12	524.2	475.9	6.85
243.8	256.3	6.61	405.6	415.7	7.11	504.4	495.7	6.86
231.5	268.6	6.61	425.3	435.4	7.11	484.7	515.4	6.88
219.2	280.9	6.62	445.1	455.2	7.21	464.9	535.2	6.92
206.9	293.2	6.62	464.9	475.0	7.25	445.1	555.0	6.96
194.6	305.5	6.65	484.7	494.8	7.23	425.3	574.8	6.94
182.3	317.8	6.65	504.4	514.5	7.20	405.6	594.5	6.95
170.0	330.1	6.65	524.2	534.3	7.19	385.8	614.3	7.02
157.7	342.4	6.66	544.0	554.1	7.30	366.0	634.1	7.04
145.4	354.7	6.70	583.6	593.7	7.38	326.4	673.7	7.13
133.1	367.0	6.73	603.3	613.4	7.39	306.7	693.4	7.13
120.8	379.3	6.76	642.9	653.0	7.51	267.1	733.0	7.16
108.5	391.6	6.77	662.7	672.8	7.56	247.3	752.8	7.19
96.2	403.9	6.79	702.2	712.3	7.51	207.8	792.3	7.24
83.8	416.3	6.81	722.0	732.1	7.55	188.0	812.1	7.22
71.5	428.6	6.82	761.6	771.7	7.60	148.4	851.7	7.31
59.2	440.9	6.86	781.3	791.4	7.64	128.7	871.4	7.30
46.9	453.2	6.87	820.9	831.0	7.60	89.1	911.0	7.42
34.6	465.5	6.91	840.7	850.8	7.67	69.3	930.8	7.49
22.3	477.8	6.89	880.2	890.3	7.74	29.8	970.3	7.68
10.0	490.1	7.18	900.0	910.1	7.76	10.0	990.1	7.96

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Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+14	+17	+20	+14	+17	+20
5.0	64.63	66.33	68.05	72.73	72.89	71.08
10.0	62.11	63.63	65.24	71.84	68.70	65.74
30.3	51.79	54.16	56.61	64.04	58.06	55.01
50.5	46.99	49.35	51.89	62.21	54.44	50.95
70.7	43.86	46.06	48.40	61.00	52.56	48.75
90.9	41.76	43.92	46.27	57.96	50.41	47.09
111.1	40.06	42.37	44.80	56.56	48.73	44.95
131.3	38.62	41.18	43.81	55.53	47.11	43.43
151.5	37.56	39.99	42.55	54.95	46.17	42.30
171.7	36.60	38.95	41.44	53.84	45.59	41.77
191.9	35.80	38.22	40.65	53.18	45.03	41.54
212.1	35.21	37.65	40.11	53.00	43.94	40.79
232.3	34.61	37.17	39.70	52.76	43.35	40.65
252.5	34.10	36.66	38.96	51.30	43.47	40.67
272.8	33.72	36.15	38.38	52.43	43.91	40.59
293.0	33.29	35.67	37.85	51.77	44.17	40.83
313.2	33.04	35.53	37.71	50.91	44.42	40.42
333.4	32.82	35.23	37.35	54.14	45.58	40.57
353.6	32.45	34.81	36.91	53.96	45.88	40.52
373.8	32.25	34.56	36.59	54.88	47.03	40.81
394.0	32.19	34.47	36.47	55.25	47.93	40.94
434.4	31.71	33.89	35.77	51.06	47.01	40.11
454.6	31.73	33.81	35.67	47.28	46.02	39.83
495.0	31.47	33.44	35.25	44.11	43.79	39.28
515.2	31.54	33.57	35.33	41.82	41.95	38.30
555.6	31.33	33.30	34.99	39.21	39.70	37.34
575.8	31.40	33.31	35.04	37.55	38.24	37.04
616.2	31.43	33.28	34.87	35.84	36.26	35.61
636.4	31.53	33.39	35.01	34.82	35.59	35.34
676.8	31.72	33.47	34.88	33.43	34.32	34.27
697.0	31.78	33.38	34.67	32.72	33.91	33.69
737.4	32.03	33.53	34.76	31.49	32.86	32.33
757.7	32.00	33.36	34.62	30.82	32.56	32.33
818.3	32.18	33.71	35.02	29.30	31.39	31.47
858.7	32.16	33.71	35.16	28.21	30.22	31.12
878.9	32.20	33.77	35.15	28.02	30.18	31.20
919.3	32.25	33.85	35.46	27.03	29.11	30.41
939.5	32.30	33.91	35.66	26.80	28.99	30.44
979.9	32.50	34.24	36.19	26.03	28.29	29.88
1000.1	32.79	34.67	36.84	25.81	28.15	29.75

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+14	+17	+20
10.1	40.1	53.66	52.46	50.21
30.3	60.3	43.91	43.89	42.64
50.5	80.5	40.74	41.26	40.43
70.7	100.7	38.93	38.55	38.40
90.9	120.9	37.04	36.97	36.74
111.1	141.1	35.78	35.72	35.41
131.3	161.3	34.63	34.84	34.96
151.5	181.5	33.65	34.10	34.06
171.7	201.7	33.03	33.56	33.63
191.9	221.9	32.56	33.07	33.15
212.1	242.1	32.07	32.52	32.85
232.3	262.3	31.76	32.55	32.83
252.5	282.5	31.59	32.20	32.56
272.8	302.8	31.42	31.99	32.41
293.0	323.0	31.41	32.13	32.57
313.2	343.2	31.07	31.98	32.44
333.4	363.4	31.15	32.32	33.09
353.6	383.6	30.62	32.08	32.98
373.8	403.8	30.50	32.19	33.50
394.0	424.0	30.36	32.09	33.62
434.4	464.4	29.76	31.41	32.80
454.6	484.6	29.51	30.84	31.81
495.0	525.0	29.14	30.02	30.54
515.2	545.2	28.59	29.17	29.65
555.6	585.6	27.05	27.42	27.74
575.8	605.8	26.19	26.42	26.64
616.2	646.2	23.91	23.94	24.19
636.4	666.4	22.95	22.94	23.13
676.8	706.8	21.06	20.76	20.78
697.0	727.0	20.17	19.82	19.81
737.4	767.4	18.84	18.36	18.13
757.7	787.7	18.12	17.58	17.28
798.1	828.1	17.18	16.68	16.29
818.3	848.3	16.81	16.32	15.96
858.7	888.7	16.00	15.53	15.17
878.9	908.9	15.72	15.27	15.02
919.3	949.3	15.09	14.66	14.42
939.5	969.5	14.82	14.39	14.04
979.9	1009.9	14.26	13.88	13.70
1000.1	1030.1	14.00	13.68	13.45

Frequency Mixer

RMS-2H+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)		
		@LO (dBm)		
		+14	+17	+20
5.0	35.0	1.40	1.54	1.67
10.0	40.0	1.32	1.49	1.62
30.3	60.3	1.04	1.10	1.21
50.5	80.5	1.03	1.11	1.21
70.7	100.7	1.04	1.14	1.23
90.9	120.9	1.06	1.13	1.23
111.1	141.1	1.07	1.15	1.25
131.3	161.3	1.08	1.16	1.26
151.5	181.5	1.09	1.15	1.25
171.7	201.7	1.11	1.16	1.26
191.9	221.9	1.11	1.18	1.27
212.1	242.1	1.12	1.19	1.29
232.3	262.3	1.12	1.18	1.28
252.5	282.5	1.13	1.20	1.30
272.8	302.8	1.14	1.22	1.31
293.0	323.0	1.13	1.21	1.31
313.2	343.2	1.14	1.23	1.32
333.4	363.4	1.14	1.24	1.33
353.6	383.6	1.14	1.24	1.33
373.8	403.8	1.14	1.25	1.34
394.0	424.0	1.15	1.27	1.35
434.4	464.4	1.14	1.26	1.36
454.6	484.6	1.16	1.28	1.38
495.0	525.0	1.15	1.27	1.37
515.2	545.2	1.17	1.28	1.37
555.6	585.6	1.16	1.28	1.37
575.8	605.8	1.17	1.29	1.38
616.2	646.2	1.18	1.32	1.42
636.4	666.4	1.19	1.34	1.43
676.8	706.8	1.20	1.36	1.47
697.0	727.0	1.22	1.39	1.49
737.4	767.4	1.22	1.39	1.50
757.7	787.7	1.23	1.39	1.50
798.1	828.1	1.22	1.38	1.49
818.3	848.3	1.22	1.37	1.48
858.7	888.7	1.22	1.35	1.46
878.9	908.9	1.21	1.34	1.44
919.3	949.3	1.21	1.32	1.42
939.5	969.5	1.21	1.31	1.41
979.9	1009.9	1.23	1.32	1.42
1000.1	1030.1	1.25	1.33	1.43

LO (MHz)	LO VSWR (:1)		
	@LO (dBm)		
	+14	+17	+20
5.0	1.52	1.95	2.77
10.0	1.31	1.85	2.65
30.3	1.07	1.71	2.64
50.5	1.06	1.69	2.57
70.7	1.05	1.61	2.38
90.9	1.06	1.59	2.34
111.1	1.08	1.63	2.42
131.3	1.08	1.66	2.50
151.5	1.08	1.64	2.45
171.7	1.10	1.60	2.35
191.9	1.10	1.59	2.34
212.1	1.10	1.63	2.43
232.3	1.12	1.66	2.48
252.5	1.12	1.64	2.43
272.8	1.10	1.61	2.37
293.0	1.11	1.62	2.39
313.2	1.13	1.66	2.46
333.4	1.10	1.67	2.49
353.6	1.11	1.66	2.45
373.8	1.11	1.65	2.42
394.0	1.09	1.66	2.45
434.4	1.11	1.71	2.52
454.6	1.10	1.70	2.48
495.0	1.12	1.73	2.52
515.2	1.13	1.75	2.56
555.6	1.15	1.76	2.54
575.8	1.16	1.77	2.55
616.2	1.19	1.82	2.62
636.4	1.20	1.82	2.61
676.8	1.24	1.84	2.61
697.0	1.26	1.86	2.65
737.4	1.31	1.91	2.69
757.7	1.32	1.91	2.68
798.1	1.37	1.98	2.76
818.3	1.38	1.99	2.77
858.7	1.43	2.03	2.79
878.9	1.44	2.04	2.80
919.3	1.48	2.07	2.84
939.5	1.49	2.07	2.83
979.9	1.51	2.09	2.84
1000.1	1.52	2.10	2.84

IF (OUT) (MHz)	IF VSWR @LO=1500.1MHz (:1)		
	@LO (dBm)		
	+14	+17	+20
5.0	1.31	1.07	1.07
10.0	1.32	1.08	1.06
29.8	2.69	2.05	1.69
49.6	2.60	2.03	1.68
69.3	2.57	2.02	1.68
89.1	2.61	2.04	1.69
108.9	2.63	2.04	1.68
128.7	2.64	2.05	1.69
148.4	2.62	2.05	1.69
168.2	2.61	2.05	1.70
188.0	2.62	2.05	1.69
207.8	2.66	2.07	1.70
227.6	2.66	2.08	1.71
247.3	2.61	2.04	1.68
267.1	2.59	2.03	1.67
286.9	2.62	2.05	1.69
306.7	2.61	2.04	1.68
326.4	2.57	2.01	1.66
346.2	2.58	2.03	1.67
366.0	2.58	2.04	1.68
385.8	2.54	2.00	1.65
405.6	2.53	2.00	1.64
425.3	2.56	2.04	1.68
445.1	2.54	2.02	1.68
464.9	2.51	2.00	1.66
484.7	2.52	2.01	1.67
504.4	2.52	2.02	1.68
524.2	2.48	1.99	1.66
544.0	2.47	2.00	1.66
583.6	2.48	2.02	1.69
603.3	2.41	1.97	1.66
642.9	2.44	2.01	1.71
662.7	2.42	2.00	1.69
702.2	2.36	1.97	1.69
722.0	2.31	1.94	1.67
761.6	2.33	1.97	1.70
781.3	2.33	1.98	1.72
820.9	2.18	1.88	1.64
840.7	2.18	1.89	1.66
880.2	2.16	1.88	1.67
900.0	2.12	1.85	1.65

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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	16	21	8	23	16	33	36	51	33	44
1	-	22	+0	30	14	33	31	34	34	39	35	46
2	90	49	41	49	43	52	42	53	54	58	57	59
3	>100	69	56	68	55	68	50	67	52	83	59	77
4	>100	76	74	85	79	77	74	74	69	72	73	81
5	>100	>92	>92	86	90	91	76	85	77	86	78	>92
6	>100	>92	>92	>92	91	>92	86	84	85	>92	85	91
7	>100	>92	>92	>92	>92	>92	>92	>92	91	>92	>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: 500.1 MHz; -1.00 dBm.
LO IN: 530.01 MHz; +17.00 dBm
IF OUT: 29.91 MHz; -8.17 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	25	36	22	41	31	45	46	56	45	65
1	-	23	+0	30	14	35	27	37	41	45	42	49
2	78	44	37	43	36	49	35	47	43	71	59	65
3	>100	56	40	59	42	60	36	52	42	55	48	56
4	>100	57	53	59	53	64	54	59	52	70	70	61
5	>100	71	58	66	53	70	52	65	49	74	52	68
6	>100	78	67	73	70	71	68	67	61	65	57	65
7	>100	83	85	91	73	78	72	81	65	76	62	89
8	>100	99	95	92	>102	81	80	78	73	74	69	73
9	>100	93	101	97	89	91	76	81	75	85	75	81
10	>100	98	>102	>102	>102	97	87	81	81	82	77	81
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 500.1 MHz; 9.00 dBm.
LO IN: 530.01 MHz; +17.00 dBm
IF OUT: 29.91 MHz; 1.87 dBm

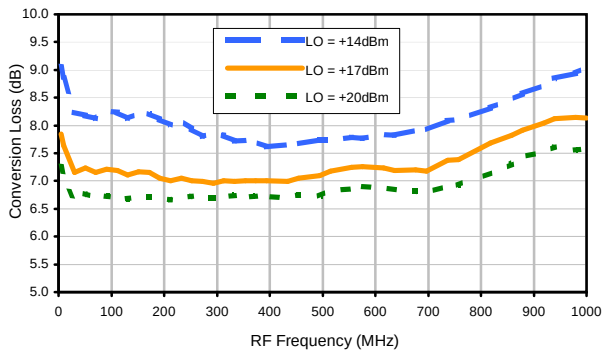
- Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

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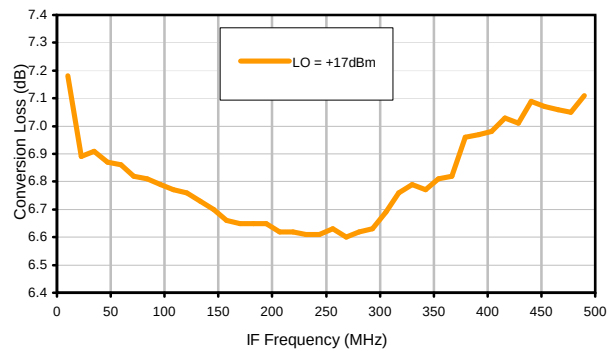


Typical Performance Curves

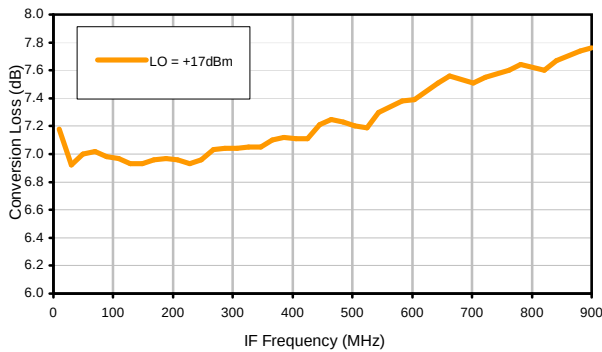
Conversion Loss @ IF=30MHz



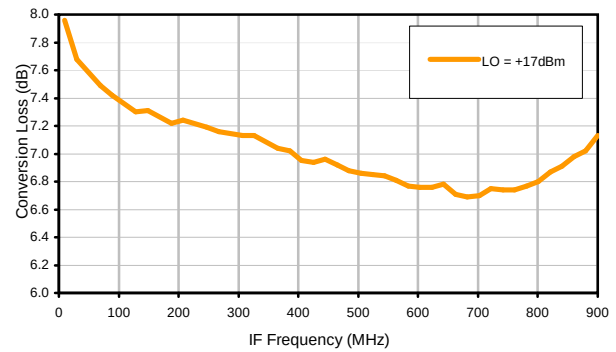
Conversion Loss vs. IF @ RF=500.1MHz



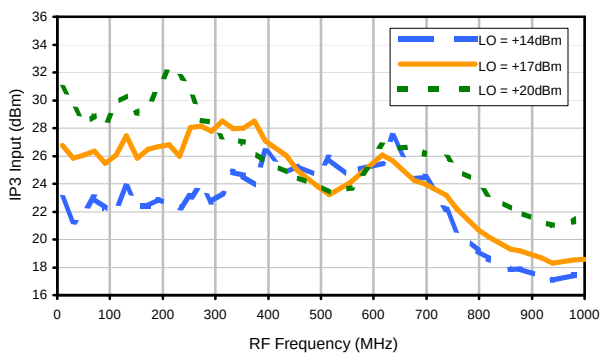
Conversion Loss vs. IF @ RF=10.1MHz



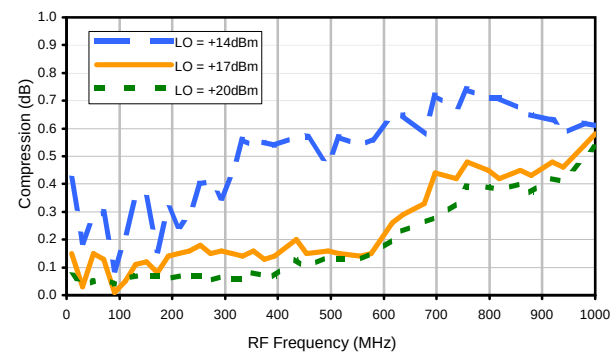
Conversion Loss vs. IF @ RF=1000.1MHz



IP3 Input

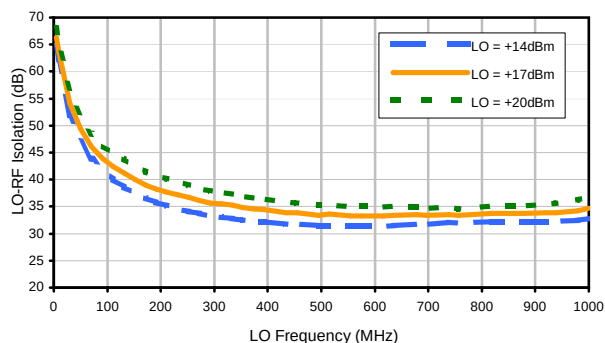


Compression @ RF IN=+14dBm

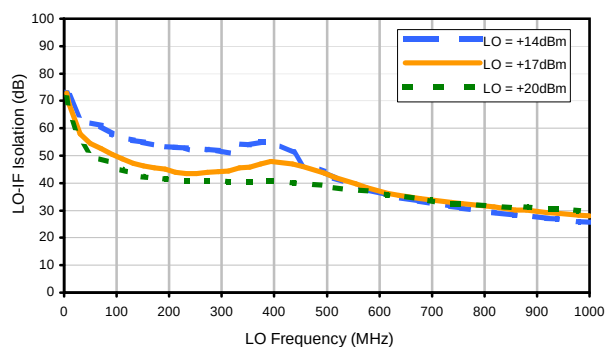


Typical Performance Curves

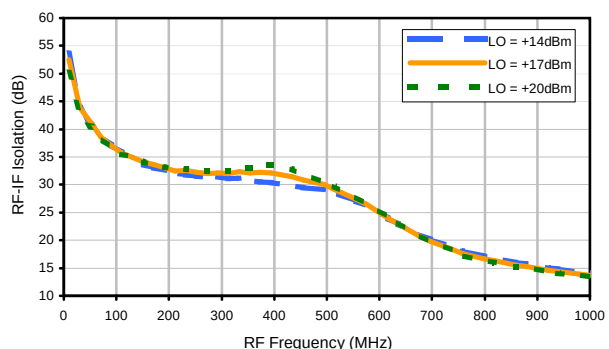
LO-RF Isolation



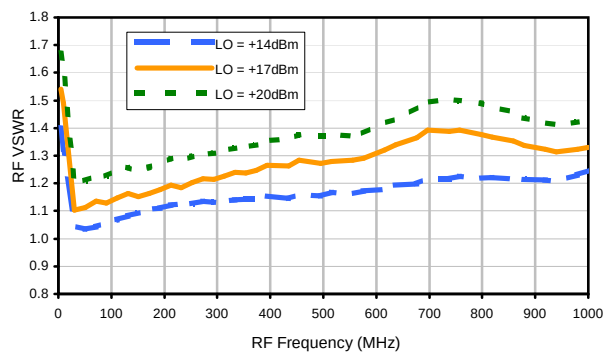
LO-IF Isolation



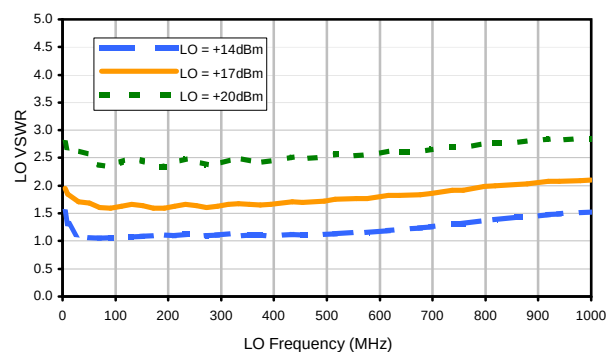
RF-IF Isolation



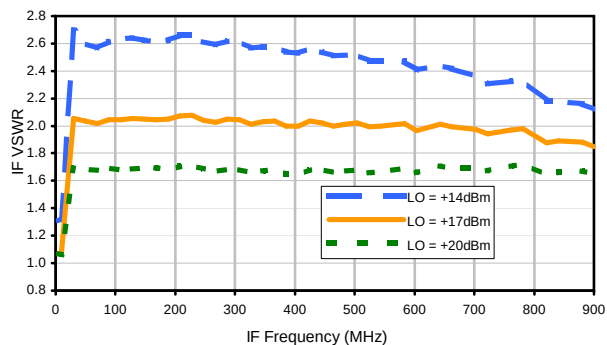
RF VSWR



LO VSWR



IF VSWR



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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	16	21	8	23	16	33	36	51	33	44
1	-	22	+0	30	14	33	31	34	34	39	35	46
2	90	49	41	49	43	52	42	53	54	58	57	59
3	>100	69	56	68	55	68	50	67	52	83	59	77
4	>100	76	74	85	79	77	74	74	69	72	73	81
5	>100	>92	>92	86	90	91	76	85	77	86	78	>92
6	>100	>92	>92	>92	91	>92	86	84	85	>92	85	91
7	>100	>92	>92	>92	>92	>92	>92	>92	91	>92	>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: 500.1 MHz; -1.00 dBm.

LO IN: 530.01 MHz; +17.00 dBm

IF OUT: 29.91 MHz; -8.17 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	25	36	22	41	31	45	46	56	45	65
1	-	23	+0	30	14	35	27	37	41	45	42	49
2	78	44	37	43	36	49	35	47	43	71	59	65
3	>100	56	40	59	42	60	36	52	42	55	48	56
4	>100	57	53	59	53	64	54	59	52	70	70	61
5	>100	71	58	66	53	70	52	65	49	74	52	68
6	>100	78	67	73	70	71	68	67	61	65	57	65
7	>100	83	85	91	73	78	72	81	65	76	62	89
8	>100	99	95	92	>102	81	80	78	73	74	69	73
9	>100	93	101	97	89	91	76	81	75	85	75	81
10	>100	98	>102	>102	>102	97	87	81	81	82	77	81
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:

RF IN: 500.1 MHz; 9.00 dBm.

LO IN: 530.01 MHz; +17.00 dBm

IF OUT: 29.91 MHz; 1.87 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

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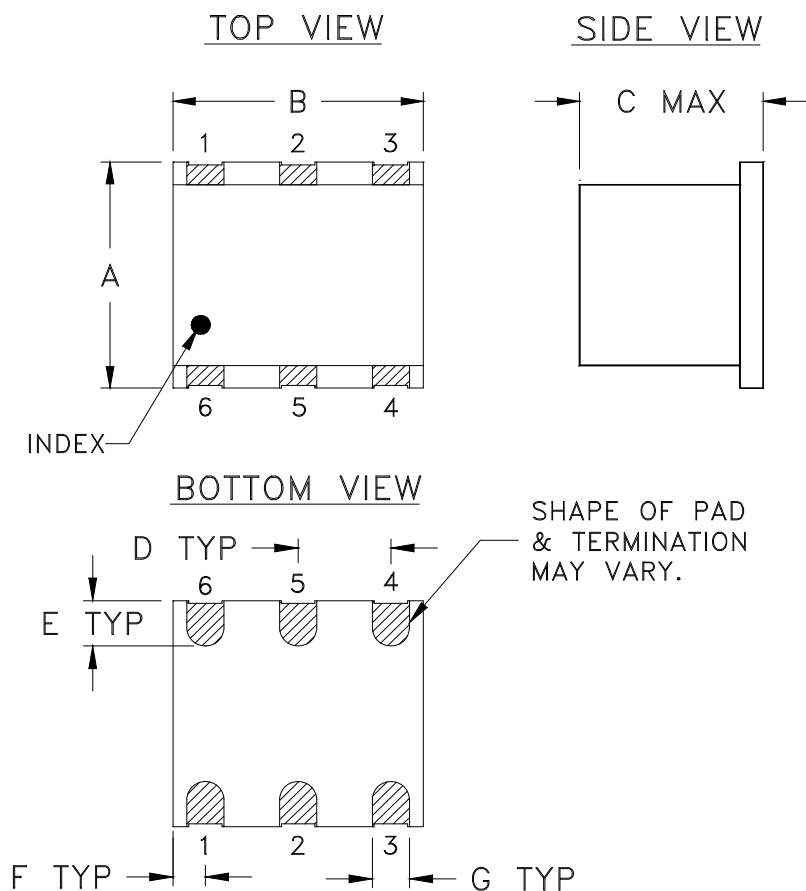
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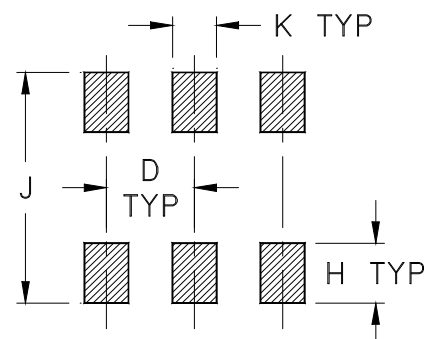
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Outline Dimensions



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.



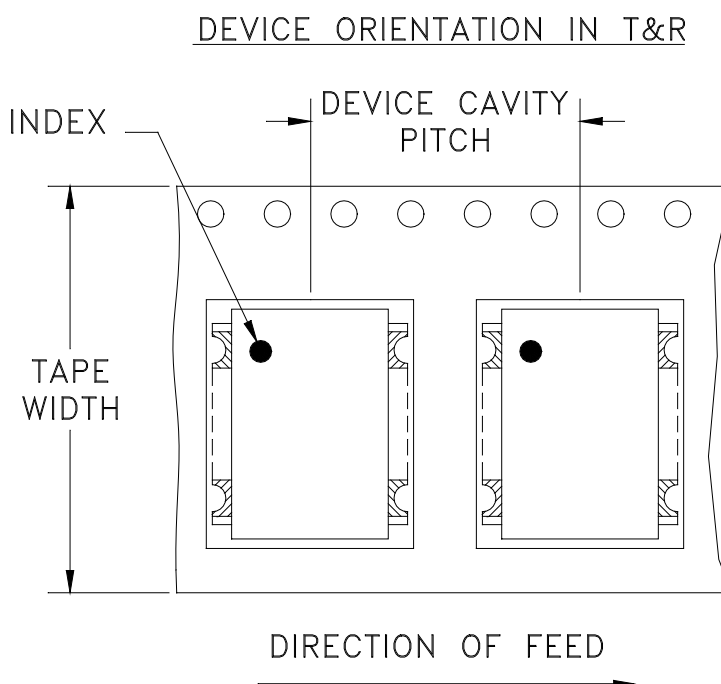
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RF/IF MICROWAVE COMPONENTS

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

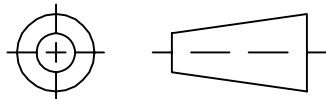
Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

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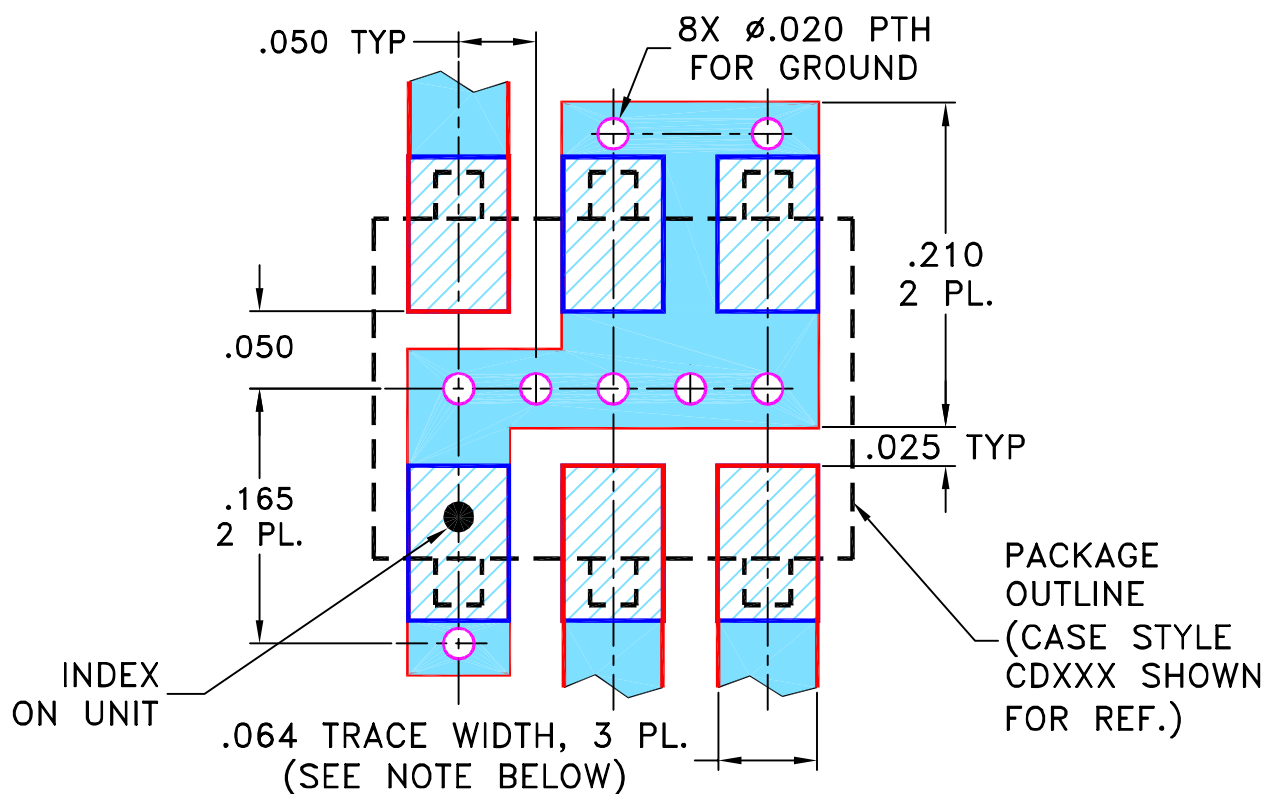
THIRD ANGLE PROJECTION



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

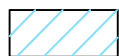
SUGGESTED MOUNTING CONFIGURATION
FOR BH292, CD541/542/636/637, TT100/240 CASE
STYLES, "gk", "ht", "hu", "nd", "w" PIN CONNECTIONS



- 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 $\pm$.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:

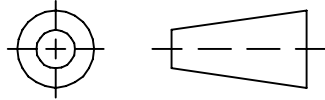
1 OF 1

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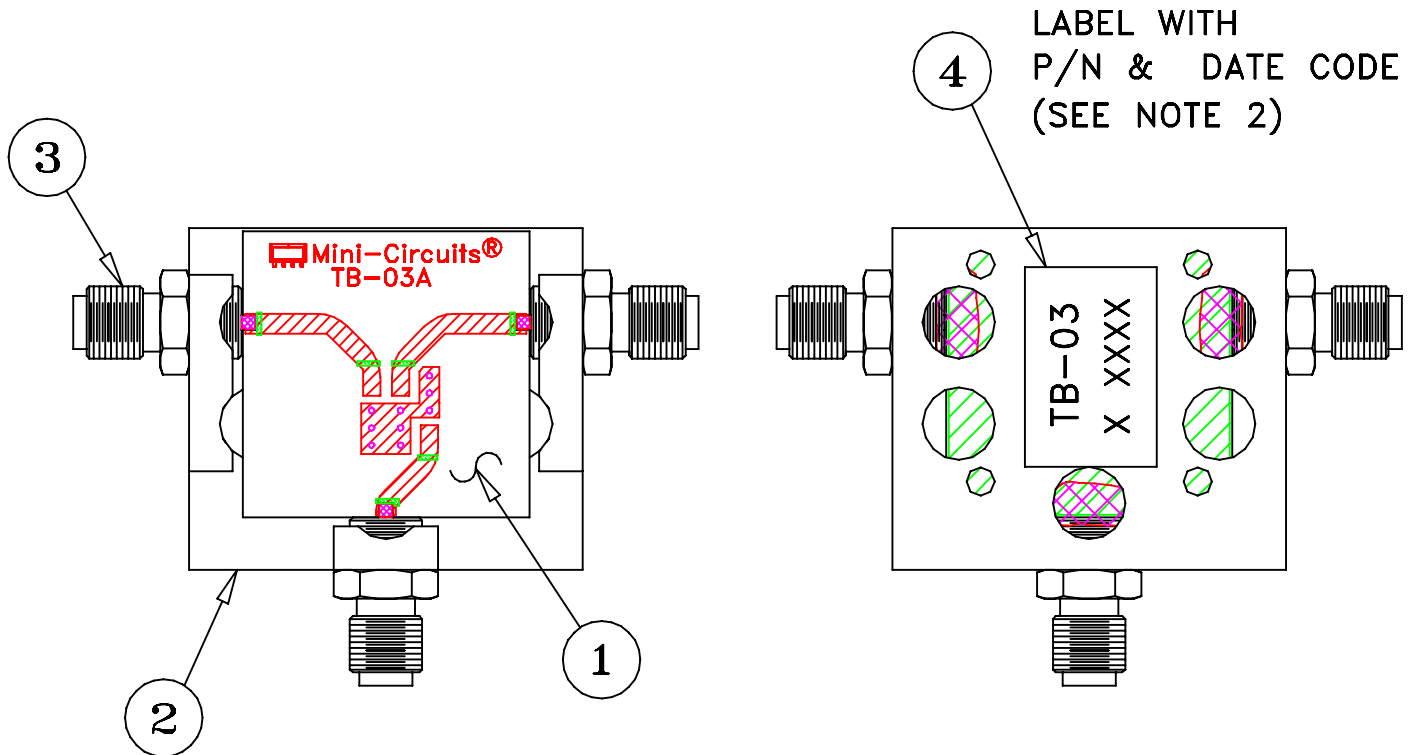
ASHEETA1.DWG REV:A DATE:01/12/95

THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
E	M119737	UPDATED PCB	10.08	MF	AD
F	M127659	UPDATED CARR	06.10	SW	SG
G	M127846	UPDATED SCHEMATIC DIAGRAM	06.10	SW	SG
H	M131840	UPDATED DWG	05.11	MF	AD

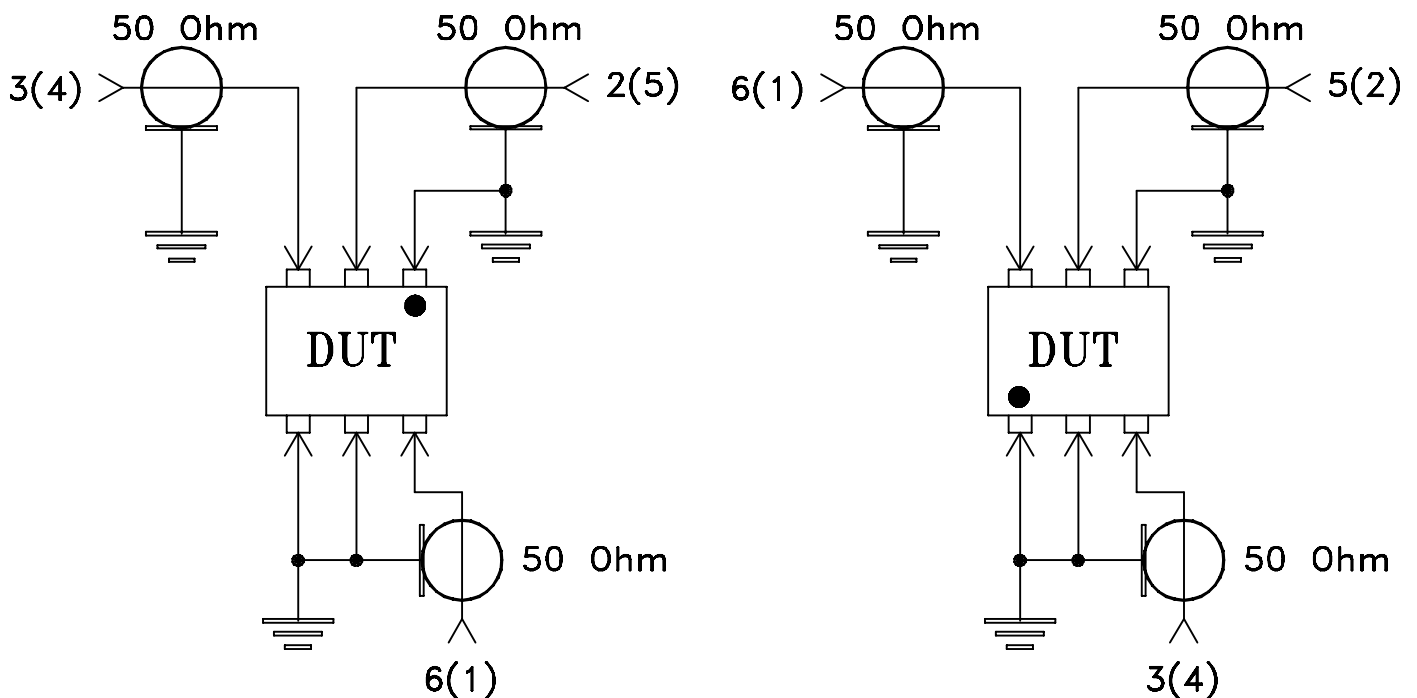
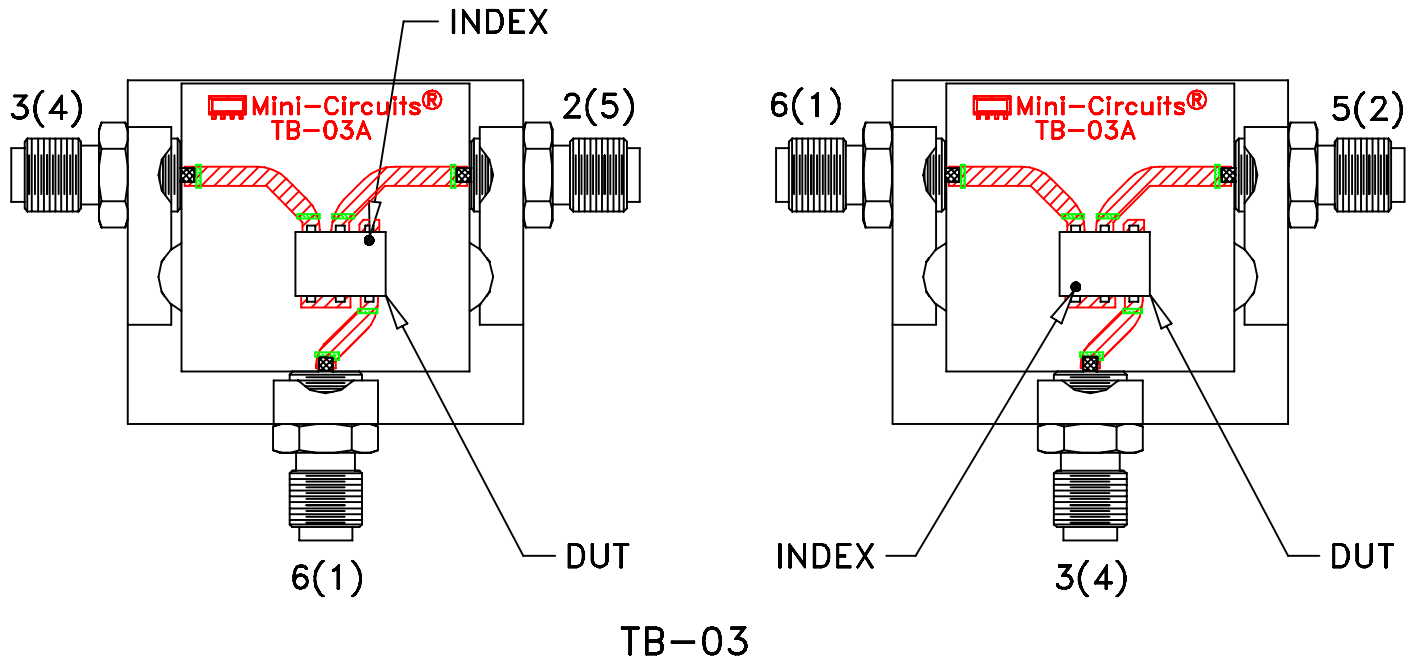
**NOTES:**

1. REFER TO -09 PAGE FOR ITEM DESCRIPTIONS.
DESIGNATION NUMBERS ON -20 PAGE CORRESPOND TO THE NUMBERS ON -09 PAGE.
2. FOR TEXT HEIGHT & STYLE ON THE LABEL REFER TO: D3-G209.

UNLESS OTHERWISE SPECIFIED		INITIALS		DATE		Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235			
DIMENSIONS ARE IN INCHES		DRAWN	S.WOLYNSKI	06.29.99		TB,ADE,CD542/636,06MX01,50			
TOLERANCES ON:		CHECKED	SG	07.06.99					
2 PL DECIMALS ±		APPROVED	MG	07.10.99					
3 PL DECIMALS ±									
ANGLES ±						SIZECODE IDENTDRAWING NO:REV: A15542TB-03-20H			
FRACTIONS ±									
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ASHEETA1.DWG REV:A DATE:01/12/95									

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