

Surface Mount Frequency Mixer

Level 7 (LO Power +7 dBm) 5 to 1200 MHz

JMS-2W+
JMS-2W



CASE STYLE: BH292

Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power	50mW
IF Current	40mA
Permanent damage may occur if any of these limits are exceeded.	

Pin Connections

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

Features

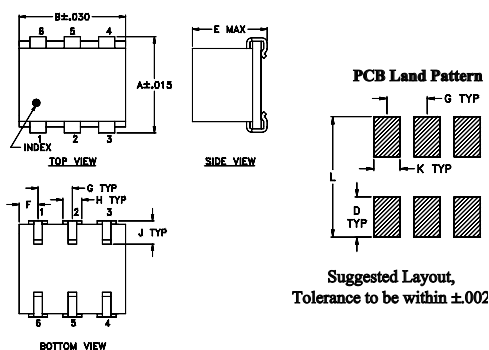
- excellent L-R isolation and L-I isolation, up to 60 dB typ.
- miniature surface mount
- J-leads for strain relief and excellent solderability

Applications

- up & down converters for receivers & transmitters
- UHF TV
- cellular/ISM/GSM

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

Outline Drawing

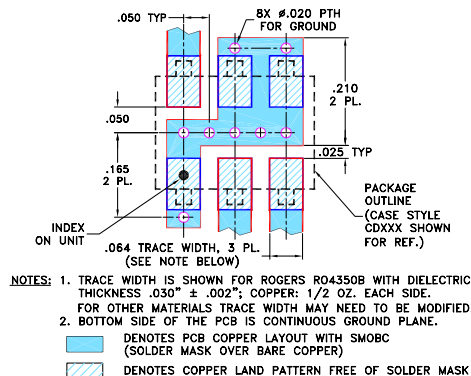


Outline Dimensions (inch)

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

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

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



Notes

- 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.
- 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

Electrical Specifications

FREQUENCY (MHz)		CONVERSION LOSS (dB)				LO-RF ISOLATION (dB)						LO-IF ISOLATION (dB)						IP3 at center band (dBm)
LO/RF	IF	Mid-Band			Total Range	L		M		U		L		M		U		
		$\bar{X}$	σ	Max.		Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	
		f _L -f _U				Max.												
5-1200	DC-500	6.8	.10	8.0	9.0	60	40	60	30	37	20	60	40	48	20	31	15	17

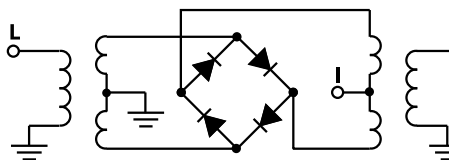
1 dB COMP.: +1 dBm typ.
Phase detection, positive polarity

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

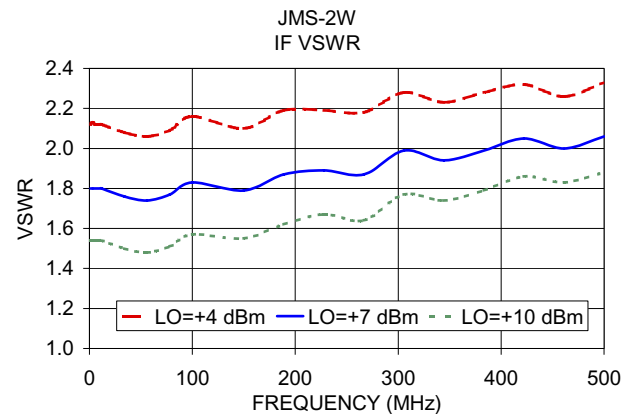
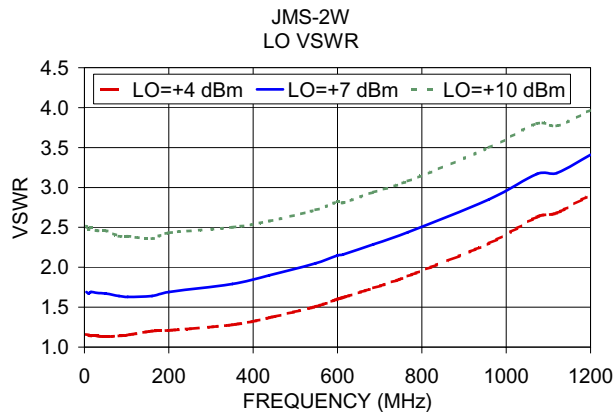
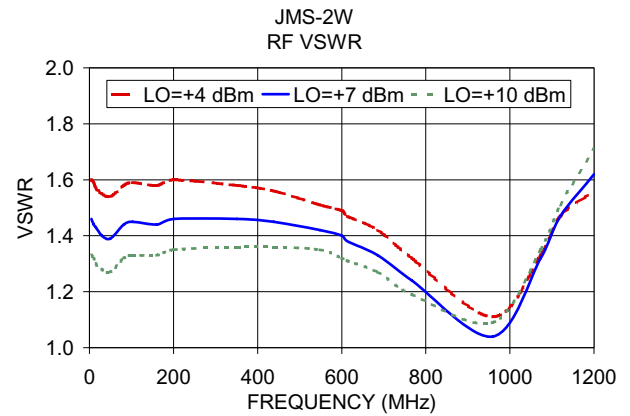
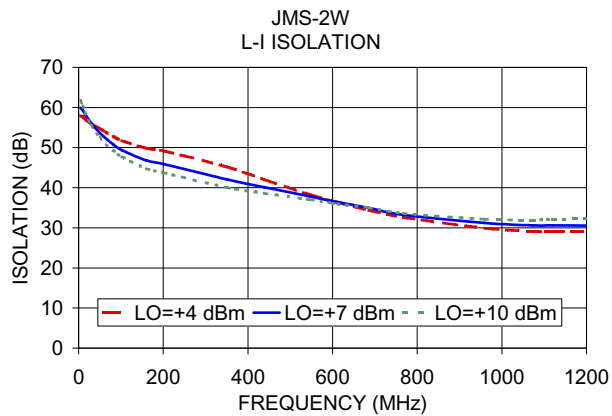
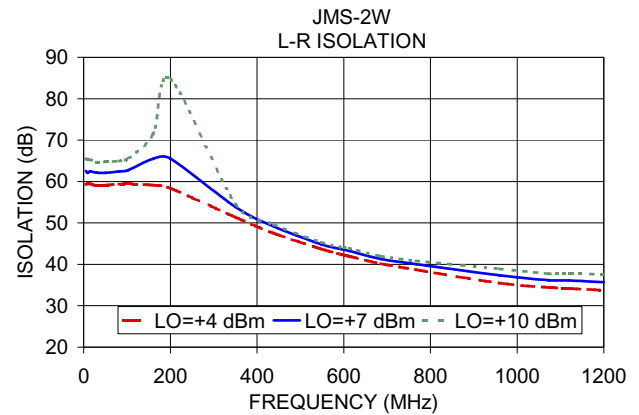
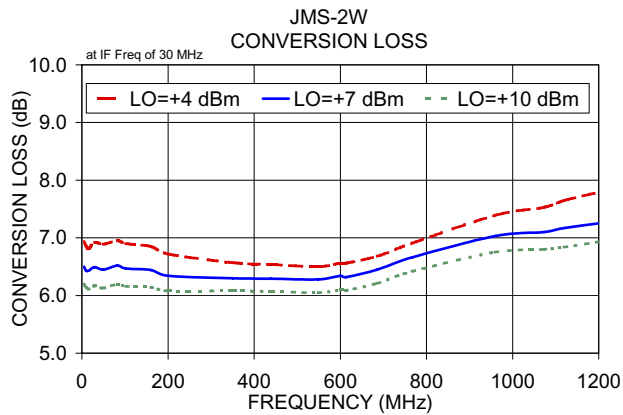
Typical Performance Data

Frequency (MHz)		Conversion Loss (dB)	Isolation L-R (dB)	Isolation L-I (dB)	VSWR RF Port (:1)	VSWR LO Port (:1)
RF	LO	LO +7dBm	LO +7dBm	LO +7dBm	LO +7dBm	LO +7dBm
5.00	35.00	6.50	62.55	59.95	1.46	1.69
10.00	40.00	6.43	62.08	59.28	1.44	1.67
15.30	45.30	6.43	62.44	58.34	1.43	1.69
29.94	59.94	6.49	62.14	56.11	1.40	1.68
50.00	80.00	6.45	62.11	53.65	1.39	1.67
81.92	111.92	6.52	62.44	50.79	1.44	1.64
102.45	132.45	6.47	62.71	49.36	1.45	1.63
160.26	130.26	6.44	65.46	46.82	1.44	1.64
200.43	170.43	6.34	65.54	45.89	1.46	1.69
350.63	320.63	6.30	53.86	42.07	1.46	1.79
438.53	408.53	6.29	49.13	40.13	1.45	1.90
548.47	518.47	6.28	44.85	37.77	1.42	2.05
600.00	570.00	6.34	43.57	36.59	1.40	2.15
613.38	583.38	6.32	43.25	36.40	1.38	2.16
685.97	655.97	6.45	41.28	34.97	1.33	2.29
767.15	737.15	6.66	40.04	33.20	1.24	2.44
959.47	929.47	7.03	37.35	31.24	1.04	2.85
1073.01	1043.01	7.10	36.16	30.62	1.32	3.17
1120.00	1090.00	7.17	36.10	30.60	1.47	3.18
1200.00	1170.00	7.25	35.69	30.56	1.62	3.41

Electrical Schematic



Performance Charts



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Frequency Mixer

JMS-2W+

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	6.93	6.50	6.19
10.0	40.0	6.86	6.43	6.14
50.4	80.4	7.27	6.76	6.53
90.6	120.6	7.22	6.77	6.50
130.9	160.9	7.26	6.77	6.54
171.1	201.1	7.18	6.71	6.50
211.4	241.4	7.11	6.67	6.51
251.6	281.6	7.05	6.64	6.44
291.9	321.9	7.04	6.67	6.45
332.1	362.1	7.01	6.63	6.48
372.4	402.4	6.99	6.62	6.48
412.6	442.6	6.92	6.58	6.44
452.9	482.9	6.96	6.61	6.42
493.1	523.1	6.92	6.59	6.44
533.4	563.4	6.94	6.58	6.40
573.6	603.6	6.90	6.55	6.38
613.9	643.9	6.97	6.62	6.46
654.2	684.2	6.96	6.64	6.48
694.4	724.4	7.03	6.69	6.50
734.7	764.7	7.11	6.78	6.62
774.9	804.9	7.20	6.87	6.68
815.2	845.2	7.34	6.99	6.79
855.4	885.4	7.37	7.03	6.81
895.7	925.7	7.50	7.15	6.95
935.9	965.9	7.58	7.26	7.01
976.2	1006.2	7.66	7.29	7.06
1016.4	1046.4	7.74	7.38	7.12
1056.7	1086.7	7.82	7.41	7.16
1096.9	1126.9	7.96	7.49	7.26
1137.2	1167.2	8.08	7.61	7.34
1177.4	1207.4	8.22	7.70	7.40
1217.7	1247.7	8.43	7.86	7.55
1257.9	1287.9	8.65	8.09	7.73
1298.2	1328.2	8.87	8.31	7.93
1338.5	1368.5	9.07	8.53	8.14
1378.7	1408.7	9.33	8.78	8.40
1419.0	1449.0	9.59	9.04	8.64
1459.2	1489.2	9.82	9.22	8.89
1499.5	1529.5	9.93	9.50	9.12
1539.7	1569.7	10.48	9.94	9.57
1600.1	1630.1			

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	15.17	18.17	20.76
50.4	80.4	15.81	17.83	18.48
90.6	120.6	15.10	18.11	17.54
130.9	160.9	14.50	15.99	20.67
171.1	201.1	14.62	16.52	22.95
211.4	241.4	14.47	18.03	19.89
251.6	281.6	15.51	19.89	17.16
291.9	321.9	16.15	16.84	16.99
332.1	362.1	17.31	16.04	16.22
372.4	402.4	16.45	15.73	15.93
412.6	442.6	17.88	17.16	17.11
452.9	482.9	16.07	14.80	14.79
493.1	523.1	16.21	15.66	15.72
533.4	563.4	14.90	15.02	15.53
573.6	603.6	14.27	14.21	15.28
613.9	643.9	13.06	14.53	14.19
654.2	684.2	14.09	14.29	13.99
694.4	724.4	13.85	13.49	14.34
734.7	764.7	13.89	13.41	14.68
774.9	804.9	14.79	15.13	14.82
815.2	845.2	17.77	17.82	15.30
855.4	885.4	19.64	18.25	17.45
895.7	925.7	17.10	17.08	16.48
935.9	965.9	17.02	15.14	16.03
976.2	1006.2	16.89	14.57	14.85
1016.4	1046.4	15.01	14.35	14.61
1056.7	1086.7	13.52	13.28	13.94
1096.9	1126.9	13.17	12.80	13.64
1137.2	1167.2	13.52	12.24	12.56
1177.4	1207.4	12.75	11.58	12.28
1217.7	1247.7	12.48	11.80	12.58
1257.9	1287.9	11.99	11.99	13.19
1298.2	1328.2	11.01	11.63	12.37
1338.5	1368.5	10.87	11.22	11.70
1378.7	1408.7	10.53	11.38	12.43
1419.0	1449.0	9.78	12.28	12.98
1459.2	1489.2	9.46	11.36	12.43
1499.5	1529.5	9.92	10.38	12.60
1539.7	1569.7	9.18	10.46	11.95
1600.1	1630.1	9.32	9.79	11.05

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+1dBm (dB)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	0.71	0.35	0.36
50.4	80.4	0.66	0.51	0.30
90.6	120.6	0.73	0.53	0.27
130.9	160.9	0.74	0.56	0.44
171.1	201.1	0.68	0.49	0.35
211.4	241.4	0.71	0.53	0.36
251.6	281.6	0.73	0.57	0.42
291.9	321.9	0.76	0.63	0.41
332.1	362.1	0.85	0.58	0.38
372.4	402.4	0.85	0.58	0.33
412.6	442.6	0.76	0.54	0.46
452.9	482.9	0.78	0.53	0.35
493.1	523.1	0.92	0.70	0.44
533.4	563.4	0.77	0.55	0.35
573.6	603.6	0.84	0.62	0.39
613.9	643.9	0.85	0.55	0.41
654.2	684.2	0.92	0.67	0.47
694.4	724.4	0.89	0.70	0.49
734.7	764.7	0.95	0.65	0.51
774.9	804.9	0.99	0.71	0.44
815.2	845.2	1.07	0.85	0.59
855.4	885.4	1.10	0.91	0.61
895.7	925.7	1.06	0.75	0.52
935.9	965.9	1.18	0.83	0.72
976.2	1006.2	1.18	0.97	0.73
1016.4	1046.4	1.29	0.89	0.76
1056.7	1086.7	1.20	0.96	0.67
1096.9	1126.9	1.19	1.02	0.72
1137.2	1167.2	1.19	0.99	0.78
1177.4	1207.4	1.23	0.98	0.80
1217.7	1247.7	1.16	1.03	0.75
1257.9	1287.9	1.23	1.04	0.76
1298.2	1328.2	1.15	1.03	0.87
1338.5	1368.5	1.13	0.98	0.77
1378.7	1408.7	0.88	0.83	0.76
1419.0	1449.0	0.93	0.74	0.51
1459.2	1489.2	0.76	0.63	0.46
1499.5	1529.5	0.65	0.65	0.31
1539.7	1569.7	0.59	0.31	0.39
1600.1	1630.1	0.45	0.25	0.28

REV. X2

JMS-2W+

100817

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

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Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=600.1MHz (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)=1200.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+7			+7			+7
500.0	100.1	6.65	10.0	20.1	6.57	500.0	700.1	7.57
487.8	112.4	6.64	22.6	32.7	6.43	487.4	712.7	7.56
475.5	124.6	6.61	35.1	45.2	6.43	474.9	725.2	7.55
463.3	136.9	6.57	47.7	57.8	6.46	462.3	737.8	7.54
451.0	149.1	6.58	60.3	70.4	6.45	449.7	750.4	7.55
438.8	161.4	6.56	72.8	82.9	6.48	437.2	762.9	7.58
426.5	173.6	6.55	85.4	95.5	6.45	424.6	775.5	7.58
414.3	185.9	6.54	97.9	108.0	6.48	412.1	788.0	7.56
402.0	198.1	6.51	110.5	120.6	6.50	399.5	800.6	7.54
389.8	210.4	6.50	123.1	133.2	6.51	386.9	813.2	7.54
377.5	222.6	6.47	135.6	145.7	6.50	374.4	825.7	7.54
365.3	234.9	6.46	148.2	158.3	6.54	361.8	838.3	7.57
353.0	247.1	6.47	160.8	170.9	6.50	349.2	850.9	7.58
340.8	259.4	6.47	173.3	183.4	6.55	336.7	863.4	7.58
328.5	271.6	6.47	185.9	196.0	6.55	324.1	876.0	7.57
316.3	283.9	6.45	198.5	208.6	6.53	311.5	888.6	7.58
304.0	296.1	6.44	211.0	221.1	6.57	299.0	901.1	7.58
291.8	308.4	6.44	223.6	233.7	6.53	286.4	913.7	7.55
279.5	320.6	6.44	236.2	246.3	6.59	273.8	926.3	7.55
267.3	332.9	6.44	248.7	258.8	6.57	261.3	938.8	7.58
255.0	345.1	6.45	261.3	271.4	6.58	248.7	951.4	7.58
242.8	357.4	6.43	273.8	283.9	6.62	236.2	963.9	7.56
230.5	369.6	6.44	286.4	296.5	6.64	223.6	976.5	7.57
218.3	381.9	6.46	299.0	309.1	6.63	211.0	989.1	7.57
206.0	394.1	6.46	311.5	321.6	6.65	198.5	1001.6	7.56
193.8	406.4	6.46	324.1	334.2	6.69	185.9	1014.2	7.54
181.5	418.6	6.46	336.7	346.8	6.67	173.3	1026.8	7.57
169.3	430.9	6.46	349.2	359.3	6.68	160.8	1039.3	7.59
157.0	443.1	6.48	361.8	371.9	6.69	148.2	1051.9	7.58
144.8	455.4	6.48	374.4	384.5	6.75	135.6	1064.5	7.57
132.5	467.6	6.49	386.9	397.0	6.79	123.1	1077.0	7.57
120.3	479.9	6.49	399.5	409.6	6.78	110.5	1089.6	7.55
108.0	492.1	6.49	412.1	422.2	6.77	97.9	1102.2	7.54
95.8	504.4	6.49	424.6	434.7	6.78	85.4	1114.7	7.56
83.5	516.6	6.50	437.2	447.3	6.78	72.8	1127.3	7.56
71.3	528.9	6.50	449.7	459.8	6.79	60.3	1139.8	7.57
59.0	541.1	6.51	462.3	472.4	6.84	47.7	1152.4	7.56
46.8	553.4	6.52	474.9	485.0	6.86	35.1	1165.0	7.61
22.3	577.9	6.52	487.4	497.5	6.81	22.6	1177.5	7.62
10.0	590.1	6.73	500.0	510.1	6.86	10.0	1190.1	7.77

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	59.28	62.55	65.54	57.98	59.95	61.74
10.0	59.42	62.08	65.34	57.62	59.28	60.34
50.4	72.06	70.02	68.24	55.32	54.65	53.48
90.6	70.76	69.90	67.61	54.35	52.80	51.41
130.9	69.31	69.64	69.12	54.14	51.65	49.92
171.1	65.51	70.37	71.72	54.36	50.72	48.72
211.4	62.11	67.85	81.11	54.37	50.34	47.91
251.6	59.12	64.69	74.75	54.59	49.78	47.05
291.9	56.79	61.34	66.91	54.01	49.22	46.46
332.1	54.74	58.54	62.46	52.15	48.18	45.59
372.4	52.94	56.27	59.13	49.88	46.95	44.65
412.6	51.27	54.00	56.29	47.80	45.87	43.98
452.9	49.84	52.16	54.13	45.58	44.52	43.06
493.1	48.36	50.37	52.06	43.84	43.34	42.34
533.4	47.18	49.05	50.76	41.93	41.94	41.26
573.6	46.10	47.81	49.27	40.29	40.63	40.50
654.2	44.32	46.10	47.59	37.69	38.25	38.23
694.4	43.40	45.07	46.59	36.61	37.38	37.53
734.7	42.52	44.07	45.49	35.42	36.37	36.90
774.9	41.73	43.21	44.47	34.65	35.58	36.35
815.2	41.15	42.70	43.93	33.85	34.68	35.38
855.4	40.63	42.42	43.88	33.15	33.96	34.58
895.7	39.99	41.86	43.48	32.58	33.35	33.86
935.9	39.61	41.56	43.30	32.05	32.91	33.39
976.2	39.01	40.91	42.69	31.49	32.54	33.15
1016.4	38.60	40.43	42.18	30.99	32.16	32.97
1056.7	38.24	39.92	41.58	30.49	31.67	32.63
1096.9	37.86	39.43	40.97	29.97	31.08	32.05
1137.2	37.86	39.40	40.82	29.59	30.64	31.60
1177.4	38.08	39.74	41.02	29.30	30.29	31.23
1217.7	38.16	40.01	41.24	28.96	29.90	30.81
1257.9	38.26	40.12	41.33	28.80	29.69	30.56
1298.2	38.24	40.07	41.31	28.66	29.51	30.34
1338.5	38.19	39.87	41.09	28.38	29.19	29.95
1378.7	38.19	39.65	40.67	28.38	29.16	29.83
1419.0	38.21	39.40	40.19	28.29	29.05	29.69
1459.2	38.10	38.99	39.47	28.21	29.00	29.64
1499.5	38.04	38.62	38.80	28.22	29.14	29.82
1539.7	38.25	38.59	38.56	28.21	29.29	30.09
1600.1	38.65	38.75	38.57	27.90	29.04	29.92

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	39.79	46.84	43.91
50.4	80.4	35.98	35.71	35.41
90.6	120.6	31.23	30.78	30.78
130.9	160.9	28.48	28.27	28.04
171.1	201.1	26.57	26.39	26.22
211.4	241.4	25.24	25.08	24.95
251.6	281.6	24.39	24.25	24.16
291.9	321.9	23.80	23.67	23.59
332.1	362.1	23.41	23.32	23.22
372.4	402.4	23.13	23.08	23.03
412.6	442.6	22.99	23.05	23.04
452.9	482.9	22.84	22.94	22.98
493.1	523.1	22.49	22.60	22.65
533.4	563.4	22.01	22.10	22.14
573.6	603.6	21.33	21.44	21.48
613.9	643.9	20.43	20.60	20.72
654.2	684.2	19.33	19.53	19.71
694.4	724.4	18.09	18.28	18.44
734.7	764.7	16.89	17.04	17.18
774.9	804.9	15.82	15.93	16.04
815.2	845.2	14.84	14.93	15.02
855.4	885.4	14.02	14.07	14.16
895.7	925.7	13.32	13.35	13.43
935.9	965.9	12.74	12.76	12.83
976.2	1006.2	12.25	12.25	12.32
1016.4	1046.4	11.89	11.89	11.94
1056.7	1086.7	11.63	11.67	11.72
1096.9	1126.9	11.46	11.54	11.62
1137.2	1167.2	11.30	11.44	11.56
1177.4	1207.4	11.19	11.41	11.57
1217.7	1247.7	11.15	11.42	11.65
1257.9	1287.9	11.13	11.43	11.72
1298.2	1328.2	11.22	11.53	11.87
1338.5	1368.5	11.30	11.60	11.94
1378.7	1408.7	11.42	11.69	12.00
1419.0	1449.0	11.56	11.78	12.00
1459.2	1489.2	11.68	11.85	11.98
1499.5	1529.5	11.86	12.01	12.07
1539.7	1569.7	11.99	12.14	12.16
1600.1	1630.1	11.97	12.13	12.17

Frequency Mixer

JMS-2W+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=1200.1MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+4	+7	+10		+4	+7	+10		+4	+7	+10
5.0	35.0	1.60	1.46	1.33	5.0	1.16	1.69	2.51	1.0	2.12	1.80	1.54
10.0	40.0	1.59	1.44	1.32	10.0	1.15	1.67	2.48	3.3	2.13	1.80	1.54
50.4	80.4	1.43	1.32	1.27	50.4	1.20	1.74	2.48	5.5	2.12	1.80	1.54
90.6	120.6	1.51	1.40	1.34	90.6	1.18	1.73	2.45	7.8	2.12	1.80	1.54
130.9	160.9	1.45	1.35	1.28	130.9	1.18	1.72	2.42	10.0	2.12	1.80	1.54
171.1	201.1	1.50	1.40	1.34	171.1	1.20	1.73	2.42	22.4	1.91	1.64	1.48
211.4	241.4	1.43	1.33	1.29	211.4	1.21	1.72	2.39	34.6	1.78	1.56	1.40
251.6	281.6	1.42	1.33	1.27	251.6	1.22	1.74	2.42	46.9	1.75	1.51	1.35
291.9	321.9	1.40	1.32	1.27	291.9	1.23	1.74	2.41	59.1	1.70	1.47	1.33
332.1	362.1	1.36	1.29	1.25	332.1	1.25	1.78	2.47	71.4	1.71	1.46	1.34
372.4	402.4	1.33	1.27	1.23	372.4	1.26	1.81	2.52	83.6	1.72	1.49	1.36
412.6	442.6	1.29	1.24	1.21	412.6	1.27	1.81	2.51	95.9	1.77	1.53	1.41
452.9	482.9	1.27	1.23	1.21	452.9	1.30	1.86	2.58	120.4	1.80	1.57	1.43
493.1	523.1	1.23	1.19	1.17	493.1	1.30	1.85	2.53	132.6	1.78	1.55	1.42
533.4	563.4	1.22	1.20	1.19	533.4	1.31	1.87	2.57	144.9	1.75	1.52	1.39
573.6	603.6	1.18	1.17	1.17	573.6	1.33	1.88	2.56	157.1	1.72	1.50	1.38
613.9	643.9	1.17	1.18	1.21	613.9	1.36	1.92	2.62	169.4	1.71	1.50	1.39
654.2	684.2	1.14	1.18	1.21	654.2	1.40	1.97	2.68	181.6	1.72	1.52	1.41
694.4	724.4	1.17	1.21	1.26	694.4	1.43	2.00	2.71	193.9	1.77	1.56	1.46
734.7	764.7	1.17	1.24	1.29	734.7	1.47	2.06	2.78	206.1	1.81	1.60	1.50
774.9	804.9	1.19	1.27	1.33	774.9	1.49	2.07	2.77	218.4	1.83	1.61	1.50
815.2	845.2	1.23	1.31	1.38	815.2	1.52	2.10	2.80	230.6	1.81	1.59	1.48
855.4	885.4	1.23	1.31	1.37	855.4	1.55	2.12	2.82	242.9	1.76	1.55	1.44
895.7	925.7	1.30	1.37	1.44	895.7	1.58	2.15	2.83	255.1	1.71	1.52	1.42
935.9	965.9	1.29	1.36	1.41	935.9	1.64	2.23	2.94	267.4	1.70	1.52	1.43
976.2	1006.2	1.35	1.43	1.48	976.2	1.67	2.25	2.93	279.6	1.72	1.55	1.47
1016.4	1046.4	1.38	1.45	1.50	1016.4	1.73	2.32	3.03	291.9	1.75	1.58	1.50
1056.7	1086.7	1.45	1.52	1.58	1056.7	1.76	2.34	3.04	304.1	1.77	1.59	1.52
1096.9	1126.9	1.53	1.60	1.66	1096.9	1.78	2.35	3.03	316.4	1.77	1.59	1.52
1137.2	1167.2	1.75	1.80	1.85	1137.2	1.84	2.41	3.10	340.9	1.72	1.55	1.48
1177.4	1207.4	1.73	1.80	1.87	1177.4	1.86	2.41	3.08	353.1	1.68	1.53	1.48
1217.7	1247.7	1.86	1.92	1.99	1217.7	1.91	2.47	3.14	365.4	1.68	1.55	1.50
1257.9	1287.9	1.99	2.03	2.09	1257.9	2.00	2.56	3.22	377.6	1.71	1.58	1.55
1298.2	1328.2	2.13	2.16	2.22	1298.2	2.01	2.57	3.23	389.9	1.75	1.62	1.59
1338.5	1368.5	2.28	2.30	2.34	1338.5	2.09	2.67	3.34	402.1	1.79	1.66	1.62
1378.7	1408.7	2.44	2.45	2.48	1378.7	2.12	2.68	3.35	414.4	1.79	1.65	1.61
1419.0	1449.0	2.66	2.66	2.67	1419.0	2.16	2.72	3.40	438.9	1.72	1.59	1.56
1459.2	1489.2	2.82	2.81	2.79	1459.2	2.19	2.74	3.40	451.1	1.69	1.58	1.56
1499.5	1529.5	3.10	3.09	3.04	1499.5	2.21	2.75	3.39	463.4	1.69	1.59	1.59
1539.7	1569.7	3.24	3.23	3.16	1539.7	2.27	2.80	3.45	487.9	1.77	1.69	1.69
1600.1	1630.1	3.60	3.60	3.52	1600.1	2.35	2.87	3.50	500.1	1.80	1.71	1.70

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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	11	27	18	31	46	38	22	38	27	48
1	-	14	0	34	12	27	23	48	48	44	49	35
2	112	70	59	64	59	71	58	67	75	75	57	70
3	119	76	70	74	67	74	70	71	79	82	84	80
4	112	104	96	100	97	89	94	105	94	101	105	113
5	130	101	103	98	108	101	89	100	99	102	100	117
6	116	114	101	102	100	106	102	90	107	116	109	99
7	121	98	102	102	102	105	119	92	86	96	102	105
8	118	102	106	101	107	107	102	114	100	88	104	108
9	116	111	102	107	109	109	100	101	105	91	98	103
10	118	108	111	102	109	107	112	99	102	102	97	94
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions:

RF IN: 600.1 MHz; -14.00 dBm.

LO IN: 630.01 MHz; +7.00 dBm

IF OUT: 29.91 MHz; -20.70 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	21	37	28	43	53	50	35	49	42	62
1	-	14	0	33	12	28	24	53	47	48	51	40
2	93	65	50	55	49	77	52	61	66	65	51	65
3	112	56	48	54	45	59	50	49	51	65	71	61
4	125	78	78	69	71	70	74	70	64	71	80	88
5	116	83	77	74	61	75	59	75	60	73	65	81
6	111	108	97	86	90	81	80	82	80	99	82	87
7	126	92	105	91	80	79	77	87	76	89	83	87
8	126	133	104	120	112	102	107	105	110	93	101	94
9	113	104	110	113	109	112	102	98	97	113	90	99
10	105	110	114	120	115	115	112	107	114	101	101	99
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions:

RF IN: 600.1 MHz; -4.00 dBm.

LO IN: 630.01 MHz; +7.00 dBm

IF OUT: 29.91 MHz; -10.69 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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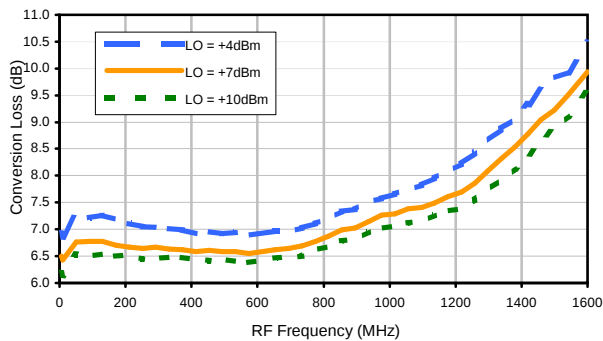


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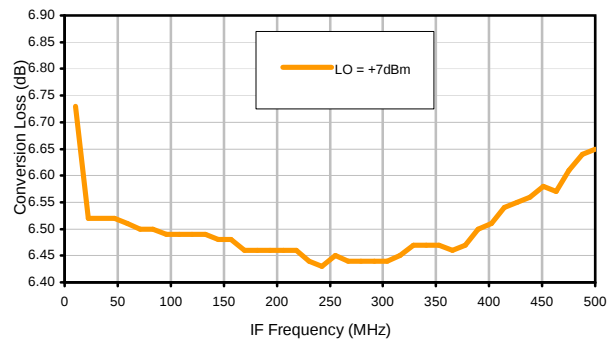


Typical Performance Curves

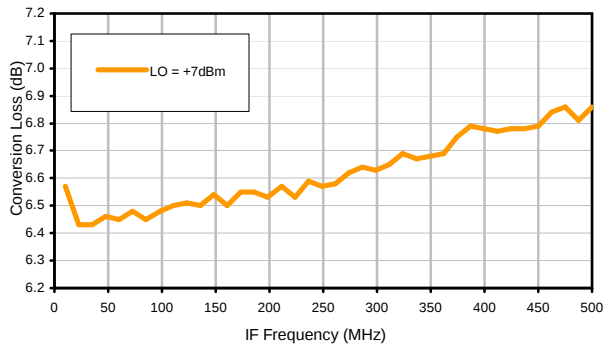
Conversion Loss @ IF=30MHz



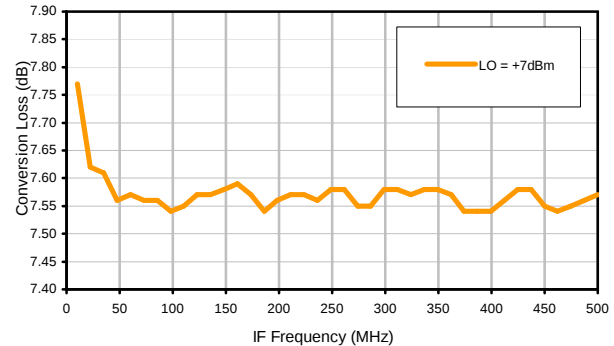
Conversion Loss vs. IF @ RF=600.1MHz



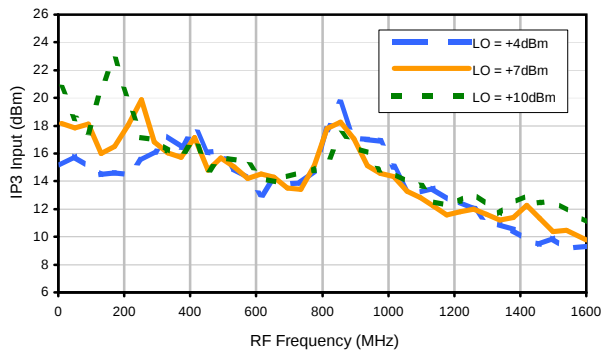
Conversion Loss vs. IF @ RF=10.1MHz



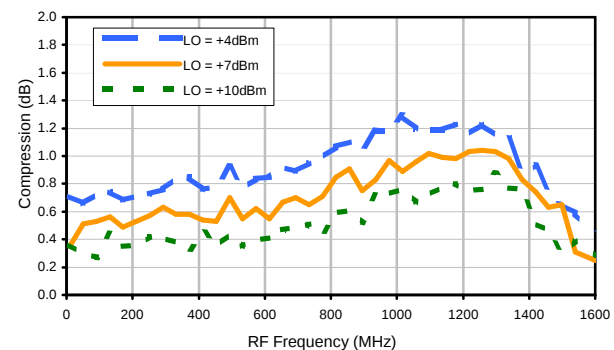
Conversion Loss vs. IF @ RF=1200.1MHz



IP3 Input

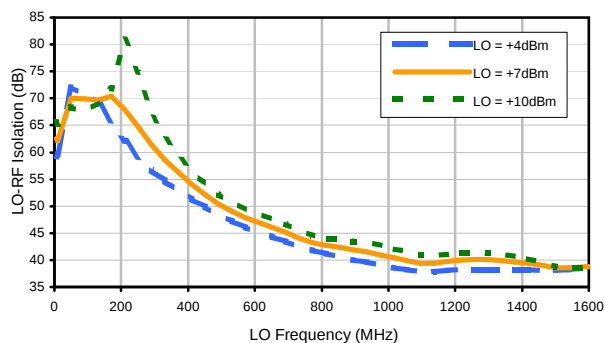


Compression @ RF IN=+1dBm

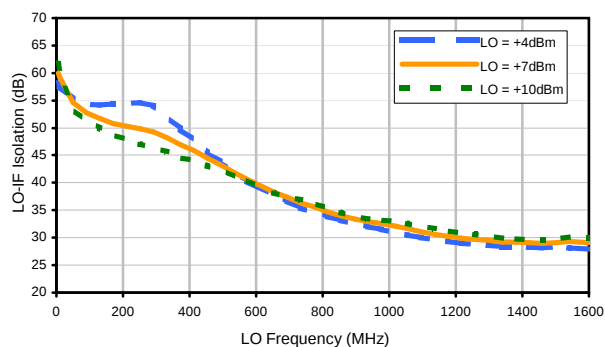


Typical Performance Curves

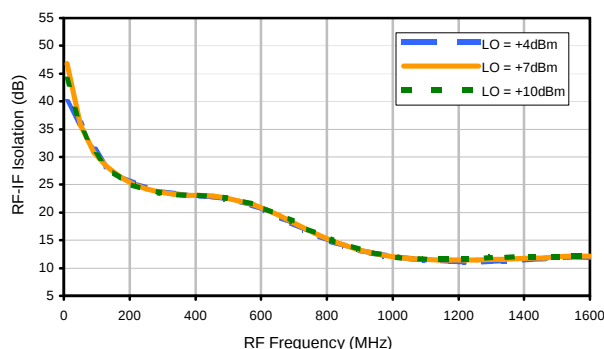
LO-RF Isolation



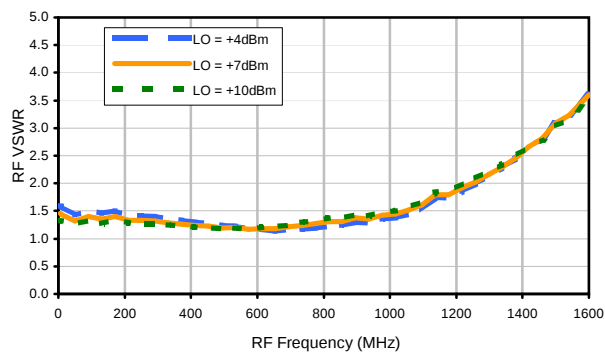
LO-IF Isolation



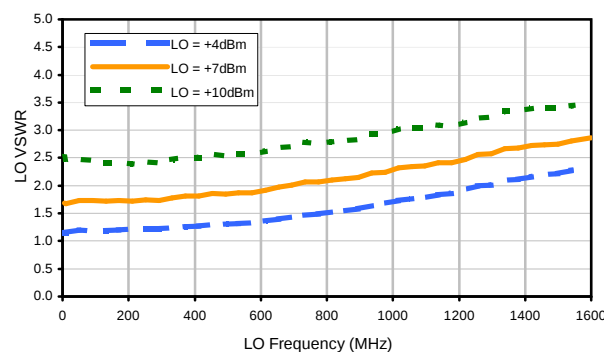
RF-IF Isolation



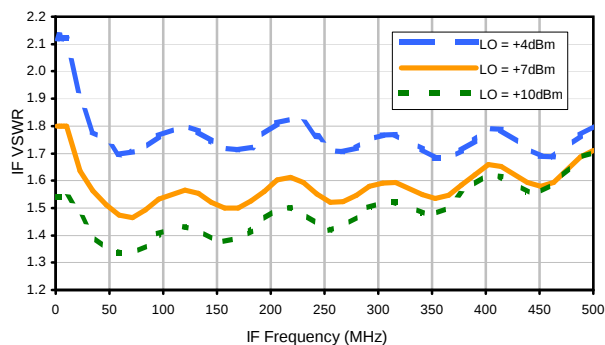
RF VSWR



LO VSWR



IF VSWR



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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	11	27	18	31	46	38	22	38	27	48
1	-	14	0	34	12	27	23	48	48	44	49	35
2	112	70	59	64	59	71	58	67	75	75	57	70
3	119	76	70	74	67	74	70	71	79	82	84	80
4	112	104	96	100	97	89	94	105	94	101	105	113
5	130	101	103	98	108	101	89	100	99	102	100	117
6	116	114	101	102	100	106	102	90	107	116	109	99
7	121	98	102	102	102	105	119	92	86	96	102	105
8	118	102	106	101	107	107	102	114	100	88	104	108
9	116	111	102	107	109	109	100	101	105	91	98	103
10	118	108	111	102	109	107	112	99	102	102	97	94
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions: RF IN: 600.1 MHz; -14.00 dBm.
LO IN: 630.01 MHz; +7.00 dBm
IF OUT: 29.91 MHz; -20.70 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	21	37	28	43	53	50	35	49	42	62
1	-	14	0	33	12	28	24	53	47	48	51	40
2	93	65	50	55	49	77	52	61	66	65	51	65
3	112	56	48	54	45	59	50	49	51	65	71	61
4	125	78	78	69	71	70	74	70	64	71	80	88
5	116	83	77	74	61	75	59	75	60	73	65	81
6	111	108	97	86	90	81	80	82	80	99	82	87
7	126	92	105	91	80	79	77	87	76	89	83	87
8	126	133	104	120	112	102	107	105	110	93	101	94
9	113	104	110	113	109	112	102	98	97	113	90	99
10	105	110	114	120	115	115	112	107	114	101	101	99
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions: RF IN: 600.1 MHz; -4.00 dBm.
LO IN: 630.01 MHz; +7.00 dBm
IF OUT: 29.91 MHz; -10.69 dBm

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



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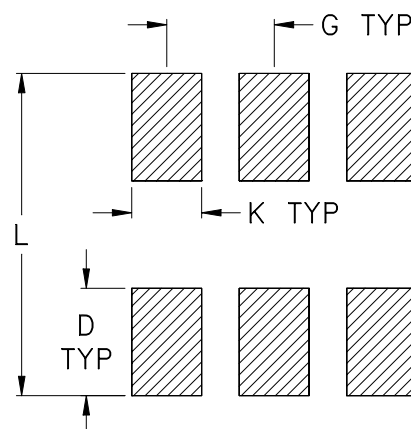


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Outline Dimensions



PCB Land Pattern



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

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

Notes:

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

Tape & Reel Packaging TR-F24



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

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

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



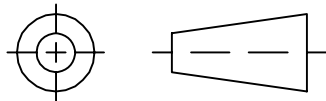
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THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
A	M101143	ADDED "gk" PIN CONNECTION, 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

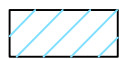
SUGGESTED MOUNTING CONFIGURATION
FOR BH292, CD541/542/636/637, TT100/240 CASE
STYLES, "gk", "ht", "hu", "nd", "w" PIN CONNECTIONS



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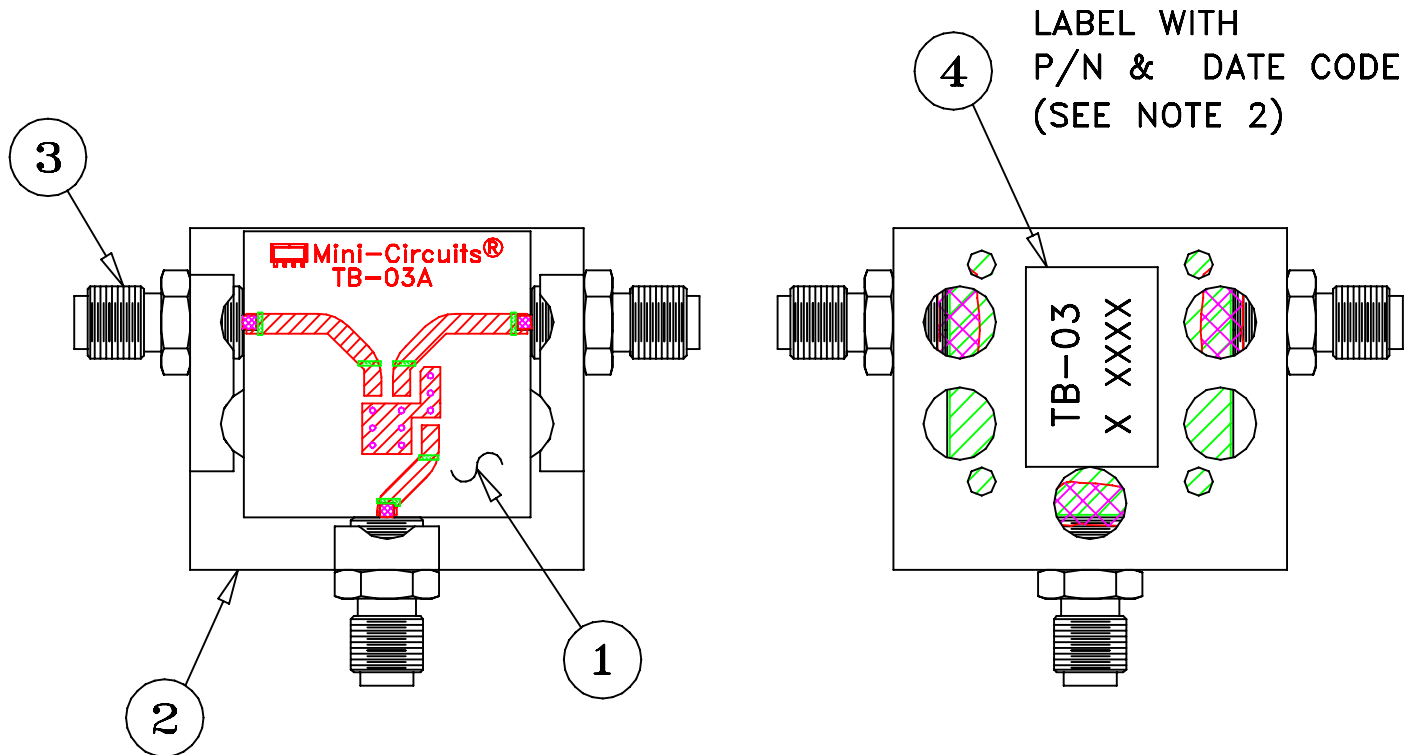
ASHEETA1.DWG REV:A DATE:01/12/95

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

DIMENSIONS ARE IN INCHES

DRAWN

S.WOLYNSKI

08.29.99

TOLERANCES ON:

CHECKED

SG

07.06.99

2 PL DECIMALS ±

APPROVED

MG

07.10.99

3 PL DECIMALS ±

ANGLES ±

FRACTIONS ±

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


Mini-Circuits® 13 Neptune Avenue
Brooklyn NY 11235

TB,ADE,CD542/636,06MX01,50

 SIZE
A

 CODE IDENT
15542

 DRAWING NO:
TB-03-20

 REV:
H

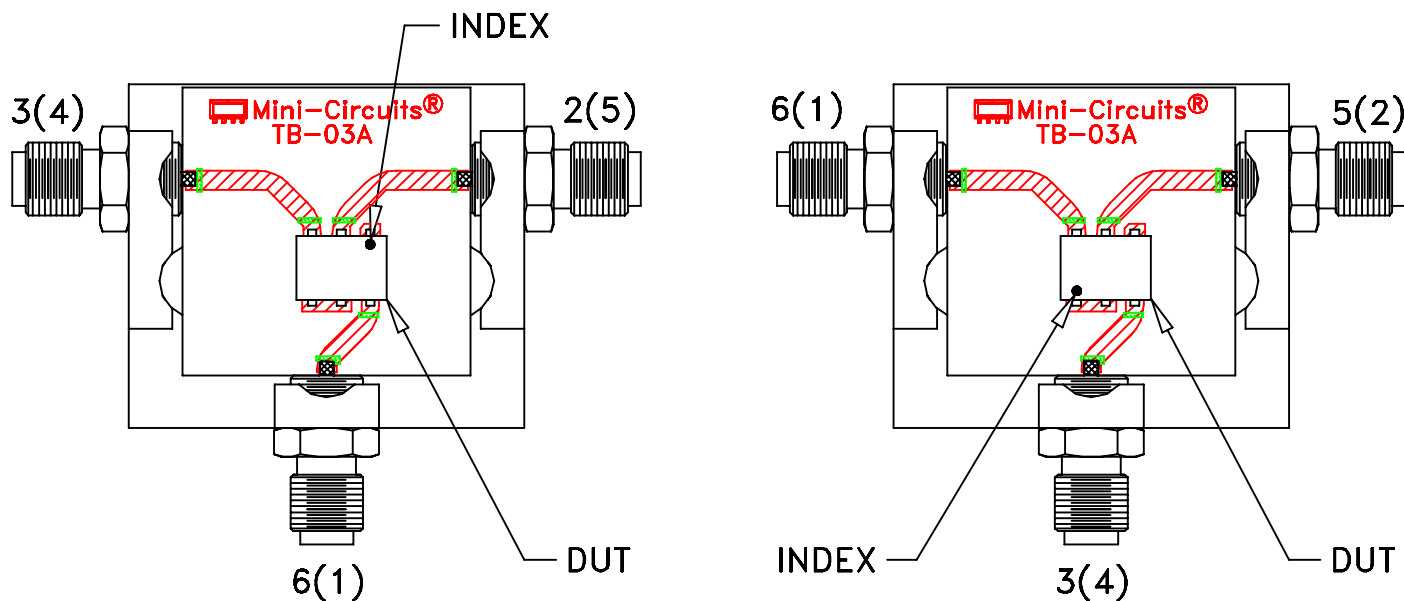
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SCALE: 1.5:1

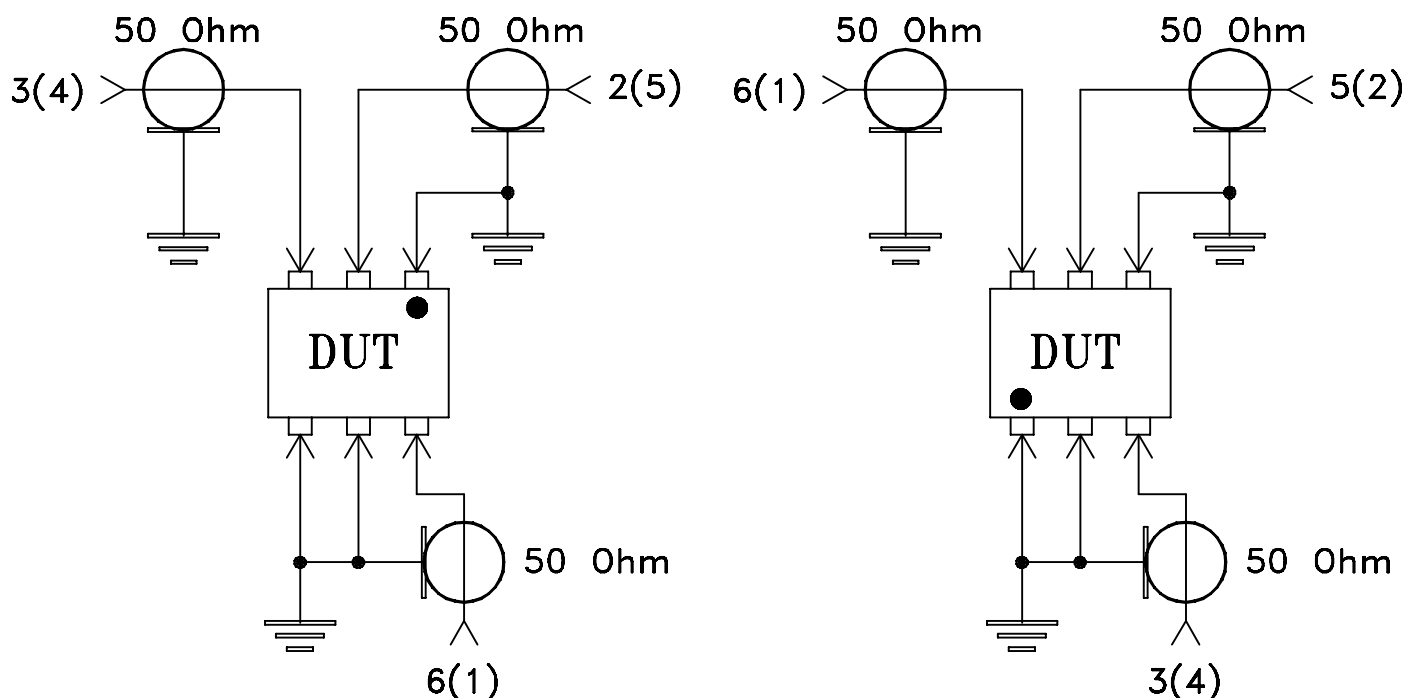
SHEET: 1 OF 2

Evaluation Board and Circuit

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



TB-03



Schematic Diagram

Notes:

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

 **Mini-Circuits®**



All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-40° to 85°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Humidity	90 to 95% RH, 240 hours, 50°C	MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutetic Process: 225°C peak Pb-Free Process 245° - 250°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, 95% Coverage
Vibration (High Frequency)	20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215