Surface Mount

Frequency Mixer

ADE-2ASK

Level 7 (LO Power +7 dBm) 1 to 1000 MHz

Generic photo used for illustration purposes only

CASE STYLE: CD542

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

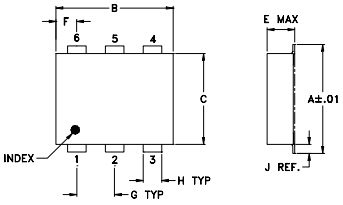
Features

- low conversion loss, 5.4 dB typ.
- excellent L-R isolation, 45 dB typ.
- low profile package
- aqueous washable
- protected by U.S. Patent 6,133,525

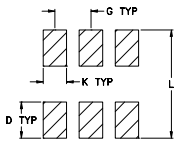
Applications

- VSAT systems
- instrumentation
- cellular

Outline Drawing



PCB Land Pattern



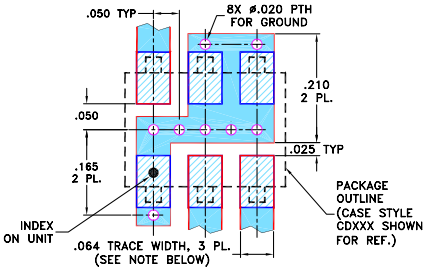
Suggested Layout,
Tolerance to be within ±.002

Outline Dimensions (inch / mm)

A	B	C	D	E	F	G
.272	.310	.220	.100	.112	.055	.100
6.91	7.87	5.59	2.54	2.84	1.40	2.54

H	J	K	L	wt
.030	.026	.065	.300	grams
0.76	0.66	1.65	7.62	0.20

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)
		Mid-Band m			Total Range	L		M		U		L		M		U		
LO/RF f_L-f_U	IF	$\overline{X}$	σ	Max.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.
1-1000	DC-1000	5.4	0.10	6.8	9.5	55	45	45	30	36	20	50	40	32	22	22	12	12

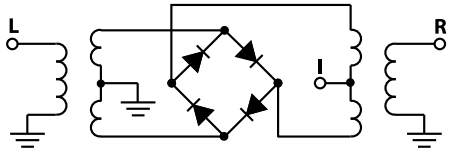
1 dB COMP.: +1 dBm typ.
Phase detection, positive polarity

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]
m= mid band [2f_L to f_U/2]

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
1.00	31.00	6.13	67.70	64.10	1.38	2.58
2.00	32.00	5.68	67.90	64.20	1.22	2.55
2.18	32.18	5.68	67.90	64.00	1.21	2.52
4.73	34.73	5.45	66.90	64.10	1.12	2.55
10.29	40.29	5.40	66.00	63.10	1.09	2.52
22.37	52.37	5.49	63.30	61.10	1.07	2.52
48.66	78.66	5.44	59.70	57.50	1.04	2.52
105.82	135.82	5.42	54.50	52.40	1.00	2.52
230.13	260.13	5.49	48.90	47.20	1.05	2.61
500.50	530.50	5.96	46.80	38.20	1.25	2.88
556.00	586.00	6.18	47.40	36.40	1.20	2.92
600.00	630.00	6.29	45.90	35.20	1.21	2.96
611.50	641.50	6.31	45.10	35.00	1.21	2.88
667.00	697.00	6.43	42.60	31.90	1.26	3.21
722.50	752.50	6.81	41.00	30.90	1.38	3.01
778.00	808.00	6.93	38.60	29.20	1.58	3.21
833.50	863.50	7.22	36.80	28.10	1.78	3.38
889.00	919.00	7.46	35.20	28.60	1.99	3.16
944.50	974.50	7.58	33.10	26.60	2.25	3.64
1000.00	1030.00	7.83	30.70	24.00	2.49	3.64

Electrical Schematic



Notes
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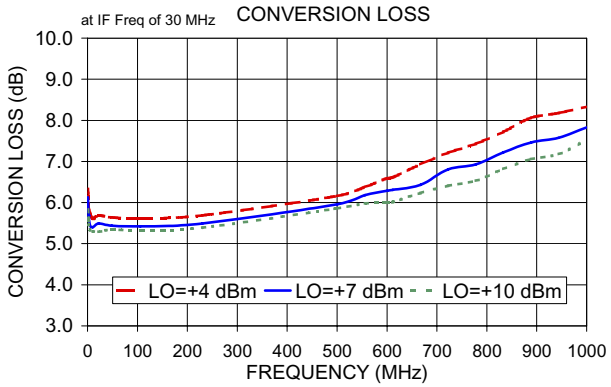
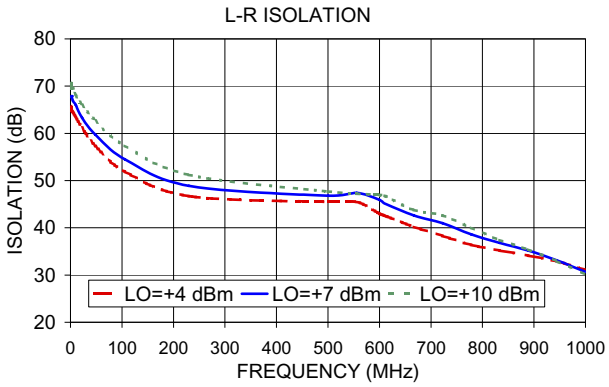
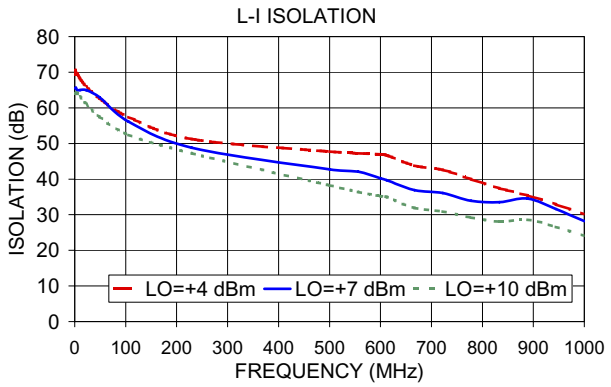
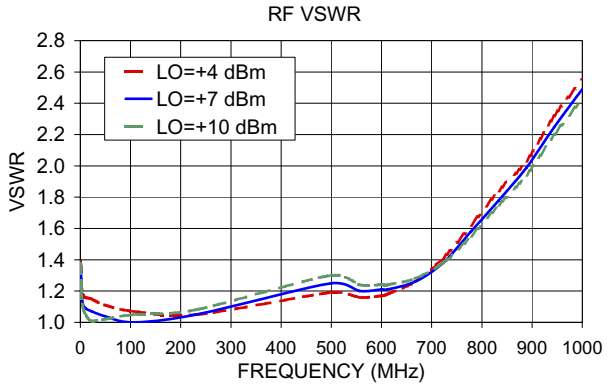
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty 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

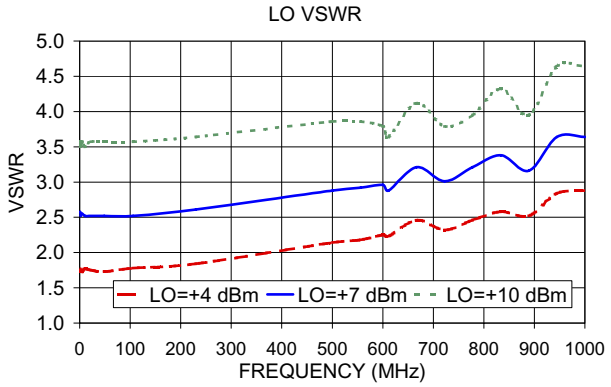
at IF Freq of 30 MHz

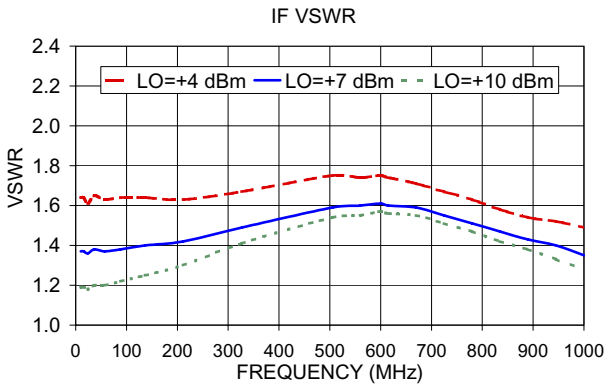












Frequency Mixer ADE-2ASK

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB) @LO (dBm)		
		+4	+7	+10
1.0	31.0	6.33	6.13	5.83
2.0	32.0	5.98	5.68	5.58
2.2	32.2	5.88	5.68	5.48
4.7	34.7	5.75	5.45	5.35
10.3	40.3	5.60	5.40	5.30
50.4	80.4	5.62	5.34	5.20
90.8	120.8	5.64	5.39	5.25
110.9	140.9	5.63	5.38	5.25
171.5	201.5	5.65	5.43	5.30
211.8	241.8	5.68	5.46	5.32
232.0	262.0	5.69	5.48	5.33
272.3	302.3	5.74	5.52	5.37
292.5	322.5	5.73	5.51	5.37
332.8	362.8	5.76	5.52	5.36
353.0	383.0	5.82	5.55	5.37
393.3	423.3	5.91	5.65	5.45
453.8	483.8	5.99	5.75	5.58
474.0	504.0	5.98	5.73	5.56
514.3	544.3	5.98	5.70	5.54
534.5	564.5	6.05	5.73	5.58
574.8	604.8	6.29	5.86	5.65
595.0	625.0	6.47	6.01	5.73
635.4	665.4	6.78	6.32	5.91
695.9	725.9	7.12	6.68	6.26
716.0	746.0	7.22	6.78	6.38
756.4	786.4	7.42	6.95	6.52
776.5	806.5	7.54	7.02	6.57
816.9	846.9	7.56	6.96	6.51
837.0	867.0	7.55	6.92	6.48
877.4	907.4	7.49	6.86	6.46
897.6	927.6	7.43	6.84	6.47
958.1	988.1	7.56	7.04	6.76
998.4	1028.4	7.71	7.28	7.04
1018.6	1048.6	7.86	7.42	7.20
1058.9	1088.9	8.22	7.82	7.60
1079.1	1109.1	8.42	8.04	7.86
1119.4	1149.4	8.86	8.50	8.35
1139.6	1169.6	9.17	8.79	8.64
1179.9	1209.9	9.68	9.29	9.17
1200.1	1230.1	9.90	9.53	9.40

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm) @LO (dBm)		
		+4	+7	+10
10.1	40.1	20.63	23.58	22.71
50.4	80.4	23.45	19.76	23.68
90.8	120.8	20.06	20.85	22.02
110.9	140.9	19.20	19.79	20.11
151.3	181.3	18.73	24.20	19.96
171.5	201.5	18.48	23.33	21.14
211.8	241.8	22.35	18.50	20.44
232.0	262.0	19.40	21.64	20.99
272.3	302.3	19.97	16.95	23.32
292.5	322.5	15.84	13.51	14.13
332.8	362.8	16.12	14.50	15.45
353.0	383.0	18.85	20.31	20.72
393.3	423.3	14.51	15.27	21.80
413.5	443.5	13.55	13.99	15.06
453.8	483.8	14.56	13.02	14.20
474.0	504.0	14.90	13.22	13.67
514.3	544.3	16.29	15.05	18.07
534.5	564.5	14.60	15.28	20.73
574.8	604.8	9.70	15.13	16.99
595.0	625.0	7.27	12.16	16.38
635.4	665.4	4.82	6.84	11.93
655.5	685.5	4.33	5.91	9.59
695.9	725.9	4.31	5.21	6.96
716.0	746.0	4.42	5.26	6.64
756.4	786.4	4.89	5.85	7.41
776.5	806.5	5.47	6.54	8.25
816.9	846.9	7.42	8.71	10.77
837.0	867.0	8.91	9.93	14.36
877.4	907.4	12.31	15.89	17.50
897.6	927.6	16.12	19.42	15.50
937.9	967.9	15.21	15.68	14.49
958.1	988.1	14.33	14.11	14.23
998.4	1028.4	12.27	13.56	14.66
1018.6	1048.6	11.30	13.39	14.24
1058.9	1088.9	10.85	11.89	11.33
1079.1	1109.1	10.91	11.13	10.80
1119.4	1149.4	9.50	9.94	9.46
1139.6	1169.6	9.43	10.13	9.68
1179.9	1209.9	8.84	10.59	10.73
1200.1	1230.1	9.14	10.96	11.92

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+1dBm (dB) @LO (dBm)		
		+4	+7	+10
10.1	40.1	1.31	1.20	0.88
50.4	80.4	1.41	1.10	0.96
90.8	120.8	1.46	1.16	0.98
110.9	140.9	1.49	1.23	0.99
151.3	181.3	1.46	1.06	0.95
171.5	201.5	1.40	1.08	0.86
211.8	241.8	1.32	1.00	0.85
232.0	262.0	1.37	1.14	0.88
272.3	302.3	1.31	1.00	0.91
292.5	322.5	1.26	1.04	0.87
332.8	362.8	1.33	1.09	0.90
353.0	383.0	1.34	1.17	0.90
393.3	423.3	1.28	1.01	0.93
413.5	443.5	1.35	1.13	0.94
453.8	483.8	1.44	1.11	0.94
474.0	504.0	1.52	1.29	1.02
514.3	544.3	1.66	1.24	0.99
534.5	564.5	1.74	1.30	1.06
574.8	604.8	1.92	1.54	1.30
595.0	625.0	1.92	1.61	1.42
635.4	665.4	2.03	1.89	1.71
655.5	685.5	2.02	1.82	1.69
695.9	725.9	2.00	1.82	1.68
716.0	746.0	2.10	1.78	1.73
756.4	786.4	1.96	1.84	1.67
776.5	806.5	2.01	1.86	1.75
816.9	846.9	2.23	2.09	1.90
837.0	867.0	2.08	1.85	1.73
877.4	907.4	2.23	1.83	1.70
897.6	927.6	2.20	1.93	1.70
937.9	967.9	2.29	1.92	1.67
958.1	988.1	2.12	1.84	1.56
998.4	1028.4	2.17	1.67	1.42
1018.6	1048.6	2.15	1.68	1.53
1058.9	1088.9	1.97	1.59	1.32
1079.1	1109.1	1.92	1.50	1.28
1119.4	1149.4	1.92	1.35	1.15
1139.6	1169.6	1.93	1.32	1.02
1179.9	1209.9	1.88	1.29	1.00
1200.1	1230.1	1.88	1.23	0.85

Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=500.1MHz (dB) @LO (dBm) +7
490.0	10.1	5.82
477.7	22.4	5.80
465.4	34.7	5.77
453.1	47.0	5.75
440.8	59.3	5.77
428.5	71.6	5.76
416.2	83.9	5.72
403.8	96.3	5.65
391.5	108.6	5.65
379.2	120.9	5.65
366.9	133.2	5.65
354.6	145.5	5.65
342.3	157.8	5.65
330.0	170.1	5.65
317.7	182.4	5.66
305.4	194.7	5.67
293.1	207.0	5.66
280.8	219.3	5.65
268.5	231.6	5.65
256.2	243.9	5.68
243.8	256.3	5.65
231.5	268.6	5.60
219.2	280.9	5.60
206.9	293.2	5.67
194.6	305.5	5.69
182.3	317.8	5.70
170.0	330.1	5.71
157.7	342.4	5.70
145.4	354.7	5.73
133.1	367.0	5.71
120.8	379.3	5.71
108.5	391.6	5.73
96.2	403.9	5.73
83.8	416.3	5.72
71.5	428.6	5.79
59.2	440.9	5.79
46.9	453.2	5.76
34.6	465.5	5.79
22.3	477.8	5.84
10.0	490.1	5.83

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=10.1MHz (dB) @LO (dBm) +7
10.0	20.1	5.10
30.0	40.1	4.68
50.0	60.1	4.83
70.0	80.1	4.80
90.0	100.1	4.74
110.0	120.1	4.75
130.0	140.1	4.80
150.0	160.1	4.79
170.0	180.1	4.80
190.0	200.1	4.82
210.0	220.1	4.85
230.0	240.1	4.87
250.0	260.1	4.91
270.0	280.1	4.95
290.0	300.1	4.99
310.0	320.1	4.99
330.0	340.1	4.94
350.0	360.1	4.92
370.0	380.1	4.96
390.0	400.1	5.00
430.0	440.1	5.55
450.0	460.1	5.20
490.0	500.1	5.23
510.0	520.1	5.17
550.0	560.1	5.19
570.0	580.1	5.19
610.0	620.1	5.26
630.0	640.1	5.22
670.0	680.1	5.34
690.0	700.1	5.33
730.0	740.1	5.38
750.0	760.1	5.35
790.0	800.1	5.36
810.0	820.1	5.31
850.0	860.1	5.27
870.0	880.1	5.24
910.0	920.1	5.24
930.0	940.1	5.25
970.0	980.1	5.34
990.0	1000.1	5.39

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1000.1MHz (dB) @LO (dBm) +7
990.0	10.1	8.14
970.0	30.1	8.16
950.0	50.1	8.15
930.0	70.1	8.16
910.0	90.1	8.18
890.0	110.1	8.15
870.0	130.1	8.09
850.0	150.1	8.12
830.0	170.1	8.14
810.0	190.1	8.09
790.0	210.1	8.08
770.0	230.1	8.01
750.0	250.1	7.96
730.0	270.1	7.96
710.0	290.1	7.93
690.0	310.1	7.90
670.0	330.1	7.85
650.0	350.1	7.79
630.0	370.1	7.71
610.0	390.1	7.71
570.0	430.1	7.78
550.0	450.1	7.84
510.0	490.1	7.75
490.0	510.1	7.62
450.0	550.1	7.35
430.0	570.1	7.42
390.0	610.1	7.38
370.0	630.1	7.56
330.0	670.1	7.96
310.0	690.1	8.05
270.0	730.1	8.16
250.0	750.1	8.25
210.0	790.1	8.27
190.0	810.1	8.25
150.0	850.1	8.11
130.0	870.1	7.95
90.0	910.1	7.65
70.0	930.1	7.55
30.0	970.1	7.38
10.0	990.1	7.51

Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB) @LO (dBm)			LO-IF ISOLATION (dB) @LO (dBm)		
	+4	+7	+10	+4	+7	+10
1.0	65.7	67.7	70.6	65.5	64.1	62.9
2.0	65.4	67.9	70.3	65.4	64.2	62.6
2.2	64.8	67.9	69.5	65.7	64.0	62.5
4.7	64.5	66.9	69.6	65.0	64.1	62.5
10.3	63.4	66.0	68.1	65.0	63.1	60.8
50.4	72.24	89.61	78.67	53.31	51.24	50.16
90.8	62.11	70.02	81.00	49.15	46.64	45.76
110.9	60.21	66.69	76.09	47.36	45.12	44.04
171.5	54.45	59.29	63.81	44.02	42.13	40.84
211.8	51.60	55.40	58.59	42.78	40.80	39.42
232.0	50.52	53.86	56.32	41.85	39.91	38.49
272.3	48.72	51.44	53.26	40.56	38.52	37.09
292.5	47.40	50.16	51.90	40.35	38.24	36.71
332.8	45.22	47.53	49.18	38.99	36.94	35.45
353.0	44.20	46.22	47.75	38.24	36.27	34.78
393.3	43.01	44.51	45.53	36.79	35.19	33.83
453.8	41.81	42.83	43.16	34.05	32.74	31.69
474.0	41.30	42.21	42.53	33.51	32.19	31.15
514.3	40.60	41.20	41.02	32.27	30.91	29.70
534.5	40.15	40.64	40.34	31.68	30.21	28.92
574.8	39.12	39.51	39.17	30.56	29.12	27.85
595.0	38.67	38.90	38.46	29.85	28.41	27.19
635.4	37.90	38.16	37.75	28.57	27.28	25.99
695.9	36.42	37.15	36.94	26.97	26.24	25.12
716.0	35.58	36.40	36.31	26.38	25.75	24.78
756.4	34.71	35.59	35.53	25.50	25.06	24.29
776.5	34.16	35.02	34.90	25.04	24.58	23.77
816.9	33.15	33.90	33.57	24.16	23.83	22.91
837.0	32.70	33.33	32.92	23.74	23.43	22.38
877.4	31.86	32.18	31.60	23.21	22.91	21.61
897.6	31.32	31.53	30.92	22.66	22.42	21.11
958.1	30.21	29.99	29.43	21.24	20.83	19.68
998.4	29.08	28.68	28.09	19.98	19.75	18.83
1018.6	28.55	28.03	27.41	19.25	19.11	18.28
1058.9	27.37	26.67	25.97	18.23	18.41	17.75
1079.1	26.84	26.03	25.24	17.51	17.97	17.48
1119.4	25.75	24.75	23.87	16.52	17.22	16.97
1139.6	25.29	24.16	23.24	16.14	16.92	16.73
1179.9	24.58	23.26	22.22	15.25	16.25	16.36
1200.1	24.03	22.67	21.63	14.89	15.93	16.09

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB) @LO (dBm)		
		+4	+7	+10
10.1	40.1	34.31	34.06	35.99
50.4	80.4	33.92	34.31	35.56
90.8	120.8	30.41	30.78	30.39
110.9	140.9	29.26	29.40	29.34
151.3	181.3	27.42	27.61	27.58
171.5	201.5	26.58	26.81	26.94
211.8	241.8	25.80	25.97	26.25
232.0	262.0	25.61	25.84	26.07
272.3	302.3	25.36	25.86	26.30
292.5	322.5	25.36	25.89	26.22
332.8	362.8	25.62	26.11	26.51
353.0	383.0	25.92	26.46	26.93
393.3	423.3	26.71	27.30	27.85
413.5	443.5	26.95	27.52	28.08
453.8	483.8	26.36	27.04	27.52
474.0	504.0	25.52	25.95	26.33
514.3	544.3	23.26	23.53	23.67
534.5	564.5	22.13	22.12	22.15
574.8	604.8	20.41	20.15	19.92
595.0	625.0	19.81	19.50	19.21
635.4	665.4	18.94	18.72	18.46
655.5	685.5	18.65	18.46	18.33
695.9	725.9	18.47	18.25	18.23
716.0	746.0	18.54	18.31	18.26
756.4	786.4	18.90	18.72	18.68
776.5	806.5	19.00	18.84	18.81
816.9	846.9	18.92	18.64	18.45
837.0	867.0	18.60	18.22	17.90
877.4	907.4	17.76	17.26	16.99
897.6	927.6	17.28	16.93	16.71
937.9	967.9	16.44	16.28	16.15
958.1	988.1	15.94	15.83	15.68
998.4	1028.4	14.80	14.67	14.47
1018.6	1048.6	14.15	14.01	13.79
1058.9	1088.9	12.81	12.63	12.37
1079.1	1109.1	12.09	11.86	11.59
1119.4	1149.4	10.79	10.43	10.10
1139.6	1169.6	10.25	9.80	9.43
1179.9	1209.9	9.24	8.65	8.20
1200.1	1230.1	8.78	8.16	7.69

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1) @LO (dBm)		
		+4	+7	+10
1.0	31.0	1.39	1.38	1.38
2.0	32.0	1.25	1.22	1.22
2.2	32.2	1.24	1.21	1.20
4.7	34.7	1.18	1.12	1.10
10.3	40.3	1.16	1.09	1.05
50.4	80.4	1.06	1.03	1.07
90.8	120.8	1.17	1.10	1.08
110.9	140.9	1.11	1.04	1.03
171.5	201.5	1.13	1.08	1.07
211.8	241.8	1.09	1.09	1.12
232.0	262.0	1.13	1.13	1.14
272.3	302.3	1.14	1.12	1.14
292.5	322.5	1.12	1.12	1.14
332.8	362.8	1.16	1.16	1.18
353.0	383.0	1.16	1.15	1.18
393.3	423.3	1.20	1.20	1.23
453.8	483.8	1.21	1.23	1.25
474.0	504.0	1.23	1.25	1.29
514.3	544.3	1.21	1.25	1.29
534.5	564.5	1.22	1.26	1.30
574.8	604.8	1.23	1.24	1.27
595.0	625.0	1.23	1.21	1.24
635.4	665.4	1.30	1.26	1.26
695.9	725.9	1.45	1.39	1.36
716.0	746.0	1.53	1.48	1.44
756.4	786.4	1.76	1.69	1.64
776.5	806.5	1.82	1.75	1.70
816.9	846.9	2.07	1.98	1.92
837.0	867.0	2.18	2.09	2.02
877.4	907.4	2.30	2.20	2.14
897.6	927.6	2.44	2.35	2.28
958.1	988.1	2.63	2.54	2.47
998.4	1028.4	2.88	2.79	2.72
1018.6	1048.6	2.93	2.83	2.75
1058.9	1088.9	2.97	2.88	2.82
1079.1	1109.1	3.07	2.98	2.90
1119.4	1149.4	2.99	2.89	2.82
1139.6	1169.6	3.01	2.91	2.84
1179.9	1209.9	3.07	2.93	2.84
1200.1	1230.1	2.96	2.82	2.73

LO (MHz)	LO VSWR (:1) @LO (dBm)		
	+4	+7	+10
1.0	1.77	2.58	3.57
2.0	1.73	2.55	3.57
2.2	1.75	2.52	3.50
4.7	1.73	2.55	3.57
10.3	1.77	2.52	3.50
50.4	1.80	2.62	3.70
90.8	1.79	2.59	3.61
110.9	1.74	2.51	3.47
171.5	1.82	2.61	3.60
211.8	1.82	2.58	3.53
232.0	1.87	2.66	3.64
272.3	1.91	2.69	3.65
292.5	1.90	2.65	3.56
332.8	1.96	2.73	3.67
353.0	2.01	2.79	3.73
393.3	2.02	2.75	3.63
453.8	2.17	2.93	3.88
474.0	2.16	2.89	3.79
514.3	2.20	2.91	3.79
534.5	2.23	2.92	3.79
574.8	2.32	2.98	3.80
595.0	2.42	3.11	3.95
635.4	2.53	3.27	4.10
695.9	2.60	3.34	4.18
716.0	2.60	3.33	4.16
756.4	2.65	3.34	4.15
776.5	2.69	3.38	4.20
816.9	2.75	3.43	4.22
837.0	2.77	3.42	4.19
877.4	2.77	3.37	4.09
897.6	2.77	3.34	4.06
958.1	2.89	3.45	4.16
998.4	2.99	3.54	4.23
1018.6	3.11	3.64	4.31
1058.9	3.27	3.74	4.36
1079.1	3.33	3.74	4.33
1119.4	3.62	3.97	4.52
1139.6	3.76	4.09	4.61
1179.9	3.90	4.15	4.60
1200.1	4.01	4.26	4.69

IF (OUT) (MHz)	IF VSWR @LO=1200.1MHz (:1) @LO (dBm)		
	+4	+7	+10
10.0	1.64	1.37	1.19
29.9	1.34	1.11	1.03
49.7	1.24	1.03	1.14
69.5	1.20	1.11	1.17
89.3	1.29	1.15	1.17
109.1	1.31	1.16	1.17
128.9	1.29	1.14	1.17
148.7	1.27	1.16	1.21
168.5	1.28	1.18	1.22
188.3	1.31	1.21	1.24
208.1	1.30	1.20	1.23
227.9	1.28	1.20	1.24
247.7	1.28	1.21	1.29
267.5	1.30	1.26	1.32
287.3	1.33	1.28	1.33
307.1	1.33	1.29	1.34
326.9	1.31	1.27	1.34
346.7	1.30	1.28	1.36
386.3	1.34	1.33	1.41
406.1	1.34	1.34	1.42
445.7	1.34	1.36	1.45
465.5	1.35	1.38	1.49
505.1	1.35	1.38	1.48
524.9	1.36	1.39	1.50
564.5	1.37	1.41	1.53
584.3	1.36	1.39	1.49
623.9	1.37	1.41	1.52
643.7	1.38	1.42	1.53
683.3	1.40	1.40	1.51
703.1	1.39	1.39	1.50
742.7	1.40	1.38	1.48
762.5	1.42	1.37	1.46
802.1	1.40	1.32	1.41
821.9	1.40	1.31	1.39
861.5	1.44	1.30	1.36
881.3	1.45	1.27	1.31
920.9	1.44	1.23	1.25
940.7	1.46	1.23	1.24
980.3	1.50	1.21	1.15
1000.1	1.49	1.19	1.10

Harmonics Tables

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	4	16	11	30	14	28	36	45	45	51
1	-	18	0	37	11	32	34	51	50	43	65	55
2	109	59	45	57	44	57	47	64	52	66	70	73
3	113	67	67	68	65	69	63	83	89	81	89	79
4	120	95	92	90	95	90	98	92	92	92	93	96
5	119	99	120	107	108	111	95	109	102	117	96	111
6	128	125	108	102	124	94	101	85	104	100	108	105
7	112	107	108	99	106	131	97	97	87	101	102	98
8	116	107	99	104	105	106	102	100	97	85	96	111
9	111	109	122	100	99	107	109	106	100	98	96	99
10	120	106	106	105	104	105	119	118	122	99	92	90
	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; -19.53 dBm

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	13	28	23	42	27	39	49	54	54	63
1	-	19	0	34	12	33	35	52	52	49	65	61
2	94	47	38	59	38	49	39	61	44	58	61	73
3	110	44	43	51	42	52	40	54	65	68	70	63
4	109	76	61	59	53	57	53	57	57	67	62	70
5	142	71	70	84	58	61	58	62	61	74	77	76
6	112	84	92	90	78	82	73	84	91	73	77	81
7	113	87	95	91	83	75	72	73	74	73	74	86
8	112	93	89	95	101	92	81	77	76	76	77	80
9	109	115	100	96	100	98	98	87	81	86	85	85
10	113	117	113	104	102	110	112	109	94	89	94	94
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

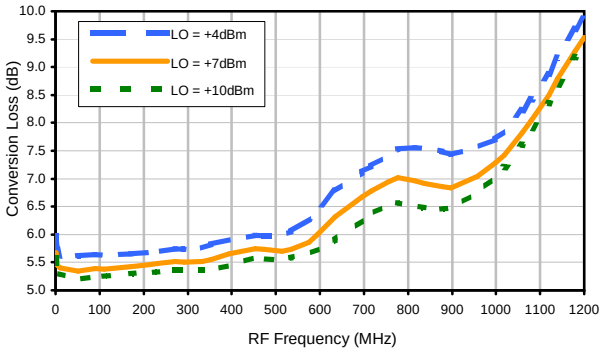
Test conditions: **RF IN: 500.1 MHz; -4.00 dBm.**
LO IN: 530.01 MHz; +7.00 dBm
IF OUT: 29.91 MHz; -9.52 dBm

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.

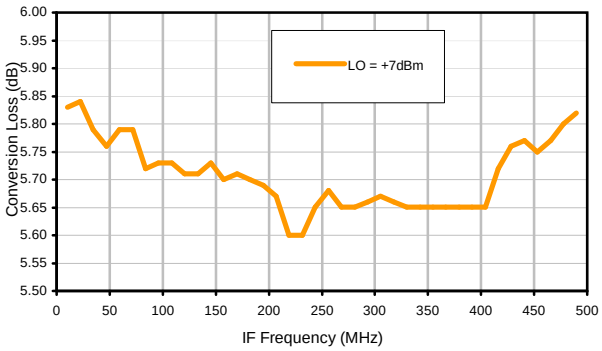
Frequency Mixer ADE-2ASK

Typical Performance Curves

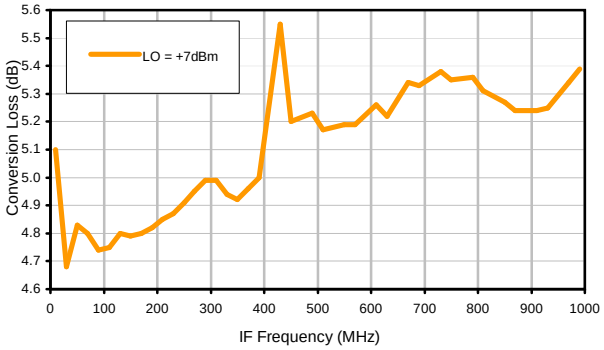
Conversion Loss @ IF=30 MHz



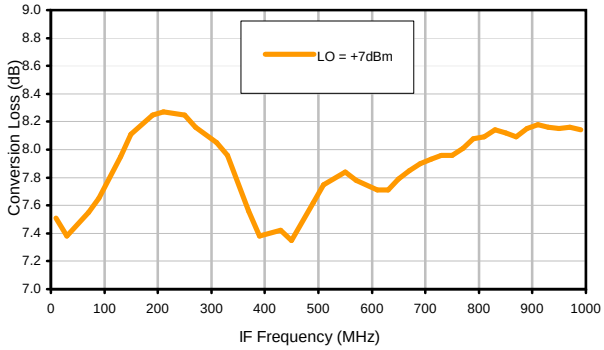
Conversion Loss vs. IF @ RF=500.1 MHz



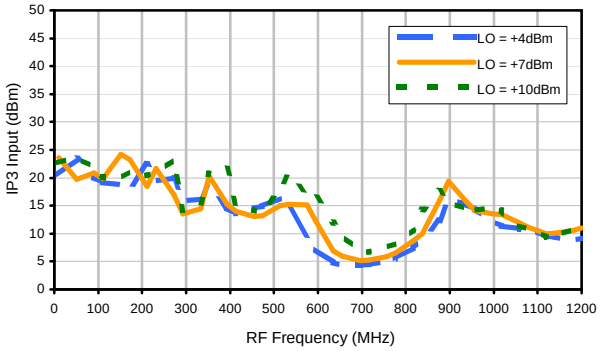
Conversion Loss vs. IF @ RF=10.1 MHz



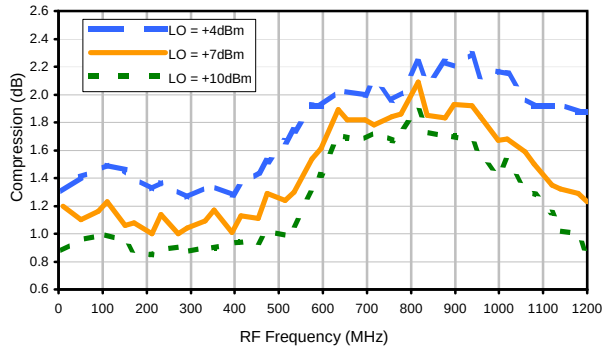
Conversion Loss vs. IF @ RF=1000.1 MHz



IP3 Input

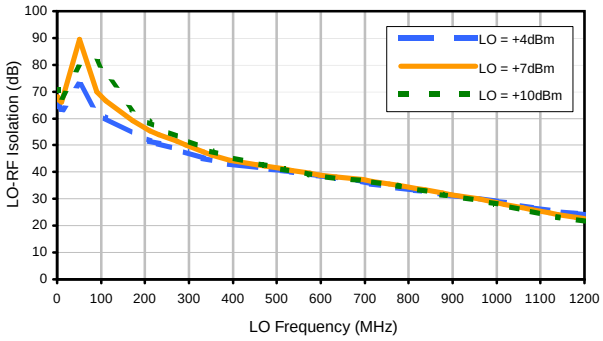


Compression @ RF IN = +1 dBm

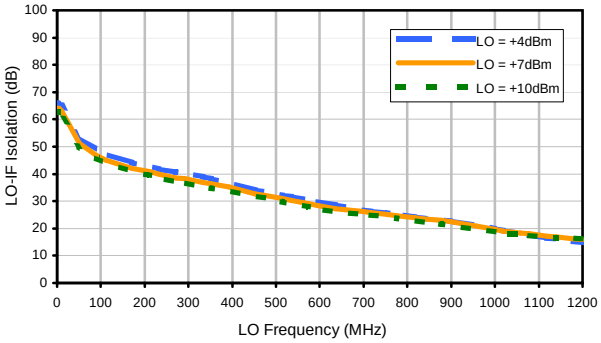


Typical Performance Curves

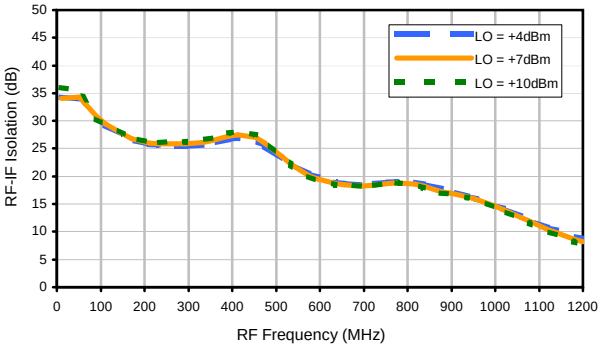
LO-RF Isolation



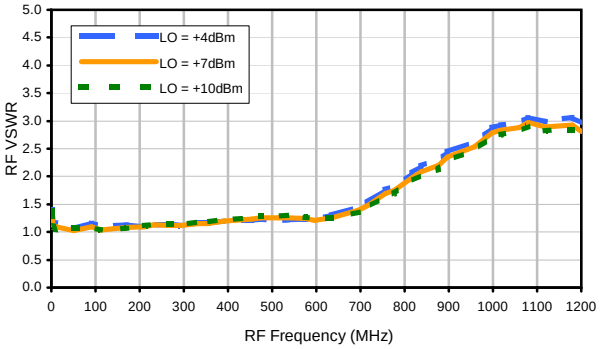
LO-IF Isolation



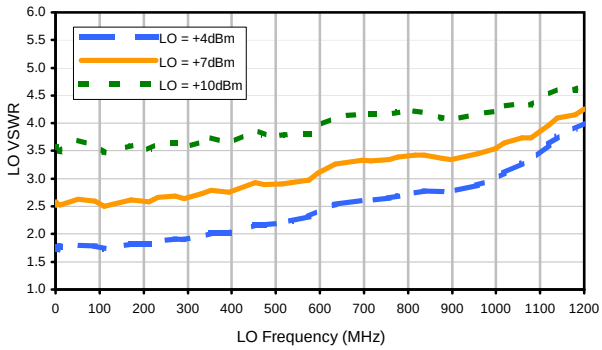
RF-IF Isolation



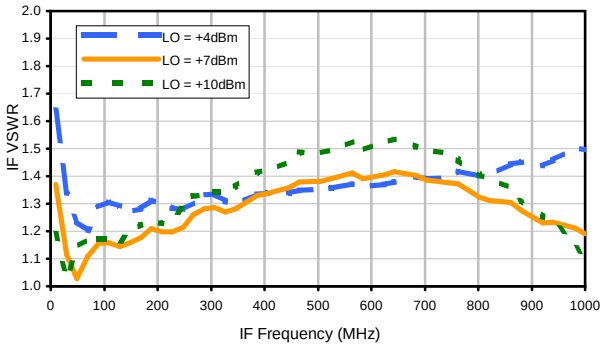
RF VSWR



LO VSWR



IF VSWR



Harmonics Tables

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	4	16	11	30	14	28	36	45	45	51
1	-	18	0	37	11	32	34	51	50	43	65	55
2	109	59	45	57	44	57	47	64	52	66	70	73
3	113	67	67	68	65	69	63	83	89	81	89	79
4	120	95	92	90	95	90	98	92	92	92	93	96
5	119	99	120	107	108	111	95	109	102	117	96	111
6	128	125	108	102	124	94	101	85	104	100	108	105
7	112	107	108	99	106	131	97	97	87	101	102	98
8	116	107	99	104	105	106	102	100	97	85	96	111
9	111	109	122	100	99	107	109	106	100	98	96	99
10	120	106	106	105	104	105	119	118	122	99	92	90
	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; -19.53 dBm

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	13	28	23	42	27	39	49	54	54	63
1	-	19	0	34	12	33	35	52	52	49	65	61
2	94	47	38	59	38	49	39	61	44	58	61	73
3	110	44	43	51	42	52	40	54	65	68	70	63
4	109	76	61	59	53	57	53	57	57	67	62	70
5	142	71	70	84	58	61	58	62	61	74	77	76
6	112	84	92	90	78	82	73	84	91	73	77	81
7	113	87	95	91	83	75	72	73	74	73	74	86
8	112	93	89	95	101	92	81	77	76	76	77	80
9	109	115	100	96	100	98	98	87	81	86	85	85
10	113	117	113	104	102	110	112	109	94	89	94	94
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

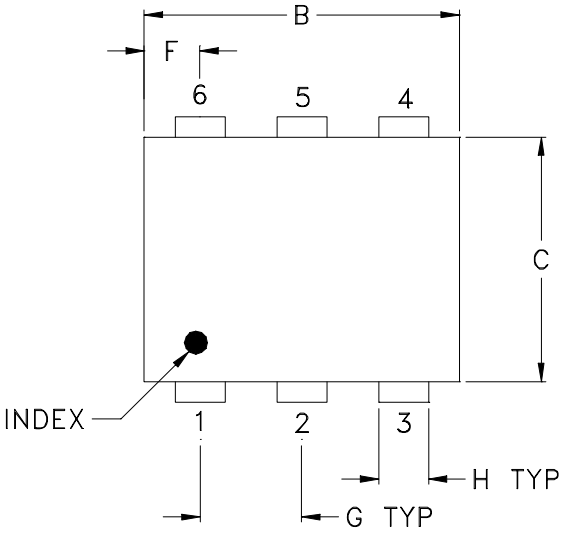
Test conditions: **RF IN: 500.1 MHz; -4.00 dBm.**
LO IN: 530.01 MHz; +7.00 dBm
IF OUT: 29.91 MHz; -9.52 dBm

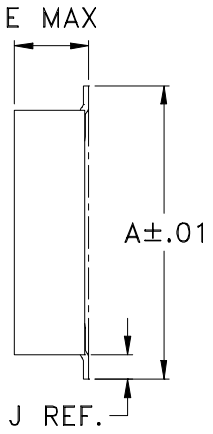
Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

Case Style CD

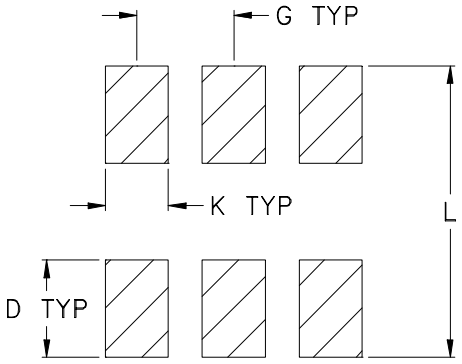
CD541
CD542
CD636
CD637

Outline Dimensions





PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE#	A	B	C	D	E	F	G	H	J	K	L	WT, GRAM
CD541	.272 (6.91)	.310 (7.87)	.220 (5.58)	.100 (2.54)	.082 (2.08)	.055 (1.40)	.100 (2.54)	.030 (0.76)	.026 (0.66)	.065 (1.65)	.300 (7.62)	.15
CD542					.112 (2.84)							.20
CD636					.162 (4.11)							.25
CD637					.206 (5.23)							.40

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

Notes:

1. Case material: Plastic.
2. 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.

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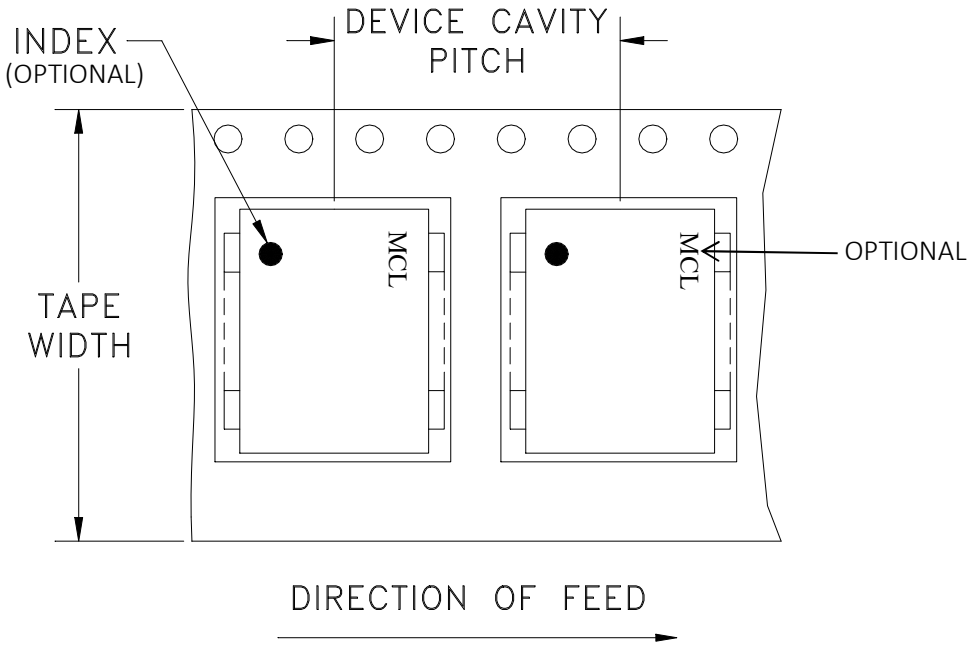
Tape & Reel Packaging TR-F34

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel see note	
16	12	7	Small quantity standard (see note)	20
				50
				100
				200
		13	Standard	500
				1000

Note: Availability of small reel quantity varies by model.
Refer to pricing and availability on individual model dashboard.

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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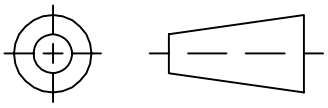
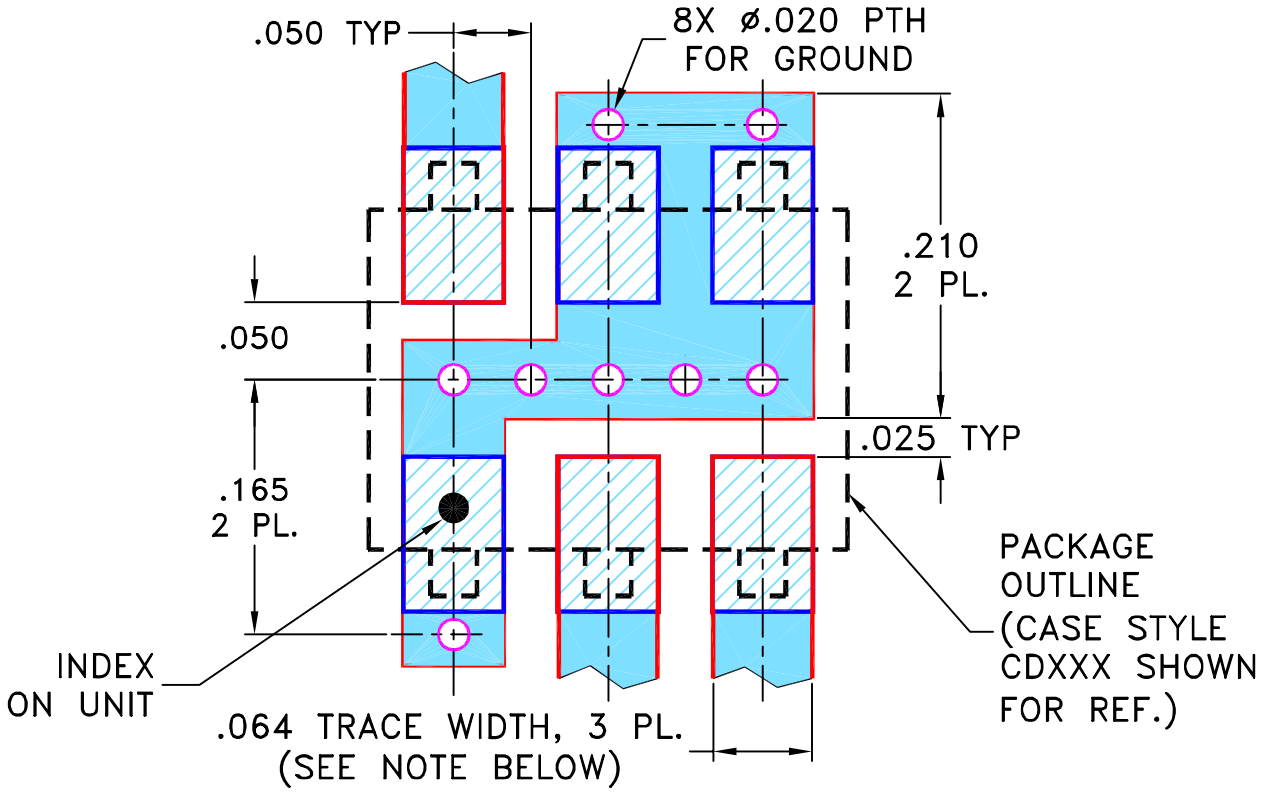
THIRD ANGLE PROJECTION



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

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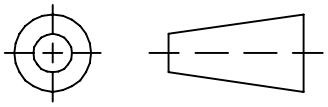
13 Neptune Avenue
Brooklyn NY 11235

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

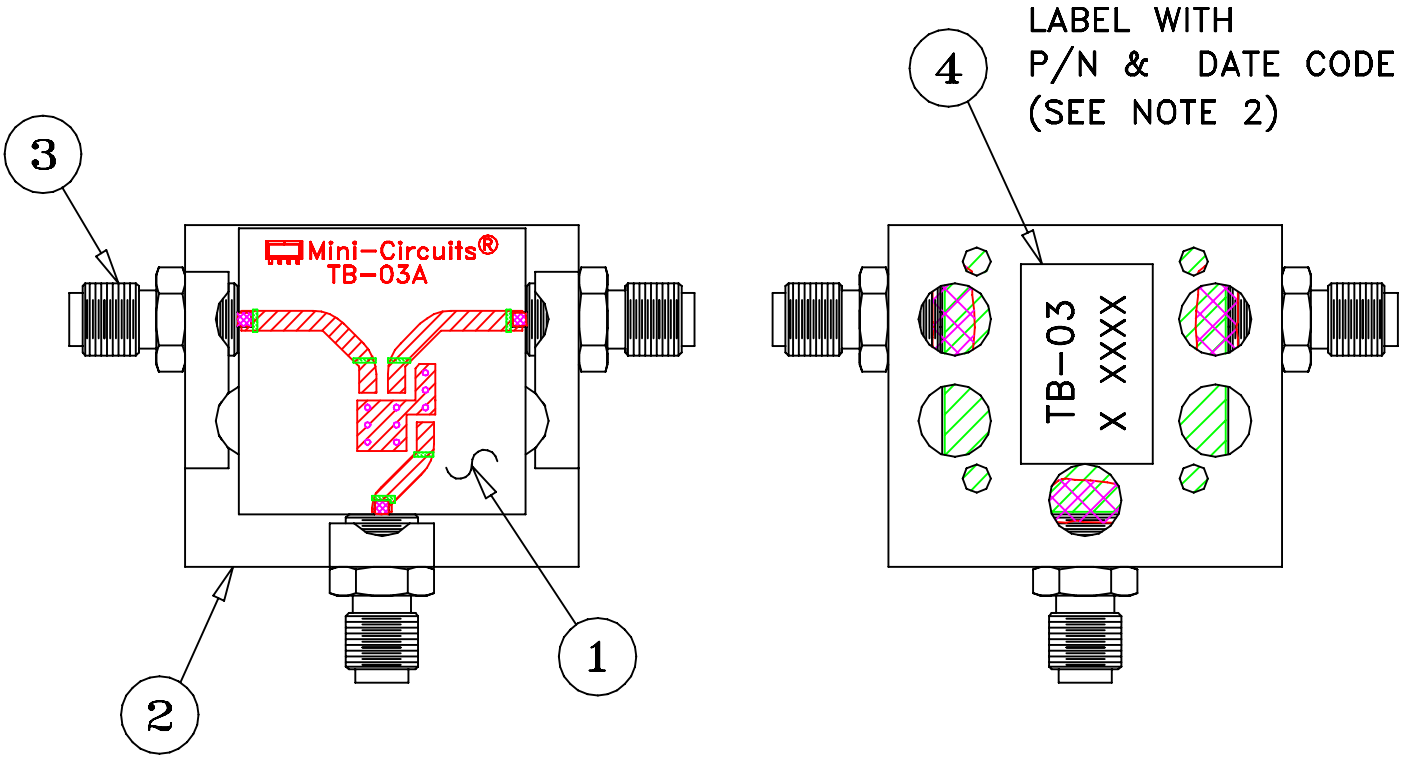
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-052	C

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

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	06.29.99
TOLERANCES ON:	CHECKED	SG	07.06.99
2 PL DECIMALS ±	APPROVED	MG	07.10.99
3 PL DECIMALS ±			
ANGLES ±			
FRACTIONS ±			

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

Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

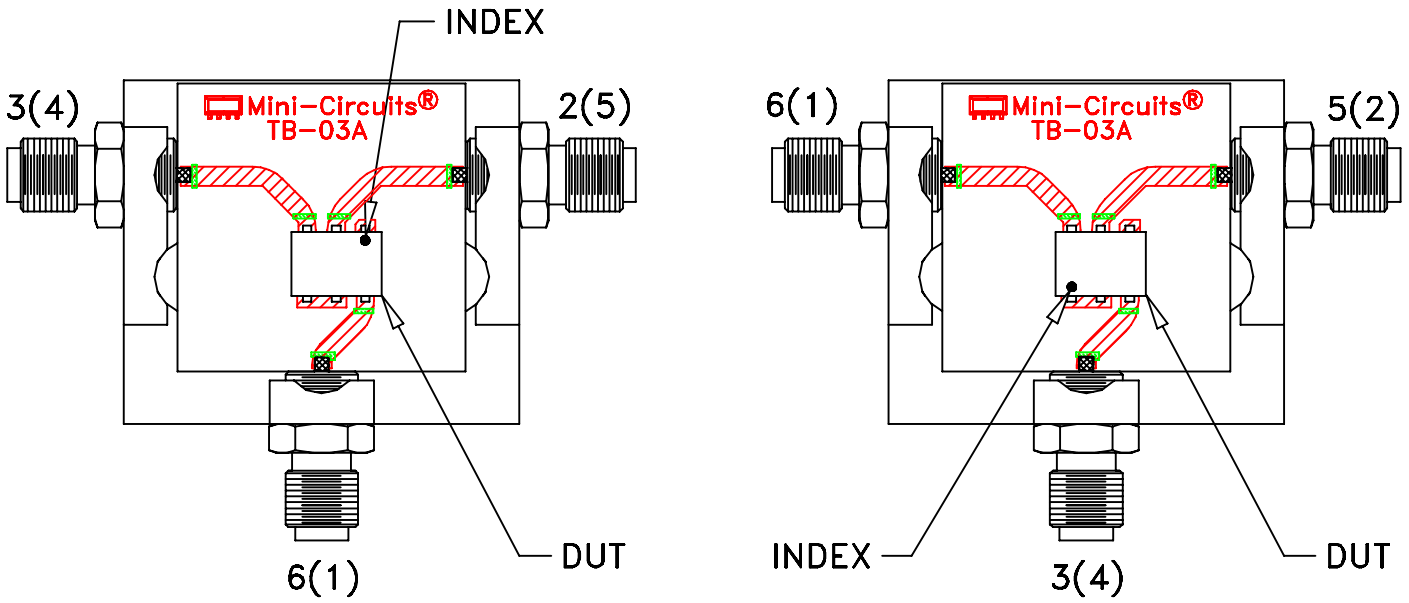
TB,ADE,CD542/636,06MX01,50

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	TB-03-20	H

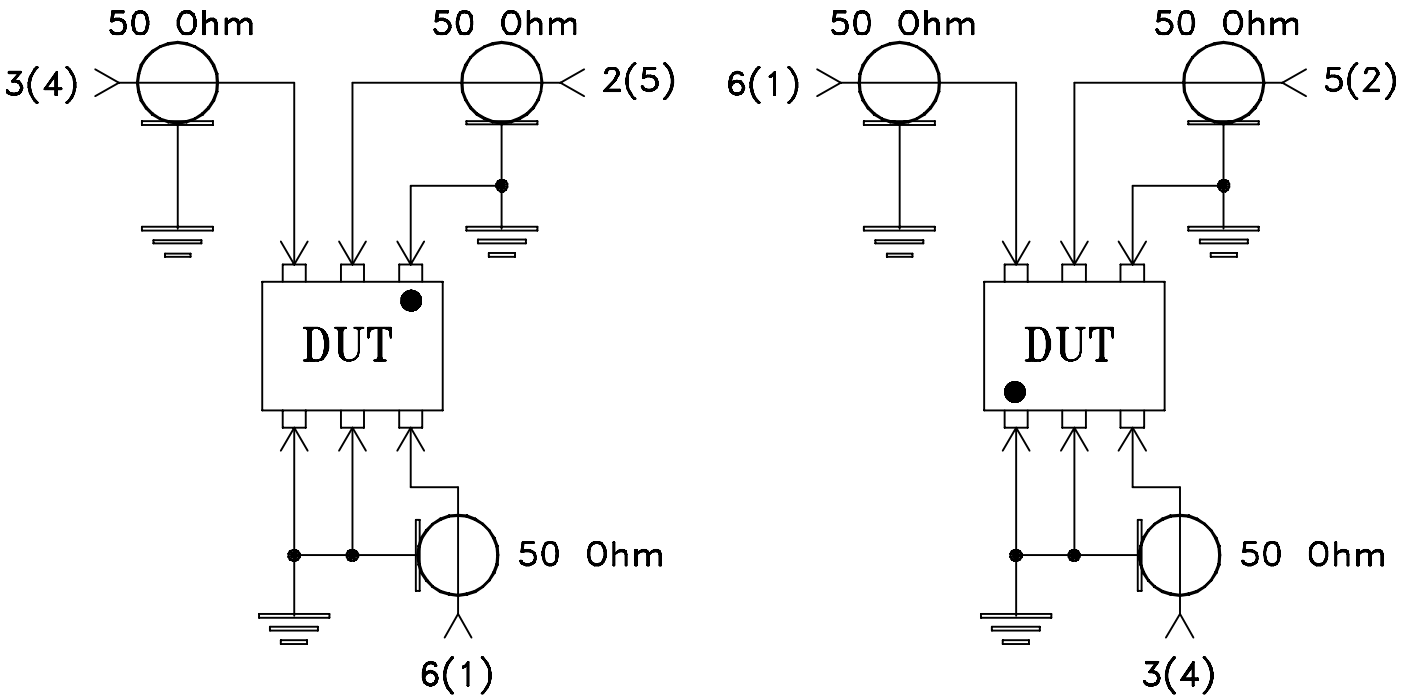
FILE:	SCALE:	SHEET:
WTB-03	1.5:1	1 OF 2

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 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