Surface Mount

Frequency Mixer

ADE-1MH

Level 13 (LO Power +13 dBm) 2 to 500 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	200mW
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

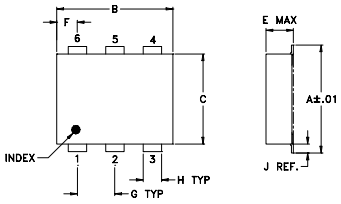
Features

- good L-R isolation, 50 dB typ.
  L-I isolation, 45 dB typ.
- low profile package
- aqueous washable
- protected by U.S. Patent 6,133,525

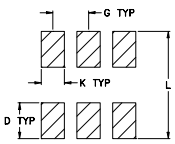
Applications

- cellular
- VHF/UHF receivers

Outline Drawing



PCB Land Pattern



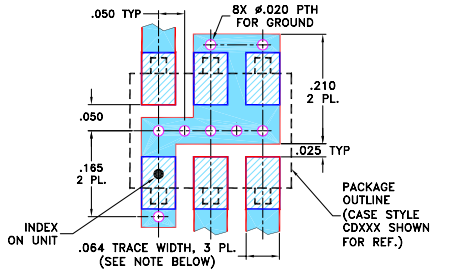
Suggested Layout,
Tolerance to be within ±.002

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.
2-500	DC-500	5.2	0.10	6.5	8.0	60	45	50	35	48	25	55	40	45	30	40	22	17

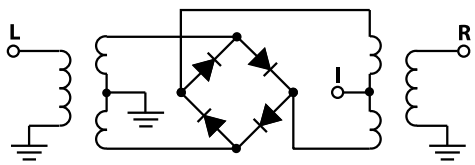
1 dB COMP.: +9 dBm typ.

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

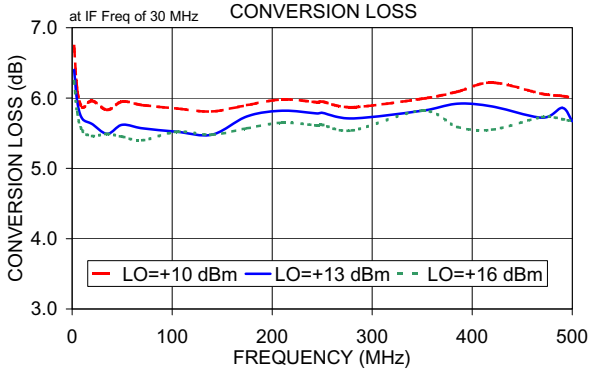
Frequency (MHz)		Conversion Loss (dB)	Isolation L-R (dB)	Isolation L-I (dB)	VSWR RF Port (:1)	VSWR LO Port (:1)
RF	LO	LO +13dBm	LO +13dBm	LO +13dBm	LO +13dBm	LO +13dBm
2.00	32.00	6.40	61.50	52.50	1.48	2.37
5.00	35.00	5.96	60.83	51.00	1.24	2.37
10.00	40.00	5.71	60.00	51.00	1.15	2.46
20.00	50.00	5.63	58.00	49.67	1.10	2.51
35.10	65.10	5.49	55.50	48.00	1.08	2.46
50.00	80.00	5.62	53.83	46.17	1.07	2.41
70.09	100.09	5.57	53.01	44.50	1.06	2.46
105.09	135.09	5.52	50.16	40.67	1.05	2.36
140.08	170.08	5.48	48.66	41.00	1.05	2.41
175.08	205.08	5.74	50.67	40.00	1.09	2.36
210.07	240.07	5.82	48.84	39.50	1.11	2.46
245.07	275.07	5.78	47.00	38.17	1.12	2.51
250.00	280.00	5.79	46.83	38.17	1.12	2.46
280.06	310.06	5.71	47.00	37.17	1.12	2.51
350.05	380.05	5.82	43.50	35.17	1.14	2.51
385.05	415.05	5.92	41.17	33.00	1.19	2.61
420.04	450.04	5.88	39.83	30.67	1.24	2.67
470.00	500.00	5.72	38.50	30.67	1.27	2.67
490.03	520.03	5.86	38.00	30.34	1.26	2.79
500.00	530.00	5.67	37.33	30.33	1.26	2.67

Electrical Schematic

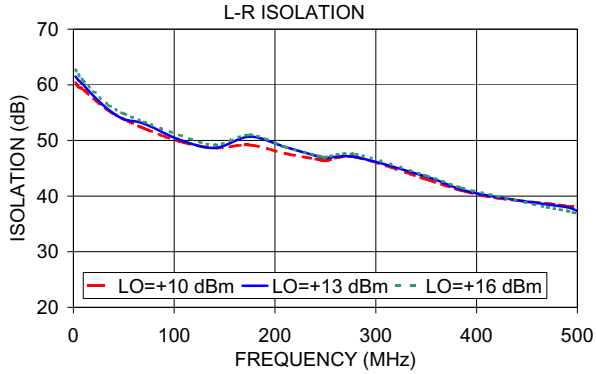


Notes
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
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

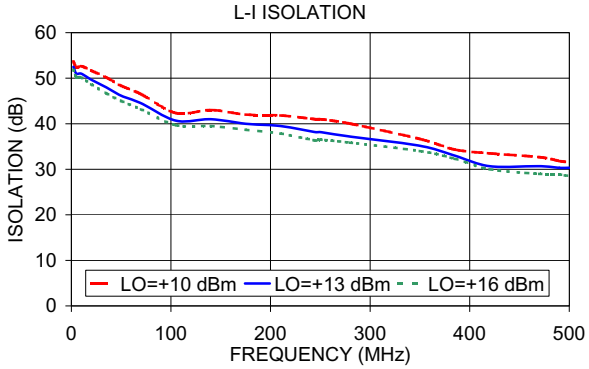
ADE-1MH+
at IF Freq of 30 MHz
CONVERSION LOSS



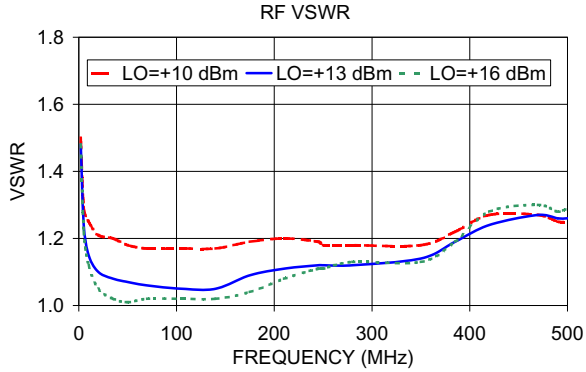
ADE-1MH+
L-R ISOLATION



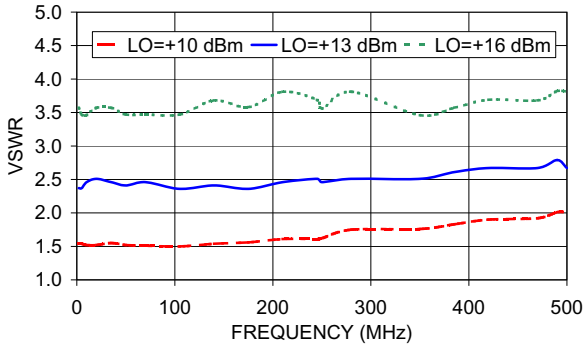
ADE-1MH+
L-I ISOLATION



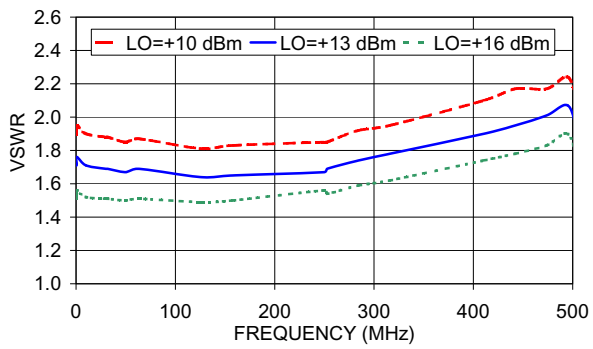
ADE-1MH+
RF VSWR



ADE-1MH+
LO VSWR



ADE-1MH+
IF VSWR



Frequency Mixer ADE-1MH

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB) @LO (dBm)		
		+10	+13	+16
2.0	32.0	6.74	6.40	6.24
5.0	35.0	6.13	5.96	5.80
10.0	40.0	5.87	5.71	5.54
50.4	80.4	5.63	5.32	5.20
90.7	120.7	5.63	5.31	5.20
131.0	161.0	5.57	5.33	5.23
171.3	201.3	5.59	5.37	5.26
211.5	241.5	5.58	5.36	5.25
251.8	281.8	5.62	5.42	5.32
292.1	322.1	5.66	5.47	5.35
332.4	362.4	5.68	5.50	5.40
372.7	402.7	5.89	5.51	5.33
453.3	483.3	5.96	5.78	5.65
493.6	523.6	5.94	5.71	5.54
533.9	563.9	5.86	5.59	5.48
574.2	604.2	6.02	5.68	5.55
614.4	644.4	6.50	5.87	5.64
654.7	684.7	6.94	6.42	5.85
695.0	725.0	7.39	6.90	6.32
735.3	765.3	7.95	7.43	6.93
775.6	805.6	8.44	7.90	7.36
815.9	845.9	8.60	7.96	7.28
856.2	886.2	8.48	7.65	7.01
896.5	926.5	8.03	7.11	6.53
956.9	986.9	7.32	6.80	6.55
977.1	1007.1	7.25	6.84	6.65
1017.3	1047.3	7.36	7.02	6.85
1037.5	1067.5	7.45	7.16	6.98
1077.8	1107.8	7.73	7.42	7.25
1097.9	1127.9	7.92	7.58	7.41
1138.2	1168.2	8.34	8.04	7.86
1158.4	1188.4	8.55	8.28	8.14
1198.7	1228.7	8.83	8.64	8.55
1218.8	1248.8	8.96	8.81	8.77
1259.1	1289.1	9.24	9.09	9.08
1279.2	1309.2	9.42	9.22	9.28
1319.5	1349.5	9.87	9.71	9.75
1339.7	1369.7	10.13	9.92	9.98
1380.0	1410.0	10.70	10.48	10.52
1400.1	1430.1	10.96	10.76	10.75

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm) @LO (dBm)		
		+10	+13	+16
10.1	40.1	24.69	29.56	29.78
50.4	80.4	24.84	27.76	31.13
90.7	120.7	25.46	29.26	26.25
131.0	161.0	25.66	25.70	23.80
171.3	201.3	25.00	22.68	25.70
211.5	241.5	21.01	21.79	24.71
251.8	281.8	24.59	25.18	25.26
292.1	322.1	18.13	17.41	18.43
332.4	362.4	20.46	19.33	20.46
372.7	402.7	18.70	25.03	31.11
413.0	443.0	15.32	15.18	18.00
453.3	483.3	17.44	16.85	17.09
493.6	523.6	22.94	24.72	23.84
533.9	563.9	24.43	20.44	24.25
574.2	604.2	17.79	26.76	29.76
614.4	644.4	10.44	19.42	29.07
654.7	684.7	7.73	10.25	17.30
695.0	725.0	7.70	8.08	10.47
735.3	765.3	8.36	8.41	9.00
775.6	805.6	9.79	10.45	11.52
815.9	845.9	12.18	13.74	16.47
856.2	886.2	13.08	17.28	19.76
896.5	926.5	14.73	20.26	22.40
916.6	946.6	16.93	25.15	22.71
956.9	986.9	20.28	20.96	22.95
977.1	1007.1	19.62	21.19	22.63
1017.3	1047.3	19.82	21.37	22.78
1037.5	1067.5	19.53	21.13	22.48
1077.8	1107.8	18.86	20.58	21.75
1097.9	1127.9	18.91	20.27	21.40
1138.2	1168.2	19.28	19.59	20.79
1158.4	1188.4	18.59	18.89	19.45
1198.7	1228.7	17.86	19.12	19.77
1218.8	1248.8	17.92	20.14	21.10
1259.1	1289.1	17.07	20.35	21.75
1279.2	1309.2	16.77	19.46	21.22
1319.5	1349.5	16.07	18.52	20.72
1339.7	1369.7	16.17	19.06	21.16
1380.0	1410.0	15.64	19.80	21.70
1400.1	1430.1	15.90	20.62	20.51

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+9dBm (dB) @LO (dBm)		
		+10	+13	+16
10.1	40.1	1.77	1.56	1.38
50.4	80.4	1.70	1.49	1.31
90.7	120.7	1.70	1.51	1.32
131.0	161.0	1.74	1.51	1.31
171.3	201.3	1.64	1.41	1.24
211.5	241.5	1.67	1.45	1.28
251.8	281.8	1.61	1.35	1.21
292.1	322.1	1.57	1.35	1.22
332.4	362.4	1.56	1.33	1.19
372.7	402.7	1.46	1.38	1.18
413.0	443.0	1.47	1.31	1.21
453.3	483.3	1.57	1.35	1.22
493.6	523.6	1.82	1.54	1.41
533.9	563.9	2.08	1.59	1.38
574.2	604.2	2.36	1.86	1.60
614.4	644.4	2.40	2.27	1.91
654.7	684.7	2.40	2.28	2.12
695.0	725.0	2.38	2.25	2.20
735.3	765.3	2.12	2.06	2.01
775.6	805.6	1.78	1.79	1.84
815.9	845.9	1.70	1.78	1.89
856.2	886.2	1.82	1.96	1.86
896.5	926.5	2.20	2.18	2.03
916.6	946.6	2.34	2.21	2.01
956.9	986.9	2.60	2.24	1.98
977.1	1007.1	2.49	2.13	1.87
1017.3	1047.3	2.22	1.91	1.71
1037.5	1067.5	2.06	1.77	1.62
1077.8	1107.8	1.81	1.61	1.51
1097.9	1127.9	1.80	1.63	1.54
1138.2	1168.2	1.70	1.44	1.39
1158.4	1188.4	1.67	1.39	1.33
1198.7	1228.7	1.67	1.25	1.16
1218.8	1248.8	1.65	1.19	1.06
1259.1	1289.1	1.73	1.21	0.98
1279.2	1309.2	1.76	1.17	0.90
1319.5	1349.5	1.82	1.10	0.79
1339.7	1369.7	1.73	1.00	0.69
1380.0	1410.0	1.84	0.97	0.67
1400.1	1430.1	1.77	0.92	0.63

Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=250.1MHz (dB)
		@LO (dBm)
		+13
240.0	10.1	5.46
234.1	16.0	5.45
228.2	21.9	5.43
222.3	27.8	5.43
216.4	33.7	5.41
210.5	39.6	5.40
204.6	45.5	5.39
198.7	51.4	5.36
192.8	57.3	5.35
186.9	63.2	5.32
181.0	69.1	5.33
175.1	75.0	5.34
169.2	80.9	5.31
163.3	86.8	5.29
157.4	92.7	5.29
151.5	98.6	5.27
145.6	104.5	5.29
139.7	110.4	5.29
133.8	116.3	5.27
127.9	122.2	5.24
122.1	128.0	5.23
116.2	133.9	5.26
110.3	139.8	5.28
104.4	145.7	5.28
98.5	151.6	5.28
92.6	157.5	5.27
86.7	163.4	5.28
80.8	169.3	5.29
74.9	175.2	5.30
69.0	181.1	5.29
63.1	187.0	5.28
57.2	192.9	5.28
51.3	198.8	5.30
45.4	204.7	5.33
39.5	210.6	5.36
33.6	216.5	5.35
27.7	222.4	5.36
21.8	228.3	5.40
15.9	234.2	5.44
10.0	240.1	5.56

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=10.1MHz (dB)
		@LO (dBm)
		+13
10.0	20.1	5.19
22.3	32.4	5.04
34.6	44.7	5.01
46.9	57.0	5.01
59.2	69.3	4.98
71.5	81.6	5.00
83.8	93.9	5.01
96.2	106.3	5.01
108.5	118.6	5.02
120.8	130.9	5.01
133.1	143.2	5.01
145.4	155.5	5.06
157.7	167.8	5.06
170.0	180.1	5.05
182.3	192.4	5.07
194.6	204.7	5.08
206.9	217.0	5.08
219.2	229.3	5.08
231.5	241.6	5.09
243.8	253.9	5.13
256.2	266.3	5.14
268.5	278.6	5.12
280.8	290.9	5.14
293.1	303.2	5.17
305.4	315.5	5.20
317.7	327.8	5.25
330.0	340.1	5.24
342.3	352.4	5.20
354.6	364.7	5.19
366.9	377.0	5.17
379.2	389.3	5.14
391.5	401.6	5.13
403.8	413.9	5.15
416.2	426.3	5.28
428.5	438.6	5.37
440.8	450.9	5.40
453.1	463.2	5.42
465.4	475.5	5.42
477.7	487.8	5.43
490.0	500.1	5.46

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=500.1MHz (dB)
		@LO (dBm)
		+13
490.0	10.1	5.68
477.7	22.4	5.68
465.4	34.7	5.63
453.1	47.0	5.61
440.8	59.3	5.63
428.5	71.6	5.57
416.2	83.9	5.52
403.8	96.3	5.47
391.5	108.6	5.44
379.2	120.9	5.45
366.9	133.2	5.46
354.6	145.5	5.44
342.3	157.8	5.45
330.0	170.1	5.46
317.7	182.4	5.46
305.4	194.7	5.49
293.1	207.0	5.47
280.8	219.3	5.47
268.5	231.6	5.49
256.2	243.9	5.51
243.8	256.3	5.53
231.5	268.6	5.52
219.2	280.9	5.49
206.9	293.2	5.52
194.6	305.5	5.54
182.3	317.8	5.56
170.0	330.1	5.60
157.7	342.4	5.62
145.4	354.7	5.64
133.1	367.0	5.65
120.8	379.3	5.60
108.5	391.6	5.56
96.2	403.9	5.56
83.8	416.3	5.58
71.5	428.6	5.68
59.2	440.9	5.73
46.9	453.2	5.72
34.6	465.5	5.77
22.3	477.8	5.80
10.0	490.1	5.95

Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB) @LO (dBm)			LO-IF ISOLATION (dB) @LO (dBm)		
	+10	+13	+16	+10	+13	+16
2.0	60.3	61.5	62.7	53.7	52.5	51.8
5.0	59.7	60.8	61.8	52.3	51.0	50.2
10.0	59.2	60.0	60.7	52.7	51.0	50.2
50.4	56.23	56.29	56.32	57.82	55.74	54.39
90.7	51.52	51.73	51.99	52.52	50.61	49.51
131.0	48.90	49.34	49.22	49.20	47.71	47.12
171.3	47.48	47.71	47.43	47.06	46.24	45.51
211.5	46.08	45.98	45.58	46.15	45.30	44.23
251.8	44.99	44.89	44.50	45.73	44.23	43.07
292.1	43.62	43.11	42.72	45.84	44.15	42.55
332.4	42.89	42.49	41.84	44.83	42.31	40.41
372.7	42.17	41.84	41.35	44.75	41.96	39.66
453.3	38.12	37.82	37.45	38.78	36.67	35.45
493.6	36.79	36.63	36.22	38.62	35.90	34.27
533.9	34.87	34.43	33.85	38.72	35.10	32.65
574.2	34.63	33.92	33.21	39.44	35.16	32.22
614.4	34.88	33.68	32.49	36.14	33.81	31.48
654.7	34.09	33.06	31.88	33.90	32.10	29.94
695.0	33.37	32.37	31.16	31.24	30.44	28.83
735.3	32.58	31.91	30.71	29.28	28.24	27.07
775.6	32.06	31.41	30.34	28.25	26.99	25.87
815.9	31.73	31.15	30.21	27.43	26.16	24.95
856.2	31.60	31.06	30.33	27.07	25.98	24.53
896.5	31.23	30.61	29.83	27.38	26.29	23.96
956.9	31.00	30.09	29.57	26.43	23.93	21.87
977.1	30.96	30.10	29.53	25.38	23.12	21.25
1017.3	31.42	30.58	30.12	22.63	21.13	19.68
1037.5	31.93	31.05	30.64	21.57	20.47	19.17
1077.8	32.88	31.54	30.99	19.64	19.12	18.05
1097.9	33.10	31.28	30.48	18.72	18.40	17.39
1138.2	33.63	30.69	29.37	17.29	17.46	16.64
1158.4	33.50	30.12	28.61	16.68	17.05	16.32
1198.7	32.63	28.49	26.54	15.46	16.19	15.71
1218.8	32.25	27.80	25.70	14.89	15.89	15.59
1259.1	30.33	26.28	24.17	13.97	15.20	15.10
1279.2	29.23	25.38	23.27	13.63	14.99	14.95
1319.5	27.16	24.07	22.03	12.81	14.42	14.54
1339.7	26.29	23.53	21.58	12.60	14.30	14.45
1380.0	24.26	22.40	20.60	11.94	13.86	14.25
1400.1	23.29	21.88	20.22	11.47	13.51	14.16

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB) @LO (dBm)		
		+10	+13	+16
10.1	40.1	42.25	44.24	42.96
50.4	80.4	31.93	31.92	31.74
90.7	120.7	27.44	27.52	27.55
131.0	161.0	24.82	24.97	25.05
171.3	201.3	23.28	23.40	23.50
211.5	241.5	22.18	22.31	22.42
251.8	281.8	21.81	21.95	21.98
292.1	322.1	21.31	21.54	21.90
332.4	362.4	21.36	21.72	21.98
372.7	402.7	21.84	22.15	22.47
413.0	443.0	22.85	23.04	23.21
453.3	483.3	23.59	24.01	24.46
493.6	523.6	23.52	24.03	24.68
533.9	563.9	22.67	23.58	24.22
574.2	604.2	20.59	20.58	20.47
614.4	644.4	19.02	18.42	18.06
654.7	684.7	17.57	17.34	16.86
695.0	725.0	16.63	16.39	16.28
735.3	765.3	16.40	16.08	15.89
775.6	805.6	16.16	15.88	15.71
815.9	845.9	15.83	15.61	15.73
856.2	886.2	15.51	15.36	15.21
896.5	926.5	15.00	14.54	14.29
916.6	946.6	14.70	14.31	14.23
956.9	986.9	14.39	14.30	14.31
977.1	1007.1	14.37	14.30	14.28
1017.3	1047.3	14.32	14.24	14.15
1037.5	1067.5	14.24	14.15	14.03
1077.8	1107.8	13.95	13.83	13.62
1097.9	1127.9	13.76	13.69	13.50
1138.2	1168.2	13.08	13.09	13.02
1158.4	1188.4	12.61	12.59	12.52
1198.7	1228.7	11.47	11.27	11.08
1218.8	1248.8	10.87	10.56	10.28
1259.1	1289.1	9.74	9.32	8.93
1279.2	1309.2	9.29	8.84	8.43
1319.5	1349.5	8.33	7.86	7.44
1339.7	1369.7	7.88	7.40	6.98
1380.0	1410.0	7.09	6.63	6.26
1400.1	1430.1	6.71	6.27	5.93

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1) @LO (dBm)		
		+10	+13	+16
2.0	32.0	1.50	1.48	1.48
5.0	35.0	1.29	1.24	1.22
10.0	40.0	1.25	1.15	1.12
50.4	80.4	1.18	1.08	1.02
90.7	120.7	1.18	1.08	1.03
131.0	161.0	1.17	1.08	1.05
171.4	201.4	1.16	1.08	1.07
211.7	241.7	1.16	1.09	1.09
252.0	282.0	1.16	1.11	1.11
292.3	322.3	1.17	1.14	1.14
332.6	362.6	1.16	1.14	1.14
372.9	402.9	1.20	1.16	1.19
413.2	443.2	1.23	1.19	1.19
453.5	483.5	1.24	1.22	1.22
493.9	523.9	1.25	1.25	1.27
514.0	544.0	1.24	1.27	1.31
554.3	584.3	1.24	1.29	1.32
574.5	604.5	1.23	1.27	1.30
614.8	644.8	1.26	1.23	1.26
634.9	664.9	1.31	1.23	1.24
675.3	705.3	1.42	1.34	1.29
695.4	725.4	1.49	1.41	1.35
735.7	765.7	1.71	1.62	1.56
755.9	785.9	1.84	1.75	1.68
796.2	826.2	2.06	1.96	1.88
816.4	846.4	2.17	2.07	1.97
856.7	886.7	2.34	2.21	2.12
876.8	906.8	2.41	2.27	2.19
917.1	947.1	2.51	2.38	2.33
937.3	967.3	2.54	2.44	2.40
977.6	1007.6	2.64	2.57	2.53
997.8	1027.8	2.68	2.62	2.57
1038.1	1068.1	2.82	2.75	2.69
1058.2	1088.2	2.90	2.82	2.76
1098.5	1128.5	3.04	2.95	2.88
1118.7	1148.7	3.12	3.02	2.95
1159.0	1189.0	3.18	3.11	3.05
1179.2	1209.2	3.19	3.12	3.07
1219.5	1249.5	3.19	3.11	3.07
1239.6	1269.6	3.17	3.08	3.02
1279.9	1309.9	3.13	3.01	2.97
1300.1	1330.1	3.06	2.95	2.91

LO (MHz)	LO VSWR (:1) @LO (dBm)		
	+10	+13	+16
32.0	1.54	2.37	3.57
35.0	1.54	2.37	3.47
40.0	1.52	2.46	3.46
80.4	1.49	2.32	3.40
120.7	1.49	2.30	3.35
161.0	1.49	2.30	3.34
201.4	1.50	2.30	3.31
241.7	1.54	2.31	3.30
282.0	1.57	2.34	3.33
322.3	1.62	2.37	3.31
362.6	1.67	2.43	3.41
402.9	1.76	2.50	3.47
443.2	1.80	2.55	3.50
483.5	1.85	2.61	3.60
523.9	1.85	2.55	3.47
544.0	1.87	2.52	3.41
584.3	1.98	2.57	3.42
604.5	2.21	2.79	3.61
644.8	2.31	3.00	3.79
664.9	2.32	3.06	3.92
705.3	2.36	3.11	4.01
725.4	2.33	3.03	3.90
765.7	2.33	3.00	3.85
785.9	2.31	2.93	3.72
826.2	2.25	2.83	3.58
846.4	2.26	2.86	3.62
886.7	2.18	2.77	3.57
906.8	2.17	2.77	3.57
947.1	2.33	2.94	3.72
967.3	2.41	2.96	3.69
1007.6	2.64	3.10	3.76
1027.8	2.78	3.21	3.87
1068.1	3.03	3.36	3.95
1088.2	3.14	3.43	3.96
1128.5	3.35	3.56	4.05
1148.7	3.46	3.62	4.07
1189.0	3.61	3.75	4.13
1209.2	3.65	3.80	4.19
1249.5	3.68	3.87	4.24
1269.6	3.69	3.91	4.28
1309.9	3.65	3.91	4.28
1330.1	3.58	3.86	4.23

IF (OUT) (MHz)	IF VSWR @LO=500.5MHz (:1) @LO (dBm)		
	+10	+13	+16
0.1	1.90	1.73	1.52
0.3	1.90	1.71	1.51
0.5	1.92	1.72	1.54
1.0	1.95	1.76	1.56
10.0	1.90	1.71	1.52
22.4	1.75	1.64	1.54
34.6	1.72	1.59	1.50
46.9	1.75	1.62	1.51
59.1	1.79	1.66	1.54
71.4	1.80	1.66	1.54
83.6	1.80	1.66	1.55
95.9	1.79	1.67	1.55
108.1	1.78	1.65	1.53
120.4	1.80	1.66	1.55
132.6	1.82	1.68	1.57
144.9	1.83	1.69	1.57
157.1	1.83	1.69	1.57
169.4	1.82	1.69	1.57
181.6	1.83	1.70	1.58
193.9	1.87	1.74	1.61
218.4	1.89	1.76	1.63
230.6	1.87	1.73	1.61
242.9	1.87	1.73	1.61
255.1	1.89	1.75	1.62
267.4	1.90	1.77	1.64
279.6	1.92	1.78	1.66
291.9	1.92	1.78	1.66
304.1	1.91	1.77	1.65
316.4	1.91	1.77	1.65
328.6	1.93	1.80	1.67
340.9	1.96	1.82	1.69
353.1	1.96	1.83	1.70
365.4	1.96	1.82	1.70
377.6	1.97	1.84	1.71
389.9	2.00	1.86	1.73
402.1	2.03	1.89	1.77
414.4	2.07	1.93	1.80
438.9	2.04	1.90	1.78
451.1	2.04	1.91	1.78
463.4	2.07	1.93	1.80
487.9	2.12	1.99	1.87
500.1	2.10	1.99	1.88

Harmonics Tables

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	20	25	21	33	18	37	29	45	30	48
1	-	17	+0	26	12	31	17	34	31	41	40	47
2	>100	70	57	66	57	65	54	66	50	62	63	72
3	>100	66	68	73	61	75	55	74	55	70	58	75
4	>100	88	77	>89	77	>89	78	83	77	87	84	>89
5	>100	86	81	>89	78	>89	80	>89	78	87	76	87
6	>100	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89
7	>100	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89
8	>100	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89
9	>100	>89	>89	>89	>89	>89	>89	>89	>89	70	>89	>89
10	>100	>89	>89	>89	>89	>89	>89	>89	>89	>89	77	>89
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: **RF IN: 250.1 MHz; -6.00 dBm.**
LO IN: 280.01 MHz; +13.00 dBm
IF OUT: 29.91 MHz; -11.36 dBm

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	29	35	34	46	31	48	43	59	49	65
1	-	17	+0	27	12	34	18	34	32	47	46	54
2	87	71	46	59	47	71	47	61	44	61	57	65
3	>100	41	45	46	46	47	42	45	40	58	51	55
4	>100	67	68	66	68	66	65	63	59	68	56	66
5	>100	75	59	57	51	61	48	57	46	63	47	60
6	>100	82	75	81	75	85	73	>99	70	75	68	73
7	>100	76	73	74	72	68	72	65	65	62	59	61
8	>100	91	88	85	84	88	80	83	80	77	76	74
9	>100	89	80	84	72	73	71	69	71	70	70	70
10	>100	98	93	>99	92	90	84	88	85	92	79	89
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

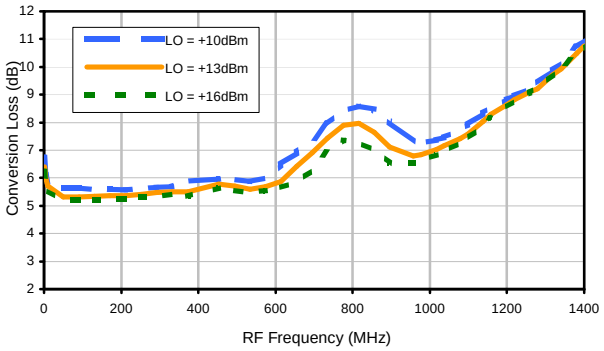
Test conditions: **RF IN: 250.1 MHz; 4.00 dBm.**
LO IN: 280.01 MHz; +13.00 dBm
IF OUT: 29.91 MHz; -1.43 dBm

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.

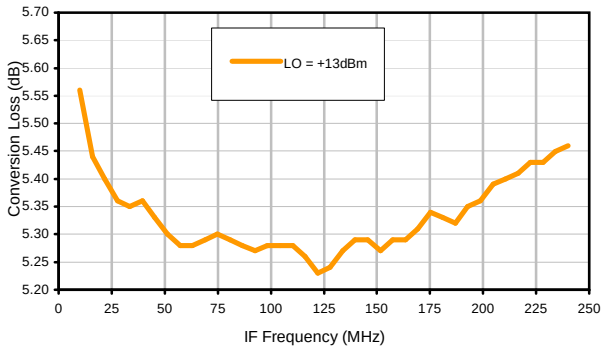
Frequency Mixer ADE-1MH

Typical Performance Curves

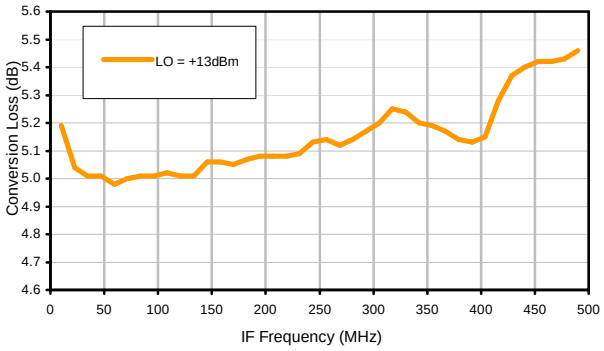
Conversion Loss @ IF=30MHz



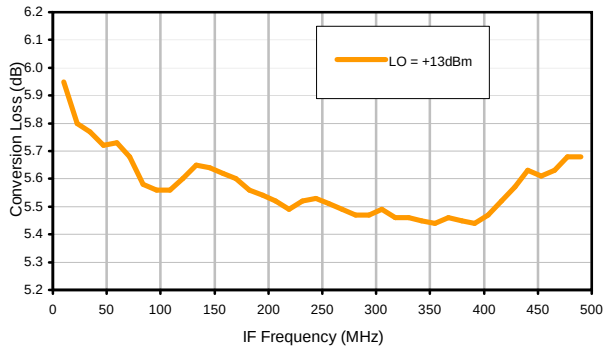
Conversion Loss vs. IF @ RF=250.1MHz



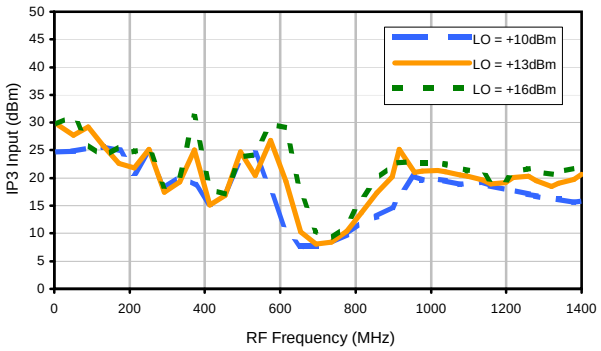
Conversion Loss vs. IF @ RF=10.1MHz



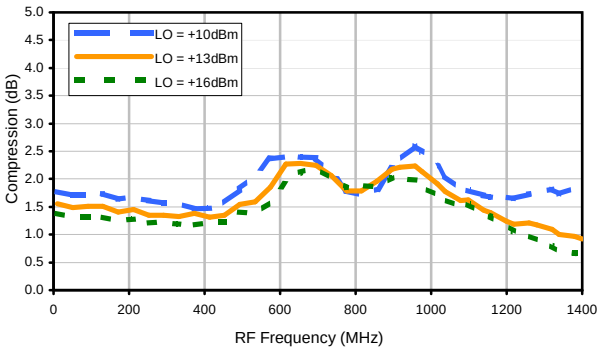
Conversion Loss vs. IF @ RF=500.1MHz



IP3 Input

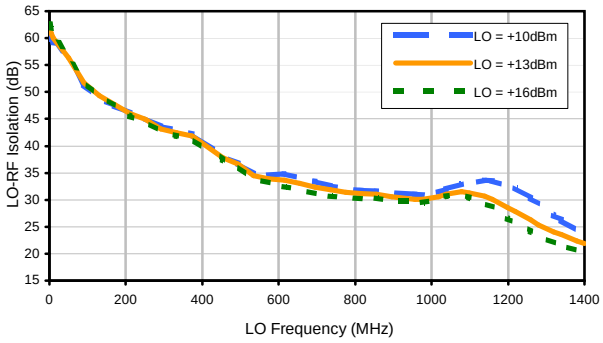


Compression @ RF IN=+9dBm

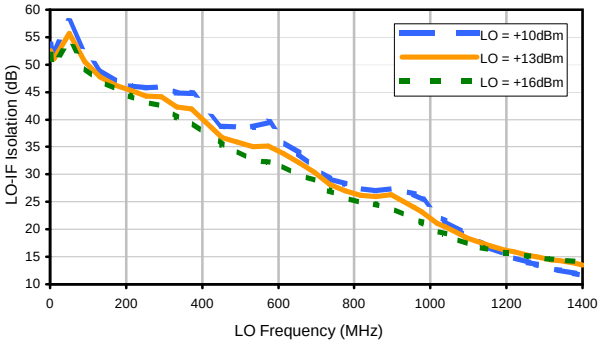


Typical Performance Curves

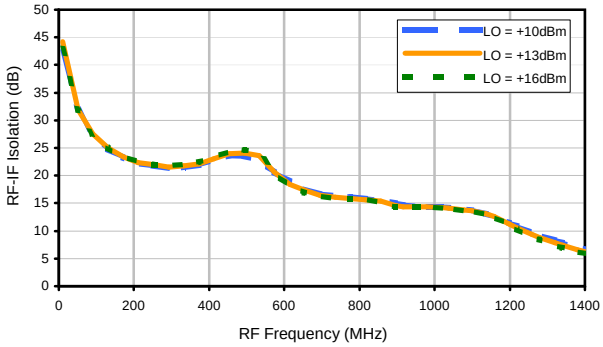
LO-RF Isolation



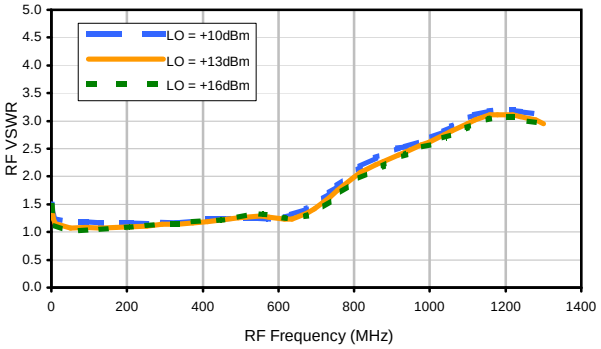
LO-IF Isolation



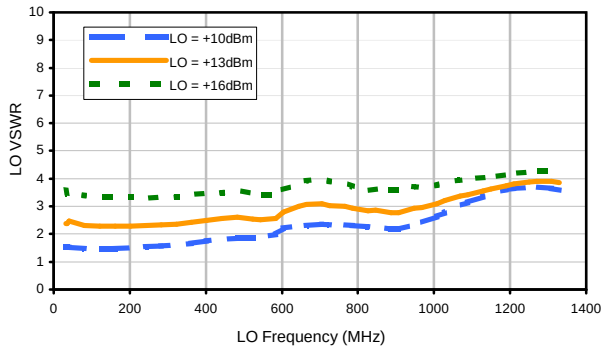
RF-IF Isolation



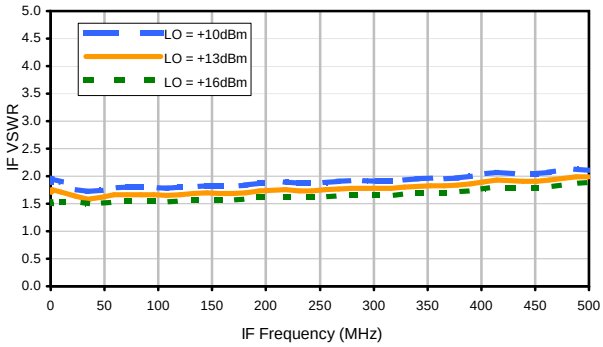
RF VSWR



LO VSWR



IF VSWR



Harmonics Tables

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	20	25	21	33	18	37	29	45	30	48
1	-	17	+0	26	12	31	17	34	31	41	40	47
2	>100	70	57	66	57	65	54	66	50	62	63	72
3	>100	66	68	73	61	75	55	74	55	70	58	75
4	>100	88	77	>89	77	>89	78	83	77	87	84	>89
5	>100	86	81	>89	78	>89	80	>89	78	87	76	87
6	>100	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89
7	>100	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89
8	>100	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89
9	>100	>89	>89	>89	>89	>89	>89	>89	>89	70	>89	>89
10	>100	>89	>89	>89	>89	>89	>89	>89	>89	>89	77	>89
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: **RF IN: 250.1 MHz; -6.00 dBm.**
LO IN: 280.01 MHz; +13.00 dBm
IF OUT: 29.91 MHz; -11.36 dBm

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	29	35	34	46	31	48	43	59	49	65
1	-	17	+0	27	12	34	18	34	32	47	46	54
2	87	71	46	59	47	71	47	61	44	61	57	65
3	>100	41	45	46	46	47	42	45	40	58	51	55
4	>100	67	68	66	68	66	65	63	59	68	56	66
5	>100	75	59	57	51	61	48	57	46	63	47	60
6	>100	82	75	81	75	85	73	>99	70	75	68	73
7	>100	76	73	74	72	68	72	65	65	62	59	61
8	>100	91	88	85	84	88	80	83	80	77	76	74
9	>100	89	80	84	72	73	71	69	71	70	70	70
10	>100	98	93	>99	92	90	84	88	85	92	79	89
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

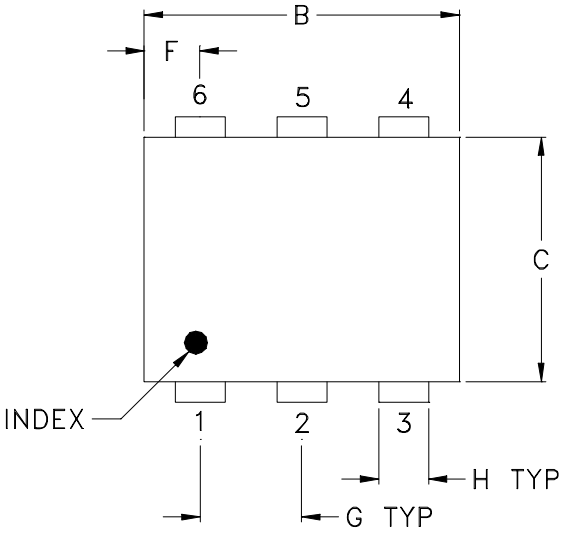
Test conditions: **RF IN: 250.1 MHz; 4.00 dBm.**
LO IN: 280.01 MHz; +13.00 dBm
IF OUT: 29.91 MHz; -1.43 dBm

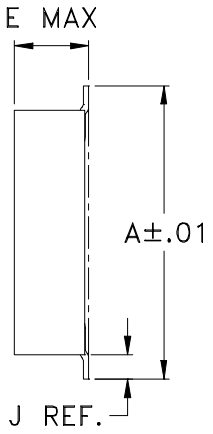
Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

Case Style CD

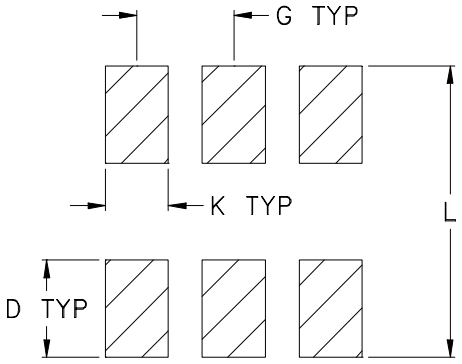
CD541
CD542
CD636
CD637

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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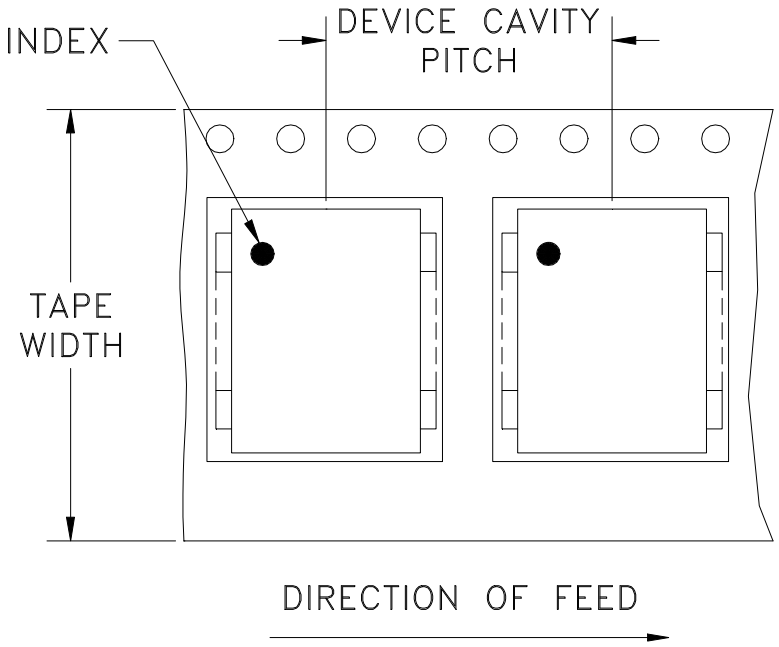
Tape & Reel Packaging TR-F34

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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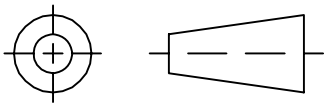
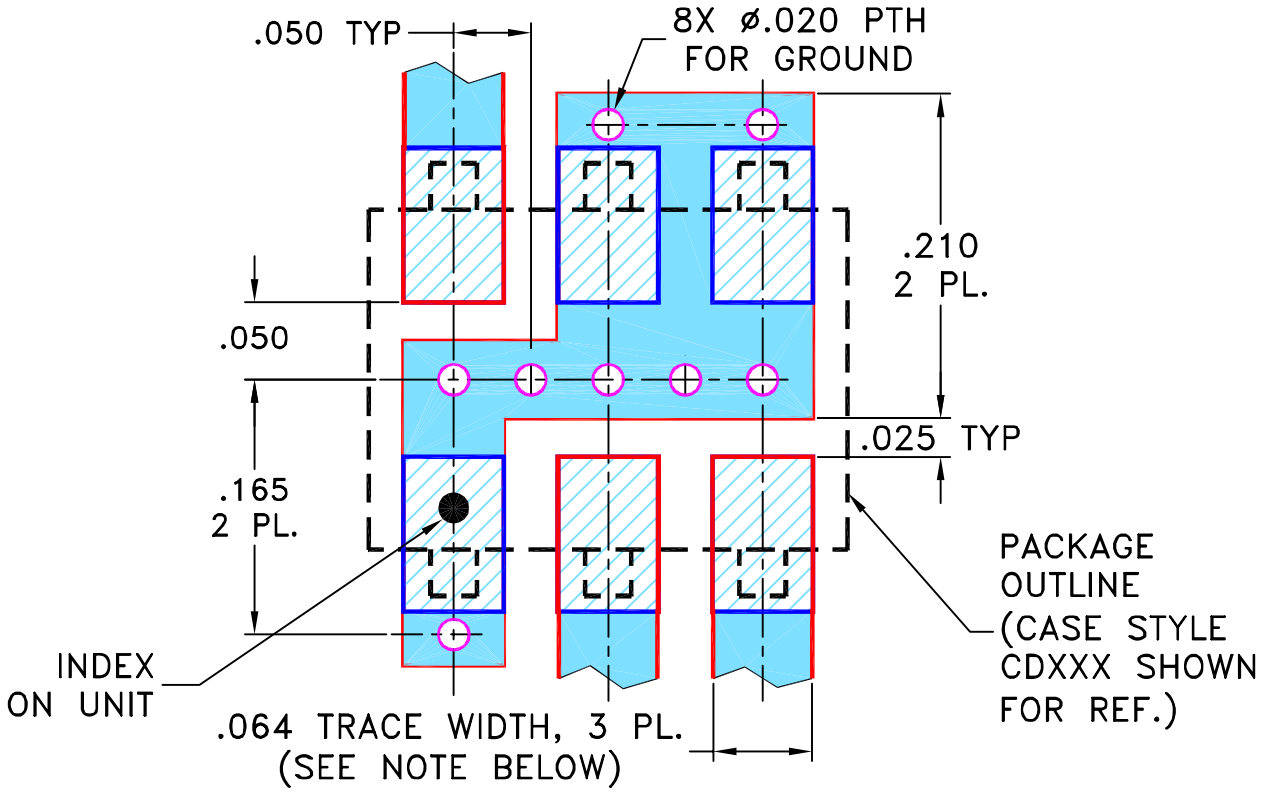
THIRD ANGLE PROJECTION



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

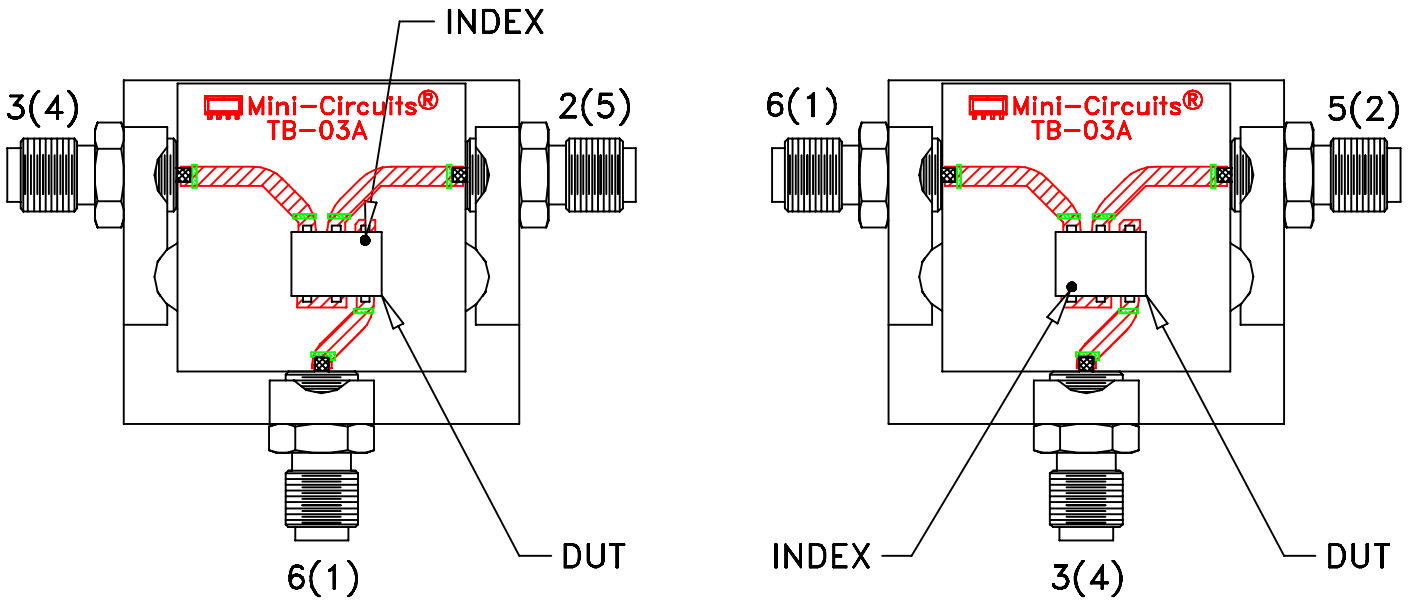
PL, gk/ht/hu/nd/w, BH292, CD541/542/636/637, TT100/240, TB-03

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

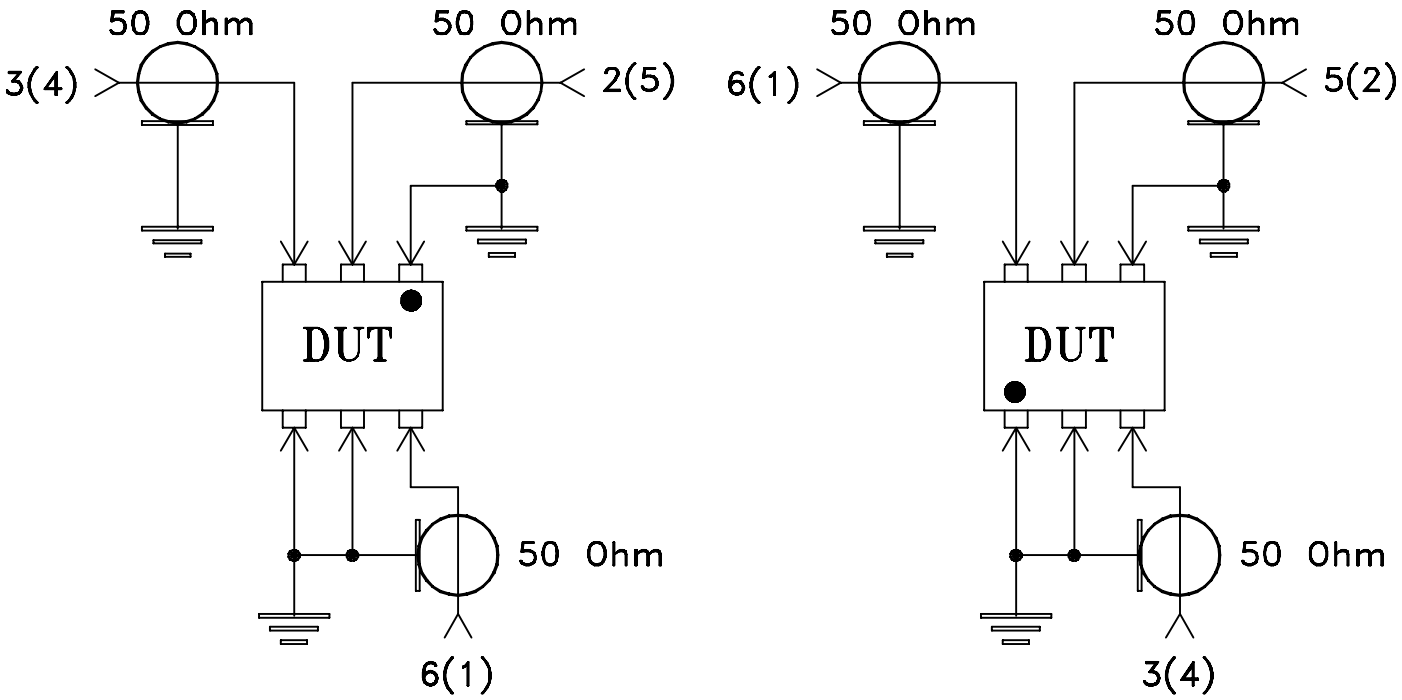
FILE:	SCALE:	SHEET:
98PL052	8:1	1 OF 1

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