

Frequency Mixer

Level 7 (LO Power +7 dBm) 1 to 600 MHz

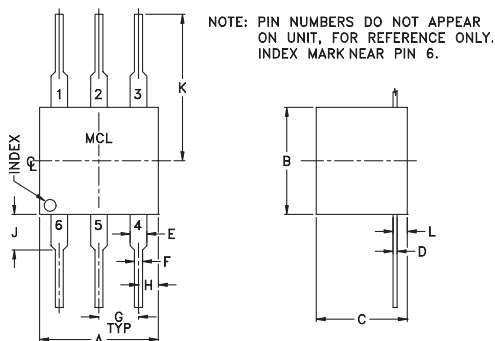
Maximum Ratings

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	1
RF	4
IF	5
GROUND	2,3,6

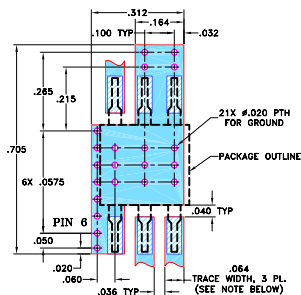
Outline Drawing



Outline Dimensions (inch/mm)

A	B	C	D	E	F
.30	.27	.23	.010	.042	.020
7.62	6.86	5.84	0.25	1.07	0.51
G	H	J	K	L	wt
.100	.05	.09	.31	.036	grams
2.54	1.27	2.29	7.87	0.91	0.50

Demo Board MCL P/N: TB-03
Suggested PCB Layout (PL-082)



- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS 0.030" ± 0.002"; 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.
3. DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
4. DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

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

Features

- low conversion loss, 5.58 dB typ.
- good L-R isolation, 35 dB typ.

Applications

- HF/VHF/UHF
- FM radio
- federal & defense communications



CASE STYLE: W38

+RoHS Compliant

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

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 Max.	L	M	U	L	M	U								
		$\overline{X}$	σ								Max.		Typ. Min.	Typ. Min.	Typ. Min.	Typ. Min.	Typ. Min.	Typ. Min.
f_L - f_U												Typ.						
1-600	DC-600	5.58	.06	7.0	8.5	50	30	35	25	30	20	45	35	30	20	25	15	14

1 dB COMPR.: +1 dBm typ.

L = low range [f_L to 10 f_L]
m = mid band [$2f_L$ to $f_U/2$]

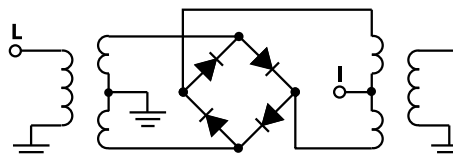
M = mid range [10 f_L to $f_U/2$]

U = upper range [$f_U/2$ to f_U]

Typical Performance Data

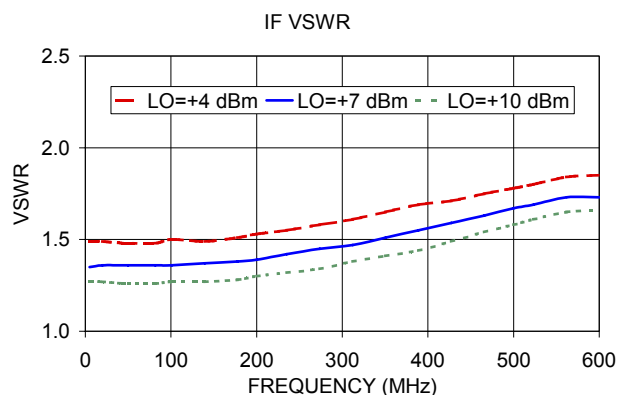
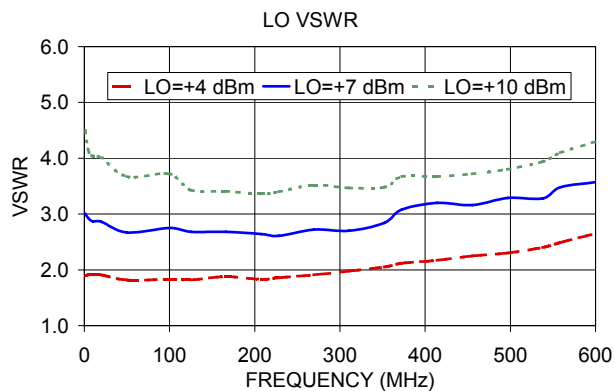
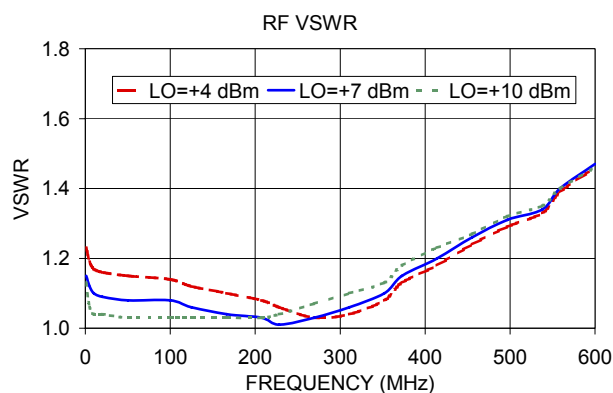
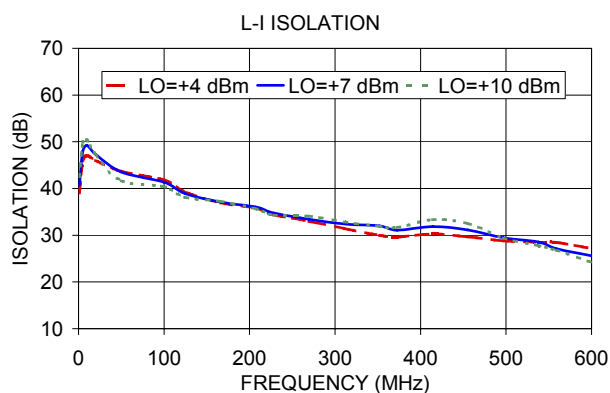
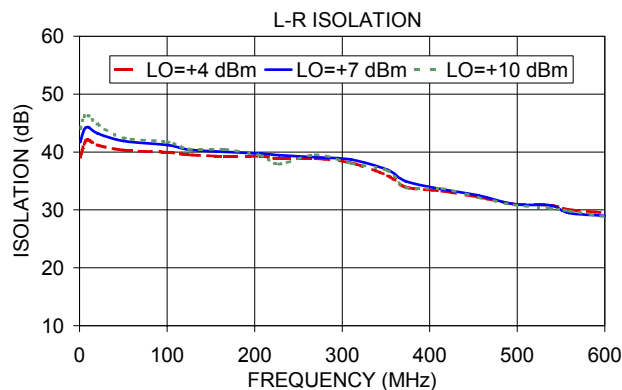
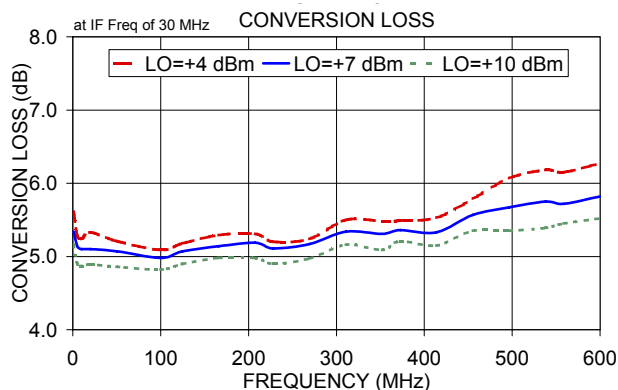
Frequency (MHz)		Conversion Loss (dB)	Isolation L-R (dB)	Isolation L-I (dB)	VSWR RF Port (:1)	VSWR LO Port (:1)
RF	LO	LO +7dBm	LO +7dBm	LO +7dBm	LO +7dBm	LO +7dBm
1.00	31.00	5.34	41.73	40.78	1.15	3.01
5.00	35.00	5.14	43.83	48.03	1.12	2.92
10.00	40.00	5.10	44.31	49.23	1.10	2.87
20.00	50.00	5.10	43.27	47.31	1.09	2.86
50.00	80.00	5.07	41.89	43.53	1.08	2.67
100.00	70.00	4.98	41.22	41.32	1.08	2.75
124.93	94.93	5.07	40.40	38.91	1.06	2.68
166.24	136.24	5.14	40.04	37.11	1.04	2.68
207.55	177.55	5.19	39.72	36.06	1.03	2.64
228.21	198.21	5.11	39.43	34.77	1.01	2.61
269.52	239.52	5.17	39.11	33.40	1.03	2.72
310.83	280.83	5.34	38.68	32.44	1.06	2.70
352.14	322.14	5.31	36.90	31.98	1.10	2.84
372.79	342.79	5.36	34.94	31.09	1.15	3.08
414.10	384.10	5.33	33.57	31.83	1.20	3.20
455.41	425.41	5.57	32.53	31.14	1.26	3.16
496.72	466.72	5.67	30.97	29.46	1.31	3.29
538.03	508.03	5.75	30.78	28.57	1.34	3.28
558.69	528.69	5.72	29.47	27.11	1.40	3.48
600.00	570.00	5.82	28.98	25.59	1.47	3.57

Electrical Schematic



Performance Charts

ASK-1-W38+ ASK-1-W38



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Frequency Mixer

ASK-1+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	4.99	4.79	4.69
40.1	70.1	5.50	5.29	5.12
70.1	100.1	5.46	5.28	5.17
100.1	130.1	5.57	5.40	5.28
130.1	160.1	5.59	5.40	5.29
160.1	190.1	5.66	5.46	5.35
190.1	220.1	5.70	5.49	5.39
220.1	250.1	5.75	5.55	5.42
250.1	280.1	5.84	5.64	5.49
280.1	310.1	5.85	5.63	5.48
310.1	340.1	5.93	5.67	5.50
340.1	370.1	6.02	5.76	5.58
370.1	400.1	6.01	5.77	5.61
400.1	430.1	6.11	5.86	5.69
430.1	460.1	6.20	5.91	5.71
460.1	490.1	6.25	5.92	5.70
490.1	520.1	6.46	6.03	5.77
520.1	550.1	6.71	6.15	5.81
550.1	580.1	6.80	6.16	5.77
580.1	610.1	7.15	6.44	5.95
610.1	640.1	7.28	6.60	6.09
640.1	670.1	7.18	6.60	6.14
670.1	700.1	7.33	6.79	6.34
700.1	730.1	7.26	6.80	6.41
730.1	760.1	7.16	6.76	6.46
760.1	790.1	7.27	6.89	6.60
790.1	820.1	7.24	6.92	6.69
820.1	850.1	7.25	6.98	6.81
850.1	880.1	7.41	7.15	6.99
880.1	910.1	7.54	7.31	7.19
900.1	930.1	7.67	7.45	7.35
930.1	960.1	7.85	7.67	7.60
950.1	980.1	8.05	7.89	7.83
980.1	1010.1	8.35	8.21	8.18
1000.1	1030.1	8.60	8.50	8.50
1030.1	1060.1	9.02	8.94	8.92
1050.1	1080.1	9.31	9.26	9.26
1080.1	1110.1	9.79	9.73	9.70
1100.1	1130.1	10.13	10.07	10.06
1130.1	1160.1	10.64	10.53	10.53

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	21.50	21.12	21.66
40.1	70.1	20.08	21.36	21.44
70.1	100.1	17.93	20.54	21.42
100.1	130.1	21.22	21.30	20.55
130.1	160.1	18.16	19.09	19.00
160.1	190.1	16.28	16.68	18.06
190.1	220.1	18.68	18.07	19.90
220.1	250.1	15.24	15.63	17.95
250.1	280.1	13.09	14.37	17.88
280.1	310.1	15.49	16.96	21.26
310.1	340.1	17.76	20.66	21.25
340.1	370.1	14.26	16.69	21.21
370.1	400.1	11.98	13.74	17.46
400.1	430.1	9.93	11.65	14.03
430.1	460.1	9.58	11.29	13.92
460.1	490.1	10.69	13.65	17.81
490.1	520.1	11.16	16.62	19.53
520.1	550.1	10.20	15.59	16.24
550.1	580.1	9.65	15.24	15.75
580.1	610.1	8.32	11.93	13.08
610.1	640.1	6.97	9.46	11.05
640.1	670.1	7.24	9.24	10.91
670.1	700.1	6.65	8.49	10.30
700.1	730.1	7.09	9.00	11.03
730.1	760.1	9.28	11.38	12.79
760.1	790.1	10.23	12.54	13.04
790.1	820.1	13.72	15.87	14.61
820.1	850.1	15.59	17.09	15.68
850.1	880.1	15.81	16.65	15.93
880.1	910.1	15.31	16.86	16.86
900.1	930.1	15.11	16.25	17.47
930.1	960.1	14.14	15.71	16.58
950.1	980.1	13.52	15.36	15.82
980.1	1010.1	12.94	14.91	14.80
1000.1	1030.1	12.10	13.87	14.39
1030.1	1060.1	11.19	12.56	13.79
1050.1	1080.1	11.34	12.49	13.89
1080.1	1110.1	11.37	12.80	14.56
1100.1	1130.1	11.82	13.81	15.37
1130.1	1160.1	13.34	15.03	15.61

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+1dBm (dB)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	1.68	1.19	1.06
40.1	70.1	1.45	1.04	0.91
70.1	100.1	1.44	1.11	0.88
100.1	130.1	1.30	0.97	0.77
130.1	160.1	1.26	1.00	0.76
160.1	190.1	1.30	1.01	0.80
190.1	220.1	1.24	0.97	0.75
220.1	250.1	1.22	0.96	0.76
250.1	280.1	1.22	0.95	0.75
280.1	310.1	1.24	0.98	0.79
310.1	340.1	1.28	1.03	0.84
340.1	370.1	1.36	1.10	0.90
370.1	400.1	1.53	1.24	1.03
400.1	430.1	1.58	1.31	1.11
430.1	460.1	1.74	1.45	1.24
460.1	490.1	1.90	1.61	1.38
490.1	520.1	1.95	1.68	1.47
520.1	550.1	2.00	1.77	1.56
550.1	580.1	2.06	1.92	1.71
580.1	610.1	1.82	1.77	1.62
610.1	640.1	1.73	1.66	1.56
640.1	670.1	1.81	1.69	1.56
670.1	700.1	1.67	1.52	1.39
700.1	730.1	1.69	1.48	1.33
730.1	760.1	1.74	1.48	1.28
760.1	790.1	1.65	1.36	1.15
790.1	820.1	1.62	1.31	1.07
820.1	850.1	1.60	1.25	0.98
850.1	880.1	1.51	1.16	0.91
880.1	910.1	1.46	1.09	0.85
900.1	930.1	1.44	1.08	0.84
930.1	960.1	1.37	1.02	0.81
950.1	980.1	1.33	0.98	0.81
980.1	1010.1	1.26	0.92	0.77
1000.1	1030.1	1.19	0.85	0.73
1030.1	1060.1	1.10	0.76	0.68
1050.1	1080.1	0.99	0.67	0.63
1080.1	1110.1	0.90	0.61	0.62
1100.1	1130.1	0.82	0.56	0.59
1130.1	1160.1	0.76	0.54	0.56

REV. X2

ASK-1+

101012

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Frequency Mixer

ASK-1+

Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=300.1MHz (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)=600.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+7			+7			+7
290.0	10.1	5.60	10.0	20.1	5.34	590.0	10.1	6.28
282.8	17.3	5.58	30.0	40.1	4.96	575.1	25.0	6.21
275.6	24.5	5.58	50.0	60.1	4.94	560.3	39.8	6.15
268.5	31.6	5.54	70.0	80.1	4.74	545.4	54.7	6.19
261.3	38.8	5.50	110.0	120.1	4.62	530.5	69.6	6.16
254.1	46.0	5.54	130.0	140.1	4.74	515.6	84.5	6.15
246.9	53.2	5.49	170.0	180.1	4.83	500.8	99.3	6.24
239.7	60.4	5.48	190.0	200.1	4.98	485.9	114.2	6.16
232.6	67.5	5.51	230.0	240.1	5.05	471.0	129.1	6.16
225.4	74.7	5.45	250.0	260.1	4.98	456.2	143.9	6.21
218.2	81.9	5.46	290.0	300.1	5.07	441.3	158.8	6.17
211.0	89.1	5.49	310.0	320.1	5.08	426.4	173.7	6.19
203.8	96.3	5.48	350.0	360.1	5.03	411.5	188.6	6.20
196.7	103.4	5.47	370.0	380.1	5.07	396.7	203.4	6.19
189.5	110.6	5.49	410.0	420.1	5.15	381.8	218.3	6.21
182.3	117.8	5.48	430.0	440.1	5.12	366.9	233.2	6.14
175.1	125.0	5.46	470.0	480.1	5.31	352.1	248.0	6.20
167.9	132.2	5.46	490.0	500.1	5.12	337.2	262.9	6.25
160.8	139.3	5.52	530.0	540.1	5.29	322.3	277.8	6.21
153.6	146.5	5.49	550.0	560.1	5.42	307.4	292.7	6.29
146.4	153.7	5.50	590.0	600.1	5.22	292.6	307.5	6.30
139.2	160.9	5.54	610.0	620.1	5.32	277.7	322.4	6.22
132.1	168.0	5.51	650.0	660.1	5.13	262.8	337.3	6.27
124.9	175.2	5.48	670.0	680.1	5.11	247.9	352.2	6.26
117.7	182.4	5.51	710.0	720.1	5.27	233.1	367.0	6.23
110.5	189.6	5.50	730.0	740.1	5.18	218.2	381.9	6.33
103.3	196.8	5.49	770.0	780.1	4.87	203.3	396.8	6.32
96.2	203.9	5.52	790.0	800.1	5.31	188.5	411.6	6.30
89.0	211.1	5.50	830.0	840.1	5.44	173.6	426.5	6.33
81.8	218.3	5.46	850.0	860.1	5.68	158.7	441.4	6.28
74.6	225.5	5.38	890.0	900.1	5.98	143.8	456.3	6.28
67.4	232.7	5.40	910.0	920.1	5.93	129.0	471.1	6.24
60.3	239.8	5.41	950.0	960.1	6.77	114.1	486.0	6.12
53.1	247.0	5.56	970.0	980.1	6.97	99.2	500.9	6.11
45.9	254.2	5.59	1010.0	1020.1	7.94	84.4	515.7	5.98
38.7	261.4	5.56	1030.0	1040.1	8.51	69.5	530.6	6.02
31.5	268.6	5.57	1070.0	1080.1	9.59	54.6	545.5	6.11
24.4	275.7	5.62	1090.0	1100.1	10.13	39.7	560.4	6.04
17.2	282.9	5.65	1130.0	1140.1	11.81	24.9	575.2	6.20
10.0	290.1	6.07	1150.0	1160.1	12.57	10.0	590.1	6.75

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Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+4	+7	+10	+4	+7	+10
40.1	39.98	41.68	43.05	61.18	62.15	63.18
70.1	39.07	40.19	40.91	57.29	58.22	58.56
100.1	38.45	39.05	39.16	53.90	54.49	54.85
130.1	37.87	37.87	37.56	50.54	51.39	52.00
160.1	37.12	36.72	36.18	48.44	49.60	50.54
190.1	36.66	35.95	35.26	46.24	47.51	48.70
220.1	35.81	34.84	34.02	44.92	46.64	48.13
250.1	35.19	34.07	33.19	43.86	45.79	47.68
280.1	35.12	33.82	32.85	42.11	44.06	45.94
310.1	34.44	33.11	32.12	41.22	43.27	45.39
340.1	33.58	32.22	31.29	42.21	44.48	46.88
370.1	32.45	31.32	30.53	43.69	46.48	48.69
400.1	31.36	30.46	29.87	43.90	45.29	45.28
430.1	31.08	30.25	29.66	42.15	41.30	40.23
460.1	30.89	30.06	29.45	39.71	38.19	36.72
490.1	30.91	29.93	29.31	37.86	36.06	34.41
520.1	30.86	29.74	28.95	36.77	34.84	33.09
550.1	30.30	29.33	28.53	36.80	34.53	32.35
580.1	29.32	28.55	27.92	36.18	33.74	31.33
610.1	28.46	27.82	27.21	33.29	31.63	29.60
640.1	27.50	26.95	26.55	30.63	29.41	27.96
670.1	26.86	26.33	25.97	28.21	27.02	25.86
700.1	26.52	25.86	25.42	26.19	24.90	23.80
730.1	26.18	25.45	24.99	24.77	23.37	22.22
760.1	26.09	25.34	24.83	23.26	21.83	20.68
790.1	26.16	25.31	24.69	22.03	20.55	19.42
820.1	26.05	25.10	24.37	20.82	19.39	18.24
850.1	26.03	24.89	24.10	19.71	18.24	17.16
880.1	26.05	24.78	23.88	18.84	17.45	16.41
910.1	25.66	24.23	23.26	17.63	16.33	15.31
930.1	25.48	24.00	23.00	17.12	15.90	14.92
960.1	24.90	23.41	22.33	16.10	15.03	14.10
980.1	24.42	22.87	21.83	15.66	14.62	13.75
1010.1	23.44	22.05	20.99	14.74	13.89	13.01
1030.1	22.58	21.33	20.37	14.26	13.50	12.72
1060.1	21.34	20.32	19.40	13.55	12.93	12.14
1080.1	20.61	19.73	18.91	13.32	12.76	12.05
1110.1	19.20	18.54	17.88	12.56	12.07	11.43
1130.1	18.40	17.89	17.30	12.28	11.85	11.24
1160.1	17.30	17.02	16.56	11.80	11.44	10.89

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	44.26	44.09	43.38
40.1	70.1	33.98	33.39	33.56
70.1	100.1	29.38	29.66	29.80
100.1	130.1	27.34	27.66	27.75
130.1	160.1	25.79	26.10	26.25
160.1	190.1	24.64	24.95	25.23
190.1	220.1	24.08	24.53	24.75
220.1	250.1	23.89	24.48	24.94
250.1	280.1	23.91	24.52	25.03
280.1	310.1	23.79	24.27	24.76
310.1	340.1	24.03	24.88	25.56
340.1	370.1	24.21	25.39	26.50
370.1	400.1	23.92	25.02	25.98
400.1	430.1	23.30	23.86	24.15
430.1	460.1	21.51	21.44	21.18
460.1	490.1	19.25	18.96	18.64
490.1	520.1	17.93	17.56	17.25
520.1	550.1	17.06	16.67	16.34
550.1	580.1	16.46	16.05	15.70
580.1	610.1	16.60	16.21	15.79
610.1	640.1	16.98	16.57	16.17
640.1	670.1	16.95	16.51	16.11
670.1	700.1	16.90	16.44	16.01
700.1	730.1	16.73	16.15	15.66
730.1	760.1	16.09	15.46	14.92
760.1	790.1	15.47	14.72	14.13
790.1	820.1	14.78	13.99	13.31
820.1	850.1	13.90	13.09	12.44
850.1	880.1	13.11	12.30	11.68
880.1	910.1	12.26	11.50	10.89
900.1	930.1	11.67	10.96	10.36
930.1	960.1	10.78	10.11	9.59
950.1	980.1	10.15	9.57	9.09
980.1	1010.1	9.41	8.87	8.46
1000.1	1030.1	8.78	8.33	7.96
1030.1	1060.1	8.09	7.72	7.38
1050.1	1080.1	7.56	7.19	6.93
1080.1	1110.1	6.97	6.66	6.43
1100.1	1130.1	6.58	6.30	6.08
1130.1	1160.1	6.08	5.83	5.65

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=600.1MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+4	+7	+10		+4	+7	+10		+4	+7	+10
10.1	40.1	1.25	1.25	1.05	40.1	1.91	2.89	4.27	10.1	1.80	1.51	1.33
40.1	70.1	1.18	1.09	1.05	70.1	1.83	2.69	3.82	20.1	1.85	1.56	1.37
70.1	100.1	1.12	1.05	1.01	100.1	1.76	2.54	3.55	40.1	1.83	1.54	1.35
100.1	130.1	1.16	1.08	1.03	130.1	1.81	2.62	3.67	50.1	1.81	1.53	1.34
130.1	160.1	1.12	1.05	1.01	160.1	1.81	2.61	3.61	70.1	1.86	1.57	1.37
160.1	190.1	1.13	1.06	1.03	190.1	1.79	2.54	3.48	80.1	1.85	1.56	1.38
190.1	220.1	1.14	1.07	1.02	220.1	1.82	2.59	3.54	100.1	1.81	1.53	1.34
220.1	250.1	1.12	1.05	1.01	250.1	1.86	2.63	3.58	110.1	1.86	1.57	1.38
250.1	280.1	1.13	1.07	1.03	280.1	1.87	2.62	3.54	130.1	1.87	1.58	1.39
280.1	310.1	1.14	1.08	1.03	310.1	1.90	2.65	3.57	140.1	1.84	1.55	1.37
310.1	340.1	1.13	1.06	1.01	340.1	1.95	2.70	3.62	160.1	1.88	1.60	1.41
340.1	370.1	1.12	1.05	1.02	370.1	1.98	2.72	3.63	170.1	1.88	1.60	1.41
370.1	400.1	1.13	1.06	1.01	400.1	2.02	2.78	3.70	190.1	1.84	1.56	1.38
400.1	430.1	1.13	1.07	1.02	430.1	2.07	2.82	3.74	200.1	1.87	1.59	1.41
430.1	460.1	1.17	1.11	1.06	460.1	2.10	2.84	3.75	220.1	1.91	1.64	1.45
460.1	490.1	1.23	1.16	1.12	490.1	2.17	2.91	3.82	230.1	1.88	1.61	1.43
490.1	520.1	1.30	1.23	1.18	520.1	2.25	2.99	3.90	250.1	1.91	1.64	1.45
520.1	550.1	1.41	1.33	1.28	550.1	2.30	3.03	3.93	260.1	1.94	1.66	1.48
550.1	580.1	1.54	1.44	1.38	580.1	2.37	3.12	4.02	280.1	1.85	1.59	1.42
580.1	610.1	1.66	1.55	1.47	610.1	2.46	3.23	4.15	290.1	1.88	1.62	1.44
610.1	640.1	1.77	1.67	1.59	640.1	2.48	3.25	4.15	310.1	1.94	1.68	1.51
640.1	670.1	1.85	1.76	1.68	670.1	2.50	3.26	4.16	320.1	1.90	1.65	1.48
670.1	700.1	1.90	1.82	1.75	700.1	2.55	3.32	4.23	340.1	1.92	1.66	1.49
700.1	730.1	1.96	1.89	1.84	730.1	2.58	3.33	4.23	350.1	1.95	1.70	1.53
730.1	760.1	1.97	1.92	1.88	760.1	2.57	3.30	4.16	370.1	1.84	1.61	1.46
760.1	790.1	1.97	1.93	1.90	790.1	2.61	3.33	4.18	380.1	1.85	1.61	1.46
790.1	820.1	2.03	2.00	1.98	820.1	2.66	3.35	4.20	400.1	1.93	1.69	1.54
820.1	850.1	2.04	2.02	2.00	850.1	2.67	3.33	4.14	410.1	1.89	1.66	1.52
850.1	880.1	2.09	2.06	2.04	880.1	2.70	3.34	4.12	430.1	1.85	1.64	1.49
880.1	910.1	2.16	2.13	2.10	910.1	2.78	3.38	4.14	440.1	1.90	1.68	1.53
900.1	930.1	2.24	2.20	2.17	930.1	2.83	3.41	4.13	460.1	1.80	1.60	1.48
930.1	960.1	2.28	2.24	2.21	960.1	2.86	3.38	4.05	470.1	1.76	1.57	1.44
950.1	980.1	2.33	2.29	2.25	980.1	2.90	3.40	4.02	490.1	1.84	1.64	1.51
980.1	1010.1	2.40	2.36	2.33	1010.1	3.00	3.45	4.02	500.1	1.81	1.62	1.50
1000.1	1030.1	2.46	2.42	2.39	1030.1	3.05	3.46	4.01	520.1	1.74	1.56	1.44
1030.1	1060.1	2.46	2.43	2.40	1060.1	3.05	3.40	3.88	530.1	1.78	1.59	1.47
1050.1	1080.1	2.47	2.45	2.43	1080.1	3.06	3.38	3.86	550.1	1.71	1.54	1.45
1080.1	1110.1	2.48	2.47	2.46	1110.1	3.09	3.39	3.79	560.1	1.65	1.48	1.39
1100.1	1130.1	2.48	2.48	2.48	1130.1	3.07	3.36	3.73	580.1	1.70	1.53	1.43
1130.1	1160.1	2.43	2.44	2.45	1160.1	2.99	3.27	3.59	590.1	1.70	1.54	1.44

Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	17	9	14	34	19	29	27	36	34	45
1	-	19	+0	30	11	29	25	38	36	43	43	51
2	>90	57	60	59	64	55	56	61	59	68	62	60
3	>90	62	69	65	62	69	59	>70	>70	>70	70	>70
4	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
5	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
6	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
7	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
8	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
9	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
10	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 300.1 MHz; -14.00 dBm.
LO IN: 330.1 MHz; +7.00 dBm
IF OUT: 30 MHz; -19.78 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	27	19	25	54	29	43	40	48	51	62
1	-	20	+0	29	12	33	27	44	37	49	49	55
2	73	46	47	54	50	47	46	64	57	55	55	62
3	>90	41	41	47	42	59	42	50	49	53	55	58
4	>90	66	63	55	77	53	77	55	64	67	64	66
5	>90	64	60	65	50	67	50	66	51	64	65	72
6	>90	79	>80	70	74	65	74	65	74	61	69	72
7	>90	>80	80	80	69	75	68	77	66	77	61	70
8	>90	>80	>80	>80	>80	77	>80	75	>80	76	>80	>80
9	>90	>80	>80	>80	>80	>80	76	>80	79	>80	79	>80
10	>90	>80	>80	>80	>80	>80	>80	79	>80	79	>80	78
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 300.1 MHz; -4.00 dBm.
LO IN: 330.1 MHz; +7.00 dBm
IF OUT: 30 MHz; -9.78 dBm

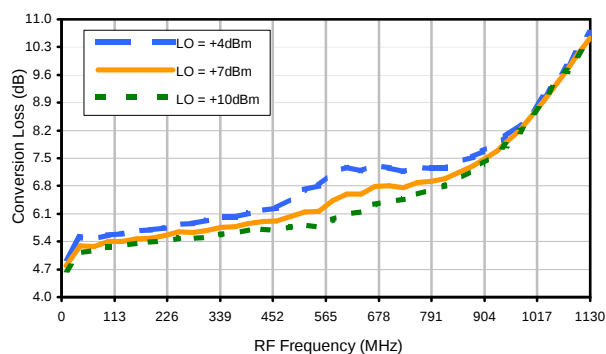
- Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

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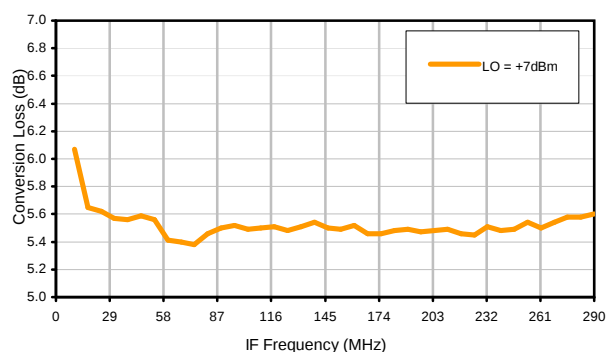


Typical Performance Curves

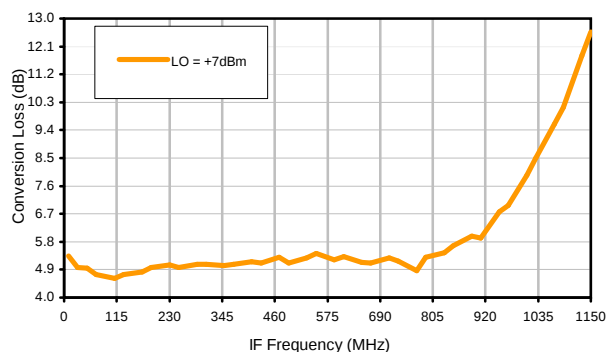
Conversion Loss @ IF=30MHz



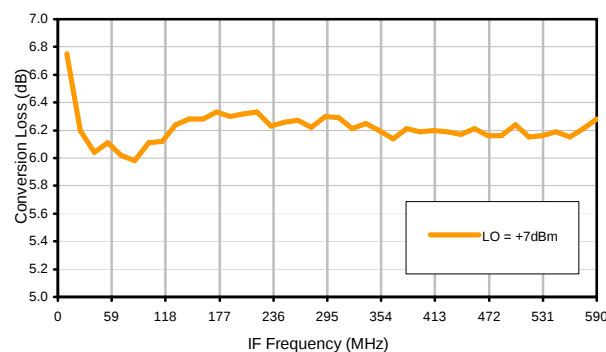
Conversion Loss vs. IF @ RF=300.1MHz



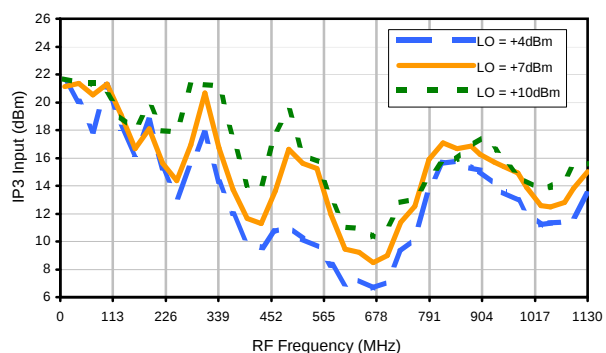
Conversion Loss vs. IF @ RF=10.1MHz



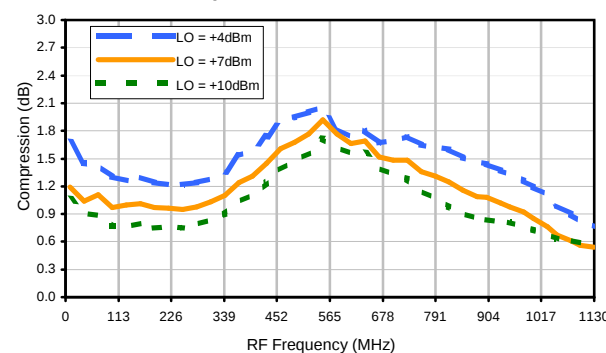
Conversion Loss vs. IF @ RF=600.1MHz



IP3 Input

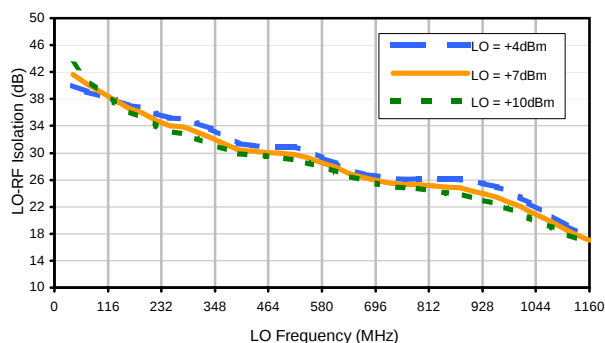


Compression @ RF IN=+1dBm

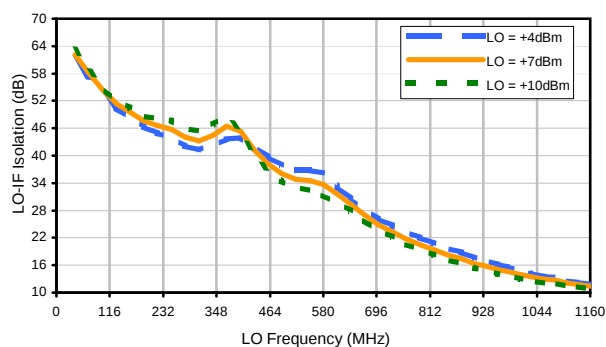


Typical Performance Curves

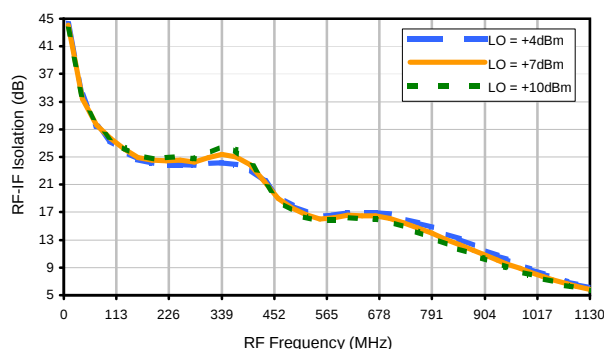
LO-RF Isolation



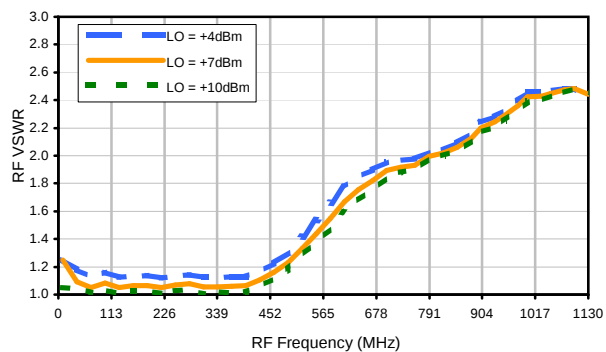
LO-IF Isolation



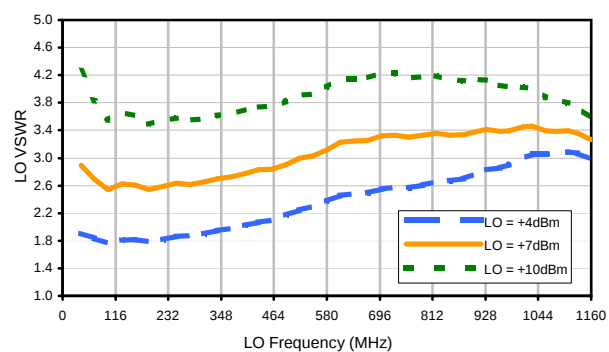
RF-IF Isolation



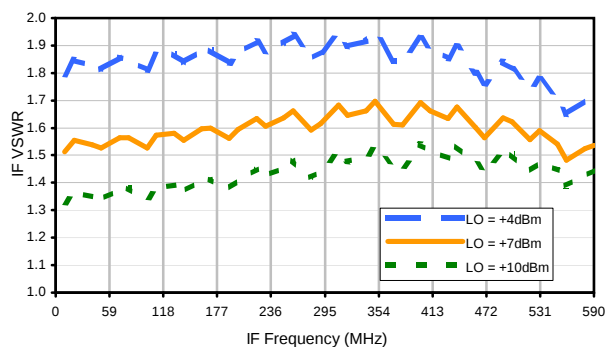
RF VSWR



LO VSWR



IF VSWR



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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	17	9	14	34	19	29	27	36	34	45
1	-	19	+0	30	11	29	25	38	36	43	43	51
2	>90	57	60	59	64	55	56	61	59	68	62	60
3	>90	62	69	65	62	69	59	>70	>70	>70	70	>70
4	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
5	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
6	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
7	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
8	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
9	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
10	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 300.1 MHz; -14.00 dBm.
LO IN: 330.1 MHz; +7.00 dBm
IF OUT: 30 MHz; -19.78 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	27	19	25	54	29	43	40	48	51	62
1	-	20	+0	29	12	33	27	44	37	49	49	55
2	73	46	47	54	50	47	46	64	57	55	55	62
3	>90	41	41	47	42	59	42	50	49	53	55	58
4	>90	66	63	55	77	53	77	55	64	67	64	66
5	>90	64	60	65	50	67	50	66	51	64	65	72
6	>90	79	>80	70	74	65	74	65	74	61	69	72
7	>90	>80	80	80	69	75	68	77	66	77	61	70
8	>90	>80	>80	>80	>80	77	>80	75	>80	76	>80	>80
9	>90	>80	>80	>80	>80	>80	76	>80	79	>80	79	>80
10	>90	>80	>80	>80	>80	>80	>80	79	>80	79	>80	78
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 300.1 MHz; -4.00 dBm.
LO IN: 330.1 MHz; +7.00 dBm
IF OUT: 30 MHz; -9.78 dBm

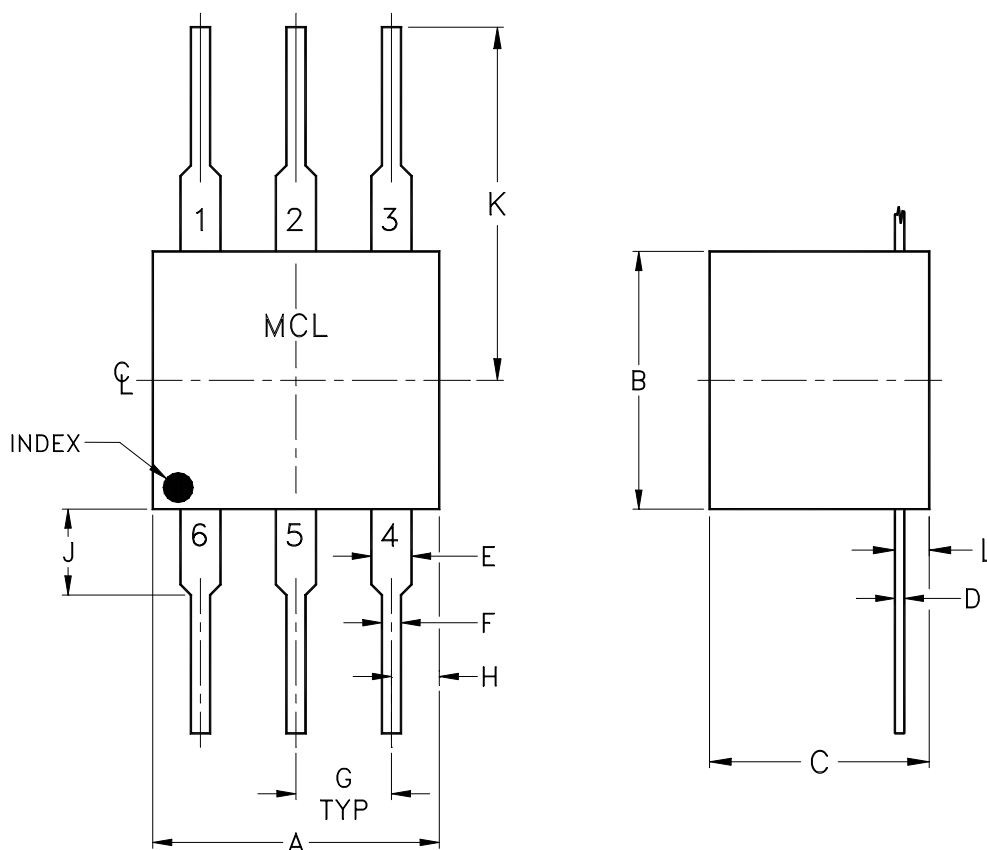
- Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

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Outline Dimensions

W38



CASE #	A	B	C	D	E	F	G	H	J	K	L	WT. GRAM
W38	.30 (7.62)	.27 (6.86)	.23 (5.84)	.010 (0.25)	.042 (1.07)	.020 (0.51)	.100 (2.54)	.05 (1.27)	.09 (2.29)	.31 (7.87)	.036 (0.91)	.50

Dimensions are in inches (mm). Tolerances: 2Pl. $\pm .03$; 3 Pl. $\pm .015$.

Notes:

- Case material: Plastic.
Termination finish: For RoHS Case Styles: Tin Plate over Nickel Plate.
For RoHS-5 Case Styles: Tin-Lead Plate.



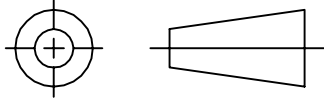
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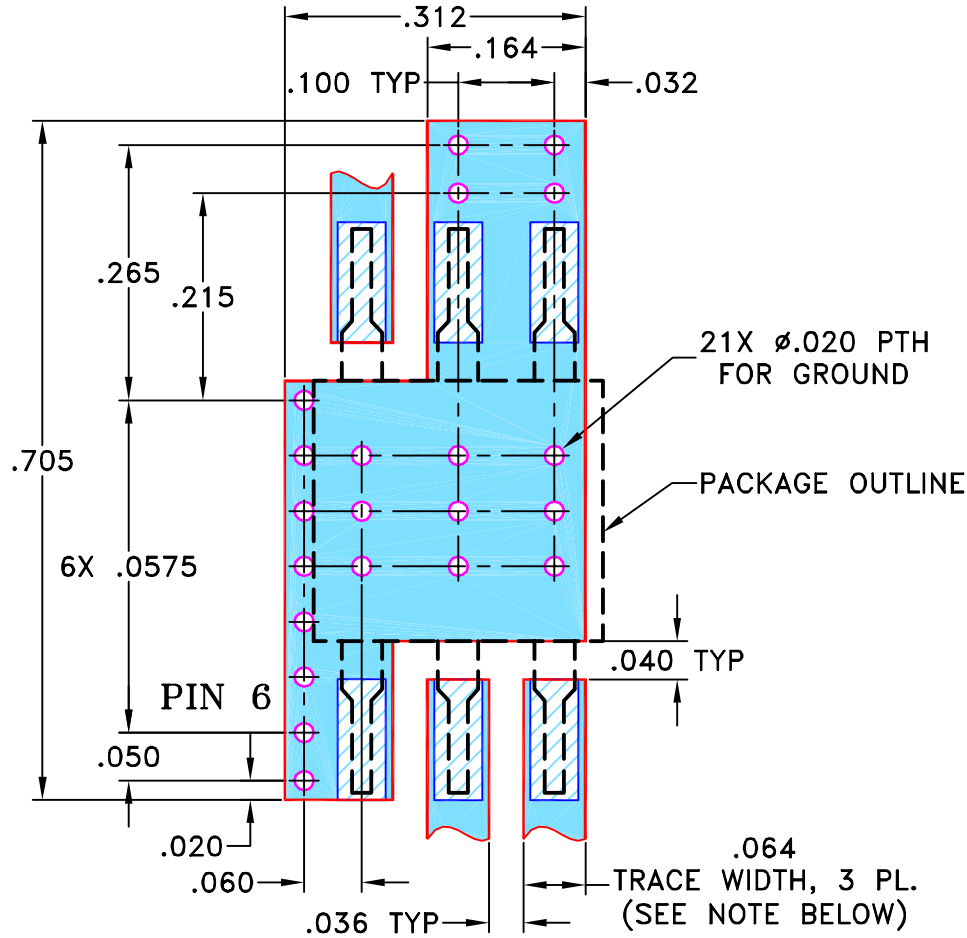
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M82272	NEW RELEASE	08/02/02	AV	DJ
A	M102713	UPDATED NOTES	01/14/06	GF	IL

SUGGESTED MOUNTING CONFIGURATION FOR KK81 CASE STYLE, "w" PIN CONNECTION



NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS $0.030" \pm 0.002"$; 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 $\pm$.005
ANGLES $\pm$
FRACTIONS $\pm$

DRAWN

AV

07/23/02

CHECKED

WL

08/02/02

APPROVED

DJ

08/02/02



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PL, w, KK81, ASK, TB-174

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SIZE
A

CODE IDENT
15542

DRAWING NO:
98-PL-082

REV:
A

FILE: 98PL082

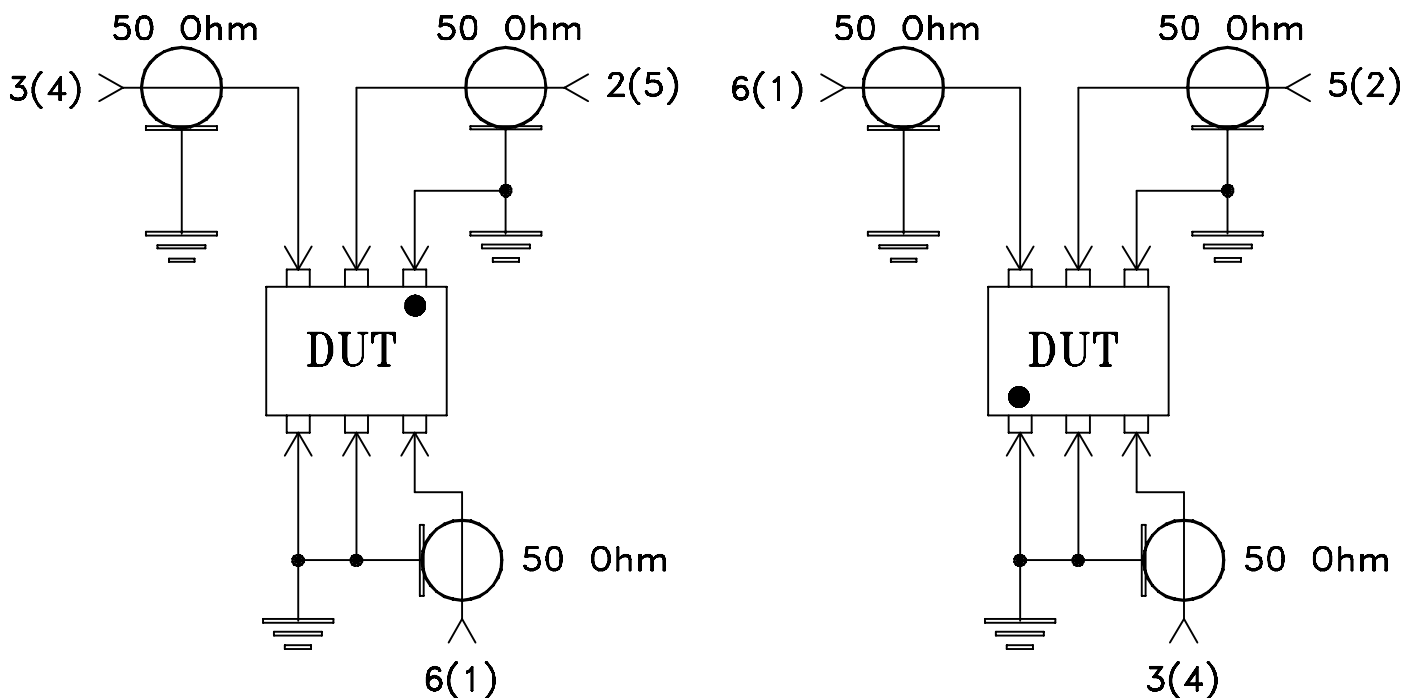
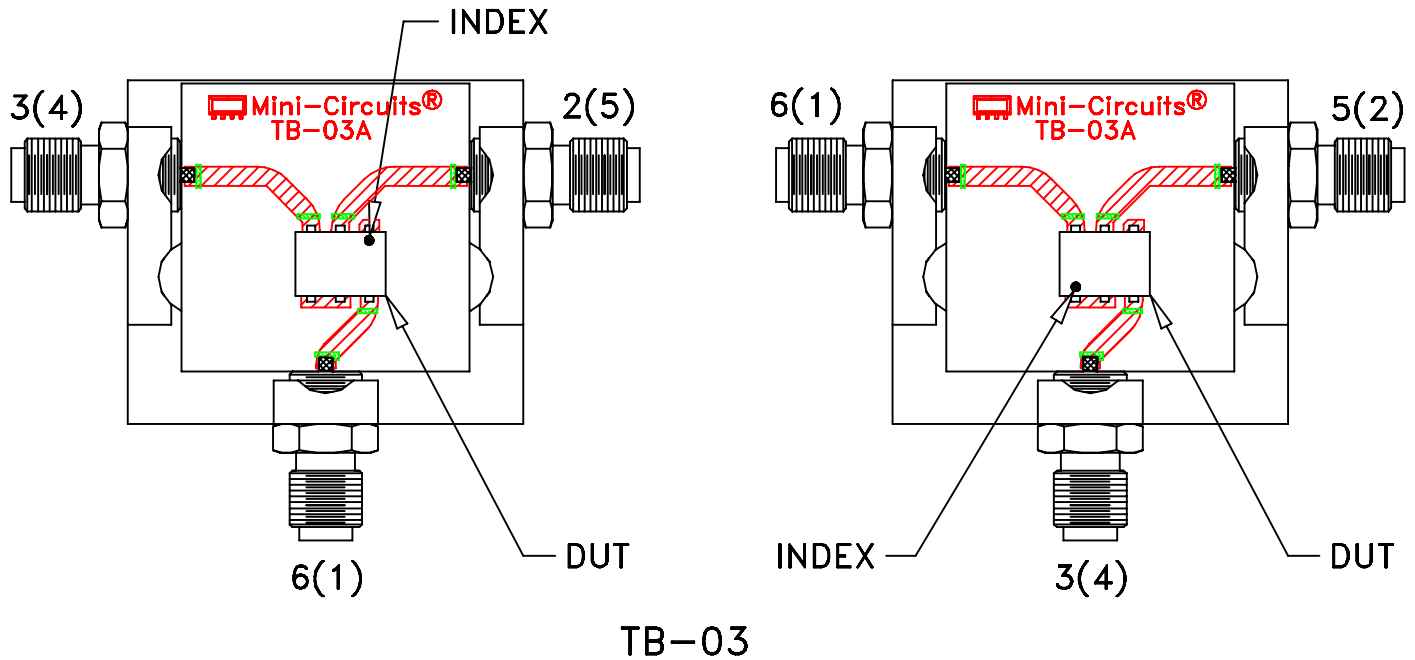
SCALE: 5:1

SHEET: 1 OF 1

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

Evaluation Board and Circuit

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



Schematic Diagram

Notes:

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

 **Mini-Circuits®**



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

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-40° to 85°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutectic Process: 225°C peak Pb-Free Process, 245°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 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
Lead Integrity	2 Pound Pull, perpendicular to edge of unit	MIL-STD-202, Method 211, 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