Ceramic Surface Mount

Frequency Mixer WIDE BAND

SIM-63LH+

Level 10 (LO Power +10 dBm) 750 to 6000 MHz

Generic photo used for illustration purposes only

CASE STYLE: HV1195

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

Available Tape and Reel at no extra cost

Reel Size	Devices/Reel
7"	10, 20, 50, 100, 200, 500

Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power	50mW

For extended temperature range, consult factory.
Permanent damage may occur if any of these limits are exceeded.

Pin Connections

LO	8
RF	4
IF	2
GROUND	1,3,5,6,7

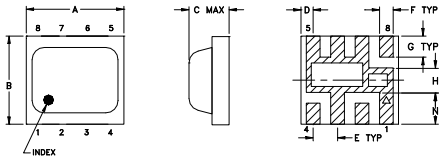
Features

- wide bandwidth, 750 to 6000 MHz
- low conversion loss, 6.2 dB typ.
- excellent L-R isolation, 34 dB typ.
- LTCC double balanced mixer
- tiny size, low profile, 0.08"
- useable as up and down converter
- aqueous washable
- protected by US patent 7,027,795

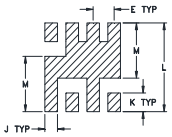
Applications

- cellular
- defense & weather radar
- defense communications
- PCN
- WCDMA
- WIFI
- blue tooth
- VSAT
- ISM

Outline Drawing



PCB Metal Land Pattern



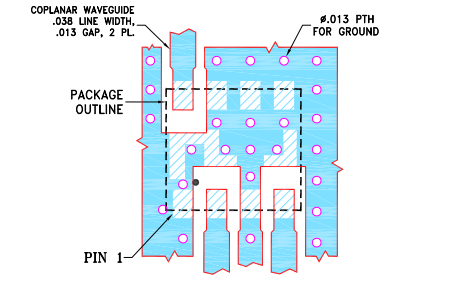
Suggested Layout,
Tolerance to be within±.002

Outline Dimensions (inch / mm)

A	B	C	D	E	F	G
.200	.180	.087	.025	.050	.028	.043
5.08	4.57	2.2098	0.64	1.27	0.71	1.09

H	J	K	L	M	N	wt
.050	.030	.043	.204	.127	0.065	grams
1.27	0.76	1.09	5.18	3.23	1.65	0.08

Demo Board MCL P/N: TB-382
Suggested PCB Layout (PL-239)



NOTES:
1. TRACE WIDTH AND GAP ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020"±.0015"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP 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

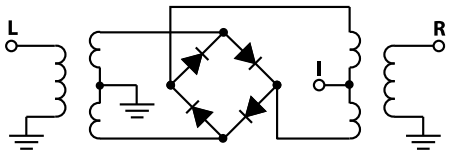
FREQUENCY (MHz)		CONVERSION LOSS* (dB)			LO-RF ISOLATION (dB)		LO-IF ISOLATION (dB)		IP3 at center band (dBm)
LO/RF f_L-f_U	IF	Typ.	σ	Max.	Typ.	Min.	Typ.	Min.	Typ.
750-6000	**DC-1500**								
750-1700		6.3	0.1	7.3	37	31	30	20	12
1700-2000		6.6	0.1	7.5	37	32	20	12	18
2000-3100		5.8	0.1	7.2	32	25	22	12	12
3100-3800		5.7	0.1	7.0	30	25	25	15	15
3800-6000		8.0	0.2	9.3	30	22	20	13	15

1 dB Compression: +3 dBm typ.
* Conversion loss at 30 MHz IF. σ is a measure of repeatability from unit to unit.

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 +10dBm	LO +10dBm	LO +10dBm	LO +10dBm	LO +10dBm
740.00	771.00	6.12	39.29	26.22	1.99	7.05
850.00	881.00	5.79	36.91	27.35	1.51	4.55
1000.00	1031.00	6.24	40.47	28.20	2.63	2.78
1200.00	1231.00	6.27	42.51	30.04	3.21	1.54
1500.00	1531.00	6.05	36.17	42.37	2.94	2.15
1800.00	1831.00	6.53	37.46	21.72	3.22	2.96
2100.00	2131.00	6.29	36.76	17.14	3.00	2.64
2400.00	2431.00	5.47	35.23	21.65	2.01	2.45
2700.00	2731.00	5.11	31.43	23.85	1.75	1.87
3000.00	3031.00	5.05	30.30	26.15	1.34	1.30
3400.00	3431.00	5.53	30.24	23.55	1.44	1.45
3800.00	3831.00	6.01	28.84	20.37	2.40	2.23
4200.00	4231.00	7.01	30.59	18.41	3.57	3.00
4500.00	4531.00	8.08	32.32	17.66	4.84	3.45
4800.00	4831.00	8.28	31.53	21.57	5.04	3.96
5100.00	5131.00	7.96	28.60	26.68	3.55	3.05
5400.00	5431.00	7.36	28.72	23.26	3.65	3.13
5700.00	5731.00	7.43	28.75	20.86	2.99	3.26
5850.00	5881.00	7.75	27.90	20.28	2.82	2.87
6000.00	6031.00	7.66	27.87	21.39	2.48	2.13

Electrical Schematic



Notes
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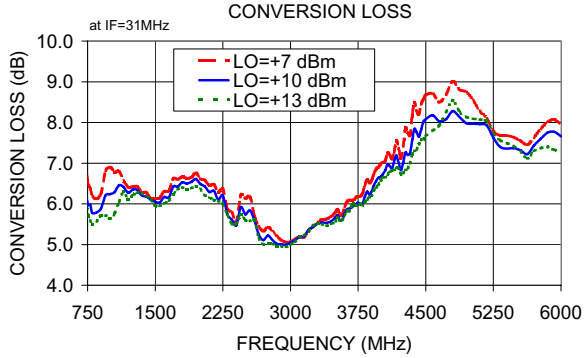
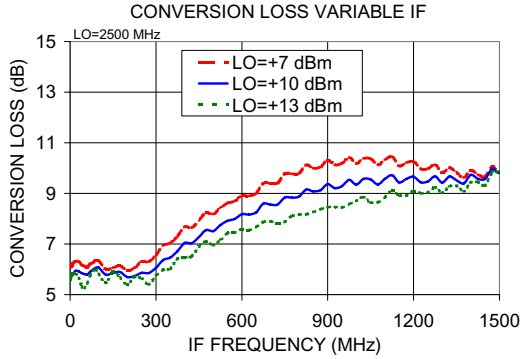
REV. B
ECO-000060
SIM-63LH+
ED-12399/1
DJ/RS/CP
200821

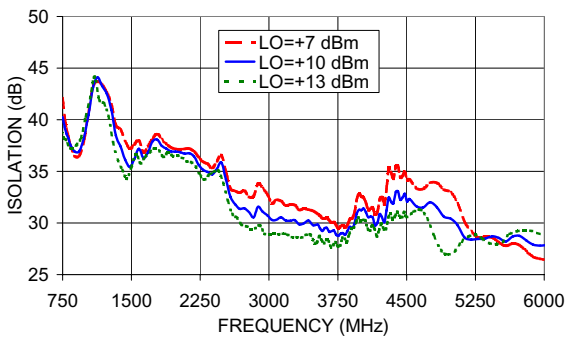
SIM-63LH+
CONVERSION LOSS



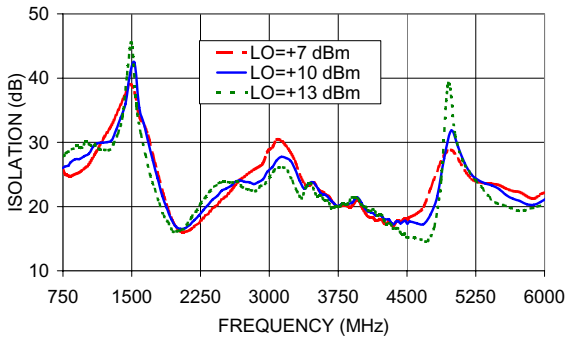
SIM-63LH+
CONVERSION LOSS VARIABLE IF



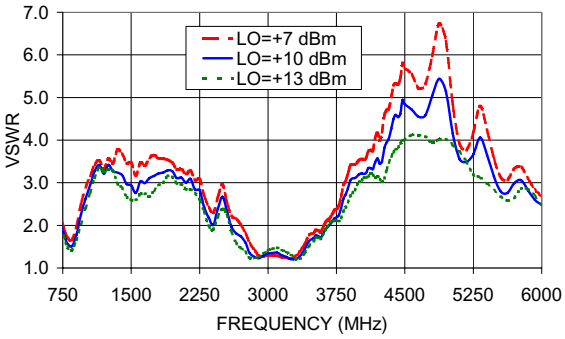
SIM-63LH+
L-R ISOLATION



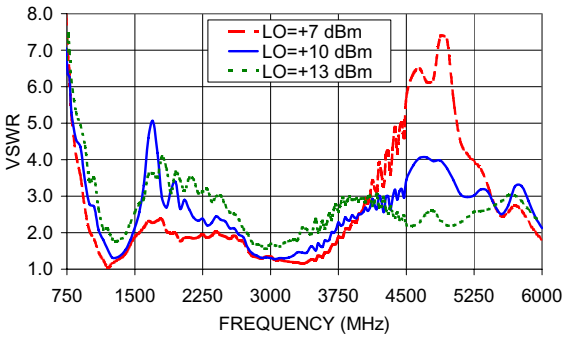
SIM-63LH+
L-I ISOLATION



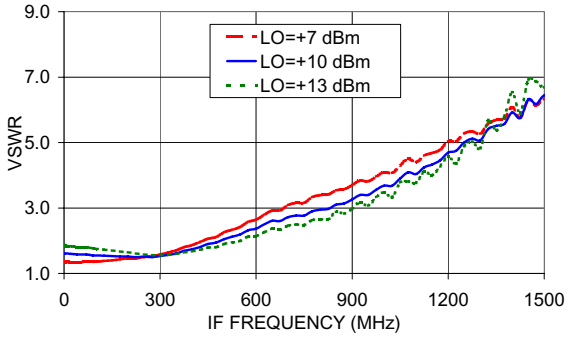
SIM-63LH+
RF VSWR



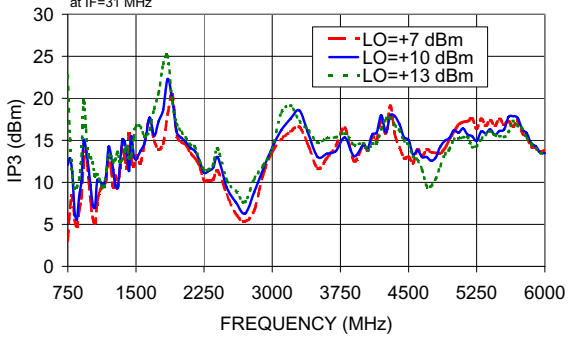
SIM-63LH+
LO VSWR



SIM-63LH+
IF VSWR



SIM-63LH+
IP3



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Frequency Mixer SIM-63LH+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB) @LO (dBm)		
		+7	+10	+13
550.0	580.0	19.19	12.50	8.87
750.0	780.0	7.31	6.60	6.29
950.0	980.0	6.81	6.27	5.85
1150.0	1180.0	6.41	6.28	6.18
1350.0	1380.0	6.26	6.21	6.25
1550.0	1580.0	6.17	6.02	5.98
1750.0	1780.0	6.45	6.27	6.21
1950.0	1980.0	6.62	6.49	6.43
2150.0	2180.0	6.51	6.36	6.29
2350.0	2380.0	6.11	5.93	5.85
2550.0	2580.0	6.51	6.08	5.82
2750.0	2780.0	5.56	5.32	5.21
2950.0	2980.0	5.09	5.00	5.02
3150.0	3180.0	5.27	5.30	5.38
3350.0	3380.0	5.53	5.53	5.59
3550.0	3580.0	6.07	5.94	5.91
3730.0	3760.0	6.61	6.42	6.38
3910.0	3940.0	7.45	7.11	6.91
4010.0	4040.0	7.50	7.22	7.10
4090.0	4120.0	7.72	7.36	7.25
4190.0	4220.0	8.11	7.63	7.46
4270.0	4300.0	8.05	7.56	7.42
4370.0	4400.0	8.73	7.83	7.59
4520.0	4550.0	7.82	6.95	6.79
4640.0	4670.0	8.10	7.16	6.98
4780.0	4810.0	8.00	7.25	7.33
4900.0	4930.0	7.97	7.30	7.29
5040.0	5070.0	8.29	7.63	7.57
5160.0	5190.0	8.54	7.96	7.89
5300.0	5330.0	8.28	8.02	8.08
5420.0	5450.0	8.36	8.04	8.00
5560.0	5590.0	8.55	8.26	8.15
5680.0	5710.0	8.14	7.94	7.90
5820.0	5850.0	7.83	7.65	7.62
5940.0	5970.0	8.61	8.22	8.05
6080.0	6110.0	8.20	7.81	7.62
6200.0	6230.0	7.89	7.55	7.32
6340.0	6370.0	8.16	7.87	7.64
6460.0	6490.0	9.40	9.02	8.78
6600.0	6630.0	14.98	12.80	12.11

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm) @LO (dBm)		
		+7	+10	+13
550.0	580.0	-4.69	1.33	11.39
750.0	780.0	5.24	13.31	14.53
950.0	980.0	6.35	7.94	9.60
1150.0	1180.0	8.94	9.04	9.42
1350.0	1380.0	11.85	11.61	13.01
1550.0	1580.0	14.71	13.50	16.22
1750.0	1780.0	14.26	15.40	19.95
1950.0	1980.0	18.69	18.52	18.78
2150.0	2180.0	14.48	14.86	15.31
2350.0	2380.0	10.21	11.61	12.54
2550.0	2580.0	7.65	8.63	9.91
2750.0	2780.0	5.21	6.07	7.31
2950.0	2980.0	11.89	12.65	12.76
3150.0	3180.0	14.24	15.51	16.19
3350.0	3380.0	17.19	18.84	18.91
3550.0	3580.0	14.90	14.82	15.88
3730.0	3760.0	16.81	15.55	15.21
3910.0	3940.0	14.29	15.12	15.86
4010.0	4040.0	15.23	16.31	16.17
4090.0	4120.0	16.13	18.63	17.08
4190.0	4220.0	15.09	17.38	17.41
4270.0	4300.0	15.46	18.76	19.11
4370.0	4400.0	19.68	20.22	19.84
4520.0	4550.0	11.58	11.89	11.46
4640.0	4670.0	12.83	11.34	11.19
4780.0	4810.0	14.48	12.21	10.30
4900.0	4930.0	13.87	13.33	12.63
5040.0	5070.0	18.34	14.27	14.78
5160.0	5190.0	17.21	15.09	15.72
5300.0	5330.0	13.13	15.48	14.43
5420.0	5450.0	16.26	16.37	16.22
5560.0	5590.0	17.00	16.92	15.17
5680.0	5710.0	15.06	17.73	17.29
5820.0	5850.0	16.58	15.48	16.10
5940.0	5970.0	15.08	14.11	14.34
6080.0	6110.0	12.03	11.55	11.78
6200.0	6230.0	11.57	10.93	11.17
6340.0	6370.0	13.18	12.82	12.12
6460.0	6490.0	12.69	14.75	14.71
6600.0	6630.0	9.76	11.60	13.95

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+3dBm (dB) @LO (dBm)		
		+7	+10	+13
550.0	580.0	-4.17	-0.23	1.02
750.0	780.0	3.42	2.71	2.23
950.0	980.0	2.75	2.65	2.58
1150.0	1180.0	2.04	1.69	1.39
1350.0	1380.0	1.13	0.87	0.73
1550.0	1580.0	0.90	0.70	0.56
1750.0	1780.0	0.98	0.70	0.50
1950.0	1980.0	0.90	0.69	0.52
2150.0	2180.0	1.09	0.85	0.66
2350.0	2380.0	1.38	1.14	0.94
2550.0	2580.0	1.76	1.58	1.38
2750.0	2780.0	2.26	1.97	1.77
2950.0	2980.0	1.78	1.46	1.31
3150.0	3180.0	1.09	0.77	0.65
3350.0	3380.0	1.48	1.09	0.84
3550.0	3580.0	1.51	1.15	0.91
3730.0	3760.0	1.16	0.89	0.71
3910.0	3940.0	1.06	0.87	0.77
4010.0	4040.0	0.93	0.76	0.70
4090.0	4120.0	0.79	0.60	0.50
4190.0	4220.0	0.81	0.60	0.47
4270.0	4300.0	0.84	0.61	0.46
4370.0	4400.0	0.93	0.70	0.56
4520.0	4550.0	1.48	1.14	1.03
4640.0	4670.0	1.57	1.19	1.01
4780.0	4810.0	1.38	1.15	1.07
4900.0	4930.0	1.07	0.81	0.73
5040.0	5070.0	0.86	0.62	0.55
5160.0	5190.0	0.70	0.49	0.44
5300.0	5330.0	0.78	0.49	0.43
5420.0	5450.0	0.58	0.43	0.42
5560.0	5590.0	0.46	0.35	0.31
5680.0	5710.0	0.57	0.40	0.35
5820.0	5850.0	0.59	0.44	0.37
5940.0	5970.0	0.73	0.66	0.60
6080.0	6110.0	1.00	0.91	0.88
6200.0	6230.0	1.17	1.04	1.00
6340.0	6370.0	1.25	1.03	0.96
6460.0	6490.0	1.20	0.83	0.75
6600.0	6630.0	0.73	0.84	0.58

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Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=3010.1MHz (dB) @LO (dBm) +10
1550.1	1460.0	10.80
1510.1	1500.0	9.60
1470.1	1540.0	8.86
1430.1	1580.0	8.52
1390.1	1620.0	8.25
1350.1	1660.0	8.09
1310.1	1700.0	7.72
1270.1	1740.0	7.42
1230.1	1780.0	7.56
1190.1	1820.0	8.01
1150.1	1860.0	8.15
1110.1	1900.0	8.11
1070.1	1940.0	8.05
1030.1	1980.0	8.02
990.1	2020.0	7.96
950.1	2060.0	7.63
910.1	2100.0	7.42
870.1	2140.0	7.12
830.1	2180.0	6.75
790.1	2220.0	6.59
750.1	2260.0	6.44
710.1	2300.0	6.52
670.1	2340.0	6.53
630.1	2380.0	6.54
590.1	2420.0	6.09
550.1	2460.0	5.82
510.1	2500.0	5.55
470.1	2540.0	5.35
430.1	2580.0	5.25
390.1	2620.0	5.30
350.1	2660.0	5.22
310.1	2700.0	5.19
270.1	2740.0	5.13
230.1	2780.0	5.19
190.1	2820.0	5.28
150.1	2860.0	5.28
110.1	2900.0	5.19
70.1	2940.0	5.15
30.1	2980.0	5.07
10.1	3000.0	5.50

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=739.9MHz (dB) @LO (dBm) +10
10.1	750.0	7.15
50.1	790.0	6.61
90.1	830.0	6.52
130.1	870.0	6.48
170.1	910.0	6.49
210.1	950.0	6.61
250.1	990.0	6.57
290.1	1030.0	6.44
330.1	1070.0	6.28
370.1	1110.0	6.27
410.1	1150.0	6.31
450.1	1190.0	6.25
490.1	1230.0	6.17
530.1	1270.0	6.15
570.1	1310.0	6.19
610.1	1350.0	6.15
650.1	1390.0	6.20
690.1	1430.0	6.19
730.1	1470.0	6.31
770.1	1510.0	6.45
810.1	1550.0	6.47
850.1	1590.0	6.50
890.1	1630.0	6.74
930.1	1670.0	6.95
970.1	1710.0	7.08
1010.1	1750.0	7.09
1050.1	1790.0	6.97
1090.1	1830.0	7.24
1130.1	1870.0	7.40
1170.1	1910.0	7.56
1210.1	1950.0	7.62
1250.1	1990.0	7.82
1290.1	2030.0	7.98
1330.1	2070.0	8.09
1370.1	2110.0	8.24
1410.1	2150.0	8.47
1450.1	2190.0	8.64
1490.1	2230.0	9.04
1530.1	2270.0	9.49
1590.1	2330.0	10.59

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=6010.1MHz (dB) @LO (dBm) +10
1510.1	4500.0	12.60
1470.1	4540.0	12.09
1430.1	4580.0	11.81
1390.1	4620.0	11.43
1350.1	4660.0	11.16
1310.1	4700.0	11.12
1270.1	4740.0	10.77
1230.1	4780.0	10.57
1190.1	4820.0	10.21
1150.1	4860.0	9.78
1110.1	4900.0	9.45
1070.1	4940.0	9.00
1030.1	4980.0	8.63
990.1	5020.0	8.33
950.1	5060.0	7.96
910.1	5100.0	7.94
870.1	5140.0	7.68
830.1	5180.0	7.62
790.1	5220.0	7.52
750.1	5260.0	7.34
710.1	5300.0	7.35
670.1	5340.0	7.14
630.1	5380.0	7.04
590.1	5420.0	6.93
550.1	5460.0	6.91
510.1	5500.0	6.98
470.1	5540.0	6.86
430.1	5580.0	6.78
390.1	5620.0	6.89
350.1	5660.0	6.92
310.1	5700.0	7.04
270.1	5740.0	7.25
230.1	5780.0	7.51
190.1	5820.0	7.81
150.1	5860.0	8.00
130.1	5880.0	8.10
90.1	5920.0	8.11
70.1	5940.0	8.04
30.1	5980.0	8.00
10.1	6000.0	8.36

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Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB) @LO (dBm)			LO-IF ISOLATION (dB) @LO (dBm)		
	+7	+10	+13	+7	+10	+13
580.0	63.45	61.39	57.89	28.88	29.02	29.15
780.0	41.56	40.63	40.44	24.70	26.74	28.99
980.0	40.40	41.01	41.50	26.69	29.00	31.11
1180.0	41.05	40.43	39.67	30.66	32.25	32.44
1380.0	35.15	33.80	32.71	34.02	35.24	35.38
1580.0	33.73	32.61	31.73	29.06	30.36	31.29
1780.0	35.56	34.34	33.22	21.21	21.45	21.31
1980.0	34.56	33.58	32.83	13.04	13.91	14.39
2180.0	34.91	33.62	32.74	11.63	13.04	14.15
2380.0	32.27	30.75	29.52	14.31	16.03	17.69
2580.0	31.12	29.87	29.25	17.19	18.76	20.20
2780.0	29.16	27.24	25.56	19.24	19.71	19.79
2980.0	29.15	26.63	25.11	21.25	20.40	19.94
3180.0	26.71	25.38	24.20	24.41	23.57	22.91
3380.0	27.34	26.20	25.58	22.76	22.56	22.42
3580.0	26.33	25.60	25.13	22.35	22.66	23.06
3760.0	26.10	25.39	24.62	18.77	19.30	19.74
3940.0	26.79	26.15	25.21	19.36	20.00	20.67
4040.0	27.32	26.37	25.27	18.35	19.41	20.46
4120.0	27.12	26.29	25.18	16.71	17.76	18.88
4220.0	26.99	25.98	24.63	15.77	16.77	17.92
4300.0	27.83	26.32	24.62	15.51	16.49	17.61
4400.0	29.46	27.18	25.08	15.03	15.82	16.76
4550.0	28.75	26.19	23.87	15.37	15.61	15.63
4670.0	28.87	26.27	23.15	17.25	16.86	15.46
4810.0	29.10	26.50	22.98	23.17	20.55	17.38
4930.0	28.98	26.37	23.38	38.13	31.88	27.43
5070.0	28.02	25.78	23.52	30.61	31.97	32.72
5190.0	27.04	25.32	23.76	26.74	27.04	26.72
5330.0	25.81	24.93	24.14	24.70	24.32	23.79
5450.0	24.79	24.49	24.12	23.32	22.66	22.00
5590.0	24.27	24.36	24.22	21.96	21.12	20.48
5710.0	24.14	24.54	24.72	21.17	20.19	19.74
5850.0	23.40	24.23	24.50	19.71	19.17	18.62
5970.0	22.69	23.76	24.70	18.72	18.20	18.07
6110.0	21.45	22.59	23.67	18.27	18.02	18.10
6230.0	21.12	22.47	23.50	18.04	18.30	18.37
6370.0	22.28	23.88	25.14	18.39	19.09	19.52
6490.0	24.64	26.57	28.27	18.50	19.69	20.47
6630.0	29.01	29.94	31.33	17.62	18.74	19.14

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB) @LO (dBm)		
		+7	+10	+13
550.0	580.0	28.19	24.87	20.29
750.0	780.0	15.77	14.32	13.73
950.0	980.0	13.04	12.49	12.14
1150.0	1180.0	19.12	18.82	18.59
1350.0	1380.0	25.03	25.52	25.81
1550.0	1580.0	27.10	27.10	26.93
1750.0	1780.0	26.91	26.76	26.66
1950.0	1980.0	34.07	33.90	33.78
2150.0	2180.0	38.73	38.67	38.80
2350.0	2380.0	39.43	39.65	39.88
2550.0	2580.0	35.36	35.39	35.77
2750.0	2780.0	28.79	28.56	28.48
2950.0	2980.0	26.35	26.47	26.85
3150.0	3180.0	23.48	23.15	23.13
3350.0	3380.0	28.25	27.43	26.63
3550.0	3580.0	20.01	19.82	19.70
3730.0	3760.0	22.13	21.38	21.07
3910.0	3940.0	30.07	29.81	30.35
4010.0	4040.0	39.05	37.74	35.98
4090.0	4120.0	28.93	27.45	26.62
4190.0	4220.0	24.96	23.27	22.25
4270.0	4300.0	23.66	21.67	20.76
4370.0	4400.0	27.85	26.80	26.85
4520.0	4550.0	28.12	27.53	26.68
4640.0	4670.0	27.25	25.93	24.68
4780.0	4810.0	27.86	25.14	23.31
4900.0	4930.0	24.46	23.14	22.15
5040.0	5070.0	23.06	23.60	23.76
5160.0	5190.0	24.58	25.25	25.68
5300.0	5330.0	27.45	28.29	28.93
5420.0	5450.0	30.17	30.94	31.60
5560.0	5590.0	32.40	33.31	34.02
5680.0	5710.0	34.31	35.22	35.52
5820.0	5850.0	33.90	34.52	34.77
5940.0	5970.0	29.66	29.74	29.64
6080.0	6110.0	25.98	25.61	25.13
6200.0	6230.0	24.19	23.69	22.91
6340.0	6370.0	22.52	22.03	21.33
6460.0	6490.0	21.60	21.29	20.97
6600.0	6630.0	21.78	21.32	21.62

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Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1) @LO (dBm)		
		+7	+10	+13
550.0	580.0	10.89	6.81	4.82
750.0	780.0	2.37	2.25	2.19
950.0	980.0	2.13	1.96	1.82
1150.0	1180.0	3.15	3.12	3.07
1350.0	1380.0	3.19	3.08	3.05
1550.0	1580.0	2.95	2.71	2.48
1750.0	1780.0	3.05	2.74	2.55
1950.0	1980.0	3.18	3.01	2.89
2150.0	2180.0	3.08	2.89	2.75
2350.0	2380.0	2.59	2.39	2.24
2550.0	2580.0	2.82	2.60	2.44
2750.0	2780.0	1.90	1.70	1.52
2950.0	2980.0	1.34	1.34	1.35
3150.0	3180.0	1.60	1.67	1.73
3350.0	3380.0	1.54	1.51	1.51
3550.0	3580.0	2.26	2.13	2.06
3730.0	3760.0	3.09	2.88	2.74
3910.0	3940.0	3.85	3.56	3.33
4010.0	4040.0	4.03	3.74	3.53
4090.0	4120.0	4.10	3.74	3.46
4190.0	4220.0	4.42	3.98	3.67
4270.0	4300.0	4.16	3.69	3.37
4370.0	4400.0	4.66	4.01	3.69
4520.0	4550.0	3.05	2.67	2.47
4640.0	4670.0	2.98	2.60	2.36
4780.0	4810.0	3.13	2.73	2.51
4900.0	4930.0	3.24	2.86	2.67
5040.0	5070.0	3.62	3.25	3.08
5160.0	5190.0	4.04	3.67	3.52
5300.0	5330.0	4.36	3.96	3.84
5420.0	5450.0	4.47	4.05	3.78
5560.0	5590.0	4.45	4.09	3.74
5680.0	5710.0	4.19	3.84	3.56
5820.0	5850.0	3.45	3.14	2.88
5940.0	5970.0	3.79	3.52	3.28
6080.0	6110.0	2.92	2.73	2.55
6200.0	6230.0	2.10	1.99	1.84
6340.0	6370.0	1.74	1.68	1.61
6460.0	6490.0	2.28	2.24	2.19
6600.0	6630.0	4.02	3.83	3.76

LO (MHz)	LO VSWR (:1) @LO (dBm)		
	+7	+10	+13
580.0	36.97	34.75	28.03
780.0	10.19	8.35	8.64
980.0	3.07	3.85	4.80
1180.0	1.46	2.01	2.62
1380.0	1.08	1.40	1.86
1580.0	1.67	2.01	2.53
1780.0	2.07	2.62	3.31
1980.0	1.92	2.61	3.39
2180.0	1.90	2.48	3.17
2380.0	2.08	2.40	2.90
2580.0	1.98	2.03	2.35
2780.0	1.64	1.52	1.76
2980.0	1.43	1.15	1.45
3180.0	1.18	1.24	1.65
3380.0	1.17	1.56	2.05
3580.0	1.63	1.98	2.48
3760.0	2.12	2.37	2.82
3940.0	2.77	2.73	3.03
4040.0	3.26	2.95	3.11
4120.0	3.72	3.13	3.11
4220.0	4.20	3.26	3.04
4300.0	4.68	3.29	2.86
4400.0	5.72	3.67	2.86
4550.0	6.28	3.95	2.78
4670.0	6.73	4.29	2.88
4810.0	6.91	4.27	2.87
4930.0	6.76	4.00	2.72
5070.0	5.95	3.73	2.90
5190.0	5.19	3.56	3.16
5330.0	4.17	3.40	3.43
5450.0	3.43	3.25	3.56
5590.0	2.94	3.06	3.44
5710.0	2.63	2.90	3.30
5850.0	2.15	2.52	2.93
5970.0	1.94	2.27	2.62
6110.0	1.90	2.19	2.48
6230.0	2.11	2.39	2.66
6370.0	2.71	3.03	3.31
6490.0	3.37	3.71	3.99
6630.0	3.02	3.17	3.28

IF (OUT) (MHz)	IF VSWR @LO=6000MHz (:1) @LO (dBm)		
	+7	+10	+13
10.0	1.57	1.95	2.29
50.0	1.60	1.98	2.33
90.0	1.57	1.92	2.24
130.0	1.60	1.92	2.22
170.0	1.60	1.87	2.13
210.0	1.61	1.83	2.05
250.0	1.62	1.80	2.00
290.0	1.63	1.75	1.91
330.0	1.67	1.75	1.89
370.0	1.66	1.69	1.80
410.0	1.72	1.71	1.78
450.0	1.70	1.65	1.69
490.0	1.74	1.64	1.64
530.0	1.70	1.57	1.54
570.0	1.69	1.49	1.42
610.0	1.67	1.43	1.31
650.0	1.68	1.40	1.22
690.0	1.88	1.60	1.43
730.0	2.32	2.04	1.88
770.0	3.12	2.77	2.54
810.0	3.81	3.34	3.02
850.0	4.19	3.65	3.29
890.0	4.30	3.75	3.36
930.0	4.18	3.66	3.30
970.0	4.15	3.65	3.31
1010.0	4.03	3.57	3.24
1050.0	3.98	3.55	3.26
1090.0	3.95	3.55	3.29
1130.0	3.97	3.63	3.42
1170.0	4.10	3.81	3.64
1210.0	4.20	3.96	3.84
1250.0	4.41	4.27	4.22
1290.0	4.67	4.61	4.64
1330.0	5.10	5.16	5.28
1370.0	5.68	5.87	6.11
1390.0	6.01	6.28	6.56
1430.0	6.86	7.31	7.70
1450.0	7.34	7.87	8.31
1490.0	8.39	9.04	9.58
1510.0	8.90	9.63	10.13

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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	4	4	12	36	19	36	32	---	---	---
1	-	18	+0	22	12	31	41	57	46	46	---	---
2	90	63	52	60	69	64	64	>72	64	67	65	---
3	>90	>72	66	>72	67	>72	66	>72	>72	>72	>72	>72
4	>90	>72	>72	>72	>72	>72	>72	>72	>72	>72	>72	>72
5	>90	>72	>72	>72	>72	>72	>72	>72	>72	>72	>72	>72
6	>90	>72	>72	>72	>72	>72	>72	>72	>72	>72	>72	>72
7	>90	>72	>72	>72	>72	>72	>72	>72	>72	>72	>72	>72
8	---	---	>72	>72	>72	>72	>72	>72	>72	>72	>72	>72
9	---	---	---	>72	>72	>72	>72	>72	>72	>72	>72	>72
10	---	---	---	---	>72	>72	>72	>72	>72	>72	>72	>72
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

Test conditions: RF IN: 3375 MHz; -12.00 dBm.
LO IN: 3405 MHz; +10.00 dBm
IF OUT: 30 MHz; -17.76 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	6	15	22	48	30	49	45	---	---	---
1	-	17	+0	22	12	32	41	56	48	47	---	---
2	70	51	40	49	64	53	56	70	55	58	56	---
3	>90	62	45	55	44	52	44	60	70	70	65	70
4	>90	>82	71	66	70	61	65	65	77	>82	77	75
5	>90	75	>82	>82	70	75	68	>82	72	82	>82	>82
6	>90	>82	>82	>82	>82	>82	>82	77	82	>82	>82	>82
7	>90	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82
8	---	---	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82
9	---	---	---	>82	>82	>82	>82	>82	>82	>82	>82	>82
10	---	---	---	---	>82	>82	>82	>82	>82	>82	>82	>82
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 3375 MHz; -2.00 dBm.
LO IN: 3405 MHz; +10.00 dBm
IF OUT: 30 MHz; -7.85 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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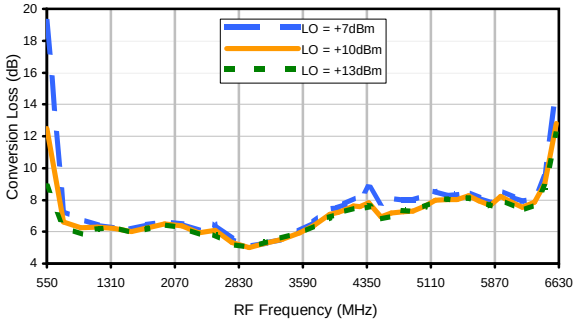
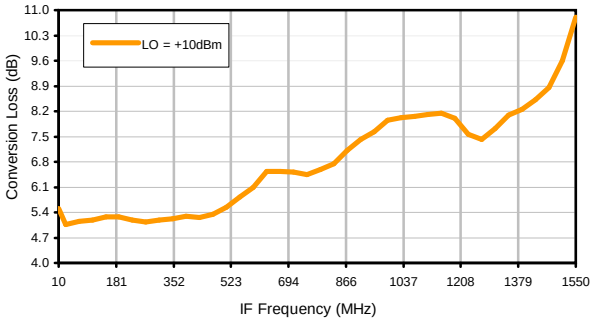
Typical Performance Curves

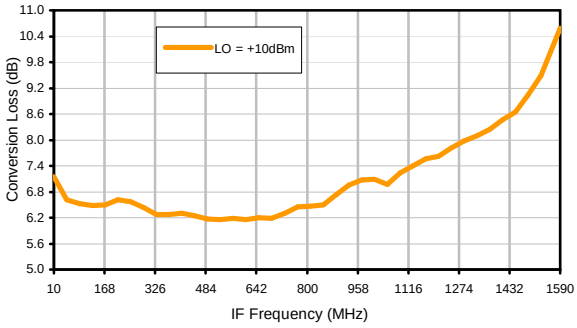
Conversion Loss @ IF=30MHz



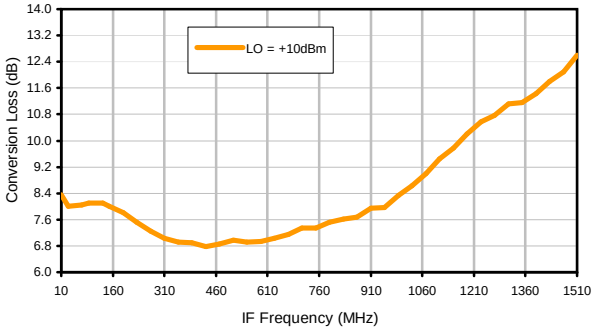
Conversion Loss vs. IF @ RF=3010.1MHz



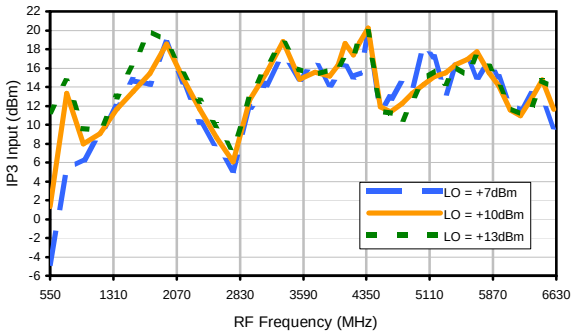
Conversion Loss vs. IF @ RF=739.9MHz



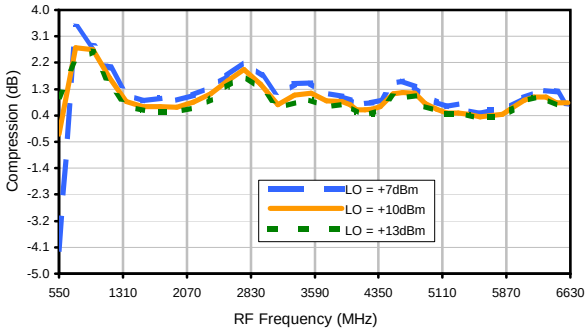
Conversion Loss vs. IF @ RF=6010.1MHz



IP3 Input



Compression @ RF IN=+3dBm



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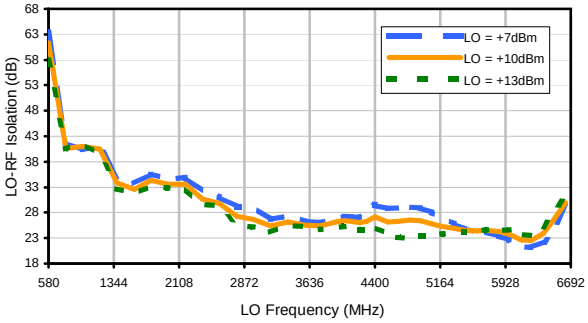
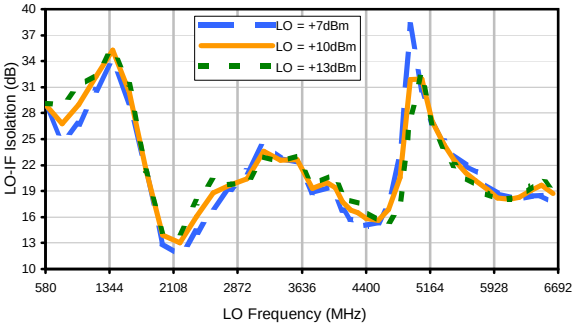
Typical Performance Curves

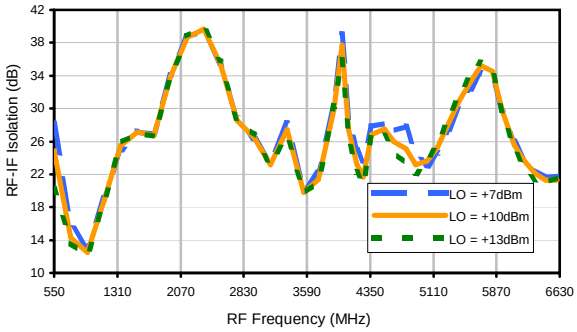
LO-RF Isolation



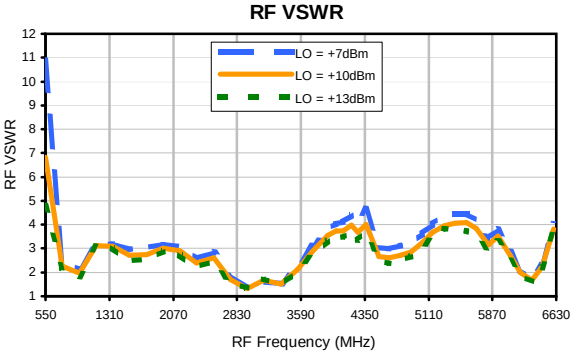
LO-IF Isolation



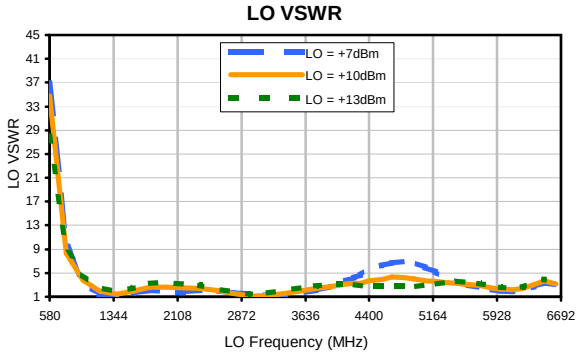
RF-IF Isolation



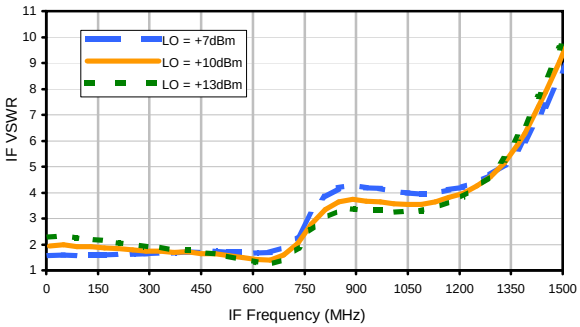
RF VSWR



LO VSWR



IF VSWR



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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	4	4	12	36	19	36	32	---	---	---
1	-	18	+0	22	12	31	41	57	46	46	---	---
2	90	63	52	60	69	64	64	>72	64	67	65	---
3	>90	>72	66	>72	67	>72	66	>72	>72	>72	>72	>72
4	>90	>72	>72	>72	>72	>72	>72	>72	>72	>72	>72	>72
5	>90	>72	>72	>72	>72	>72	>72	>72	>72	>72	>72	>72
6	>90	>72	>72	>72	>72	>72	>72	>72	>72	>72	>72	>72
7	>90	>72	>72	>72	>72	>72	>72	>72	>72	>72	>72	>72
8	---	---	>72	>72	>72	>72	>72	>72	>72	>72	>72	>72
9	---	---	---	>72	>72	>72	>72	>72	>72	>72	>72	>72
10	---	---	---	---	>72	>72	>72	>72	>72	>72	>72	>72
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

Test conditions: RF IN: 3375 MHz; -12.00 dBm.
LO IN: 3405 MHz; +10.00 dBm
IF OUT: 30 MHz; -17.76 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	6	15	22	48	30	49	45	---	---	---
1	-	17	+0	22	12	32	41	56	48	47	---	---
2	70	51	40	49	64	53	56	70	55	58	56	---
3	>90	62	45	55	44	52	44	60	70	70	65	70
4	>90	>82	71	66	70	61	65	65	77	>82	77	75
5	>90	75	>82	>82	70	75	68	>82	72	82	>82	>82
6	>90	>82	>82	>82	>82	>82	>82	77	82	>82	>82	>82
7	>90	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82
8	---	---	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82
9	---	---	---	>82	>82	>82	>82	>82	>82	>82	>82	>82
10	---	---	---	---	>82	>82	>82	>82	>82	>82	>82	>82
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 3375 MHz; -2.00 dBm.
LO IN: 3405 MHz; +10.00 dBm
IF OUT: 30 MHz; -7.85 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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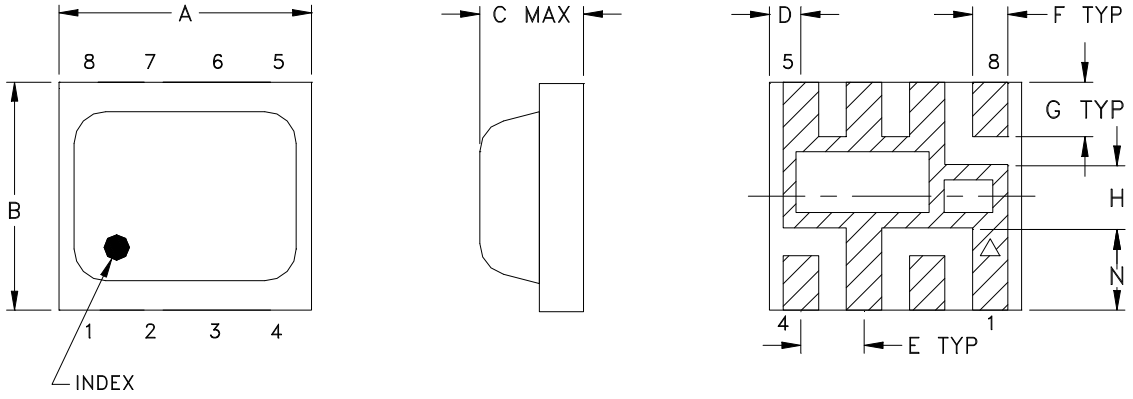
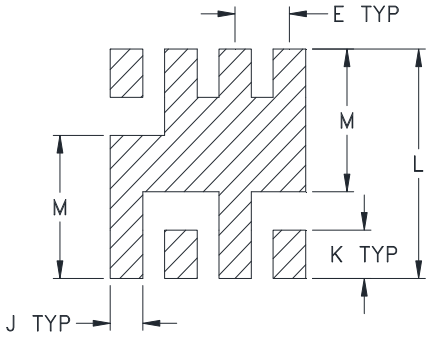
Case Style HV

Outline Dimensions

HV1195



PCB Metal Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
HV1195	0.200 (5.08)	0.180 (4.57)	0.087 (2.21)	0.025 (0.64)	0.050 (1.27)	0.028 (0.71)	0.043 (1.09)	0.050 (1.27)	0.030 (0.76)	0.043 (1.09)	0.204 (5.18)	0.127 (3.23)	0.065 (1.65)

CASE#	WT, GRAM
HV1195	.08

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

Notes:

1. Case material: Plastic encapsulation on Ceramic base.
2. Termination finish: Palladium Silver.

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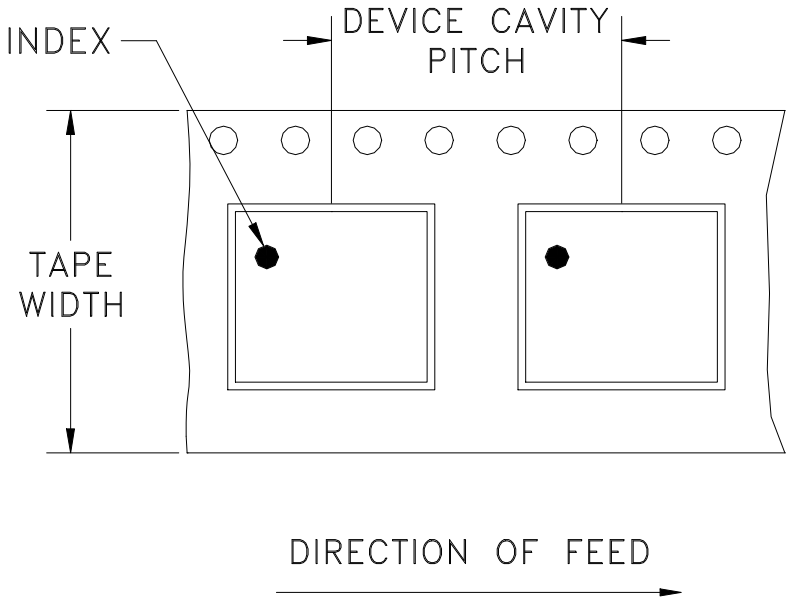
Tape & Reel Packaging TR-F82

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
12	8	7	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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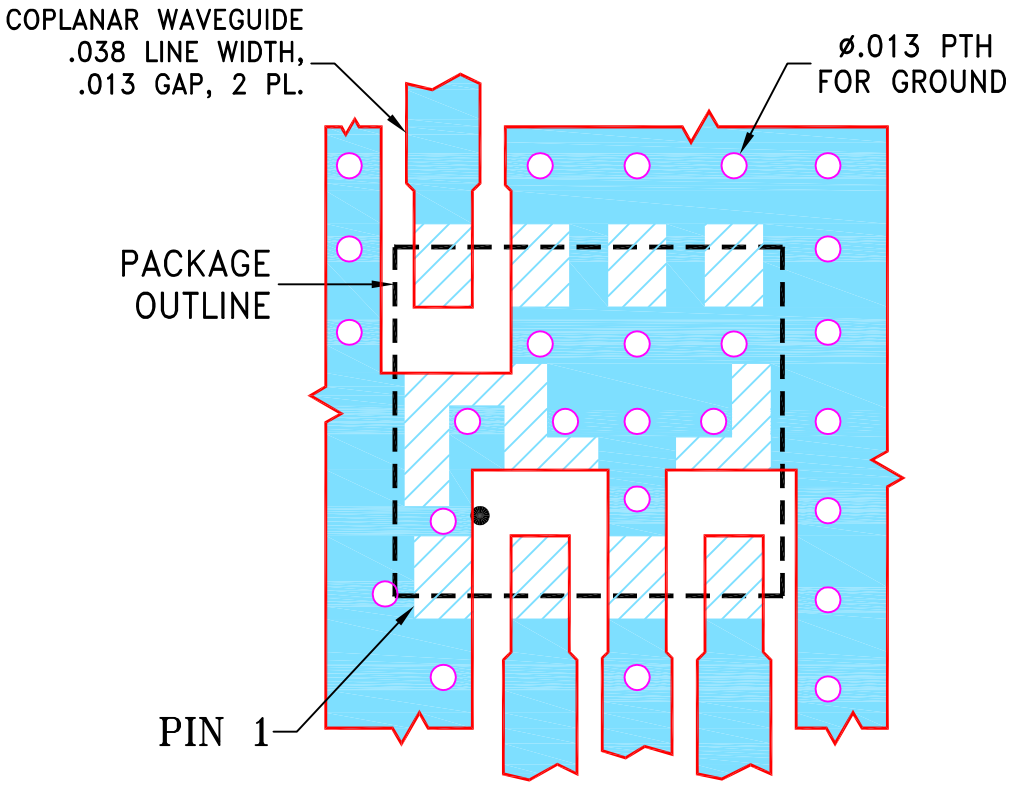
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M104559	NEW RELEASE	04/11/06	MMG	DJ
A	M109513	MODIFIED SMOBC AREA, REMOVED NOTE 3	01/31/07	PW	DJ
B	M176274	MODIFIED CASE STYLE	09/23/19	ITG	RB

SUGGESTED MOUNTING CONFIGURATION FOR HV1195 CASE STYLE, "rh" PIN CONNECTION



NOTES:

1. TRACE WIDTH AND GAP ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020"±.0015"; COPPER: 1/2 OZ. EACH SIDE.
   FOR OTHER MATERIALS TRACE WIDTH AND GAP 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	04/10/06
TOLERANCES ON:	CHECKED	IL	04/11/06
2 PL DECIMALS ±	APPROVED	DJ	04/11/06
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

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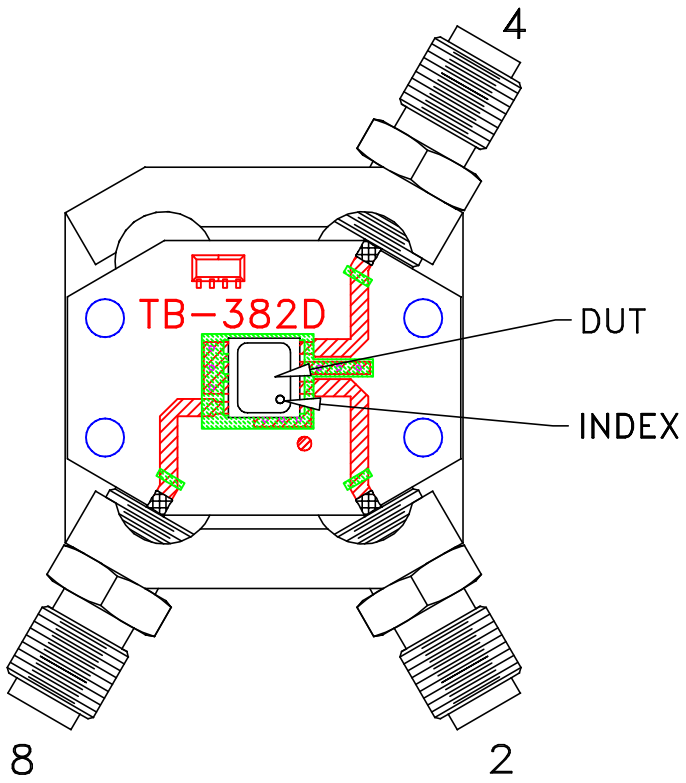
PL, rh, HV1195, SIM, TB-382

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-239	B

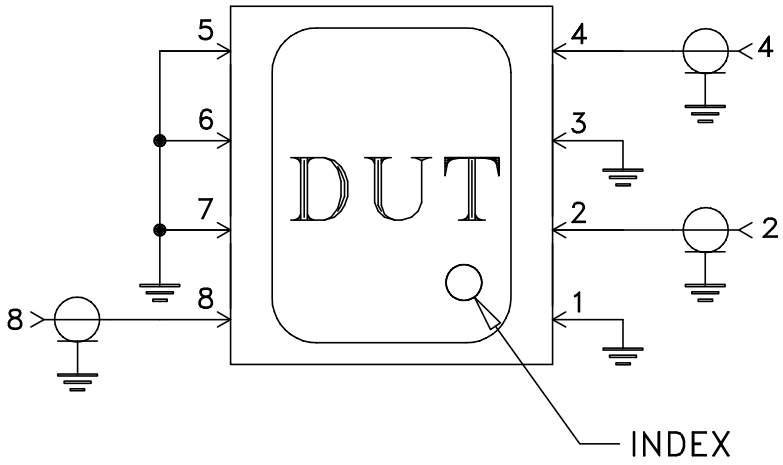
FILE:	SCALE:	SHEET:
98PL239	10:1	1 OF 1

Evaluation Board and Circuit

For Pin Connections refer to Data Sheet of the DUT



TB-382



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers RO4350 or equivalent, Dielectric Constant=3.5, Thickness=.020 inch.

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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 Case Temperature	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Autoclave	15 psig, 100% RH, 121°C, 96 hours	JESD22-A102-C, Condition C
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: 250°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
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

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