

# High IP3 Frequency Mixer

## LAVI-25VH+

Level 23 (LO Power +23 dBm) 400 to 2500 MHz

### Maximum Ratings

Operating Temperature	-45°C to 85°C
Storage Temperature	-55°C to 100°C
LO Power	+25 dBm
RF Power	+23 dBm

Permanent damage may occur if any of these limits are exceeded.

### Pin Connections

LO	10
RF	2
IF	14
GROUND	1,3,4,5,6,7,8,9,11,12,13,15,16

### Features

- very high IP3, 32 dBm typ.
- wideband, 400 to 2500 MHz
- excellent L-R isolation, 50 dB typ. and L-I isolation, 45 dB typ.
- high 1 dB compression, 20 dBm typ.
- shielded metal cover
- aqueous washable
- protected by US Patent 6,807,407

### Applications

- cellular/PCS base stations
- ISM applications
- wideband communications
- defense communications



Generic photo used for illustration purposes only  
CASE STYLE: CK605

### +RoHS Compliant

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

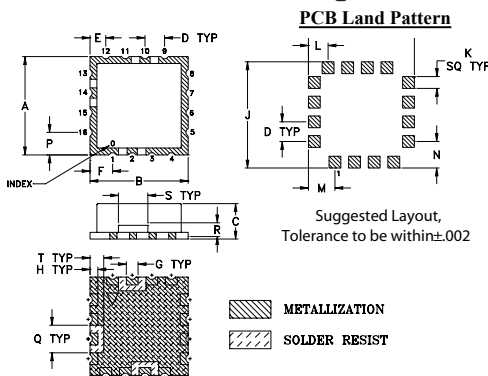
### Electrical Specifications (T<sub>AMB</sub> = 25°C)

FREQUENCY (MHz)			CONVERSION LOSS (dB)			RF in at 1dB Compr (dBm)	IP3 (dBm)	LO-RF ISOLATION (dB)		LO-IF ISOLATION (dB)	
RF	LO	IF	Typ.	σ	Max.	Typ.	Typ.	Typ.	Min.	Typ.	Min.
400-2500	650-2800	70-1500	7.8	0.25	9.6	+20	32	50	35	45	30

### Typical Performance Data

Frequency (MHz)		Conversion Loss (dB)	Isolation L-R (dB)	Isolation L-I (dB)	VSWR RF Port (:1)	VSWR LO Port (:1)	IP3 (dBm)	IF Freq. (MHz)	VSWR IF (:1)
RF	LO	LO +23dBm	LO +23dBm	LO +23dBm	LO +23dBm	LO +23dBm	LO +23dBm	LO +23dBm	LO +23dBm
400.10	650.11	7.31	56.98	55.33	1.70	2.76	31.41	70.00	1.07
580.10	834.40	7.32	55.57	45.22	1.73	3.12	32.54	100.00	1.15
760.10	1018.68	7.13	50.30	43.63	1.72	2.86	32.24	150.00	1.35
940.10	1202.97	7.39	45.50	42.65	1.77	2.52	34.15	200.00	1.58
1120.10	1387.25	7.69	43.61	38.94	2.02	2.31	32.65	250.00	1.62
1300.10	1571.54	7.58	42.32	40.68	1.99	2.32	32.17	300.00	1.71
1480.10	1755.82	7.33	44.25	41.72	1.79	2.54	31.38	350.00	1.83
1660.10	1940.11	7.55	46.42	45.12	1.54	3.12	30.99	450.00	2.11
1840.10	2124.40	7.76	54.12	46.33	1.43	3.71	31.99	650.00	2.26
2020.10	2308.68	7.76	48.47	43.32	1.44	4.13	32.38	850.00	2.04
2200.10	2492.97	7.68	41.85	36.56	1.50	4.40	32.37	1050.00	1.82
2380.10	2677.25	7.61	39.02	33.28	1.57	3.89	32.32	1250.00	1.56
2500.10	2800.11	7.91	39.71	34.21	1.70	2.47	31.79	1500.00	1.47

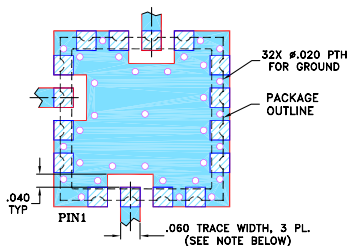
### Outline Drawing



### Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H	J	K
.500	.500	.180	.100	.080	.115	.060	.040	.540	.060
12.7	12.7	4.572	2.54	2.032	2.921	1.524	1.016	13.72	1.524
L	M	N	P	Q	R	S	T	wt.	
.100	.135	.135	.115	.140	.070	.150	.070	grams	
2.54	3.429	3.429	2.921	3.556	1.778	3.81	1.778	1.0	

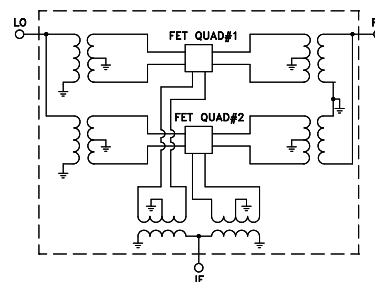
### Demo Board MCL P/N: TB-433+ Suggested PCB Layout (PL-012)



- NOTES: 1. TRACE WIDTH IS SHOWN FOR FR4 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

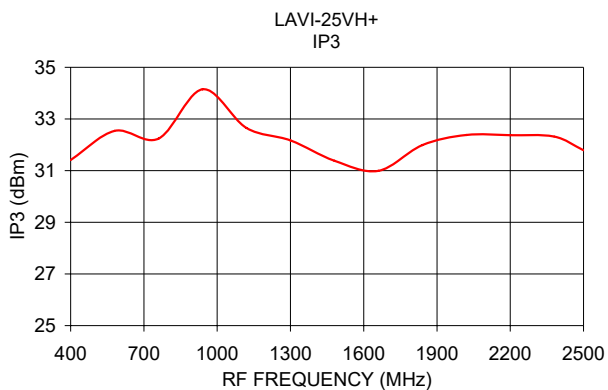
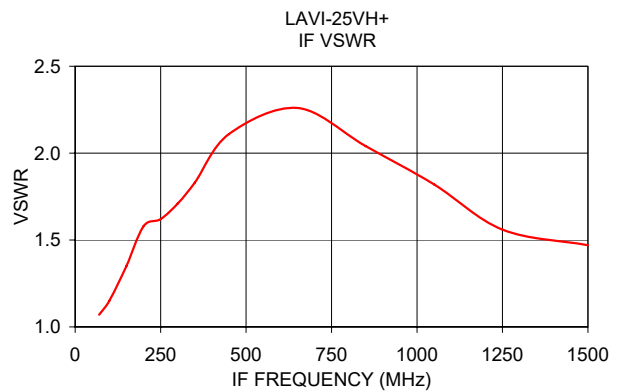
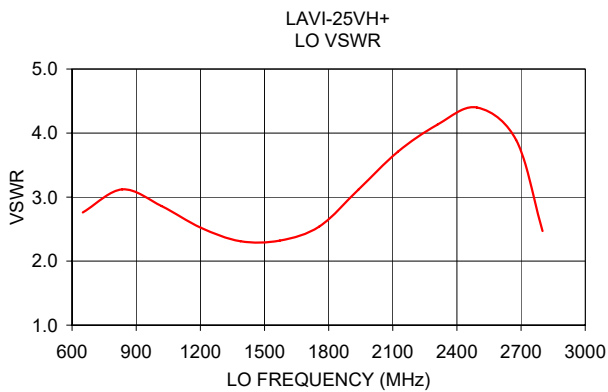
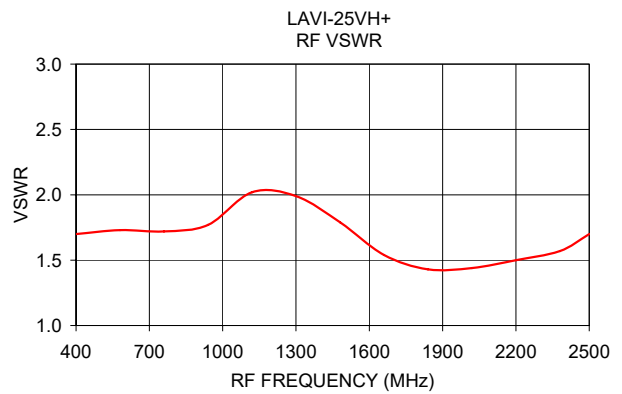
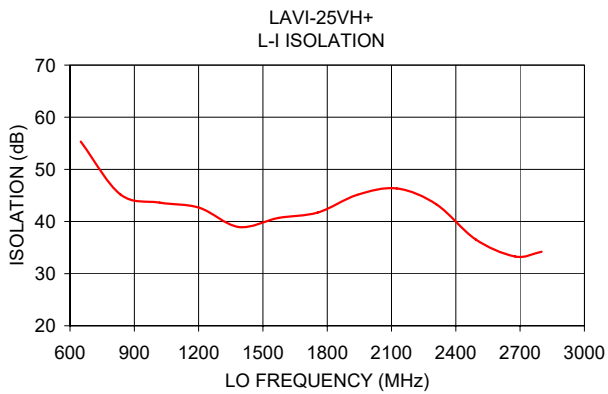
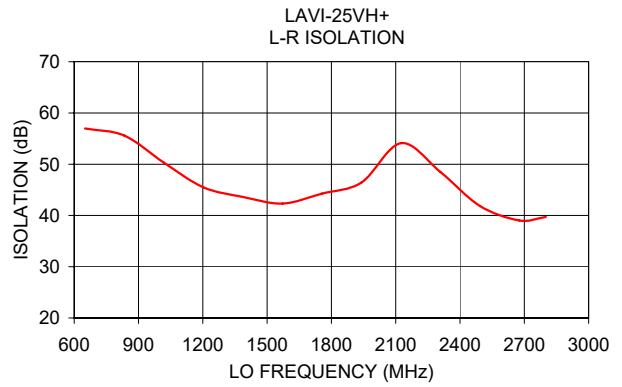
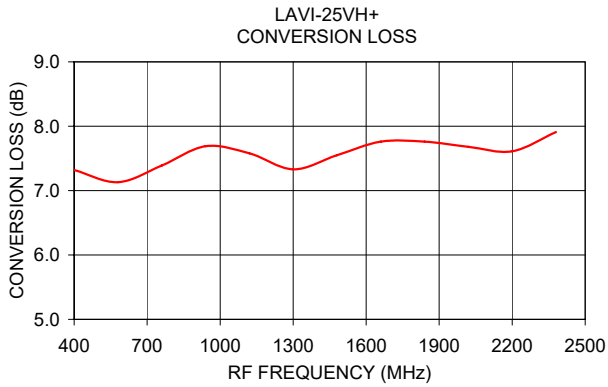
### Electrical Schematic



### 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-Circuits' 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](http://www.minicircuits.com/MCLStore/terms.jsp)





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## Harmonic Table ( $T_{AMB} = 25^{\circ}C$ ) (Relative to desired IF output)

RF HARMONICS ORDER		RF.CAL (-dBc)										
		0	1	2	3	4	5	6	7	8	9	10
0	-	-	9	16	20	23	22	55	31	49	43	53
1	-	36	+0	27	16	41	35	54	48	52	57	57
2	100	45	60	49	62	44	58	51	60	61	68	71
3	>111	82	82	79	67	77	69	88	79	90	94	109
4	>125	102	100	100	91	99	92	93	98	97	108	102
5	>125	119	115	110	105	112	107	>117	109	116	>119	>120
6	>125	>118	>122	118	>121	115	>115	>117	117	116	>123	>118
7	>125	>119	>119	>122	123	>117	>121	>116	>121	120	>123	>122
8	>125	>120	>119	>117	>123	>121	>120	>122	>121	>121	>121	122
9	>125	>119	>120	>120	>119	>124	>123	>121	>122	>122	>120	>123
10	>125	>120	>119	>120	>119	>122	>123	122	>122	>121	>122	>121

Test conditions: RF IN: 1250.10 MHz, +.02 dBm.  
 LO IN: 1500.01 MHz, +23.00 dBm.  
 IF OUT: 249.91 MHz, -7.56 dBm.  
 C. LOSS: 7.58 dB.

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# Frequency Mixer

# LAVI-25VH+

## Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=250MHz (dB)		
		@LO (dBm)		
		+22	+23	+24
10.1	260.1	9.06	8.98	8.88
90.4	340.4	7.23	7.17	7.12
170.7	420.7	7.24	7.20	7.17
250.9	500.9	7.31	7.28	7.25
331.2	581.2	7.36	7.33	7.32
411.5	661.5	7.46	7.42	7.40
491.8	741.8	7.41	7.38	7.36
572.0	822.0	7.40	7.37	7.34
652.3	902.3	7.38	7.34	7.32
732.6	982.6	7.43	7.40	7.37
812.9	1062.9	7.51	7.46	7.43
893.2	1143.2	7.67	7.63	7.60
973.4	1223.4	7.85	7.80	7.76
1053.7	1303.7	8.00	7.94	7.90
1134.0	1384.0	8.13	8.08	8.02
1214.3	1464.3	8.27	8.21	8.16
1294.5	1544.5	8.36	8.30	8.23
1354.8	1604.8	8.37	8.30	8.24
1435.0	1685.0	8.30	8.22	8.14
1495.2	1745.2	8.22	8.15	8.07
1575.5	1825.5	8.25	8.17	8.10
1635.7	1885.7	8.22	8.15	8.08
1716.0	1966.0	8.19	8.11	8.05
1776.2	2026.2	8.17	8.10	8.04
1856.5	2106.5	8.20	8.11	8.05
1916.7	2166.7	8.16	8.07	8.01
1997.0	2247.0	8.08	8.00	7.93
2057.2	2307.2	8.05	7.98	7.91
2137.5	2387.5	8.05	7.97	7.90
2197.7	2447.7	8.00	7.91	7.84
2277.9	2527.9	7.97	7.88	7.82
2338.2	2588.2	8.08	8.00	7.95
2418.4	2668.4	8.23	8.17	8.12
2478.6	2728.6	8.21	8.16	8.11
2558.9	2808.9	8.37	8.32	8.28
2619.1	2869.1	8.71	8.67	8.63
2699.4	2949.4	9.06	9.03	9.01
2759.6	3009.6	9.22	9.19	9.18
2839.9	3089.9	9.72	9.70	9.70
2900.1	3150.1	10.31	10.30	10.28

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)		
		@LO (dBm)		
		+22	+23	+24
10.1	260.1	21.49	22.49	23.46
90.4	340.4	24.75	26.01	27.38
170.7	420.7	26.67	27.74	28.42
250.9	500.9	29.56	30.25	31.05
331.2	581.2	30.75	31.31	31.79
411.5	661.5	32.56	33.61	34.47
491.8	741.8	32.42	33.16	33.92
572.0	822.0	32.66	33.48	34.28
652.3	902.3	33.00	34.38	35.06
732.6	982.6	31.63	32.42	33.41
812.9	1062.9	32.46	33.35	34.33
893.2	1143.2	31.19	32.06	32.81
973.4	1223.4	30.51	31.56	32.64
1053.7	1303.7	29.32	30.21	31.10
1134.0	1384.0	29.53	30.25	31.46
1214.3	1464.3	29.50	30.31	31.06
1294.5	1544.5	30.70	31.68	32.76
1354.8	1604.8	30.10	30.72	31.52
1435.0	1685.0	30.86	31.75	32.86
1495.2	1745.2	31.40	32.30	33.45
1575.5	1825.5	32.14	33.31	34.99
1635.7	1885.7	31.08	31.86	32.87
1716.0	1966.0	31.34	32.28	33.30
1776.2	2026.2	31.23	32.20	33.17
1856.5	2106.5	31.56	32.61	33.63
1916.7	2166.7	32.70	34.29	35.85
1997.0	2247.0	32.22	33.47	34.82
2057.2	2307.2	31.76	32.70	33.79
2137.5	2387.5	30.93	31.77	32.63
2197.7	2447.7	33.00	34.51	36.64
2277.9	2527.9	31.13	32.37	33.37
2338.2	2588.2	31.10	32.35	33.50
2418.4	2668.4	30.08	30.92	31.79
2478.6	2728.6	30.31	31.23	32.34
2558.9	2808.9	29.08	30.01	30.95
2619.1	2869.1	30.22	31.52	32.94
2699.4	2949.4	29.51	30.86	32.23
2759.6	3009.6	28.92	29.91	30.92
2839.9	3089.9	28.89	30.02	30.24
2900.1	3150.1	29.49	30.52	31.21



# Frequency Mixer

# LAVI-25VH+

## Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1450MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=400MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=2500.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+23			+23			+23
1329.9	120.1	10.09	10.1	410.1	9.10	2270.0	230.1	10.26
1259.7	190.3	9.03	90.4	490.4	6.92	2210.0	290.1	9.92
1189.5	260.5	8.68	170.6	570.6	7.19	2150.0	350.1	9.79
1119.3	330.7	8.43	250.9	650.9	7.41	2090.0	410.1	9.58
1049.1	400.9	8.06	331.1	731.1	7.33	2030.0	470.1	9.51
978.9	471.1	7.91	411.4	811.4	7.23	1970.0	530.1	9.22
908.7	541.3	8.00	491.6	891.6	7.11	1910.0	590.1	8.99
838.4	611.6	7.98	571.9	971.9	7.22	1850.0	650.1	8.96
768.2	681.8	7.80	652.1	1052.1	7.32	1790.0	710.1	8.95
698.0	752.0	7.89	732.4	1132.4	7.33	1730.0	770.1	8.67
627.8	822.2	7.91	812.6	1212.6	7.44	1670.0	830.1	8.62
557.6	892.4	7.80	892.9	1292.9	7.48	1610.0	890.1	8.73
487.4	962.6	7.76	973.1	1373.1	7.29	1550.0	950.1	8.84
417.2	1032.8	7.88	1053.4	1453.4	7.31	1490.0	1010.1	8.77
347.0	1103.0	7.96	1133.6	1533.6	7.42	1430.0	1070.1	8.90
276.8	1173.2	8.07	1213.9	1613.9	7.29	1370.0	1130.1	8.87
206.6	1243.4	8.18	1294.1	1694.1	7.18	1310.0	1190.1	8.83
136.4	1313.6	7.90	1374.4	1774.4	7.15	1250.0	1250.1	9.06
66.2	1383.8	7.99	1454.6	1854.6	7.06	1190.0	1310.1	8.91
10.0	1460.0	9.73	1534.9	1934.9	7.05	1130.0	1370.1	9.02
139.8	1589.8	8.13	1615.1	2015.1	6.99	1070.0	1430.1	8.94
269.6	1719.6	8.16	1695.4	2095.4	7.02	1010.0	1490.1	9.04
399.4	1849.4	7.85	1775.6	2175.6	7.35	950.0	1550.1	9.02
529.2	1979.2	7.62	1855.9	2255.9	7.55	890.0	1610.1	9.02
659.0	2109.0	7.81	1936.1	2336.1	7.66	830.0	1670.1	8.93
788.8	2238.8	7.90	2016.4	2416.4	7.99	770.0	1730.1	8.76
918.5	2368.5	8.00	2096.6	2496.6	8.34	710.0	1790.1	8.78
1048.3	2498.3	7.87	2176.9	2576.9	8.66	650.0	1850.1	8.82
1152.2	2602.2	7.94	2257.1	2657.1	8.88	590.0	1910.1	8.73
1282.0	2732.0	7.96	2337.4	2737.4	8.92	530.0	1970.1	8.66
1385.8	2835.8	8.14	2417.6	2817.6	8.99	470.0	2030.1	8.66
1515.6	2965.6	8.49	2497.9	2897.9	9.17	410.0	2090.1	8.72
1619.4	3069.4	8.75	2578.2	2978.2	9.21	370.0	2130.1	8.77
1749.2	3199.2	9.12	2658.4	3058.4	9.31	310.0	2190.1	8.73
1853.1	3303.1	9.26	2738.7	3138.7	9.38	270.0	2230.1	8.78
1982.8	3432.8	9.26	2839.0	3239.0	9.52	210.0	2290.1	8.84
2086.7	3536.7	9.45	2919.2	3319.2	9.69	170.0	2330.1	8.56
2216.5	3666.5	9.66	3019.5	3419.5	9.90	110.0	2390.1	8.26
2320.3	3770.3	9.87	3099.8	3499.8	10.13	70.0	2430.1	8.17
2450.1	3900.1	10.46	3200.1	3600.1	10.31	10.0	2490.1	10.39



# Frequency Mixer

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## Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+22	+23	+24	+22	+23	+24
260.1	45.70	45.80	45.77	43.20	43.28	43.40
340.4	45.55	45.57	45.54	43.29	43.30	43.26
420.7	46.11	46.05	46.14	43.49	43.45	43.48
500.9	46.67	46.62	46.63	43.62	43.53	43.49
581.2	49.05	48.99	49.06	45.20	45.06	45.08
661.5	54.04	54.00	53.84	50.37	50.36	50.12
741.8	62.82	62.01	60.72	60.49	60.25	59.96
822.0	55.49	55.61	55.88	52.98	52.90	52.85
902.3	51.47	51.61	51.76	49.63	49.78	49.88
982.6	48.73	48.84	48.86	47.73	47.85	47.86
1062.9	46.53	46.63	46.75	46.23	46.38	46.51
1143.2	44.97	45.08	45.09	44.93	45.06	45.08
1223.4	43.93	44.04	44.17	43.25	43.36	43.41
1303.7	43.62	43.74	43.85	41.31	41.36	41.36
1384.0	42.14	42.18	42.20	38.38	38.36	38.28
1464.3	44.34	44.35	44.30	40.87	41.08	41.17
1544.5	43.72	43.80	43.72	42.46	42.65	42.68
1604.8	44.00	44.10	44.26	42.84	43.07	43.24
1685.0	44.28	44.40	44.53	41.76	41.88	41.72
1745.2	44.12	44.22	44.13	41.45	41.50	41.36
1825.5	43.83	43.86	43.70	42.67	42.73	42.59
1885.7	44.15	43.99	44.12	43.69	43.57	43.65
1966.0	43.86	43.84	43.92	44.79	44.82	44.91
2026.2	44.02	44.11	44.16	45.77	45.92	45.95
2106.5	44.64	44.72	44.56	47.97	48.21	48.18
2166.7	46.59	46.61	46.63	51.41	51.61	51.90
2247.0	50.62	50.87	51.01	57.10	56.75	56.50
2307.2	51.34	51.35	51.46	49.56	49.10	48.88
2387.5	47.13	47.17	47.09	43.28	43.07	42.84
2447.7	44.77	44.70	44.39	40.35	40.13	39.74
2527.9	43.53	43.56	43.43	37.60	37.54	37.33
2588.2	43.57	43.39	43.25	36.45	36.28	36.13
2668.4	44.21	44.20	44.11	35.42	35.45	35.39
2728.6	44.47	44.40	44.28	35.19	35.16	35.08
2808.9	44.17	44.00	43.72	35.37	35.36	35.22
2869.1	42.85	42.87	42.62	35.57	35.66	35.52
2949.4	41.51	41.49	41.44	36.12	36.13	36.12
3009.6	40.66	40.66	40.82	36.52	36.56	36.69
3089.9	39.30	39.42	39.47	37.02	37.19	37.26
3150.1	38.49	38.62	38.73	37.33	37.46	37.50

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+22	+23	+24
10.1	260.1	12.28	12.20	12.17
90.4	340.4	26.72	26.67	26.04
170.7	420.7	30.96	31.07	31.49
250.9	500.9	33.10	33.09	33.00
331.2	581.2	32.98	32.40	31.57
411.5	661.5	36.71	36.61	37.06
491.8	741.8	35.95	35.42	34.55
572.0	822.0	33.02	32.49	32.45
652.3	902.3	36.02	35.43	34.70
732.6	982.6	33.39	32.32	30.87
812.9	1062.9	37.09	36.21	35.46
893.2	1143.2	38.26	36.87	34.93
973.4	1223.4	40.99	38.70	35.85
1053.7	1303.7	47.79	44.41	40.87
1134.0	1384.0	41.24	38.50	33.43
1214.3	1464.3	44.04	43.86	41.16
1294.5	1544.5	44.07	43.68	39.50
1354.8	1604.8	42.29	43.56	44.04
1435.0	1685.0	52.96	51.38	35.52
1495.2	1745.2	40.38	42.30	48.19
1575.5	1825.5	37.50	38.81	40.72
1635.7	1885.7	35.67	36.55	38.56
1716.0	1966.0	32.44	32.63	32.81
1776.2	2026.2	31.65	31.88	32.14
1856.5	2106.5	30.23	30.28	30.27
1916.7	2166.7	29.42	29.42	29.40
1997.0	2247.0	29.18	29.19	29.28
2057.2	2307.2	28.45	28.42	28.36
2137.5	2387.5	28.32	28.25	28.19
2197.7	2447.7	28.64	28.55	28.50
2277.9	2527.9	29.54	29.43	29.37
2338.2	2588.2	30.17	30.02	29.88
2418.4	2668.4	28.97	28.81	28.75
2478.6	2728.6	26.93	26.89	26.90
2558.9	2808.9	25.45	25.38	25.21
2619.1	2869.1	25.39	25.37	25.22
2699.4	2949.4	26.40	26.35	26.10
2759.6	3009.6	27.19	27.03	26.66
2839.9	3089.9	28.28	27.94	27.85
2900.1	3150.1	29.19	28.95	28.61



# Frequency Mixer

# LAVI-25VH+

## Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=2800MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+22	+23	+24		+22	+23	+24		+22	+23	+24
10.1	260.1	1.85	1.88	1.92	260.1	3.67	3.67	3.67	10.1	1.92	1.95	1.99
90.4	340.4	1.35	1.37	1.40	340.4	3.47	3.47	3.47	90.1	1.17	1.17	1.18
170.7	420.7	1.53	1.55	1.58	420.7	3.26	3.26	3.26	170.1	1.57	1.58	1.58
250.9	500.9	1.67	1.69	1.70	500.9	3.04	3.04	3.03	250.1	1.78	1.79	1.80
331.2	581.2	1.70	1.72	1.74	581.2	2.84	2.84	2.83	330.1	1.97	1.98	1.98
411.5	661.5	1.69	1.70	1.72	661.5	2.72	2.72	2.71	410.1	2.25	2.25	2.26
491.8	741.8	1.67	1.68	1.69	741.8	2.71	2.71	2.70	490.1	2.42	2.43	2.43
572.0	822.0	1.64	1.64	1.64	822.0	2.77	2.77	2.76	550.1	2.48	2.48	2.48
652.3	902.3	1.62	1.61	1.61	902.3	2.85	2.84	2.84	630.1	2.48	2.48	2.47
732.6	982.6	1.65	1.64	1.63	982.6	2.91	2.91	2.91	690.1	2.44	2.44	2.43
812.9	1062.9	1.81	1.79	1.78	1062.9	2.95	2.95	2.95	770.1	2.35	2.34	2.33
893.2	1143.2	2.04	2.02	2.00	1143.2	2.95	2.96	2.96	830.1	2.22	2.20	2.18
973.4	1223.4	2.26	2.24	2.22	1223.4	2.93	2.93	2.93	910.1	2.01	1.99	1.97
1053.7	1303.7	2.39	2.36	2.34	1303.7	2.88	2.87	2.87	970.1	1.87	1.85	1.83
1134.0	1384.0	2.40	2.38	2.36	1384.0	2.83	2.82	2.82	1050.1	1.71	1.68	1.65
1214.3	1464.3	2.38	2.36	2.33	1464.3	2.80	2.79	2.78	1110.1	1.62	1.59	1.55
1294.5	1544.5	2.31	2.28	2.25	1544.5	2.78	2.78	2.77	1190.1	1.48	1.44	1.41
1354.8	1604.8	2.24	2.21	2.18	1604.8	2.78	2.78	2.78	1250.1	1.40	1.37	1.34
1435.0	1685.0	2.13	2.10	2.07	1685.0	2.79	2.79	2.79	1330.1	1.40	1.38	1.36
1495.2	1745.2	2.10	2.07	2.04	1745.2	2.79	2.78	2.77	1390.1	1.46	1.44	1.43
1575.5	1825.5	1.95	1.92	1.90	1825.5	2.85	2.84	2.84	1470.0	1.54	1.54	1.54
1635.7	1885.7	1.86	1.83	1.81	1885.7	2.92	2.92	2.92	1530.0	1.62	1.63	1.64
1716.0	1966.0	1.76	1.74	1.72	1966.0	2.95	2.95	2.94	1610.0	1.78	1.80	1.82
1776.2	2026.2	1.72	1.69	1.67	2026.2	2.93	2.92	2.90	1670.0	1.87	1.89	1.92
1856.5	2106.5	1.69	1.67	1.65	2106.5	2.98	2.98	2.97	1750.0	2.02	2.04	2.08
1916.7	2166.7	1.66	1.64	1.62	2166.7	2.99	2.98	2.98	1810.0	2.07	2.10	2.14
1997.0	2247.0	1.65	1.63	1.62	2247.0	2.89	2.88	2.87	1890.0	2.18	2.22	2.26
2057.2	2307.2	1.64	1.63	1.62	2307.2	2.83	2.82	2.80	1950.0	2.26	2.30	2.34
2137.5	2387.5	1.60	1.59	1.58	2387.5	2.73	2.72	2.72	2030.0	2.34	2.38	2.43
2197.7	2447.7	1.59	1.58	1.58	2447.7	2.61	2.61	2.61	2090.0	2.30	2.34	2.39
2277.9	2527.9	1.60	1.60	1.60	2527.9	2.46	2.45	2.44	2170.0	2.27	2.32	2.36
2338.2	2588.2	1.61	1.62	1.63	2588.2	2.37	2.37	2.36	2230.0	2.26	2.30	2.35
2418.4	2668.4	1.67	1.68	1.70	2668.4	2.29	2.28	2.28	2310.0	2.18	2.21	2.25
2478.6	2728.6	1.74	1.76	1.78	2728.6	2.25	2.25	2.25	2370.0	2.20	2.24	2.28
2558.9	2808.9	1.83	1.86	1.88	2808.9	2.23	2.23	2.22	2450.0	2.21	2.24	2.28
2619.1	2869.1	1.91	1.94	1.97	2869.1	2.22	2.21	2.20	2510.0	2.12	2.15	2.18
2699.4	2949.4	2.07	2.10	2.13	2949.4	2.26	2.25	2.25	2590.0	2.06	2.09	2.12
2759.6	3009.6	2.22	2.25	2.28	3009.6	2.31	2.31	2.31	2650.0	2.10	2.13	2.15
2839.9	3089.9	2.41	2.45	2.46	3089.9	2.33	2.33	2.33	2730.0	2.11	2.13	2.16
2900.1	3150.1	2.53	2.57	2.59	3150.1	2.32	2.31	2.31	2790.0	2.35	2.38	2.41

# Frequency Mixer

# LAVI-25VH+

## Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	18	24	26	31	35	46	55	45	51	69
1	-	28	+0	27	15	40	35	53	45	50	51	56
2	65	44	66	47	53	36	56	40	68	47	73	56
3	>90	76	59	67	56	65	53	71	60	71	70	76
4	>90	84	>87	74	82	74	85	75	>87	74	80	79
5	>90	85	>87	>87	>87	>87	84	>87	82	>87	81	>87
6	88	>87	84	>87	82	80	85	>87	>87	>87	>87	>87
7	>90	>87	>87	>87	>87	>87	>87	>87	>87	>87	>87	86
8	>90	>87	>87	86	85	>87	>87	>87	>87	84	>87	>87
9	89	>87	83	>87	>87	86	>87	86	84	>87	>87	86
10	>90	>87	>87	86	>87	79	>87	>87	83	>87	>87	86
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

### LO HARMONICS ORDER

Test conditions: RF IN: 1450 MHz; 5.00 dBm.  
 LO IN: 1650 MHz; +23.00 dBm  
 IF OUT: 200 MHz; -3.44 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	26	28	33	33	46	40	51	44	61	68
1	-	29	+0	30	18	42	39	56	43	62	60	77
2	45	37	56	39	44	28	49	34	65	47	61	62
3	88	52	44	53	34	47	33	53	44	58	69	65
4	>90	58	61	62	65	56	62	51	69	48	75	56
5	>90	70	68	67	56	67	59	72	52	70	55	68
6	90	73	77	81	81	70	78	87	80	66	77	61
7	87	80	78	79	75	79	65	78	66	83	68	88
8	86	91	83	88	81	80	85	71	84	73	83	70
9	90	96	94	95	90	>96	82	92	80	95	75	85
10	>90	93	>96	>96	87	91	87	82	85	80	82	79
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

### LO HARMONICS ORDER

Test conditions: RF IN: 1450 MHz; 15.00 dBm.  
 LO IN: 1650 MHz; +23.00 dBm  
 IF OUT: 200 MHz; 6.35 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.

REV. X3  
 LAVI-25VH+  
 101012  
 Page 5 of 5



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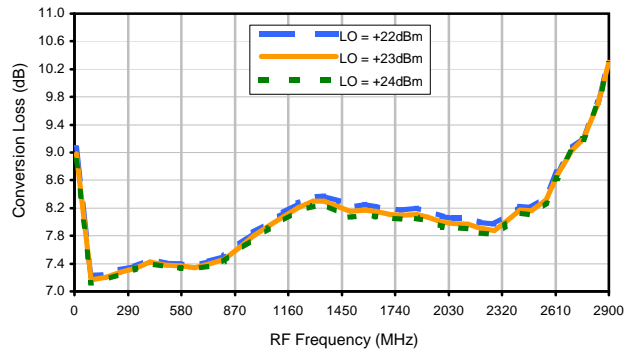


# Frequency Mixer

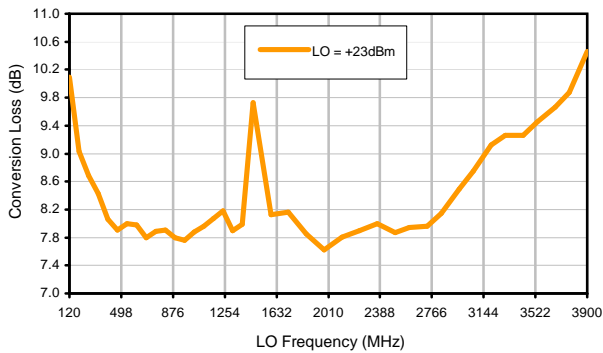
# LAVI-25VH+

## Typical Performance Curves

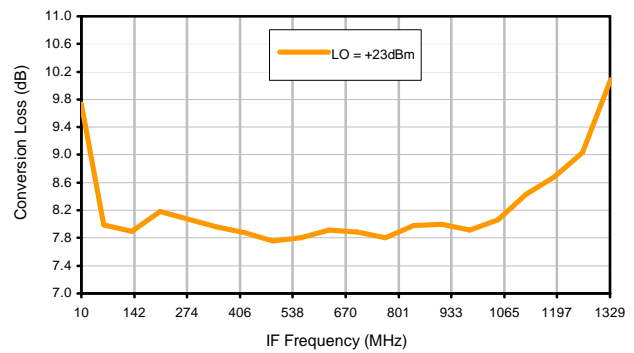
Conversion Loss @ IF=250MHz



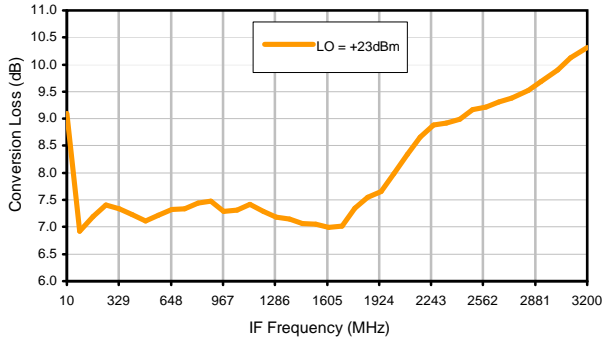
Conversion Loss vs. LO @ RF=1450MHz



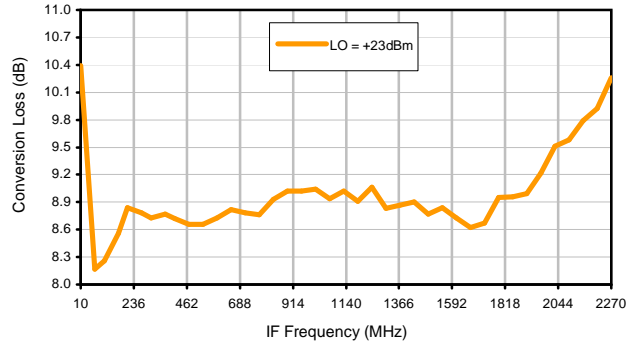
Conversion Loss vs. IF @ RF=1450MHz



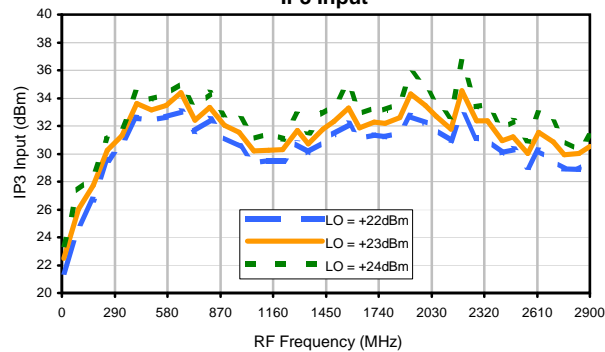
Conversion Loss vs. IF @ RF=400MHz



Conversion Loss vs. IF @ RF=2500.1MHz

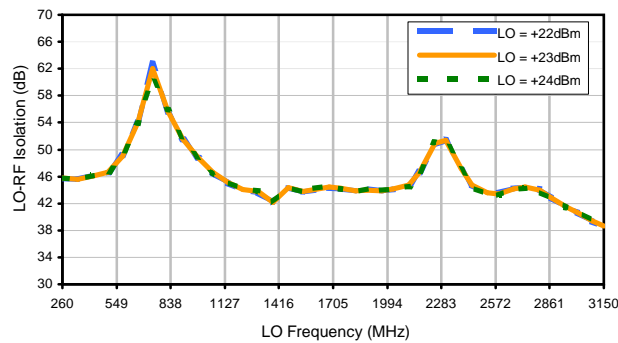


IP3 Input

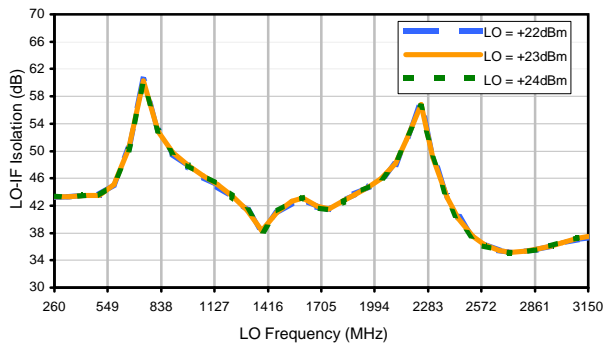


## Typical Performance Curves

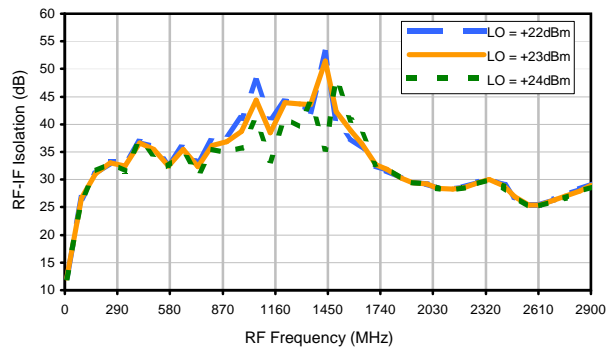
LO-RF Isolation



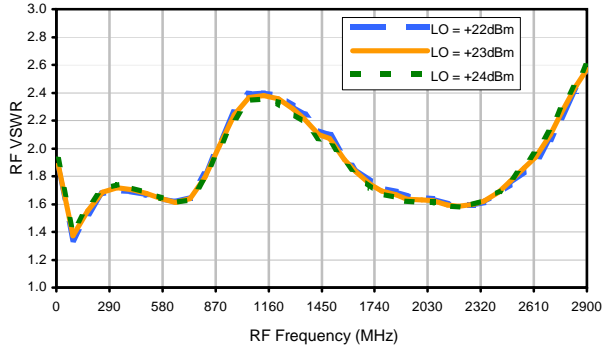
LO-IF Isolation



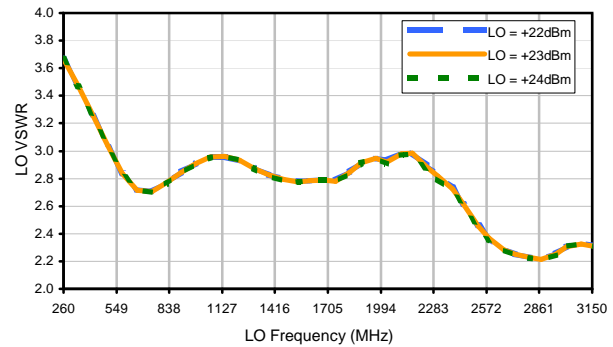
RF-IF Isolation



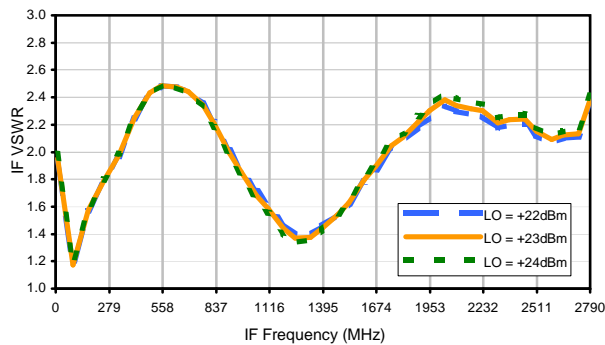
RF VSWR



LO VSWR



IF VSWR



# Frequency Mixer

# LAVI-25VH+

## Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	18	24	26	31	35	46	55	45	51	69
1	-	28	+0	27	15	40	35	53	45	50	51	56
2	65	44	66	47	53	36	56	40	68	47	73	56
3	>90	76	59	67	56	65	53	71	60	71	70	76
4	>90	84	>87	74	82	74	85	75	>87	74	80	79
5	>90	85	>87	>87	>87	>87	84	>87	82	>87	81	>87
6	88	>87	84	>87	82	80	85	>87	>87	>87	>87	>87
7	>90	>87	>87	>87	>87	>87	>87	>87	>87	>87	>87	86
8	>90	>87	>87	86	85	>87	>87	>87	>87	84	>87	>87
9	89	>87	83	>87	>87	86	>87	86	84	>87	>87	86
10	>90	>87	>87	86	>87	79	>87	>87	83	>87	>87	86
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

### LO HARMONICS ORDER

Test conditions: RF IN: 1450 MHz; 5.00 dBm.  
 LO IN: 1650 MHz; +23.00 dBm  
 IF OUT: 200 MHz; -3.44 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	26	28	33	33	46	40	51	44	61	68
1	-	29	+0	30	18	42	39	56	43	62	60	77
2	45	37	56	39	44	28	49	34	65	47	61	62
3	88	52	44	53	34	47	33	53	44	58	69	65
4	>90	58	61	62	65	56	62	51	69	48	75	56
5	>90	70	68	67	56	67	59	72	52	70	55	68
6	90	73	77	81	81	70	78	87	80	66	77	61
7	87	80	78	79	75	79	65	78	66	83	68	88
8	86	91	83	88	81	80	85	71	84	73	83	70
9	90	96	94	95	90	>96	82	92	80	95	75	85
10	>90	93	>96	>96	87	91	87	82	85	80	82	79
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

### LO HARMONICS ORDER

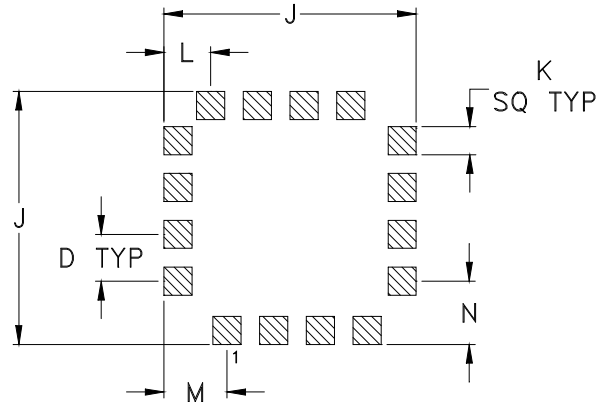
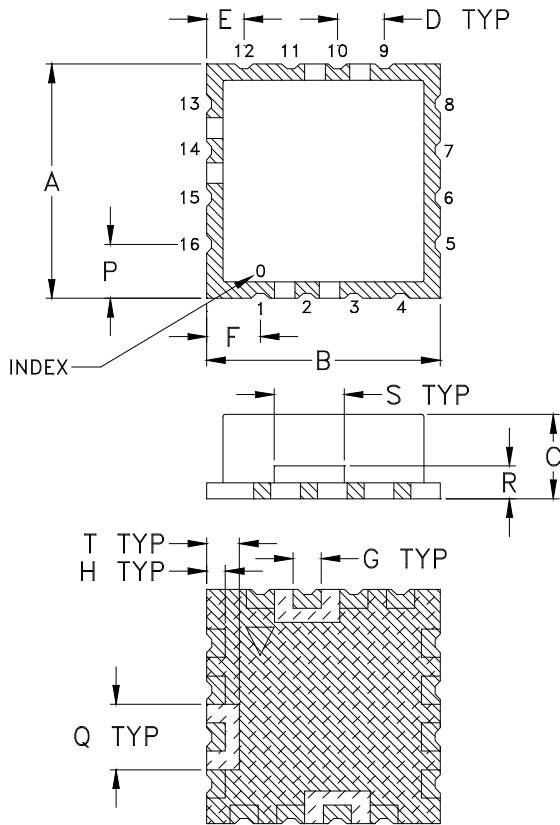
Test conditions: RF IN: 1450 MHz; 15.00 dBm.  
 LO IN: 1650 MHz; +23.00 dBm  
 IF OUT: 200 MHz; 6.35 dBm

- 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.

REV. X3  
 LAVI-25VH+  
 101012  
 Page 3 of 3

## Outline Dimensions

## PCB Land Pattern



Suggested Layout,  
Tolerance to be within  $\pm .002$

CASE #	A	B	C	D	E	F	G	H	J	K
CK605	.500 (12.70)	.500 (12.70)	.180 (4.57)	.100 (2.54)	.080 (2.03)	.115 (2.92)	.060 (1.52)	.040 (1.02)	.540 (13.72)	.060 (1.52)

CASE #	L	M	N	P	Q	R	S	T	WT. GRAM
CK605	.100 (2.54)	.135 (3.43)	.135 (3.43)	.115 (2.92)	.140 (3.56)	.070 (1.78)	.150 (3.81)	.070 (1.78)	1.2 +0.5 -0.0

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

### Notes:

- Case material: Nickel-Silver alloy.
- Base: Printed wiring laminate.
- Termination finish:  
 For RoHS Case Styles: 3-5  $\mu$  inch (.08-.13 microns) Gold over 120-240  $\mu$  inch (3.05-6.10 microns) Nickel plate.  
 All models, (+) suffix.



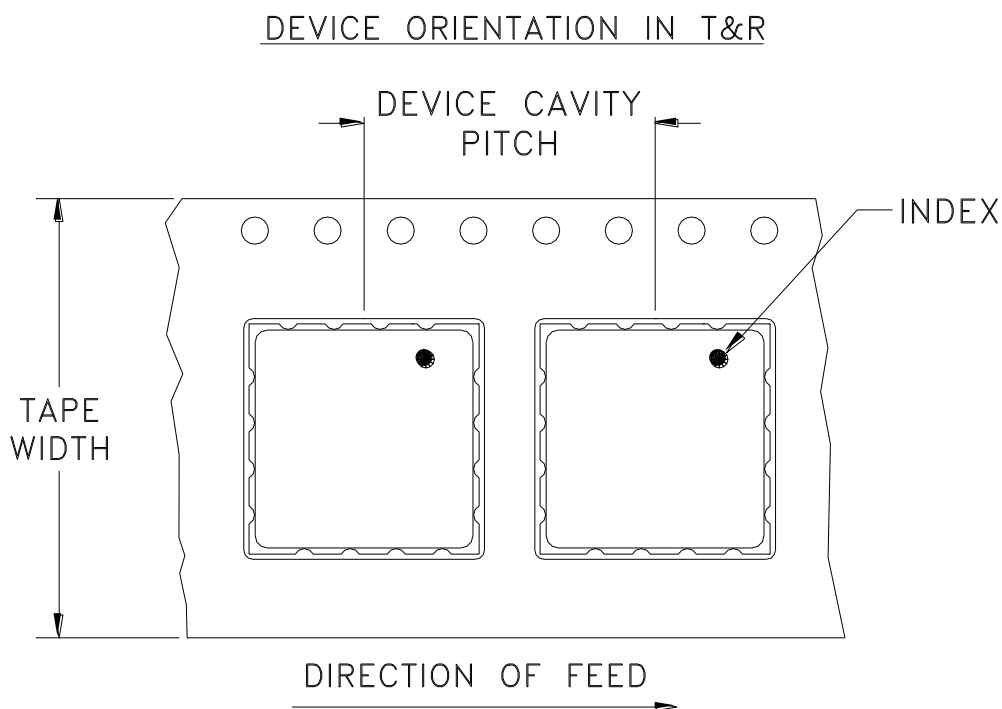
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RF/IF MICROWAVE COMPONENTS

# Tape & Reel Packaging TR-F37



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
24	16	7	Small quantity standards (see note)	10
				20
				50
				100
		13	Standard	200
500				

Note: Please consult individual model data sheet to determine device per reel availability.

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.

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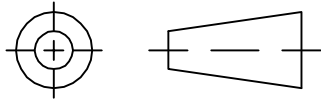
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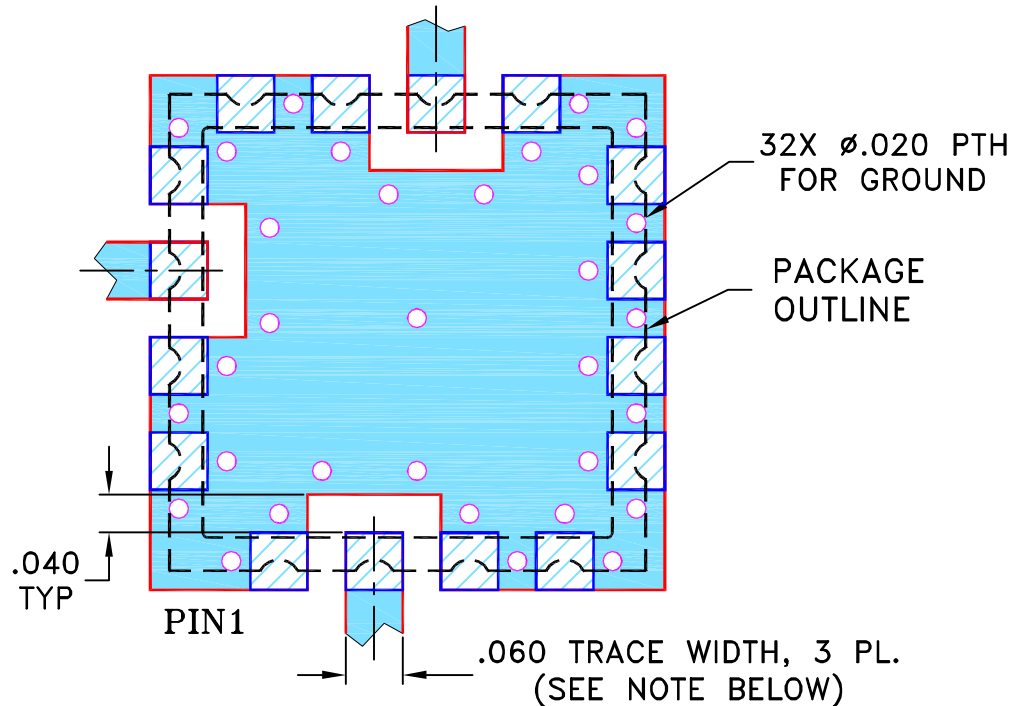
THIRD ANGLE PROJECTION



REVISIONS

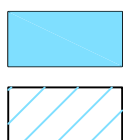
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
E	M105563	ADDED "r1" PIN CONNECTION	06/02/06	MMG	DJ
F	M105640	CORRECTED NOTE 2	06/08/06	MMG	MM
G	M124395	ADDED "RAMP"	09/09	EM	HH
G	R77589	ADDED "RAMP"	09/09	EM	HH

SUGGESTED MOUNTING CONFIGURATION FOR CK605 CASE STYLE, "kg/rl/16AM01" PIN CONNECTION



NOTES:

1. TRACE WIDTH IS SHOWN FOR FR4 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 BOTTOM IS CONTINUOUS GROUND PLANE.



DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

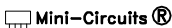
DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED	INITIALS	DATE
DIMENSIONS ARE IN INCHES	AV	08/07/00
TOLERANCES ON:	SK	08/08/00
2 PL DECIMALS ±	DB	08/08/00
3 PL DECIMALS ± .005		
ANGLES ±		
FRACTIONS ±		

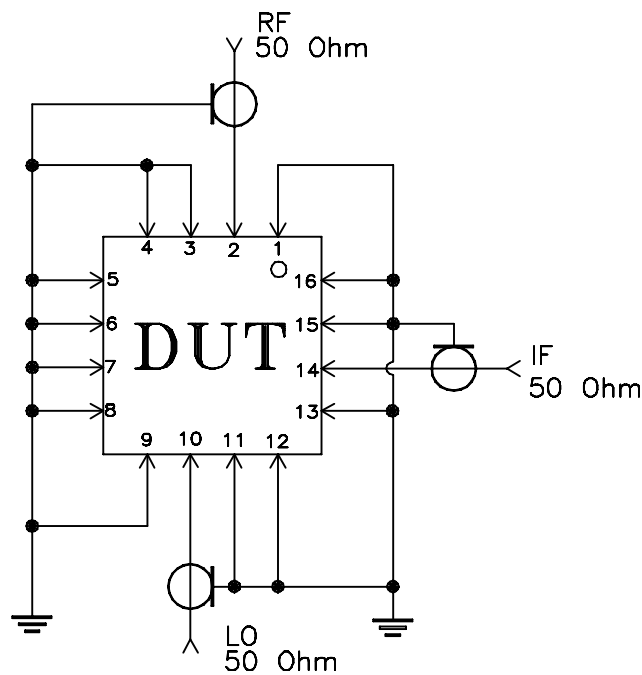
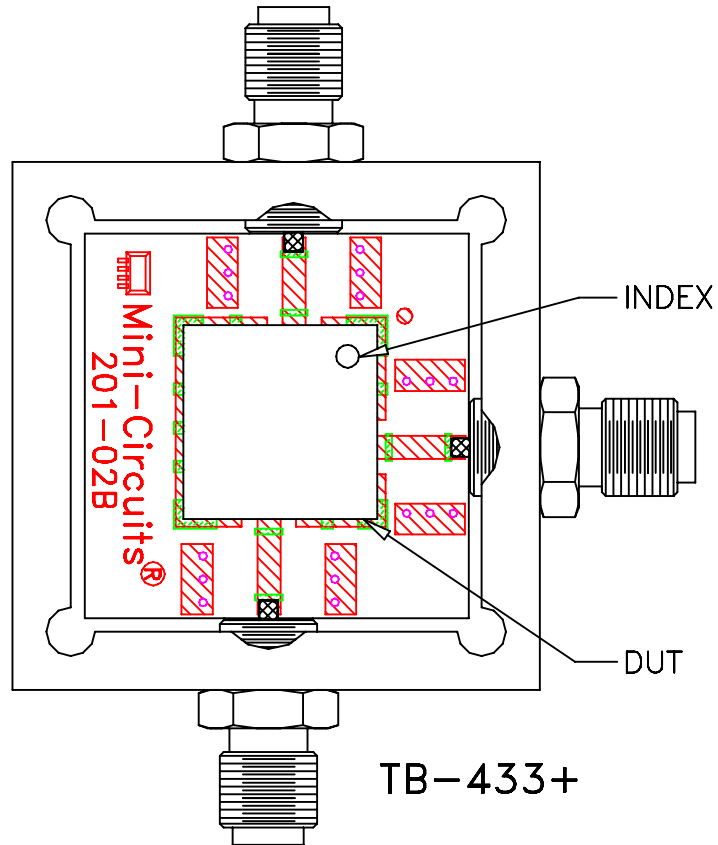
 **Mini-Circuits®** 13 Neptune Avenue  
Brooklyn NY 11235

PL,kg/rl/16AM01,CK605,ROS/LAVI/RAMP

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-012	G
FILE:	98PL012	SCALE: 5:1	SHEET: 1 OF 1

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# Evaluation Board and Circuit



## Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,  
Dielectric Constant=3.5, Thickness=.028 inch.

## Schematic Diagram

 **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	-45° 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 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, 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