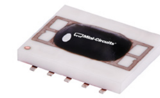
Ceramic

Active Mixer

MACA-242H+

Level -3 (LO Power -3 dBm) 750 to 2400 MHz



Generic photo used for illustration purposes only

CASE STYLE: DZ1034

+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"	20, 50, 100, 200
13"	500,1000

Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power	100mW
IF Current	40mA
LO Power	10mW

Pin Connections

LO	10
RF	5
IF	3
DC	7
GROUND	1,2,4,6,8,9

Features
- Low conversion loss, 6.1 dB typ.
- Wide bandwidth, 750 to 2400 MHz
- LTCC double balanced mixer with LO amplifier
- Aqueous washable
- Low profile
- Low cost
- Protected by U.S. Patent 7,027,795

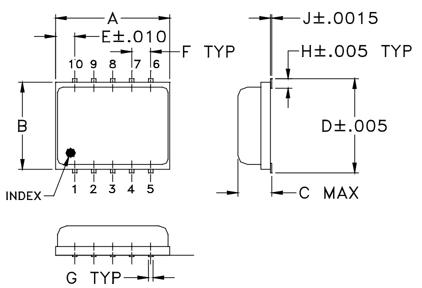
Applications
- PCN
- defense & weather radar
- cellular
- UHF TV

Electrical Specifications

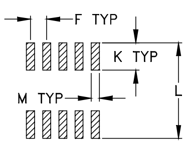
FREQUENCY (MHz) LO/RF f_L-f_U	FREQUENCY (MHz) IF	CONVERSION LOSS* (dB) $\overline{X}$	CONVERSION LOSS* (dB) σ	CONVERSION LOSS* (dB) Max.	LO-RF ISOLATION (dB) Typ.	LO-RF ISOLATION (dB) Min.	LO-IF ISOLATION (dB) Typ.	LO-IF ISOLATION (dB) Min.	DC POWER Volt	DC POWER Current (mA) Max.	IP3 at center band (dBm) Typ.
750-2400	DC-500	6.1	0.1	9.8	20	4	55	28	5	110	18

1 dB Compr. +10 dBm typ.
*Conversion Loss at IF= 30 MHz.

Outline Drawing



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

Outline Dimensions (inch / mm)

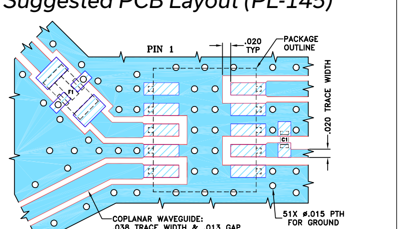
A	B	C	D	E	F	G
.30	.250	.105	.266	.050	.050	.012
7.62	6.35	2.67	6.76	1.27	1.27	0.30

H	J	K	L	M	wt grams
.029	.004	.085	.296	.030	
0.74	0.10	2.16	7.52	0.76	0.3

Typical Performance Data

Frequency (MHz) RF	Frequency (MHz) LO	Conversion Loss (dB) LO -3dBm	Isolation L-R (dB) LO -3dBm	Isolation L-I (dB) LO -3dBm	VSWR RF Port (:1) LO -3dBm	VSWR LO Port (:1) LO -3dBm
740.00	710.00	5.98	25.78	32.91	2.60	2.24
800.00	770.00	6.25	21.44	40.53	2.61	2.11
900.00	870.00	9.01	21.78	51.64	6.73	1.96
1000.00	970.00	7.39	15.99	36.56	4.55	1.90
1100.00	1070.00	6.51	11.39	46.11	2.40	1.60
1200.00	1170.00	8.22	14.01	56.21	4.95	1.45
1300.00	1270.00	7.75	23.06	62.69	4.48	1.25
1400.00	1370.00	6.35	19.72	65.30	2.44	1.10
1500.00	1470.00	6.15	17.29	69.44	2.06	1.42
1600.00	1570.00	5.22	12.57	71.04	1.36	1.53
1700.00	1670.00	5.23	8.87	61.70	1.21	1.49
1800.00	1770.00	5.58	14.87	58.23	1.65	1.38
1900.00	1870.00	5.41	18.11	54.22	1.34	1.29
2000.00	1970.00	6.16	17.88	52.30	1.37	1.16
2100.00	2070.00	8.05	14.77	52.20	2.70	1.24
2140.00	2110.00	7.81	16.43	53.26	2.87	1.33
2200.00	2170.00	7.37	15.65	57.24	3.02	1.45
2300.00	2270.00	6.90	16.43	60.29	2.90	1.72
2340.00	2310.00	6.79	17.73	58.64	2.66	1.88
2400.00	2370.00	6.92	22.78	58.59	2.53	2.05

Demo Board MCL P/N: TB-MACA-242H+
Suggested PCB Layout (PL-145)



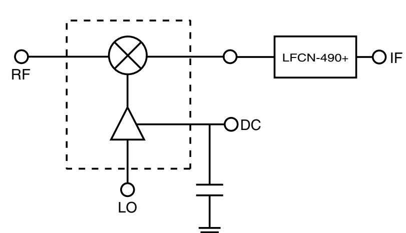
CAPACITOR C1: 1000 pF, 0402 SIZE
FILTER F1: LFCN-490+, FV1206 CASE STYLE

NOTE: 1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS 0.020" ± 0.0015". 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



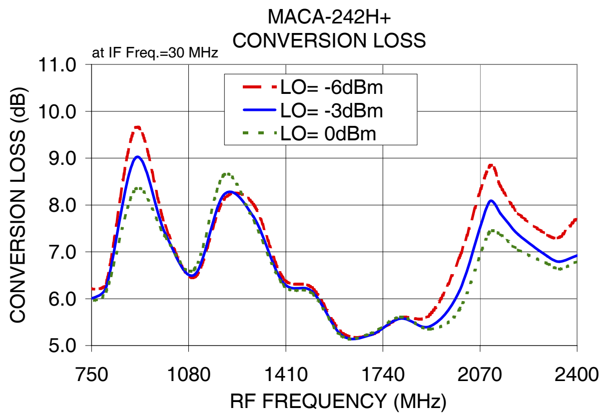
LFCN-490+ is added to improve L-I isolation.

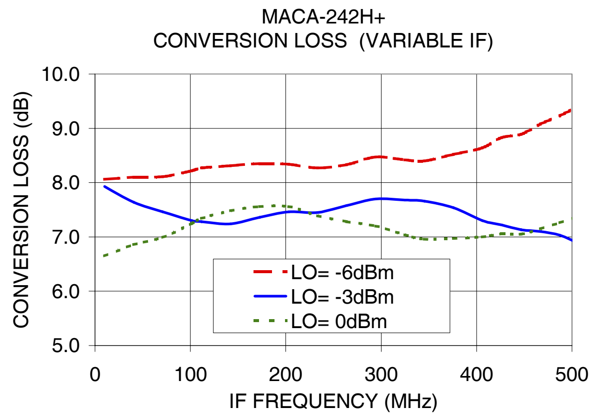
[redacted]

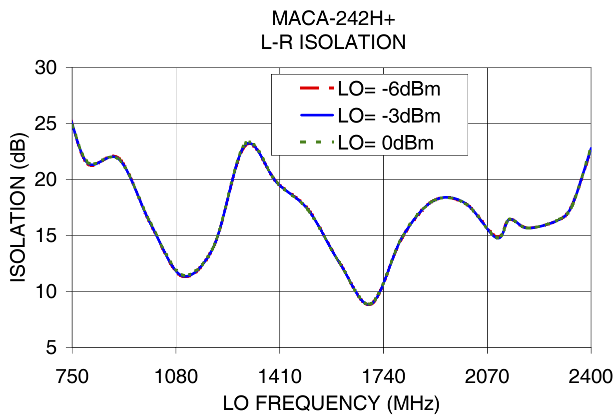
Mini-Circuits

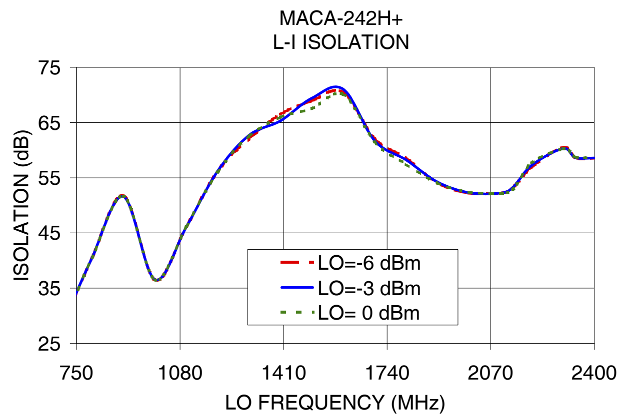
[redacted]

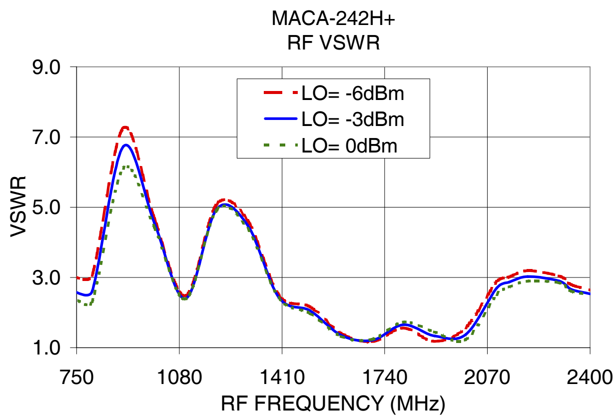
REV. B
M151107
MACA-242H
ED10457/8
MCL NY
250702

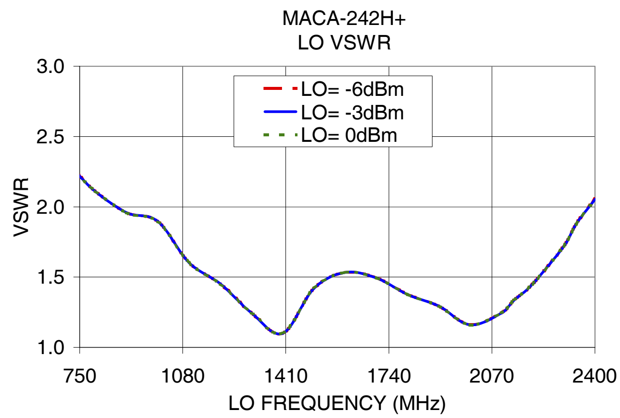

MACA-242H+
CONVERSION LOSS
at IF Freq.=30 MHz
LO= -6dBm
LO= -3dBm
LO= 0dBm
CONVERSION LOSS (dB)
11.0
10.0
9.0
8.0
7.0
6.0
5.0
750
1080
1410
1740
2070
2400
RF FREQUENCY (MHz)

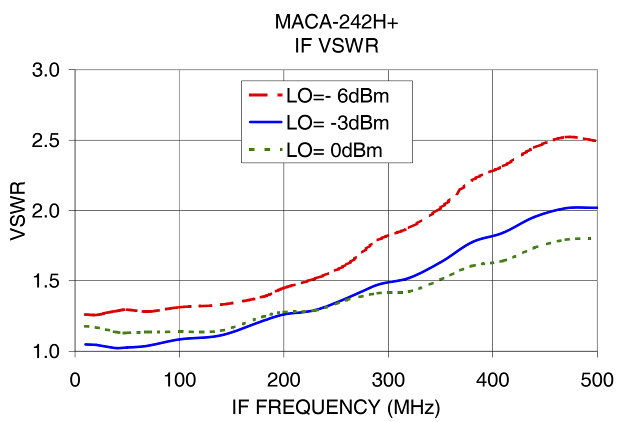

MACA-242H+
CONVERSION LOSS (VARIABLE IF)
LO= -6dBm
LO= -3dBm
LO= 0dBm
CONVERSION LOSS (dB)
10.0
9.0
8.0
7.0
6.0
5.0
0
100
200
300
400
500
IF FREQUENCY (MHz)

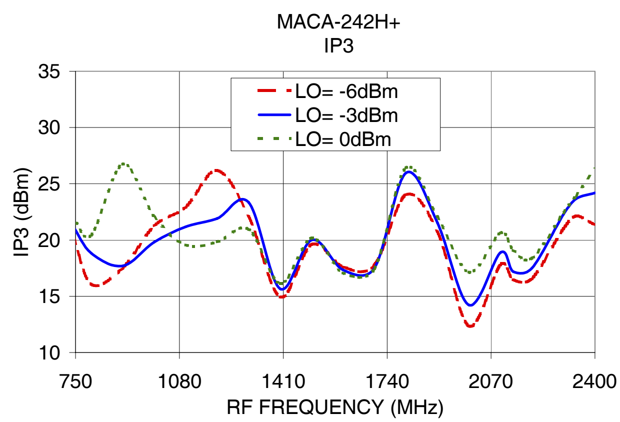

MACA-242H+
L-R ISOLATION
LO= -6dBm
LO= -3dBm
LO= 0dBm
ISOLATION (dB)
30
25
20
15
10
5
750
1080
1410
1740
2070
2400
LO FREQUENCY (MHz)


MACA-242H+
L-I ISOLATION
LO=-6 dBm
LO=-3 dBm
LO= 0 dBm
ISOLATION (dB)
75
65
55
45
35
25
750
1080
1410
1740
2070
2400
LO FREQUENCY (MHz)


MACA-242H+
RF VSWR
LO= -6dBm
LO= -3dBm
LO= 0dBm
VSWR
9.0
7.0
5.0
3.0
1.0
750
1080
1410
1740
2070
2400
RF FREQUENCY (MHz)


MACA-242H+
LO VSWR
LO= -6dBm
LO= -3dBm
LO= 0dBm
VSWR
3.0
2.5
2.0
1.5
1.0
750
1080
1410
1740
2070
2400
LO FREQUENCY (MHz)


MACA-242H+
IF VSWR
LO=- 6dBm
LO= -3dBm
LO= 0dBm
VSWR
3.0
2.5
2.0
1.5
1.0
0
100
200
300
400
500
IF FREQUENCY (MHz)


MACA-242H+
IP3
LO= -6dBm
LO= -3dBm
LO= 0dBm
IP3 (dBm)
35
30
25
20
15
10
750
1080
1410
1740
2070
2400
RF FREQUENCY (MHz)

Frequency Mixer MACA-242H+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB) @LO (dBm)		
		-6	-3	0
290.1	260.1	19.52	13.34	10.53
360.1	330.1	8.50	7.12	6.25
430.1	400.1	7.58	6.78	6.19
500.1	470.1	8.19	6.99	6.26
570.1	540.1	8.47	7.76	7.27
640.1	610.1	7.10	6.86	6.73
710.1	680.1	6.18	5.95	5.73
780.1	750.1	7.70	7.38	7.06
850.1	820.1	8.62	8.01	7.54
920.1	890.1	7.27	7.13	6.94
990.1	960.1	6.44	6.43	6.32
1060.1	1030.1	7.17	7.22	7.26
1130.1	1100.1	8.60	8.32	8.02
1200.1	1170.1	8.07	7.78	7.69
1280.1	1250.1	8.58	7.98	7.68
1350.1	1320.1	7.83	7.24	6.92
1430.1	1400.1	6.26	6.06	5.88
1500.1	1470.1	5.86	5.81	5.66
1580.1	1550.1	5.85	5.60	5.40
1650.1	1620.1	5.52	5.42	5.35
1730.1	1700.1	5.91	5.87	5.88
1800.1	1770.1	6.23	5.98	5.78
1880.1	1850.1	6.49	5.96	5.62
1950.1	1920.1	8.26	6.88	6.12
2030.1	2000.1	9.19	7.65	6.98
2100.1	2070.1	8.63	7.54	7.05
2180.1	2150.1	8.32	7.50	7.06
2250.1	2220.1	7.99	7.32	6.87
2330.1	2300.1	7.64	7.01	6.65
2400.1	2370.1	7.92	6.84	6.27
2480.1	2450.1	9.52	8.03	6.86
2550.1	2520.1	12.28	9.98	8.64
2630.1	2600.1	14.69	10.75	9.01
2700.1	2670.1	13.64	10.97	9.38
2780.1	2750.1	11.50	9.63	8.65
2850.1	2820.1	11.38	9.43	8.24
2930.1	2900.1	11.76	9.57	7.99
3000.1	2970.1	12.01	10.16	8.53
3080.1	3050.1	12.10	10.86	9.14
3150.1	3120.1	12.83	12.71	11.20

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm) @LO (dBm)		
		-6	-3	0
290.1	260.1	7.43	17.77	19.80
360.1	330.1	14.36	15.57	18.22
430.1	400.1	10.99	13.45	15.37
500.1	470.1	14.19	16.59	18.85
570.1	540.1	16.70	18.76	19.30
640.1	610.1	16.06	17.00	17.72
710.1	680.1	24.06	21.84	20.64
780.1	750.1	18.34	22.21	24.71
850.1	820.1	21.95	27.98	23.21
920.1	890.1	22.25	24.16	25.48
990.1	960.1	19.45	21.03	22.59
1060.1	1030.1	20.88	22.63	24.02
1130.1	1100.1	27.78	31.68	28.77
1200.1	1170.1	27.82	24.24	24.35
1280.1	1250.1	20.43	24.77	27.57
1350.1	1320.1	15.00	16.73	17.66
1430.1	1400.1	12.91	13.65	13.87
1500.1	1470.1	12.69	13.28	13.44
1580.1	1550.1	17.48	18.63	18.49
1650.1	1620.1	20.02	21.23	21.04
1730.1	1700.1	23.54	24.76	26.16
1800.1	1770.1	17.81	20.68	23.54
1880.1	1850.1	17.21	18.86	22.03
1950.1	1920.1	11.64	13.83	15.03
2030.1	2000.1	14.31	16.48	17.04
2100.1	2070.1	15.05	16.17	16.03
2180.1	2150.1	20.44	20.83	21.11
2250.1	2220.1	17.59	20.14	21.13
2330.1	2300.1	21.88	23.80	25.33
2400.1	2370.1	17.13	20.00	22.75
2480.1	2450.1	10.61	13.96	16.89
2550.1	2520.1	18.26	17.11	17.51
2630.1	2600.1	12.35	21.21	23.63
2700.1	2670.1	13.79	21.63	21.46
2780.1	2750.1	15.43	26.70	23.88
2850.1	2820.1	13.89	20.08	24.00
2930.1	2900.1	13.26	17.46	18.20
3000.1	2970.1	15.40	16.82	17.49
3080.1	3050.1	14.59	16.36	17.35
3150.1	3120.1	12.42	16.09	17.59

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+10dBm (dB) @LO (dBm)		
		-6	-3	0
290.1	260.1	-11.45	0.80	1.40
360.1	330.1	2.62	2.37	1.80
430.1	400.1	3.24	2.23	1.50
500.1	470.1	1.61	1.67	1.45
570.1	540.1	0.60	0.64	0.59
640.1	610.1	0.92	0.84	0.75
710.1	680.1	0.48	0.41	0.38
780.1	750.1	0.92	0.82	0.68
850.1	820.1	0.18	0.32	0.39
920.1	890.1	0.54	0.39	0.32
990.1	960.1	0.54	0.41	0.41
1060.1	1030.1	0.34	0.28	0.22
1130.1	1100.1	0.53	0.38	0.34
1200.1	1170.1	0.51	0.34	0.22
1280.1	1250.1	0.11	0.26	0.26
1350.1	1320.1	0.89	0.92	0.86
1430.1	1400.1	1.83	1.76	1.65
1500.1	1470.1	2.19	1.87	1.66
1580.1	1550.1	1.51	1.22	0.98
1650.1	1620.1	1.08	0.67	0.50
1730.1	1700.1	0.60	0.29	0.15
1800.1	1770.1	1.31	0.90	0.60
1880.1	1850.1	1.63	1.08	0.69
1950.1	1920.1	1.84	1.96	1.80
2030.1	2000.1	1.08	1.32	1.20
2100.1	2070.1	0.96	1.03	0.94
2180.1	2150.1	0.78	0.80	0.74
2250.1	2220.1	0.69	0.63	0.53
2330.1	2300.1	0.84	0.54	0.36
2400.1	2370.1	1.13	0.79	0.48
2480.1	2450.1	1.84	1.52	1.33
2550.1	2520.1	0.86	1.21	1.06
2630.1	2600.1	-2.07	0.25	0.59
2700.1	2670.1	-1.35	0.03	0.41
2780.1	2750.1	-0.33	0.31	0.36
2850.1	2820.1	-0.31	0.44	0.59
2930.1	2900.1	-0.38	0.47	0.70
3000.1	2970.1	0.25	0.36	0.49
3080.1	3050.1	1.90	1.08	1.07
3150.1	3120.1	3.13	1.52	1.40

Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1575.1MHz (dB) @LO (dBm) -3
635.0	940.1	13.05
594.7	980.4	9.88
554.4	1020.7	8.83
514.0	1061.1	7.98
473.7	1101.4	7.41
433.4	1141.7	7.63
393.1	1182.0	7.16
352.7	1222.4	6.53
312.4	1262.7	6.03
272.1	1303.0	5.58
231.8	1343.3	5.39
211.6	1363.5	5.30
171.3	1403.8	5.08
151.1	1424.0	5.13
110.8	1464.3	5.31
90.6	1484.5	5.36
50.3	1524.8	5.59
30.2	1544.9	5.57
10.0	1585.1	5.59
30.5	1605.6	5.36
71.5	1646.6	5.30
91.9	1667.0	5.41
132.9	1708.0	5.61
153.4	1728.5	5.79
194.4	1769.5	6.14
214.8	1789.9	6.30
255.8	1830.9	6.73
276.3	1851.4	6.93
317.3	1892.4	7.44
337.7	1912.8	7.81
378.7	1953.8	8.48
399.2	1974.3	8.64
440.2	2015.3	9.18
460.6	2035.7	9.58
501.6	2076.7	9.23
522.1	2097.2	8.93
563.1	2138.2	8.56
583.5	2158.6	8.59
624.5	2199.6	10.73
645.0	2220.1	13.24

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=750.1MHz (dB) @LO (dBm) -3
10.0	760.1	6.68
30.0	780.1	6.97
50.0	800.1	7.59
70.0	820.1	7.97
90.0	840.1	8.26
110.0	860.1	8.34
130.0	880.1	8.48
150.0	900.1	8.42
170.0	920.1	8.40
190.0	940.1	8.28
210.0	960.1	8.01
230.0	980.1	7.58
250.0	1000.1	7.38
260.0	1010.1	7.21
280.0	1030.1	7.09
290.0	1040.1	7.07
310.0	1060.1	7.05
320.0	1070.1	7.13
340.0	1090.1	6.91
350.0	1100.1	6.75
370.0	1120.1	6.61
380.0	1130.1	6.66
400.0	1150.1	6.69
410.0	1160.1	6.82
430.0	1180.1	7.15
440.0	1190.1	7.21
460.0	1210.1	7.52
470.0	1220.1	7.67
490.0	1240.1	7.99
500.0	1250.1	8.13
520.0	1270.1	8.31
530.0	1280.1	8.29
550.0	1300.1	8.47
560.0	1310.1	8.61
580.0	1330.1	8.89
590.0	1340.1	9.18
610.0	1360.1	9.92
620.0	1370.1	10.56
640.0	1390.1	12.95
650.0	1400.1	14.56

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=2400.1001MHz (dB) @LO (dBm) -3
650.1	1750.0	14.38
630.1	1770.0	11.79
610.1	1790.0	10.29
590.1	1810.0	9.68
570.1	1830.0	9.57
550.1	1850.0	9.64
530.1	1870.0	9.69
510.1	1890.0	9.85
490.1	1910.0	10.02
470.1	1930.0	10.13
450.1	1950.0	10.10
430.1	1970.0	9.93
410.1	1990.0	9.84
400.1	2000.0	9.79
380.1	2020.0	9.74
370.1	2030.0	9.75
350.1	2050.0	9.66
340.1	2060.0	9.58
320.1	2080.0	9.47
310.1	2090.0	9.30
290.1	2110.0	9.16
280.1	2120.0	9.07
260.1	2140.0	8.81
250.1	2150.0	8.70
230.1	2170.0	8.46
220.1	2180.0	8.26
200.1	2200.0	7.98
190.1	2210.0	7.86
170.1	2230.0	7.60
160.1	2240.0	7.50
140.1	2260.0	7.31
130.1	2270.0	7.18
110.1	2290.0	7.00
100.1	2300.0	6.95
80.1	2320.0	6.81
70.1	2330.0	6.77
50.1	2350.0	6.83
40.1	2360.0	6.79
20.1	2380.0	6.89
10.1	2390.0	6.97

Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB) @LO (dBm)			LO-IF ISOLATION (dB) @LO (dBm)		
	-6	-3	0	-6	-3	0
260.1	35.10	33.85	31.80	5.79	7.13	7.61
330.1	25.81	28.28	28.45	3.03	5.36	7.15
400.1	29.92	28.01	25.87	3.26	5.81	8.10
470.1	23.42	23.87	24.35	3.75	6.12	8.23
540.1	23.61	24.88	25.94	4.97	7.53	10.07
610.1	31.99	39.57	49.38	6.54	7.00	7.63
680.1	20.67	20.76	21.07	20.61	21.49	22.01
750.1	20.30	21.29	20.93	42.08	42.35	42.82
820.1	21.85	21.59	20.58	56.20	55.69	55.99
890.1	20.16	22.18	22.08	44.48	44.47	44.80
960.1	19.26	19.65	18.36	32.67	33.36	34.13
1030.1	21.45	22.94	20.56	39.98	41.59	43.09
1100.1	27.45	33.19	24.60	46.97	48.98	50.91
1170.1	23.73	39.27	26.36	52.00	54.05	56.21
1250.1	23.29	31.68	22.19	58.26	60.12	61.90
1320.1	19.60	22.48	23.84	75.60	79.77	82.53
1400.1	10.95	11.56	11.85	55.92	57.83	59.62
1470.1	14.73	16.30	17.40	47.28	50.43	53.45
1550.1	15.58	14.88	14.71	51.54	55.61	59.46
1620.1	13.52	13.22	13.40	51.46	55.98	60.21
1700.1	14.70	13.82	13.47	50.06	54.58	58.96
1770.1	16.50	16.88	17.72	51.90	55.14	59.12
1850.1	15.69	16.43	17.80	56.83	55.95	56.43
1920.1	15.39	15.62	16.15	63.84	59.88	57.37
2000.1	14.62	13.91	13.96	67.88	70.94	68.74
2070.1	13.79	13.46	12.68	67.68	73.61	78.26
2150.1	16.32	18.47	19.70	71.23	76.11	81.74
2220.1	14.17	14.85	15.27	70.09	74.38	80.33
2300.1	14.85	16.13	16.91	65.10	70.06	73.83
2370.1	14.95	17.26	18.52	62.44	65.49	68.43
2450.1	14.48	18.18	24.48	58.07	60.95	63.49
2520.1	13.02	20.20	23.84	54.94	59.88	63.64
2600.1	13.00	16.06	15.74	50.02	50.56	50.85
2670.1	12.11	10.00	8.48	48.43	47.42	47.07
2750.1	19.72	14.55	11.64	57.92	53.67	52.03
2820.1	20.91	17.43	14.06	62.27	56.52	54.65
2900.1	20.57	19.66	19.53	59.89	57.70	57.50
2970.1	21.96	20.26	20.06	56.99	57.46	58.47
3050.1	18.16	17.91	17.76	52.81	55.21	56.83
3120.1	16.20	17.85	18.10	50.98	54.05	56.07

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB) @LO (dBm)		
		-6	-3	0
290.1	260.1	25.45	23.97	22.14
360.1	330.1	20.89	19.53	18.22
430.1	400.1	19.92	17.39	15.88
500.1	470.1	17.25	16.76	16.55
570.1	540.1	21.33	21.14	21.42
640.1	610.1	29.52	29.47	31.60
710.1	680.1	48.28	46.98	44.53
780.1	750.1	65.71	65.04	63.38
850.1	820.1	67.31	67.53	67.84
920.1	890.1	66.65	68.14	68.97
990.1	960.1	67.73	68.18	70.04
1060.1	1030.1	70.51	71.06	69.98
1130.1	1100.1	70.20	70.98	71.04
1200.1	1170.1	72.07	71.50	72.70
1280.1	1250.1	75.16	76.16	76.41
1350.1	1320.1	84.01	84.24	87.71
1430.1	1400.1	77.97	77.36	76.82
1500.1	1470.1	74.30	75.07	78.37
1580.1	1550.1	83.03	90.00	83.21
1650.1	1620.1	87.40	86.89	81.22
1730.1	1700.1	79.76	79.73	81.98
1800.1	1770.1	77.14	76.89	76.93
1880.1	1850.1	72.56	71.11	70.38
1950.1	1920.1	71.07	69.00	68.82
2030.1	2000.1	69.79	69.47	68.57
2100.1	2070.1	68.02	66.98	67.88
2180.1	2150.1	65.74	66.00	65.51
2250.1	2220.1	66.10	66.20	66.13
2330.1	2300.1	64.68	66.01	66.73
2400.1	2370.1	65.70	66.88	67.05
2480.1	2450.1	64.69	66.13	66.00
2550.1	2520.1	64.41	64.44	64.49
2630.1	2600.1	62.72	64.55	65.84
2700.1	2670.1	70.45	67.76	67.81
2780.1	2750.1	67.21	65.26	63.82
2850.1	2820.1	63.60	62.20	61.38
2930.1	2900.1	60.39	59.92	59.35
3000.1	2970.1	57.90	57.92	57.73
3080.1	3050.1	56.24	56.31	56.34
3150.1	3120.1	55.18	55.15	54.93

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1) @LO (dBm) -6	-3	0
290.1	260.1	7.22	3.87	3.14
360.1	330.1	2.20	1.79	1.77
430.1	400.1	1.99	1.71	1.66
500.1	470.1	3.58	3.02	2.73
570.1	540.1	4.77	4.43	4.26
640.1	610.1	3.92	3.82	3.79
710.1	680.1	3.16	2.82	2.62
780.1	750.1	4.00	3.65	3.38
850.1	820.1	6.05	5.51	5.10
920.1	890.1	4.32	4.10	3.90
990.1	960.1	3.03	2.84	2.71
1060.1	1030.1	3.06	3.03	2.99
1130.1	1100.1	5.51	5.38	5.28
1200.1	1170.1	5.59	5.23	5.04
1280.1	1250.1	4.80	4.59	4.50
1350.1	1320.1	4.05	3.86	3.80
1430.1	1400.1	2.74	2.48	2.32
1500.1	1470.1	2.16	1.95	1.79
1580.1	1550.1	1.45	1.33	1.26
1650.1	1620.1	1.19	1.22	1.25
1730.1	1700.1	1.56	1.72	1.87
1800.1	1770.1	1.47	1.57	1.62
1880.1	1850.1	1.17	1.08	1.23
1950.1	1920.1	1.89	1.55	1.37
2030.1	2000.1	2.79	2.44	2.32
2100.1	2070.1	2.87	2.59	2.53
2180.1	2150.1	2.97	2.69	2.60
2250.1	2220.1	3.06	2.82	2.73
2330.1	2300.1	2.85	2.58	2.51
2400.1	2370.1	2.69	2.22	2.04
2480.1	2450.1	3.20	2.43	2.02
2550.1	2520.1	4.28	3.57	3.31
2630.1	2600.1	4.91	4.09	3.78
2700.1	2670.1	4.86	4.03	3.69
2780.1	2750.1	4.43	3.73	3.47
2850.1	2820.1	4.15	3.42	3.06
2930.1	2900.1	4.08	3.25	2.81
3000.1	2970.1	3.90	3.26	2.85
3080.1	3050.1	3.77	3.28	2.86
3150.1	3120.1	3.98	3.82	3.52

LO (MHz)	LO VSWR (:1) @LO (dBm) -6	-3	0
260.1	5.65	5.61	5.63
330.1	5.27	5.30	5.36
400.1	4.18	4.33	4.40
470.1	3.98	3.93	3.88
540.1	3.73	3.57	3.44
610.1	3.29	3.17	3.05
680.1	2.93	2.89	2.82
750.1	2.57	2.60	2.57
820.1	2.40	2.44	2.42
890.1	2.28	2.32	2.33
960.1	2.20	2.23	2.25
1030.1	2.00	2.02	2.04
1100.1	2.10	2.06	2.05
1170.1	2.07	2.03	2.02
1250.1	2.02	2.00	2.03
1320.1	1.99	2.04	2.11
1400.1	2.07	2.20	2.33
1470.1	2.26	2.46	2.68
1550.1	2.44	2.60	2.79
1620.1	2.60	2.70	2.82
1700.1	2.84	2.77	2.80
1770.1	2.95	2.80	2.73
1850.1	2.92	2.75	2.66
1920.1	2.75	2.60	2.53
2000.1	2.52	2.38	2.33
2070.1	2.18	2.10	2.12
2150.1	1.71	1.74	1.86
2220.1	1.38	1.49	1.67
2300.1	1.20	1.33	1.52
2370.1	1.36	1.36	1.46
2450.1	1.63	1.58	1.57
2520.1	1.77	1.72	1.73
2600.1	1.55	1.46	1.45
2670.1	1.54	1.46	1.45
2750.1	1.25	1.24	1.26
2820.1	1.14	1.12	1.14
2900.1	1.22	1.18	1.13
2970.1	1.37	1.32	1.25
3050.1	1.55	1.48	1.39
3120.1	1.61	1.57	1.47

IF (OUT) (MHz)	IF VSWR @LO=2400.1001MHz (:1) @LO (dBm) -6	-3	0
10.0	1.53	1.10	1.07
30.0	1.53	1.10	1.08
50.0	1.56	1.12	1.05
70.0	1.56	1.13	1.06
90.0	1.61	1.17	1.04
110.0	1.61	1.17	1.06
130.0	1.64	1.21	1.09
150.0	1.67	1.23	1.09
170.0	1.75	1.30	1.14
190.0	1.81	1.35	1.19
210.0	1.87	1.42	1.25
230.0	1.94	1.47	1.29
250.0	2.04	1.57	1.37
260.0	2.09	1.61	1.40
280.0	2.16	1.68	1.48
290.0	2.17	1.69	1.48
310.0	2.24	1.74	1.51
320.0	2.26	1.76	1.53
340.0	2.35	1.84	1.59
350.0	2.42	1.89	1.64
370.0	2.49	1.95	1.69
380.0	2.57	2.03	1.75
400.0	2.67	2.10	1.82
410.0	2.75	2.16	1.86
430.0	2.88	2.28	1.97
440.0	2.92	2.32	2.00
460.0	3.06	2.45	2.13
470.0	3.07	2.45	2.13
490.0	3.11	2.51	2.19
500.0	3.09	2.49	2.18
520.0	2.92	2.37	2.10
530.0	2.82	2.31	2.05
550.0	2.41	2.01	1.81
560.0	2.18	1.84	1.67
580.0	1.59	1.36	1.28
590.0	1.33	1.14	1.11
610.0	1.50	1.44	1.43
620.0	1.97	1.87	1.82
640.0	3.49	3.24	3.09
650.0	4.45	4.13	3.94

Harmonics Tables

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	45	59	23	34	37	35	42	73	36	55
1	-	79	+0	77	65	66	40	66	40	64	60	52
2	67	>79	>79	48	>79	>79	64	68	68	74	70	>79
3	>90	>79	>79	>79	54	>79	>79	>79	78	>79	74	>79
4	>90	>79	>79	>79	>79	76	>79	>79	>79	>79	>79	>79
5	>90	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
6	>90	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
7	>90	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
8	>90	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
9	>90	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
10	>90	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: **RF IN: 1575.1 MHz; -5.00 dBm.**
LO IN: 1545.1 MHz; +-3.00 dBm
IF OUT: 30 MHz; -10.5 dBm

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	57	70	35	47	54	47	56	77	51	66
1	-	79	+0	76	66	68	42	67	42	71	65	59
2	47	>89	86	37	75	>89	55	61	63	68	73	>89
3	87	84	>89	>89	33	>89	>89	80	63	83	64	84
4	>90	76	79	>89	>89	58	>89	>89	73	78	78	>89
5	>90	83	78	>89	>89	>89	52	>89	>89	>89	77	>89
6	>90	85	84	>89	>89	>89	>89	77	>89	>89	>89	>89
7	>90	>89	84	>89	88	>89	>89	>89	68	>89	>89	>89
8	>90	>89	>89	>89	>89	>89	>89	>89	>89	76	>89	>89
9	>90	>89	>89	>89	>89	>89	>89	>89	>89	>89	79	>89
10	>90	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89	80
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

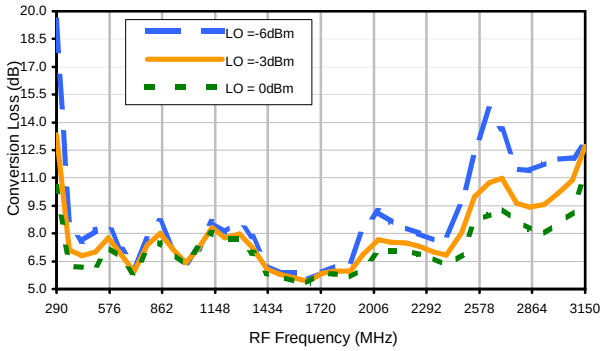
LO HARMONICS ORDER

Test conditions: **RF IN: 1575.1 MHz; 5.00 dBm.**
LO IN: 1545.1 MHz; +-3.00 dBm
IF OUT: 30 MHz; -0.78 dBm

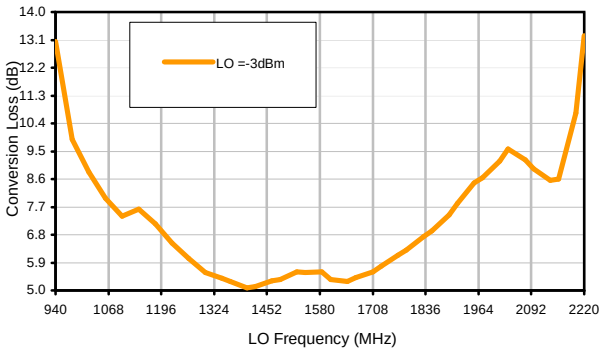
Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

Typical Performance Curves

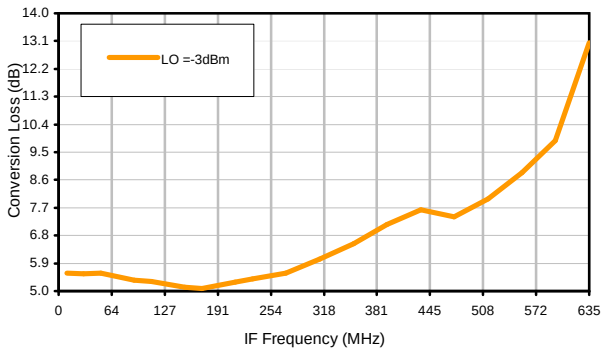
Conversion Loss @ IF=30MHz



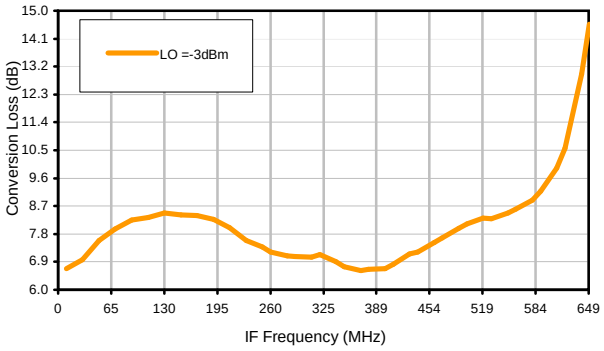
Conversion Loss vs. LO @ RF=1575.1MHz



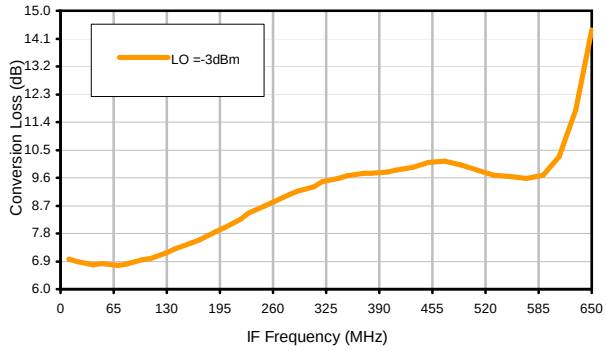
Conversion Loss vs. IF @ RF=1575.1MHz



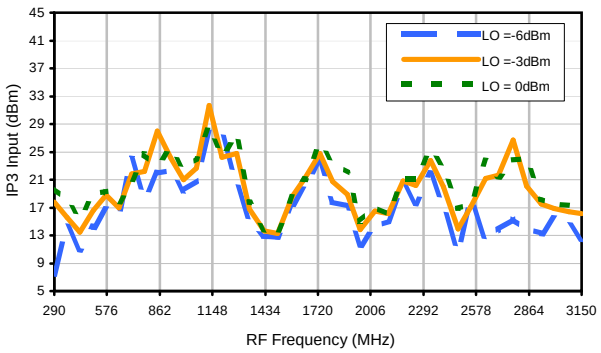
Conversion Loss vs. IF @ RF=750.1MHz



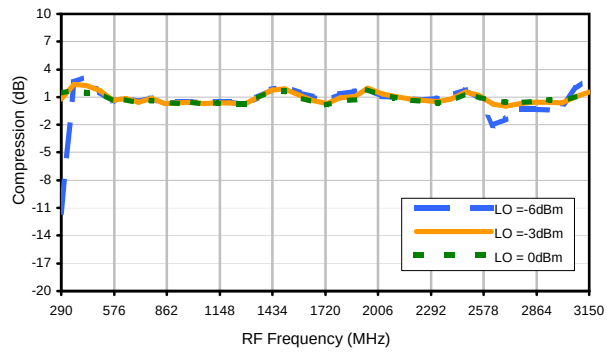
Conversion Loss vs. IF @ RF=2400.1001MHz



IP3 Input

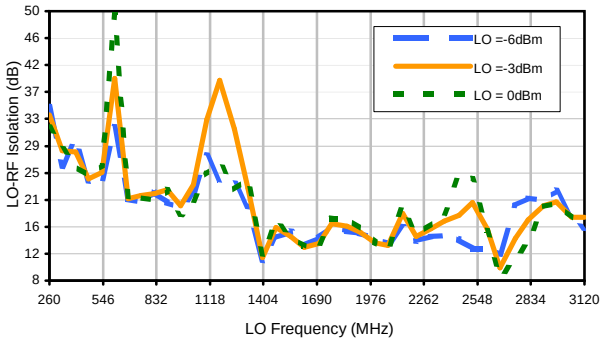


Compression @ RF IN=+10dBm

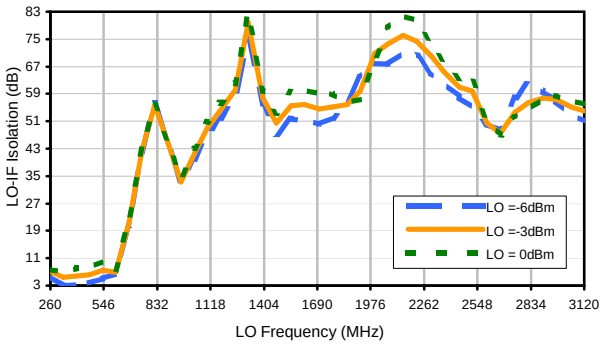


Typical Performance Curves

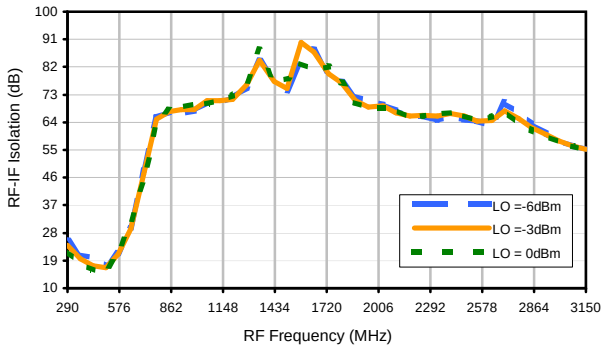
LO-RF Isolation



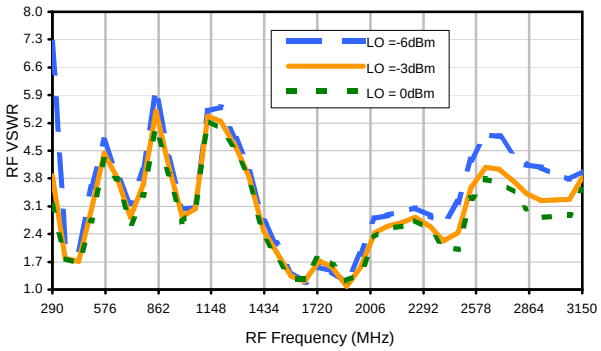
LO-IF Isolation



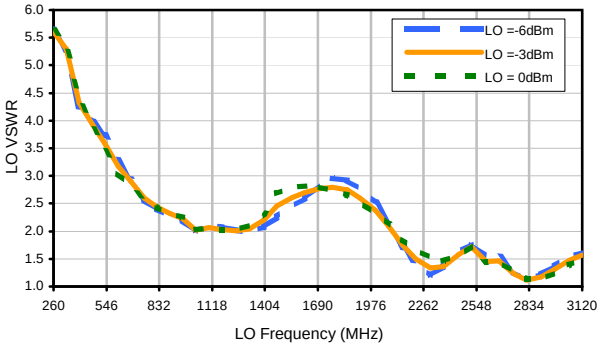
RF-IF Isolation



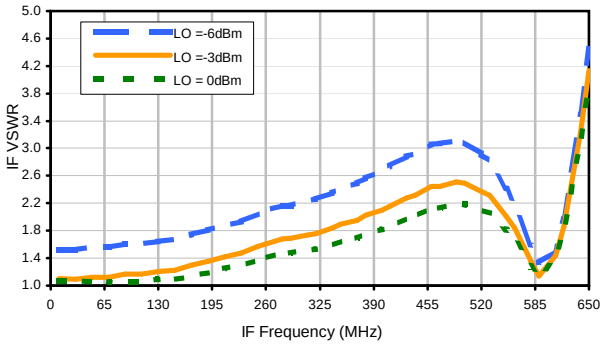
RF VSWR



LO VSWR



IF VSWR



Harmonics Tables

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	45	59	23	34	37	35	42	73	36	55
1	-	79	+0	77	65	66	40	66	40	64	60	52
2	67	>79	>79	48	>79	>79	64	68	68	74	70	>79
3	>90	>79	>79	>79	54	>79	>79	>79	78	>79	74	>79
4	>90	>79	>79	>79	>79	76	>79	>79	>79	>79	>79	>79
5	>90	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
6	>90	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
7	>90	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
8	>90	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
9	>90	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
10	>90	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: **RF IN: 1575.1 MHz; -5.00 dBm.**
LO IN: 1545.1 MHz; +-3.00 dBm
IF OUT: 30 MHz; -10.5 dBm

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	57	70	35	47	54	47	56	77	51	66
1	-	79	+0	76	66	68	42	67	42	71	65	59
2	47	>89	86	37	75	>89	55	61	63	68	73	>89
3	87	84	>89	>89	33	>89	>89	80	63	83	64	84
4	>90	76	79	>89	>89	58	>89	>89	73	78	78	>89
5	>90	83	78	>89	>89	>89	52	>89	>89	>89	77	>89
6	>90	85	84	>89	>89	>89	>89	77	>89	>89	>89	>89
7	>90	>89	84	>89	88	>89	>89	>89	68	>89	>89	>89
8	>90	>89	>89	>89	>89	>89	>89	>89	>89	76	>89	>89
9	>90	>89	>89	>89	>89	>89	>89	>89	>89	>89	79	>89
10	>90	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89	80
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

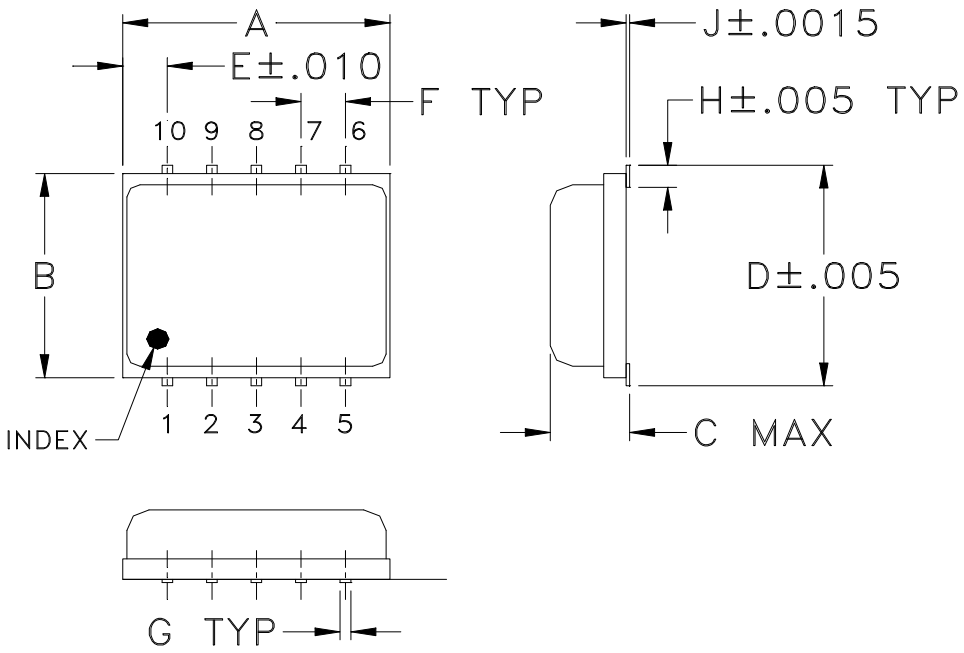
Test conditions: **RF IN: 1575.1 MHz; 5.00 dBm.**
LO IN: 1545.1 MHz; +-3.00 dBm
IF OUT: 30 MHz; -0.78 dBm

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.

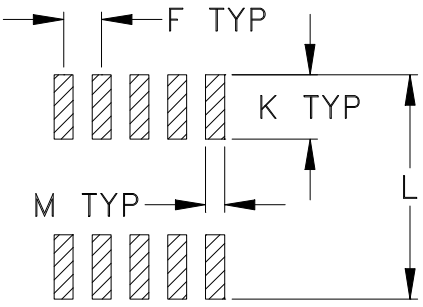
Case Style DZ

DZ885
DZ1034

Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE#	A	B	C	D	E	F	G	H	J	K	L	M	WT. GRAMS
DZ885	.30 (7.62)	.250 (6.35)	.085 (2.16)	.266 (6.76)	.050 (1.27)	.050 (1.27)	.012 (0.30)	.029 (0.74)	.004 (0.10)	.085 (2.16)	.296 (7.52)	.030 (0.76)	0.25
DZ1034			.105 (2.67)										0.3

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

Notes:

1. Case material: Plastic encapsulation on Ceramic base.
2. Termination finish:
   For RoHS Case Styles: Tin plate. All models, (+) suffix.
   For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.

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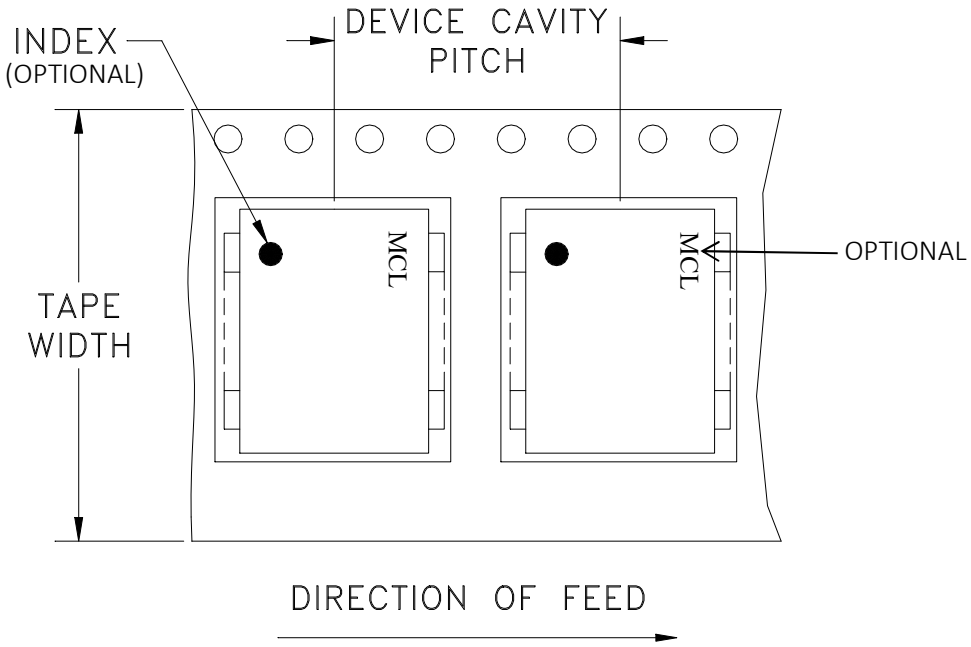
Tape & Reel Packaging TR-F34

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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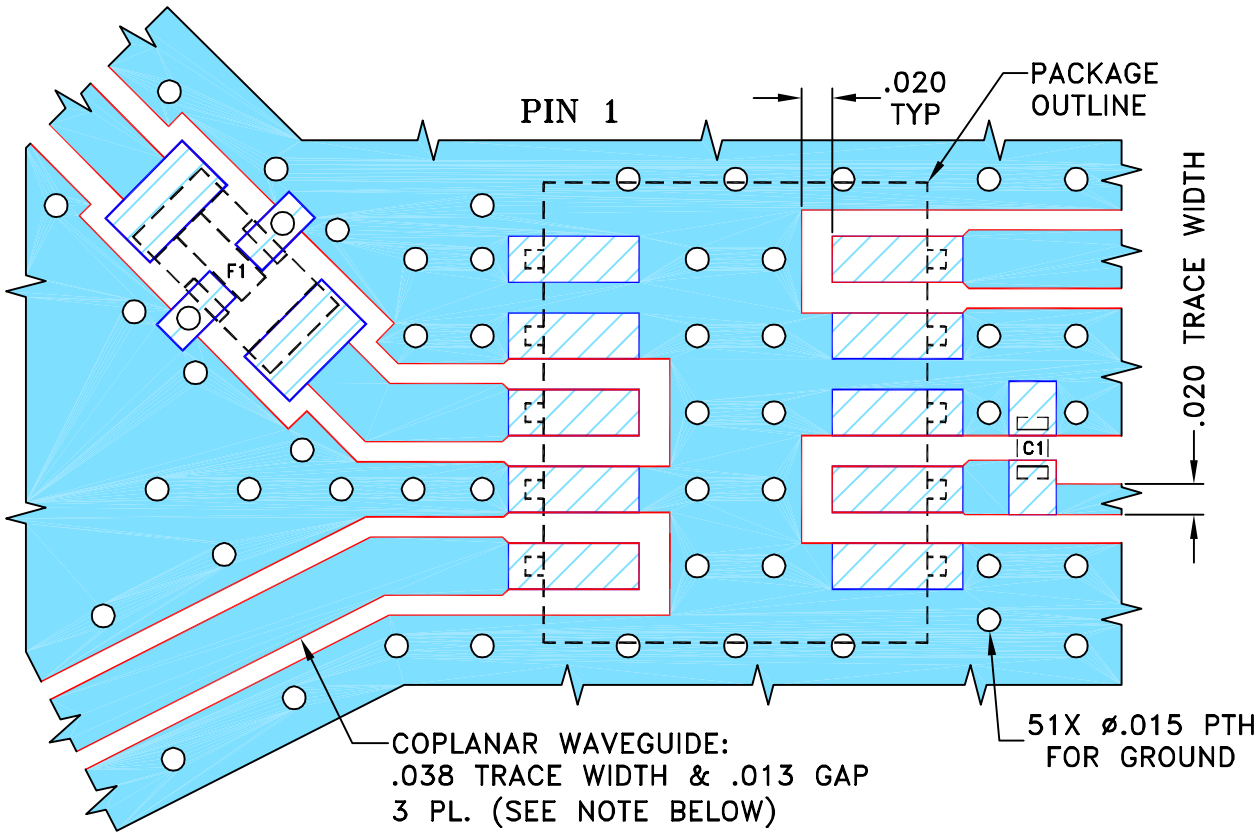
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M89275	NEW RELEASE	10/23/03	AV	DJ
A	M91639	REMOVED NOTE 2	04/14/04	AV	DJ
B	M102713	ADDED "...WITH SMOBC"	01/12/06	GF	IL
C	M115195	MODIFIED PATTERN & TEST BOARD	12/24/07	AV	DJ

SUGGESTED MOUNTING CONFIGURATION FOR DZ1034 CASE STYLE, "10MA01" PIN CODE



CAPACITOR C1: 1000 pF, 0402 SIZE
FILTER F1: LFCN-490+, FV1206 CASE STYLE

NOTE: 1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS 0.020" ± 0.0015". 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	AV	10/10/03
TOLERANCES ON:	CHECKED	IL	10/23/03
2 PL DECIMALS ±	APPROVED	DJ	10/23/03
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

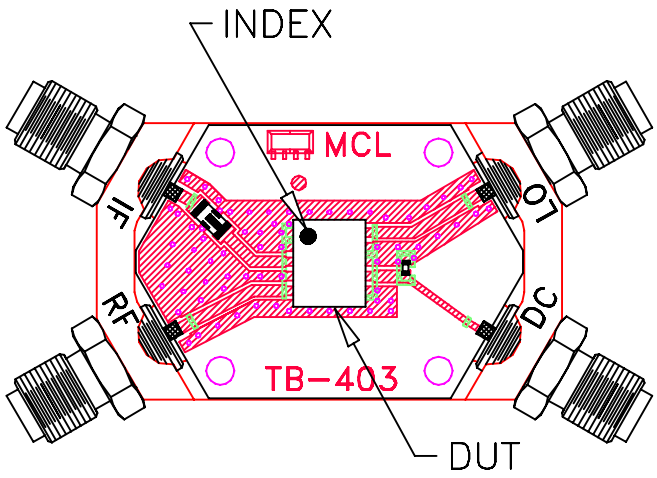
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, 10MA01, DZ1034, MACA-242H+, TB-403

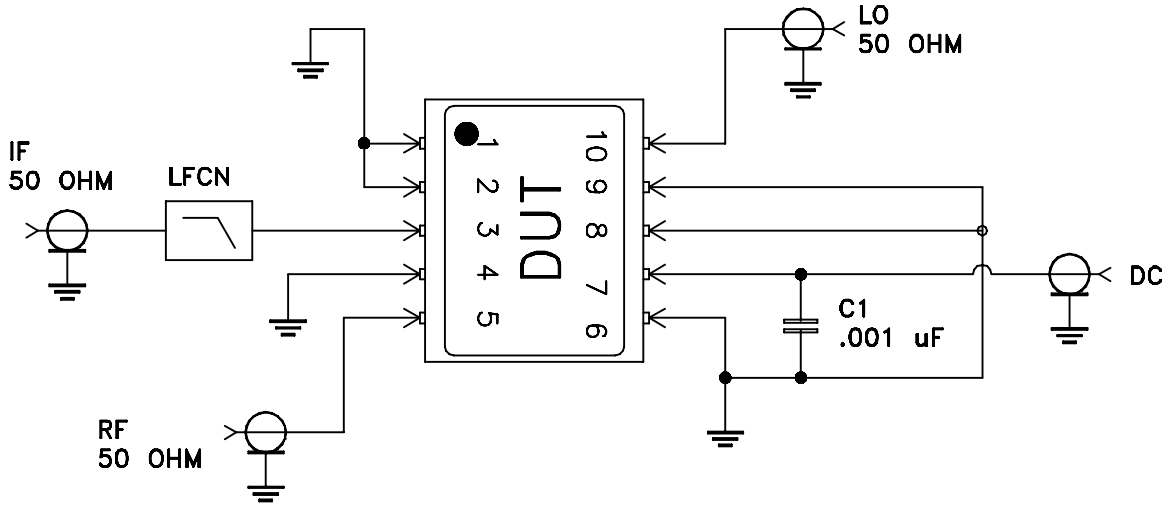
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-145	C

FILE:	SCALE:	SHEET:
98PL145	8:1	1 OF 1

Evaluation Board and Circuit



TB-403



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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Environmental Specifications ENV10

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	-55° to 100°C Ambient Environment	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