NON-CATALOG

High IP3

Frequency Mixer

MCA-19FMH+

Level 13 (LO Power+13 dBm) 1850 to 1910 MHz

CASE STYLE: DZ883

+RoHS Compliant

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

Maximum Ratings

Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
LO & RF Power	16 dBm

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

Pin Connections

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

Features

- excellent IP3, 30 dBm typ.
- excellent L-R isolation, 40 dB typ.
- excellent 1 dB compression, RF>LO power
- industry standard foot print
- LTCC design for excellent temperature stability, performance repeatability and small size
- aqueous washable
- double balanced mixer
- low price
- protected by US Patent 6,959,180

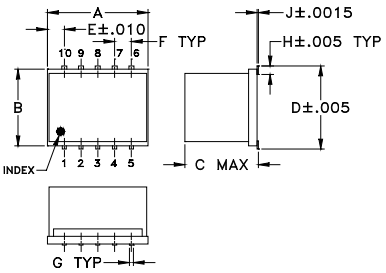
Applications

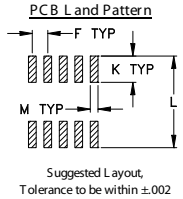
- GSM
- DECT

Available Tape and Reel at no extra cost

Reel Size	Devices/Reel
7"	10, 20, 50, 100, 200
13"	500,1000

Outline Drawing





Suggested Layout,
Tolerance to be within ±.002

Outline Dimensions (inch / mm)

A	B	C	D	E	F	G
.30	.250	.190	.266	.050	.050	.012
7.62	6.35	4.83	6.76	1.27	1.27	0.30
H	J	K	L	M		wt
.029	.004	.085	.296	.030		grams
0.74	0.10	2.16	7.52	0.76		0.5

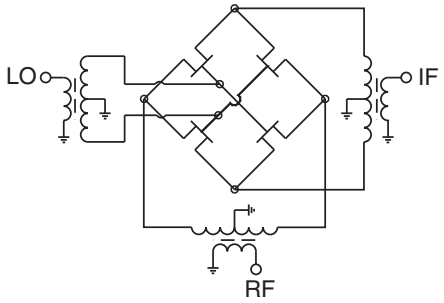
Electrical Specifications (T_{AMB}=-55°C to 100°C)

FREQUENCY (MHz)			IP3 (dBm)	RF in at 1 dB compr. (dBm)	CONVERSION LOSS (dB)		LO-RF ISOLATION (dB)		LO-IF ISOLATION (dB)	
RF	LO	IF	Typ.	Min.	Typ.	Max.	Typ.	Min.	Typ.	Min.
1850-1910	1760-1820	70-130	30	13	6.9	8.4	40	22	39	20

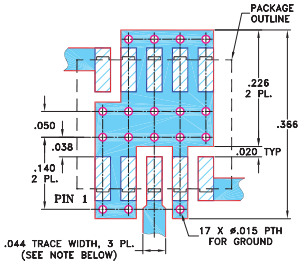
Typical Performance Data

Frequency (MHz)		Conversion Loss (dB)	Isolation L-R (dB)	Isolation L-I (dB)	VSWR RF Port (:1)	VSWR LO Port (:1)	IP3 (dBm)
RF	LO	LO +13dBm	LO +13dBm	LO +13dBm	LO +13dBm	LO +13dBm	LO +13dBm
1850.00	1760.00	6.85	43.51	45.47	1.73	2.51	30.46
1865.00	1775.00	6.87	42.53	46.32	1.78	2.14	31.19
1880.00	1790.00	6.86	41.50	43.61	1.77	1.98	31.17
1895.00	1805.00	6.85	41.15	40.87	1.74	2.01	31.16
1910.00	1820.00	6.80	41.04	39.00	1.72	2.22	30.98

Electrical Schematic



Demo Board MCL P/N: TB-144
Suggested PCB Layout (PL-045)



NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020" ± .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

Notes

A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
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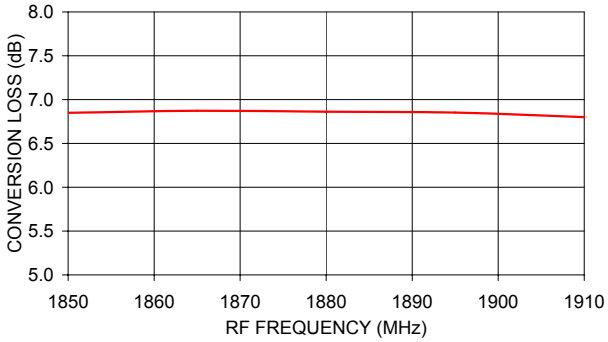
REV. H
M166133
ED-9488A/2
MCA-19FMH+
DJ/TD/CP/AM
180418

NON-CATALOG

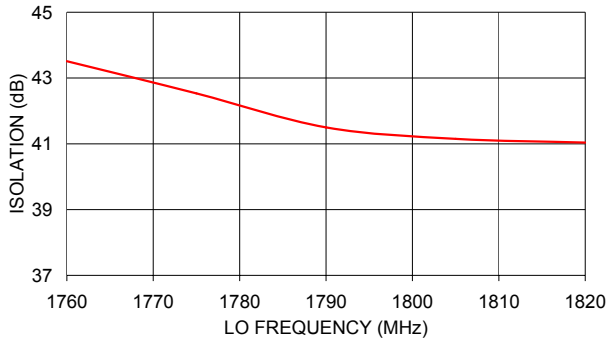
Performance Charts

MCA-19FMH+

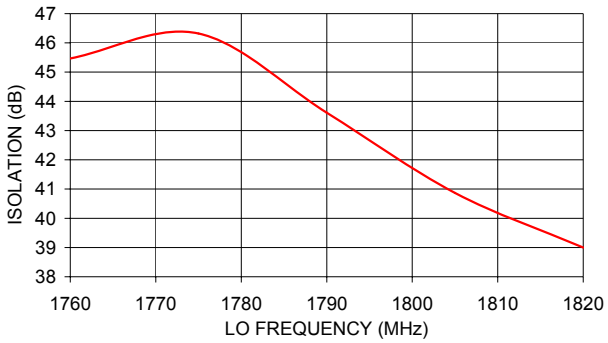
MCA-19FMH+
CONVERSION LOSS



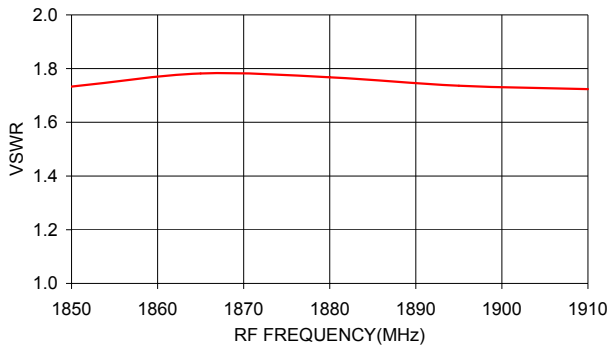
MCA-19FMH+
L-R ISOLATION



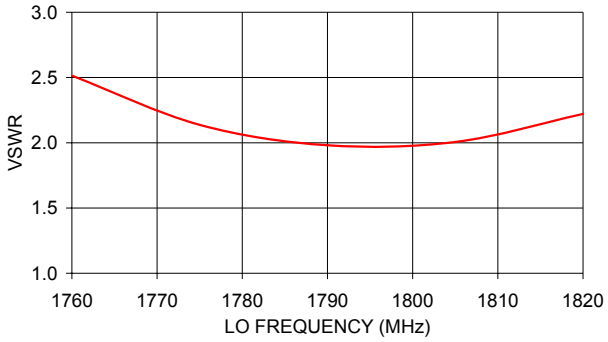
MCA-19FMH+
L-I ISOLATION



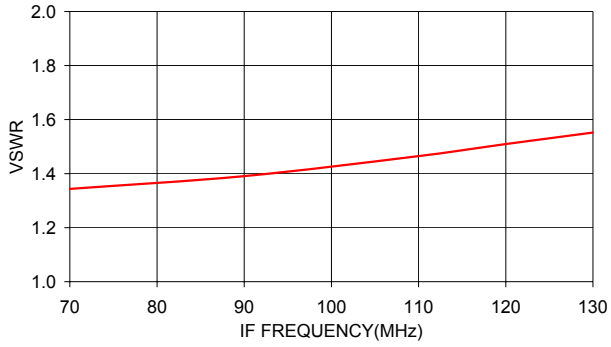
MCA-19FMH+
RF VSWR



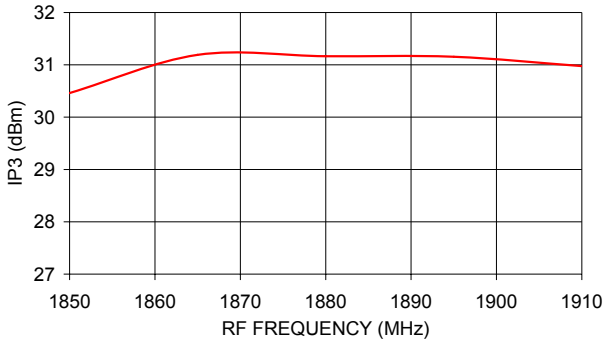
MCA-19FMH+
LO VSWR



MCA-19FMH+
IF VSWR



MCA-19FMH+
IP3



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Frequency Mixer MCA-19FMH+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=90MHz (dB) @LO (dBm)		
		+10	+13	+16
1440.1	1350.1	11.88	10.13	8.98
1475.1	1385.1	10.77	9.50	8.85
1510.1	1420.1	10.49	9.35	8.66
1545.1	1455.1	10.07	8.96	8.29
1580.1	1490.1	9.34	8.43	8.74
1615.1	1525.1	8.78	7.95	7.52
1650.1	1560.1	8.21	7.62	7.34
1685.1	1595.1	7.77	7.38	7.21
1720.1	1630.1	7.51	7.25	7.15
1755.1	1665.1	7.29	7.13	7.07
1790.1	1700.1	7.21	7.13	7.12
1825.1	1735.1	7.26	7.27	7.34
1860.1	1770.1	7.24	7.26	7.33
1895.1	1805.1	7.20	7.19	7.21
1930.1	1840.1	7.32	7.31	7.36
1965.1	1875.1	7.26	7.25	7.30
2000.1	1910.1	7.40	7.33	7.33
2035.1	1945.1	7.71	7.55	7.47
2070.1	1980.1	7.77	7.60	7.50
2105.1	2015.1	7.93	7.76	7.67
2140.1	2050.1	8.15	7.90	7.78
2175.1	2085.1	8.10	7.80	7.64
2210.1	2120.1	8.41	8.03	7.84
2245.1	2155.1	8.66	8.19	7.92
2280.1	2190.1	8.65	8.21	7.97
2315.1	2225.1	9.13	8.61	8.35
2350.1	2260.1	9.41	8.84	8.57
2385.1	2295.1	9.61	8.93	8.64
2420.1	2330.1	10.20	9.30	8.87
2455.1	2365.1	10.07	9.20	8.72
2490.1	2400.1	10.22	9.33	8.83
2525.1	2435.1	10.77	9.67	9.06
2560.1	2470.1	10.50	9.51	8.92
2595.1	2505.1	10.79	9.72	9.12
2630.1	2540.1	11.05	9.91	9.23
2665.1	2575.1	10.83	9.72	9.11
2700.1	2610.1	11.21	10.07	9.39
2735.1	2645.1	11.31	10.10	9.41
2765.1	2675.1	11.10	9.98	9.30
2800.1	2710.1	11.49	10.33	9.62

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm) @LO (dBm)		
		+10	+13	+16
1440.1	1350.1	14.16	13.60	13.49
1475.1	1385.1	13.80	14.05	15.50
1510.1	1420.1	15.04	17.18	20.97
1545.1	1455.1	18.75	21.73	23.13
1580.1	1490.1	22.12	20.66	20.34
1615.1	1525.1	19.41	18.99	20.63
1650.1	1560.1	18.87	19.58	22.50
1685.1	1595.1	19.10	21.58	25.42
1720.1	1630.1	19.85	23.21	27.58
1755.1	1665.1	21.82	26.04	30.35
1790.1	1700.1	23.12	27.98	33.39
1825.1	1735.1	25.49	31.42	34.32
1860.1	1770.1	27.45	33.16	35.23
1895.1	1805.1	27.78	32.45	34.70
1930.1	1840.1	27.38	31.74	35.42
1965.1	1875.1	25.22	30.80	36.11
2000.1	1910.1	23.95	29.60	33.74
2035.1	1945.1	21.87	26.80	31.48
2070.1	1980.1	21.03	24.79	30.92
2105.1	2015.1	20.56	23.32	27.71
2140.1	2050.1	20.69	22.72	25.80
2175.1	2085.1	21.95	23.46	25.29
2210.1	2120.1	22.79	24.37	25.49
2245.1	2155.1	20.94	23.70	25.82
2280.1	2190.1	20.61	24.37	27.25
2315.1	2225.1	19.92	23.37	27.18
2350.1	2260.1	19.72	21.66	23.36
2385.1	2295.1	18.54	19.91	23.97
2420.1	2330.1	17.91	19.16	23.29
2455.1	2365.1	17.49	19.35	23.38
2490.1	2400.1	17.43	19.31	23.15
2525.1	2435.1	16.90	18.49	21.82
2560.1	2470.1	16.49	18.18	21.95
2595.1	2505.1	16.04	18.06	21.63
2630.1	2540.1	16.03	17.81	21.08
2665.1	2575.1	16.59	18.38	21.19
2700.1	2610.1	16.65	18.18	21.01
2735.1	2645.1	20.37	18.13	21.04
2765.1	2675.1	16.52	18.31	22.13
2800.1	2710.1	16.64	18.44	22.28

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+13dBm (dB) @LO (dBm)		
		+10	+13	+16
1440.1	1350.1	2.55	2.57	2.44
1475.1	1385.1	2.22	1.91	1.36
1510.1	1420.1	1.66	1.32	0.87
1545.1	1455.1	1.42	1.23	0.91
1580.1	1490.1	1.23	1.07	-0.06
1615.1	1525.1	1.21	1.05	0.77
1650.1	1560.1	1.16	0.90	0.61
1685.1	1595.1	1.06	0.73	0.41
1720.1	1630.1	1.02	0.61	0.29
1755.1	1665.1	0.75	0.36	0.16
1790.1	1700.1	0.56	0.25	0.12
1825.1	1735.1	0.37	0.15	0.06
1860.1	1770.1	0.26	0.11	0.05
1895.1	1805.1	0.26	0.12	0.05
1930.1	1840.1	0.28	0.14	0.07
1965.1	1875.1	0.40	0.18	0.09
2000.1	1910.1	0.40	0.19	0.10
2035.1	1945.1	0.42	0.18	0.11
2070.1	1980.1	0.47	0.19	0.09
2105.1	2015.1	0.59	0.26	0.09
2140.1	2050.1	0.75	0.37	0.13
2175.1	2085.1	0.84	0.43	0.19
2210.1	2120.1	1.11	0.60	0.30
2245.1	2155.1	1.40	0.86	0.43
2280.1	2190.1	1.44	0.86	0.37
2315.1	2225.1	1.49	0.96	0.45
2350.1	2260.1	1.33	0.96	0.54
2385.1	2295.1	1.23	1.01	0.61
2420.1	2330.1	1.10	1.00	0.71
2455.1	2365.1	1.03	0.96	0.69
2490.1	2400.1	0.96	0.91	0.68
2525.1	2435.1	0.83	0.86	0.74
2560.1	2470.1	0.79	0.86	0.72
2595.1	2505.1	0.70	0.82	0.71
2630.1	2540.1	0.63	0.76	0.68
2665.1	2575.1	0.61	0.69	0.61
2700.1	2610.1	0.50	0.64	0.58
2735.1	2645.1	0.54	0.67	0.59
2765.1	2675.1	0.59	0.67	0.54
2800.1	2710.1	0.54	0.63	0.52

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Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1880.1MHz (dB) @LO (dBm) +13
460.0	1420.1	10.39
433.5	1446.6	10.15
407.1	1473.0	9.73
380.6	1499.5	9.11
354.1	1526.0	8.70
327.6	1552.5	8.43
301.2	1578.9	8.13
274.7	1605.4	7.93
248.2	1631.9	7.79
221.8	1658.3	7.62
195.3	1684.8	7.50
168.8	1711.3	7.46
142.4	1737.7	7.45
115.9	1764.2	7.33
89.4	1790.7	7.16
62.9	1817.2	7.09
36.5	1843.6	7.12
10.0	1870.1	7.21
36.8	1916.9	7.04
90.3	1970.4	7.16
143.8	2023.9	7.39
197.4	2077.5	7.66
250.9	2131.0	7.93
277.6	2157.7	8.07
331.2	2211.3	8.19
357.9	2238.0	8.35
411.5	2291.6	8.86
438.2	2318.3	9.09
491.8	2371.9	9.24
518.5	2398.6	9.28
572.1	2452.2	9.49
598.8	2478.9	9.26
652.4	2532.5	9.48
679.1	2559.2	9.56
732.6	2612.7	9.98
759.4	2639.5	10.17
812.9	2693.0	10.01
839.7	2719.8	10.08
893.2	2773.3	9.87
920.0	2800.1	9.85

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1850.1MHz (dB) @LO (dBm) +13
10.0	1860.1	7.30
30.0	1880.1	7.11
50.0	1900.1	7.06
70.0	1920.1	7.04
90.0	1940.1	7.07
110.0	1960.1	7.16
130.0	1980.1	7.20
150.0	2000.1	7.30
170.0	2020.1	7.39
190.0	2040.1	7.54
210.0	2060.1	7.66
230.0	2080.1	7.74
250.0	2100.1	7.82
270.0	2120.1	7.93
290.0	2140.1	8.06
310.0	2160.1	8.15
330.0	2180.1	8.19
350.0	2200.1	8.20
370.0	2220.1	8.34
390.0	2240.1	8.45
410.0	2260.1	8.65
430.0	2280.1	8.85
450.0	2300.1	8.99
470.0	2320.1	9.15
510.0	2360.1	9.31
530.0	2380.1	9.30
570.0	2420.1	9.55
590.0	2440.1	9.44
630.0	2480.1	9.29
650.0	2500.1	9.34
690.0	2540.1	9.64
710.0	2560.1	9.63
750.0	2600.1	9.93
770.0	2620.1	10.16
810.0	2660.1	10.12
830.0	2680.1	10.06
870.0	2720.1	9.98
890.0	2740.1	9.95
930.0	2780.1	9.82
950.0	2800.1	9.77

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1910.1MHz (dB) @LO (dBm) +13
490.0	1420.1	10.49
477.7	1432.4	10.38
465.4	1444.7	10.09
453.1	1457.0	10.09
440.8	1469.3	9.97
428.5	1481.6	9.66
416.2	1493.9	9.32
403.8	1506.3	9.12
391.5	1518.6	8.95
379.2	1530.9	8.81
366.9	1543.2	8.67
354.6	1555.5	8.50
342.3	1567.8	8.38
330.0	1580.1	8.23
317.7	1592.4	8.18
305.4	1604.7	8.09
293.1	1617.0	8.03
280.8	1629.3	7.93
268.5	1641.6	7.91
256.2	1653.9	7.83
243.8	1666.3	7.75
231.5	1678.6	7.72
219.2	1690.9	7.66
206.9	1703.2	7.66
194.6	1715.5	7.60
182.3	1727.8	7.63
170.0	1740.1	7.56
157.7	1752.4	7.60
145.4	1764.7	7.50
133.1	1777.0	7.48
120.8	1789.3	7.38
108.5	1801.6	7.39
96.2	1813.9	7.29
83.8	1826.3	7.23
71.5	1838.6	7.25
59.2	1850.9	7.23
46.9	1863.2	7.22
34.6	1875.5	7.14
22.3	1887.8	7.12
10.0	1900.1	7.17

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Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB) @LO (dBm)			LO-IF ISOLATION (dB) @LO (dBm)		
	+10	+13	+16	+10	+13	+16
1350.1	29.47	30.30	30.35	22.70	23.20	23.62
1385.1	32.39	32.71	32.22	24.28	25.09	25.91
1420.1	34.44	34.56	34.02	25.86	27.06	28.25
1455.1	36.06	37.09	37.52	27.49	29.15	30.75
1490.1	36.59	37.31	36.28	29.37	31.28	31.69
1525.1	37.03	37.21	37.40	30.10	31.69	33.04
1560.1	37.82	37.70	37.61	31.17	32.37	33.17
1595.1	38.31	38.11	38.06	32.08	32.79	33.14
1630.1	38.94	38.75	38.69	32.12	32.34	32.31
1665.1	39.26	39.10	39.04	31.50	31.37	31.14
1700.1	41.34	41.60	41.86	30.28	30.13	29.96
1735.1	42.96	43.17	43.40	29.80	29.53	29.34
1770.1	41.61	41.27	40.90	29.55	29.38	29.23
1805.1	41.42	41.00	40.65	29.82	29.83	29.87
1840.1	41.74	41.36	41.02	30.87	31.12	31.39
1875.1	42.16	41.79	41.49	31.61	32.00	32.45
1910.1	42.73	42.36	42.10	32.17	32.40	32.69
1945.1	43.34	43.08	42.84	32.36	32.26	32.23
1980.1	43.43	43.20	42.95	32.53	32.17	31.85
2015.1	43.57	43.23	42.92	33.20	32.57	31.97
2050.1	43.56	43.04	42.60	33.83	33.08	32.36
2085.1	43.63	43.05	42.63	34.58	33.74	33.09
2120.1	43.72	42.92	42.62	36.00	35.11	34.69
2155.1	43.45	42.34	41.50	38.27	37.62	37.15
2190.1	43.63	42.34	41.18	41.20	41.33	41.57
2225.1	44.95	42.92	41.27	46.64	52.59	64.35
2260.1	50.25	48.76	47.44	42.64	42.87	41.66
2295.1	51.77	52.76	53.12	38.88	38.54	37.92
2330.1	49.87	50.86	51.16	37.93	37.28	36.59
2365.1	49.38	50.06	50.34	37.55	36.65	35.76
2400.1	49.32	49.77	49.87	37.34	36.30	35.20
2435.1	49.77	49.82	49.86	37.33	35.89	34.87
2470.1	50.58	50.80	50.86	36.15	35.07	33.99
2505.1	52.65	52.71	52.97	35.45	34.28	33.52
2540.1	55.66	55.79	55.71	34.58	33.56	32.75
2575.1	63.47	63.47	62.99	33.57	32.53	31.89
2610.1	64.50	61.58	60.15	32.89	32.18	31.54
2645.1	54.52	53.26	52.66	32.31	31.87	31.64
2675.1	50.39	50.03	49.64	31.54	31.39	31.01
2710.1	47.18	46.83	46.57	30.40	30.28	29.99

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB) @LO (dBm)		
		+10	+13	+16
1440.1	1350.1	19.35	18.60	18.71
1475.1	1385.1	20.08	19.43	19.31
1510.1	1420.1	19.72	19.17	19.86
1545.1	1455.1	19.63	19.46	20.66
1580.1	1490.1	20.30	21.61	21.31
1615.1	1525.1	21.83	23.97	26.57
1650.1	1560.1	24.43	27.14	29.92
1685.1	1595.1	28.95	31.92	34.28
1720.1	1630.1	34.27	35.94	36.23
1755.1	1665.1	37.46	35.57	34.34
1790.1	1700.1	33.24	31.61	30.52
1825.1	1735.1	33.06	31.88	31.09
1860.1	1770.1	34.34	34.03	33.89
1895.1	1805.1	33.50	33.88	34.21
1930.1	1840.1	31.60	32.10	32.59
1965.1	1875.1	30.20	30.83	31.44
2000.1	1910.1	28.87	29.39	29.97
2035.1	1945.1	27.52	27.90	28.31
2070.1	1980.1	26.34	26.71	27.09
2105.1	2015.1	25.16	25.53	25.92
2140.1	2050.1	24.29	24.72	25.19
2175.1	2085.1	23.61	24.09	24.67
2210.1	2120.1	23.07	23.49	24.01
2245.1	2155.1	22.49	22.79	23.17
2280.1	2190.1	22.36	22.68	23.03
2315.1	2225.1	21.90	22.26	22.62
2350.1	2260.1	21.26	21.49	21.82
2385.1	2295.1	20.73	20.95	21.38
2420.1	2330.1	20.55	20.80	21.23
2455.1	2365.1	20.49	20.77	21.25
2490.1	2400.1	20.69	20.93	21.43
2525.1	2435.1	20.97	21.09	21.49
2560.1	2470.1	21.54	21.60	21.89
2595.1	2505.1	22.38	22.36	22.54
2630.1	2540.1	23.50	23.53	23.74
2665.1	2575.1	24.74	24.97	25.22
2700.1	2610.1	26.15	26.39	26.59
2735.1	2645.1	27.38	27.35	27.30
2765.1	2675.1	29.05	28.84	28.67
2800.1	2710.1	33.00	32.17	31.30

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Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1) @LO (dBm)		
		+10	+13	+16
1440.1	1350.1	3.65	2.98	2.46
1475.1	1385.1	3.05	2.46	2.01
1510.1	1420.1	2.58	2.07	1.70
1545.1	1455.1	2.23	1.77	1.45
1580.1	1490.1	1.84	1.47	1.26
1615.1	1525.1	1.62	1.30	1.14
1650.1	1560.1	1.41	1.16	1.12
1685.1	1595.1	1.18	1.07	1.20
1720.1	1630.1	1.05	1.13	1.29
1755.1	1665.1	1.10	1.26	1.42
1790.1	1700.1	1.26	1.42	1.57
1825.1	1735.1	1.42	1.59	1.74
1860.1	1770.1	1.54	1.70	1.84
1895.1	1805.1	1.63	1.77	1.90
1930.1	1840.1	1.69	1.83	1.96
1965.1	1875.1	1.71	1.84	1.98
2000.1	1910.1	1.79	1.91	2.04
2035.1	1945.1	1.87	1.97	2.08
2070.1	1980.1	1.92	2.01	2.11
2105.1	2015.1	1.98	2.05	2.14
2140.1	2050.1	2.07	2.11	2.18
2175.1	2085.1	2.13	2.15	2.20
2210.1	2120.1	2.22	2.20	2.23
2245.1	2155.1	2.40	2.34	2.34
2280.1	2190.1	2.50	2.40	2.38
2315.1	2225.1	2.62	2.46	2.38
2350.1	2260.1	2.72	2.48	2.39
2385.1	2295.1	2.66	2.43	2.35
2420.1	2330.1	2.75	2.47	2.35
2455.1	2365.1	2.86	2.57	2.43
2490.1	2400.1	2.93	2.61	2.43
2525.1	2435.1	3.09	2.69	2.47
2560.1	2470.1	3.17	2.78	2.53
2595.1	2505.1	3.26	2.82	2.56
2630.1	2540.1	3.33	2.87	2.58
2665.1	2575.1	3.37	2.91	2.62
2700.1	2610.1	3.44	2.96	2.63
2735.1	2645.1	3.44	2.95	2.64
2765.1	2675.1	3.42	2.95	2.61
2800.1	2710.1	3.38	2.92	2.58

LO (MHz)	LO VSWR (:1) @LO (dBm)		
	+10	+13	+16
1350.1	13.39	12.99	13.39
1385.1	15.81	15.53	16.56
1420.1	16.89	16.56	17.39
1455.1	16.89	16.41	17.39
1490.1	15.96	15.53	15.67
1525.1	14.62	14.15	14.62
1560.1	13.19	12.71	13.29
1595.1	11.09	10.62	10.96
1630.1	8.81	8.35	8.47
1665.1	6.42	6.05	6.05
1700.1	4.29	4.02	3.95
1735.1	2.80	2.63	2.56
1770.1	1.96	1.90	1.87
1805.1	2.04	2.10	2.16
1840.1	2.89	3.02	3.13
1875.1	4.18	4.36	4.53
1910.1	5.74	5.95	6.17
1945.1	7.28	7.47	7.66
1980.1	8.99	9.18	9.53
2015.1	10.43	10.50	10.82
2050.1	11.61	11.61	11.85
2085.1	12.80	12.80	13.39
2120.1	13.29	12.99	13.39
2155.1	13.70	13.29	13.60
2190.1	14.15	13.60	13.81
2225.1	13.70	12.99	12.80
2260.1	13.81	13.49	13.92
2295.1	15.26	15.00	15.81
2330.1	15.96	15.39	15.67
2365.1	16.72	16.11	16.72
2400.1	17.05	16.56	17.22
2435.1	17.05	16.26	16.56
2470.1	17.39	16.72	17.57
2505.1	17.39	16.72	17.39
2540.1	16.72	15.96	16.26
2575.1	16.41	15.81	16.72
2610.1	15.67	15.00	15.53
2645.1	15.26	14.50	14.87
2675.1	15.00	14.38	15.26
2710.1	14.38	13.70	14.15

IF (OUT) (MHz)	IF VSWR @LO=1820MHz (:1) @LO (dBm)		
	+10	+13	+16
10.0	1.31	1.44	1.57
50.0	1.31	1.44	1.57
90.0	1.39	1.51	1.62
130.0	1.53	1.62	1.73
170.0	1.64	1.71	1.79
210.0	1.83	1.88	1.94
250.0	1.93	1.97	2.03
290.0	2.09	2.12	2.16
330.0	2.22	2.24	2.28
370.0	2.30	2.32	2.35
410.0	2.49	2.51	2.53
450.0	2.50	2.49	2.51
490.0	2.56	2.53	2.53
530.0	2.58	2.54	2.52
570.0	2.52	2.46	2.44
610.0	2.55	2.49	2.46
650.0	2.49	2.40	2.36
710.0	2.49	2.39	2.33
750.0	2.42	2.29	2.21
810.0	2.39	2.25	2.16
850.0	2.36	2.21	2.10
910.0	2.24	2.24	2.03
950.0	2.32	2.15	2.03
1010.0	2.06	1.90	1.79
1050.0	2.16	1.99	1.87
1110.0	1.88	1.73	1.61
1150.0	1.88	1.73	1.62
1210.0	1.58	1.43	1.32
1250.0	1.59	1.44	1.32
1310.0	1.60	1.47	1.36
1350.0	1.61	1.48	1.37
1410.0	1.57	1.45	1.36
1450.0	1.53	1.42	1.33
1510.0	1.47	1.39	1.33
1550.0	1.52	1.48	1.45
1610.0	1.58	1.62	1.65
1650.0	1.77	1.85	1.92
1710.0	1.90	2.05	2.20
1750.0	2.04	2.24	2.42
1810.0	1.98	2.18	2.37

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Harmonics Tables

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	8	21	22	28	37	40	28	45	35	47
1	-	27	+0	42	19	38	28	47	48	41	63	56
2	64	56	56	>81	60	67	68	74	73	69	64	78
3	>90	80	73	>81	72	>81	77	>81	>81	>81	>81	>81
4	>90	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
5	>90	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
6	>90	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
7	>90	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
8	>90	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
9	>90	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
10	>90	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

Test conditions:
RF IN: 1860.1 MHz; -2.00 dBm.
LO IN: 1790.1 MHz; +13.00 dBm
IF OUT: 70 MHz; -9.16 dBm

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	18	31	32	39	47	47	39	58	47	52
1	-	27	+0	42	19	38	29	48	50	43	73	58
2	44	46	45	69	50	56	60	63	64	60	56	66
3	73	62	51	69	47	77	54	66	59	69	68	69
4	>90	84	81	82	77	79	77	77	77	81	86	86
5	>90	>91	81	>91	77	85	70	90	75	>91	79	>91
6	>90	>91	>91	>91	>91	>91	>91	>91	>91	>91	>91	>91
7	>90	>91	>91	>91	90	>91	89	>91	85	>91	>91	>91
8	>90	>91	>91	>91	>91	>91	>91	>91	>91	>91	>91	>91
9	>90	>91	>91	>91	>91	>91	>91	>91	>91	>91	>91	>91
10	>90	>91	>91	>91	>91	>91	>91	>91	>91	>91	>91	>91
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:
RF IN: 1860.1 MHz; 8.00 dBm.
LO IN: 1790.1 MHz; +13.00 dBm
IF OUT: 70 MHz; 0.79 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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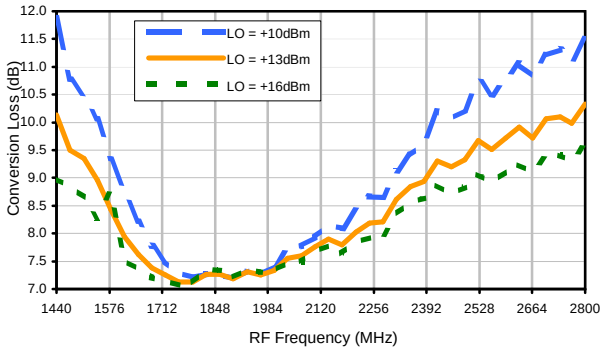
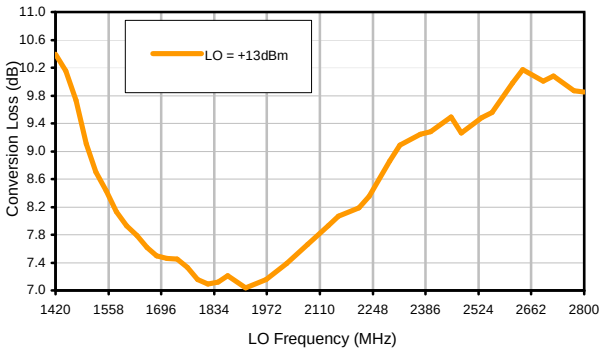
Typical Performance Curves

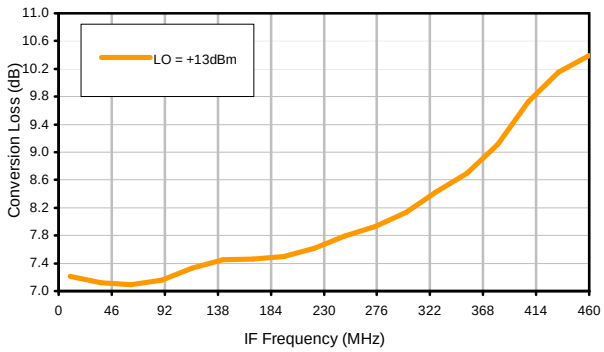
Conversion Loss @ IF=90MHz



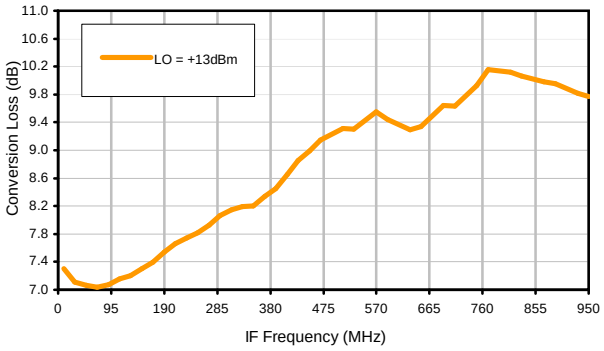
Conversion Loss vs. LO @ RF=1880.1MHz



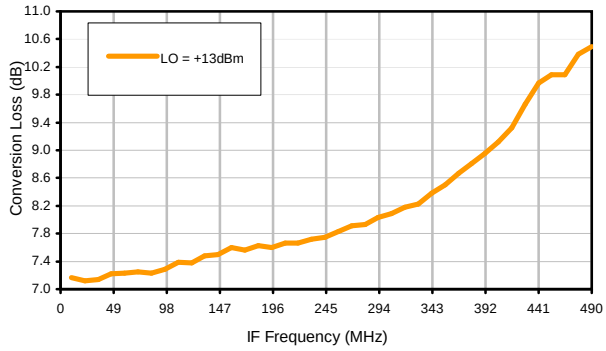
Conversion Loss vs. IF @ RF=1880.1MHz



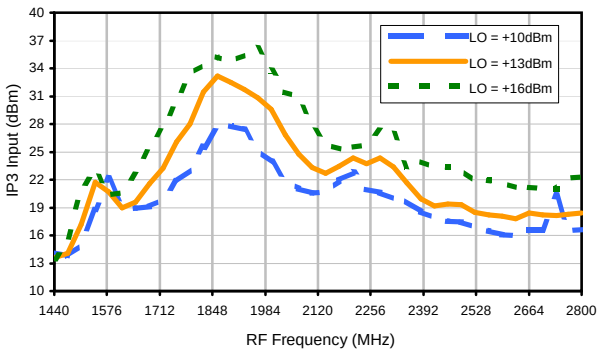
Conversion Loss vs. IF @ RF=1850.1MHz



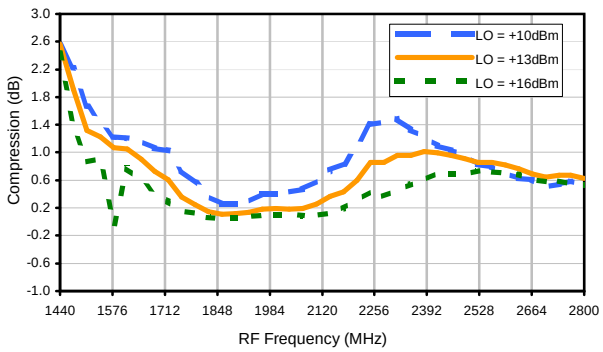
Conversion Loss vs. IF @ RF=1910.1MHz



IP3 Input



Compression @ RF IN=+13dBm



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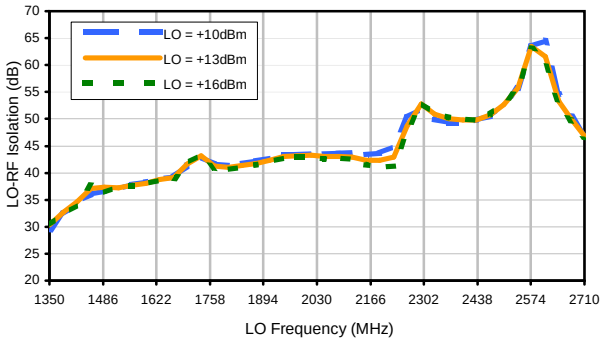
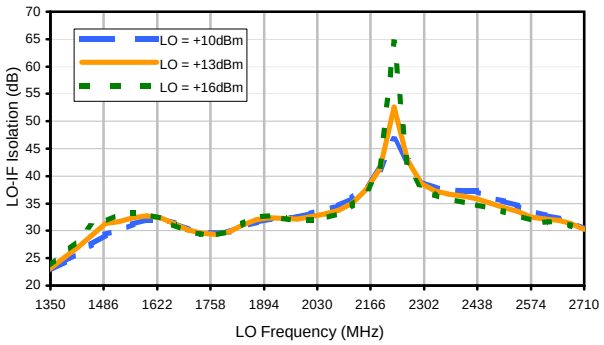
Typical Performance Curves

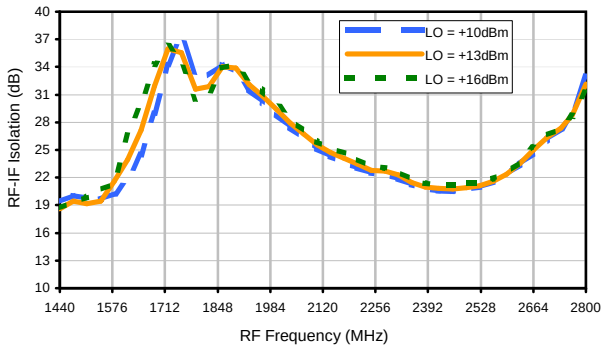
LO-RF Isolation



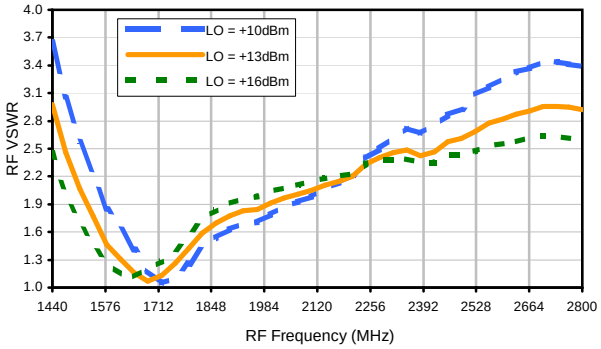
LO-IF Isolation



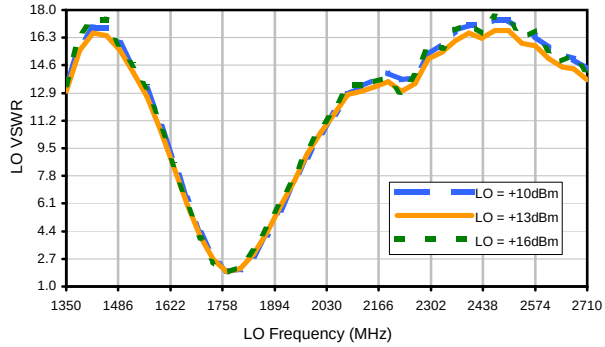
RF-IF Isolation



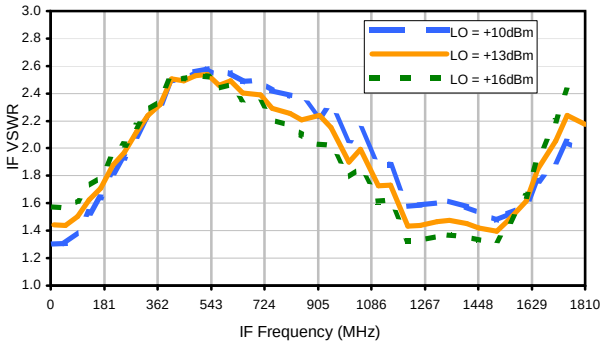
RF VSWR



LO VSWR



IF VSWR



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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	8	21	22	28	37	40	28	45	35	47
1	-	27	+0	42	19	38	28	47	48	41	63	56
2	64	56	56	>81	60	67	68	74	73	69	64	78
3	>90	80	73	>81	72	>81	77	>81	>81	>81	>81	>81
4	>90	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
5	>90	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
6	>90	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
7	>90	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
8	>90	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
9	>90	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
10	>90	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

Test conditions:
RF IN: 1860.1 MHz; -2.00 dBm.
LO IN: 1790.1 MHz; +13.00 dBm
IF OUT: 70 MHz; -9.16 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	18	31	32	39	47	47	39	58	47	52
1	-	27	+0	42	19	38	29	48	50	43	73	58
2	44	46	45	69	50	56	60	63	64	60	56	66
3	73	62	51	69	47	77	54	66	59	69	68	69
4	>90	84	81	82	77	79	77	77	77	81	86	86
5	>90	>91	81	>91	77	85	70	90	75	>91	79	>91
6	>90	>91	>91	>91	>91	>91	>91	>91	>91	>91	>91	>91
7	>90	>91	>91	>91	90	>91	89	>91	85	>91	>91	>91
8	>90	>91	>91	>91	>91	>91	>91	>91	>91	>91	>91	>91
9	>90	>91	>91	>91	>91	>91	>91	>91	>91	>91	>91	>91
10	>90	>91	>91	>91	>91	>91	>91	>91	>91	>91	>91	>91
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:
RF IN: 1860.1 MHz; 8.00 dBm.
LO IN: 1790.1 MHz; +13.00 dBm
IF OUT: 70 MHz; 0.79 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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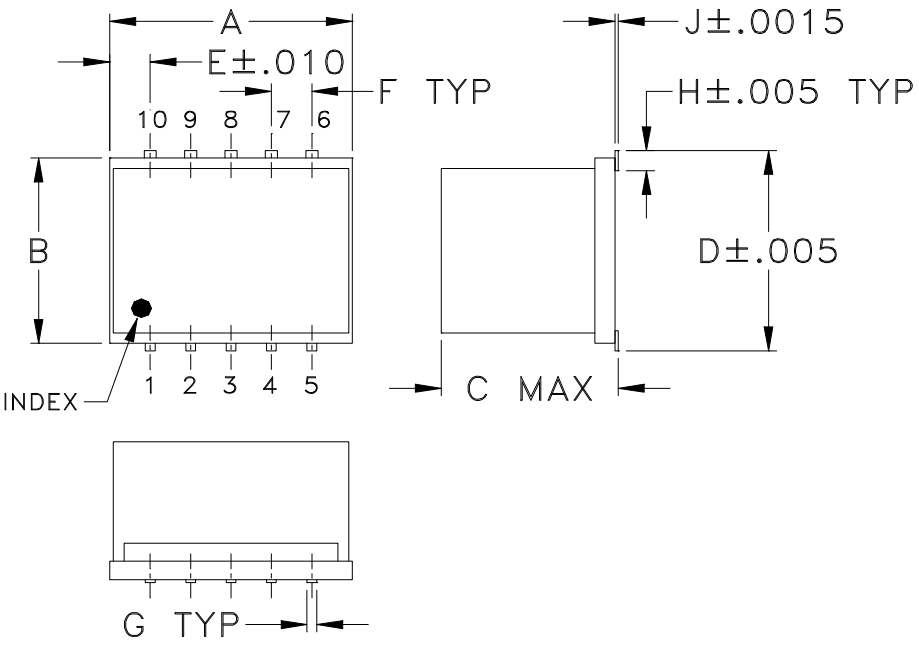
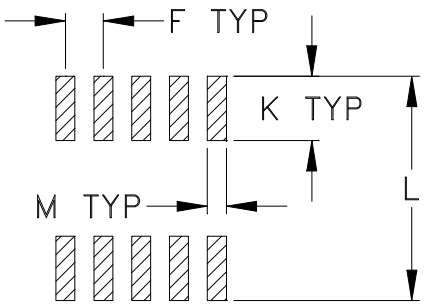
Case Style DZ

DZ883

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
DZ883	.30 (7.62)	.250 (6.35)	.190 (4.83)	.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)	0.5

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

Notes:

1. Case material: Ceramic.
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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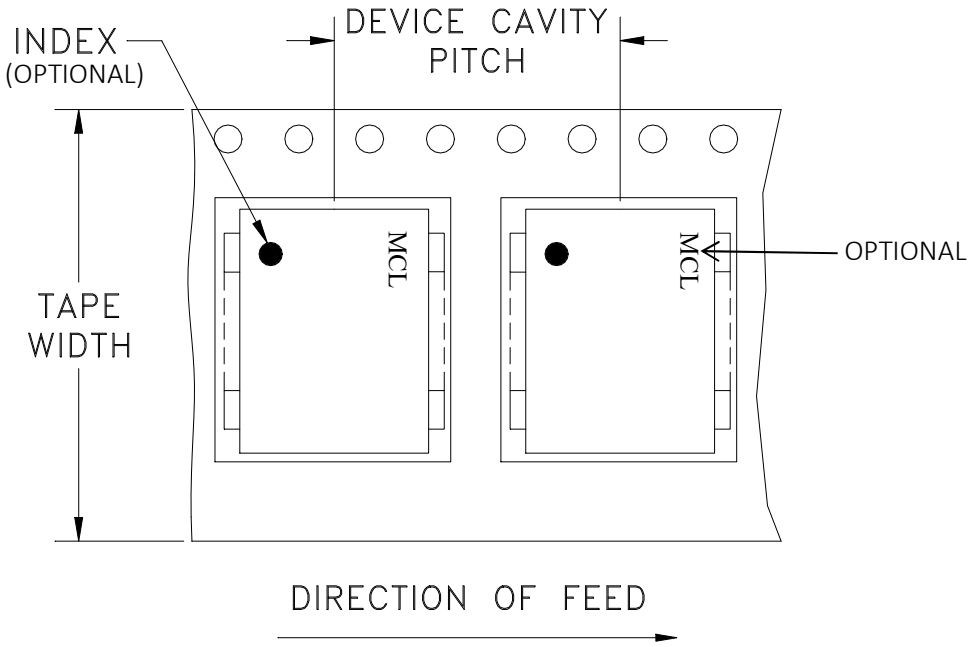
Tape & Reel Packaging TR-F34

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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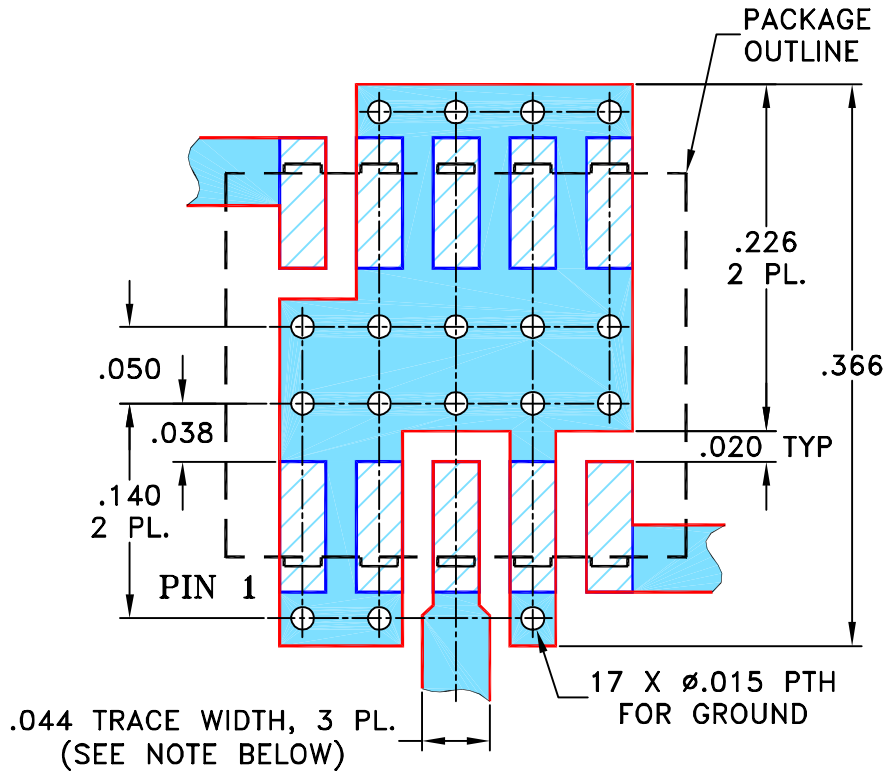
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
A	M81781	UPDATED PCB LAYOUT	06/07/02	GF	DJ
B	M82377	UPDATED DRAWING	07/31/02	AV	WL
C	M102713	ADDED NOTE 2 & "...WITH SMOBC"	01/17/06	MMG	IL
D	M135488	ADDED DZ1650, CHANGED PIN CONN.	02/02/12	GF	DJ

SUGGESTED MOUNTING CONFIGURATION FOR DZ883, DZ885 & DZ1650 CASE STYLES, "10MX01" PIN CONNECTION



NOTES:
1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020" ± .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	05/08/02
TOLERANCES ON:	CHECKED	DB	05/16/02
2 PL DECIMALS ±	APPROVED	WL	05/16/02
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

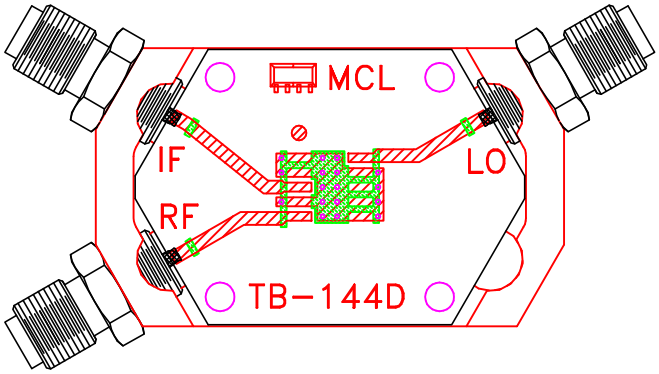
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, 10MX01, DZ883/885/1650, TB-144

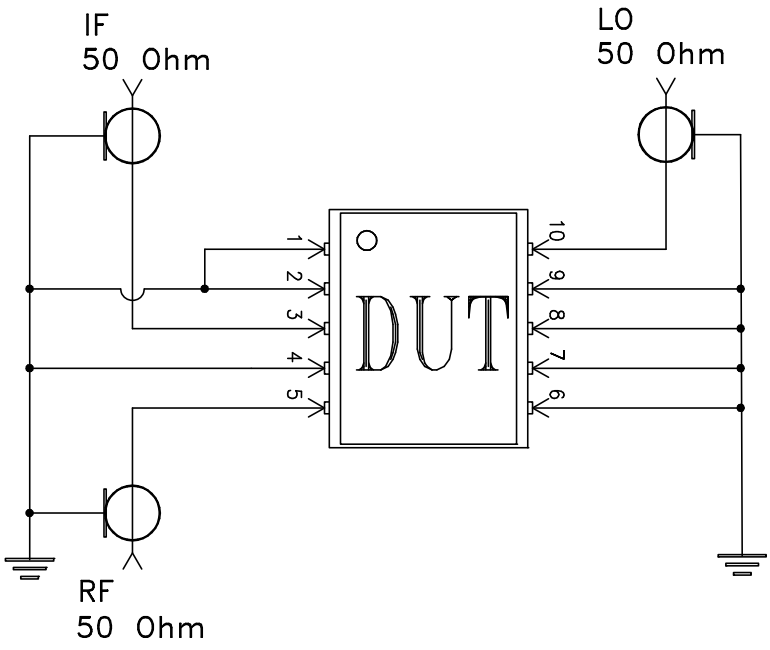
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-045	D

FILE:	SCALE:	SHEET:
98PL045	8:1	1 OF 1

Evaluation Board and Circuit



TB-144



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

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