Surface Mount

Frequency Mixer

ADE-20+

Level 7 (LO Power +7 dBm) 1500 to 2000 MHz



Generic photo used for illustration purposes only

CASE STYLE: CD542

+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	50mW
IF Current	40mA

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

Pin Connections

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

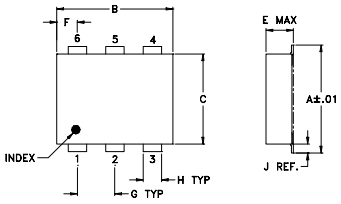
Features

- low conversion loss, 5.4 dB typ.
- excellent isolation, 31 dB typ.
- low profile package
- aqueous washable
- protected by U.S. Patent 6,133,525

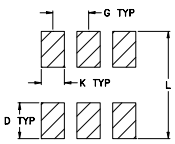
Applications

- digital cellular
- digital cordless phone
- PCN

Outline Drawing



PCB Land Pattern



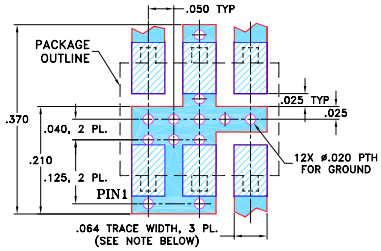
Suggested Layout,
Tolerance to be within ±.002

Outline Dimensions (inch / mm)

A	B	C	D	E	F	G
.272	.310	.220	.100	.112	.055	.100
6.91	7.87	5.59	2.54	2.84	1.40	2.54

H	J	K	L	wt
.030	.026	.065	.300	grams
0.76	0.66	1.65	7.62	0.20

Demo Board MCL P/N: TB-02
Suggested PCB Layout (PL-051)



NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B 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 Specifications

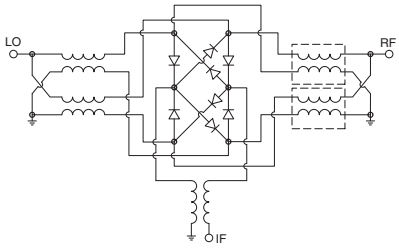
FREQUENCY (MHz)		CONVERSION LOSS (dB)			LO-RF ISOLATION (dB)		LO-IF ISOLATION (dB)		IP3 at center band (dBm)
LO/RF	IF								
f_L-f_U		$\overline{X}$	σ	Max.	Typ.	Min.	Typ.	Min.	Typ.
1500-2000	DC-300	5.4	0.10	7.8	31	22	28	20	14

1 dB COMP.: +1 dBm typ.

Typical Performance Data

Frequency (MHz)		Conversion Loss (dB)	Isolation L-R (dB)	Isolation L-I (dB)	VSWR RF Port (:1)	VSWR LO Port (:1)
RF	LO	LO +7dBm	LO +7dBm	LO +7dBm	LO +7dBm	LO +7dBm
1500.00	1530.00	5.80	37.30	31.70	1.59	1.21
1535.71	1565.71	5.77	36.90	32.60	1.49	1.31
1571.43	1601.43	5.78	36.50	32.90	1.46	1.41
1600.00	1630.00	5.87	36.30	32.90	1.45	1.49
1607.14	1637.14	5.76	36.20	32.90	1.43	1.52
1642.86	1672.86	5.78	36.00	33.00	1.40	1.57
1650.00	1680.00	5.91	36.00	33.00	1.41	1.60
1678.57	1708.57	5.87	35.70	32.90	1.41	1.66
1700.00	1730.00	5.94	35.40	33.10	1.40	1.68
1714.29	1744.29	5.96	35.30	33.00	1.40	1.69
1750.00	1780.00	5.97	35.10	33.00	1.44	1.71
1785.71	1815.71	5.96	35.20	33.00	1.48	1.70
1800.00	1830.00	6.04	35.20	33.20	1.48	1.69
1821.43	1851.43	5.97	35.40	33.20	1.52	1.68
1857.14	1887.14	5.96	35.70	33.20	1.59	1.67
1892.86	1922.86	6.00	36.10	33.20	1.61	1.61
1900.00	1930.00	5.98	36.20	33.20	1.62	1.60
1928.57	1958.57	5.99	36.30	33.20	1.70	1.57
1964.29	1994.29	5.94	36.60	33.10	1.78	1.50
2000.00	2030.00	5.93	36.60	33.10	1.84	1.46

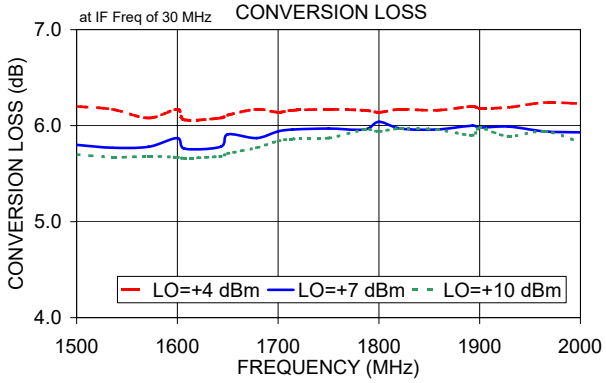
Electrical Schematic



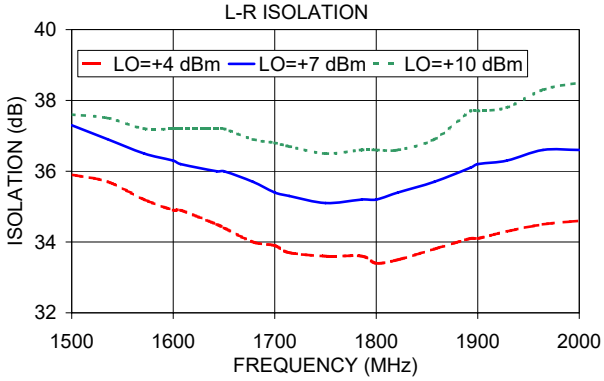
Notes

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-Circuit's applicable established test performance criteria and measurement instructions.
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp

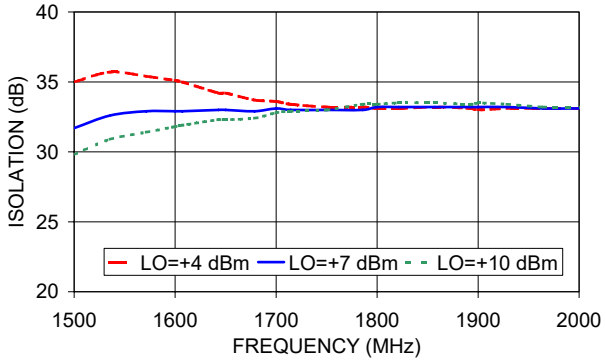
ADE-20+
at IF Freq of 30 MHz
CONVERSION LOSS



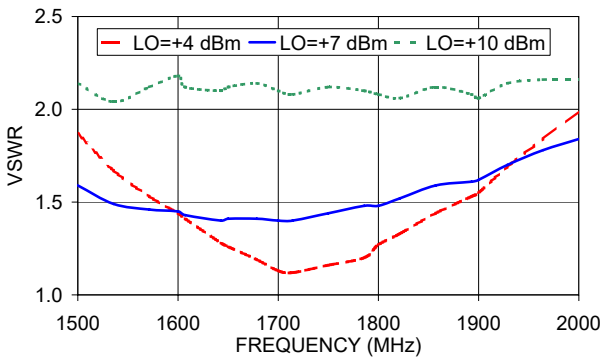
ADE-20+
L-R ISOLATION



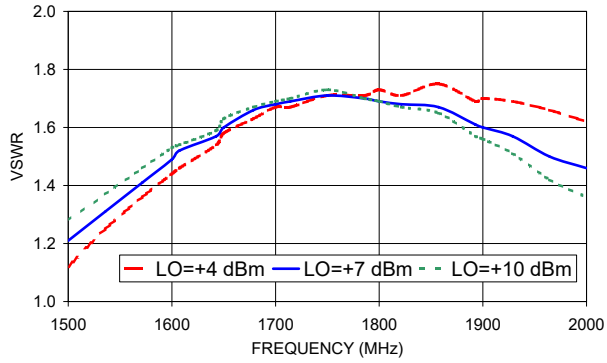
ADE-20+
L-I ISOLATION



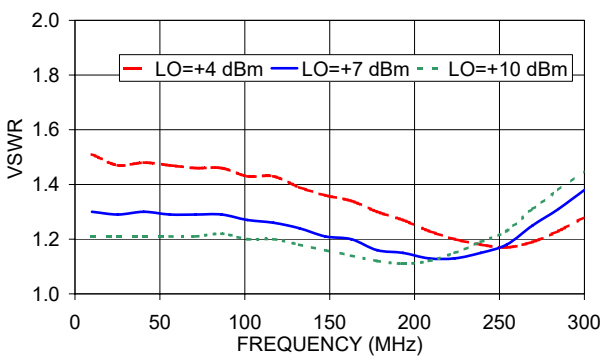
ADE-20+
RF VSWR



ADE-20+
LO VSWR



ADE-20
IF VSWR



Notes
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp

Frequency Mixer ADE-20+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB) @LO (dBm)		
		+4	+7	+10
1500.1	1530.1	5.95	5.69	5.58
1540.1	1570.1	6.00	5.73	5.64
1580.1	1610.1	6.05	5.74	5.66
1620.1	1650.1	6.11	5.78	5.67
1660.1	1690.1	6.14	5.84	5.74
1700.1	1730.1	6.14	5.86	5.78
1740.1	1770.1	6.16	5.84	5.76
1780.1	1810.1	6.13	5.79	5.72
1820.1	1850.1	6.15	5.76	5.66
1860.1	1890.1	6.17	5.74	5.63
1900.1	1930.1	6.26	5.78	5.66
1940.1	1970.1	6.23	5.75	5.63
1980.1	2010.1	6.28	5.79	5.67
2020.1	2050.1	6.25	5.77	5.64
2060.1	2090.1	6.30	5.80	5.68
2100.1	2130.1	6.28	5.77	5.64
2140.1	2170.1	6.27	5.81	5.68
2180.1	2210.1	6.31	5.79	5.66
2220.1	2250.1	6.31	5.82	5.69
2260.1	2290.1	6.35	5.83	5.71
2300.1	2330.1	6.40	5.89	5.76
2340.1	2370.1	6.39	5.93	5.80
2380.1	2410.1	6.49	5.98	5.88
2420.1	2450.1	6.48	5.99	5.90
2460.1	2490.1	6.61	6.09	5.99
2500.1	2530.1	6.71	6.18	6.08
2540.1	2570.1	6.72	6.20	6.10
2580.1	2610.1	6.88	6.28	6.15
2620.1	2650.1	6.98	6.37	6.20
2660.1	2690.1	7.30	6.52	6.29
2700.1	2730.1	7.59	6.81	6.53
2740.1	2770.1	7.91	7.13	6.84
2780.1	2810.1	8.23	7.46	7.13
2820.1	2850.1	8.46	7.76	7.47
2860.1	2890.1	8.74	8.03	7.77
2900.1	2930.1	8.98	8.32	8.06
2940.1	2970.1	9.16	8.53	8.30
3000.1	3030.1	9.64	8.97	8.73
3040.1	3070.1	10.02	9.39	9.13
3100.1	3130.1	10.43	9.87	9.66

RF (IN) (MHz)	LO (MHz)	IP-3 INPUT (dBm) @LO (dBm)		
		+4	+7	+10
1500.1	1530.1	11.52	12.62	14.66
1540.1	1570.1	12.16	13.25	13.98
1580.1	1610.1	11.49	13.40	15.08
1620.1	1650.1	11.58	13.36	14.97
1660.1	1690.1	11.69	13.40	14.12
1700.1	1730.1	11.83	13.37	13.90
1740.1	1770.1	11.66	13.85	14.43
1780.1	1810.1	11.97	13.22	14.73
1820.1	1850.1	12.08	12.48	14.78
1860.1	1890.1	12.20	12.79	13.80
1900.1	1930.1	11.89	12.33	15.30
1940.1	1970.1	12.68	12.20	15.13
1980.1	2010.1	13.02	12.98	15.00
2020.1	2050.1	13.85	12.67	15.70
2060.1	2090.1	13.46	13.07	15.30
2100.1	2130.1	13.68	13.45	15.09
2140.1	2170.1	15.19	13.75	14.76
2180.1	2210.1	14.83	14.33	15.00
2220.1	2250.1	15.09	14.09	15.51
2260.1	2290.1	16.36	15.60	16.01
2300.1	2330.1	16.84	15.05	15.74
2340.1	2370.1	16.00	14.76	17.20
2380.1	2410.1	13.54	17.46	15.62
2420.1	2450.1	13.05	17.49	16.21
2460.1	2490.1	11.69	17.99	17.28
2500.1	2530.1	11.12	19.99	19.77
2540.1	2570.1	10.01	16.72	20.58
2580.1	2610.1	9.25	16.03	17.72
2620.1	2650.1	8.97	14.52	16.77
2660.1	2690.1	9.23	14.56	18.65
2700.1	2730.1	10.28	17.50	18.76
2740.1	2770.1	12.13	31.08	20.13
2780.1	2810.1	13.01	24.01	18.56
2820.1	2850.1	14.38	25.58	18.93
2860.1	2890.1	15.00	23.06	18.30
2900.1	2930.1	14.96	20.34	20.45
2940.1	2970.1	14.37	21.75	24.44
3000.1	3030.1	13.89	23.73	22.03
3040.1	3070.1	15.32	23.99	18.14
3100.1	3130.1	16.85	23.99	20.86

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+1dBm (dB) @LO (dBm)		
		+4	+7	+10
1500.1	1530.1	0.41	0.25	0.16
1540.1	1570.1	0.34	0.28	0.15
1580.1	1610.1	0.37	0.28	0.12
1620.1	1650.1	0.29	0.20	0.12
1660.1	1690.1	0.23	0.17	0.15
1700.1	1730.1	0.28	0.10	0.11
1740.1	1770.1	0.35	0.20	0.15
1780.1	1810.1	0.26	0.22	0.13
1820.1	1850.1	0.32	0.15	0.17
1860.1	1890.1	0.17	0.11	0.15
1900.1	1930.1	0.24	0.12	0.13
1940.1	1970.1	0.33	0.10	0.16
1980.1	2010.1	0.26	0.11	0.14
2020.1	2050.1	0.22	0.14	0.15
2060.1	2090.1	0.19	0.08	0.06
2100.1	2130.1	0.31	0.17	0.08
2140.1	2170.1	0.25	0.18	0.13
2180.1	2210.1	0.18	0.17	0.11
2220.1	2250.1	0.17	0.12	0.10
2260.1	2290.1	0.25	0.12	0.15
2300.1	2330.1	0.32	0.09	0.09
2340.1	2370.1	0.30	0.07	0.07
2380.1	2410.1	0.34	0.12	0.15
2420.1	2450.1	0.36	0.14	0.08
2460.1	2490.1	0.34	0.20	0.16
2500.1	2530.1	0.27	0.11	0.11
2540.1	2570.1	0.29	0.22	0.17
2580.1	2610.1	0.27	0.23	0.17
2620.1	2650.1	0.33	0.18	0.08
2660.1	2690.1	0.12	0.22	0.13
2700.1	2730.1	0.22	0.14	0.14
2740.1	2770.1	0.08	0.07	0.08
2780.1	2810.1	0.05	0.16	0.04
2820.1	2850.1	0.06	0.08	0.04
2860.1	2890.1	0.12	0.07	0.09
2900.1	2930.1	0.13	0.08	0.11
2940.1	2970.1	0.11	0.10	0.06
3000.1	3030.1	0.05	0.08	-0.02
3040.1	3070.1	0.05	0.09	0.21
3100.1	3130.1	0.16	0.13	0.02

Mini-Circuits®
IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED RoHS compliant
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see minicircuits.com

Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1750.1MHz (dB) @LO (dBm) +7
250.0	1500.1	5.95
237.4	1512.7	5.94
224.7	1525.4	5.94
212.1	1538.0	5.93
199.5	1550.6	5.90
186.8	1563.3	5.91
174.2	1575.9	5.95
161.6	1588.5	5.95
148.9	1601.2	5.96
136.3	1613.8	5.98
123.7	1626.4	5.97
111.1	1639.0	5.96
98.4	1651.7	5.96
85.8	1664.3	5.94
73.2	1676.9	5.92
60.5	1689.6	5.89
47.9	1702.2	5.85
35.3	1714.8	5.84
22.6	1727.5	5.82
10.0	1740.1	5.85
10.0	1760.1	5.85
22.0	1772.1	5.76
34.0	1784.1	5.76
46.0	1796.1	5.77
58.0	1808.1	5.76
70.0	1820.1	5.76
82.0	1832.1	5.74
94.0	1844.1	5.76
106.0	1856.1	5.76
118.0	1868.1	5.76
130.0	1880.1	5.80
142.0	1892.1	5.82
154.0	1904.1	5.84
166.0	1916.1	5.86
178.0	1928.1	5.90
190.0	1940.1	5.91
202.0	1952.1	5.92
214.0	1964.1	5.96
238.0	1988.1	6.01
250.0	2000.1	6.02

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1500.1MHz (dB) @LO (dBm) +7
10.0	1510.1	5.96
17.3	1517.4	5.98
24.5	1524.6	5.79
31.8	1531.9	5.78
39.0	1539.1	5.76
46.3	1546.4	5.80
53.5	1553.6	5.73
60.8	1560.9	5.72
68.0	1568.1	5.76
75.3	1575.4	5.73
82.5	1582.6	5.69
89.8	1589.9	5.70
97.0	1597.1	5.71
104.3	1604.4	5.69
111.5	1611.6	5.67
118.8	1618.9	5.72
126.0	1626.1	5.73
133.3	1633.4	5.74
140.5	1640.6	5.75
147.8	1647.9	5.76
155.0	1655.1	5.76
162.3	1662.4	5.80
169.5	1669.6	5.79
176.8	1676.9	5.81
184.0	1684.1	5.83
191.3	1691.4	5.85
198.5	1698.6	5.87
205.8	1705.9	5.89
213.0	1713.1	5.92
220.3	1720.4	5.93
227.5	1727.6	5.97
234.8	1734.9	5.98
242.0	1742.1	6.00
249.3	1749.4	6.01
256.5	1756.6	6.02
263.8	1763.9	6.04
271.0	1771.1	6.06
278.3	1778.4	6.05
292.8	1792.9	6.08
300.0	1800.1	6.10

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=2000.1MHz (dB) @LO (dBm) +7
300.0	1700.1	6.10
292.8	1707.4	6.08
285.5	1714.6	6.06
278.3	1721.9	6.06
271.0	1729.1	6.06
263.8	1736.4	6.06
256.5	1743.6	6.04
249.2	1750.9	6.02
242.0	1758.1	6.02
234.8	1765.4	6.02
227.5	1772.6	6.02
220.3	1779.9	6.01
213.0	1787.1	6.01
205.8	1794.4	6.01
198.5	1801.6	6.02
191.2	1808.9	6.00
184.0	1816.1	6.01
176.8	1823.4	6.03
169.5	1830.6	6.04
162.3	1837.9	6.04
155.0	1845.1	6.02
147.8	1852.4	6.04
140.5	1859.6	6.03
133.2	1866.9	6.01
126.0	1874.1	6.03
118.8	1881.4	5.99
111.5	1888.6	5.99
104.3	1895.9	6.02
97.0	1903.1	6.00
89.8	1910.4	5.94
82.5	1917.6	5.94
75.2	1924.9	5.95
68.0	1932.1	5.98
60.8	1939.4	5.94
53.5	1946.6	5.90
46.3	1953.9	5.91
39.0	1961.1	5.88
31.8	1968.4	5.90
17.2	1982.9	6.00
10.0	1990.1	5.99

Mini-Circuits®
IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED RoHS compliant
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see minicircuits.com

Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB) @LO (dBm)			LO-IF ISOLATION (dB) @LO (dBm)		
	+4	+7	+10	+4	+7	+10
1500.1	28.86	28.58	27.91	32.31	28.30	26.09
1540.1	28.65	28.36	27.53	34.10	29.90	27.65
1580.1	28.46	28.08	27.36	35.48	31.37	29.28
1620.1	28.15	27.52	26.86	36.62	33.03	31.06
1660.1	27.98	27.04	26.34	37.20	34.56	32.94
1700.1	27.87	26.86	25.95	37.42	35.93	34.76
1740.1	27.70	26.73	25.77	37.50	36.76	36.22
1780.1	27.29	26.50	25.67	37.60	37.21	36.99
1820.1	26.92	26.04	25.36	37.85	37.30	36.99
1860.1	26.72	25.79	25.11	37.82	36.99	36.34
1900.1	26.54	25.61	24.80	37.67	36.39	35.19
1940.1	26.34	25.55	24.75	37.49	35.79	34.15
1980.1	26.13	25.32	24.71	37.18	34.80	33.15
2020.1	25.97	25.29	24.74	37.05	34.21	32.28
2060.1	25.84	25.25	24.62	36.71	33.40	31.27
2100.1	25.62	25.20	24.59	36.57	33.06	30.70
2140.1	25.57	25.14	24.74	36.19	32.18	29.96
2180.1	25.47	25.28	24.97	35.80	31.92	29.54
2220.1	25.43	25.37	25.10	35.79	31.55	29.00
2260.1	25.37	25.44	25.20	35.12	30.90	28.53
2300.1	25.42	25.52	25.48	35.16	30.77	28.37
2340.1	25.48	25.69	25.67	34.86	30.43	27.93
2380.1	25.49	25.91	25.95	34.42	30.21	27.75
2420.1	25.42	26.05	26.15	34.41	30.02	27.29
2460.1	25.55	26.18	26.52	33.91	29.55	27.07
2500.1	25.53	26.18	26.71	34.05	29.64	27.00
2540.1	25.73	26.42	27.07	33.27	29.30	26.72
2580.1	25.90	26.46	27.11	32.87	29.22	26.68
2620.1	26.30	26.73	27.31	32.74	29.14	26.47
2660.1	26.91	27.18	27.63	32.27	28.80	26.21
2700.1	27.63	27.98	28.37	32.13	28.69	26.04
2740.1	28.39	28.84	29.21	31.64	28.12	25.56
2780.1	29.22	29.78	30.29	31.52	27.95	25.49
2820.1	29.96	30.70	31.28	31.47	27.90	25.20
2860.1	30.77	31.57	32.30	30.98	27.61	25.03
2900.1	31.50	32.23	33.10	31.10	27.63	25.00
2940.1	32.38	33.03	33.88	30.70	27.40	24.75
3000.1	33.64	34.13	34.78	30.59	27.17	24.63
3040.1	34.59	35.09	35.69	30.21	26.97	24.48
3100.1	35.80	36.59	37.04	29.93	26.72	24.12

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB) @LO (dBm)		
		+4	+7	+10
1500.1	1530.1	8.95	8.48	8.21
1540.1	1570.1	9.12	8.65	8.39
1580.1	1610.1	9.17	8.78	8.55
1620.1	1650.1	9.29	8.94	8.72
1660.1	1690.1	9.38	9.03	8.86
1700.1	1730.1	9.51	9.16	8.97
1740.1	1770.1	9.77	9.40	9.20
1780.1	1810.1	9.92	9.66	9.50
1820.1	1850.1	10.04	9.88	9.76
1860.1	1890.1	10.24	10.13	10.04
1900.1	1930.1	10.27	10.27	10.21
1940.1	1970.1	10.44	10.49	10.49
1980.1	2010.1	10.74	10.85	10.89
2020.1	2050.1	11.09	11.28	11.33
2060.1	2090.1	11.40	11.62	11.76
2100.1	2130.1	11.74	12.05	12.22
2140.1	2170.1	12.12	12.49	12.73
2180.1	2210.1	12.53	12.98	13.31
2220.1	2250.1	12.84	13.38	13.74
2260.1	2290.1	13.26	13.93	14.36
2300.1	2330.1	13.78	14.55	15.00
2340.1	2370.1	14.30	15.17	15.67
2380.1	2410.1	14.80	15.79	16.41
2420.1	2450.1	15.37	16.46	17.12
2460.1	2490.1	16.01	17.13	17.84
2500.1	2530.1	16.65	17.82	18.60
2540.1	2570.1	17.42	18.52	19.25
2580.1	2610.1	18.12	19.24	19.96
2620.1	2650.1	18.98	20.01	20.67
2660.1	2690.1	19.81	20.72	21.31
2700.1	2730.1	20.86	21.66	22.12
2740.1	2770.1	22.08	22.64	22.99
2780.1	2810.1	23.30	23.72	23.91
2820.1	2850.1	24.28	24.43	24.43
2860.1	2890.1	25.24	24.99	24.84
2900.1	2930.1	25.76	25.30	24.93
2940.1	2970.1	26.00	25.27	24.81
3000.1	3030.1	25.91	25.11	24.59
3040.1	3070.1	25.48	24.69	24.22
3100.1	3130.1	24.90	24.19	23.66

Mini-Circuits®
IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED RoHS compliant
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see minicircuits.com

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1) @LO (dBm)		
		+4	+7	+10
1500.1	1530.1	1.33	1.45	1.54
1540.1	1570.1	1.38	1.47	1.56
1580.1	1610.1	1.46	1.55	1.63
1620.1	1650.1	1.49	1.57	1.63
1660.1	1690.1	1.56	1.66	1.73
1700.1	1730.1	1.55	1.66	1.74
1740.1	1770.1	1.62	1.74	1.84
1780.1	1810.1	1.66	1.74	1.83
1820.1	1850.1	1.76	1.84	1.93
1860.1	1890.1	1.84	1.88	1.94
1900.1	1930.1	1.90	1.94	2.01
1940.1	1970.1	1.93	1.93	1.98
1980.1	2010.1	1.91	1.91	1.96
2020.1	2050.1	1.92	1.91	1.95
2060.1	2090.1	1.83	1.83	1.89
2100.1	2130.1	1.90	1.91	1.98
2140.1	2170.1	1.83	1.85	1.92
2180.1	2210.1	1.92	1.95	2.04
2220.1	2250.1	1.88	1.91	1.98
2260.1	2290.1	1.94	1.97	2.05
2300.1	2330.1	1.84	1.85	1.93
2340.1	2370.1	1.82	1.86	1.95
2380.1	2410.1	1.75	1.77	1.87
2420.1	2450.1	1.77	1.83	1.95
2460.1	2490.1	1.77	1.83	1.95
2500.1	2530.1	1.87	1.95	2.10
2540.1	2570.1	1.94	2.01	2.15
2580.1	2610.1	2.08	2.13	2.26
2620.1	2650.1	2.18	2.18	2.27
2660.1	2690.1	2.35	2.31	2.39
2700.1	2730.1	2.54	2.46	2.49
2740.1	2770.1	2.81	2.77	2.80
2780.1	2810.1	3.13	3.09	3.12
2820.1	2850.1	3.47	3.47	3.53
2860.1	2890.1	3.97	3.96	4.03
2900.1	2930.1	4.44	4.44	4.54
2940.1	2970.1	5.03	5.00	5.09
3000.1	3030.1	5.89	5.85	5.93
3040.1	3070.1	6.11	6.05	6.07
3100.1	3130.1	7.08	7.20	7.28

LO (MHz)	LO VSWR (:1) @LO (dBm)		
	+4	+7	+10
1500.1	1.91	1.17	1.50
1540.1	1.95	1.21	1.54
1580.1	1.97	1.25	1.53
1620.1	2.00	1.28	1.54
1660.1	2.04	1.33	1.56
1700.1	2.06	1.36	1.56
1740.1	2.12	1.39	1.59
1780.1	2.14	1.42	1.58
1820.1	2.20	1.45	1.59
1860.1	2.24	1.49	1.60
1900.1	2.29	1.52	1.59
1940.1	2.36	1.57	1.63
1980.1	2.37	1.61	1.62
2020.1	2.47	1.65	1.65
2060.1	2.48	1.68	1.67
2100.1	2.55	1.71	1.66
2140.1	2.62	1.75	1.70
2180.1	2.65	1.78	1.68
2220.1	2.77	1.81	1.70
2260.1	2.76	1.83	1.71
2300.1	2.89	1.87	1.70
2340.1	2.94	1.90	1.73
2380.1	2.98	1.92	1.71
2420.1	3.14	1.96	1.73
2460.1	3.14	1.99	1.72
2500.1	3.33	2.03	1.69
2540.1	3.35	2.04	1.71
2580.1	3.43	2.07	1.68
2620.1	3.57	2.09	1.66
2660.1	3.56	2.10	1.64
2700.1	3.78	2.15	1.62
2740.1	3.77	2.15	1.60
2780.1	3.86	2.17	1.58
2820.1	4.05	2.21	1.56
2860.1	3.96	2.18	1.52
2900.1	4.16	2.22	1.49
2940.1	4.12	2.20	1.46
3000.1	4.30	2.21	1.40
3040.1	4.19	2.18	1.37
3100.1	4.39	2.21	1.34

IF (OUT) (MHz)	IF VSWR @LO=2000.1MHz (:1) @LO (dBm)		
	+4	+7	+10
10.1	1.64	1.26	1.22
17.4	1.97	1.48	1.14
24.6	1.78	1.37	1.20
31.9	1.75	1.34	1.19
39.1	1.59	1.28	1.19
46.4	1.56	1.26	1.13
53.6	1.56	1.24	1.17
60.9	1.53	1.25	1.16
68.1	1.52	1.25	1.15
75.4	1.54	1.24	1.14
82.6	1.56	1.26	1.14
89.9	1.57	1.28	1.16
97.1	1.60	1.30	1.20
104.4	1.63	1.33	1.23
111.6	1.66	1.35	1.26
118.9	1.65	1.38	1.29
126.1	1.66	1.38	1.29
133.4	1.65	1.38	1.29
140.6	1.63	1.38	1.31
147.9	1.61	1.37	1.32
155.1	1.61	1.40	1.34
162.4	1.60	1.38	1.32
169.6	1.60	1.38	1.33
176.9	1.61	1.39	1.34
184.1	1.62	1.41	1.36
191.4	1.62	1.43	1.36
198.6	1.62	1.42	1.39
205.9	1.63	1.43	1.40
213.1	1.64	1.44	1.42
220.4	1.63	1.45	1.43
227.6	1.61	1.45	1.43
234.9	1.60	1.44	1.44
242.1	1.60	1.46	1.45
249.4	1.58	1.46	1.45
256.6	1.58	1.45	1.46
263.9	1.58	1.44	1.45
271.1	1.58	1.45	1.46
278.4	1.56	1.44	1.46
292.9	1.56	1.46	1.49
300.1	1.57	1.46	1.49

Mini-Circuits®
IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED RoHS compliant
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see minicircuits.com

Harmonics Tables

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	12	24	13	25	27	34	35	42	38	47
1	-	3	+0	39	37	32	40	38	38	43	45	57
2	100	77	75	68	72	72	63	64	64	66	61	70
3	114	74	83	77	63	78	88	76	79	79	75	79
4	107	107	99	108	104	84	104	103	95	97	98	96
5	112	107	110	110	105	111	91	102	102	111	101	108
6	115	98	102	97	101	102	115	88	107	106	115	108
7	108	106	104	102	102	107	118	103	95	104	126	109
8	109	100	112	111	102	99	106	103	109	87	115	101
9	122	108	92	99	107	103	105	104	104	103	89	109
10	108	92	105	97	100	108	107	99	115	100	105	94
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: **RF IN: 1750.1 MHz; -14.00 dBm.**
LO IN: 1780.01 MHz; +7.00 dBm
IF OUT: 29.91 MHz; -20 dBm

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	22	34	23	36	38	47	54	61	57	65
1	-	3	+0	39	38	34	41	39	41	46	50	62
2	80	69	65	58	64	64	53	56	54	59	56	65
3	118	56	69	59	45	61	71	58	63	60	57	62
4	123	81	81	87	97	77	82	82	75	73	72	75
5	108	98	87	85	84	82	70	83	90	81	81	83
6	112	99	112	101	100	112	108	86	101	101	90	90
7	106	100	128	127	102	101	101	99	88	104	105	100
8	106	113	121	108	110	109	113	117	111	98	115	114
9	110	111	114	103	121	107	113	109	115	111	103	126
10	114	110	110	103	119	111	118	107	122	122	120	105
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: **RF IN: 1750.1 MHz; -4.00 dBm.**
LO IN: 1780.01 MHz; +7.00 dBm
IF OUT: 29.91 MHz; -10.09 dBm

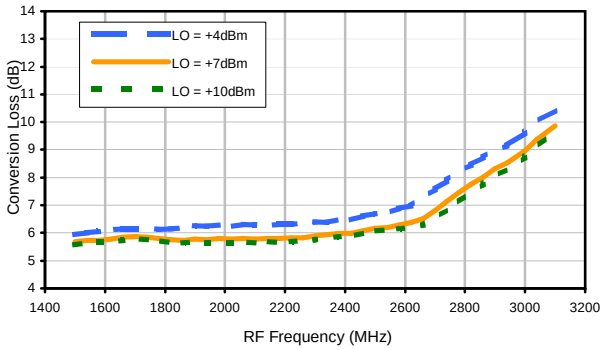
Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

Mini-Circuits®
IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED RoHS compliant
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see minicircuits.com

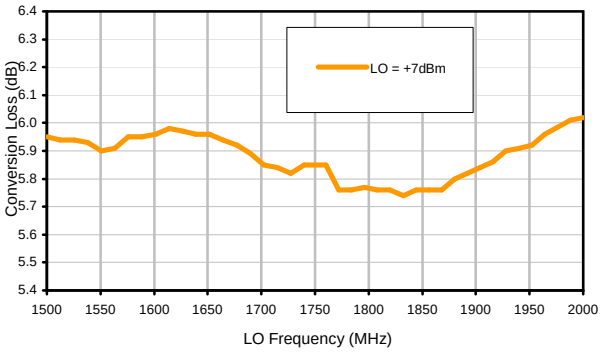
Frequency Mixer ADE-20+

Typical Performance Curves

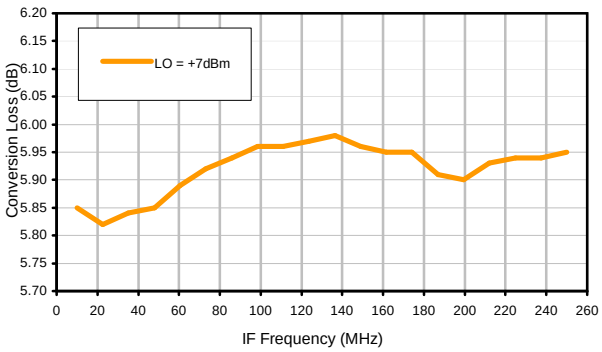
Conversion Loss @ IF=30MHz



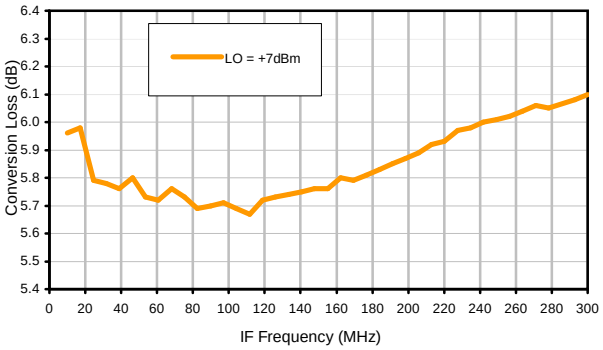
Conversion Loss vs. LO @ RF=1750.1MHz



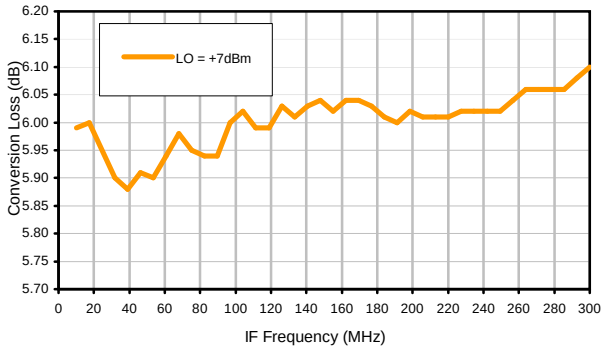
Conversion Loss vs. IF @ RF=1750.1MHz



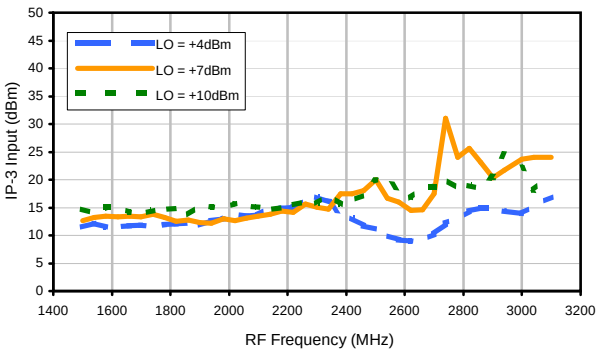
Conversion Loss vs. IF @ RF=1500.1MHz



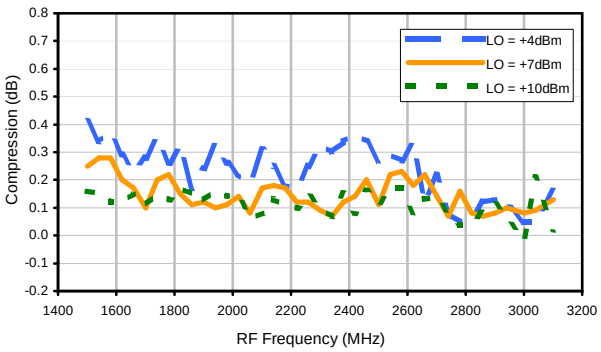
Conversion Loss vs. IF @ RF=2000.1MHz



IP-3 Input



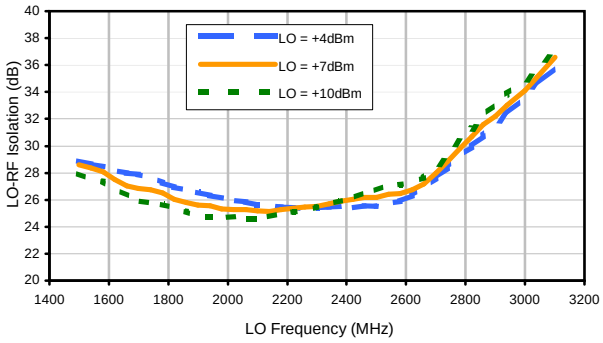
Compression @ RF IN=+1dBm



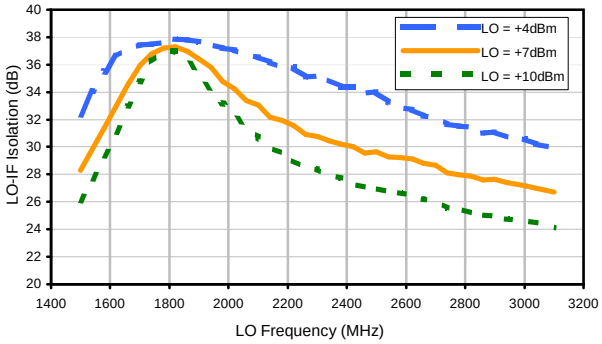
Mini-Circuits®
IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED RoHS compliant
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see minicircuits.com

Typical Performance Curves

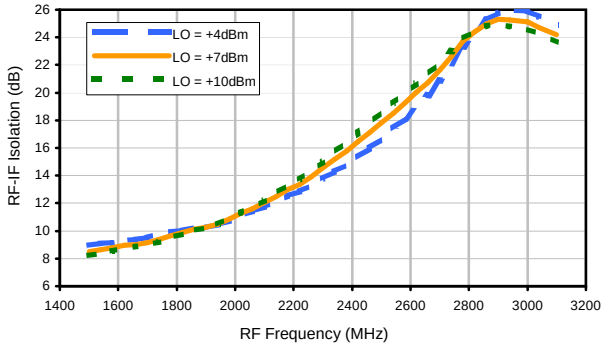
LO-RF Isolation



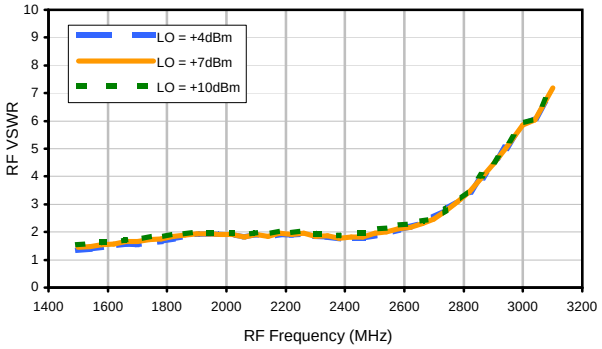
LO-IF Isolation



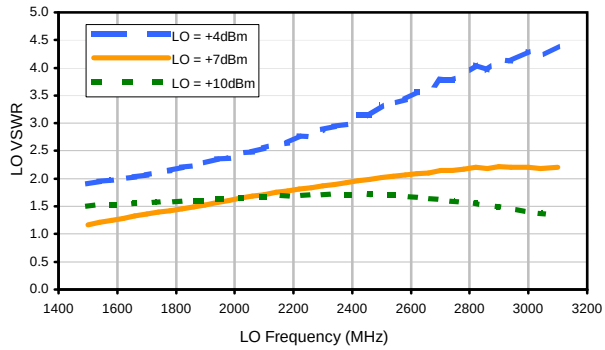
RF-IF Isolation



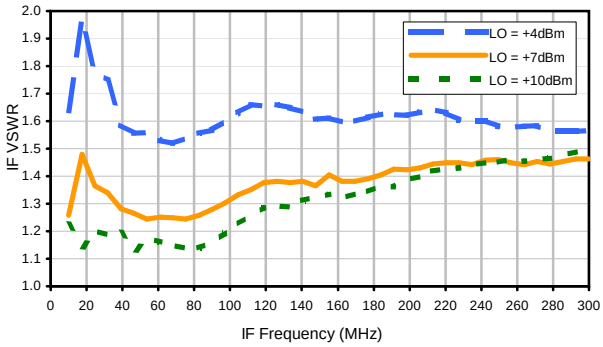
RF VSWR



LO VSWR



IF VSWR



Mini-Circuits®
IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED RoHS compliant
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see minicircuits.com

Harmonics Tables

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	12	24	13	25	27	34	35	42	38	47
1	-	3	+0	39	37	32	40	38	38	43	45	57
2	100	77	75	68	72	72	63	64	64	66	61	70
3	114	74	83	77	63	78	88	76	79	79	75	79
4	107	107	99	108	104	84	104	103	95	97	98	96
5	112	107	110	110	105	111	91	102	102	111	101	108
6	115	98	102	97	101	102	115	88	107	106	115	108
7	108	106	104	102	102	107	118	103	95	104	126	109
8	109	100	112	111	102	99	106	103	109	87	115	101
9	122	108	92	99	107	103	105	104	104	103	89	109
10	108	92	105	97	100	108	107	99	115	100	105	94
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:
RF IN: 1750.1 MHz; -14.00 dBm.
LO IN: 1780.01 MHz; +7.00 dBm
IF OUT: 29.91 MHz; -20 dBm

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	22	34	23	36	38	47	54	61	57	65
1	-	3	+0	39	38	34	41	39	41	46	50	62
2	80	69	65	58	64	64	53	56	54	59	56	65
3	118	56	69	59	45	61	71	58	63	60	57	62
4	123	81	81	87	97	77	82	82	75	73	72	75
5	108	98	87	85	84	82	70	83	90	81	81	83
6	112	99	112	101	100	112	108	86	101	101	90	90
7	106	100	128	127	102	101	101	99	88	104	105	100
8	106	113	121	108	110	109	113	117	111	98	115	114
9	110	111	114	103	121	107	113	109	115	111	103	126
10	114	110	110	103	119	111	118	107	122	122	120	105
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:
RF IN: 1750.1 MHz; -4.00 dBm.
LO IN: 1780.01 MHz; +7.00 dBm
IF OUT: 29.91 MHz; -10.09 dBm

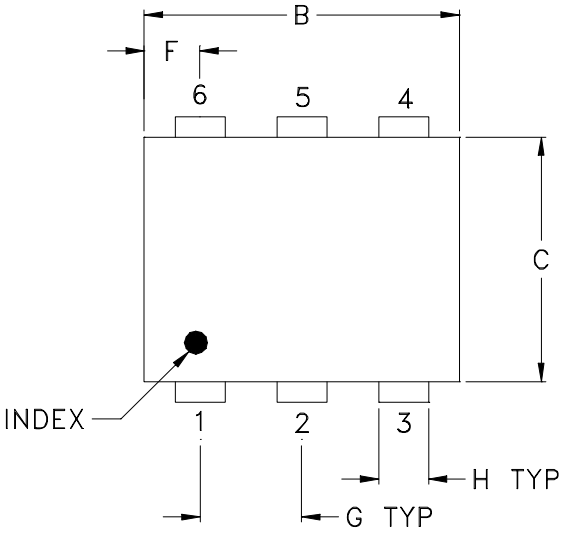
Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

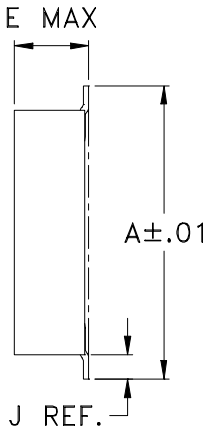
Mini-Circuits®
IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED RoHS compliant
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see minicircuits.com

Case Style CD

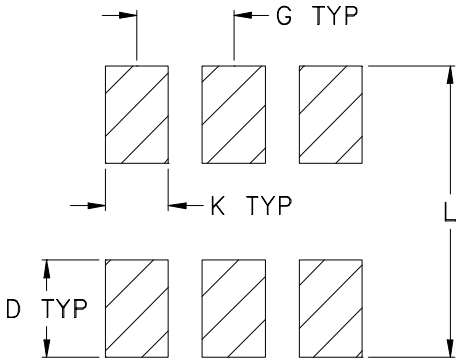
CD541
CD542
CD636
CD637

Outline Dimensions





PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE#	A	B	C	D	E	F	G	H	J	K	L	WT, GRAM
CD541	.272 (6.91)	.310 (7.87)	.220 (5.58)	.100 (2.54)	.082 (2.08)	.055 (1.40)	.100 (2.54)	.030 (0.76)	.026 (0.66)	.065 (1.65)	.300 (7.62)	.15
CD542					.112 (2.84)							.20
CD636					.162 (4.11)							.25
CD637					.206 (5.23)							.40

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

Notes:

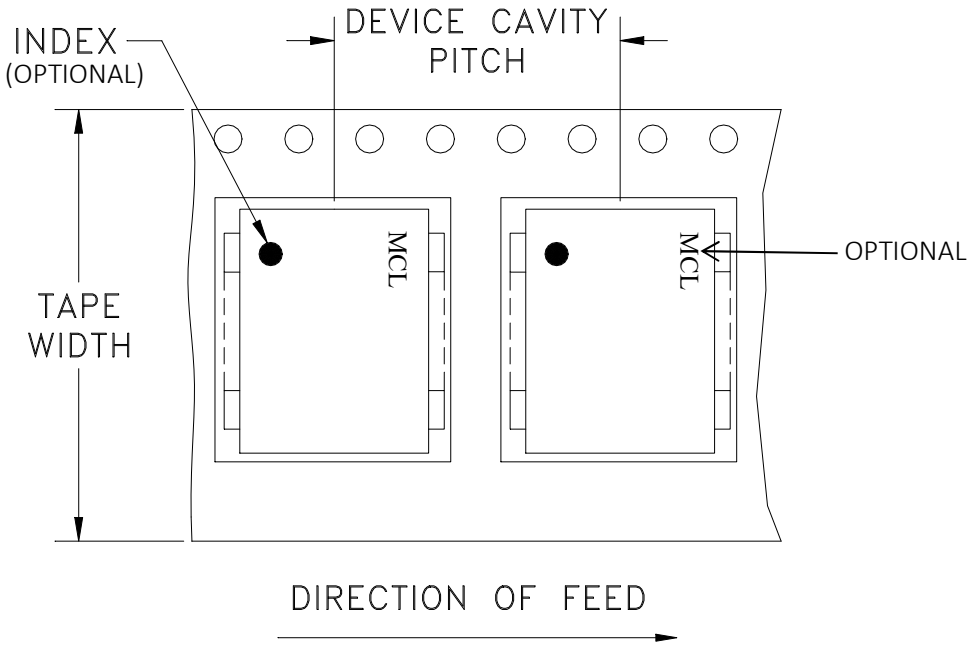
1. Case material: Plastic.
2. Termination finish:
   For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.
   For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.

Mini-Circuits®
INTERNET http://www.minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010
Mini-Circuits ISO 9001 & ISO 14001 Certified

This document and its contents are the property of Mini-Circuits

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

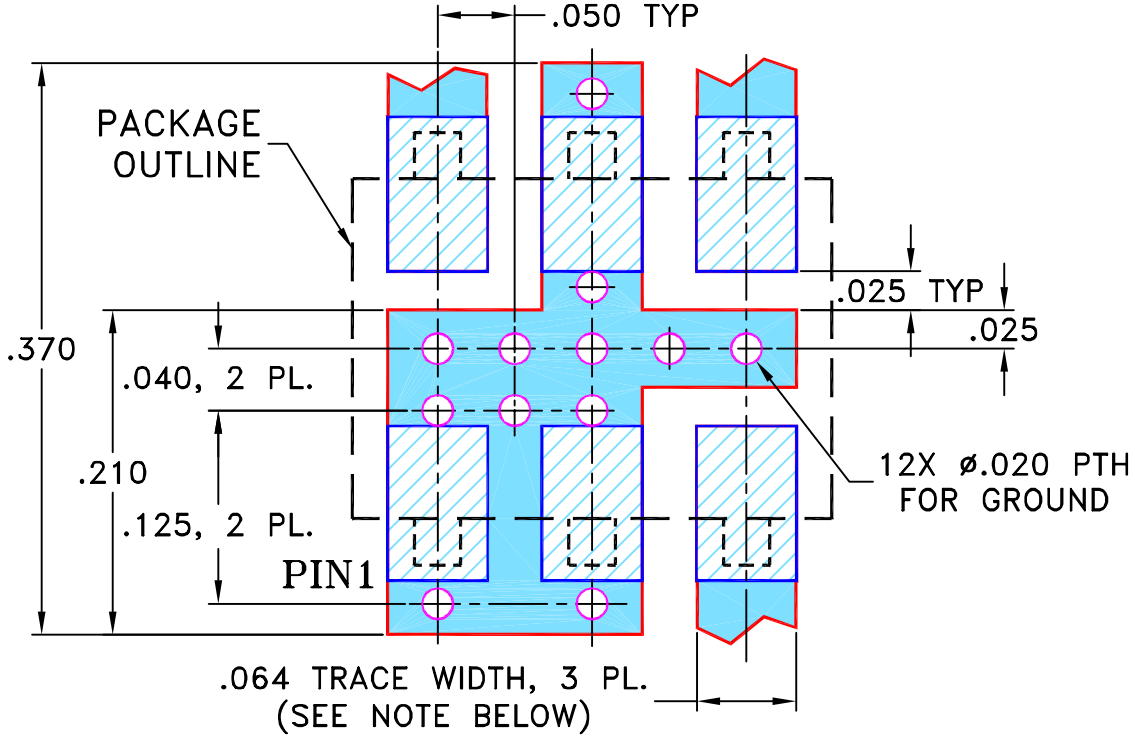
Mini-Circuits®
INTERNET http://www.minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010
Mini-Circuits ISO 9001 & ISO 14001 Certified

This document and its contents are the property of Mini-Circuits.

THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M82272	NEW RELEASE	08/05/02	MMG	DJ
A	M102713	ADDED NOTE 2 & "...WITH SMOBC"	01/17/06	MMG	IL

SUGGESTED MOUNTING CONFIGURATION FOR CD541/542/636/637 CASE STYLES, "jv", "ju", "jw" PIN CONNECTIONS



NOTES:
1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B 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

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	MMG	07/17/02
TOLERANCES ON:	CHECKED	WL	08/02/02
2 PL DECIMALS ±	APPROVED	DJ	08/05/02
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

Mini-Circuits®
THIS DOCUMENT AND ITS CONTENTS ARE THE PROPERTY OF MINI-CIRCUITS. EXCEPT FOR USE EXPRESSLY GRANTED, IN WRITING, TO ITS VENDORS, VENDEE AND THE UNITED STATES GOVERNMENT, MINI-CIRCUITS RESERVES ALL PROPRIETARY DESIGN, USE , MANUFACTURING AND REPRODUCTION RIGHTS THERETO. THESE CONTENTS SHALL NOT BE USED, DUPLICATED OR DISCLOSED TO ANY OUTSIDE PARTY, IN WHOLE OR IN PART, WITHOUT WRITTEN PERMISSION OF MINI-CIRCUITS.

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

Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

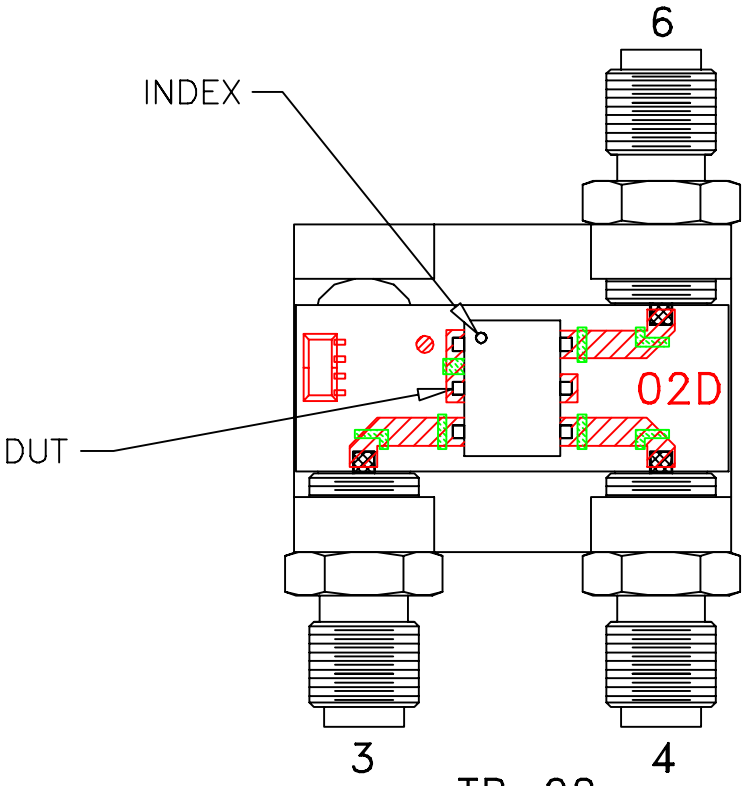
PL, jv/ju/jw, CD541/542/636/637, ADE, TB-02

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-051	A

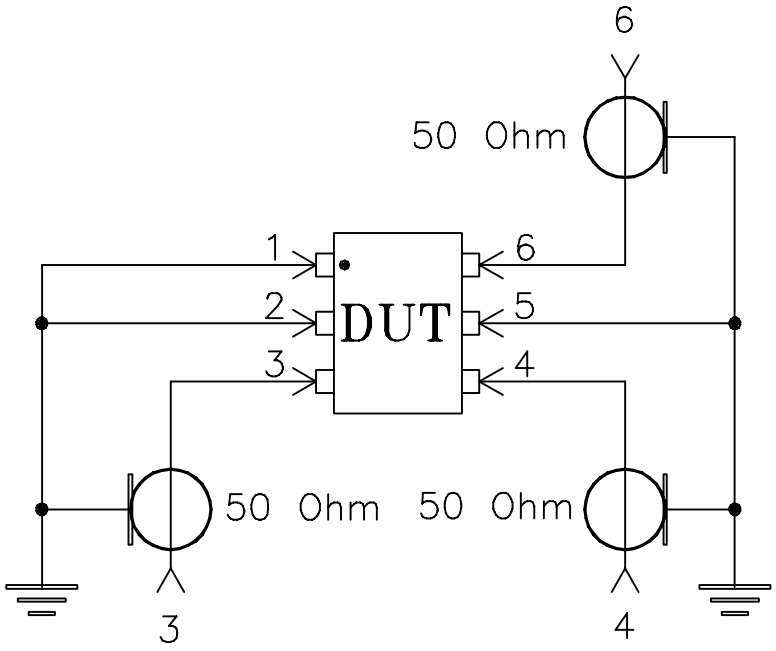
FILE:	SCALE:	SHEET:
98PL051	8:1	1 OF 1

Evaluation Board and Circuit

For Pin Connections refer to Data Sheet of the DUT



TB-02



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers RO4350 or equivalent, Dielectric Constant=3.5, Thickness=.030 inch.

Mini-Circuits®

THIS DOCUMENT AND ITS CONTENTS ARE THE PROPERTY OF MINI-CIRCUITS.

Mini-Circuits

Environmental Specifications ENV02T1

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

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-40° to 85°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
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 Eutetic Process: 225°C peak Pb-Free Process 245° - 250°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

This document and its contents are the property of Mini-Circuits.