Non-Catalog Model

Frequency Mixer TUF-11ASM

Level 7 (LO Power +7 dBm)

Important Note

This is a non-catalog model and can be manufactured on specific request. Pricing and delivery information can be supplied upon request.

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CASE STYLE : NNN150

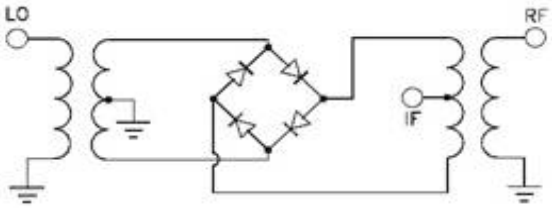
ELECTRICAL SPECIFICATIONS 50Ω @ +25°C					
Parameter		**Min.**	**Typ.**	**Max.**	**Units**
Frequency	**LO** (fL to fU)	1400		1900	MHz
	RF (fL to fU)	1400		1900	MHz
	IF	40		500	MHz
Conversion Loss			6.8	8.6	dB
LO-RF Isolation		20	33		dB
LO-IF Isolation		15	29		dB
1 dB Comp. Input Power			+1		dBm

Note: Non-hermetic

MAXIMUM RATINGS	
Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
RF Power	50mW
IF Current	40mA

PIN CONNECTIONS	
LO	4
RF	1
IF	2
GROUND	3

Electrical Schematics



Frequency Mixer TUF-11ASM

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB) @LO (dBm)		
		+4	+7	+10
750.1	780.1	11.09	10.45	10.11
830.3	860.3	9.41	8.92	8.64
910.6	940.6	8.11	7.69	7.57
990.8	1020.8	7.36	7.03	6.87
1071.1	1101.1	7.16	6.84	6.67
1151.3	1181.3	7.17	6.90	6.76
1231.5	1261.5	7.30	7.05	7.01
1311.8	1341.8	7.50	7.25	7.19
1392.0	1422.0	7.72	7.42	7.31
1472.3	1502.3	7.75	7.36	7.17
1552.5	1582.5	7.72	7.17	6.93
1632.7	1662.7	7.70	7.03	6.73
1713.0	1743.0	7.70	6.98	6.59
1793.2	1823.2	7.80	7.10	6.67
1873.5	1903.5	7.89	7.20	6.82
1953.7	1983.7	8.05	7.35	6.94
2033.9	2063.9	8.04	7.40	7.00
2114.2	2144.2	8.04	7.43	7.03
2194.4	2224.4	8.10	7.51	7.15
2294.7	2324.7	8.22	7.64	7.31
2375.0	2405.0	8.36	7.74	7.38
2475.2	2505.2	8.34	7.80	7.48
2555.5	2585.5	8.24	7.71	7.48
2655.8	2685.8	8.32	7.76	7.60
2736.0	2766.0	8.48	7.99	7.84
2836.3	2866.3	8.57	8.07	7.87
2916.6	2946.6	8.61	8.16	7.98
3016.9	3046.9	8.67	8.26	8.16
3097.1	3127.1	8.66	8.27	8.18
3197.4	3227.4	8.74	8.23	8.07
3277.6	3307.6	8.72	8.16	7.94
3377.9	3407.9	8.97	8.27	8.07
3458.2	3488.2	9.17	8.44	8.18
3558.5	3588.5	9.49	8.62	8.36
3638.7	3668.7	9.79	8.71	8.40
3739.0	3769.0	10.23	8.87	8.48
3819.3	3849.3	10.76	9.11	8.59
3919.6	3949.6	11.57	9.29	8.75
3999.8	4029.8	12.58	9.63	8.69
4100.1	4130.1	13.84	10.24	8.78

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm) @LO (dBm)		
		+4	+7	+10
750.1	780.1	12.32	13.62	15.77
830.3	860.3	8.62	9.19	9.01
910.6	940.6	5.90	6.81	6.92
990.8	1020.8	5.38	6.72	7.71
1071.1	1101.1	6.45	8.80	10.99
1151.3	1181.3	7.79	10.79	12.99
1231.5	1261.5	10.70	13.45	15.53
1311.8	1341.8	17.57	21.53	21.48
1392.0	1422.0	20.89	20.37	17.76
1472.3	1502.3	16.00	20.89	19.43
1552.5	1582.5	14.93	14.07	13.55
1632.7	1662.7	11.02	10.49	10.91
1713.0	1743.0	8.83	8.95	9.75
1793.2	1823.2	7.87	9.69	9.90
1873.5	1903.5	7.42	9.07	10.38
1953.7	1983.7	7.49	8.63	10.17
2033.9	2063.9	7.39	8.33	8.99
2114.2	2144.2	7.32	8.65	9.91
2194.4	2224.4	7.13	8.26	9.24
2294.7	2324.7	7.53	8.39	9.40
2375.0	2405.0	7.49	8.71	9.95
2475.2	2505.2	7.95	8.96	10.64
2555.5	2585.5	8.64	9.88	11.50
2655.8	2685.8	10.35	12.59	12.47
2736.0	2766.0	10.99	12.87	13.65
2836.3	2866.3	10.43	14.31	15.34
2916.6	2946.6	11.24	13.96	14.24
3016.9	3046.9	10.62	13.96	15.66
3097.1	3127.1	11.38	12.82	14.87
3197.4	3227.4	11.76	12.51	12.68
3277.6	3307.6	10.68	13.35	14.12
3377.9	3407.9	11.10	13.44	15.88
3458.2	3488.2	11.50	14.72	15.96
3558.5	3588.5	11.20	12.94	15.48
3638.7	3668.7	12.52	13.15	15.63
3739.0	3769.0	13.20	12.64	15.70
3819.3	3849.3	13.83	14.41	15.19
3919.6	3949.6	10.25	13.05	15.74
3999.8	4029.8	6.21	10.42	16.75
4100.1	4130.1	4.40	9.64	13.49

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+1dBm (dB) @LO (dBm)		
		+4	+7	+10
750.1	780.1	0.20	0.27	0.32
830.3	860.3	0.86	0.78	0.76
910.6	940.6	1.26	1.05	0.90
990.8	1020.8	1.19	0.93	0.77
1071.1	1101.1	0.90	0.64	0.54
1151.3	1181.3	0.67	0.42	0.34
1231.5	1261.5	0.53	0.31	0.27
1311.8	1341.8	0.55	0.33	0.29
1392.0	1422.0	0.66	0.41	0.32
1472.3	1502.3	0.90	0.64	0.52
1552.5	1582.5	1.18	0.97	0.82
1632.7	1662.7	1.37	1.23	1.07
1713.0	1743.0	1.38	1.27	1.12
1793.2	1823.2	1.34	1.16	1.03
1873.5	1903.5	1.25	1.06	0.91
1953.7	1983.7	1.13	0.92	0.81
2033.9	2063.9	1.08	0.87	0.70
2114.2	2144.2	1.04	0.80	0.68
2194.4	2224.4	1.01	0.77	0.68
2294.7	2324.7	0.98	0.75	0.70
2375.0	2405.0	0.96	0.78	0.72
2475.2	2505.2	1.01	0.79	0.74
2555.5	2585.5	1.00	0.80	0.75
2655.8	2685.8	1.04	0.78	0.70
2736.0	2766.0	0.93	0.69	0.58
2836.3	2866.3	0.81	0.58	0.48
2916.6	2946.6	0.73	0.48	0.41
3016.9	3046.9	0.77	0.40	0.32
3097.1	3127.1	0.75	0.36	0.29
3197.4	3227.4	0.78	0.39	0.23
3277.6	3307.6	0.87	0.45	0.27
3377.9	3407.9	0.88	0.46	0.28
3458.2	3488.2	0.88	0.43	0.26
3558.5	3588.5	0.88	0.49	0.24
3638.7	3668.7	0.85	0.53	0.31
3739.0	3769.0	0.81	0.57	0.31
3819.3	3849.3	0.66	0.60	0.35
3919.6	3949.6	0.28	0.60	0.34
3999.8	4029.8	-0.24	0.51	0.29
4100.1	4130.1	-0.93	0.30	0.30

Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1650.1MHz (dB) @LO (dBm) +7
250.0	1400.1	7.13
237.4	1412.7	7.14
224.7	1425.4	7.09
212.1	1438.0	7.07
199.5	1450.6	7.06
186.8	1463.3	6.99
174.2	1475.9	6.98
161.6	1488.5	6.99
148.9	1501.2	6.93
136.3	1513.8	6.96
123.7	1526.4	6.95
111.1	1539.0	6.91
98.4	1551.7	6.96
85.8	1564.3	6.93
73.2	1576.9	6.93
60.5	1589.6	7.01
47.9	1602.2	7.01
35.3	1614.8	7.11
22.6	1627.5	7.26
10.0	1640.1	7.54
10.0	1660.1	7.31
22.6	1672.7	7.06
35.3	1685.4	7.03
47.9	1698.0	6.97
60.5	1710.6	6.91
73.2	1723.3	6.95
85.8	1735.9	6.89
98.4	1748.5	6.90
111.1	1761.2	6.93
123.7	1773.8	6.88
136.3	1786.4	6.91
148.9	1799.0	6.90
161.6	1811.7	6.83
174.2	1824.3	6.85
186.8	1836.9	6.81
199.5	1849.6	6.79
212.1	1862.2	6.81
224.7	1874.8	6.78
237.4	1887.5	6.82
250.0	1900.1	6.82

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1400.1MHz (dB) @LO (dBm) +7
10.0	1410.1	7.58
22.6	1422.7	7.45
35.1	1435.2	7.35
47.7	1447.8	7.30
60.3	1460.4	7.29
72.8	1472.9	7.26
85.4	1485.5	7.30
97.9	1498.0	7.33
110.5	1510.6	7.30
123.1	1523.2	7.31
135.6	1535.7	7.31
148.2	1548.3	7.30
160.8	1560.9	7.37
173.3	1573.4	7.36
185.9	1586.0	7.36
198.5	1598.6	7.40
211.0	1611.1	7.37
223.6	1623.7	7.38
236.2	1636.3	7.38
248.7	1648.8	7.32
261.3	1661.4	7.34
273.8	1673.9	7.31
286.4	1686.5	7.28
299.0	1699.1	7.31
311.5	1711.6	7.26
324.1	1724.2	7.24
336.7	1736.8	7.26
349.2	1749.3	7.23
361.8	1761.9	7.25
374.4	1774.5	7.25
386.9	1787.0	7.23
399.5	1799.6	7.23
412.1	1812.2	7.21
424.6	1824.7	7.19
437.2	1837.3	7.18
449.7	1849.8	7.12
462.3	1862.4	7.11
474.9	1875.0	7.11
487.4	1887.5	7.08
500.0	1900.1	7.07

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1900.1MHz (dB) @LO (dBm) +7
500.0	1400.1	6.78
487.4	1412.7	6.78
474.9	1425.2	6.78
462.3	1437.8	6.77
449.7	1450.4	6.75
437.2	1462.9	6.79
424.6	1475.5	6.80
412.1	1488.0	6.75
399.5	1500.6	6.72
386.9	1513.2	6.73
374.4	1525.7	6.70
361.8	1538.3	6.73
349.2	1550.9	6.72
336.7	1563.4	6.71
324.1	1576.0	6.75
311.5	1588.6	6.74
299.0	1601.1	6.76
286.4	1613.7	6.78
273.8	1626.3	6.73
261.3	1638.8	6.77
248.7	1651.4	6.80
236.2	1663.9	6.78
223.6	1676.5	6.84
211.0	1689.1	6.85
198.5	1701.6	6.84
185.9	1714.2	6.92
173.3	1726.8	6.89
160.8	1739.3	6.93
148.2	1751.9	6.99
135.6	1764.5	6.98
123.1	1777.0	7.06
110.5	1789.6	7.08
97.9	1802.2	7.06
85.4	1814.7	7.14
72.8	1827.3	7.13
60.3	1839.8	7.17
47.7	1852.4	7.27
35.1	1865.0	7.30
22.6	1877.5	7.47
10.0	1890.1	7.50

Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB) @LO (dBm)			LO-IF ISOLATION (dB) @LO (dBm)		
	+4	+7	+10	+4	+7	+10
750.1	49.89	51.88	53.30	30.93	31.47	31.68
830.3	47.25	49.53	50.68	31.46	32.08	32.29
910.6	43.98	46.27	48.10	32.87	33.52	32.89
990.8	41.99	43.40	44.11	34.33	34.01	31.66
1071.1	41.47	41.69	41.42	34.93	32.03	29.12
1151.3	40.96	40.86	40.22	34.51	29.95	26.99
1231.5	40.16	40.24	39.77	31.71	27.50	24.84
1311.8	39.51	40.07	40.18	29.08	25.68	23.42
1392.0	39.60	40.98	41.84	26.38	23.73	21.86
1472.3	40.28	43.19	45.42	24.49	22.20	20.59
1552.5	40.73	45.02	49.25	22.92	20.99	19.58
1632.7	39.87	43.33	46.28	21.75	20.10	18.79
1713.0	37.93	39.91	41.03	21.00	19.53	18.38
1793.2	36.04	37.37	38.61	20.60	19.25	18.11
1873.5	34.70	35.31	35.89	20.37	19.20	18.21
1953.7	33.61	33.81	34.05	20.76	19.54	18.64
2033.9	32.62	32.57	32.75	21.50	20.39	19.48
2114.2	31.60	31.33	31.27	23.04	21.89	20.84
2194.4	30.49	30.17	30.16	25.41	24.31	23.28
2294.7	29.13	28.81	28.77	29.96	29.59	28.10
2375.0	28.11	27.90	27.95	30.63	32.01	32.04
2475.2	27.33	27.10	27.29	24.73	25.52	26.63
2555.5	26.71	26.81	27.21	20.97	21.57	22.58
2655.8	26.27	26.59	27.18	18.12	18.71	19.67
2736.0	26.13	26.61	27.23	16.68	17.40	18.36
2836.3	26.35	27.03	27.72	15.62	16.50	17.51
2916.6	26.76	27.60	28.48	15.26	16.18	17.25
3016.9	27.25	28.11	28.86	15.00	15.95	17.03
3097.1	27.69	28.54	29.39	15.12	16.02	17.02
3197.4	28.10	28.95	29.69	15.26	16.28	17.11
3277.6	28.51	29.18	29.93	15.52	16.44	17.19
3377.9	29.06	29.50	30.02	15.83	16.55	17.07
3458.2	29.54	29.89	30.19	16.19	16.65	16.87
3558.5	30.26	30.31	30.33	16.61	16.72	16.61
3638.7	30.95	30.76	30.68	16.78	16.57	16.23
3739.0	31.87	31.22	31.00	16.83	16.37	15.82
3819.3	32.57	31.37	31.15	16.53	15.92	15.43
3919.6	34.05	31.76	31.13	15.98	15.44	15.03
3999.8	35.15	32.37	31.41	15.30	15.02	14.67
4100.1	35.98	32.74	30.67	14.38	14.33	13.95

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB) @LO (dBm)		
		+4	+7	+10
750.1	780.1	24.01	23.63	23.37
830.3	860.3	22.86	22.60	22.48
910.6	940.6	22.56	22.51	22.62
990.8	1020.8	22.86	23.24	23.60
1071.1	1101.1	23.33	24.08	24.68
1151.3	1181.3	23.20	23.93	24.41
1231.5	1261.5	22.53	23.07	23.42
1311.8	1341.8	21.95	22.33	22.58
1392.0	1422.0	21.47	21.71	21.99
1472.3	1502.3	21.22	21.50	21.79
1552.5	1582.5	21.52	21.79	22.13
1632.7	1662.7	22.40	22.80	23.07
1713.0	1743.0	23.72	24.22	24.85
1793.2	1823.2	25.06	25.46	26.05
1873.5	1903.5	26.47	26.90	27.34
1953.7	1983.7	27.42	27.78	28.15
2033.9	2063.9	27.77	28.15	28.45
2114.2	2144.2	27.85	28.08	28.18
2194.4	2224.4	27.34	27.60	27.56
2294.7	2324.7	26.47	26.52	26.28
2375.0	2405.0	25.86	25.74	25.24
2475.2	2505.2	24.95	24.45	23.55
2555.5	2585.5	24.46	23.69	22.62
2655.8	2685.8	24.03	23.17	22.24
2736.0	2766.0	23.60	22.79	22.05
2836.3	2866.3	23.61	23.00	22.30
2916.6	2946.6	23.83	23.41	22.86
3016.9	3046.9	24.29	23.93	23.60
3097.1	3127.1	24.67	24.36	24.06
3197.4	3227.4	24.95	24.69	24.32
3277.6	3307.6	24.99	24.82	24.42
3377.9	3407.9	24.92	24.70	24.39
3458.2	3488.2	24.95	24.64	24.23
3558.5	3588.5	24.59	24.28	23.89
3638.7	3668.7	24.07	23.79	23.38
3739.0	3769.0	23.13	23.09	22.72
3819.3	3849.3	22.26	22.44	22.04
3919.6	3949.6	20.86	21.28	20.94
3999.8	4029.8	19.83	20.21	19.93
4100.1	4130.1	18.91	19.36	19.32

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1) @LO (dBm)		
		+4	+7	+10
750.1	780.1	8.27	7.83	7.53
830.3	860.3	5.56	5.23	5.04
910.6	940.6	3.67	3.44	3.32
990.8	1020.8	2.67	2.52	2.44
1071.1	1101.1	2.26	2.22	2.25
1151.3	1181.3	2.15	2.25	2.37
1231.5	1261.5	2.09	2.27	2.45
1311.8	1341.8	1.96	2.15	2.32
1392.0	1422.0	1.76	1.91	2.03
1472.3	1502.3	1.48	1.60	1.70
1552.5	1582.5	1.19	1.31	1.40
1632.7	1662.7	1.16	1.24	1.32
1713.0	1743.0	1.45	1.45	1.52
1793.2	1823.2	1.73	1.70	1.73
1873.5	1903.5	2.01	1.97	1.96
1953.7	1983.7	2.33	2.28	2.26
2033.9	2063.9	2.63	2.58	2.56
2114.2	2144.2	2.84	2.78	2.73
2194.4	2224.4	2.93	2.88	2.81
2294.7	2324.7	3.03	2.99	2.94
2375.0	2405.0	3.23	3.19	3.12
2475.2	2505.2	3.41	3.40	3.34
2555.5	2585.5	3.32	3.31	3.27
2655.8	2685.8	3.20	3.18	3.17
2736.0	2766.0	3.23	3.23	3.24
2836.3	2866.3	3.40	3.42	3.42
2916.6	2946.6	3.43	3.45	3.45
3016.9	3046.9	3.23	3.28	3.29
3097.1	3127.1	3.15	3.19	3.25
3197.4	3227.4	3.33	3.30	3.37
3277.6	3307.6	3.50	3.44	3.48
3377.9	3407.9	3.54	3.43	3.40
3458.2	3488.2	3.45	3.33	3.30
3558.5	3588.5	3.50	3.35	3.34
3638.7	3668.7	3.75	3.52	3.50
3739.0	3769.0	4.04	3.67	3.60
3819.3	3849.3	4.10	3.62	3.54
3919.6	3949.6	4.18	3.56	3.40
3999.8	4029.8	4.46	3.65	3.40
4100.1	4130.1	5.10	4.05	3.63

LO (MHz)	LO VSWR (:1) @LO (dBm)		
	+4	+7	+10
750.1	1.68	2.12	2.79
830.3	1.67	2.07	2.70
910.6	1.66	2.01	2.61
990.8	1.66	1.96	2.52
1071.1	1.63	1.89	2.42
1151.3	1.62	1.84	2.34
1231.5	1.61	1.79	2.26
1311.8	1.60	1.75	2.20
1392.0	1.58	1.72	2.16
1472.3	1.57	1.71	2.14
1552.5	1.57	1.71	2.15
1632.7	1.57	1.72	2.14
1713.0	1.57	1.73	2.13
1793.2	1.58	1.75	2.16
1873.5	1.60	1.77	2.17
1953.7	1.61	1.78	2.18
2033.9	1.62	1.77	2.16
2114.2	1.63	1.74	2.11
2194.4	1.63	1.69	2.01
2294.7	1.62	1.62	1.89
2375.0	1.61	1.56	1.77
2475.2	1.58	1.48	1.65
2555.5	1.55	1.42	1.56
2655.8	1.53	1.37	1.46
2736.0	1.49	1.31	1.39
2836.3	1.44	1.25	1.30
2916.6	1.39	1.19	1.24
3016.9	1.31	1.13	1.21
3097.1	1.25	1.08	1.21
3197.4	1.15	1.09	1.26
3277.6	1.07	1.15	1.33
3377.9	1.08	1.26	1.46
3458.2	1.18	1.36	1.57
3558.5	1.34	1.52	1.73
3638.7	1.48	1.65	1.86
3739.0	1.68	1.83	2.04
3819.3	1.86	1.98	2.18
3919.6	2.13	2.18	2.36
3999.8	2.36	2.34	2.47
4100.1	2.66	2.61	2.69

IF (OUT) (MHz)	IF VSWR @LO=1900.1MHz (:1) @LO (dBm)		
	+4	+7	+10
10.0	1.89	1.77	1.86
22.6	1.32	1.23	1.21
35.1	1.29	1.16	1.11
47.7	1.29	1.14	1.04
60.3	1.31	1.16	1.05
72.8	1.32	1.17	1.06
85.4	1.32	1.17	1.07
97.9	1.31	1.16	1.05
110.5	1.28	1.14	1.02
123.1	1.27	1.12	1.04
135.6	1.27	1.12	1.05
148.2	1.30	1.15	1.05
160.8	1.32	1.17	1.06
173.3	1.32	1.17	1.07
185.9	1.30	1.15	1.06
198.5	1.26	1.12	1.05
211.0	1.25	1.10	1.05
223.6	1.25	1.12	1.05
236.2	1.27	1.14	1.08
248.7	1.28	1.15	1.10
261.3	1.26	1.14	1.11
273.8	1.25	1.12	1.09
286.4	1.24	1.11	1.08
299.0	1.25	1.12	1.09
311.5	1.25	1.14	1.12
324.1	1.24	1.15	1.16
336.7	1.24	1.15	1.17
349.2	1.24	1.15	1.16
361.8	1.26	1.16	1.16
374.4	1.27	1.18	1.18
386.9	1.28	1.20	1.20
399.5	1.26	1.19	1.22
412.1	1.25	1.19	1.22
424.6	1.24	1.18	1.22
437.2	1.25	1.20	1.23
449.7	1.26	1.22	1.27
462.3	1.27	1.25	1.31
474.9	1.26	1.25	1.32
487.4	1.25	1.24	1.31
500.0	1.26	1.25	1.31

Harmonics Tables

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	+8	12	6	30	17	28	21	30	36	39
1	-	16	+0	32	15	50	44	44	51	45	39	52
2	>100	57	57	58	52	60	51	64	54	61	55	59
3	>100	77	66	73	59	>79	77	>79	73	>79	76	77
4	>100	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
5	>100	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
6	>100	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
7	>100	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
8	>100	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
9	>100	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
10	>100	>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: 1650.1 MHz; -14.00 dBm.**
LO IN: 1690.01 MHz; +7.00 dBm
IF OUT: 39.91 MHz; -21.03 dBm

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	2	23	16	42	29	43	35	45	54	55
1	-	16	+0	33	15	50	45	48	56	51	48	67
2	84	46	47	46	40	52	42	58	49	58	50	57
3	>100	57	46	49	39	61	49	73	58	64	63	63
4	>100	84	76	63	66	56	66	64	64	69	64	66
5	>100	74	82	74	57	77	53	82	63	81	70	84
6	>100	74	84	85	82	66	66	85	78	75	80	85
7	>100	>89	79	>89	>89	>89	75	82	71	>89	77	89
8	>100	>89	>89	>89	>89	>89	>89	86	88	79	>89	>89
9	>100	>89	>89	>89	>89	>89	>89	>89	87	>89	85	>89
10	>100	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

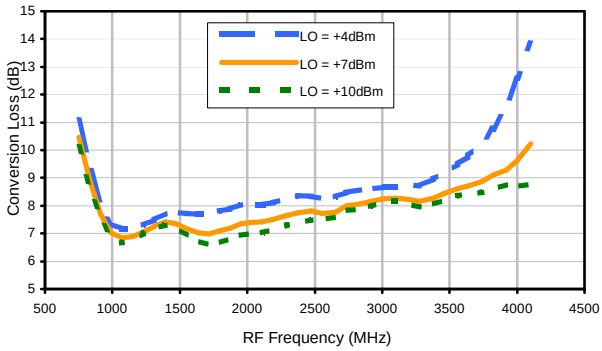
LO HARMONICS ORDER

Test conditions: **RF IN: 1650.1 MHz; -4.00 dBm.**
LO IN: 1690.01 MHz; +7.00 dBm
IF OUT: 39.91 MHz; -11.06 dBm

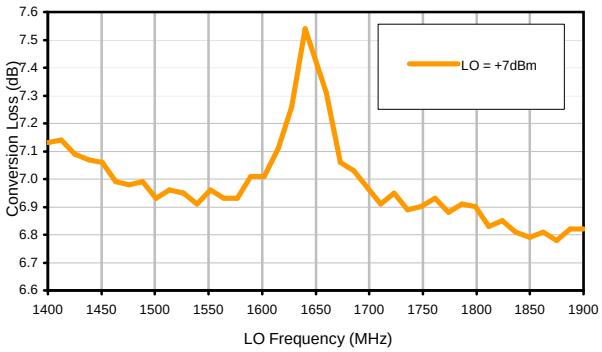
Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

Typical Performance Curves

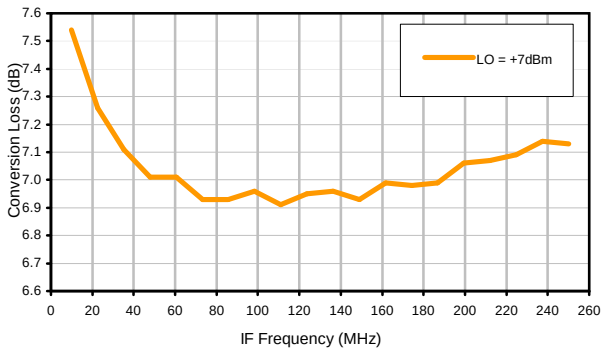
Conversion Loss @ IF=30MHz



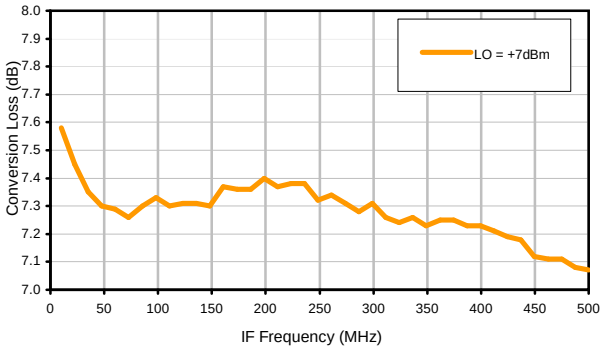
Conversion Loss vs. LO @ RF=1650.1MHz



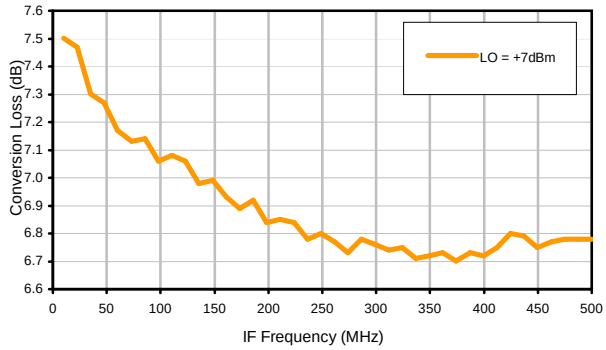
Conversion Loss vs. IF @ RF=1650.1MHz



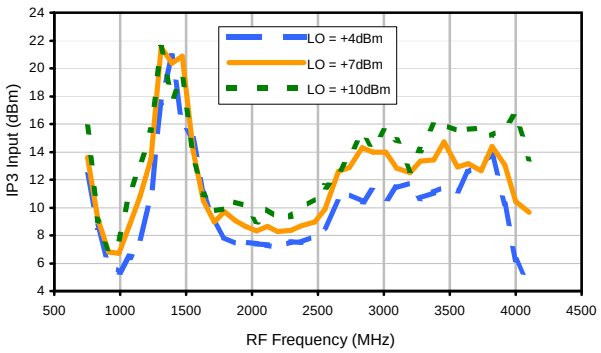
Conversion Loss vs. IF @ RF=1400.1MHz



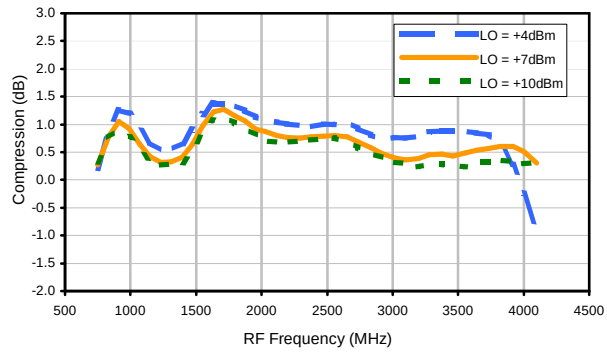
Conversion Loss vs. IF @ RF=1900.1MHz



IP3 Input

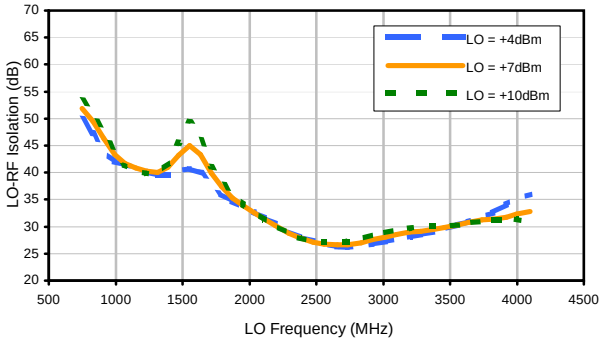


Compression @ RF IN=+1dBm

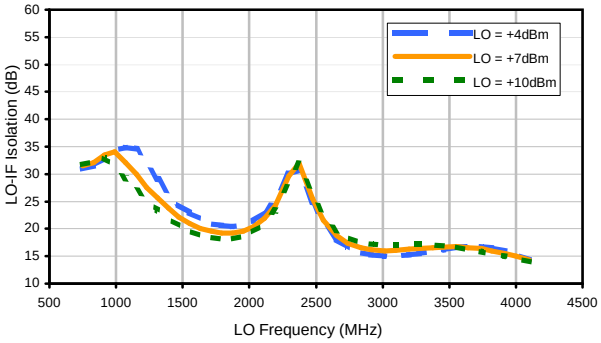


Typical Performance Curves

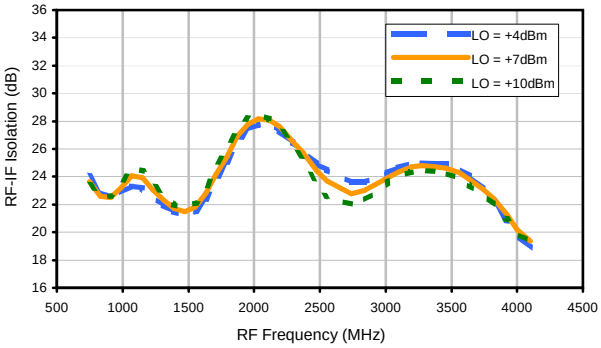
LO-RF Isolation



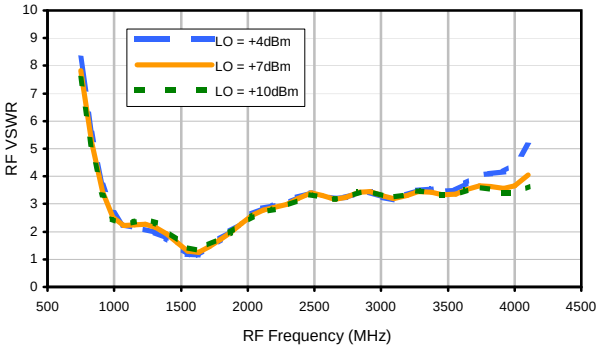
LO-IF Isolation



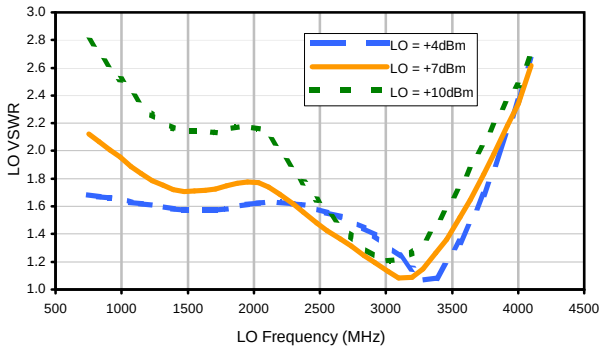
RF-IF Isolation



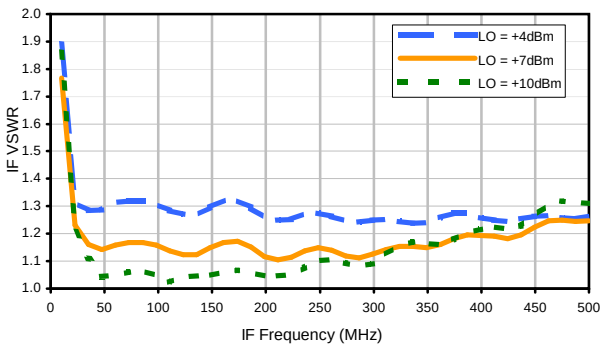
RF VSWR



LO VSWR



IF VSWR



Harmonics Tables

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	+8	12	6	30	17	28	21	30	36	39
1	-	16	+0	32	15	50	44	44	51	45	39	52
2	>100	57	57	58	52	60	51	64	54	61	55	59
3	>100	77	66	73	59	>79	77	>79	73	>79	76	77
4	>100	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
5	>100	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
6	>100	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
7	>100	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
8	>100	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
9	>100	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
10	>100	>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: 1650.1 MHz; -14.00 dBm.
LO IN: 1690.01 MHz; +7.00 dBm
IF OUT: 39.91 MHz; -21.03 dBm

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	2	23	16	42	29	43	35	45	54	55
1	-	16	+0	33	15	50	45	48	56	51	48	67
2	84	46	47	46	40	52	42	58	49	58	50	57
3	>100	57	46	49	39	61	49	73	58	64	63	63
4	>100	84	76	63	66	56	66	64	64	69	64	66
5	>100	74	82	74	57	77	53	82	63	81	70	84
6	>100	74	84	85	82	66	66	85	78	75	80	85
7	>100	>89	79	>89	>89	>89	75	82	71	>89	77	89
8	>100	>89	>89	>89	>89	>89	>89	86	88	79	>89	>89
9	>100	>89	>89	>89	>89	>89	>89	>89	87	>89	85	>89
10	>100	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

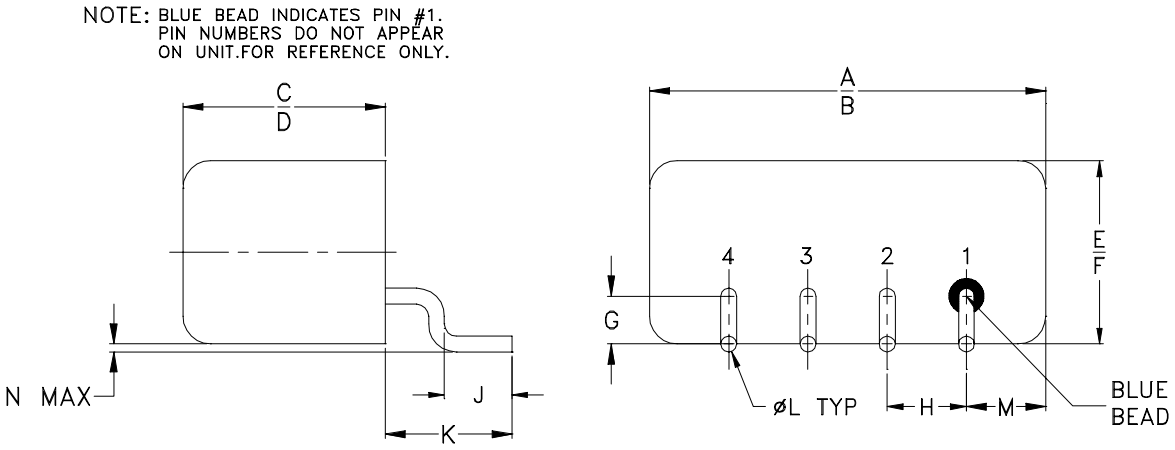
Test conditions:
RF IN: 1650.1 MHz; -4.00 dBm.
LO IN: 1690.01 MHz; +7.00 dBm
IF OUT: 39.91 MHz; -11.06 dBm

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.

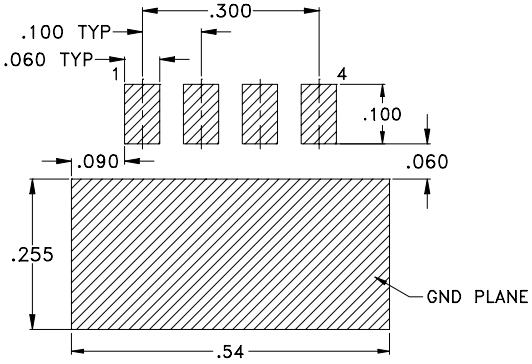
Case Style NNN

Outline Dimensions

NNN150



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE #.	A	B	C	D	E	F	G	H	J	K	L	M	N	WT, GRAM
NNN150	.50 (12.70)	.48 (12.19)	.255 (6.48)	.240 (6.10)	.23 (5.84)	.21 (5.33)	.06 (1.52)	.100 (2.54)	.09 (2.29)	.16 (4.06)	.020 (0.51)	.09 (2.29)	.005 (0.13)	1.9

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

Notes:

1. Header material C.R.S. Pin material #52 alloy.
2. Finish: Electro-Tin, hot-oil flowed or electro-Tin-Silver.
3. Cover material: Cupro-Nickel.
4. Pin's meniscus 0.015 inch max.
5. Special Tolerances: Pin diameter ± .005 inch.

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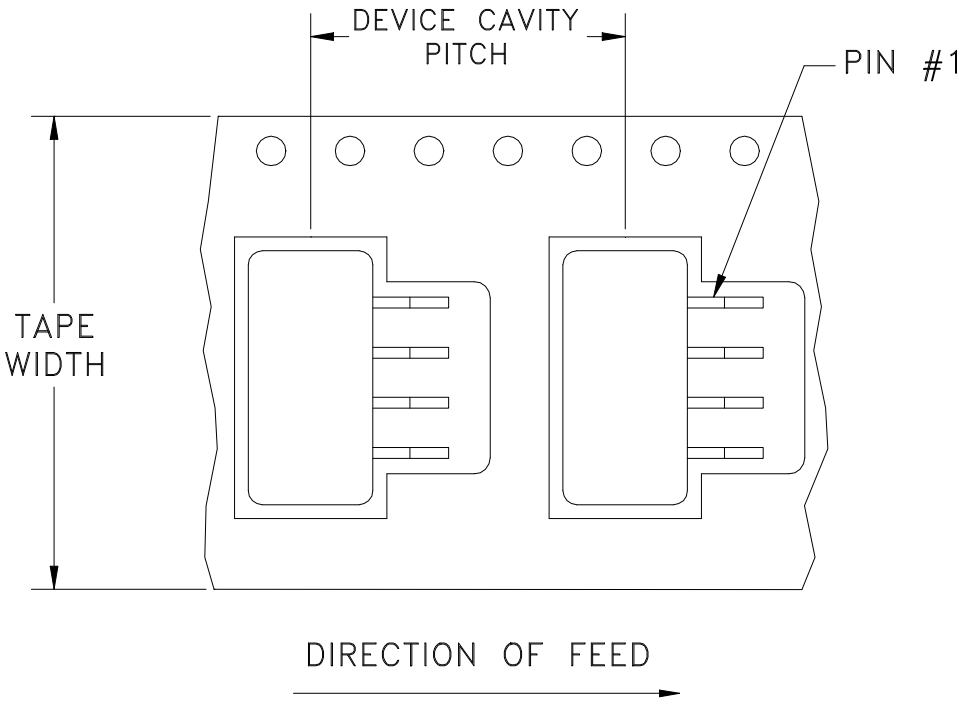
Tape & Reel Packaging TR-F9

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
24	16	13	500

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

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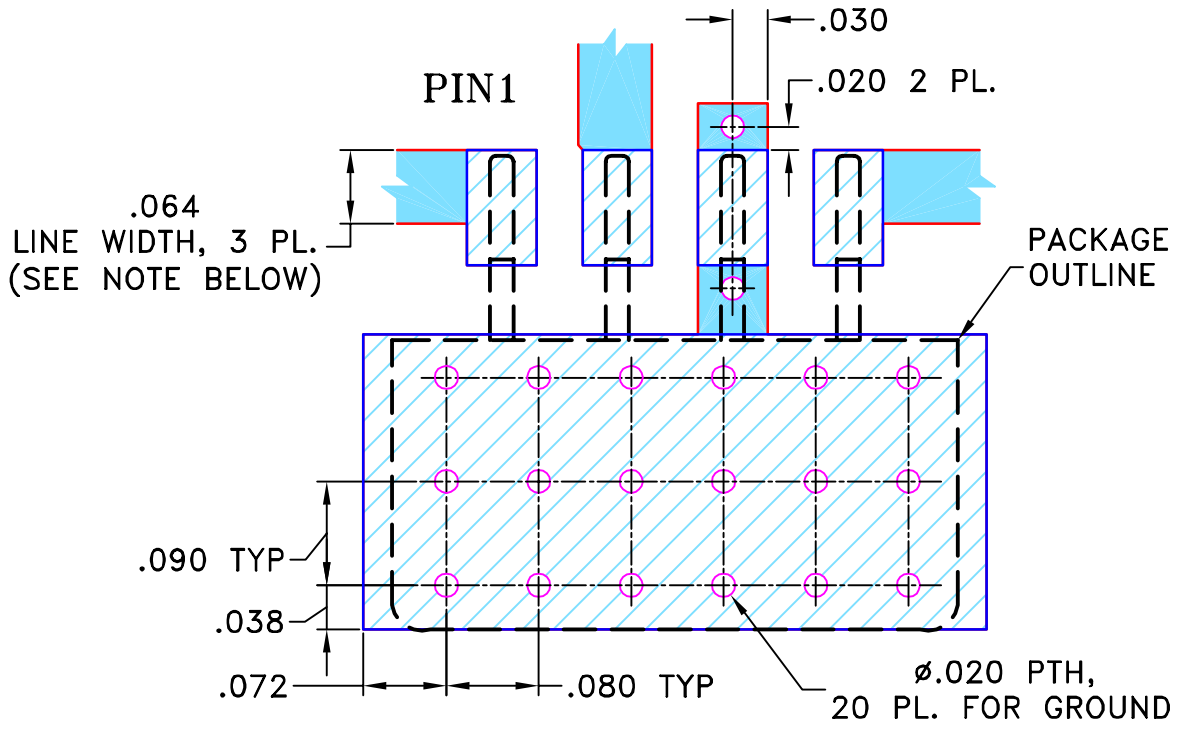
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M86549	NEW RELEASE	04/15/03	GF	DJ
A	M102713	UPDATED NOTES & DISCRIPTION	01/14/06	GF	IL

SUGGESTED MOUNTING CONFIGURATION
FOR NNN150 CASE STYLE, "z"/"cm" PIN CONNECTIONS.



NOTES: 1.TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS 0.030" ± 0.002"; 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	GF	04/11/03
TOLERANCES ON:	CHECKED	AV	04/15/03
2 PL DECIMALS ±	APPROVED	DJ	04/15/03
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

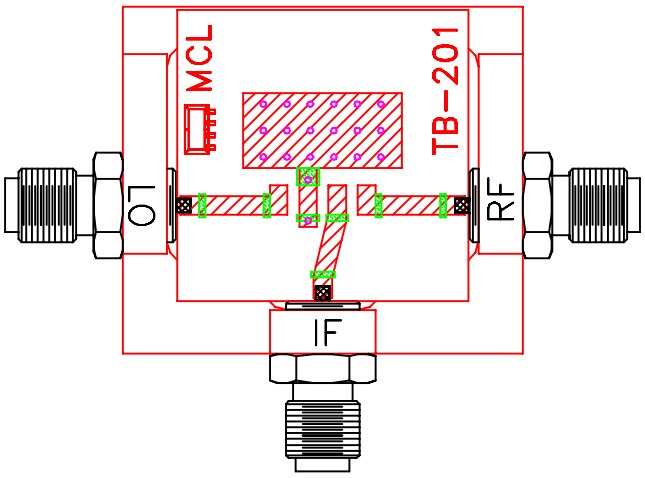
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, z/cm NNN150, TUF/TFAS-SM, TB-201

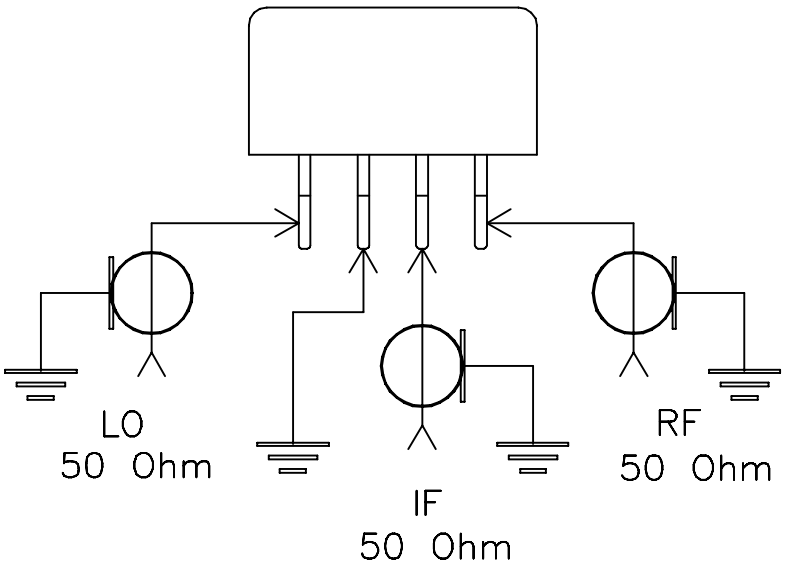
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-081	A

FILE:	SCALE:	SHEET:
98PL081	6:1	1 OF 1

Evaluation Board and Circuit



TB-201



Schematic Diagram

Notes:

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

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