Non-Catalog Model

Frequency Mixer SYM-25H

Level 17 (LO Power +17 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 : TTT167

ELECTRICAL SPECIFICATIONS 50Ω @ +25°C					
Parameter		**Min.**	**Typ.**	**Max.**	**Units**
Frequency	**LO** (fL to fU)	10		2400	MHz
	RF (fL to fU)	10		2400	MHz
	IF	1		1100	MHz
Conversion Loss	**mid band**		6.1	8.5	dB
	Total Range			9.2	dB
LO-RF Isolation	**Low Range**	20	38		dB
	Mid Range	20	40		dB
	Upper Range	18	30		dB
LO-IF Isolation	**Low Range**	40	54		dB
	Mid Range	22	40		dB
	Upper Range	20	33		dB
IP3 Input			+25		dBm
1 dB Comp. Input Power			+10		dBm

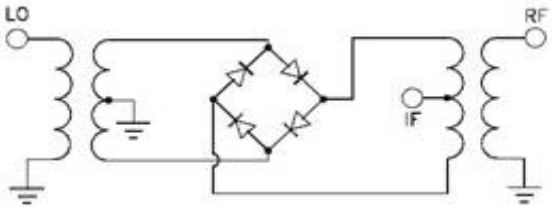
Notes: Low Range = [fL to 10fL] Mid Range = [10fL to fU/2] Upper Range = [fU/2 to fU]
mid band = [2fL to fU/2]

Units are non-hermetic.

MAXIMUM RATINGS	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power	200mW
IF Current	40mA

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

Electrical Schematics



Frequency Mixer SYM-25H

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB) @LO (dBm)		
		+14	+17	+20
10.1	40.1	5.82	5.35	5.17
90.4	120.4	6.17	5.71	5.48
170.6	200.6	6.43	5.94	5.61
250.9	280.9	6.66	6.09	5.74
331.1	361.1	6.88	6.23	5.73
411.4	441.4	7.16	6.30	5.76
491.6	521.6	7.61	6.49	5.77
571.9	601.9	7.58	6.37	5.82
652.1	682.1	7.11	6.28	5.93
732.4	762.4	6.90	6.32	6.08
812.6	842.6	6.51	6.16	6.01
892.9	922.9	6.36	5.99	5.85
973.1	1003.1	6.32	6.00	5.79
1053.4	1083.4	6.44	6.00	5.86
1133.6	1163.6	6.63	6.08	5.90
1213.9	1243.9	7.08	6.35	6.15
1294.1	1324.1	7.56	6.65	6.35
1374.4	1404.4	8.10	6.93	6.59
1454.6	1484.6	8.65	7.36	6.87
1534.9	1564.9	9.26	7.59	6.98
1615.1	1645.1	9.55	7.87	7.16
1695.4	1725.4	9.81	8.05	7.26
1775.6	1805.6	9.80	7.97	7.30
1855.9	1885.9	9.33	7.76	7.23
1936.1	1966.1	8.94	7.54	7.10
2016.4	2046.4	8.58	7.40	6.99
2096.6	2126.6	8.57	7.40	7.03
2176.9	2206.9	8.56	7.39	7.08
2257.1	2287.1	8.38	7.41	7.13
2337.4	2367.4	8.20	7.45	7.15
2417.6	2447.6	8.16	7.52	7.22
2497.9	2527.9	8.32	7.64	7.37
2578.2	2608.2	8.40	7.81	7.54
2658.4	2688.4	8.33	7.85	7.59
2738.7	2768.7	8.38	8.02	7.78
2839.0	2869.0	9.05	8.66	8.38
2919.2	2949.2	9.48	9.01	8.76
3019.5	3049.5	9.81	9.34	9.02
3099.8	3129.8	10.09	9.57	9.22
3200.1	3230.1	10.48	10.01	9.65

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm) @LO (dBm)		
		+14	+17	+20
10.1	40.1	25.37	29.22	26.95
90.4	120.4	20.53	21.36	21.16
170.6	200.6	18.09	18.92	22.26
250.9	280.9	18.04	21.46	24.88
331.1	361.1	19.81	21.77	24.82
411.4	441.4	18.73	22.80	26.99
491.6	521.6	17.53	20.86	27.34
571.9	601.9	15.91	21.57	27.69
652.1	682.1	19.07	27.09	26.61
732.4	762.4	23.50	26.20	28.48
812.6	842.6	28.97	28.82	29.65
892.9	922.9	32.59	29.09	27.70
973.1	1003.1	32.04	28.65	27.03
1053.4	1083.4	23.32	32.03	32.11
1133.6	1163.6	30.29	34.12	28.36
1213.9	1243.9	30.19	27.92	31.63
1294.1	1324.1	26.40	25.86	32.02
1374.4	1404.4	28.24	30.18	27.46
1454.6	1484.6	26.43	25.97	27.04
1534.9	1564.9	19.91	34.10	33.24
1615.1	1645.1	22.98	28.42	34.82
1695.4	1725.4	22.02	25.18	27.29
1775.6	1805.6	22.35	33.70	27.74
1855.9	1885.9	23.11	28.86	25.79
1936.1	1966.1	24.07	26.13	26.20
2016.4	2046.4	25.23	24.92	26.62
2096.6	2126.6	25.32	26.56	25.53
2176.9	2206.9	28.25	24.09	23.85
2257.1	2287.1	27.19	25.77	24.02
2337.4	2367.4	24.58	23.76	22.22
2417.6	2447.6	24.00	23.92	23.04
2497.9	2527.9	24.98	23.26	22.19
2578.2	2608.2	22.75	23.44	22.31
2658.4	2688.4	21.87	22.75	22.78
2738.7	2768.7	22.42	23.57	23.62
2839.0	2869.0	21.91	23.00	22.42
2919.2	2949.2	21.79	22.45	21.74
3019.5	3049.5	21.92	22.81	23.39
3099.8	3129.8	21.06	20.92	22.65
3200.1	3230.1	23.76	22.41	22.35

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+10dBm (dB) @LO (dBm)		
		+14	+17	+20
10.1	40.1	0.14	0.08	0.07
90.4	120.4	-0.13	-0.06	-0.05
170.6	200.6	-0.18	-0.13	-0.08
250.9	280.9	-0.20	-0.16	-0.12
331.1	361.1	-0.27	-0.23	-0.10
411.4	441.4	-0.43	-0.20	-0.05
491.6	521.6	-0.66	-0.26	-0.06
571.9	601.9	-0.55	-0.12	-0.04
652.1	682.1	-0.15	-0.03	-0.02
732.4	762.4	0.03	0.00	-0.01
812.6	842.6	0.13	0.02	0.02
892.9	922.9	0.12	0.04	0.03
973.1	1003.1	0.12	0.05	0.04
1053.4	1083.4	0.11	0.06	0.04
1133.6	1163.6	0.10	0.05	0.03
1213.9	1243.9	0.10	0.04	0.02
1294.1	1324.1	0.07	0.04	0.01
1374.4	1404.4	0.02	0.00	0.00
1454.6	1484.6	-0.13	-0.04	-0.02
1534.9	1564.9	-0.33	-0.05	-0.02
1615.1	1645.1	-0.36	-0.12	-0.04
1695.4	1725.4	-0.48	-0.13	-0.04
1775.6	1805.6	-0.46	-0.11	-0.03
1855.9	1885.9	-0.31	-0.05	0.00
1936.1	1966.1	-0.25	0.00	0.02
2016.4	2046.4	-0.16	0.01	0.03
2096.6	2126.6	-0.09	0.03	0.03
2176.9	2206.9	-0.01	0.07	0.05
2257.1	2287.1	0.08	0.10	0.06
2337.4	2367.4	0.14	0.12	0.08
2417.6	2447.6	0.21	0.13	0.10
2497.9	2527.9	0.27	0.16	0.10
2578.2	2608.2	0.39	0.20	0.13
2658.4	2688.4	0.48	0.25	0.14
2738.7	2768.7	0.50	0.27	0.15
2839.0	2869.0	0.52	0.26	0.15
2919.2	2949.2	0.34	0.18	0.13
3019.5	3049.5	0.30	0.14	0.10
3099.8	3129.8	0.27	0.15	0.09
3200.1	3230.1	0.28	0.13	0.11

Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1200.1MHz (dB) @LO (dBm) +17
1100.0	100.1	8.06
1079.4	120.7	8.06
1058.9	141.2	7.99
1038.3	161.8	7.94
1017.7	182.4	7.96
997.2	202.9	7.98
976.6	223.5	7.89
956.0	244.1	7.91
935.5	264.6	7.87
914.9	285.2	7.81
894.3	305.8	7.85
873.8	326.3	7.77
832.6	367.5	7.69
812.1	388.0	7.62
770.9	429.2	7.52
750.4	449.7	7.45
709.2	490.9	7.38
688.7	511.4	7.23
647.5	552.6	7.17
627.0	573.1	7.03
585.8	614.3	6.89
565.3	634.8	6.83
524.2	675.9	6.71
503.6	696.5	6.67
462.5	737.6	6.56
441.9	758.2	6.55
400.8	799.3	6.43
380.2	819.9	6.39
339.1	861.0	6.31
318.5	881.6	6.27
277.4	922.7	6.28
256.8	943.3	6.30
215.7	984.4	6.31
195.1	1005.0	6.36
154.0	1046.1	6.34
133.4	1066.7	6.37
92.3	1107.8	6.30
71.7	1128.4	6.30
30.6	1169.5	6.30
10.0	1190.1	6.35

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=10.1MHz (dB) @LO (dBm) +17
10.0	20.1	5.78
30.6	40.7	5.61
51.1	61.2	5.74
71.7	81.8	5.72
92.3	102.4	5.71
112.8	122.9	5.74
133.4	143.5	5.63
154.0	164.1	5.75
174.5	184.6	5.80
195.1	205.2	5.68
215.7	225.8	5.69
236.2	246.3	5.72
277.4	287.5	5.76
297.9	308.0	5.80
339.1	349.2	5.77
359.6	369.7	5.89
400.8	410.9	5.84
421.3	431.4	5.91
462.5	472.6	5.96
483.0	493.1	5.97
524.2	534.3	6.04
544.7	554.8	6.02
585.8	595.9	6.13
606.4	616.5	6.07
647.5	657.6	6.15
668.1	678.2	6.18
709.2	719.3	6.24
729.8	739.9	6.27
770.9	781.0	6.36
791.5	801.6	6.35
832.6	842.7	6.38
853.2	863.3	6.41
894.3	904.4	6.42
914.9	925.0	6.43
956.0	966.1	6.48
976.6	986.7	6.50
1017.7	1027.8	6.50
1038.3	1048.4	6.52
1079.4	1089.5	6.57
1100.0	1110.1	6.55

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=2400.1MHz (dB) @LO (dBm) +17
1100.0	1300.1	8.34
1080.2	1319.9	8.38
1060.4	1339.7	8.38
1040.5	1359.6	8.33
1020.7	1379.4	8.31
1000.9	1399.2	8.31
981.1	1419.0	8.34
961.3	1438.8	8.28
921.6	1478.5	8.25
901.8	1498.3	8.21
862.2	1537.9	8.15
842.4	1557.7	8.07
802.7	1597.4	8.04
782.9	1617.2	7.98
743.3	1656.8	7.89
723.5	1676.6	7.82
683.8	1716.3	7.71
664.0	1736.1	7.70
624.4	1775.7	7.57
604.5	1795.6	7.51
564.9	1835.2	7.47
545.1	1855.0	7.40
505.5	1894.6	7.34
485.6	1914.5	7.37
446.0	1954.1	7.31
426.2	1973.9	7.28
386.5	2013.6	7.32
366.7	2033.4	7.22
327.1	2073.0	7.20
307.3	2092.8	7.19
267.6	2132.5	7.18
247.8	2152.3	7.19
208.2	2191.9	7.19
188.4	2211.7	7.21
148.7	2251.4	7.18
128.9	2271.2	7.14
89.3	2310.8	7.22
69.5	2330.6	7.24
29.8	2370.3	7.33
10.0	2390.1	7.46

Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB) @LO (dBm)			LO-IF ISOLATION (dB) @LO (dBm)		
	+14	+17	+20	+14	+17	+20
10.1	27.49	30.24	33.01	47.21	51.67	57.20
90.4	36.67	39.65	42.72	49.90	56.85	71.55
170.6	38.94	42.00	44.78	53.41	63.25	61.33
250.9	40.98	44.04	45.72	60.78	60.16	55.12
331.1	44.36	46.80	45.55	64.08	54.21	51.15
411.4	50.16	46.23	42.86	53.82	49.99	48.58
491.6	48.59	42.93	40.17	48.45	46.47	45.86
571.9	42.18	39.64	38.06	44.63	44.98	44.37
652.1	38.56	37.27	36.46	42.46	42.70	42.22
732.4	36.28	35.30	34.75	40.45	40.64	40.06
812.6	34.53	33.78	33.21	40.87	40.23	39.01
892.9	32.93	32.29	32.03	41.65	40.19	38.37
973.1	31.95	31.54	31.41	41.39	39.04	37.17
1053.4	31.30	31.10	31.06	39.27	37.11	35.58
1133.6	30.53	30.84	30.86	37.70	35.83	34.31
1213.9	30.07	30.54	30.65	37.07	35.26	33.61
1294.1	29.80	30.39	30.57	36.09	34.79	33.25
1374.4	29.38	30.16	30.34	34.69	33.63	32.31
1454.6	29.15	29.99	30.31	34.17	32.85	31.76
1534.9	28.75	29.65	30.13	34.74	33.04	31.86
1615.1	28.46	29.36	29.94	34.98	33.04	32.02
1695.4	28.32	29.07	29.74	34.88	33.21	32.04
1775.6	28.22	28.83	29.63	34.18	32.66	31.69
1855.9	28.18	28.65	29.49	33.40	32.11	31.48
1936.1	28.27	29.03	29.65	32.69	31.42	30.89
2016.4	28.24	29.38	30.40	32.25	31.27	30.72
2096.6	28.71	29.83	30.80	31.65	31.37	31.29
2176.9	29.51	31.09	31.92	31.00	31.84	32.61
2257.1	30.47	32.40	33.92	30.61	32.41	34.30
2337.4	31.86	34.23	35.94	30.17	32.75	36.10
2417.6	33.26	36.48	38.11	29.92	32.97	38.25
2497.9	35.04	39.52	42.76	30.79	34.82	41.53
2578.2	36.46	41.17	45.58	32.43	38.69	43.71
2658.4	36.49	39.37	41.23	35.89	45.40	40.22
2738.7	34.32	35.57	36.30	44.59	45.25	35.53
2839.0	30.95	31.25	30.99	36.89	34.44	31.23
2919.2	30.28	30.05	29.47	33.61	32.45	30.35
3019.5	30.94	30.95	30.64	36.77	34.74	31.81
3099.8	32.13	32.50	32.41	40.47	36.01	32.29
3200.1	32.73	33.54	33.63	38.75	34.35	31.13

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB) @LO (dBm)		
		+14	+17	+20
10.1	40.1	39.36	34.69	35.46
90.4	120.4	37.71	37.62	37.65
170.6	200.6	38.31	38.49	38.21
250.9	280.9	39.56	39.54	39.04
331.1	361.1	40.23	40.16	40.47
411.4	441.4	40.62	40.97	42.16
491.6	521.6	41.06	42.44	45.38
571.9	601.9	39.58	42.90	44.76
652.1	682.1	38.04	43.69	46.22
732.4	762.4	38.36	44.05	45.86
812.6	842.6	40.97	44.45	46.88
892.9	922.9	40.32	42.51	44.20
973.1	1003.1	37.57	39.56	41.12
1053.4	1083.4	36.03	37.90	39.26
1133.6	1163.6	34.57	36.51	38.04
1213.9	1243.9	32.97	35.62	36.76
1294.1	1324.1	32.49	35.08	36.80
1374.4	1404.4	32.34	34.32	35.41
1454.6	1484.6	31.06	32.02	32.56
1534.9	1564.9	30.57	31.11	31.54
1615.1	1645.1	30.75	31.14	31.19
1695.4	1725.4	31.15	31.25	31.48
1775.6	1805.6	31.65	31.76	31.88
1855.9	1885.9	32.27	32.48	32.33
1936.1	1966.1	32.81	33.23	33.12
2016.4	2046.4	33.17	33.44	33.58
2096.6	2126.6	33.92	33.85	33.75
2176.9	2206.9	34.42	34.07	33.93
2257.1	2287.1	34.34	33.76	33.00
2337.4	2367.4	33.00	32.37	31.27
2417.6	2447.6	31.15	30.84	30.27
2497.9	2527.9	29.54	29.12	29.71
2578.2	2608.2	27.98	27.67	27.65
2658.4	2688.4	27.86	27.52	27.36
2738.7	2768.7	28.78	28.45	28.17
2839.0	2869.0	29.72	29.20	28.68
2919.2	2949.2	31.39	30.72	29.79
3019.5	3049.5	31.80	32.12	32.01
3099.8	3129.8	32.09	32.26	32.31
3200.1	3230.1	31.85	32.15	32.34

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1) @LO (dBm)		
		+14	+17	+20
10.1	40.1	1.49	1.37	1.31
90.4	120.4	1.50	1.33	1.22
170.6	200.6	1.61	1.43	1.33
250.9	280.9	1.74	1.58	1.47
331.1	361.1	1.93	1.75	1.60
411.4	441.4	2.17	1.91	1.73
491.6	521.6	2.42	2.11	1.89
571.9	601.9	2.52	2.18	2.00
652.1	682.1	2.46	2.18	2.06
732.4	762.4	2.40	2.19	2.09
812.6	842.6	2.29	2.12	2.04
892.9	922.9	2.27	2.08	1.99
973.1	1003.1	2.37	2.10	1.97
1053.4	1083.4	2.42	2.10	1.96
1133.6	1163.6	2.42	2.10	1.96
1213.9	1243.9	2.56	2.20	2.04
1294.1	1324.1	2.69	2.35	2.17
1374.4	1404.4	2.83	2.51	2.34
1454.6	1484.6	3.01	2.69	2.53
1534.9	1564.9	3.18	2.77	2.60
1615.1	1645.1	3.17	2.79	2.58
1695.4	1725.4	3.14	2.72	2.51
1775.6	1805.6	2.99	2.57	2.38
1855.9	1885.9	2.81	2.41	2.24
1936.1	1966.1	2.62	2.27	2.10
2016.4	2046.4	2.41	2.11	1.96
2096.6	2126.6	2.26	1.96	1.83
2176.9	2206.9	2.12	1.83	1.69
2257.1	2287.1	1.95	1.73	1.62
2337.4	2367.4	1.79	1.64	1.56
2417.6	2447.6	1.69	1.56	1.50
2497.9	2527.9	1.58	1.47	1.42
2578.2	2608.2	1.44	1.36	1.34
2658.4	2688.4	1.30	1.26	1.28
2738.7	2768.7	1.23	1.25	1.30
2839.0	2869.0	1.23	1.31	1.39
2919.2	2949.2	1.24	1.34	1.43
3019.5	3049.5	1.22	1.32	1.41
3099.8	3129.8	1.25	1.35	1.43
3200.1	3230.1	1.38	1.46	1.54

LO (MHz)	LO VSWR (:1) @LO (dBm)		
	+14	+17	+20
10.1	1.27	1.62	2.30
90.4	1.03	1.53	2.23
170.6	1.10	1.55	2.25
250.9	1.15	1.57	2.29
331.1	1.26	1.60	2.30
411.4	1.34	1.60	2.25
491.6	1.36	1.57	2.18
571.9	1.38	1.51	2.11
652.1	1.44	1.49	2.07
732.4	1.51	1.47	2.02
812.6	1.71	1.51	1.97
892.9	1.97	1.59	1.94
973.1	2.20	1.65	1.88
1053.4	2.42	1.69	1.80
1133.6	2.68	1.74	1.71
1213.9	2.94	1.82	1.63
1294.1	3.12	1.87	1.56
1374.4	3.26	1.90	1.46
1454.6	3.45	1.92	1.37
1534.9	3.61	1.94	1.28
1615.1	3.67	1.95	1.22
1695.4	3.64	1.94	1.23
1775.6	3.58	1.95	1.32
1855.9	3.62	2.02	1.47
1936.1	3.74	2.10	1.64
2016.4	3.81	2.17	1.80
2096.6	3.63	2.21	2.00
2176.9	3.30	2.26	2.23
2257.1	3.05	2.31	2.41
2337.4	2.93	2.37	2.57
2417.6	2.82	2.44	2.73
2497.9	2.69	2.54	2.95
2578.2	2.59	2.67	3.20
2658.4	2.52	2.78	3.38
2738.7	2.48	2.85	3.50
2839.0	2.39	2.86	3.50
2919.2	2.26	2.79	3.42
3019.5	2.32	2.96	3.70
3099.8	2.48	3.20	4.00
3200.1	2.74	3.48	4.31

IF (OUT) (MHz)	IF VSWR @LO=2400.1MHz (:1) @LO (dBm)		
	+14	+17	+20
10.0	1.63	1.33	1.18
29.8	1.57	1.26	1.12
49.6	1.49	1.21	1.10
69.5	1.46	1.19	1.11
89.3	1.51	1.23	1.14
109.1	1.53	1.25	1.16
128.9	1.54	1.28	1.21
148.7	1.53	1.30	1.25
188.4	1.56	1.33	1.27
208.2	1.62	1.39	1.34
247.8	1.65	1.45	1.40
267.6	1.64	1.47	1.43
307.3	1.72	1.52	1.47
327.1	1.72	1.54	1.49
366.7	1.69	1.54	1.50
386.5	1.65	1.51	1.48
426.2	1.68	1.54	1.51
446.0	1.65	1.51	1.49
485.6	1.64	1.53	1.52
505.5	1.64	1.51	1.50
545.1	1.59	1.50	1.51
564.9	1.58	1.47	1.48
604.5	1.52	1.43	1.45
624.4	1.51	1.42	1.44
664.0	1.41	1.32	1.37
683.8	1.41	1.32	1.37
723.5	1.32	1.23	1.31
743.3	1.28	1.21	1.32
782.9	1.25	1.14	1.25
802.7	1.20	1.14	1.28
842.4	1.18	1.09	1.25
862.2	1.16	1.09	1.26
901.8	1.17	1.09	1.25
921.6	1.18	1.12	1.27
961.3	1.23	1.17	1.30
981.1	1.27	1.19	1.30
1020.7	1.32	1.28	1.38
1040.5	1.38	1.31	1.39
1080.2	1.47	1.40	1.47
1100.0	1.49	1.41	1.47

Harmonics Tables

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	16	17	23	36	28	39	36	43	35	52
1	-	25	+0	37	14	31	27	47	42	43	52	37
2	85	57	45	56	46	55	50	63	58	62	66	64
3	>100	72	63	81	57	79	52	66	62	84	68	72
4	>100	>93	>93	>93	84	>93	79	92	79	>93	89	89
5	>100	>93	>93	>93	87	>93	82	>93	83	>93	90	>93
6	>100	>93	>93	>93	>93	>93	92	>93	>93	>93	>93	>93
7	>100	>93	>93	>93	>93	>93	>93	>93	91	>93	>93	>93
8	>100	>93	>93	>93	>93	>93	>93	>93	>93	>93	>93	>93
9	>100	>93	>93	>93	>93	>93	>93	>93	>93	>93	>93	>93
10	>100	>93	>93	>93	>93	>93	>93	>93	>93	>93	>93	>93
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: **RF IN: 1200.1 MHz; -1.00 dBm.**
LO IN: 1230.01 MHz; +17.00 dBm
IF OUT: 29.91 MHz; -7.46 dBm

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	23	27	38	50	43	63	57	60	57	74
1	-	26	+0	41	15	35	30	49	51	56	54	51
2	69	48	42	54	43	49	48	59	54	63	60	61
3	>100	58	39	63	40	63	36	49	47	62	64	59
4	>100	74	73	62	57	60	55	62	57	69	62	68
5	>100	73	74	86	58	81	53	75	49	65	59	76
6	>100	88	76	86	71	73	68	70	73	71	70	84
7	>100	86	82	86	76	85	66	99	65	85	64	79
8	>100	94	101	>103	85	>103	83	92	79	80	81	76
9	>100	96	101	>103	97	99	91	92	78	90	77	92
10	>100	>103	93	102	>103	100	96	101	85	90	83	86
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

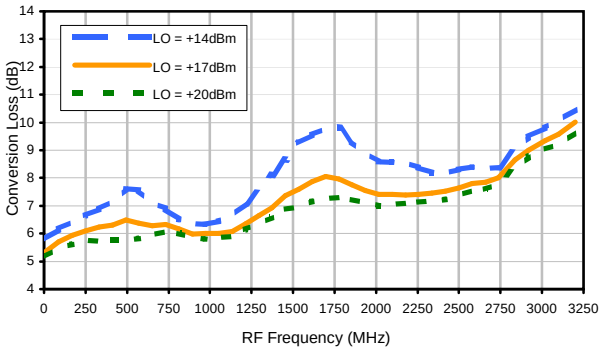
LO HARMONICS ORDER

Test conditions: **RF IN: 1200.1 MHz; 9.00 dBm.**
LO IN: 1230.01 MHz; +17.00 dBm
IF OUT: 29.91 MHz; 2.56 dBm

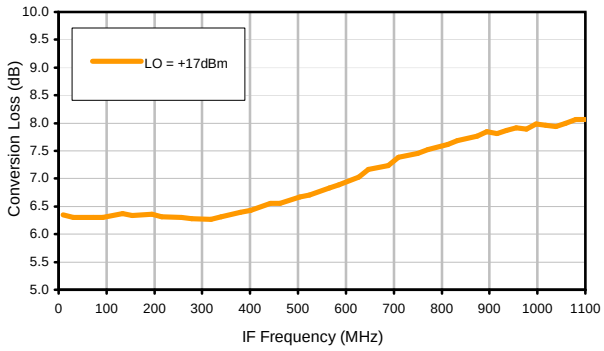
Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

Typical Performance Curves

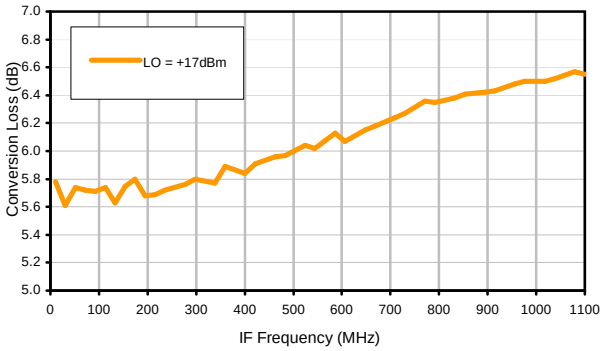
Conversion Loss @ IF=30MHz



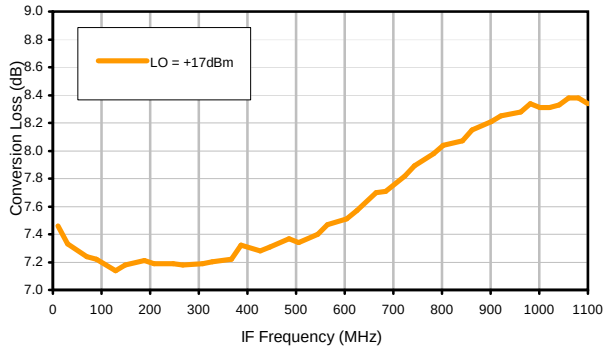
Conversion Loss vs. IF @ RF=1200.1MHz



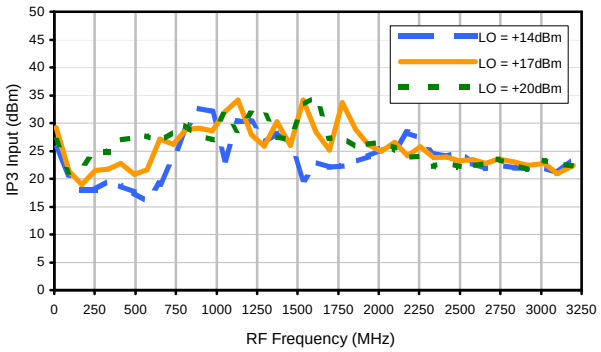
Conversion Loss vs. IF @ RF=10.1MHz



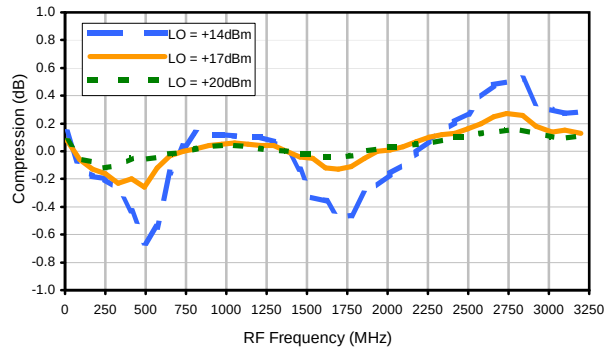
Conversion Loss vs. IF @ RF=2400.1MHz



IP3 Input

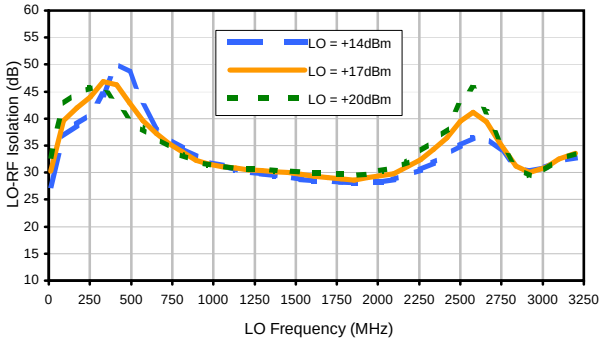


Compression @ RF IN=+10dBm

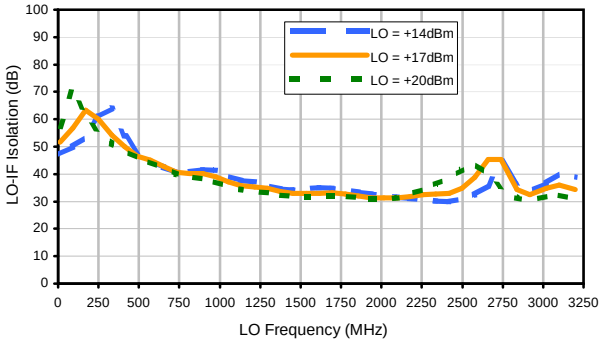


Typical Performance Curves

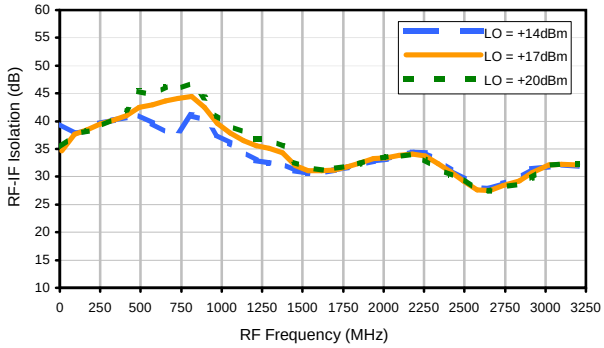
LO-RF Isolation



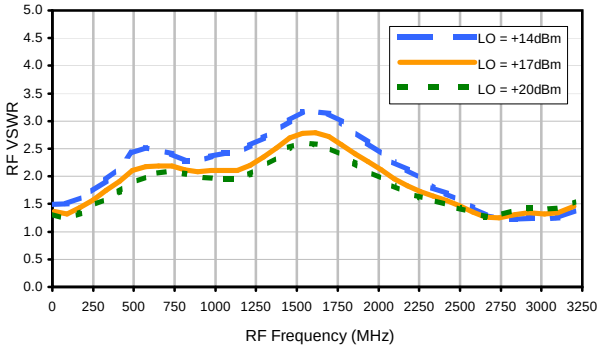
LO-IF Isolation



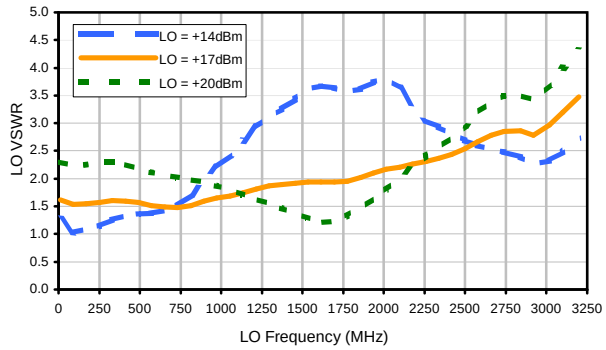
RF-IF Isolation



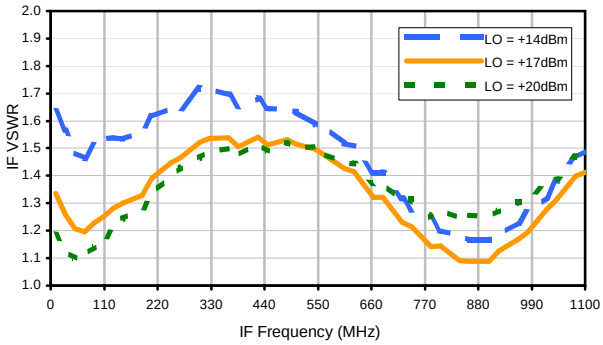
RF VSWR



LO VSWR



IF VSWR



Harmonics Tables

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	16	17	23	36	28	39	36	43	35	52
1	-	25	+0	37	14	31	27	47	42	43	52	37
2	85	57	45	56	46	55	50	63	58	62	66	64
3	>100	72	63	81	57	79	52	66	62	84	68	72
4	>100	>93	>93	>93	84	>93	79	92	79	>93	89	89
5	>100	>93	>93	>93	87	>93	82	>93	83	>93	90	>93
6	>100	>93	>93	>93	>93	>93	92	>93	>93	>93	>93	>93
7	>100	>93	>93	>93	>93	>93	>93	>93	91	>93	>93	>93
8	>100	>93	>93	>93	>93	>93	>93	>93	>93	>93	>93	>93
9	>100	>93	>93	>93	>93	>93	>93	>93	>93	>93	>93	>93
10	>100	>93	>93	>93	>93	>93	>93	>93	>93	>93	>93	>93
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: **RF IN: 1200.1 MHz; -1.00 dBm.**
LO IN: 1230.01 MHz; +17.00 dBm
IF OUT: 29.91 MHz; -7.46 dBm

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	23	27	38	50	43	63	57	60	57	74
1	-	26	+0	41	15	35	30	49	51	56	54	51
2	69	48	42	54	43	49	48	59	54	63	60	61
3	>100	58	39	63	40	63	36	49	47	62	64	59
4	>100	74	73	62	57	60	55	62	57	69	62	68
5	>100	73	74	86	58	81	53	75	49	65	59	76
6	>100	88	76	86	71	73	68	70	73	71	70	84
7	>100	86	82	86	76	85	66	99	65	85	64	79
8	>100	94	101	>103	85	>103	83	92	79	80	81	76
9	>100	96	101	>103	97	99	91	92	78	90	77	92
10	>100	>103	93	102	>103	100	96	101	85	90	83	86
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

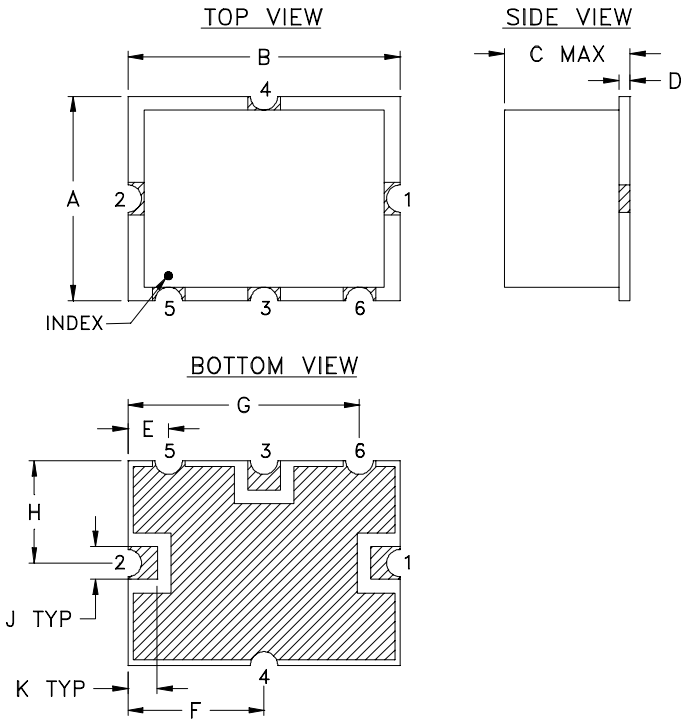
Test conditions: **RF IN: 1200.1 MHz; 9.00 dBm.**
LO IN: 1230.01 MHz; +17.00 dBm
IF OUT: 29.91 MHz; 2.56 dBm

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.

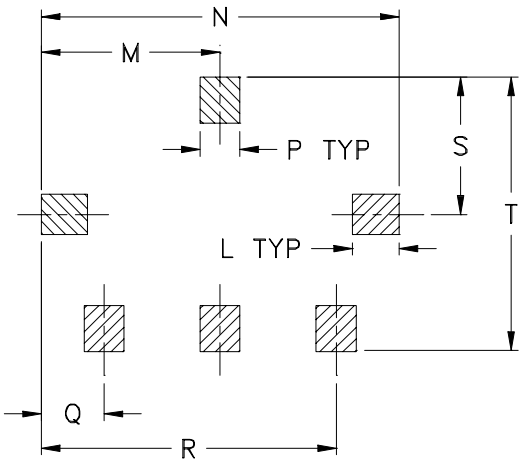
Case Style TTT

Outline Dimensions

TTT166
TTT167



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE #	A	B	C	D	E	F	G	H	J	K	L	M	N
TTT166	.38 (9.65)	.50 (12.70)	.15 (3.81)	.020 (0.51)	.075 (1.91)	.250 (6.35)	.425 (10.80)	.187 (4.75)	.050 (1.27)	.050 (1.27)	.070 (1.78)	.270 (6.86)	.540 (13.72)
TTT167			.23 (5.84)										

CASE #	P	Q	R	S	T	WT. GRAM
TTT166	.060 (1.52)	.095 (2.41)	.445 (11.30)	.208 (5.28)	.415 (10.54)	.8
TTT167						.8

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

Note:

1. Case material: Plastic.
2. Base material: Printed wiring laminate.
3. Termination finish:
   For RoHS Case Styles: 3-5 µ inch (.08-.13 microns) Gold over 120-240 µ inch (3.05-6.10 microns) Nickel plate. All models, (+) suffix.
   For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.

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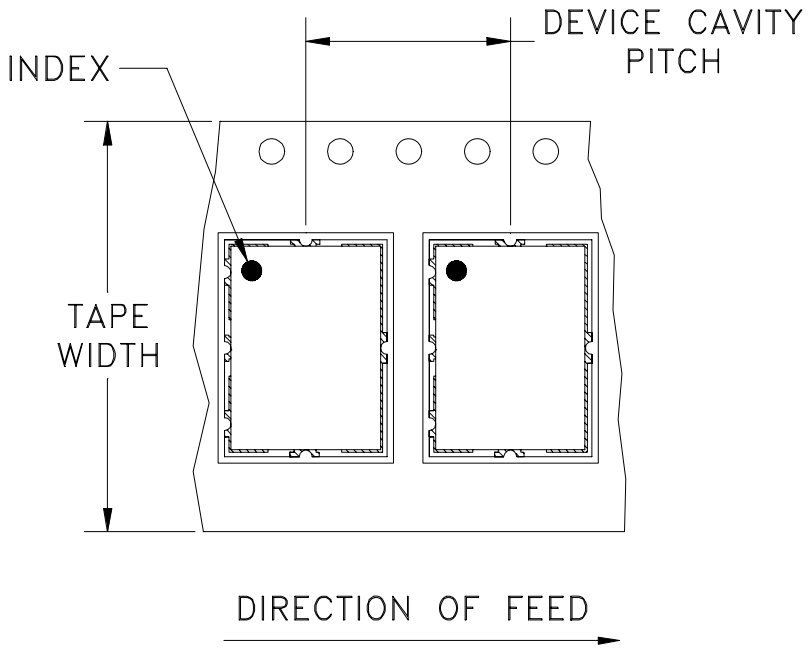
Mini-Circuits ISO 9001 & ISO 14001 Certified

Tape & Reel Packaging TR-F12

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
24	12	7	Small quantity standards (see note)	10
				20
				50
				100
				200
		13	Standard	500

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

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

Go to: www.minicircuits.com/pages/pdfs/tape.pdf

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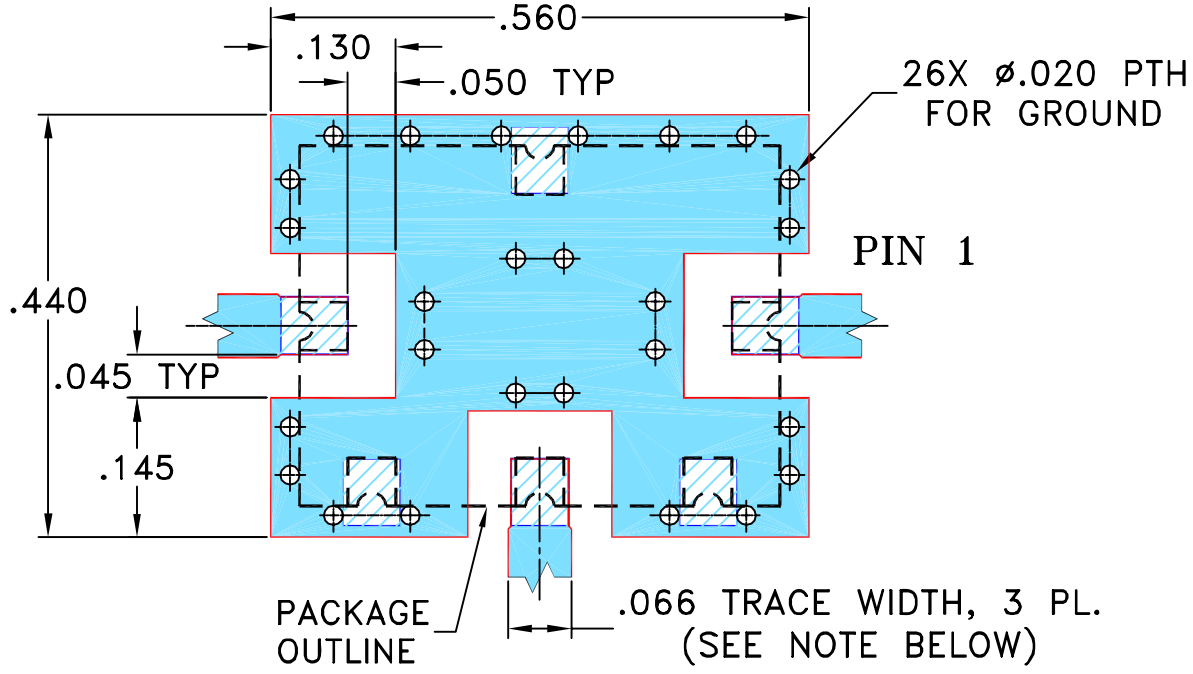
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
A	M86762	ADDED CONNECTIONS "lp & lq"	05/23/03	MMG	WL
B	M94598	ADDED CONNECTION "hk"	10/08/04	MMG	HY
C	M102713	UPDATED NOTES & DESCRIPTION	01/14/06	GF	IL
D	M132989	UPDATED NOTE 2	08/24/11	GF	DJ

SUGGESTED MOUNTING CONFIGURATION FOR TTT166/167 CASE STYLE, "hk"/"lp"/"lq" "x"/"ck"/"ec" PIN CONNECTIONS



NOTE:

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. THE USE OF SOLDER MASK OVER THE GROUND AREA UNDER THE UNIT AS SHOWN IS RECOMMENDED TO PREVENT POTENTIAL SHORTING. IF USER CHOOSES TO EXPOSE METAL UNDER THE ENTIRE UNIT GROUND PAD FOR IMPROVED GROUNDING, IT IS RECOMMENDED A SOLDER MASK DAM BE APPLIED AROUND EACH GROUND PAD TO ENSURE FILLET AND CONNECTION AT GROUND PADS.
3. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER), SEE NOTE 2.

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	GF	03/18/03
TOLERANCES ON:	CHECKED	IL	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

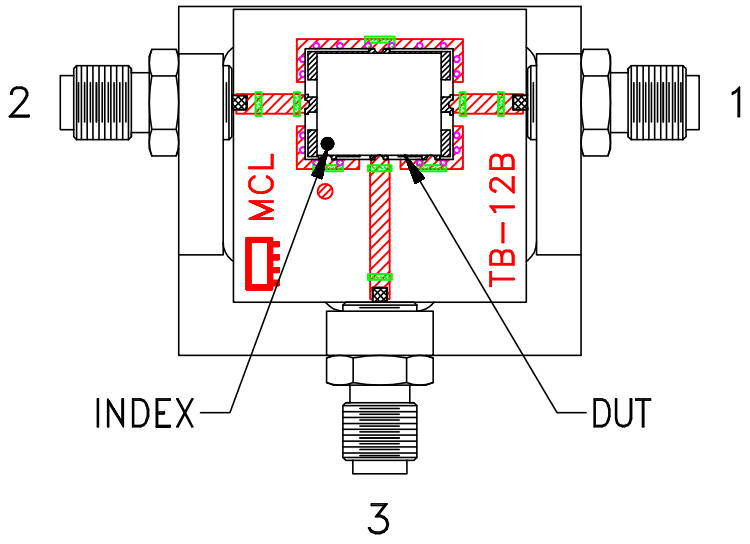
PL, hk/lp/lq/x/ck/ec, TTT166/167, SYM/HJK/SYAS/SYPD, TB-12

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-079	D

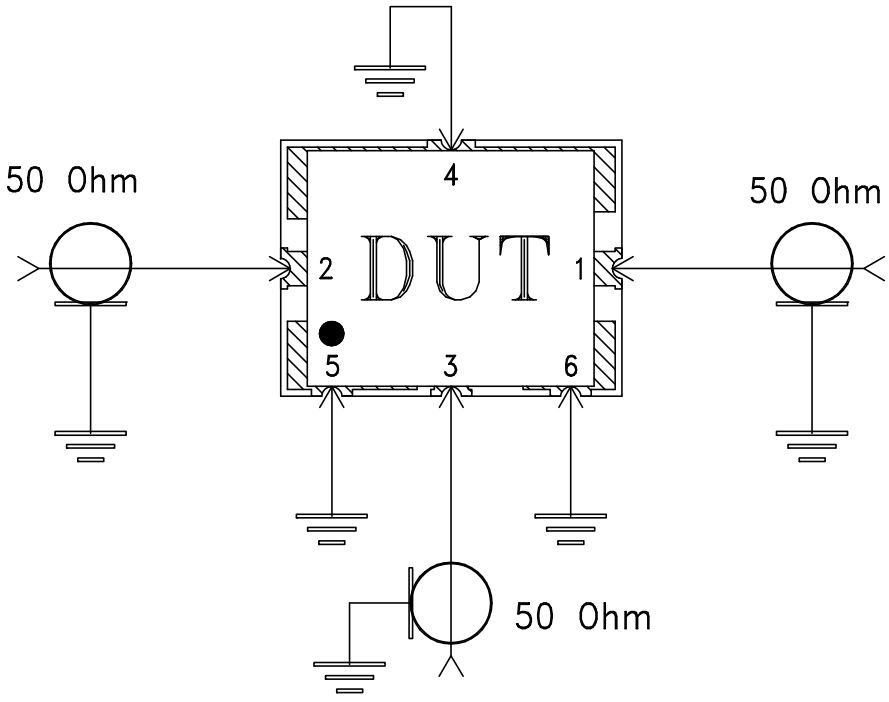
FILE:	SCALE:	SHEET:
98PL079	5:1	1 OF 1

Evaluation Board and Circuit

For Pin Connections Refer to Data Sheet of the DUT



TB-12



Schematic Diagram

Notes:

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

Mini-Circuits®