Surface Mount

Frequency Mixer

JYM-28H+

Level 17 (LO Power +17 dBm) 400 to 2800 MHz

Generic photo used for illustration purposes only

CASE STYLE: BJ293

+RoHS Compliant

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

Maximum Ratings

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

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

Pin Connections

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

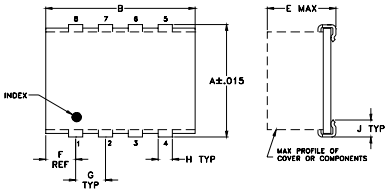
Features

- wide bandwidth, 400 to 2800 MHz
- good IP3, 23 dBm typ.
- high L-R isolation, 40 dB typ.

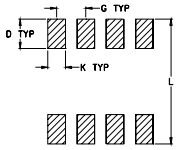
Applications

- cellular
- satellite distribution
- PCS, DCS, UMTS
- MMDS

Outline Drawing



PCB Land Pattern



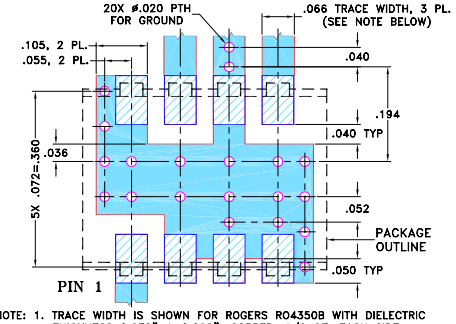
Suggested Layout,
Tolerance to be within ±.002

Outline Dimensions (inch / mm)

A	B	C	D	E	F	G
.395	.500	--	.100	.230	.100	.100
10.03	12.70	--	2.54	5.84	2.54	2.54

H	J	K	L	wt
.047	.065	.065	.425	grams
1.19	1.65	1.65	10.80	0.80

Demo Board MCL P/N: TB-259
Suggested PCB Layout (PL-080)



NOTE: 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 SOLDERMASK

Electrical Specifications

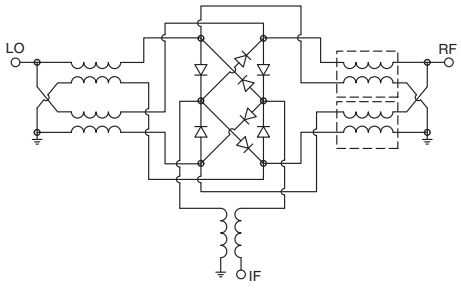
FREQUENCY (MHz)		CONVERSION LOSS (dB)				LO-RF ISOLATION (dB)		LO-IF ISOLATION (dB)		IP3 at center band (dBm)
LO/RF	IF	Mid-Band m			Total Range					
f_L-f_U		$\overline{X}$	σ	Max.	Max.	Typ.	Min.	Typ.	Min.	Typ.
400-2800	4-700	6.3	.20	8.0	9.0	40	25	30	15	23

1 dB COMP.: +10 dBm typ.
m=mid band [$2f_L$ to $f_U/2$]

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 +17dBm	LO +17dBm	LO +17dBm	LO +17dBm	LO +17dBm
400.00	430.00	6.35	39.96	42.42	1.21	2.00
535.85	565.85	6.15	39.94	40.97	1.38	1.68
671.70	701.70	6.13	39.08	39.25	1.60	1.53
800.00	830.00	6.36	39.17	39.90	1.78	1.43
943.40	973.40	6.03	37.63	38.28	2.01	1.41
1079.25	1109.25	5.82	37.76	38.87	2.21	1.39
1169.81	1199.81	5.76	36.05	39.48	2.31	1.37
1260.38	1290.38	5.78	35.62	40.30	2.28	1.36
1400.00	1430.00	5.83	33.66	40.46	2.46	1.32
1486.79	1516.79	5.96	33.40	40.25	2.52	1.33
1622.64	1592.64	6.05	33.61	40.84	2.61	1.35
1713.21	1683.21	6.22	34.09	41.86	2.70	1.35
1803.77	1773.77	6.41	36.18	41.43	2.77	1.36
1984.91	1954.91	6.36	38.60	49.09	2.85	1.37
2075.47	2045.47	6.23	36.96	45.57	2.87	1.40
2211.32	2181.32	6.17	37.30	45.52	2.80	1.54
2347.17	2317.17	6.42	35.31	42.38	2.63	1.75
2483.02	2453.02	6.71	35.03	38.65	2.42	2.06
2618.87	2588.87	7.05	34.27	36.72	2.13	2.36
2800.00	2770.00	8.39	31.73	33.90	1.98	2.80

Electrical Schematic



Notes

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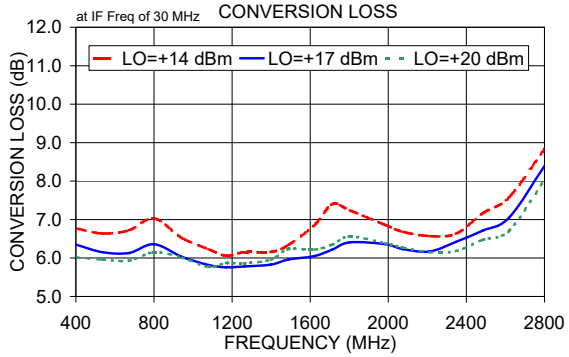
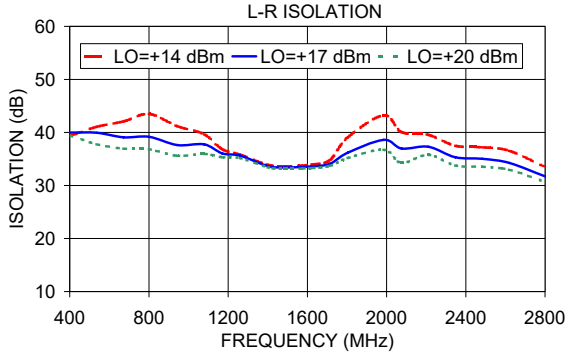
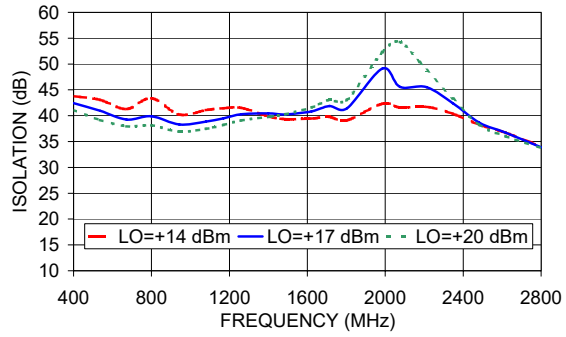
JYM-28H
at IF Freq of 30 MHz CONVERSION LOSS



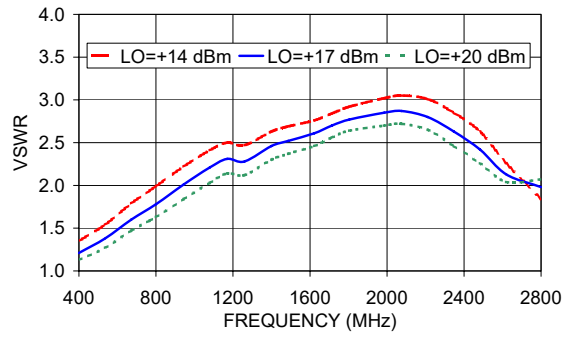
JYM-28H
L-R ISOLATION



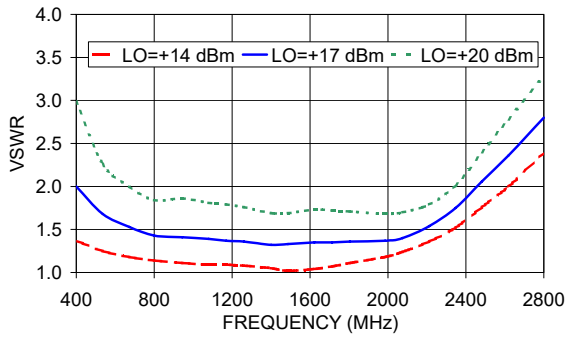
JYM-28H
L-I ISOLATION



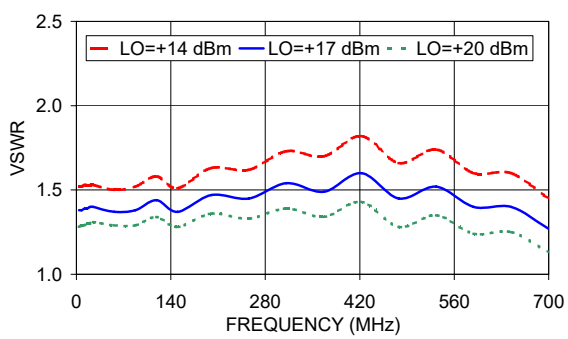
JYM-28H
RF VSWR



JYM-28H
LO VSWR



JYM-28H
IF VSWR



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Frequency Mixer JYM-28H+

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	6.32	6.00	6.00
90.9	120.9	6.12	5.88	5.77
171.7	201.7	6.25	5.98	5.83
252.5	282.5	6.39	6.08	5.88
333.2	363.2	6.48	6.07	5.88
414.0	444.0	6.60	6.12	5.90
494.8	524.8	6.65	6.16	5.96
575.6	605.6	6.50	6.11	5.95
656.4	686.4	6.53	6.15	5.99
737.2	767.2	6.66	6.24	6.02
817.9	847.9	6.60	6.27	6.10
898.7	928.7	6.44	6.18	6.07
979.5	1009.5	6.28	6.08	5.98
1060.3	1090.3	6.17	5.98	5.90
1141.1	1171.1	6.07	5.91	5.84
1221.9	1251.9	6.08	5.87	5.80
1302.6	1332.6	6.08	5.89	5.81
1383.4	1413.4	6.07	5.88	5.82
1464.2	1494.2	6.10	5.91	5.85
1545.0	1575.0	6.19	6.02	5.96
1625.8	1655.8	6.27	6.07	6.02
1706.6	1736.6	6.42	6.18	6.10
1787.4	1817.4	6.43	6.16	6.10
1868.1	1898.1	6.43	6.17	6.13
1948.9	1978.9	6.37	6.15	6.15
2029.7	2059.7	6.45	6.22	6.19
2110.5	2140.5	6.50	6.28	6.26
2191.3	2221.3	6.62	6.35	6.30
2272.1	2302.1	6.76	6.40	6.34
2352.8	2382.8	6.88	6.55	6.47
2433.6	2463.6	7.04	6.70	6.61
2514.4	2544.4	7.21	6.89	6.77
2595.2	2625.2	7.40	7.11	7.01
2676.0	2706.0	7.66	7.43	7.35
2756.8	2786.8	7.99	7.82	7.76
2817.4	2847.4	8.31	8.15	8.09
2898.1	2928.1	8.84	8.70	8.68
2958.7	2988.7	9.27	9.14	9.17
3039.5	3069.5	9.94	9.83	9.89
3100.1	3130.1	10.43	10.32	10.37

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm) @LO (dBm)		
		+14	+17	+20
10.1	40.1	26.37	23.95	23.39
90.9	120.9	21.05	19.80	20.48
171.7	201.7	17.64	18.69	21.74
252.5	282.5	17.10	20.68	26.05
333.2	363.2	18.71	23.89	25.46
414.0	444.0	19.04	23.22	23.20
494.8	524.8	19.39	22.93	23.77
575.6	605.6	19.76	20.48	21.30
656.4	686.4	18.33	20.43	21.90
737.2	767.2	18.32	20.32	21.51
817.9	847.9	16.96	18.40	19.95
898.7	928.7	16.42	17.74	19.07
979.5	1009.5	16.83	18.48	20.21
1060.3	1090.3	17.27	18.93	20.15
1141.1	1171.1	17.49	18.67	19.42
1221.9	1251.9	17.61	18.45	19.56
1302.6	1332.6	18.40	19.00	20.10
1383.4	1413.4	18.76	20.20	21.32
1464.2	1494.2	20.92	21.52	22.32
1545.0	1575.0	20.48	21.21	21.99
1625.8	1655.8	21.92	22.81	20.94
1706.6	1736.6	19.51	20.09	17.44
1787.4	1817.4	15.62	15.54	14.71
1868.1	1898.1	13.79	14.35	14.96
1948.9	1978.9	14.27	15.34	15.85
2029.7	2059.7	14.89	15.98	16.75
2110.5	2140.5	17.30	18.28	18.07
2191.3	2221.3	18.12	19.56	19.84
2272.1	2302.1	18.63	19.36	20.02
2352.8	2382.8	17.68	18.26	19.22
2433.6	2463.6	16.56	17.77	18.87
2514.4	2544.4	16.15	17.57	18.44
2595.2	2625.2	15.87	17.85	18.81
2676.0	2706.0	15.70	17.42	18.49
2756.8	2786.8	15.47	16.90	17.77
2817.4	2847.4	15.22	16.62	17.73
2898.1	2928.1	15.02	16.27	17.39
2958.7	2988.7	15.43	16.96	18.00
3039.5	3069.5	15.62	16.74	17.65
3100.1	3130.1	15.82	17.07	18.29

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+10dBm (dB) @LO (dBm)		
		+14	+17	+20
10.1	40.1	0.30	0.19	0.14
90.9	120.9	0.42	0.26	0.16
171.7	201.7	0.41	0.26	0.18
252.5	282.5	0.41	0.29	0.22
333.2	363.2	0.44	0.43	0.34
414.0	444.0	0.61	0.56	0.44
494.8	524.8	0.66	0.61	0.48
575.6	605.6	0.92	0.76	0.58
656.4	686.4	0.99	0.82	0.64
737.2	767.2	0.98	0.85	0.69
817.9	847.9	1.03	0.87	0.72
898.7	928.7	1.14	0.96	0.81
979.5	1009.5	1.09	0.91	0.79
1060.3	1090.3	1.06	0.91	0.78
1141.1	1171.1	1.00	0.89	0.77
1221.9	1251.9	0.90	0.80	0.71
1302.6	1332.6	0.81	0.72	0.64
1383.4	1413.4	0.75	0.65	0.59
1464.2	1494.2	0.71	0.63	0.59
1545.0	1575.0	0.67	0.58	0.55
1625.8	1655.8	0.71	0.58	0.53
1706.6	1736.6	0.73	0.62	0.56
1787.4	1817.4	0.83	0.69	0.62
1868.1	1898.1	0.97	0.76	0.63
1948.9	1978.9	1.13	0.84	0.67
2029.7	2059.7	1.20	0.92	0.77
2110.5	2140.5	1.09	0.87	0.75
2191.3	2221.3	0.99	0.78	0.69
2272.1	2302.1	0.90	0.76	0.68
2352.8	2382.8	0.87	0.73	0.65
2433.6	2463.6	0.79	0.66	0.58
2514.4	2544.4	0.73	0.62	0.54
2595.2	2625.2	0.74	0.59	0.49
2676.0	2706.0	0.74	0.59	0.47
2756.8	2786.8	0.70	0.54	0.46
2817.4	2847.4	0.63	0.48	0.41
2898.1	2928.1	0.57	0.41	0.34
2958.7	2988.7	0.56	0.43	0.34
3039.5	3069.5	0.49	0.43	0.36
3100.1	3130.1	0.43	0.39	0.36

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Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1400.1MHz (dB) @LO (dBm) +17
600.0	800.1	6.00
584.9	815.2	5.98
569.7	830.4	5.98
554.6	845.5	5.92
539.5	860.6	5.93
524.4	875.7	5.86
509.2	890.9	5.85
494.1	906.0	5.81
479.0	921.1	5.80
463.8	936.3	5.80
448.7	951.4	5.76
433.6	966.5	5.78
418.5	981.6	5.73
403.3	996.8	5.73
388.2	1011.9	5.70
373.1	1027.0	5.74
357.9	1042.2	5.73
342.8	1057.3	5.72
327.7	1072.4	5.74
312.6	1087.5	5.72
297.4	1102.7	5.76
282.3	1117.8	5.74
267.2	1132.9	5.79
252.1	1148.0	5.77
236.9	1163.2	5.80
221.8	1178.3	5.81
206.7	1193.4	5.84
191.5	1208.6	5.88
176.4	1223.7	5.86
161.3	1238.8	5.89
146.2	1253.9	5.84
131.0	1269.1	5.87
115.9	1284.2	5.83
100.8	1299.3	5.83
85.6	1314.5	5.84
70.5	1329.6	5.84
55.4	1344.7	5.87
40.3	1359.8	5.86
25.1	1375.0	5.91
10.0	1390.1	5.91

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=400.1MHz (dB) @LO (dBm) +17
10.0	410.1	6.09
27.7	427.8	6.11
45.4	445.5	6.09
63.1	463.2	6.17
80.8	480.9	6.13
98.5	498.6	6.13
116.2	516.3	6.09
133.8	533.9	6.14
151.5	551.6	6.18
169.2	569.3	6.22
186.9	587.0	6.19
204.6	604.7	6.18
222.3	622.4	6.15
240.0	640.1	6.19
257.7	657.8	6.24
275.4	675.5	6.27
293.1	693.2	6.26
310.8	710.9	6.26
328.5	728.6	6.31
346.2	746.3	6.34
363.8	763.9	6.44
381.5	781.6	6.48
399.2	799.3	6.53
416.9	817.0	6.50
434.6	834.7	6.61
452.3	852.4	6.55
470.0	870.1	6.62
487.7	887.8	6.53
505.4	905.5	6.58
523.1	923.2	6.53
540.8	940.9	6.62
558.5	958.6	6.62
576.2	976.3	6.70
593.8	993.9	6.66
611.5	1011.6	6.69
629.2	1029.3	6.67
646.9	1047.0	6.72
664.6	1064.7	6.73
682.3	1082.4	6.76
700.0	1100.1	6.77

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=2800.1MHz (dB) @LO (dBm) +17
700.0	2100.1	7.61
682.3	2117.8	7.59
664.6	2135.5	7.54
646.9	2153.2	7.53
629.2	2170.9	7.50
611.5	2188.6	7.51
593.8	2206.3	7.52
576.2	2223.9	7.59
558.5	2241.6	7.61
540.8	2259.3	7.62
523.1	2277.0	7.62
505.4	2294.7	7.60
487.7	2312.4	7.57
470.0	2330.1	7.54
452.3	2347.8	7.54
434.6	2365.5	7.48
416.9	2383.2	7.44
399.2	2400.9	7.41
381.5	2418.6	7.45
363.8	2436.3	7.41
346.2	2453.9	7.39
328.5	2471.6	7.38
310.8	2489.3	7.37
293.1	2507.0	7.34
275.4	2524.7	7.37
257.7	2542.4	7.39
240.0	2560.1	7.40
222.3	2577.8	7.41
204.6	2595.5	7.43
186.9	2613.2	7.46
169.2	2630.9	7.49
151.5	2648.6	7.53
133.8	2666.3	7.53
116.2	2683.9	7.57
98.5	2701.6	7.60
80.8	2719.3	7.68
63.1	2737.0	7.73
45.4	2754.7	7.81
27.7	2772.4	7.90
10.0	2790.1	7.95

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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	25.69	28.40	31.12	44.09	47.03	49.67
90.9	36.56	40.06	43.87	44.37	47.06	48.53
171.7	39.21	42.83	45.82	44.50	45.54	44.85
252.5	40.28	42.88	44.38	43.79	42.95	41.83
333.2	40.18	42.03	42.57	43.04	41.18	40.09
414.0	39.85	41.31	41.09	42.21	39.81	38.71
494.8	39.92	40.95	40.32	41.47	38.94	37.66
575.6	41.57	41.43	39.94	40.60	38.65	37.51
656.4	42.74	41.89	39.94	41.32	38.66	37.39
737.2	43.15	41.86	40.06	40.69	38.26	36.83
817.9	45.09	42.12	39.80	41.28	38.87	37.31
898.7	45.55	41.70	39.73	42.15	39.35	37.82
979.5	43.59	40.52	38.95	45.38	41.05	38.89
1060.3	42.79	40.14	39.32	48.67	42.48	39.65
1141.1	51.29	45.27	42.17	48.88	43.21	40.57
1221.9	56.60	49.94	44.54	55.36	46.50	42.65
1302.6	52.23	47.16	43.36	50.35	53.60	46.96
1383.4	43.51	41.16	39.82	44.52	51.84	49.29
1464.2	41.28	39.36	38.18	41.98	47.13	52.47
1545.0	39.37	37.95	36.96	41.26	47.02	53.78
1625.8	39.09	37.64	36.61	40.57	45.79	55.07
1706.6	39.18	37.37	36.10	41.19	45.15	49.89
1787.4	40.14	37.81	36.16	41.01	43.53	45.76
1868.1	44.80	41.75	39.18	40.02	41.09	42.50
1948.9	46.70	45.80	42.99	40.22	41.53	42.24
2029.7	49.20	50.52	49.66	40.04	41.68	41.56
2110.5	51.67	52.52	57.19	40.36	41.05	40.36
2191.3	51.91	56.66	60.31	39.03	38.56	37.78
2272.1	53.40	56.69	57.60	38.15	36.74	35.49
2352.8	48.78	48.64	49.86	37.15	36.11	34.76
2433.6	47.39	49.13	50.23	35.40	33.96	33.07
2514.4	45.94	48.97	50.35	34.33	32.65	31.51
2595.2	44.91	45.46	45.71	33.78	32.18	30.69
2676.0	43.46	42.91	41.53	32.58	31.39	30.20
2756.8	42.73	42.13	39.98	31.59	30.50	29.42
2817.4	41.30	41.09	38.85	31.22	29.75	28.65
2898.1	38.64	37.39	35.79	31.18	29.98	28.76
2958.7	37.41	35.63	33.92	30.72	29.64	28.82
3039.5	35.46	33.41	31.22	30.59	29.91	29.00
3100.1	34.36	31.73	29.42	30.36	30.00	29.41

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB) @LO (dBm)		
		+14	+17	+20
10.1	40.1	33.98	33.80	35.32
90.9	120.9	33.99	34.35	34.75
171.7	201.7	33.57	33.83	33.76
252.5	282.5	33.53	33.75	33.83
333.2	363.2	33.24	33.28	33.69
414.0	444.0	33.02	33.03	33.42
494.8	524.8	33.11	33.27	33.32
575.6	605.6	33.49	33.53	33.55
656.4	686.4	33.63	33.69	34.06
737.2	767.2	35.73	36.06	35.98
817.9	847.9	37.43	37.04	36.69
898.7	928.7	37.38	36.78	36.04
979.5	1009.5	36.38	35.38	34.85
1060.3	1090.3	35.79	35.02	34.51
1141.1	1171.1	34.71	34.20	33.75
1221.9	1251.9	34.10	33.30	32.92
1302.6	1332.6	35.32	34.37	33.72
1383.4	1413.4	37.98	36.70	35.51
1464.2	1494.2	39.97	39.87	39.17
1545.0	1575.0	42.86	43.53	44.59
1625.8	1655.8	48.66	56.34	50.58
1706.6	1736.6	41.79	45.38	42.85
1787.4	1817.4	36.14	39.39	40.20
1868.1	1898.1	34.05	36.87	39.60
1948.9	1978.9	35.38	37.08	38.45
2029.7	2059.7	32.86	34.81	38.59
2110.5	2140.5	31.44	31.56	33.25
2191.3	2221.3	30.35	30.33	30.69
2272.1	2302.1	29.24	29.14	29.23
2352.8	2382.8	28.01	28.06	28.21
2433.6	2463.6	27.10	26.92	26.96
2514.4	2544.4	26.22	25.82	25.64
2595.2	2625.2	25.77	25.19	24.84
2676.0	2706.0	25.43	25.16	24.99
2756.8	2786.8	24.93	25.01	24.91
2817.4	2847.4	24.04	24.33	24.49
2898.1	2928.1	23.37	23.56	23.89
2958.7	2988.7	23.13	23.31	23.56
3039.5	3069.5	22.69	22.93	23.13
3100.1	3130.1	22.34	22.63	23.06

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Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1) @LO (dBm)		
		+14	+17	+20
10.1	40.1	1.66	1.65	1.65
90.9	120.9	1.20	1.17	1.17
171.7	201.7	1.25	1.20	1.18
252.5	282.5	1.30	1.24	1.20
333.2	363.2	1.36	1.28	1.23
414.0	444.0	1.43	1.33	1.26
494.8	524.8	1.46	1.34	1.27
575.6	605.6	1.47	1.36	1.28
656.4	686.4	1.50	1.38	1.31
737.2	767.2	1.52	1.41	1.34
817.9	847.9	1.52	1.43	1.37
898.7	928.7	1.50	1.42	1.36
979.5	1009.5	1.46	1.40	1.36
1060.3	1090.3	1.43	1.37	1.34
1141.1	1171.1	1.37	1.32	1.31
1221.9	1251.9	1.33	1.29	1.28
1302.6	1332.6	1.29	1.25	1.24
1383.4	1413.4	1.23	1.21	1.20
1464.2	1494.2	1.20	1.17	1.16
1545.0	1575.0	1.15	1.12	1.13
1625.8	1655.8	1.12	1.09	1.10
1706.6	1736.6	1.15	1.10	1.09
1787.4	1817.4	1.19	1.12	1.10
1868.1	1898.1	1.23	1.15	1.12
1948.9	1978.9	1.21	1.13	1.12
2029.7	2059.7	1.20	1.14	1.11
2110.5	2140.5	1.18	1.10	1.10
2191.3	2221.3	1.22	1.11	1.06
2272.1	2302.1	1.25	1.11	1.04
2352.8	2382.8	1.26	1.12	1.03
2433.6	2463.6	1.26	1.13	1.07
2514.4	2544.4	1.22	1.14	1.13
2595.2	2625.2	1.19	1.18	1.21
2676.0	2706.0	1.23	1.27	1.33
2756.8	2786.8	1.32	1.40	1.47
2817.4	2847.4	1.42	1.51	1.59
2898.1	2928.1	1.59	1.71	1.80
2958.7	2988.7	1.75	1.89	1.99
3039.5	3069.5	2.00	2.12	2.23
3100.1	3130.1	2.22	2.33	2.44

LO (MHz)	LO VSWR (:1) @LO (dBm)		
	+14	+17	+20
10.1	1.93	2.60	3.56
90.9	1.73	2.48	3.43
171.7	1.74	2.51	3.45
252.5	1.76	2.55	3.50
333.2	1.77	2.53	3.47
414.0	1.74	2.47	3.37
494.8	1.69	2.39	3.23
575.6	1.65	2.32	3.13
656.4	1.65	2.29	3.06
737.2	1.63	2.25	3.00
817.9	1.58	2.19	2.92
898.7	1.56	2.13	2.83
979.5	1.52	2.07	2.73
1060.3	1.51	2.02	2.65
1141.1	1.50	1.97	2.57
1221.9	1.50	1.92	2.48
1302.6	1.49	1.87	2.40
1383.4	1.49	1.82	2.33
1464.2	1.48	1.79	2.27
1545.0	1.46	1.73	2.20
1625.8	1.45	1.66	2.11
1706.6	1.46	1.64	2.05
1787.4	1.44	1.59	1.98
1868.1	1.41	1.54	1.92
1948.9	1.40	1.48	1.85
2029.7	1.40	1.45	1.80
2110.5	1.38	1.39	1.73
2191.3	1.34	1.30	1.63
2272.1	1.31	1.22	1.54
2352.8	1.27	1.17	1.50
2433.6	1.27	1.11	1.46
2514.4	1.31	1.12	1.44
2595.2	1.36	1.19	1.46
2676.0	1.41	1.29	1.52
2756.8	1.47	1.41	1.62
2817.4	1.53	1.50	1.71
2898.1	1.63	1.66	1.88
2958.7	1.72	1.78	2.01
3039.5	1.84	1.94	2.17
3100.1	1.95	2.07	2.30

IF (OUT) (MHz)	IF VSWR @LO=2800.1MHz (:1) @LO (dBm)		
	+14	+17	+20
10.0	2.22	2.10	2.01
27.7	2.23	2.12	2.01
45.4	2.23	2.11	2.01
63.1	2.25	2.13	2.02
80.8	2.33	2.20	2.08
98.5	2.37	2.23	2.12
116.2	2.31	2.18	2.06
133.8	2.26	2.13	2.01
151.5	2.25	2.10	1.99
169.2	2.24	2.09	1.97
186.9	2.22	2.08	1.96
204.6	2.26	2.10	1.97
222.3	2.34	2.17	2.03
240.0	2.33	2.15	2.00
257.7	2.26	2.07	1.93
275.4	2.26	2.07	1.92
293.1	2.32	2.11	1.96
310.8	2.30	2.09	1.93
328.5	2.24	2.04	1.88
346.2	2.20	2.00	1.84
363.8	2.19	1.98	1.82
381.5	2.16	1.95	1.79
399.2	2.15	1.94	1.78
416.9	2.20	1.98	1.81
434.6	2.18	1.96	1.79
452.3	2.07	1.85	1.70
470.0	1.99	1.79	1.64
487.7	2.01	1.80	1.65
505.4	2.05	1.84	1.68
523.1	2.03	1.81	1.66
540.8	1.96	1.75	1.60
558.5	1.91	1.70	1.56
576.2	1.87	1.67	1.53
593.8	1.86	1.66	1.51
611.5	1.87	1.67	1.52
629.2	1.86	1.66	1.51
646.9	1.77	1.58	1.45
664.6	1.68	1.50	1.38
682.3	1.68	1.50	1.38
700.0	1.72	1.54	1.41

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Harmonics Tables

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	30	20	34	44	30	40	29	58	46	60
1	-	38	+0	40	16	41	28	55	29	38	45	60
2	>100	40	41	42	44	40	66	54	53	51	48	70
3	>100	55	43	49	39	62	40	69	55	66	48	53
4	>100	69	82	51	73	50	54	76	82	69	74	68
5	>100	77	74	73	50	62	56	56	60	68	75	76
6	>100	70	79	82	78	58	62	65	63	61	73	89
7	>100	75	77	89	80	83	68	74	67	68	76	87
8	>100	85	84	99	97	88	83	67	73	75	71	69
9	>100	97	>99	84	93	90	88	87	72	74	73	96
10	>100	>99	99	98	83	91	95	90	>99	75	86	74
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: **RF IN: 1600.1 MHz; 5.00 dBm.**
LO IN: 1630.01 MHz; +17.00 dBm
IF OUT: 29.91 MHz; -1.24 dBm

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	18	10	24	36	20	27	17	43	31	46
1	-	43	+0	38	15	40	27	52	27	37	43	53
2	>100	51	64	60	60	52	67	61	59	58	61	86
3	>100	74	65	72	66	71	65	78	72	84	65	70
4	>100	>89	>89	>89	>89	>89	88	87	>89	>89	>89	>89
5	>100	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89
6	>100	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89
7	>100	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89
8	>100	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89
9	>100	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89	>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: 1600.1 MHz; -5.00 dBm.**
LO IN: 1630.01 MHz; +17.00 dBm
IF OUT: 29.91 MHz; -11.07 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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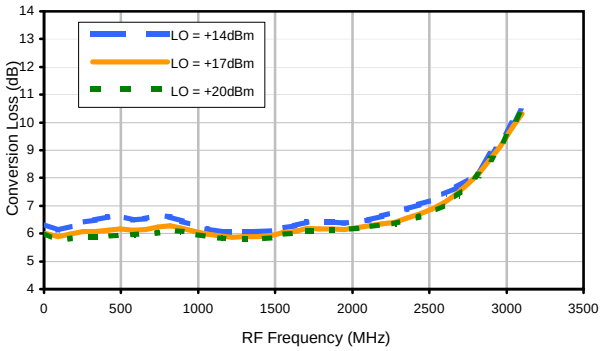
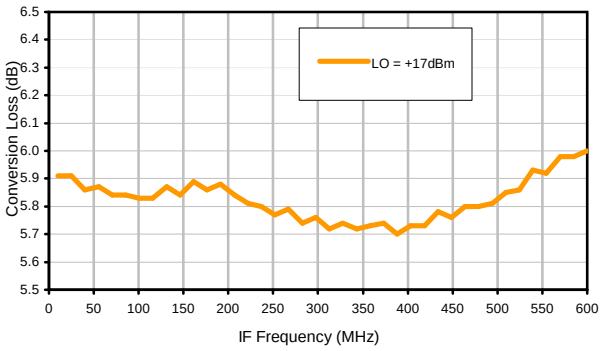
Frequency Mixer JYM-28H+

Typical Performance Curves

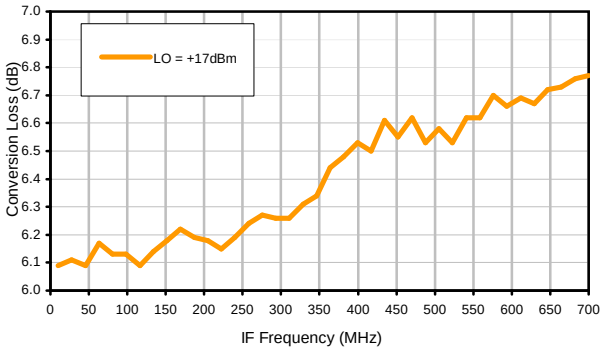
Conversion Loss @ IF=30MHz



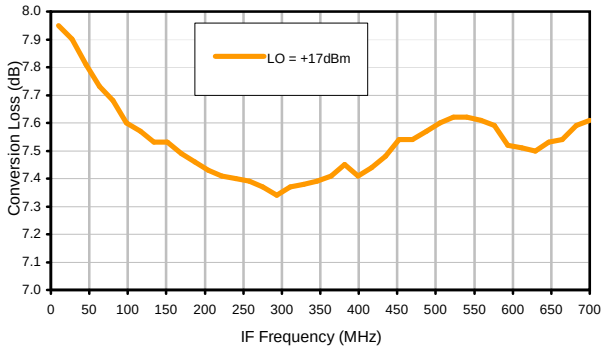
Conversion Loss vs. IF @ RF=1400.1MHz



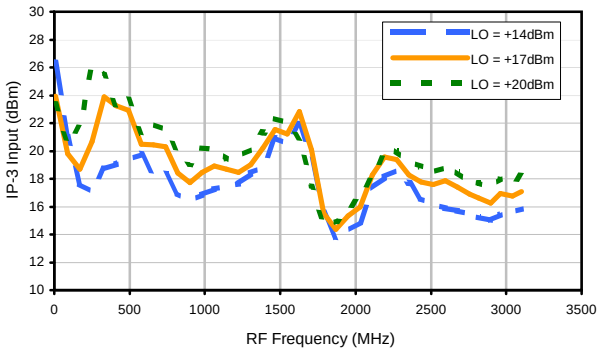
Conversion Loss vs. IF @ RF=400.1MHz



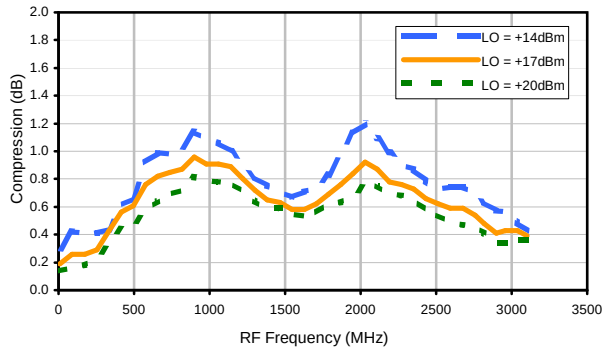
Conversion Loss vs. IF @ RF=2800.1MHz



IP3 Input



Compression @ RF IN=+10dBm



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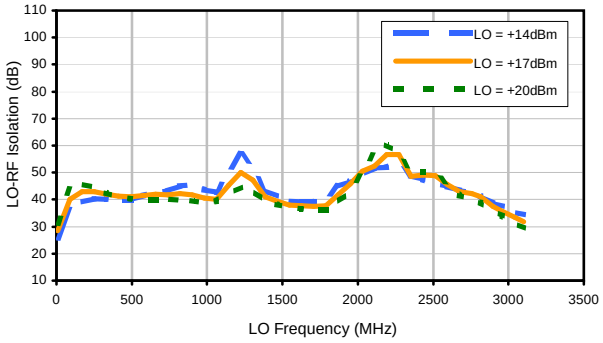
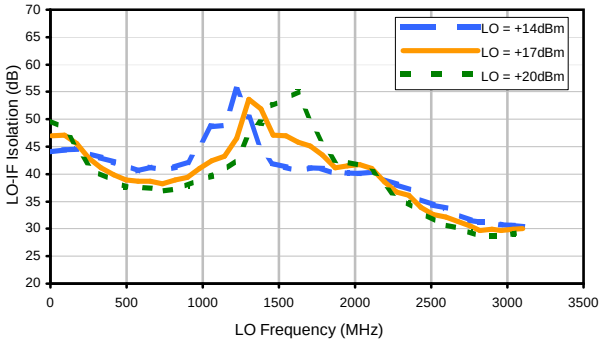
Typical Performance Curves

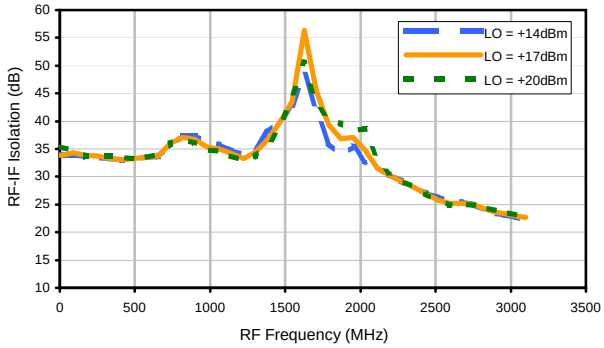
LO-RF Isolation



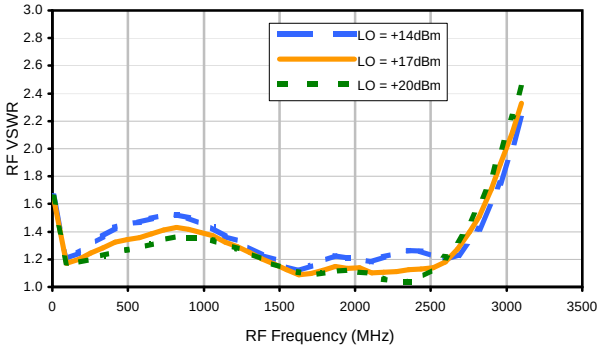
LO-IF Isolation



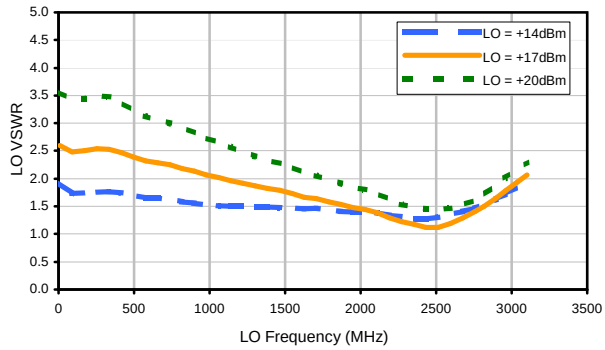
RF-IF Isolation



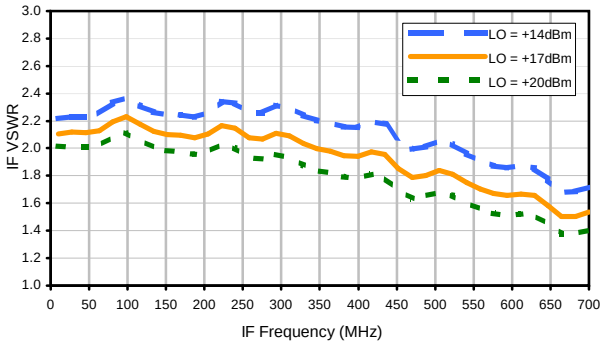
RF VSWR



LO VSWR



IF VSWR



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Harmonics Tables

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	30	20	34	44	30	40	29	58	46	60
1	-	38	+0	40	16	41	28	55	29	38	45	60
2	>100	40	41	42	44	40	66	54	53	51	48	70
3	>100	55	43	49	39	62	40	69	55	66	48	53
4	>100	69	82	51	73	50	54	76	82	69	74	68
5	>100	77	74	73	50	62	56	56	60	68	75	76
6	>100	70	79	82	78	58	62	65	63	61	73	89
7	>100	75	77	89	80	83	68	74	67	68	76	87
8	>100	85	84	99	97	88	83	67	73	75	71	69
9	>100	97	>99	84	93	90	88	87	72	74	73	96
10	>100	>99	99	98	83	91	95	90	>99	75	86	74
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: **RF IN: 1600.1 MHz; 5.00 dBm.**
LO IN: 1630.01 MHz; +17.00 dBm
IF OUT: 29.91 MHz; -1.24 dBm

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	18	10	24	36	20	27	17	43	31	46
1	-	43	+0	38	15	40	27	52	27	37	43	53
2	>100	51	64	60	60	52	67	61	59	58	61	86
3	>100	74	65	72	66	71	65	78	72	84	65	70
4	>100	>89	>89	>89	>89	>89	88	87	>89	>89	>89	>89
5	>100	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89
6	>100	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89
7	>100	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89
8	>100	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89
9	>100	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89	>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: 1600.1 MHz; -5.00 dBm.**
LO IN: 1630.01 MHz; +17.00 dBm
IF OUT: 29.91 MHz; -11.07 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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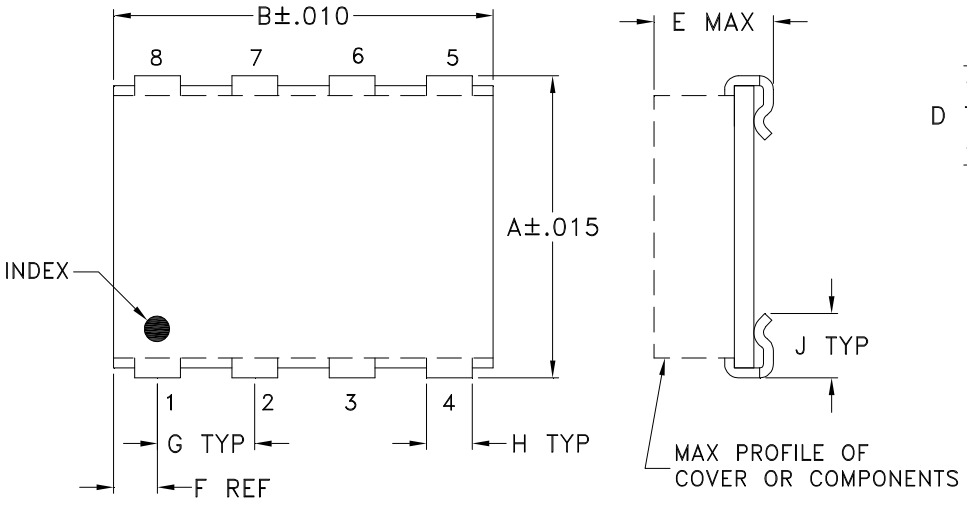
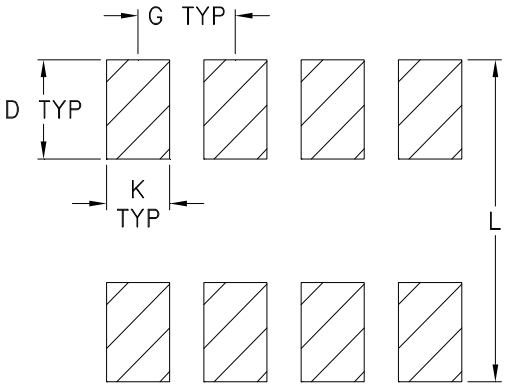
Case Style BJ

BJ293
BJ398

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. GRAMS
BJ293	.395 (10.03)	.500 (12.70)	-- --	.100 (2.54)	.230 (5.84)	.100 (2.54)	.100 (2.54)	.047 (1.19)	.065 (1.65)	.065 (1.65)	.425 (10.80)	.80
BJ398	.305 (7.75)	.390 (9.91)	-- --	.100 (2.54)	.105 (2.67)	.045 (1.14)	.100 (2.54)	.047 (1.19)	.065 (1.65)	.065 (1.65)	.325 (8.26)	.20

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

Notes:
1. Case material: Plastic.
2. Base material: Printed wiring laminate.
3. 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.

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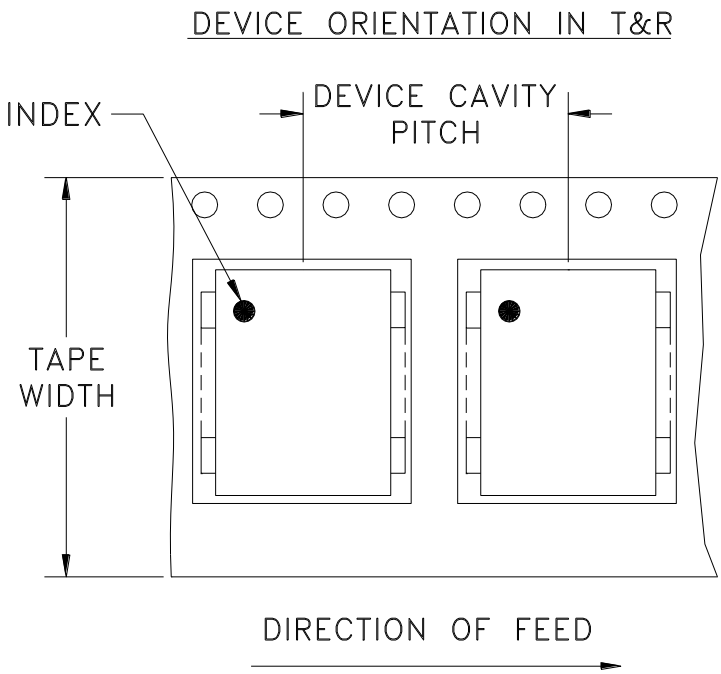
Tape & Reel Packaging TR-F10



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
24	16	7	10,20,50,100
		13	200,500

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.

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

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

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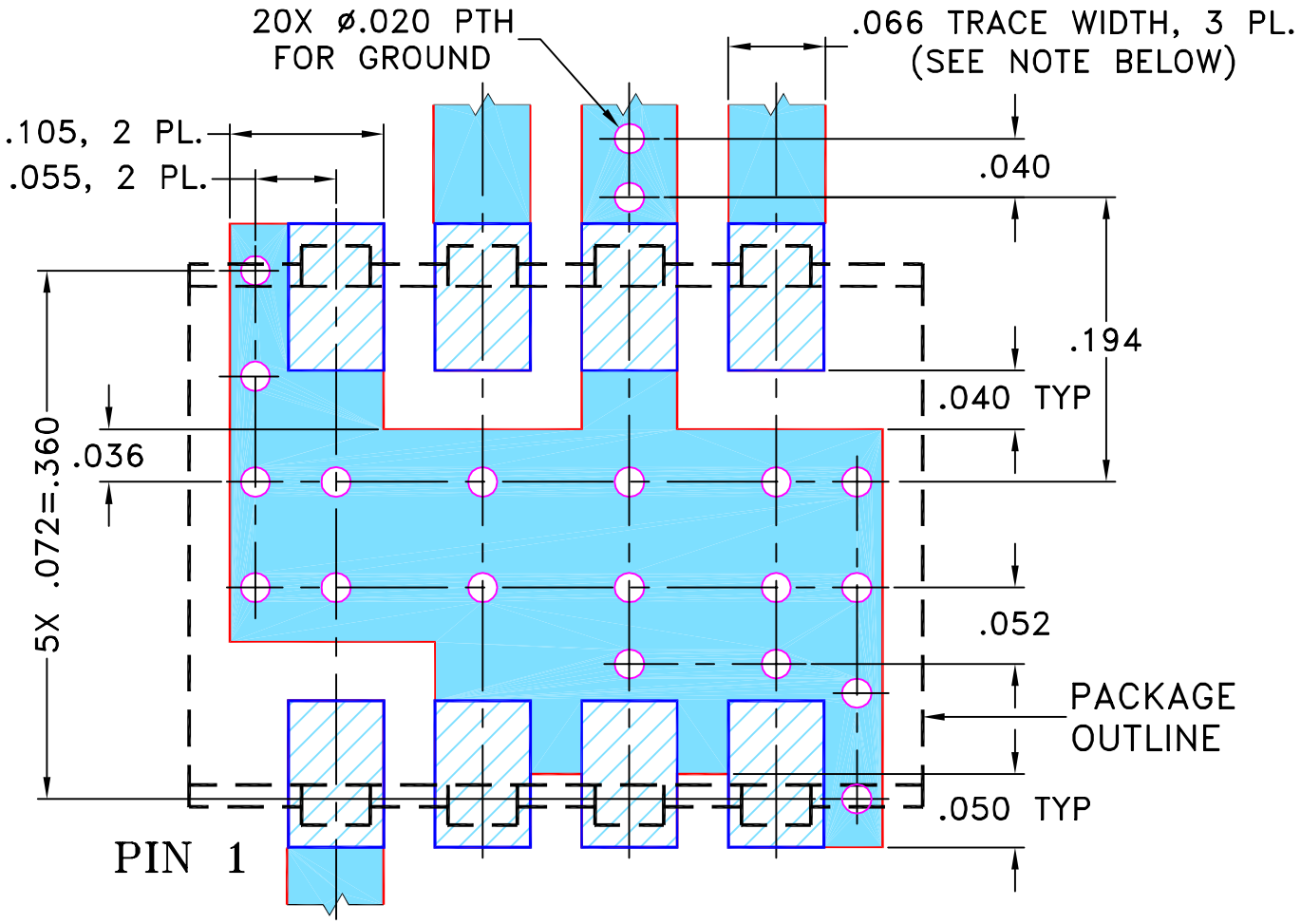
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M94649	NEW RELEASE	10/11/04	MMG	WL
A	M102713	ADDED "...WITH SMOBC"	01/14/06	GF	IL

SUGGESTED MOUNTING CONFIGURATION
FOR BJ293 CASE STYLE, "hp" PIN CONNECTION.



NOTE: 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 SOLDERMASK

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	MMG	10/04/04
TOLERANCES ON:	CHECKED	AV	10/11/04
2 PL DECIMALS ±	APPROVED	WL	10/11/04
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

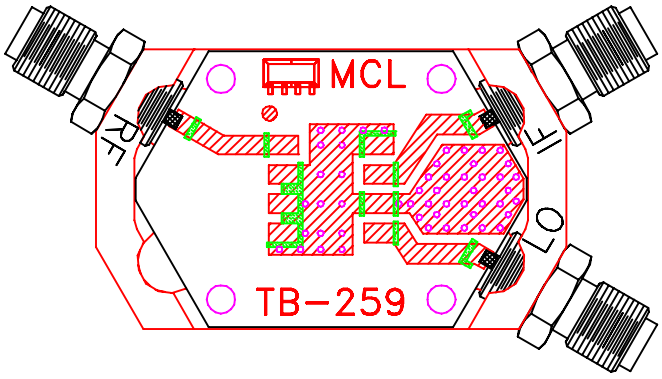
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, hp, BJ293, JYM, TB-259

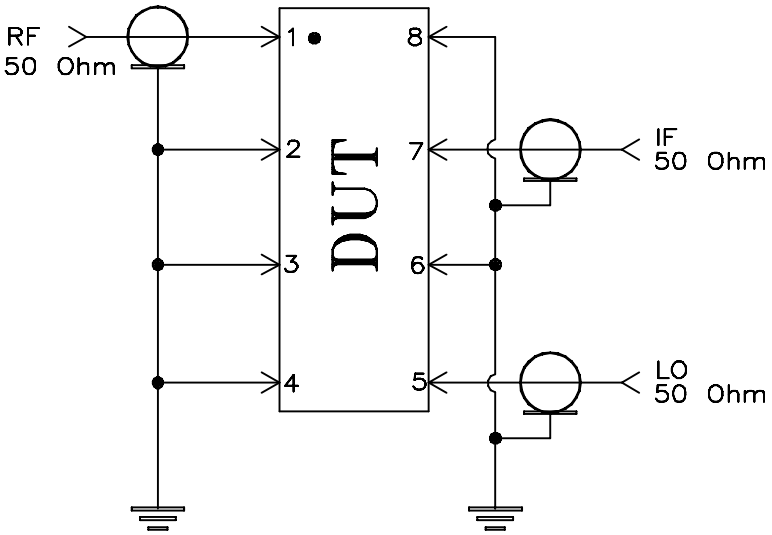
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-080	A

FILE:	SCALE:	SHEET:
98PL080	8:1	1 OF 1

Evaluation Board and Circuit



TB-259



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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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

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