High Power
Bi-Directional Coupler

SYBD-20-142HP+

50Ω 20dB Coupling DC Pass 960 to 1400 MHz

Generic photo used for illustration purposes only

CASE STYLE: JB1233

+RoHS Compliant

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

Maximum Ratings

Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
DC Current	2A

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

Pin Connections

INPUT	1
OUTPUT	2
COUPLED (forward)	4
COUPLED (reverse)	3
GROUND	5

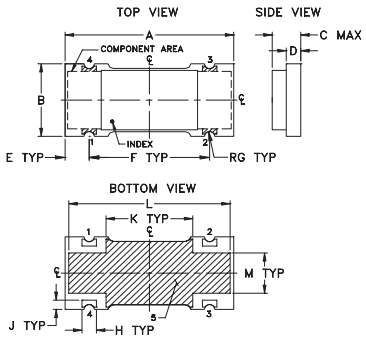
Features

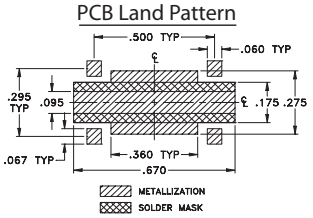
- high power handling, 50 watts max.
- low mainline loss, 0.09 dB typ.
- excellent VSWR, 1.15:1 typ.
- excellent directivity, 26 dB typ.
- wideband frequency, 960 to 1400 MHz

Applications

- GPS
- defense communications

Outline Drawing





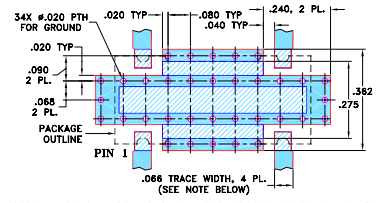
Suggested Layout,
Tolerance to be within ±.002

Outline Dimensions (inch / mm)

A	B	C	D	E	F	G
.70	.32	.13	.060	.100	.500	.022
17.78	8.13	3.30	1.52	2.54	12.70	0.56

H	J	K	L	M	wt
.060	.040	.360	.670	.175	grams
1.52	1.02	9.14	17.02	4.45	0.68

Demo Board MCL P/N: TB-398
Suggested PCB Layout (PL-260)



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

Bi-Directional Coupler Electrical Specifications

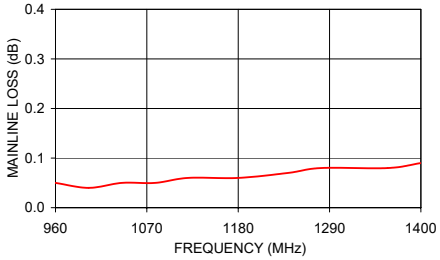
FREQ. (MHz)	COUPLING (dB)		MAINLINE LOSS[1] (dB)		DIRECTIVITY (dB)		VSWR (:1)	POWER INPUT (W)
f_L-f_U	Nom.	Flatness	Typ.	Max.	Typ.	Min.	Typ.	Max.
960-1400			**0.09**	**0.25**	**26**	**18**	**1.10**	**—**
960-1240	21.8±0.8	±1.3	0.07	0.25	27	18	1.10	50
1240-1400	20.3±0.8	±0.7	0.09	0.25	26	18	1.10	50

1. Mainline loss includes theoretical power loss at coupled port.

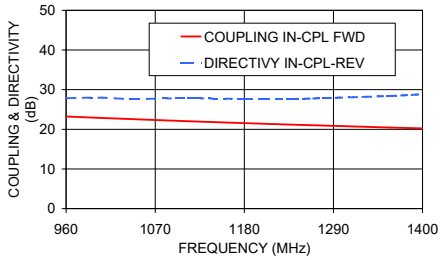
Typical Performance Data

Frequency (MHz)	Mainline Loss (dB)	Coupling (dB)		Directivity (dB)		Return Loss (dB)			
	In-Out	In-Cpl Fwd	Out-Cpl Rev	Out-Cpl Fwd	In-Cpl Rev	In	Out	Cpl Fwd	Cpl Rev
960.00	0.05	23.23	23.27	27.25	27.84	29.59	29.11	32.48	32.30
1000.00	0.04	22.89	22.93	27.22	27.98	29.09	28.66	32.18	32.23
1040.00	0.05	22.58	22.61	27.13	27.63	28.73	28.19	31.97	31.64
1080.00	0.05	22.27	22.31	26.90	27.78	28.55	27.97	31.41	31.51
1120.00	0.06	21.98	22.02	26.81	27.80	28.28	27.71	31.27	31.42
1180.00	0.06	21.56	21.59	26.95	27.69	28.08	27.53	31.15	31.23
1240.00	0.07	21.17	21.21	26.88	27.67	27.92	27.38	31.02	31.07
1280.00	0.08	20.93	20.97	26.98	27.88	27.94	27.37	31.07	31.30
1360.00	0.08	20.44	20.48	27.35	28.43	28.19	27.64	31.82	31.80
1400.00	0.09	20.22	20.26	27.67	28.84	28.48	27.90	32.21	32.39

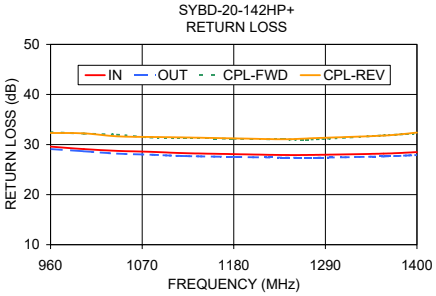
SYBD-20-142HP+
MAINLINE LOSS



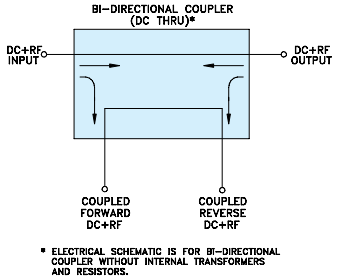
SYBD-20-142HP+
COUPLING & DIRECTIVITY



SYBD-20-142HP+
RETURN LOSS



Electrical Schematic



* ELECTRICAL SCHEMATIC IS FOR BI-DIRECTIONAL COUPLER WITHOUT INTERNAL TRANSFORMERS AND RESISTORS.

Notes

A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
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Bi-Directional Coupler SYBD-20-142HP+

Typical Performance Data

TEST CONDITIONS: INPUT POWER =0 dBm @Temperature = +25°C

FREQ. (MHz)	INSERTION LOSS (dB)		COUPLING (dB)		DIRECTIVITY (dB)		RETURN LOSS (dB)			
	IN-OUT	FWD-REV	IN-FWD	OUT-REV	IN-REV	OUT-FWD	IN	OUT	FWD	REV
500	0.01	0.01	28.57	28.57	34.92	34.00	39.73	38.38	37.75	38.30
600	0.00	0.00	27.02	27.02	32.98	32.26	36.04	35.91	35.17	35.34
700	0.02	0.02	25.70	25.73	30.98	30.19	33.09	33.54	32.86	32.71
800	0.03	0.03	24.61	24.61	29.77	28.33	31.03	31.66	31.26	31.01
900	0.04	0.05	23.64	23.67	28.12	26.77	29.63	30.22	29.68	29.73
950	0.05	0.05	23.21	23.23	27.59	26.30	28.84	29.53	29.09	29.13
960	0.06	0.05	23.13	23.13	27.49	26.23	28.77	29.40	28.99	29.03
1000	0.04	0.04	22.75	22.77	27.47	26.08	28.46	28.89	28.58	28.70
1050	0.05	0.05	22.35	22.37	26.81	25.36	28.06	28.34	28.17	28.39
1100	0.06	0.06	21.99	21.99	26.03	24.64	27.76	28.07	27.89	28.24
1150	0.06	0.07	21.65	21.65	25.49	23.89	27.65	27.70	27.67	28.03
1200	0.08	0.07	21.36	21.34	24.59	23.19	27.59	27.63	27.67	28.02
1240	0.07	0.07	21.07	21.09	24.70	23.27	27.64	27.62	27.65	28.07
1250	0.07	0.07	21.00	21.01	24.68	23.16	27.63	27.66	27.63	28.03
1300	0.07	0.07	20.68	20.69	24.50	22.83	27.73	27.83	27.70	28.20
1350	0.08	0.08	20.44	20.44	23.35	22.06	28.13	28.20	27.96	28.47
1400	0.09	0.09	20.14	20.15	23.56	22.12	28.52	28.51	28.24	28.84
1450	0.09	0.10	19.89	19.89	23.37	21.92	29.18	29.13	28.82	29.42
1500	0.09	0.10	19.62	19.62	23.49	21.93	29.99	30.01	29.36	29.80
1600	0.11	0.12	19.13	19.14	23.27	21.58	31.96	32.17	31.03	31.40
1650	0.11	0.13	18.91	18.92	23.26	21.63	33.64	33.84	32.31	32.32
1700	0.12	0.13	18.70	18.71	23.29	21.61	35.66	35.95	33.76	33.01
1750	0.13	0.14	18.48	18.49	23.44	21.80	38.52	38.73	35.10	33.45
1800	0.14	0.16	18.26	18.23	24.00	22.24	41.73	42.38	35.99	34.33
1850	0.15	0.16	18.12	18.12	23.41	21.58	44.95	49.03	38.04	34.04
1900	0.16	0.17	17.93	17.93	23.96	21.99	43.39	45.51	38.76	33.72
1950	0.18	0.19	17.78	17.76	23.83	21.87	40.96	41.03	36.50	33.97
2000	0.19	0.19	17.69	17.68	22.99	21.15	37.04	37.11	35.78	32.72
2100	0.20	0.19	17.43	17.44	22.75	21.14	33.08	32.59	33.30	30.89
2150	0.21	0.20	17.29	17.29	23.26	21.35	32.06	31.49	32.65	30.53
2200	0.22	0.21	17.14	17.13	23.91	22.17	31.29	30.73	32.03	30.37
2300	0.25	0.22	16.94	16.96	23.71	22.02	29.91	29.52	31.16	30.27
2350	0.24	0.24	16.79	16.82	24.73	22.49	30.04	29.44	31.12	30.69
2400	0.23	0.25	16.65	16.66	25.46	23.41	30.10	29.35	31.39	31.20
2500	0.26	0.26	16.43	16.48	26.68	24.59	30.72	30.45	32.05	32.29
2750	0.28	0.29	15.90	15.91	29.83	28.56	36.95	41.55	34.38	39.72
3000	0.33	0.33	15.53	15.57	23.75	24.37	29.93	30.87	28.28	29.55
3250	0.37	0.37	15.18	15.23	20.79	20.33	23.92	23.80	23.72	24.09
3500	0.41	0.41	14.84	14.84	17.90	17.49	21.49	21.46	22.48	22.57
3750	0.44	0.45	14.51	14.54	15.74	15.28	21.78	22.02	23.74	23.81
4000	0.46	0.46	14.21	14.20	14.44	13.90	25.22	25.94	29.08	28.52
4250	0.49	0.50	13.96	13.94	13.69	13.06	33.61	46.53	42.70	35.11
4500	0.56	0.55	13.81	13.81	13.44	12.77	26.04	27.00	26.74	26.30
4750	0.62	0.60	13.83	13.79	13.18	12.52	20.76	21.30	22.59	22.53
5000	0.66	0.65	13.85	13.82	13.15	12.29	18.52	19.09	21.06	21.20
5250	0.72	0.69	13.81	13.80	12.83	12.04	17.58	18.00	20.46	20.52
5500	0.78	0.74	13.75	13.60	13.25	12.03	16.94	17.61	20.12	19.89
5750	0.80	0.78	13.70	13.54	12.32	11.33	16.50	17.09	18.87	18.60
6000	0.89	0.86	13.67	13.41	11.08	10.19	15.96	16.05	17.08	16.88
6250	1.00	0.98	13.46	13.21	10.26	9.73	14.60	14.68	15.11	14.98
6500	1.16	1.13	13.39	13.10	9.34	8.88	13.18	13.01	13.47	13.47
6750	1.41	1.35	13.53	13.11	8.46	8.20	11.23	11.43	12.17	12.08
7000	1.71	1.55	13.52	13.31	8.04	7.99	9.72	10.10	10.88	10.86

Bi-Directional Coupler SYBD-20-142HP+

Typical Performance Data

TEST CONDITIONS: INPUT POWER =0 dBm @Temperature = -55°C

FREQ. (MHz)	INSERTION LOSS (dB)		COUPLING (dB)		DIRECTIVITY (dB)		RETURN LOSS (dB)			
	IN-OUT	FWD-REV	IN-FWD	OUT-REV	IN-REV	OUT-FWD	IN	OUT	FWD	REV
500	0.05	0.10	28.53	28.53	37.95	36.04	46.17	41.99	41.76	42.58
600	0.03	0.09	26.97	26.98	34.99	33.67	39.30	38.82	37.75	37.89
700	0.02	0.09	25.67	25.68	32.32	30.97	34.45	34.91	34.10	33.82
800	0.01	0.08	24.57	24.57	30.41	29.04	31.81	32.45	31.75	31.46
900	0.00	0.08	23.57	23.58	29.75	27.75	30.07	30.67	29.92	30.05
950	0.00	0.07	23.13	23.15	28.50	27.09	29.06	29.80	29.01	29.14
960	0.01	0.07	23.05	23.06	28.62	26.94	28.96	29.62	28.84	28.94
1000	0.01	0.09	22.68	22.70	28.42	26.44	28.43	28.87	28.22	28.44
1050	0.00	0.09	22.25	22.26	27.75	25.67	27.75	28.05	27.60	28.00
1100	0.01	0.08	21.92	21.93	25.67	24.44	27.24	27.58	27.15	27.71
1150	0.02	0.07	21.57	21.55	25.36	23.17	26.88	26.99	26.86	27.38
1200	0.02	0.08	21.28	21.27	25.27	23.50	26.76	26.83	26.61	27.04
1240	0.02	0.08	20.98	21.00	25.06	23.26	26.72	26.73	26.18	26.61
1250	0.02	0.08	20.90	20.91	24.85	23.03	26.71	26.78	26.08	26.52
1300	0.02	0.08	20.62	20.63	24.27	22.62	27.00	27.10	26.10	26.65
1350	0.02	0.08	20.30	20.31	23.91	22.39	27.42	27.50	26.34	26.79
1400	0.03	0.07	20.00	20.02	23.86	22.19	27.75	27.85	26.77	27.30
1450	0.03	0.06	19.76	19.75	23.25	21.88	28.41	28.37	27.51	28.15
1500	0.03	0.07	19.50	19.51	23.62	22.07	29.22	29.27	28.44	28.82
1600	0.05	0.06	19.07	19.09	22.73	21.11	30.65	30.93	30.26	30.59
1650	0.04	0.06	18.84	18.87	22.61	21.09	31.72	31.96	31.27	31.14
1700	0.05	0.05	18.60	18.60	22.83	21.50	32.79	32.98	32.48	32.35
1750	0.06	0.05	18.32	18.33	24.05	21.92	34.29	34.62	33.89	32.69
1800	0.06	0.05	18.13	18.15	24.08	21.76	36.01	37.36	35.61	32.87
1850	0.08	0.04	18.10	18.10	21.73	20.17	40.03	43.84	36.75	33.06
1900	0.08	0.02	17.92	17.92	22.03	20.12	39.72	53.11	36.84	33.49
1950	0.09	0.04	17.70	17.73	22.60	20.73	37.75	41.18	39.05	32.53
2000	0.10	0.03	17.53	17.56	23.00	21.17	35.66	36.62	36.75	32.91
2100	0.12	0.02	17.18	17.18	24.61	22.97	33.67	32.79	35.13	32.90
2150	0.15	0.00	17.22	17.20	22.17	21.04	32.04	31.48	32.11	31.39
2200	0.14	0.01	16.92	16.91	24.60	23.67	32.02	31.35	31.54	30.49
2300	0.14	0.01	16.75	16.74	23.85	22.72	30.06	29.09	29.86	28.88
2350	0.15	0.01	16.58	16.59	25.87	25.00	30.14	28.98	30.75	30.25
2400	0.16	0.01	16.54	16.53	24.72	23.24	29.44	28.69	31.12	30.17
2500	0.18	0.02	16.23	16.26	27.97	26.76	29.60	29.18	32.01	30.89
2750	0.21	0.04	15.59	15.66	31.08	30.38	37.19	43.91	32.57	35.76
3000	0.21	0.04	15.40	15.38	24.55	25.45	30.32	30.97	26.95	28.55
3250	0.25	0.08	15.01	15.04	20.48	20.12	23.92	23.87	23.29	23.99
3500	0.29	0.10	14.66	14.67	17.17	17.35	20.69	20.72	22.93	23.03
3750	0.30	0.12	14.27	14.30	16.01	16.02	21.65	21.77	23.73	24.08
4000	0.33	0.11	14.02	13.95	14.45	14.26	24.75	25.32	26.29	26.38
4250	0.35	0.13	13.77	13.74	13.47	13.50	31.57	40.37	36.71	38.42
4500	0.40	0.17	13.56	13.58	13.95	12.80	26.02	27.46	31.29	28.07
4750	0.46	0.19	13.51	13.49	13.36	12.51	20.70	21.48	23.71	23.27
5000	0.51	0.25	13.58	13.41	12.83	11.93	19.04	19.34	19.78	19.58
5250	0.54	0.26	13.56	13.46	13.30	11.68	17.41	18.05	19.26	18.64
5500	0.61	0.31	13.56	13.20	12.92	12.24	16.86	17.64	18.66	18.21
5750	0.60	0.33	13.45	13.28	12.30	11.53	16.32	16.88	17.90	17.76
6000	0.70	0.36	13.35	13.07	11.05	10.89	15.52	15.59	16.97	17.12
6250	0.81	0.42	13.18	12.88	10.37	9.81	14.44	14.47	16.17	16.18
6500	0.94	0.60	12.89	12.65	9.41	9.08	12.96	13.02	13.62	13.60
6750	1.19	0.78	13.13	12.79	8.77	7.28	11.37	11.50	11.72	11.32
7000	1.43	1.08	13.35	12.97	8.34	7.31	9.73	10.00	9.81	9.59

Bi-Directional Coupler SYBD-20-142HP+

Typical Performance Data

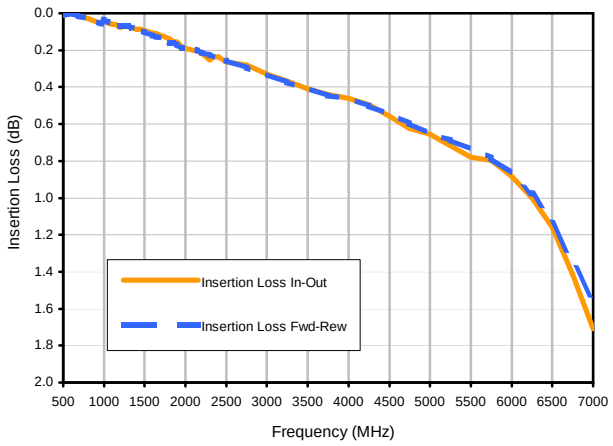
TEST CONDITIONS: INPUT POWER =0 dBm @Temperature = +100°C

FREQ. (MHz)	INSERTION LOSS (dB)		COUPLING (dB)		DIRECTIVITY (dB)		RETURN LOSS (dB)			
	IN-OUT	FWD-REV	IN-FWD	OUT-REV	IN-REV	OUT-FWD	IN	OUT	FWD	REV
500	0.01	0.03	28.56	28.57	33.39	32.68	37.46	36.18	35.73	36.10
600	0.03	0.05	27.03	27.04	32.01	31.16	34.76	34.41	33.96	34.12
700	0.04	0.07	25.73	25.75	30.65	29.34	32.27	32.46	32.07	31.96
800	0.06	0.09	24.64	24.64	29.18	27.86	30.75	31.22	31.02	30.78
900	0.07	0.11	23.66	23.67	28.19	27.02	29.66	30.19	29.86	29.88
950	0.08	0.12	23.22	23.24	27.60	26.53	29.02	29.66	29.43	29.41
960	0.09	0.12	23.14	23.15	27.70	26.43	29.00	29.55	29.39	29.37
1000	0.07	0.11	22.78	22.79	27.67	26.13	28.74	29.11	29.12	29.15
1050	0.09	0.12	22.36	22.37	27.14	25.75	28.46	28.69	28.90	29.00
1100	0.10	0.13	22.05	22.05	25.52	24.41	28.42	28.73	28.89	29.18
1150	0.11	0.15	21.69	21.66	24.96	23.23	28.41	28.53	28.75	29.00
1200	0.11	0.14	21.39	21.38	25.40	23.93	28.51	28.62	28.91	29.17
1240	0.11	0.15	21.10	21.12	25.18	23.73	28.59	28.70	28.98	29.28
1250	0.11	0.15	21.03	21.04	25.11	23.71	28.61	28.76	28.96	29.26
1300	0.11	0.16	20.73	20.74	25.04	23.39	28.80	29.03	29.03	29.44
1350	0.12	0.17	20.42	20.42	24.92	23.25	29.01	29.23	29.10	29.52
1400	0.13	0.18	20.15	20.16	24.64	22.93	29.20	29.47	29.59	30.15
1450	0.14	0.19	19.91	19.91	24.19	22.67	29.88	30.04	30.15	30.85
1500	0.14	0.19	19.66	19.67	24.09	22.51	31.00	31.29	30.68	31.13
1600	0.16	0.22	19.23	19.24	23.35	21.67	33.30	34.05	32.39	32.58
1650	0.16	0.23	18.99	19.00	23.77	21.98	35.17	36.23	33.49	33.10
1700	0.18	0.24	18.79	18.79	23.45	21.98	37.47	38.75	34.38	33.79
1750	0.19	0.24	18.50	18.50	25.29	22.81	39.52	41.89	34.82	33.47
1800	0.19	0.26	18.34	18.34	24.79	22.62	41.40	45.71	36.51	33.92
1850	0.22	0.27	18.23	18.24	23.32	21.90	46.68	57.66	37.40	34.25
1900	0.21	0.31	18.15	18.11	22.71	20.79	43.24	46.02	36.12	35.41
1950	0.22	0.28	17.92	17.93	23.24	21.57	41.84	43.02	37.64	33.03
2000	0.24	0.30	17.75	17.79	23.57	21.56	40.19	40.76	36.82	32.82
2100	0.25	0.32	17.43	17.46	24.70	21.89	36.33	34.97	34.39	31.94
2150	0.29	0.34	17.41	17.36	22.88	21.88	34.55	34.31	33.63	32.46
2200	0.29	0.34	17.16	17.14	25.70	23.55	34.08	33.45	34.29	32.41
2300	0.29	0.34	17.02	17.01	24.55	22.08	32.05	31.32	33.34	31.90
2350	0.31	0.38	16.86	16.88	24.86	22.64	32.89	31.93	32.58	33.10
2400	0.32	0.38	16.77	16.73	25.33	22.77	32.89	32.80	33.32	33.17
2500	0.34	0.39	16.40	16.52	27.72	25.24	34.29	35.14	33.14	34.87
2750	0.39	0.46	15.94	15.95	27.20	28.53	35.57	50.99	33.24	38.59
3000	0.40	0.50	15.65	15.67	23.58	25.17	29.85	30.35	29.16	30.21
3250	0.45	0.56	15.30	15.37	21.05	20.13	24.83	24.57	25.00	25.14
3500	0.50	0.61	15.02	14.98	18.19	17.91	22.50	22.66	22.79	22.70
3750	0.54	0.65	14.65	14.69	16.00	15.36	21.96	22.47	24.28	24.24
4000	0.58	0.70	14.42	14.34	14.53	13.77	25.30	26.22	30.38	29.65
4250	0.61	0.75	14.14	14.18	13.36	12.87	34.19	42.61	42.17	34.28
4500	0.69	0.80	14.00	13.97	13.14	12.71	27.58	28.45	26.54	26.51
4750	0.78	0.87	14.01	13.99	13.16	12.41	21.34	21.80	22.33	22.57
5000	0.81	0.93	14.04	13.96	13.14	12.26	18.60	19.11	21.61	22.07
5250	0.89	0.99	14.03	13.99	12.72	11.91	17.46	18.00	21.36	21.87
5500	0.95	1.05	13.96	13.81	13.01	12.19	16.68	17.35	20.29	20.31
5750	0.97	1.13	14.01	13.83	12.57	11.08	16.25	16.74	19.11	18.72
6000	1.05	1.19	13.82	13.69	11.64	10.23	15.70	16.01	16.75	16.55
6250	1.14	1.34	13.77	13.42	10.15	9.68	15.09	14.84	14.70	14.35
6500	1.35	1.49	13.61	13.32	9.75	8.99	13.63	13.18	13.55	13.20
6750	1.60	1.71	13.94	13.43	8.29	7.74	11.53	11.62	12.84	12.69
7000	1.93	1.90	13.84	13.59	7.98	8.46	9.89	10.31	11.59	11.86

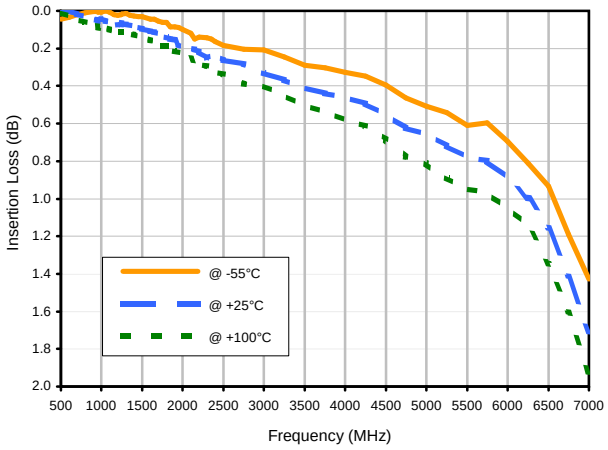
Bi-Directional Coupler SYBD-20-142HP+

Typical Performance Curves

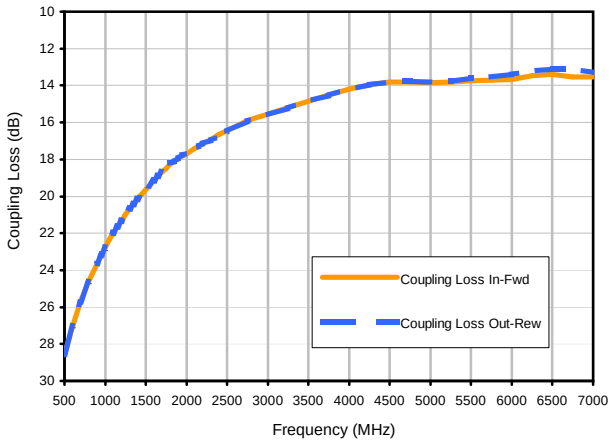
Insertion Loss



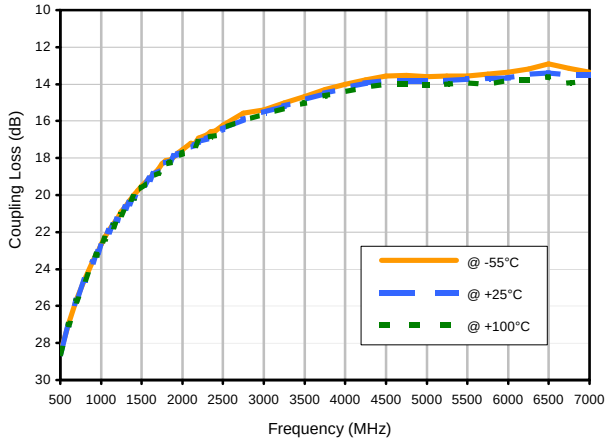
Insertion Loss vs. TEMPERATURE



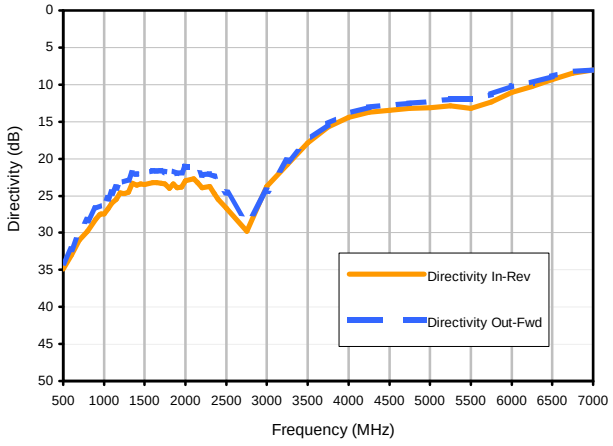
Coupling Loss



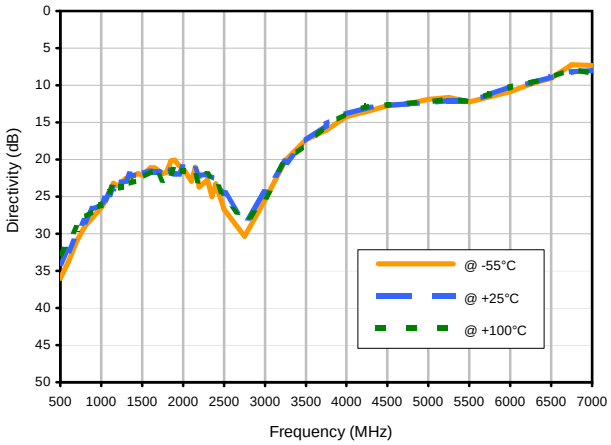
Coupling Loss vs. TEMPERATURE



Directivity



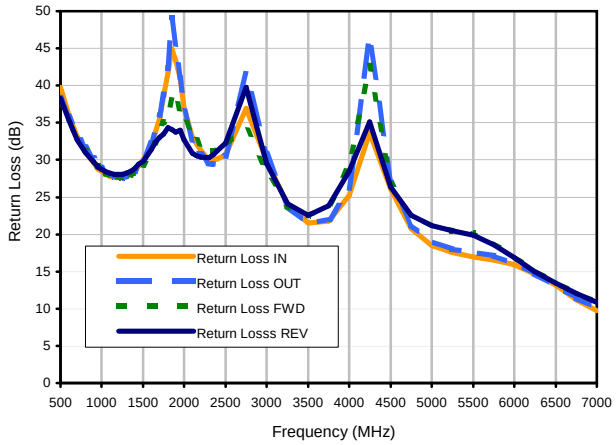
Directivity vs. TEMPERATURE



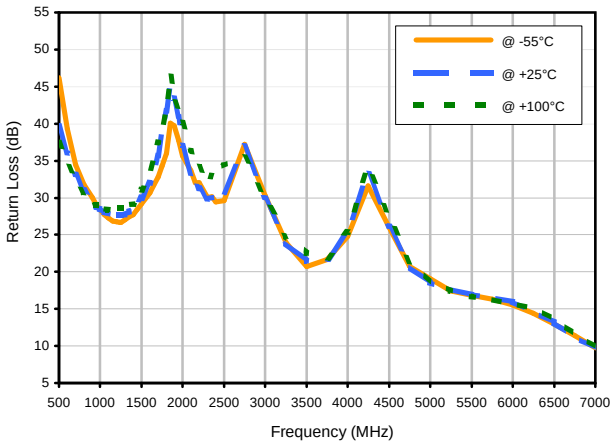
Bi-Directional Coupler SYBD-20-142HP+

Typical Performance Curves

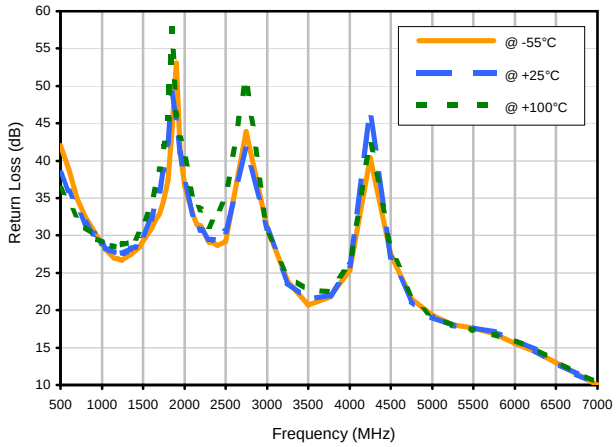
Return Loss



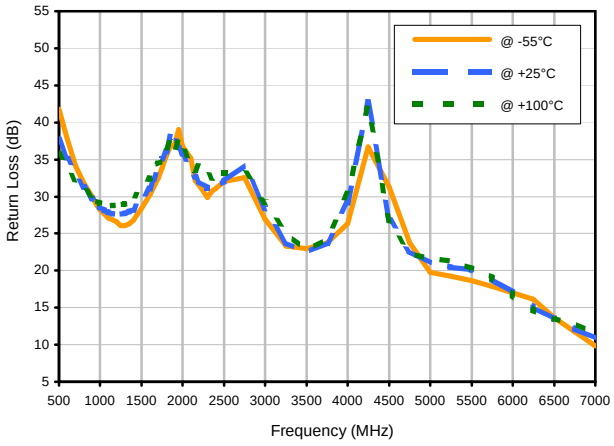
Return Loss In vs. TEMPERATURE



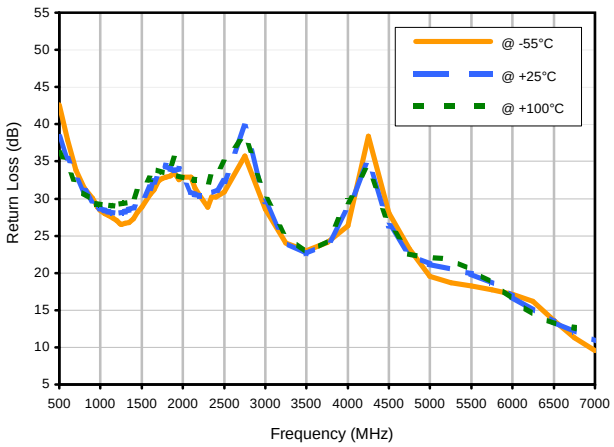
Return Loss Out vs. TEMPERATURE



Return Loss Fwd vs. TEMPERATURE



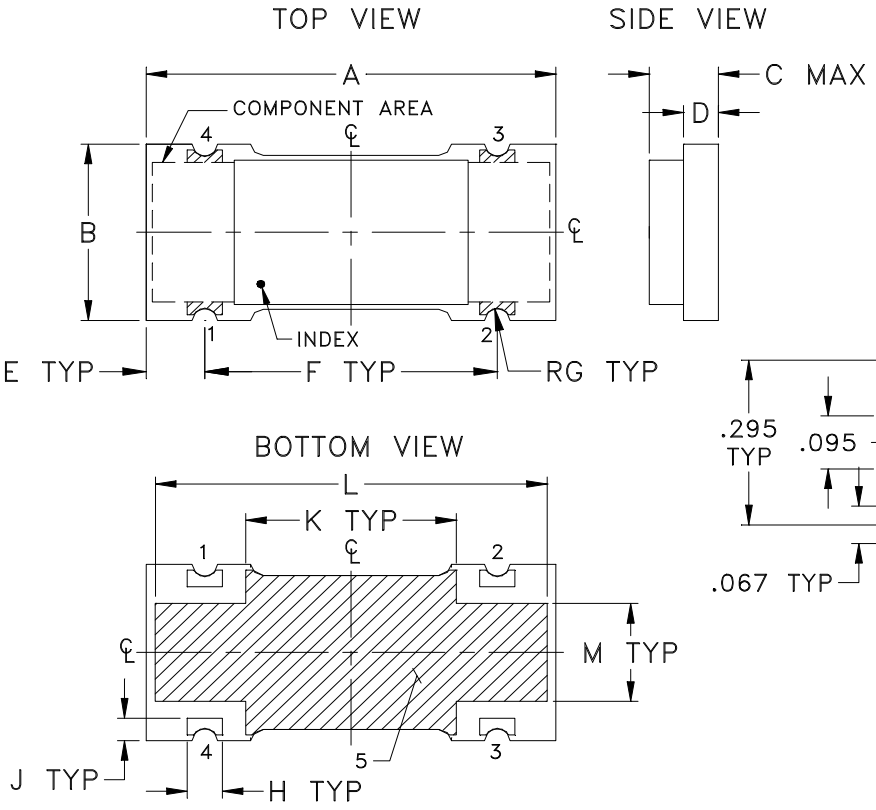
Return Loss Rev vs. TEMPERATURE



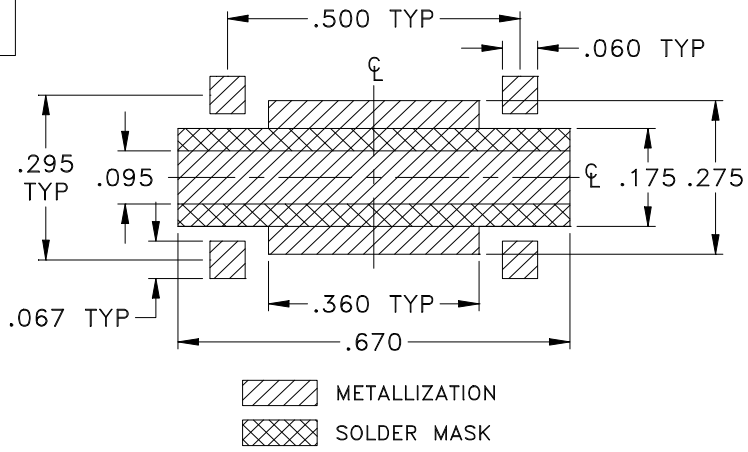
Case Style JB

JB1233

Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE #.	A	B	C	D	E	F	G	H	J	K	L	M	WT, GRAM
JB1233	.70 (17.78)	.32 (8.13)	.13 (3.30)	.060 (1.52)	.100 (2.54)	.500 (12.70)	.022 (0.56)	.060 (1.52)	.040 (1.02)	.360 (9.14)	.670 (17.02)	.175 (4.45)	0.68

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

Notes:

1. Open style, Base material: Printed wiring laminate.
2. Termination finish: 3-5 µ inch (.08-.13 microns) Gold over 120-240 µ inch (3.05-6.10 microns) Nickel plate. All models, (+) suffix.

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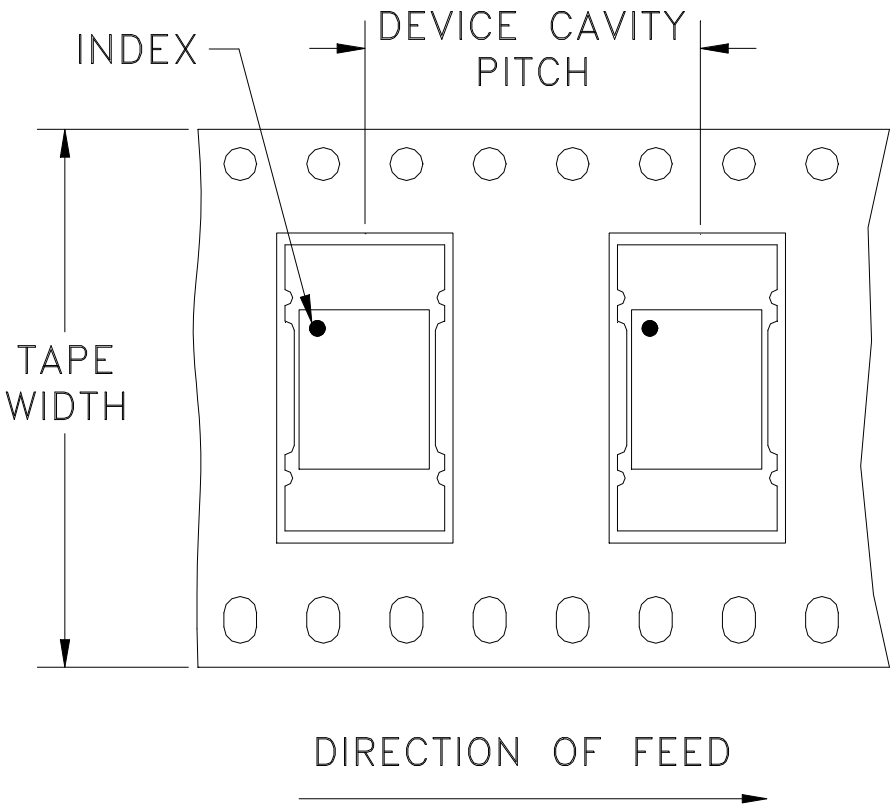
Tape & Reel Packaging TR-F84

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
32	12	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.

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

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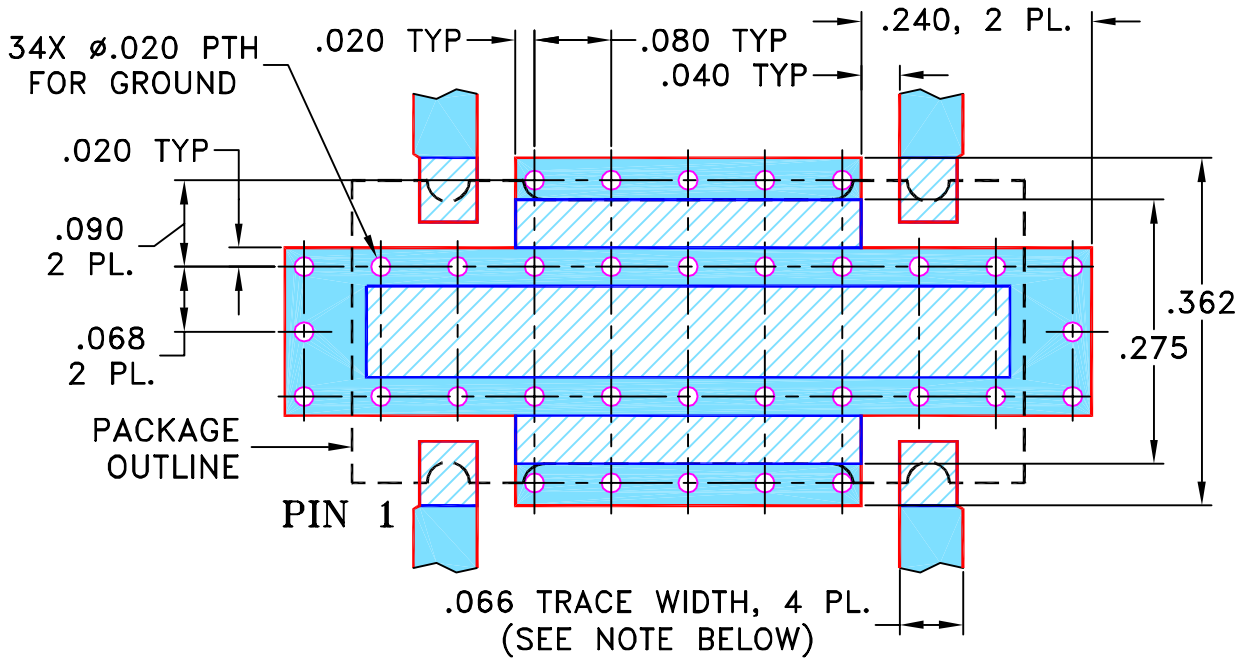
THIRD ANGLE PROJECTION

REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M109017	NEW RELEASE	12/29/06	MMG	WP

SUGGESTED MOUNTING CONFIGURATION FOR JB1233 CASE STYLE, "rw" PIN CONNECTION



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	12/21/06
TOLERANCES ON:	CHECKED	AV	12/29/06
2 PL DECIMALS ±	APPROVED	WP	12/29/06
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

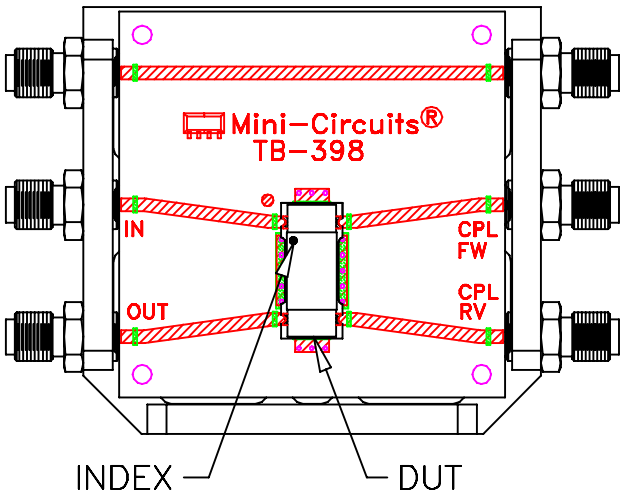
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, rw, JB1233, SYBD, TB-398

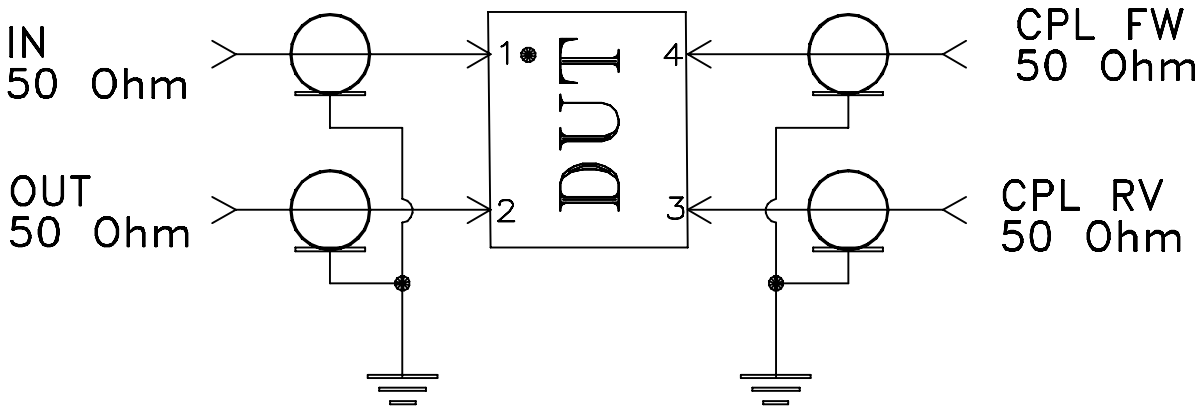
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-260	OR

FILE:	SCALE:	SHEET:
98PL260	5:1	1 OF 1

Evaluation Board and Circuit



TB-398



Schematic Diagram

Notes:

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

Mini-Circuits®

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Environmental Specifications ENV02T2

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

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-55° to 100°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
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