

High Power Bi-Directional Coupler

NON-CATALOG

BDCA-10-25

50Ω 10dB Coupling DC Pass 800 to 2500 MHz



Generic photo used for illustration purposes only

CASE STYLE: SM1L

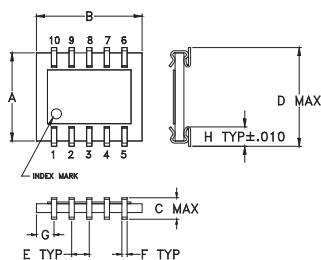
Maximum Ratings

Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
DC Current	0.25A
Permanent damage may occur if any of these limits are exceeded.	

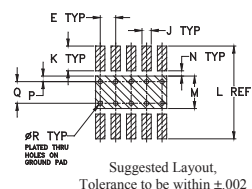
Pin Connections

INPUT	1
OUTPUT	6
COUPLED (forward)	10
COUPLED (reverse)	5
GROUND	2,3,4,7,8,9

Outline Drawing



PCB Land Pattern

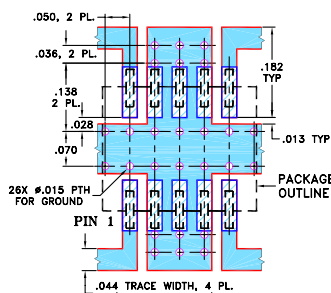


Suggested Layout,
Tolerance to be within ±0.02

Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H	
.250	.300	.070	.320	.050	.015	.050	.075	
6.35	7.62	1.78	8.13	1.27	0.38	1.27	1.91	
J	K	L	M	N	P	Q	R	wt
.030	.095	.330	.100	.020	.015	.070	.014	grams
0.76	2.41	8.38	2.54	0.51	0.38	1.78	0.36	0.3

Demo Board MCL P/N: TB-115+ Suggested PCB Layout (PL-004)



- NOTE: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020 ± .0015; 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.
3. DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
4. DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

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

Features

- four-port coupler
- wideband, 800 to 2500 MHz
- excellent VSWR, 1.05:1 typ. all ports
- good flatness, ±0.6 dB typ.
- excellent power handling capability, 50W (800-1000 MHz)
- hermetically sealed
- minimal variation with temperature variation
- low profile, 0.07" height
- protected by US Patent 7,049,905
- DC current through input to output 0.25A Max. at 1.0 watt RF input power.

Applications

- cellular, PCS, PCN, UMTS
- ISM
- GPS

Bi-Directional Coupler Electrical Specifications

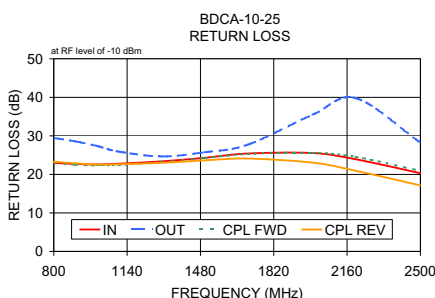
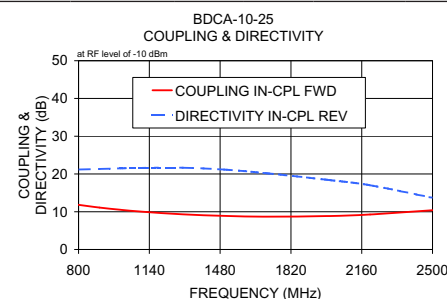
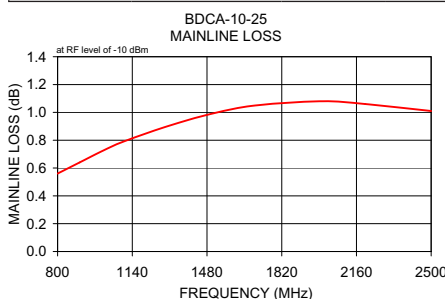
FREQUENCY (MHz)	COUPLING (dB)		MAINLINE LOSS ¹ (dB)		DIRECTIVITY (dB)		VSWR (:1)	POWER INPUT ² (W)
	Nom.	Max. Flatness	Typ.	Max.	Typ.	Min.		
800-2500	10.1±2.0	±2.0	1.0	1.5	22	14	1.05	24
800-1000	11.0±0.8	±1.2	0.6	1.0	22	18	1.05	50
1700-2000	8.5±0.5	±0.6	1.1	1.5	23	19	1.05	34
2000-2500	9.4±1.2	±1.5	1.0	1.5	22	14	1.05	24

1. Includes theoretical power loss of 0.46 dB at 10 dB coupling.

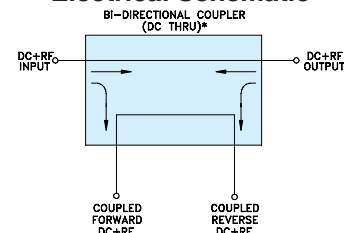
2. Derate linearly 1/3 at 100°C

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
800.00	0.56	11.83	11.88	20.59	21.17	22.99	29.46	22.90	23.30
900.00	0.64	11.11	11.16	20.65	21.33	22.69	28.57	22.52	22.87
1000.00	0.72	10.52	10.58	20.79	21.48	22.57	27.38	22.33	22.55
1100.00	0.79	10.03	10.10	20.92	21.62	22.77	25.93	22.47	22.63
1300.00	0.90	9.32	9.43	21.40	21.66	23.38	24.65	23.22	23.01
1500.00	0.99	8.89	9.04	21.96	21.15	24.32	25.75	24.26	23.65
1700.00	1.05	8.70	8.92	22.46	20.21	25.42	27.72	25.30	24.11
2000.00	1.08	8.86	9.21	22.63	18.42	25.54	35.50	25.58	23.07
2200.00	1.06	9.27	9.77	22.30	17.02	23.92	39.80	24.56	20.95
2500.00	1.01	10.40	11.25	19.70	13.69	20.32	28.28	20.94	17.14



Electrical Schematic



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



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Bi-Directional Coupler

BDCA-10-25

Typical Performance Data

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

FREQ. (MHz)	INSERTION LOSS		COUPLING		DIRECTIVITY		RETURN LOSS			
	(dB) IN-OUT	(dB) FWD-REV	(dB) IN-FWD	(dB) OUT-REV	(dB) IN-REV	(dB) OUT-FWD	(dB) IN	(dB) OUT	(dB) FWD	(dB) REV
500	0.32	0.32	15.39	15.39	21.18	21.23	31.12	30.83	32.46	31.28
600	0.39	0.39	14.02	14.01	21.53	21.78	29.61	29.85	31.22	30.60
700	0.47	0.46	12.91	12.91	21.99	22.29	28.57	28.54	30.33	29.70
750	0.51	0.49	12.44	12.44	22.46	22.67	28.42	28.37	29.97	29.72
800	0.54	0.54	12.01	12.01	22.79	23.07	28.26	28.39	29.74	29.61
850	0.58	0.57	11.62	11.62	23.16	23.41	28.11	28.21	29.68	29.54
900	0.61	0.61	11.26	11.26	23.59	23.91	27.95	28.00	29.82	29.73
1000	0.69	0.68	10.64	10.64	24.47	24.95	28.12	28.17	30.19	30.28
1050	0.72	0.72	10.38	10.38	24.98	25.47	28.24	28.18	30.54	30.61
1100	0.76	0.75	10.13	10.13	25.44	26.15	28.42	28.47	30.73	30.88
1150	0.79	0.78	9.91	9.91	25.89	26.81	28.61	28.69	31.15	31.25
1200	0.82	0.81	9.71	9.72	26.56	27.57	29.21	29.16	31.45	31.57
1250	0.85	0.85	9.53	9.53	27.30	28.40	29.68	29.63	31.98	31.98
1300	0.88	0.87	9.36	9.37	28.03	29.47	30.19	30.21	33.00	32.86
1350	0.90	0.90	9.22	9.22	28.81	30.94	30.97	31.07	34.12	33.94
1400	0.93	0.92	9.09	9.10	29.89	32.10	32.05	32.24	35.24	34.56
1450	0.95	0.95	8.98	8.99	30.57	33.69	33.30	33.50	35.81	35.08
1500	0.97	0.97	8.88	8.89	31.28	36.16	34.20	34.43	37.35	36.17
1550	0.99	0.99	8.80	8.81	31.46	38.82	35.50	36.05	37.73	36.46
1600	1.01	1.01	8.73	8.74	32.04	41.53	36.79	38.06	37.99	36.52
1650	1.03	1.03	8.68	8.69	31.81	48.19	38.13	40.31	37.92	36.29
1700	1.04	1.04	8.64	8.65	31.91	62.23	38.74	42.28	39.04	37.23
1800	1.06	1.06	8.60	8.61	31.06	45.84	38.63	44.84	38.30	36.42
1850	1.07	1.07	8.59	8.61	30.70	41.08	38.37	45.44	38.72	37.06
1900	1.07	1.08	8.60	8.62	30.48	38.34	38.10	44.31	39.43	37.57
1950	1.08	1.08	8.63	8.64	29.43	37.53	37.58	43.32	38.12	37.21
2000	1.08	1.08	8.66	8.67	28.67	36.37	37.59	42.64	38.17	37.66
2050	1.08	1.08	8.71	8.72	27.78	34.60	38.03	43.26	37.25	37.99
2100	1.08	1.08	8.77	8.77	27.21	34.50	38.93	44.43	36.32	38.13
2200	1.06	1.07	8.93	8.95	25.64	32.34	41.87	43.01	33.18	36.12
2250	1.05	1.06	9.03	9.04	24.87	31.81	43.70	40.83	31.49	34.68
2300	1.05	1.06	9.15	9.16	24.09	30.83	41.50	37.40	29.76	32.11
2350	1.04	1.05	9.27	9.28	23.28	30.12	38.19	34.80	27.97	30.15
2400	1.03	1.04	9.42	9.43	22.51	29.02	34.59	31.86	26.47	28.33
2450	1.02	1.03	9.60	9.60	21.66	27.94	31.44	29.77	25.05	26.83
2500	1.01	1.03	9.79	9.79	20.81	26.60	29.22	27.69	23.88	25.23
2550	0.99	1.01	9.98	9.97	20.18	25.70	27.34	26.16	22.80	23.97
2600	0.98	0.99	10.19	10.21	19.29	24.38	25.32	24.41	21.95	22.92
2700	0.96	0.98	10.70	10.70	17.66	22.30	22.18	21.58	19.85	20.57
2800	0.95	0.97	11.30	11.32	16.23	20.52	19.83	19.21	18.22	18.78
2900	0.93	0.96	12.05	12.04	14.56	18.22	17.57	17.27	16.59	17.01
3000	0.94	0.96	12.85	12.83	13.17	16.51	15.93	15.69	15.38	15.74
3250	0.97	0.97	15.47	15.42	10.01	12.33	13.32	13.15	13.30	13.57
3500	0.99	0.95	19.27	19.15	7.21	8.70	12.42	12.20	12.98	13.19
3750	0.91	0.86	27.00	26.52	3.65	3.88	13.14	12.76	14.13	14.31
4000	0.80	0.76	31.72	30.75	16.89	10.52	16.76	15.92	18.36	19.07
4250	0.80	0.80	20.26	20.37	9.58	12.34	27.97	21.03	25.53	44.68
4500	1.01	1.01	16.09	16.21	7.49	9.21	18.53	16.46	16.67	17.51
4750	1.32	1.34	13.99	14.16	6.02	7.73	12.70	11.96	12.09	12.33
5000	1.66	1.68	13.08	13.23	5.33	6.85	10.08	9.71	9.80	9.97
5250	1.92	1.99	12.68	12.82	4.99	6.47	8.84	8.63	8.44	8.64
5500	2.10	2.21	12.51	12.58	4.84	6.31	8.33	8.11	7.79	7.96
6000	2.21	2.35	11.93	11.95	5.34	7.03	8.34	8.12	7.73	8.07

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Bi-Directional Coupler

BDCA-10-25

Typical Performance Data

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

FREQ. (MHz)	INSERTION LOSS		COUPLING		DIRECTIVITY		RETURN LOSS			
	(dB) IN-OUT	(dB) FWD-REV	(dB) IN-FWD	(dB) OUT-REV	(dB) IN-REV	(dB) OUT-FWD	(dB) IN	(dB) OUT	(dB) FWD	(dB) REV
500	0.25	0.24	15.39	15.36	21.83	21.91	33.40	33.05	35.12	33.71
600	0.32	0.30	14.00	13.96	22.12	22.36	31.53	31.97	33.29	32.71
700	0.38	0.37	12.89	12.85	22.54	22.88	30.08	30.05	32.19	31.45
750	0.42	0.40	12.41	12.37	22.82	23.22	29.62	29.59	31.53	31.37
800	0.45	0.44	11.98	11.93	23.23	23.65	29.24	29.35	31.14	31.21
850	0.48	0.47	11.58	11.54	23.76	23.96	29.39	29.49	31.09	31.17
900	0.51	0.50	11.23	11.18	24.13	24.38	29.23	29.27	31.06	31.14
1000	0.58	0.57	10.59	10.54	24.89	25.16	28.68	28.68	31.67	31.96
1050	0.61	0.60	10.32	10.27	25.44	25.52	28.50	28.47	31.57	31.80
1100	0.64	0.63	10.08	10.02	25.93	26.15	28.84	28.98	31.41	31.74
1150	0.67	0.66	9.85	9.80	26.06	26.72	28.91	28.93	31.31	31.60
1200	0.70	0.69	9.65	9.60	26.57	27.57	29.34	29.10	31.00	31.37
1250	0.72	0.72	9.46	9.41	27.66	28.60	30.49	30.28	30.99	31.32
1300	0.75	0.74	9.29	9.24	28.42	29.82	31.78	31.58	31.44	31.74
1350	0.77	0.77	9.15	9.09	28.88	31.42	32.29	31.96	32.18	32.71
1400	0.80	0.79	9.01	8.95	30.57	32.78	33.53	33.30	33.69	33.92
1450	0.82	0.81	8.90	8.83	31.40	34.31	34.33	34.01	35.27	35.77
1500	0.83	0.83	8.80	8.73	32.04	36.38	33.92	33.44	36.73	37.25
1550	0.85	0.85	8.71	8.65	32.83	39.35	35.73	35.64	35.70	36.02
1600	0.87	0.86	8.64	8.57	33.15	43.73	38.57	38.92	35.13	35.57
1650	0.88	0.88	8.58	8.51	32.12	52.62	40.89	41.55	35.40	36.30
1700	0.89	0.89	8.53	8.46	31.76	46.71	40.27	40.77	37.40	38.83
1800	0.91	0.91	8.48	8.41	31.85	44.68	39.86	42.13	38.62	38.57
1850	0.91	0.91	8.47	8.40	31.47	42.20	38.51	42.13	38.62	38.18
1900	0.92	0.92	8.48	8.41	31.07	38.85	37.67	41.91	38.25	37.22
1950	0.92	0.92	8.49	8.42	29.52	36.91	35.90	39.35	36.60	36.01
2000	0.92	0.91	8.52	8.44	29.17	35.11	37.05	41.55	36.84	35.80
2050	0.92	0.91	8.57	8.49	29.10	32.87	38.34	45.27	37.44	36.18
2100	0.91	0.91	8.62	8.53	28.32	32.21	38.82	44.44	38.37	37.57
2200	0.89	0.89	8.77	8.69	26.04	31.09	40.09	42.32	34.75	37.90
2250	0.88	0.88	8.86	8.77	24.71	31.39	40.80	39.96	31.44	34.65
2300	0.88	0.87	8.96	8.88	24.31	30.87	44.07	40.91	29.54	32.01
2350	0.86	0.86	9.08	8.99	23.39	30.10	44.64	38.71	27.89	30.12
2400	0.85	0.86	9.22	9.13	22.75	28.68	37.96	33.24	26.84	28.92
2450	0.83	0.84	9.38	9.28	22.28	27.28	32.55	30.46	25.78	27.81
2500	0.83	0.83	9.56	9.44	21.66	26.24	29.55	28.56	24.58	26.12
2550	0.81	0.82	9.76	9.65	20.21	24.81	26.81	25.74	22.96	24.07
2600	0.78	0.80	9.97	9.88	19.57	24.03	25.35	24.40	21.77	22.60
2700	0.77	0.77	10.44	10.34	17.64	23.01	22.25	21.20	20.09	20.75
2800	0.75	0.77	11.02	10.92	17.06	20.79	20.40	19.81	18.28	18.61
2900	0.73	0.75	11.73	11.63	14.89	18.86	17.80	17.22	16.74	17.05
3000	0.73	0.73	12.52	12.40	13.30	16.77	15.87	15.53	15.51	15.72
3250	0.75	0.74	15.07	14.92	10.24	12.35	13.17	12.85	13.05	13.10
3500	0.75	0.69	18.66	18.49	7.35	8.77	12.00	11.64	12.87	12.76
3750	0.66	0.61	25.62	25.10	4.32	4.35	12.88	12.49	14.01	13.94
4000	0.54	0.51	34.43	32.95	9.23	5.70	16.21	15.37	17.30	17.50
4250	0.50	0.49	20.92	20.85	10.51	13.67	24.51	19.86	25.66	34.78
4500	0.64	0.65	16.21	16.17	7.73	9.59	19.81	17.20	17.25	18.17
4750	0.93	0.94	13.96	13.91	6.45	8.25	13.47	12.33	12.48	12.81
5000	1.26	1.30	12.89	12.80	5.63	7.04	10.46	9.83	9.73	9.73
5250	1.53	1.62	12.43	12.34	5.11	6.65	8.88	8.44	8.21	8.26
5500	1.74	1.81	12.21	12.12	4.87	6.33	8.03	7.64	7.64	7.64
6000	1.92	1.98	11.78	11.55	5.28	6.47	7.73	7.35	7.44	7.51

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FREQ. (MHz)	INSERTION LOSS		COUPLING		DIRECTIVITY		RETURN LOSS			
	(dB) IN-OUT	(dB) FWD-REV	(dB) IN-FWD	(dB) OUT-REV	(dB) IN-REV	(dB) OUT-FWD	(dB) IN	(dB) OUT	(dB) FWD	(dB) REV
500	0.37	0.37	15.36	15.38	20.43	20.48	29.45	29.19	30.43	29.62
600	0.45	0.44	14.00	14.01	20.89	21.13	28.19	28.35	29.45	28.91
700	0.53	0.53	12.90	12.93	21.40	21.61	27.18	27.10	28.93	28.38
750	0.57	0.57	12.44	12.46	21.90	22.07	27.08	26.99	28.73	28.44
800	0.61	0.61	12.01	12.03	22.28	22.51	27.08	27.17	28.81	28.65
850	0.65	0.65	11.62	11.65	22.66	22.83	26.96	27.06	28.85	28.63
900	0.69	0.69	11.27	11.30	23.13	23.42	26.90	26.95	29.08	28.86
1000	0.76	0.76	10.66	10.69	24.07	24.60	27.44	27.50	29.84	29.77
1050	0.80	0.80	10.40	10.43	24.53	25.19	27.65	27.62	30.29	30.15
1100	0.84	0.84	10.16	10.18	24.97	25.92	27.83	27.88	30.81	30.77
1150	0.87	0.87	9.94	9.97	25.46	26.55	27.97	28.06	31.64	31.49
1200	0.90	0.91	9.75	9.78	26.18	27.25	28.53	28.55	32.25	31.98
1250	0.93	0.94	9.57	9.60	26.92	28.01	29.02	29.13	33.06	32.56
1300	0.96	0.97	9.41	9.45	27.46	29.04	29.48	29.67	34.40	33.65
1350	0.99	1.00	9.27	9.31	28.06	30.41	30.29	30.55	35.65	34.67
1400	1.02	1.03	9.15	9.18	28.83	31.43	31.42	31.79	36.53	34.87
1450	1.05	1.06	9.04	9.08	29.13	32.84	32.71	33.14	36.66	34.98
1500	1.07	1.08	8.95	8.99	29.32	34.70	33.50	33.89	37.97	36.06
1550	1.09	1.10	8.87	8.92	29.27	35.97	34.40	34.93	38.10	36.41
1600	1.11	1.12	8.81	8.85	29.81	37.36	35.61	36.72	38.37	36.55
1650	1.13	1.14	8.76	8.81	29.60	39.19	36.71	38.35	38.61	36.67
1700	1.14	1.16	8.72	8.77	29.55	41.33	37.14	39.44	39.23	37.57
1800	1.17	1.18	8.69	8.75	28.66	43.27	38.01	41.30	37.02	36.33
1850	1.18	1.19	8.70	8.75	28.27	42.50	38.83	42.81	36.79	37.23
1900	1.18	1.20	8.71	8.77	28.09	39.82	39.33	43.14	36.89	38.07
1950	1.19	1.21	8.74	8.80	27.31	39.03	38.65	42.35	35.28	36.93
2000	1.19	1.21	8.78	8.84	26.84	37.88	38.26	40.98	35.12	37.14
2050	1.19	1.21	8.84	8.89	25.98	36.04	38.42	39.96	33.40	36.01
2100	1.19	1.22	8.90	8.96	25.46	35.50	38.72	39.62	31.58	33.91
2200	1.18	1.21	9.09	9.15	24.26	32.47	38.35	36.16	29.14	31.34
2250	1.18	1.20	9.20	9.25	23.79	31.28	36.97	34.69	28.16	30.17
2300	1.17	1.20	9.32	9.39	23.04	29.87	33.93	32.16	27.01	28.46
2350	1.16	1.20	9.46	9.53	22.38	28.98	32.02	30.48	25.58	26.95
2400	1.16	1.20	9.62	9.68	21.53	28.02	30.18	28.70	24.21	25.54
2450	1.15	1.19	9.82	9.87	20.63	27.23	28.53	27.26	22.99	24.29
2500	1.14	1.18	10.02	10.07	19.94	26.12	27.43	26.07	22.07	23.20
2550	1.13	1.17	10.22	10.28	19.37	25.20	26.23	25.00	21.37	22.33
2600	1.11	1.16	10.44	10.50	18.66	23.94	24.45	23.65	20.85	21.76
2700	1.10	1.15	10.97	11.03	17.11	21.72	21.43	20.94	19.07	19.75
2800	1.10	1.15	11.58	11.66	15.76	20.39	19.44	18.84	17.89	18.55
2900	1.09	1.14	12.37	12.44	14.19	17.97	17.37	17.07	16.43	16.94
3000	1.09	1.13	13.20	13.24	12.70	16.05	16.07	15.79	15.32	15.87
3250	1.12	1.12	15.89	15.97	9.76	12.26	13.62	13.50	13.83	14.25
3500	1.13	1.13	20.23	20.16	7.27	8.75	12.81	12.66	13.55	13.98
3750	1.09	1.06	29.05	28.17	2.92	2.86	13.74	13.42	14.98	15.58
4000	1.00	1.00	29.32	28.90	26.00	16.73	17.78	16.89	19.46	21.31
4250	1.01	1.05	19.69	19.87	9.35	11.65	33.92	22.35	23.83	31.09
4500	1.26	1.29	15.81	16.05	6.97	8.81	17.54	15.94	16.26	17.15
4750	1.63	1.67	13.98	14.26	5.93	7.29	12.01	11.61	11.96	12.15
5000	1.99	2.03	13.26	13.49	5.14	6.57	9.71	9.56	9.96	10.15
5250	2.26	2.35	12.90	13.20	4.75	6.19	8.72	8.66	8.68	8.91
5500	2.40	2.59	12.74	12.95	4.69	6.15	8.47	8.38	8.01	8.22
6000	2.48	2.73	12.09	12.20	5.23	7.45	8.82	8.67	7.97	8.41

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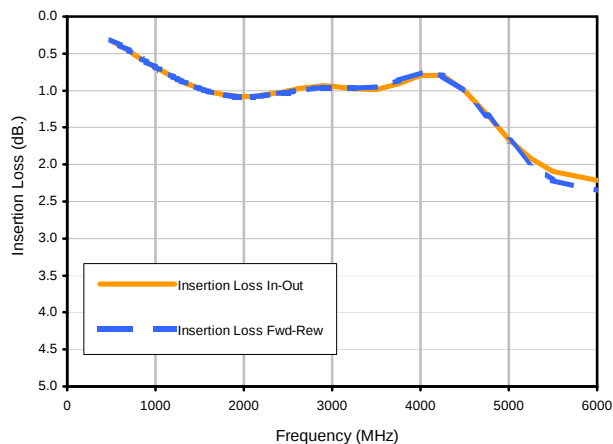


Bi-Directional Coupler

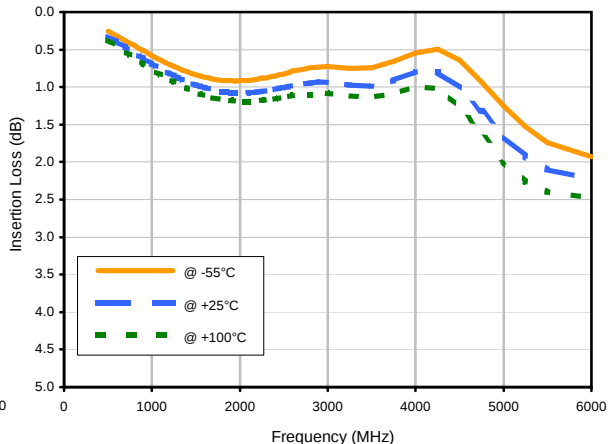
Typical Performance Curves

BDCA-10-25

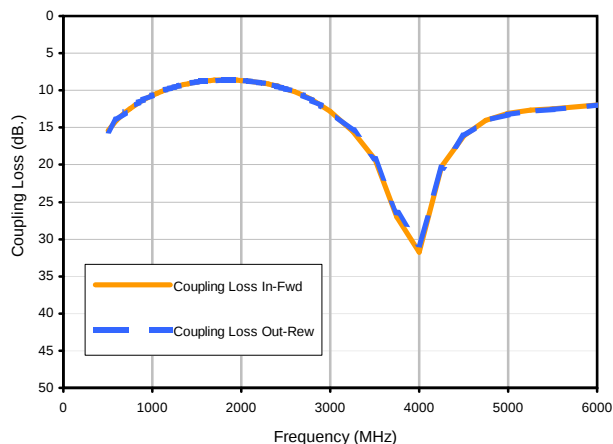
Insertion Loss



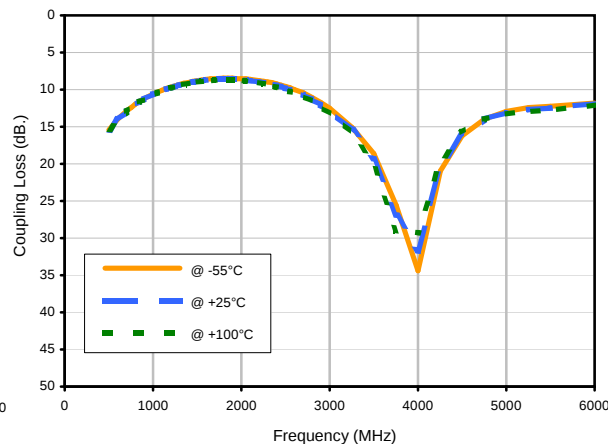
Insertion Loss vs. TEMPERATURE



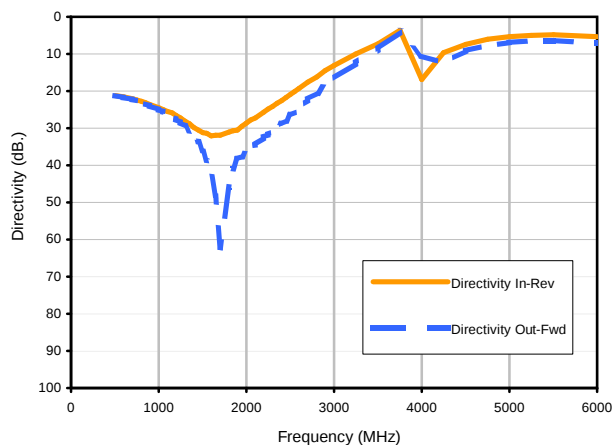
Coupling Loss



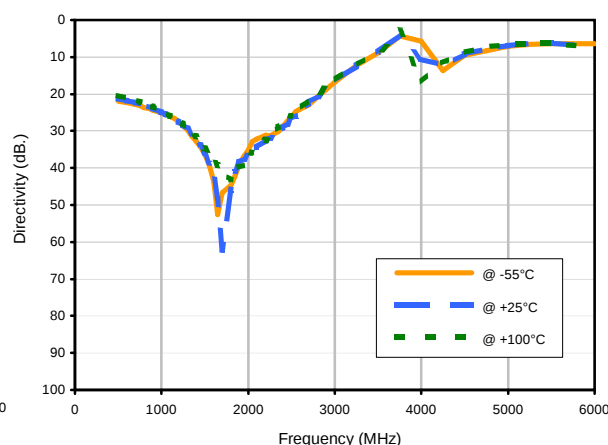
Coupling Loss vs. TEMPERATURE



Directivity



Directivity vs. TEMPERATURE



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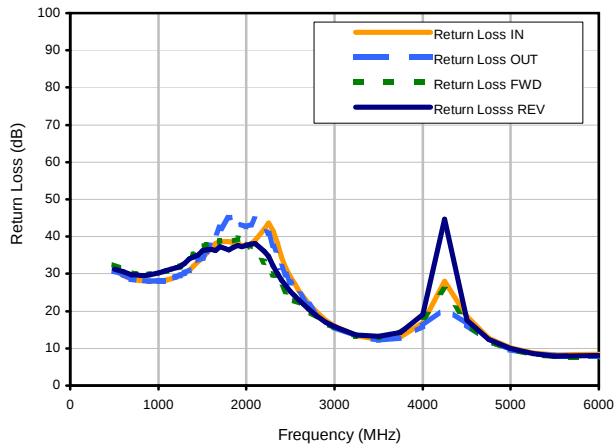


Bi-Directional Coupler

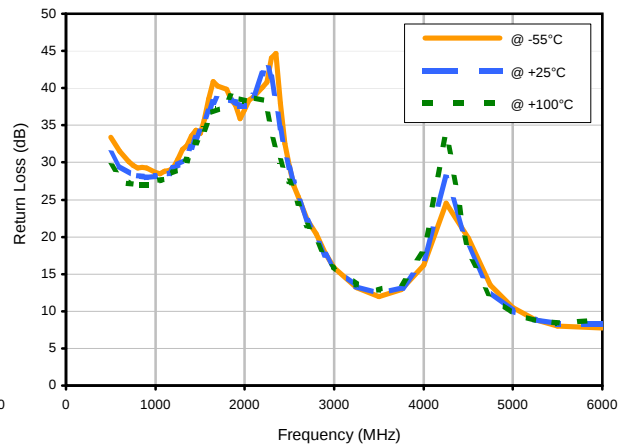
Typical Performance Curves

BDCA-10-25

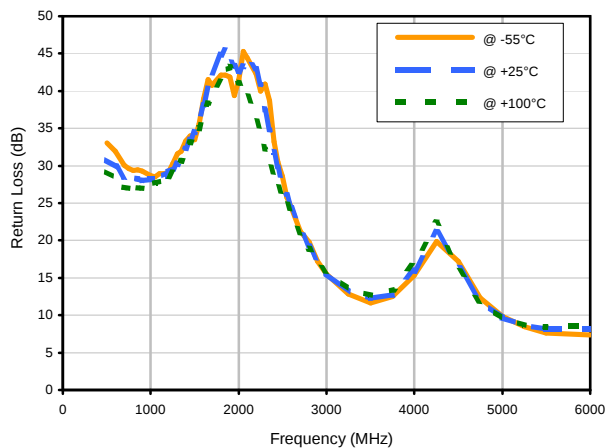
Return Loss



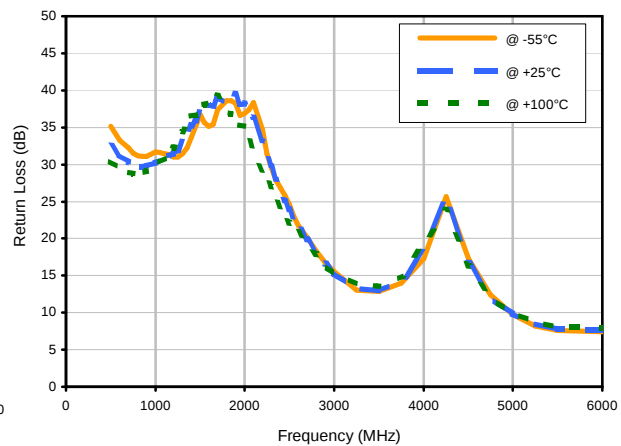
Return Loss In vs. TEMPERATURE



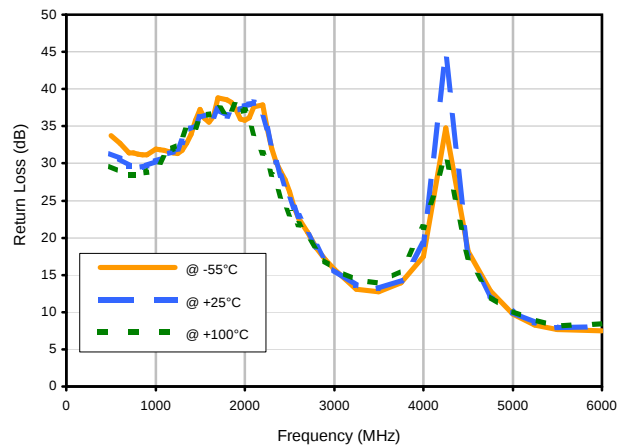
Return Loss Out vs. TEMPERATURE



Return Loss Fwd vs. TEMPERATURE



Return Loss Rev vs. TEMPERATURE



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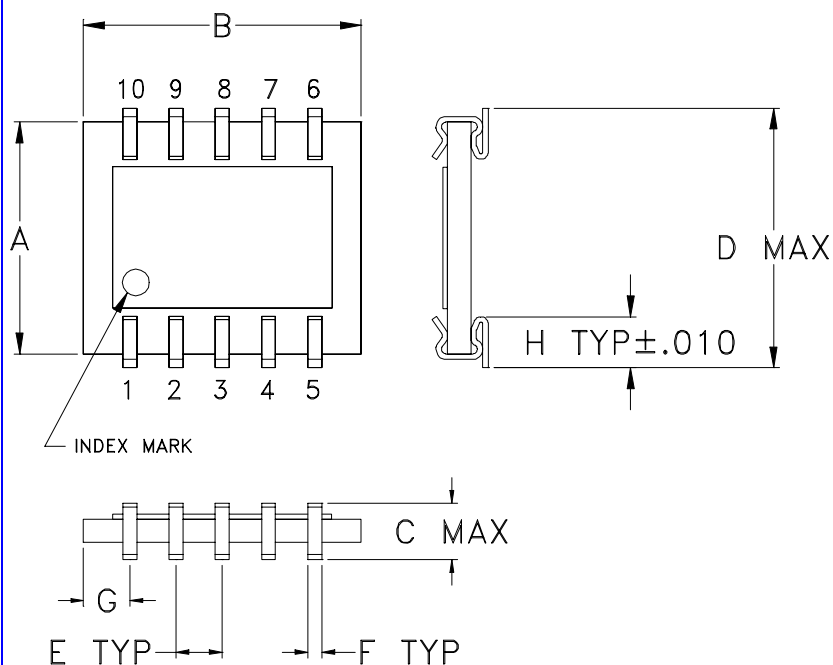


Case Style

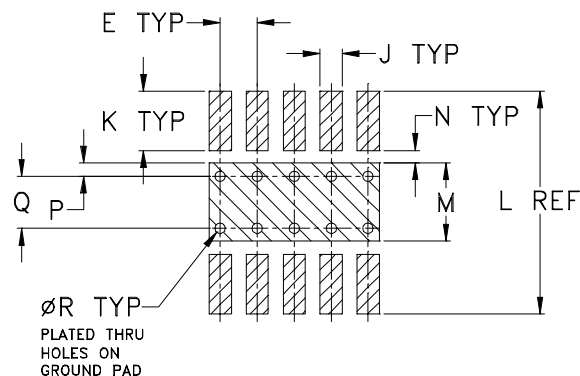
SM1L

SM1L

Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within $\pm .002$

ADJACENT GROUND PINS SHALL BE CONNECTED
TO EACH OTHER AND TO GROUND PAD

CASE #	A	B	C	D	E	F	G	H	J	K	L	M	N	P
SM1L	.250 (6.35)	.300 (7.62)	.070 (1.78)	.320 (8.12)	.050 (1.27)	.015 (0.38)	.050 (1.27)	.075 (1.91)	.030 (0.76)	.095 (2.41)	.330 (8.38)	.100 (2.54)	.020 (0.51)	.015 (0.38)

CASE #	Q	R	WT. GRAM
SM1L	.070 (1.78)	.014 (0.36)	.3

Dimensions are in inches (mm). Tolerances: $\pm .005$

Notes:

- Open style, ceramic base.
- Termination finish:
For RoHS Case Styles: Tin plate over Nickel plate.
For RoHS-5 Case Styles: Tin-Lead plate.



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Tape & Reel Packaging TR-F34



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel see note	
16	12	7	Small quantity standard (see note)	20
				50
				100
				200
		13	Standard	500
				1000

Note: Availability of small reel quantity varies by model.
Refer to pricing and availability on individual model dashboard.

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

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



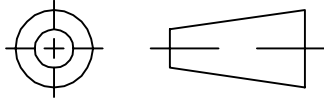
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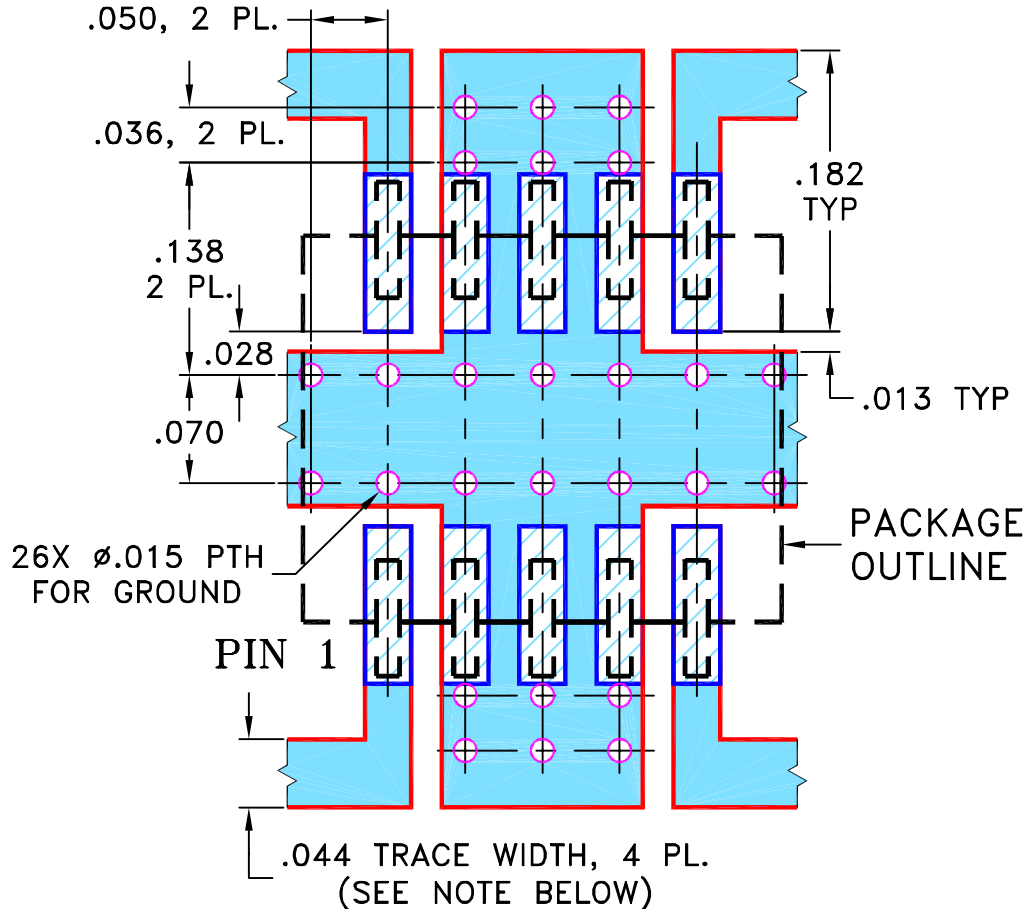
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
A	M82377	UPDATED DRAWING	07/31/02	AV	DB
B	M101085	UPDATED DRAWING, ADDED	10/06/05	MMG	HY
		DZ944 CASE STYLE & NOTE 2			
C	M102713	UPDATED NOTES	01/10/06	MMG	ABD

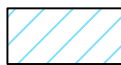
SUGGESTED MOUNTING CONFIGURATION FOR SM1L/SM33/DZ944 CASE STYLES, "lf/nl" PIN CONNECTIONS



- NOTE: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS $.020 \pm .0015$; 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

TOLERANCES ON:

2 PL DECIMALS $\pm$ 3 PL DECIMALS $\pm$.005ANGLES $\pm$ FRACTIONS $\pm$

DRAWN

MMG

04/12/00

CHECKED

WP

04/27/00

APPROVED

DB

04/27/00

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



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PL, lf/nl, SM1L/SM33/DZ944, BDCA/QBA, TB-115

SIZE

A

CODE IDENT

15542

DRAWING NO:

98-PL-004

REV:

C

FILE: 98PL004

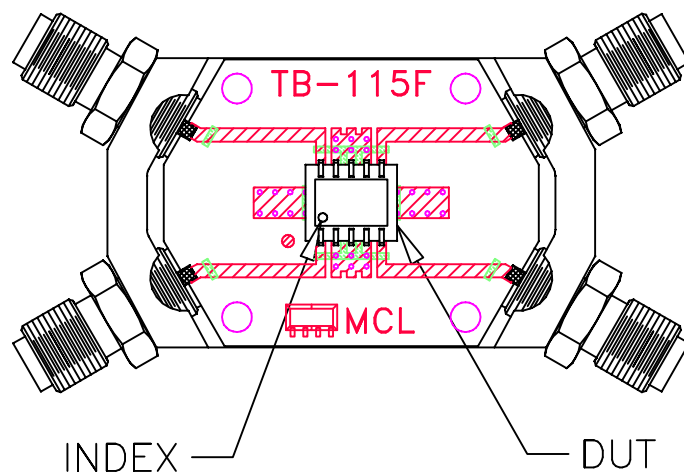
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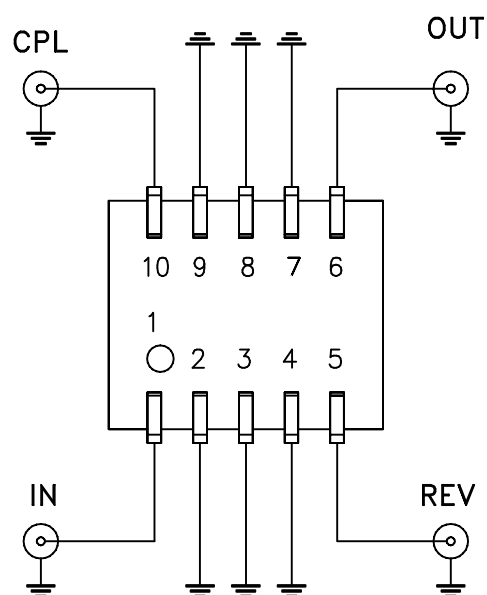
SHEET:

1 OF 1

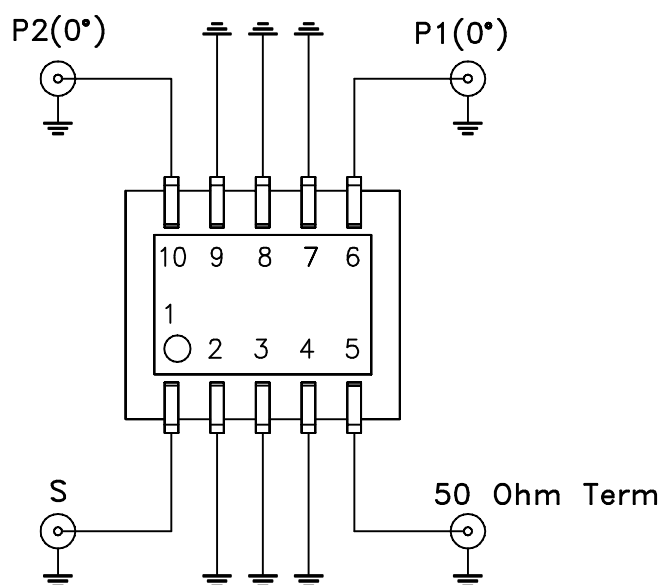
Evaluation Board and Circuit



TB-115+



BDCA MODELS



QBA MODELS

SCHEMATIC DIAGRAM

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.020 inch.

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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