MINIATURE SURFACE MOUNT

Fixed Attenuator

LAT-3+

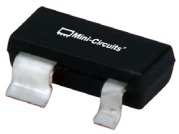
50Ω 0.5 W 3 dB DC to 2.5 GHz

FEATURES

- Wideband, DC to 2.5 GHz
- Excellent VSWR Through Entire Band
- Miniature Size, SOT143 Package
- Aqueous Washable

APPLICATIONS

- Cellular
- PCS
- ISM
- VHF/UHF



Generic photo used for illustration purposes only

CASE STYLE: MMM168

+RoHS Compliant
The +Suffix identifies RoHS Compliance.
See our website for methodologies and qualifications

ELECTRICAL SPECIFICATIONS AT +25°C

Parameter	Condition (GHz)	Min.	Typ.	Max.	Unit
Frequency Range		DC		2.5	GHz
Attenuation, Nominal			3±0.3		dB
Attenuation, Flatness[1]	DC - 0.5			0.3	dB
	DC - 1			0.4	
	DC - 2.5			0.7	
VSWR	DC - 0.5			1.2	:1
	DC - 1			1.3	
	DC - 2.5			1.5	
Input Power[2]				0.5	W

1. Flatness = variation over band divided by 2.
2. RF power at +25°C case temperature: ½ Watt. Derate linearly to 0.2 Watt at +85°C.

ABSOLUTE MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-55°C to +85°C
Storage Temperature	-55°C to +100°C

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

REV. G
ECO-024218
LAT-3+
MCL NY
250113

MINIATURE SURFACE MOUNT

Fixed Attenuator

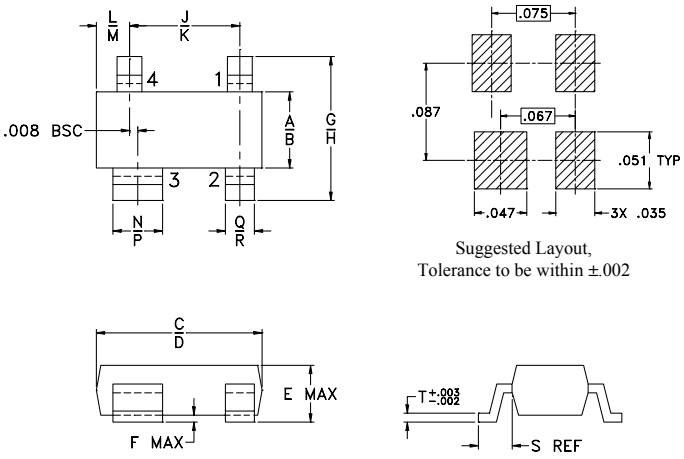
LAT-3+

50Ω 0.5 W 3 dB DC to 2.5 GHz

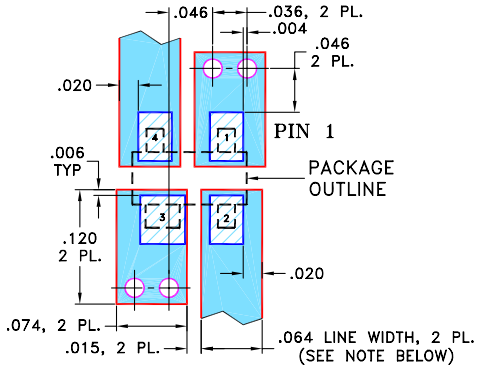
PAD CONNECTIONS

INPUT	4
OUTPUT	2
GROUND	1,3

OUTLINE DRAWING



DEMO BOARD MCL P/N: TB-39
SUGGESTED PCB LAYOUT (PL-225)



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

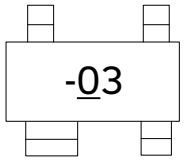
OUTLINE DIMENSIONS (Inch / mm)

A	B	C	D	E	F	G	H	J	K
.045	.055	.105	.120	.047	.005	.083	.104	.070	.080
1.14	1.40	2.67	3.05	1.19	0.13	2.11	2.64	1.78	2.03

L	M	N	P	Q	R	S	T	wt
.018	.024	.030	.036	.015	.021	.023	.005	grams
0.46	0.61	0.76	0.91	0.38	0.53	0.58	0.13	0.01

TAPE & REEL INFORMATION: F8

PRODUCT MARKING



Marking may contain other features or characters for internal lot control

MINIATURE SURFACE MOUNT

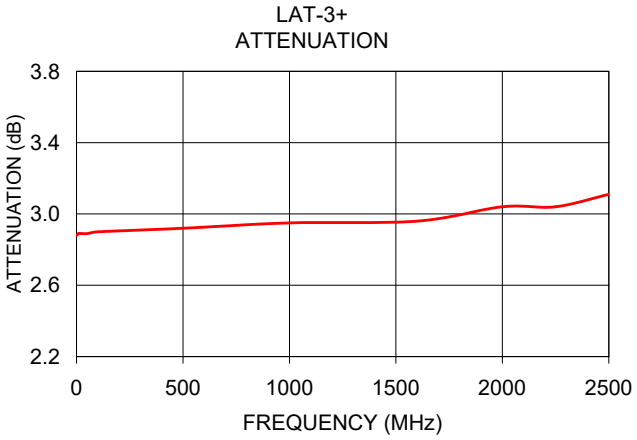
Fixed Attenuator

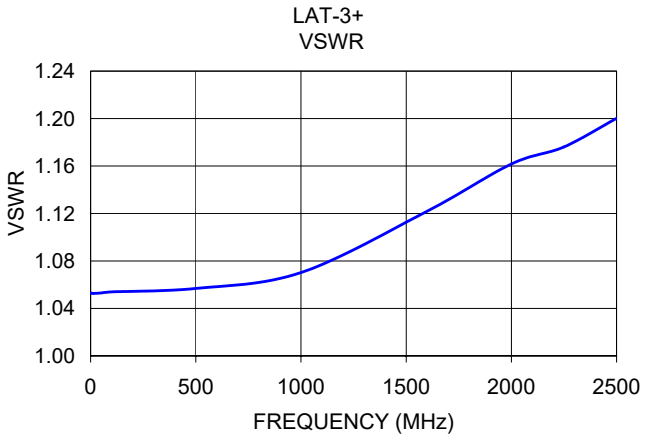
LAT-3+

50Ω 0.5 W 3 dB DC to 2.5 GHz

TYPICAL PERFORMANCE DATA AND CHARTS

Frequency (MHz)	Attenuation (dB)	VSWR (:1)
1.00	2.88	1.05
10.00	2.89	1.05
50.00	2.89	1.05
100.00	2.90	1.05
500.00	2.92	1.06
1000.00	2.95	1.07
1600.00	2.96	1.12
2000.00	3.04	1.16
2250.00	3.04	1.18
2500.00	3.11	1.20





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/terms/viewterm.html

Typical Performance Data

FREQUENCY (MHz)	ATTENUATION (dB)	RETURN LOSS (dB)
1.00	2.88	31.75
10.00	2.89	31.82
50.00	2.89	31.75
100.00	2.90	31.62
500.00	2.92	31.17
1000.00	2.95	29.39
1600.00	2.96	24.81
2000.00	3.04	22.52
2250.00	3.04	21.84
2500.00	3.11	20.82

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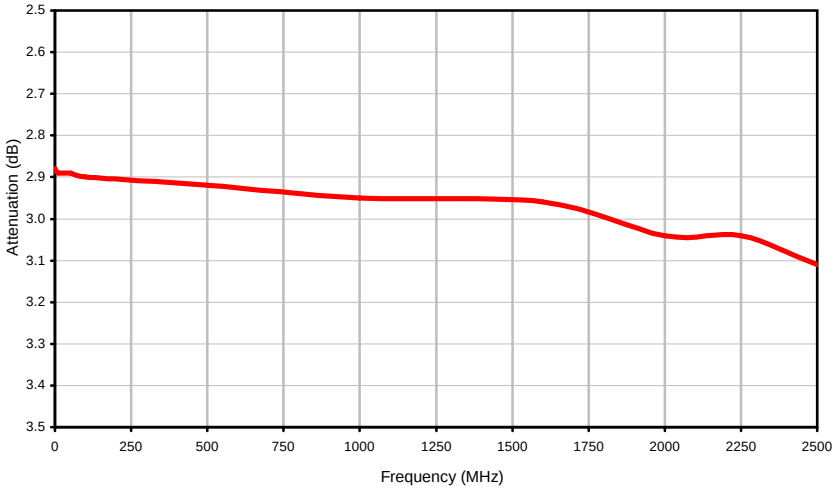
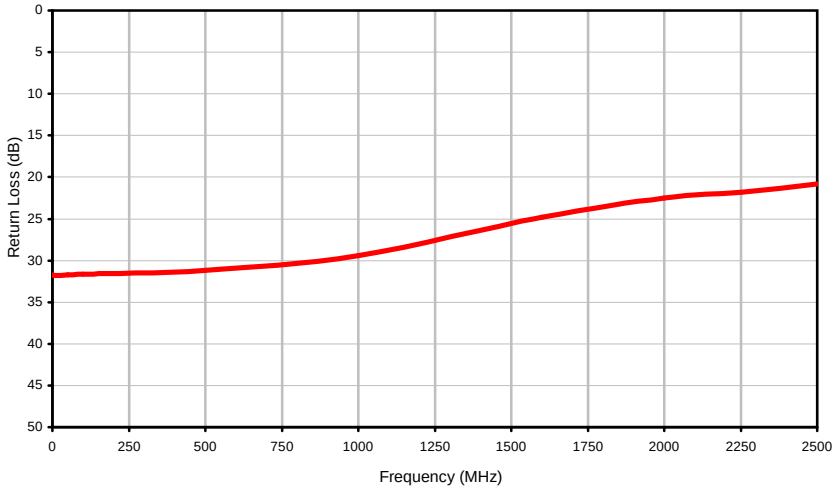
The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see minicircuits.com

Typical Performance Curves

Attenuation



Return Loss



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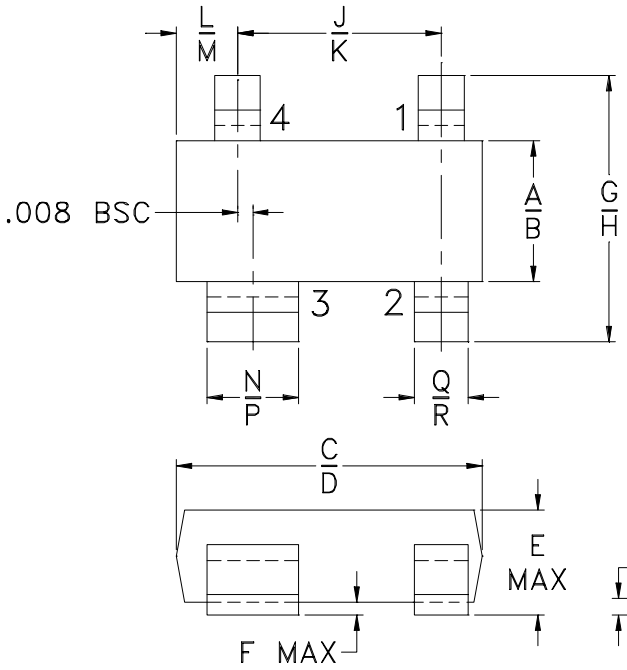
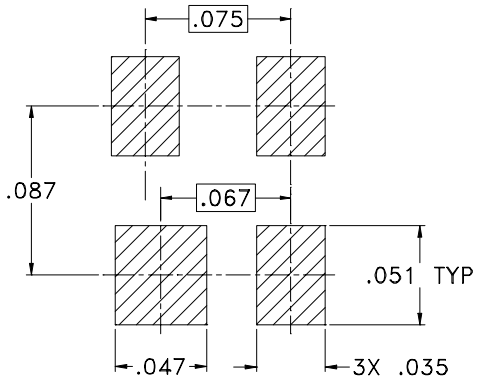
Case Style MMM

MMM168

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	N	P
MMM168	.045 (1.14)	.055 (1.40)	.105 (2.67)	.120 (3.05)	.047 (1.19)	.005 (0.13)	.083 (2.11)	.104 (2.64)	.070 (1.78)	.080 (2.03)	.018 (0.46)	.024 (0.61)	.030 (0.76)	.036 (0.91)

CASE #.	Q	R	S	T	WT, GRAM
MMM168	.015 (0.38)	.021 (0.53)	.023 (0.58)	.005 (0.13)	.01

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

Notes:

1. Case material: Plastic.
2. Termination finish:
   For RoHS Case Styles: Tin-Silver alloy plate over Nickel barrier.
   For RoHS-5 Case Styles: Tin-Lead plate.

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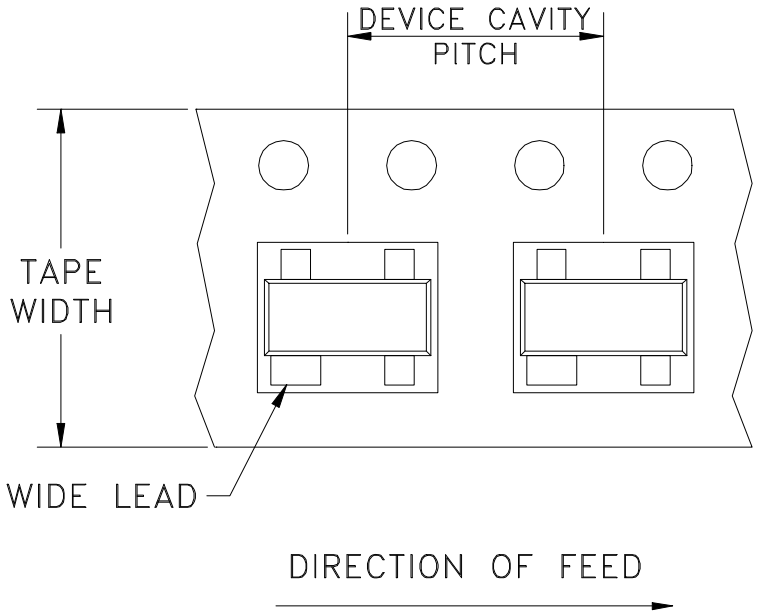
Tape & Reel Packaging TR-F8

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
8	4	7	3000

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

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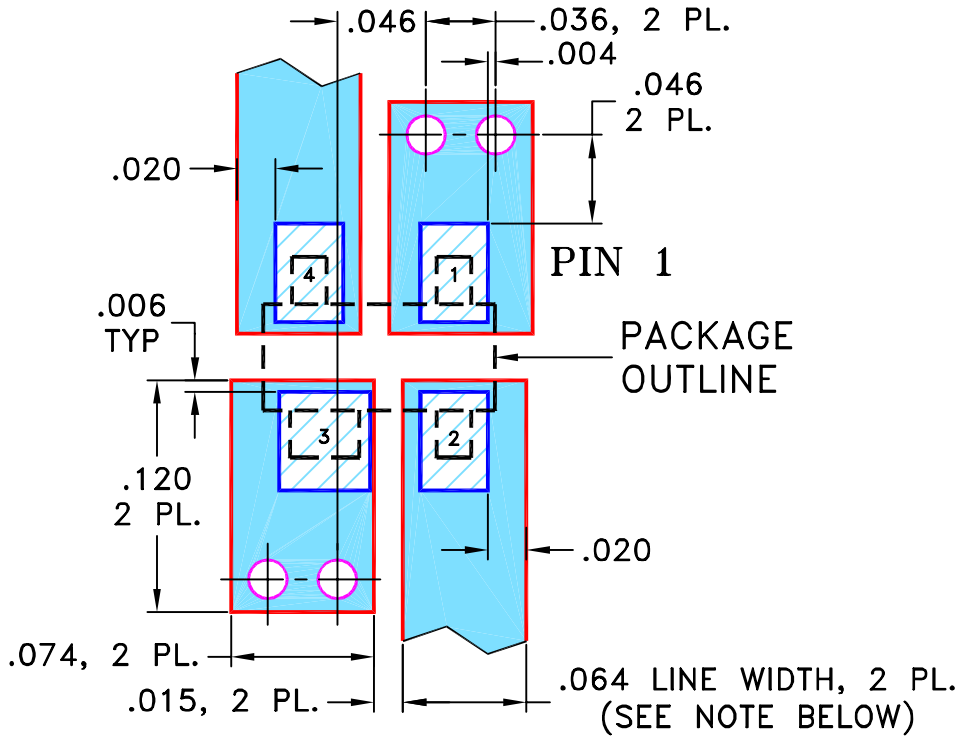
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M101091	NEW RELEASE	02/03/06	MMG	MM

SUGGESTED MOUNTING CONFIGURATION FOR MMM168 CASE STYLE, "jk" PIN CONNECTION



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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	12/12/05
TOLERANCES ON:	CHECKED	AV	01/03/06
2 PL DECIMALS ±	APPROVED	MM	02/03/06
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

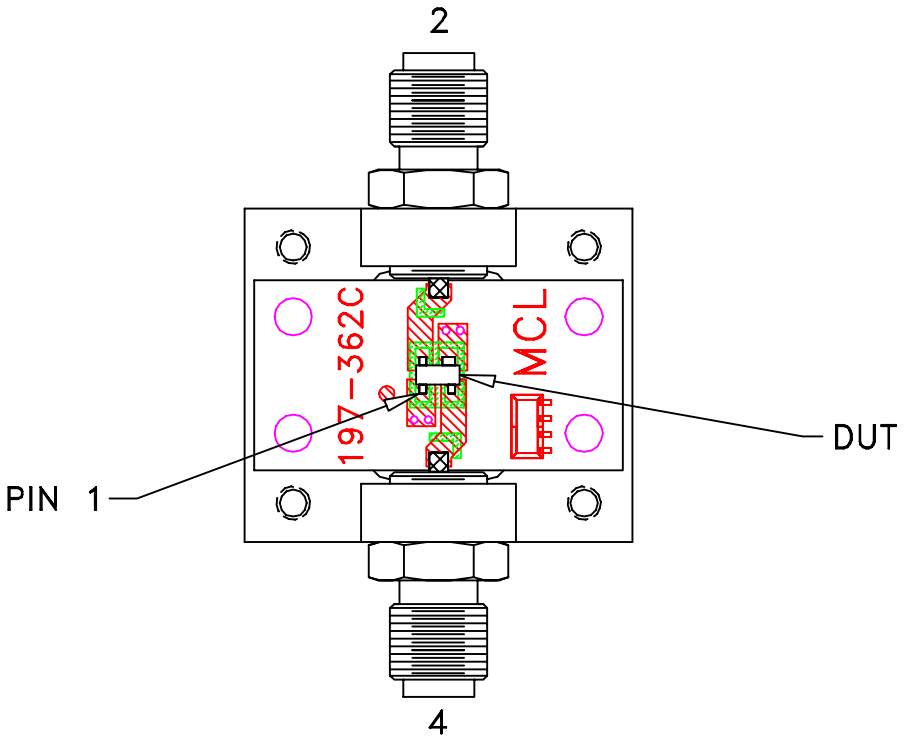
PL, jk, MMM168, LAT, TB-39

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-225	OR

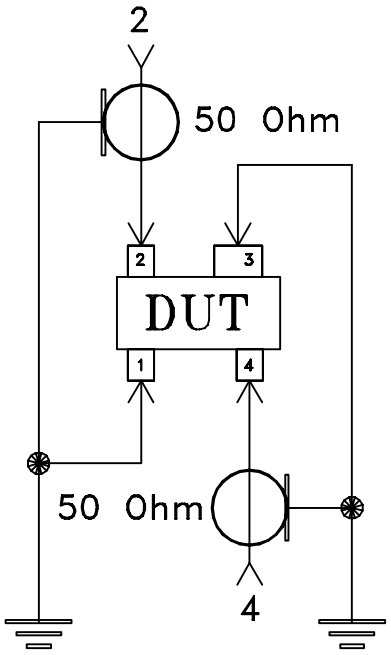
FILE:	SCALE:	SHEET:
98PL225	10:1	1 OF 1

Evaluation Board and Circuit

For Pin Connections refer to Data Sheet of the DUT



TB-39



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 **ENV08T5**

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Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-55° to 85°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Mechanical Shock	1.5Kg, 0.5 ms, 5 shock pulses, Y1 direction only	MIL-STD-883, Method 2002, Condition B, except Y1 direction only
Vibration (Variable Frequency)	50g peak	MIL-STD-883, Method 2007, Condition B
Autoclave	15 psig, 100% RH, 121°C, 96 hours	JESD22-A102, Condition C
HAST	130°C, 85% RH, 96 hours	JESD22-A110
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Solder Reflow Heat	Sn-Pb Eutetic Process: 240°C peak Pb-Free Process: 260°C peak	J-STD-020, Table 4-1, 4-2 and 5-2; Figure 5-1
Moisture Sensitivity: Level 1	Bake at 125°C for 24 hours Soak at 85°C/85% RH for 168 hours, Reflow 3 cycles at 260°C peak	J-STD-020
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether +	MIL-STD-202, Method 215

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Specification	Test/Inspection Condition	Reference/Spec
	monoethanolamine at 63°C to 70°C	

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