LUMPED LC SURFACE MOUNT

Triplexer

TPLX-E3000+

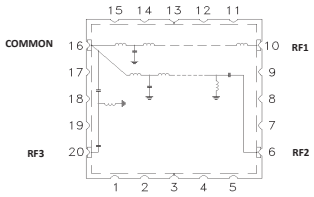
50Ω DC to 3000 MHz (DC-100, 400-550, 1850-3000 MHz)

THE BIG DEAL

- Low Passband Insertion Loss, 0.4 dB Typ. at Lowpass and 0.6 dB Typ. at Bandpass and 0.7 dB Typ. at Highpass Channel
- Good Rejection, 66 dB Typ.
- Power Handling: 5 Watts
- Compact Size, 30.48 x 30.48 mm

Generic photo used for illustration purposes only

FUNCTIONAL DIAGRAM



APPLICATIONS

- Test and Measurement
  - Combining Three ISM Bands (27MHz, 434MHz, 2450MHz)
- Aerospace and Defense
  - Ground based Radar Systems
- Industrial
  - Semi-Conductor Processing

PRODUCT OVERVIEW

Mini-Circuits' TPLX-E3000+ is a high performance 50Ω triplexer with the lowpass channel-1 at 1-100 MHz, bandpass channel-2 at 400-550 MHz and highpass channel-3 at 1850-3000 MHz. The channels are well isolated to minimize inter-channel interference and have minimal insertion loss through their respective bands. The triplexer is built in a shielded package.

KEY FEATURES

Features	Advantages
Low Passband Insertion Loss, 0.4 dB Typ.	Very low insertion loss ensures less signal loss through all the channels.
Good Rejection, 66 dB Typ.	Rejection of 66 dB ensures sufficient isolation between the channels.
Excellent power handling, 5W	Well suited for transmitter application.
Miniature shielded package, 30.48 x 30.48 mm	Triplexer is designed into a surface mount package for automated assembly.

Triplexer

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50Ω DC to 3000 MHz (DC-100, 400-550, 1850-3000 MHz)

ELECTRICAL SPECIFICATIONS AT +25°C

Parameter		Function (Port)	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Insertion Loss	Low Pass Channel-1 (RF COM-RF1)	DC-100	—	0.4	1	dB
		Band Pass Channel-2 (RF COM-RF2)	400-550	—	0.6	1	
		High Pass Channel-3 (RFCOM-RF3)	1850-3000	—	0.7	1.2	
	Return Loss	Low Pass Channel-1 (RF1)	DC-100	12	19	—	dB
		Band Pass Channel-2 (RF2)	400-550	12	16	—	
		High Pass Channel-3 (RF3)	1850-3000	10	13	—	
		Common (COM)	DC-100	12	15	—	
			400-550	12	15	—	
			1850-3000	10	13	—	
Stop Band Rejection		Low Pass Channel-1 (RF COM-RF1)	400-2200	45	57	—	dB
			2200-3000	20	30	—	
		Band Pass Channel-2 (RF COM-RF2)	DC-100	50	66	—	
			1850-2300	40	55	—	
			2300-3000	—	27	—	
		High Pass Channel-3 (RFCOM-RF3)	DC-550	50	62	—	

ABSOLUTE MAXIMUM RATINGS[1]

Parameter	Ratings
Operating Temperature	-40 °C to +85 °C
Storage Temperature	-55 °C to +100 °C
Input Power[2]	5W max. at 25°C

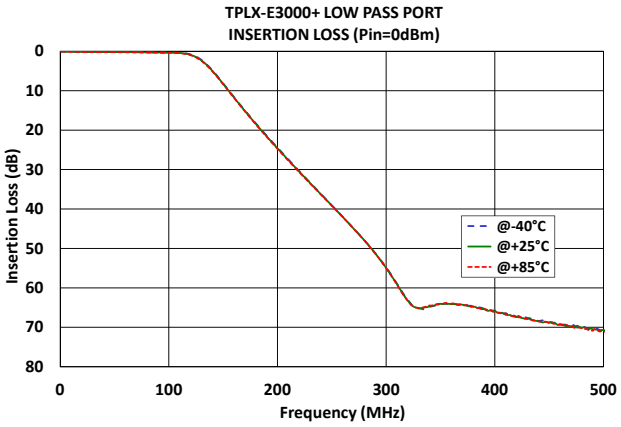
1. Permanent damage may occur if any of these limits are exceeded.
2. Power rating applies only to signals within the passband.

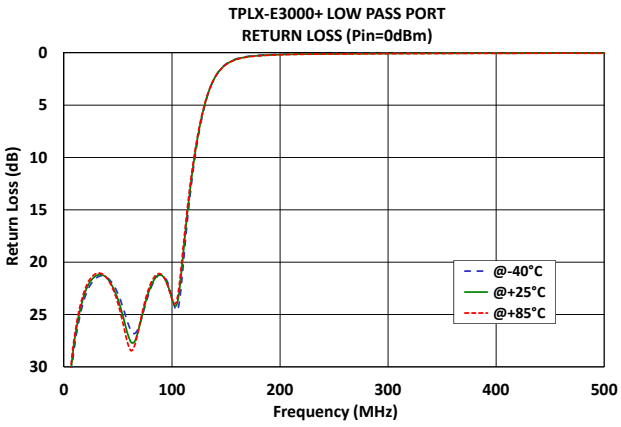
Triplexer

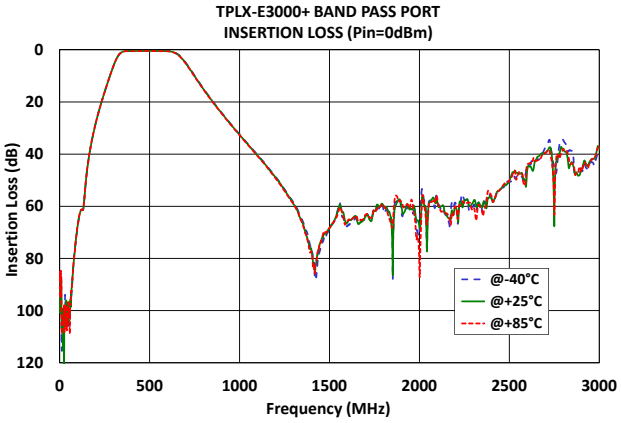
TPLX-E3000+

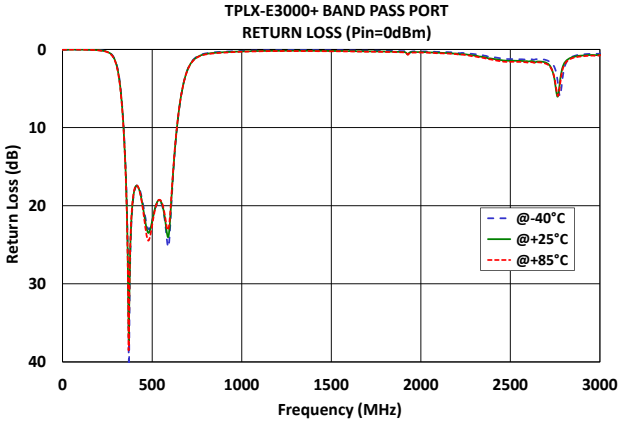
50Ω DC to 3000 MHz (DC-100, 400-550, 1850-3000 MHz)

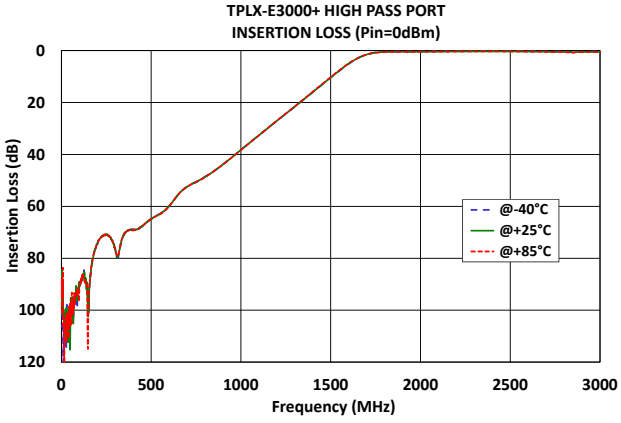
TYPICAL PERFORMANCE GRAPHS

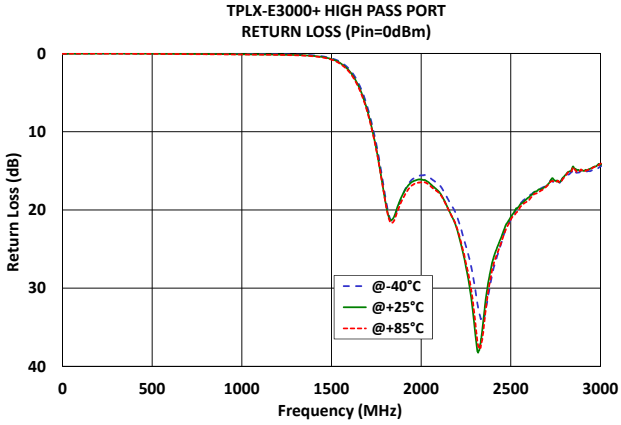












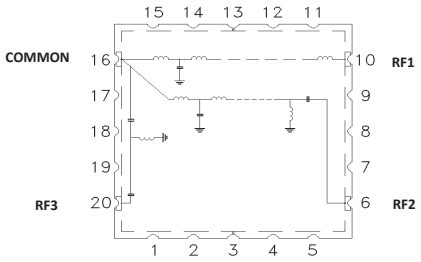
LUMPED LC SURFACE MOUNT

Triplexer

TPLX-E3000+

50Ω DC to 3000 MHz (DC-100, 400-550, 1850-3000 MHz)

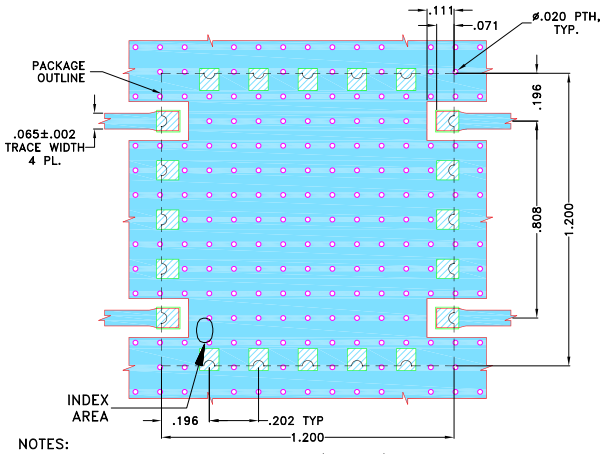
FUNCTIONAL DIAGRAM



PAD DESCRIPTION

Port	Pad Number	Description
COMMON	16	Connects to Common Port
RF1	10	Connects to Low Pass Port
RF2	6	Connects to Band Pass Port
RF3	20	Connects to High Pass Port
GROUND	1,2,3,4,5,7,8, 9,11,12,13,14 ,15,17,18,19	Connects to Ground on PCB, (See drawing PL-409)
NC	—	No connection, not used internally. See drawing PL-409 for connection to PCB

SUGGESTED PCB LAYOUT (PL-409)

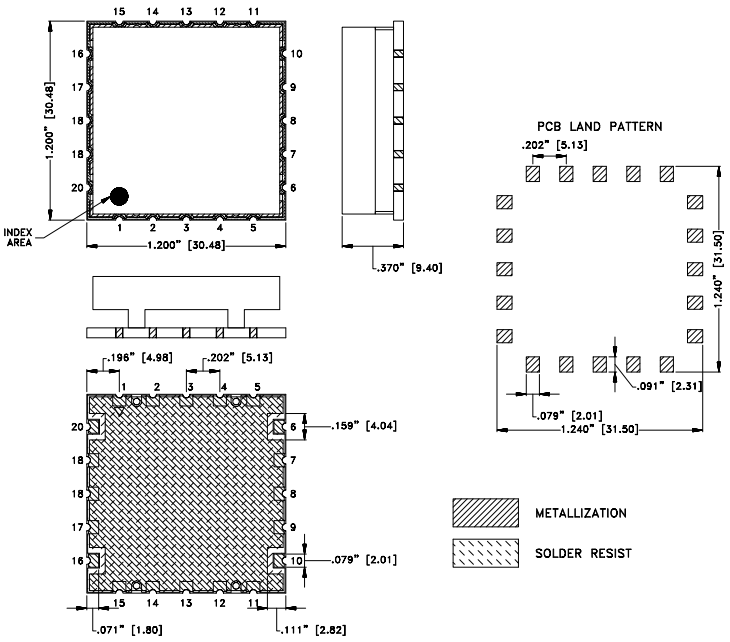


NOTES:
1. TRACE WIDTH IS SHOWN FOR ROGERS (RO4350B) WITH DIELECTRIC THICKNESS .030"±.002". COPPER: 1/2 Oz. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

CASE STYLE DRAWING



Weight: 8.5 grams
Dimensions are in inches[mm]. Tolerance: 2PL.±.03; 3PL.±.015

PRODUCT MARKING*: TPLX-E3000

*Marking may contain other features or characters for internal lot control.

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TPLX-E3000+

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ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASH BOARD. CLICK HERE

Performance Data and Graphs	Data Graphs S-Parameter (S4P Files) Data Set (.zip file) De-embedded to device pads
Case Style	HR1843 Lead Finish: Electroless Nickel Immersion Gold
RoHs Status	Compliant
Tape and Reel	TR-F80
Suggested Layout for PCB Design	PL-409
Evaluation Board	TB-TPLX-E3000+
	Gerber File
Environmental Rating	ENV02T1

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

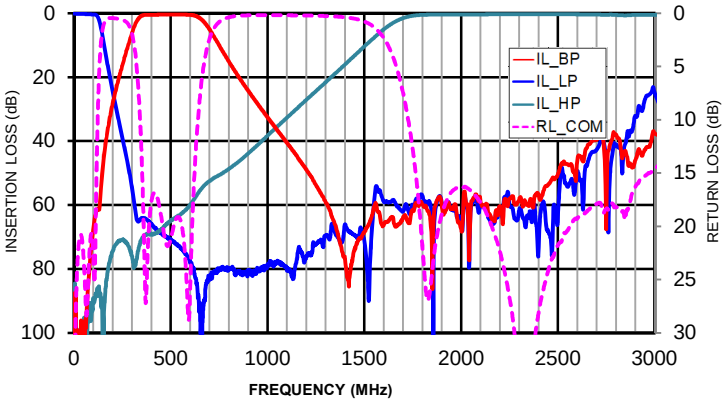
Triplexer TPLX-E3000+

Typical Performance Data

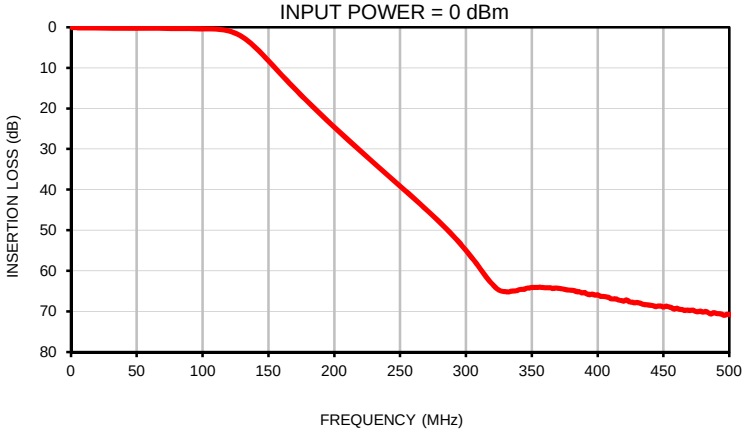
FREQUENCY (MHz)	INSERTIONLOSS (dB)			RETURNLOSS (dB)			
	Lowpass port	Bandpass port	Highpass port	Common port	Lowpass port	Bandpass port	Highpass port
1	0.08	100.79	94.96	44.00	44.70	0.05	0.05
10	0.12	102.89	99.18	27.17	27.30	0.04	0.04
20	0.16	99.39	101.94	22.55	22.75	0.04	0.04
30	0.19	99.25	104.37	20.91	21.27	0.03	0.04
40	0.21	105.54	112.26	21.11	21.55	0.03	0.04
50	0.21	99.87	106.61	23.22	23.57	0.03	0.03
60	0.22	95.74	99.56	27.36	27.16	0.03	0.03
80	0.29	79.64	94.11	22.19	22.39	0.03	0.03
100	0.35	67.39	89.09	23.14	23.49	0.03	0.02
150	8.26	47.42	94.52	1.26	1.11	0.05	0.02
200	24.61	28.18	74.36	0.45	0.17	0.10	0.02
220	30.53	22.98	72.09	0.49	0.13	0.15	0.02
250	39.13	16.12	70.82	0.61	0.10	0.31	0.02
270	44.94	11.88	71.64	0.82	0.08	0.60	0.02
300	54.95	5.98	76.16	1.99	0.06	1.91	0.02
360	64.13	0.55	69.88	20.49	0.04	21.97	0.03
400	65.90	0.49	69.06	17.58	0.04	18.11	0.03
420	67.42	0.48	68.91	16.89	0.03	17.54	0.03
440	68.44	0.45	68.16	18.08	0.03	19.09	0.03
460	69.20	0.42	67.00	20.24	0.02	21.83	0.03
480	70.15	0.41	65.97	21.82	0.03	23.48	0.04
500	70.72	0.42	64.78	21.09	0.02	21.97	0.04
520	71.64	0.44	64.01	19.62	0.02	20.01	0.04
550	73.61	0.46	62.90	19.46	0.02	19.52	0.05
570	74.65	0.46	61.87	21.99	0.02	21.45	0.05
600	78.23	0.51	59.92	25.69	0.01	21.90	0.04
620	81.37	0.68	58.17	15.68	0.01	14.79	0.05
640	89.15	1.13	56.36	9.89	0.02	9.63	0.05
660	108.53	2.00	54.73	6.19	0.01	6.15	0.06
700	82.88	5.05	52.45	2.36	0.01	2.48	0.06
800	80.24	15.14	48.65	0.37	0.02	0.58	0.08
900	80.87	24.27	43.82	0.18	0.02	0.36	0.09
1100	80.56	40.55	32.62	0.18	0.04	0.20	0.13
1200	76.26	48.95	27.05	0.20	0.06	0.17	0.15
1250	72.16	53.76	24.30	0.23	0.06	0.17	0.17
1300	69.59	59.16	21.54	0.25	0.06	0.17	0.20
1350	68.90	66.40	18.76	0.29	0.08	0.17	0.24
1400	66.03	76.91	15.96	0.37	0.07	0.17	0.32
1450	69.38	73.66	13.15	0.50	0.07	0.18	0.45
1500	71.33	68.37	10.32	0.77	0.08	0.20	0.72
1550	58.94	60.63	7.60	1.30	0.08	0.20	1.24
1600	58.98	66.24	5.00	2.31	0.08	0.21	2.24
1650	58.34	64.30	2.91	4.21	0.09	0.23	4.11
1700	62.01	64.08	1.49	7.52	0.08	0.25	7.28
1750	60.12	61.76	0.75	12.84	0.08	0.26	12.19
1800	57.18	59.76	0.47	22.02	0.09	0.28	18.88
1850	64.71	76.52	0.41	24.22	0.09	0.29	20.84
1900	59.55	59.88	0.41	18.85	0.08	0.33	17.90
1950	61.25	60.92	0.41	16.76	0.09	0.35	16.41
2000	66.16	67.69	0.40	16.28	0.08	0.35	16.10
2100	60.03	58.47	0.35	17.75	0.08	0.42	17.68
2200	60.63	60.31	0.29	22.36	0.09	0.54	22.48
2300	61.38	58.19	0.25	35.50	0.07	0.79	35.34
2400	73.49	56.73	0.25	28.12	0.06	1.19	26.40
2500	63.37	50.30	0.28	21.75	0.13	1.45	20.89
2600	49.30	46.07	0.32	19.26	0.19	1.53	18.39
2700	42.62	39.47	0.37	17.88	0.32	1.71	16.90
2800	40.98	37.96	0.51	18.21	0.71	1.82	15.65
2900	32.13	45.88	0.48	16.29	0.84	0.79	14.94
3000	25.02	37.70	0.47	14.65	10.09	0.69	14.23

Typical Performance Curves

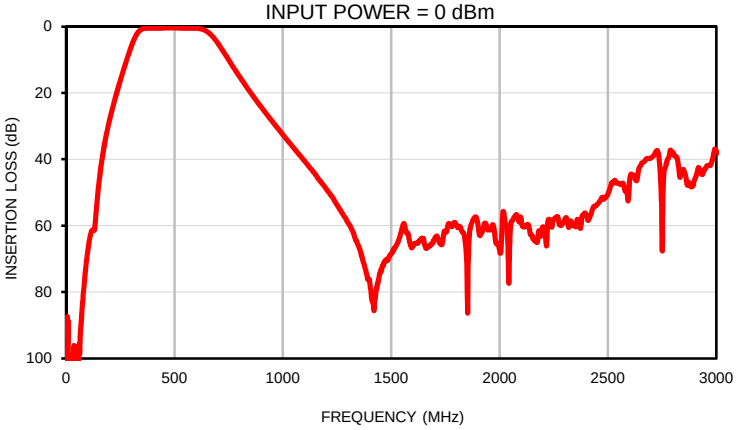
TPLX-E3000+ IL-LP Vs IL-HP Vs IL-BP Vs RL-COM
INSERTION LOSS (INPUT POWER=0dBm)



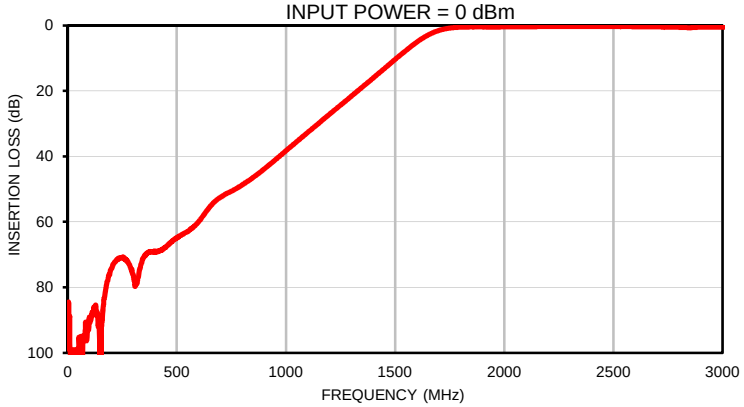
LOWPASS INSERTION LOSS
INPUT POWER = 0 dBm



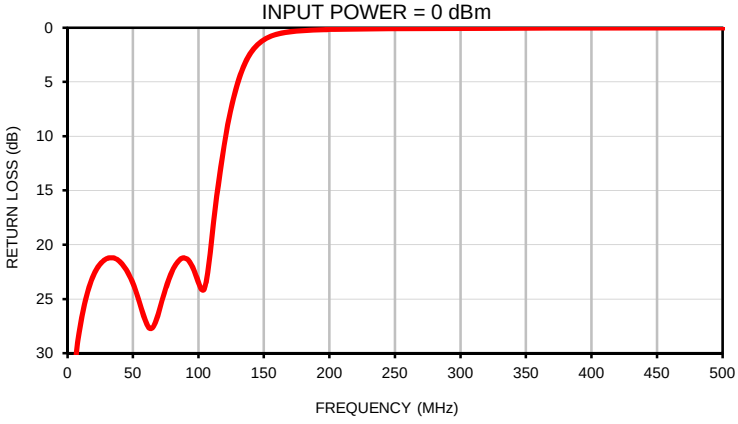
BANDPASS INSERTION LOSS
INPUT POWER = 0 dBm



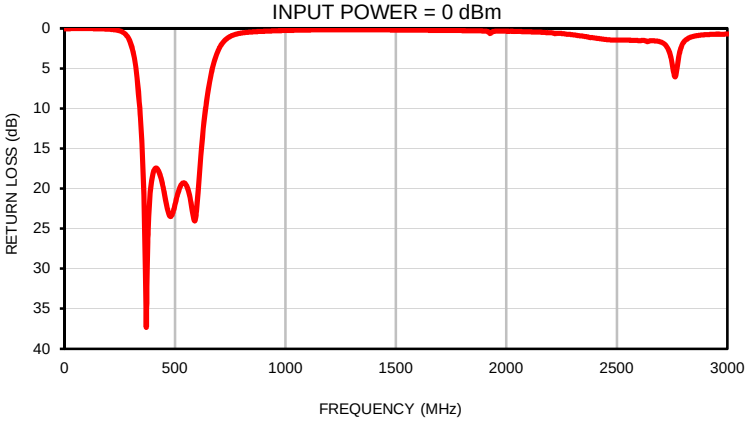
HIGHPASS INSERTION LOSS
INPUT POWER = 0 dBm



LOWPASS RETURN LOSS
INPUT POWER = 0 dBm

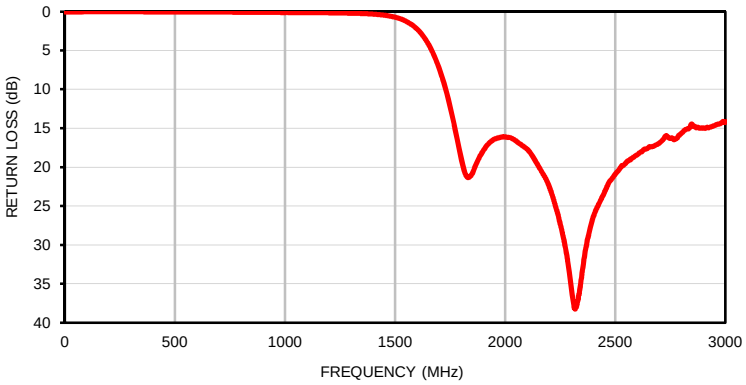


BANDPASS RETURN LOSS
INPUT POWER = 0 dBm

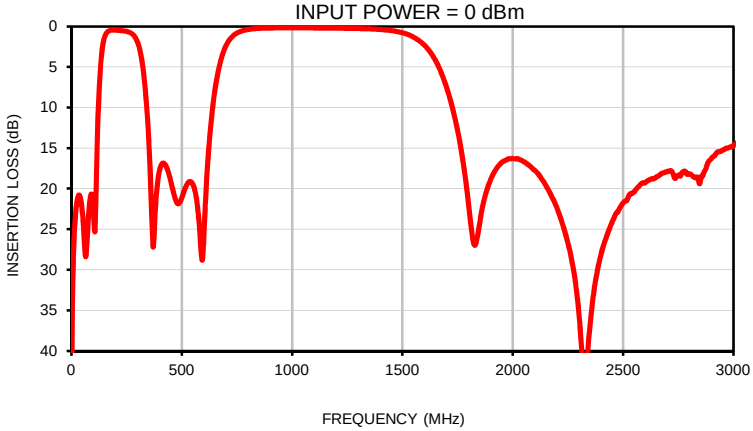


Typical Performance Curves

HIGHPASS RETURN LOSS
INPUT POWER = 0 dBm



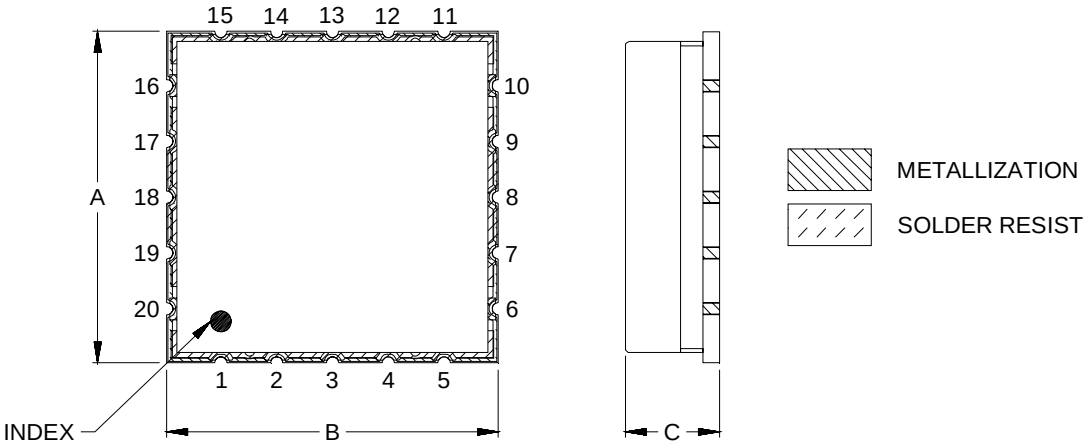
COMMON PORT RETURN LOSS
INPUT POWER = 0 dBm



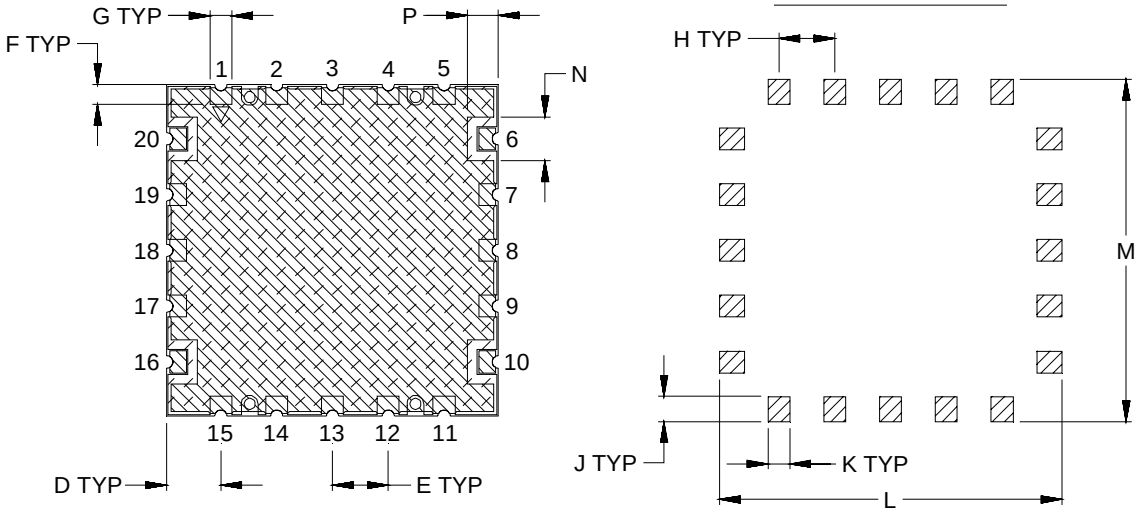
Case Style HR

Outline Dimensions

HR1843



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	WT.GRAMS
HR1843	1.200 (30.48)	1.200 (30.48)	.370 (9.40)	.196 (4.98)	.202 (5.13)	.071 (1.80)	.079 (2.01)	.202 (5.13)	.091 (2.31)	.079 (2.01)	1.240 (31.50)	1.240 (31.50)	.159 (4.04)	.111 (2.82)	8

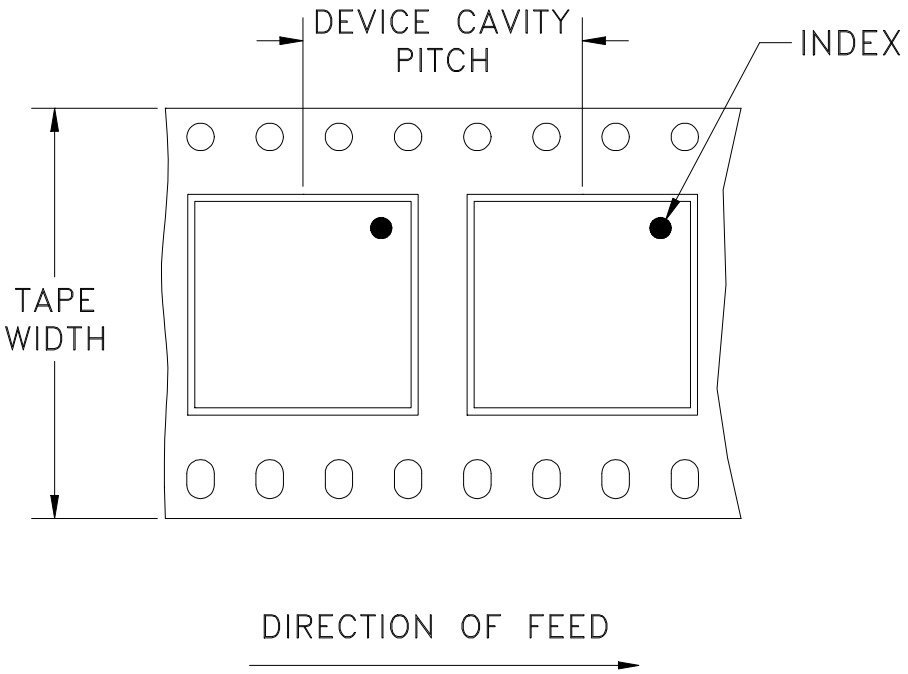
Dimensions are in inches (mm). Tolerances: 2Pl. ± .03; 3Pl. ± .015

Notes:

1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. Termination finish:
   For RoHS Case Styles: 3-5 µ inch Gold over 120-240 µ inch Nickel plate.
   For RoHS-5 Case Styles: Tin-Lead plate.

Tape & Reel Packaging TR-F80

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
44	40	13	100

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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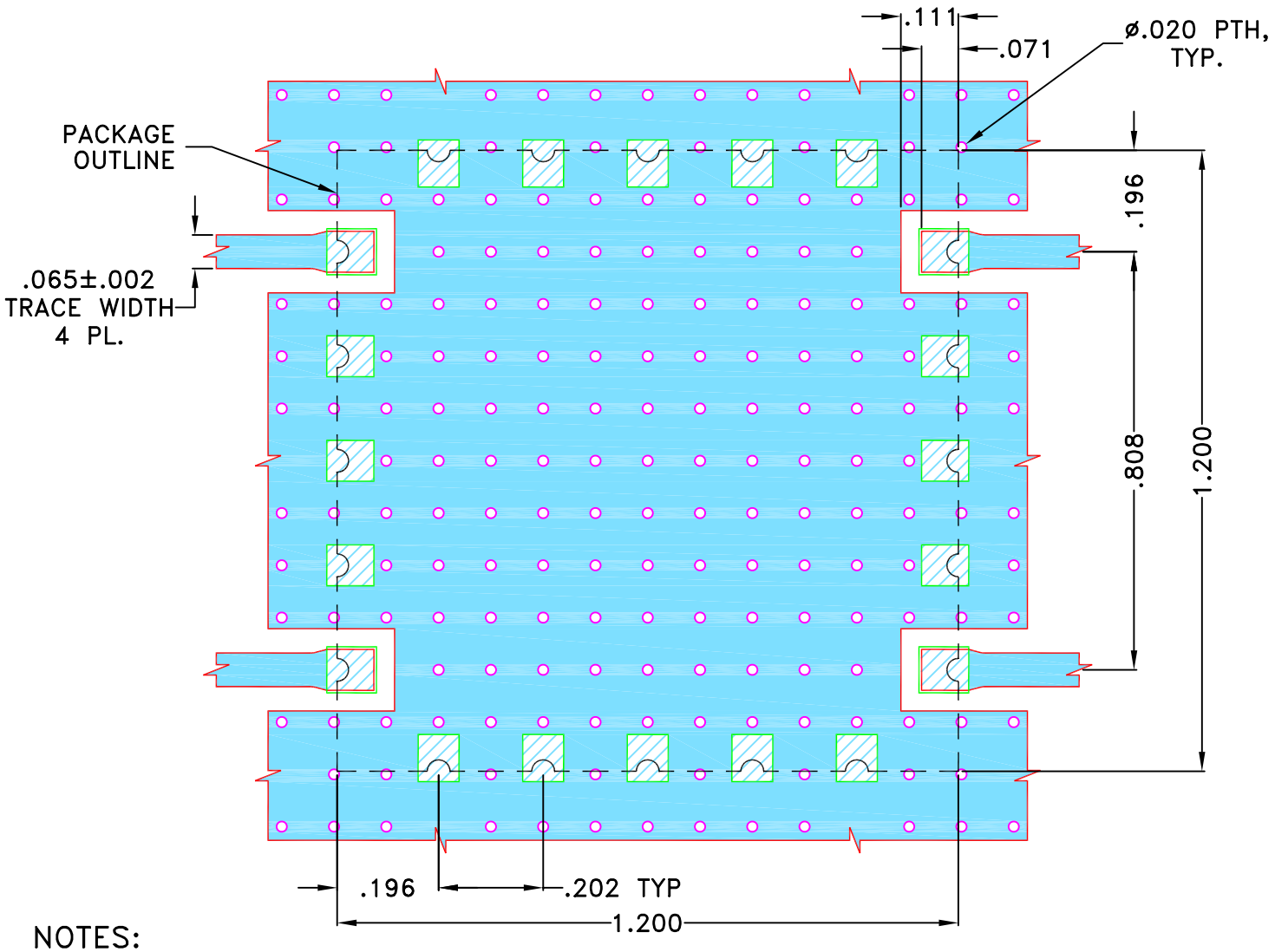
Mini-Circuits ISO 9001 & ISO 14001 Certified

THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M144572	NEW RELEASE	DEC 13	DDR	KG

SUGGESTED MOUNTING CONFIGURATION FOR HR1843 CASE STYLE "20FS01" PIN CODE



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 SOLDERMASK

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	DDR	26 DEC 13
TOLERANCES ON:	CHECKED	MD	26 DEC 13
2 PL DECIMALS ±	APPROVED	KR	26 DEC 13
3 PL DECIMALS ± .005"			
ANGLES ±			
FRACTIONS ±			

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

Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

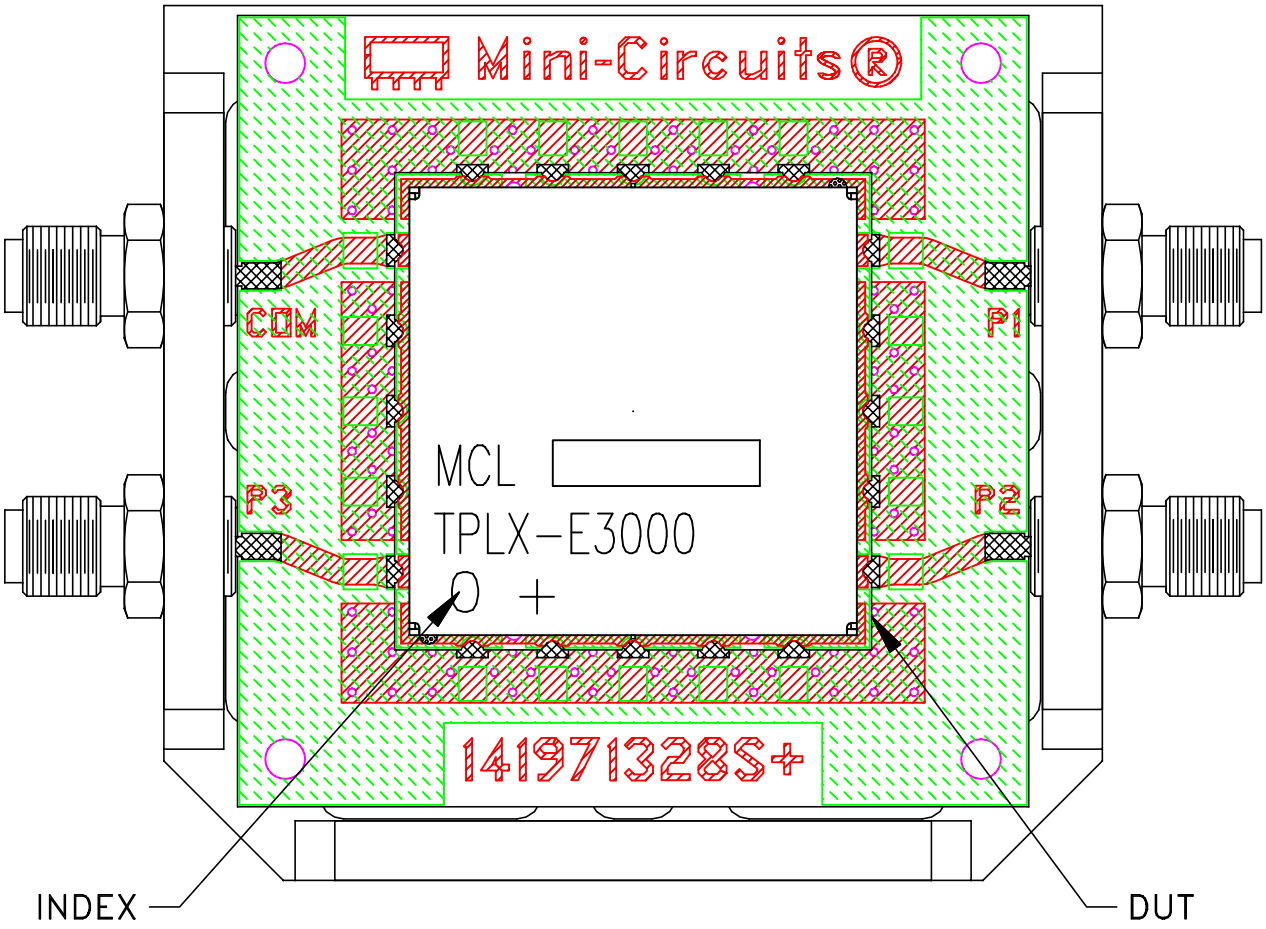
PL, 20FS01, HR1843, TTP TB-767+, 50 Ohm

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-409	OR

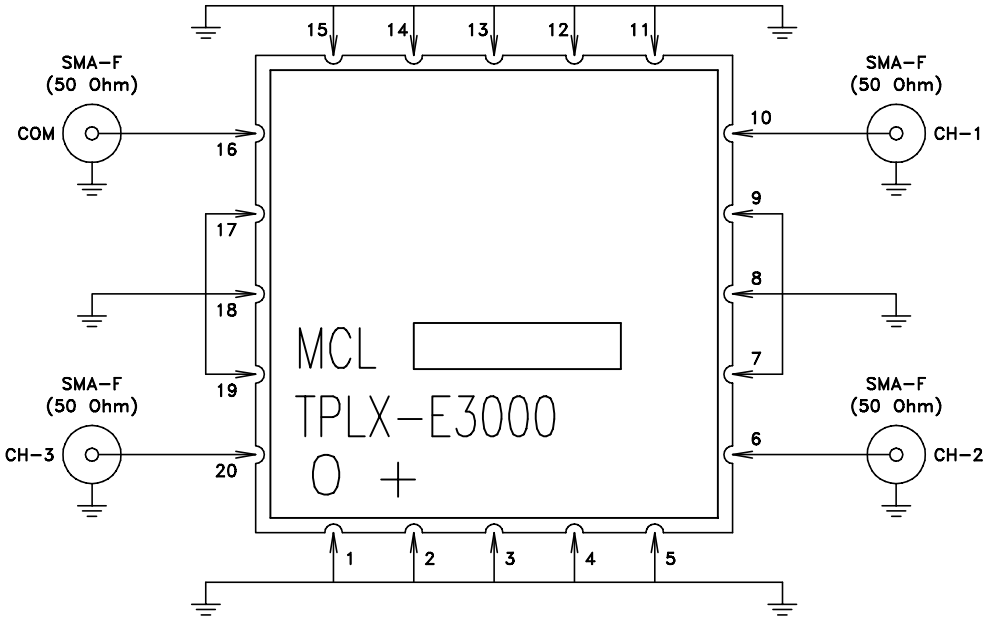
FILE:	SCALE:	SHEET:
98PL409	3:1	1 OF 1

Evaluation Board and Circuit

TB-TPLX-E3000+



Schematic diagram



Notes:

1. PCB Material: ROGERS (RO4350B) OR Equivalent, Dielectric Constant=3.48±.05
Dielectric Thickness: .030±.002
2. 50 Ohm SMA Female Connectors.

Mini-Circuits®

Mini-Circuits

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