

Surface Mount Power Splitter/Combiner

2 Way-90° 50Ω 820 to 980 MHz

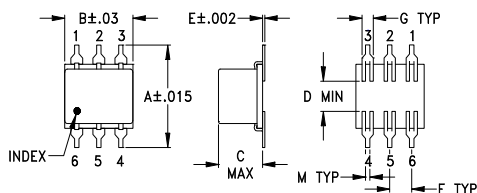
Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Power Input (as a splitter)	1W max.
Permanent damage may occur if any of these limits are exceeded.	

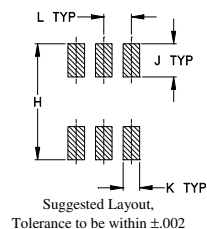
Pin Connections

SUM PORT	6
PORT 1 (0°)	4
PORT 2 (+90°)	1
GROUND	2,5
50 OHM TERM EXTERNAL	3

Outline Drawing



PCB Land Pattern



Outline Dimensions (inch/mm)

A	B	C	D	E	F	G
.400	.31	.200	.10	.010	.100	.050
10.16	7.87	5.08	2.54	0.25	2.54	1.27
H	J	K	L	M	wt	
.420	.120	.060	.100	.020	grams	
10.67	3.05	1.52	2.54	0.51	0.55	

Features

- low insertion loss, 0.15 dB typ.
- excellent phase unbalance 1 deg. typ.
- aqueous washable

Applications

- land mobile
- ISM

LRPQ-980+
LRPQ-980



CASE STYLE: QQQ130
PRICE: contact sales dept.

+ RoHS compliant in accordance
with EU Directive (2002/95/EC)

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

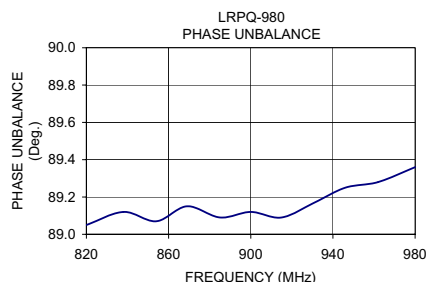
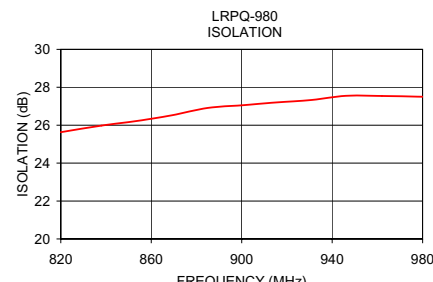
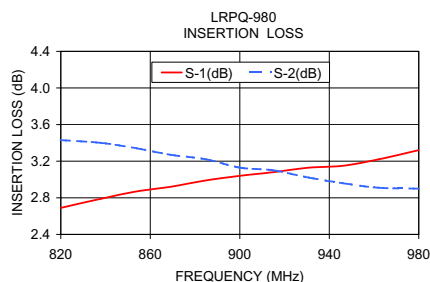
Electrical Specifications

FREQ. RANGE (MHz)	ISOLATION (dB)	INSERTION LOSS (dB) Avg. of Coupled Outputs less 3 dB	PHASE UNBALANCE (Degrees)	AMPLITUDE UNBALANCE (dB)
f_L - f_U	Typ. Min.	Typ. Max.	Max.	Max.
820-980	28 20	0.15 0.5	4	1.0

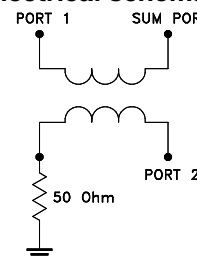
LRPQ units have bottom barrier ground plane insulated with glass barrier.

Typical Performance Data

Frequency (MHz)	Insertion Loss (dB)		Amplitude Unbalance (dB)	Isolation (dB)	Phase Unbalance (deg.)	VSWR S	VSWR 1	VSWR 2
	S-1	S-2						
820.00	2.69	3.43	0.74	25.63	89.05	1.07	1.11	1.08
838.00	2.79	3.40	0.61	25.98	89.12	1.06	1.11	1.08
854.00	2.87	3.34	0.47	26.23	89.07	1.06	1.11	1.08
869.00	2.92	3.27	0.35	26.52	89.15	1.06	1.11	1.07
885.00	2.99	3.22	0.23	26.91	89.09	1.05	1.11	1.07
900.00	3.04	3.13	0.09	27.05	89.12	1.05	1.11	1.07
915.00	3.08	3.10	0.02	27.20	89.09	1.05	1.11	1.07
931.00	3.13	3.02	0.11	27.33	89.17	1.05	1.11	1.08
946.00	3.15	2.96	0.19	27.55	89.25	1.05	1.11	1.08
962.00	3.22	2.91	0.31	27.54	89.28	1.05	1.11	1.08
980.00	3.32	2.90	0.42	27.50	89.36	1.05	1.11	1.08



electrical schematic



For detailed performance specs
& shopping online see web site

Mini-Circuits®
ISO 9001 ISO 14001 AS 9100 CERTIFIED

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 The Design Engineers Search Engine Provides ACTUAL Data Instantly at minicircuits.com

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet 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.

REV. A
M108697
LRPQ-980
HY/TD/CP
091117

2 Way-90° Power Splitter/Combiner

LRPQ-980

Typical Performance Data

FREQUENCY (MHz)	TOTAL LOSS ¹ (dB)			AMPLITUDE UNBALANCE (dB)	ISOLATION (dB) 1-2	PHASE UNBALANCE (deg.)	FREQUENCY (MHz)	VSWR (:1)		
	S-1	S-2	AVG.					S	1	2
820.0	2.69	3.43	3.06	0.74	25.63	89.05	820.0	1.07	1.11	1.08
838.0	2.79	3.40	3.10	0.61	25.98	89.12	838.0	1.06	1.11	1.08
854.0	2.87	3.34	3.11	0.47	26.23	89.07	854.0	1.06	1.11	1.08
869.0	2.92	3.27	3.10	0.35	26.52	89.15	869.0	1.06	1.11	1.07
885.0	2.99	3.22	3.11	0.23	26.91	89.09	885.0	1.05	1.11	1.07
900.0	3.04	3.13	3.09	0.09	27.05	89.12	900.0	1.05	1.11	1.07
915.0	3.08	3.10	3.09	0.02	27.20	89.09	915.0	1.05	1.11	1.07
931.0	3.13	3.02	3.08	0.11	27.33	89.17	931.0	1.05	1.11	1.08
946.0	3.15	2.96	3.06	0.19	27.55	89.25	946.0	1.05	1.11	1.08
962.0	3.22	2.91	3.07	0.31	27.54	89.28	962.0	1.05	1.11	1.08
980.0	3.32	2.90	3.11	0.42	27.50	89.36	980.0	1.05	1.11	1.08

¹ Total Loss = Insertion Loss+ 3dB Splitter Loss

REV. X2
LRPQ-980
100705
Page 1 of 1



Mini-Circuits®

IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED • RoHS compliant
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

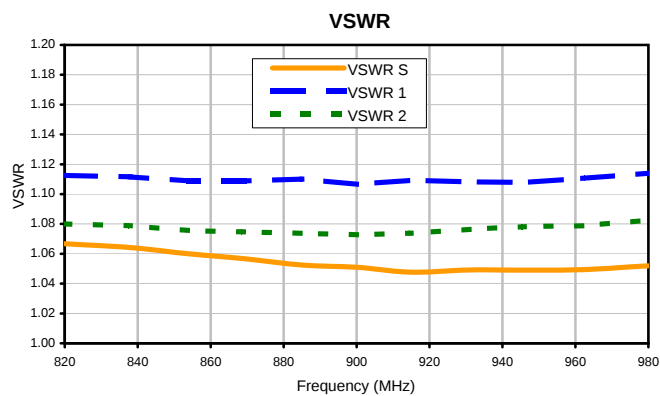
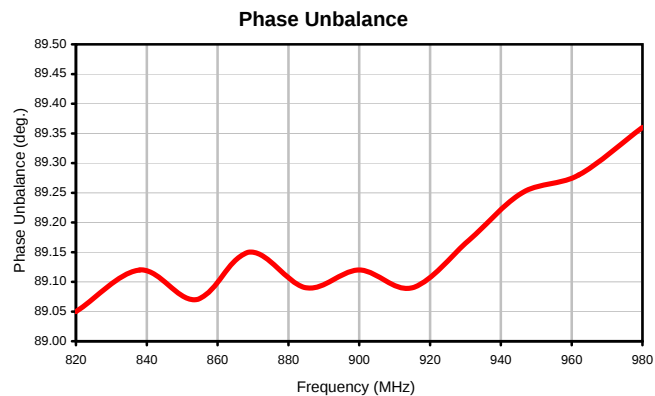
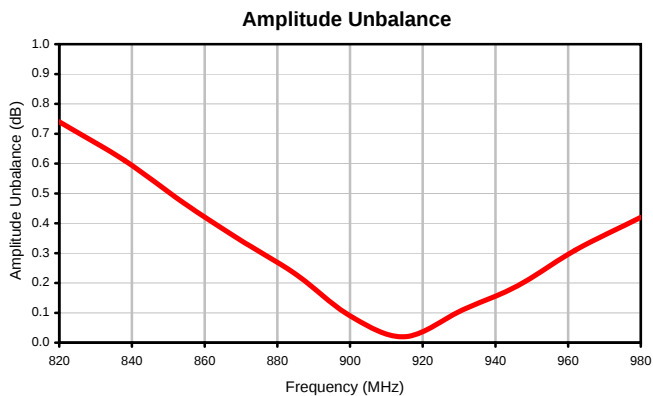
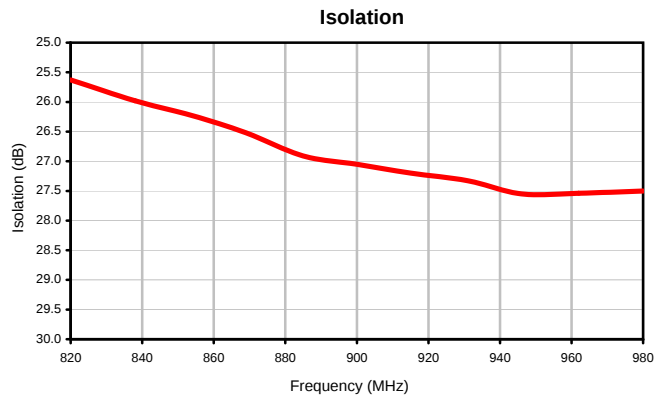
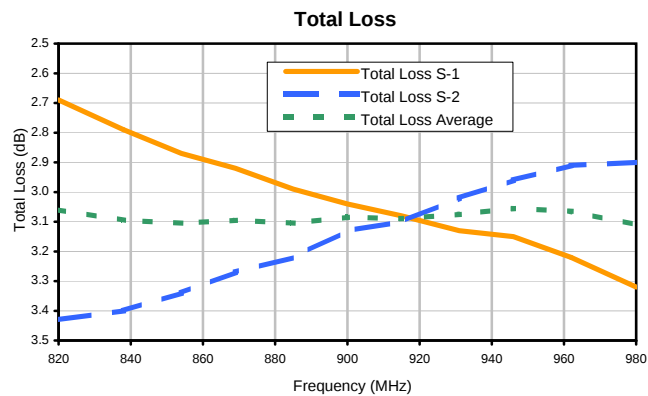
The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see



2 Way-90° Power Splitter/Combiner

LRPQ-980

Typical Performance Curves



REV. X2
LRPQ-980
100705
Page 1 of 1



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED • RoHS compliant
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661



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

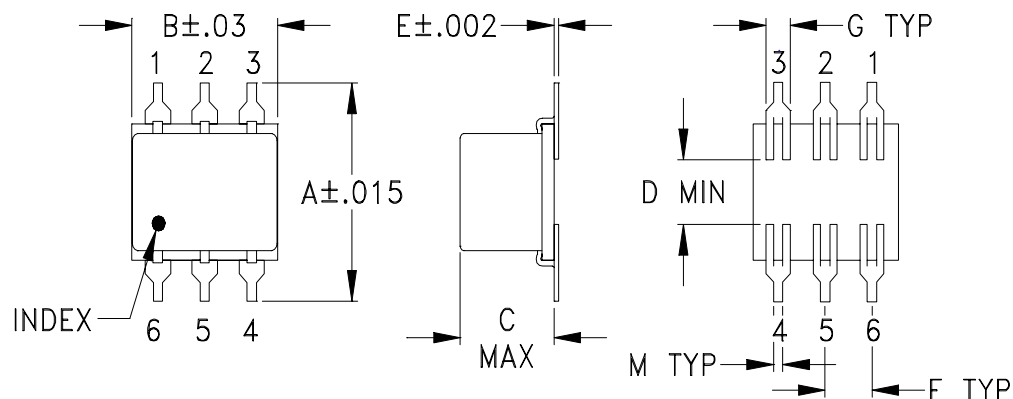


Case Style

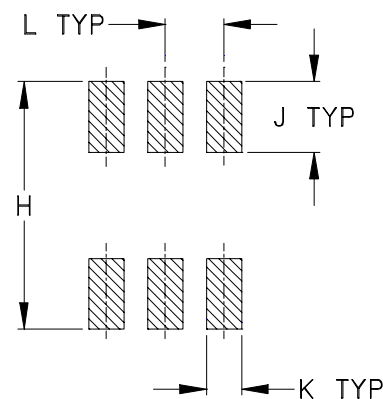
QQQ

Outline Dimensions

QQQ130 (non-waterproof)
QQQ828 (washable)



PCB Land Pattern



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

CASE#	A	B	C	D	E	F	G	H	J	K	L	M	WT, GRAM
QQQ130	.400 (10.16)	.31 (7.87)	.200 (5.08)	.10 (2.54)	.010 (.25)	.100 (2.54)	.050 (1.27)	.420 (10.67)	.120 (3.05)	.060 (1.52)	.100 (2.54)	.020 (.51)	.55
QQQ828			.050 (1.27)										.20

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

Notes:

- Case material: Ceramic.
- Termination finish:
 - For RoHS Case Styles: Tin plate over Nickel plate.
 - For RoHS-5 Case Styles: Tin-Lead plate.



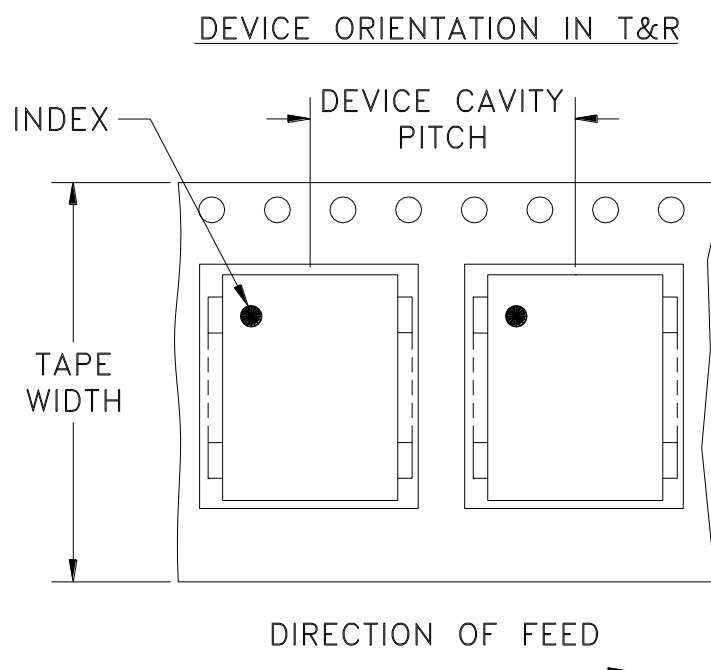
Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010

Mini-Circuits ISO 9001 & ISO 14001 Certified

INTERNET <http://www.minicircuits.com>

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

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.



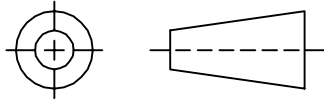
INTERNET <http://www.minicircuits.com>

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010

Mini-Circuits ISO 9001 & ISO 14001 Certified

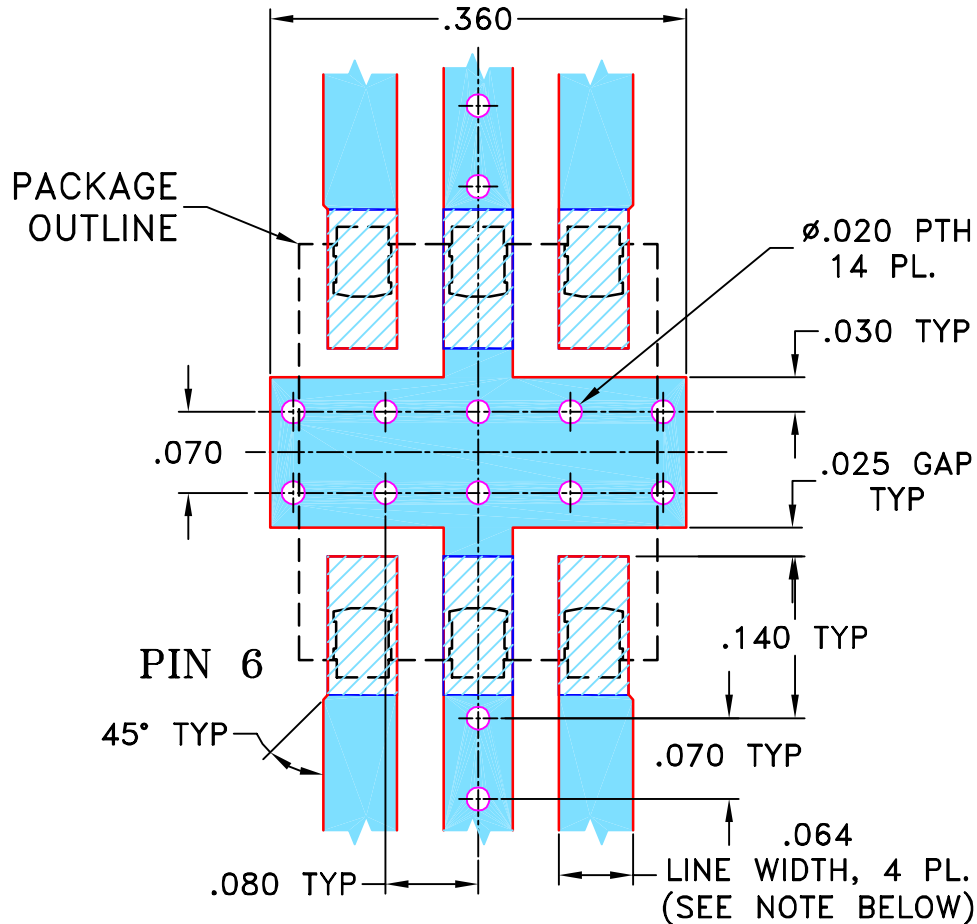
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M88792	NEW RELEASE	10/20/03	GF	HY
A	M100924	CHANGED ORIENTATION PIN 1 TO PIN 6	09/23/05	GT	HY
B	M102713	ADDED "...WITH SMOBC"	01/12/06	GF	IL

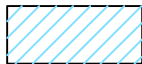
**SUGGESTED MOUNTING CONFIGURATION
FOR QQQ569 CASE STYLE, "ay/lr" PIN CONNECTION.**



- NOTE:**
- TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .030" $\pm$.002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
 - 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

GF

09/18/03

TOLERANCES ON:

CHECKED

IL

10/20/03

2 PL DECIMALS $\pm$

APPROVED

HY

10/20/03

3 PL DECIMALS $\pm$.005ANGLES $\pm$ 1°FRACTIONS $\pm$

Mini-Circuits®

THIS DOCUMENT AND ITS CONTENTS ARE THE PROPERTY OF MINI-CIRCUITS. EXCEPT FOR USE EXPRESSLY GRANTED, IN WRITING, TO ITS VENDORS, VENDEE AND THE UNITED STATES GOVERNMENT, MINI-CIRCUITS RESERVES ALL PROPRIETARY DESIGN, USE, MANUFACTURING AND REPRODUCTION RIGHTS THERETO. THESE CONTENTS SHALL NOT BE USED, DUPLICATED OR DISCLOSED TO ANY OUTSIDE PARTY, IN WHOLE OR IN PART, WITHOUT WRITTEN PERMISSION OF MINI-CIRCUITS.

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



Mini-Circuits®

13 Neptune Avenue
Brooklyn NY 11235

PL, ay/lr, QQQ569, LRPQ-J, TB-226

SIZE
ACODE IDENT
15542DRAWING NO:
98-PL-140REV:
B

FILE: 98PL140

SCALE: 6:1

SHEET: 1 OF 1



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