

# RF Transformer

## SYTX1-52HP-15W+

50Ω 15 Watt 20 to 520 MHz

### The Big Deal

- High power handling, 15W
- Low insertion loss, 0.4 dB
- Excellent amplitude unbalance, 0.15 dB
- Excellent phase unbalance, 1°
- Small size, 0.43 x 0.69 x 0.28"



CASE STYLE: AH1647-4

### Product Overview

Mini-Circuits' SYTX1-52HP-15W+ is a high-power, surface-mount transformer with a secondary/primary impedance ratio of 1:1, covering the 20 to 520 MHz band. With proper heat sinking, the transformer is capable handling RF input power up to 15W and DC current up to 30mA. It provides low insertion loss (0.4 dB) as well as very low phase unbalance (1°) and amplitude unbalance (0.15 dB). Featuring core and wire construction mounted on a printed laminate base, the unit comes enclosed in a miniature, shielded package measuring just 0.43 x 0.69 x 0.28", ideal for dense circuit board layouts.

### Key Features

Feature	Advantages
High RF power handling (15W) and high DC current handling (30mA)	Supports systems with high power requirements in small device size.
Low phase and amplitude unbalance – 1°, 0.15 dB	Good phase and amplitude unbalance can improve a system's electromagnetic compatibility by rejecting unwanted common-mode noise.
Low insertion loss, 0.4 dB	Provides excellent transmission of signal power from input to output.
Small footprint, 0.43 x 0.69 x 0.28"	Accommodates tight space requirements for dense PCB layouts.

Surface Mount  **RF Transformer**

50Ω 15 Watt 20 to 520 MHz

**SYTX1-52HP-15W+**



Generic photo used for illustration purposes only

CASE STYLE: AH1647-4

**+RoHS Compliant**

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

**Features**

- high power input, 15 Watt max.
- good amplitude unbalance, 0.15 dB typ.
- excellent phase unbalance 1 deg. typ.

**Applications**

- military radios
- VHF/UHF radios

**Electrical Specifications at 25°C**

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Impedance Ratio			1.0		
Frequency Range		20	—	520	MHz
Insertion Loss	20-520	—	0.4	1.0	dB
Amplitude Unbalance	20-520	—	0.15	0.5	dB
Phase Unbalance	20-520	—	2	10	Degree
Power Handling at Input	20-520	—	—	15	Watt

1. The user must provide adequate means of heat removal to limit the temperature of ground connections under the PCB to +85°C, in order to ensure proper performance. At 25°C ambient temperature this requires thermal resistance of the user's PC board heat sink to be 10°C/W.

**Maximum Ratings**

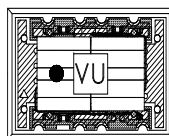
Parameter	Ratings
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power	15W
DC Current	30mA

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

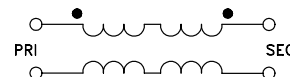
**Pad Connections**

Function	Pin Number
PRIMARY DOT	1
PRIMARY	4
SECONDARY DOT	8
SECONDARY	5
GND	2,3,6,7

**Product Marking**

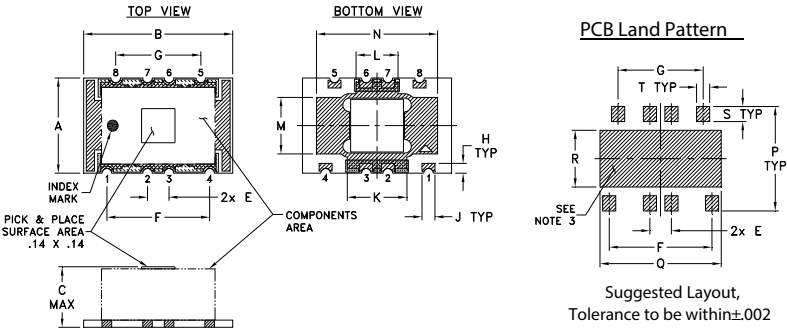


**Configuration G**



# SYTX1-52HP-15W+

## Outline Drawing

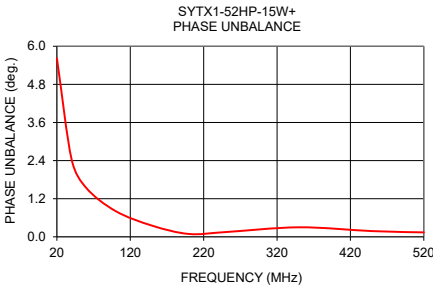
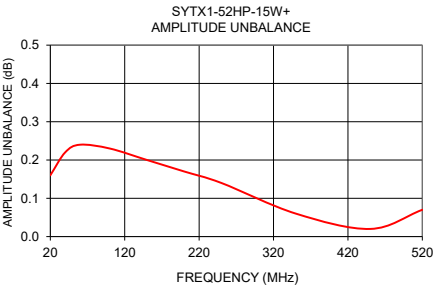
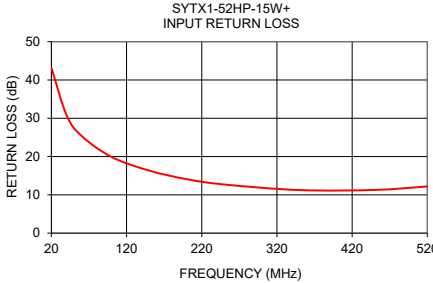
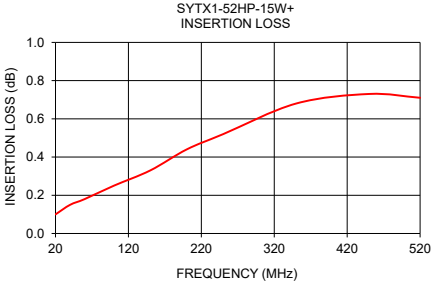


## Outline Dimensions (inch/mm)

A	B	C	E	F	G	H	J	K
.433	.690	.275	.100	.476	.394	.045	.060	.276
11.00	17.53	6.99	2.54	12.09	10.01	1.14	1.52	7.01
L	M	N	P	Q	R	S	T	wt
.194	.257	.560	.475	.561	.258	.069	.061	grams
4.93	6.53	14.22	12.07	14.25	6.55	1.75	1.55	2.80

## Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS (dB)	INPUT R. LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (Deg.)
20	0.10	43.25	0.16	5.62
40	0.15	30.91	0.22	2.44
60	0.18	25.43	0.24	1.54
100	0.25	19.90	0.23	0.81
150	0.33	16.34	0.20	0.35
200	0.44	14.09	0.17	0.09
250	0.52	12.70	0.14	0.15
350	0.68	11.24	0.06	0.30
450	0.73	11.28	0.02	0.18
520	0.71	12.20	0.07	0.14



### Additional 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](http://www.minicircuits.com/MCLStore/terms.jsp)

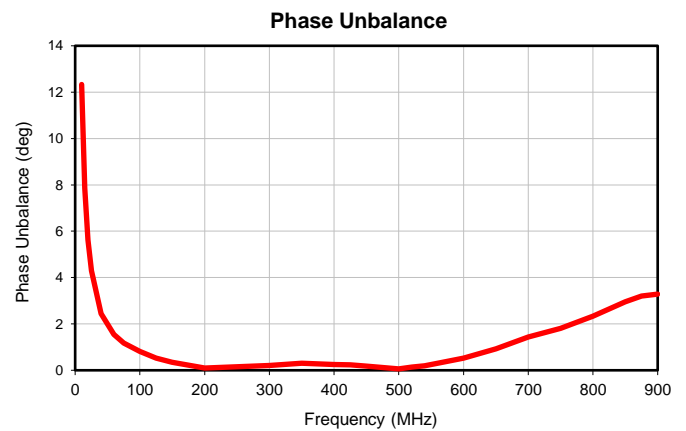
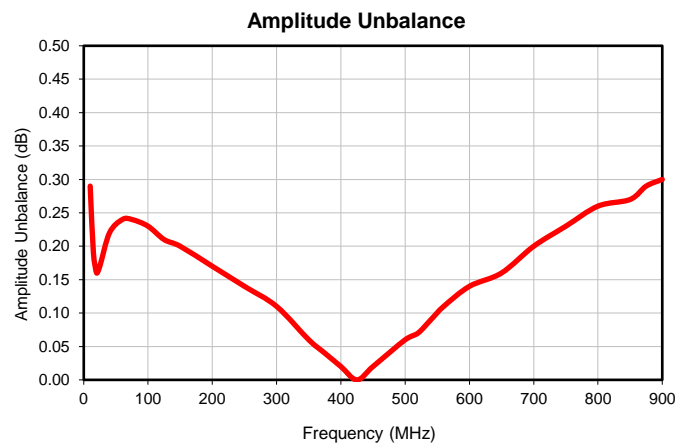
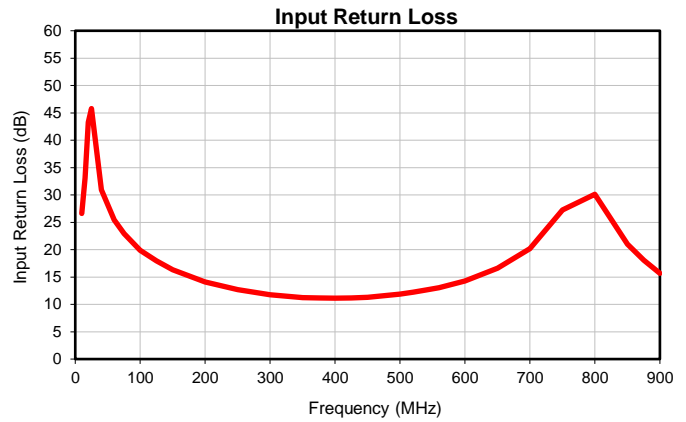
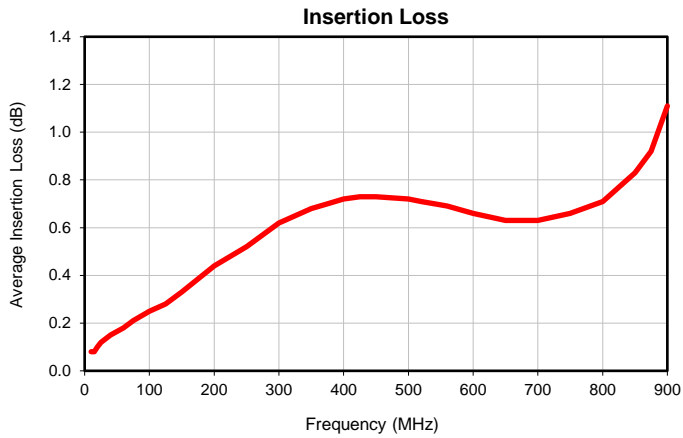


# RF Transformer SYTX1-52HP-15W+

## Typical Performance Data

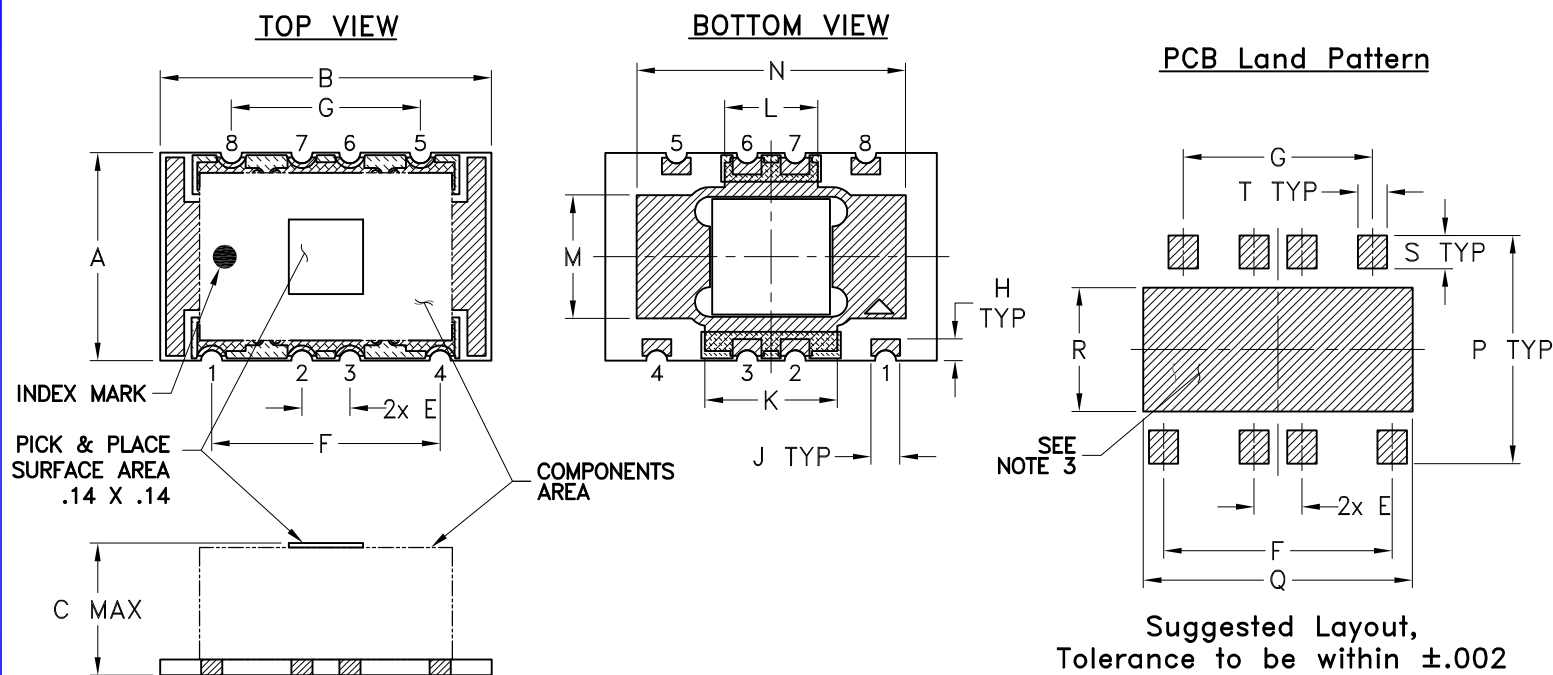
FREQUENCY MHz	INSERTION LOSS (dB)	INPUT RETURN LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (deg.)
10	0.08	26.63	0.29	12.33
15	0.08	33.09	0.19	7.85
20	0.10	43.25	0.16	5.62
25	0.12	45.78	0.17	4.29
40	0.15	30.91	0.22	2.44
60	0.18	25.43	0.24	1.54
75	0.21	22.91	0.24	1.18
100	0.25	19.90	0.23	0.81
125	0.28	17.94	0.21	0.53
150	0.33	16.34	0.20	0.35
200	0.44	14.09	0.17	0.09
250	0.52	12.70	0.14	0.15
300	0.62	11.77	0.11	0.21
350	0.68	11.24	0.06	0.30
375	0.70	11.15	0.04	0.28
400	0.72	11.13	0.02	0.25
425	0.73	11.17	0.00	0.24
450	0.73	11.28	0.02	0.18
500	0.72	11.85	0.06	0.06
520	0.71	12.20	0.07	0.14
540	0.70	12.61	0.09	0.19
560	0.69	13.07	0.11	0.30
600	0.66	14.28	0.14	0.52
650	0.63	16.60	0.16	0.93
700	0.63	20.19	0.20	1.43
750	0.66	27.26	0.23	1.81
800	0.71	30.09	0.26	2.33
850	0.83	20.97	0.27	2.95
875	0.92	18.07	0.29	3.21
900	1.11	15.68	0.30	3.29

## Typical Performance Data



## Outline Dimensions

AH1647-4



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
AH1647-4	.433 (11.00)	.690 (17.53)	.275 (6.99)	- -	.100 (2.54)	.476 (12.09)	.394 (10.01)	.045 (1.14)	.060 (1.52)	.276 (7.01)	.194 (4.93)	.257 (6.53)	.560 (14.22)
CASE #	P	Q	R	S	T	WT, GRAM							
AH1647-4	.475 (12.07)	.561 (14.25)	.258 (6.55)	.069 (1.75)	.061 (1.55)	2.80							

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

### Notes:

- Case material: Nickel Silver alloy.
- Base material: Printed wiring laminate.
- Termination finish: Tin copper solder alloy up to 0.07% Nickel. All models, (+) suffix.

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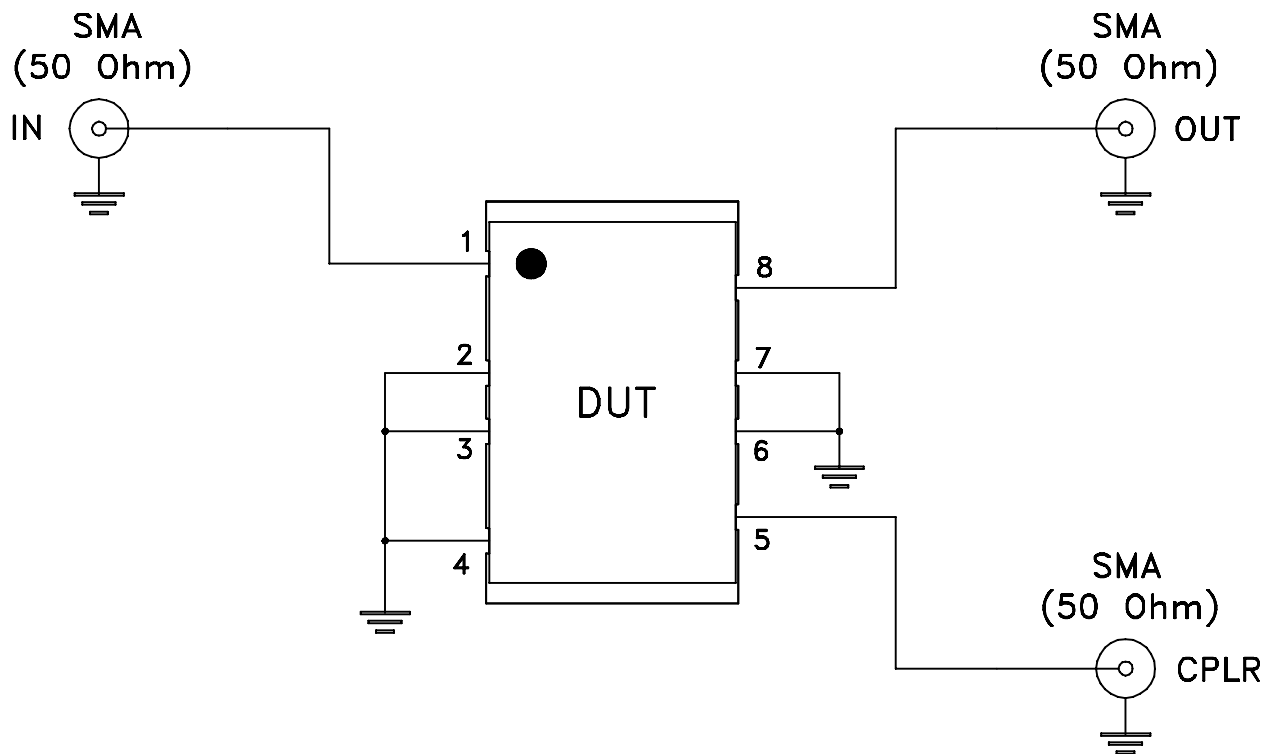
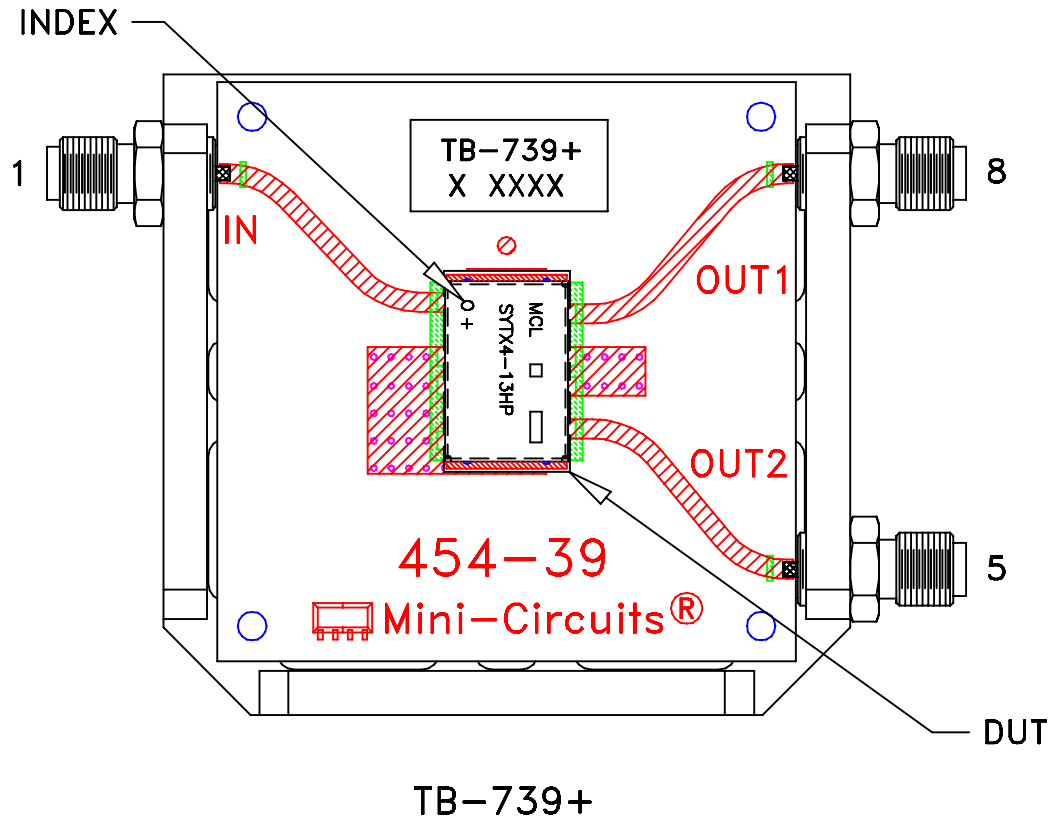
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



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RF/IF MICROWAVE COMPONENTS


# Evaluation Board and Circuit



Schematic Diagram

## Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: R04350 or equivalent.  
Dielectric Constant=3.5, Thickness=.030 inch.

 **Mini-Circuits®**

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