

## Engineering Development Model

# Power Splitter/Combiner

# JS4PS-ED10334/1

## 4 Way-0°

### Important Note

This model has been designed, built and tested in our engineering department. Performance data represents model capability. At present it is a non-catalog model. On request, we can supply a final specification sheet, part number and price/delivery information.



Please click "Back", and then click "Contact Us" for Applications support.

CASE STYLE : BJ360

| ELECTRICAL SPECIFICATIONS 50Ω @ +25°C |                |      |       |            |
|---------------------------------------|----------------|------|-------|------------|
| Parameter                             |                | Min. | Typ.  | Max. Units |
| Frequency                             |                | 10   |       | 1150 MHz   |
| Isolation                             | 10 - 100 MHz   |      | 20    | dB         |
|                                       | 100 - 575 MHz  |      | 23    | dB         |
|                                       | 575 - 1150 MHz |      | 25    | dB         |
| Insertion Loss Above 6.0 dB           | 10 - 100 MHz   |      | 0.30  | dB         |
|                                       | 100 - 575 MHz  |      | 0.40  | dB         |
|                                       | 575 - 1150 MHz |      | 0.80  | dB         |
| Phase Unbalance                       | 10 - 100 MHz   |      | 0.034 | deg.       |
|                                       | 100 - 575 MHz  |      | 0.339 | deg.       |
|                                       | 575 - 1150 MHz |      | 1.756 | deg.       |
| Amplitude Unbalance                   | 10 - 100 MHz   |      | 0.004 | dB         |
|                                       | 100 - 575 MHz  |      | 0.034 | dB         |
|                                       | 575 - 1150 MHz |      | 0.153 | dB         |
| VSWR                                  | SUM Port       |      | 1.25  | (:1)       |
|                                       | OUT Ports      |      | 1.20  | (:1)       |

**Note:** Sum port impedance is 50 ohms. Output port impedance is 75 ohms.

| MAXIMUM RATINGS       |                |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C  |
| Storage Temperature   | -55°C to 100°C |

| PIN CONNECTIONS |         |
|-----------------|---------|
| SUM PORT        | 2       |
| PORT 1          | 8       |
| PORT 2          | 7       |
| PORT 3          | 6       |
| PORT 4          | 5       |
| GND EXT         | 1, 3, 4 |

### Functional Diagram



# 4 Way-0° Power Splitter/Combiner

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## Typical Performance Data

| FREQ.<br>(MHz) | TOTAL LOSS <sup>1</sup><br>(dB) |      |      |      | AMP.<br>UNBAL.<br>(dB) | ISOLATION<br>(dB) |       |       | PHASE<br>UNBAL.<br>(deg.) | FREQ.<br>(MHz) | VSWR<br>(:1) |      |      |      |      |
|----------------|---------------------------------|------|------|------|------------------------|-------------------|-------|-------|---------------------------|----------------|--------------|------|------|------|------|
|                | S-1                             | S-2  | S-3  | S-4  |                        | 1-2               | 2-3   | 3-4   |                           |                | S            | 1    | 2    | 3    | 4    |
| 10.0           | 6.30                            | 6.30 | 6.31 | 6.30 | 0.01                   | 14.49             | 30.70 | 15.05 | 0.05                      | 10.0           | 1.29         | 1.56 | 1.56 | 1.52 | 1.52 |
| 15.0           | 6.30                            | 6.30 | 6.30 | 6.30 | 0.01                   | 16.35             | 31.08 | 16.83 | 0.08                      | 15.0           | 1.27         | 1.42 | 1.41 | 1.39 | 1.39 |
| 20.0           | 6.29                            | 6.29 | 6.29 | 6.29 | 0.00                   | 17.47             | 31.12 | 17.92 | 0.01                      | 20.0           | 1.26         | 1.35 | 1.34 | 1.33 | 1.33 |
| 25.0           | 6.29                            | 6.29 | 6.29 | 6.29 | 0.00                   | 18.27             | 31.07 | 18.68 | 0.01                      | 25.0           | 1.25         | 1.30 | 1.30 | 1.29 | 1.29 |
| 30.0           | 6.28                            | 6.28 | 6.29 | 6.29 | 0.01                   | 18.85             | 31.03 | 19.24 | 0.03                      | 30.0           | 1.24         | 1.27 | 1.27 | 1.26 | 1.26 |
| 35.0           | 6.28                            | 6.28 | 6.28 | 6.28 | 0.00                   | 19.29             | 30.96 | 19.66 | 0.02                      | 35.0           | 1.24         | 1.26 | 1.25 | 1.24 | 1.24 |
| 40.0           | 6.28                            | 6.28 | 6.28 | 6.28 | 0.00                   | 19.63             | 30.93 | 19.99 | 0.02                      | 40.0           | 1.24         | 1.24 | 1.24 | 1.23 | 1.23 |
| 45.0           | 6.27                            | 6.28 | 6.28 | 6.28 | 0.00                   | 19.90             | 30.89 | 20.25 | 0.02                      | 45.0           | 1.24         | 1.23 | 1.23 | 1.22 | 1.22 |
| 50.0           | 6.27                            | 6.28 | 6.27 | 6.28 | 0.00                   | 20.13             | 30.85 | 20.47 | 0.03                      | 50.0           | 1.23         | 1.22 | 1.22 | 1.21 | 1.21 |
| 55.0           | 6.27                            | 6.27 | 6.27 | 6.27 | 0.00                   | 20.32             | 30.80 | 20.66 | 0.02                      | 55.0           | 1.23         | 1.21 | 1.21 | 1.20 | 1.20 |
| 60.0           | 6.27                            | 6.28 | 6.27 | 6.28 | 0.00                   | 20.50             | 30.76 | 20.83 | 0.02                      | 60.0           | 1.23         | 1.21 | 1.21 | 1.20 | 1.20 |
| 65.0           | 6.27                            | 6.28 | 6.27 | 6.28 | 0.00                   | 20.64             | 30.73 | 20.96 | 0.05                      | 65.0           | 1.23         | 1.20 | 1.20 | 1.19 | 1.19 |
| 70.0           | 6.27                            | 6.28 | 6.27 | 6.27 | 0.01                   | 20.76             | 30.71 | 21.08 | 0.03                      | 70.0           | 1.23         | 1.20 | 1.20 | 1.19 | 1.19 |
| 75.0           | 6.27                            | 6.27 | 6.28 | 6.28 | 0.00                   | 20.88             | 30.69 | 21.19 | 0.02                      | 75.0           | 1.22         | 1.19 | 1.19 | 1.18 | 1.18 |
| 80.0           | 6.27                            | 6.27 | 6.27 | 6.27 | 0.01                   | 20.97             | 30.65 | 21.28 | 0.06                      | 80.0           | 1.22         | 1.19 | 1.19 | 1.18 | 1.18 |
| 100.0          | 6.27                            | 6.28 | 6.28 | 6.28 | 0.01                   | 21.25             | 30.61 | 21.55 | 0.08                      | 100.0          | 1.22         | 1.18 | 1.18 | 1.17 | 1.17 |
| 125.0          | 6.28                            | 6.29 | 6.28 | 6.29 | 0.01                   | 21.48             | 30.58 | 21.77 | 0.11                      | 125.0          | 1.21         | 1.17 | 1.17 | 1.17 | 1.16 |
| 150.0          | 6.28                            | 6.29 | 6.29 | 6.29 | 0.01                   | 21.66             | 30.59 | 21.95 | 0.17                      | 150.0          | 1.21         | 1.17 | 1.17 | 1.16 | 1.16 |
| 175.0          | 6.28                            | 6.29 | 6.29 | 6.29 | 0.01                   | 21.83             | 30.67 | 22.12 | 0.16                      | 175.0          | 1.21         | 1.17 | 1.17 | 1.16 | 1.16 |
| 200.0          | 6.30                            | 6.31 | 6.31 | 6.31 | 0.02                   | 22.02             | 30.74 | 22.31 | 0.23                      | 200.0          | 1.21         | 1.16 | 1.16 | 1.16 | 1.15 |
| 250.0          | 6.31                            | 6.32 | 6.32 | 6.33 | 0.02                   | 22.41             | 31.00 | 22.71 | 0.31                      | 250.0          | 1.20         | 1.16 | 1.16 | 1.16 | 1.15 |
| 300.0          | 6.33                            | 6.35 | 6.35 | 6.36 | 0.03                   | 22.89             | 31.35 | 23.22 | 0.37                      | 300.0          | 1.20         | 1.16 | 1.16 | 1.16 | 1.16 |
| 350.0          | 6.34                            | 6.36 | 6.37 | 6.38 | 0.04                   | 23.46             | 31.79 | 23.81 | 0.43                      | 350.0          | 1.19         | 1.16 | 1.16 | 1.17 | 1.15 |
| 400.0          | 6.37                            | 6.39 | 6.41 | 6.42 | 0.05                   | 24.15             | 32.29 | 24.54 | 0.48                      | 400.0          | 1.19         | 1.16 | 1.17 | 1.17 | 1.16 |
| 450.0          | 6.38                            | 6.40 | 6.42 | 6.43 | 0.06                   | 24.94             | 32.78 | 25.37 | 0.51                      | 450.0          | 1.17         | 1.16 | 1.17 | 1.18 | 1.16 |
| 500.0          | 6.40                            | 6.43 | 6.46 | 6.47 | 0.07                   | 25.84             | 33.11 | 26.32 | 0.55                      | 500.0          | 1.15         | 1.16 | 1.18 | 1.18 | 1.16 |
| 550.0          | 6.44                            | 6.47 | 6.50 | 6.52 | 0.08                   | 26.81             | 33.14 | 27.34 | 0.67                      | 550.0          | 1.13         | 1.16 | 1.17 | 1.18 | 1.16 |
| 600.0          | 6.44                            | 6.49 | 6.53 | 6.55 | 0.10                   | 27.62             | 32.66 | 28.14 | 0.78                      | 600.0          | 1.09         | 1.15 | 1.16 | 1.17 | 1.15 |
| 650.0          | 6.48                            | 6.54 | 6.58 | 6.59 | 0.12                   | 28.17             | 31.84 | 28.57 | 0.88                      | 650.0          | 1.04         | 1.14 | 1.15 | 1.16 | 1.13 |
| 700.0          | 6.50                            | 6.57 | 6.61 | 6.63 | 0.13                   | 28.25             | 30.79 | 28.41 | 1.00                      | 700.0          | 1.01         | 1.13 | 1.14 | 1.15 | 1.12 |
| 750.0          | 6.55                            | 6.64 | 6.68 | 6.70 | 0.14                   | 27.83             | 29.69 | 27.71 | 1.17                      | 750.0          | 1.07         | 1.12 | 1.14 | 1.15 | 1.12 |
| 800.0          | 6.60                            | 6.68 | 6.73 | 6.75 | 0.15                   | 26.99             | 28.57 | 26.63 | 1.31                      | 800.0          | 1.14         | 1.11 | 1.13 | 1.13 | 1.11 |
| 850.0          | 6.66                            | 6.77 | 6.81 | 6.82 | 0.16                   | 25.99             | 27.49 | 25.48 | 1.54                      | 850.0          | 1.22         | 1.10 | 1.12 | 1.13 | 1.10 |
| 900.0          | 6.71                            | 6.83 | 6.87 | 6.88 | 0.17                   | 24.97             | 26.52 | 24.36 | 1.74                      | 900.0          | 1.31         | 1.09 | 1.11 | 1.12 | 1.08 |
| 950.0          | 6.79                            | 6.92 | 6.96 | 6.96 | 0.17                   | 24.05             | 25.66 | 23.36 | 1.97                      | 950.0          | 1.41         | 1.07 | 1.09 | 1.09 | 1.06 |
| 1000.0         | 6.86                            | 7.00 | 7.04 | 7.04 | 0.18                   | 23.21             | 24.91 | 22.46 | 2.20                      | 1000.0         | 1.50         | 1.07 | 1.09 | 1.09 | 1.05 |
| 1050.0         | 6.94                            | 7.08 | 7.12 | 7.11 | 0.17                   | 22.47             | 24.29 | 21.67 | 2.44                      | 1050.0         | 1.59         | 1.07 | 1.07 | 1.07 | 1.04 |
| 1100.0         | 7.04                            | 7.17 | 7.20 | 7.19 | 0.16                   | 21.83             | 23.75 | 20.97 | 2.77                      | 1100.0         | 1.66         | 1.08 | 1.09 | 1.08 | 1.05 |
| 1150.0         | 7.11                            | 7.27 | 7.29 | 7.27 | 0.18                   | 21.23             | 23.34 | 20.34 | 3.27                      | 1150.0         | 1.71         | 1.09 | 1.10 | 1.10 | 1.06 |

<sup>1</sup> Total Loss = Insertion Loss + 6dB Splitter Loss

REV. X2

JS4PS-ED10334/1

100707

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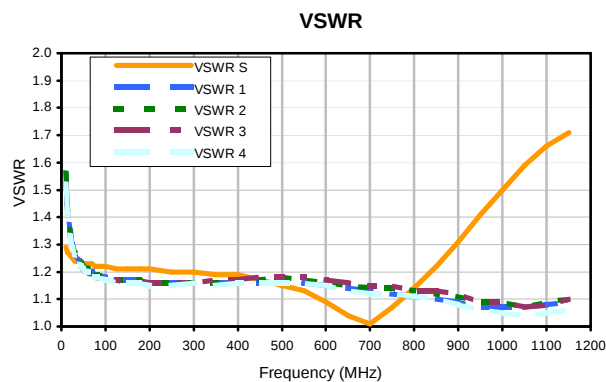
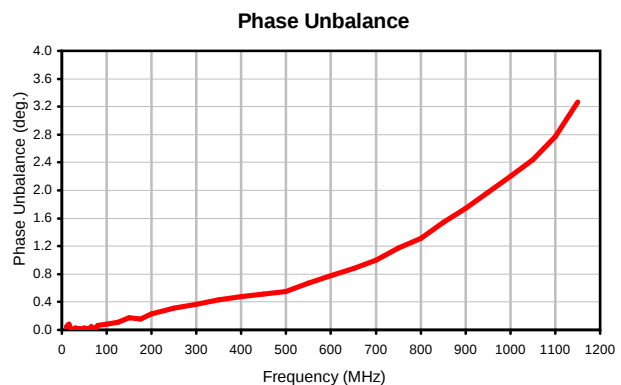
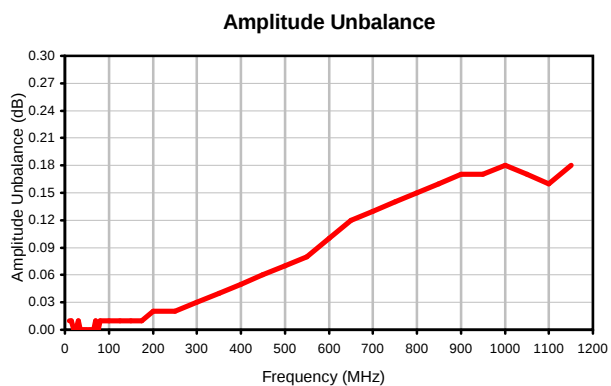
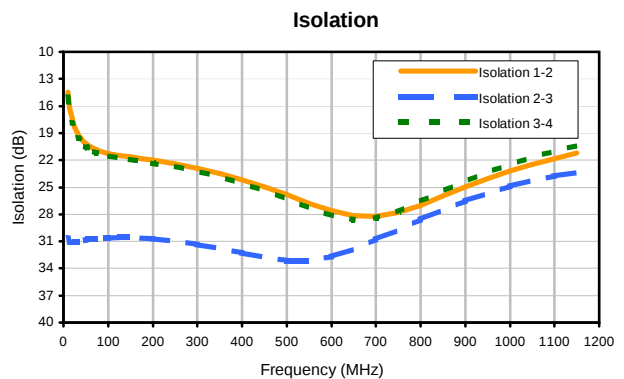
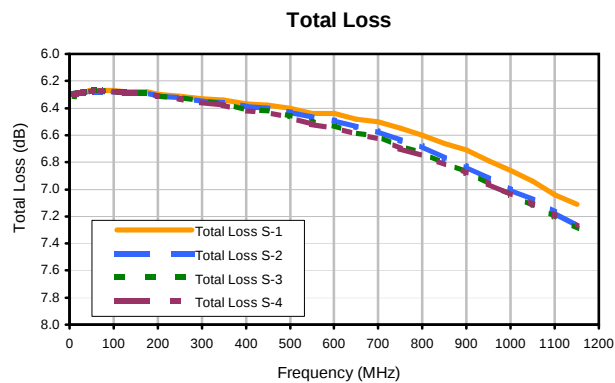
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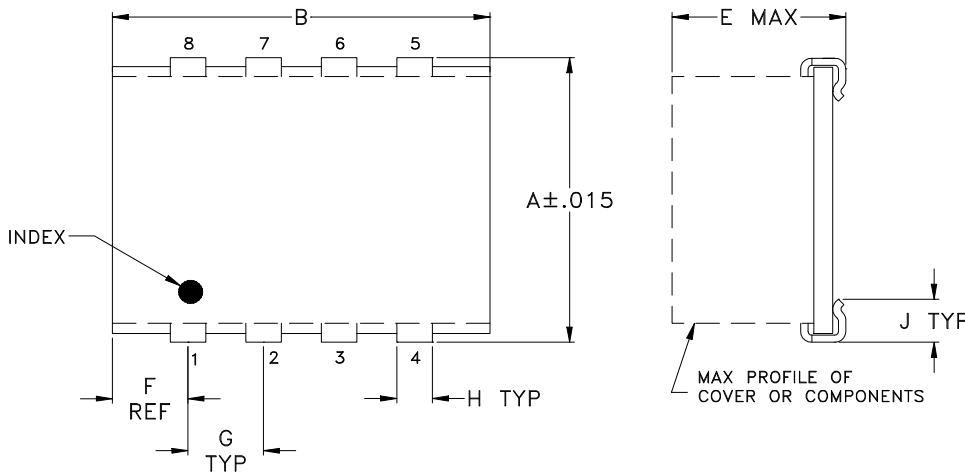
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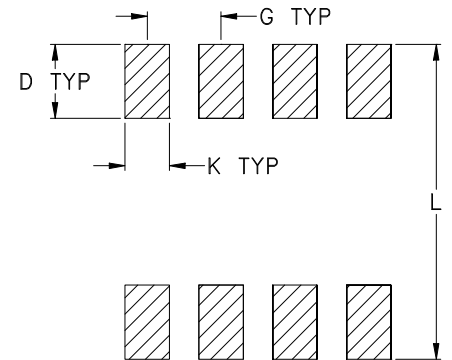
## Typical Performance Curves



### Outline Dimensions



### PCB Land Pattern



Suggested Layout,  
Tolerance to be within ±.002

| CASE# | A               | B               | C        | D              | E              | F              | G              | H              | J              | K              | L               | WT.<br>GRAMS |
|-------|-----------------|-----------------|----------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|--------------|
| BJ360 | .450<br>(11.43) | .800<br>(20.32) | --<br>-- | .100<br>(2.54) | .250<br>(6.35) | .100<br>(2.54) | .200<br>(5.08) | .047<br>(1.19) | .065<br>(1.65) | .065<br>(1.65) | .480<br>(12.19) | 1.7          |

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

#### Notes:

- Case material: Nickel-Silver alloy.
- Base material: Printed wiring laminate.
- Termination finish:
  - For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.
  - For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.



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# Tape & Reel Packaging TR-F5



| Tape Width,<br>mm | Device Cavity<br>Pitch, mm | Reel Size,<br>inches | Devices per Reel |
|-------------------|----------------------------|----------------------|------------------|
| 32                | 16                         | 13                   | 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.

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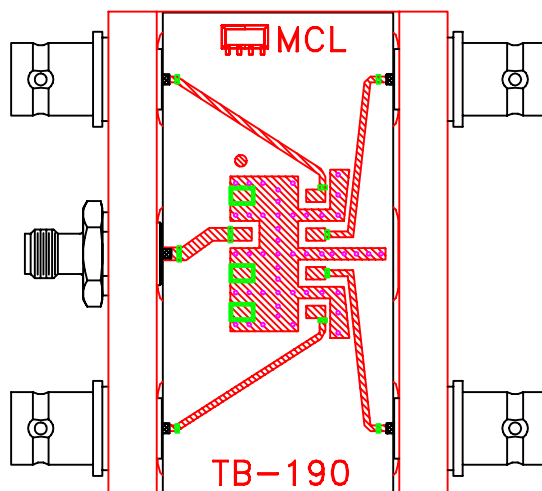
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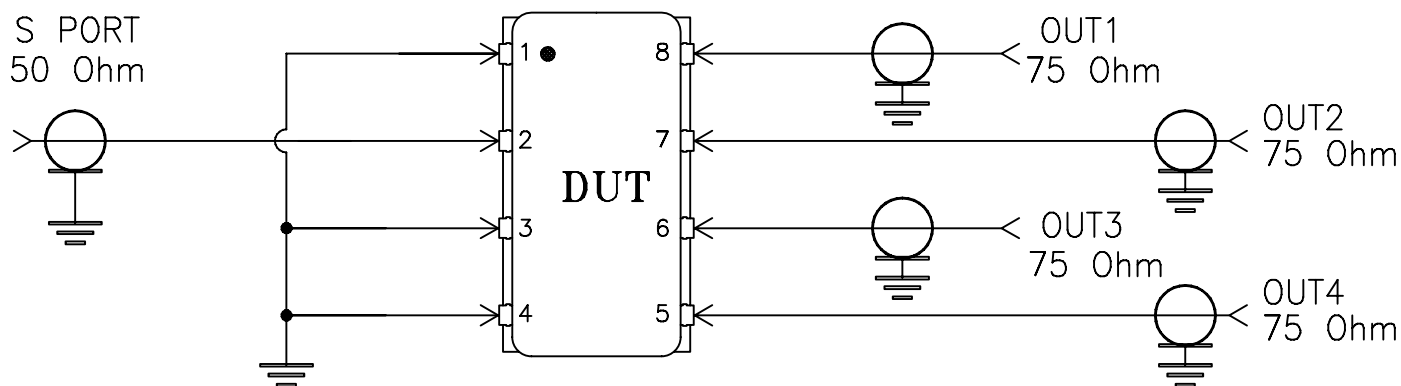
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# Evaluation Board and Circuit



TB-190



Schematic Diagram

## Notes:

1. SMA AND BNC Female connectors.
2. PCB Material: Rogers R04350 or equivalent,  
Dielectric Constant=3.5, Thickness=.030 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          | -40° to 85°C<br>Ambient Environment                                                                                                                             | Individual Model Data Sheet                                                                          |
| Storage Temperature            | -55° to 100° C<br>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<br>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;<br>distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C | MIL-STD-202, Method 215                                                                              |