

# Surface Mount Power Splitter/Combiner

## QBA-12+

2 Way-90° 50Ω 800 to 1200 MHz

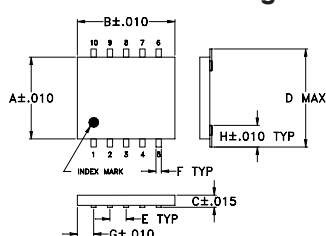
### Maximum Ratings

|                                                                 |                |
|-----------------------------------------------------------------|----------------|
| Operating Temperature                                           | -55°C to 100°C |
| Storage Temperature                                             | -55°C to 100°C |
| Permanent damage may occur if any of these limits are exceeded. |                |

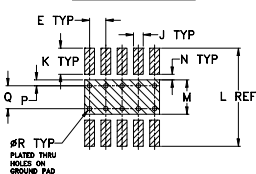
### Pin Connections

|                      |             |
|----------------------|-------------|
| SUM PORT             | 1           |
| PORT 1 (+90°)        | 10          |
| PORT 2 (0°)          | 6           |
| GROUND               | 2,3,4,7,8,9 |
| 50 OHM TERM EXTERNAL | 5           |

### Outline Drawing



### PCB Land Pattern

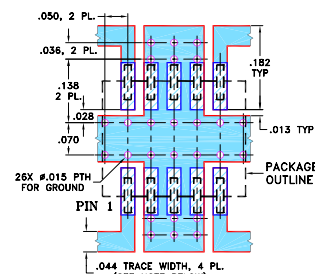


Suggested Layout,  
Tolerance to be within ±.002  
ADJACENT GROUND PINS SHALL BE CONNECTED  
TO EACH OTHER AND TO GROUND PAD

### Outline Dimensions (inch)

| A    | B    | C    | D    | E    | F    | G    | H    |       |
|------|------|------|------|------|------|------|------|-------|
| .250 | .300 | .050 | .310 | .050 | .015 | .050 | .066 |       |
| 6.35 | 7.62 | 1.27 | 7.87 | 1.27 | 0.38 | 1.27 | 1.68 |       |
| J    | K    | L    | M    | N    | P    | Q    | R    | wt    |
| .030 | .095 | .330 | .100 | .020 | .015 | .070 | .014 | grams |
| 0.76 | 2.41 | 8.38 | 2.54 | 0.51 | 0.38 | 1.78 | 0.36 | 0.2   |

### Demo Board MCL P/N: TB-115+ Suggested PCB Layout (PL-004)



- NOTE: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020 ± .0015, 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.  
B. DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)  
C. DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

### 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.  
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### Features

- low insertion loss, 0.25 dB typ.
- high power capability, 50W
- isolation, 23 dB typ.
- ceramic body, good for heat dissipation
- solder plated leads for excellent solderability
- aqueous washable
- protected by U.S. Patent 5,534,830

### Applications

- cellular
- ISM

### Electrical Specifications

| FREQ. RANGE (MHz) | ISOLATION (dB) | INSERTION LOSS <sup>1</sup> (dB)<br>Avg. of Coupled Outputs ABOVE 3 dB | PHASE UNBALANCE (Degrees) | AMPLITUDE UNBALANCE (dB) | INPUT POWER <sup>2</sup> (W) |
|-------------------|----------------|------------------------------------------------------------------------|---------------------------|--------------------------|------------------------------|
| $f_L$ - $f_U$     | Typ. Min.      | $f_L$ $f_U$ $\sigma$                                                   | Max.                      | Max.                     | below 25°C                   |
| 800-1200          | 23 14          | 0.25 0.44 0.02                                                         | 6.0                       | 1.2                      | 50                           |

1. Includes test fixture losses.

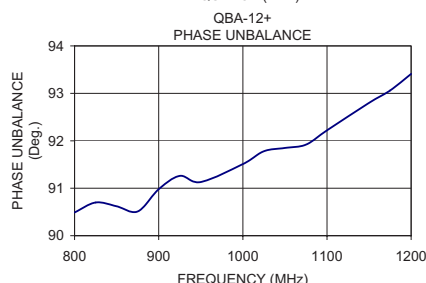
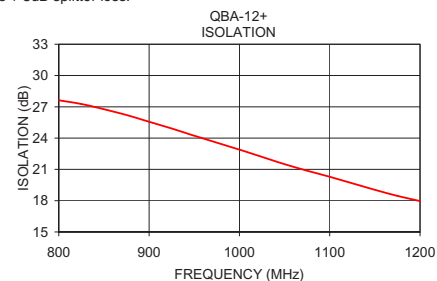
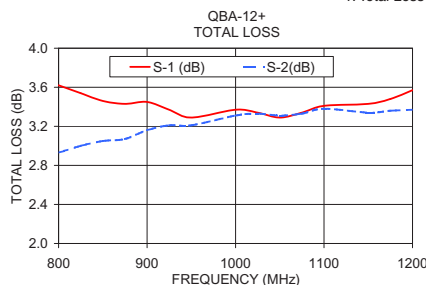
2. Derate linearly to 10W at 100°C

Thermal compound may be applied to decrease body temperature. See application note AN-10-007

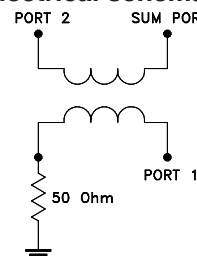
### Typical Performance Data

| Frequency (MHz) | Total Loss <sup>1</sup> (dB) | Amplitude Unbalance (dB) | Isolation (dB) | Phase Unbalance (deg.) | VSWR S | VSWR 1 | VSWR 2 |
|-----------------|------------------------------|--------------------------|----------------|------------------------|--------|--------|--------|
|                 | S-1 S-2                      |                          |                |                        |        |        |        |
| 800.00          | 3.62 2.93                    | 0.70                     | 27.63          | 90.49                  | 1.08   | 1.21   | 1.09   |
| 825.00          | 3.54 3.00                    | 0.54                     | 27.27          | 90.70                  | 1.08   | 1.21   | 1.09   |
| 850.00          | 3.46 3.05                    | 0.40                     | 26.77          | 90.62                  | 1.08   | 1.22   | 1.09   |
| 875.00          | 3.43 3.07                    | 0.36                     | 26.21          | 90.51                  | 1.08   | 1.23   | 1.09   |
| 900.00          | 3.45 3.16                    | 0.28                     | 25.57          | 90.98                  | 1.09   | 1.24   | 1.10   |
| 925.00          | 3.37 3.21                    | 0.16                     | 24.92          | 91.26                  | 1.09   | 1.25   | 1.10   |
| 950.00          | 3.29 3.21                    | 0.09                     | 24.23          | 91.13                  | 1.11   | 1.26   | 1.11   |
| 1000.00         | 3.37 3.31                    | 0.06                     | 22.89          | 91.51                  | 1.13   | 1.28   | 1.13   |
| 1025.00         | 3.34 3.33                    | 0.01                     | 22.20          | 91.78                  | 1.15   | 1.29   | 1.15   |
| 1050.00         | 3.29 3.31                    | 0.03                     | 21.50          | 91.85                  | 1.17   | 1.30   | 1.16   |
| 1075.00         | 3.34 3.33                    | 0.01                     | 20.87          | 91.92                  | 1.19   | 1.31   | 1.17   |
| 1100.00         | 3.41 3.38                    | 0.03                     | 20.29          | 92.22                  | 1.21   | 1.32   | 1.19   |
| 1150.00         | 3.43 3.34                    | 0.09                     | 19.04          | 92.80                  | 1.26   | 1.35   | 1.23   |
| 1175.00         | 3.48 3.36                    | 0.12                     | 18.46          | 93.06                  | 1.28   | 1.36   | 1.25   |
| 1200.00         | 3.57 3.37                    | 0.20                     | 17.96          | 93.41                  | 1.31   | 1.37   | 1.27   |

1. Total Loss = Insertion Loss + 3dB splitter loss.



### electrical schematic



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M151107  
EDB-991005  
QBA-12  
WZ/BC/CP  
160113

## 2 Way-90° Power Splitter/Combiner

**QBA-12+**

### Typical Performance Data

TEST CONDITIONS: INPUT POWER = 0dBm @Temperature = +25°C

| FREQ.<br>(MHz) | TOTAL LOSS <sup>1</sup><br>(dB) |      |      | AMP.<br>UNBAL.<br>(dB) | PHASE UNBAL.<br>From 90°<br>(deg.) | ISOLATION<br>(dB)<br>1-2 | VSWR<br>(:1) |      |      |
|----------------|---------------------------------|------|------|------------------------|------------------------------------|--------------------------|--------------|------|------|
|                | S-1                             | S-2  | AVG. |                        |                                    |                          | S            | 1    | 2    |
| 700            | 3.94                            | 2.88 | 3.41 | 1.06                   | 0.68                               | 20.96                    | 1.22         | 1.14 | 1.16 |
| 725            | 3.83                            | 2.97 | 3.40 | 0.85                   | 0.56                               | 21.08                    | 1.21         | 1.13 | 1.15 |
| 750            | 3.73                            | 3.05 | 3.39 | 0.69                   | 0.49                               | 21.20                    | 1.21         | 1.11 | 1.14 |
| 775            | 3.65                            | 3.13 | 3.39 | 0.52                   | 0.42                               | 21.33                    | 1.20         | 1.10 | 1.13 |
| 800            | 3.57                            | 3.20 | 3.38 | 0.37                   | 0.34                               | 21.44                    | 1.20         | 1.09 | 1.12 |
| 825            | 3.50                            | 3.27 | 3.38 | 0.22                   | 0.30                               | 21.58                    | 1.19         | 1.09 | 1.11 |
| 850            | 3.44                            | 3.33 | 3.38 | 0.10                   | 0.25                               | 21.71                    | 1.19         | 1.08 | 1.10 |
| 875            | 3.39                            | 3.39 | 3.39 | 0.00                   | 0.22                               | 21.83                    | 1.19         | 1.08 | 1.10 |
| 900            | 3.34                            | 3.44 | 3.39 | 0.10                   | 0.22                               | 21.95                    | 1.19         | 1.08 | 1.10 |
| 950            | 3.28                            | 3.53 | 3.40 | 0.26                   | 0.24                               | 22.17                    | 1.19         | 1.08 | 1.10 |
| 975            | 3.26                            | 3.56 | 3.41 | 0.30                   | 0.25                               | 22.25                    | 1.19         | 1.08 | 1.10 |
| 1000           | 3.25                            | 3.59 | 3.42 | 0.34                   | 0.31                               | 22.33                    | 1.19         | 1.09 | 1.11 |
| 1025           | 3.25                            | 3.62 | 3.43 | 0.37                   | 0.34                               | 22.41                    | 1.19         | 1.10 | 1.11 |
| 1050           | 3.25                            | 3.63 | 3.44 | 0.38                   | 0.39                               | 22.45                    | 1.19         | 1.10 | 1.12 |
| 1100           | 3.28                            | 3.64 | 3.46 | 0.36                   | 0.46                               | 22.49                    | 1.20         | 1.12 | 1.13 |
| 1125           | 3.31                            | 3.63 | 3.47 | 0.32                   | 0.48                               | 22.47                    | 1.20         | 1.13 | 1.14 |
| 1150           | 3.34                            | 3.62 | 3.48 | 0.27                   | 0.52                               | 22.42                    | 1.20         | 1.14 | 1.15 |
| 1175           | 3.39                            | 3.60 | 3.49 | 0.21                   | 0.55                               | 22.34                    | 1.21         | 1.15 | 1.17 |
| 1200           | 3.44                            | 3.56 | 3.50 | 0.12                   | 0.59                               | 22.24                    | 1.21         | 1.16 | 1.18 |
| 1250           | 3.58                            | 3.49 | 3.54 | 0.09                   | 0.59                               | 21.92                    | 1.23         | 1.19 | 1.21 |
| 1300           | 3.76                            | 3.39 | 3.58 | 0.37                   | 0.52                               | 21.53                    | 1.25         | 1.22 | 1.24 |
| 1350           | 4.00                            | 3.26 | 3.63 | 0.74                   | 0.35                               | 21.06                    | 1.28         | 1.27 | 1.28 |
| 1400           | 4.31                            | 3.13 | 3.72 | 1.17                   | 0.06                               | 20.58                    | 1.33         | 1.32 | 1.33 |
| 1450           | 4.68                            | 2.99 | 3.83 | 1.69                   | 0.46                               | 20.11                    | 1.38         | 1.38 | 1.38 |
| 1500           | 5.12                            | 2.83 | 3.97 | 2.29                   | 1.17                               | 19.67                    | 1.45         | 1.46 | 1.45 |

<sup>1</sup> Total Loss = Insertion Loss+ 3dB Splitter Loss

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# 2 Way-90° Power Splitter/Combiner

**QBA-12+**

## Typical Performance Data

TEST CONDITIONS: INPUT POWER = 0dBm @Temperature = -55°C

| FREQ.<br>(MHz) | TOTAL LOSS <sup>1</sup><br>(dB) |      |      | AMP.<br>UNBAL.<br>(dB) | PHASE UNBAL.<br>From 90°<br>(deg.) | ISOLATION<br>(dB)<br>1-2 | VSWR<br>(:1) |      |      |
|----------------|---------------------------------|------|------|------------------------|------------------------------------|--------------------------|--------------|------|------|
|                | S-1                             | S-2  | AVG. |                        |                                    |                          | S            | 1    | 2    |
| 700            | 3.81                            | 2.73 | 3.27 | 1.08                   | 0.64                               | 20.91                    | 1.22         | 1.15 | 1.16 |
| 725            | 3.70                            | 2.81 | 3.26 | 0.89                   | 0.54                               | 21.01                    | 1.22         | 1.13 | 1.16 |
| 750            | 3.60                            | 2.90 | 3.25 | 0.70                   | 0.43                               | 21.07                    | 1.21         | 1.12 | 1.15 |
| 775            | 3.51                            | 2.98 | 3.24 | 0.53                   | 0.36                               | 21.20                    | 1.21         | 1.11 | 1.14 |
| 800            | 3.43                            | 3.05 | 3.24 | 0.38                   | 0.29                               | 21.31                    | 1.20         | 1.10 | 1.12 |
| 825            | 3.35                            | 3.11 | 3.23 | 0.24                   | 0.24                               | 21.42                    | 1.20         | 1.08 | 1.11 |
| 850            | 3.28                            | 3.18 | 3.23 | 0.11                   | 0.20                               | 21.49                    | 1.20         | 1.08 | 1.11 |
| 875            | 3.23                            | 3.23 | 3.23 | 0.00                   | 0.16                               | 21.58                    | 1.19         | 1.08 | 1.10 |
| 900            | 3.18                            | 3.28 | 3.23 | 0.10                   | 0.17                               | 21.74                    | 1.19         | 1.08 | 1.10 |
| 950            | 3.10                            | 3.36 | 3.23 | 0.26                   | 0.22                               | 21.96                    | 1.19         | 1.07 | 1.09 |
| 975            | 3.08                            | 3.39 | 3.24 | 0.32                   | 0.24                               | 22.00                    | 1.19         | 1.07 | 1.09 |
| 1000           | 3.06                            | 3.43 | 3.24 | 0.37                   | 0.29                               | 22.06                    | 1.19         | 1.08 | 1.10 |
| 1025           | 3.05                            | 3.44 | 3.25 | 0.39                   | 0.34                               | 22.13                    | 1.19         | 1.09 | 1.10 |
| 1050           | 3.05                            | 3.45 | 3.25 | 0.40                   | 0.35                               | 22.17                    | 1.19         | 1.09 | 1.10 |
| 1100           | 3.07                            | 3.46 | 3.26 | 0.39                   | 0.41                               | 22.14                    | 1.19         | 1.11 | 1.13 |
| 1125           | 3.09                            | 3.46 | 3.27 | 0.37                   | 0.47                               | 22.06                    | 1.19         | 1.12 | 1.14 |
| 1150           | 3.12                            | 3.44 | 3.28 | 0.33                   | 0.51                               | 21.94                    | 1.20         | 1.13 | 1.14 |
| 1175           | 3.15                            | 3.42 | 3.29 | 0.27                   | 0.55                               | 21.85                    | 1.21         | 1.14 | 1.15 |
| 1200           | 3.20                            | 3.39 | 3.30 | 0.19                   | 0.60                               | 21.78                    | 1.21         | 1.15 | 1.16 |
| 1250           | 3.32                            | 3.31 | 3.32 | 0.01                   | 0.69                               | 21.38                    | 1.23         | 1.18 | 1.19 |
| 1300           | 3.49                            | 3.21 | 3.35 | 0.28                   | 0.66                               | 20.92                    | 1.25         | 1.21 | 1.23 |
| 1350           | 3.71                            | 3.09 | 3.40 | 0.63                   | 0.60                               | 20.52                    | 1.28         | 1.26 | 1.27 |
| 1400           | 3.99                            | 2.95 | 3.47 | 1.04                   | 0.37                               | 20.05                    | 1.32         | 1.31 | 1.32 |
| 1450           | 4.34                            | 2.79 | 3.56 | 1.55                   | 0.01                               | 19.63                    | 1.37         | 1.37 | 1.37 |
| 1500           | 4.76                            | 2.64 | 3.70 | 2.12                   | 0.66                               | 19.06                    | 1.44         | 1.44 | 1.44 |

<sup>1</sup> Total Loss = Insertion Loss+ 3dB Splitter Loss

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## 2 Way-90° Power Splitter/Combiner

**QBA-12+**

### Typical Performance Data

TEST CONDITIONS: INPUT POWER = 0dBm @Temperature = +100°C

| FREQ.<br>(MHz) | TOTAL LOSS <sup>1</sup><br>(dB) |      |      | AMP.<br>UNBAL.<br>(dB) | PHASE UNBAL.<br>From 90°<br>(deg.) | ISOLATION<br>(dB)<br>1-2 | VSWR<br>(:1) |      |      |
|----------------|---------------------------------|------|------|------------------------|------------------------------------|--------------------------|--------------|------|------|
|                | S-1                             | S-2  | AVG. |                        |                                    |                          | S            | 1    | 2    |
| 700            | 3.99                            | 2.97 | 3.48 | 1.02                   | 0.64                               | 20.98                    | 1.22         | 1.14 | 1.15 |
| 725            | 3.89                            | 3.05 | 3.47 | 0.83                   | 0.54                               | 21.16                    | 1.21         | 1.12 | 1.13 |
| 750            | 3.79                            | 3.14 | 3.47 | 0.65                   | 0.46                               | 21.30                    | 1.20         | 1.11 | 1.12 |
| 775            | 3.71                            | 3.22 | 3.46 | 0.49                   | 0.40                               | 21.45                    | 1.20         | 1.10 | 1.11 |
| 800            | 3.63                            | 3.29 | 3.46 | 0.34                   | 0.34                               | 21.58                    | 1.19         | 1.09 | 1.11 |
| 825            | 3.57                            | 3.36 | 3.46 | 0.20                   | 0.30                               | 21.76                    | 1.19         | 1.08 | 1.10 |
| 850            | 3.50                            | 3.41 | 3.46 | 0.09                   | 0.25                               | 21.94                    | 1.19         | 1.08 | 1.09 |
| 875            | 3.46                            | 3.48 | 3.47 | 0.02                   | 0.23                               | 22.08                    | 1.19         | 1.08 | 1.09 |
| 900            | 3.42                            | 3.53 | 3.48 | 0.11                   | 0.23                               | 22.22                    | 1.18         | 1.08 | 1.09 |
| 950            | 3.36                            | 3.62 | 3.49 | 0.26                   | 0.25                               | 22.50                    | 1.18         | 1.08 | 1.10 |
| 975            | 3.35                            | 3.65 | 3.50 | 0.30                   | 0.28                               | 22.65                    | 1.18         | 1.09 | 1.10 |
| 1000           | 3.34                            | 3.68 | 3.51 | 0.34                   | 0.32                               | 22.77                    | 1.18         | 1.09 | 1.11 |
| 1025           | 3.35                            | 3.70 | 3.52 | 0.35                   | 0.33                               | 22.89                    | 1.18         | 1.10 | 1.12 |
| 1050           | 3.36                            | 3.72 | 3.54 | 0.36                   | 0.36                               | 22.96                    | 1.18         | 1.10 | 1.13 |
| 1100           | 3.40                            | 3.72 | 3.56 | 0.32                   | 0.42                               | 23.09                    | 1.19         | 1.12 | 1.15 |
| 1125           | 3.44                            | 3.71 | 3.58 | 0.27                   | 0.41                               | 23.11                    | 1.19         | 1.13 | 1.15 |
| 1150           | 3.47                            | 3.70 | 3.59 | 0.23                   | 0.41                               | 23.06                    | 1.20         | 1.14 | 1.17 |
| 1175           | 3.53                            | 3.68 | 3.60 | 0.15                   | 0.42                               | 23.00                    | 1.20         | 1.15 | 1.18 |
| 1200           | 3.59                            | 3.64 | 3.62 | 0.06                   | 0.44                               | 22.92                    | 1.21         | 1.16 | 1.19 |
| 1250           | 3.74                            | 3.57 | 3.66 | 0.17                   | 0.36                               | 22.61                    | 1.23         | 1.19 | 1.22 |
| 1300           | 3.94                            | 3.47 | 3.71 | 0.47                   | 0.21                               | 22.24                    | 1.25         | 1.23 | 1.25 |
| 1350           | 4.19                            | 3.35 | 3.77 | 0.84                   | 0.04                               | 21.78                    | 1.28         | 1.27 | 1.29 |
| 1400           | 4.51                            | 3.22 | 3.87 | 1.30                   | 0.42                               | 21.31                    | 1.32         | 1.33 | 1.33 |
| 1450           | 4.89                            | 3.07 | 3.98 | 1.83                   | 1.01                               | 20.85                    | 1.37         | 1.39 | 1.37 |
| 1500           | 5.35                            | 2.92 | 4.13 | 2.43                   | 1.73                               | 20.32                    | 1.43         | 1.46 | 1.43 |

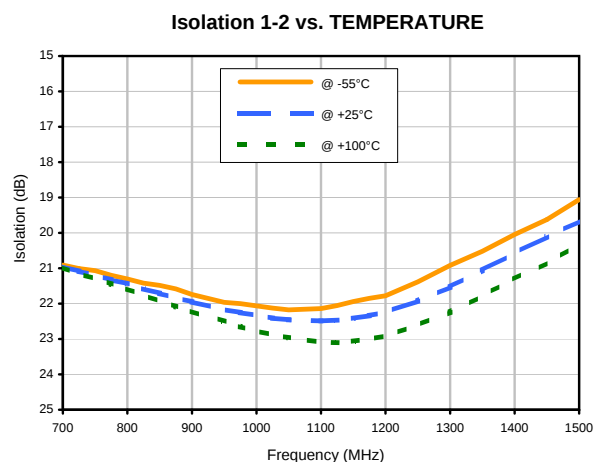
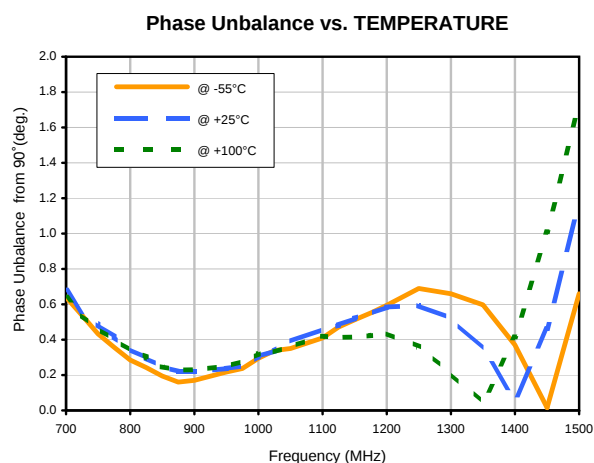
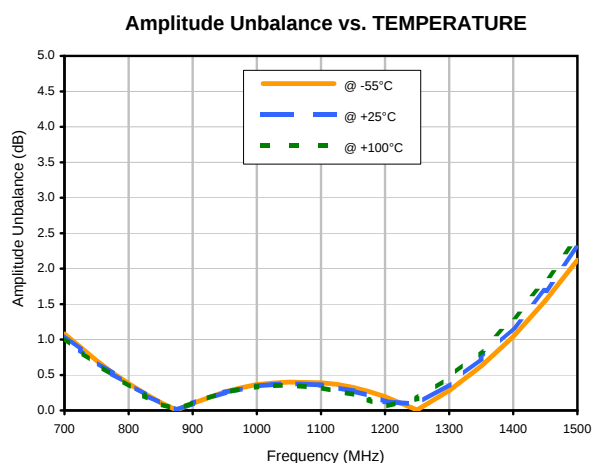
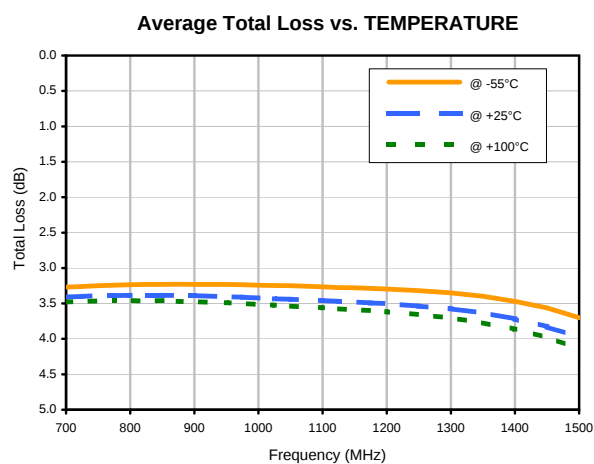
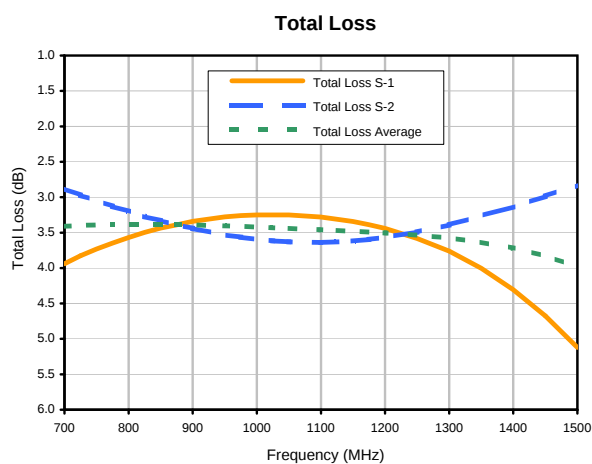
<sup>1</sup> Total Loss = Insertion Loss+ 3dB Splitter Loss

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# 2 Way-90° Power Splitter/Combiner

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## Typical Performance Curves



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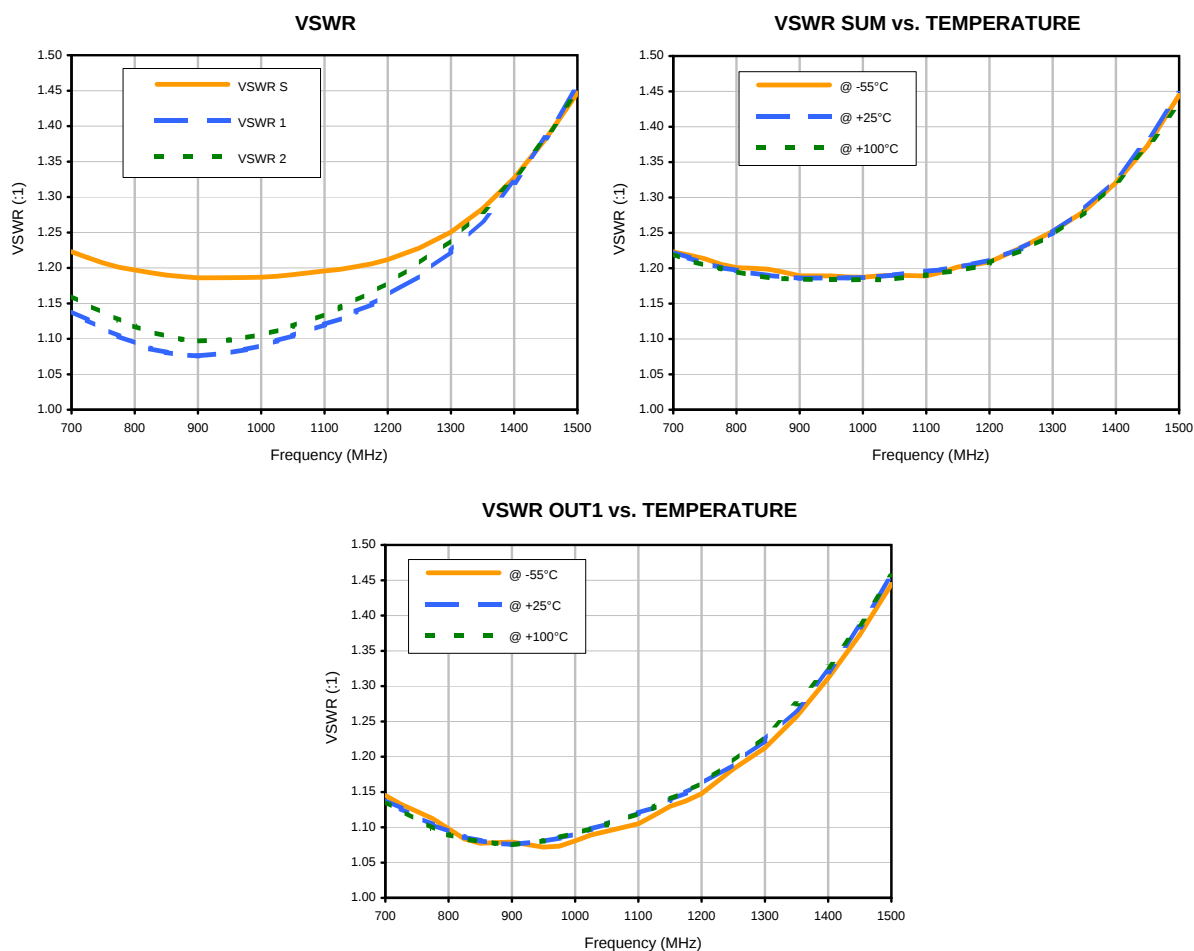
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The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see

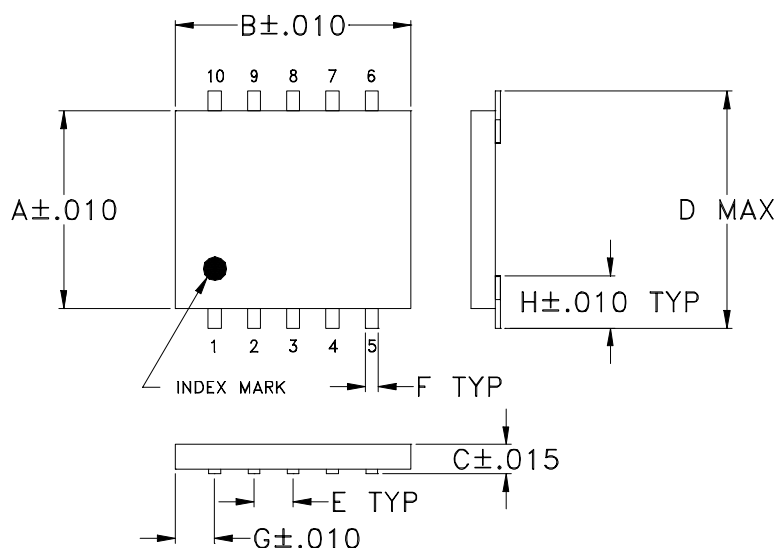


# Case Style

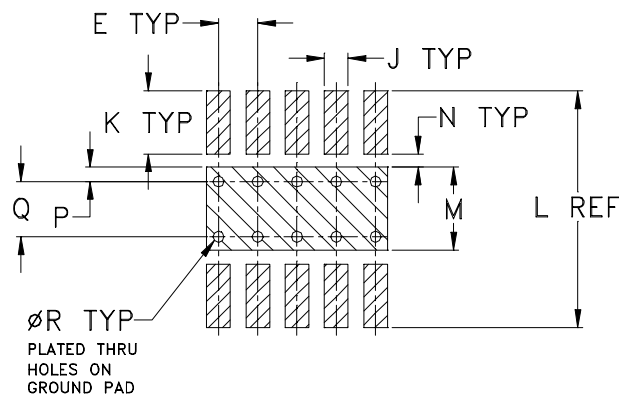
# SM33

SM33

## Outline Dimensions



## PCB Land Pattern



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

ADJACENT GROUND PINS SHALL BE CONNECTED  
TO EACH OTHER AND TO GROUND PAD

| CASE # | A              | B              | C              | D              | E              | F              | G              | H              | J              | K              | L              | M              | N              | P              |
|--------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| SM33   | .250<br>(6.35) | .300<br>(7.62) | .050<br>(1.27) | .310<br>(7.87) | .050<br>(1.27) | .015<br>(0.38) | .050<br>(1.27) | .066<br>(1.68) | .030<br>(0.76) | .095<br>(2.41) | .330<br>(8.38) | .100<br>(2.54) | .020<br>(0.51) | .015<br>(0.38) |

| CASE # | Q              | R              | WT. GRAM |
|--------|----------------|----------------|----------|
| SM33   | .070<br>(1.78) | .014<br>(0.36) | 0.2      |

Dimensions are in inches (mm). Tolerances:  $\pm .005$

### Notes:

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



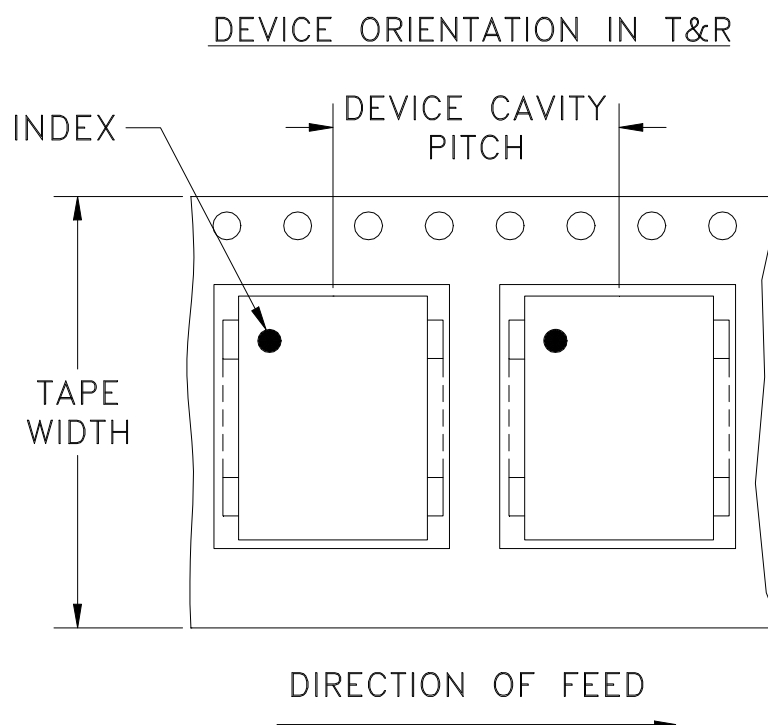
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# Tape & Reel Packaging TR-F34



| Tape Width,<br>mm | Device Cavity<br>Pitch, mm | Reel Size,<br>inches | Devices per Reel<br>see note                |      |
|-------------------|----------------------------|----------------------|---------------------------------------------|------|
| 16                | 12                         | 7                    | Small<br>quantity<br>standard<br>(see note) | 20   |
|                   |                            |                      |                                             | 50   |
|                   |                            |                      |                                             | 100  |
|                   |                            |                      |                                             | 200  |
|                   |                            | 13                   | Standard                                    | 500  |
|                   |                            |                      |                                             | 1000 |

Note: Availability of small reel quantity varies by model.  
Refer to pricing and availability on individual model dashboard.

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](http://www.minicircuits.com/pages/pdfs/tape.pdf)



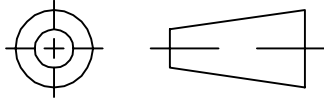
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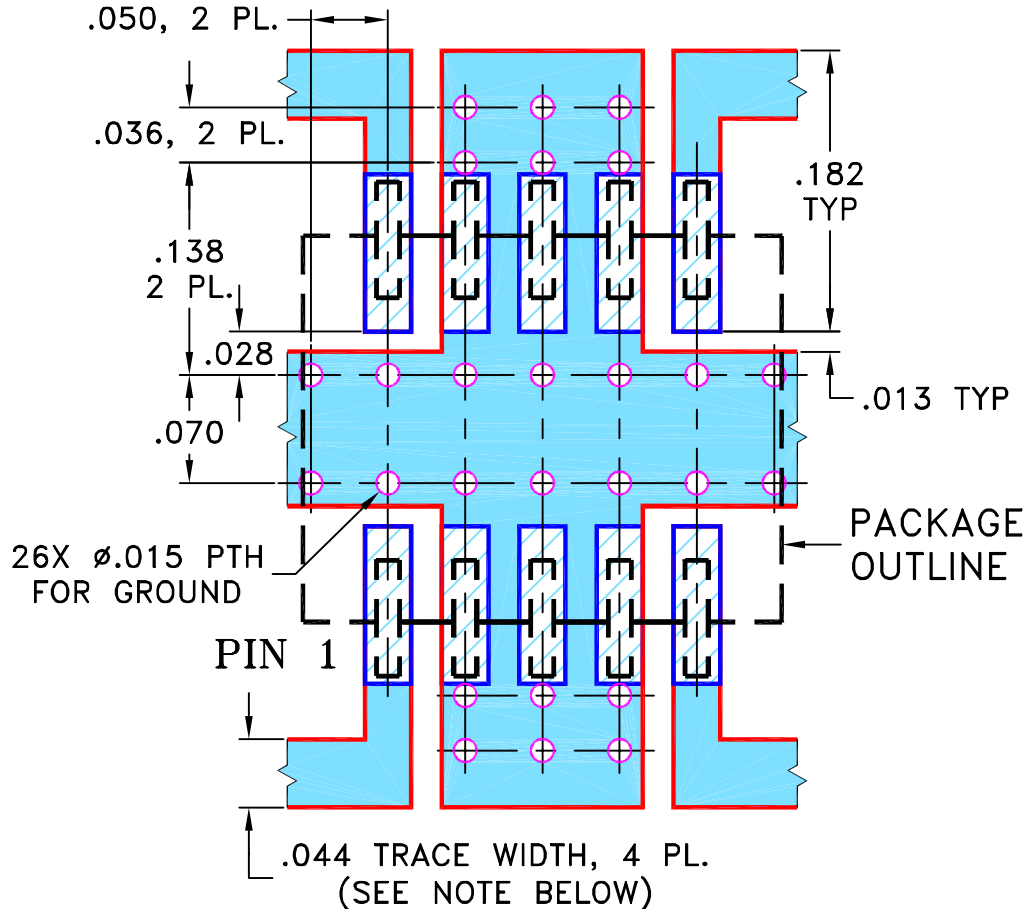
## THIRD ANGLE PROJECTION



## REVISIONS

| REV | ECN No. | DESCRIPTION               | DATE     | DR  | AUTH |
|-----|---------|---------------------------|----------|-----|------|
| A   | M82377  | UPDATED DRAWING           | 07/31/02 | AV  | DB   |
| B   | M101085 | UPDATED DRAWING, ADDED    | 10/06/05 | MMG | HY   |
|     |         | DZ944 CASE STYLE & NOTE 2 |          |     |      |
| C   | M102713 | UPDATED NOTES             | 01/10/06 | MMG | ABD  |

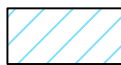
### SUGGESTED MOUNTING CONFIGURATION FOR SM1L/SM33/DZ944 CASE STYLES, "lf/nl" PIN CONNECTIONS



- NOTE: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS  $.020 \pm .0015$ ; 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

UNLESS OTHERWISE SPECIFIED

INITIALS

DATE

DIMENSIONS ARE IN INCHES

TOLERANCES ON:

2 PL DECIMALS  $\pm$ 3 PL DECIMALS  $\pm$  .005ANGLES  $\pm$ FRACTIONS  $\pm$ 

DRAWN

MMG

04/12/00

CHECKED

WP

04/27/00

APPROVED

DB

04/27/00

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



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13 Neptune Avenue  
Brooklyn NY 11235

PL, lf/nl, SM1L/SM33/DZ944, BDCA/QBA, TB-115

SIZE

A

CODE IDENT

15542

DRAWING NO:

98-PL-004

REV:

C

FILE: 98PL004

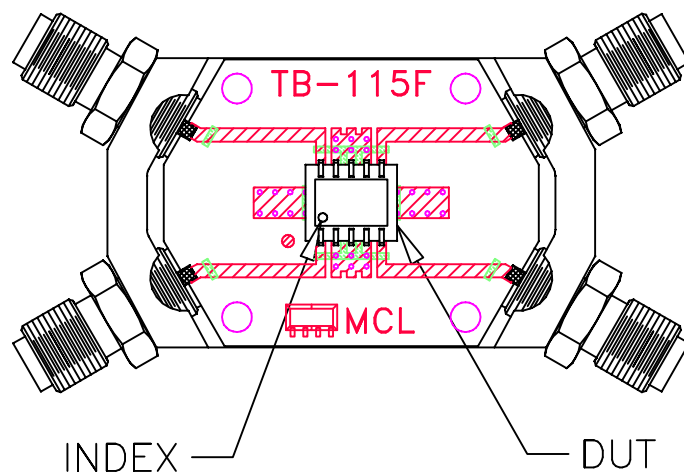
SCALE:

8:1

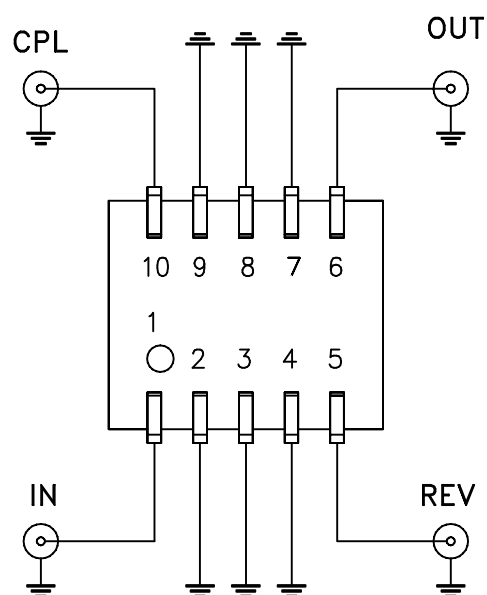
SHEET:

1 OF 1

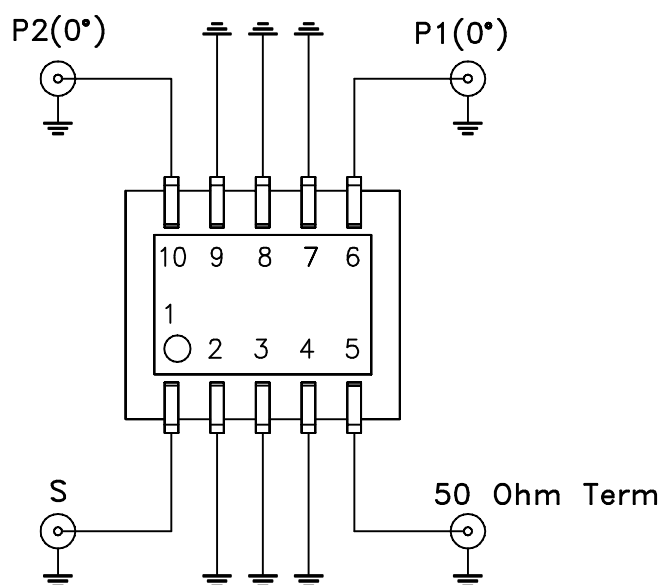
# Evaluation Board and Circuit



TB-115+



BDCA MODELS



QBA MODELS

## SCHEMATIC DIAGRAM

### Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent, Dielectric Constant=3.5, Thickness=.020 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          | -55° to 100°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                                                                              |