

DC Pass

# Power Splitter/Combiner

**ZX10-2-852-S+**

2 Way-0° 50Ω 500 to 8500 MHz

## The Big Deal

- Ultra-Wideband, 500 to 8500 MHz
- Good VSWR, 1.4:1 typ.
- Low unbalance, 0.1 dB
- Rugged unibody case



CASE STYLE: FL2227

## Product Overview

Mini-Circuits' ZX10-2-852-S+ is a coaxial, ultra-wideband 2-way 0° splitter combiner providing RF input power handling up to 2.5W as a splitter for an wide range of applications from 500 to 8500 MHz. The splitter/combiner comes housed in a rugged, compact case with SMA connectors.

## Key Features

| Feature                         | Advantages                                                                                                                                                           |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ultra-wideband, 500 to 8500 MHz | ZX10-2-852-S+ supports bandwidth requirements for a wide variety of applications including broadband applications such as instrumentation and defense.               |
| Good VSWR, 1.4:1                | Provides excellent thru-path transmission with minimal signal reflection.                                                                                            |
| Low amplitude unbalance, 0.1 dB | Produces nearly equal output signals, ideal for parallel path / multichannel systems.                                                                                |
| DC passing up to 0.4 A          | Supports applications where DC power is needed through the RF line.                                                                                                  |
| Rugged, unibody construction    | Mini-Circuits' unibody construction integrates the RF connector into the case body, providing high reliability and excellent survivability in critical applications. |

### Notes

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B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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)



# Power Splitter/Combiner

## ZX10-2-852-S+

2 Way-0° 50Ω 500 to 8500 MHz

### Maximum Ratings

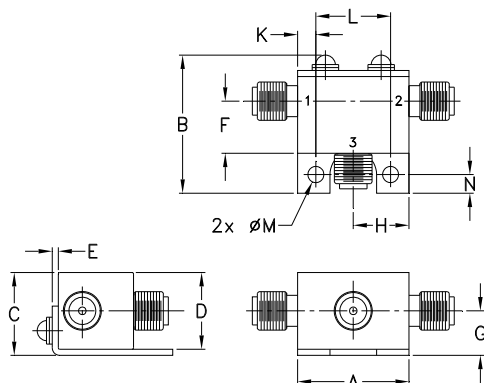
|                                                            |                                |
|------------------------------------------------------------|--------------------------------|
| Operating Temperature                                      | -40°C to 85°C                  |
| Storage Temperature                                        | -55°C to 100°C                 |
| Power Input (as a splitter) 2.5W <sup>1</sup> max. at 25°C |                                |
| Internal Dissipation                                       | 1.7W <sup>2</sup> max. at 25°C |
| DC Current                                                 | 0.4 A max.                     |

Permanent damage may occur if any of these limits are exceeded.  
 1. Derate linearly to 1.25W at 85°C  
 2. Derate linearly to 1.1W at 85°C

### Coaxial Connections

|          |   |
|----------|---|
| SUM PORT | S |
| PORT 1   | 1 |
| PORT 2   | 2 |

### Outline Drawing



### Outline Dimensions (inch/mm)

|       |       |       |       |      |      |      |
|-------|-------|-------|-------|------|------|------|
| A     | B     | C     | D     | E    | F    | G    |
| .74   | .90   | .54   | .50   | .04  | .34  | .29  |
| 18.80 | 22.86 | 13.72 | 12.70 | 1.02 | 8.64 | 7.37 |

|      |    |      |       |      |      |       |
|------|----|------|-------|------|------|-------|
| H    | J  | K    | L     | M    | N    | wt    |
| .37  | -- | .122 | .496  | .106 | .122 | grams |
| 9.40 | -- | 3.10 | 12.60 | 2.69 | 3.10 | 20.0  |

### Features

- wide bandwidth, 500 to 8500 MHz
- excellent amplitude unbalance, 0.1 dB typ.
- small size
- high ESD level\*
- DC passing
- protected under US patent 6,790,049

### Applications

- WIMAX
- ISM
- instrumentation
- radar
- WLAN
- satellite communications
- LTE



Generic photo used for illustration purposes only

CASE STYLE: FL2227

| Connectors | Model         |
|------------|---------------|
| SMA        | ZX10-2-852-S+ |

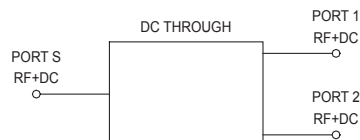
+RoHS Compliant

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

### Electrical Specifications at 25°C

| Parameter                                        | Frequency (MHz) | Min. | Typ. | Max. | Unit   |
|--------------------------------------------------|-----------------|------|------|------|--------|
| <b>Frequency</b>                                 |                 | 500  |      | 8500 | MHz    |
| <b>Insertion Loss (above theoretical 3.0 dB)</b> | 500 - 3000      | —    | 1.1  | 1.5  | dB     |
|                                                  | 3000 - 6000     | —    | 1.9  | 2.2  |        |
|                                                  | 6000 - 8500     | —    | 3.0  | 3.4  |        |
| <b>Isolation</b>                                 | 500 - 3000      | 6.3  | 9.4  | —    | dB     |
|                                                  | 3000 - 6000     | 16.8 | 20.6 | —    |        |
|                                                  | 6000 - 8500     | 12.4 | 18.2 | —    |        |
| <b>Phase Unbalance</b>                           | 500 - 3000      | —    | 2.0  | 4    | Degree |
|                                                  | 3000 - 6000     | —    | 2.0  | 7    |        |
|                                                  | 6000 - 8500     | —    | 4.0  | 8    |        |
| <b>Amplitude Unbalance</b>                       | 500 - 3000      | —    | 0.1  | 0.3  | dB     |
|                                                  | 3000 - 6000     | —    | 0.2  | 0.5  |        |
|                                                  | 6000 - 8500     | —    | 0.3  | 0.9  |        |
| <b>VSWR (Port S)</b>                             | 500 - 3000      | —    | 1.5  | —    | :1     |
|                                                  | 3000 - 6000     | —    | 1.3  | —    |        |
|                                                  | 6000 - 8500     | —    | 1.5  | —    |        |
| <b>VSWR (Port 1-2)</b>                           | 500 - 3000      | —    | 1.25 | —    | :1     |
|                                                  | 3000 - 6000     | —    | 1.4  | —    |        |
|                                                  | 6000 - 8500     | —    | 1.7  | —    |        |

### Electrical Schematic



\* ESD rating

Human body model (HBM): Class 2 (1800 to 4000V) in accordance with ANSI / ESD 5.1-2007.  
 Machine model (MM): Class M3 (200 to <400V) in accordance with ANSI / ESD 5.2-2009

### Notes

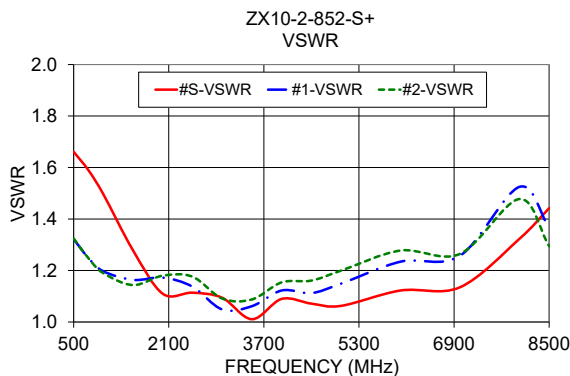
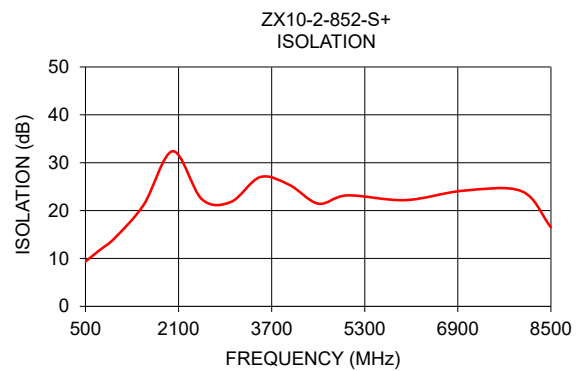
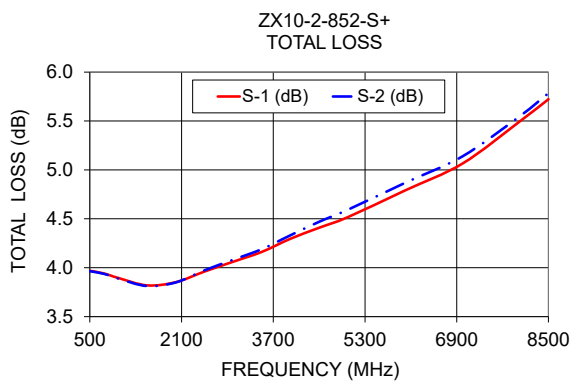
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## Typical Performance Data

| Frequency<br>(MHz) | Total Loss <sup>1</sup><br>(dB) |      | Amplitude<br>Unbalance<br>(dB) | Isolation<br>(dB) | Phase<br>Unbalance<br>(deg.) | VSWR<br>S | VSWR<br>1 | VSWR<br>2 |
|--------------------|---------------------------------|------|--------------------------------|-------------------|------------------------------|-----------|-----------|-----------|
|                    | S-1                             | S-2  |                                |                   |                              |           |           |           |
| 500                | 3.97                            | 3.96 | 0.00                           | 9.36              | 0.25                         | 1.66      | 1.32      | 1.32      |
| 750                | 3.94                            | 3.94 | 0.00                           | 11.80             | 0.36                         | 1.59      | 1.25      | 1.25      |
| 1000               | 3.89                            | 3.89 | 0.01                           | 14.23             | 0.49                         | 1.50      | 1.20      | 1.19      |
| 1500               | 3.82                            | 3.81 | 0.01                           | 21.20             | 0.73                         | 1.28      | 1.16      | 1.14      |
| 2000               | 3.85                            | 3.85 | 0.00                           | 32.40             | 0.95                         | 1.11      | 1.17      | 1.18      |
| 2500               | 3.96                            | 3.97 | 0.01                           | 22.37             | 1.20                         | 1.11      | 1.14      | 1.18      |
| 3000               | 4.06                            | 4.08 | 0.02                           | 21.80             | 1.55                         | 1.09      | 1.05      | 1.09      |
| 3500               | 4.16                            | 4.19 | 0.03                           | 26.99             | 1.84                         | 1.01      | 1.06      | 1.09      |
| 4000               | 4.30                            | 4.33 | 0.04                           | 25.40             | 2.11                         | 1.09      | 1.12      | 1.15      |
| 4500               | 4.41                            | 4.47 | 0.06                           | 21.45             | 2.40                         | 1.07      | 1.11      | 1.16      |
| 5000               | 4.52                            | 4.59 | 0.08                           | 23.17             | 2.83                         | 1.06      | 1.15      | 1.20      |
| 6000               | 4.79                            | 4.87 | 0.08                           | 22.18             | 3.50                         | 1.12      | 1.23      | 1.28      |
| 7000               | 5.06                            | 5.14 | 0.07                           | 24.16             | 4.27                         | 1.13      | 1.26      | 1.26      |
| 8000               | 5.50                            | 5.55 | 0.05                           | 24.03             | 4.54                         | 1.32      | 1.52      | 1.48      |
| 8500               | 5.72                            | 5.78 | 0.06                           | 16.52             | 4.78                         | 1.44      | 1.37      | 1.29      |

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



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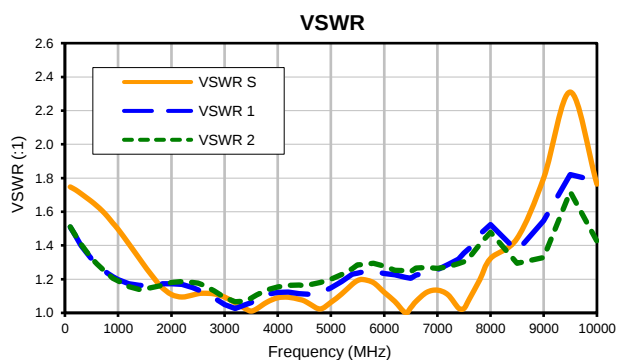
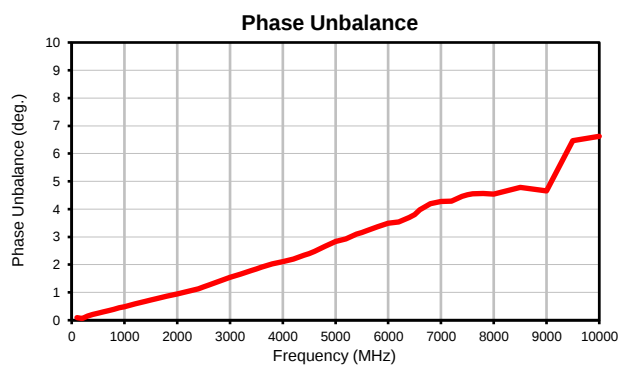
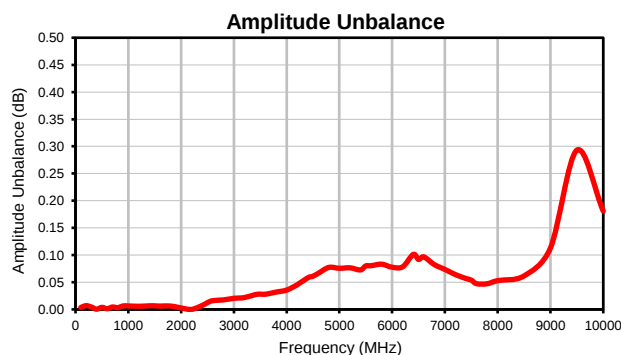
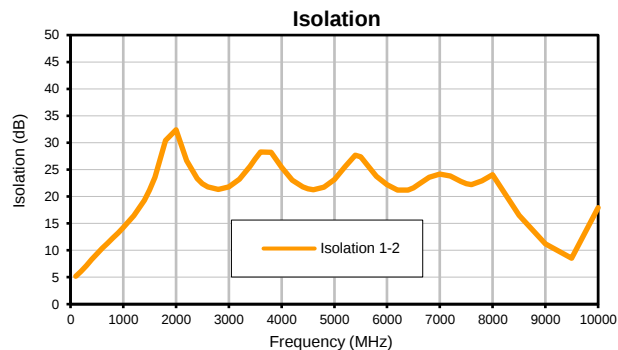
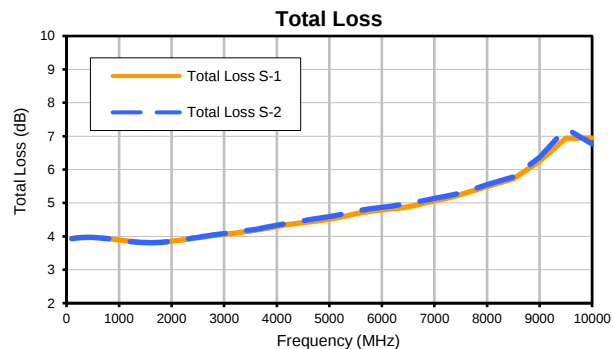


## Typical Performance Data

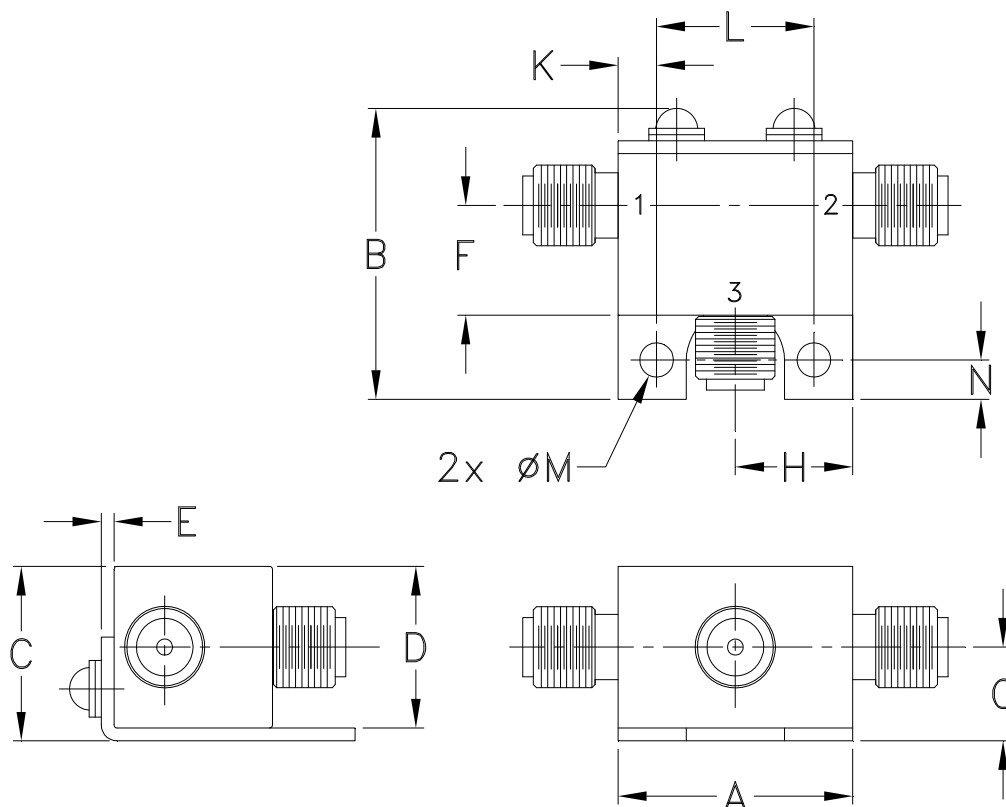
| FREQUENCY<br>(MHz) | TOTAL LOSS <sup>1</sup><br>(dB) |      | AMPLITUDE<br>UNBALANCE<br>(dB) | ISOLATION<br>(dB) | PHASE<br>UNBALANCE<br>(deg.) | FREQUENCY<br>(MHz) | VSWR<br>(:1) |      |      |
|--------------------|---------------------------------|------|--------------------------------|-------------------|------------------------------|--------------------|--------------|------|------|
|                    | S-1                             | S-2  |                                |                   |                              |                    | S            | 1    | 2    |
| 100                | 3.93                            | 3.93 | 0.00                           | 5.18              | 0.09                         | 100                | 1.75         | 1.51 | 1.51 |
| 200                | 3.96                            | 3.95 | 0.01                           | 6.07              | 0.06                         | 200                | 1.73         | 1.46 | 1.46 |
| 300                | 3.96                            | 3.97 | 0.00                           | 7.17              | 0.16                         | 300                | 1.71         | 1.40 | 1.41 |
| 400                | 3.97                            | 3.97 | 0.00                           | 8.30              | 0.21                         | 400                | 1.68         | 1.36 | 1.36 |
| 500                | 3.97                            | 3.96 | 0.00                           | 9.36              | 0.25                         | 500                | 1.66         | 1.32 | 1.32 |
| 600                | 3.96                            | 3.96 | 0.00                           | 10.36             | 0.30                         | 600                | 1.63         | 1.29 | 1.29 |
| 700                | 3.95                            | 3.95 | 0.00                           | 11.32             | 0.34                         | 700                | 1.61         | 1.26 | 1.26 |
| 800                | 3.93                            | 3.93 | 0.00                           | 12.27             | 0.40                         | 800                | 1.57         | 1.24 | 1.23 |
| 900                | 3.91                            | 3.91 | 0.01                           | 13.24             | 0.45                         | 900                | 1.53         | 1.21 | 1.21 |
| 1000               | 3.89                            | 3.89 | 0.01                           | 14.23             | 0.49                         | 1000               | 1.50         | 1.20 | 1.19 |
| 1200               | 3.85                            | 3.85 | 0.01                           | 16.46             | 0.59                         | 1200               | 1.41         | 1.17 | 1.15 |
| 1400               | 3.83                            | 3.82 | 0.01                           | 19.32             | 0.68                         | 1400               | 1.32         | 1.16 | 1.14 |
| 1500               | 3.82                            | 3.81 | 0.01                           | 21.20             | 0.73                         | 1500               | 1.28         | 1.16 | 1.14 |
| 1600               | 3.81                            | 3.81 | 0.01                           | 23.57             | 0.77                         | 1600               | 1.24         | 1.17 | 1.15 |
| 1800               | 3.82                            | 3.82 | 0.01                           | 30.43             | 0.86                         | 1800               | 1.16         | 1.17 | 1.16 |
| 2000               | 3.85                            | 3.85 | 0.00                           | 32.40             | 0.95                         | 2000               | 1.11         | 1.17 | 1.18 |
| 2200               | 3.89                            | 3.89 | 0.00                           | 26.65             | 1.04                         | 2200               | 1.09         | 1.17 | 1.19 |
| 2400               | 3.94                            | 3.95 | 0.01                           | 23.32             | 1.13                         | 2400               | 1.11         | 1.15 | 1.18 |
| 2500               | 3.96                            | 3.97 | 0.01                           | 22.37             | 1.20                         | 2500               | 1.11         | 1.14 | 1.18 |
| 2600               | 3.98                            | 4.00 | 0.02                           | 21.78             | 1.27                         | 2600               | 1.12         | 1.12 | 1.16 |
| 2800               | 4.02                            | 4.04 | 0.02                           | 21.34             | 1.41                         | 2800               | 1.11         | 1.09 | 1.13 |
| 3000               | 4.06                            | 4.08 | 0.02                           | 21.80             | 1.55                         | 3000               | 1.09         | 1.05 | 1.09 |
| 3200               | 4.10                            | 4.12 | 0.02                           | 23.20             | 1.66                         | 3200               | 1.06         | 1.03 | 1.07 |
| 3400               | 4.14                            | 4.17 | 0.03                           | 25.59             | 1.78                         | 3400               | 1.02         | 1.05 | 1.07 |
| 3500               | 4.16                            | 4.19 | 0.03                           | 26.99             | 1.84                         | 3500               | 1.01         | 1.06 | 1.09 |
| 3600               | 4.19                            | 4.21 | 0.03                           | 28.29             | 1.92                         | 3600               | 1.02         | 1.08 | 1.11 |
| 3800               | 4.24                            | 4.27 | 0.03                           | 28.21             | 2.02                         | 3800               | 1.06         | 1.11 | 1.14 |
| 4000               | 4.30                            | 4.33 | 0.04                           | 25.40             | 2.11                         | 4000               | 1.09         | 1.12 | 1.15 |
| 4200               | 4.35                            | 4.39 | 0.05                           | 23.05             | 2.20                         | 4200               | 1.09         | 1.12 | 1.16 |
| 4400               | 4.39                            | 4.45 | 0.06                           | 21.77             | 2.34                         | 4400               | 1.08         | 1.11 | 1.16 |
| 4500               | 4.41                            | 4.47 | 0.06                           | 21.45             | 2.40                         | 4500               | 1.07         | 1.11 | 1.16 |
| 4600               | 4.43                            | 4.49 | 0.07                           | 21.28             | 2.48                         | 4600               | 1.05         | 1.11 | 1.17 |
| 4800               | 4.47                            | 4.54 | 0.08                           | 21.71             | 2.66                         | 4800               | 1.02         | 1.12 | 1.18 |
| 5000               | 4.52                            | 4.59 | 0.08                           | 23.17             | 2.83                         | 5000               | 1.06         | 1.15 | 1.20 |
| 5200               | 4.58                            | 4.65 | 0.08                           | 25.53             | 2.93                         | 5200               | 1.11         | 1.19 | 1.23 |
| 5400               | 4.64                            | 4.72 | 0.07                           | 27.66             | 3.10                         | 5400               | 1.17         | 1.23 | 1.26 |
| 5500               | 4.67                            | 4.75 | 0.08                           | 27.37             | 3.16                         | 5500               | 1.19         | 1.24 | 1.28 |
| 5600               | 4.70                            | 4.78 | 0.08                           | 26.22             | 3.23                         | 5600               | 1.20         | 1.24 | 1.29 |
| 5800               | 4.75                            | 4.83 | 0.08                           | 23.77             | 3.37                         | 5800               | 1.18         | 1.25 | 1.29 |
| 6000               | 4.79                            | 4.87 | 0.08                           | 22.18             | 3.50                         | 6000               | 1.12         | 1.23 | 1.28 |
| 6200               | 4.83                            | 4.91 | 0.08                           | 21.20             | 3.54                         | 6200               | 1.07         | 1.23 | 1.25 |
| 6400               | 4.86                            | 4.96 | 0.10                           | 21.20             | 3.70                         | 6400               | 1.00         | 1.21 | 1.25 |
| 6500               | 4.89                            | 4.98 | 0.09                           | 21.63             | 3.80                         | 6500               | 1.03         | 1.20 | 1.24 |
| 6600               | 4.92                            | 5.02 | 0.10                           | 22.28             | 3.98                         | 6600               | 1.07         | 1.22 | 1.26 |
| 6800               | 4.99                            | 5.08 | 0.08                           | 23.55             | 4.20                         | 6800               | 1.12         | 1.24 | 1.27 |
| 7000               | 5.06                            | 5.14 | 0.07                           | 24.16             | 4.27                         | 7000               | 1.13         | 1.26 | 1.26 |
| 7200               | 5.13                            | 5.19 | 0.06                           | 23.82             | 4.29                         | 7200               | 1.11         | 1.29 | 1.27 |
| 7400               | 5.20                            | 5.26 | 0.06                           | 22.82             | 4.45                         | 7400               | 1.03         | 1.32 | 1.29 |
| 7500               | 5.25                            | 5.31 | 0.05                           | 22.38             | 4.52                         | 7500               | 1.03         | 1.35 | 1.30 |
| 7600               | 5.30                            | 5.35 | 0.05                           | 22.21             | 4.55                         | 7600               | 1.08         | 1.38 | 1.33 |
| 7800               | 5.40                            | 5.44 | 0.05                           | 22.93             | 4.56                         | 7800               | 1.20         | 1.47 | 1.41 |
| 8000               | 5.50                            | 5.55 | 0.05                           | 24.03             | 4.54                         | 8000               | 1.32         | 1.52 | 1.48 |
| 8500               | 5.72                            | 5.78 | 0.06                           | 16.52             | 4.78                         | 8500               | 1.44         | 1.37 | 1.29 |
| 9000               | 6.25                            | 6.36 | 0.11                           | 11.20             | 4.66                         | 9000               | 1.80         | 1.55 | 1.33 |
| 9500               | 6.94                            | 7.23 | 0.29                           | 8.55              | 6.47                         | 9500               | 2.31         | 1.82 | 1.72 |
| 10000              | 6.94                            | 6.76 | 0.18                           | 17.93             | 6.62                         | 10000              | 1.76         | 1.78 | 1.42 |

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

## Typical Performance Curves



### Outline Dimensions



| CASE #. | A              | B              | C              | D              | E             | F             | G             | H             | J | K              | L               | M              | N              | WT,<br>GRAM |
|---------|----------------|----------------|----------------|----------------|---------------|---------------|---------------|---------------|---|----------------|-----------------|----------------|----------------|-------------|
| FL2227  | .74<br>(18.80) | .90<br>(22.86) | .54<br>(13.72) | .50<br>(12.70) | .04<br>(1.02) | .34<br>(8.64) | .29<br>(7.37) | .37<br>(9.40) | - | .122<br>(3.10) | .496<br>(12.60) | .106<br>(2.69) | .122<br>(3.10) | 20.0        |

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

Tolerance on hole size and interaxes dimensions to be  $\pm .005$ .

#### Notes:

1. Case material: Brass.
2. Case finish: Nickel plate.



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Mini-Circuits ISO 9001 & ISO 14001 Certified



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 or -45° to 85° C or -55° to 105° C or -40° to 105° C or -40° to 95° C<br>Ambient Environment | Individual Model Data Sheet                                     |
| Storage Temperature            | -55° to 100° C or -65° to 150°<br>Ambient Environment                                                      | Individual Model Data Sheet                                     |
| HTOL                           | 1000 hours at 125°C                                                                                        | MIL-STD-883, Method 1005, Condition B                           |
| Thermal Shock                  | -55° to 100°C, 100 cycles                                                                                  | MIL-STD-202, Method 107, Condition A-3, except +100°C           |
| Mechanical Shock               | 1.5Kg, 0.5 ms, 5 shock pulses, Y1 direction only                                                           | MIL-STD-883, Method 2002, Condition B, except Y1 direction only |
| Vibration (Variable Frequency) | 50g peak                                                                                                   | MIL-STD-883, Method 2007, Condition B                           |
| Autoclave                      | 15 psig, 100% RH, 121°C, 96 hours                                                                          | JESD22-A102, Condition C                                        |
| HAST                           | 130°C, 85% RH, 96 hours                                                                                    | JESD22-A110                                                     |
| Solderability                  | 10X Magnification                                                                                          | J-STD-002, Para 4.2.5, Test S, 95% Coverage                     |
| Solder Reflow Heat             | Sn-Pb Eutetic Process: 240°C peak<br>Pb-Free Process: 260°C peak                                           | J-STD-020, Table 4-1, 4-2 and 5-2; Figure 5-1                   |
| Moisture Sensitivity: Level 1  | Bake at 125°C for 24 hours<br>Soak at 85°C/85% RH for 168 hours, Reflow 3 cycles at 260°C peak             | J-STD-020                                                       |



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| Specification                  | Test/Inspection Condition                                                                                                                                       | Reference/Spec          |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| 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 |