

DC Pass

NON-CATALOG

# High Power Combiner

## ZB4CS-870-10W

4 Way-0° 50Ω 570 to 870 MHz

### Maximum Ratings

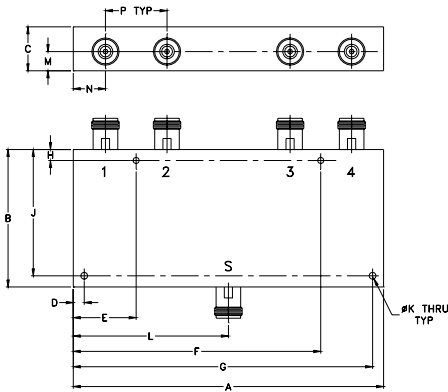
|                       |                             |
|-----------------------|-----------------------------|
| Operating Temperature | -55°C to 90°C               |
| Storage Temperature   | -55°C to 100°C              |
| DC Current            | 600 A (150mA for each port) |

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

### Coaxial Connections

|          |   |
|----------|---|
| SUM PORT | S |
| PORT 1   | 1 |
| PORT 2   | 2 |
| PORT 3   | 3 |
| PORT 4   | 4 |

### Outline Drawing



### Outline Dimensions (inch/mm)

| A      | B     | C     | D     | E     | F      | G      | H    |
|--------|-------|-------|-------|-------|--------|--------|------|
| 7.06   | 3.13  | 1.00  | .250  | 1.430 | 5.630  | 6.810  | .250 |
| 179.32 | 79.50 | 25.40 | 6.35  | 36.32 | 143.00 | 172.97 | 6.35 |
| J      | K     | L     | M     | N     | P      | wt     |      |
| 2.875  | .156  | 3.53  | .44   | .73   | 1.40   | grams  |      |
| 73.03  | 3.96  | 89.66 | 11.18 | 18.54 | 35.56  | 810    |      |

### Features

- high power, up to 10W input power
- low insertion loss, 0.3 dB typ.
- high isolation, 28 dB typ.
- good sum-port VSWR, 1.1 typ.
- good VSWR at ports 1-4, 1.15 typ.

### Applications

- tv broadcast
- UHF

### High Power Combiner Electrical Specifications

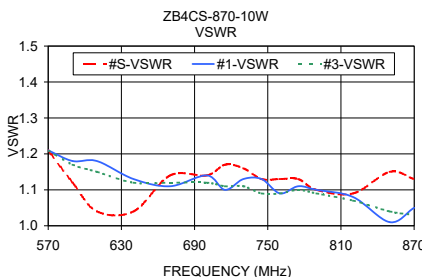
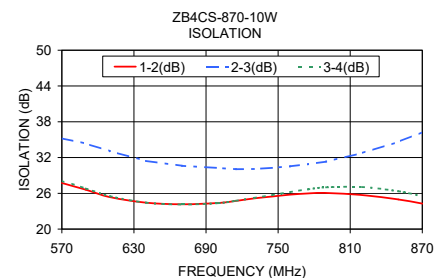
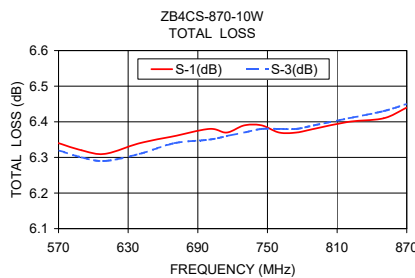
| FREQ. RANGE (MHz)              | ISOLATION (dB) |      | INSERTION LOSS (dB) ABOVE 6.0 dB |      | PHASE UNBALANCE (Degrees) |      | AMPLITUDE UNBALANCE (dB) |      | POWER INPUT <sup>1</sup> (W)  |                  |
|--------------------------------|----------------|------|----------------------------------|------|---------------------------|------|--------------------------|------|-------------------------------|------------------|
|                                | Typ.           | Min. | Typ.                             | Max. | Typ.                      | Max. | Typ.                     | Max. | as combiner <sup>2</sup> Max. | as splitter Max. |
| f <sub>L</sub> -f <sub>U</sub> |                |      |                                  |      |                           |      |                          |      |                               |                  |
| 570-870                        | 28             | 20   | 0.35                             | 0.8  | 0.6                       | 3.0  | 0.1                      | 0.3  | 10                            | 20               |

1. Over -55°C to +55°C. Derate linearly to 20% of rating at 90°C
2. As a combiner of non-coherent signals, max. power per port is power rating divided by number of ports.

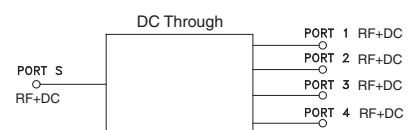
### Typical Performance Data

| Freq. (MHz) | Total Loss <sup>1</sup> (dB) |      |      |      | Amp. Unbal. (dB) | Isolation (dB) |       |       | Phase Unbal. (deg.) | VSWR S | VSWR 1 | VSWR 2 | VSWR 3 | VSWR 4 |
|-------------|------------------------------|------|------|------|------------------|----------------|-------|-------|---------------------|--------|--------|--------|--------|--------|
|             | S-1                          | S-2  | S-3  | S-4  |                  | 1-2            | 2-3   | 3-4   |                     |        |        |        |        |        |
| 570.00      | 6.34                         | 6.36 | 6.32 | 6.31 | 0.05             | 27.74          | 35.22 | 28.08 | 0.61                | 1.21   | 1.21   | 1.19   | 1.21   | 1.22   |
| 590.00      | 6.32                         | 6.34 | 6.30 | 6.29 | 0.05             | 26.60          | 34.35 | 26.81 | 0.65                | 1.12   | 1.18   | 1.16   | 1.17   | 1.16   |
| 610.00      | 6.31                         | 6.34 | 6.29 | 6.29 | 0.05             | 25.37          | 33.07 | 25.51 | 0.64                | 1.04   | 1.18   | 1.16   | 1.15   | 1.15   |
| 640.00      | 6.34                         | 6.37 | 6.31 | 6.30 | 0.07             | 24.43          | 31.43 | 24.43 | 0.63                | 1.04   | 1.13   | 1.11   | 1.12   | 1.15   |
| 670.00      | 6.36                         | 6.39 | 6.34 | 6.32 | 0.06             | 24.17          | 30.62 | 24.13 | 0.65                | 1.14   | 1.11   | 1.09   | 1.12   | 1.14   |
| 700.00      | 6.38                         | 6.41 | 6.35 | 6.34 | 0.07             | 24.38          | 30.25 | 24.34 | 0.64                | 1.14   | 1.14   | 1.11   | 1.12   | 1.12   |
| 715.00      | 6.37                         | 6.41 | 6.36 | 6.34 | 0.06             | 24.73          | 30.04 | 24.75 | 0.67                | 1.17   | 1.10   | 1.10   | 1.11   | 1.09   |
| 730.00      | 6.39                         | 6.42 | 6.37 | 6.36 | 0.07             | 25.15          | 30.09 | 25.23 | 0.71                | 1.16   | 1.13   | 1.13   | 1.11   | 1.09   |
| 745.00      | 6.39                         | 6.42 | 6.38 | 6.36 | 0.06             | 25.47          | 30.27 | 25.69 | 0.67                | 1.13   | 1.13   | 1.09   | 1.09   | 1.10   |
| 760.00      | 6.37                         | 6.42 | 6.38 | 6.35 | 0.07             | 25.78          | 30.53 | 26.21 | 0.71                | 1.13   | 1.09   | 1.11   | 1.09   | 1.10   |
| 775.00      | 6.37                         | 6.42 | 6.38 | 6.36 | 0.07             | 25.98          | 30.89 | 26.68 | 0.71                | 1.13   | 1.11   | 1.10   | 1.10   | 1.11   |
| 790.00      | 6.38                         | 6.43 | 6.39 | 6.36 | 0.07             | 26.06          | 31.32 | 27.01 | 0.76                | 1.10   | 1.10   | 1.06   | 1.09   | 1.11   |
| 820.00      | 6.40                         | 6.45 | 6.41 | 6.39 | 0.07             | 25.70          | 32.76 | 27.06 | 0.80                | 1.09   | 1.08   | 1.05   | 1.07   | 1.07   |
| 850.00      | 6.41                         | 6.47 | 6.43 | 6.39 | 0.07             | 24.97          | 34.63 | 26.35 | 0.91                | 1.15   | 1.01   | 1.07   | 1.04   | 1.04   |
| 870.00      | 6.44                         | 6.51 | 6.45 | 6.42 | 0.09             | 24.28          | 36.25 | 25.50 | 0.91                | 1.13   | 1.05   | 1.01   | 1.03   | 1.01   |

1. Total Loss = Insertion Loss + 6dB splitter loss.



### electrical schematic



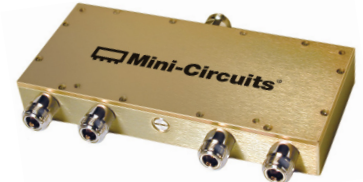
### Notes

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REV. E  
ECO-001560  
ZB4CS-870-10W  
ED-7665/1  
HY/TD/CP/AM  
200127  
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N-Type version shown  
CASE STYLE: Z689

| Connectors | Model           |
|------------|-----------------|
| N-TYPE     | ZB4CS-870-10W-N |
| SMA        | ZB4CS-870-10W-S |

# 4 Way-0° Power Splitter/Combiner ZB4CS-870-10W

## Typical Performance Data

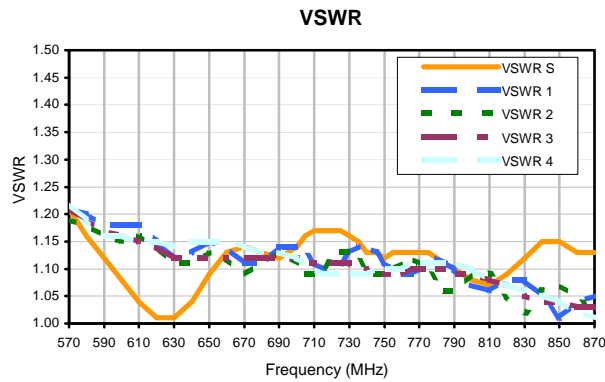
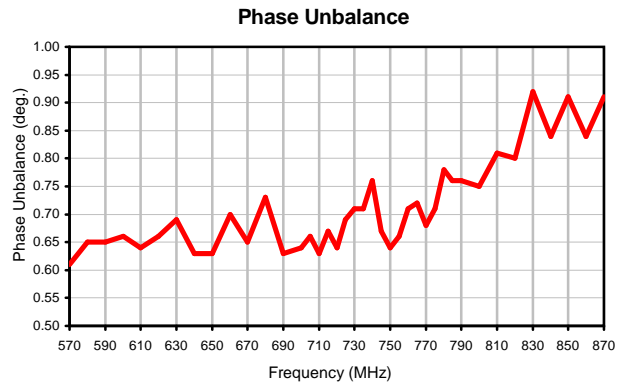
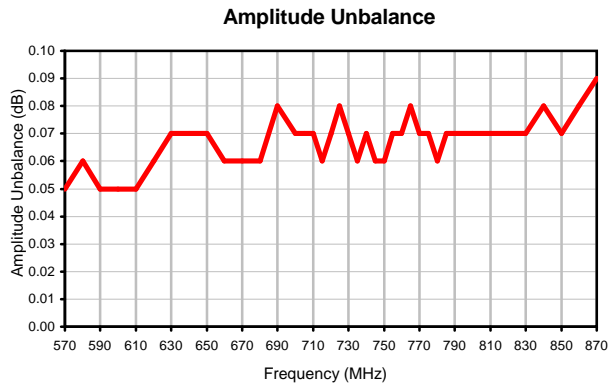
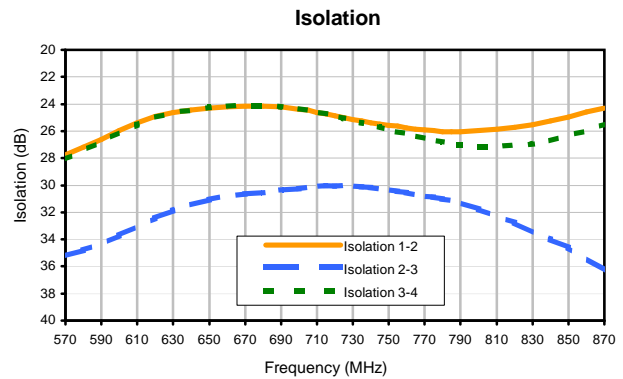
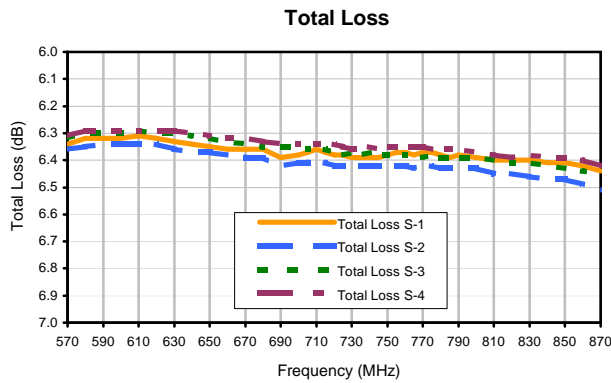
| FREQ.<br>(MHz) | TOTAL LOSS <sup>1</sup><br>(dB) |      |      |      | AMP.<br>UNBAL.<br>(dB) | ISOLATION<br>(dB) |       |       | PHASE<br>UNBAL.<br>(deg.) | FREQ.<br>(MHz) | VSWR<br>(:1) |      |      |      |      |
|----------------|---------------------------------|------|------|------|------------------------|-------------------|-------|-------|---------------------------|----------------|--------------|------|------|------|------|
|                | S-1                             | S-2  | S-3  | S-4  |                        | 1-2               | 2-3   | 3-4   |                           |                | S            | 1    | 2    | 3    | 4    |
| 570.0          | 6.34                            | 6.36 | 6.32 | 6.31 | 0.05                   | 27.74             | 35.22 | 28.08 | 0.61                      | 570.0          | 1.21         | 1.21 | 1.19 | 1.21 | 1.22 |
| 580.0          | 6.32                            | 6.35 | 6.30 | 6.29 | 0.06                   | 27.21             | 34.80 | 27.46 | 0.65                      | 580.0          | 1.16         | 1.20 | 1.18 | 1.19 | 1.19 |
| 590.0          | 6.32                            | 6.34 | 6.30 | 6.29 | 0.05                   | 26.60             | 34.35 | 26.81 | 0.65                      | 590.0          | 1.12         | 1.18 | 1.16 | 1.17 | 1.16 |
| 600.0          | 6.32                            | 6.34 | 6.30 | 6.29 | 0.05                   | 25.94             | 33.73 | 26.12 | 0.66                      | 600.0          | 1.08         | 1.18 | 1.15 | 1.16 | 1.16 |
| 610.0          | 6.31                            | 6.34 | 6.29 | 6.29 | 0.05                   | 25.37             | 33.07 | 25.51 | 0.64                      | 610.0          | 1.04         | 1.18 | 1.16 | 1.15 | 1.15 |
| 620.0          | 6.32                            | 6.34 | 6.30 | 6.29 | 0.06                   | 24.90             | 32.42 | 25.00 | 0.66                      | 620.0          | 1.01         | 1.15 | 1.14 | 1.14 | 1.15 |
| 630.0          | 6.33                            | 6.36 | 6.30 | 6.29 | 0.07                   | 24.63             | 31.87 | 24.64 | 0.69                      | 630.0          | 1.01         | 1.12 | 1.11 | 1.12 | 1.14 |
| 640.0          | 6.34                            | 6.37 | 6.31 | 6.30 | 0.07                   | 24.43             | 31.43 | 24.43 | 0.63                      | 640.0          | 1.04         | 1.13 | 1.11 | 1.12 | 1.15 |
| 650.0          | 6.35                            | 6.37 | 6.32 | 6.31 | 0.07                   | 24.28             | 31.06 | 24.26 | 0.63                      | 650.0          | 1.09         | 1.15 | 1.13 | 1.12 | 1.15 |
| 660.0          | 6.36                            | 6.38 | 6.33 | 6.32 | 0.06                   | 24.20             | 30.79 | 24.16 | 0.70                      | 660.0          | 1.13         | 1.14 | 1.12 | 1.12 | 1.15 |
| 670.0          | 6.36                            | 6.39 | 6.34 | 6.32 | 0.06                   | 24.17             | 30.62 | 24.13 | 0.65                      | 670.0          | 1.14         | 1.11 | 1.09 | 1.12 | 1.14 |
| 680.0          | 6.36                            | 6.39 | 6.35 | 6.33 | 0.06                   | 24.14             | 30.56 | 24.09 | 0.73                      | 680.0          | 1.13         | 1.11 | 1.11 | 1.12 | 1.13 |
| 690.0          | 6.39                            | 6.42 | 6.35 | 6.34 | 0.08                   | 24.23             | 30.37 | 24.19 | 0.63                      | 690.0          | 1.12         | 1.14 | 1.13 | 1.12 | 1.13 |
| 700.0          | 6.38                            | 6.41 | 6.35 | 6.34 | 0.07                   | 24.38             | 30.25 | 24.34 | 0.64                      | 700.0          | 1.14         | 1.14 | 1.11 | 1.12 | 1.12 |
| 705.0          | 6.37                            | 6.41 | 6.36 | 6.33 | 0.07                   | 24.46             | 30.17 | 24.44 | 0.66                      | 705.0          | 1.16         | 1.13 | 1.09 | 1.11 | 1.11 |
| 710.0          | 6.36                            | 6.40 | 6.36 | 6.34 | 0.07                   | 24.61             | 30.09 | 24.59 | 0.63                      | 710.0          | 1.17         | 1.11 | 1.09 | 1.11 | 1.10 |
| 715.0          | 6.37                            | 6.41 | 6.36 | 6.34 | 0.06                   | 24.73             | 30.04 | 24.75 | 0.67                      | 715.0          | 1.17         | 1.10 | 1.10 | 1.11 | 1.09 |
| 720.0          | 6.38                            | 6.42 | 6.37 | 6.34 | 0.07                   | 24.87             | 30.06 | 24.91 | 0.64                      | 720.0          | 1.17         | 1.10 | 1.12 | 1.11 | 1.09 |
| 725.0          | 6.38                            | 6.42 | 6.38 | 6.35 | 0.08                   | 25.00             | 30.04 | 25.07 | 0.69                      | 725.0          | 1.17         | 1.11 | 1.13 | 1.11 | 1.09 |
| 730.0          | 6.39                            | 6.42 | 6.37 | 6.36 | 0.07                   | 25.15             | 30.09 | 25.23 | 0.71                      | 730.0          | 1.16         | 1.13 | 1.13 | 1.11 | 1.09 |
| 735.0          | 6.39                            | 6.42 | 6.38 | 6.36 | 0.06                   | 25.26             | 30.13 | 25.38 | 0.71                      | 735.0          | 1.15         | 1.14 | 1.12 | 1.10 | 1.09 |
| 740.0          | 6.39                            | 6.42 | 6.37 | 6.35 | 0.07                   | 25.37             | 30.17 | 25.58 | 0.76                      | 740.0          | 1.13         | 1.14 | 1.10 | 1.10 | 1.09 |
| 745.0          | 6.39                            | 6.42 | 6.38 | 6.36 | 0.06                   | 25.47             | 30.27 | 25.69 | 0.67                      | 745.0          | 1.13         | 1.13 | 1.09 | 1.09 | 1.10 |
| 750.0          | 6.38                            | 6.42 | 6.38 | 6.35 | 0.06                   | 25.56             | 30.37 | 25.90 | 0.64                      | 750.0          | 1.12         | 1.11 | 1.09 | 1.09 | 1.10 |
| 755.0          | 6.37                            | 6.42 | 6.38 | 6.35 | 0.07                   | 25.64             | 30.47 | 26.03 | 0.66                      | 755.0          | 1.13         | 1.10 | 1.10 | 1.09 | 1.10 |
| 760.0          | 6.37                            | 6.42 | 6.38 | 6.35 | 0.07                   | 25.78             | 30.53 | 26.21 | 0.71                      | 760.0          | 1.13         | 1.09 | 1.11 | 1.09 | 1.10 |
| 765.0          | 6.38                            | 6.43 | 6.38 | 6.35 | 0.08                   | 25.85             | 30.71 | 26.35 | 0.72                      | 765.0          | 1.13         | 1.09 | 1.12 | 1.10 | 1.11 |
| 770.0          | 6.37                            | 6.42 | 6.39 | 6.35 | 0.07                   | 25.93             | 30.83 | 26.52 | 0.68                      | 770.0          | 1.13         | 1.10 | 1.11 | 1.10 | 1.11 |
| 775.0          | 6.37                            | 6.42 | 6.38 | 6.36 | 0.07                   | 25.98             | 30.89 | 26.68 | 0.71                      | 775.0          | 1.13         | 1.11 | 1.10 | 1.10 | 1.11 |
| 780.0          | 6.38                            | 6.43 | 6.39 | 6.36 | 0.06                   | 26.05             | 31.03 | 26.81 | 0.78                      | 780.0          | 1.12         | 1.12 | 1.08 | 1.10 | 1.11 |
| 785.0          | 6.39                            | 6.43 | 6.39 | 6.36 | 0.07                   | 26.04             | 31.16 | 26.98 | 0.76                      | 785.0          | 1.11         | 1.11 | 1.06 | 1.10 | 1.11 |
| 790.0          | 6.38                            | 6.43 | 6.39 | 6.36 | 0.07                   | 26.06             | 31.32 | 27.01 | 0.76                      | 790.0          | 1.10         | 1.10 | 1.06 | 1.09 | 1.11 |
| 800.0          | 6.39                            | 6.43 | 6.39 | 6.37 | 0.07                   | 25.96             | 31.75 | 27.12 | 0.75                      | 800.0          | 1.08         | 1.07 | 1.09 | 1.09 | 1.10 |
| 810.0          | 6.40                            | 6.45 | 6.40 | 6.38 | 0.07                   | 25.85             | 32.27 | 27.12 | 0.81                      | 810.0          | 1.07         | 1.06 | 1.09 | 1.08 | 1.08 |
| 820.0          | 6.40                            | 6.45 | 6.41 | 6.39 | 0.07                   | 25.70             | 32.76 | 27.06 | 0.80                      | 820.0          | 1.09         | 1.08 | 1.05 | 1.07 | 1.07 |
| 830.0          | 6.40                            | 6.46 | 6.41 | 6.38 | 0.07                   | 25.51             | 33.50 | 26.94 | 0.92                      | 830.0          | 1.12         | 1.08 | 1.02 | 1.05 | 1.06 |
| 840.0          | 6.41                            | 6.47 | 6.42 | 6.39 | 0.08                   | 25.27             | 33.99 | 26.70 | 0.84                      | 840.0          | 1.15         | 1.05 | 1.06 | 1.04 | 1.05 |
| 850.0          | 6.41                            | 6.47 | 6.43 | 6.39 | 0.07                   | 24.97             | 34.63 | 26.35 | 0.91                      | 850.0          | 1.15         | 1.01 | 1.07 | 1.04 | 1.04 |
| 860.0          | 6.42                            | 6.49 | 6.44 | 6.40 | 0.08                   | 24.59             | 35.39 | 25.94 | 0.84                      | 860.0          | 1.13         | 1.04 | 1.05 | 1.03 | 1.02 |
| 870.0          | 6.44                            | 6.51 | 6.45 | 6.42 | 0.09                   | 24.28             | 36.25 | 25.50 | 0.91                      | 870.0          | 1.13         | 1.05 | 1.01 | 1.03 | 1.01 |

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

# 4 Way-0° Power Splitter/Combiner

# ZB4CS-870-10W

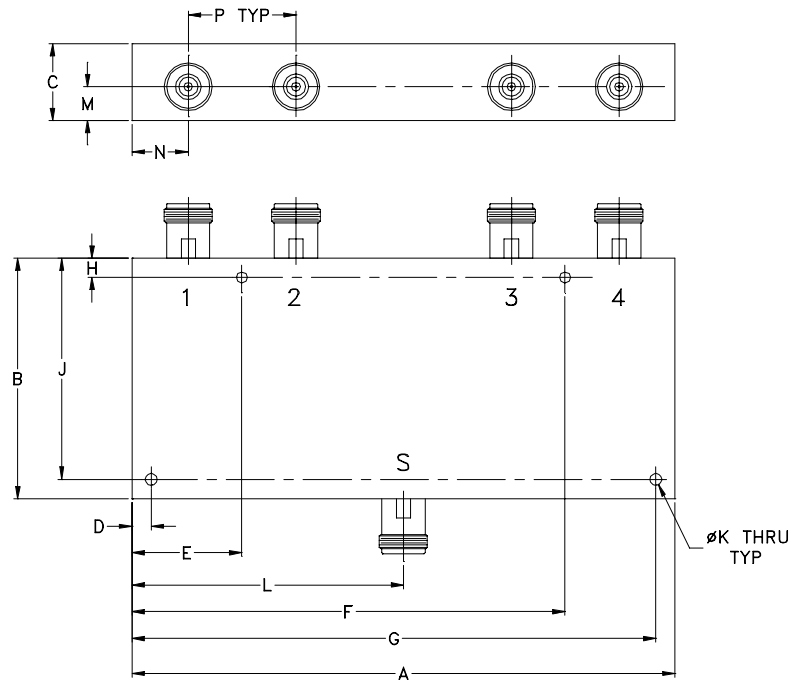
## Typical Performance Curves



REV. X2  
ZB4CS-870-10W  
100627  
Page 1 of 1



### Outline Dimensions



| CASE# | A                | B               | C               | D              | E                | F                 | G                 | H              | J                | K              | L               | M              | N              |
|-------|------------------|-----------------|-----------------|----------------|------------------|-------------------|-------------------|----------------|------------------|----------------|-----------------|----------------|----------------|
| Z689  | 7.06<br>(179.32) | 3.13<br>(79.50) | 1.00<br>(25.40) | .250<br>(6.35) | 1.430<br>(36.32) | 5.630<br>(143.00) | 6.810<br>(172.97) | .250<br>(6.35) | 2.875<br>(73.03) | .156<br>(3.96) | 3.53<br>(89.66) | .44<br>(11.18) | .73<br>(18.54) |

| CASE# | P               | WT.GRAMS |
|-------|-----------------|----------|
| Z689  | 1.40<br>(35.56) | 810      |

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

#### Notes:

- Case material: Aluminum alloy.
- Case finish:  
For RoHS Case Styles: Clear chemical conversion coating, non-chrome or trivalent chrome based.



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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      | -55° to 90° C<br>Ambient Environment   | Individual Model Data Sheet          |
| Storage Temperature        | -55° to 100° C<br>Ambient Environment  | Individual Model Data Sheet          |
| Barometric Pressure        | 100,000 Feet   | MIL-STD-202, Method 105, Condition D |
| Humidity                   | 90% RH, 65°C<br>Units may require bake-out after humidity to restore full performance. | MIL-STD-202, Method 103              |
| Thermal Shock              | -65° to 125°C, 5 cycles  | MIL-STD-202, Method 107, Condition B |
| 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           | 100g, 6ms sawtooth, 3 shocks each direction 3 axes (total 18)                          | MIL-STD-202, Method 213, Condition I |