

# Power Splitter/Combiner

## ZMSC-4-2+

4 Way-0° 50Ω 0.002 to 20 MHz

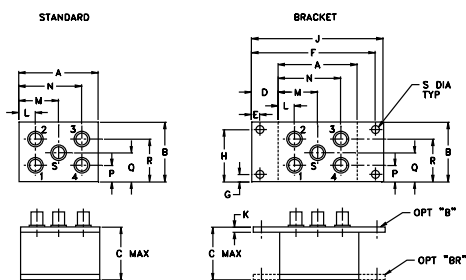
### Maximum Ratings

|                                                                 |                |
|-----------------------------------------------------------------|----------------|
| Operating Temperature                                           | -55°C to 100°C |
| Storage Temperature                                             | -55°C to 100°C |
| Power Input (as a splitter)                                     | 1W max.        |
| Internal Dissipation                                            | 0.250W max.    |
| 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     | J     |
| 1.50  | 1.13  | 1.00  | .50   | .155 | 2.345 | .138  | .987  | 2.50  |
| 38.10 | 28.70 | 25.40 | 12.70 | 3.94 | 59.56 | 3.51  | 25.07 | 63.50 |
| K     | L     | M     | N     | P    | Q     | R     | S     | wt    |
| .10   | .32   | .75   | 1.18  | .31  | .56   | .81   | .150  | grams |
| 2.54  | 8.13  | 19.05 | 29.97 | 7.87 | 14.22 | 20.57 | 3.81  | 45.0  |

### Features

- high isolation, 33 dB typ.
- rugged shielded case

### Applications

- HF
- amateur radio



Generic photo used for illustration purposes only

CASE STYLE: N24

Connectors Model

SMA ZMSC-4-2+

BRACKET (OPTION "B")

BRACKET (OPTION "BR")

+RoHS Compliant

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

### Electrical Specifications

| FREQ.*<br>RANGE<br>(MHz) | ISOLATION<br>(dB) |     |      |     |      |     | INSERTION LOSS (dB)<br>ABOVE 6.0 dB |      |      |      |      |      | PHASE<br>UNBALANCE<br>(Degrees) |      |      | AMPLITUDE<br>UNBALANCE<br>(dB) |      |      |
|--------------------------|-------------------|-----|------|-----|------|-----|-------------------------------------|------|------|------|------|------|---------------------------------|------|------|--------------------------------|------|------|
|                          | L                 |     | M    |     | U    |     | L                                   |      | M    |      | U    |      | L                               |      |      | L                              |      |      |
|                          | Typ.              | Min | Typ. | Min | Typ. | Min | Typ.                                | Max. | Typ. | Max. | Typ. | Max. | Max.                            | Max. | Max. | Max.                           | Max. | Max. |
| 0.002-20                 | 30                | 20  | 33   | 25  | 33   | 25  | 0.45                                | 0.75 | 0.3  | 0.5  | 0.7  | 1.0  | 4                               | 6    | 8    | 0.15                           | 0.20 | 0.25 |

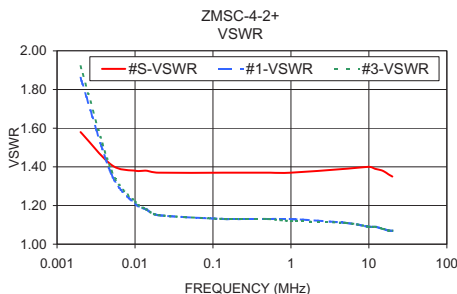
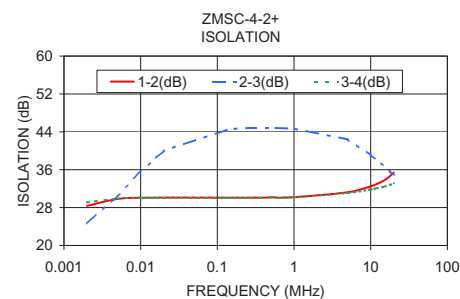
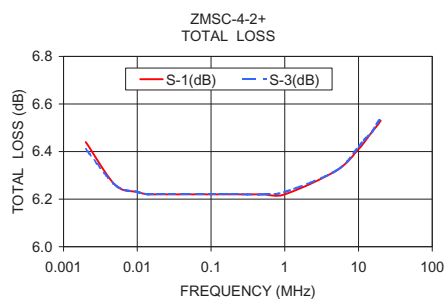
L = low range [ $f_L$  to  $10 f_L$ ] M = mid range [ $10 f_L$  to  $f_U/2$ ] U = upper range [ $f_U/2$  to  $f_U$ ]

\* At low range frequency band ( $f_L$  to  $10 f_L$ ), linearly derate maximum power by 13dB.

### 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.) | VSWR  | VSWR  | VSWR  | VSWR  | VSWR  |
|----------------|---------------------------------|-------|-------|-------|------------------------|-------------------|--------|--------|---------------------------|-------|-------|-------|-------|-------|
|                | S-1                             | S-2   | S-3   | S-4   |                        | 1-2               | 2-3    | 3-4    |                           | S     | 1     | 2     | 3     | 4     |
| 0.002          | 6.440                           | 6.440 | 6.410 | 6.410 | 0.030                  | 28.370            | 24.590 | 29.080 | 0.320                     | 1.580 | 1.860 | 1.860 | 1.920 | 1.920 |
| 0.005          | 6.260                           | 6.260 | 6.260 | 6.260 | 0.010                  | 29.820            | 30.590 | 29.890 | 0.200                     | 1.410 | 1.360 | 1.360 | 1.380 | 1.380 |
| 0.010          | 6.230                           | 6.230 | 6.230 | 6.220 | 0.000                  | 30.090            | 35.540 | 30.080 | 0.110                     | 1.380 | 1.210 | 1.210 | 1.220 | 1.220 |
| 0.014          | 6.220                           | 6.220 | 6.220 | 6.220 | 0.000                  | 30.110            | 37.820 | 30.110 | 0.080                     | 1.380 | 1.180 | 1.180 | 1.180 | 1.180 |
| 0.020          | 6.220                           | 6.220 | 6.220 | 6.220 | 0.000                  | 30.120            | 39.980 | 30.110 | 0.060                     | 1.370 | 1.150 | 1.150 | 1.150 | 1.150 |
| 0.142          | 6.220                           | 6.220 | 6.220 | 6.220 | 0.000                  | 30.110            | 44.600 | 30.110 | 0.020                     | 1.370 | 1.130 | 1.130 | 1.130 | 1.130 |
| 0.265          | 6.220                           | 6.220 | 6.220 | 6.220 | 0.000                  | 30.100            | 44.820 | 30.120 | 0.040                     | 1.370 | 1.130 | 1.130 | 1.130 | 1.130 |
| 0.510          | 6.220                           | 6.220 | 6.220 | 6.220 | 0.000                  | 30.120            | 44.840 | 30.140 | 0.050                     | 1.370 | 1.130 | 1.130 | 1.130 | 1.130 |
| 1.000          | 6.220                           | 6.220 | 6.230 | 6.220 | 0.000                  | 30.190            | 44.690 | 30.200 | 0.090                     | 1.370 | 1.130 | 1.130 | 1.120 | 1.120 |
| 5.000          | 6.320                           | 6.320 | 6.320 | 6.320 | 0.010                  | 31.240            | 42.390 | 31.090 | 0.280                     | 1.390 | 1.110 | 1.110 | 1.110 | 1.110 |
| 10.000         | 6.410                           | 6.410 | 6.420 | 6.410 | 0.010                  | 32.480            | 39.090 | 31.850 | 0.530                     | 1.400 | 1.090 | 1.090 | 1.090 | 1.090 |
| 12.000         | 6.440                           | 6.440 | 6.450 | 6.440 | 0.010                  | 32.970            | 38.030 | 32.080 | 0.630                     | 1.390 | 1.090 | 1.090 | 1.090 | 1.090 |
| 15.000         | 6.480                           | 6.480 | 6.480 | 6.480 | 0.010                  | 33.770            | 36.690 | 32.420 | 0.780                     | 1.380 | 1.080 | 1.080 | 1.080 | 1.080 |
| 18.000         | 6.510                           | 6.510 | 6.520 | 6.520 | 0.010                  | 34.700            | 35.550 | 32.820 | 0.920                     | 1.360 | 1.070 | 1.070 | 1.070 | 1.070 |
| 20.000         | 6.530                           | 6.530 | 6.540 | 6.540 | 0.010                  | 35.410            | 34.890 | 33.160 | 1.030                     | 1.350 | 1.070 | 1.070 | 1.070 | 1.060 |

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



### electrical schematic



### 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-Circuit's applicable established test performance criteria and measurement instructions.  
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# 4 Way-0° Power Splitter/Combiner

ZMSC-4-2+

## 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    |
| 0.002          | 6.44                            | 6.44 | 6.41 | 6.41 | 0.03                   | 28.37             | 24.59 | 29.08 | 0.32                      | 0.002          | 1.58         | 1.86 | 1.86 | 1.92 | 1.92 |
| 0.003          | 6.33                            | 6.33 | 6.32 | 6.31 | 0.02                   | 29.18             | 27.09 | 29.52 | 0.27                      | 0.003          | 1.47         | 1.57 | 1.58 | 1.61 | 1.61 |
| 0.004          | 6.29                            | 6.28 | 6.28 | 6.28 | 0.01                   | 29.60             | 29.02 | 29.76 | 0.23                      | 0.004          | 1.43         | 1.44 | 1.44 | 1.46 | 1.46 |
| 0.005          | 6.26                            | 6.26 | 6.26 | 6.26 | 0.01                   | 29.82             | 30.59 | 29.89 | 0.20                      | 0.005          | 1.41         | 1.36 | 1.36 | 1.38 | 1.38 |
| 0.006          | 6.25                            | 6.25 | 6.24 | 6.24 | 0.00                   | 29.94             | 31.89 | 29.96 | 0.16                      | 0.006          | 1.40         | 1.31 | 1.31 | 1.32 | 1.32 |
| 0.007          | 6.24                            | 6.24 | 6.24 | 6.24 | 0.00                   | 30.00             | 33.01 | 30.01 | 0.15                      | 0.007          | 1.39         | 1.27 | 1.27 | 1.28 | 1.28 |
| 0.008          | 6.23                            | 6.23 | 6.23 | 6.23 | 0.00                   | 30.05             | 33.97 | 30.04 | 0.13                      | 0.008          | 1.39         | 1.25 | 1.25 | 1.25 | 1.25 |
| 0.009          | 6.23                            | 6.23 | 6.23 | 6.23 | 0.00                   | 30.08             | 34.81 | 30.06 | 0.12                      | 0.009          | 1.38         | 1.23 | 1.23 | 1.23 | 1.23 |
| 0.010          | 6.23                            | 6.23 | 6.23 | 6.22 | 0.00                   | 30.09             | 35.54 | 30.08 | 0.11                      | 0.010          | 1.38         | 1.21 | 1.21 | 1.22 | 1.22 |
| 0.012          | 6.22                            | 6.22 | 6.22 | 6.22 | 0.00                   | 30.10             | 36.81 | 30.10 | 0.09                      | 0.012          | 1.38         | 1.19 | 1.19 | 1.19 | 1.19 |
| 0.014          | 6.22                            | 6.22 | 6.22 | 6.22 | 0.00                   | 30.11             | 37.82 | 30.11 | 0.08                      | 0.014          | 1.38         | 1.18 | 1.18 | 1.18 | 1.18 |
| 0.016          | 6.22                            | 6.22 | 6.22 | 6.22 | 0.00                   | 30.11             | 38.66 | 30.11 | 0.07                      | 0.016          | 1.37         | 1.17 | 1.17 | 1.17 | 1.17 |
| 0.018          | 6.22                            | 6.22 | 6.22 | 6.22 | 0.00                   | 30.11             | 39.39 | 30.12 | 0.07                      | 0.018          | 1.37         | 1.16 | 1.16 | 1.16 | 1.16 |
| 0.020          | 6.22                            | 6.22 | 6.22 | 6.22 | 0.00                   | 30.12             | 39.98 | 30.11 | 0.06                      | 0.020          | 1.37         | 1.15 | 1.15 | 1.15 | 1.15 |
| 0.142          | 6.22                            | 6.22 | 6.22 | 6.22 | 0.00                   | 30.11             | 44.60 | 30.11 | 0.02                      | 0.142          | 1.37         | 1.13 | 1.13 | 1.13 | 1.13 |
| 0.265          | 6.22                            | 6.22 | 6.22 | 6.22 | 0.00                   | 30.10             | 44.82 | 30.12 | 0.04                      | 0.265          | 1.37         | 1.13 | 1.13 | 1.13 | 1.13 |
| 0.387          | 6.22                            | 6.22 | 6.22 | 6.22 | 0.00                   | 30.11             | 44.85 | 30.12 | 0.04                      | 0.387          | 1.37         | 1.13 | 1.13 | 1.13 | 1.13 |
| 0.510          | 6.22                            | 6.22 | 6.22 | 6.22 | 0.00                   | 30.12             | 44.84 | 30.14 | 0.05                      | 0.510          | 1.37         | 1.13 | 1.13 | 1.13 | 1.13 |
| 0.632          | 6.22                            | 6.22 | 6.22 | 6.22 | 0.00                   | 30.14             | 44.81 | 30.15 | 0.06                      | 0.632          | 1.37         | 1.13 | 1.13 | 1.13 | 1.13 |
| 0.755          | 6.22                            | 6.22 | 6.22 | 6.22 | 0.00                   | 30.15             | 44.75 | 30.17 | 0.07                      | 0.755          | 1.37         | 1.13 | 1.13 | 1.13 | 1.12 |
| 0.877          | 6.22                            | 6.22 | 6.22 | 6.22 | 0.00                   | 30.17             | 44.73 | 30.18 | 0.08                      | 0.877          | 1.37         | 1.13 | 1.13 | 1.12 | 1.12 |
| 1.000          | 6.22                            | 6.22 | 6.23 | 6.22 | 0.00                   | 30.19             | 44.69 | 30.20 | 0.09                      | 1.000          | 1.37         | 1.13 | 1.13 | 1.12 | 1.12 |
| 2.000          | 6.25                            | 6.25 | 6.25 | 6.25 | 0.00                   | 30.42             | 44.31 | 30.41 | 0.14                      | 2.000          | 1.38         | 1.12 | 1.12 | 1.12 | 1.12 |
| 3.000          | 6.27                            | 6.27 | 6.27 | 6.27 | 0.00                   | 30.70             | 43.76 | 30.65 | 0.18                      | 3.000          | 1.38         | 1.12 | 1.12 | 1.12 | 1.12 |
| 4.000          | 6.29                            | 6.29 | 6.30 | 6.30 | 0.00                   | 30.97             | 43.09 | 30.88 | 0.23                      | 4.000          | 1.39         | 1.11 | 1.11 | 1.11 | 1.11 |
| 5.000          | 6.32                            | 6.32 | 6.32 | 6.32 | 0.01                   | 31.24             | 42.39 | 31.09 | 0.28                      | 5.000          | 1.39         | 1.11 | 1.11 | 1.11 | 1.11 |
| 6.000          | 6.34                            | 6.34 | 6.34 | 6.34 | 0.01                   | 31.49             | 41.67 | 31.27 | 0.33                      | 6.000          | 1.39         | 1.11 | 1.11 | 1.11 | 1.11 |
| 7.000          | 6.36                            | 6.36 | 6.36 | 6.36 | 0.01                   | 31.74             | 40.96 | 31.43 | 0.38                      | 7.000          | 1.40         | 1.10 | 1.10 | 1.10 | 1.10 |
| 8.000          | 6.37                            | 6.37 | 6.38 | 6.38 | 0.01                   | 31.99             | 40.30 | 31.58 | 0.43                      | 8.000          | 1.40         | 1.10 | 1.10 | 1.10 | 1.10 |
| 9.000          | 6.39                            | 6.39 | 6.40 | 6.40 | 0.01                   | 32.24             | 39.67 | 31.72 | 0.48                      | 9.000          | 1.40         | 1.10 | 1.10 | 1.10 | 1.10 |
| 10.000         | 6.41                            | 6.41 | 6.42 | 6.41 | 0.01                   | 32.48             | 39.09 | 31.85 | 0.53                      | 10.000         | 1.40         | 1.09 | 1.09 | 1.09 | 1.09 |
| 11.000         | 6.42                            | 6.42 | 6.43 | 6.43 | 0.01                   | 32.73             | 38.54 | 31.96 | 0.58                      | 11.000         | 1.39         | 1.09 | 1.09 | 1.09 | 1.09 |
| 12.000         | 6.44                            | 6.44 | 6.45 | 6.44 | 0.01                   | 32.97             | 38.03 | 32.08 | 0.63                      | 12.000         | 1.39         | 1.09 | 1.09 | 1.09 | 1.09 |
| 13.000         | 6.45                            | 6.45 | 6.46 | 6.46 | 0.01                   | 33.23             | 37.56 | 32.19 | 0.67                      | 13.000         | 1.39         | 1.08 | 1.09 | 1.08 | 1.08 |
| 14.000         | 6.46                            | 6.46 | 6.47 | 6.47 | 0.01                   | 33.49             | 37.10 | 32.30 | 0.72                      | 14.000         | 1.39         | 1.08 | 1.08 | 1.08 | 1.08 |
| 15.000         | 6.48                            | 6.48 | 6.48 | 6.48 | 0.01                   | 33.77             | 36.69 | 32.42 | 0.78                      | 15.000         | 1.38         | 1.08 | 1.08 | 1.08 | 1.08 |
| 16.000         | 6.49                            | 6.49 | 6.50 | 6.50 | 0.01                   | 34.06             | 36.28 | 32.55 | 0.83                      | 16.000         | 1.38         | 1.08 | 1.08 | 1.08 | 1.07 |
| 17.000         | 6.50                            | 6.50 | 6.51 | 6.51 | 0.01                   | 34.37             | 35.90 | 32.68 | 0.87                      | 17.000         | 1.37         | 1.07 | 1.07 | 1.07 | 1.07 |
| 18.000         | 6.51                            | 6.51 | 6.52 | 6.52 | 0.01                   | 34.70             | 35.55 | 32.82 | 0.92                      | 18.000         | 1.36         | 1.07 | 1.07 | 1.07 | 1.07 |
| 19.000         | 6.52                            | 6.52 | 6.53 | 6.53 | 0.01                   | 35.04             | 35.21 | 32.98 | 0.98                      | 19.000         | 1.36         | 1.07 | 1.07 | 1.07 | 1.07 |
| 20.000         | 6.53                            | 6.53 | 6.54 | 6.54 | 0.01                   | 35.41             | 34.89 | 33.16 | 1.03                      | 20.000         | 1.35         | 1.07 | 1.07 | 1.07 | 1.06 |

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

REV. X2  
ZMSC-4-2+  
100627  
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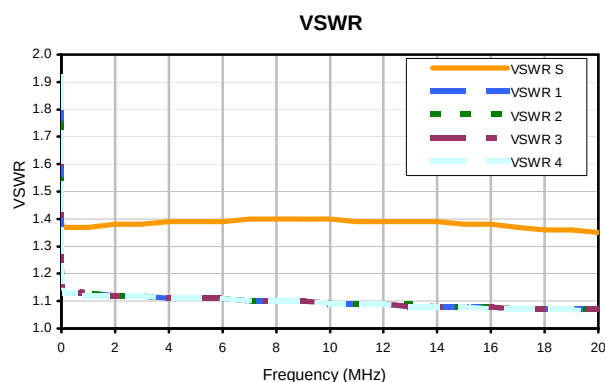
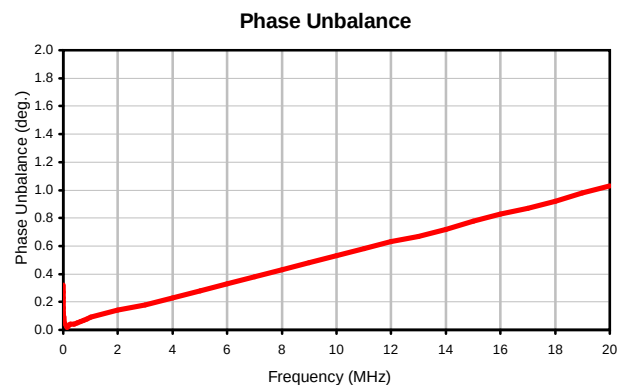
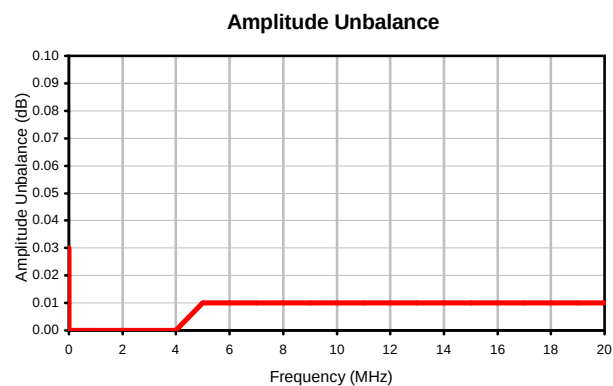
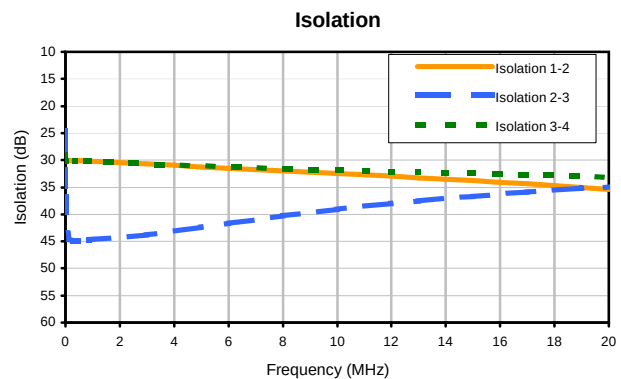
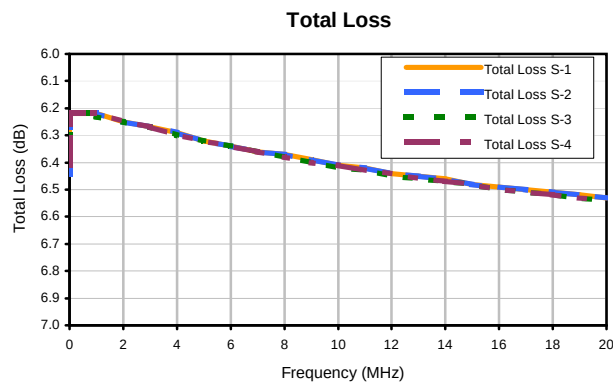
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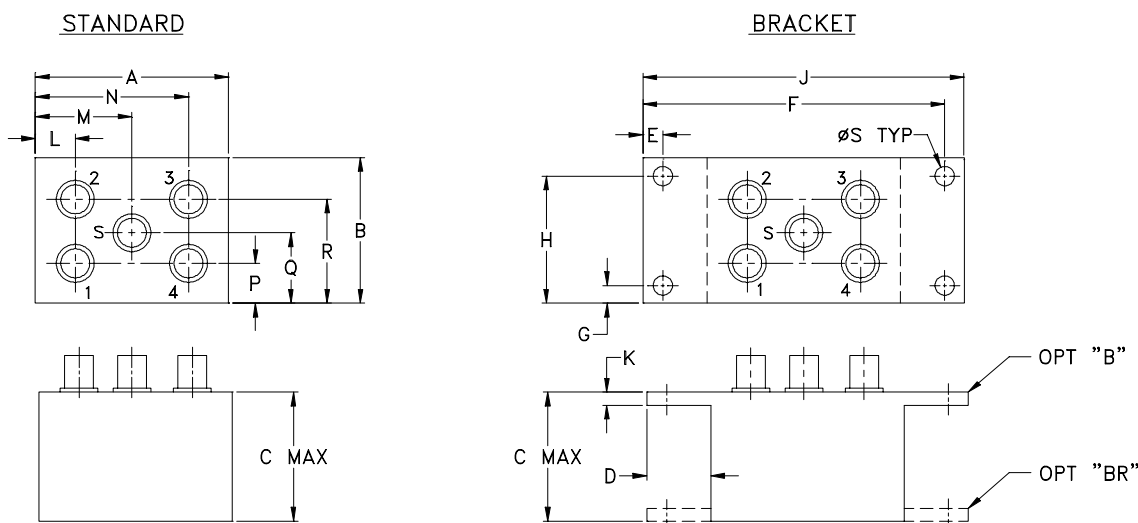
# 4 Way-0° Power Splitter/Combiner

ZMSC-4-2+

## Typical Performance Curves



## Outline Dimensions



| CASE# | A               | B               | C               | D              | E              | F                | G              | H                | J               | K             | L              | M               | N               |
|-------|-----------------|-----------------|-----------------|----------------|----------------|------------------|----------------|------------------|-----------------|---------------|----------------|-----------------|-----------------|
| N24   | 1.50<br>(38.10) | 1.13<br>(28.70) | 1.00<br>(25.40) | .50<br>(12.70) | .155<br>(3.94) | 2.345<br>(59.56) | .138<br>(3.51) | .987<br>(25.07)  | 2.50<br>(63.50) | .10<br>(2.54) | .32<br>(8.13)  | .75<br>(19.05)  | 1.18<br>(29.97) |
| N27   | 2.25<br>(57.15) | 1.38<br>(35.05) | 1.24<br>(31.50) |                | .150<br>(3.81) | 3.100<br>(78.74) |                | 1.238<br>(31.45) | 3.25<br>(82.55) |               | .48<br>(12.19) | 1.13<br>(28.70) | 1.78<br>(45.21) |

| CASE# | P             | Q              | R               | S              | WT. GRAMS |
|-------|---------------|----------------|-----------------|----------------|-----------|
| N24   | .31<br>(7.87) | .56<br>(14.22) | .81<br>(20.57)  | .150<br>(3.81) | 45.0      |
| N27   | .36<br>(9.14) | .69<br>(17.53) | 1.01<br>(25.65) |                | 92.0      |

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.
  - For Non-RoHS Case Styles: Yellow hexavalent chrome based conversion coating. Due to transition from non-RoHS to RoHS, models will be supplied with either case style finish until the non-RoHS case inventory is depleted.
- Mounting bracket available on request. For bracket mounted on connector end add suffix B to part number and add \$5.00 to unit cost. For bracket mounted on the rear, add suffix BR to part number and add \$1.50 to unit cost.



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| 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          |
| 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 |