



Mini-Circuits

SUSPENDED SUBSTRATE STRIPLINE COAXIAL

# Diplexer

**ZDSS-K10G13G+**

50Ω DC to 40 GHz (DC-10.5, 13.5-20 GHz) 2.92mm Female

## KEY FEATURES

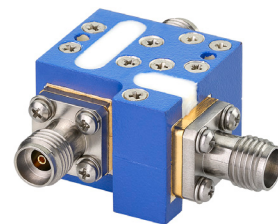
- Low Passband Insertion Loss of 1 dB Typ.
- High Rejection of 90 dB Typ. in High Pass Channel and 70dB Typ. up to 40 GHz in Low Pass Channel
- Good Return Loss of 14 dB Typ.

## APPLICATIONS

- Test & Measurement
- Quantum Computing
- Electronic Counter Machine

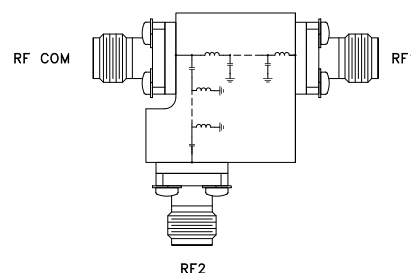
## PRODUCT OVERVIEW

Mini-Circuits' Suspended Substrate Stripline filters offer low insertion loss combined with wide stopband, good power handling & temperature stability, small form factor with rugged build ideal for harsh operating environments making them an excellent choice for wideband instruments and systems like ECM, ECCM, ELINT and ultra-broadband receivers. Low pass, high pass, band pass, diplexer and multiplexer designs can be realized with this technology with passband, stopband up to 40GHz and stopband width greater than 6x cutoff frequency.



Generic photo used for illustration purposes only

## FUNCTIONAL DIAGRAM



## ELECTRICAL SPECIFICATIONS AT +25°C

| Parameter           |                | Function (Port)           | Frequency (GHz)        | Min.   | Typ.     | Max.   | Unit |
|---------------------|----------------|---------------------------|------------------------|--------|----------|--------|------|
| Pass Band           | Insertion Loss | Low Pass<br>(RF COM-RF1)  | DC - 10.5              | —      | 1.0      | 2      | dB   |
|                     |                | High Pass<br>(RF COM-RF2) | 13.5 - 20              | —      | 1.5      | 3      |      |
|                     | Return Loss    | Low Pass<br>(RF1)         | DC - 10.5              | —      | 14       | —      | dB   |
|                     |                | High Pass<br>(RF2)        | 13.5 - 20              | —      | 10       | —      |      |
|                     |                | Common (RF COM)           | DC - 10.5<br>13.5 - 20 | —<br>— | 14<br>10 | —<br>— |      |
| Stop Band Rejection |                | Low Pass<br>(RF COM-RF1)  | 13.5 - 16              | —      | 20       | —      | dB   |
|                     |                |                           | 16 - 20                | 30     | 50       | —      |      |
|                     |                |                           | 20 - 25                | 50     | 70       | —      |      |
|                     |                |                           | 25 - 40                | —      | 70       | —      |      |
|                     |                | High Pass<br>(RF COM-RF2) | DC - 6                 | 60     | 90       | —      |      |
|                     |                |                           | 6 - 9                  | 50     | 70       | —      |      |
|                     |                |                           | 9 - 10.5               | 25     | 50       | —      |      |

## ABSOLUTE MAXIMUM RATINGS<sup>1</sup>

| Parameter                | Ratings           |
|--------------------------|-------------------|
| Operating Temperature    | -40 °C to +85 °C  |
| Storage Temperature      | -55 °C to +100 °C |
| Input Power <sup>2</sup> | 10W @ 25°C        |

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

2. Power rating applies only to signals within the passband.

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REV. OR  
ECO-018154  
ZDSS-K10G13G+  
EDU4388  
URJ  
230802  
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SUSPENDED SUBSTRATE STRIPLINE COAXIAL

# Diplexer

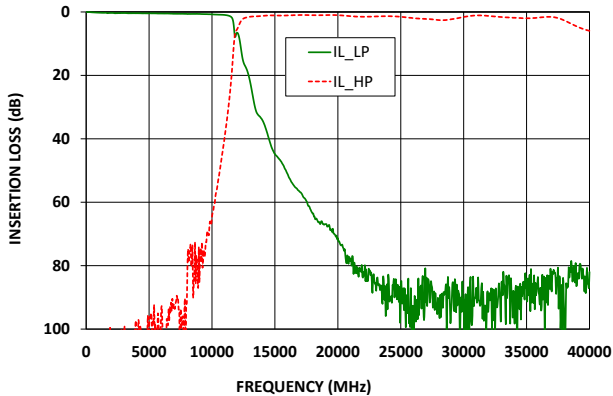
**ZDSS-K10G13G+**

Mini-Circuits

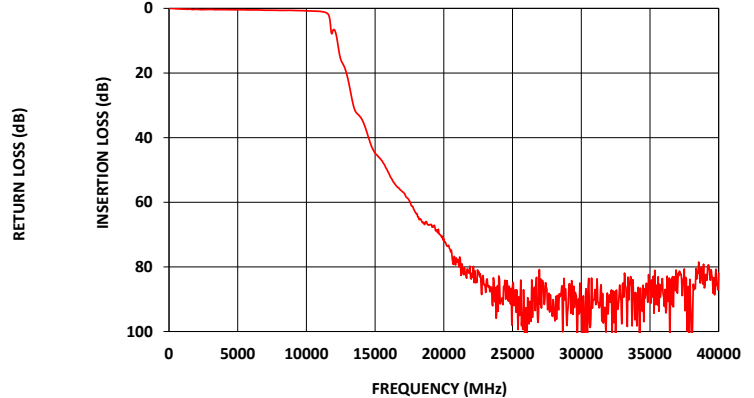
50Ω DC to 40 GHz (DC-10.5, 13.5-20 GHz) 2.92mm Female

## TYPICAL PERFORMANCE GRAPHS AT +25°C

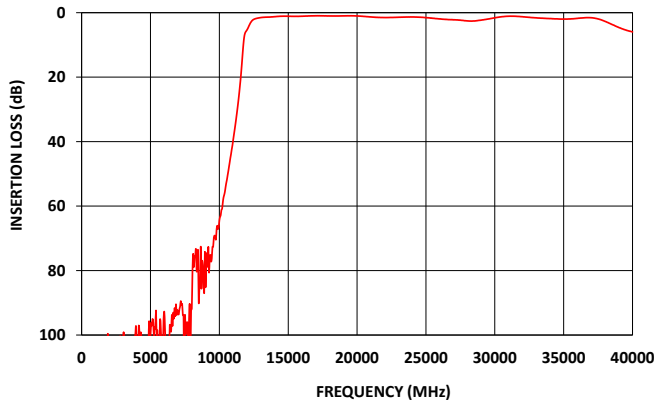
ZDSS-K10G13G+ IL-LP Vs IL-HP Vs RL-COM  
(Pin=0dBm)



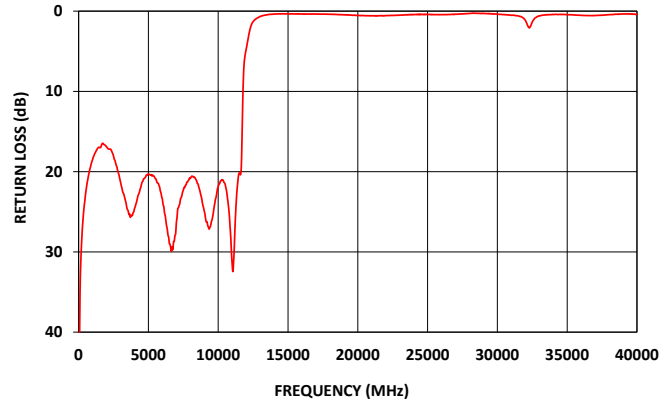
ZDSS-K10G13G+ LOW PASS PORT  
INSERTION LOSS (Pin=0dBm)



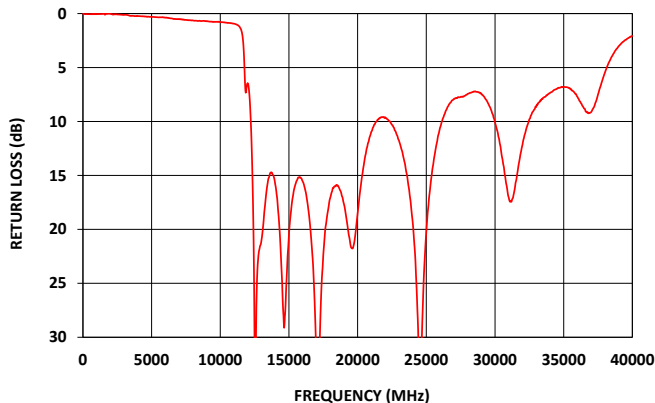
ZDSS-K10G13G+ HIGH PASS PORT  
INSERTION LOSS (Pin=0dBm)



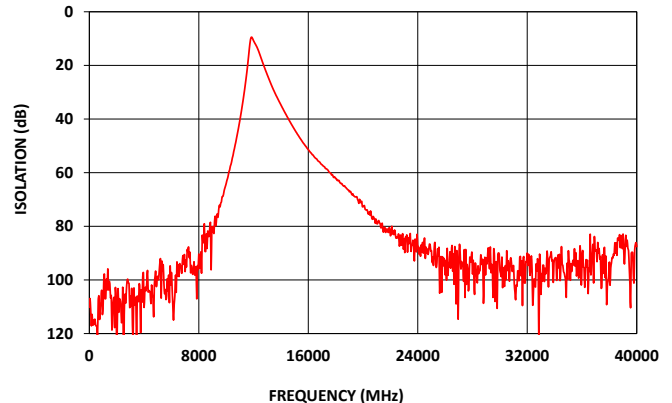
ZDSS-K10G13G+ LOW PASS PORT  
RETURN LOSS (Pin=0dBm)



ZDSS-K10G13G+ HIGH PASS PORT  
RETURN LOSS (Pin=0dBm)



ZDSS-K10G13G+  
CROSS OVER ISOLATION (Pin=0dBm)





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# Diplexer

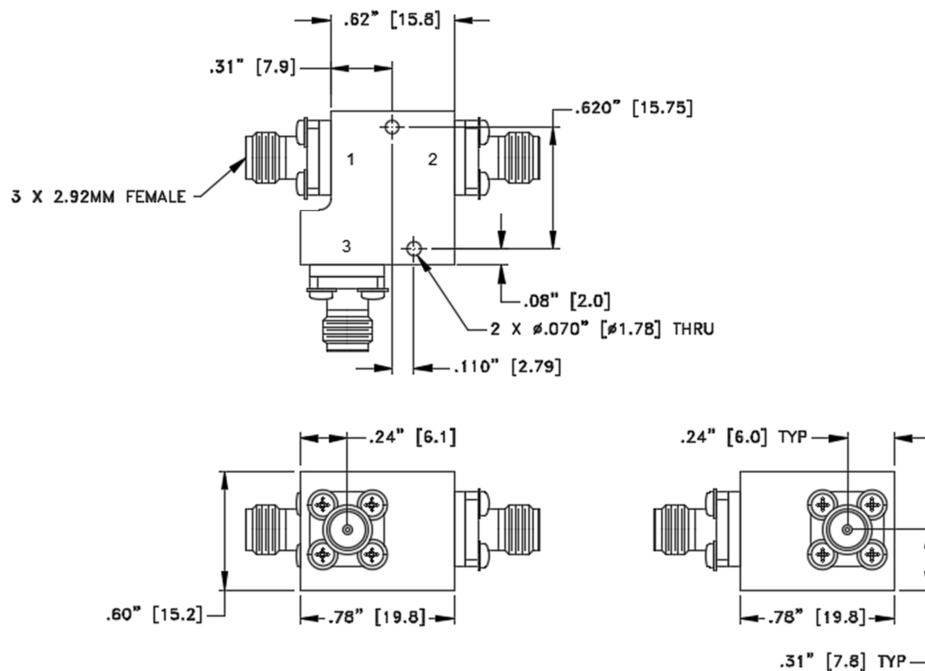
**ZDSS-K10G13G+**

50Ω DC to 40 GHz (DC-10.5, 13.5-20 GHz) 2.92mm Female

## CONNECTOR DESCRIPTION

| Function        | Marking on Unit | Connector     |
|-----------------|-----------------|---------------|
| RF COM (Common) | 1               | 2.92mm Female |
| RF1 (Low Pass)  | 2               | 2.92mm Female |
| RF2 (High Pass) | 3               | 2.92mm Female |

## CASE STYLE DRAWING



Weight: 50 grams

Dimensions are in inches[mm]. Tolerance: 2PL  $\pm 0.050$ ; 3PL  $\pm 0.015$

## PRODUCT MARKING\*: ZDSS-K10G13G+

\*Marking may contain other features or characters for internal lot control.





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ADDITIONAL INFORMATION IS AVAILABLE ON OUR DASHBOARD

[CLICK HERE](#)

|                           |                                              |
|---------------------------|----------------------------------------------|
| Performance Data & Graphs | Data                                         |
|                           | Graphs                                       |
|                           | S-Parameter (S3P Files) Data Set (.zip file) |
| Case Style                | ZE3315                                       |
| RoHS Status               | Compliant                                    |
| Environmental Ratings     | ENV001                                       |

## 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.
- 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/terms/viewterm.html](http://www.minicircuits.com/terms/viewterm.html)



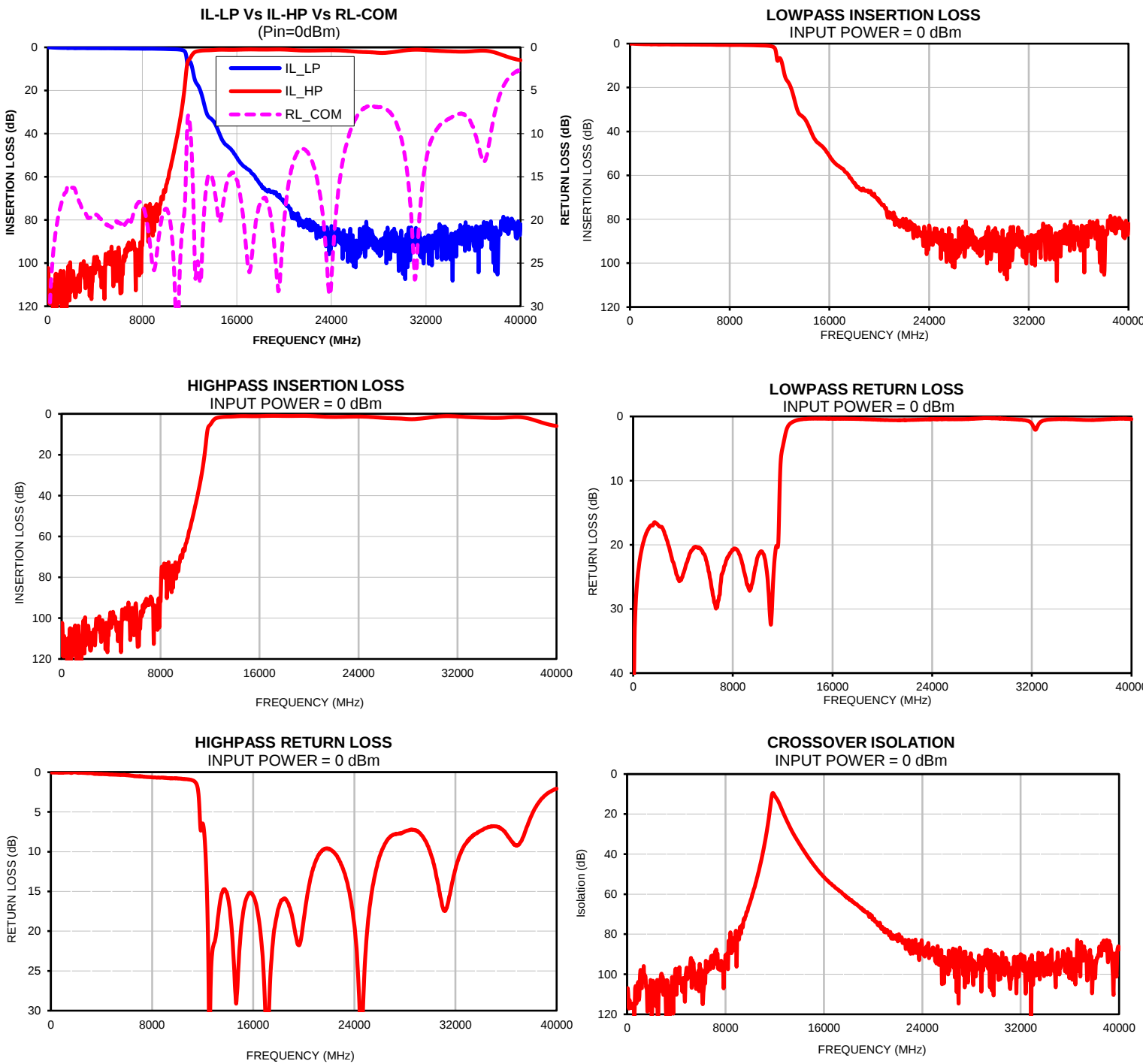
# Suspended substrate stripline Diplexer

ZDSS-K10G13G+

## Typical Performance Data

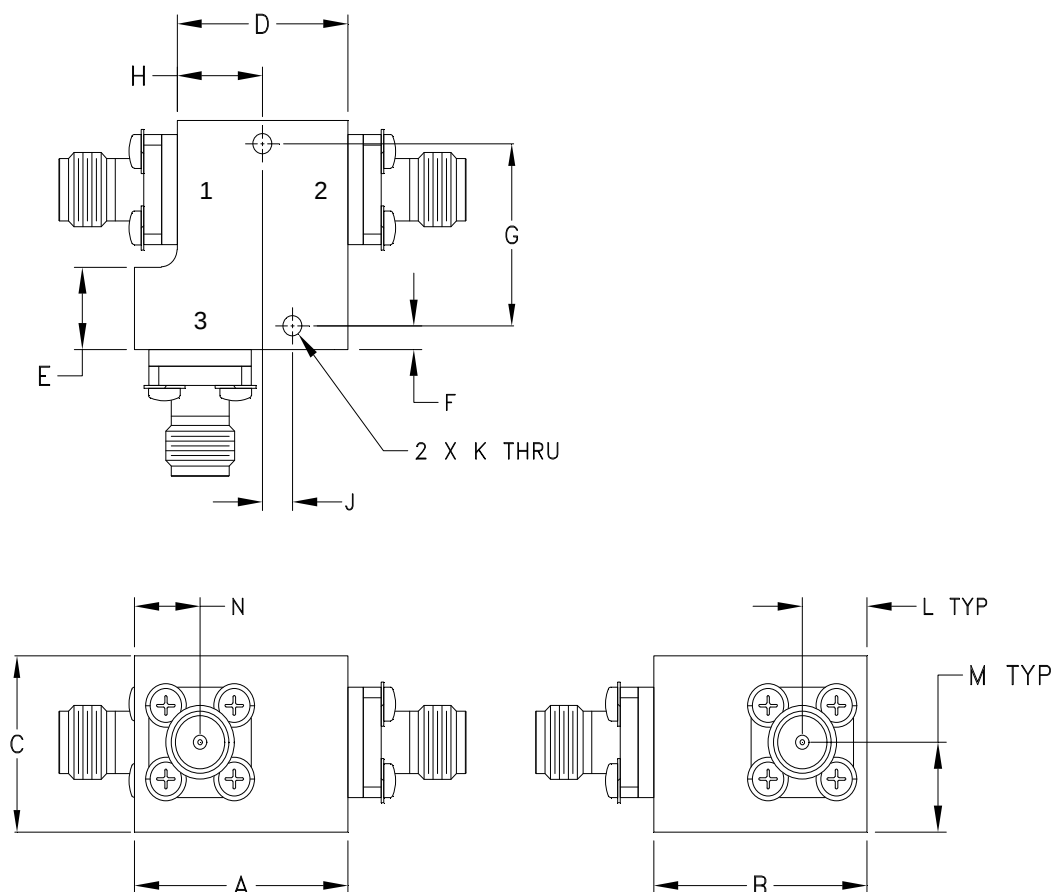
| FREQUENCY<br>(MHz) | INSERTION<br>LOSS<br>(dB) |               | Cross over<br>isolation<br>(dB)<br>(between LPF<br>and HPF) | RETURN<br>LOSS<br>(dB) |              |               |
|--------------------|---------------------------|---------------|-------------------------------------------------------------|------------------------|--------------|---------------|
|                    | Lowpass port              | Highpass port |                                                             | Common port            | Lowpass port | Highpass port |
| 10                 | 0.02                      | 112.57        | 109.02                                                      | 43.41                  | 48.21        | 0.01          |
| 50                 | 0.02                      | 103.36        | 106.93                                                      | 41.48                  | 44.34        | 0.02          |
| 100                | 0.06                      | 110.63        | 111.31                                                      | 34.57                  | 35.13        | 0.05          |
| 500                | 0.12                      | 110.15        | 117.19                                                      | 23.28                  | 22.71        | 0.05          |
| 1000               | 0.23                      | 108.39        | 110.67                                                      | 18.88                  | 18.48        | 0.03          |
| 2000               | 0.31                      | 108.28        | 125.74                                                      | 16.26                  | 16.91        | 0.01          |
| 3000               | 0.32                      | 103.93        | 105.97                                                      | 18.89                  | 21.28        | 0.11          |
| 4000               | 0.40                      | 104.74        | 110.26                                                      | 19.47                  | 24.61        | 0.24          |
| 5000               | 0.43                      | 100.23        | 98.59                                                       | 20.50                  | 20.30        | 0.31          |
| 6000               | 0.47                      | 92.72         | 97.24                                                       | 20.29                  | 23.43        | 0.37          |
| 8000               | 0.61                      | 91.74         | 90.34                                                       | 18.30                  | 20.86        | 0.64          |
| 9000               | 0.62                      | 85.19         | 82.09                                                       | 25.84                  | 24.92        | 0.72          |
| 10000              | 0.75                      | 64.49         | 64.03                                                       | 18.68                  | 21.86        | 0.79          |
| 10500              | 0.85                      | 52.88         | 53.55                                                       | 21.82                  | 21.60        | 0.85          |
| 11500              | 1.49                      | 22.45         | 22.91                                                       | 19.70                  | 20.17        | 1.44          |
| 12000              | 6.56                      | 5.40          | 10.81                                                       | 8.59                   | 4.78         | 6.45          |
| 12500              | 15.82                     | 2.08          | 16.54                                                       | 26.84                  | 1.32         | 31.58         |
| 13000              | 21.49                     | 1.53          | 23.49                                                       | 25.99                  | 0.67         | 20.99         |
| 13500              | 31.21                     | 1.37          | 29.58                                                       | 15.39                  | 0.47         | 15.31         |
| 14000              | 34.09                     | 1.24          | 34.74                                                       | 15.52                  | 0.36         | 15.82         |
| 15000              | 44.78                     | 1.11          | 43.96                                                       | 16.75                  | 0.35         | 20.47         |
| 16000              | 51.06                     | 1.08          | 51.41                                                       | 15.39                  | 0.37         | 15.56         |
| 17000              | 56.80                     | 0.97          | 57.04                                                       | 25.72                  | 0.37         | 32.58         |
| 18000              | 63.58                     | 1.01          | 62.23                                                       | 18.01                  | 0.39         | 17.10         |
| 19000              | 66.90                     | 1.00          | 67.14                                                       | 21.03                  | 0.45         | 17.64         |
| 20000              | 71.31                     | 1.03          | 72.71                                                       | 20.26                  | 0.54         | 18.49         |
| 21000              | 78.58                     | 1.33          | 78.93                                                       | 12.55                  | 0.57         | 10.94         |
| 22000              | 83.76                     | 1.51          | 83.49                                                       | 12.17                  | 0.56         | 9.61          |
| 23000              | 85.56                     | 1.42          | 84.62                                                       | 16.79                  | 0.50         | 11.74         |
| 24000              | 83.00                     | 1.34          | 88.28                                                       | 26.83                  | 0.45         | 19.22         |
| 25000              | 85.95                     | 1.55          | 89.13                                                       | 12.87                  | 0.42         | 20.22         |
| 25500              | 95.01                     | 1.71          | 91.06                                                       | 10.12                  | 0.43         | 14.01         |
| 26000              | 95.13                     | 1.95          | 98.12                                                       | 8.40                   | 0.44         | 10.58         |
| 26500              | 86.83                     | 2.07          | 87.15                                                       | 7.37                   | 0.43         | 8.81          |
| 27000              | 91.58                     | 2.23          | 92.55                                                       | 6.85                   | 0.38         | 7.91          |
| 27500              | 87.06                     | 2.31          | 88.64                                                       | 6.89                   | 0.35         | 7.72          |
| 28000              | 93.18                     | 2.54          | 97.80                                                       | 6.93                   | 0.30         | 7.45          |
| 28500              | 88.53                     | 2.58          | 96.67                                                       | 7.02                   | 0.26         | 7.24          |
| 29000              | 94.35                     | 2.30          | 91.90                                                       | 7.56                   | 0.30         | 7.39          |
| 29500              | 92.56                     | 1.99          | 106.52                                                      | 8.79                   | 0.30         | 8.33          |
| 30000              | 90.90                     | 1.60          | 96.38                                                       | 11.06                  | 0.39         | 10.08         |
| 30500              | 86.50                     | 1.26          | 89.10                                                       | 15.51                  | 0.44         | 13.23         |
| 31000              | 86.99                     | 1.10          | 94.61                                                       | 25.41                  | 0.52         | 17.04         |
| 31500              | 96.77                     | 1.11          | 91.28                                                       | 18.80                  | 0.61         | 15.67         |
| 32000              | 90.41                     | 1.25          | 89.96                                                       | 13.18                  | 1.14         | 12.17         |
| 32500              | 101.06                    | 1.42          | 99.61                                                       | 10.63                  | 1.36         | 9.79          |
| 33000              | 85.24                     | 1.59          | 105.38                                                      | 9.31                   | 0.61         | 8.65          |
| 33500              | 85.87                     | 1.72          | 94.40                                                       | 8.69                   | 0.45         | 7.81          |
| 34000              | 92.06                     | 1.84          | 92.09                                                       | 8.22                   | 0.43         | 7.37          |
| 34500              | 85.66                     | 1.91          | 87.57                                                       | 7.83                   | 0.41         | 6.96          |
| 35000              | 84.38                     | 1.99          | 89.42                                                       | 7.66                   | 0.44         | 6.80          |
| 35500              | 85.63                     | 1.96          | 94.87                                                       | 8.01                   | 0.48         | 7.03          |
| 36000              | 89.26                     | 1.77          | 93.28                                                       | 9.27                   | 0.53         | 7.71          |
| 36500              | 83.94                     | 1.59          | 95.48                                                       | 11.72                  | 0.55         | 8.82          |
| 37000              | 88.14                     | 1.56          | 89.26                                                       | 13.07                  | 0.55         | 9.13          |
| 37500              | 81.00                     | 1.94          | 90.63                                                       | 9.92                   | 0.52         | 7.50          |
| 38000              | 96.47                     | 2.68          | 93.35                                                       | 6.60                   | 0.45         | 5.49          |
| 38500              | 82.01                     | 3.64          | 86.18                                                       | 4.67                   | 0.37         | 3.99          |
| 39000              | 86.15                     | 4.58          | 82.89                                                       | 3.53                   | 0.36         | 3.03          |
| 40000              | 81.97                     | 5.96          | 87.59                                                       | 2.59                   | 0.42         | 2.08          |

Typical Performance Curves



## Outline Dimensions

ZE3315



| CASE#  | A             | B             | C             | D             | E            | F            | G               |
|--------|---------------|---------------|---------------|---------------|--------------|--------------|-----------------|
| ZE3315 | .78<br>(19.8) | .78<br>(19.8) | .60<br>(15.2) | .62<br>(15.8) | .28<br>(7.1) | .08<br>(2.0) | .620<br>(15.75) |

| CASE#  | H            | J              | K              | L            | M             | N            | WT. GRAMS |
|--------|--------------|----------------|----------------|--------------|---------------|--------------|-----------|
| ZE3315 | .31<br>(7.9) | .110<br>(2.79) | .070<br>(1.78) | .24<br>(6.0) | 0.31<br>(7.8) | .24<br>(6.1) | 50        |

Dimensions are in inches (mm). Tolerances: 2 Pl.  $\pm .050$ ; 3 Pl.  $\pm .015$

### Notes:

1. Case material: Brass alloy.
2. Case Finish: Powder coated over silver plating.
3. Refer to the individual model data sheet for the type of connectors available.



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



Provides ACTUAL Data Instantly From MINI-CIRCUITS At: [www.minicircuits.com](http://www.minicircuits.com)

RF/IF MICROWAVE COMPONENTS



All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

| Specification         | Test/Inspection Condition             | Reference/Spec              |
|-----------------------|---------------------------------------|-----------------------------|
| Operating Temperature | -40° to 85° C<br>Ambient Temperature  | Individual Model Data Sheet |
| Storage Temperature   | -55° to 100° C<br>Ambient Environment | Individual Model Data Sheet |