

# Surface Mount Band Stop Filter

## BSF-C160+

50Ω      150.3 to 169.7 MHz

### The Big Deal

- High rejection, 48 dB typical
- Good VSWR, 1.2:1 typical in passband
- Stopband (150.3 to 169.7 MHz)
- Miniature shielded package



CASE STYLE: HU1186

### Product Overview

The BSF-C160+ is stopband filter fabricated using SMT Technology. Covering 150.3 to 169.7 MHz stopband, this units offer good rejection. This unit uses a miniature high Q capacitors and wire welded inductors for high reliability. It has repeatable performance across production lots and consistent performance across temperature.

### Key Features

| Feature                                  | Advantages                                                                                                                     |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| High rejection, 48 dB typical            | BSF-C160+ enables the filter to attenuate spurious signals and reject harmonics for broadband of frequencies.                  |
| Good VSWR 1.2:1 typical in the pass-band | This filter maintains typical VSWR over a passband frequency range which provided good interface when used with other devices. |
| Shielded package                         | Shielded package (Size of .087" x 0.80" x 0.25")reduced interface with and from the surrounding components.                    |

#### 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.  
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# Surface Mount Band Stop Filter

50Ω 150.3 to 169.7 MHz

BSF-C160+



CASE STYLE: HU1186

## Features

- High rejection, 48 dB typical
- Good VSWR 1.2:1 typical in passband
- Aqueous washable
- Miniature shielded package

## Applications

- FM radio
- Receivers / Transmitters
- Lab use

## Electrical Specifications at 25°C

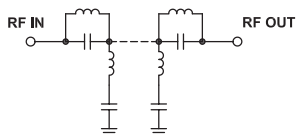
| Parameter        | F#             | Frequency (MHz) | Min.        | Typ. | Max. | Unit |
|------------------|----------------|-----------------|-------------|------|------|------|
| Pass Band, Lower | Insertion Loss | DC-F1           | DC - 115    | -    | 0.6  | dB   |
|                  | VSWR           | DC-F1           | DC - 115    | -    | 1.2  | :1   |
| Stop Band        | Rejection      | F4-F5           | 150.3-169.7 | 30   | 48   | dB   |
|                  | VSWR           | F4-F5           | 150.3-169.7 | -    | 7    | :1   |
| Pass Band, Upper | Insertion Loss | F2-F3           | 230-1500    | -    | 0.8  | dB   |
|                  | VSWR           | F2-F3           | 230-1500    | -    | 1.2  | :1   |

## Maximum Ratings

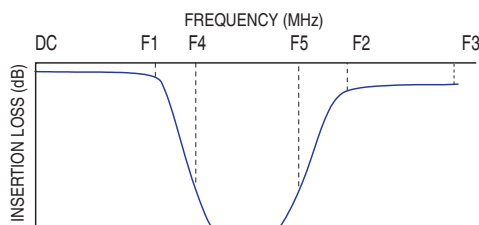
|                       |                |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C  |
| Storage Temperature   | -55°C to 100°C |
| RF Power Input        | 250 mW max.    |

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

## Functional Schematic



## Typical Frequency Response

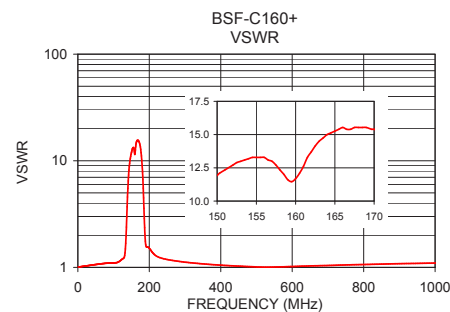
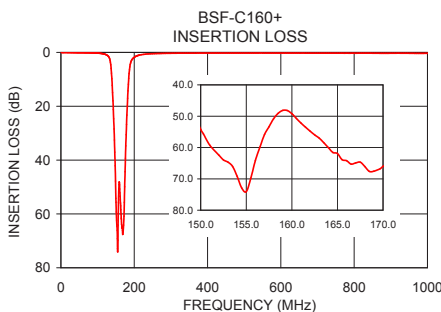


## Typical Performance Data at 25°C

| Frequency (MHz) | Insertion Loss (dB) | VSWR (:1) |
|-----------------|---------------------|-----------|
| 1.0             | 0.03                | 1.01      |
| 30.0            | 0.06                | 1.04      |
| 80.0            | 0.16                | 1.09      |
| 115.0           | 0.51                | 1.14      |
| 130.0           | 1.53                | 1.16      |
| 135.0           | 3.60                | 1.61      |
| 140.0           | 12.25               | 4.51      |
| 144.0           | 24.67               | 7.70      |
| 146.0           | 32.54               | 9.04      |
| 150.3           | 55.65               | 11.17     |
| 160.0           | 49.19               | 8.77      |
| 169.7           | 66.75               | 9.74      |
| 174.0           | 49.92               | 7.83      |
| 180.0           | 23.28               | 4.67      |
| 185.0           | 9.67                | 2.09      |
| 190.0           | 3.96                | 1.07      |
| 200.0           | 1.83                | 1.28      |
| 230.0           | 0.66                | 1.12      |
| 800.0           | 0.29                | 1.09      |
| 1000.0          | 0.34                | 1.13      |

## +RoHS Compliant

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



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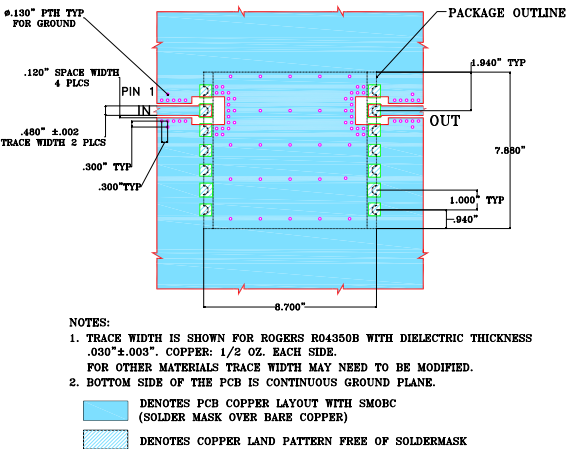


[www.minicircuits.com](http://www.minicircuits.com) P.O. Box 350166, Brooklyn, NY 11235-0003 (718) 934-4500 [sales@minicircuits.com](mailto:sales@minicircuits.com)

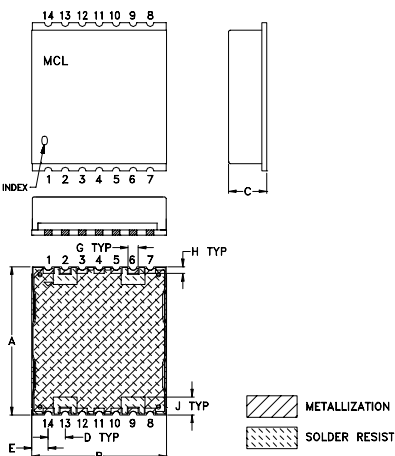
REV. A  
M160153  
BSF-C160+  
EDU1289  
URJ/NY  
161230  
Page 2 of 3

|                 |                         |
|-----------------|-------------------------|
| Pin Connections |                         |
| INPUT           | 2                       |
| OUTPUT          | 13                      |
| NOT CONNECTED   | 6,9                     |
| GROUND          | 1,3,4,5,7,8,10,11,12,14 |

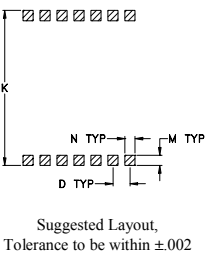
Demo Board MCL P/N: TB-378+  
Suggested PCB Layout (PL-347)



Outline Drawing



PCB Land Pattern



Outline Dimensions ( inch )

|       |       |      |      |      |    |      |       |
|-------|-------|------|------|------|----|------|-------|
| A     | B     | C    | D    | E    | F  | G    | H     |
| .870  | .800  | .25  | .100 | .097 | -- | .060 | .040  |
| 22.10 | 20.32 | 6.35 | 2.54 | 2.46 | -- | 1.52 | 1.02  |
| J     | K     | L    | M    | N    | P  |      | wt    |
| .105  | .910  | --   | .060 | .060 | -- |      | grams |
| 2.67  | 23.11 | --   | 1.52 | 1.52 | -- |      | 2.85  |

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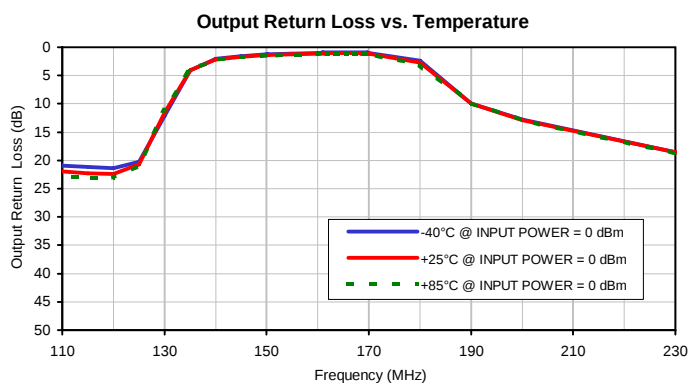
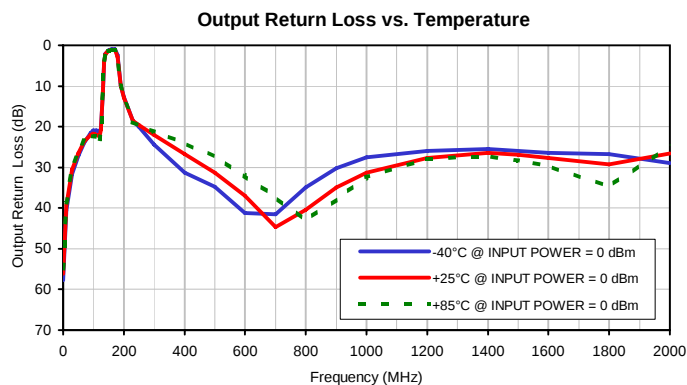
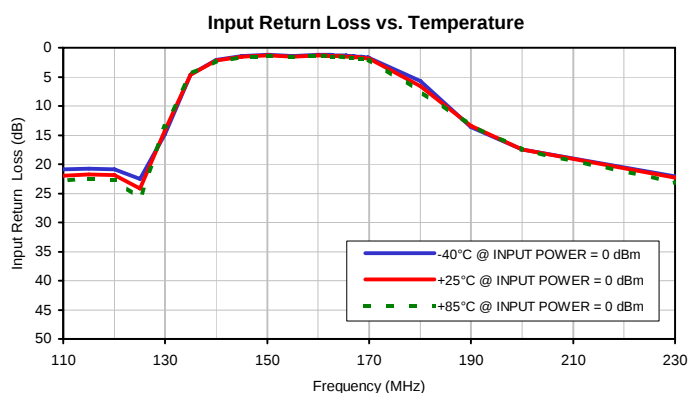
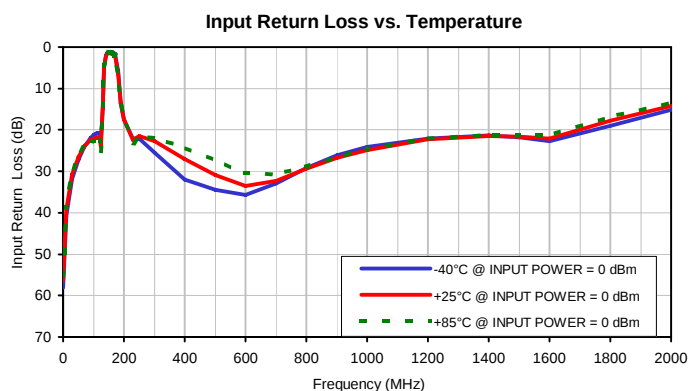
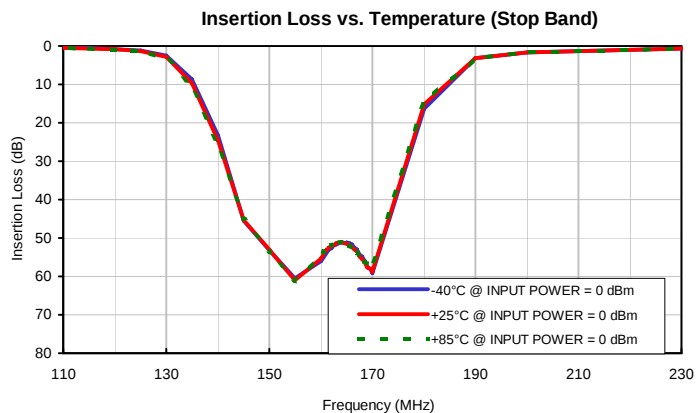
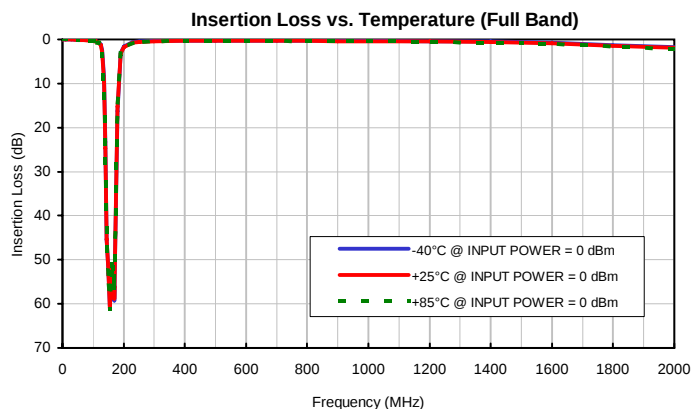
## Typical Performance Data

| FREQ.<br>(MHz) | INSERTION LOSS |        |        | INPUT RETURN LOSS |        |        | OUTPUT RETURN LOSS |        |        |
|----------------|----------------|--------|--------|-------------------|--------|--------|--------------------|--------|--------|
|                | (dB)           |        |        | (dB)              |        |        | (dB)               |        |        |
|                | @-40°C         | @+25°C | @+85°C | @-40°C            | @+25°C | @+85°C | @-40°C             | @+25°C | @+85°C |
| 1.0            | 0.01           | 0.02   | 0.02   | 58.12             | 56.44  | 55.35  | 57.74              | 56.13  | 54.94  |
| 10.0           | 0.03           | 0.02   | 0.03   | 40.72             | 39.28  | 38.69  | 40.63              | 39.25  | 38.64  |
| 30.0           | 0.05           | 0.06   | 0.07   | 31.81             | 30.73  | 30.13  | 31.66              | 30.57  | 30.02  |
| 50.0           | 0.08           | 0.10   | 0.11   | 27.21             | 26.57  | 26.08  | 27.02              | 26.35  | 25.93  |
| 70.0           | 0.13           | 0.14   | 0.15   | 24.08             | 23.97  | 23.75  | 23.85              | 23.65  | 23.52  |
| 90.0           | 0.20           | 0.23   | 0.25   | 21.87             | 22.43  | 22.72  | 21.57              | 21.99  | 22.29  |
| 100.0          | 0.28           | 0.31   | 0.34   | 21.21             | 22.14  | 22.73  | 20.95              | 21.70  | 22.31  |
| 105.0          | 0.34           | 0.38   | 0.41   | 21.00             | 22.08  | 22.81  | 20.87              | 21.80  | 22.57  |
| 110.0          | 0.41           | 0.47   | 0.51   | 20.86             | 21.99  | 22.78  | 20.92              | 22.00  | 22.86  |
| 115.0          | 0.54           | 0.61   | 0.67   | 20.76             | 21.80  | 22.52  | 21.15              | 22.23  | 23.08  |
| 120.0          | 0.75           | 0.85   | 0.94   | 20.88             | 21.88  | 22.62  | 21.37              | 22.40  | 23.12  |
| 125.0          | 1.16           | 1.33   | 1.47   | 22.49             | 24.16  | 25.77  | 20.29              | 20.75  | 20.96  |
| 130.0          | 2.44           | 2.86   | 3.24   | 14.82             | 14.13  | 13.49  | 12.07              | 11.55  | 11.08  |
| 135.0          | 8.63           | 9.69   | 10.61  | 4.67              | 4.57   | 4.48   | 4.11               | 4.05   | 3.97   |
| 140.0          | 23.28          | 24.69  | 25.87  | 2.05              | 2.18   | 2.27   | 2.04               | 2.16   | 2.22   |
| 145.0          | 45.43          | 45.37  | 45.15  | 1.41              | 1.56   | 1.66   | 1.53               | 1.65   | 1.72   |
| 150.0          | 53.09          | 53.00  | 53.42  | 1.18              | 1.33   | 1.42   | 1.25               | 1.37   | 1.45   |
| 150.3          | 53.46          | 53.58  | 54.35  | 1.18              | 1.32   | 1.42   | 1.24               | 1.37   | 1.45   |
| 155.0          | 60.43          | 61.06  | 61.16  | 1.46              | 1.54   | 1.57   | 1.10               | 1.23   | 1.32   |
| 160.0          | 55.92          | 55.25  | 54.55  | 1.24              | 1.36   | 1.45   | 0.99               | 1.12   | 1.19   |
| 160.5          | 54.94          | 54.12  | 53.63  | 1.23              | 1.35   | 1.45   | 0.97               | 1.10   | 1.18   |
| 161.0          | 53.96          | 53.09  | 52.67  | 1.23              | 1.36   | 1.46   | 0.96               | 1.09   | 1.17   |
| 161.5          | 53.08          | 52.48  | 52.19  | 1.24              | 1.37   | 1.48   | 0.95               | 1.08   | 1.16   |
| 162.0          | 52.70          | 52.21  | 51.84  | 1.25              | 1.38   | 1.49   | 0.94               | 1.07   | 1.16   |
| 162.5          | 51.84          | 51.75  | 51.47  | 1.26              | 1.39   | 1.50   | 0.94               | 1.06   | 1.15   |
| 163.0          | 51.60          | 51.32  | 51.10  | 1.27              | 1.41   | 1.53   | 0.93               | 1.06   | 1.15   |
| 163.5          | 51.34          | 51.20  | 51.09  | 1.29              | 1.43   | 1.54   | 0.93               | 1.06   | 1.15   |
| 164.0          | 51.02          | 51.09  | 51.05  | 1.31              | 1.44   | 1.57   | 0.92               | 1.05   | 1.14   |
| 164.5          | 51.25          | 51.29  | 51.24  | 1.32              | 1.47   | 1.59   | 0.92               | 1.06   | 1.15   |
| 165.0          | 51.10          | 51.45  | 51.68  | 1.34              | 1.49   | 1.62   | 0.92               | 1.05   | 1.15   |
| 165.5          | 51.41          | 51.76  | 51.97  | 1.37              | 1.52   | 1.65   | 0.93               | 1.06   | 1.15   |
| 166.0          | 51.63          | 52.40  | 52.58  | 1.40              | 1.55   | 1.69   | 0.92               | 1.06   | 1.15   |
| 166.5          | 52.58          | 53.00  | 53.15  | 1.43              | 1.58   | 1.72   | 0.93               | 1.06   | 1.16   |
| 167.0          | 53.05          | 53.56  | 53.77  | 1.46              | 1.62   | 1.76   | 0.93               | 1.06   | 1.16   |
| 167.5          | 54.25          | 54.78  | 54.67  | 1.50              | 1.66   | 1.80   | 0.93               | 1.06   | 1.17   |
| 168.0          | 54.90          | 55.50  | 55.65  | 1.53              | 1.70   | 1.85   | 0.93               | 1.07   | 1.17   |
| 168.5          | 56.01          | 56.27  | 56.11  | 1.57              | 1.75   | 1.90   | 0.94               | 1.08   | 1.18   |
| 169.0          | 57.57          | 57.63  | 56.64  | 1.62              | 1.80   | 1.95   | 0.95               | 1.09   | 1.19   |
| 169.7          | 58.40          | 57.92  | 56.81  | 1.69              | 1.87   | 2.04   | 0.96               | 1.10   | 1.21   |
| 170.0          | 59.24          | 58.80  | 56.75  | 1.72              | 1.91   | 2.08   | 0.97               | 1.11   | 1.22   |
| 180.0          | 16.25          | 15.24  | 14.44  | 5.70              | 6.54   | 7.39   | 2.37               | 2.76   | 3.10   |
| 190.0          | 3.10           | 3.18   | 3.24   | 13.67             | 13.42  | 13.27  | 9.98               | 9.90   | 9.87   |
| 200.0          | 1.61           | 1.69   | 1.74   | 17.51             | 17.52  | 17.52  | 12.76              | 12.85  | 12.90  |
| 230.0          | 0.63           | 0.69   | 0.72   | 22.14             | 22.36  | 23.15  | 18.50              | 18.56  | 18.83  |
| 250.0          | 0.48           | 0.53   | 0.55   | 22.12             | 21.44  | 21.70  | 20.17              | 19.64  | 19.73  |
| 300.0          | 0.31           | 0.37   | 0.40   | 25.46             | 22.73  | 21.87  | 24.41              | 22.08  | 21.25  |
| 400.0          | 0.25           | 0.31   | 0.34   | 32.02             | 27.05  | 24.30  | 31.24              | 26.79  | 24.11  |
| 500.0          | 0.24           | 0.29   | 0.33   | 34.40             | 30.98  | 27.34  | 34.74              | 31.25  | 27.43  |
| 600.0          | 0.25           | 0.31   | 0.34   | 35.68             | 33.54  | 30.42  | 41.16              | 36.92  | 32.00  |
| 700.0          | 0.26           | 0.32   | 0.36   | 32.96             | 32.36  | 30.82  | 41.60              | 44.61  | 37.29  |
| 800.0          | 0.28           | 0.35   | 0.39   | 29.21             | 29.34  | 28.85  | 34.90              | 40.42  | 43.13  |
| 900.0          | 0.29           | 0.37   | 0.42   | 26.11             | 26.81  | 26.58  | 30.16              | 34.86  | 37.75  |
| 1000.0         | 0.32           | 0.41   | 0.46   | 24.03             | 24.83  | 24.58  | 27.53              | 31.37  | 32.44  |
| 1200.0         | 0.39           | 0.49   | 0.55   | 22.04             | 22.32  | 22.05  | 25.93              | 27.65  | 27.88  |
| 1400.0         | 0.48           | 0.62   | 0.71   | 21.36             | 21.43  | 21.24  | 25.46              | 26.47  | 27.27  |
| 1500.0         | 0.59           | 0.74   | 0.85   | 21.77             | 21.65  | 21.36  | 25.99              | 26.93  | 28.29  |
| 1600.0         | 0.74           | 0.94   | 1.05   | 22.78             | 22.10  | 21.35  | 26.49              | 27.64  | 29.64  |
| 1800.0         | 1.32           | 1.50   | 1.62   | 18.93             | 17.73  | 16.91  | 26.75              | 29.23  | 34.82  |
| 2000.0         | 1.69           | 1.95   | 2.15   | 15.20             | 14.26  | 13.47  | 29.01              | 26.58  | 24.58  |

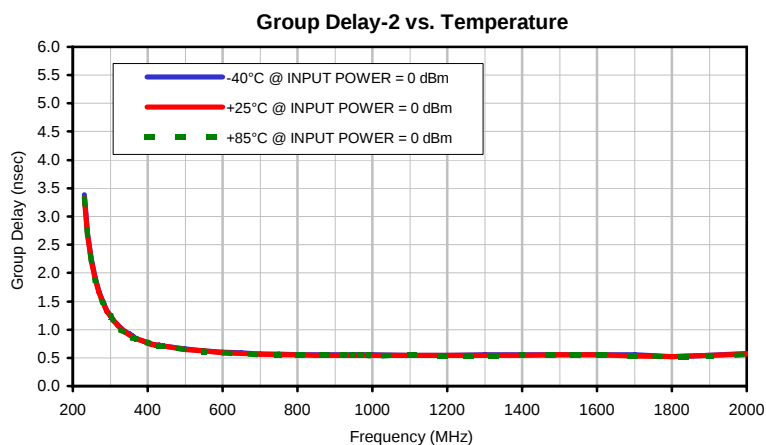
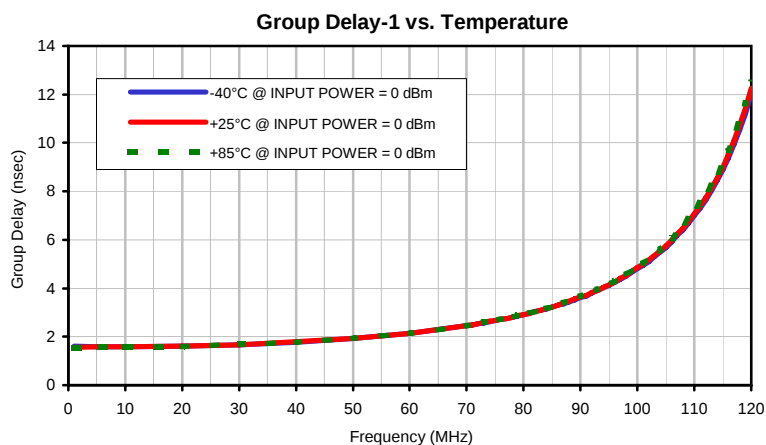
*Typical Performance Data*

| FREQ. | GROUP DELAY-1 |        |        | FREQ.  | GROUP DELAY-2 |        |        |
|-------|---------------|--------|--------|--------|---------------|--------|--------|
| (MHz) | (nsec)        |        |        | (MHz)  | (nsec)        |        |        |
|       | @-40°C        | @+25°C | @+85°C |        | @-40°C        | @+25°C | @+85°C |
| 1.0   | 1.60          | 1.57   | 1.54   | 230.0  | 3.38          | 3.33   | 3.31   |
| 5.0   | 1.59          | 1.59   | 1.57   | 240.0  | 2.70          | 2.67   | 2.64   |
| 10.0  | 1.58          | 1.59   | 1.58   | 250.0  | 2.24          | 2.21   | 2.19   |
| 20.0  | 1.60          | 1.60   | 1.58   | 260.0  | 1.91          | 1.89   | 1.86   |
| 30.0  | 1.67          | 1.67   | 1.68   | 270.0  | 1.66          | 1.65   | 1.63   |
| 40.0  | 1.78          | 1.79   | 1.78   | 280.0  | 1.49          | 1.48   | 1.47   |
| 50.0  | 1.93          | 1.92   | 1.92   | 290.0  | 1.34          | 1.32   | 1.32   |
| 60.0  | 2.14          | 2.14   | 2.14   | 300.0  | 1.25          | 1.23   | 1.23   |
| 70.0  | 2.46          | 2.45   | 2.45   | 310.0  | 1.16          | 1.16   | 1.14   |
| 71.0  | 2.49          | 2.49   | 2.51   | 320.0  | 1.09          | 1.08   | 1.07   |
| 72.0  | 2.53          | 2.53   | 2.55   | 330.0  | 1.02          | 1.01   | 1.00   |
| 73.0  | 2.57          | 2.58   | 2.59   | 340.0  | 0.96          | 0.95   | 0.94   |
| 74.0  | 2.61          | 2.63   | 2.63   | 350.0  | 0.93          | 0.91   | 0.91   |
| 75.0  | 2.67          | 2.66   | 2.67   | 360.0  | 0.88          | 0.86   | 0.85   |
| 76.0  | 2.71          | 2.72   | 2.71   | 370.0  | 0.84          | 0.84   | 0.84   |
| 77.0  | 2.76          | 2.76   | 2.77   | 380.0  | 0.82          | 0.82   | 0.82   |
| 78.0  | 2.80          | 2.80   | 2.83   | 390.0  | 0.79          | 0.79   | 0.79   |
| 79.0  | 2.85          | 2.87   | 2.88   | 400.0  | 0.77          | 0.76   | 0.77   |
| 80.0  | 2.90          | 2.90   | 2.91   | 410.0  | 0.75          | 0.74   | 0.75   |
| 81.0  | 2.96          | 2.97   | 2.98   | 420.0  | 0.73          | 0.72   | 0.71   |
| 82.0  | 3.03          | 3.04   | 3.04   | 430.0  | 0.73          | 0.72   | 0.71   |
| 83.0  | 3.08          | 3.08   | 3.11   | 440.0  | 0.70          | 0.70   | 0.71   |
| 84.0  | 3.14          | 3.16   | 3.18   | 450.0  | 0.70          | 0.70   | 0.69   |
| 85.0  | 3.21          | 3.22   | 3.25   | 500.0  | 0.66          | 0.64   | 0.64   |
| 86.0  | 3.31          | 3.31   | 3.34   | 550.0  | 0.62          | 0.62   | 0.61   |
| 87.0  | 3.36          | 3.41   | 3.41   | 600.0  | 0.60          | 0.59   | 0.59   |
| 88.0  | 3.44          | 3.47   | 3.49   | 650.0  | 0.59          | 0.58   | 0.58   |
| 89.0  | 3.52          | 3.56   | 3.58   | 700.0  | 0.57          | 0.57   | 0.56   |
| 90.0  | 3.63          | 3.65   | 3.66   | 750.0  | 0.57          | 0.56   | 0.56   |
| 91.0  | 3.68          | 3.71   | 3.75   | 800.0  | 0.56          | 0.55   | 0.55   |
| 92.0  | 3.81          | 3.84   | 3.87   | 850.0  | 0.55          | 0.54   | 0.54   |
| 93.0  | 3.91          | 3.92   | 3.97   | 900.0  | 0.55          | 0.54   | 0.54   |
| 94.0  | 4.02          | 4.05   | 4.07   | 910.0  | 0.55          | 0.54   | 0.54   |
| 95.0  | 4.11          | 4.16   | 4.18   | 925.0  | 0.56          | 0.54   | 0.54   |
| 96.0  | 4.24          | 4.26   | 4.30   | 930.0  | 0.55          | 0.54   | 0.54   |
| 97.0  | 4.35          | 4.40   | 4.42   | 935.0  | 0.55          | 0.54   | 0.54   |
| 98.0  | 4.50          | 4.53   | 4.57   | 940.0  | 0.55          | 0.54   | 0.54   |
| 99.0  | 4.64          | 4.69   | 4.72   | 945.0  | 0.55          | 0.54   | 0.54   |
| 100.0 | 4.80          | 4.85   | 4.87   | 950.0  | 0.55          | 0.54   | 0.54   |
| 101.0 | 4.93          | 4.99   | 5.01   | 955.0  | 0.55          | 0.54   | 0.54   |
| 102.0 | 5.11          | 5.18   | 5.20   | 960.0  | 0.55          | 0.54   | 0.53   |
| 103.0 | 5.30          | 5.36   | 5.41   | 965.0  | 0.55          | 0.54   | 0.54   |
| 104.0 | 5.49          | 5.55   | 5.61   | 970.0  | 0.54          | 0.54   | 0.54   |
| 105.0 | 5.68          | 5.75   | 5.82   | 975.0  | 0.55          | 0.54   | 0.54   |
| 106.0 | 5.92          | 5.99   | 6.05   | 980.0  | 0.55          | 0.54   | 0.54   |
| 107.0 | 6.17          | 6.24   | 6.31   | 985.0  | 0.55          | 0.54   | 0.54   |
| 108.0 | 6.40          | 6.48   | 6.57   | 990.0  | 0.55          | 0.54   | 0.54   |
| 109.0 | 6.67          | 6.77   | 6.84   | 995.0  | 0.54          | 0.54   | 0.53   |
| 110.0 | 6.99          | 7.08   | 7.18   | 1000.0 | 0.55          | 0.54   | 0.53   |
| 111.0 | 7.28          | 7.40   | 7.49   | 1100.0 | 0.54          | 0.54   | 0.54   |
| 112.0 | 7.64          | 7.73   | 7.84   | 1200.0 | 0.54          | 0.54   | 0.53   |
| 113.0 | 8.02          | 8.13   | 8.23   | 1300.0 | 0.55          | 0.54   | 0.53   |
| 114.0 | 8.44          | 8.56   | 8.69   | 1400.0 | 0.55          | 0.54   | 0.54   |
| 115.0 | 8.89          | 9.02   | 9.17   | 1500.0 | 0.55          | 0.55   | 0.54   |
| 116.0 | 9.36          | 9.52   | 9.66   | 1600.0 | 0.56          | 0.55   | 0.54   |
| 117.0 | 9.92          | 10.09  | 10.25  | 1700.0 | 0.55          | 0.53   | 0.53   |
| 118.0 | 10.55         | 10.74  | 10.93  | 1800.0 | 0.52          | 0.52   | 0.52   |
| 119.0 | 11.20         | 11.44  | 11.64  | 1900.0 | 0.54          | 0.54   | 0.53   |
| 120.0 | 12.01         | 12.25  | 12.50  | 2000.0 | 0.58          | 0.57   | 0.56   |

## Typical Performance Curves

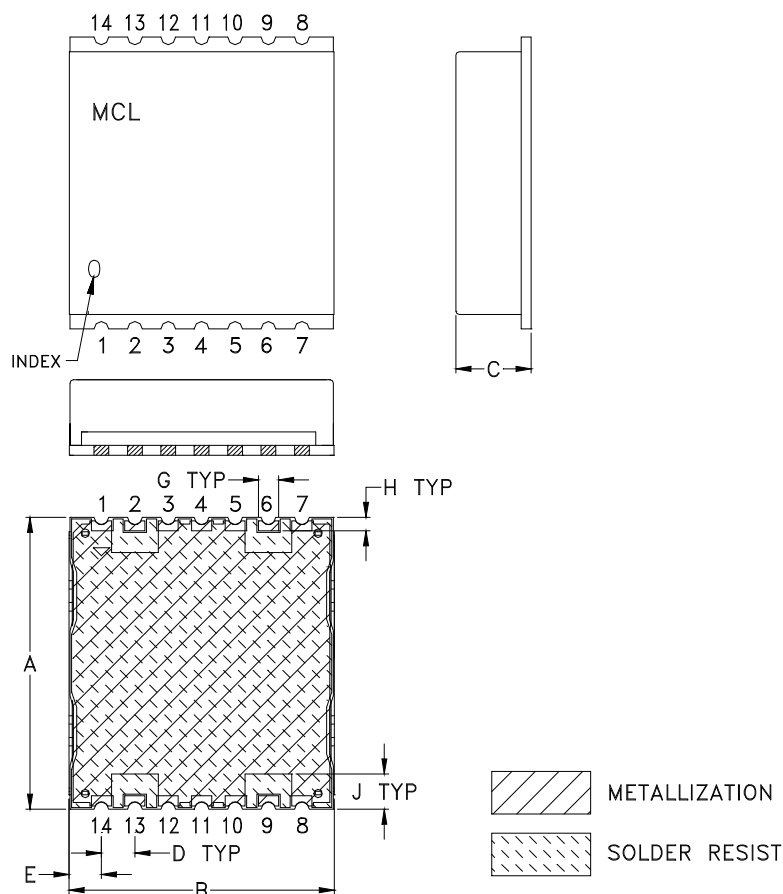


## Typical Performance Curves

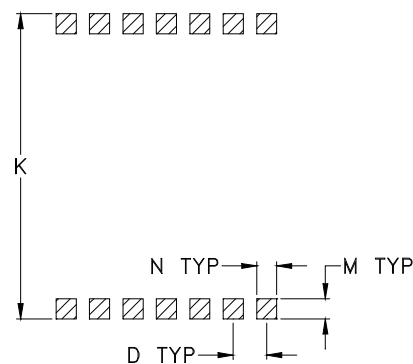


## Outline Dimensions

HU1186



## PCB Land Pattern



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

| CASE#  | A               | B               | C             | D              | E              | F      | G              | H              | J              | K               | L      | M              | N              | P      | WT,<br>GRAM |
|--------|-----------------|-----------------|---------------|----------------|----------------|--------|----------------|----------------|----------------|-----------------|--------|----------------|----------------|--------|-------------|
| HU1186 | .870<br>(22.10) | .800<br>(20.32) | .25<br>(6.35) | .100<br>(2.54) | .097<br>(2.46) | -<br>- | .060<br>(1.52) | .040<br>(1.02) | .105<br>(2.67) | .910<br>(23.11) | -<br>- | .060<br>(1.52) | .060<br>(1.52) | -<br>- | 2.85        |

Dimensions are in inches (mm). Tolerances: 2PL. +/- .03; 3PL. +/- .015

### Notes:

1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. Termination finish:

For RoHS Case Styles: 2-5  $\mu$  inch (.05-.13 microns) Gold over 120-240  $\mu$  inch (3.05-6.10 microns) Nickel plate.  
For RoHS-5 Case Styles: Tin-Lead plate.

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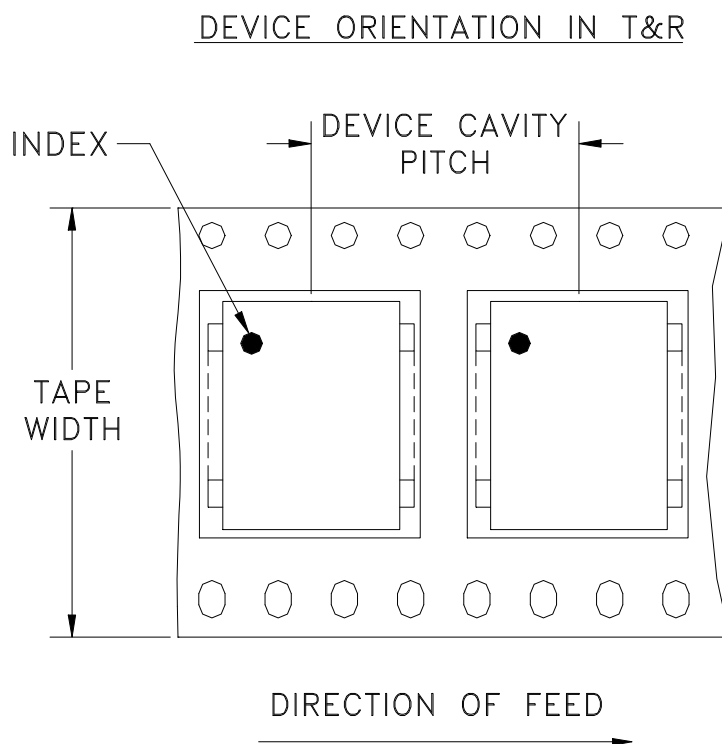
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



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RF/IF MICROWAVE COMPONENTS

# Tape & Reel Packaging TR-F21



| Tape Width,<br>mm | Device Cavity<br>Pitch, mm | Reel Size,<br>inches | Devices per Reel |
|-------------------|----------------------------|----------------------|------------------|
| 32                | 32                         | 13                   | 200              |

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

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

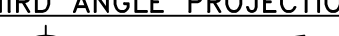


INTERNET <http://www.minicircuits.com>

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

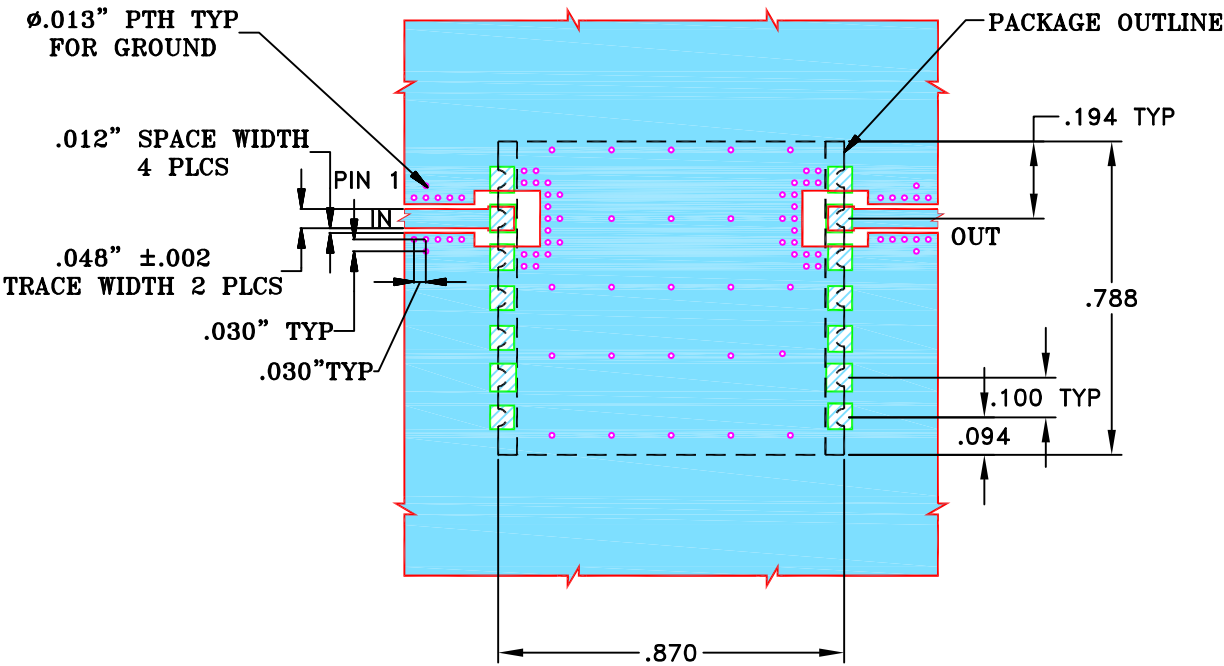
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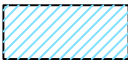
| THIRD ANGLE PROJECTION                                                            |  |
|-----------------------------------------------------------------------------------|--|
|  |  |

| REVISIONS |         |             |        |    |      |
|-----------|---------|-------------|--------|----|------|
| REV       | ECN No. | DESCRIPTION | DATE   | DR | AUTH |
| OR        | M132023 | NEW RELEASE | MAY 11 | MD | KG   |
|           |         |             |        |    |      |
|           |         |             |        |    |      |
|           |         |             |        |    |      |

SUGGESTED MOUNTING CONFIGURATION FOR  
HU1186 CASE STYLE "14FL05" PIN CODE

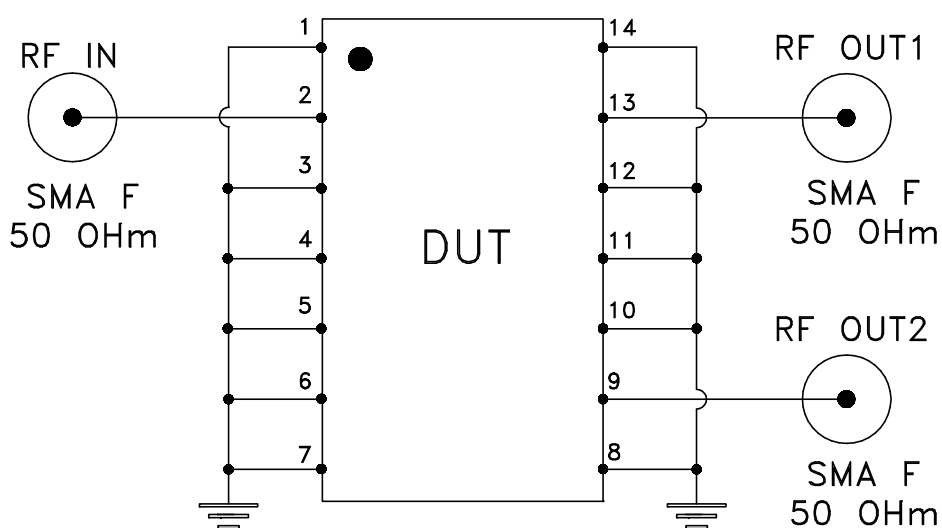
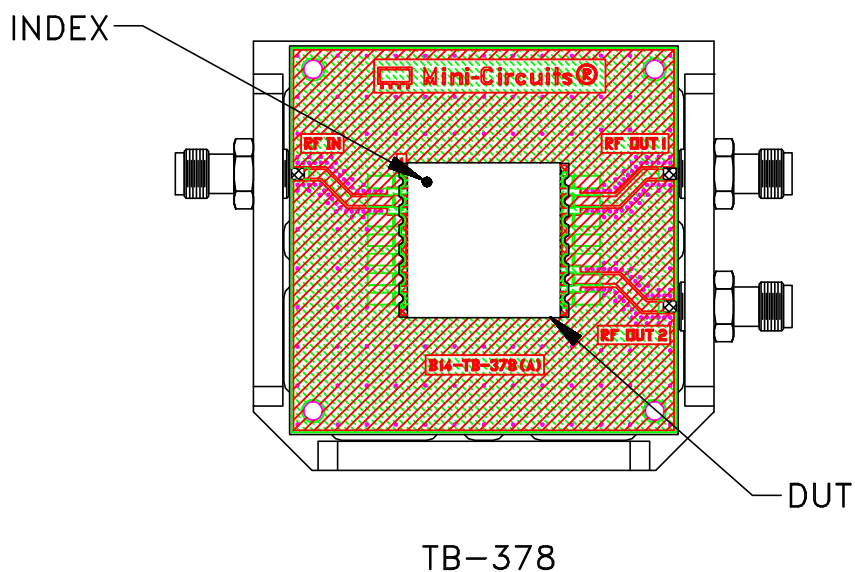


- NOTES:
- TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .030"±.003". COPPER: 1/2 OZ. EACH SIDE.  
FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
  - BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

-  DENOTES PCB COPPER LAYOUT WITH SMOBC  
(SOLDER MASK OVER BARE COPPER)
-  DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

| UNLESS OTHERWISE SPECIFIED                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          | INITIALS |           | DATE |  | <div><div><div></div><div></div><div></div><div></div></div><div>Mini-Circuits®</div><div>13 Neptune Avenue<br/>Brooklyn NY 11235</div></div> |  |                     |  |                          |  |            |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|-----------|------|--|-----------------------------------------------------------------------------------------------------------------------------------------------|--|---------------------|--|--------------------------|--|------------|--|
| DIMENSIONS ARE IN INCHES<br><br>TOLERANCES ON:<br>2 PL DECIMALS ±<br>3 PL DECIMALS ± .005"<br><br>ANGLES ±<br>FRACTIONS ±<br><div><div></div><div></div></div>                                                                                                                                                                                                                                                                                                                                 | DRAWN    | MD       | 24 MAY 11 |      |  |                                                                                                                                               |  |                     |  |                          |  |            |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CHECKED  | MD       | 24 MAY 11 |      |  |                                                                                                                                               |  |                     |  |                          |  |            |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | APPROVED | AKR      | 24 MAY 11 |      |  |                                                                                                                                               |  |                     |  |                          |  |            |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |          |           |      |  | PL, 14FL05, HU1186, BSF-C,<br>TB-378S+, 50Ω                                                                                                   |  |                     |  |                          |  |            |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |          |           |      |  |                                                                                                                                               |  |                     |  |                          |  |            |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |          |           |      |  |                                                                                                                                               |  |                     |  |                          |  |            |  |
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| ASHEETA1.DWG REV:A DATE:01/12/95                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |          |           |      |  | FILE: 98PL347                                                                                                                                 |  | SCALE: 2:1          |  | SHEET: 1 OF 1            |  |            |  |

# Evaluation Board and Circuit



Schematic Diagram

## Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: ROGERS R04350 or equivalent, Dielectric Constant=3.48, Thickness=.030 inch.

 **Mini-Circuits®**



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

| Specification                 | Test/Inspection Condition                                                                                                 | Reference/Spec                                |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| Operating Temperature         | -40° to 85° C<br>Ambient Environment                                                                                      | Individual Model Data Sheet                   |
| Storage Temperature           | -65° to 150° C<br>Ambient Environment                                                                                     | Individual Model Data Sheet                   |
| Autoclave                     | 15 psig, 100% RH, 121°C, 96 hours                                                                                         | JESD22-A102-C, Condition C                    |
| Temperature Cycling           | -65° to 150°C, 100 cycles                                                                                                 | JESD22-A104                                   |
| Temperature Humidity          | 85°C/ 85% RH, 168 hours                                                                                                   | JESD22-113                                    |
| 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 240°C peak (Non-RoHS) or 260°C (RoHS) | J-STD-020                                     |
| Solderability                 | 10X magnification, 95% coverage                                                                                           | JESD22-B102, Method 1: Dip and Look Test      |
| Mechanical Shock              | 50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes                                                         | MIL-STD-202, Method 213, Condition A          |
| 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          |