

Surface Mount

Coaxial-Ceramic Resonator Filters and Multiplexers

50Ω DC to 6 GHz

The Big Deal

- Low insertion loss with excellent power handling
- Passbands up to 6 GHz
- Fractional bandwidth from <1 to 25%
- Low profile designs with min. height of 0.120"
- Excellent temperature stability
- Rugged construction to handle demanding environmental conditions



Product Overview

Mini-Circuits' *Coaxial-Ceramic Resonator filters* offer low insertion loss in very small form factors, using ceramic material with high dielectric constant and superior Q factor. Bandpass and bandstop filters, diplexer and multiplexer designs can be constructed using this technology. Low insertion loss combined with excellent power handling makes these filters well suited for transmitter and receiver signal chains. Advanced filter design and construction can achieve stopband width greater than 3x the center frequency as high as 20 GHz.

All our coaxial-ceramic resonator filters are built with rugged construction, qualified to withstand multiple demanding reflow cycles. Excellent repeatability across units is achieved through precise tuning and process control.

Key Features

| Feature | Advantages |
|--------------------------|---|
| Low insertion loss | Low signal loss results in better SNR in signal chain |
| Fast roll-off | Higher selectivity results in better adjacent channel rejection and dynamic range |
| Wide stop band | Wide spur-free stopband results in better receiver sensitivity |
| Excellent power handling | Well suited for transmitter applications |
| Rugged Construction | These filter assemblies have been qualified over a wide range of thermal, mechanical and environmental conditions including withstanding the stress of extensive solder reflow cycles |
| Small Size | Very well suited for high performance applications where size is a constraint. |
| Temperature stability | Very minimal change in electrical performance across temperature makes these filters suitable for a wide range of operating conditions. |

Notes

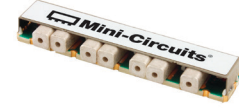
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Surface Mount Bandpass Filter

CBP-1598AF+

50Ω 1505.5 to 1690.5 MHz



Generic photo used for illustration purposes only
CASE STYLE:SV2484

Features

- High rejection of 50 dB
- High selectivity
- Miniature shielded package

Applications

- Aviation
- Maritime
- Military radar

Electrical Specifications⁽¹⁾ at 25°C

| Parameter | F# | Frequency (MHz) | Min. | Typ. | Max. | Unit | |
|------------------|------------------|-----------------|---------------|------|------|------|----|
| Pass Band | Center Frequency | - | - | 1598 | - | MHz | |
| | Insertion Loss | F1-F2 | 1505.5-1690.5 | - | 1.8 | 3 | dB |
| | VSWR | F1-F2 | 1505.5-1690.5 | - | 1.5 | 1.9 | :1 |
| Stop Band, Lower | Insertion Loss | DC-F3 | DC-1264 | 50 | 60 | - | dB |
| | VSWR | DC-F3 | DC-1264 | - | 20 | - | :1 |
| Stop Band, Upper | Insertion Loss | F4-F5 | 1888-2900 | 50 | 60 | - | dB |
| | VSWR | F4-F5 | 1888-2900 | - | 20 | - | :1 |

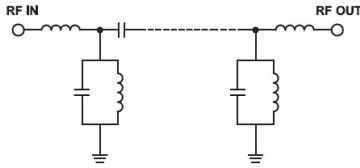
(1) Measured on Mini-Circuits Characterization Test Board TB-1069+.

Maximum Ratings

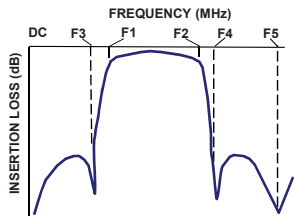
| | |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C |
| Storage Temperature | -55°C to 100°C |
| RF Power Input | 10 W Max. |

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

Functional Schematic



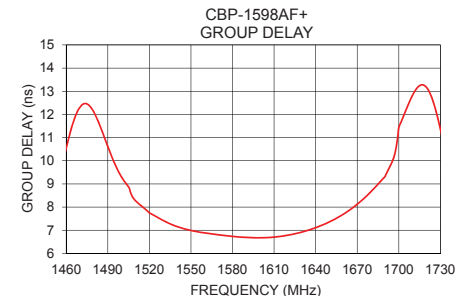
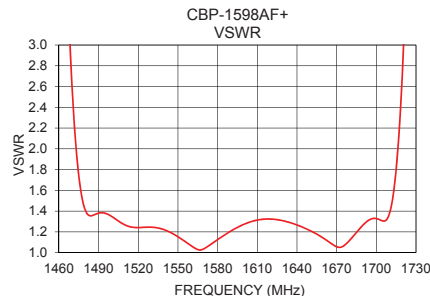
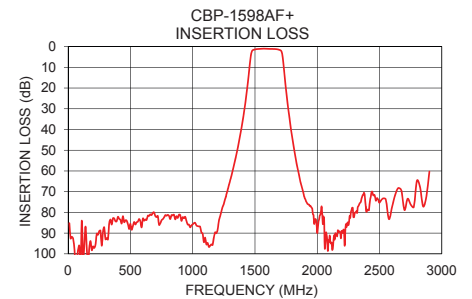
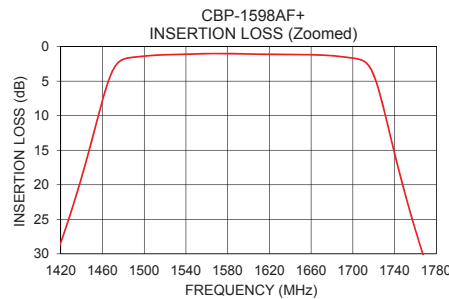
Typical Frequency Response



Typical Performance Data at 25°C

| Frequency (MHz) | Insertion Loss (dB) | VSWR (:1) | Frequency (MHz) | Group Delay (ns) |
|-----------------|---------------------|-----------|-----------------|------------------|
| 10.0 | 85.20 | 318.85 | 1505.5 | 8.82 |
| 100.0 | 107.55 | 177.42 | 1510.0 | 8.27 |
| 210.0 | 97.13 | 132.00 | 1520.0 | 7.75 |
| 320.0 | 93.03 | 125.20 | 1530.0 | 7.42 |
| 430.0 | 85.34 | 129.12 | 1540.0 | 7.16 |
| 1264.0 | 73.02 | 114.30 | 1550.0 | 6.99 |
| 1416.0 | 30.04 | 34.93 | 1560.0 | 6.88 |
| 1436.0 | 20.93 | 23.79 | 1570.0 | 6.80 |
| 1470.0 | 3.40 | 2.58 | 1580.0 | 6.73 |
| 1505.5 | 1.31 | 1.30 | 1598.0 | 6.67 |
| 1598.0 | 1.07 | 1.26 | 1600.0 | 6.67 |
| 1690.0 | 1.48 | 1.27 | 1610.0 | 6.70 |
| 1690.5 | 1.48 | 1.27 | 1620.0 | 6.78 |
| 1718.0 | 3.44 | 2.32 | 1630.0 | 6.92 |
| 1748.0 | 20.15 | 22.20 | 1640.0 | 7.11 |
| 1768.0 | 30.43 | 36.66 | 1650.0 | 7.36 |
| 1888.0 | 70.36 | 89.78 | 1660.0 | 7.69 |
| 2350.0 | 74.87 | 91.52 | 1670.0 | 8.12 |
| 2400.0 | 79.06 | 90.00 | 1680.0 | 8.67 |
| 2900.0 | 60.32 | 83.56 | 1690.5 | 9.38 |

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



Notes

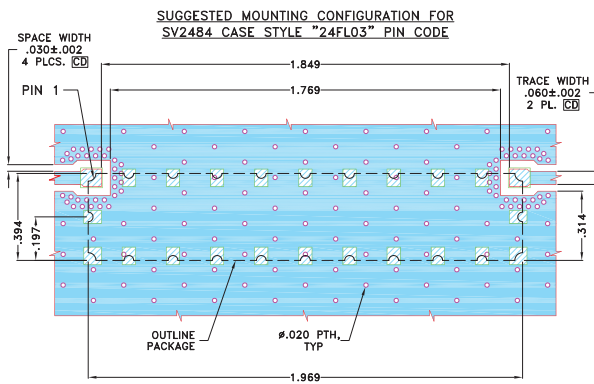
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Pad Connections

| | |
|--------|-----------------|
| INPUT | 1 |
| OUTPUT | 11 |
| GROUND | 2 - 10, 12 - 24 |

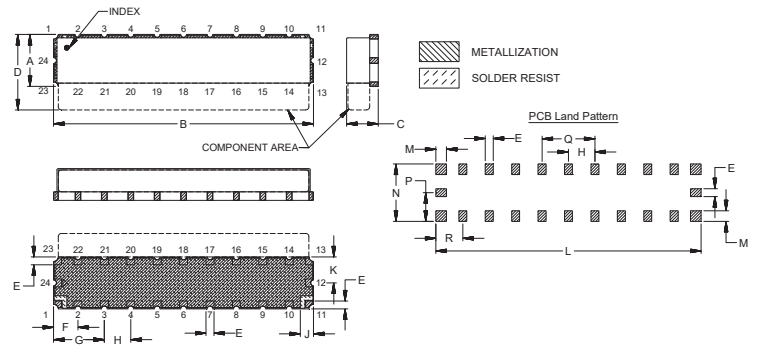
Demo Board MCL P/N: TB-1069+ Suggested PCB Layout (PL-604)



NOTES:

- TRACE WIDTH IS SHOWN FOR ROEGERS (R04350B), WITH DIELECTRIC THICKNESS .030"±.002". 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

Outline Drawing



Outline Dimensions (inch)

| A | B | C | D | E | F | G | H | J | K |
|-------|-------|-------|-------|-------|------|-------|------|------|------|
| .394 | 1.969 | .240 | .492 | .060 | .184 | .384 | .200 | .100 | .197 |
| 10.00 | 50.00 | 6.10 | 12.50 | 1.52 | 4.68 | 9.76 | 5.08 | 2.54 | 5.00 |
| L | M | N | P | Q | R | Wt. | | | |
| 2.009 | .080 | .434 | .217 | .400 | .204 | grams | | | |
| 51.02 | 2.03 | 11.02 | 5.51 | 10.16 | 5.19 | 7.0 | | | |

Note: Please refer to case style drawing for details

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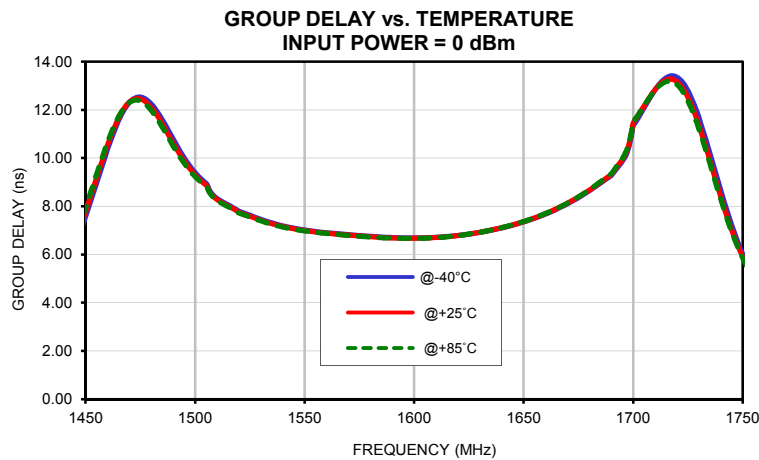
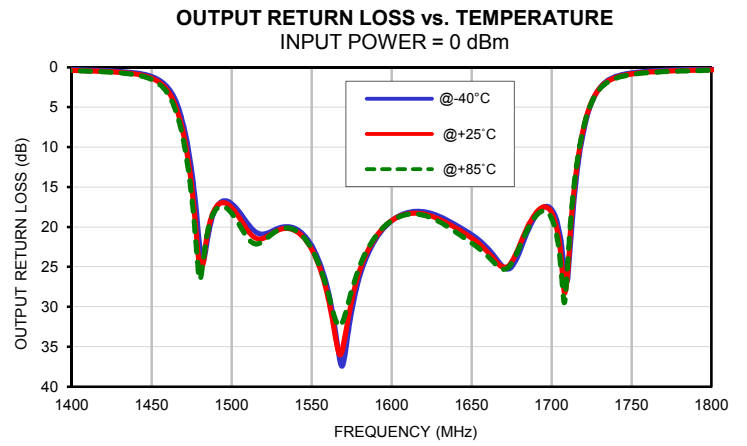
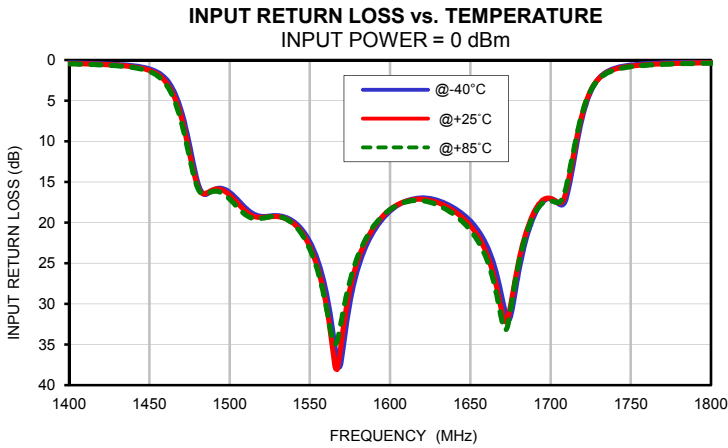
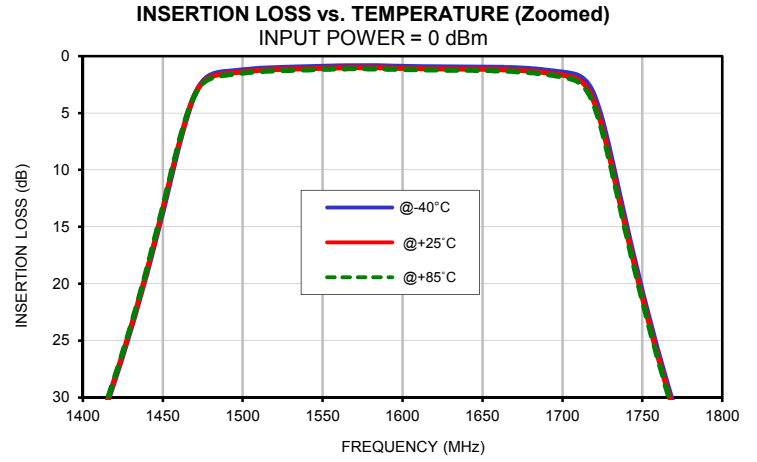
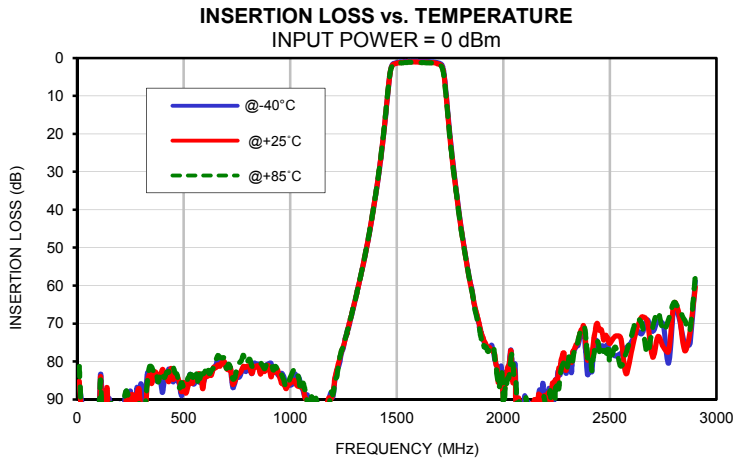
Typical Performance Data

| FREQ. (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 |
| 10.0 | 85.76 | 85.20 | 81.31 | 0.05 | 0.05 | 0.06 | 0.05 | 0.06 | 0.06 |
| 100.0 | 97.73 | 107.55 | 98.41 | 0.09 | 0.10 | 0.09 | 0.09 | 0.09 | 0.09 |
| 150.0 | 89.69 | 97.52 | 97.50 | 0.11 | 0.12 | 0.11 | 0.11 | 0.11 | 0.10 |
| 200.0 | 91.28 | 96.41 | 93.37 | 0.12 | 0.13 | 0.12 | 0.12 | 0.12 | 0.12 |
| 250.0 | 87.79 | 89.01 | 92.97 | 0.13 | 0.13 | 0.13 | 0.12 | 0.13 | 0.12 |
| 300.0 | 86.01 | 92.93 | 92.10 | 0.12 | 0.14 | 0.13 | 0.12 | 0.13 | 0.13 |
| 350.0 | 83.16 | 85.84 | 81.48 | 0.12 | 0.14 | 0.14 | 0.11 | 0.13 | 0.13 |
| 400.0 | 88.20 | 82.12 | 83.41 | 0.12 | 0.14 | 0.14 | 0.10 | 0.12 | 0.13 |
| 450.0 | 85.38 | 84.68 | 81.41 | 0.11 | 0.13 | 0.14 | 0.09 | 0.12 | 0.12 |
| 500.0 | 85.80 | 85.53 | 86.83 | 0.10 | 0.13 | 0.13 | 0.08 | 0.11 | 0.12 |
| 550.0 | 85.90 | 84.76 | 85.38 | 0.09 | 0.12 | 0.13 | 0.07 | 0.10 | 0.11 |
| 600.0 | 84.40 | 82.97 | 82.71 | 0.09 | 0.11 | 0.12 | 0.06 | 0.10 | 0.11 |
| 650.0 | 81.14 | 81.67 | 79.88 | 0.07 | 0.10 | 0.12 | 0.05 | 0.09 | 0.10 |
| 700.0 | 81.13 | 81.74 | 81.82 | 0.06 | 0.10 | 0.11 | 0.04 | 0.08 | 0.09 |
| 1264.0 | 73.10 | 73.02 | 72.92 | 0.09 | 0.15 | 0.18 | 0.09 | 0.15 | 0.18 |
| 1300.0 | 64.97 | 64.78 | 64.79 | 0.12 | 0.18 | 0.21 | 0.11 | 0.18 | 0.20 |
| 1350.0 | 52.32 | 52.25 | 52.21 | 0.19 | 0.26 | 0.29 | 0.17 | 0.25 | 0.27 |
| 1414.0 | 31.04 | 30.87 | 30.72 | 0.40 | 0.48 | 0.53 | 0.37 | 0.46 | 0.51 |
| 1416.0 | 30.22 | 30.04 | 29.89 | 0.41 | 0.50 | 0.55 | 0.38 | 0.48 | 0.53 |
| 1436.0 | 21.18 | 20.93 | 20.74 | 0.62 | 0.73 | 0.81 | 0.61 | 0.74 | 0.82 |
| 1450.0 | 13.73 | 13.43 | 13.21 | 1.07 | 1.25 | 1.39 | 1.15 | 1.36 | 1.52 |
| 1470.0 | 3.42 | 3.40 | 3.42 | 6.29 | 7.11 | 7.64 | 7.32 | 8.45 | 9.27 |
| 1500.0 | 1.21 | 1.38 | 1.49 | 16.25 | 16.59 | 17.07 | 17.06 | 17.57 | 18.27 |
| 1502.0 | 1.19 | 1.35 | 1.46 | 16.58 | 16.96 | 17.47 | 17.43 | 18.04 | 18.82 |
| 1505.5 | 1.14 | 1.31 | 1.42 | 17.27 | 17.70 | 18.21 | 18.29 | 19.05 | 19.94 |
| 1526.0 | 1.00 | 1.16 | 1.27 | 19.17 | 19.24 | 19.25 | 20.44 | 20.72 | 20.76 |
| 1550.0 | 0.90 | 1.06 | 1.17 | 22.37 | 22.96 | 23.25 | 22.31 | 22.76 | 22.72 |
| 1560.0 | 0.87 | 1.03 | 1.13 | 28.31 | 29.86 | 30.13 | 27.71 | 28.54 | 28.03 |
| 1598.0 | 0.90 | 1.07 | 1.17 | 18.94 | 18.71 | 18.68 | 19.57 | 19.51 | 19.51 |
| 1600.0 | 0.91 | 1.07 | 1.18 | 18.57 | 18.39 | 18.38 | 19.23 | 19.21 | 19.22 |
| 1690.5 | 1.25 | 1.48 | 1.63 | 18.83 | 18.40 | 18.71 | 18.45 | 18.16 | 18.55 |
| 1692.0 | 1.28 | 1.51 | 1.66 | 18.27 | 17.92 | 18.24 | 18.04 | 17.84 | 18.25 |
| 1698.0 | 1.38 | 1.63 | 1.78 | 17.06 | 16.98 | 17.29 | 17.47 | 17.67 | 18.26 |
| 1700.0 | 1.41 | 1.67 | 1.83 | 17.03 | 17.02 | 17.30 | 17.78 | 18.17 | 18.87 |
| 1718.0 | 2.89 | 3.44 | 3.77 | 8.63 | 8.01 | 7.80 | 10.25 | 9.58 | 9.44 |
| 1748.0 | 19.55 | 20.15 | 20.42 | 0.66 | 0.78 | 0.86 | 0.76 | 0.89 | 0.97 |
| 1768.0 | 29.95 | 30.43 | 30.65 | 0.36 | 0.47 | 0.53 | 0.40 | 0.52 | 0.58 |
| 1888.0 | 71.21 | 70.36 | 71.38 | 0.11 | 0.19 | 0.23 | 0.13 | 0.21 | 0.24 |
| 1950.0 | 76.72 | 77.32 | 76.69 | 0.10 | 0.17 | 0.21 | 0.12 | 0.20 | 0.23 |
| 2000.0 | 88.25 | 89.94 | 91.62 | 0.10 | 0.17 | 0.21 | 0.12 | 0.20 | 0.22 |
| 2050.0 | 81.60 | 81.96 | 84.31 | 0.10 | 0.17 | 0.21 | 0.12 | 0.20 | 0.22 |
| 2100.0 | 89.06 | 91.12 | 99.95 | 0.11 | 0.17 | 0.20 | 0.12 | 0.20 | 0.22 |
| 2150.0 | 92.77 | 90.33 | 93.11 | 0.11 | 0.18 | 0.21 | 0.12 | 0.20 | 0.22 |
| 2200.0 | 91.97 | 89.06 | 93.59 | 0.12 | 0.18 | 0.21 | 0.13 | 0.20 | 0.22 |
| 2250.0 | 86.37 | 86.13 | 86.82 | 0.12 | 0.18 | 0.21 | 0.13 | 0.20 | 0.22 |
| 2300.0 | 81.26 | 80.67 | 81.46 | 0.13 | 0.19 | 0.21 | 0.12 | 0.20 | 0.21 |
| 2350.0 | 75.82 | 74.87 | 74.48 | 0.13 | 0.19 | 0.21 | 0.13 | 0.20 | 0.22 |
| 2400.0 | 82.93 | 79.06 | 79.69 | 0.13 | 0.19 | 0.22 | 0.12 | 0.19 | 0.21 |
| 2450.0 | 76.95 | 71.81 | 77.10 | 0.14 | 0.19 | 0.22 | 0.11 | 0.19 | 0.20 |
| 2500.0 | 77.42 | 75.26 | 80.18 | 0.14 | 0.20 | 0.22 | 0.11 | 0.19 | 0.20 |
| 2550.0 | 77.89 | 73.74 | 81.22 | 0.14 | 0.20 | 0.22 | 0.10 | 0.18 | 0.19 |
| 2600.0 | 74.93 | 77.51 | 73.43 | 0.13 | 0.19 | 0.22 | 0.10 | 0.18 | 0.19 |
| 2650.0 | 72.63 | 68.26 | 70.12 | 0.14 | 0.20 | 0.22 | 0.09 | 0.17 | 0.18 |
| 2700.0 | 72.07 | 78.84 | 71.10 | 0.12 | 0.19 | 0.22 | 0.07 | 0.16 | 0.18 |
| 2750.0 | 70.30 | 76.21 | 71.87 | 0.12 | 0.19 | 0.22 | 0.07 | 0.15 | 0.18 |
| 2800.0 | 65.88 | 64.73 | 64.48 | 0.12 | 0.19 | 0.22 | 0.06 | 0.15 | 0.17 |
| 2825.0 | 68.65 | 67.77 | 66.51 | 0.12 | 0.20 | 0.23 | 0.06 | 0.15 | 0.17 |
| 2850.0 | 75.34 | 77.14 | 69.00 | 0.13 | 0.20 | 0.24 | 0.05 | 0.14 | 0.17 |
| 2875.0 | 75.40 | 72.68 | 71.69 | 0.13 | 0.21 | 0.25 | 0.04 | 0.14 | 0.16 |
| 2900.0 | 58.77 | 60.32 | 57.64 | 0.13 | 0.21 | 0.25 | 0.05 | 0.14 | 0.17 |

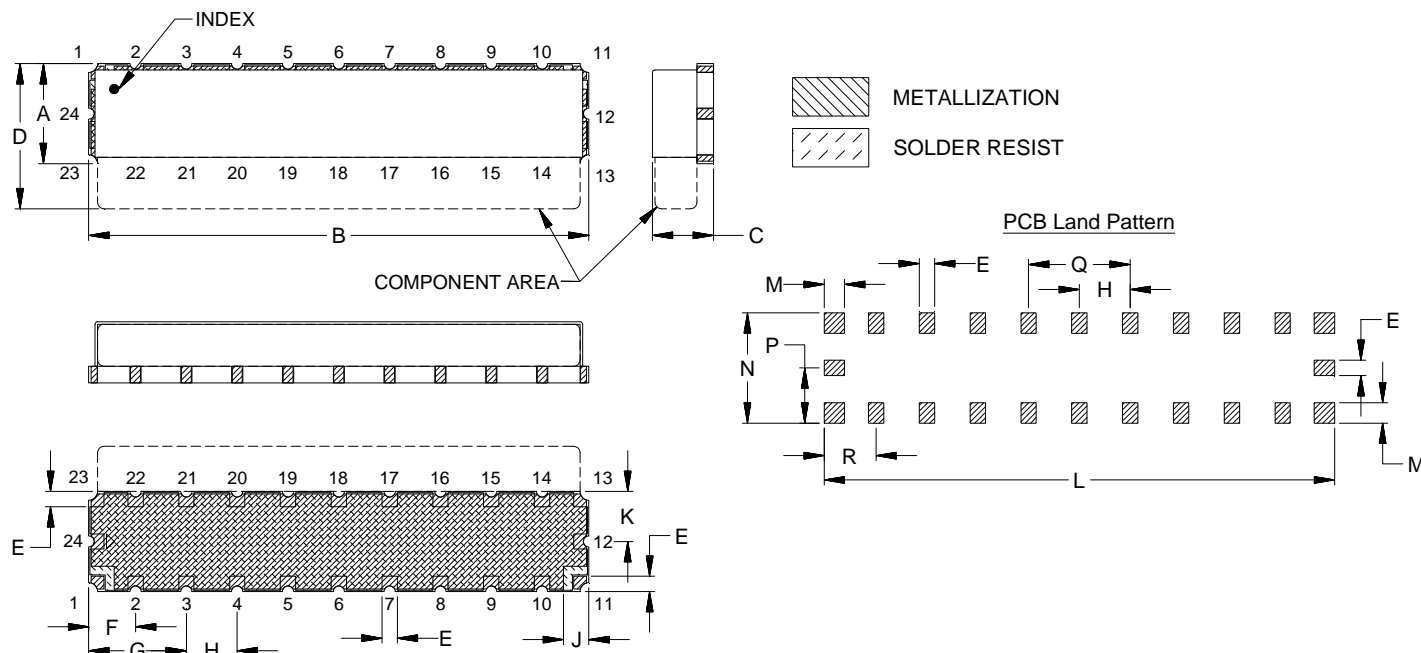
Typical Performance Data

| FREQ. (MHz) | GROUP DELAY | | |
|--------------------|-------------|--------|--------|
| | (nsec) | | |
| | @-40°C | @+25°C | @+85°C |
| 1505.5 | 8.90 | 8.82 | 8.78 |
| 1508.0 | 8.48 | 8.43 | 8.39 |
| 1512.0 | 8.21 | 8.16 | 8.13 |
| 1516.0 | 8.01 | 7.96 | 7.93 |
| 1520.0 | 7.79 | 7.75 | 7.71 |
| 1524.0 | 7.66 | 7.62 | 7.59 |
| 1528.0 | 7.52 | 7.49 | 7.46 |
| 1532.0 | 7.39 | 7.36 | 7.33 |
| 1536.0 | 7.28 | 7.25 | 7.23 |
| 1540.0 | 7.19 | 7.16 | 7.14 |
| 1544.0 | 7.11 | 7.08 | 7.06 |
| 1548.0 | 7.04 | 7.02 | 7.00 |
| 1552.0 | 6.98 | 6.97 | 6.95 |
| 1556.0 | 6.94 | 6.92 | 6.91 |
| 1560.0 | 6.90 | 6.88 | 6.87 |
| 1564.0 | 6.87 | 6.85 | 6.84 |
| 1568.0 | 6.83 | 6.82 | 6.80 |
| 1572.0 | 6.80 | 6.79 | 6.77 |
| 1576.0 | 6.78 | 6.76 | 6.75 |
| 1580.0 | 6.75 | 6.73 | 6.72 |
| 1584.0 | 6.73 | 6.71 | 6.70 |
| 1588.0 | 6.71 | 6.69 | 6.68 |
| 1592.0 | 6.70 | 6.68 | 6.67 |
| 1598.0 | 6.69 | 6.67 | 6.66 |
| 1600.0 | 6.69 | 6.67 | 6.67 |
| 1604.0 | 6.69 | 6.68 | 6.67 |
| 1608.0 | 6.70 | 6.69 | 6.69 |
| 1612.0 | 6.72 | 6.71 | 6.71 |
| 1616.0 | 6.75 | 6.75 | 6.74 |
| 1620.0 | 6.79 | 6.78 | 6.78 |
| 1624.0 | 6.83 | 6.83 | 6.83 |
| 1628.0 | 6.89 | 6.89 | 6.89 |
| 1632.0 | 6.95 | 6.95 | 6.95 |
| 1636.0 | 7.02 | 7.03 | 7.03 |
| 1640.0 | 7.10 | 7.11 | 7.11 |
| 1644.0 | 7.19 | 7.20 | 7.21 |
| 1648.0 | 7.30 | 7.31 | 7.31 |
| 1652.0 | 7.41 | 7.42 | 7.43 |
| 1656.0 | 7.53 | 7.55 | 7.55 |
| 1660.0 | 7.67 | 7.69 | 7.70 |
| 1690.5 | 9.33 | 9.38 | 9.41 |

Typical Performance Curves



Outline Dimensions



| CASE# | A | B | C | D | E | F | G | H | J | K | L | M |
|--------|-----------------|------------------|----------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|------------------|----------------|
| SV2484 | .394 (10.00) | 1.969 (50.00) | .240 (6.10) | .492 (12.50) | .060 (1.52) | .184 (4.68) | .384 (9.76) | .200 (5.08) | .100 (2.54) | .197 (5.00) | 2.009 (51.02) | .080 (2.03) |

| CASE# | N | P | Q | R | WT. GRAMS |
|--------|-----------------|----------------|-----------------|----------------|-----------|
| SV2484 | .434 (11.02) | .217 (5.51) | .400 (10.16) | .204 (5.19) | 7.0 |

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

Notes:

- Case material: Nickel-Silver alloy.
- Base: Printed wiring laminate.
- Termination finish:
 For RoHS Case Styles: 3-5 μ inch Gold over 120-240 μ inch Nickel plate.
 For RoHS-5 Case Styles: Tin-Lead plate.



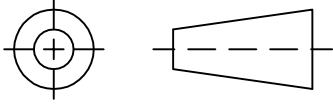
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS

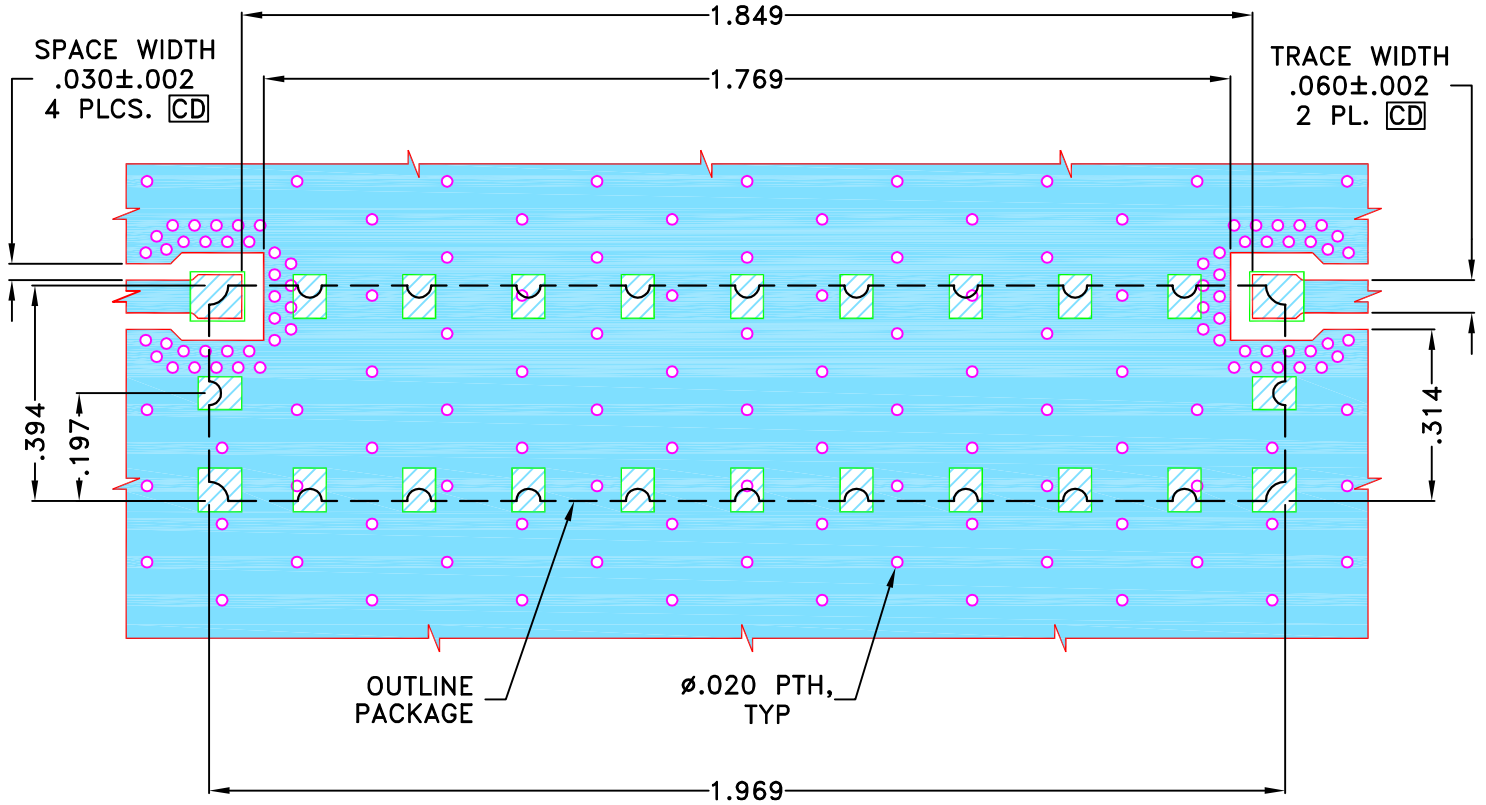
THIRD ANGLE PROJECTION



REVISIONS

| REV | ECN No. | DESCRIPTION | DATE | DR | AUTH |
|-----|---------|-------------|--------|----|------|
| OR | M169276 | NEW RELEASE | AUG 18 | TM | MD |
| | | | | | |
| | | | | | |

SUGGESTED MOUNTING CONFIGURATION FOR SV2484 CASE STYLE "24FL03" PIN CODE



NOTES:

- TRACE WIDTH IS SHOWN FOR REOGERS (R04350B), WITH DIELECTRIC THICKNESS .030"±.002". 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 |
|----------------------------|-------------|-----------|
| DIMENSIONS ARE IN INCHES | DRAWN TM | 16 AUG 18 |
| TOLERANCES ON: | CHECKED MD | 16 AUG 18 |
| 2 PL DECIMALS ± | APPROVED KK | 16 AUG 18 |
| 3 PL DECIMALS ± .005" | | |
| ANGLES ± | | |
| FRACTIONS ± | | |



Mini-Circuits® 13 Neptune Avenue
Brooklyn NY 11235

PL, 24FL03, SV2484, CBP
TB-1069+, 50 Ohm

Mini-Circuits®
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ASHEETA1.DWG REV:A DATE:01/12/95

| SIZE | CODE IDENT | DRAWING NO: | REV: |
|-------|------------|-------------|--------|
| A | 15542 | 98-PL-604 | OR |
| FILE: | 98PL604 | SCALE: | SHEET: |
| | | 3:1 | 1 OF 1 |

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 Ambient Environment | Individual Model Data Sheet |
| Storage Temperature | -55° to 100° C Ambient Environment | Individual Model Data Sheet |
| Humidity | 90 to 95% RH, 96 hours, 40°C | MIL-STD-202, Method 103B, Condition B, Except 50°C |
| Thermal Shock | -55° to 100°C, 100 cycles | MIL-STD-202, Method 107, Condition A-3, except +100°C |
| Solder Reflow Heat | Sn-Pb Eutectic Process: 225°C peak Pb-Free Process, 245°C peak | J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1 |
| Solderability | 10X Magnification | J-STD-002, Para 4.2.5, Test S, 95% Coverage |
| Vibration (High Frequency) | 20g peak, 10-2000 Hz, 4 times in each of three axes (total 12) | MIL-STD-202, Method 204, Condition D |
| Mechanical Shock | 50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes | MIL-STD-202, Method 213, Condition A |