CERAMIC RESONATOR SURFACE MOUNT

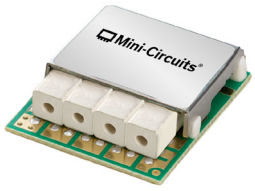
# Band Pass Filter

# CBP2-1350CR+

50Ω 1300 to 1400 MHz

## THE BIG DEAL

- Good Insertion Loss, 1.2 dB Typ.
- Excellent Rejection, 70 dB Typ.
- Good Return Loss, 15 dB Typ.
- Miniature Shielded Package

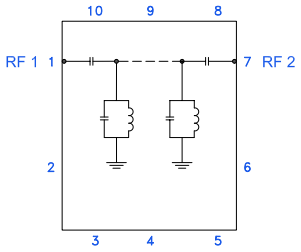



*Generic photo used for illustration purposes only*

## APPLICATIONS

- Radionavigation

## FUNCTIONAL DIAGRAM




## PRODUCT OVERVIEW

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.

## ELECTRICAL SPECIFICATIONS[1,2] AT +25°C

| Parameter | | F# | Frequency (MHz) | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|---|
| Passband | Center Frequency | — | — | — | 1350 | — | MHz |
| | Insertion Loss | F1-F2 | 1300 - 1400 | — | 1.2 | 1.6 | dB |
| | Return Loss | F1-F2 | 1300 - 1400 | 12 | 15 | — | dB |
| Stopband, Lower | Rejection | DC-F3 | DC - 900 | 60 | 70 | — | dB |
| | | F3-F4 | 900 - 1180 | 20 | 30 | — | |
| Stopband, Upper | Rejection | F5-F6 | 1540 - 1720 | 20 | 30 | — | dB |
| | | F6-F7 | 1720 - 2300 | 45 | 55 | — | |

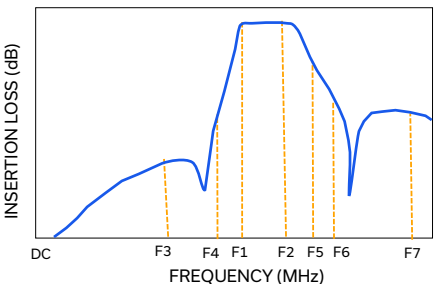
1. Tested in Evaluation Board P/N TB-CBP2-1350CR+.
2. This component should not be used as a DC-block. In applications where DC voltage and/or current is present at either the input or output ports, external DC blocking capacitors are required.

## ABSOLUTE MAXIMUM RATINGS[3]

| | |
|---|---|
| Operating Temperature | -40°C to +85°C |
| Storage Temperature | -55°C to +100°C |
| Input Power[4] | 10 W at +25°C |

3. Permanent damage may occur if any of these limits are exceeded.
4. Power rating applies only to signals within the passband. Power rating above +25°C operating temperature decreases linearly to 2 W at +85°C.

## TYPICAL FREQUENCY RESPONSE




REV. OR
ECO-030814
EDU5258
CBP2-1350CR+
MCINU
260831

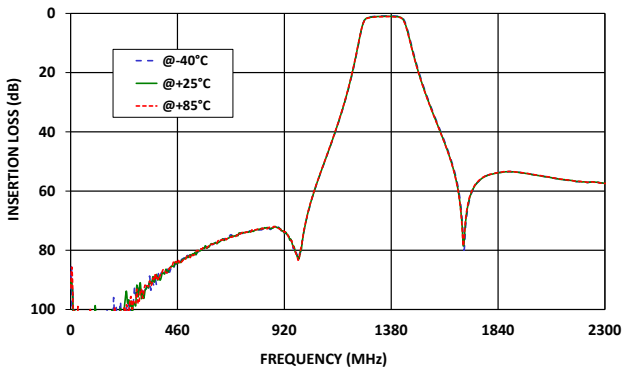
# Band Pass Filter

# CBP2-1350CR+

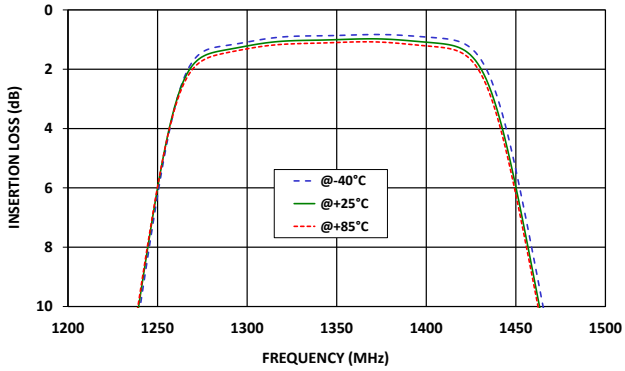
50Ω 1300 to 1400 MHz

## TYPICAL PERFORMANCE GRAPHS

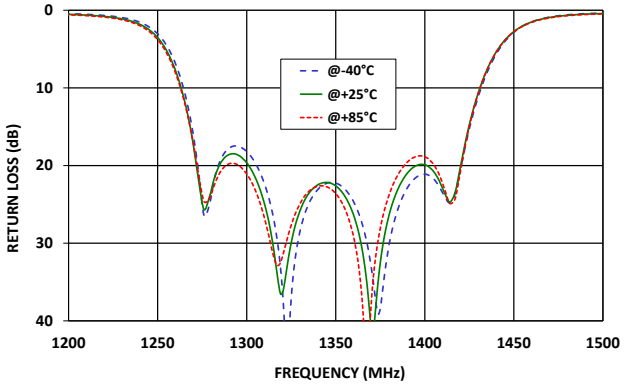
CBP2-1350CR+
INSERTION LOSS



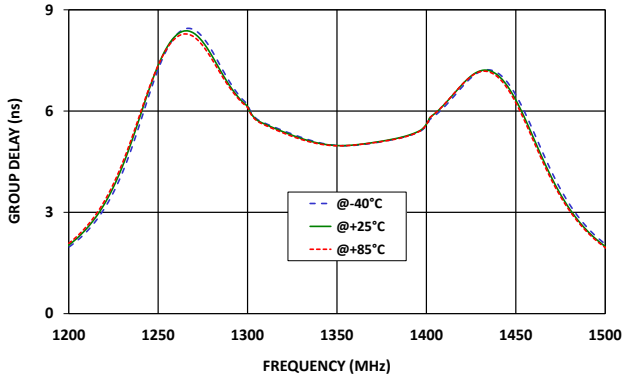

CBP2-1350CR+
INSERTION LOSS (Zoomed)




CBP2-1350CR+
RETURN LOSS (Zoomed)




CBP2-1350CR+
GROUP DELAY



CERAMIC RESONATOR SURFACE MOUNT

# Band Pass Filter

# CBP2-1350CR+

50Ω 1300 to 1400 MHz

## FUNCTIONAL DIAGRAM

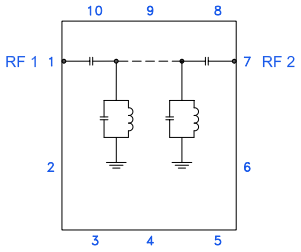


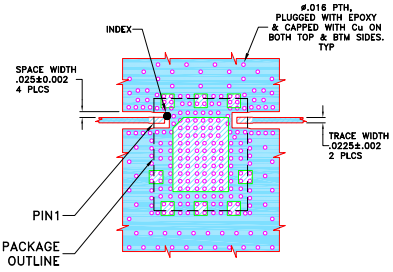

Figure 1. CBP2-1350CR+ Functional Diagram

## PAD DESCRIPTION

| Function | Pad Number | Description |
|---|---|---|
| RF1 | 1 | Connects to RF Input Port |
| RF2 | 7 | Connects to RF Output Port |
| GROUND | 2-6,8-10 | Connects to Ground on PCB, (See drawing PL-875) |

## SUGGESTED PCB LAYOUT

SUGGESTED MOUNTING CONFIGURATION FOR BCE3840 CASE STYLE



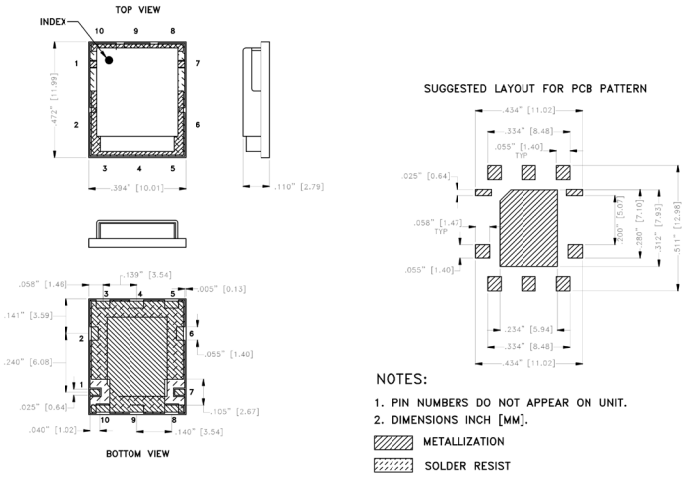

NOTES:
1. TRACE WIDTH IS SHOWN FOR ROGERS (RO4350B) WITH DIELECTRIC THICKNESS .010±.001. COPPER: 1/2 Oz. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

Figure 2. Suggested PCB Layout

## CASE STYLE DRAWING




**Weight: 1 gram**
**Dimensions are in inches (mm). Tolerances: 2Pl. ± .03 [.76]; 3Pl. ± .015 [.38]**

## PRODUCT MARKING*: CBP2-1350CR

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

# Band Pass Filter

## CBP2-1350CR+

50Ω 1300 to 1400 MHz

**ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASHBOARD** CLICK HERE

| | |
|---|---|
| **Performance Data & Graphs** | Data<br>Graphs<br>S-Parameter (S2P Files) Data Set (.zip file) De-embedded to device pads |
| **Case Style** | BCE3840 Lead Finish: Gold over Nickel Plate |
| **RoHS/REACH Status** | Compliant |
| **Tape and Reel** | F10-1 |
| **Suggested Layout for PCB Design** | PL-875 |
| **Evaluation Board** | TB-CBP2-1350CR+<br>Gerber File |
| **Environmental Rating** | ENV54 |
| **MSL Level** | MSL1 |

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

# Surface Mount Bandpass Filter CBP2-1350CR+

*Typical Performance Data*

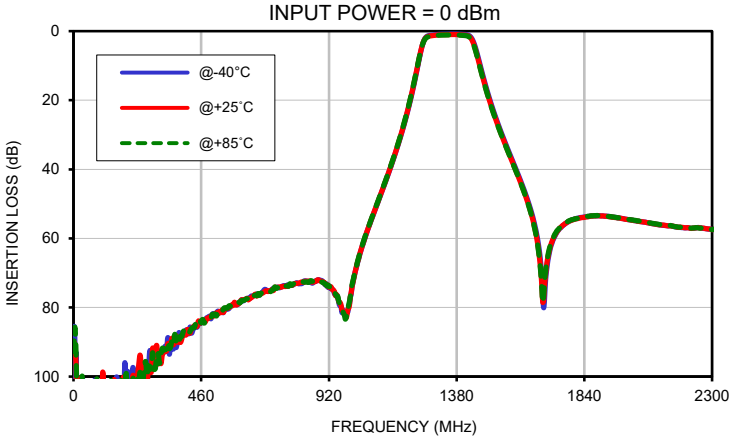
| FREQ. | INSERTION LOSS | | | INPUT RETURN LOSS | | | OUTPUT RETURN LOSS | | |
|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dB) | | | (dB) | | | (dB) | | |
| | @-40°C | @+25°C | @+85°C | @-40°C | @+25°C | @+85°C | @-40°C | @+25°C | @+85°C |
| 5 | 90.13 | 91.03 | 85.69 | 0.06 | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 |
| 15 | 100.15 | 106.31 | 107.04 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| 55 | 106.36 | 103.71 | 101.79 | 0.05 | 0.05 | 0.05 | 0.04 | 0.04 | 0.04 |
| 105 | 108.63 | 98.80 | 105.98 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| 205 | 100.13 | 104.10 | 102.13 | 0.03 | 0.04 | 0.04 | 0.02 | 0.04 | 0.04 |
| 255 | 109.58 | 98.90 | 97.20 | 0.03 | 0.04 | 0.05 | 0.02 | 0.04 | 0.05 |
| 305 | 95.81 | 96.29 | 93.13 | 0.03 | 0.04 | 0.05 | 0.02 | 0.04 | 0.05 |
| 355 | 91.36 | 88.88 | 89.35 | 0.03 | 0.05 | 0.05 | 0.02 | 0.04 | 0.05 |
| 400 | 87.13 | 87.75 | 86.45 | 0.03 | 0.05 | 0.06 | 0.03 | 0.05 | 0.05 |
| 500 | 81.93 | 82.11 | 81.96 | 0.04 | 0.06 | 0.07 | 0.03 | 0.05 | 0.07 |
| 600 | 78.40 | 78.35 | 78.65 | 0.05 | 0.08 | 0.09 | 0.04 | 0.07 | 0.08 |
| 655 | 76.22 | 76.12 | 76.42 | 0.06 | 0.09 | 0.11 | 0.05 | 0.08 | 0.10 |
| 705 | 75.27 | 75.14 | 75.35 | 0.07 | 0.10 | 0.12 | 0.06 | 0.10 | 0.11 |
| 900 | 72.62 | 72.71 | 72.74 | 0.12 | 0.16 | 0.18 | 0.11 | 0.14 | 0.17 |
| 1000 | 76.23 | 75.72 | 75.20 | 0.16 | 0.20 | 0.23 | 0.15 | 0.19 | 0.21 |
| 1180 | 30.04 | 29.80 | 29.61 | 0.35 | 0.42 | 0.47 | 0.34 | 0.41 | 0.46 |
| 1300 | 1.08 | 1.22 | 1.31 | 18.19 | 19.64 | 21.07 | 18.17 | 19.81 | 21.59 |
| 1310 | 0.98 | 1.12 | 1.22 | 22.38 | 24.95 | 26.79 | 22.39 | 25.55 | 28.81 |
| 1320 | 0.91 | 1.05 | 1.16 | 35.87 | 36.48 | 31.77 | 34.61 | 41.44 | 35.37 |
| 1330 | 0.88 | 1.03 | 1.13 | 28.40 | 25.77 | 24.88 | 27.66 | 25.49 | 24.65 |
| 1340 | 0.87 | 1.02 | 1.12 | 23.07 | 22.47 | 22.65 | 22.73 | 22.15 | 22.18 |
| 1350 | 0.86 | 1.00 | 1.10 | 22.26 | 22.63 | 23.61 | 22.01 | 22.24 | 22.87 |
| 1360 | 0.84 | 0.98 | 1.08 | 24.65 | 26.36 | 29.15 | 24.43 | 25.66 | 27.00 |
| 1370 | 0.83 | 0.97 | 1.08 | 33.21 | 41.15 | 37.51 | 33.12 | 35.07 | 30.83 |
| 1380 | 0.84 | 0.99 | 1.10 | 30.11 | 26.31 | 23.73 | 31.09 | 26.31 | 23.33 |
| 1390 | 0.87 | 1.04 | 1.16 | 22.94 | 21.04 | 19.61 | 23.36 | 21.18 | 19.52 |
| 1400 | 0.91 | 1.09 | 1.21 | 21.12 | 19.90 | 18.87 | 21.70 | 20.19 | 18.84 |
| 1441 | 3.21 | 3.67 | 3.91 | 5.30 | 5.05 | 5.06 | 5.43 | 5.13 | 5.07 |
| 1501 | 20.23 | 20.77 | 20.96 | 0.35 | 0.42 | 0.46 | 0.35 | 0.41 | 0.45 |
| 1540 | 29.23 | 29.71 | 29.83 | 0.23 | 0.29 | 0.32 | 0.22 | 0.28 | 0.31 |
| 1546 | 30.48 | 30.96 | 31.08 | 0.22 | 0.28 | 0.31 | 0.21 | 0.27 | 0.30 |
| 1600 | 41.23 | 41.71 | 41.81 | 0.19 | 0.25 | 0.28 | 0.18 | 0.23 | 0.26 |
| 1720 | 62.07 | 61.70 | 61.36 | 0.18 | 0.24 | 0.26 | 0.17 | 0.22 | 0.25 |
| 1750 | 57.25 | 57.15 | 57.04 | 0.19 | 0.24 | 0.27 | 0.17 | 0.23 | 0.25 |
| 1805 | 54.39 | 54.45 | 54.36 | 0.19 | 0.24 | 0.27 | 0.18 | 0.23 | 0.25 |
| 1810 | 54.25 | 54.33 | 54.29 | 0.19 | 0.25 | 0.27 | 0.18 | 0.23 | 0.26 |
| 1815 | 54.17 | 54.28 | 54.21 | 0.20 | 0.25 | 0.28 | 0.18 | 0.23 | 0.26 |
| 1820 | 54.06 | 54.18 | 54.07 | 0.20 | 0.25 | 0.28 | 0.18 | 0.23 | 0.26 |
| 1825 | 53.96 | 54.07 | 54.00 | 0.20 | 0.25 | 0.28 | 0.18 | 0.23 | 0.26 |
| 1830 | 53.92 | 53.99 | 53.91 | 0.19 | 0.25 | 0.27 | 0.18 | 0.23 | 0.25 |
| 1835 | 53.87 | 53.95 | 53.84 | 0.19 | 0.25 | 0.27 | 0.18 | 0.23 | 0.25 |
| 1840 | 53.82 | 53.91 | 53.80 | 0.19 | 0.24 | 0.27 | 0.18 | 0.23 | 0.25 |
| 1845 | 53.73 | 53.78 | 53.68 | 0.19 | 0.24 | 0.27 | 0.17 | 0.23 | 0.25 |
| 1850 | 53.68 | 53.77 | 53.59 | 0.18 | 0.24 | 0.26 | 0.17 | 0.23 | 0.25 |
| 1855 | 53.64 | 53.71 | 53.60 | 0.18 | 0.24 | 0.26 | 0.17 | 0.23 | 0.25 |
| 1860 | 53.57 | 53.61 | 53.52 | 0.18 | 0.24 | 0.26 | 0.17 | 0.23 | 0.25 |
| 1865 | 53.53 | 53.55 | 53.44 | 0.18 | 0.24 | 0.26 | 0.17 | 0.23 | 0.25 |
| 1870 | 53.48 | 53.52 | 53.46 | 0.18 | 0.23 | 0.26 | 0.17 | 0.22 | 0.25 |
| 1875 | 53.46 | 53.48 | 53.41 | 0.18 | 0.23 | 0.26 | 0.17 | 0.22 | 0.25 |
| 1880 | 53.47 | 53.49 | 53.40 | 0.18 | 0.23 | 0.26 | 0.17 | 0.22 | 0.25 |
| 1890 | 53.45 | 53.43 | 53.39 | 0.18 | 0.24 | 0.26 | 0.17 | 0.22 | 0.25 |
| 1895 | 53.43 | 53.48 | 53.39 | 0.18 | 0.24 | 0.27 | 0.17 | 0.23 | 0.25 |
| 1900 | 53.48 | 53.52 | 53.45 | 0.19 | 0.24 | 0.27 | 0.17 | 0.23 | 0.25 |
| 1950 | 53.89 | 53.96 | 53.88 | 0.18 | 0.24 | 0.27 | 0.17 | 0.23 | 0.26 |
| 2000 | 54.58 | 54.57 | 54.52 | 0.18 | 0.24 | 0.26 | 0.17 | 0.23 | 0.26 |
| 2050 | 55.23 | 55.20 | 55.14 | 0.17 | 0.24 | 0.27 | 0.16 | 0.22 | 0.25 |
| 2100 | 55.95 | 55.92 | 55.83 | 0.17 | 0.24 | 0.27 | 0.16 | 0.23 | 0.26 |
| 2150 | 56.32 | 56.37 | 56.26 | 0.17 | 0.24 | 0.27 | 0.16 | 0.23 | 0.26 |
| 2200 | 56.93 | 56.89 | 56.80 | 0.16 | 0.23 | 0.26 | 0.15 | 0.23 | 0.26 |
| 2300 | 57.41 | 57.46 | 57.46 | 0.16 | 0.24 | 0.27 | 0.15 | 0.23 | 0.26 |

## Typical Performance Data

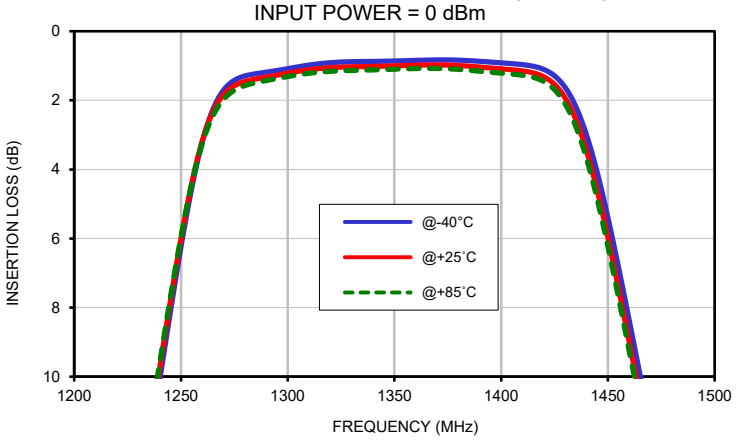
| FREQ. | GROUP DELAY | | |
|---|---|---|---|
| | (nsec) | | |
| (MHz) | @-40°C | @+25°C | @+85°C |
| 1300 | 6.19 | 6.14 | 6.11 |
| 1302 | 5.96 | 5.93 | 5.90 |
| 1304 | 5.82 | 5.79 | 5.77 |
| 1306 | 5.73 | 5.71 | 5.68 |
| 1308 | 5.68 | 5.65 | 5.63 |
| 1310 | 5.63 | 5.61 | 5.58 |
| 1312 | 5.59 | 5.56 | 5.53 |
| 1314 | 5.54 | 5.51 | 5.48 |
| 1316 | 5.50 | 5.47 | 5.44 |
| 1318 | 5.46 | 5.43 | 5.39 |
| 1320 | 5.42 | 5.38 | 5.35 |
| 1322 | 5.38 | 5.34 | 5.31 |
| 1324 | 5.34 | 5.30 | 5.27 |
| 1326 | 5.30 | 5.26 | 5.23 |
| 1328 | 5.26 | 5.23 | 5.20 |
| 1330 | 5.22 | 5.19 | 5.16 |
| 1332 | 5.19 | 5.16 | 5.13 |
| 1334 | 5.15 | 5.12 | 5.10 |
| 1336 | 5.12 | 5.10 | 5.07 |
| 1338 | 5.09 | 5.07 | 5.05 |
| 1340 | 5.06 | 5.05 | 5.03 |
| 1345 | 5.01 | 5.00 | 4.99 |
| 1350 | 4.98 | 4.98 | 4.97 |
| 1355 | 4.97 | 4.98 | 4.98 |
| 1360 | 4.99 | 5.00 | 5.00 |
| 1365 | 5.01 | 5.03 | 5.03 |
| 1370 | 5.05 | 5.07 | 5.06 |
| 1375 | 5.09 | 5.11 | 5.10 |
| 1380 | 5.14 | 5.16 | 5.14 |
| 1390 | 5.27 | 5.29 | 5.27 |
| 1400 | 5.57 | 5.61 | 5.60 |

## *Typical Performance Curves*

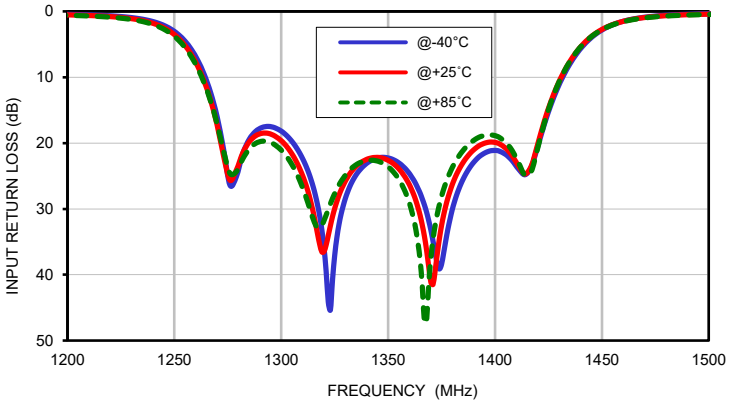
**INSERTION LOSS vs. TEMPERATURE**
INPUT POWER = 0 dBm



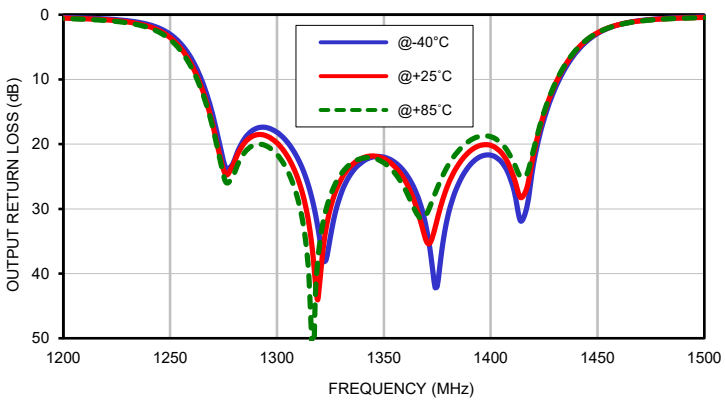

**INSERTION LOSS vs. TEMPERATURE (Zoomed)**
INPUT POWER = 0 dBm



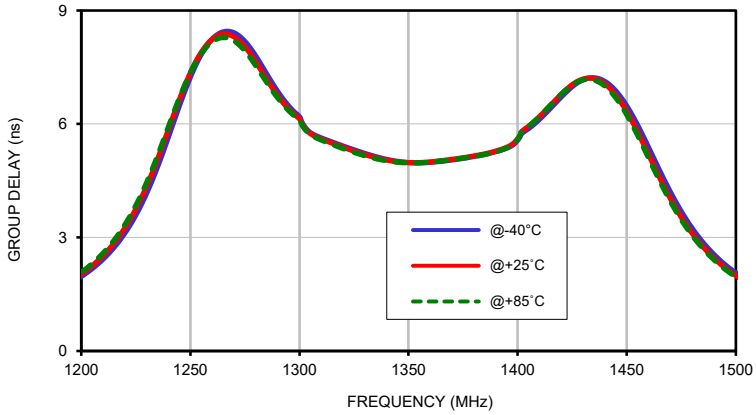

**INPUT RETURN LOSS vs. TEMPERATURE**
INPUT POWER = 0 dBm




**OUTPUT RETURN LOSS vs. TEMPERATURE**
INPUT POWER = 0 dBm



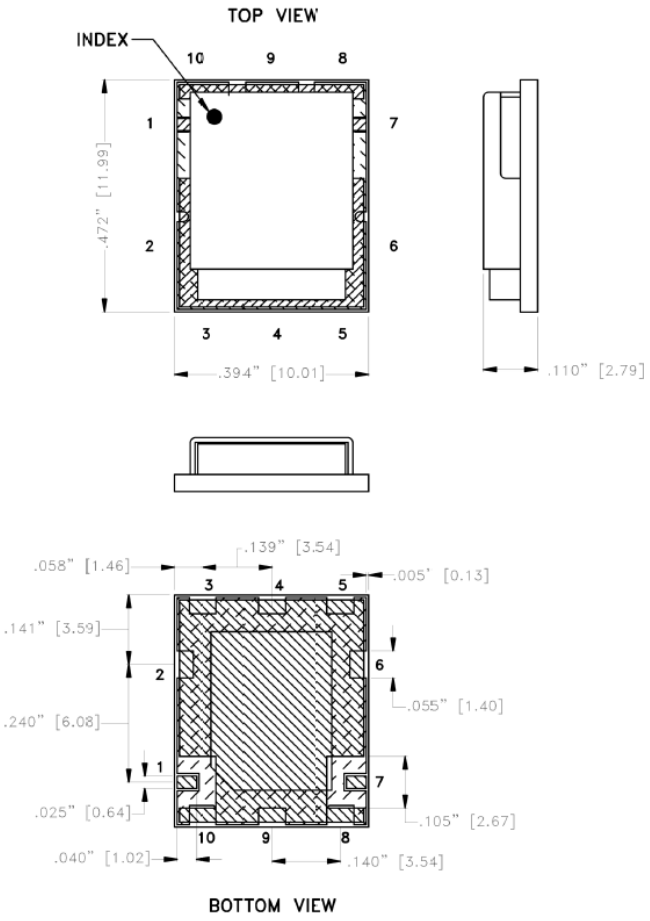

**GROUP DELAY vs. TEMPERATURE**
**INPUT POWER = 0 dBm**

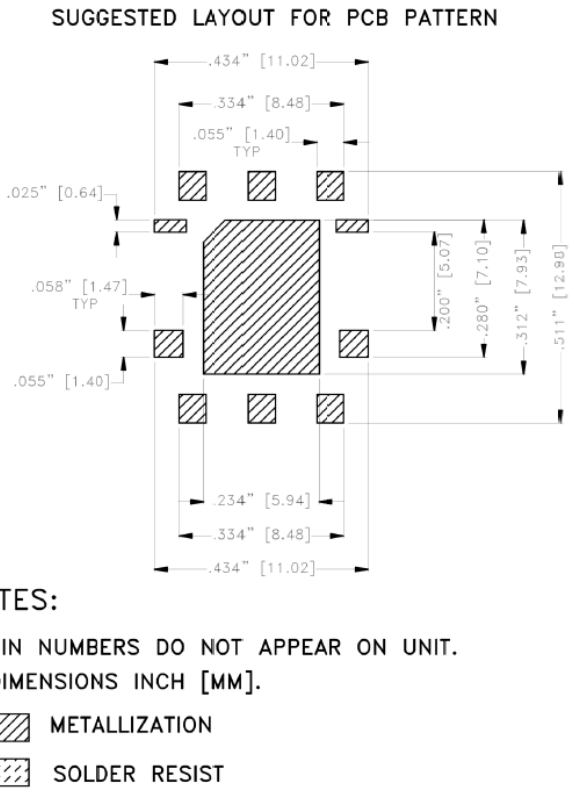


# Case Style BCE

## Outline Dimension

**BCE3840**




NOTES:

1. PIN NUMBERS DO NOT APPEAR ON UNIT.
2. DIMENSIONS INCH [MM].

METALLIZATION

SOLDER RESIST

**Dimensions are in inches [mm]. Tolerances: 2 Pl ± .030 [.76]; 3 Pl ± .015[.38]**

## Notes:

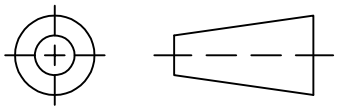
1. Case material: Nickel-silver alloy.
2. Base: Printed wiring laminate.
3. Unit weight: 1g
4. Termination finish:
   For RoHS Case styles: 2-5 µ inch (.05-.13 microns) Gold over 120-240 µ inch (3.05-6.10 microns) Nickel plate.
   All models, (+) suffix.


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The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com
RF/IF MICROWAVE COMPONENTS



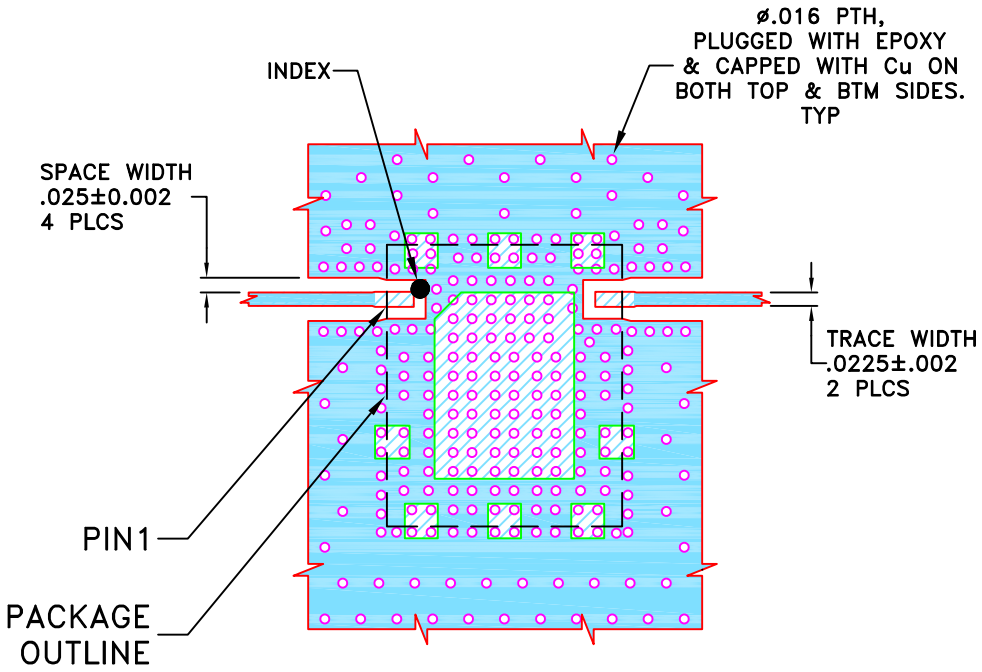

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THIRD ANGLE PROJECTION



| REVISIONS | | | | | |
|---|---|---|---|---|---|
| REV | ECN No. | DESCRIPTION | DATE | DR | AUTH |
| OR | NPO-006345 | NEW RELEASE | JUL 26 | PS | VR |
| | | | | | |
| | | | | | |
| | | | | | |

# SUGGESTED MOUNTING CONFIGURATION FOR BCE3840 CASE STYLE




NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS (RO4350B) WITH DIELECTRIC THICKNESS .010±.001. COPPER: 1/2 Oz. EACH SIDE.
   FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. 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 | PS | 07 JUL 26 |
| TOLERANCES ON: | CHECKED | MD | 07 JUL 26 |
| 2 PL DECIMALS ± .005 | APPROVED | CSS | 07 JUL 26 |
| 3 PL DECIMALS ± | | | |
| ANGLES ± | | | |
| FRACTIONS ± | | | |

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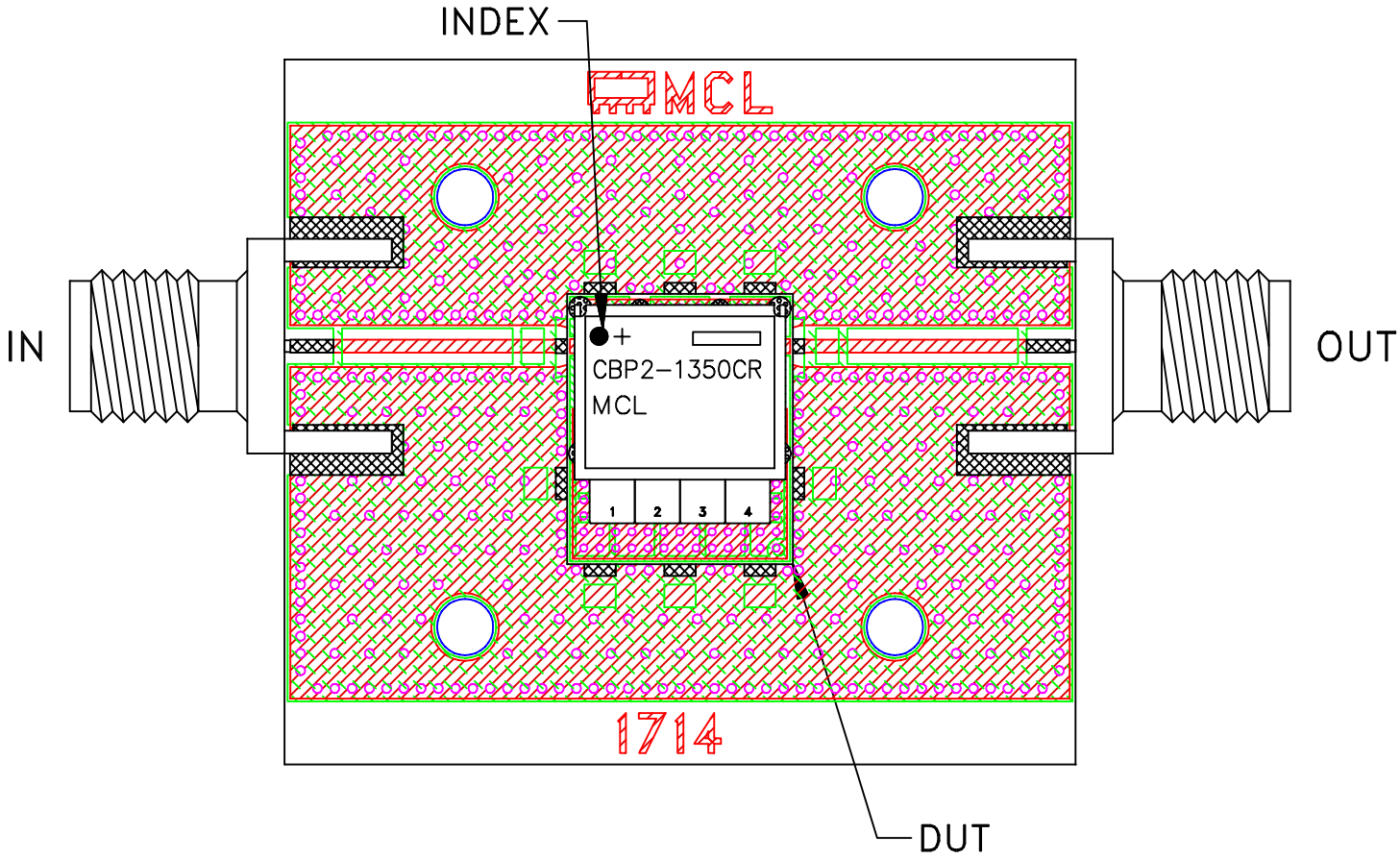
PL DWG, BCE3840, TB-1345

| SIZE | CODE IDENT | DRAWING NO: | REV: |
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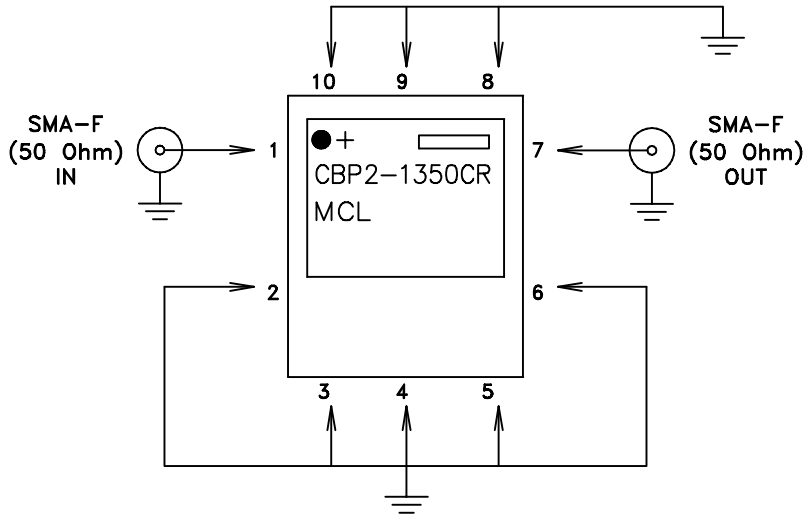
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| 98-PL-875 | 3:1 | 1 OF 1 |

# Evaluation Board and Circuit

## TB-CBP2-1350CR+




## Schematic diagram




Notes:

1. PCB Material: ROGERS (RO4350B) OR Equivalent, Dielectric Constant=3.48
   Thickness=.010 inch
2. 50 Ohm SMA Female Connector.

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# Environmental Specifications ENV54

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 | -55° to 100° C<br>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<br>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 |


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