



Mini-Circuits

LTCC SURFACE MOUNT

# High Pass Filter

**HFCG-440+**

50Ω

550 to 6000 MHz

## THE BIG DEAL

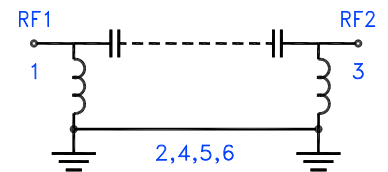
- Insertion Loss, Typ. 0.5 dB
- Stopband Rejection, Typ. 51 dB
- Passband Return Loss, Typ. 11 dB
- 0805 Surface Mount Footprint
- Power Handling: 4 W

*Generic photo used for illustration purposes only*

## APPLICATIONS

- Test & Measurement Equipment
- Radar, EW, and ECM Defense System
- 5G MIMO and Back Haul Radio
- 5G Sub 6 GHz and WiFi 6E

## FUNCTIONAL DIAGRAM



## PRODUCT OVERVIEW

Mini-Circuits' HFCG-440+ is a miniature low temperature co-fired ceramic (LTCC) high pass filter with a 550 to 6000 MHz passband that supports a variety of applications. This model provides 0.5 dB typical insertion loss over a wide band due to its rugged monolithic construction. Housed in a small 0805 ceramic form factor the filter is ideal for dense signal chain PCB layouts where it complements MMIC size and performance. The LTCC fabrication process assures minimal RF performance variation while delivering a product that is well suited for environmental extremes of high humidity and temperature.

## KEY FEATURES

| Features                   | Advantages                                                                                                                                                                                                                                         |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Wide Passband              | This filter has a very wide passband, from 550 to 6000 MHz.                                                                                                                                                                                        |
| LTCC Construction          | The use of LTCC technology allows for repeatable performance in a rugged ceramic package, well suited for tough environments such as high humidity and temperature extremes. See Mini-Circuits Environmental Rating ENV06T11 for more information. |
| Small Size, 0805           | Saves space in dense circuit board layouts and minimizes the effects of parasitics.                                                                                                                                                                |
| Rugged Power Handling, 4 W | Handles up to 4 Watts in a small 0805 package.                                                                                                                                                                                                     |



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ELECTRICAL SPECIFICATIONS<sup>1,2,3</sup> AT +25°C

| Parameter |                            | F#    | Frequency (MHz) | Min. | Typ. | Max. | Units |
|-----------|----------------------------|-------|-----------------|------|------|------|-------|
| Passband  | Insertion Loss             | F3-F4 | 550 - 1500      | —    | 1.5  | 2.8  | dB    |
|           |                            | F4-F5 | 1500 - 6000     | —    | 0.5  | 1.4  |       |
|           | Return Loss                | F3-F4 | 550 - 1500      | —    | 11   | —    | dB    |
|           |                            | F4-F5 | 1500 - 6000     | —    | 12   | —    |       |
| Stopband  | Rejection                  | DC-F1 | DC - 160        | 40   | 51   | —    | dB    |
|           |                            | F1-F2 | 160 - 300       | 20   | 27   | —    |       |
|           | Freq. Cut-Off <sup>4</sup> | Fc    | 450             | —    | 3    | —    | dB    |

1. Tested on Evaluation Board P/N TB-HFCG-440+ with port extension on option in network analyzer.

2. This filter is bi-directional, RF1 and RF2 ports may be interchanged.

3. 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.

4. Typical variation ±5%.

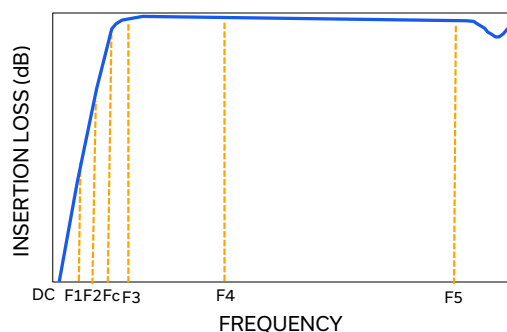
ABSOLUTE MAXIMUM RATINGS<sup>5</sup>

| Parameter                | Ratings         |
|--------------------------|-----------------|
| Operating Temperature    | -55°C to +125°C |
| Storage Temperature      | -55°C to +125°C |
| Input Power <sup>6</sup> | 4 W @ +25°C     |

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

6. Power rating applies only to signals within the passband. Power rating above +25°C operating temperature decreases linearly to 0.8 W at +125°C.

## TYPICAL FREQUENCY RESPONSE AT +25°C





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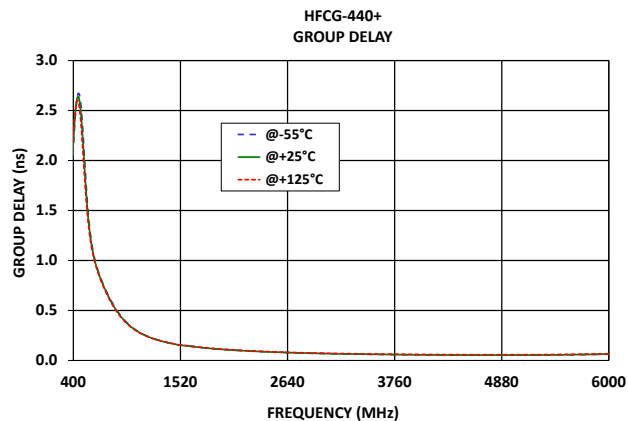
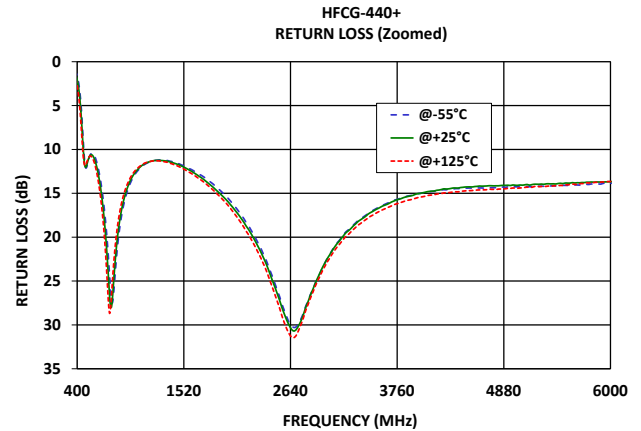
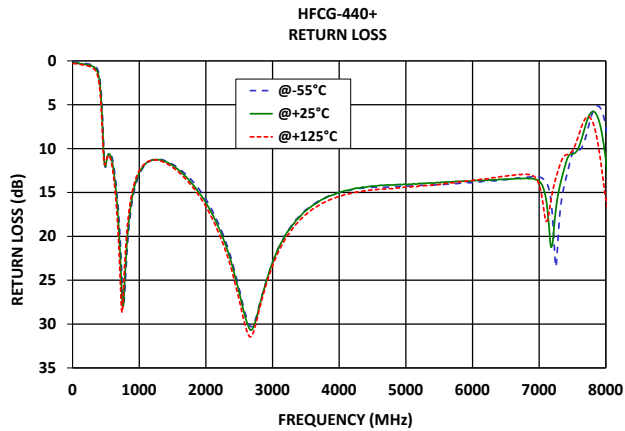
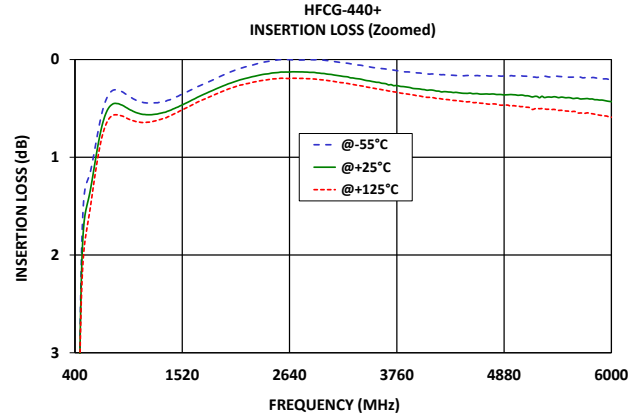
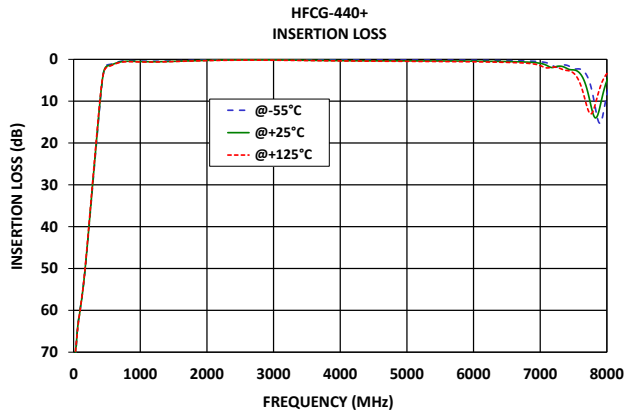
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## TYPICAL PERFORMANCE GRAPHS





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## FUNCTIONAL DIAGRAM

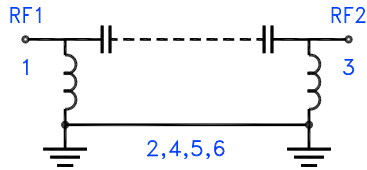
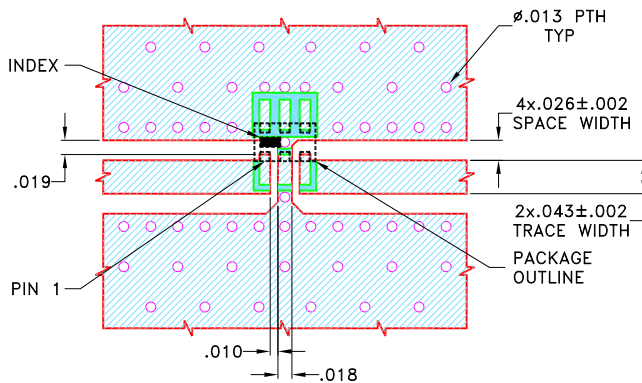


Figure 1. HFCG-440+ Functional Diagram

## PAD DESCRIPTION

| Function         | Pad Number | Description                                        |
|------------------|------------|----------------------------------------------------|
| RF1 <sup>2</sup> | 1          | Connects to RF Input Port                          |
| RF2 <sup>2</sup> | 3          | Connects to RF Output Port                         |
| GROUND           | 2,4,5,6    | Connects to Ground on PCB,<br>(See drawing PL-633) |

## SUGGESTED PCB LAYOUT (PL-633)

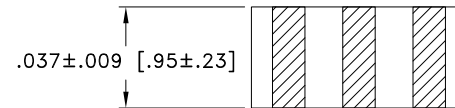
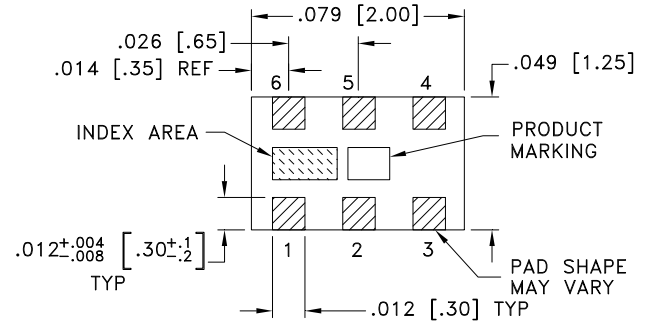


## NOTES:

1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS (R04350B) WITH DIELECTRIC THICKNESS .020±.0015. COPPER: 1/2 Oz. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
  2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
- DENOTES PCB COPPER PATTERN WITH SMOBC (SOLDER MASK OVER BARE COPPER)  
 DENOTES PCB COPPER PATTERN FREE OF SOLDERMASK

Figure 2. Suggested PCB Layout PL-633

## CASE STYLE DRAWING



Weight: .008 grams.

Dimensions are in inches (mm). Tolerances: 2Pl. ± .01; 3 Pl. ± .005

## PRODUCT MARKING\*: E6

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



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ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASHBOARD.

[CLICK HERE](#)

|                                 |                                                                         |
|---------------------------------|-------------------------------------------------------------------------|
| Performance Data and Graphs     | Data                                                                    |
|                                 | Graphs                                                                  |
|                                 | S-Parameter (S2P Files) Data Set (.zip file) De-embedded to device pads |
| Case Style                      | GE0805C-9    Lead Finish: Tin over Nickel Plating                       |
| RoHS Status                     | Compliant                                                               |
| Tape and Reel                   | TR-F114                                                                 |
| Suggested Layout for PCB Design | PL-633                                                                  |
| Evaluation Board                | TB-HFCG-440+                                                            |
|                                 | Gerber File                                                             |
| Environmental Rating            | ENV06T11                                                                |

## 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)

