



THIN-FILM SURFACE MOUNT

# Bandpass Filter

## ABF-3R3G+

50Ω 3100 to 3500 MHz

### KEY FEATURES

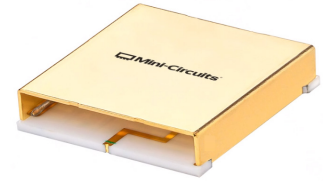
- Low Passband Insertion Loss of 1.6dB Typ.
- High Rejection of 54dB Typ.
- Good Return Loss of 15dB Typ.
- Small Size, 12 x 12 x 2.54 mm.

### APPLICATIONS

- 5G-sub GHz
- S-Band Radar.
- Defence System.
- Test and Measurement Equipment.

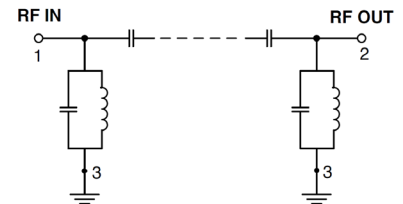
### PRODUCT OVERVIEW

Mini-Circuits' Surface Mount Thin-Film filters offer low insertion loss and high rejection realized via Thin-Film on Alumina substrate, using a sputtering process that can guarantee an enhanced Q and repeatable performance. Low pass, high pass, and bandpass surface mount thin-film designs can be realized with this technology up to 40 GHz in a small form factor helping customers achieve their SWaP objectives. Using our high quality thin-film manufacturing process we can guarantee repeatability on large batches of filters.



Generic photo used for illustration purposes only

### FUNCTIONAL DIAGRAM



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

| Parameter        | F#                            | Frequency (MHz) | Min.        | Typ. | Max. | Units |
|------------------|-------------------------------|-----------------|-------------|------|------|-------|
| Passband         | Center Frequency <sup>3</sup> | —               | —           | 3300 | —    | MHz   |
|                  | Insertion Loss                | F1-F2           | 3100 - 3500 | 1.6  | 2.5  | dB    |
|                  | Return Loss                   | F1-F2           | 3100 - 3500 | —    | 15   | dB    |
| Stop Band, Lower | Rejection                     | DC-F3           | DC - 1500   | 42   | 54   | dB    |
|                  |                               | F3-F4           | 1500 - 2400 | 22   | 35   | dB    |
| Stop Band, Upper | Rejection                     | F5-F6           | 4000 - 4500 | 22   | 44   | dB    |
|                  |                               | F6-F7           | 4500 - 6000 | 40   | 50   | dB    |
|                  |                               | F7-F8           | 6000 - 7000 | —    | 35   | —     |

1. Measured on Mini-Circuits Characterization Test Board TB-ABF-3R3G+ with feedline losses removed by normalization of S12 and S21 traces to measurement of TB thru-line.

2. This filter is bi-directional RF1 and RF2 ports may be interchanged, see S-Parameters for actual performance.

3. Typical variation ±3%

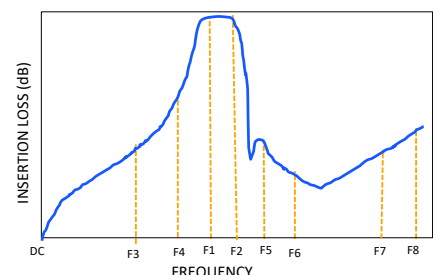
### ABSOLUTE MAXIMUM RATINGS<sup>4</sup>

| Parameter                | Ratings           |
|--------------------------|-------------------|
| Operating Temperature    | -55 °C to +125 °C |
| Storage Temperature      | -55 °C to +125 °C |
| Input Power <sup>5</sup> | 12W max. at 25°C  |

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

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

### TYPICAL FREQUENCY RESPONSE AT +25°C





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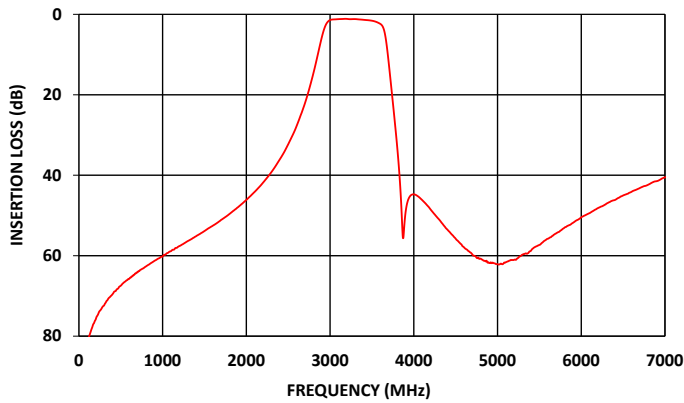
## ABF-3R3G+

Mini-Circuits

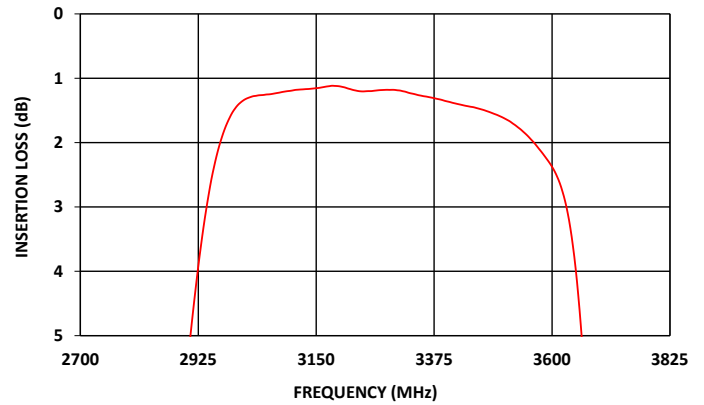
50Ω 3100 to 3500 MHz

### TYPICAL PERFORMANCE GRAPHS AT +25°C

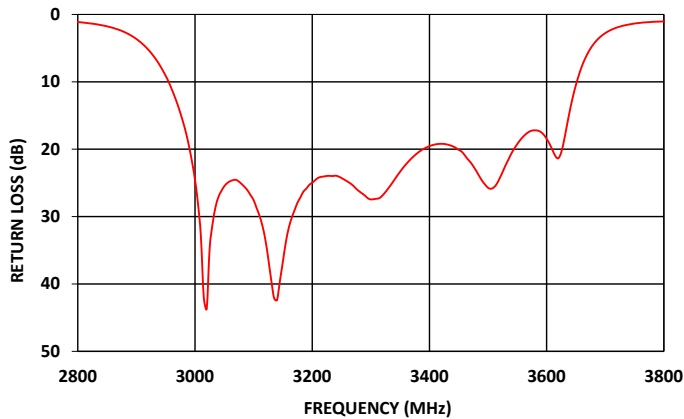
ABF-3R3G+  
INSERTION LOSS



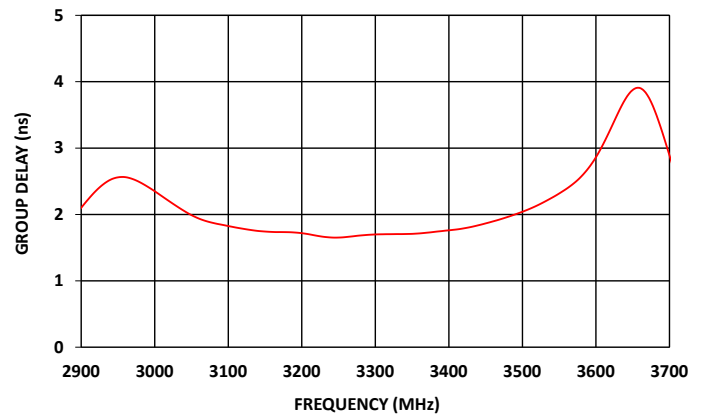
ABF-3R3G+  
INSERTION LOSS (Zoomed)



ABF-3R3G+  
RETURN LOSS



ABF-3R3G+  
GROUP DELAY





### FUNCTIONAL DIAGRAM

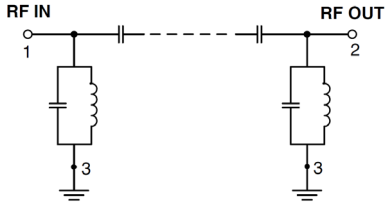
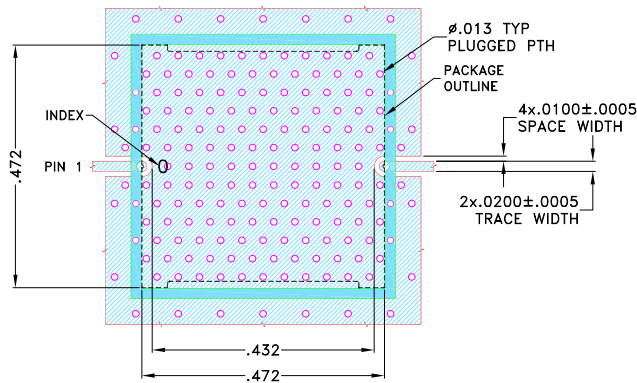


Figure 1. ABF-3R3G+ Functional Diagram

### PAD DESCRIPTION

| Function                 | Pad Number | Description  |
|--------------------------|------------|--|
| RF <sub>1</sub> (Note 2) | 1          | Connects to RF Input Port  |
| RF <sub>2</sub> (Note 2) | 2          | Connects to RF Output Port   |
| GROUND                   | 3          | Connects to Ground on PCB,<br>(See drawing PL-755)                                 |
| NC                       | —          | No connection, not used internally.<br>See drawing PL-755 for connection<br>to PCB |

### SUGGESTED PCB LAYOUT (PL-755)

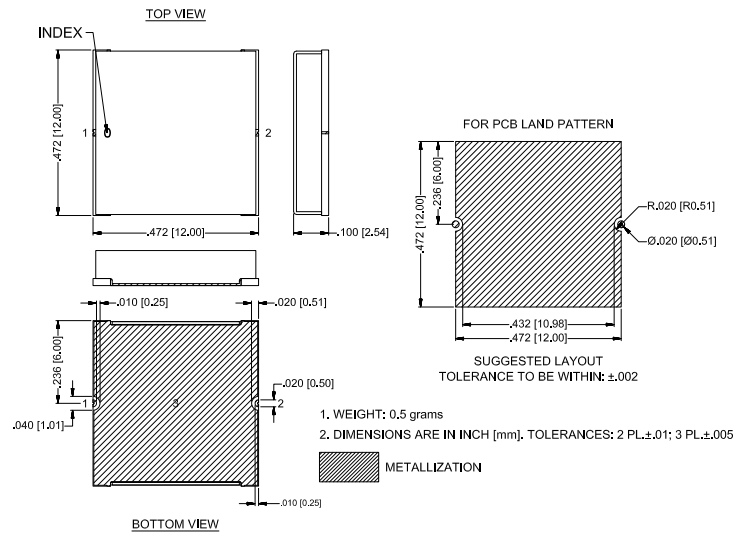


NOTES:

- COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS (RO4350B) WITH DIELECTRIC THICKNESS .010±.001. COPPER: 1/2 Oz. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
  - 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-755

### CASE STYLE DRAWING

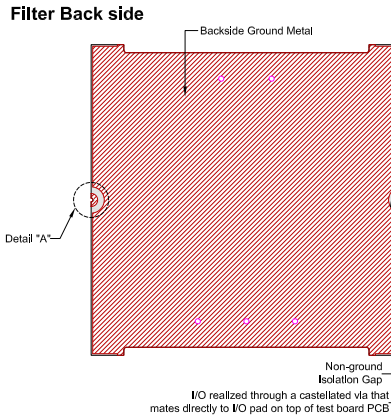


### PRODUCT MARKING\*: ABF-3R3G

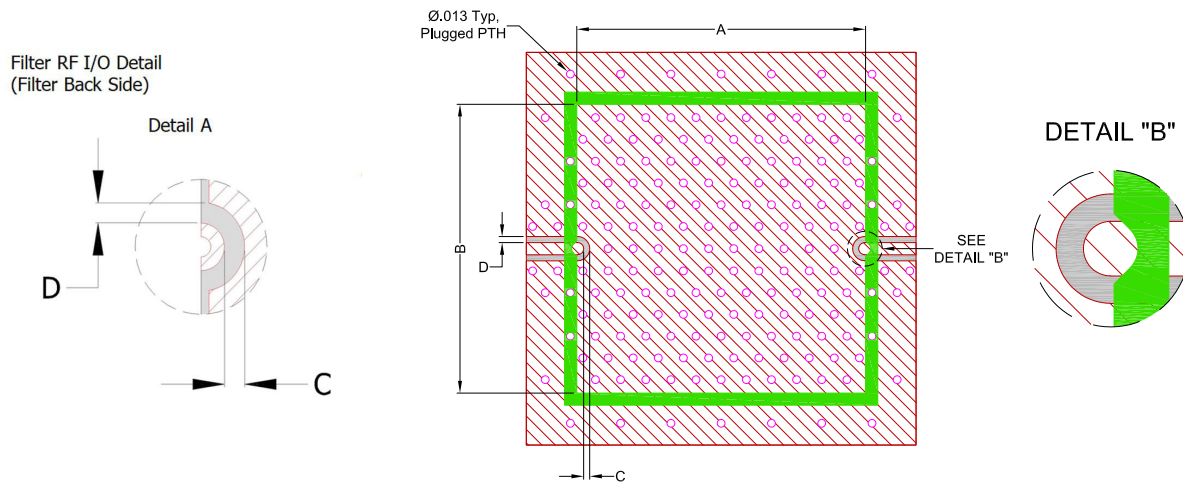
\*Marking may contain other features or characters for internal lot control.



### RECOMMENDED PCB LAYOUT PATTERN FOR FILTER



### PCB Pattern Recommendations

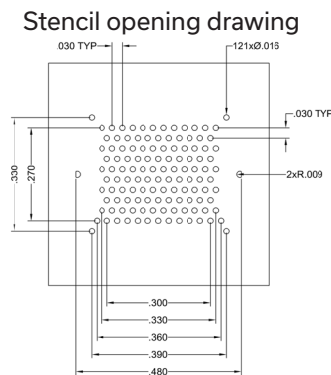


- 1) Customer PCB's ground pattern length (dimension A) can be similar to filter length.
- 2) Customer PCB's ground pattern width (dimension B) can be similar filter width.
- 3) Dimensions C and D on Filter RF I/O detail and Customer PCB pattern can be closely match. The dimensions of C and D on the Customer PCB pattern can be slightly larger to account for component alignment tolerance (ground metal can be pulled back from RF I/O trace).
- 4) Recommend to use Solder mask at Customer PCB at outer area of filter pattern/ footprint with a clearance of about 1.25mil at each side. (Tighter registration tolerance required for solder mask)
- 5) Recommended to use Solder mask at I/O of Customer PCB as per above diagram (refer detail B).

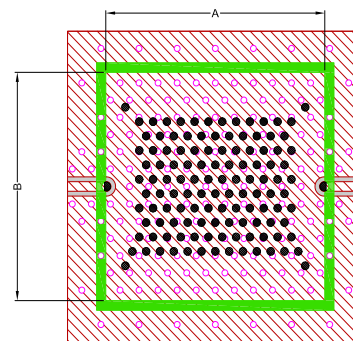


### COMMENTS ON COMPONENT HANDLING AND SOLDER ATTACH

- 1) Avoid using soldering iron directly to the ceramic filter. This would lead to development of crack in the component due to thermal shock.
- 2) Vacuum pick-up tool or plastic tweezers are recommended for handling the components. Extra care should be taken not to scratch the filter or metal area.
- 3) Use 2-3 mil thickness stencil plate and screen print the solder. Refer below picture for recommended stencil pattern to get the best solder attachment.



Solder location after screen print



- 4) Plugged ground vias in the PWB will improve attachment consistency.
- 5) Recommended to have a similar or closer test board material and thickness (refer Mini-Circuits evaluation board for details) to minimize the CTE over the temperature range.



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ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASH BOARD.

[CLICK HERE](#)

|                                 |   |
|---------------------------------|---|
| Performance Data and Graphs     | Data  |
|                                 | Graphs  |
|                                 | S-Parameter (S2P Files) Data Set (.zip file) De-embedded to device pads |
| Case Style                      | ZH3433 Lead Finish: Gold over Nickel Plate                              |
| RoHS Status                     | Compliant   |
| Tape and Reel                   | TR-F008   |
| Suggested Layout for PCB Design | PL-755  |
| Evaluation Board                | TB-ABF-3R3G+  |
|                                 | Gerber File   |
| Environmental Rating            | ENV120T1  |

### 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)

