



Mini-Circuits

THIN-FILM SURFACE MOUNT

Bandpass Filter

ABF-3R3G+

50Ω 3100 to 3500 MHz

KEY FEATURES

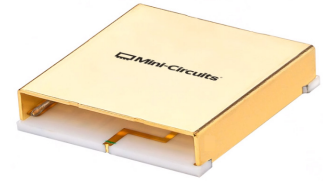
- Low Passband Insertion Loss of 1.6dB Typ.
- High Rejection of 54dB Typ.
- Good Return Loss of 15dB Typ.
- Small Size, 12 x 12 x 2.54 mm.

APPLICATIONS

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

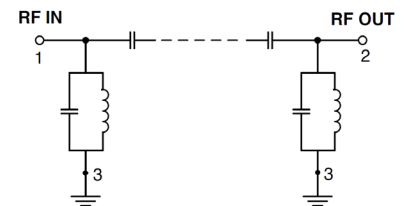
PRODUCT OVERVIEW

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^{1,2} AT +25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Units
Passband	Center Frequency ³	—	—	—	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	—	
Stop Band, Upper	Rejection	F5-F6	4000 - 4500	22	44	—	dB
		F6-F7	4500 - 6000	40	50	—	
		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%

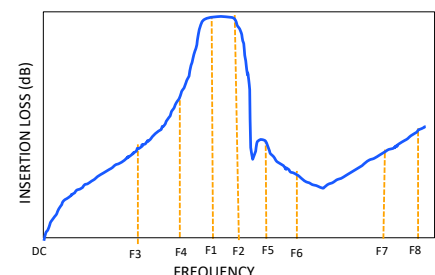
ABSOLUTE MAXIMUM RATINGS⁴

Parameter	Ratings
Operating Temperature	-55 °C to +125 °C
Storage Temperature	-55 °C to +125 °C
Input Power ⁵	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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REV. A
ECO-020923
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EDU4549
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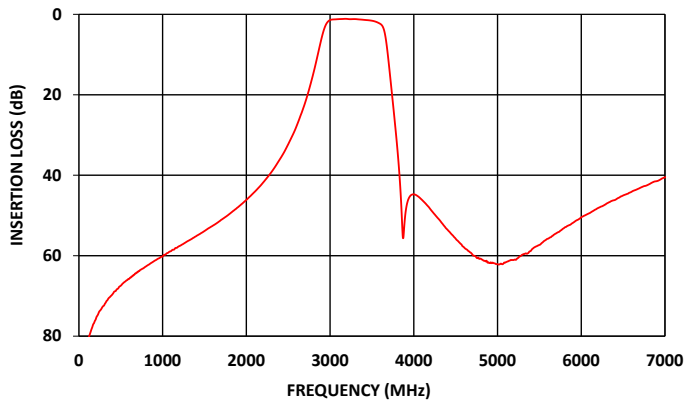
ABF-3R3G+

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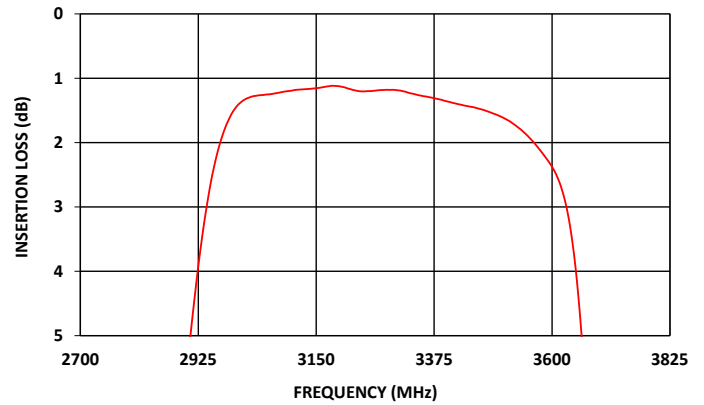
50Ω 3100 to 3500 MHz

TYPICAL PERFORMANCE GRAPHS AT +25°C

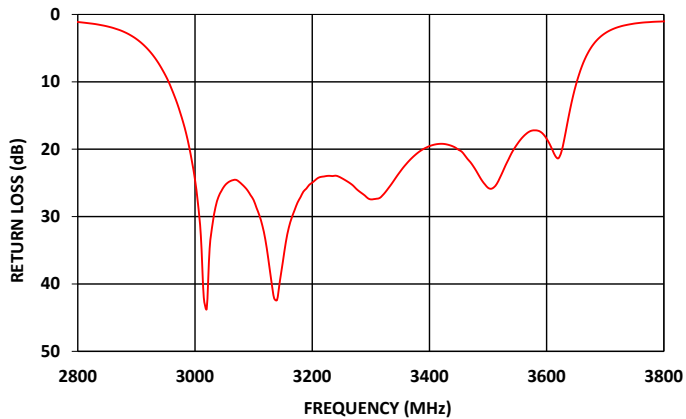
ABF-3R3G+
INSERTION LOSS



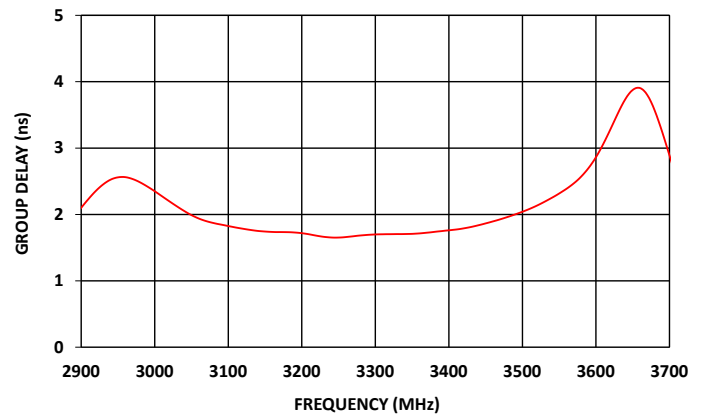
ABF-3R3G+
INSERTION LOSS (Zoomed)



ABF-3R3G+
RETURN LOSS



ABF-3R3G+
GROUP DELAY





FUNCTIONAL DIAGRAM

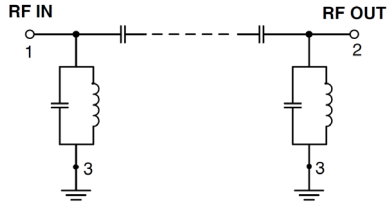
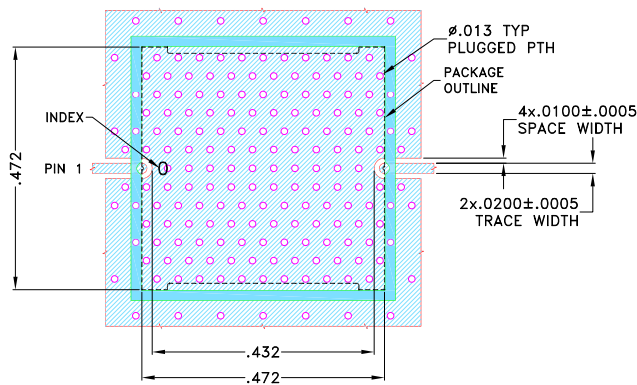


Figure 1. ABF-3R3G+ Functional Diagram

PAD DESCRIPTION

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

SUGGESTED PCB LAYOUT (PL-755)

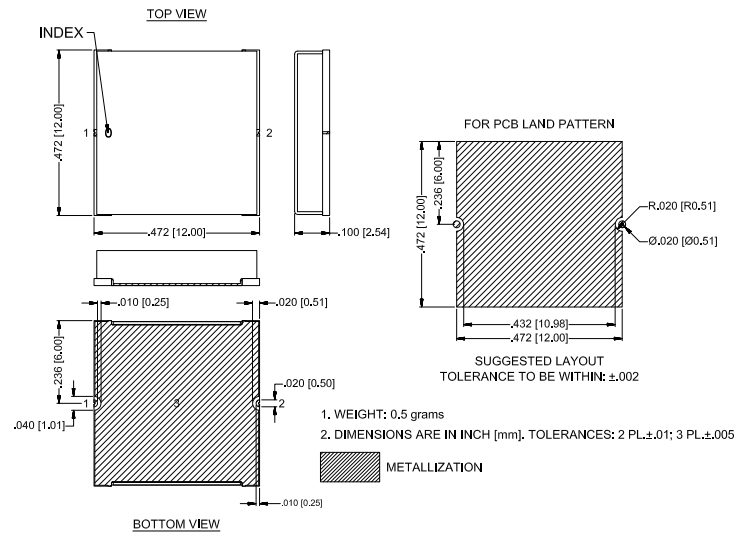


NOTES:

- COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS (R04350B) 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.



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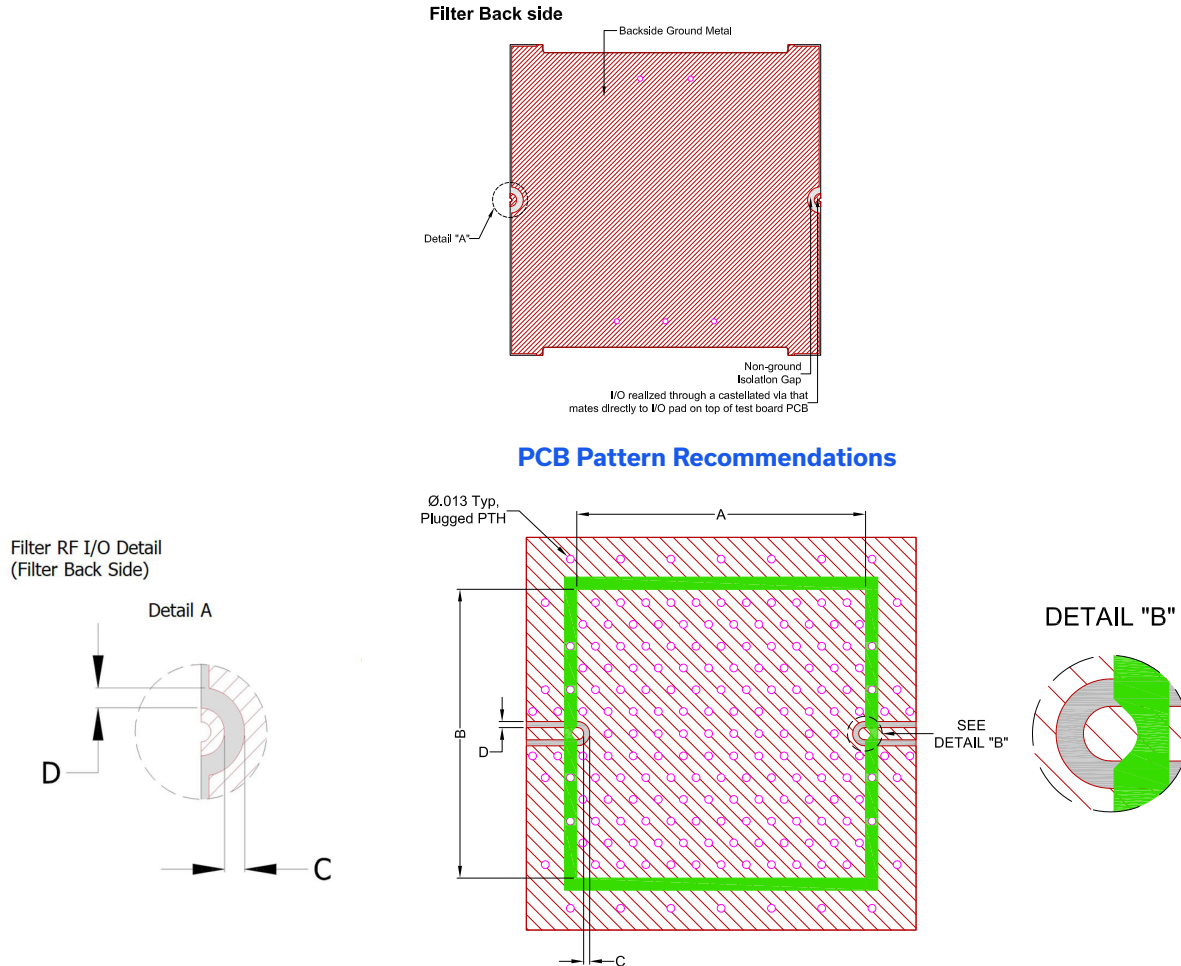
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RECOMMENDED PCB LAYOUT PATTERN FOR FILTER



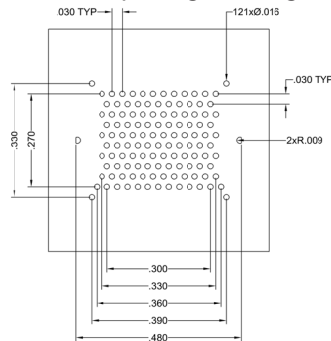
- 1) Customer PCB's ground pattern length (dimension A) can be similar to filter length.
- 2) Customer PCB's ground pattern width (dimension B) can be similar filter width.
- 3) Dimensions C and D on Filter RF I/O detail and Customer PCB pattern can be closely match. The dimensions of C and D on the 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).



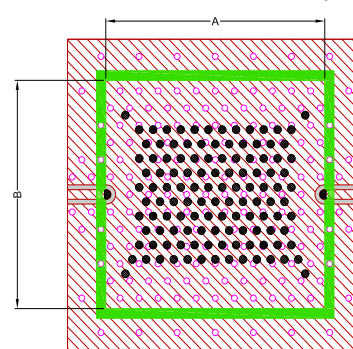
**COMMENTS ON COMPONENT HANDLING AND SOLDER ATTACH**

- 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.

Stencil opening drawing



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



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