



Mini-Circuits

THIN FILM SURFACE MOUNT

Low Pass Filter

ALF-6000+

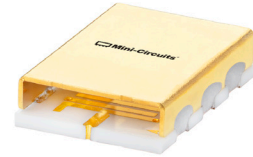
50Ω DC to 6GHz

KEY FEATURES

- Low Passband Insertion Loss of 0.7dB Typ.
- High Rejection of 38dB Typ.
- Good Return Loss of 16dB Typ.
- Small Size, 5.59 x 8.13 x 2.03 mm

APPLICATIONS

- Harmonic Rejection
- VHF/UHF Transmitters/Receivers.
- Test and Measurement Equipment.

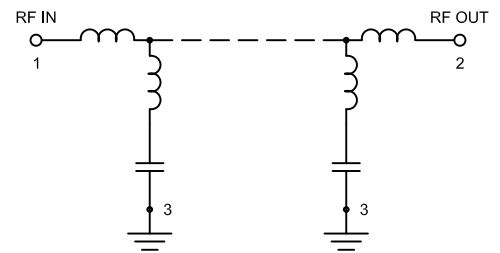


Generic photo used for illustration purposes only

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 40GHz 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.

FUNCTIONAL DIAGRAM

ELECTRICAL SPECIFICATIONS^{1,2} AT +25°C

Parameter		F#	Frequency (GHz)	Min.	Typ.	Max.	Units
Pass Band	Insertion Loss	DC-F1	DC - 6	—	0.7	1.2	dB
	Freq. Cut-Off ³	Fc	6.93	—	3.0	—	dB
	Return Loss	DC-F1	DC - 6	—	16	—	dB
Stop Band	Rejection	F2-F3	8.2 - 9.4	25	37	—	dB
		F3-F4	9.4 - 13	32	37	—	
		F4-F5	13 - 14	—	38	—	
		F5-F6	14 - 15.5	—	15	—	

1. Tested in Evaluation Board P/N TB-ALF-6000+ 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 $\pm 3\%$

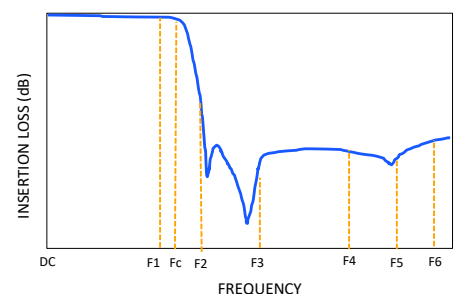
ABSOLUTE MAXIMUM RATINGS⁴

Parameter	Ratings
Operating Temperature	-55 °C to +125 °C
Storage Temperature	-55 °C to +125 °C
Input Power ⁵	15 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



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REV. OR
ECO-020314
ALF-6000+
EDU4721
URJ
231017

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THIN FILM SURFACE MOUNT

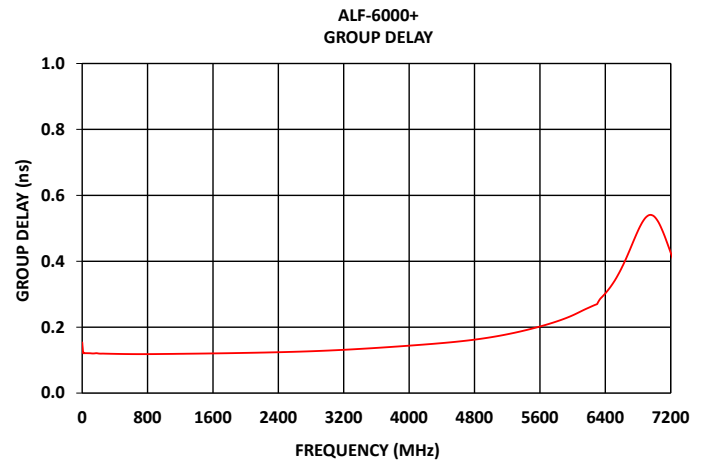
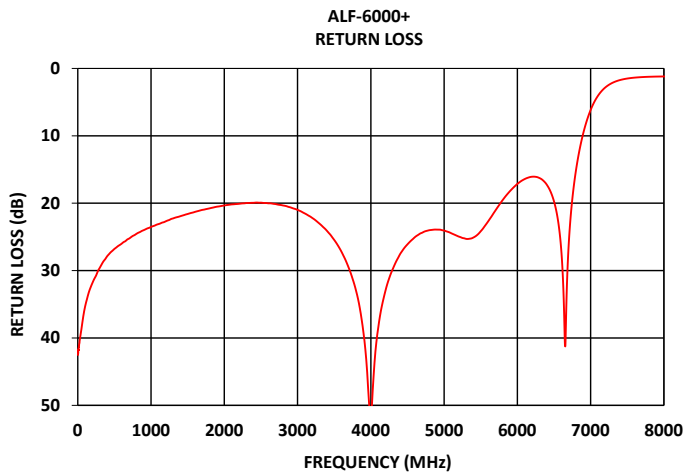
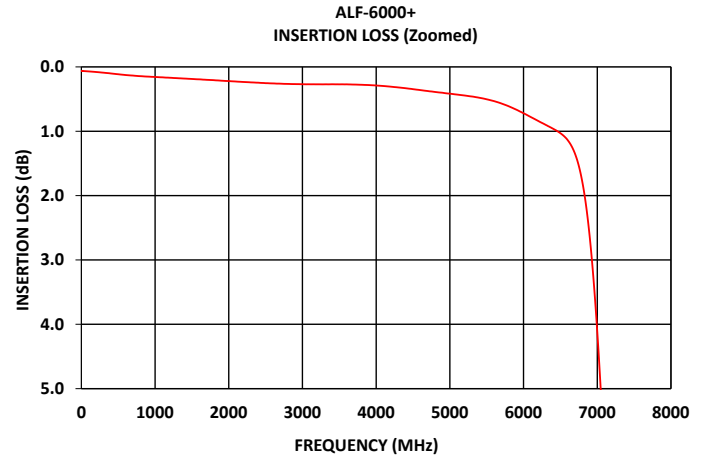
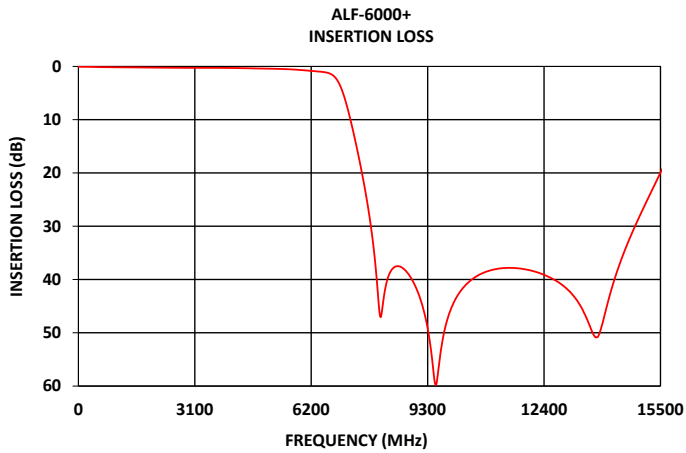
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TYPICAL PERFORMANCE GRAPHS AT +25°C





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FUNCTIONAL DIAGRAM

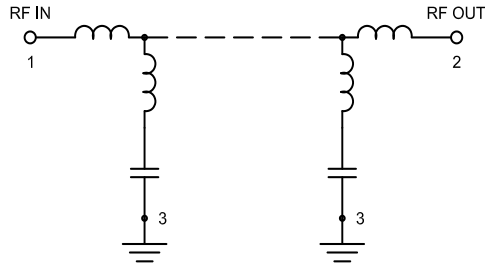
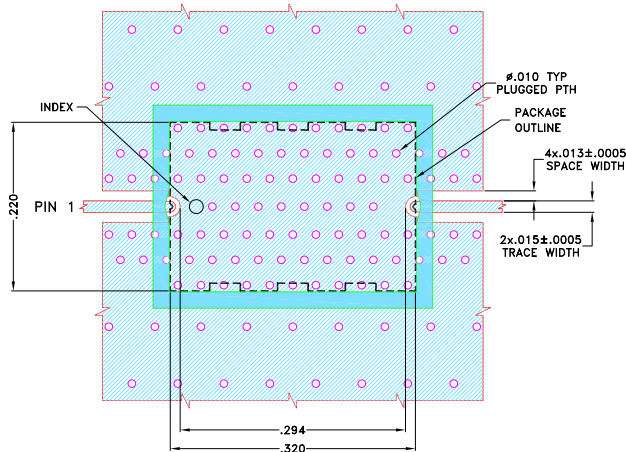


Figure 1. ALF-6000+ Functional Diagram

PAD DESCRIPTION

Function	Pad Number	Description
RF1 ²	1	Connects to RF Input Port
RF2 ²	2	Connects to RF Output Port
GROUND	3	Connects to Ground on PCB, (See drawing PL-764)
NC	—	No connection, not used internally. See drawing PL-764 for connection to PCB

SUGGESTED PCB LAYOUT (PL-764)

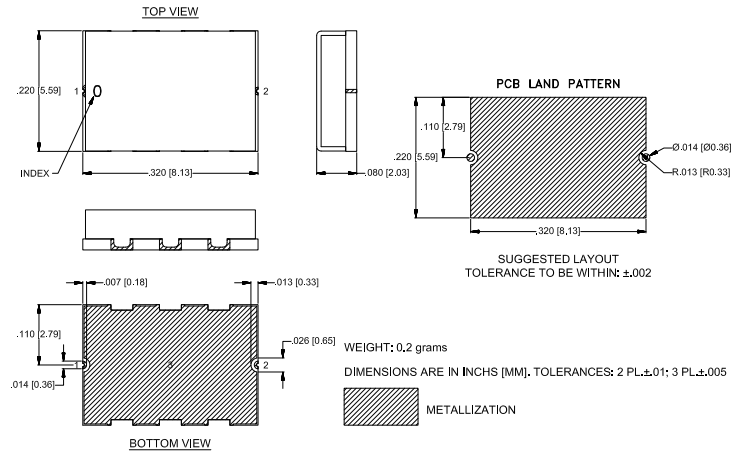


NOTES:

1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS (R04350B Lo Pro) WITH DIELECTRIC THICKNESS .0073±.0007, 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-764

CASE STYLE DRAWING



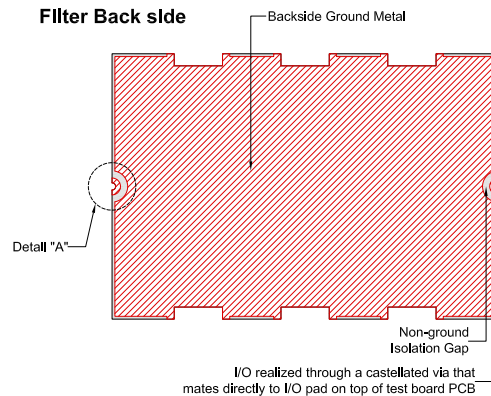
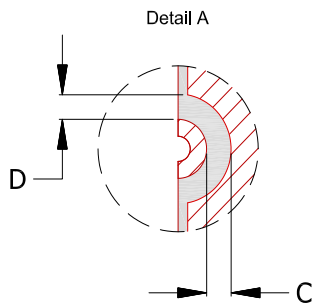
PRODUCT MARKING*: ALF-6000

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

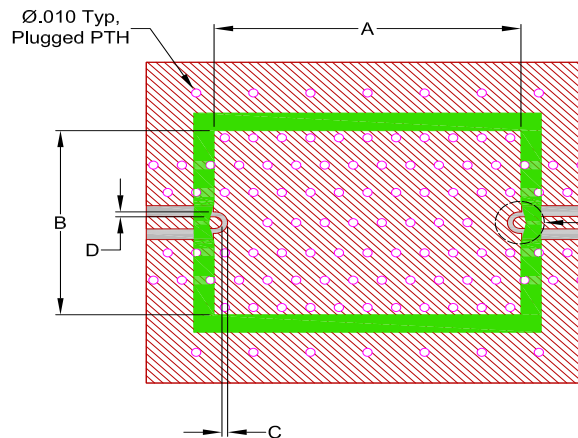
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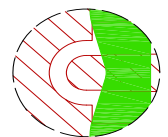
RECOMMENDED PCB LAYOUT PATTERN FOR FILTER

Filter RF I/O Detail
(Filter Back Side)

PCB Pattern Recommendations



DETAIL "B"

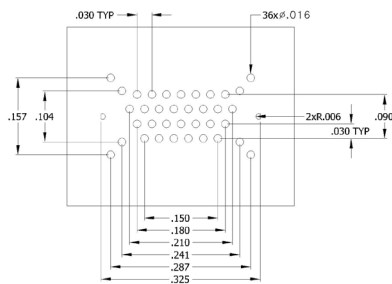
SEE
DETAIL "B"

- 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).

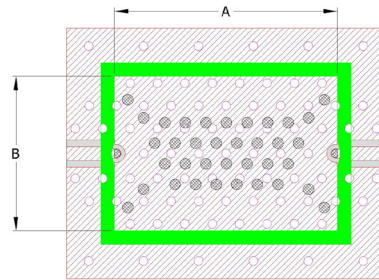
**COMMENTS ON COMPONENT HANDLING AND SOLDER ATTACH**

- 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	UC2731 Lead Finish: Gold over Nickel Plate.
RoHS Status	Compliant
Tape and Reel	TR-F003
Suggested Layout for PCB Design	PL-764
Evaluation Board	TB-ALF-6000+
	Gerber File
Environmental Rating	ENV120

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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