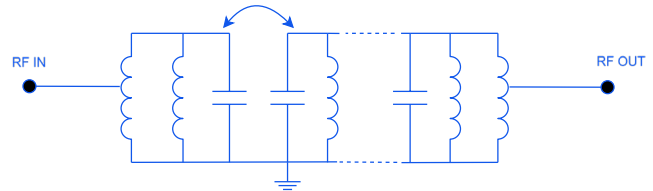


**THE BIG DEAL**

- SIW High-Performance Topology
- Low Insertion Loss, 0.8 dB Typ.
- Compact 1812 SMT package
- Ultra-High Stopband Rejection, up to 58 dB
- Scalable, Cost-Effective for Volume Production



Generic photo used for illustration purposes only

**FUNCTIONAL DIAGRAM****APPLICATIONS**

- SATCOM Ka-Band Downlink
- Satellite Communication Systems
- 5G / NTN Infrastructure
- Test and Measurement Equipment

**PRODUCT OVERVIEW**

Mini-Circuits' BFHK-1942+ is a high-performance bandpass filter designed for the SATCOM Ka-Band downlink, covering 17.7 to 21.2 GHz with exceptionally low insertion loss and high out-of-band rejection. This filter was designed with an advanced substrate integrated waveguide (SIW) topology to deliver waveguide-class selectivity and rejection in a compact, SMT LTCC package. This approach combines the low loss and high-Q performance of waveguide structures with the scalability and manufacturability of standard SMT components.

**KEY FEATURES**

| Features                     | Advantages                                                                                          |
|------------------------------|-----------------------------------------------------------------------------------------------------|
| Low Insertion Loss           | Typical insertion loss of 0.8 dB                                                                    |
| Cost Effective               | Utilizes a scalable technology that is cost effective due to ease of production in high quantities. |
| Small Size (4.5 mm x 3.2 mm) | Allows for high layout density of circuit boards, while minimizing the effects of parasitics.       |
| Surface Mountable            | Suitable for very high-volume automated assembly process.                                           |



LTCC SURFACE MOUNT

## Band Pass Filter

BFHK-1942+

50Ω 17.7 to 21.2 GHz

ELECTRICAL SPECIFICATIONS<sup>1,2,3</sup> AT +25°C,  $Z_0 = 50\Omega$ 

| Parameter       |                               | F#      | Frequency (GHz) | Min. | Typ.  | Max. | Units |
|-----------------|-------------------------------|---------|-----------------|------|-------|------|-------|
| Passband        | Center Frequency <sup>4</sup> | —       | —               | —    | 19.45 | —    | GHz   |
|                 | Insertion Loss                | F4-F5   | 17.7-18         | —    | 1.6   | 2    | dB    |
|                 |                               | F5-F6   | 18-21.2         | —    | 0.8   | 1.2  |       |
|                 | Return Loss                   | F4-F5   | 17.7-18         | —    | 10.6  | —    | dB    |
|                 |                               | F5-F6   | 18-21.2         | 10.7 | 13.6  | —    |       |
| Stopband, Lower | Rejection                     | DC-F1   | DC-5            | 48   | 58    | —    | dB    |
|                 |                               | F1-F2   | 5-11.6          | 35   | 45    | —    |       |
|                 |                               | F2-F3   | 11.6-15         | 30   | 40    | —    |       |
| Stopband, Upper | Rejection                     | F7-F8   | 24-25           | 20   | 27    | —    | dB    |
|                 |                               | F8-F9   | 25-27           | 35   | 47    | —    |       |
|                 |                               | F9-F10  | 27-31           | 48   | 58    | —    |       |
|                 |                               | F10-F11 | 31-35           | 40   | 52    | —    |       |

1. Tested in Evaluation Board P/N TB-BFHK-1942C+ with the connector and feedline effects de-embedded using the 2X Thru IEEE P370 method.

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

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  $\pm 1.5\%$ .

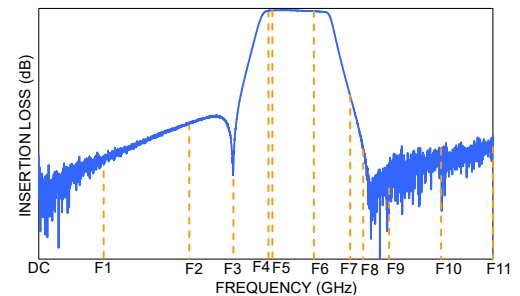
ABSOLUTE MAXIMUM RATINGS<sup>5</sup>

|                          |                   |
|--------------------------|-------------------|
| Operating Temperature    | -55 °C to +125 °C |
| Storage Temperature      | -55 °C to +125 °C |
| Input Power <sup>6</sup> | 10 W              |

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 3.1 W at +125 °C.

## TYPICAL FREQUENCY RESPONSE





LTCC SURFACE MOUNT

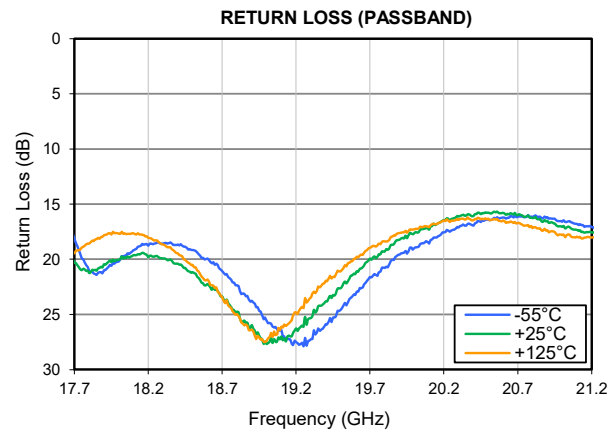
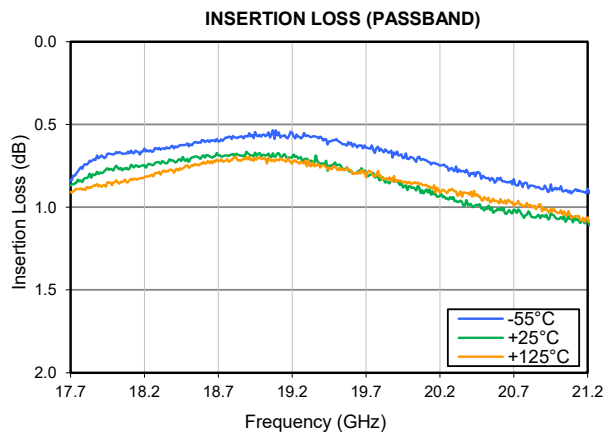
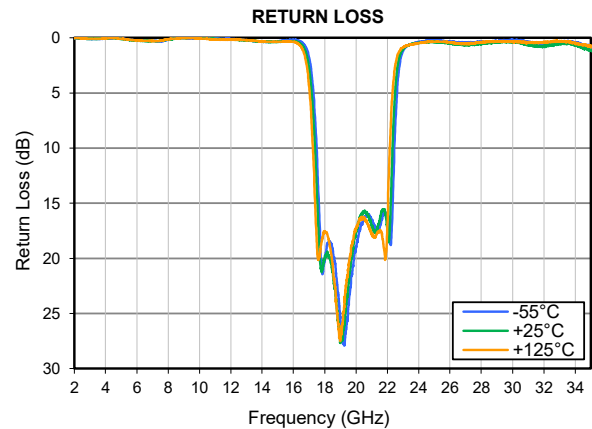
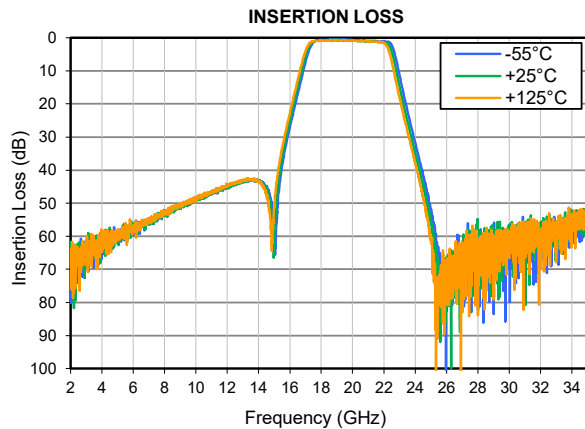
# Band Pass Filter

**BFHK-1942+**

Mini-Circuits

50 $\Omega$  17.7 to 21.2 GHz

## TYPICAL PERFORMANCE GRAPHS





LTCC SURFACE MOUNT

# Band Pass Filter

**BFHK-1942+**

Mini-Circuits

50Ω 17.7 to 21.2 GHz

## FUNCTIONAL DIAGRAM

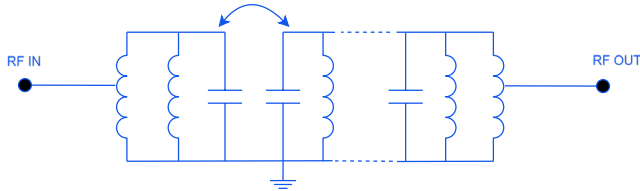
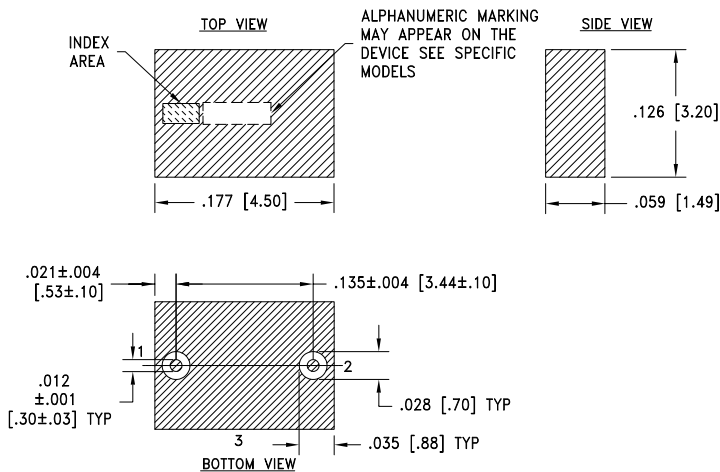


Figure 1. BFHK-1942+ Functional Diagram

## PAD DESCRIPTION

| Function         | Pad Number | Description                                     |
|------------------|------------|-------------------------------------------------|
| RF1 <sup>2</sup> | 1          | Connects to RF Input Port                       |
| RF2 <sup>2</sup> | 2          | Connects to RF Output Port                      |
| GROUND           | 3          | Connects to Ground on PCB, (See drawing PL-730) |

## CASE STYLE DRAWING

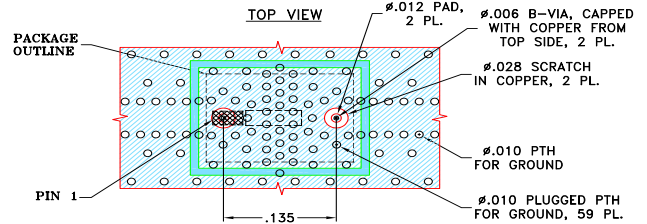


Weight: .126 grams  
Dimensions are in inches [mm]. Tolerances: 2 Pl. ±.01; 3 Pl. ±.005

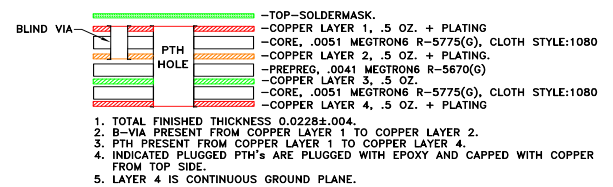
## PRODUCT MARKING\*: F632

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

## SUGGESTED PCB LAYOUT: PL-730



### STACK-UP DIAGRAM

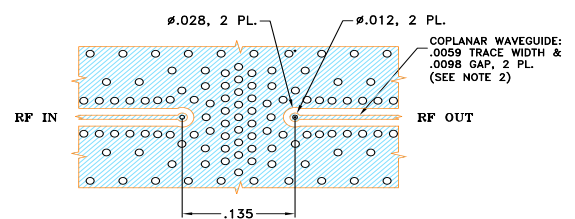


### NOTES:

- PCB IS MULTILAYER PCB, SEE STACK-UP DIAGRAM.
- TRACE WIDTH & GAP PARAMETERS ARE SHOWN FOR MEGTRON6 R-5775(G), CLOTH STYLE:1080 WITH DIELECTRIC THICKNESS .0051; COPPER: 1/2 OZ.-PLATING. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
- COPPER LAYER 4 OF THE PCB ARE CONTINUOUS GROUND PLANE.

- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
- DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

### LAYER 2, B-VIA & PTH



### LAYER 3 & PTH

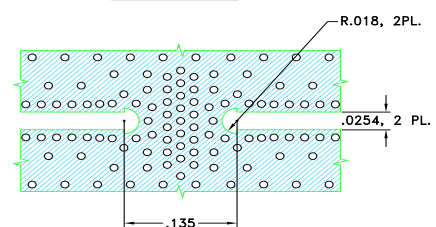


Figure 2. Suggested PCB Layout

Mini-Circuits



LTCC SURFACE MOUNT

# Band Pass Filter

**BFHK-1942+**

Mini-Circuits

50Ω 17.7 to 21.2 GHz

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                      | NM1812C-3 Finish: Tin over Nickel plating                                                 |
| RoHS/REACH Status               | Compliant                                                                                 |
| Tape and Reel                   | F77                                                                                       |
| Suggested Layout for PCB Design | PL-730                                                                                    |
| Evaluation Board                | TB-BFHK-1942C+<br>Gerber File                                                             |
| Environmental Rating            | ENV164                                                                                    |

## NOTES

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuits' applicable established test performance criteria and measurement instructions.
- 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)

