Passive MMIC 13.6-15.1 GHz Bandpass Filter **MFB-1445SM**

1 Device Overview

QFN

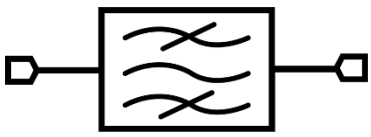
1.1 General Description

The MFB-1445SM is a passive MMIC bandpass filter. It is an integrated filter that passes Ku-Band frequencies (13.6-15.1 GHz). Passive GaAs MMIC technology allows production of smaller filter constructions that replace larger form factor circuit board constructions. Tight fabrication tolerances allow for less unit to unit variation than traditional filter technologies. Low unit to unit variation allows for accurate simulations using the provided S2P file taken from measured production units. The MFB-1445SM is available as a 3 X 3 mm QFN package. Evaluation boards are also available.

1.2 Features

- Designed for Ku-Band Applications including Satcom
- Excellent Return Loss
- High Stop Band Suppression
- Wide Stop Band
- S2P data available

1.3 Functional Block Diagram



1.4 Part Ordering Options[1]

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
MFB-1445SM	3 X 3 mm QFN	SM	**RoHS**	Active	EAR99
EVAL-MFB-1445	Connectorized Evaluation Fixture	Eval	**ROHS**	Active	EAR99

[1] Refer to our website for a list of definitions for terminology presented in this table.

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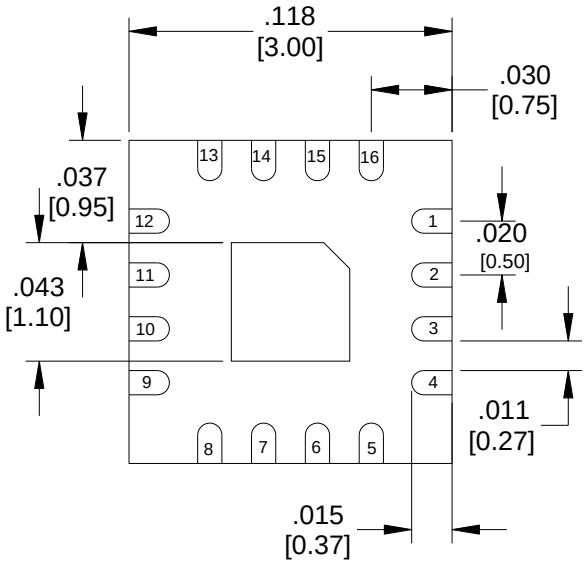
Revision History

Revision Code	Revision Date	Comment
-	January 2021	Datasheet Initial Release

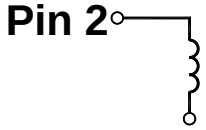
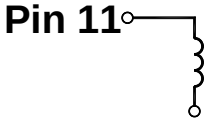
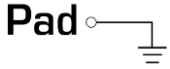
2 Port Configurations and Functions

2.1 Port Diagram

A bottom-up view of the MFB-1445SM package outline drawing is shown below. The MMIC bandpass filters are symmetrical allowing Pin 2 or Pin 11 to be used as the input.



2.2 Port Functions

Port	Function	Description	Equivalent Circuit
Pin 2	Input/Output	Pin 2 is DC open to ground for the SM package.	
Pin 11	Input/Output	Pin 11 is DC open to ground for the SM package.	
Pad	Ground	SM package ground path is provided through the ground paddle.	

3 Specifications

3.1 Absolute Maximum Ratings

The Absolute Maximum Ratings indicate limits beyond which damage may occur to the device. If these limits are exceeded, the device may be inoperable or have a reduced lifetime.

Parameter	Maximum Rating	Units
DC Current at any port	N/A	mA
Power Handling, at any Port	+30	dBm
Operating Temperature	-55 to +100	°C
Storage Temperature	-65 to +125	°C

3.2 Package Information

Parameter	Details	Rating
ESD	Human Body Model (HBM), per MIL-STD-750, Method 1020	N/A

3.3 Electrical Specifications

The electrical specifications apply at T_A=+25°C in a 50Ω system.[2][3]

Min and Max limits are guaranteed at T_A=+25°C.

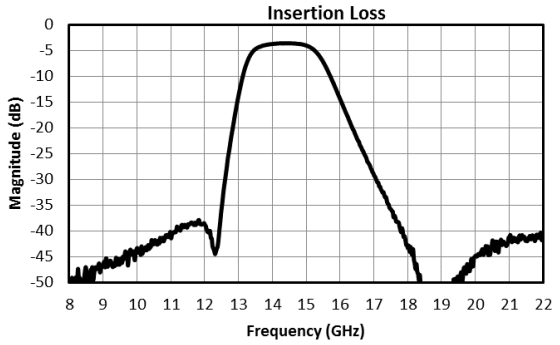
Parameter	Frequency (GHz)	Min	Typ.	Max
Center Frequency, f_c (GHz)			14.45	
1dB Passband (GHz)			13.6-15.1	
Insertion Loss @ f_c (dB)	14.45		3.75	4.5
Passband Return Loss (dB)	13.6-15.1	16	25	
Stopband Suppression (dB)	11.5 12.5	35 30	45 35	
Stopband Suppression (dB)	17.5 18.5	30 35	35 40	
Group Delay (ps)			630	
Impedance (Ω)			50	

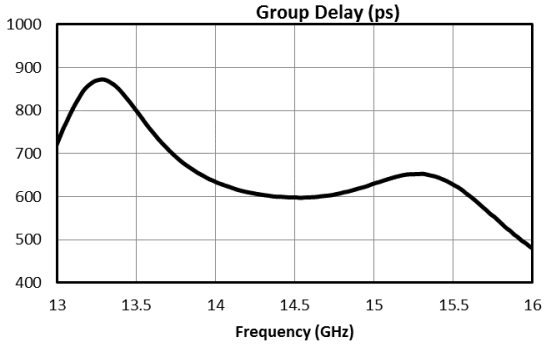
[2] Filter is symmetrical. Reverse measurement is equivalent to forward measurement.
[3] All measured data is taken from the eval board without de-embedding of the connectors and traces.

3.4 Typical Performance Plots

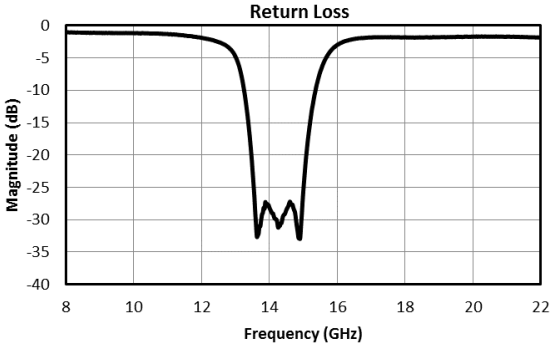
3.4.1 Insertion Loss & Group Delay

NOTE: All measured data is taken from the eval board without de-embedding of the connectors and traces.

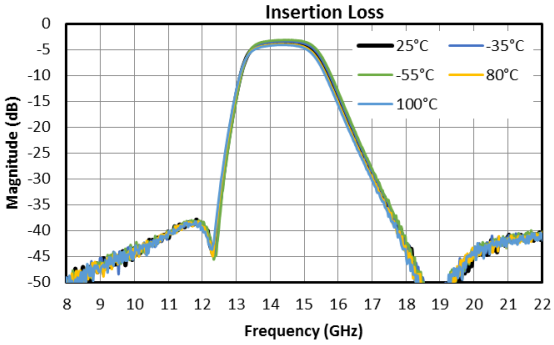


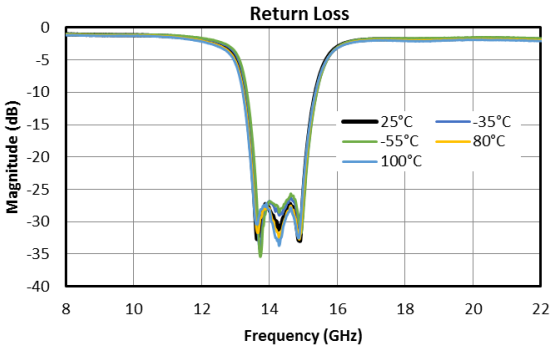


3.4.2 Return Loss



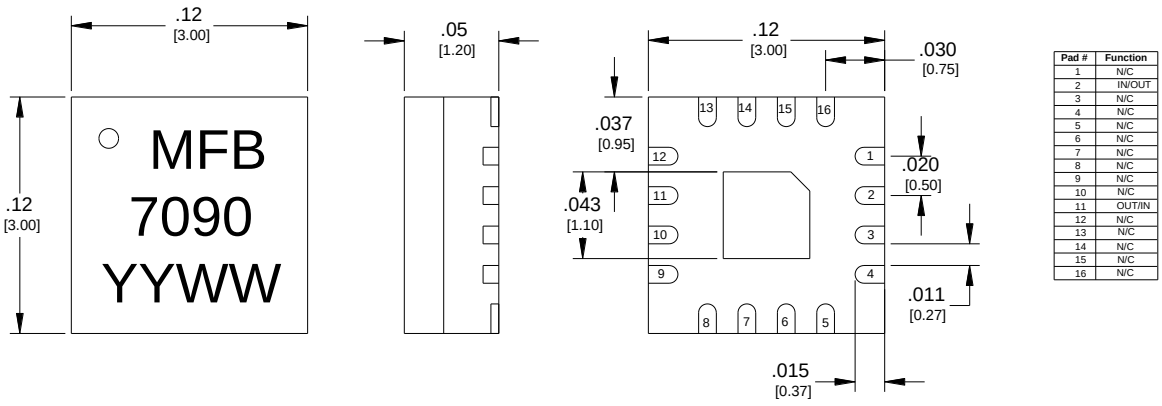
3.4.3 Performance Over Temperature





4 Mechanical Data

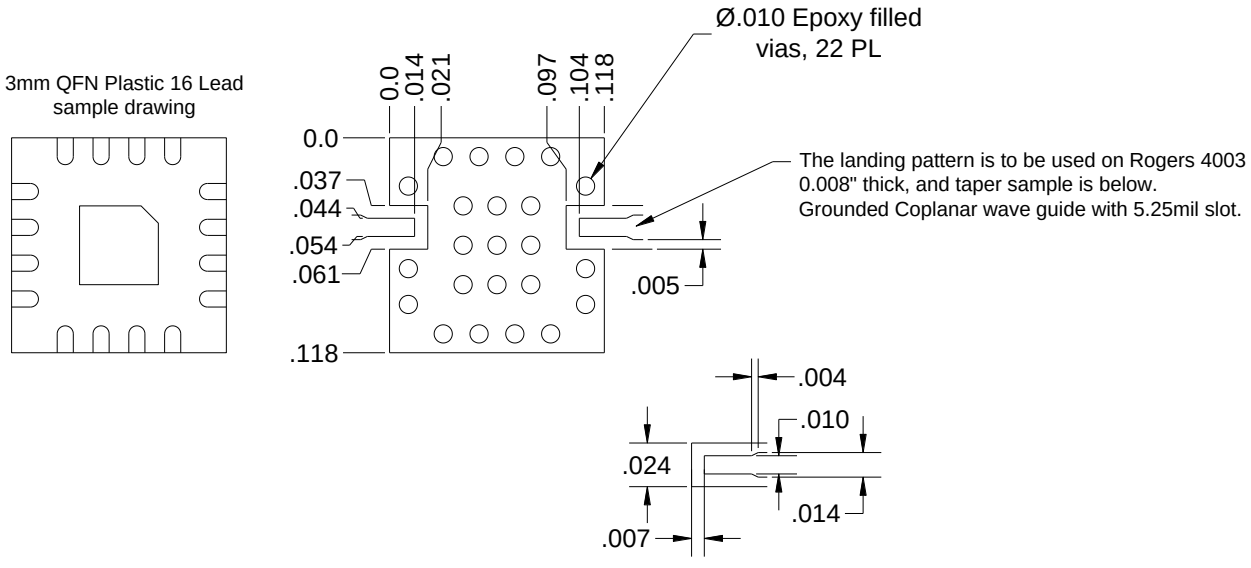
4.1 SM package Outline Drawing



Pad #	Function
1	N/C
2	IN/OUT
3	N/C
4	N/C
5	N/C
6	N/C
7	N/C
8	N/C
9	N/C
10	N/C
11	OUT/IN
12	N/C
13	N/C
14	N/C
15	N/C
16	N/C

1. Substrate material is LCP.
2. I/O Leads and Ground paddle plating is (from base to finish):
   Ni: 0.5um MIN
   Pd: 0.02um MIN
   Au: 0.05um MAX
3. All unconnected pins should be connected to PCB RF ground

4.2 SM package Footprint



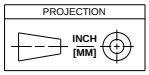
QFN-Package Surface-Mount Landing Pattern

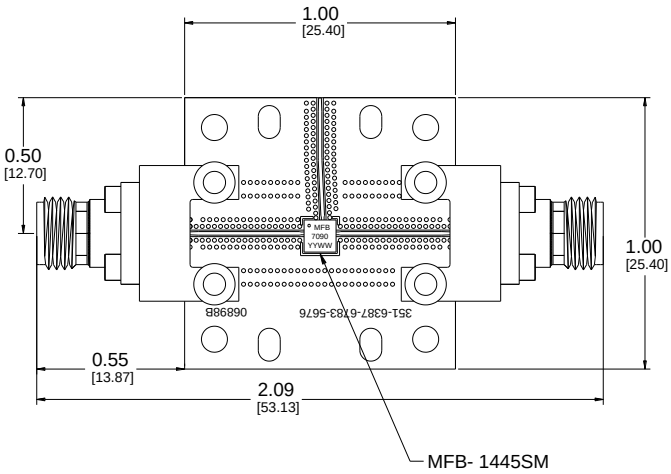
Click here for a DXF of the above layout.

Click here for leaded solder reflow. Click here for lead-free solder reflow

4.3 Evaluation Board Outline

All measurement are typical





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