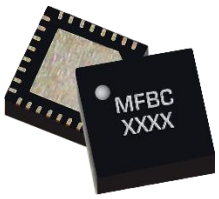
1 Device Overview



PSM

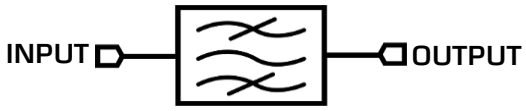
1.1 General Description

The MFBC-000XXPSM family of passive MMIC surface mount bandpass filters are an ideal solution for small form factor, high rejection filtering. 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. The MFBC-000XXPSM is available as a 5x5mm plastic QFN. Low unit to unit variation allows for accurate simulations using the provided S2P file taken from measured production units.

1.2 Features

- Excellent Return Loss
- High Stop Band Suppression
- Wide Stop Band with Fast Roll-Off
- S2P data available

1.3 Functional Block Diagram



1.4 Part Ordering Options[1]

Part Number	1dBc Passband (GHz)	Description	Package	Green Status	Product Lifecycle	Export Classification
MFBC-00001PSM	7.40 – 9.90	5 x 5 mm QFN	PSM	RoHS	Active	EAR99
MFBC-00002PSM	9.13 – 12.40					
MFBC-00003PSM	11.85 – 15.90					
MFBC-00004PSM	14.90 – 19.90					
MFBC-00005PSM	18.60 – 25.10					
MFBC-00006PSM	23.60 – 32.20					
MFBC-00007PSM	30.10 – 39.30					

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

MFBC-00010PSM	14.60 – 18.90	5 x 5 mm QFN	PSM	RoHS	Active	EAR99
MFBC-00011PSM	16.15 – 20.70					
MFBC-00012PSM	17.20 – 23.40					
MFBC-00013PSM	19.50 – 26.20					
MFBC-00014PSM	22.20 – 29.90					
MFBC-00015PSM	25.40 – 34.70					
MFBC-00016PSM	30.60 – 41.00					
EVB-MFBC-00001P	7.40 – 9.90	Connectorized Evaluation Fixture with 2.92mm Connectors	EVB	RoHS	Active	EAR99
EVB-MFBC-00002P	9.13 – 12.40					
EVB-MFBC-00003P	11.85 – 15.90					
EVB-MFBC-00004P	14.90 – 19.90					
EVB-MFBC-00005P	18.60 – 25.10					
EVB-MFBC-00006P	23.60 – 32.20					
EVB-MFBC-00007P	30.10 – 39.30					
EVB-MFBC-00010P	14.60 – 18.90					
EVB-MFBC-00011P	16.15 – 20.70					
EVB-MFBC-00012P	17.20 – 23.40					
EVB-MFBC-00013P	19.50 – 26.20					
EVB-MFBC-00014P	22.20 – 29.90					
EVB-MFBC-00015P	25.40 – 34.70					
EVB-MFBC-00016P	30.60 – 41.00	Connectorized Evaluation Fixture with 1.85mm Connectors				

Table of Contents

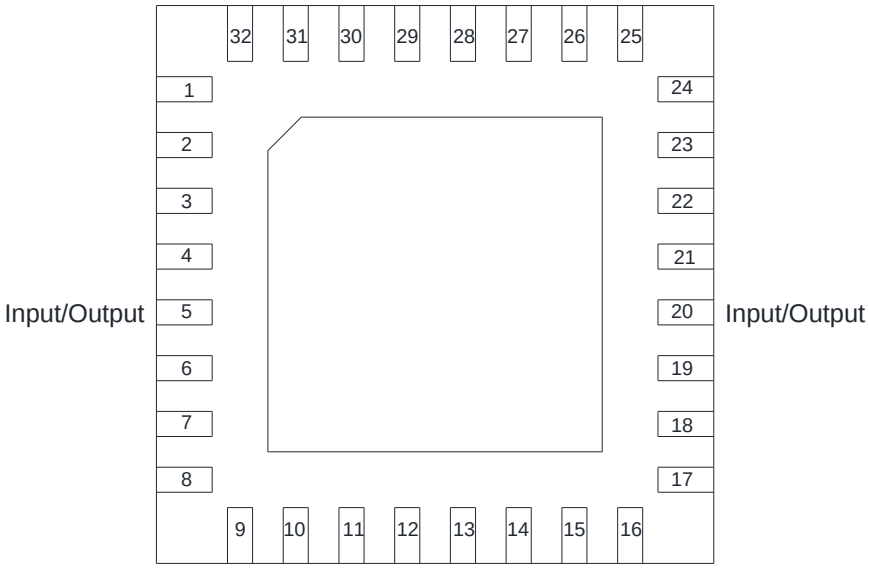
Revision History

Revision Code	Revision Date	Comment
-	December 2022	Datasheet Initial Release
A	February 2023	Added MFBC-00016PSM
B	April 2023	Added MFBC-00010PSM – MFBC-00015PSM

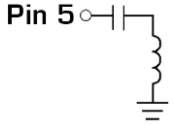
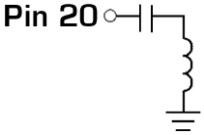
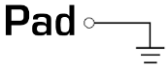
2 Port Configurations and Functions

2.1 Port Diagram

A top-down x-ray view of the MFBC-000XXPSM package outline drawing is shown below. The MMIC bandpass filters are symmetrical allowing Pin 5 or Port 20 to be used as the input.



2.2 Port Functions

Port	Function	Description	Equivalent Circuit
Pin 5	Input/Output	Pin 5 is DC open to ground for the PSM package.	
Pin 20	Input/Output	Pin 20 is DC open to ground for the PSM package.	
Pad	Ground	PSM package ground path is provided through the substrate and ground bond pads.	

3 Specifications

3.1 Absolute Maximum Ratings

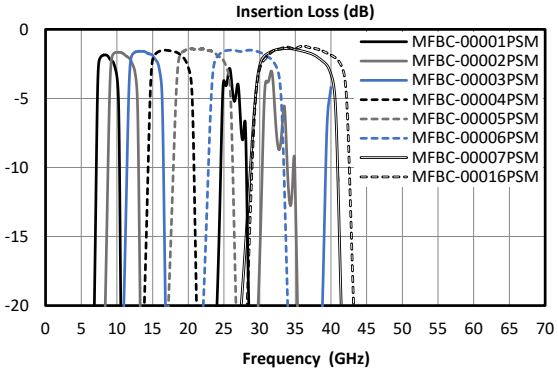
The Absolute Maximum Ratings indicate limits beyond which damage may occur to the device. If these limits are exceeded, the device may be inoperable or have a reduced lifetime.

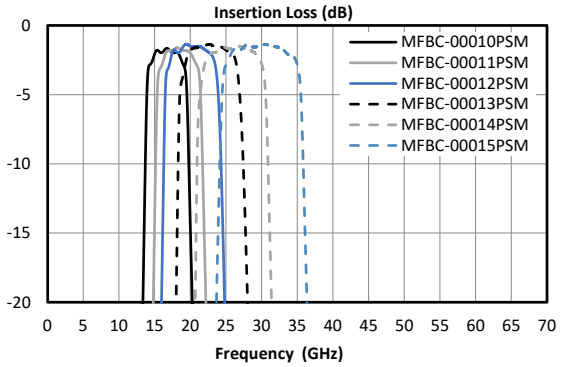
Device	Parameter	Maximum Rating	Units
MFBC-00001PSM	DC Current: Port 1 / Port 2	800	mA
MFBC-00002PSM	DC Current: Port 1 / Port 2	800	mA
MFBC-00003PSM	DC Current: Port 1 / Port 2	800	mA
MFBC-00004PSM	DC Current: Port 1 / Port 2	800	mA
MFBC-00005PSM	DC Current: Port 1 / Port 2	800	mA
MFBC-00006PSM	DC Current: Port 1 / Port 2	800	mA
MFBC-00007PSM	DC Current: Port 1 / Port 2	400	mA
MFBC-00010PSM	DC Current: Port 1 / Port 2	400	mA
MFBC-00011PSM	DC Current: Port 1 / Port 2	400	mA
MFBC-00012PSM	DC Current: Port 1 / Port 2	600	mA
MFBC-00013PSM	DC Current: Port 1 / Port 2	400	mA
MFBC-00014PSM	DC Current: Port 1 / Port 2	400	mA
MFBC-00015PSM	DC Current: Port 1 / Port 2	600	mA
MFBC-00016PSM	DC Current: Port 1 / Port 2	800	mA
MFBC-000XXPSM	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 Passband Comparison





Part Number	1dBc Cutoff Low (GHz)	1dBc Cutoff High (GHz)
MFBC-00001PSM	7.40	9.90
MFBC-00002PSM	9.13	12.40
MFBC-00003PSM	11.85	15.90
MFBC-00004PSM	14.90	19.90
MFBC-00005PSM	18.60	25.10
MFBC-00006PSM	23.60	32.20
MFBC-00007PSM	30.10	39.30
MFBC-00010PSM	14.60	18.90
MFBC-00011PSM	16.15	20.70
MFBC-00012PSM	17.20	23.40
MFBC-00013PSM	19.50	26.20
MFBC-00014PSM	22.20	29.90
MFBC-00015PSM	25.40	34.70
MFBC-00016PSM	30.60	41.00

3.4 Electrical Specifications

The electrical specifications apply at T_A=+25°C in a 50Ω system. Typical data shown is for the filter in a PSM package with a sine wave input applied to Pin 5.

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

MFBC-00001PSM	Frequency (GHz)	Min	Typ.	Max
Center Frequency, f_c (GHz)			8.70	
1dBc Passband (GHz)			7.40 – 9.90	
3dBc Passband (GHz)			7.25 – 10.25	
Insertion Loss @ f_c (dB)	8.70		2.00	
Passband Return Loss (dB)	7.35 – 10.25		15	
Stopband Suppression (dB)	DC – 5GHz	40	82	
	12.00 – 20.00	40	54	
Group Delay (ps)			673	
Impedance (Ω)			50	

MFBC-00002PSM	Frequency (GHz)	Min	Typ.	Max
Center Frequency, f_c (GHz)			11.00	
1dBc Passband (GHz)			9.13 – 12.40	
3dBc Passband (GHz)			9.00 – 12.85	
Insertion Loss @ f_c (dB)	11.00		1.80	
Passband Return Loss (dB)	9.20 – 12.85		15	
Stopband Suppression (dB)	DC – 6	40	82	
	15.00 – 26.00	40	50	
Group Delay (ps)			508	
Impedance (Ω)			50	

MFBC-00003PSM	Frequency (GHz)	Min	Typ.	Max
Center Frequency, f_c (GHz)			14.15	
1dBc Passband (GHz)			11.85 – 15.90	
3dBc Passband (GHz)			11.65 – 16.30	
Insertion Loss @ f_c (dB)	14.15		1.70	
Passband Return Loss (dB)	11.85 – 16.30		15	
Stopband Suppression (dB)	DC – 8.5	40	82	
	19.00 – 34.00	40	50	
Group Delay (ps)			434	
Impedance (Ω)			50	

MFBC-00004PSM	Frequency (GHz)	Min	Typ.	Max
Center Frequency, f_c (GHz)			17.50	
1dBc Passband (GHz)			14.90 – 19.90	
3dBc Passband (GHz)			14.65 – 20.50	
Insertion Loss @ f_c (dB)	17.50		1.60	
Passband Return Loss (dB)	14.95 – 20.50		15	
Stopband Suppression (dB)	DC – 11.00	40	71	
	23.00 – 40.00	40	52	
Group Delay (ps)			350	
Impedance (Ω)			50	

MFBC-00005PSM	Frequency (GHz)	Min	Typ.	Max
Center Frequency, f_c (GHz)			22.00	
1dBc Passband (GHz)			18.60 – 25.10	
3dBc Passband (GHz)			18.30 – 25.90	
Insertion Loss @ f_c (dB)	22.00		1.40	
Passband Return Loss (dB)	18.65 – 25.90		15	
Stopband Suppression (dB)	DC – 14.00	40	71	
	28.00 – 40.00	30	46	
Group Delay (ps)			274	
Impedance (Ω)			50	

MFBC-00006PSM	Frequency (GHz)	Min	Typ.	Max
Center Frequency, f_c (GHz)			28.00	
1dBc Passband (GHz)			23.60 – 32.20	
3dBc Passband (GHz)			23.25 – 33.00	
Insertion Loss @ f_c (dB)	28.00		1.60	
Passband Return Loss (dB)	23.50 – 32.90		15	
Stopband Suppression (dB)	DC – 18.00	40	67	
	38.00 – 67.00	40	51	
Group Delay (ps)			231	
Impedance (Ω)			50	

MFBC-00007PSM	Frequency (GHz)	Min	Typ.	Max
Center Frequency, f_c (GHz)			35.00	
1dBc Passband (GHz)			30.10 – 39.30	
3dBc Passband (GHz)			29.50 – 40.50	
Insertion Loss @ f_c (dB)	35.00		1.50	
Passband Return Loss (dB)	30.00 – 40.00		15	
Stopband Suppression (dB)	DC – 21.00	40	63	
	44.00 – 67.00	40	50	
Group Delay (ps)			193	
Impedance (Ω)			50	

MFBC-00010PSM	Frequency (GHz)	Min	Typ.	Max
Center Frequency, f_c (GHz)			16.50	
1dBc Passband (GHz)			14.60 – 18.90	
3dBc Passband (GHz)			13.93 – 19.50	
Insertion Loss @ f_c (dB)	16.50		1.70	
Passband Return Loss (dB)	13.93 – 19.50		13	
Stopband Suppression (dB)	DC – 12.00	40	82	
	23.00 – 40.00	40	54	
Group Delay (ps)			356	
Impedance (Ω)			50	

MFBC-00011PSM	Frequency (GHz)	Min	Typ.	Max
Center Frequency, f_c (GHz)			18.50	
1dBc Passband (GHz)			16.15 – 20.70	
3dBc Passband (GHz)			15.40 – 21.40	
Insertion Loss @ f_c (dB)	18.50		1.70	
Passband Return Loss (dB)	16.15 – 20.70		12	
Stopband Suppression (dB)	DC – 13.50	40	76	
	24.00 – 40.00	40	51	
Group Delay (ps)			305	
Impedance (Ω)			50	

MFBC-00012PSM	Frequency (GHz)	Min	Typ.	Max
Center Frequency, f_c (GHz)			20.30	
1dBc Passband (GHz)			17.20 – 23.40	
3dBc Passband (GHz)			16.50 – 23.90	
Insertion Loss @ f_c (dB)	20.30		1.55	
Passband Return Loss (dB)	17.20 – 23.40		10	
Stopband Suppression (dB)	DC – 14	40	75	
	27.00 – 40.00	40	49	
Group Delay (ps)			281	
Impedance (Ω)			50	

MFBC-00013PSM	Frequency (GHz)	Min	Typ.	Max
Center Frequency, f_c (GHz)			22.50	
1dBc Passband (GHz)			19.50 – 26.20	
3dBc Passband (GHz)			18.60 – 26.80	
Insertion Loss @ f_c (dB)	22.50		1.50	
Passband Return Loss (dB)	19.50 – 26.20		12	
Stopband Suppression (dB)	DC – 14.00	40	75	
	27.00 – 40.00	40	49	
Group Delay (ps)			251	
Impedance (Ω)			50	

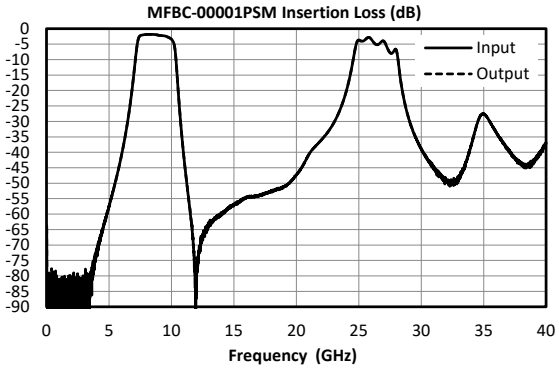
MFBC-00014PSM	Frequency (GHz)	Min	Typ.	Max
Center Frequency, f_c (GHz)			25.75	
1dBc Passband (GHz)			22.20 – 29.90	
3dBc Passband (GHz)			21.30 – 30.50	
Insertion Loss @ f_c (dB)	25.75		1.75	
Passband Return Loss (dB)	22.20 – 29.90		15	
Stopband Suppression (dB)	DC – 19.00	40	58	
	33.00 – 40.00	40	54	
Group Delay (ps)			233	
Impedance (Ω)			50	

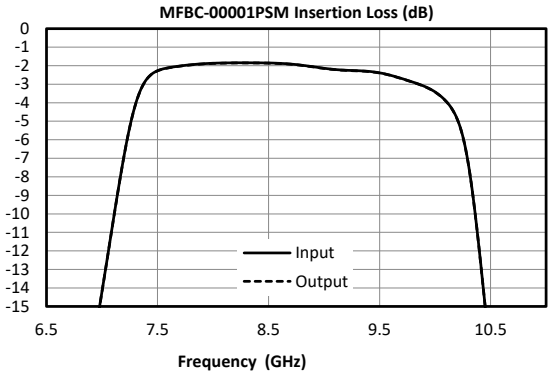
MFBC-00015PSM	Frequency (GHz)	Min	Typ.	Max
Center Frequency, f_c (GHz)			30.00	
1dBc Passband (GHz)			25.40 – 34.70	
3dBc Passband (GHz)			24.50 – 35.40	
Insertion Loss @ f_c (dB)	30.00		1.39	
Passband Return Loss (dB)	25.40 – 34.70		12	
Stopband Suppression (dB)	DC – 21.00	40	70	
	38.00 – 67.00	30	45	
Group Delay (ps)			203	
Impedance (Ω)			50	

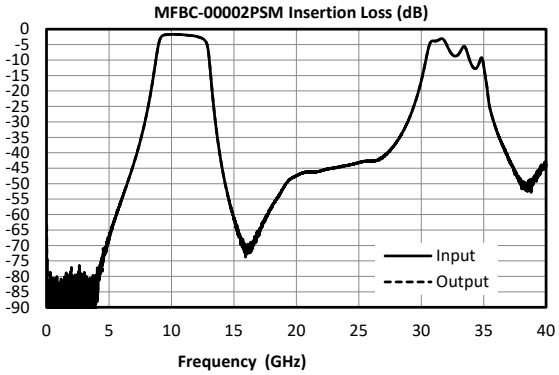
MFBC-00016PSM	Frequency (GHz)	Min	Typ.	Max
Center Frequency, f_c (GHz)			36.00	
1dBc Passband (GHz)			30.60 – 41.00	
3dBc Passband (GHz)			29.60 – 42.10	
Insertion Loss @ f_c (dB)	36.00		1.21	
Passband Return Loss (dB)	30.60 – 41.00		13	
Stopband Suppression (dB)	DC – 26.00	40	76	
		30	45	
Group Delay (ps)			170	
Impedance (Ω)			50	

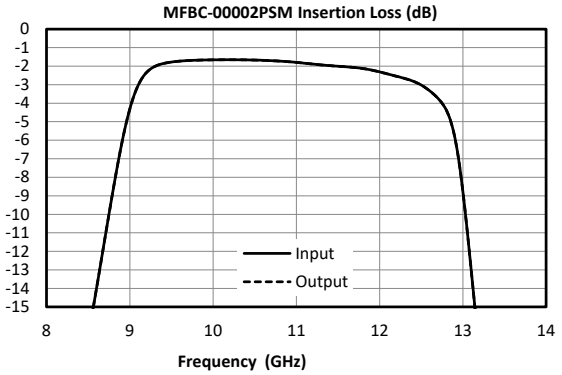
3.5 Typical Performance Plots

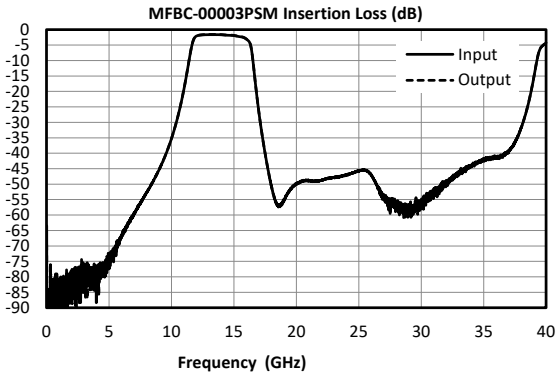
3.5.1 Insertion Loss

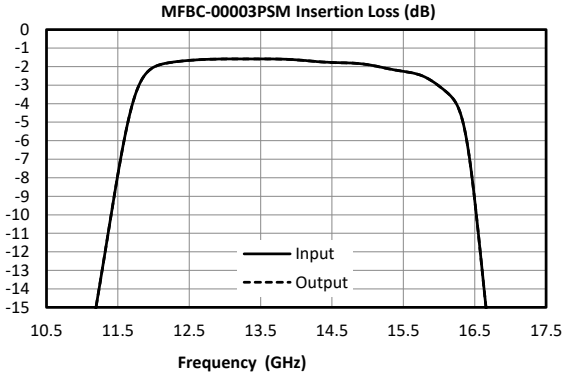


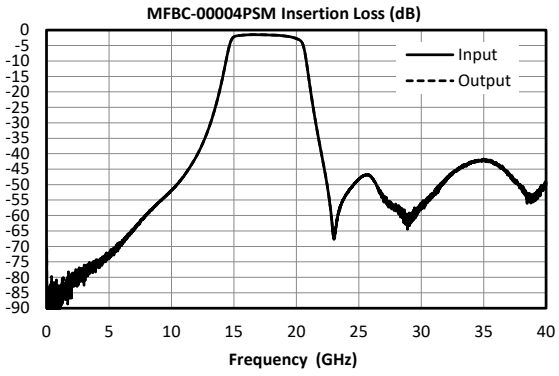


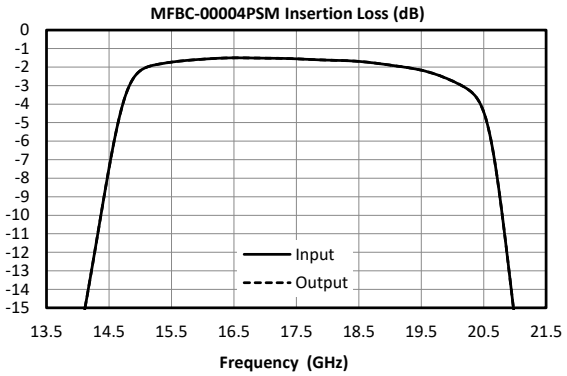


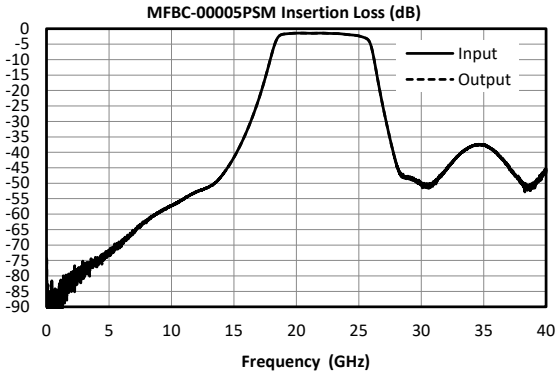


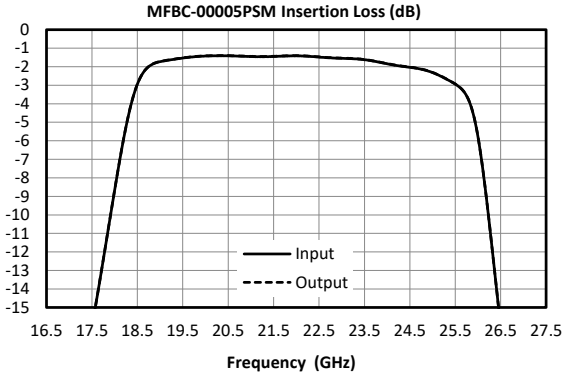


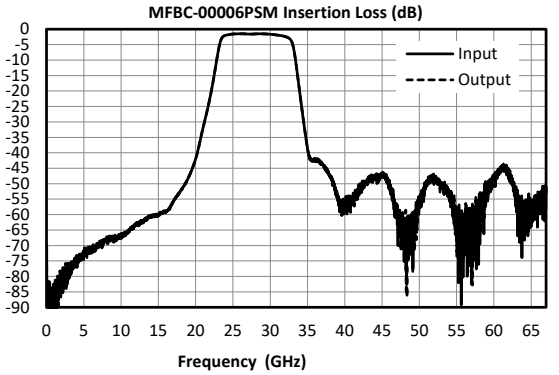


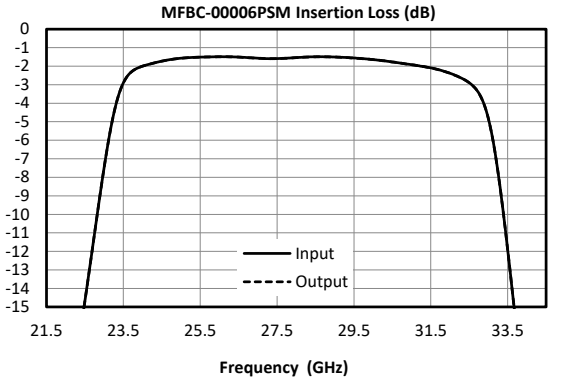


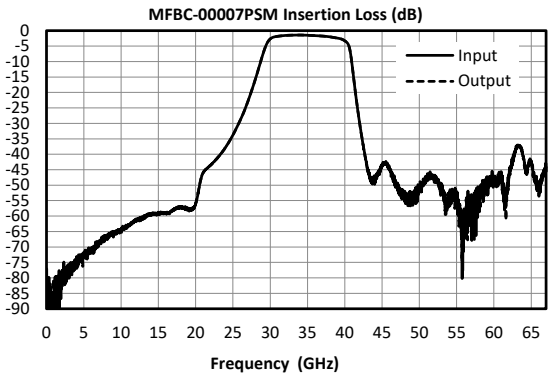


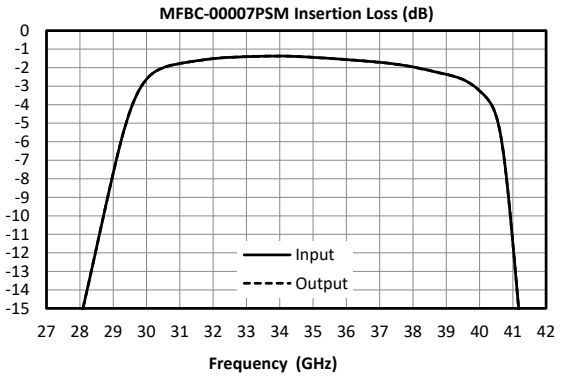


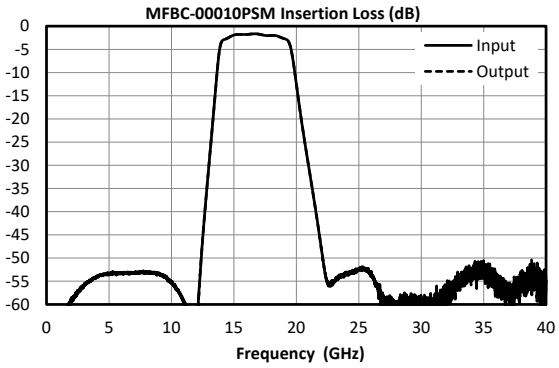


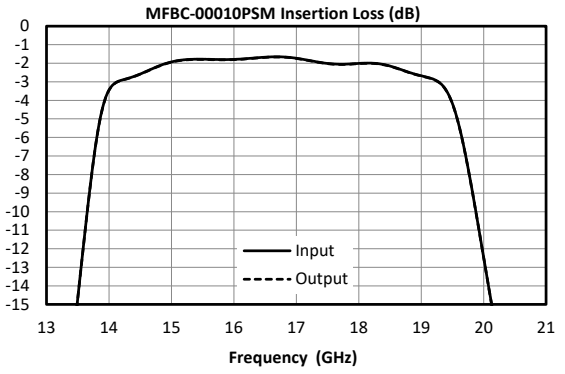


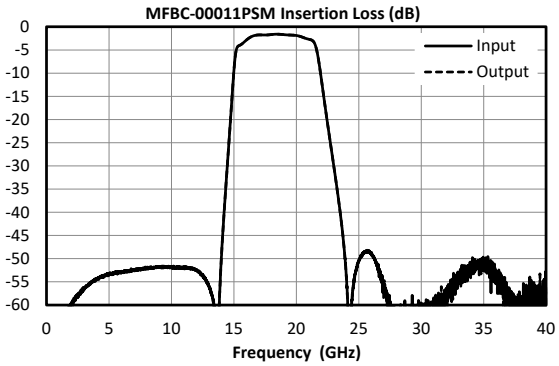


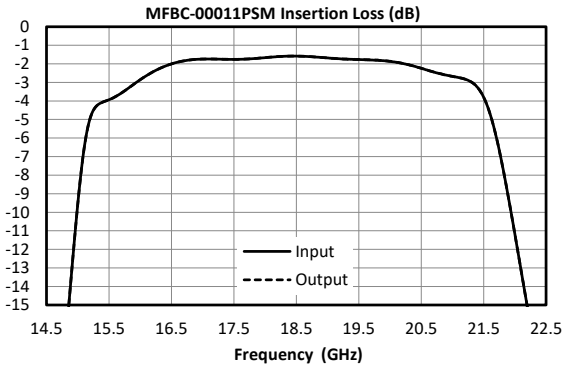


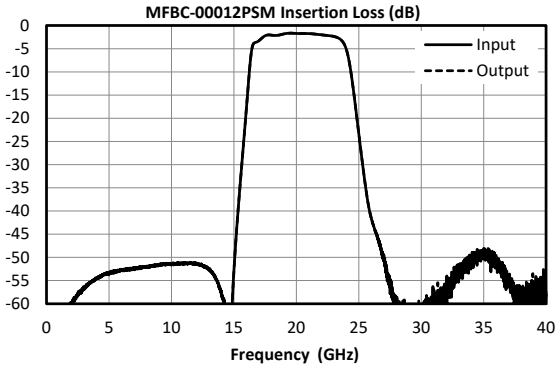


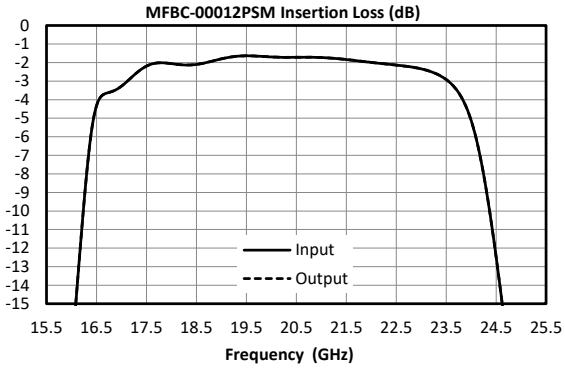


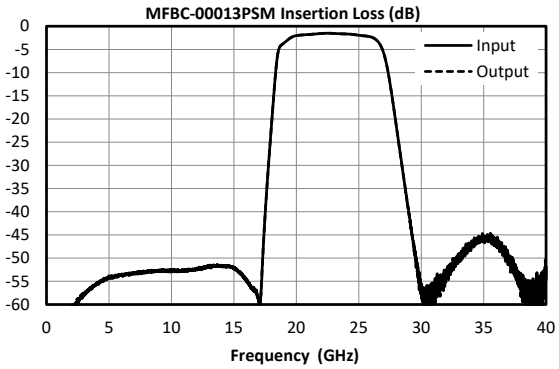


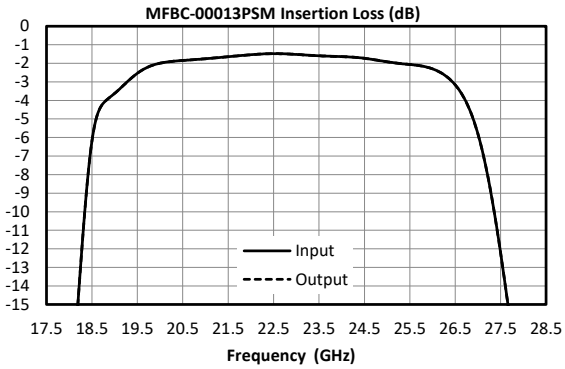


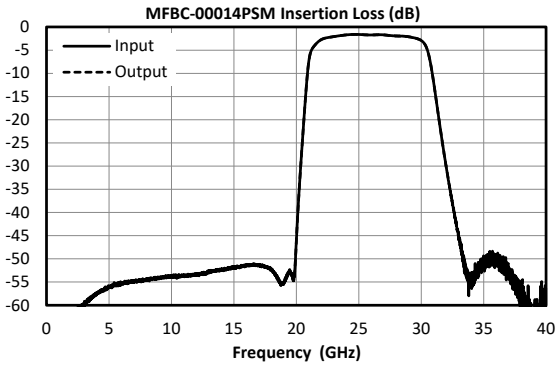


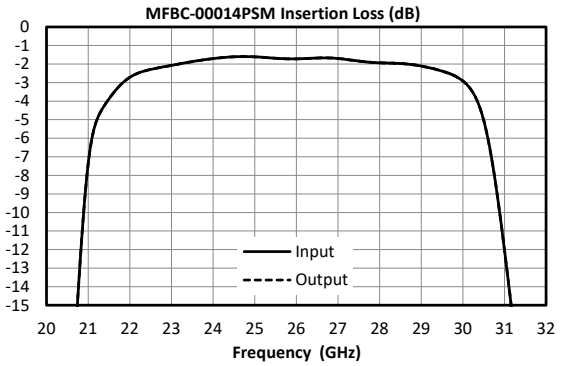


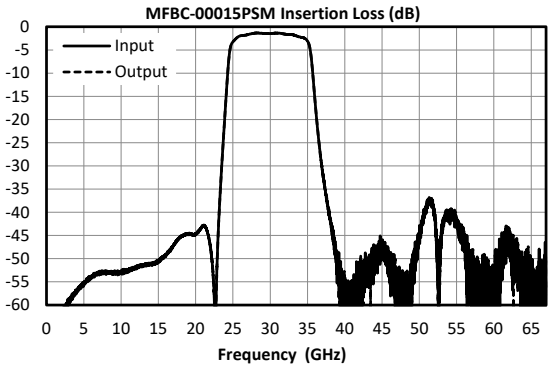


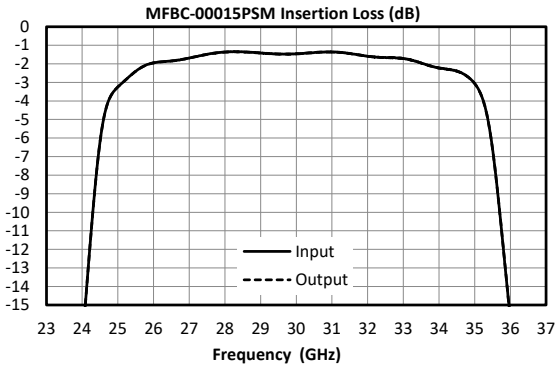


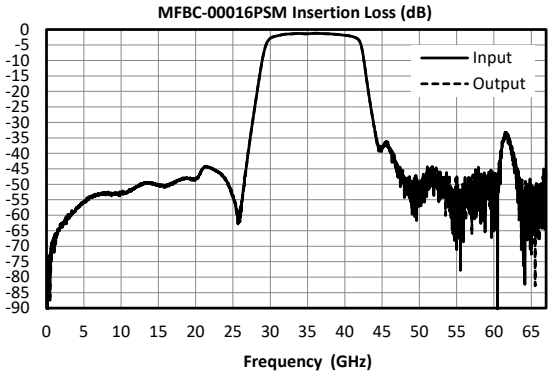


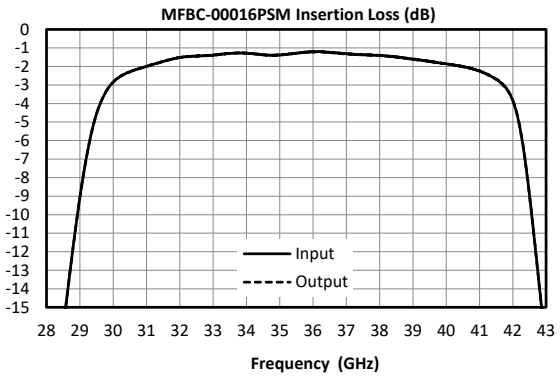




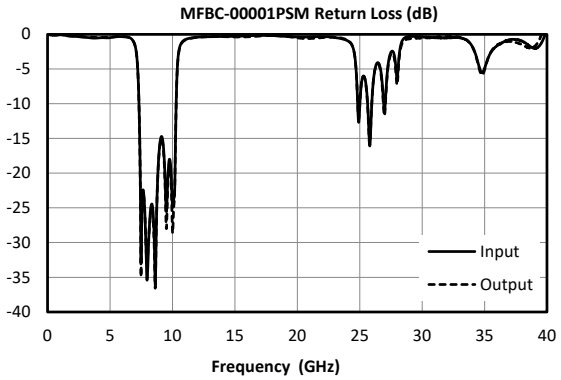


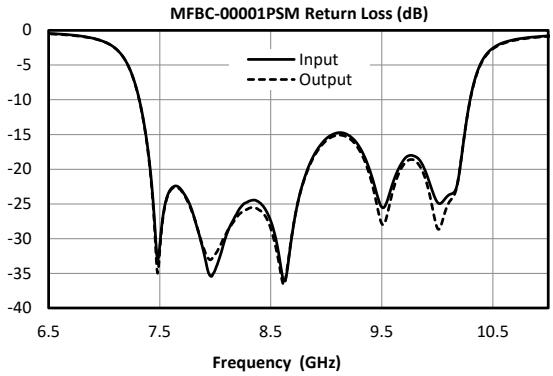


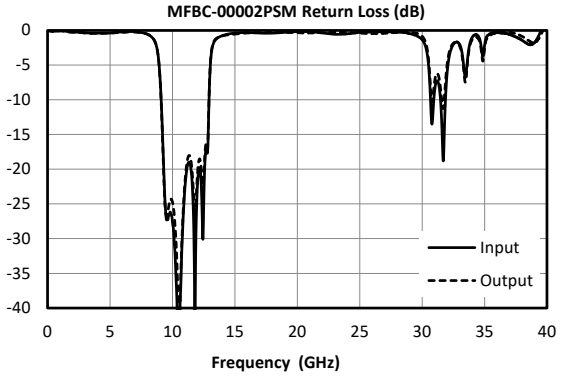


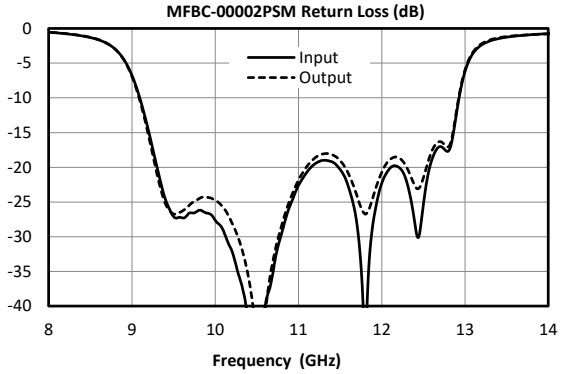


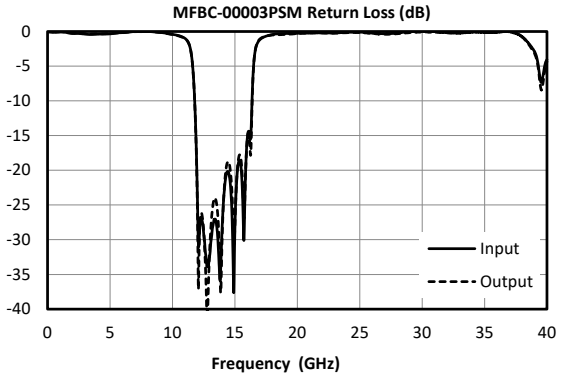
3.5.2 Return Loss

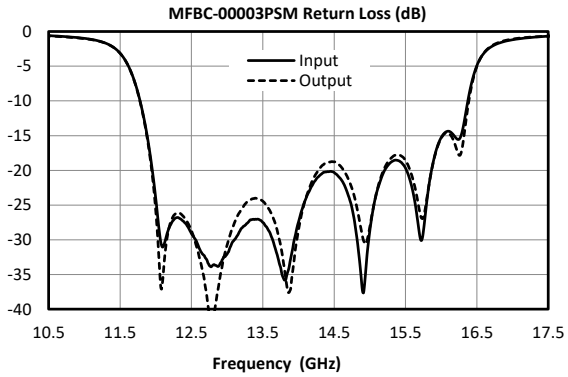


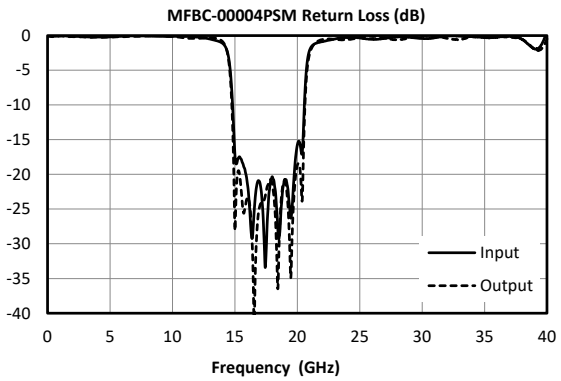


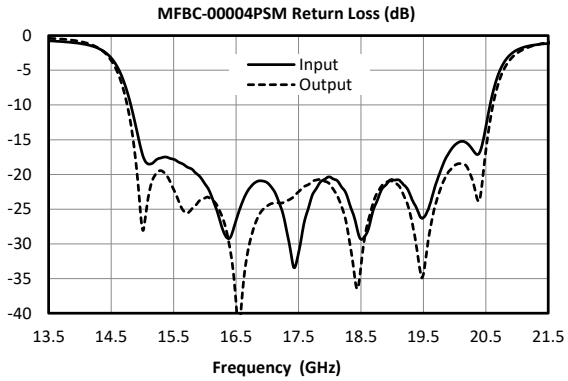


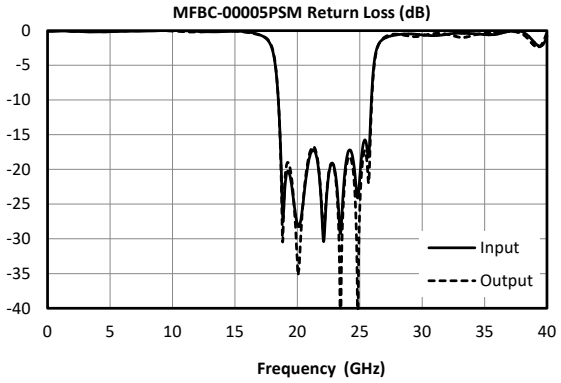


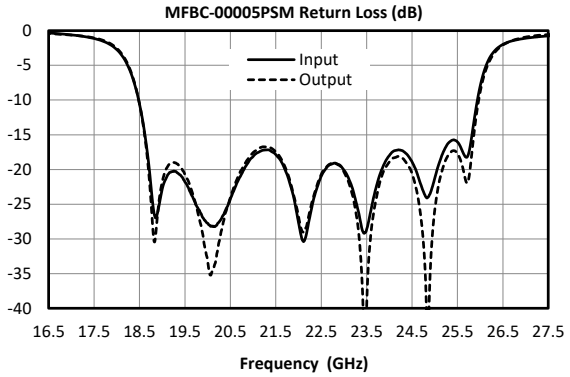


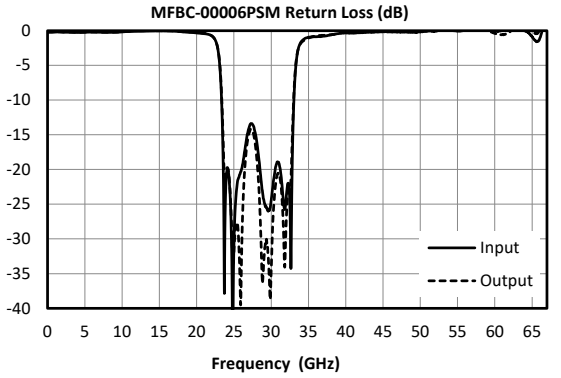


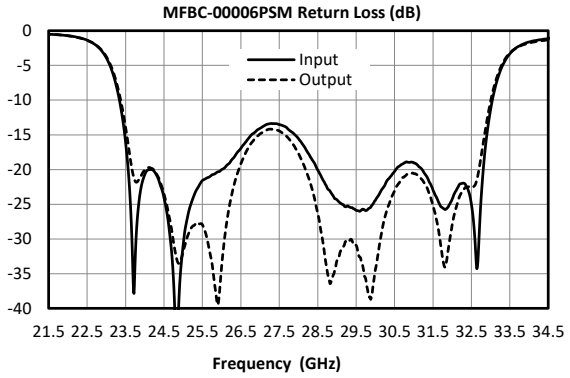


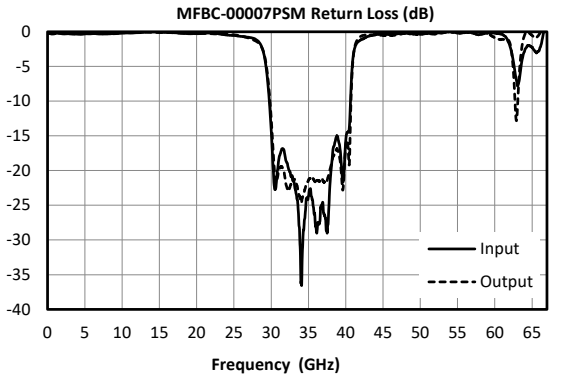


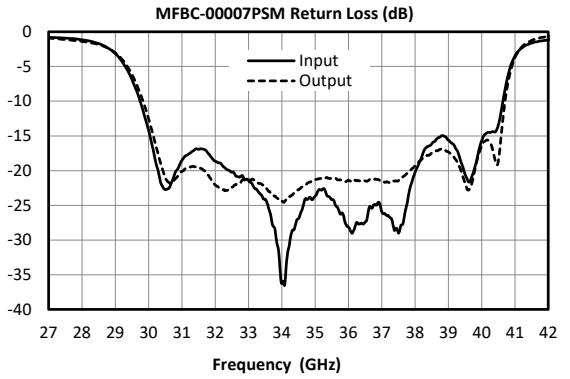


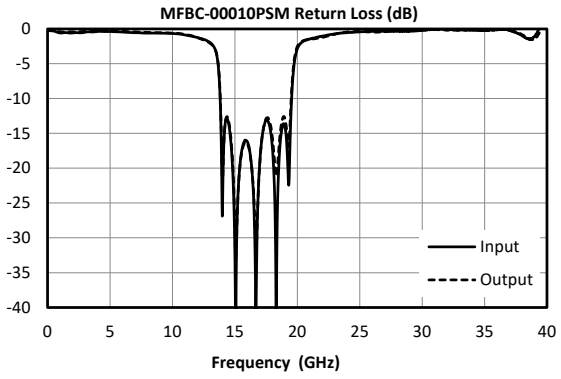


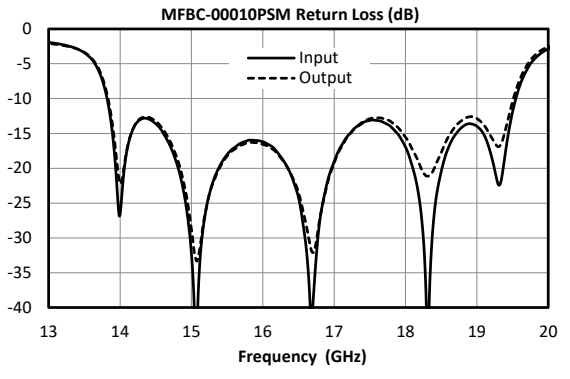


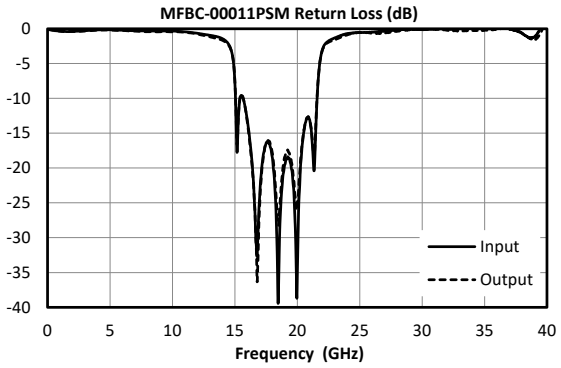


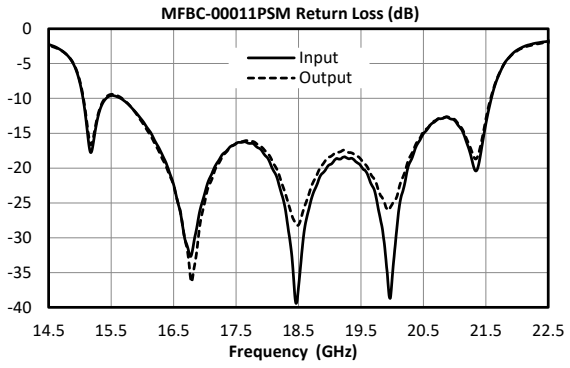


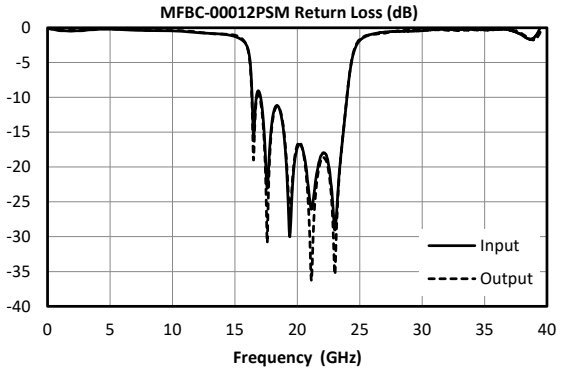


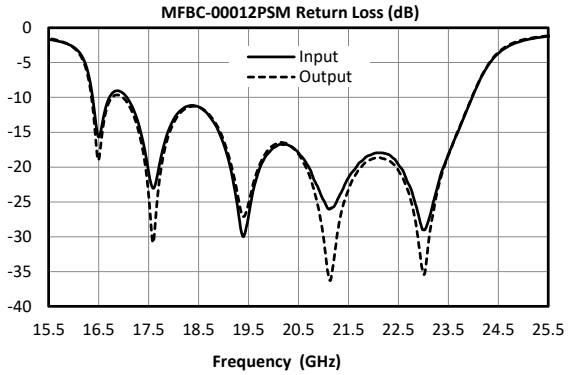


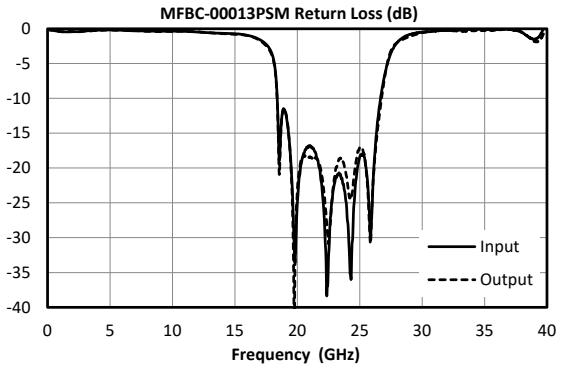


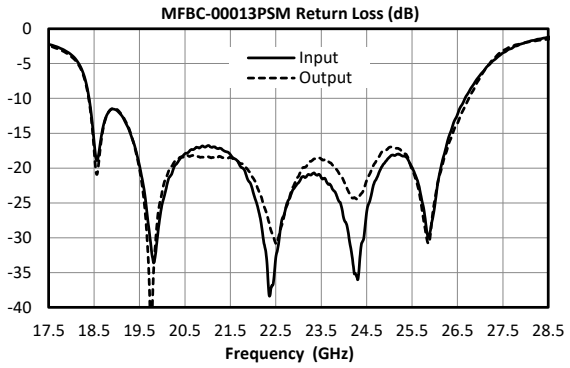


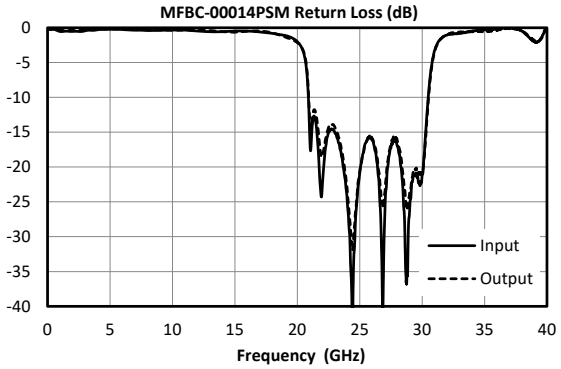


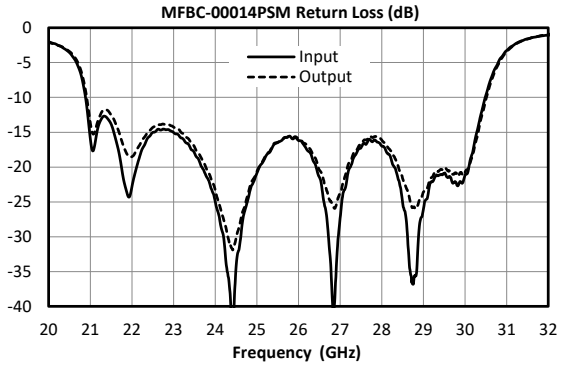


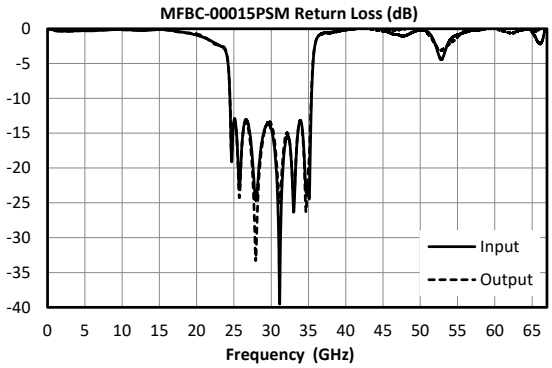


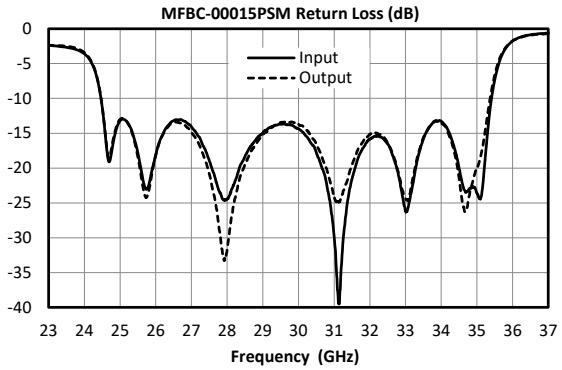


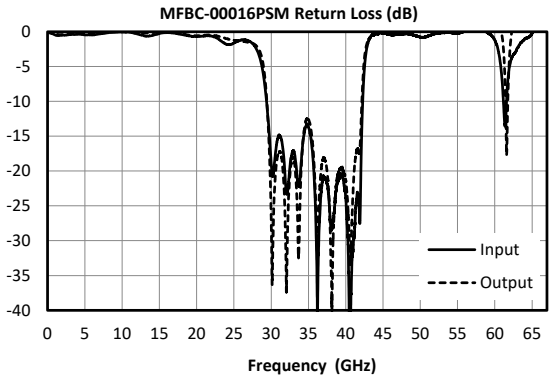


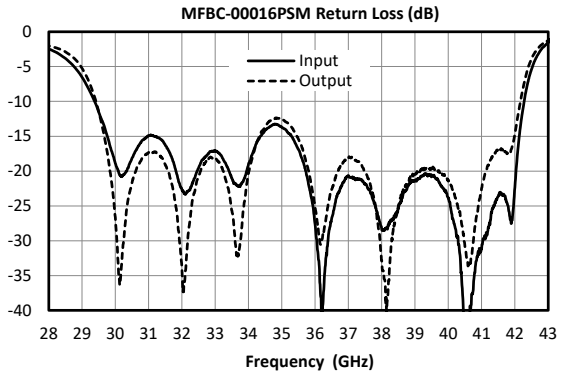




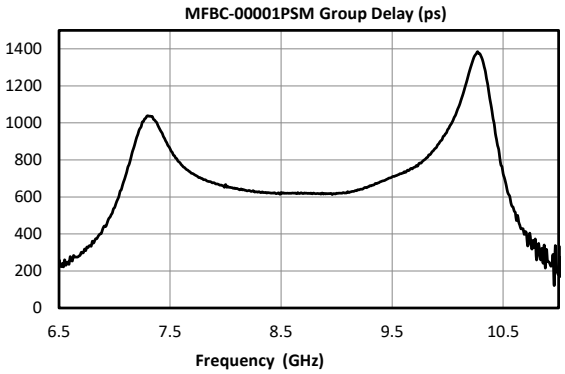


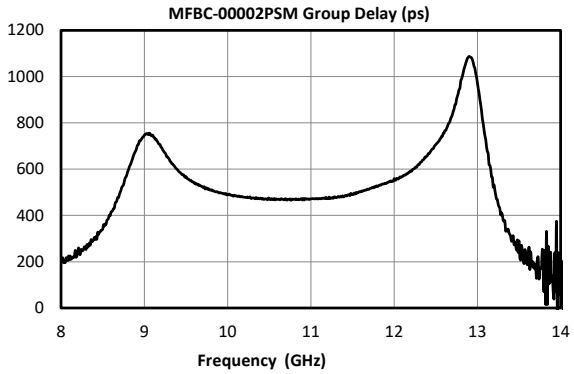


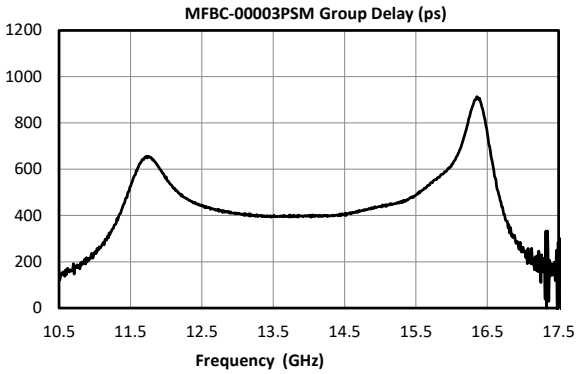


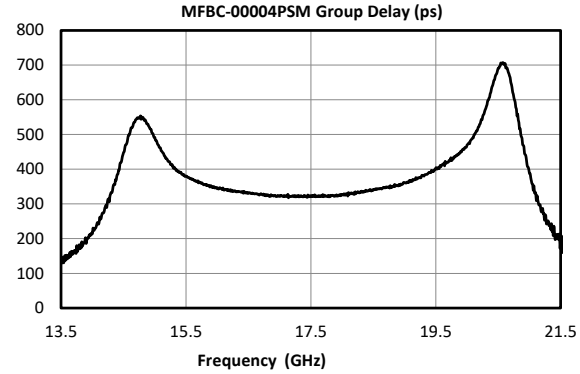


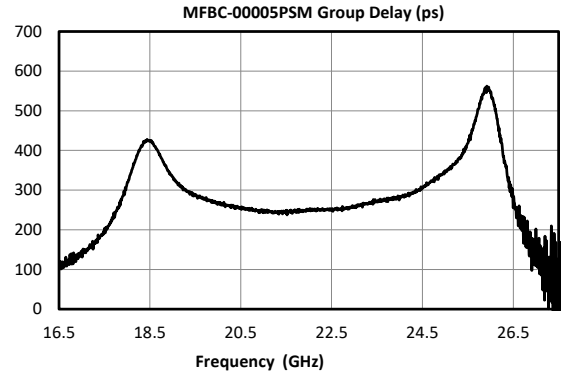
3.5.3 Group Delay

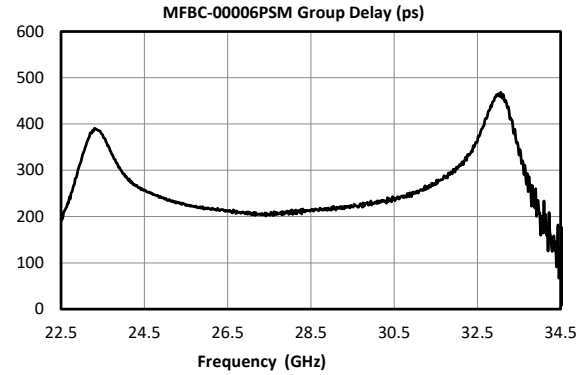


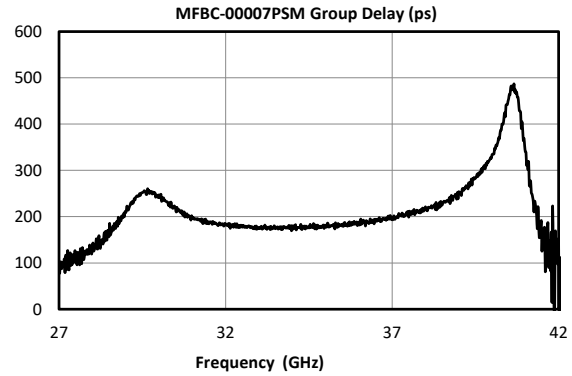


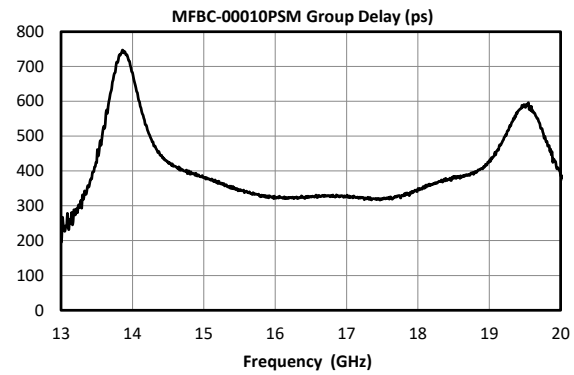


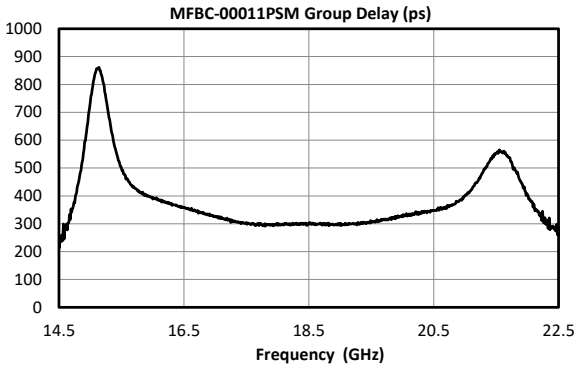


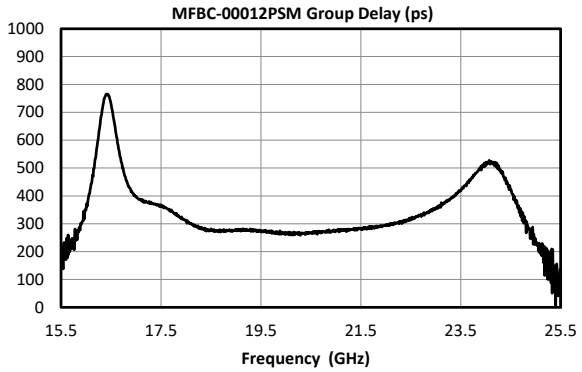


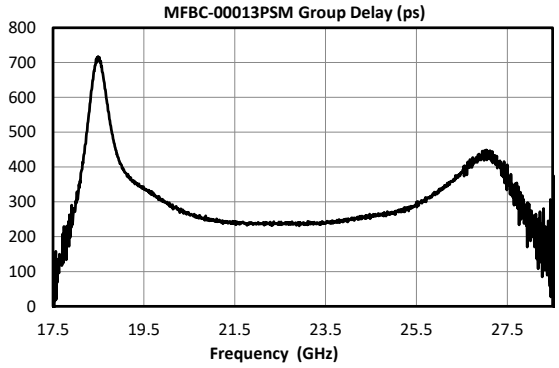


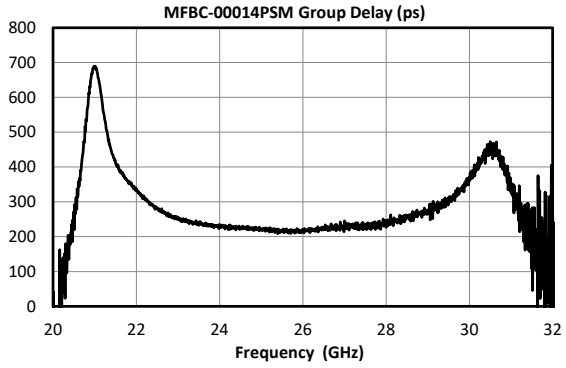


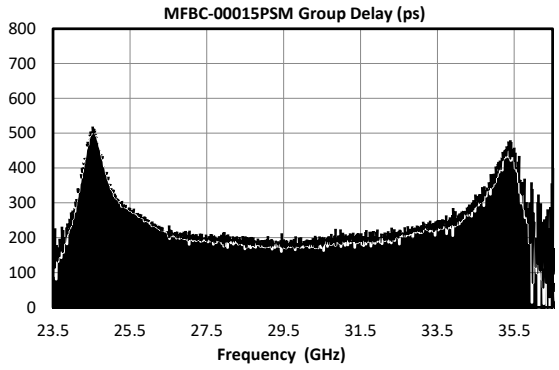


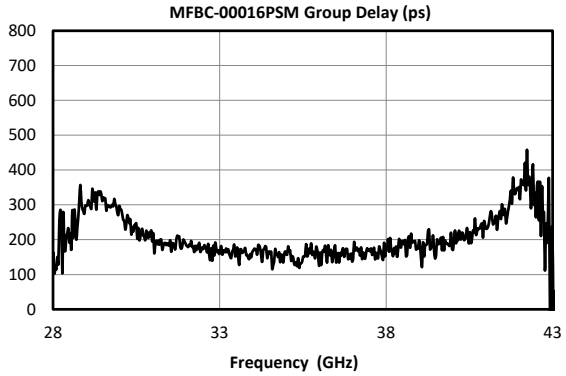








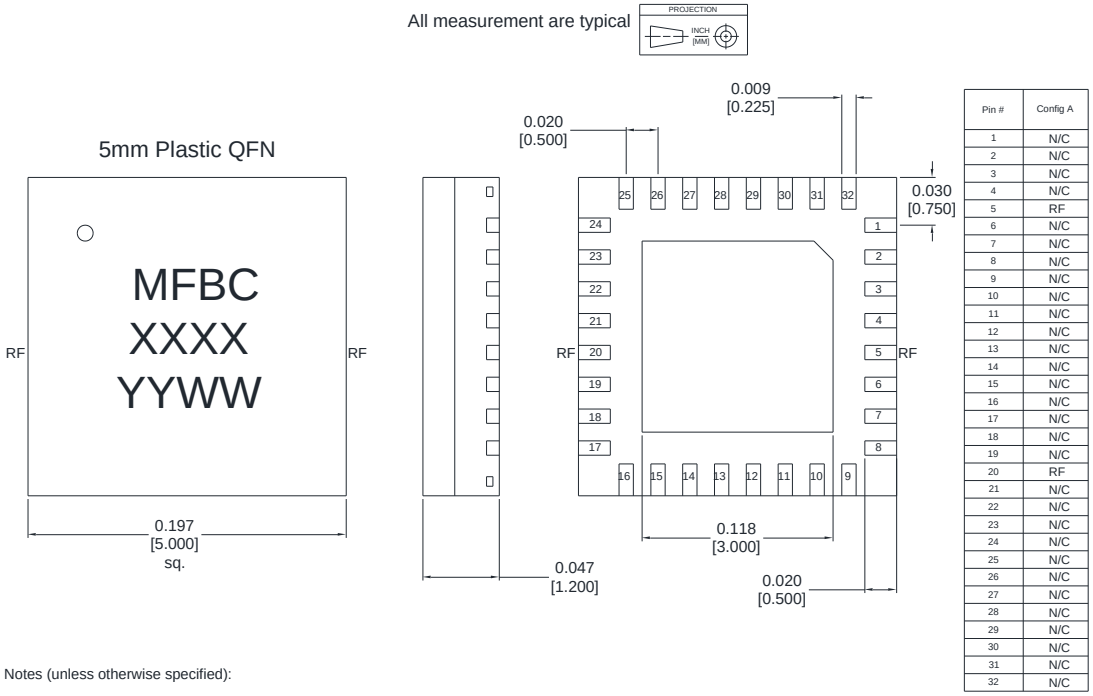




4 Mechanical Data

4.1 PSM Package Outline Drawing

All measurement are typical



Pin #	Config A
1	N/C
2	N/C
3	N/C
4	N/C
5	RF
6	N/C
7	N/C
8	N/C
9	N/C
10	N/C
11	N/C
12	N/C
13	N/C
14	N/C
15	N/C
16	N/C
17	N/C
18	N/C
19	N/C
20	RF
21	N/C
22	N/C
23	N/C
24	N/C
25	N/C
26	N/C
27	N/C
28	N/C
29	N/C
30	N/C
31	N/C
32	N/C

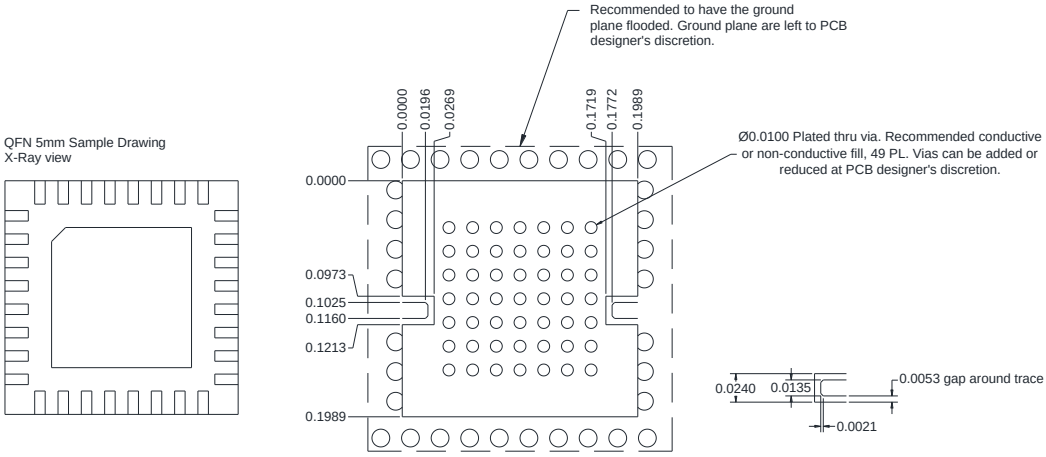
Notes (unless otherwise specified):

1. Substrate material is LCP.
2. I/O Leads and Die Paddle are:
   0.008 - 0.05 µm Gold, over
   0.02 - 0.15 µm Palladium, over
   0.5 - 2.0 µm Nickel.
3. All unconnected pins should be connected to PCB RF ground.

Part Number	Lid Label
MFBC-00001PSM	8163
MFBC-00002PSM	8164
MFBC-00003PSM	8165
MFBC-00004PSM	8166
MFBC-00005PSM	8167
MFBC-00006PSM	8168
MFBC-00007PSM	8169
MFBC-00010PSM	8245
MFBC-00011PSM	8246
MFBC-00012PSM	8247
MFBC-00013PSM	8248
MFBC-00014PSM	8249
MFBC-00015PSM	8250
MFBC-00016PSM	8251

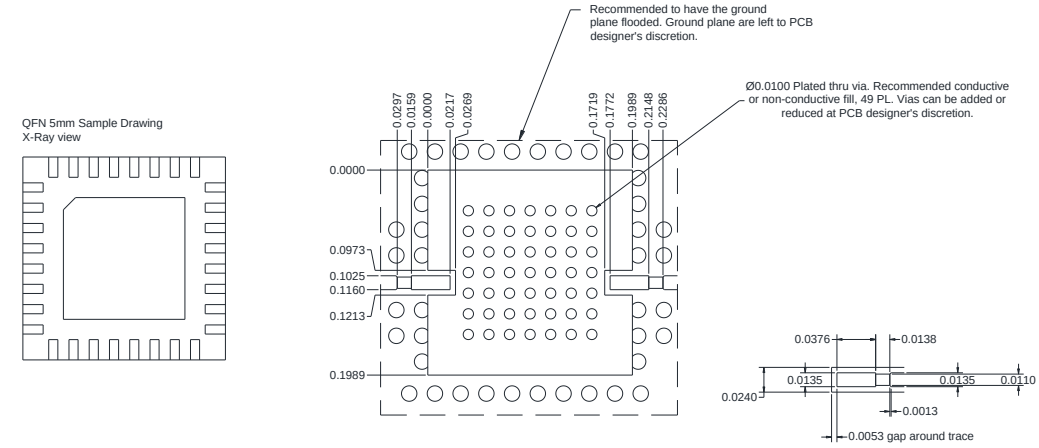
4.2 PSM Package Footprint

MFBC-00001/2/3/10-15PSM



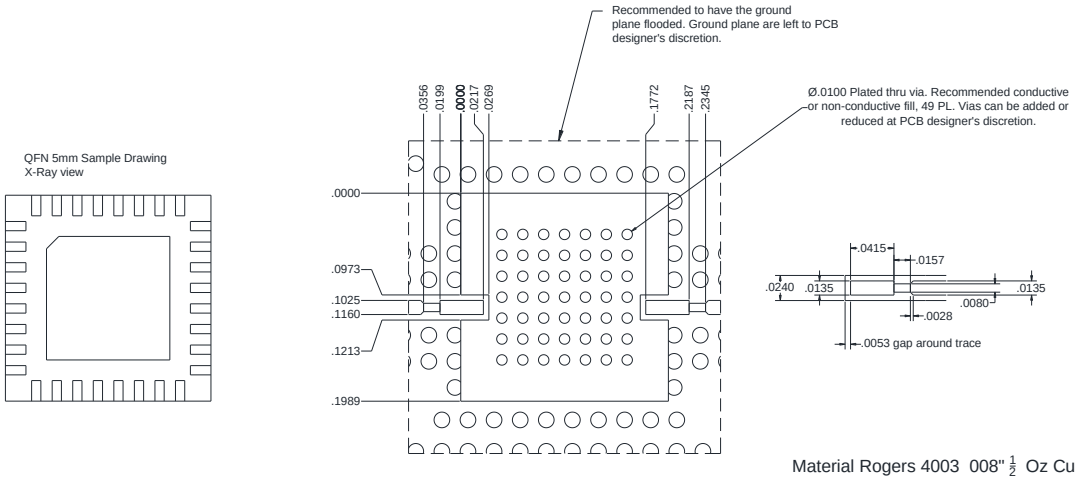
Material Rogers 4003 008" $\frac{1}{2}$ Oz Cu both sides.

MFBC-00004PSM



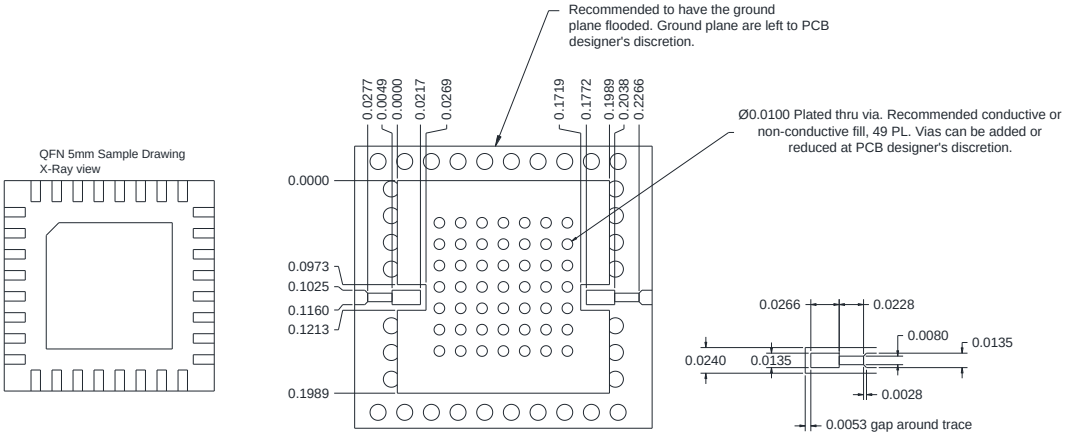
Material Rogers 4003 008" $\frac{1}{2}$ Oz Cu both sides.

MFBC-00005PSM



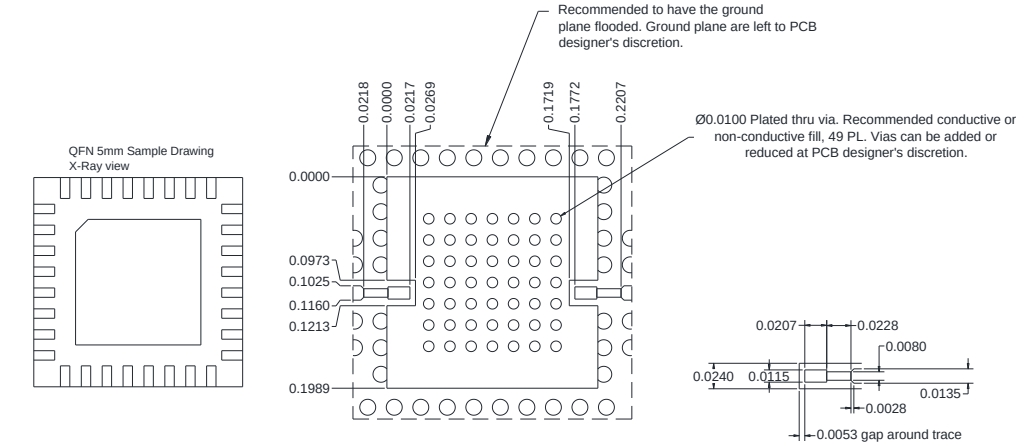
Material Rogers 4003 008" $\frac{1}{2}$ Oz Cu both sides.

MFBC-00006PSM



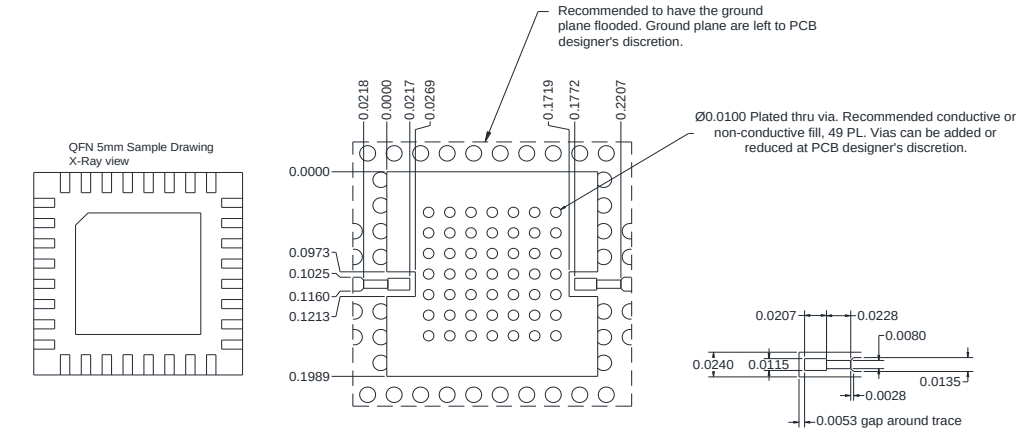
Material Rogers 4003 008" ½ Oz Cu both sides.

MFBC-00007PSM



Material Rogers 4003 008" ½ Oz Cu both sides.

MFBC-000016PSM

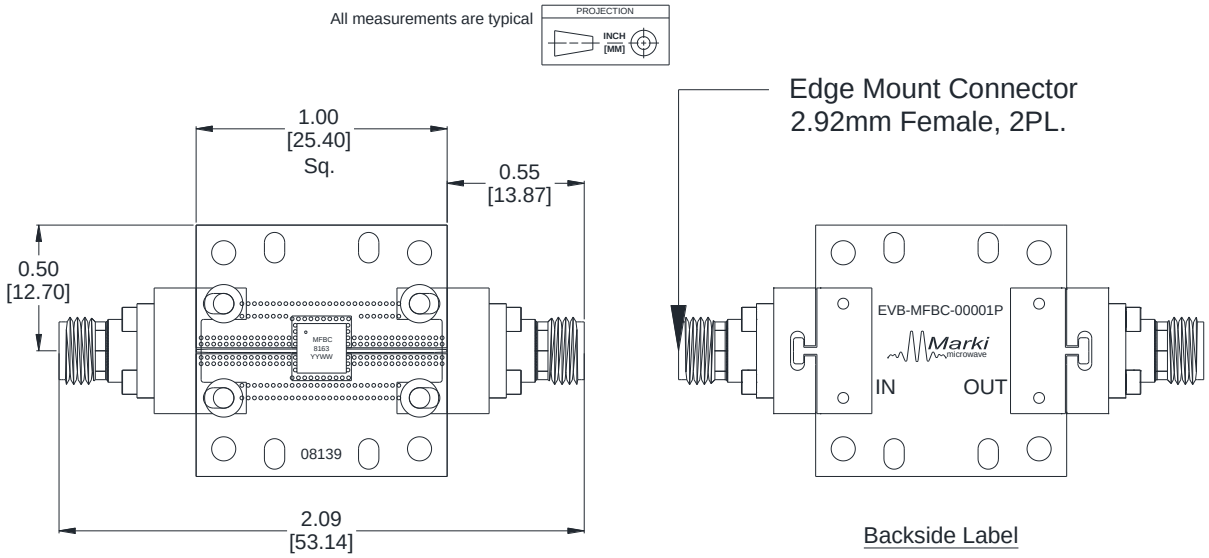


Material Rogers 4003 008" ½ Oz Cu both sides.

QFN-Package Surface-Mount Landing Pattern
Click here for a DXF of the above layouts.
Click here for leaded solder reflow. Click here for lead-free solder reflow

4.3 EVB Package Outline

EVB-MFBC-00001P – EVB-MFBC-00015P



EVB-MFBC-000016P