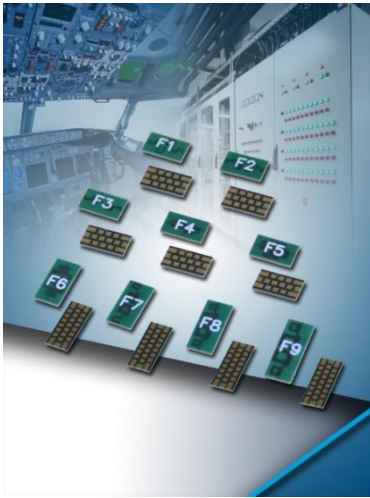


# Multilayer Organic (MLO®) Band Pass Filters

## BP Series

### GENERAL DESCRIPTION

The BP series of MLO® High Performance Band Pass Filters exhibit low insertion loss, steep roll-offs, and very high rejection of out of band frequencies. MLO® Band Pass Filters support many frequency bands and multiple wireless standards, and are less than 1.0mm in thickness.

MLO components are low profile devices with best in class performance based on AVX's patented multilayer organic high density interconnect technology. MLO components utilize high dielectric constant and low loss materials to realize high Q passive printed elements, such as inductors and capacitors, in a multilayer stack. All MLO components are expansion matched to most organic PCB materials, thereby resulting in improved reliability over standard Si and ceramic devices.

### FEATURES

- Low insertion loss
- High rejection out-of-band
- Steep roll-off
- 50Ω Impedance
- Expansion matched to PCB
- Surface Mount
- RoHS Compliant

### APPLICATIONS

- Wireless Communications Systems
- Military Radios
- EMS Radios
- UAVs
- Basestations
- Wireless access points and terminals
- Instrumentation

### LAND GRID ARRAY ADVANTAGES

- Inherent Low Profile
- Excellent Solderability
- Low Parasitics
- Better Heat Dissipation

### HOW TO ORDER

**BP**



**Series**  
Band Pass Filters

**OF**



**Case Size**  
0A = 2616  
0B = 3116  
0C = 3416  
0D = 4016  
0E = 4617  
0F = 5021

**A**



**Type**

**1100**



**Center Frequency**  
In MHz

**A**



**Standard Testing**

**7**



**Termination**  
7 – Gold

**00**



**Package Code**  
00 – Waffle Pack  
TR – 1000 pcs Tape & Reel  
TR1250 – 250 pcs Tape & Reel

### QUALITY INSPECTION

Finished Parts are 100% electrically tested

### TERMINATION

All finishes are compatible with automatic soldering technologies: Pb free reflow, wave soldering, vapor phase, and manual soldering.

### OPERATING TEMPERATURE

-55°C to +85°C




# Multilayer Organic (MLO®) Band Pass Filters

## BP Series



### ELECTRICAL SPECIFICATIONS

AVX PN	Fc (GHz)	Typical Insertion Loss @ Fc (dB)	Passband (GHz)	Insertion Loss (dB)		Stopband Rejection (GHz)						Rated RF Power (W)
						Low Band (DC - F3)			High Band (F4 - Fn)			
				Typ.	Max	-20dB	-30dB	-40dB	-20dB	-30dB	-40dB	
<a href="#">BP0CA0770A7**</a>	0.77	1.28	0.62 - 0.97	1.96	5	0.5	0.48	0.46	1.15 - 9.00	1.19 - 4.50	1.23 - 4.00	1
<a href="#">BP0CA1100A7**</a>	1.1	1.18	0.86 - 1.39	1.97	5	0.7	0.68	0.66	1.63 - 9.00	1.68 - 5.00	1.73 - 4.50	1
<a href="#">BP0FA1100A7**</a>	1.1	1.37	0.87 - 1.39	2.41	5	0.69	0.67	0.64	1.67 - 18.00	1.72 - 16.70	1.78 - 11.11	1
<a href="#">BP0FA1130A7**</a>	1.13	1.43	0.89 - 1.44	2.25	5	0.71	0.68	0.66	1.71 - 18.00	1.76 - 15.54	1.79 - 11.7	1
<a href="#">BP0FA1190A7**</a>	1.19	1.56	0.99 - 1.44	2.26	5	0.8	0.76	0.74	1.68 - 18.00	1.74 - 18.00	1.78 - 16.29	1
<a href="#">BP0CA1610A7**</a>	1.61	1.1	1.27 - 2.05	1.88	5	1.07	1.04	1.02	2.42 - 9.00	2.50 - 9.00	2.57 - 6.26	1
<a href="#">BP0EA1950A7**</a>	1.95	0.96	1.44 - 2.64	2.03	5	1.24	1.19	1.16	3.04 - 9.00	3.14 - 9.00	3.22 - 7.50	1
<a href="#">BP0EA1980A7**</a>	1.98	0.85	1.47 - 2.68	1.89	5	1.26	1.21	1.17	3.14 - 9.00	3.27 - 9.00	3.37 - 7.62	1
<a href="#">BP0EA2090A7**</a>	2.09	0.96	1.54 - 2.84	1.94	5	1.33	1.28	1.23	3.28 - 9.00	3.4 - 9.00	3.6 - 7.92	1
<a href="#">BP0EA2500A7**</a>	2.5	1.19	2.02 - 3.10	2.03	5	1.76	1.69	1.64	3.60 - 9.00	3.71 - 9.00	3.80 - 7.51	1
<a href="#">BP0EA2540A7**</a>	2.54	1.24	2.02 - 3.21	2.12	5	1.76	1.7	1.64	3.70 - 9.00	3.80 - 8.31	3.89 - 7.8	1
<a href="#">BP0EA2620A7**</a>	2.62	1.13	2.09 - 3.28	1.92	5	1.81	1.74	1.68	3.79 - 9.00	3.91 - 7.81	3.96 - 7.7	1
<a href="#">BP0EA3180A7**</a>	3.18	0.97	2.45 - 4.14	1.81	5	1.88	1.81	1.75	4.97 - 20.00	5.25 - 18.43	5.46 - 15.5	1
<a href="#">BP0EA3310A7**</a>	3.31	1.13	2.62 - 4.19	1.79	5	1.99	1.91	1.86	4.99 - 20.00	5.22 - 19.05	5.41 - 15.94	1
<a href="#">BP0EA3430A7**</a>	3.43	1	2.64 - 4.46	1.57	5	2.04	1.95	1.89	5.32 - 20.00	5.59 - 20.00	5.83 - 16.01	1
<a href="#">BP0EA4440A7**</a>	4.44	0.98	3.49 - 5.66	1.83	5	2.99	2.89	2.79	6.72 - 20.00	7.06 - 13.82	7.39 - 9.26	1
<a href="#">BP0EA4600A7**</a>	4.6	0.96	3.66 - 5.78	2.12	5	3.1	2.99	2.9	6.81 - 20.00	7.15 - 9.68	7.50 - 9.55	1
<a href="#">BP0EA4680A7**</a>	4.68	0.99	3.70 - 5.93	2.01	5	3.16	3.05	2.96	6.99 - 20.00	7.37 - 9.86	7.73 - 8.40	1

 [Click on part number to see full specifications.](#)

\*\*Packaging: 00 = waffle pack, TR = 1000pcs T&R, TR250 = 250pcs T&R

### MECHANICAL DIMENSIONS inches (mm)

Case Size	Length	Width	Height
A 2616	0.259±0.010 (6.579±0.254)	0.157±0.010 (3.975±0.254)	Varies - see part specification
B 3116	0.306±0.010 (7.785±0.254)	0.156±0.010 (3.975±0.254)	Varies - see part specification
C 3416	0.342±0.010 (8.674±0.254)	0.157±0.010 (3.975±0.254)	Varies - see part specification
D 4016	0.401±0.010 (10.198±0.254)	0.156±0.010 (3.975±0.254)	Varies - see part specification
E 4617	0.460±0.010 (11.684±0.254)	0.170±0.010 (4.318±0.254)	Varies - see part specification
F 5021	0.512±0.010 (12.992±0.254)	0.207±0.010 (5.245±0.254)	Varies - see part specification

# Multilayer Organic (MLO®)

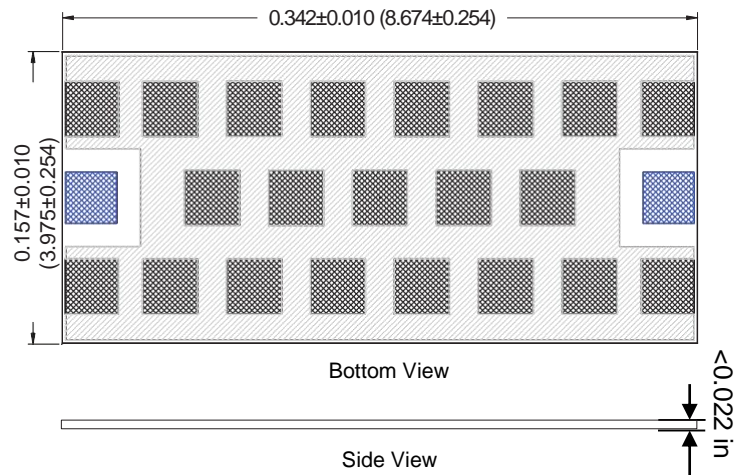
AVX PN: BP0CA0770A7\*\*



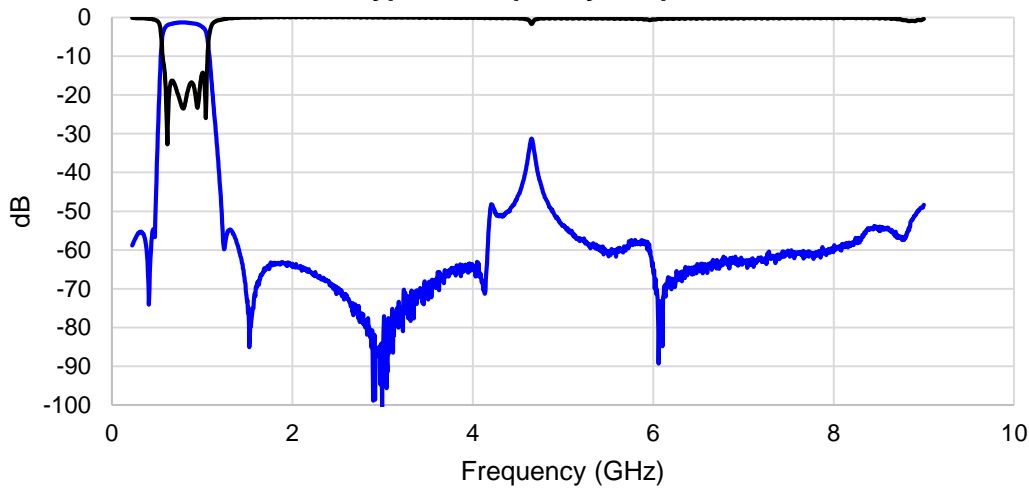
## ELECTRICAL SPECIFICATIONS

Passband	
Passband Frequency	0.62 - 0.97 GHz
Passband IL	1.96 dB typ. 5 dB max
Center Frequency	0.77 dB
Center Frequency IL	1.28 dB
Power	1 W
Stopband	
Low Stopband Frequency	DC - 0.46 GHz
Rejection Low Band	40 dB typ. 35 dB min.
High Frequency	1.23 - 4.00 GHz
Rejection High Band	40 dB typ. 35 dB min.
Dimension	
Thickness	<0.022 in Max.

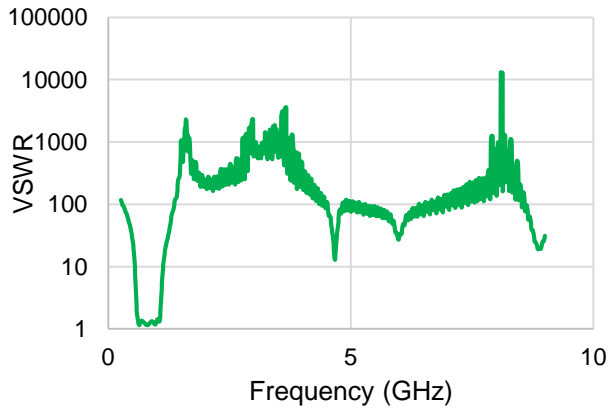
## DIMENSIONS – CASE SIZE C inches (mm)



### Typical Frequency Response



### VSWR



## TYPICAL PERFORMANCE AT 25°C

Frequency (GHz)	Insertion Loss (dB)	VSWR (:1)	Return Loss (dB)
0.46	-54.61	33.13	-0.52
0.48	-52.50	26.87	-0.65
0.50	-33.72	18.77	-0.93
0.62	-1.96	1.08	-28.19
0.77	-1.28	1.16	-22.82
0.97	-1.94	1.25	-19.20
1.15	-29.34	17.72	-0.98
1.19	-40.50	25.38	-0.68
1.23	-57.84	36.26	-0.48
4.00	-65.01	122.71	-0.14
4.50	-45.94	96.37	-0.18

[\[GO TO DETAILED MECHANICAL SPECIFICATIONS AND PAD LAYOUT\]](#)

[\[RETURN TO GENERAL ELECTRICAL SPECIFICATIONS\]](#)



# Multilayer Organic (MLO®)

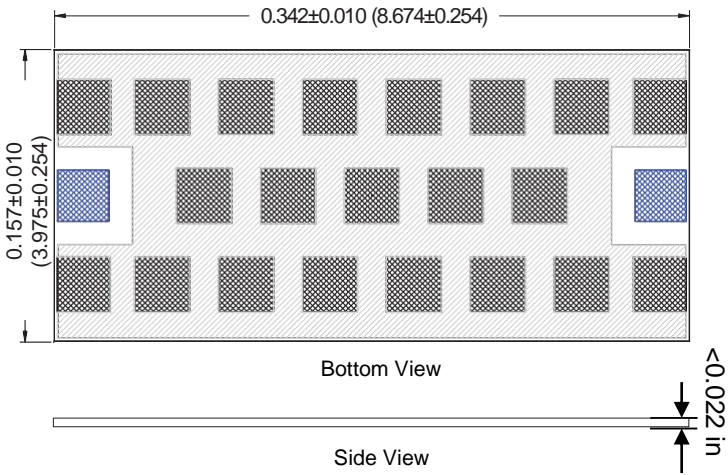
AVX PN: BP0CA1100A7\*\*



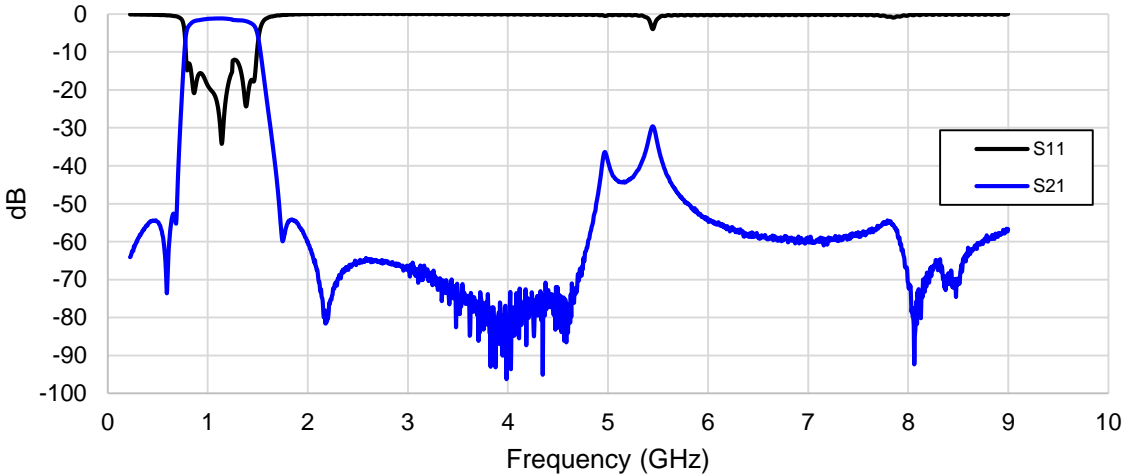
## ELECTRICAL SPECIFICATIONS

Passband	
Passband Frequency	0.86 - 1.39 GHz
Passband IL	1.97 dB typ. 5 dB max
Center Frequency	1.10 GHz
Center Frequency IL	1.18 dB
Power	1 W
Stopband	
Low Stopband Frequency	DC - 0.66 GHz
Rejection Low Band	40 dB typ. 35 dB min.
High Frequency	1.73 - 4.50 GHz
Rejection High Band	40 dB typ. 35 dB min.
Dimension	
Thickness	<0.022 in. Max.

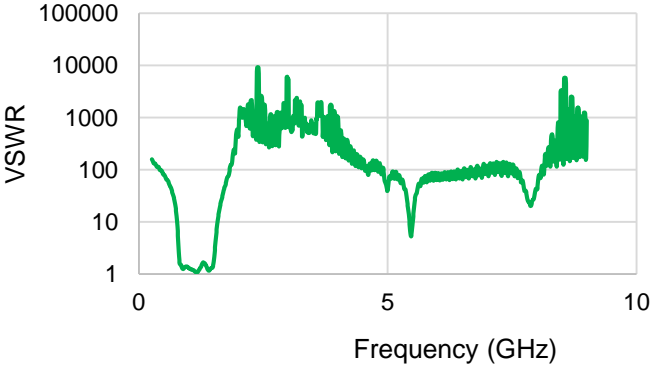
## DIMENSIONS – CASE SIZE C inches (mm)



## Typical Frequency Response



## VSWR



## TYPICAL PERFORMANCE AT 25°C

Frequency (GHz)	Insertion Loss (dB)	VSWR (:1)	Return Loss (dB)
0.66	-67.20	47.97	-0.36
0.68	-54.87	30.46	-0.57
0.70	-44.36	23.59	-0.74
0.86	-1.97	1.20	-20.72
1.10	-1.18	1.13	-24.44
1.39	-1.97	1.14	-23.50
1.63	-30.10	24.50	-0.71
1.68	-41.86	40.14	-0.43
1.73	-56.31	55.01	-0.32
4.50	-82.71	148.10	-0.12
5.00	-38.95	59.80	-0.29

[\[GO TO DETAILED MECHANICAL SPECIFICATIONS AND PAD LAYOUT\]](#)

[\[RETURN TO GENERAL ELECTRICAL SPECIFICATIONS\]](#)



# Multilayer Organic (MLO®)

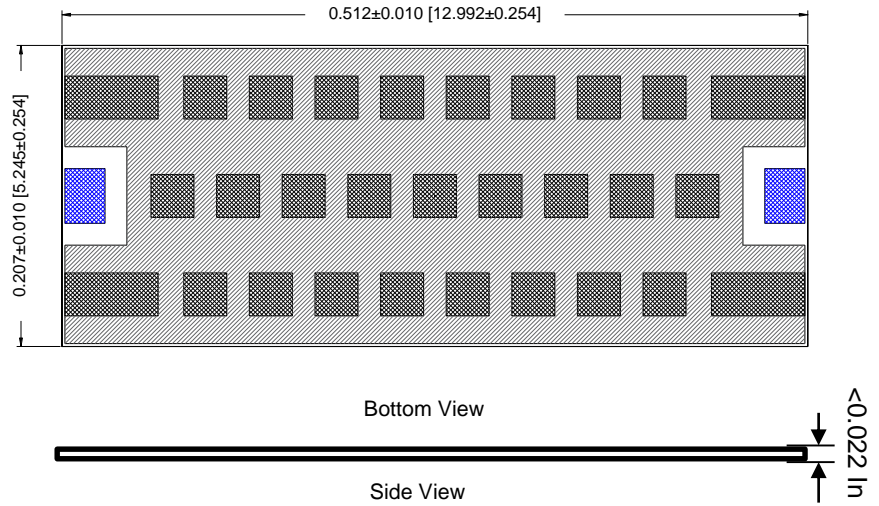
AVX PN: BP0FA1100A7\*\*



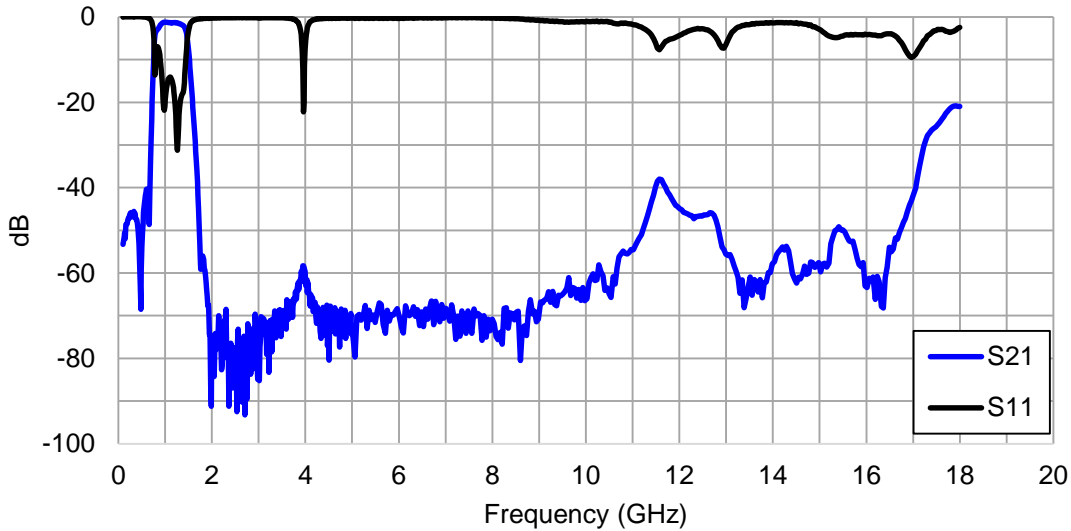
## ELECTRICAL SPECIFICATIONS

Passband	
Passband Frequency	0.87 - 1.39 GHz
Passband IL	2.41 dB typ.
	5 dB max
Center Frequency	1.10 GHz
Center Frequency IL	1.37 dB
Power	1 Watt
Stopband	
Low Stopband Frequency	DC - 0.64 GHz
Rejection Low Band	40 dB typ.
	35 dB min.
High Frequency	1.78 - 11.1 GHz
Rejection High Band	40 dB typ.
	35 dB min.
Dimension	
Thickness	<0.022 in. Max

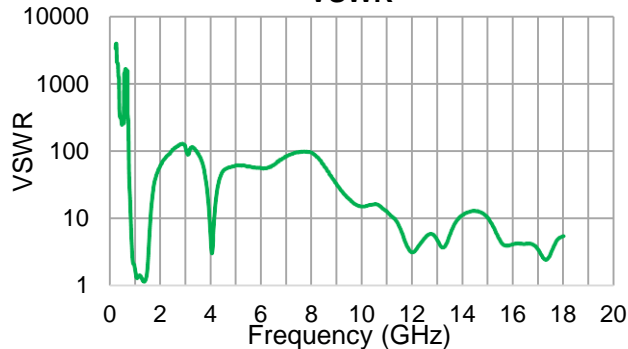
## DIMENSIONS – CASE SIZE F inches (mm)



## Typical Frequency Response



## VSWR



## TYPICAL PERFORMANCE AT 25°C

Frequency (GHz)	Insertion Loss (dB)	VSWR (:1)	Return Loss (dB)
0.68	-40.70	43.35	-0.40
0.69	-33.99	30.12	-0.58
0.71	-23.81	15.46	-1.13
0.85	-2.85	2.60	-7.05
0.87	-2.41	2.33	-7.96
1.41	-2.30	1.41	-15.43
1.44	-2.88	1.74	-11.34
1.60	-21.19	20.26	-0.86
1.66	-31.44	27.41	-0.63
1.71	-41.61	35.11	-0.49
4.00	-59.62	2.41	-7.67

[\[GO TO DETAILED MECHANICAL SPECIFICATIONS AND PAD LAYOUT\]](#)

[\[RETURN TO GENERAL ELECTRICAL SPECIFICATIONS\]](#)



# Multilayer Organic (MLO®)

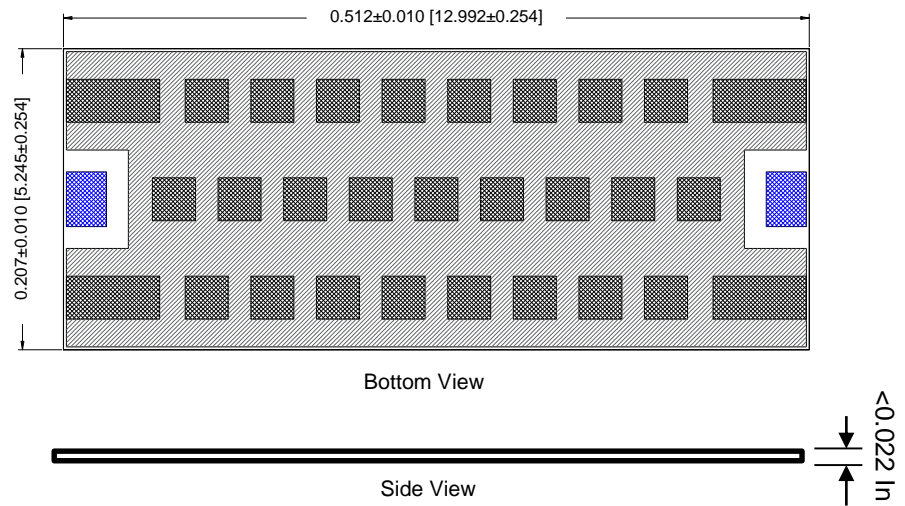
AVX PN: BP0FA1130A7\*\*



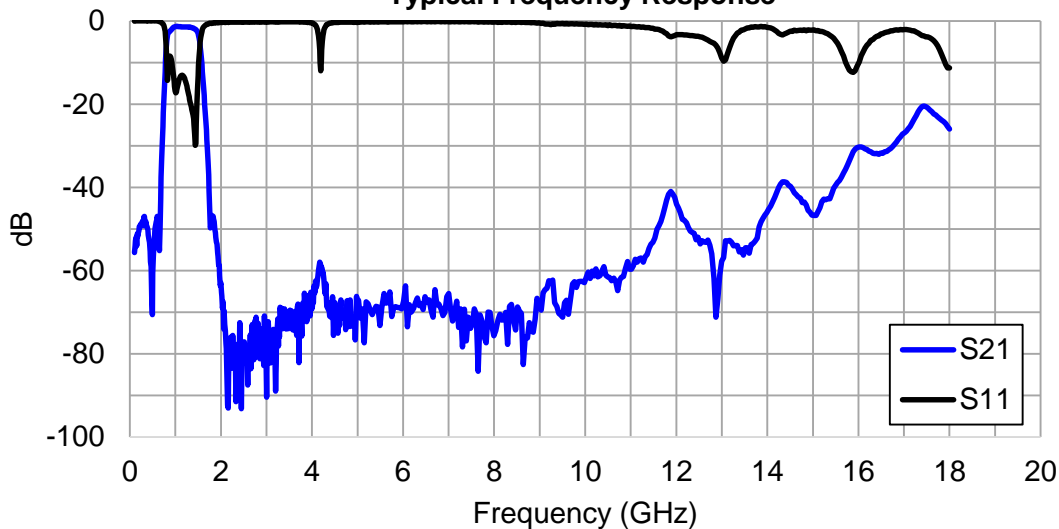
## ELECTRICAL SPECIFICATIONS

Passband	
Passband Frequency	0.89 - 1.44 GHz
Passband IL	2.25 dB typ. 5 dB max
Center Frequency	1.13 GHz
Center Frequency IL	1.43 dB
Power	1 W
Stopband	
Low Stopband Frequency	DC - 0.66 GHz
Rejection Low Band	40 dB typ. 35 dB min.
High Frequency	1.79 - 13.8 GHz
Rejection High Band	40 dB typ. 35 dB min.
Dimension	
Thickness	<0.022 in. Max.

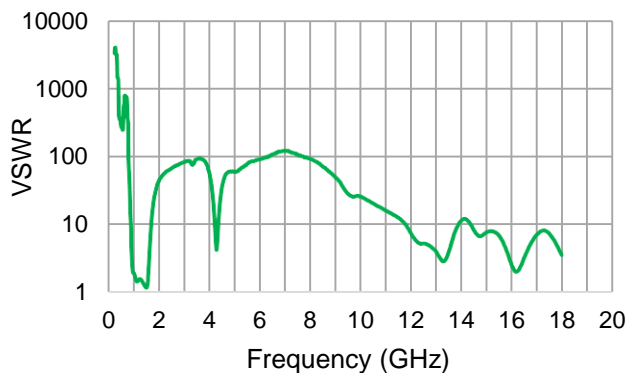
## DIMENSIONS – CASE SIZE F inches (mm)



Typical Frequency Response



VSWR



## TYPICAL PERFORMANCE AT 25°C

Frequency (GHz)	Insertion Loss (dB)	VSWR (:1)	Return Loss (dB)
0.68	-42.81	106.22	-0.16
0.70	-33.02	41.57	-0.42
0.74	-22.03	21.38	-0.81
0.85	-2.78	1.83	-10.65
0.88	-2.41	2.22	-8.42
1.47	-2.37	1.22	-20.03
1.50	-2.96	1.56	-13.19
1.66	-21.99	16.34	-1.06
1.71	-31.05	23.77	-0.73
1.74	-40.79	27.99	-0.62
4.00	-69.31	37.57	-0.46

[\[GO TO DETAILED MECHANICAL SPECIFICATIONS AND PAD LAYOUT\]](#)

[\[RETURN TO GENERAL ELECTRICAL SPECIFICATIONS\]](#)





# Multilayer Organic (MLO®)

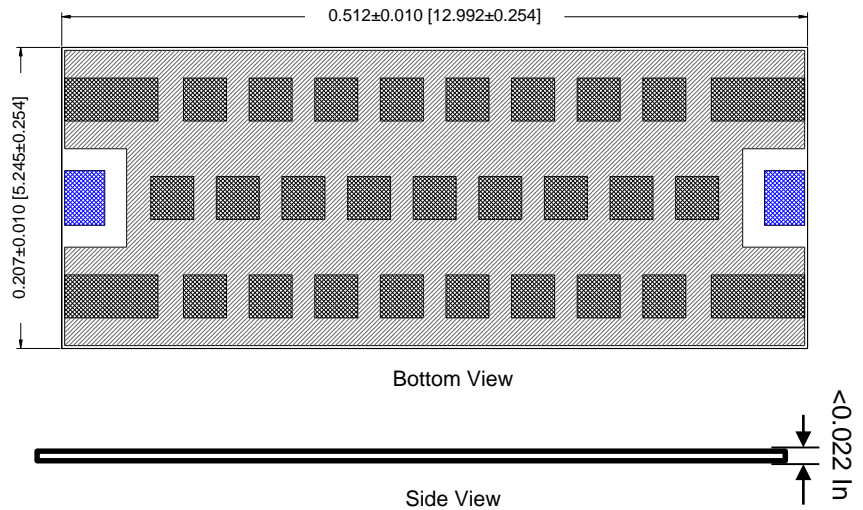
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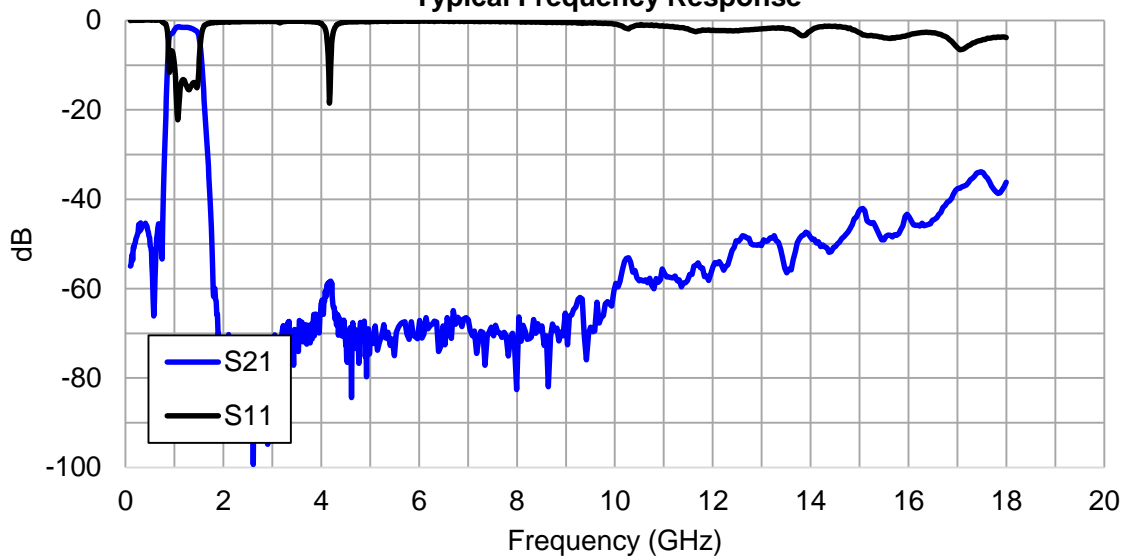
## ELECTRICAL SPECIFICATIONS

Passband	
Passband Frequency	0.99 - 1.44 GHz
Passband IL	2.26 dB typ. 5 dB max
Center Frequency	1.19 GHz
Center Frequency IL	1.56 dB
Power	1 W
Stopband	
Low Stopband Frequency	DC - 0.74 GHz
Rejection Low Band	40 dB typ. 35 dB min.
High Frequency	1.78 - 16.3 GHz
Rejection High Band	40 dB typ. 35 dB min.
Dimension	
Thickness	<0.022 in. Max

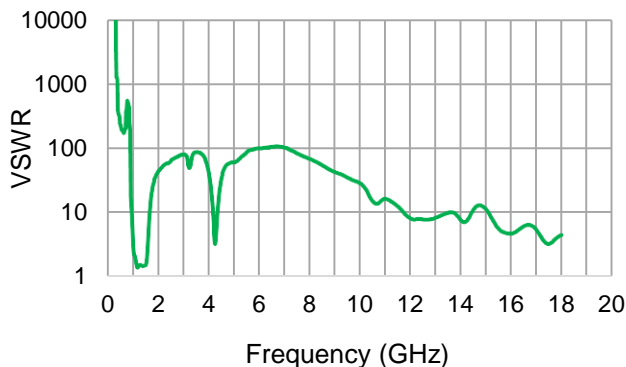
## DIMENSIONS – CASE SIZE F inches (mm)



Typical Frequency Response



VSWR



## TYPICAL PERFORMANCE AT 25°C

Frequency (GHz)	Insertion Loss (dB)	VSWR (:1)	Return Loss (dB)
0.76	-45.35	39.68	-0.44
0.79	-33.86	27.32	-0.64
0.82	-21.36	20.11	-0.86
0.95	-2.99	2.69	-6.80
0.98	-2.46	2.26	-8.26
1.46	-2.49	1.43	-15.06
1.48	-2.96	1.56	-13.19
1.63	-21.95	18.19	-0.96
1.68	-30.48	25.41	-0.68
1.73	-40.11	26.78	-0.65
4.00	-63.31	25.83	-0.67

[\[GO TO DETAILED MECHANICAL SPECIFICATIONS AND PAD LAYOUT\]](#)

[\[RETURN TO GENERAL ELECTRICAL SPECIFICATIONS\]](#)



# Multilayer Organic (MLO®)

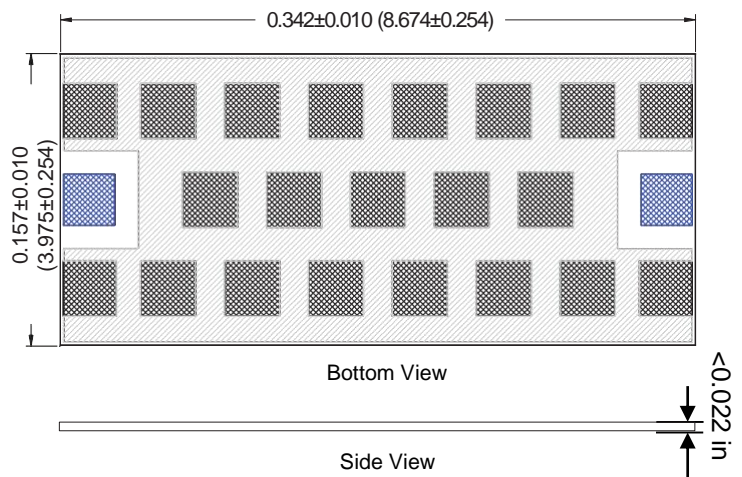
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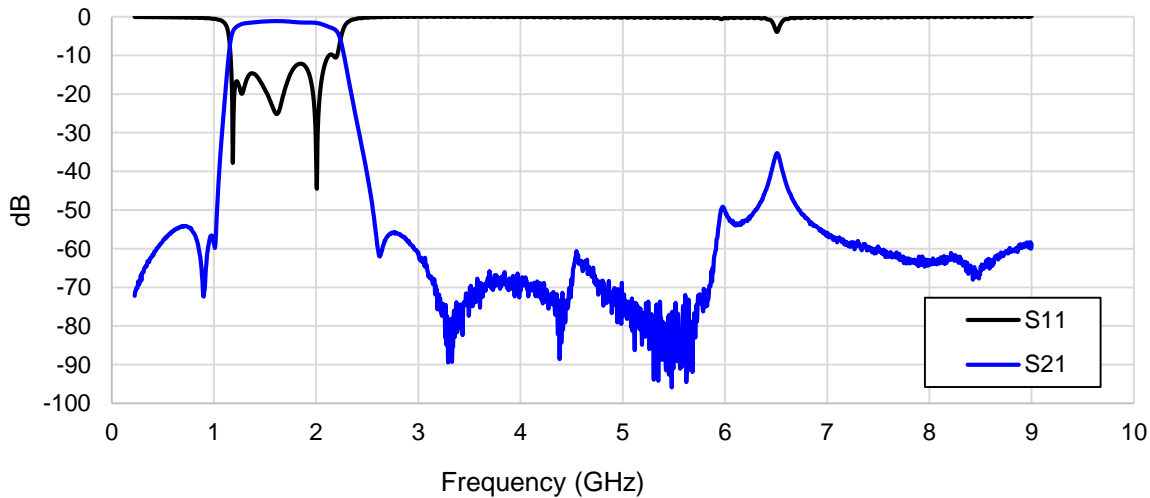
## ELECTRICAL SPECIFICATIONS

Passband	
Passband Frequency	1.27 - 2.05 GHz
Passband IL	1.88 dB typ. 5 dB max
Center Frequency	1.61 GHz
Center Frequency IL	1.10 dB
Power	1 Watt
Stopband	
Low Stopband Frequency	DC - 1.02 GHz
Rejection Low Band	40 dB typ. 35 dB min.
High Frequency	2.57 - 6.26 GHz
Rejection High Band	30 dB typ. 25 dB min.
Dimension	
Thickness	<0.022 in. Max

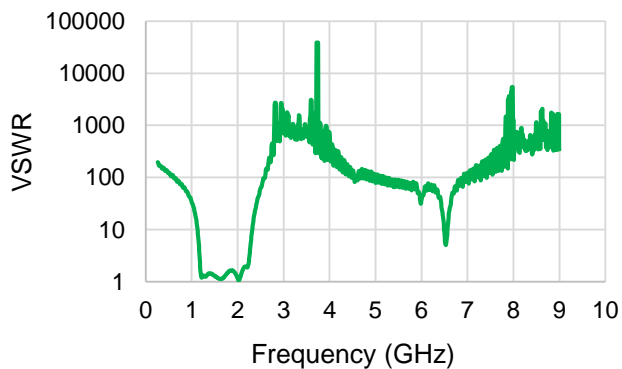
## DIMENSIONS – CASE SIZE C inches (mm)



### Typical Frequency Response



### VSWR



### TYPICAL PERFORMANCE AT 25°C

Frequency (GHz)	Insertion Loss (dB)	VSWR (:1)	Return Loss (dB)
1.02	-56.22	27.80	-0.63
1.04	-44.39	21.86	-0.80
1.07	-33.47	17.92	-0.97
1.27	-1.86	1.22	-19.93
1.61	-1.10	1.12	-25.14
2.05	-1.88	1.34	-16.80
2.42	-30.50	42.88	-0.41
2.50	-41.00	62.73	-0.28
2.57	-53.36	88.84	-0.20
6.26	-51.31	77.23	-0.22
7.50	-60.32	358.65	-0.05

[\[GO TO DETAILED MECHANICAL SPECIFICATIONS AND PAD LAYOUT\]](#)

[\[RETURN TO GENERAL ELECTRICAL SPECIFICATIONS\]](#)





# Multilayer Organic (MLO®)

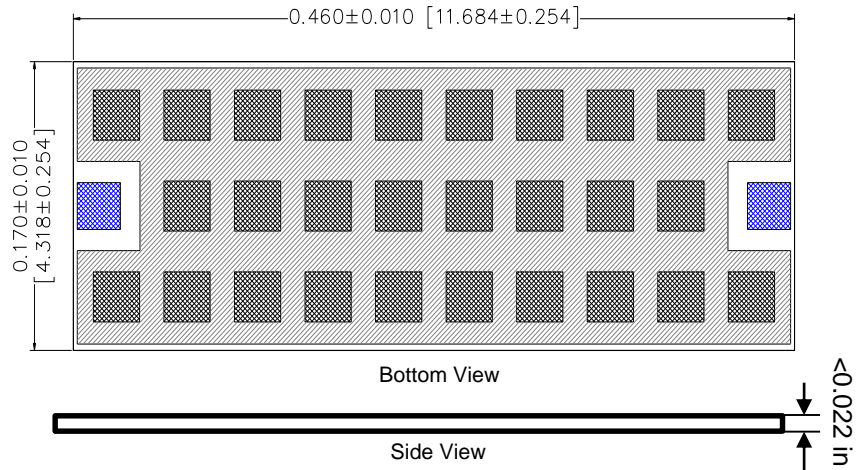


AVX PN: BP0EA1950A7\*\*

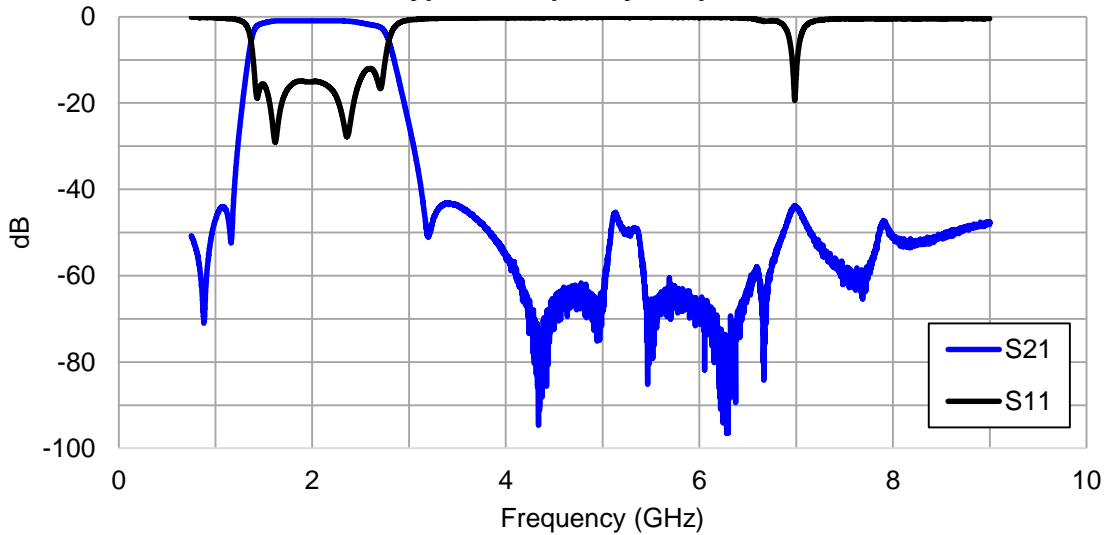
## ELECTRICAL SPECIFICATIONS

Passband	
Passband Frequency	1.44 - 2.64 GHz
Passband IL	2.03 dB typ. 5 dB max
Center Frequency	1.95 GHz
Center Frequency IL	0.96 dB
Power	1 Watt
Stopband	
Low Stopband Frequency	DC - 1.16 GHz
Rejection Low Band	40 dB typ. 35 dB min.
High Frequency	3.22 - 7.50 GHz
Rejection High Band	40 dB typ. 35 dB min.
Dimension	
Thickness	<0.022 in. Max

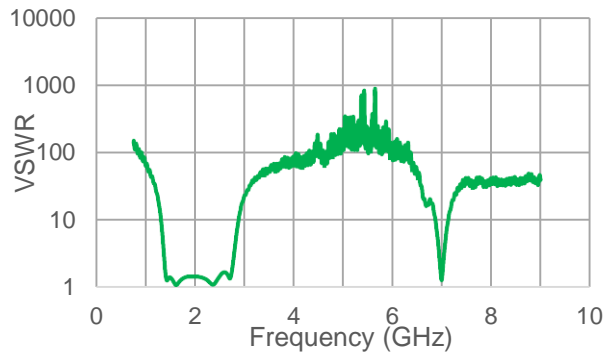
## DIMENSIONS – CASE SIZE E inches (mm)



Typical Frequency Response



VSWR



## TYPICAL PERFORMANCE AT 25°C

Frequency (GHz)	Insertion Loss (dB)	VSWR (:1)	Return Loss (dB)
1.19	-40.36	31.60	-0.55
1.23	-30.30	24.48	-0.71
1.28	-20.16	15.36	-1.13
1.40	-2.94	1.53	-13.55
1.42	-2.45	1.32	-17.14
2.71	-2.51	1.35	-16.53
2.73	-2.90	1.49	-14.06
2.95	-20.10	17.87	-0.97
3.05	-30.06	27.05	-0.64
3.13	-40.12	32.21	-0.54
5.00	-65.35	113.56	-0.15

[\[GO TO DETAILED MECHANICAL SPECIFICATIONS AND PAD LAYOUT\]](#)

[\[RETURN TO GENERAL ELECTRICAL SPECIFICATIONS\]](#)



# Multilayer Organic (MLO®)

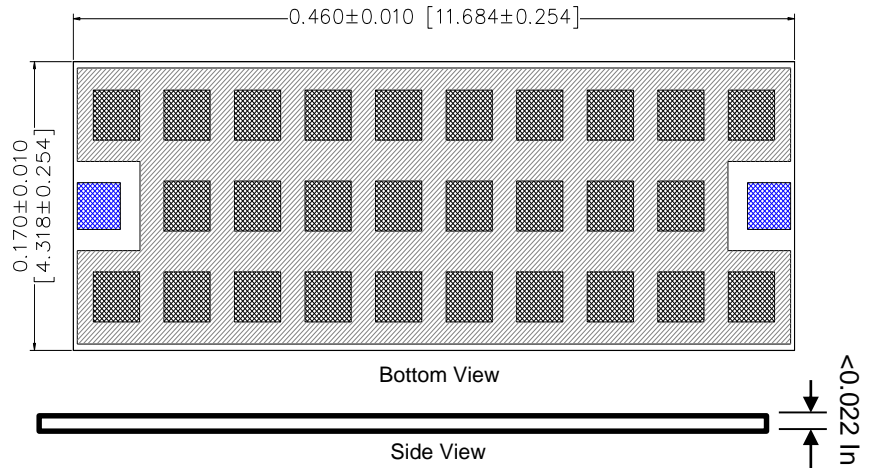
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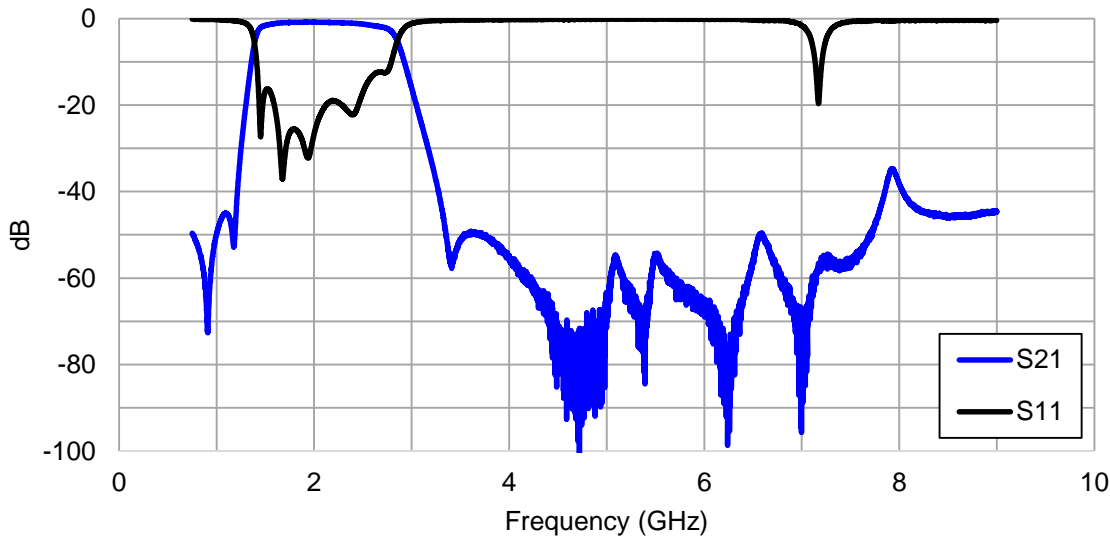
## ELECTRICAL SPECIFICATIONS

Passband	
Passband Frequency	1.47 - 2.68 GHz
Passband IL	1.89 dB typ. 5 dB max
Center Frequency	1.98 GHz
Center Frequency IL	0.85 dB
Power	1 W
Stopband	
Low Stopband Frequency	DC - 1.17 GHz
Rejection Low Band	40 dB typ. 35 dB min.
High Frequency	3.27 - 9.00 GHz
Rejection High Band	30 dB typ. 25 dB min.
Dimension	
Thickness	<0.022 in. Max

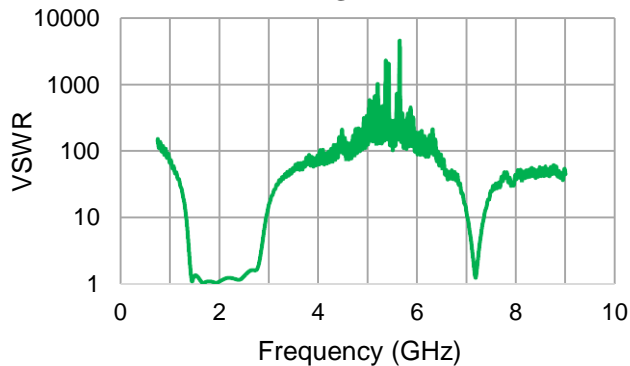
## DIMENSIONS – CASE SIZE E inches (mm)



Typical Frequency Response



VSWR



## TYPICAL PERFORMANCE AT 25°C

Frequency (GHz)	Insertion Loss (dB)	VSWR (:1)	Return Loss (dB)
1.21	-40.30	29.86	-0.58
1.25	-30.19	24.58	-0.71
1.30	-20.19	16.08	-1.08
1.42	-2.93	1.52	-13.77
1.43	-2.47	1.26	-18.87
2.77	-2.49	1.71	-11.65
2.80	-2.99	1.98	-9.68
3.05	-20.07	20.81	-0.84
3.17	-30.05	31.57	-0.55
3.28	-40.04	39.93	-0.44
7.85	-40.03	39.14	-0.44

[\[GO TO DETAILED MECHANICAL SPECIFICATIONS AND PAD LAYOUT\]](#)

[\[RETURN TO GENERAL ELECTRICAL SPECIFICATIONS\]](#)



# Multilayer Organic (MLO®)

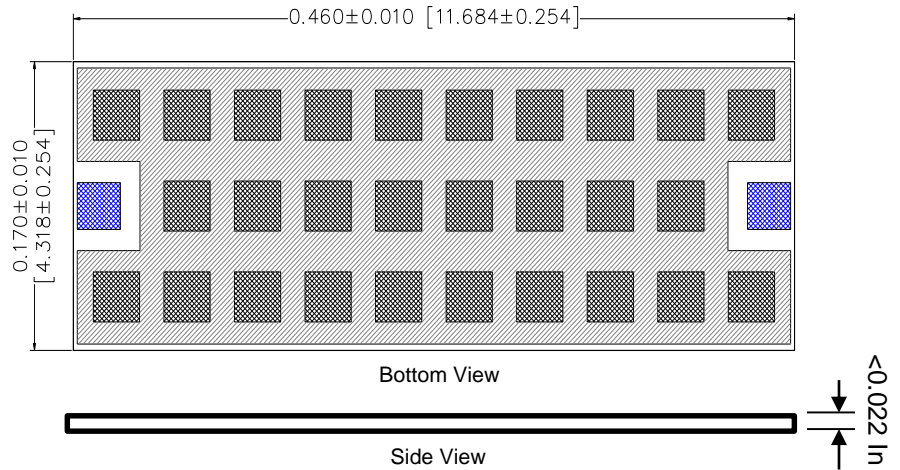
AVX PN: BP0EA2090A7\*\*



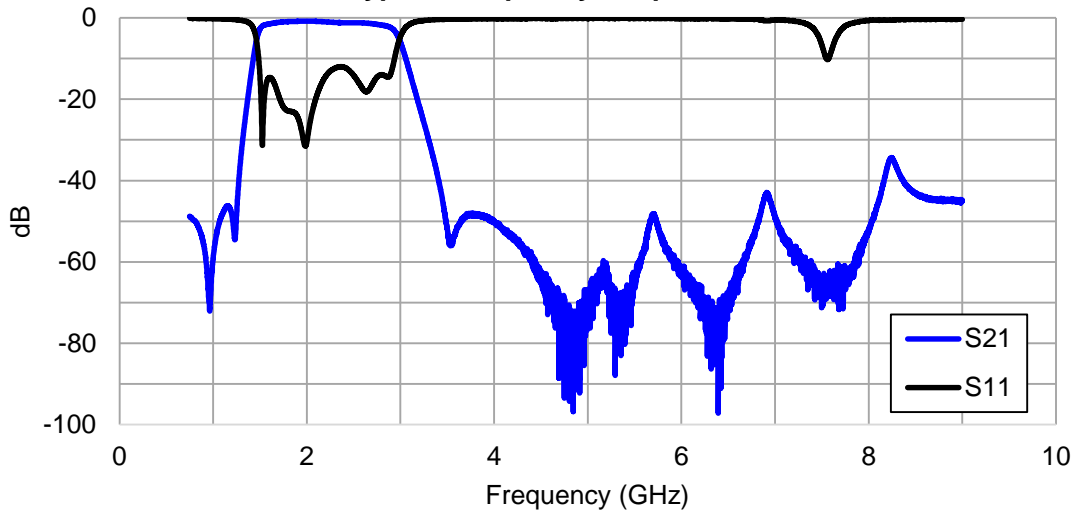
## ELECTRICAL SPECIFICATIONS

Passband	
Passband Frequency	1.54 - 2.84 GHz
Passband IL	1.94 dB typ.
	5 dB max
Center Frequency	2.09 GHz
Center Frequency IL	0.96 dB
Power	1 Watt
Stopband	
Low Stopband Frequency	DC - 1.23 GHz
Rejection Low Band	40 dB typ.
	35 dB min.
High Frequency	3.60 - 7.92 GHz
Rejection High Band	40 dB typ.
	35 dB min.
Dimension	
Thickness	<0.022 in. Max

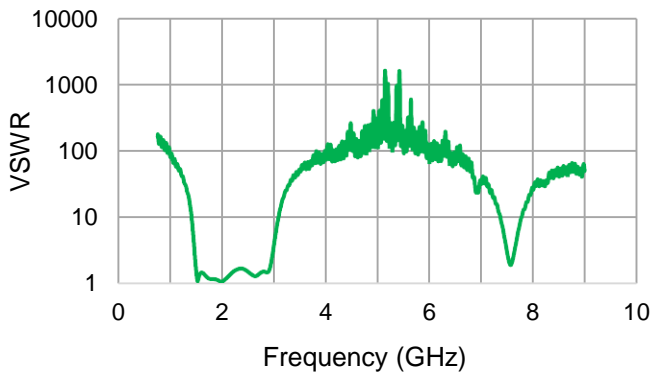
## DIMENSIONS – CASE SIZE E inches (mm)



Typical Frequency Response



VSWR



## TYPICAL PERFORMANCE AT 25°C

Frequency (GHz)	Insertion Loss (dB)	VSWR (:1)	Return Loss (dB)
1.27	-40.18	32.06	-0.54
1.32	-30.16	26.06	-0.67
1.37	-20.00	17.13	-1.02
1.49	-2.99	1.64	-12.31
1.51	-2.48	1.33	-16.91
2.90	-2.49	1.56	-13.18
2.93	-2.98	1.80	-10.86
3.18	-20.00	19.67	-0.88
3.30	-30.07	31.74	-0.55
3.41	-40.07	40.01	-0.43
8.17	-40.09	29.97	-0.58

[\[GO TO DETAILED MECHANICAL SPECIFICATIONS AND PAD LAYOUT\]](#)

[\[RETURN TO GENERAL ELECTRICAL SPECIFICATIONS\]](#)



# Multilayer Organic (MLO®)

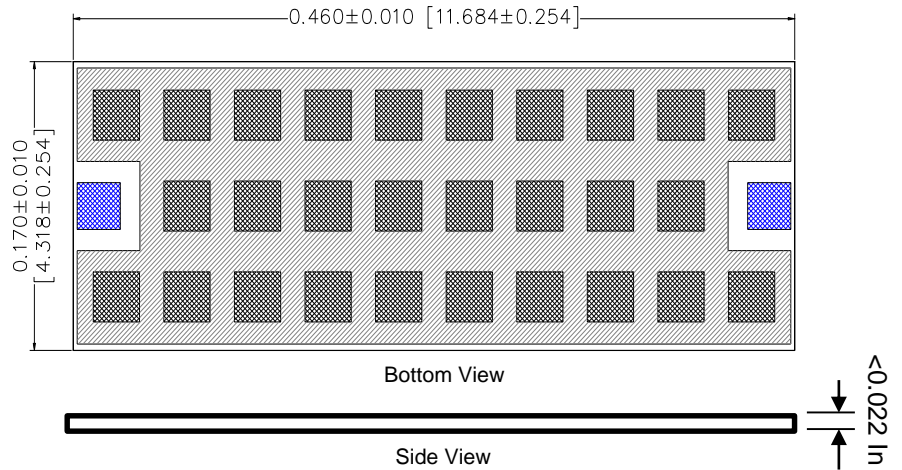
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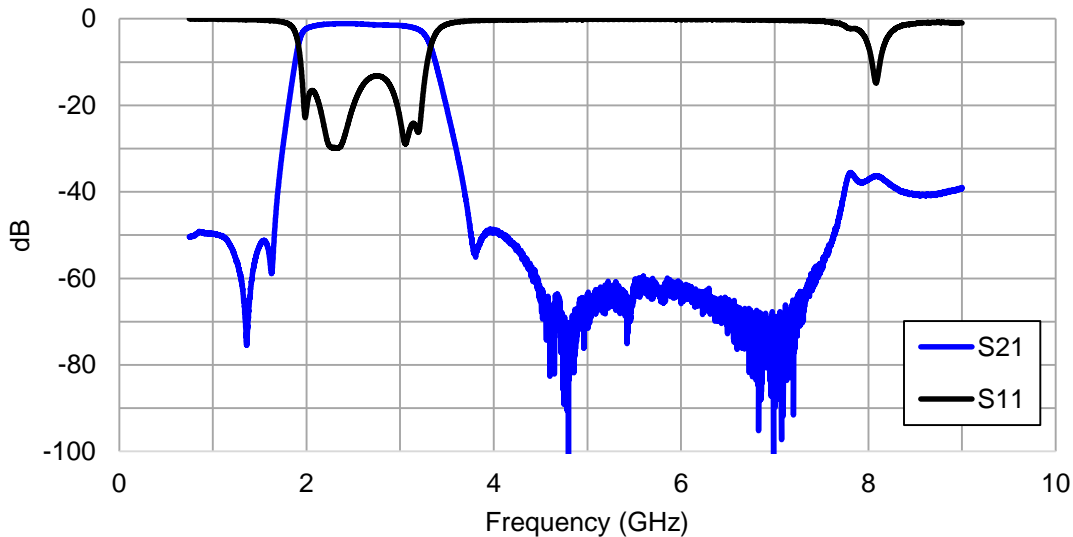
## ELECTRICAL SPECIFICATIONS

Passband	
Passband Frequency	2.02 - 3.10 GHz
Passband IL	2.03 dB typ. 5 dB max
Center Frequency	2.50 GHz
Center Frequency IL	1.19 dB
Power	1 Watt
Stopband	
Low Stopband Frequency	DC - 1.64 GHz
Rejection Low Band	40 dB typ. 35 dB min.
High Frequency	3.80 - 7.51 GHz
Rejection High Band	40 dB typ. 35 dB min.
Dimension	
Thickness	<0.022 in. Max

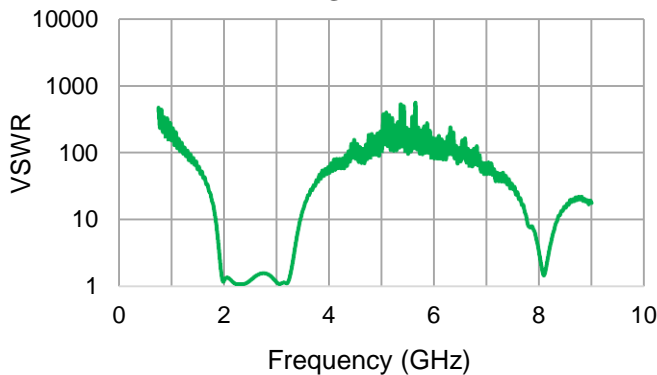
## DIMENSIONS – CASE SIZE E inches (mm)



Typical Frequency Response



VSWR



## TYPICAL PERFORMANCE AT 25°C

Frequency (GHz)	Insertion Loss (dB)	VSWR (:1)	Return Loss (dB)
1.69	-40.00	32.46	-0.54
1.75	-30.14	24.26	-0.72
1.81	-20.11	14.61	-1.19
1.96	-2.96	1.31	-17.41
1.98	-2.47	1.16	-22.81
3.20	-2.49	1.10	-26.16
3.23	-2.94	1.21	-20.56
3.49	-20.06	13.17	-1.32
3.60	-30.30	23.16	-0.75
3.69	-40.14	28.76	-0.60
7.74	-40.21	11.30	-1.54

[\[GO TO DETAILED MECHANICAL SPECIFICATIONS AND PAD LAYOUT\]](#)

[\[RETURN TO GENERAL ELECTRICAL SPECIFICATIONS\]](#)



# Multilayer Organic (MLO®)

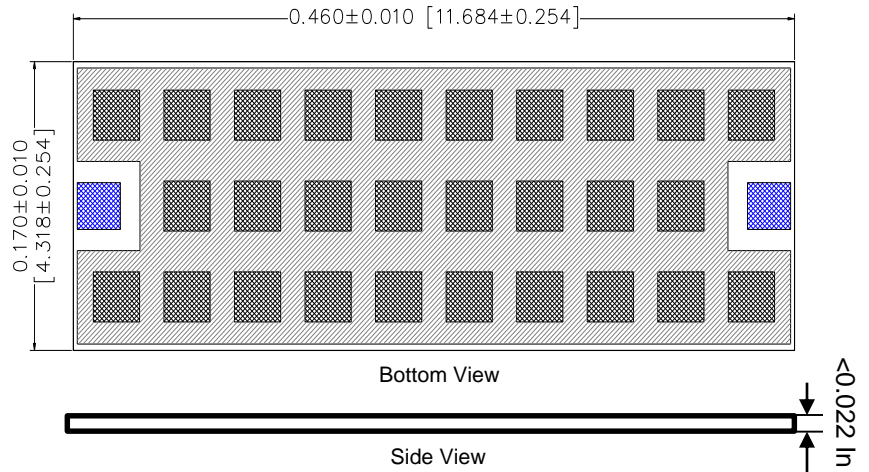
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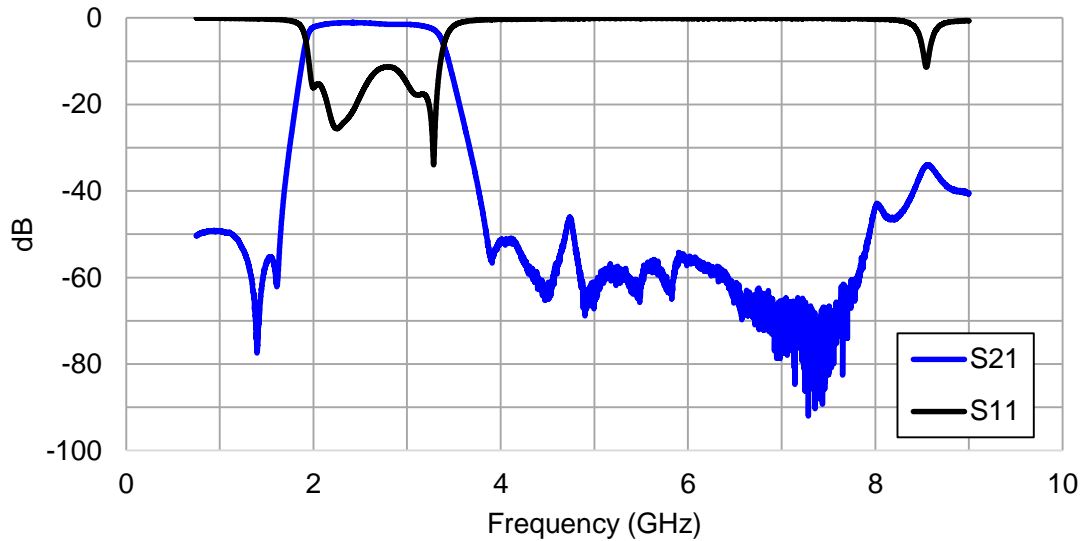
## ELECTRICAL SPECIFICATIONS

Passband	
Passband Frequency	2.02 - 3.21 GHz
Passband IL	2.12 dB typ. 5 dB max
Center Frequency	2.54 GHz
Center Frequency IL	1.24 dB
Power	1 Watt
Stopband	
Low Stopband Frequency	DC - 1.64 GHz
Rejection Low Band	40 dB typ. 35 dB min.
High Frequency	3.80 - 8.31 GHz
Rejection High Band	30 dB typ. 25 dB min.
Dimension	
Thickness	<0.022 in. Max

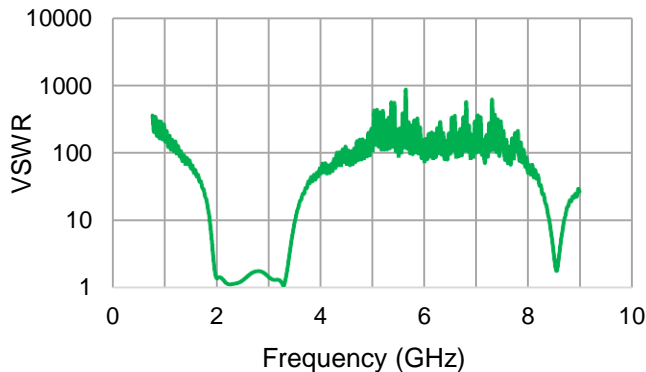
## DIMENSIONS – CASE SIZE E inches (mm)



Typical Frequency Response



VSWR



## TYPICAL PERFORMANCE AT 25°C

Frequency (GHz)	Insertion Loss (dB)	VSWR (:1)	Return Loss (dB)
1.69	-40.30	38.24	-0.45
1.75	-30.10	28.65	-0.61
1.81	-20.03	17.56	-0.99
1.96	-2.98	1.70	-11.75
1.97	-2.60	1.50	-14.05
3.28	-2.63	1.05	-33.06
3.32	-3.32	1.30	-17.60
3.56	-20.11	14.85	-1.17
3.67	-30.07	24.47	-0.71
3.77	-40.19	37.95	-0.46
8.41	-40.14	9.67	-1.80

[\[GO TO DETAILED MECHANICAL SPECIFICATIONS AND PAD LAYOUT\]](#)

[\[RETURN TO GENERAL ELECTRICAL SPECIFICATIONS\]](#)



# Multilayer Organic (MLO®)

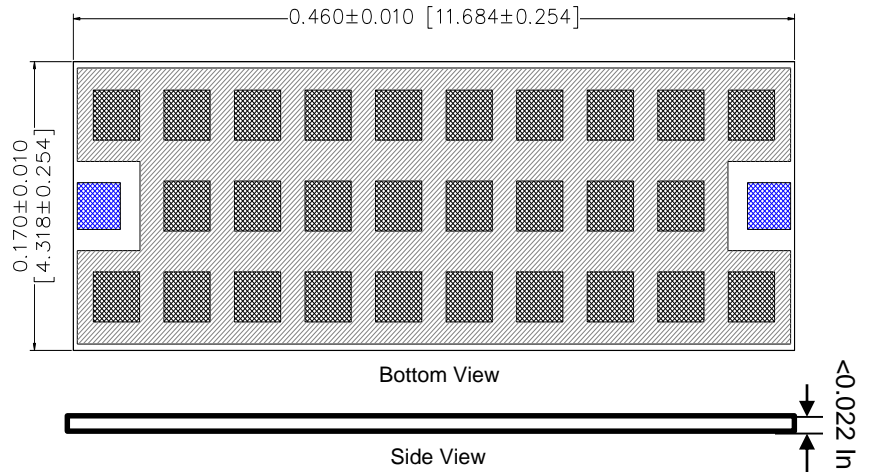
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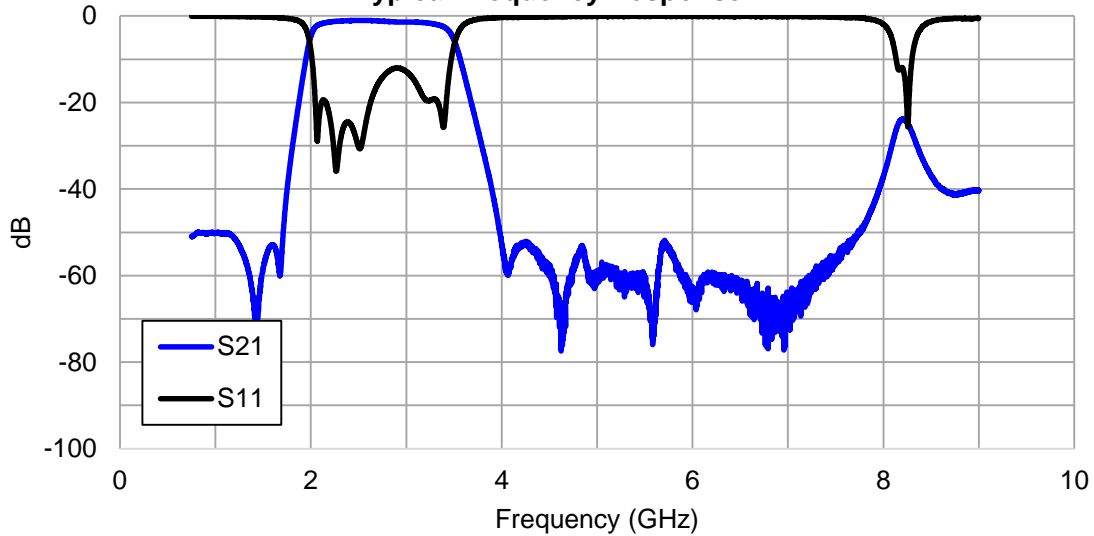
## ELECTRICAL SPECIFICATIONS

Passband	
Passband Frequency	2.09 - 3.28 GHz
Passband IL	1.92 dB typ. 5 dB max
Center Frequency	2.62 GHz
Center Frequency IL	1.13 dB
Power	1 Watt
Stopband	
Low Stopband Frequency	DC - 1.68 GHz
Rejection Low Band	40 dB typ. 35 dB min.
High Frequency	3.96 - 7.70 GHz
Rejection High Band	40 dB typ. 35 dB min.
Dimension	
Thickness	<0.022 in. Max

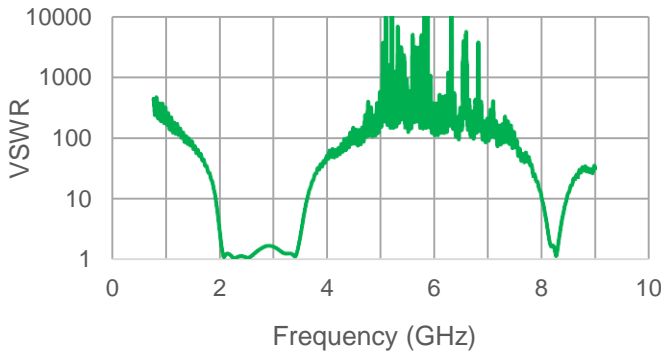
## DIMENSIONS – CASE SIZE E inches (mm)



Typical Frequency Response



VSWR



## TYPICAL PERFORMANCE AT 25°C

Frequency (GHz)	Insertion Loss (dB)	VSWR (:1)	Return Loss (dB)
1.75	-40.02	32.49	-0.53
1.81	-30.21	24.79	-0.70
1.87	-20.18	14.87	-1.17
2.03	-2.99	1.43	-14.97
2.05	-2.48	1.17	-21.90
3.39	-2.47	1.11	-25.76
3.43	-3.03	1.29	-17.96
3.68	-20.05	15.19	-1.15
3.79	-30.07	26.23	-0.66
3.90	-40.06	33.08	-0.53
7.96	-40.06	13.45	-1.29

[\[GO TO DETAILED MECHANICAL SPECIFICATIONS AND PAD LAYOUT\]](#)

[\[RETURN TO GENERAL ELECTRICAL SPECIFICATIONS\]](#)





# Multilayer Organic (MLO®)

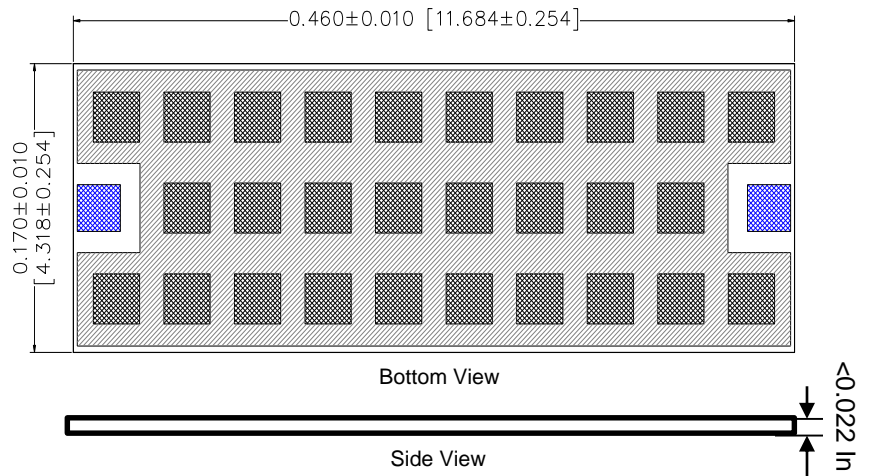
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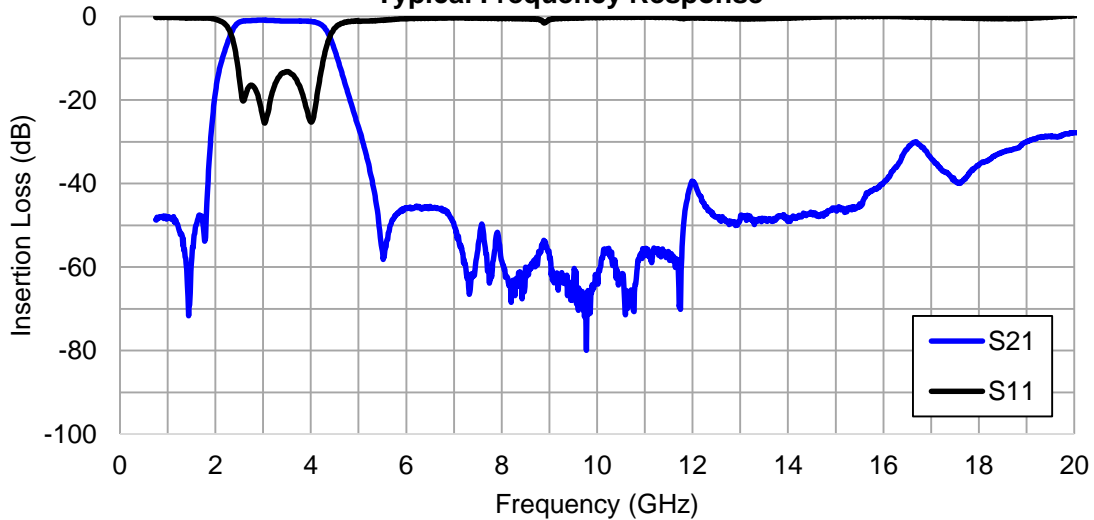
## ELECTRICAL SPECIFICATIONS

Passband	
Passband Frequency	2.45 - 4.14 GHz
Passband IL	1.81 dB typ. 5 dB max
Center Frequency	3.18 GHz
Center Frequency IL	0.97 dB
Power	1 Watt
Stopband	
Low Stopband Frequency	DC - 1.75 GHz
Rejection Low Band	40 dB typ. 35 dB min.
High Frequency	5.46 - 15.5 GHz
Rejection High Band	40 dB typ. 35 dB min.
Dimension	
Thickness	<0.022 in. Max

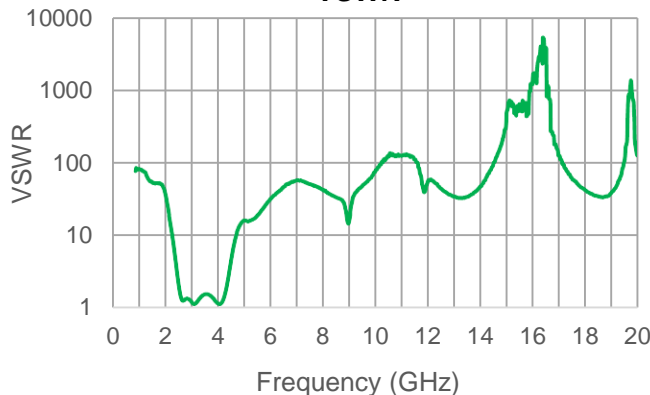
## DIMENSIONS – CASE SIZE E inches (mm)



Typical Frequency Response



VSWR



## TYPICAL PERFORMANCE AT 25°C

Frequency (GHz)	Insertion Loss (dB)	VSWR (:1)	Return Loss (dB)
1.83	-41.86	53.42	-0.33
1.89	-30.69	45.33	-0.38
1.98	-20.23	31.45	-0.55
2.37	-2.96	3.04	-0.59
2.41	-2.31	2.36	-0.79
4.26	-2.38	1.88	-10.31
4.30	-2.84	2.20	-8.50
4.83	-20.22	14.45	-1.20
5.09	-30.25	15.74	-1.11
5.30	-40.82	16.77	-1.04
15.98	-40.27	598.41	-0.03

[\[GO TO DETAILED MECHANICAL SPECIFICATIONS AND PAD LAYOUT\]](#)

[\[RETURN TO GENERAL ELECTRICAL SPECIFICATIONS\]](#)



# Multilayer Organic (MLO®)

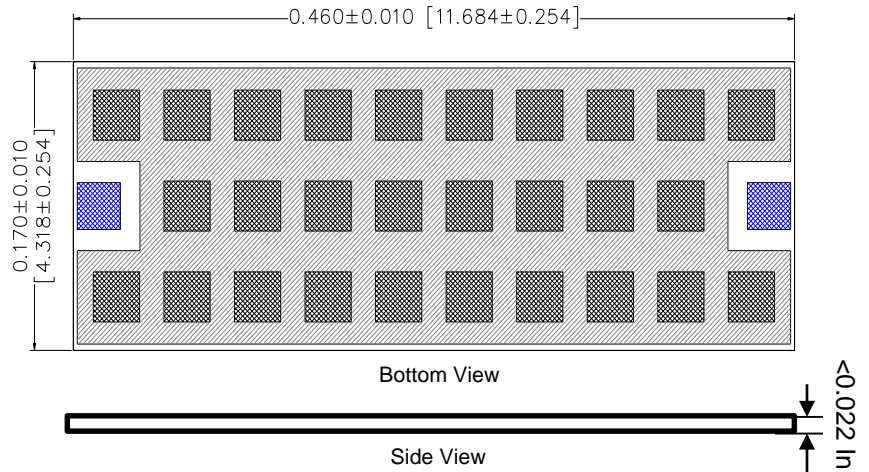
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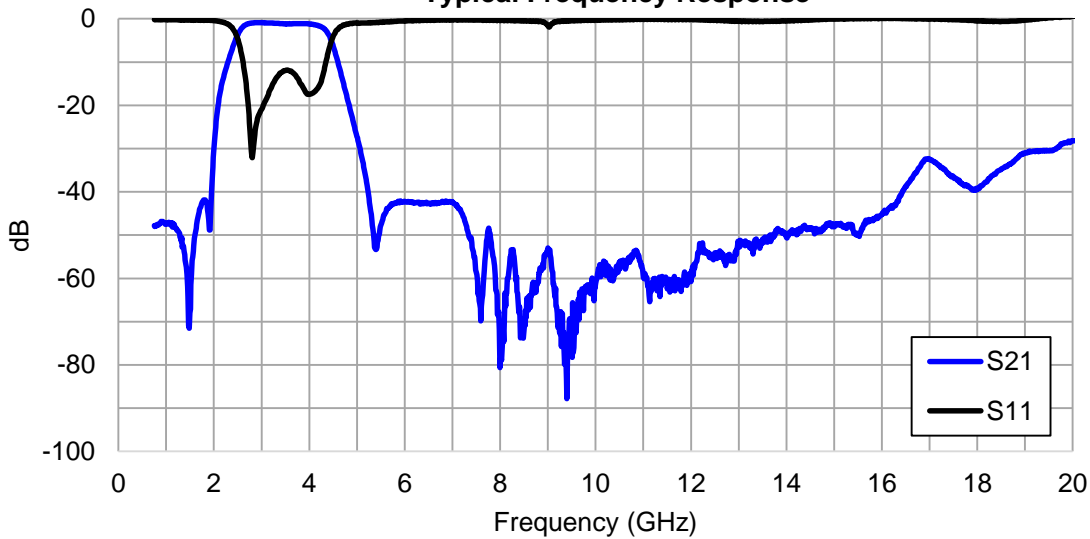
## ELECTRICAL SPECIFICATIONS

Passband	
Passband Frequency	2.62 - 4.19 GHz
Passband IL	1.79 dB typ.
	5 dB max
Center Frequency	3.31 GHz
Center Frequency IL	1.13 dB
Power	1 Watt
Stopband	
Low Stopband Frequency	DC - 1.86 GHz
Rejection Low Band	40 dB typ.
	35 dB min.
High Frequency	5.41 - 15.9 GHz
Rejection High Band	40 dB typ.
	35 dB min.
Dimension	
Thickness	<0.022 in. Max

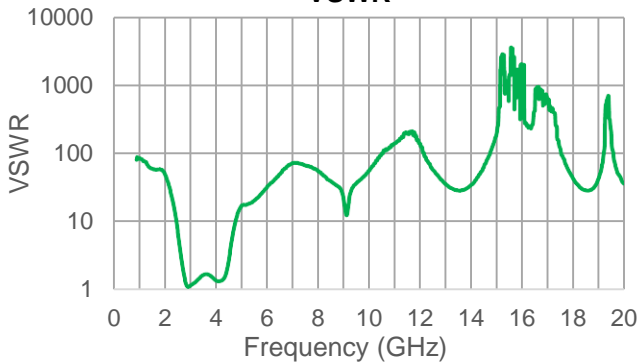
## DIMENSIONS – CASE SIZE E inches (mm)



Typical Frequency Response



VSWR



## TYPICAL PERFORMANCE AT 25°C

Frequency (GHz)	Insertion Loss (dB)	VSWR (:1)	Return Loss (dB)
1.94	-42.93	42.40	-0.41
2.00	-30.11	39.11	-0.44
2.09	-20.21	30.68	-0.57
2.54	-2.79	2.88	-6.30
2.57	-2.42	2.46	-7.49
4.32	-2.43	1.76	-11.23
4.36	-2.86	2.02	-9.42
4.84	-20.27	15.53	-1.12
5.07	-30.35	17.71	-0.98
5.24	-40.46	18.01	-0.97
16.43	-40.21	832.00	-0.02

[\[GO TO DETAILED MECHANICAL SPECIFICATIONS AND PAD LAYOUT\]](#)

[\[RETURN TO GENERAL ELECTRICAL SPECIFICATIONS\]](#)



# Multilayer Organic (MLO®)

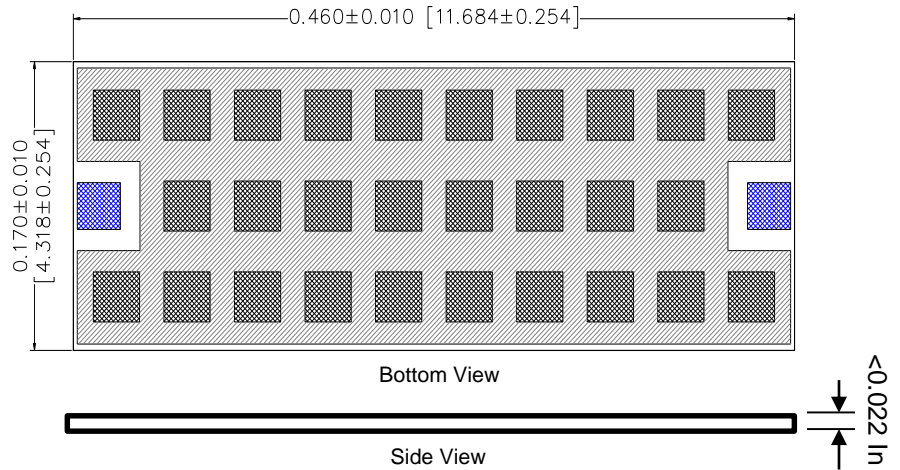
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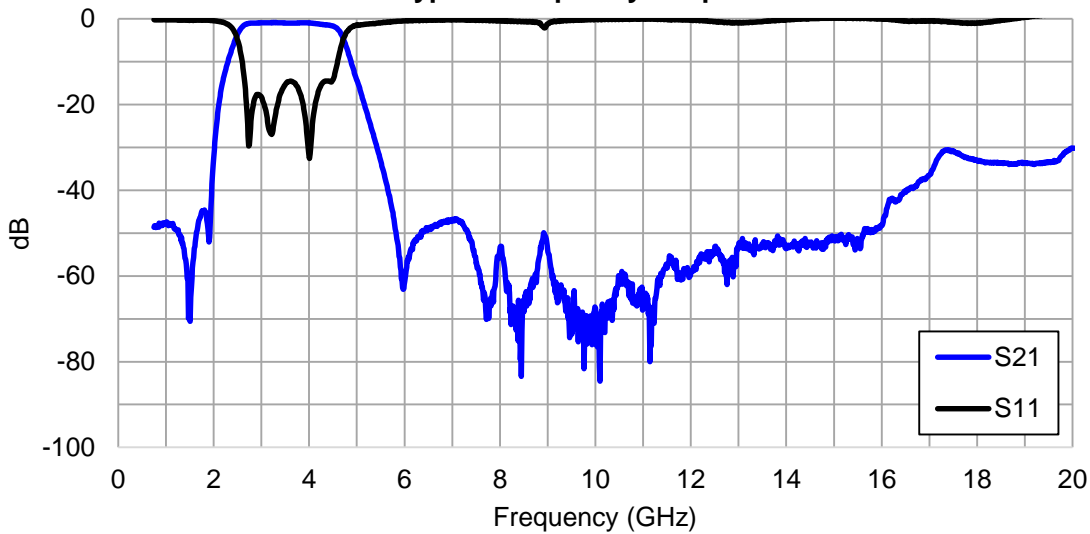
## ELECTRICAL SPECIFICATIONS

Passband	
Passband Frequency	2.64 - 4.46 GHz
Passband IL	1.57 dB typ. 5 dB max
Center Frequency	3.43 GHz
Center Frequency IL	1.00 dB
Power	1 Watt
Stopband	
Low Stopband Frequency	DC - 1.89 GHz
Rejection Low Band	40 dB typ. 35 dB min.
High Frequency	5.83 - 16.0 GHz
Rejection High Band	40 dB typ. 35 dB min.
Dimension	
Thickness	<0.022 in. Max

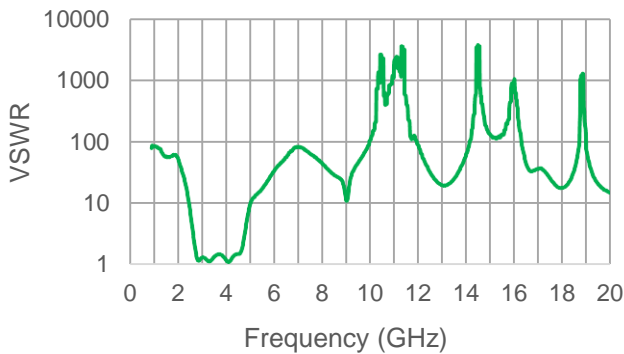
## DIMENSIONS – CASE SIZE E inches (mm)



## Typical Frequency Response



## VSWR



## TYPICAL PERFORMANCE AT 25°C

Frequency (GHz)	Insertion Loss (dB)	VSWR (:1)	Return Loss (dB)
1.95	-41.31	43.19	-0.40
2.01	-30.50	35.65	-0.49
2.10	-20.88	29.44	-0.59
2.53	-2.90	2.98	-6.06
2.56	-2.49	2.50	-7.34
4.60	-2.41	1.95	-9.84
4.64	-2.86	2.35	-7.89
5.17	-20.70	13.79	-1.26
5.43	-30.31	17.43	-1.00
5.66	-40.26	22.59	-0.77
16.50	-40.43	34.01	-0.51

[\[GO TO DETAILED MECHANICAL SPECIFICATIONS AND PAD LAYOUT\]](#)

[\[RETURN TO GENERAL ELECTRICAL SPECIFICATIONS\]](#)



# Multilayer Organic (MLO®)

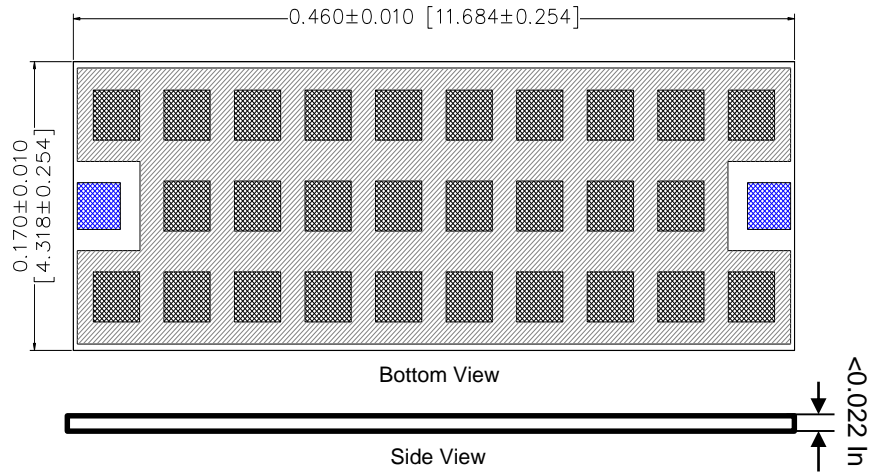
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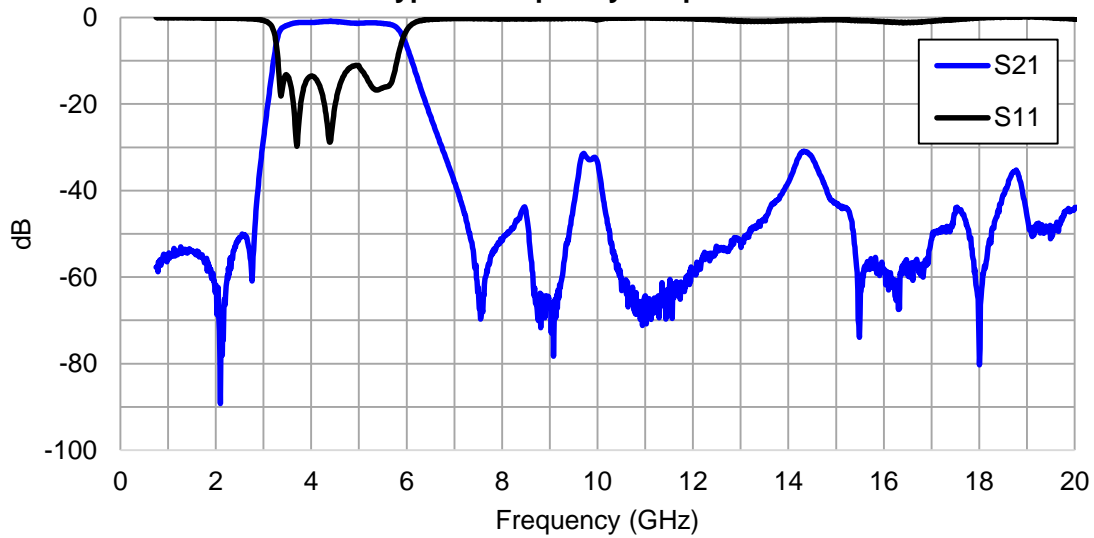
## ELECTRICAL SPECIFICATIONS

Passband	
Passband Frequency	3.49 - 5.66 GHz
Passband IL	1.83 dB typ. 5 dB max
Center Frequency	4.44 GHz
Center Frequency IL	0.98 dB
Power	1 Watt
Stopband	
Low Stopband Frequency	DC - 2.79 GHz
Rejection Low Band	40 dB typ. 35 dB min.
High Frequency	7.06 - 13.8 GHz
Rejection High Band	30 dB typ. 25 dB min.
Dimension	
Thickness	<0.022 in. Max

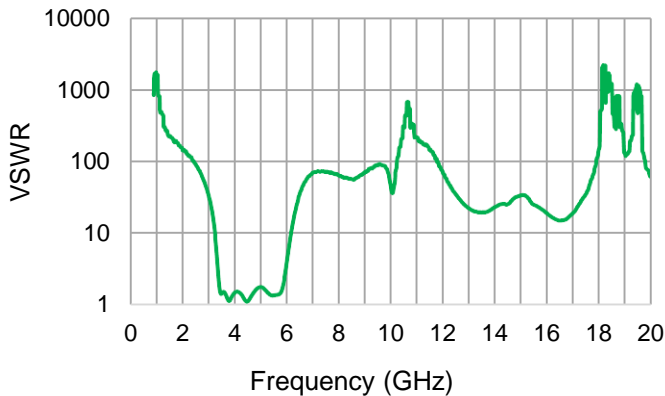
## DIMENSIONS – CASE SIZE E inches (mm)



## Typical Frequency Response



## VSWR



## TYPICAL PERFORMANCE AT 25°C

Frequency (GHz)	Insertion Loss (dB)	VSWR (:1)	Return Loss (dB)
2.88	-40.10	35.61	-0.49
2.98	-30.16	25.90	-0.67
3.08	-20.62	16.75	-1.04
3.35	-2.95	1.32	-17.10
3.39	-2.43	1.32	-17.21
5.80	-2.48	1.97	-9.69
5.84	-2.93	2.31	-8.03
6.42	-20.27	38.88	-0.45
6.74	-30.10	57.91	-0.30
7.07	-40.09	71.03	-0.24
9.55	-40.29	63.69	-0.27

[\[GO TO DETAILED MECHANICAL SPECIFICATIONS AND PAD LAYOUT\]](#)

[\[RETURN TO GENERAL ELECTRICAL SPECIFICATIONS\]](#)



# Multilayer Organic (MLO®)

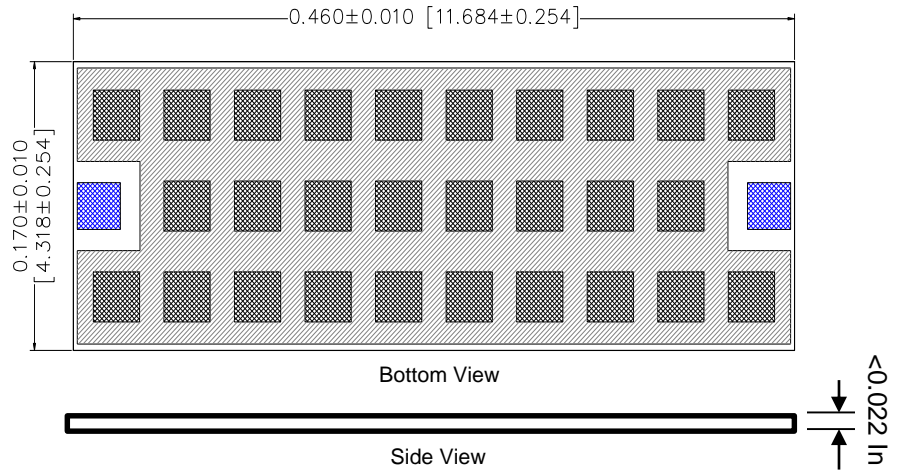
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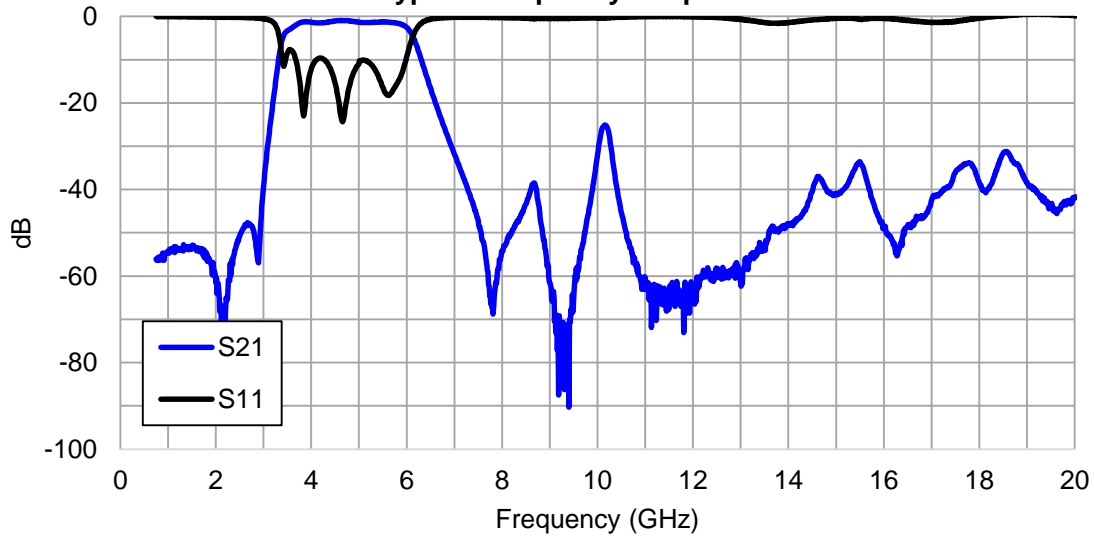
## ELECTRICAL SPECIFICATIONS

Passband	
Passband Frequency	3.66 - 5.78 GHz
Passband IL	2.12 dB typ. 5 dB max
Center Frequency	4.60 GHz
Center Frequency IL	0.96 dB
Power	1 Watt
Stopband	
Low Stopband Frequency	DC - 2.90 GHz
Rejection Low Band	40 dB typ. 35 dB min.
High Frequency	7.50 - 9.55 GHz
Rejection High Band	40 dB typ. 35 dB min.
Dimension	
Thickness	<0.022 in. Max

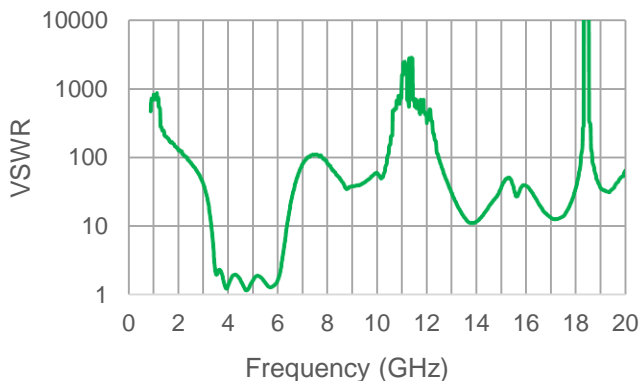
## DIMENSIONS – CASE SIZE E inches (mm)



Typical Frequency Response



VSWR



## TYPICAL PERFORMANCE AT 25°C

Frequency (GHz)	Insertion Loss (dB)	VSWR (:1)	Return Loss (dB)
2.99	-40.84	34.54	-0.50
3.08	-30.26	25.90	-0.67
3.19	-20.51	13.48	-1.29
3.55	-2.97	2.41	-7.66
3.63	-2.41	2.24	-8.36
6.00	-2.47	1.99	-9.60
6.03	-2.91	2.31	-8.05
6.61	-20.21	33.30	-0.52
6.95	-30.17	112.45	-0.15
7.28	-40.04	104.23	-0.17
9.89	-40.05	50.09	-0.35

[\[GO TO DETAILED MECHANICAL SPECIFICATIONS AND PAD LAYOUT\]](#)

[\[RETURN TO GENERAL ELECTRICAL SPECIFICATIONS\]](#)



# Multilayer Organic (MLO®)

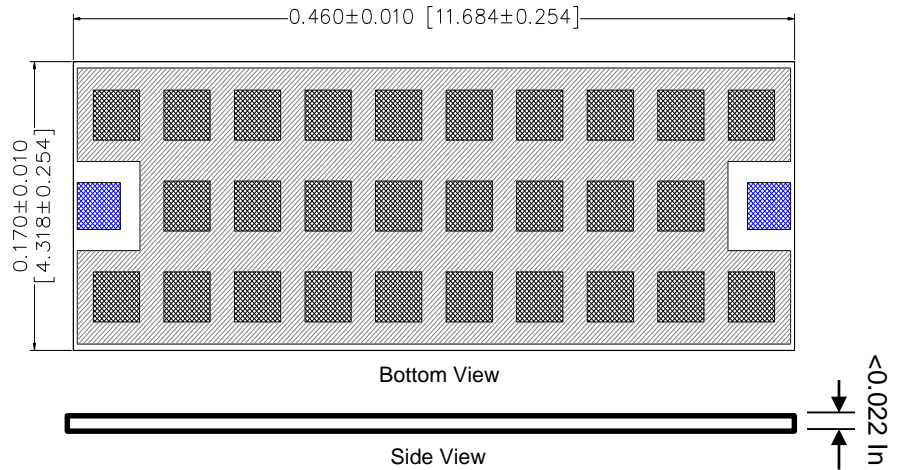
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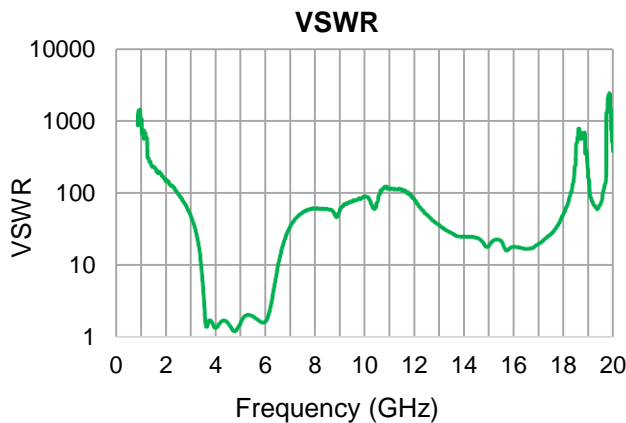
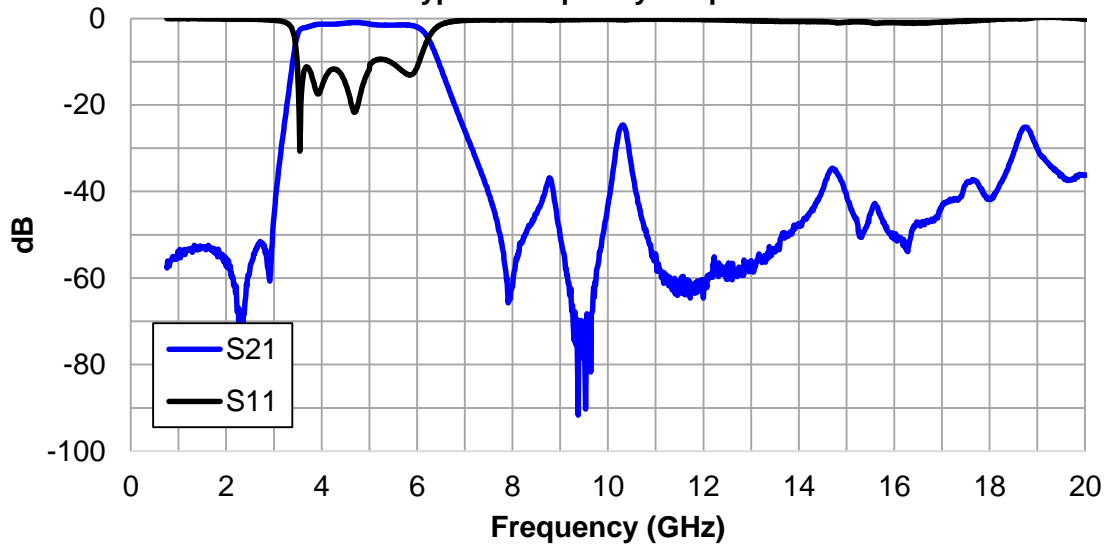
## ELECTRICAL SPECIFICATIONS

Passband	
Passband Frequency	3.70 - 5.93 GHz
Passband IL	2.01 dB typ.
	5 dB max
Center Frequency	4.68 GHz
Center Frequency IL	0.99 dB
Power	1 Watt
Stopband	
Low Stopband Frequency	DC - 2.96 GHz
Rejection Low Band	40 dB typ.
	35 dB min.
High Frequency	6.99 - 20.0 GHz
Rejection High Band	20 dB typ.
	15 dB min.
Dimension	
Thickness	<0.022 in. Max

## DIMENSIONS – CASE SIZE E inches (mm)



Typical Frequency Response



## TYPICAL PERFORMANCE AT 25°C

Frequency (GHz)	Insertion Loss (dB)	VSWR (:1)	Return Loss (dB)
3.05	-40.07	33.16	-0.52
3.14	-30.81	29.20	-0.60
3.26	-20.74	16.34	-1.06
3.53	-2.88	1.15	-22.99
3.57	-2.44	1.22	-20.22
6.08	-2.48	2.11	-8.94
6.12	-2.88	2.38	-7.78
6.79	-20.02	29.28	-0.59
7.15	-30.08	47.23	-0.37
7.50	-40.54	50.73	-0.34
8.68	-40.14	53.72	-0.32

[\[GO TO DETAILED MECHANICAL SPECIFICATIONS AND PAD LAYOUT\]](#)

[\[RETURN TO GENERAL ELECTRICAL SPECIFICATIONS\]](#)

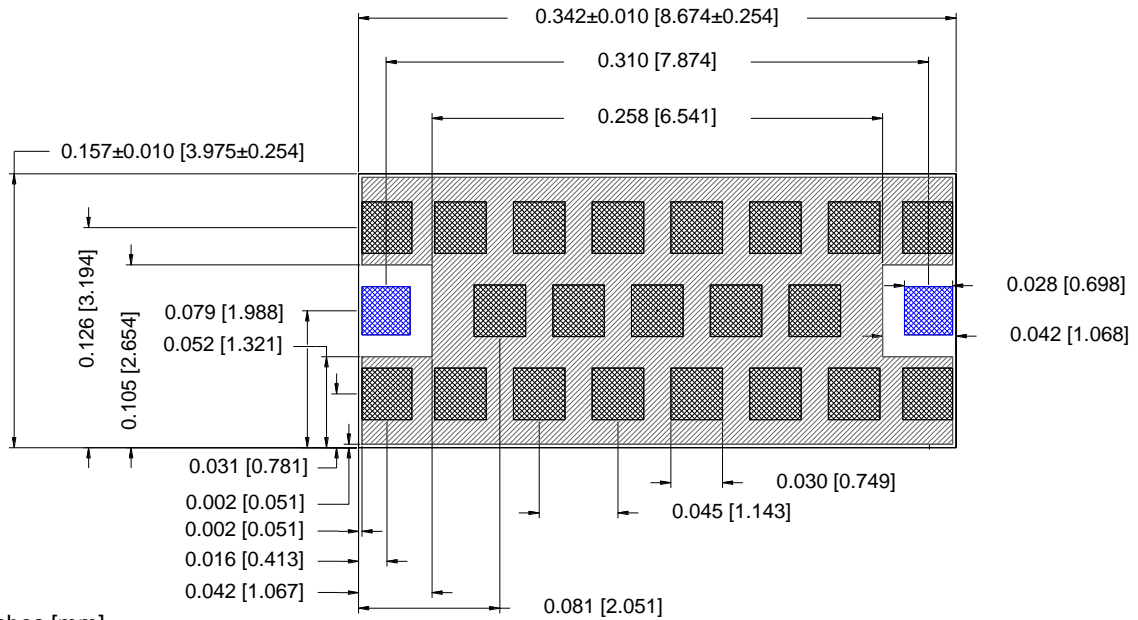




# Multilayer Organic (MLO®) Filters

## Mechanical Specifications, PCB Layout & Mounting Recommendations

### MECHANICAL SPECIFICATIONS – FOOTPRINT C



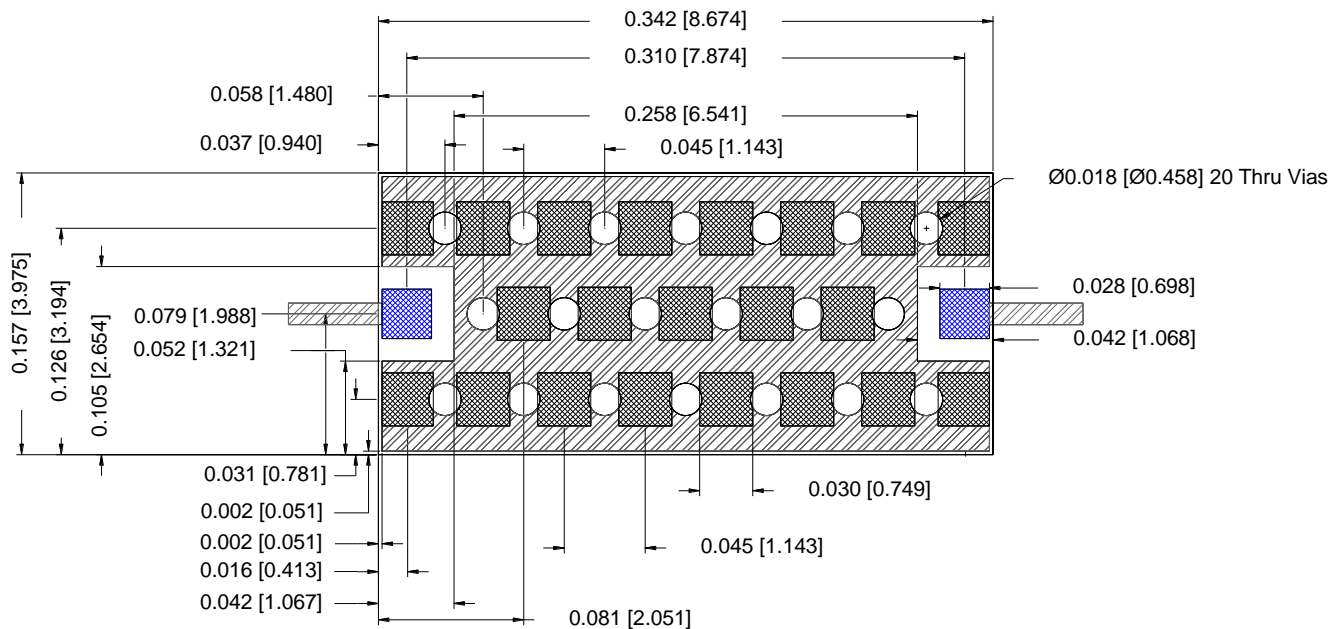
Dimensions in inches [mm]

Tolerances are +/-0.002 [0.05], unless noted.

All contact areas are gold plated, including I/O pads.

Blue pads are I/O, Gray are ground

### RECOMMENDED PCB LAYOUT – FOOTPRINT C



Dimensions in inches [mm].

Line width should be designed to match 50 ohm characteristic impedance, depending on PCB material and thickness.

Grounding is solid copper under solder mask, with solder mask defined pads for ground openings. I/O pads are not shorted to ground.

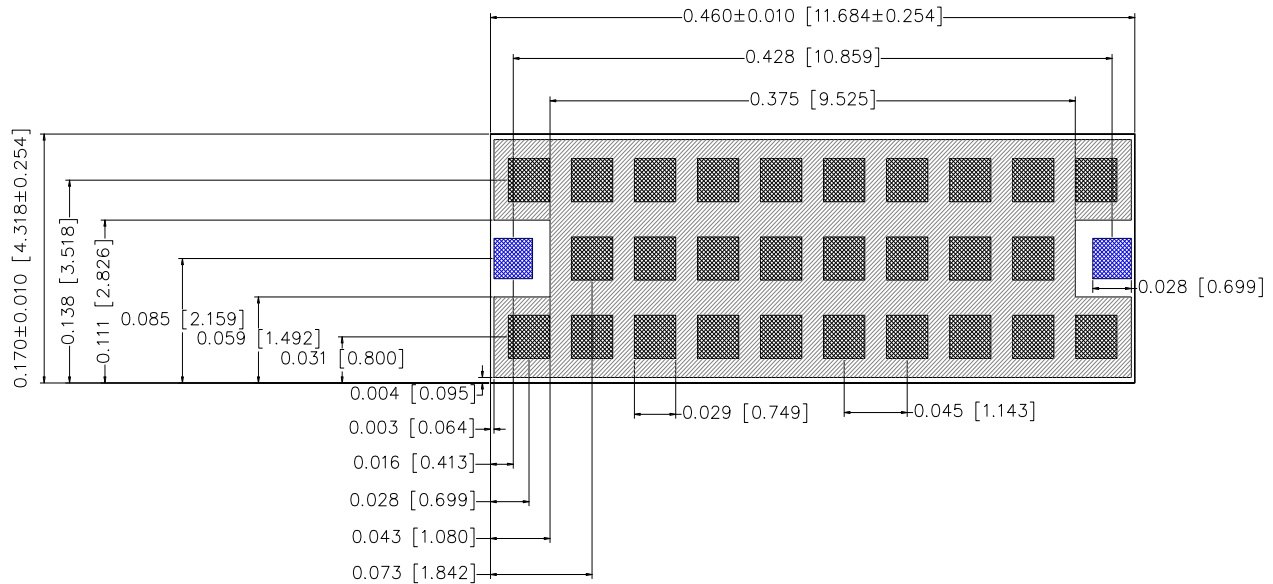
DXF Files available upon request.

[\[RETURN TO GENERAL ELECTRICAL SPECIFICATIONS\]](#)

# Multilayer Organic (MLO®) Filters

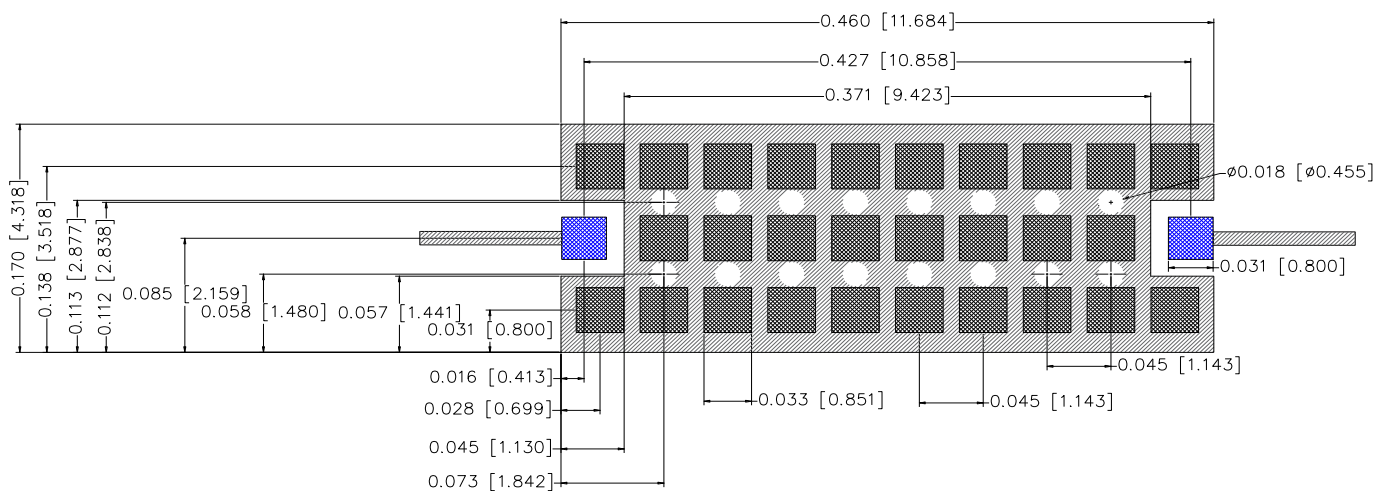
## Mechanical Specifications, PCB Layout & Mounting Recommendations

### MECHANICAL SPECIFICATIONS – FOOTPRINT E



Dimensions in inches [mm]  
 Tolerances are +/-0.002 [0.05], unless noted.  
 All contact areas are gold plated, including I/O pads.

### RECOMMENDED PCB LAYOUT – FOOTPRINT E



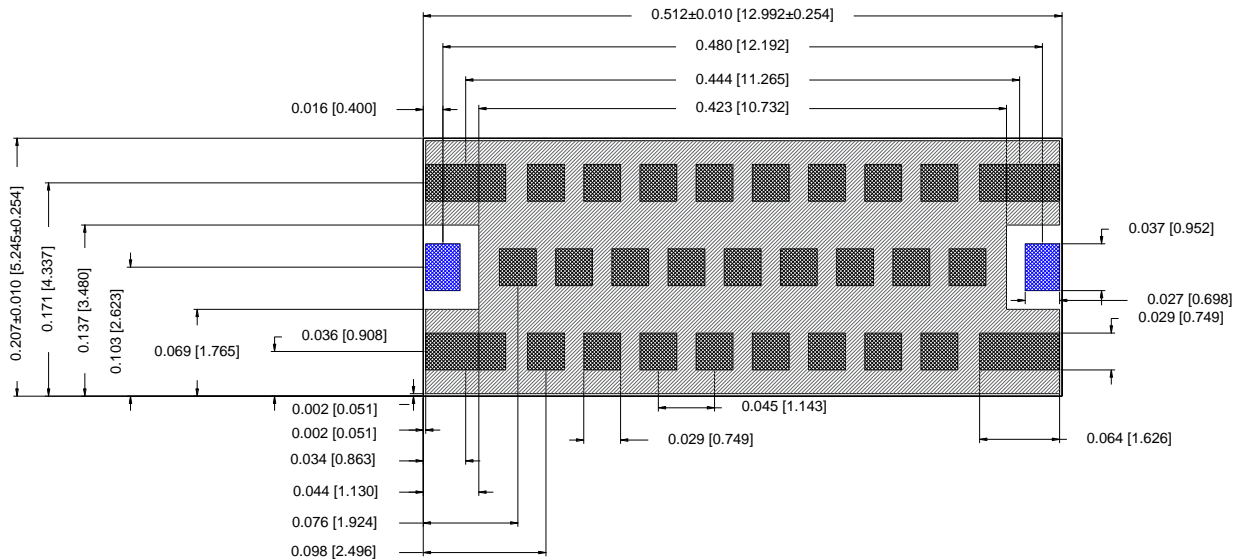
Dimensions in inches [mm].  
 Line width should be designed to match 50 ohm characteristic impedance, depending on PCB material and thickness.  
 Grounding is solid copper under solder mask, with solder mask defined pads for ground openings. I/O pads are not shorted to ground.  
 DXF Files available upon request.

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# Multilayer Organic (MLO®) Filters

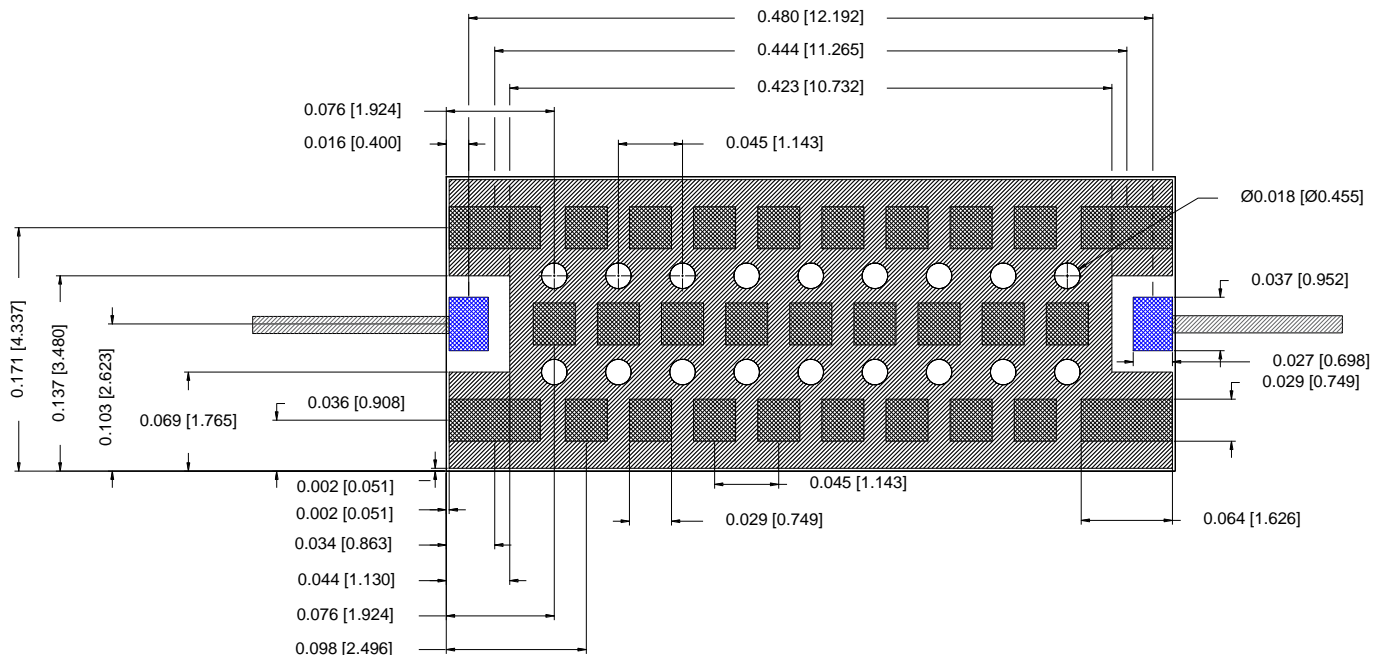
## Mechanical Specifications, PCB Layout & Mounting Recommendations

### MECHANICAL SPECIFICATIONS – FOOTPRINT F



Dimensions in inches [mm]  
 Tolerances are +/-0.002 [0.05], unless noted.  
 All contact areas are gold plated, including I/O pads.

### RECOMMENDED PCB LAYOUT – FOOTPRINT F



Dimensions in inches [mm].  
 Line width should be designed to match 50 ohm characteristic impedance, depending on PCB material and thickness.  
 Grounding is solid copper under solder mask, with solder mask defined pads for ground openings. I/O pads are not shorted to ground.  
 DXF Files available upon request.

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# Multilayer Organic (MLO®) Filters

## Mechanical Specifications, PCB Layout & Mounting Recommendations

### MOUNTING RECOMMENDATIONS

#### AUTOMATED SMT ASSEMBLY

The following section describes the guidelines for automated SMT assembly of MLO® RF devices which are typically Land Grid Array (LGA) packages or side termination SMT packages.

Control of solder and solder paste volume is critical for surface mount assembly of MLO® RF devices onto the PCB.

Stencil thickness and aperture openings should be adjusted according to the optimal solder volume. The following are general recommendations for SMT mounting of MLO® devices onto the PCB.

#### SMT REFLOW PROFILE

Common IR or convection reflow SMT processes shall be used for the assembly. Standard SMT reflow profiles, for eutectic and Pb free solders, can be used to surface mount the MLO® devices onto the PCB. In all cases, a temperature gradient of 3°C/sec, or less, should be maintained to prevent warpage of the package and to ensure that all joints reflow properly. Additional soak time and slower preheating time may be required to improve the out-gassing of solder

paste. In addition, the reflow profile depends on the PCB density and the type of solder paste used. Standard no-clean solder paste is generally recommended. If another type of flux is used, complete removal of flux residual may be necessary. Example of a typical lead-free reflow profile is shown below.

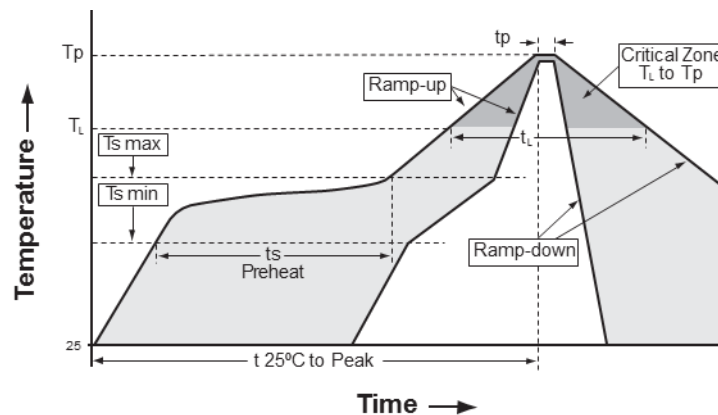


Figure A. Typical Lead Free Profile and Parameters

Profile Parameter	Pb free, Convection, IR/Convection
Ramp-up rate (T <sub>smax</sub> to T <sub>p</sub> )	3 °C/second max.
Preheat temperature (T <sub>s min</sub> to T <sub>s max</sub> )	150 °C to 200 °C
Preheat time (t <sub>s</sub> )	60 - 180 seconds
Time above T <sub>L</sub> , 217 °C (t <sub>L</sub> )	60 - 120 seconds
Peak temperature (T <sub>p</sub> )	260 °C
Time within 5 °C of peak temperature (t <sub>p</sub> )	10 - 20 seconds
Ramp-down rate	4 °C/second max.
Time 25 °C to peak temperature	6 minutes max.

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