

# Coaxial Bandpass Filter

## VBF-7331+

50Ω 6850 to 7850 MHz

### The Big Deal

- Good rejection
- Good VSWR
- Connectorized package



Generic photo used for illustration purposes only  
CASE STYLE: FF704

### Product Overview

The VBF-7331+ Band Pass Filter is constructed using internal LTCC Band Pass Filter structure to achieve repeatable performance. This offers low insertion loss and good rejection at the band reject edges. Built using Mini-Circuits proven unibody construction which integrates the RF connectors with the case body, the VBF-7331+ takes very little space and meets rugged test lab system environment.

### Key Features

Feature	Advantages
Good Rejection close to pass band	Provides good rejection of signals close to the pass band, for improved system performance.
Compact Versatile Case (1.43"x0.41")	Enables use in a variety of applications including space constrained connectorized systems. Connectors: SMA Female (1), SMA Male (1)
Rugged Unibody Construction	Mini-Circuits Unibody construction allows survivability in critical applications including militarized or industrial systems.

#### Notes

- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.  
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.  
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CASE STYLE: FF704

Connectors Model  
SMA VBF-7331+

### Features

- Small size
- Temperature stable
- Rugged unibody construction

### Applications

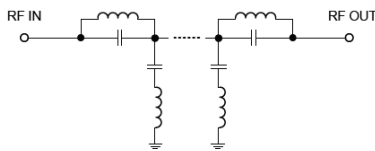
- Harmonic rejection
- Transmitters / Receivers
- UWB impulse radar
- Emission masking

### Electrical Specifications<sup>(1)</sup> at 25°C

Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Unit	
Pass Band	Insertion Loss	F1	7331	-	-	2	dB
	Insertion Loss	F2-F3	6850 - 7850	-	1.4	-	dB
	VSWR	F2-F3	6850 - 7850	-	1.45	-	:1
Stop Band, Lower	Insertion Loss	DC-F4	10-5600	10	23	-	dB
	VSWR	F4-F5	5600-5800	-	10	-	dB
Stop Band, Upper	Insertion Loss	F6-F7	9300 - 10500	10	20	-	dB
		F7-F8	10500-13300	-	10	-	dB
	VSWR	F6-F8	9300-13300	-	20	-	:1

(1) In Application where DC voltage is present at either input or output ports, coupling capacitors are required.

### Functional Schematic



### Maximum Ratings

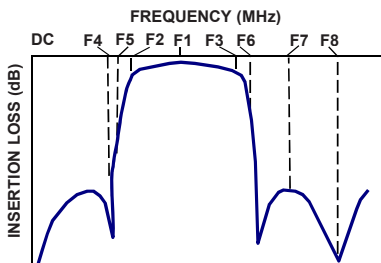
Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
RF Power Input	2.5 W max.

\*Passband rating, derate linearly to 0.7 W at 100°C ambient  
Permanent damage may occur if any of these limits are exceeded.

### Typical Performance Data at 25°C

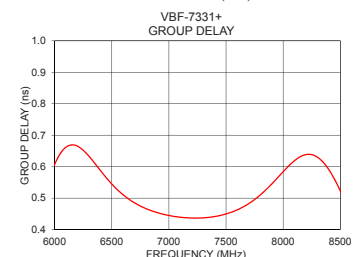
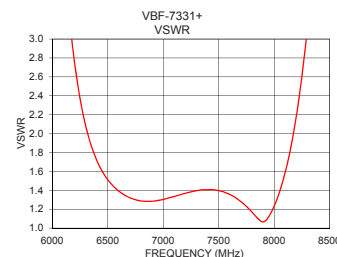
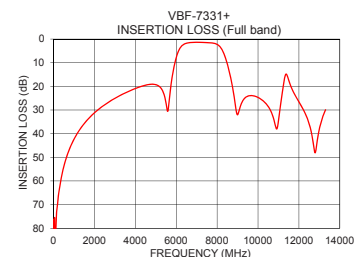
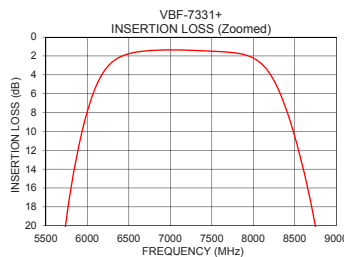
Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (ns)
10	76.27	7226.80	6850	0.46
200	69.65	262.08	6900	0.45
900	44.13	118.17	6950	0.45
2150	30.09	84.25	7000	0.44
3000	25.06	77.66	7050	0.44
3700	22.00	67.17	7100	0.44
4250	20.12	55.05	7150	0.44
5600	30.34	20.53	7200	0.44
5800	16.15	12.98	7250	0.44
6250	3.07	2.37	7331	0.44
6850	1.38	1.28	7350	0.44
7331	1.43	1.40	7400	0.44
7850	1.78	1.10	7450	0.44
8600	13.90	8.34	7500	0.45
9300	25.50	18.83	7550	0.46
10000	24.67	23.10	7600	0.46
10500	28.52	24.93	7650	0.47
11400	14.97	12.91	7700	0.48
12100	28.03	25.93	7750	0.50
13300	29.93	23.48	7850	0.53

### Typical Frequency Response



### +RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications



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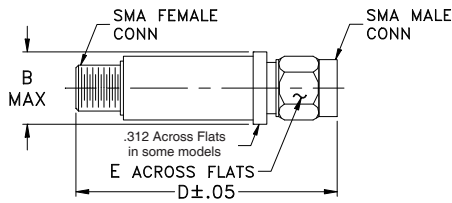
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Page 2 of 3

## Coaxial Connections

PORT - 1	SMA-MALE
PORT - 2	SMA-FEMALE

## Outline Drawing



## Outline Dimensions ( $\frac{\text{inch}}{\text{mm}}$ )

B	D	E	wt.
.410	1.43	.312	grams
10.41	36.32	7.92	10

Note: Please refer to case style drawing for details

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*Typical Performance Data*

FREQ.  (MHz)	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
	(dB)			(dB)			(dB)		
	@-55°C	@+25°C	@+100°C	@-55°C	@+25°C	@+100°C	@-55°C	@+25°C	@+100°C
10	81.41	76.27	80.80	0.00	0.00	0.01	0.01	0.00	0.01
100	84.59	84.10	80.43	0.04	0.05	0.06	0.00	0.00	0.01
300	62.58	62.82	62.35	0.07	0.09	0.10	0.00	0.02	0.04
500	54.18	54.10	53.97	0.08	0.11	0.12	0.00	0.04	0.06
700	48.47	48.37	48.32	0.09	0.13	0.14	0.01	0.06	0.09
900	44.18	44.13	44.07	0.11	0.15	0.16	0.02	0.08	0.11
1100	40.85	40.82	40.73	0.12	0.17	0.18	0.05	0.11	0.15
1300	38.08	38.06	37.93	0.13	0.18	0.20	0.08	0.14	0.18
1500	35.78	35.75	35.59	0.13	0.19	0.21	0.11	0.18	0.21
1700	33.80	33.76	33.58	0.14	0.20	0.21	0.13	0.21	0.24
1900	32.06	32.01	31.87	0.14	0.20	0.22	0.16	0.24	0.27
2100	30.49	30.45	30.36	0.14	0.20	0.23	0.17	0.27	0.31
2300	29.11	29.06	29.00	0.13	0.21	0.24	0.19	0.30	0.36
2500	27.82	27.79	27.76	0.13	0.21	0.25	0.19	0.32	0.40
2700	26.60	26.62	26.62	0.12	0.21	0.26	0.20	0.33	0.42
2900	25.50	25.56	25.57	0.13	0.22	0.27	0.22	0.35	0.44
3100	24.52	24.57	24.60	0.12	0.23	0.28	0.22	0.36	0.45
3300	23.56	23.66	23.69	0.12	0.23	0.30	0.24	0.37	0.46
3500	22.76	22.80	22.83	0.13	0.25	0.32	0.25	0.38	0.48
3700	21.99	22.00	22.03	0.13	0.26	0.33	0.25	0.40	0.50
3900	21.23	21.26	21.28	0.14	0.27	0.35	0.25	0.41	0.54
4100	20.52	20.59	20.60	0.16	0.30	0.38	0.24	0.44	0.61
4300	19.87	19.98	20.03	0.19	0.32	0.41	0.25	0.47	0.68
4500	19.31	19.49	19.58	0.22	0.36	0.44	0.26	0.51	0.75
4700	18.90	19.16	19.33	0.26	0.40	0.48	0.30	0.57	0.83
4900	18.79	19.11	19.39	0.31	0.46	0.53	0.37	0.63	0.90
5100	19.24	19.60	20.02	0.35	0.52	0.60	0.46	0.72	0.97
5300	20.70	21.32	22.06	0.42	0.60	0.68	0.59	0.85	1.07
5600	30.96	30.34	27.64	0.60	0.85	0.98	0.93	1.25	1.48
5700	25.90	22.62	20.07	0.73	1.02	1.20	1.11	1.53	1.84
5800	18.22	16.15	14.38	0.98	1.34	1.62	1.42	1.98	2.46
6250	3.09	3.07	3.01	6.79	7.81	8.72	8.28	10.07	12.11
6300	2.55	2.64	2.67	8.15	9.07	9.85	9.93	11.53	13.28
6500	1.48	1.76	1.95	13.54	13.83	14.11	15.96	15.66	15.33
6850	1.08	1.38	1.60	17.93	18.13	17.98	17.20	16.88	15.93
6900	1.07	1.37	1.59	17.81	18.12	17.93	16.82	16.74	15.88
7300	1.13	1.42	1.63	14.77	15.66	16.07	13.83	15.00	15.43
7331	1.14	1.43	1.64	14.63	15.53	16.03	13.70	14.94	15.49
7500	1.19	1.49	1.72	14.38	15.65	16.62	13.39	15.05	16.37
7700	1.26	1.60	1.88	16.29	18.22	19.86	14.62	16.81	19.30
7850	1.35	1.78	2.14	22.49	26.12	24.47	17.08	18.98	20.71
8100	2.09	2.84	3.59	15.01	12.81	10.82	12.15	11.12	10.11
8125	2.25	3.06	3.87	13.53	11.59	9.84	11.15	10.17	9.22
8500	8.41	10.55	12.62	3.03	2.78	2.52	2.62	2.48	2.50
8700	15.12	17.85	20.58	1.58	1.67	1.60	1.32	1.47	1.62
8900	24.98	28.42	30.77	1.04	1.24	1.24	0.86	1.09	1.27
9100	31.80	29.50	27.98	0.81	1.03	1.06	0.68	0.92	1.09
9300	26.35	25.50	24.97	0.69	0.92	0.97	0.57	0.82	1.00
9500	24.37	24.13	23.94	0.61	0.85	0.91	0.50	0.76	0.96
9700	23.81	23.90	23.91	0.55	0.79	0.87	0.44	0.71	0.94
9900	23.89	24.30	24.50	0.53	0.77	0.85	0.42	0.68	0.93
10100	24.54	25.16	25.59	0.48	0.73	0.83	0.38	0.65	0.94
10300	25.73	26.50	27.17	0.48	0.72	0.84	0.36	0.63	0.94
10500	27.57	28.52	29.53	0.44	0.70	0.83	0.34	0.63	0.96
10700	30.54	31.99	33.68	0.45	0.69	0.83	0.36	0.65	1.00
10900	36.49	37.96	36.25	0.45	0.70	0.84	0.40	0.74	1.13
11100	32.65	28.01	24.31	0.51	0.77	0.97	0.58	1.12	1.84
11300	19.76	16.51	15.61	0.77	1.28	1.46	1.82	4.03	4.82
11500	14.89	17.33	19.29	1.01	0.98	0.97	2.65	1.63	1.37
13300	31.88	29.93	28.65	0.41	0.74	0.79	0.04	0.47	0.75



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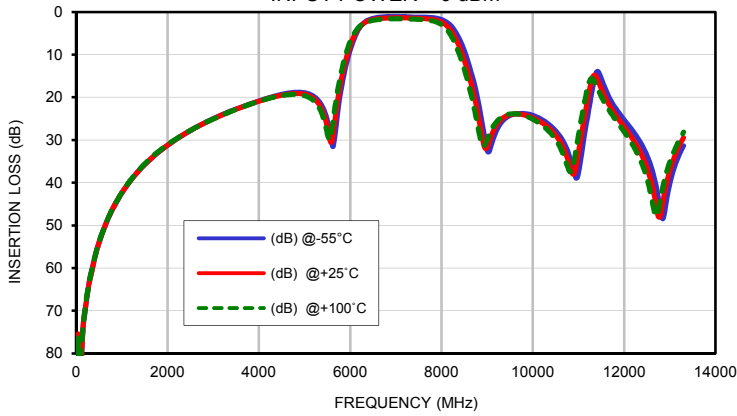
IF/RF MICROWAVE COMPONENTS

## Typical Performance Data

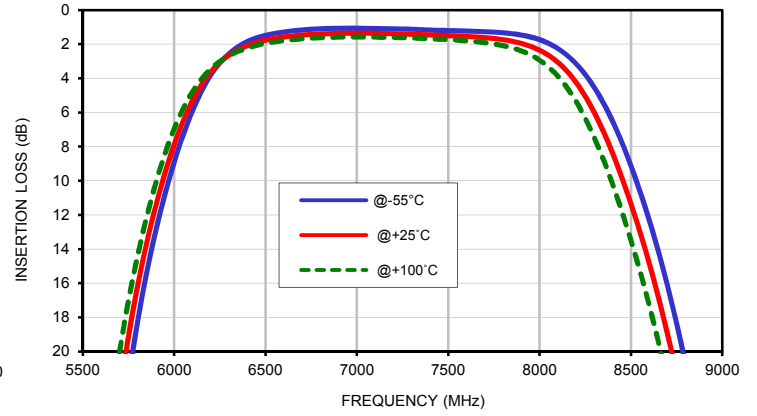
FREQ.  (MHz)	GROUP DELAY		
	(nsec)		
	@-55°C	@+25°C	@+100°C
6850	0.48	0.46	0.45
6875	0.47	0.46	0.45
6900	0.47	0.45	0.44
6925	0.47	0.45	0.44
6950	0.46	0.45	0.44
6975	0.46	0.45	0.44
7000	0.46	0.44	0.44
7025	0.46	0.44	0.43
7050	0.46	0.44	0.43
7075	0.45	0.44	0.43
7100	0.45	0.44	0.43
7125	0.45	0.44	0.43
7150	0.45	0.44	0.43
7175	0.45	0.44	0.43
7200	0.45	0.44	0.43
7225	0.45	0.44	0.43
7250	0.45	0.44	0.43
7275	0.45	0.44	0.43
7300	0.45	0.44	0.43
7331	0.45	0.44	0.44
7350	0.45	0.44	0.44
7375	0.45	0.44	0.44
7400	0.45	0.44	0.44
7425	0.45	0.44	0.44
7450	0.45	0.44	0.44
7475	0.45	0.45	0.45
7500	0.45	0.45	0.45
7525	0.46	0.45	0.45
7550	0.46	0.46	0.46
7575	0.46	0.46	0.46
7600	0.47	0.46	0.47
7625	0.47	0.47	0.47
7650	0.47	0.47	0.48
7675	0.48	0.48	0.48
7700	0.48	0.48	0.49
7725	0.49	0.49	0.50
7750	0.49	0.50	0.50
7775	0.50	0.50	0.51
7800	0.51	0.51	0.52
7825	0.51	0.52	0.53
7850	0.52	0.53	0.54

## Typical Performance Curves

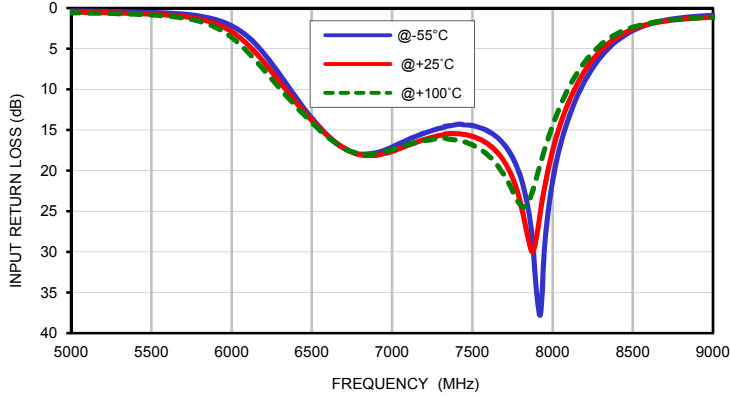
**INSERTION LOSS vs. TEMPERATURE**  
INPUT POWER = 0 dBm



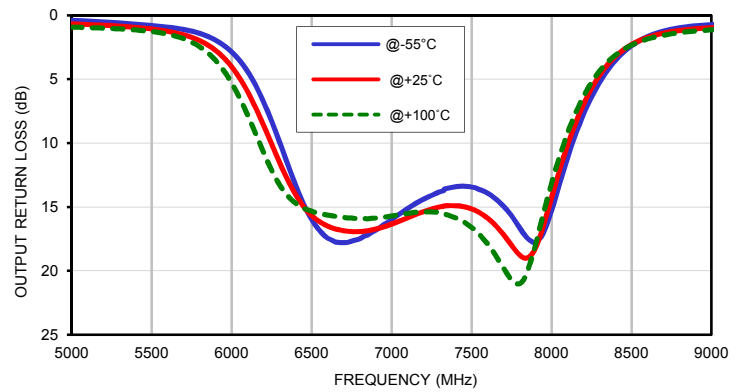
**INSERTION LOSS vs. TEMPERATURE (Zoomed)**  
INPUT POWER = 0 dBm



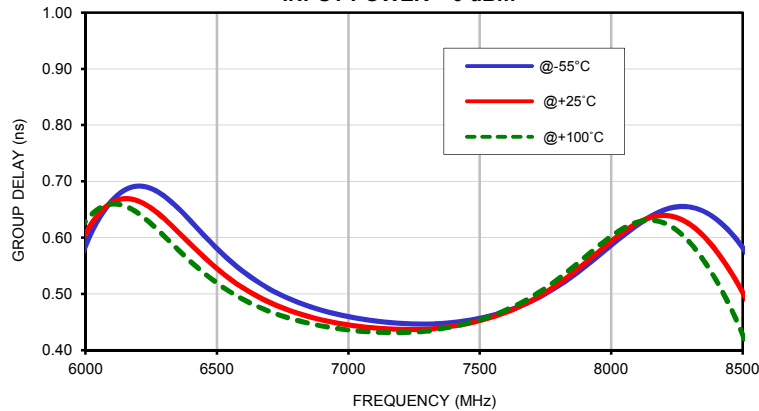
**INPUT RETURN LOSS vs. TEMPERATURE**  
INPUT POWER = 0 dBm



**OUTPUT RETURN LOSS vs. TEMPERATURE**  
INPUT POWER = 0 dBm



**GROUP DELAY vs. TEMPERATURE**  
INPUT POWER = 0 dBm

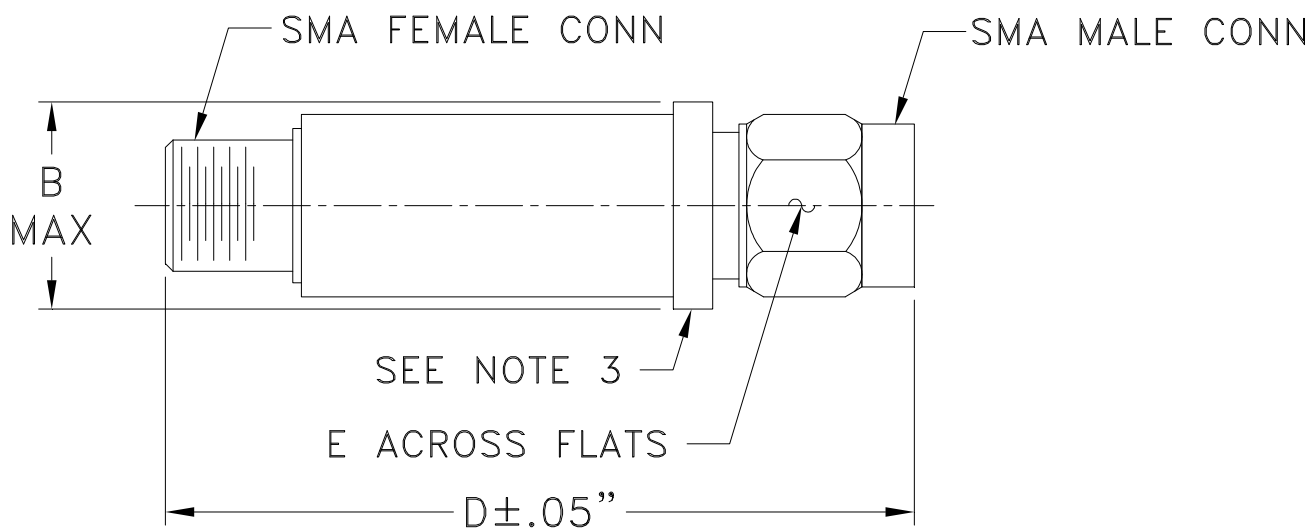


# Case Style

# FF

## FF704

### Outline Dimensions



CASE #.	A	B	C	D	E	WT GRAMS
FF704	--	.410 (10.41)	--	1.43 (36.32)	.312 (7.92)	10.0

Dimensions are in inches (mm). Tolerances: 2Pl. ± .04; 3Pl. ± .030

#### Notes:

1. Case material: Stainless steel.
2. Case finish: Gold plated.
3. Round Flange may have .312 Across Flats in some models.

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<b>Specification</b>	<b>Test/Inspection Condition</b>	<b>Reference/Spec</b>
Operating Temperature	-55° to 100°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Barometric Pressure	100,000 Feet	MIL-STD-202, Method 105, Condition D
Humidity	90% RH, 65°C Units may require bake-out after humidity to restore full performance.	MIL-STD-202, Method 103
Thermal Shock	-65° to 125°C, 5 cycles	MIL-STD-202, Method 107, Condition B
Vibration (High Frequency)	20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	100g, 6ms sawtooth, 3 shocks each direction 3 axes (total 18)	MIL-STD-202, Method 213, Condition I