

# Coaxial Bandpass Filter

## BBP-20R5+

50Ω 20 to 21 MHz



Generic photo used for illustration purposes only

CASE STYLE: FF55

Connectors	Model
BNC	BBP-20R5+

### Features

- Flat group delay over passband
- Good VSWR, 1.3:1 typical in passband
- High rejection (40dB form 40-380 MHz)

### Applications

- Transmitters / Receivers - IF stage
- Harmonic rejection
- Test equipments
- Military

### Electrical Specifications at 25°C

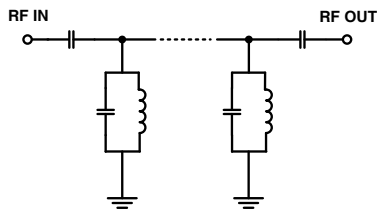
Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
<b>Pass Band</b>	Center Frequency	-	-	20.5	-	MHz
	Insertion Loss	F1-F2	20 - 21	2.2	3.0	dB
	VSWR	F1-F2	20 - 21	1.3	1.6	:1
<b>Stop Band, Lower</b>	Insertion Loss	DC-F3	DC - 15.8	40	50	dB
		F3-F4	15.8 - 17	20	27	dB
	VSWR	DC-F4	DC - 17	-	20	:1
<b>Stop Band, Upper</b>	Insertion Loss	F5-F6	27 - 40	20	28	dB
		F6-F7	40 - 380	40	45	dB
	VSWR	F5-F7	27 - 380	-	20	:1

### Maximum Ratings

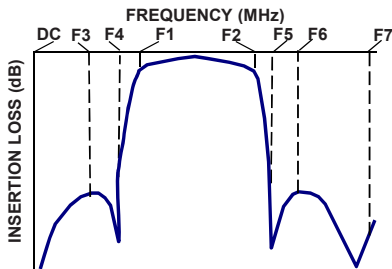
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	0.5 W max.

Permanent damage may occur if any of these limits are exceeded.

### Functional Schematic



### Typical Frequency Response

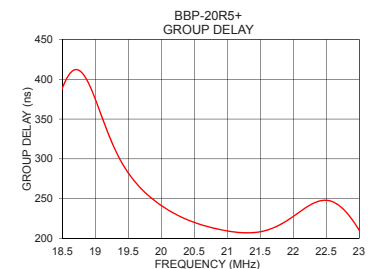
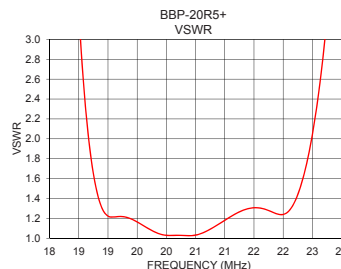
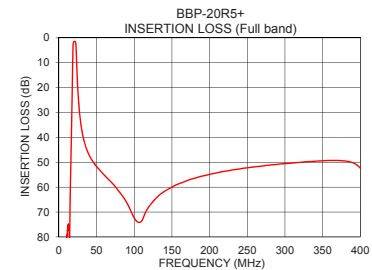
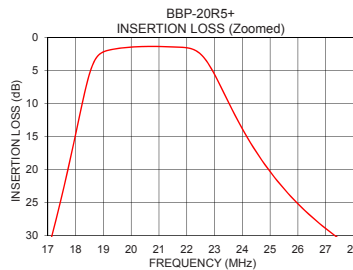


### Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (ns)
1.0	98.76	3744.00	19.5	282.22
10.0	81.53	1498.50	19.6	271.33
15.0	62.87	174.64	19.7	262.11
15.8	50.22	112.05	19.8	254.31
17.0	32.36	48.32	19.9	247.41
17.1	30.76	44.24	20.0	241.31
17.7	20.43	22.27	20.1	235.95
18.0	14.68	13.12	20.2	231.18
18.7	3.41	1.85	20.3	226.99
20.0	1.49	1.03	20.4	223.32
20.5	1.40	1.03	20.5	220.13
21.0	1.40	1.18	20.6	217.33
22.7	3.53	2.91	20.7	214.95
24.0	13.84	22.15	20.8	212.81
25.0	20.33	48.71	20.9	210.93
27.0	28.91	111.48	21.0	209.38
27.5	30.49	126.54	21.1	208.18
40.0	47.04	320.77	21.2	207.31
150.0	59.97	93.85	21.3	207.06
380.0	49.47	61.09	21.5	208.37

### +RoHS Compliant

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



### Notes

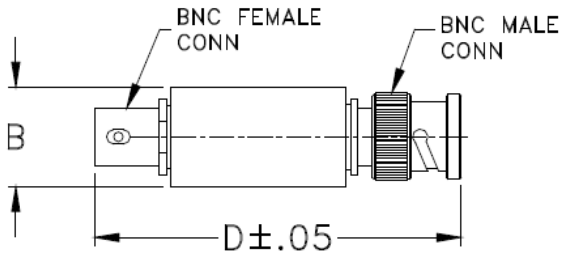
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## Coaxial Connections

PORT - 1	BNC-MALE
PORT - 2	BNC-FEMALE

## Outline Drawing



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

A	B	C	D	E	Wt.
--	<b>0.57</b>	--	<b>2.59</b>	--	grams
--	14.47	--	65.79	--	40

Note: Please refer to case style drawing for details

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*Typical Performance Data*

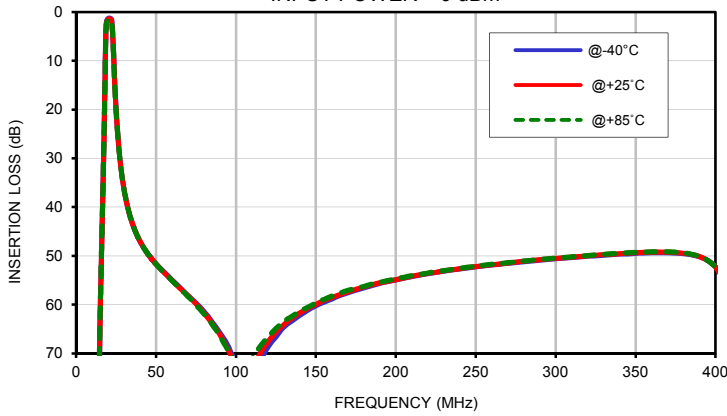
FREQ.  (MHz)	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
1.0	93.43	98.76	104.79	0.00	0.00	0.00	0.00	0.00	0.00
5.0	103.39	92.97	105.00	0.00	0.00	0.00	0.00	0.00	0.00
10.0	81.08	81.53	81.06	0.01	0.01	0.01	0.02	0.02	0.02
12.0	75.83	76.19	76.07	0.02	0.03	0.03	0.03	0.03	0.04
13.0	75.49	75.81	75.36	0.03	0.04	0.04	0.04	0.05	0.05
14.0	86.53	85.58	89.19	0.05	0.06	0.07	0.06	0.07	0.08
15.0	63.31	62.87	62.49	0.09	0.10	0.11	0.10	0.11	0.12
15.8	50.50	50.22	49.94	0.14	0.16	0.17	0.15	0.17	0.19
17.0	32.62	32.36	31.98	0.31	0.36	0.40	0.35	0.40	0.45
17.1	31.03	30.76	30.37	0.34	0.39	0.44	0.39	0.44	0.49
17.5	24.31	24.04	23.62	0.52	0.60	0.67	0.59	0.68	0.76
17.7	20.70	20.43	20.01	0.68	0.78	0.88	0.77	0.89	1.00
18.0	14.93	14.68	14.26	1.16	1.33	1.51	1.31	1.51	1.71
18.5	5.53	5.53	5.38	4.93	5.48	6.18	5.51	6.15	6.97
18.7	3.27	3.41	3.45	9.79	10.52	11.54	11.28	12.26	13.71
19.0	2.01	2.21	2.35	19.83	19.96	19.98	35.68	31.89	28.30
19.5	1.54	1.71	1.84	21.86	22.40	22.94	22.21	22.89	23.30
19.8	1.40	1.56	1.68	29.66	30.20	31.41	29.69	30.73	30.72
20.0	1.33	1.49	1.62	37.79	36.70	37.78	34.58	34.19	32.53
20.1	1.31	1.46	1.59	38.01	37.03	37.93	33.22	32.59	31.46
20.2	1.29	1.44	1.57	36.75	36.60	37.88	31.52	31.02	30.44
20.3	1.27	1.42	1.55	36.68	37.11	39.17	30.52	30.07	29.85
20.4	1.26	1.41	1.53	37.38	37.74	40.05	29.76	29.26	29.22
20.5	1.25	1.40	1.52	37.00	36.21	36.72	29.03	28.39	28.38
20.6	1.24	1.39	1.51	33.74	32.46	32.05	27.88	27.13	27.05
20.7	1.24	1.39	1.51	29.89	28.80	28.28	26.32	25.57	25.42
20.8	1.24	1.39	1.51	26.68	25.84	25.37	24.56	23.90	23.72
20.9	1.24	1.39	1.51	24.14	23.50	23.13	22.87	22.32	22.16
21.0	1.25	1.40	1.52	22.12	21.63	21.35	21.37	20.94	20.81
21.5	1.31	1.47	1.59	17.58	17.52	17.62	18.01	18.08	18.36
22.0	1.41	1.59	1.75	19.80	19.42	19.03	30.97	35.20	47.68
22.5	2.28	2.56	2.85	9.70	9.32	8.83	10.70	10.32	9.80
22.7	3.21	3.53	3.87	6.42	6.21	5.93	6.92	6.74	6.46
23.0	5.27	5.62	6.00	3.46	3.42	3.32	3.71	3.68	3.59
23.5	9.51	9.83	10.18	1.43	1.46	1.47	1.54	1.58	1.60
24.0	13.59	13.84	14.14	0.75	0.78	0.81	0.81	0.86	0.89
24.5	17.12	17.33	17.58	0.47	0.50	0.52	0.51	0.55	0.58
25.0	20.15	20.33	20.54	0.33	0.36	0.38	0.36	0.39	0.42
25.5	22.77	22.92	23.09	0.25	0.27	0.29	0.28	0.30	0.32
26.0	25.05	25.17	25.32	0.20	0.22	0.24	0.22	0.24	0.26
26.5	27.05	27.15	27.29	0.17	0.18	0.20	0.18	0.20	0.22
27.0	28.83	28.91	29.03	0.14	0.16	0.17	0.16	0.17	0.19
27.5	30.41	30.49	30.60	0.12	0.14	0.15	0.14	0.15	0.16
28.0	31.85	31.92	32.01	0.11	0.12	0.13	0.12	0.13	0.14
28.5	33.14	33.20	33.29	0.10	0.11	0.12	0.11	0.12	0.13
29.0	34.31	34.37	34.46	0.09	0.10	0.11	0.10	0.11	0.12
29.5	35.40	35.45	35.51	0.08	0.09	0.10	0.09	0.10	0.11
30.0	36.39	36.43	36.49	0.07	0.08	0.09	0.08	0.09	0.10
35.0	43.19	43.18	43.22	0.05	0.06	0.06	0.05	0.06	0.06
40.0	47.03	47.04	47.05	0.04	0.05	0.05	0.04	0.05	0.06
45.0	49.66	49.65	49.67	0.04	0.05	0.05	0.04	0.05	0.06
45.6	49.92	49.94	49.92	0.04	0.06	0.06	0.04	0.05	0.06
46.2	50.21	50.20	50.20	0.05	0.06	0.06	0.04	0.05	0.06
46.8	50.43	50.42	50.47	0.05	0.06	0.06	0.04	0.05	0.05
48.0	50.93	50.92	50.97	0.05	0.06	0.06	0.04	0.06	0.06
50.0	51.67	51.72	51.71	0.05	0.07	0.06	0.04	0.05	0.06
100.0	72.16	72.42	71.96	0.10	0.13	0.12	0.07	0.09	0.09
200.0	54.94	54.86	54.71	0.17	0.21	0.21	0.14	0.16	0.16
300.0	50.61	50.54	50.46	0.20	0.26	0.26	0.18	0.21	0.22
380.0	49.54	49.47	49.39	0.22	0.28	0.30	0.21	0.25	0.26

*Typical Performance Data*

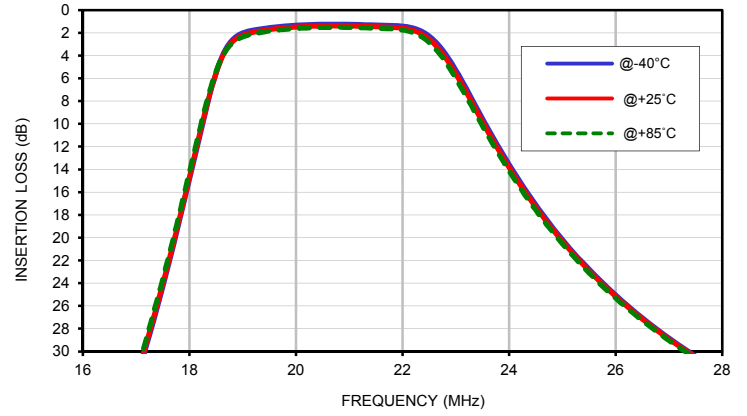
FREQ.  (MHz)	GROUP DELAY		
	(nsec)		
	@-40°C	@+25°C	@+85°C
18.0	218.18	224.59	233.55
18.1	250.35	257.05	266.46
18.2	286.60	292.62	301.85
18.3	324.36	329.01	336.78
18.4	359.84	362.31	367.67
18.5	388.74	388.61	390.95
18.6	408.32	405.62	404.80
18.7	416.92	412.15	408.15
18.8	414.56	407.96	401.65
18.9	402.12	394.72	386.82
19.0	382.42	375.10	366.84
19.1	359.24	352.66	345.07
19.2	336.23	330.93	324.36
19.3	315.82	311.69	306.37
19.4	298.64	295.41	291.21
19.5	284.75	282.22	278.79
19.6	273.37	271.33	268.52
19.7	263.89	262.11	259.82
19.8	255.79	254.31	252.25
19.9	248.77	247.41	245.67
20.0	242.49	241.31	239.73
20.1	237.01	235.95	234.57
20.2	232.12	231.18	230.00
20.3	227.82	226.99	226.01
20.4	224.07	223.32	222.40
20.5	220.75	220.13	219.32
20.6	217.86	217.33	216.64
20.7	215.36	214.95	214.36
20.8	213.19	212.81	212.32
20.9	211.23	210.93	210.54
21.0	209.69	209.38	209.07
21.1	208.35	208.18	208.04
21.2	207.46	207.31	207.38
21.3	206.99	207.06	207.25
21.4	207.16	207.33	207.76
21.5	208.03	208.37	209.04
21.6	209.83	210.34	211.28
21.7	212.53	213.27	214.42
21.8	216.30	217.24	218.51
21.9	221.06	222.05	223.40
22.0	226.70	227.58	228.89
22.1	232.82	233.48	234.50
22.2	238.97	239.21	239.79
22.3	244.31	243.98	243.83
22.4	248.16	247.08	246.05
22.5	249.89	247.96	245.85
22.6	248.82	246.03	243.05
22.7	244.60	241.07	237.15
22.8	237.40	233.27	228.64
22.9	227.27	222.83	217.68
23.0	214.98	210.38	204.99

## Typical Performance Curves

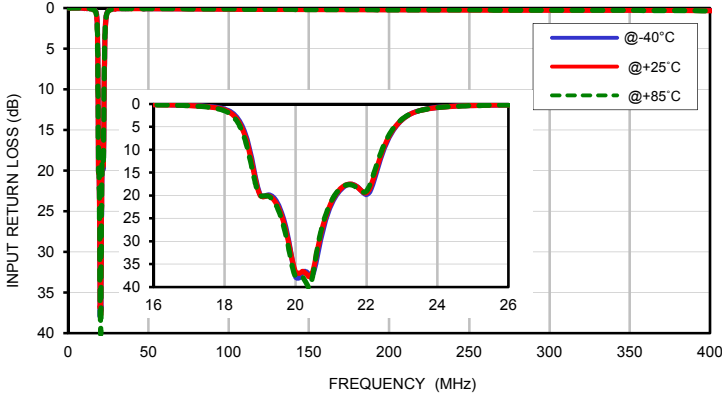
**INSERTION LOSS vs. TEMPERATURE**  
INPUT POWER = 0 dBm



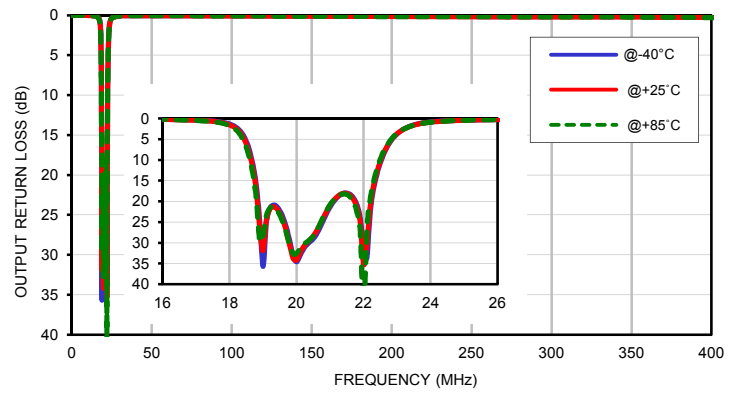
**INSERTION LOSS vs. TEMPERATURE (Zoomed)**  
INPUT POWER = 0 dBm



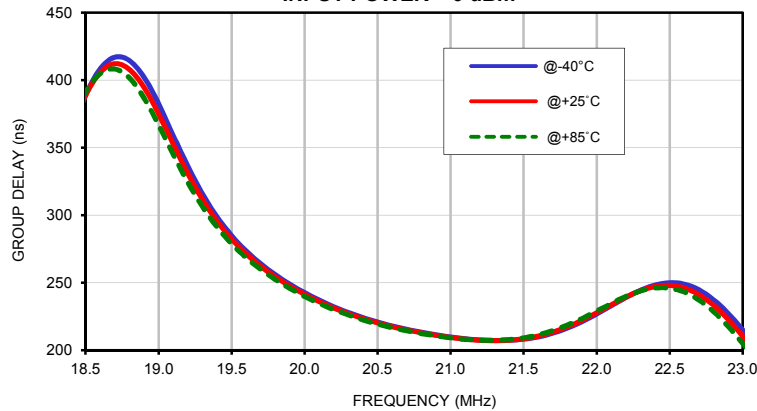
**INPUT RETURN LOSS vs. TEMPERATURE**  
INPUT POWER = 0 dBm



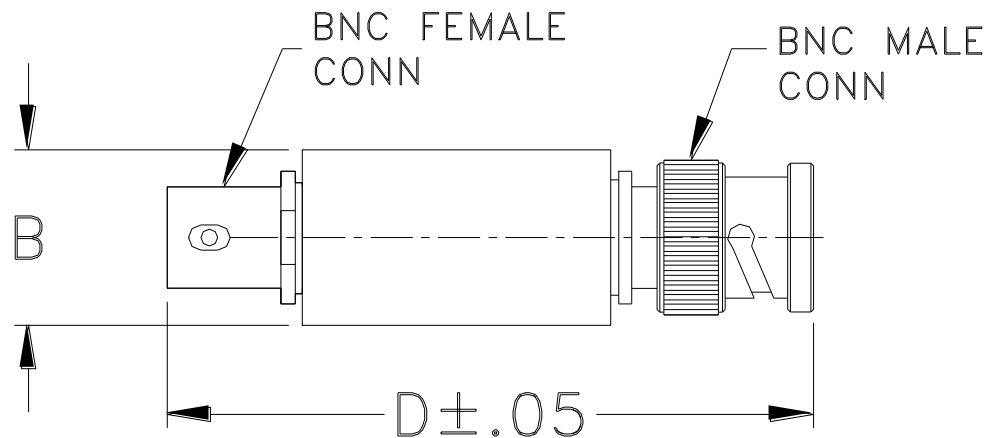
**OUTPUT RETURN LOSS vs. TEMPERATURE**  
INPUT POWER = 0 dBm



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



### Outline Dimensions



CASE #.	A	B	C	D	E	WT GRAMS
FF55	--	.57 (14.47)	--	2.59 (65.79)	--	40.0

Dimensions are in inches (mm). Tolerances: 2Pl. +.03/-.04; 3Pl. ± .015

#### Note:

1. Case material: Stainless steel.



All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-40° to 85°C	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