

# Coaxial Bandpass Filter

## BBP-29+

50Ω 24 to 35 MHz



Generic photo used for illustration purposes only  
CASE STYLE: FF55

### The Big Deal

- Low insertion loss, 0.9 dB typ.
- Good VSWR 1.4:1 typ in passband
- Connectorized package
- Fast roll-off

### Product Overview

BBP-29+ is a 50Ω bandpass filter in a connectorized package. The bandpass filter covers from 24 to 35 MHz, offering good matching within the passband. It uses miniature high Q capacitors and wire welded inductors for high reliability. It has repeatable performance across production lots and consistent performance across temperature.

### Key Features

Feature	Advantages
Low insertion loss, 0.9 dB typ.	Low insertion loss enables usage in receivers and transmitters.
Good VSWR, 1.4:1 typical in passband	This provides well matched input and output ports.
Connectorized package	Connectorized package is easy to interface with other devices and well suited for test setups.

#### 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: FF55  
Connectors Model  
BNC BBP-29+

### Features

- Good VSWR, 1.4:1 typical over passband
- Low insertion loss, 0.9 dB typ.
- Connectorized package

### Applications

- Receivers / Transmitters
- Harmonic rejection
- Test equipment
- Military

### Electrical Specifications at 25°C

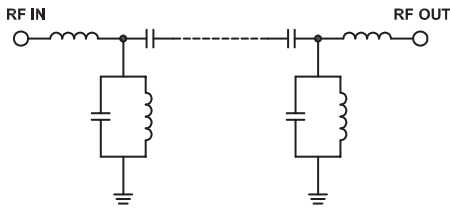
Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Unit	
Pass Band	Insertion Loss	F1-F2	24 - 35	-	0.9	1.5	dB
	VSWR	F1-F2	24 - 35	-	1.4	1.7	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC - 18	20	27	-	dB
	VSWR	DC-F3	DC - 18	-	50	-	:1
Stop Band, Upper	Insertion Loss	F4-F5	46 - 1600	20	27	-	dB
	VSWR	F4-F5	46 - 1600	-	26	-	:1

### Maximum Ratings

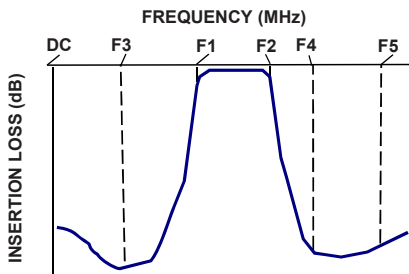
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	0.25 W max.

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

### Functional Schematic



### Typical Frequency Response

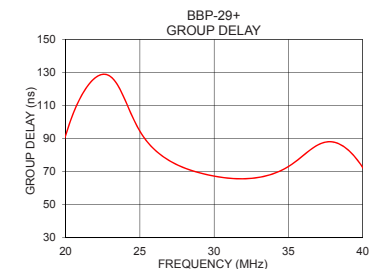
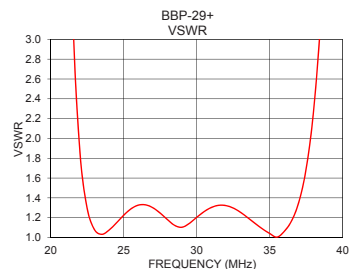
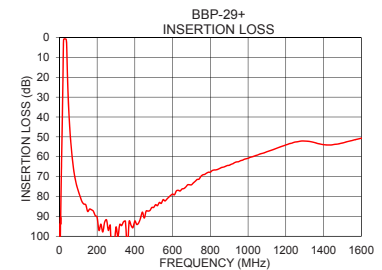
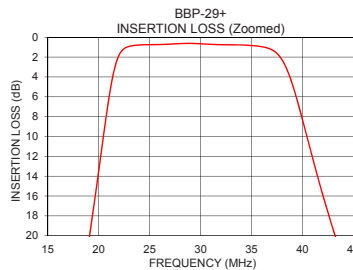


### Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (ns)
1	107.45	69514.92	24.0	113.42
10	71.59	1567.11	24.5	103.16
18	27.28	93.78	25.0	94.48
19	20.66	52.77	25.5	88.03
22	1.78	1.86	26.0	83.24
24	0.78	1.08	26.5	79.53
26	0.74	1.33	27.0	76.57
29	0.62	1.10	27.5	74.18
33	0.76	1.25	28.0	72.25
35	0.84	1.04	28.5	70.66
39	4.73	4.70	29.0	69.34
44	22.50	47.38	29.5	68.23
46	28.01	65.53	30.0	67.32
60	52.05	154.95	30.5	66.57
100	77.11	231.92	31.0	66.03
300	95.48	191.42	31.5	65.72
500	85.49	105.09	32.0	65.68
600	78.79	81.50	32.5	65.95
1000	60.78	36.98	33.0	66.52
1600	50.68	12.37	35.0	73.12

### +RoHS Compliant

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



### Notes

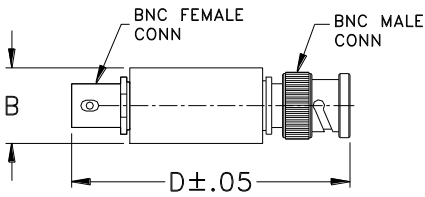
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**Coaxial Connections**

PORT - 1	BNC-Male
PORT - 2	BNC-Female

**Outline Drawing**



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

A	B	C	D	E	Wt.
--	0.57	--	2.59	--	grams
--	14.47	--	65.79	--	40

*Note: Please refer to case style drawing for details*

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*Typical Performance Data*

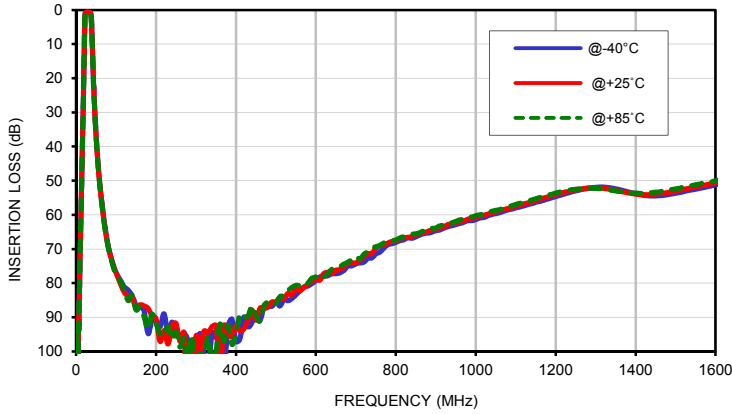
FREQ.  (MHz)	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
1.0	107.02	107.45	99.31	0.00	0.00	0.00	0.00	0.00	0.00
10.0	71.21	71.59	70.83	0.01	0.01	0.01	0.01	0.01	0.02
15.0	44.74	44.61	44.48	0.05	0.06	0.06	0.05	0.06	0.06
16.0	39.25	39.11	38.98	0.07	0.08	0.09	0.08	0.08	0.09
18.0	27.44	27.28	27.11	0.16	0.19	0.20	0.17	0.19	0.21
19.0	20.84	20.66	20.47	0.29	0.33	0.36	0.30	0.33	0.36
20.0	13.59	13.41	13.21	0.69	0.76	0.84	0.69	0.76	0.84
21.5	3.37	3.35	3.31	5.08	5.44	5.84	5.08	5.44	5.84
22.0	1.73	1.78	1.82	9.91	10.42	11.04	9.92	10.42	11.03
23.0	0.84	0.92	1.00	27.42	28.51	30.36	27.12	27.85	29.35
24.0	0.70	0.78	0.85	29.37	28.75	28.66	28.49	28.09	28.31
25.0	0.68	0.74	0.81	19.96	19.89	19.98	19.92	19.87	20.00
26.0	0.68	0.74	0.79	16.89	17.05	17.30	16.89	17.05	17.32
27.0	0.65	0.69	0.75	17.31	17.68	18.13	17.27	17.65	18.11
29.0	0.56	0.62	0.69	26.50	26.13	25.67	25.22	25.34	25.11
30.0	0.60	0.66	0.73	21.44	20.68	20.05	21.11	20.59	20.04
35.0	0.75	0.84	0.94	33.47	34.04	35.23	34.00	34.29	33.30
38.5	3.02	3.32	3.67	5.82	5.59	5.38	6.06	5.86	5.69
40.0	7.93	8.32	8.72	1.79	1.78	1.78	1.90	1.91	1.93
41.0	11.85	12.22	12.59	0.96	0.98	1.01	1.04	1.07	1.11
42.0	15.60	15.94	16.28	0.61	0.63	0.66	0.66	0.69	0.73
43.5	20.66	20.97	21.26	0.39	0.41	0.43	0.42	0.45	0.48
46.0	27.75	28.01	28.26	0.25	0.27	0.28	0.27	0.29	0.31
47.0	30.21	30.46	30.69	0.22	0.23	0.25	0.23	0.25	0.27
50.0	36.66	36.87	37.09	0.17	0.18	0.19	0.18	0.19	0.20
60.0	51.86	52.05	52.21	0.10	0.11	0.12	0.11	0.11	0.12
70.0	61.71	62.06	62.30	0.08	0.09	0.10	0.08	0.09	0.10
80.0	68.86	69.15	69.24	0.07	0.08	0.09	0.08	0.08	0.09
90.0	73.44	73.82	74.00	0.07	0.08	0.09	0.07	0.08	0.08
100.0	76.82	77.11	77.53	0.06	0.07	0.08	0.07	0.08	0.08
150.0	86.47	87.52	87.83	0.05	0.07	0.08	0.05	0.07	0.08
200.0	91.34	90.41	91.87	0.05	0.07	0.09	0.05	0.07	0.08
250.0	94.42	91.80	94.32	0.05	0.08	0.10	0.05	0.07	0.09
300.0	100.48	95.48	118.14	0.06	0.09	0.11	0.05	0.08	0.10
350.0	95.98	92.47	99.96	0.07	0.11	0.13	0.06	0.09	0.11
400.0	97.00	92.32	94.59	0.08	0.12	0.15	0.07	0.11	0.12
450.0	88.82	90.84	89.42	0.10	0.14	0.17	0.08	0.12	0.14
500.0	85.58	85.49	86.03	0.11	0.17	0.19	0.09	0.13	0.15
550.0	83.50	81.60	80.67	0.13	0.19	0.22	0.10	0.15	0.17
600.0	79.26	78.79	78.19	0.15	0.21	0.25	0.11	0.16	0.19
650.0	77.27	76.22	75.41	0.17	0.24	0.28	0.13	0.19	0.22
700.0	74.37	74.11	72.31	0.20	0.27	0.32	0.14	0.20	0.24
750.0	71.43	69.89	69.34	0.22	0.30	0.35	0.16	0.22	0.26
800.0	68.08	67.76	67.36	0.25	0.33	0.38	0.17	0.25	0.29
850.0	66.46	65.87	65.55	0.27	0.36	0.42	0.19	0.27	0.32
900.0	64.66	64.31	63.87	0.30	0.39	0.46	0.21	0.29	0.34
950.0	62.86	62.49	61.99	0.33	0.43	0.50	0.23	0.32	0.38
1000.0	61.43	60.78	60.25	0.36	0.47	0.55	0.26	0.36	0.42
1050.0	59.64	59.15	58.71	0.40	0.52	0.60	0.29	0.40	0.47
1100.0	58.00	57.47	56.97	0.45	0.57	0.67	0.33	0.45	0.53
1150.0	56.34	55.80	55.29	0.52	0.66	0.77	0.40	0.53	0.63
1200.0	54.63	54.06	53.65	0.63	0.78	0.92	0.50	0.67	0.78
1250.0	53.00	52.59	52.55	0.81	0.98	1.12	0.69	0.88	1.00
1300.0	51.95	52.10	52.26	1.04	1.18	1.27	0.97	1.13	1.21
1350.0	52.32	52.80	52.97	1.12	1.20	1.28	1.13	1.20	1.24
1400.0	53.82	53.90	53.61	1.03	1.14	1.24	1.03	1.10	1.17
1450.0	54.46	53.94	53.37	0.96	1.11	1.25	0.91	1.02	1.13
1500.0	53.68	53.09	52.37	0.96	1.14	1.31	0.86	1.01	1.14
1550.0	52.49	51.87	51.22	1.02	1.24	1.44	0.88	1.06	1.21
1600.0	51.22	50.68	50.04	1.14	1.41	1.64	0.95	1.17	1.35

## Typical Performance Data

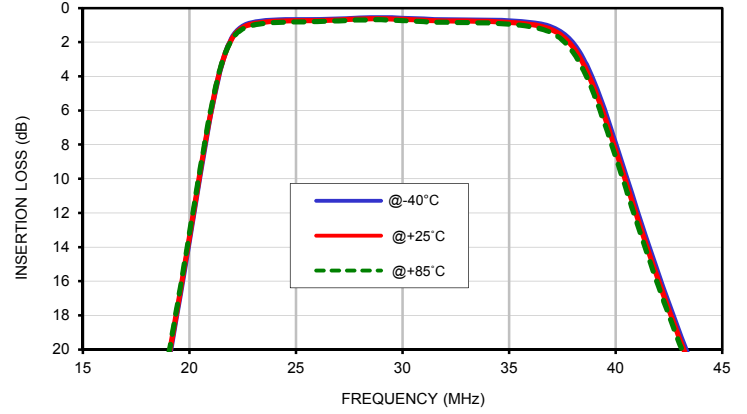
FREQ.  (MHz)	GROUP DELAY		
	(nsec)		
	@-40°C	@+25°C	@+85°C
20.00	91.09	91.97	92.95
20.50	104.40	104.98	105.67
21.00	114.53	114.88	115.34
21.50	121.93	122.09	122.35
22.00	126.86	126.84	126.90
22.50	129.15	128.92	128.75
23.00	128.19	127.72	127.28
23.50	123.19	122.46	121.74
24.00	114.24	113.42	112.60
24.50	103.83	103.16	102.47
25.00	94.92	94.48	94.02
25.50	88.30	88.03	87.74
26.00	83.40	83.24	83.06
26.50	79.62	79.53	79.42
27.00	76.61	76.57	76.52
27.50	74.18	74.18	74.16
28.00	72.23	72.25	72.26
28.50	70.62	70.66	70.68
29.00	69.29	69.34	69.36
29.50	68.19	68.23	68.25
30.00	67.27	67.32	67.34
30.50	66.52	66.57	66.59
31.00	65.97	66.03	66.07
31.50	65.65	65.72	65.79
32.00	65.58	65.68	65.77
32.50	65.79	65.95	66.07
33.00	66.33	66.52	66.69
33.50	67.21	67.44	67.68
34.00	68.49	68.80	69.09
34.50	70.27	70.65	71.01
35.00	72.66	73.12	73.54
35.50	75.70	76.21	76.66
36.00	79.29	79.79	80.18
36.50	82.97	83.37	83.59
37.00	86.08	86.25	86.24
37.50	87.97	87.89	87.59
38.00	88.31	87.97	87.41
38.50	87.03	86.44	85.64
39.00	84.16	83.32	82.32
39.50	79.71	78.68	77.51
40.00	73.82	72.62	71.32

## Typical Performance Curves

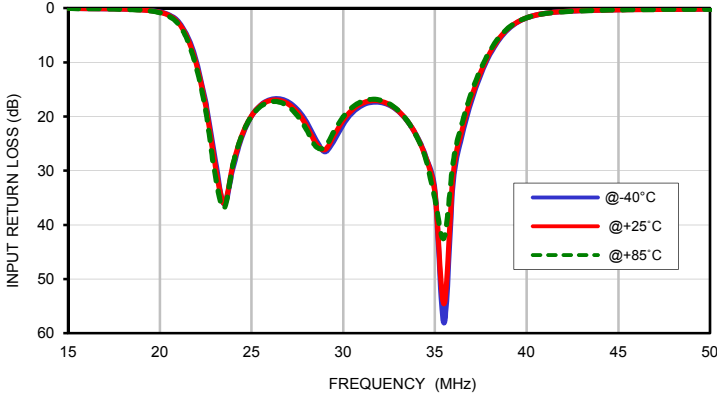
**INSERTION LOSS vs. TEMPERATURE**  
INPUT POWER = 0 dBm



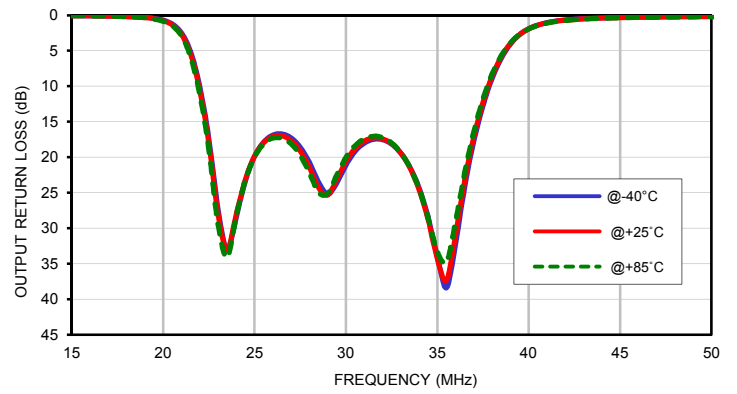
**INSERTION LOSS vs. TEMPERATURE (Zoomed)**  
INPUT POWER = 0 dBm



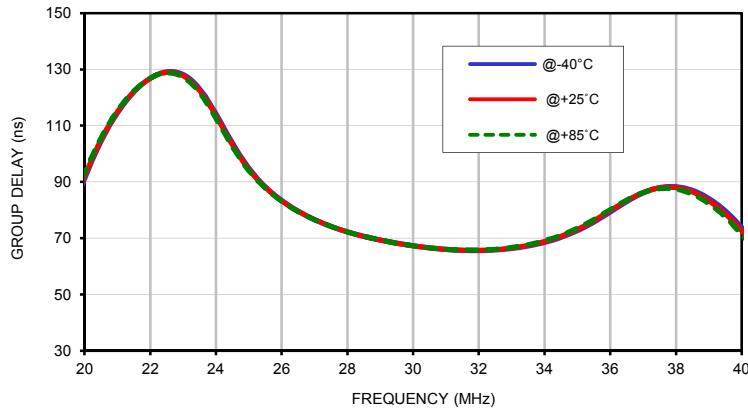
**INPUT RETURN LOSS vs. TEMPERATURE**  
INPUT POWER = 0 dBm



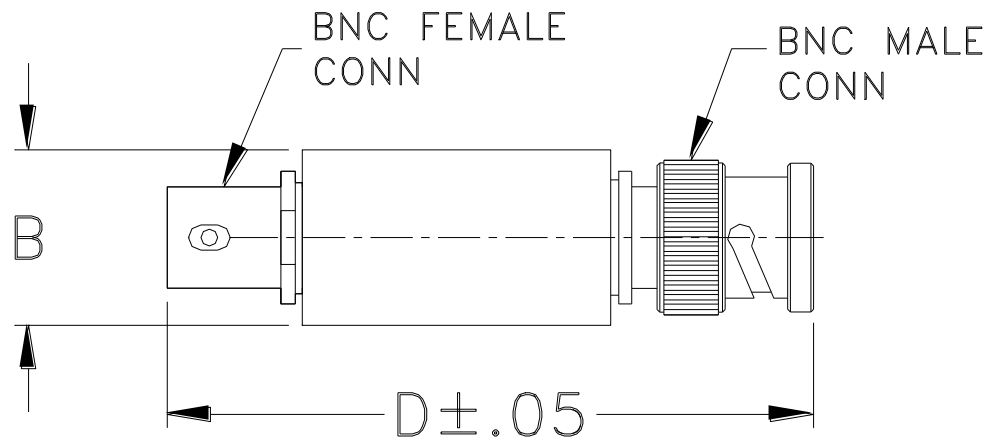
**OUTPUT RETURN LOSS vs. TEMPERATURE**  
INPUT POWER = 0 dBm



**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 Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C