Ultra-Wideband, Millimeter Wave

Precision Fixed Attenuator BW-EX-1W653+ Series

50Ω 1W 3, 6, 10, 20 and 30 dB DC to 65 GHz

The Big Deal

- Extremely wideband, DC to 65 GHz
- 1.85mm Female to 1.85mm Male connectors
- Good VSWR, 1.2 @ 26.5 GHz, 1.3 @ 65 GHz typ.
- Outstanding accuracy, ±1.5 dB over full range

CASE STYLE: DJ2591

Product Overview

The BW-Ex-1W653+ series of precision fixed attenuators achieves extremely wide frequency range from DC up to 65 GHz. Available in a variety of attention values for different requirements, these units support a broad range of system and test applications. Excellent attenuation flatness, good VSWR (1.2:1 typ.) and rugged construction make these models ideal solutions for applications requiring precise attenuation across very wide frequency range.

Key Features

Feature	Advantages
Extremely wideband, DC to 65 GHz	Ideal for an exceptionally wide variety of lab and system applications up to millimeter wave bands.
Excellent attenuation accuracy, ±1.5 dB or better across full range	Provides precise, consistent attenuation across the entire frequency band, ideal for broadband and multi-band usage.
Good VSWR • 1.2 dB @ 26.5 GHz typ. • 1.3 dB @ 65 GHz typ.	Efficient power utilization with minimal signal power reflected back to source.
1W power handling	Provides precise attenuation for a range of input power levels.
Passivated stainless steel connectors	Rugged construction withstands harsh environmental conditions for high reliability and long life of use.

Precision Fixed Attenuator

BW-E30-1W653+

50Ω 1W 30dB DC to 65 GHz

Generic photo used for illustration purposes only

CASE STYLE: DJ2591

Connectors	Model
1.85mm-Female - 1.85mm Male	BW-E30-1W653+

+RoHS Compliant

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

Maximum Ratings

Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C

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

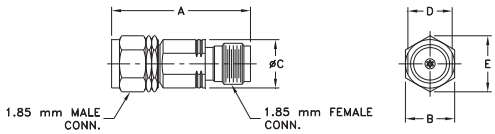
Features

- DC to 65 GHz
- precise attenuation
- excellent VSWR, 1.12 typ.
- passivated stainless steel connectors

Applications

- matching
- instrumentation
- test set-ups

Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	wt
0.88	0.31	0.310	0.284	.36	grams
22.2	8.0	7.90	7.21	9.14	5.6

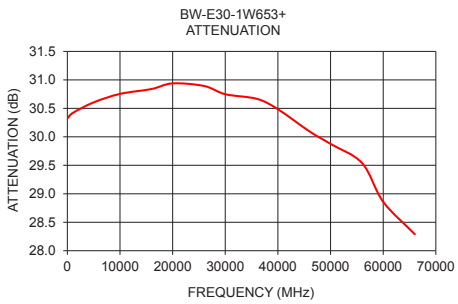
Electrical Specifications at 25°C

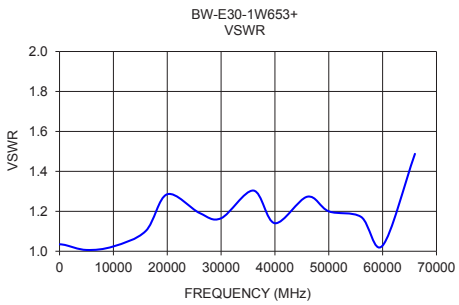
Parameter	Condition (GHz)	Min.	Typ.	Max.	Unit
Frequency Range		DC	—	65	GHz
Attenuation	DC - 26.5	28.75	30.4	31.25	dB
	26.5 - 40	28.5	30.0	31.5	
	40 - 60	27.7	29.2	32	
	60 - 65	25	28.2	35	
VSWR	DC - 26.5	—	1.09	1.35	:1
	26.5 - 50	—	1.12	1.55	
	50 - 65	—	1.18	1.65	
Input Power[1]	DC - 65	—	—	1	W

1. Max. power at 25°C ambient, derate linearly to 0.1W at 100°C.

Typical Performance Data

Frequency (MHz)	Attenuation (dB)	VSWR (:1)
10	30.32	1.03
1000	30.42	1.03
5000	30.61	1.01
10000	30.75	1.02
16000	30.84	1.10
20000	30.94	1.29
26000	30.89	1.19
30000	30.75	1.17
36000	30.67	1.30
40000	30.48	1.14
46000	30.09	1.27
50000	29.88	1.20
56000	29.54	1.17
65000	28.29	1.49





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.
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp

Fixed Attenuator BW-E30-1W653+

1.85mm-Female/1.85mm-Male

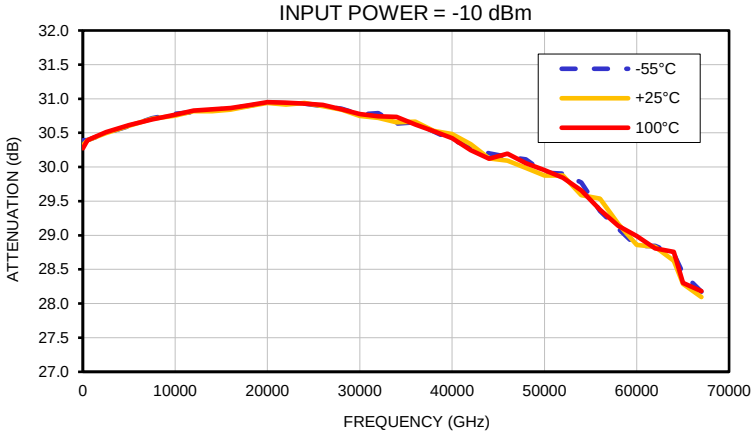
Typical Performance Curves

FREQ.	ATTENUATION			INPUT VSWR			OUTPUT VSWR		
(MHz)	(dB)			(:1)			(:1)		
	@-55˚C	@25°C	@+100°C	@-55°C	@+25˚C	@+100°C	@-55°C	@+25˚C	@+100°C
10	30.39	30.32	30.28	1.04	1.03	1.03	1.04	1.04	1.04
500	30.40	30.39	30.39	1.02	1.02	1.02	1.01	1.01	1.01
1000	30.42	30.42	30.42	1.03	1.03	1.03	1.01	1.01	1.01
2500	30.50	30.50	30.51	1.05	1.05	1.05	1.04	1.04	1.04
5000	30.60	30.61	30.61	1.01	1.01	1.00	1.05	1.05	1.05
7500	30.72	30.70	30.70	1.06	1.06	1.06	1.06	1.06	1.06
10000	30.78	30.75	30.76	1.02	1.02	1.02	1.06	1.06	1.06
12000	30.80	30.82	30.82	1.09	1.08	1.09	1.05	1.05	1.05
14000	30.84	30.82	30.84	1.14	1.13	1.14	1.05	1.05	1.05
16000	30.86	30.84	30.86	1.10	1.10	1.10	1.08	1.08	1.08
18000	30.90	30.89	30.91	1.20	1.20	1.20	1.14	1.13	1.13
20000	30.94	30.94	30.95	1.28	1.29	1.28	1.18	1.18	1.18
22000	30.93	30.91	30.94	1.24	1.24	1.24	1.22	1.22	1.22
24000	30.93	30.94	30.93	1.22	1.22	1.22	1.25	1.25	1.24
26000	30.89	30.89	30.91	1.19	1.19	1.20	1.24	1.23	1.24
28000	30.85	30.84	30.84	1.10	1.09	1.10	1.22	1.21	1.23
30000	30.77	30.75	30.78	1.17	1.17	1.18	1.16	1.14	1.17
32000	30.79	30.72	30.75	1.14	1.14	1.16	1.09	1.08	1.10
34000	30.64	30.66	30.74	1.20	1.20	1.20	1.06	1.08	1.06
36000	30.66	30.67	30.62	1.30	1.30	1.31	1.12	1.14	1.12
38000	30.52	30.53	30.52	1.15	1.15	1.16	1.17	1.18	1.16
40000	30.39	30.48	30.42	1.12	1.14	1.12	1.19	1.19	1.17
42000	30.30	30.34	30.24	1.20	1.21	1.18	1.17	1.18	1.15
44000	30.20	30.13	30.12	1.04	1.04	1.05	1.18	1.18	1.17
46000	30.15	30.09	30.20	1.30	1.27	1.30	1.19	1.18	1.18
48000	30.11	29.99	30.06	1.33	1.32	1.33	1.17	1.17	1.16
50000	29.92	29.88	29.96	1.21	1.20	1.22	1.15	1.14	1.14
52000	29.91	29.87	29.84	1.46	1.46	1.46	1.14	1.14	1.14
54000	29.77	29.59	29.66	1.47	1.47	1.48	1.15	1.15	1.16
56000	29.35	29.54	29.38	1.17	1.17	1.17	1.15	1.16	1.17
58000	29.10	29.17	29.14	1.08	1.08	1.09	1.14	1.14	1.15
60000	28.84	28.86	28.99	1.03	1.03	1.03	1.19	1.19	1.20
62000	28.85	28.83	28.81	1.34	1.34	1.35	1.31	1.30	1.30
64000	28.73	28.63	28.76	1.48	1.46	1.46	1.39	1.39	1.40
65000	28.44	28.29	28.30	1.50	1.49	1.51	1.46	1.45	1.46
67000	28.17	28.10	28.18	1.64	1.64	1.67	1.46	1.44	1.45

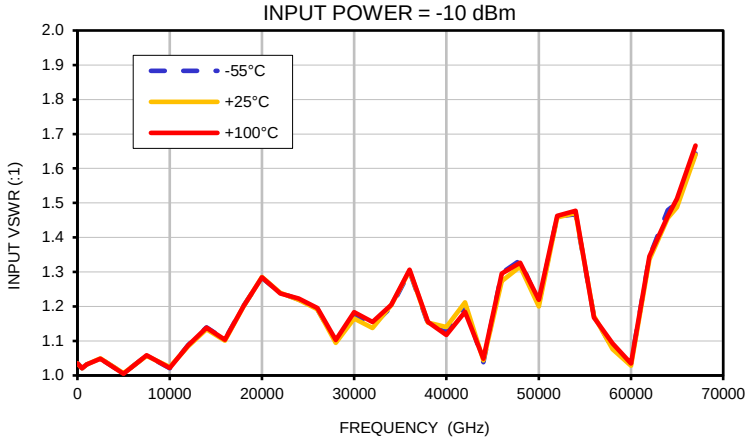
1.85mm-Female/1.85mm-Male

Typical Performance Curves

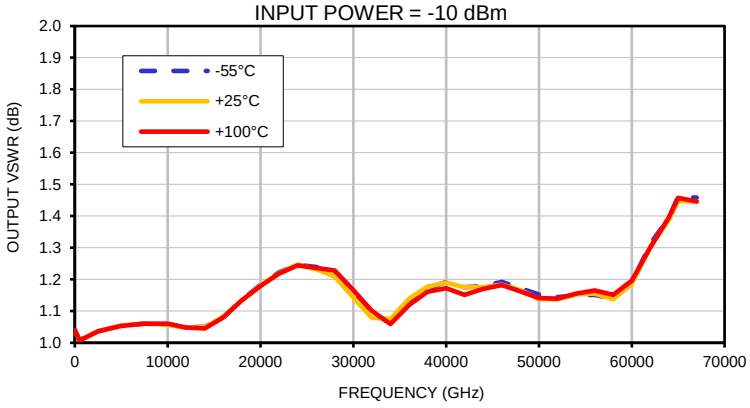
ATTENUATION vs. TEMPERATURE
INPUT POWER = -10 dBm



INPUT VSWR vs. TEMPERATURE
INPUT POWER = -10 dBm



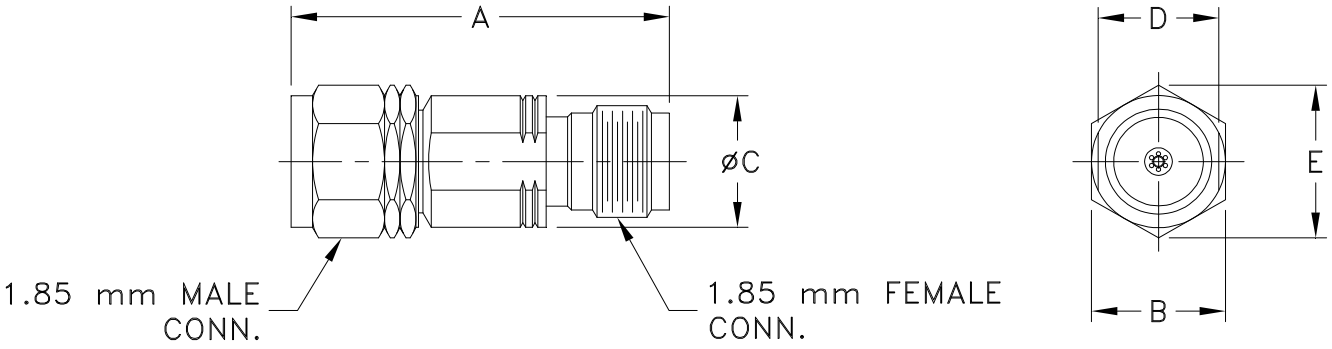
OUTPUT VSWR vs. TEMPERATURE
INPUT POWER = -10 dBm



Case Style DJ

DJ2591

Outline Dimensions



CASE#	A	B	C	D	E	WT. GRAM
DJ2591	.88 (22.2)	.312 (8.00)	.31 (7.9)	.284 (7.21)	.36 (9.14)	5.6

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

Notes:

1. Case material: Stainless steel.
2. Finish: Passivation.

Mini-Circuits

Environmental Specifications ENV89

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	-55° to 100° C or -55° to 85° C or -45° to 100° 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, 5 cycles	MIL-STD-202, Method 107, Condition B except over -55° to 100°C
Connector Durability	500 mating/unmating cycles	MIL-PRF-39012E, PARAGRAPH 4.6.12
Drop Test	1 meter height, 5 times	