

Precision

Digital Step Attenuator

ZFAT-51020

50Ω TTL Control, Pin Diode 10 to 1000 MHz

Maximum Ratings

Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 125°C
Input Power	15 dBm
DC Voltage	5.5 V
TTL	5.5V

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

Features

- wideband, 10 to 1000 MHz
- excellent step accuracy, 0.2 dB typ.
- small, shielded metal case

Applications

- base stations
- cellular
- test sets



CASE STYLE: SSS173

Connectors	Model
SMA	ZFAT-51020
BRACKET (OPTION "B")	

Digital Step Attenuator Electrical Specifications

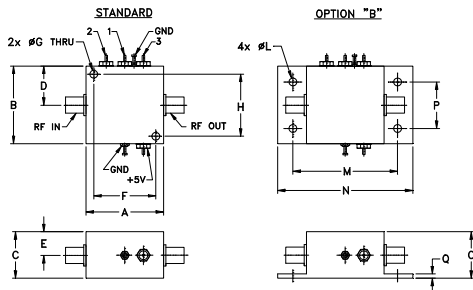
MODEL NO.	FREQUENCY (MHz)		PRIMARY ATTENUATION STEPS (dB)			ATTENUATION (dB)		VSWR (:1)		
	f_L	f_U	#1	#2	#3	(1,1,1)** Nom.	(0,0,0) Max.	L	M	U
ZFAT-51020	10	1000	5±0.4	10±0.4	20±0.5	35.0	4.0	1.6	1.4	1.5

L=10 to 100 MHz M=100 to 500 MHz U=500 to 1000 MHz

** Total attenuation above thru-loss.

1. Step accuracy is specified for basic steps. For combination of steps accuracy is additive.
2. Thru-loss is minimum insertion loss with all attenuation elements bypassed (All TTL controls state are Low)

Outline Drawing



Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H
1.25	1.25	0.75	.63	.38	1.000	.125	1.000
31.75	31.75	19.05	16.00	9.65	25.40	3.18	25.40
J	K	L	M	N	P	Q	wt
--	--	.125	1.688	2.18	.75	.07	grams
--	--	3.18	42.88	55.37	19.05	1.78	75

Additional Specifications

DC Voltage	+5V
DC Current	12mA max.
Switching Time (50% TTL to within specified accuracy of the next-selected attenuation step, and to within 0.1 dB of steady-state Thru-Loss)	10µs typ., 15µs max.,
TTL Input High Threshold	2V min
TTL Input Low Threshold	0.8V max.
TTL Toggle Rate	50 kHz typ.
1dB Compression	0 dBm (10-100 MHz) +10 dBm (100-1000MHz)

Notes

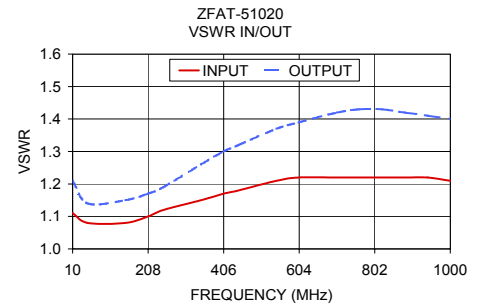
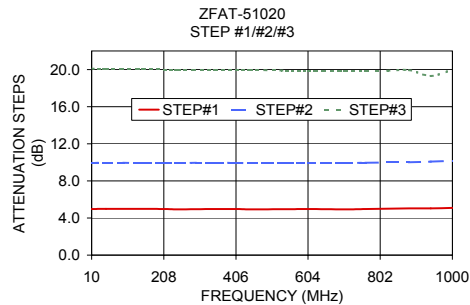
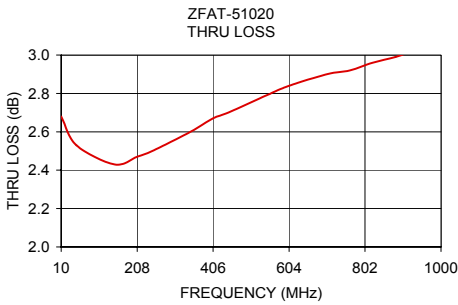
- Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's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



www.minicircuits.com P.O. Box 350166, Brooklyn, NY 11235-0003 (718) 934-4500 sales@minicircuits.com

REV. B
M151107
ZFAT-51020
DJ/VV/CP/AM
151029

ZFAT-51020



Step Attenuation at TTL Control State

FREQ. (MHz)	000 (dB)	001 (dB)	010 (dB)	011 (dB)	100 (dB)	101 (dB)	110 (dB)	111 (dB)
10.00	2.68	4.96	9.93	14.90	20.10	24.96	29.77	34.53
49.60	2.53	4.98	9.95	14.90	20.05	24.95	29.92	34.69
148.60	2.43	4.98	9.94	14.93	20.04	25.05	29.90	34.88
208.00	2.47	4.96	9.93	14.89	20.00	24.91	29.92	34.86
247.60	2.50	4.94	9.94	14.88	19.95	24.83	29.91	34.76
346.60	2.60	4.96	9.96	14.87	19.96	24.96	29.92	34.42
406.00	2.67	4.96	9.94	14.82	19.97	24.91	29.80	34.60
445.60	2.70	4.94	9.92	14.80	19.96	24.96	29.84	34.47
544.60	2.79	4.95	9.91	14.81	19.88	24.85	29.76	34.43
604.00	2.84	4.97	9.94	14.84	19.88	24.90	29.83	34.54
703.00	2.90	4.94	9.94	14.82	19.88	24.90	29.72	34.86
762.40	2.92	4.96	9.96	14.81	19.83	24.85	29.80	35.22
821.80	2.96	5.01	9.98	14.88	19.87	24.92	29.99	35.21
881.20	2.99	5.03	10.01	14.96	19.94	24.92	30.10	35.13
940.60	3.03	5.04	10.07	14.98	19.30	24.98	30.03	35.08
1000.00	3.06	5.09	10.16	15.08	20.00	25.28	29.95	35.55

INPUT VSWR

FREQ. (MHz)	001	010	011	100	101	110	111
10.00	1.11	1.15	1.09	1.20	1.10	1.14	1.09
49.60	1.08	1.10	1.06	1.13	1.07	1.10	1.06
148.60	1.08	1.10	1.06	1.12	1.07	1.10	1.06
208.00	1.10	1.12	1.08	1.15	1.09	1.12	1.08
247.60	1.12	1.14	1.09	1.17	1.10	1.13	1.09
346.60	1.15	1.18	1.12	1.21	1.13	1.18	1.12
406.00	1.17	1.21	1.14	1.24	1.16	1.20	1.14
445.60	1.18	1.22	1.16	1.26	1.17	1.22	1.16
544.60	1.21	1.26	1.19	1.30	1.20	1.25	1.19
604.00	1.22	1.28	1.21	1.32	1.22	1.27	1.21
703.00	1.22	1.30	1.23	1.35	1.24	1.30	1.21
762.40	1.22	1.31	1.25	1.36	1.25	1.31	1.25
821.80	1.22	1.32	1.26	1.36	1.26	1.32	1.27
881.20	1.22	1.32	1.27	1.37	1.27	1.33	1.28
940.60	1.22	1.32	1.28	1.36	1.27	1.33	1.29
1000.00	1.21	1.32	1.29	1.36	1.28	1.33	1.30

OUTPUT VSWR

FREQ. (MHz)	001	010	011	100	101	110	111
10.00	1.21	1.15	1.15	1.07	1.08	1.08	1.08
49.60	1.14	1.11	1.10	1.05	1.05	1.05	1.05
148.60	1.15	1.10	1.10	1.05	1.05	1.05	1.05
208.00	1.17	1.13	1.12	1.06	1.06	1.06	1.16
247.60	1.19	1.14	1.14	1.07	1.07	1.06	1.07
346.60	1.26	1.19	1.19	1.10	1.10	1.10	1.09
406.00	1.30	1.22	1.22	1.12	1.11	1.12	1.11
445.60	1.32	1.24	1.24	1.13	1.13	1.13	1.12
544.60	1.37	1.28	1.28	1.15	1.15	1.15	1.15
604.00	1.39	1.30	1.30	1.16	1.16	1.16	1.17
703.00	1.42	1.35	1.34	1.20	1.20	1.20	1.20
762.40	1.43	1.37	1.37	1.22	1.20	1.22	1.22
821.80	1.43	1.37	1.38	1.23	1.23	1.23	1.23
881.20	1.42	1.38	1.39	1.24	1.25	1.25	1.25
940.60	1.41	1.39	1.41	1.26	1.27	1.27	1.27
1000.00	1.40	1.40	1.42	1.27	1.27	1.28	1.28

* Step attenuation above thru-loss (TTL logic 000)

Notes

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- 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/WCLStore/terms.jsp



Digital Step Attenuator

ZFAT-51020

Typical Performance Data

FREQUENCY (MHz)	STEP ATTENUATION* AT TTL CONTROL STATE (dB)							
	000 THRU LOSS	001 5 dB	010 10 dB	011 15 dB	100 20 dB	101 25 dB	110 30 dB	111 35 dB
10.0	2.68	4.96	9.93	14.90	20.10	24.96	29.77	34.53
49.6	2.53	4.98	9.95	14.90	20.05	24.95	29.92	34.69
148.6	2.43	4.98	9.94	14.93	20.04	25.05	29.90	34.88
208.0	2.47	4.96	9.93	14.89	20.00	24.91	29.92	34.86
247.6	2.50	4.94	9.94	14.88	19.95	24.83	29.91	34.76
346.6	2.60	4.96	9.96	14.87	19.96	24.96	29.92	34.42
406.0	2.67	4.96	9.94	14.82	19.97	24.91	29.80	34.60
445.6	2.70	4.94	9.92	14.80	19.96	24.96	29.84	34.47
544.6	2.79	4.95	9.91	14.81	19.88	24.85	29.76	34.43
604.0	2.84	4.97	9.94	14.84	19.88	24.90	29.83	34.54
703.0	2.90	4.94	9.94	14.82	19.88	24.90	29.72	34.86
762.4	2.92	4.96	9.96	14.81	19.83	24.85	29.80	35.22
821.8	2.96	5.01	9.98	14.88	19.87	24.92	29.99	35.21
881.2	2.99	5.03	10.01	14.96	19.94	24.92	30.10	35.13
940.6	3.03	5.04	10.07	14.98	19.30	24.98	30.03	35.08
1000.0	3.06	5.09	10.16	15.08	20.00	25.28	29.95	35.55

* Step Attenuation above Thru Loss (TTL Logic 000).

FREQUENCY (MHz)	INPUT VSWR AT TTL CONTROL STATE (:1)						
	001 5 dB	010 10 dB	011 15 dB	100 20 dB	101 25 dB	110 30 dB	111 35 dB
10.0	1.11	1.15	1.09	1.20	1.10	1.14	1.09
49.6	1.08	1.10	1.06	1.13	1.07	1.10	1.06
148.6	1.08	1.10	1.06	1.12	1.07	1.10	1.06
208.0	1.10	1.12	1.08	1.15	1.09	1.12	1.08
247.6	1.12	1.14	1.09	1.17	1.10	1.13	1.09
346.6	1.15	1.18	1.12	1.21	1.13	1.18	1.12
406.0	1.17	1.21	1.14	1.24	1.16	1.20	1.14
445.6	1.18	1.22	1.16	1.26	1.17	1.22	1.16
544.6	1.21	1.26	1.19	1.30	1.20	1.25	1.19
604.0	1.22	1.28	1.21	1.32	1.22	1.27	1.21
703.0	1.22	1.30	1.23	1.35	1.24	1.30	1.21
762.4	1.22	1.31	1.25	1.36	1.25	1.31	1.25
821.8	1.22	1.32	1.26	1.36	1.26	1.32	1.27
881.2	1.22	1.32	1.27	1.37	1.27	1.33	1.28
940.6	1.22	1.32	1.28	1.36	1.27	1.33	1.29
1000.0	1.21	1.32	1.29	1.36	1.28	1.33	1.30

FREQUENCY (MHz)	OUTPUT VSWR AT TTL CONTROL STATE (:1)						
	001 5 dB	010 10 dB	011 15 dB	100 20 dB	101 25 dB	110 30 dB	111 35 dB
10.0	1.21	1.15	1.15	1.07	1.08	1.08	1.08
49.6	1.14	1.11	1.10	1.05	1.05	1.05	1.05
148.6	1.15	1.10	1.10	1.05	1.05	1.05	1.05
208.0	1.17	1.13	1.12	1.06	1.06	1.06	1.06
247.6	1.19	1.14	1.14	1.07	1.07	1.06	1.07
346.6	1.26	1.19	1.19	1.10	1.10	1.10	1.09
406.0	1.30	1.22	1.22	1.12	1.11	1.12	1.11
445.6	1.32	1.24	1.24	1.13	1.13	1.13	1.12
544.6	1.37	1.28	1.28	1.15	1.15	1.15	1.15
604.0	1.39	1.30	1.30	1.16	1.16	1.16	1.17
703.0	1.42	1.35	1.34	1.20	1.20	1.20	1.20
762.4	1.43	1.37	1.37	1.22	1.20	1.22	1.22
821.8	1.43	1.37	1.38	1.23	1.23	1.23	1.23
881.2	1.42	1.38	1.39	1.24	1.25	1.25	1.25
940.6	1.41	1.39	1.41	1.26	1.27	1.27	1.27
1000.0	1.40	1.40	1.42	1.27	1.27	1.28	1.28

REV. X1
ZFAT-51020
061207
Page 1 of 1



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED • RoHS compliant
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

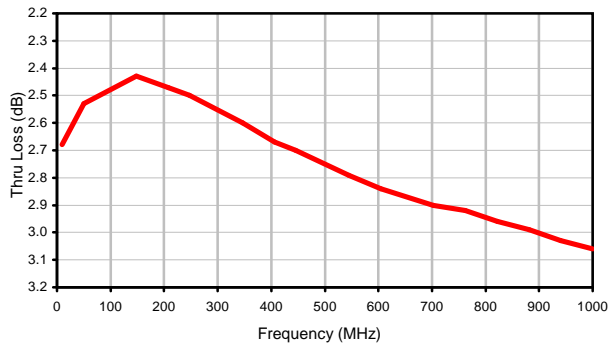


The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see

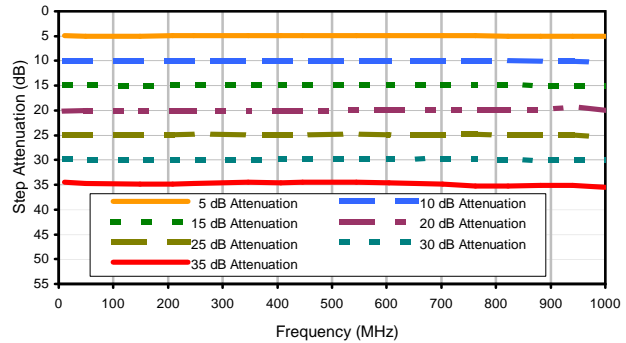


Typical Performance Curves

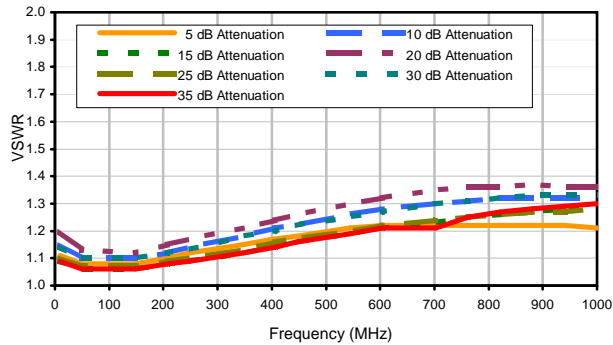
Thru Loss



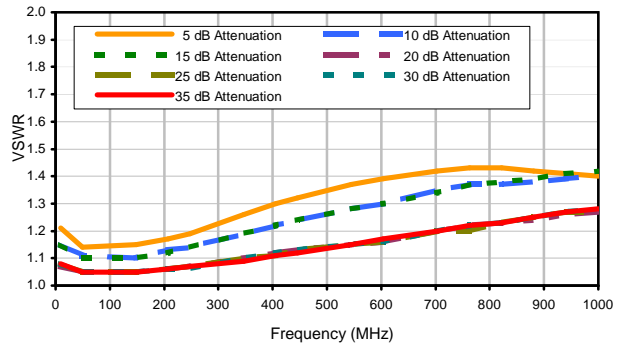
Step Attenuation



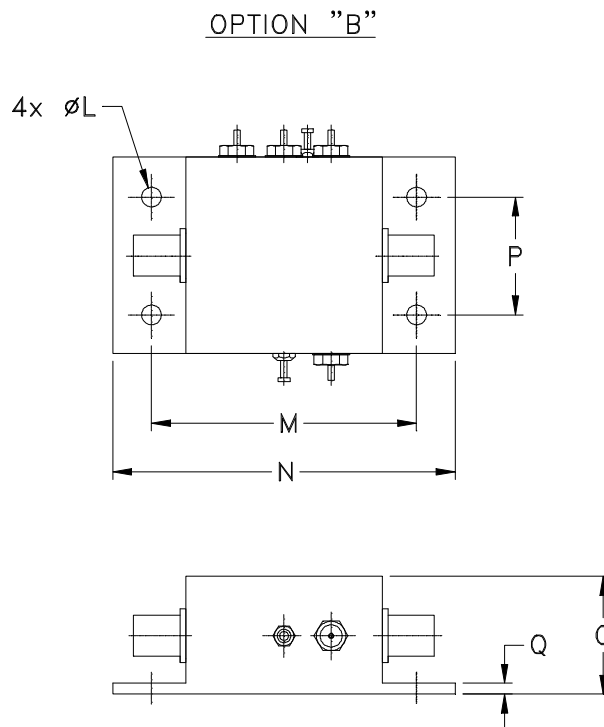
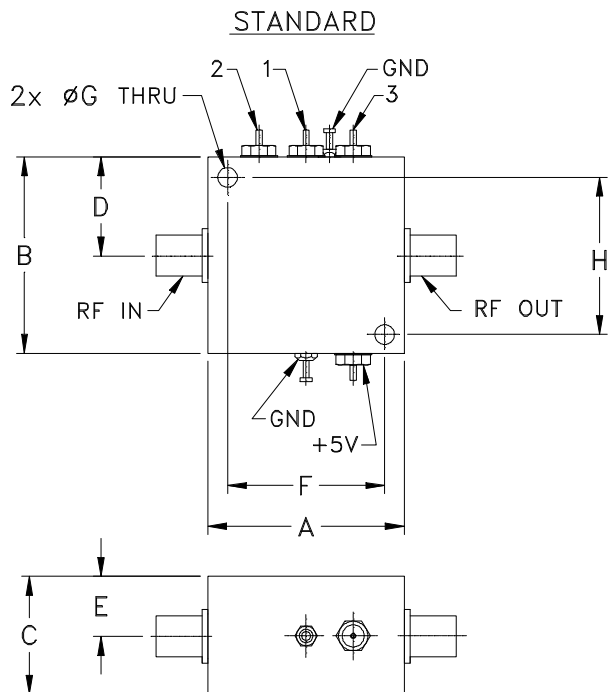
Input VSWR



Output VSWR



Outline Dimensions



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
SSS173	1.25 (31.75)	1.25 (31.75)	.75 (19.05)	.63 (16.00)	.38 (9.65)	1.000 (25.40)	.125 (3.18)	1.000 (25.40)	--	--	.125 (3.18)	1.688 (42.88)	2.18 (55.38)

CASE#	P	Q	WT. GRAMS
SSS173	.750 (19.05)	.07 (1.78)	75

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

Notes:

1. Case material: Aluminum alloy.
2. Case finish:

For RoHS Case Styles:

Clear chemical conversion coating, non-chrome or trivalent chrome based.



INTERNET <http://www.minicircuits.com>

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010

Mini-Circuits ISO 9001 & ISO 14001 Certified

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 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