

# Coaxial Attenuator/Switch

50Ω Bi-Phase 1 to 200 MHz

## ZMAS-3



Generic photo used for illustration purposes only

CASE STYLE: M21

Connectors Model  
**SMA ZMAS-3**  
**BRACKET (OPTION "B")**  
**BRACKET (OPTION "BR")**

### Maximum Ratings

Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
Control Current	30mA
Permanent damage may occur if any of these limits are exceeded.	

### Coaxial Connections

INPUT	3
OUTPUT	1
CONTROL	2

### Features

- wideband, 1 to 200 MHz
- rugged shielded case
- excellent phase and amplitude unbalance
- low insertion loss, 1.6 dB typ.

### Applications

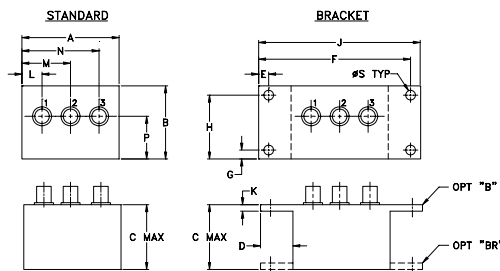
- bi-phase modulator
- electronic attenuator

### Attenuator/Switch Electrical Specifications

FREQUENCY (MHz)	INSERTION LOSS (dB) ±20 mA	MAX. INPUT PWR (dBm) ±20mA	IN-OUT ISOLATION (dB) 0 mA			BI-PHASE X (±20 mA) Typ.						
			L	M	U	Δ AMP (dB)	Phase (deg.) deviation from 180°					
1-200	DC-0.05	15 30	65	50	50	40	50	35	0.10	0.1	0.5	1.0

L = low range [f<sub>L</sub> to 10 f<sub>L</sub>] M = mid range [10 f<sub>L</sub> to f<sub>U</sub>/2] U = upper range [f<sub>U</sub>/2 to f<sub>U</sub>] m = [2 f<sub>L</sub> to f<sub>U</sub>/2]  
 Performance specifications apply for input power up to 10 dB below stated 1 dB compression.

### Outline Drawing



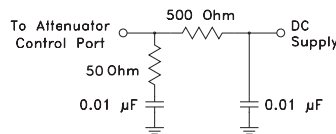
### Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H
1.50	1.13	1.00	.50	.155	2.345	.138	.987
38.10	28.70	25.40	12.70	3.94	59.56	3.51	25.07

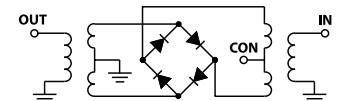
  

J	K	L	M	N	P	S	wt
2.50	.10	.31	.75	1.19	.66	.150	grams
63.50	2.54	7.87	19.05	30.23	16.76	3.81	40.0

### suggested control port biasing configuration

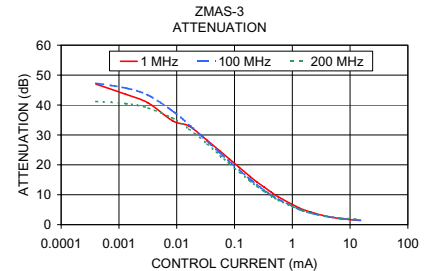
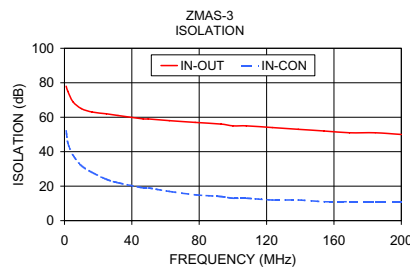
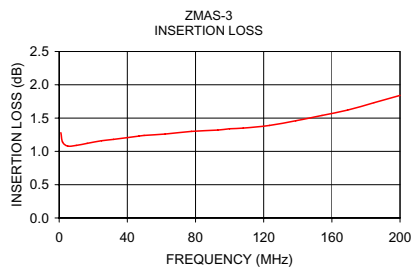


### electrical schematic



### Typical Performance Data

Freq. (MHz)	I. Loss (dB) at 20mA	±Control ΔAMP (dB)	20mA ΔPhase (deg.)	Isolation (in-out) (dB)	Input R. Loss (dB)	Control Current (mA)	Attenuation (dB)			Phase Δ ref at 15mA Ctrl deg.			Input VSWR				
							1 MHz	100 MHz	200 MHz	1 MHz	100 MHz	200 MHz	1 MHz	100 MHz	200 MHz		
1.0	1.28	0.002	0.01	180.0	78	52	23.5	0.0000	50.3	47.8	41.7	26.3	69.1	69.7	13.6	11.6	8.1
2.0	1.14	0.002	0.01	180.0	75	45	28.1	0.0004	47.0	47.3	41.2	19.0	65.6	65.4	13.5	11.6	8.1
5.0	1.08	0.002	0.01	180.0	69	38	35.4	0.0013	43.6	45.7	40.5	10.3	50.0	58.2	13.3	11.5	8.0
10.0	1.09	0.002	0.01	180.0	65	32	43.0	0.0032	40.7	43.3	39.0	5.7	36.8	46.4	12.9	11.3	7.9
16.4	1.12	0.002	0.01	179.9	63	28	42.7	0.0085	34.7	38.0	35.6	6.3	20.9	29.7	12.5	10.9	7.7
24.9	1.16	0.002	0.01	179.9	62	24	37.5	0.0162	33.0	33.5	32.0	6.6	12.3	19.1	11.7	10.3	7.4
31.8	1.18	0.002	0.01	179.9	61	22	35.2	0.0336	28.2	27.9	27.0	7.2	7.0	10.3	10.5	9.2	6.8
46.8	1.23	0.001	0.02	179.8	59	19	31.6	0.0567	24.5	23.9	23.1	7.5	4.7	6.0	9.3	8.1	6.1
49.8	1.24	0.001	0.02	179.8	59	19	31.0	0.0807	22.0	21.2	20.5	7.7	3.9	4.3	8.3	7.3	5.6
62.2	1.26	0.002	0.02	179.8	58	17	28.7	0.1215	19.1	18.2	17.5	7.5	3.0	2.9	7.1	6.2	4.9
77.6	1.30	0.001	0.02	179.7	57	15	26.4	0.1860	16.1	15.2	14.6	7.1	2.4	1.8	5.8	5.1	4.2
93.0	1.32	0.001	0.02	179.6	56	14	24.4	0.2459	14.2	13.3	12.8	6.5	2.1	1.4	5.0	4.5	3.7
100.0	1.34	0.001	0.02	179.6	55	13	23.5	0.3285	12.5	11.5	11.1	6.3	1.8	1.1	4.3	3.8	3.2
108.0	1.35	0.001	0.02	179.6	55	13	22.6	0.4365	10.8	9.9	9.6	5.7	1.6	0.9	3.6	3.3	2.8
123.4	1.39	0.001	0.02	179.5	54	12	21.0	0.5714	9.3	8.5	8.2	5.1	1.4	0.7	3.1	2.8	2.5
138.8	1.46	0.001	0.02	179.5	53	12	19.5	1.3114	5.6	5.2	5.1	3.3	0.8	0.3	2.0	1.9	1.7
154.2	1.54	0.001	0.02	179.4	52	11	18.2	2.0989	4.2	3.9	3.9	2.3	0.6	0.3	1.6	1.6	1.5
169.2	1.62	0.001	0.02	179.5	51	11	17.0	3.7220	2.9	2.8	2.9	1.3	0.3	0.1	1.3	1.3	1.3
184.6	1.73	0.001	0.02	179.5	51	11	15.9	7.0357	2.0	2.0	2.2	0.5	0.2	0.0	1.2	1.2	1.2
200.0	1.84	0.002	0.03	179.6	50	11	14.8	15.1415	1.4	1.5	1.8	0.0	0.0	0.0	1.1	1.1	1.1



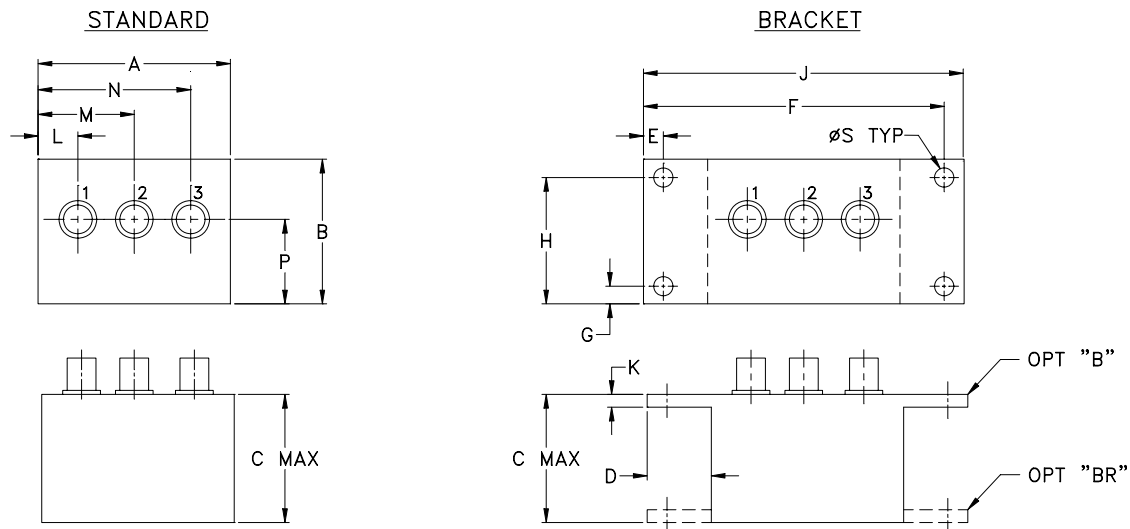
### Notes

- 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-Circuits' applicable established test performance criteria and measurement instructions.
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M21  
M22  
M23

## Outline Dimensions



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
M21	1.50 (38.10)	1.13 (28.70)	1.00 (25.40)	.50 (12.70)	.155 (3.94)	2.345 (59.56)	.138 (3.51)	.987 (25.07)	2.50 (63.50)	.10 (2.54)	.31 (7.87)	.75 (19.05)	1.19 (30.23)
M22	2.25 (57.15)	1.38 (35.05)	1.24 (31.50)		.150 (3.81)	3.100 (78.74)		1.238 (31.45)	3.25 (82.55)		.40 (10.16)	1.15 (29.21)	1.86 (47.24)
M23	2.25 (57.15)	1.38 (35.05)	1.24 (31.50)		.150 (3.81)	3.100 (78.74)		1.238 (31.45)	3.25 (82.55)		.63 (16.00)	1.06 (26.92)	1.63 (41.40)

CASE#	P	Q	R	S	WT. GRAMS
M21	.66 (16.76)	--	--	.150 (3.81)	40.0
M22	.64 (16.26)	--	--		74.0
M23	.69 (17.53)	--	--		70.0

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

### Notes:

- Case material: Aluminum alloy.
- Case finish:
  - For RoHS Case Styles: Clear chemical conversion coating, non-chrome or trivalent chrome based.
  - For Non-RoHS Case Styles: Yellow hexavalent chrome based conversion coating.  
Due to transition from non-RoHS to RoHS, models will be supplied with either case style finish until the non-RoHS case inventory is depleted.
- Mounting bracket available on request. For bracket mounted on connector end add suffix B to part number and add \$5.00 to unit cost. For bracket mounted on the rear, add suffix BR to part number and add \$1.50 to unit cost.

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.

<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