

# Coaxial High Power Combiner

## ZA2CS-251-20W+

2 Way-0° 50Ω 10 to 250 MHz 20 Watt

### The Big Deal

- High power, up to 20W as a combiner (each input port)
- Low insertion loss, 0.17 dB
- High isolation, 25 dB
- Low unbalance, 0.5°/0.05 dB



CASE STYLE: AW254

### Product Overview

Mini-Circuits' ZA2CS-251-20W+ is a 2-way 0° splitter/combiner providing 20W power handling and very low insertion loss across the 10 to 250 MHz band, covering applications including AM/FM radio, VHF/UHF, instrumentation and more. Its low intrinsic losses provide excellent signal fidelity from input to output, even to high-power signals. This model also provides high isolation and very low amplitude and phase unbalance. It features rugged construction with your choice of SMA or N-Type connectors and a heat sink for efficient cooling.

### Key Features

Feature	Advantages
Feature 1 High power handling: <ul style="list-style-type: none"><li>• Up to 25W as a splitter</li><li>• Up to 20W as a combiner</li></ul>	Suitable for many high power applications.
Very low insertion loss, 0.17 dB	Very low insertion loss minimizes intrinsic losses, making this model a suitable candidate for high power signal distribution applications where low loss is a requirement.
Very low unbalance: <ul style="list-style-type: none"><li>• 0.05 dB amplitude unbalance</li><li>• 0.5° phase unbalance</li></ul>	ZA2CS-251-20+ produces nearly equal output signals, ideal for parallel path / multichannel systems.
Good isolation, 25 dB	Minimizes interference between input ports.
Excellent VSWR, 1.1:1 typ.	Provides excellent thru-path transmission with low signal reflection.

#### 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](http://www.minicircuits.com/MCLStore/terms.jsp)



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## ZA2CS-251-20W+

2 Way-0° 50Ω 10 to 250 MHz 20 Watt



Generic photo used for illustration purposes only

CASE STYLE: AW254

Connectors	Model
N-TYPE	ZA2CS-251-20WN+
SMA	ZA2CS-251-20WS+

**+RoHS Compliant**

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

### Maximum Ratings

Operating Temperature	-55°C to 60°C
Storage Temperature	-55°C to 100°C

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

### Coaxial Connections

SUM PORT	S
PORT 1	1
PORT 2	2

### Features

- high power, up to 20W input power as combiner
- low insertion loss, .17 dB typ.
- high isolation, 30 dB typ.
- excellent VSWR, 1.1:1 typ.

### Applications

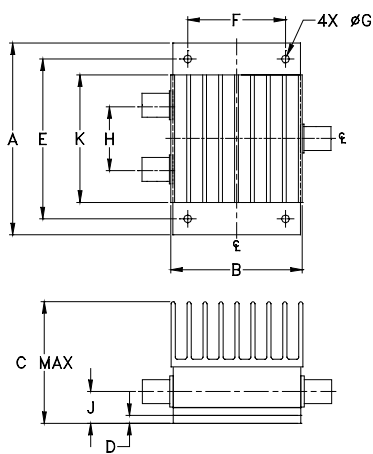
- instrumentation
- VHF/UHF
- AM/FM RADIO

### Electrical Specifications at 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
<b>Frequency Range</b>		10		250	MHz
<b>Insertion Loss Above 3.0 dB</b>	10 - 250	—	0.25	0.5	dB
	25 - 120	—	0.17	0.4	
<b>Isolation</b>	10 - 250	15	20	—	dB
	25 - 120	20	25	—	
<b>Phase Unbalance</b>	10 - 250	—	0.5	2	Degree
<b>Amplitude Unbalance</b>	10 - 250	—	.05	0.25	dB
<b>VSWR (Port S)</b>	10 - 250	—	1.15	1.5	:1
<b>VSWR (Port 1-2)</b>	10 - 250	—	1.20	1.6	:1
<b>Power Input</b>	as combiner*	10 - 250	—	10	W
		25 - 120	—	20	
	as splitter	10 - 250	—	25	
		25 - 120	—	65	

\* Maximum Power Input for each port.

### Outline Drawing



### Outline Dimensions (inch/mm)

A	B	C	D	E	F	
3.00	2.06	1.92	.100	2.500	1.525	
76.20	52.32	48.77	2.54	63.50	38.74	
G	H	J	K			wt
.125	1.000	.50	2.00			grams
3.18	25.40	12.70	50.80			330

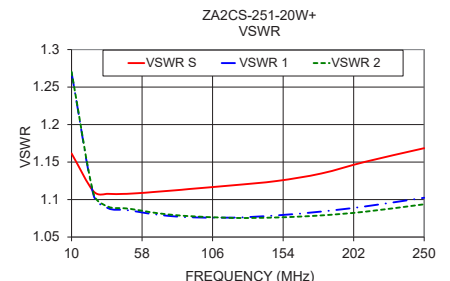
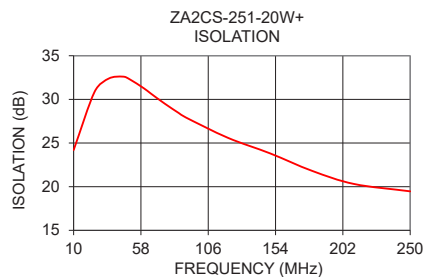
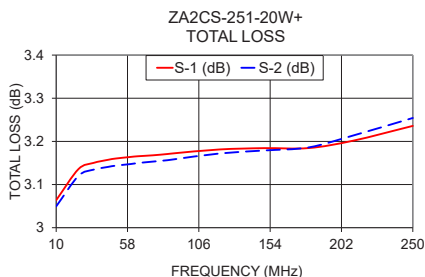
### Electrical Schematic



### Typical Performance Data

Frequency (MHz)	Total Loss <sup>1</sup> (dB)		Amplitude Unbalance (dB)	Isolation (dB)	Phase Unbalance (deg.)	VSWR S	VSWR 1	VSWR 2
	S-1	S-2						
10	3.06	3.05	0.01	24.19	0.01	1.16	1.27	1.27
25	3.14	3.12	0.02	30.88	0.01	1.11	1.11	1.11
35	3.15	3.13	0.02	32.38	0.02	1.11	1.09	1.09
45	3.16	3.14	0.02	32.61	0.02	1.11	1.09	1.09
50	3.16	3.14	0.02	32.30	0.03	1.11	1.09	1.09
60	3.16	3.15	0.02	31.28	0.02	1.11	1.08	1.08
65	3.17	3.15	0.02	30.68	0.02	1.11	1.08	1.08
75	3.17	3.15	0.01	29.51	0.03	1.11	1.08	1.08
85	3.17	3.16	0.01	28.43	0.03	1.11	1.08	1.08
90	3.17	3.16	0.01	27.93	0.03	1.11	1.08	1.08
120	3.18	3.17	0.01	25.60	0.05	1.12	1.08	1.08
150	3.18	3.18	0.01	23.82	0.06	1.12	1.08	1.08
180	3.18	3.19	0.00	21.82	0.08	1.13	1.08	1.08
210	3.20	3.21	0.01	20.31	0.12	1.15	1.09	1.08
250	3.24	3.25	0.02	19.47	0.16	1.17	1.10	1.09

1. Total Loss = Insertion Loss + 3dB splitter theoretical loss.



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# 2 Way-0° Power Splitter/Combiner

# ZA2CS-251-20W+

## Typical Performance Data

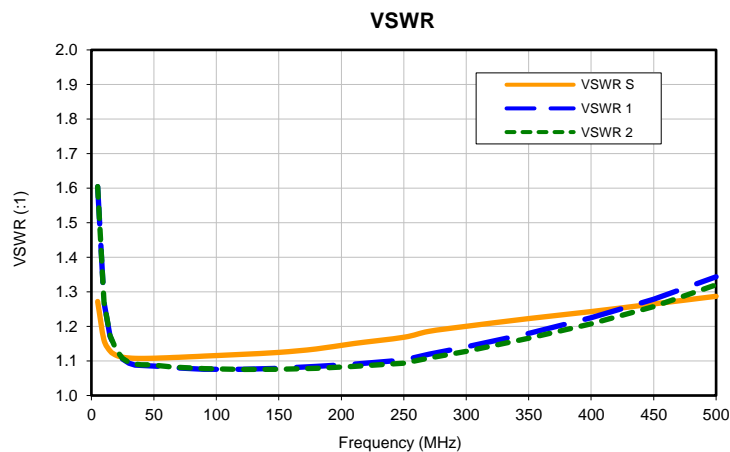
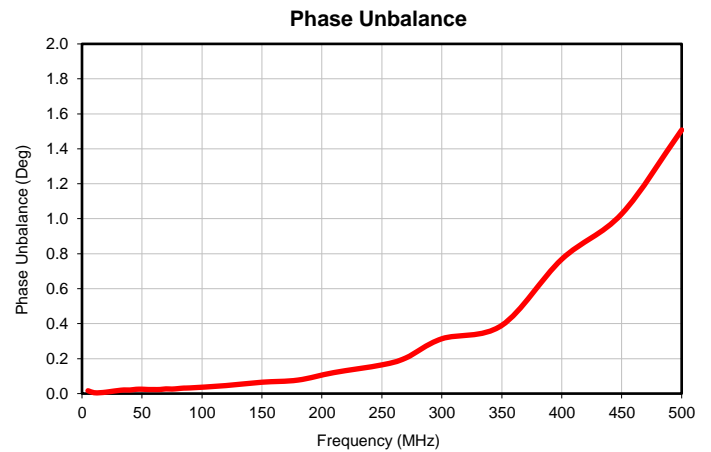
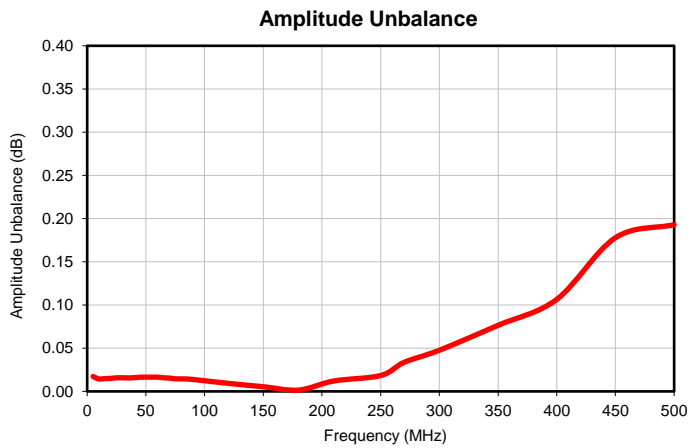
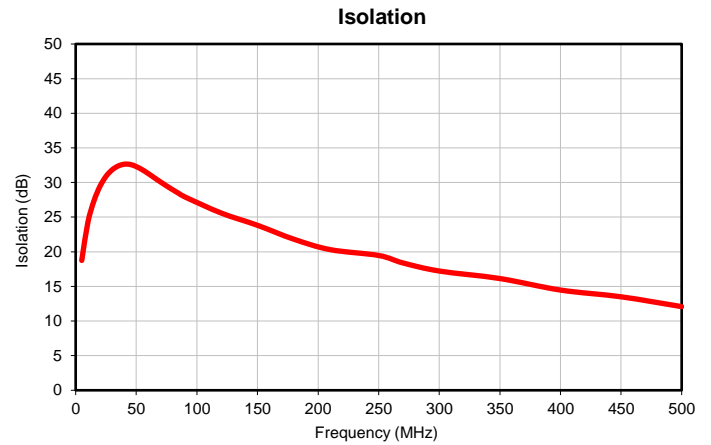
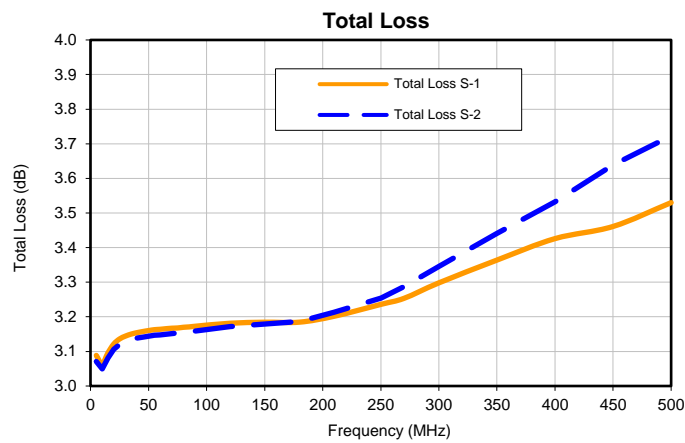
FREQUENCY (MHz)	TOTAL LOSS <sup>1</sup> (dB)		AMPLITUDE UNBALANCE (dB)	ISOLATION (dB) 1-2	PHASE UNBALANCE (Deg)	FREQUENCY (MHz)	VSWR (:1)		
	S-1	S-2					S	1	2
5	3.09	3.07	0.02	18.75	0.02	5	1.27	1.60	1.60
10	3.06	3.05	0.01	24.19	0.01	10	1.16	1.27	1.27
15	3.10	3.08	0.01	27.32	0.01	15	1.13	1.17	1.17
20	3.12	3.11	0.02	29.43	0.01	20	1.12	1.13	1.13
25	3.14	3.12	0.02	30.88	0.01	25	1.11	1.11	1.11
30	3.14	3.13	0.02	31.82	0.02	30	1.11	1.09	1.10
35	3.15	3.13	0.02	32.38	0.02	35	1.11	1.09	1.09
40	3.15	3.14	0.02	32.64	0.02	40	1.11	1.09	1.09
45	3.16	3.14	0.02	32.61	0.02	45	1.11	1.09	1.09
50	3.16	3.14	0.02	32.30	0.03	50	1.11	1.09	1.09
55	3.16	3.15	0.02	31.84	0.02	55	1.11	1.08	1.09
60	3.16	3.15	0.02	31.28	0.02	60	1.11	1.08	1.08
65	3.17	3.15	0.02	30.68	0.02	65	1.11	1.08	1.08
70	3.17	3.15	0.02	30.08	0.03	70	1.11	1.08	1.08
75	3.17	3.15	0.01	29.51	0.03	75	1.11	1.08	1.08
80	3.17	3.16	0.01	28.96	0.03	80	1.11	1.08	1.08
85	3.17	3.16	0.01	28.43	0.03	85	1.11	1.08	1.08
90	3.17	3.16	0.01	27.93	0.03	90	1.11	1.08	1.08
120	3.18	3.17	0.01	25.60	0.05	120	1.12	1.08	1.08
150	3.18	3.18	0.01	23.82	0.06	150	1.12	1.08	1.08
180	3.18	3.19	0.00	21.82	0.08	180	1.13	1.08	1.08
210	3.20	3.21	0.01	20.31	0.12	210	1.15	1.09	1.08
250	3.24	3.25	0.02	19.47	0.16	250	1.17	1.10	1.09
270	3.25	3.29	0.03	18.39	0.20	270	1.19	1.12	1.11
300	3.30	3.35	0.05	17.22	0.31	300	1.20	1.14	1.13
350	3.36	3.44	0.08	16.14	0.39	350	1.22	1.18	1.17
400	3.43	3.53	0.11	14.47	0.77	400	1.24	1.22	1.21
450	3.46	3.64	0.18	13.50	1.03	450	1.26	1.28	1.26
500	3.53	3.72	0.19	12.08	1.51	500	1.29	1.34	1.32

<sup>1</sup>Total Loss = Insertion Loss + 3dB Splitter Loss

# 2 Way-0° Power Splitter/Combiner

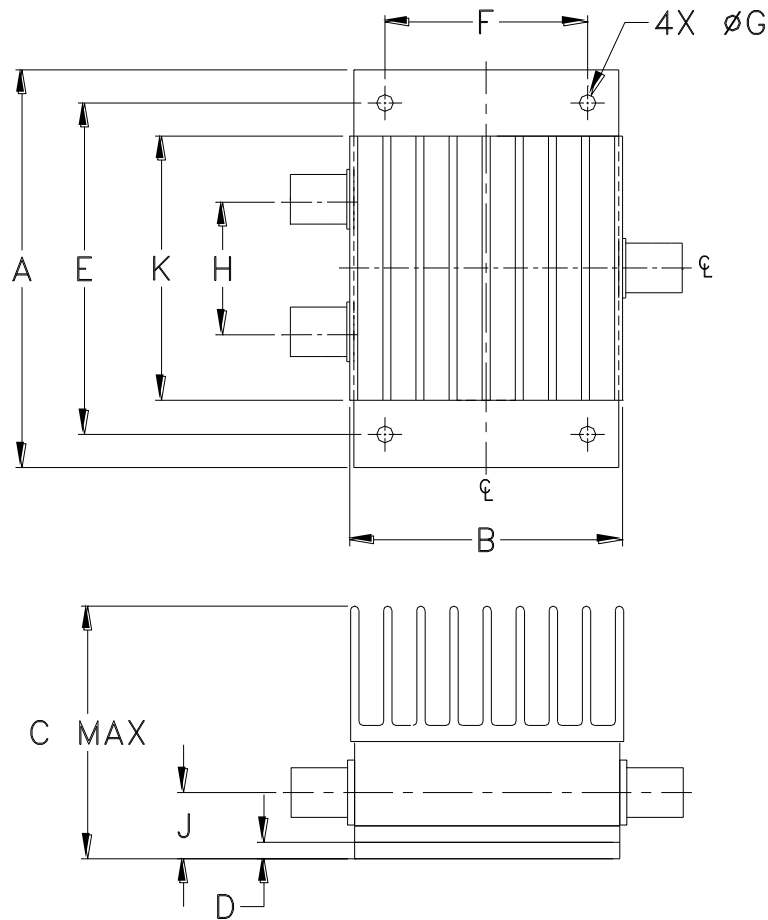
# ZA2CS-251-20W+

## Typical Performance Curves



## Outline Dimensions

AW254



CASE #	A	B	C	D	E	F	G	H	J	K	WT. GRAM
AW254	3.00 (76.20)	2.06 (52.32)	1.92 (48.77)	.100 (2.54)	2.500 (63.50)	1.525 (38.74)	.125 (3.18)	1.000 (25.40)	.50 (12.70)	2.00 (50.80)	330

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

### Notes:

1. Case material: Aluminum alloy.
2. Case Finish:  
For RoHS Case Styles: Clear chemical conversion coating, non-chrome or trivalent chrome based.
3. Heat sink finish: Black anodize.



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: [www.minicircuits.com](http://www.minicircuits.com)

RF/IF MICROWAVE COMPONENTS

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 60°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