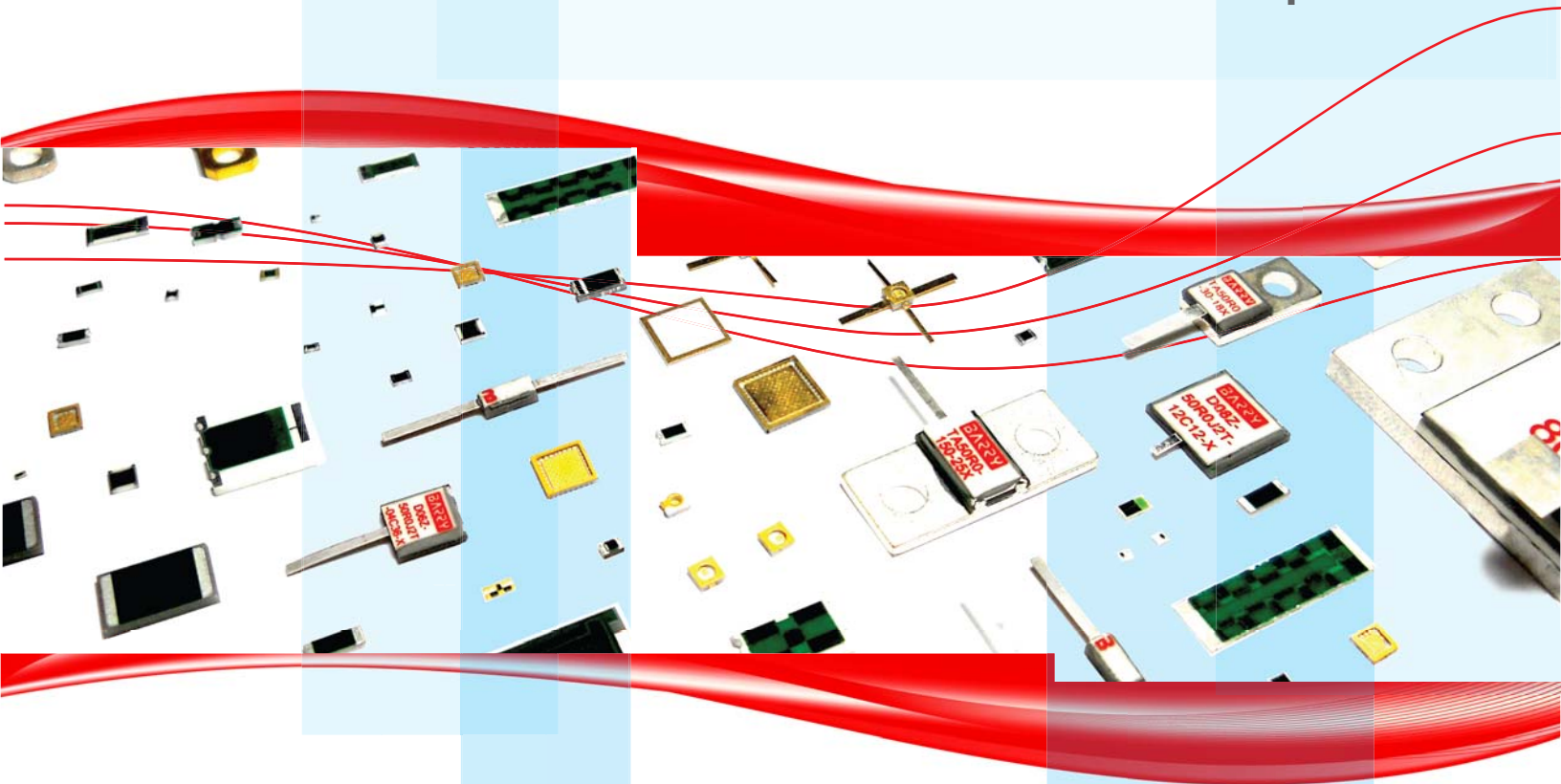


**A**ttenuators

**R**esistors

**T**erminations

The **ART** of Passive Components



**BARRY**



ISO CERTIFIED



ITAR REGISTERED

**A**ttenuators

**R**esistors

**T**erminations



Al<sub>2</sub>O<sub>3</sub>, AlN or BeO



Laser Scribing



Screen Printing

**B**arry Industries Inc. is a leading manufacturer of ceramic components including attenuators, resistors, terminations, semiconductor packaging and custom thick film circuits.

For decades, leading providers of mission-critical communication, military, medical, aerospace, detection, fiber-optic and industrial devices have relied on Barry components.

We keep large inventories of standard components for rapid delivery. For non-standard devices we are a start-to-finish component design partner.

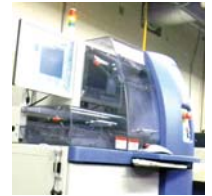
**Vertical Integration** is the key to our quality and success. Unsurpassed quality standards, precise attention to detail, excellent customer service and in-house control of our manufacturing process are some of the reasons to choose Barry as your ceramic component supplier.



Firing



Laser Trimming



Dicing



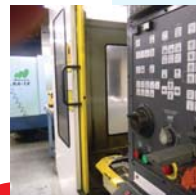
Plating



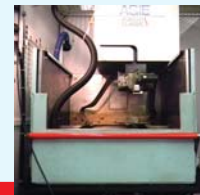
XRF Measuring



Brazing



CNC Machining



EDM Machining



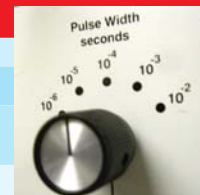
Thermal Analysis

**“Vertical Integration is the key to our quality and success.”**

Barry Industries, Inc. is an ISO9001 certified, ITAR registered company with headquarters and manufacturing operations in Attleboro, Massachusetts. We invite you to visit our facility. We know that you will like what we have to show you.



Thermal Cycling



Pulse Testing



High Power Testing



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**MADE IN USA**



Life Testing



RF Testing to 60GHz



Optical CMM Measuring



The **ART** of Passive Components



# Attenuator Overview

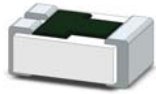
- Chip Sizes 0405 to 3737
- Al<sub>2</sub>O<sub>3</sub>, AlN or BeO
- Values 0dB to 32dB\*, Accuracy to ±0.25dB
- Tape & Reel‡ and Waffle Pack Available
- Non-magnetic Available

- Chip, Leaded or Flanged Configurations
- Group A, B, C & Life Testing Available
- Robust Thick Film Construction
- Solder, Epoxy or Wirebond Attachment
- Operating Temperature -55 to +150°C

- RoHS Available, Sn62 Available
- Nickel Barrier Available

\* Ohmic Value, Size & Substrate Dependant.  
‡ Available for sizes 0402 to 3725

## Chip Attenuator Configurations:



**Full Wraparound**  
AP Type  
**P**



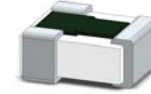
**1/4 Wraparound**  
AK Type  
**K**



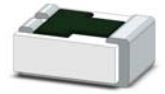
**Single-Sided w/ Backplane**  
AM Type  
**M**



**Single-Sided**  
AS Type  
**S**



**3-Sided Wrap**  
AT Type  
**T**



**1/2 Wrap**  
AV Type  
**V**

## Chip Attenuator Sizes:

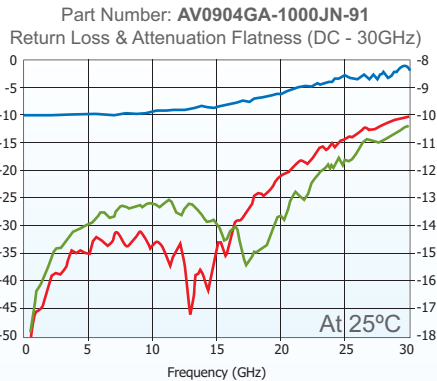
Actual footprint:												
Size:	0405	0706	0904	0905	1005	1007	1612	2010	2525	2335	3725	3737
Available Terminal Configurations:	P, K, T V	P, M, S T	M, S, T V	M, S	P, M, S	P	P, M, S	T	S, T, V	V	V	V

Power Rating is Value Dependant. See Individual Data Sheets or Contact Factory.

## Attenuator Performance Examples:

Rated Power: **3/4W**  
Example Attenuation: **10dB**  
Frequency Range: **DC - 30GHz**  
Return Loss: **25dB (to 18GHz)**  
Return Loss: **10dB (to 30GHz)**  
Substrate: **0.015" Al<sub>2</sub>O<sub>3</sub>**  
Metallization: **Au**  
Footprint: **0.090" x 0.040"**

— Attenuation (right axis)  
— S11 (left axis)  
— S22 (left axis)



Rated Power: **2000W**  
Example Attenuation: **1dB**  
Frequency Range: **DC - 2GHz**  
Return Loss: **25dB (to 1GHz)**  
Return Loss: **20dB (to 2GHz)**  
Substrate: **0.060" BeO**  
Flange: **Ni Plated Cu**  
Footprint: **1.10" x 0.50"**

— Attenuation (right axis)  
— S11 (left axis)  
— S22 (left axis)



## Flanged Attenuator Examples:



Rated Power: **10W**  
Example Attenuation: **1dB**  
Frequency Range: **DC - 6GHz**  
Typical Return Loss: **17dB**  
Substrate: **0.040" AlN**  
Flange: **Ni Plated Cu**  
Footprint: **0.200" x 0.300"**



Rated Power: **20W**  
Example Attenuation: **3dB**  
Frequency Range: **DC - 3GHz**  
Typical Return Loss: **17dB**  
Substrate: **0.040" BeO**  
Flange: **Ni Plated Cu**  
Footprint: **0.250" x 0.515"**



Rated Power: **100W**  
Example Attenuation: **30dB**  
Frequency Range: **DC - 2.5GHz**  
Typical Return Loss: **30dB**  
Substrate: **0.040" AlN**  
Flange: **Ni Plated Cu**  
Footprint: **0.800" x 0.230"**



Rated Power: **100W**  
Example Attenuation: **1dB**  
Frequency Range: **DC - 4GHz**  
Typical Return Loss: **20dB**  
Substrate: **0.040" BeO**  
Flange: **Ni Plated Cu**  
Footprint: **0.800" x 0.230"**



Rated Power: **250W**  
Example Attenuation: **5dB**  
Frequency Range: **DC - 2.5GHz**  
Typical Return Loss: **22dB**  
Substrate: **0.060" AlN**  
Flange: **Ni Plated Cu**  
Footprint: **0.975" x 0.375"**

*Many other options & configurations available. Custom requests are our specialty!*

All part illustrations are for reference purposes only.



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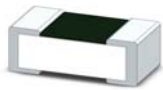
barryind.com



# Resistor Overview

- Chip Sizes 0201 to 5050
- Al<sub>2</sub>O<sub>3</sub>, AlN or BeO
- Values 0.1Ω to 1GΩ\*, Tolerances to ±1%
- Tape & Reel<sup>‡</sup> and Waffle Pack Available
- Non-magnetic Available
- Chip, Leaded or Flanged Configurations
- Group A, B, C & Life Testing Available
- Robust Thick Film Construction
- Solder, Epoxy or Wirebond Attachment
- Operating Temperature -55 to +150°C
- RoHS Available, Sn62 Available
- Nickel Barrier Available
- Zero Ω Jumpers Available
- TCR to ±100PPM

## Chip Resistor Configurations:



**Full Wraparound**  
RP Type  
**P**



**Wraparound w/ Isolated Center Pad**  
RY Type  
**Y**



**Wrap w/ Extended Mounting Pads**  
RE Type  
**E**



**1/4 Wraparound**  
RK Type  
**K**



**Single-Sided w/ Backplane**  
RM Type  
**M**

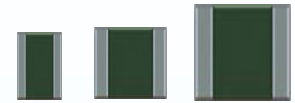


**Single-Sided RS Type**  
**S**

## Chip Resistor Sizes & Typical Power Ratings†:

Actual footprint:

Size:	0202	0302	0402	0502	0504	0505	0603	0805
Al <sub>2</sub> O <sub>3</sub> Rated Power:	0.05W	0.12W	0.5W	1.0W	1.5W	1.5W	1.0W	2.0W
AlN Rated Power:	0.17W	0.4W	1.7W	3.5W	5.0W	5.0W	3.5W	6.7W
BeO Rated Power:	0.25W	0.6W	2.5W	5.0W	7.5W	7.5W	5.0W	10.0W
Available Terminal Configurations:	M, S	P, K, M, S	P, K, M, S	P, K, M, S	P, K, M, S	P, K, M, S	P, K, M, S	P, Y, E, K, M, S



2335	3737	5050
30.0W	50.0W	80.0W
100W	170W	270W
150W	250W	400W
P, Y, E, K, M, S	P, Y, E, K, M, S	P, Y, E, K, M, S

Actual footprint:

Size:	1005	1206	1505	1010	2010	2512	2525	3725
Al <sub>2</sub> O <sub>3</sub> Rated Power:	2.5W	2.5W	3.0W	3.5W	6.0W	10.0W	20.0W	30.0W
AlN Rated Power:	8.0W	8.0W	10.0W	12.0W	20.0W	35.0W	70.0W	100W
BeO Rated Power:	12.5W	12.5W	15.0W	17.5W	30.0W	50.0W	100.0W	150W
Available Terminal Configurations:	P, Y, E, K, M, S	P, Y, E, K, M, S	P, Y, E, K, M, S	P, Y, E, K, M, S	P, Y, E, K, M, S	P, Y, E, K, M, S	P, Y, E, K, M, S	P, Y, E, K, M, S

‡ Available for sizes 0402 to 3725

\* Ohmic Value, Size & Substrate Dependent.

† Based on thinnest available substrate per size using 'RM Type' terminal configuration and rated at ≤100°C baseplate temperature. Rating may vary for other terminal configurations and mounting implementation.

## Flanged Resistor Examples:



Rated Power: **20W**  
Substrate: **BeO**  
Flange: **Ni Plated Cu**  
Footprint: **0.200" x 0.300"**



Rated Power: **50W**  
Substrate: **AlN**  
Flange: **Ni Plated Cu**  
Footprint: **0.250" x 0.515"**



Rated Power: **80W**  
Substrate: **BeO**  
Flange: **Au Plated CuW**  
Footprint: **0.250" x 0.515"**



Rated Power: **100W**  
Substrate: **AlN**  
Flange: **Ni Plated Cu**  
Footprint: **0.800" x 0.230"**



Rated Power: **150W**  
Substrate: **BeO**  
Flange: **Au Plated CuW**  
Footprint: **0.800" x 0.230"**



Rated Power: **250W**  
Substrate: **AlN**  
Flange: **Ni Plated Cu**  
Footprint: **0.975" x 0.375"**



Rated Power: **400W**  
Substrate: **BeO**  
Flange: **Au Plated CuW**  
Footprint: **1.100" x 0.500"**



Rated Power: **800W**  
Substrate: **BeO**  
Flange: **Au Plated CuW**  
Footprint: **1.900" x 1.040"**

Many other options & configurations available. Custom requests are our specialty!

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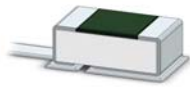


# Termination Overview

- Chip Sizes 0202 to 3737
- Al<sub>2</sub>O<sub>3</sub>, AlN or BeO
- Standard Values 50Ω & 100Ω. Others Available
- Tape & Reel‡ and Waffle Pack Available
- Non-magnetic Available
- Chip, Leaded or Flanged Configurations
- Group A, B, C & Life Testing Available
- Robust Thick Film Construction
- Solder, Epoxy or Wirebond Attachment
- Operating Temperature -55 to +150°C
- RoHS Available, Sn62 Available
- Nickel Barrier Available

‡ Available for sizes 0402 to 3725  
 Δ Sizes 1206 and larger  
 ◇ Shown with input ribbon attached by customer  
 † Based on thinnest available substrate per size using same sized 'RM Type' chip resistor terminal configuration and rated at ≤100°C baseplate temperature.

## Chip Termination Configurations:



**SMT TZ Type Z**



**SMT w/ Castellations<sup>Δ</sup> TZC Type ZC**



**Half Wrap<sup>◇</sup> TV Type V**



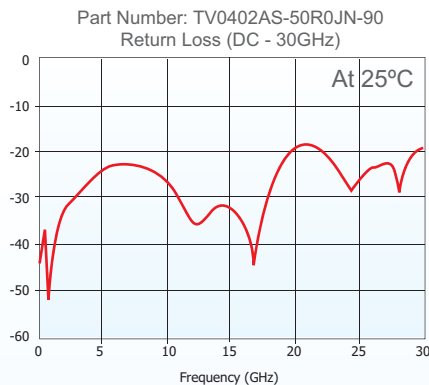
**Half Wrap w/ Castellations<sup>Δ◇</sup> TVC Type VC**

## Chip Termination Sizes & Typical Power Ratings†:

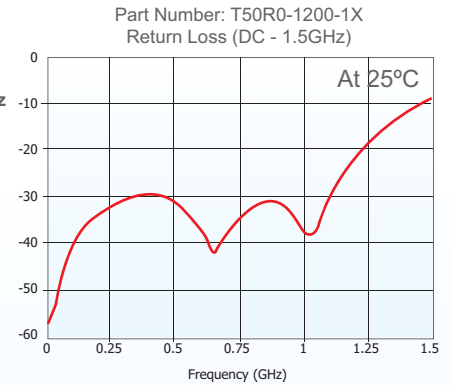
Actual footprint:	•	■	■	■	■	■	■	■	■	■	■	■	■	■
Size:	0202	0402	0502	0505	0605	0805	1005	1206	2010	2525	3725	2335	3737	
Al <sub>2</sub> O <sub>3</sub> Rated Power:	0.05W	0.5W	1.0W	1.5W	1.0W	2.0W	2.5W	2.5W	6.0W	20.0W	30.0W	30.0W	50.0W	
AlN Rated Power:	0.17W	1.7W	3.5W	5.0W	3.5W	6.7W	8.0W	8.0W	20.0W	70.0W	100W	100W	170W	
BeO Rated Power:	0.25W	2.5W	5.0W	7.5W	5.0W	10.0W	12.5W	12.5W	30.0W	100W	150W	150W	250W	
Available Configurations:	V	V	V	V	V	V, Z	V, Z	V, VC, Z ZC	V, VC, Z ZC	V, VC, Z ZC	V, VC, Z ZC	V, VC, Z ZC	V, VC, Z ZC	

## Termination Performance Examples:

Rated Power: **63mW**  
 Example Impedance: **50Ω**  
 Frequency Range: **DC - 26GHz**  
 Return Loss: **15dB or better**  
 Substrate: **0.010" Al<sub>2</sub>O<sub>3</sub>**  
 Metallization: **SnPb Plated PdPtAg**  
 Footprint: **0.040" x 0.020"**



Rated Power: **1200W**  
 Example Impedance: **50Ω**  
 Frequency Range: **DC - 1.5GHz**  
 Return Loss: **20dB or better**  
 Substrate: **0.120" BeO**  
 Flange: **Ni Plated Cu**  
 Footprint: **1.10" x 1.04"**



## Flanged Termination Examples:



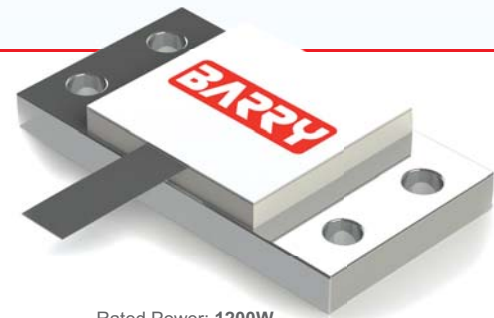
Rated Power: **10W**  
 Frequency Range: **DC - 4GHz**  
 Typical Return Loss: **18dB (to 2GHz)**  
 Typical Return Loss: **14dB (to 4GHz)**  
 Substrate: **0.040" BeO**  
 Flange: **Ni Plated Cu**  
 Footprint: **0.200" x 0.300"**



Rated Power: **30W**  
 Frequency Range: **DC - 6GHz**  
 Typical Return Loss: **17dB**  
 Substrate: **0.040" BeO**  
 Flange: **Ni Plated Cu**  
 Footprint: **0.250" x 0.515"**



Rated Power: **250W**  
 Frequency Range: **DC - 3GHz**  
 Typical Return Loss: **19dB**  
 Substrate: **0.040" AlN**  
 Flange: **Ni Plated Cu**  
 Footprint: **0.975" x 0.375"**



Rated Power: **1200W**  
 Frequency Range: **DC - 1.5GHz**  
 Typical Return Loss: **20dB**  
 Substrate: **0.120" AlN**  
 Flange: **Ni Plated Cu**  
 Footprint: **1.90" x 1.04"**

*Many other options & configurations available. Custom requests are our specialty!*

All part illustrations are for reference purposes only.



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[www.barryind.com](http://www.barryind.com)