

# BARRY

www.barryind.com

## Resistive Components

### Terminations, Resistors and Attenuators

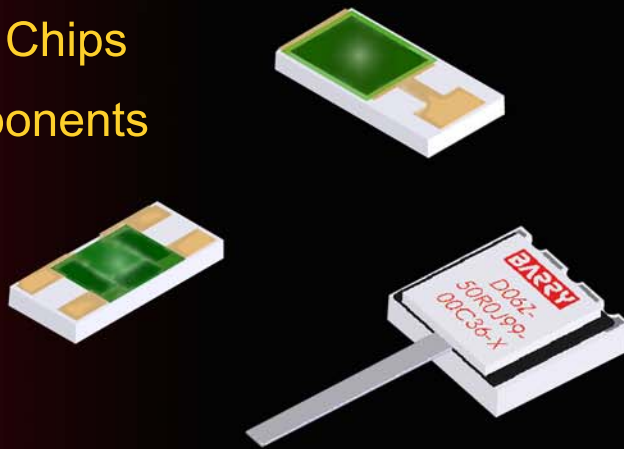
- Custom Precision Chips
- High Power Components

Flanged

Leaded

Chips

- Surface Mount
- Pulsed Power-High Thermal Cycling
- Thick Film Circuits



ISO 9001:2008 Certified  
ITAR Registered



RoHS Compliant

Barry Industries, Inc., 60 Walton Street, Attleboro, Massachusetts 02703 U.S.A.

Tel: +1-508-226-3350 Fax: +1-508-226-3317 E-mail: sales@barryind.com

# About Us

**Founded in 1977**, Barry Industries is an internationally renowned supplier to the electronics and communications market. Our focus is to provide our customers with the highest level of product quality available, supported by world class customer service.

**Barry Industries** is an approved vendor to the leading manufacturers of military, commercial, aerospace, and medical products; the “Who’s Who?” in the marketplace. Barry’s products are used in telecommunications, space, and healthcare applications of all types.

**We offer application assistance on your projects and leading edge technology to support your R&D efforts. With our extensive research and development capabilities, we believe that product development can be achieved in conjunction with your team, bringing the product you desire to reality.**

**Barry is ISO 9001:2008 Certified. We carry a complete line of RoHS Compliant products. We are also ITAR Registered.**

**Vertical integration is the key to our quality and success.** Total in-house control of the manufacturing process using our own machine shop, lasers, and state-of-the-art electroplating facilities means that we can avoid delays in product delivery.

**We are your partner.** We manufacture quality components that you need to make your programs a success.

**Barry product offerings include...  
Low Power Precision Chips; High Power Terminations, Resistors, Attenuators and Surface Mount Products; Pulsed Power Devices; Low Capacitance Resistors; Semiconductor Packages-HTCC (High Temperature Co-Fired Ceramic); Machining and Plating Services.**

**Carefully selected** strategic alliances with best-of-breed leaders in manufacturing technology permit us to offer the broadest product line of high-reliability components available in the industry.

**Barry’s worldwide network** ensures that you will always have a Barry representative close at hand to speak with, in your own language and time zone. This is part of our continued commitment to customer service.

**We invite you** to visit our facility. We know that you will like what we have to show you.



**Barry’s Product Warranty** can be located on our web site: [www.barryind.com](http://www.barryind.com)



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*Barry Industries welcomes custom requests and all customer specifications.*

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# Precision Chip Components

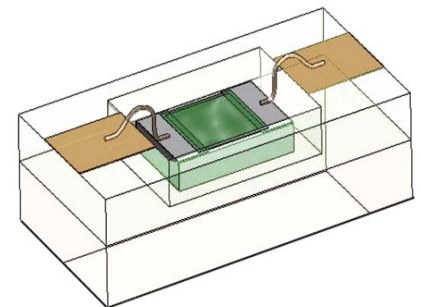
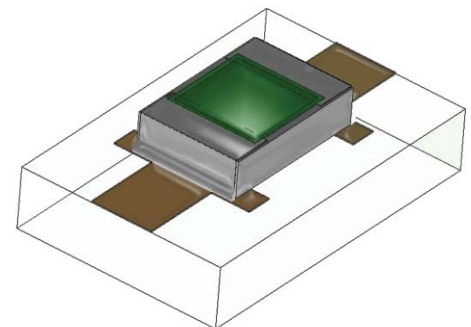
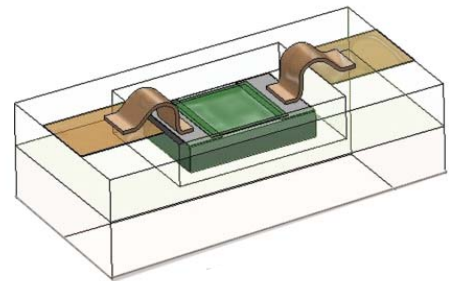
Chip components are the smallest and lowest cost components available. Ideal for surface mount applications and resistive elements for your custom designs. Custom requests are welcome.

- √ Custom resistor values ranging from 0.1 Ohm to 1.0 Gigohm
  - √ Custom attenuator values from 0.25 dB to 32 dB
  - √ Several metallization schemes
  - √ Multiple substrate choices
  - √ A variety of resistor configurations
  - √ Packaging options: Tape & Reel available on sizes 0402 through 3725  
Waffle or bulk packing available for all chips
  - √ ITAR Registered
  - √ Many designs are RoHS Compliant.....
- √ ISO9001:2008 Certified by.....



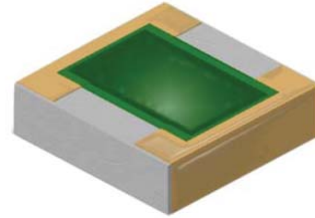
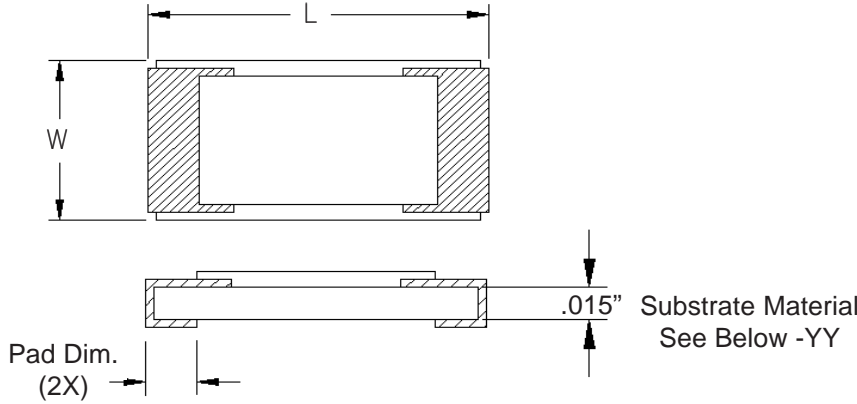
## Several Package Styles to Select From:

Package	Description	Page #
<b>RESISTORS - PRECISION CHIP</b>		
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# RP Resistor Series

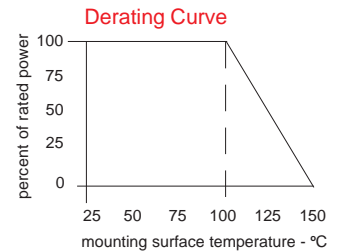


## Dual Wrap Around Resistor

(Images for reference purposes only.)

RP	1005	ZZ	XXXX	W	N	YY
Dual Wrap Around Resistor	Example Size .100" x .050" (see table below)	Termination Material and Finish	.1 Ohms to 1 Gigohm (see examples below)	Tolerance	Normal Inspection	Substrates
	L x W	Pad Dim. (Min.)	0.5 .... R500 1 ..... 1R00 10 ..... 10R0 50 ..... 50R0 100 ... 1000 150 ... 1500 1K ..... 1001 10K .. 1002 100K 1003 470K 4703 1M .... 1004	F ..... 1% G ..... 2% J ..... 5% K .... 10% L .... 20%	91 ..... .015" Alumina 96 ..... .015" BeO 2Q ..... .015" AlN	
RP 0302	.030" x .020"	.007"				
RP 0402	.040" x .020"	.011"				
RP 0502	.050" x .020"	.013"				
RP 0503	.050" x .030"	.012"				
RP 0504	.050" x .040"	.014"				
RP 0505	.050" x .050"	.012"				
RP 0603	.060" x .030"	.010"				
RP 0605	.060" x .050"	.012"				
RP 0805	.075" x .050"	.013"				
RP 1005	.100" x .050"	.012"				
RP 1010	.100" x .100"	.015"				
RP 1206	.120" x .060"	.025"				
RP 1505	.150" x .050"	.015"				
RP 2010	.200" x .100"	.019"				
RP 2512	.250" x .120"	.020"				

**Part Number Example:**  
**RP1005CB-50R0JN-91**



### Termination Material/Finish



BeO Alumina ALN Solder Epoxy Wirebond

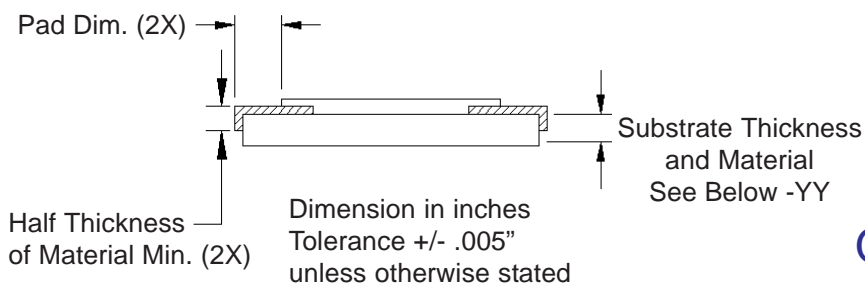
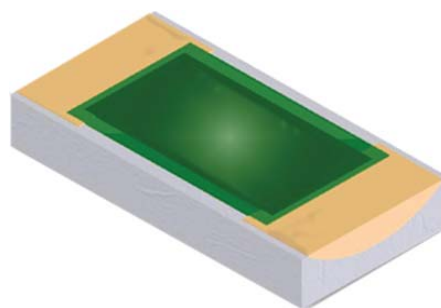
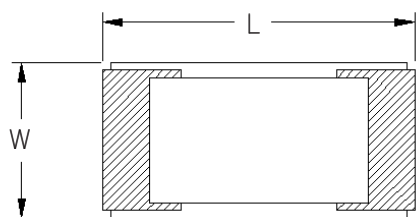
Termination	Material/Finish	BeO	Alumina	ALN	Solder	Epoxy	Wirebond
AS	Tin Lead over Platinum Palladium Gold	No	Yes	Yes	No	Yes	No
BA	Palladium Silver	Yes	No	Yes	Yes	No	Yes
CB	Tin Lead over Nickel over Silver	No	Yes	Yes	No	Yes	No
CT	Matte Tin over Nickel over Silver	Yes	Yes	Yes	Yes	No	No
GA	Gold	Yes	No	Yes	Yes	No	Yes
HA*	Gold over Plat.Palladium Gold I/O with Plat.Palladium Gold Ground	Yes	Yes	No	No	Yes (GND)	Yes (I/O)
JA	Gold over Platinum Palladium Gold	Yes	Yes	No	No	No	Yes

\*I/O = Input/Output Pads



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# RK Resistor Series

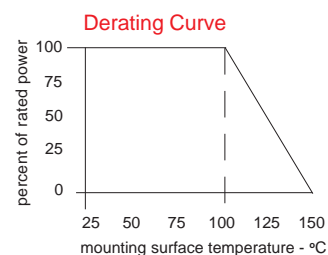


## Quarter Wrap Resistor

(Images for reference purposes only.)

RK	1005	ZZ	-	XXXX	W	N	-	YY
Quarter Wrap Resistor	Example Size .100" x .050" (see table below)	Termination Material and Finish		.1 Ohms to 1 Gigohm (see examples below)	Tolerance	Normal Inspection		Substrates
	L x W	Pad Dim. (Min.)		0.5 .... R500 1 ..... 1R00 10 ..... 10R0 50 ..... 50R0 100 ... 1000 150 ... 1500 1K ..... 1001 10K .. 1002 100K 1003 470K 4703 1M .... 1004	F ..... 1% G ..... 2% J ..... 5% K .... 10% L .... 20%			91 ..... .015" Alumina 93 ..... .025" Alumina 81 ..... .015" BeO Free 83 ..... .025" BeO Free 96 ..... .015" BeO 98 ..... .025" BeO 2Q ..... .015" AlN 2S ..... .025" AlN
RK	0302	.030" x .020"						
RK	0402	.040" x .020"						
RK	0502	.050" x .020"						
RK	0503	.050" x .030"						
RK	0504	.050" x .040"						
RK	0505	.050" x .050"						
RK	0603	.060" x .030"						
RK	0805	.075" x .050"						
RK	1005	.100" x .050"						
RK	1010	.100" x .100"						
RK	1206	.120" x .060"						
RK	1505	.150" x .050"						
RK	2010	.206" x .100"						
RK	2512	.250" x .120"						

**Part Number Example:**  
**RK1005CB-50R0JN-91**



### Termination Material/Finish



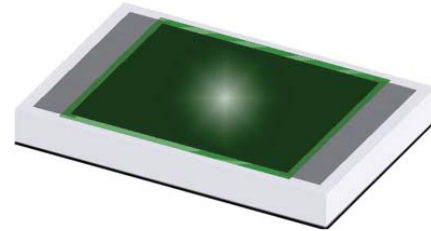
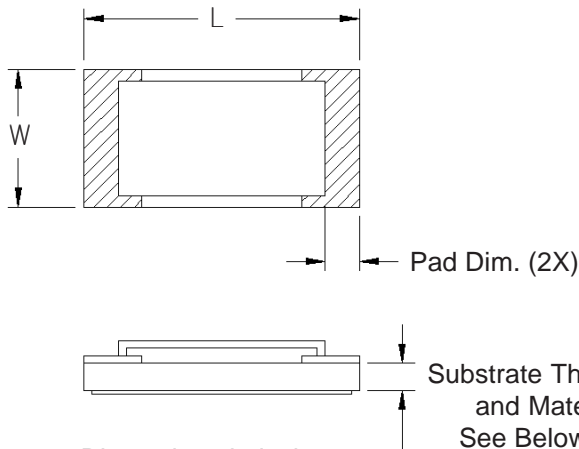
BeO    Alumina    ALN    Solder    Epoxy    Wirebond

Termination	AS - Tin Lead over Platinum Palladium Gold	BA - Palladium Silver	CB - Tin Lead over Nickel over Silver	CT - Matte Tin over Nickel over Silver	GA - Gold	BeO	Alumina	ALN	Solder	Epoxy	Wirebond
	No	Yes	Yes	No	Yes	No	Yes	No	Yes	No	No
	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No
	No	Yes	Yes	No	Yes	Yes	No	Yes	No	No	No
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes



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# RM Resistor Series

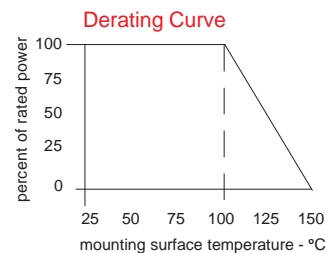


## Flip Chip w/Back Metallization

(Images for reference purposes only.)

RM	1005	ZZ	XXXX	W	N	YY
Flip Chip w/Back Metallization	Example Size .100" x .050" (see table below)	Termination Material and Finish	.1 Ohms to 1 Gigohm (see examples below)	Tolerance	Normal Inspection	Substrates
	L x W	Pad Dim. (Min.)		F ..... 1%		90 ..... .010" Alumina
RM 0202	.025" x .025"	.007"	0.5 .... R500	G ..... 2%		91 ..... .015" Alumina
RM 0302	.030" x .020"	.005"	1 ..... 1R00	J ..... 5%		93 ..... .025" Alumina
RM 0402	.040" x .020"	.010"	10 ..... 10R0	K ..... 10%		94 ..... .040" Alumina
RM 0502	.050" x .020"	.009"	50 ..... 50R0	L .... 20%		95 ..... .010" BeO
RM 0503	.050" x .030"	.010"	100 ... 1000			96 ..... .015" BeO
RM 0505	.050" x .050"	.009"	150 ... 1500			98 ..... .025" BeO
RM 0603	.060" x .030"	.008"	1K ..... 1001			99 ..... .040" BeO
RM 0605	.060" x .050"	.010"	10K .. 1002			9F ..... .060" BeO
RM 0802	.080" x .020"	.018"	100K 1003			2S ..... .025" AlN
RM 0805	.075" x .050"	.015"	470K 4703			2T ..... .040" AlN
RM 1005	.100" x .050"	.010"	1M .... 1004			
RM 1010	.100" x .100"	.015"				
RM 1206	.120" x .060"	.025"				
RM 1505	.150" x .050"	.015"				
RM 2010	.200" x .100"	**				
RM 2335	.230" x .350"	**				
RM 2510	.250" x .100"	**				
RM 2512	.250" x .125"	.020"				
RM 2525	.250" x .250"	.045"				
RM 3725	.375" x .250"	**				
RM 3737	.375" x .375"	**				

**Part Number Example:**  
**RM1005CB-50R0JN-90**



### Termination Material/Finish



BeO Alumina ALN Solder Epoxy Wirebond

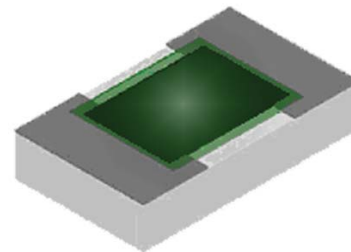
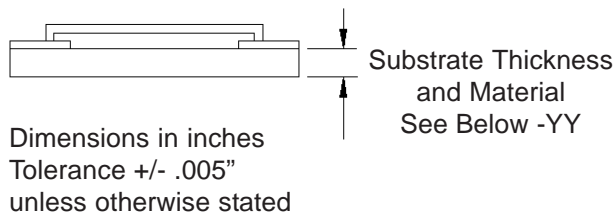
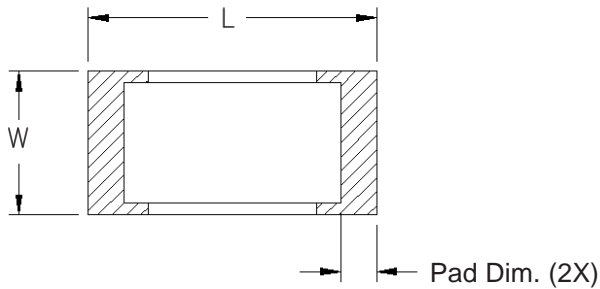
Termination	BeO	Alumina	ALN	Solder	Epoxy	Wirebond
AS - Tin Lead over Platinum Palladium Gold	No	Yes	Yes	No	Yes	No
BA - Palladium Silver	Yes	No	Yes	Yes	No	Yes
CB - Tin Lead over Nickel over Silver	No	Yes	Yes	No	Yes	No
CT - Matte Tin over Nickel over Silver	Yes	Yes	Yes	Yes	Yes	No
EA* - Gold I/O with Palladium Silver Ground	Yes	No	Yes	No	Yes (GND)	Yes (I/O)
FA* - Gold I/O with Platinum Palladium Gold Ground	Yes	No	Yes	No	Yes (GND)	Yes (I/O)
GA - Gold	Yes	No	Yes	Yes	No	Yes
HA* - Gold over Plat.Palladium Gold I/O with Plat.Palladium Gold Ground	Yes	Yes	No	No	Yes (GND)	Yes (I/O)
JA - Gold over Platinum Palladium Gold	Yes	Yes	No	No	No	Yes

\*I/O = Input/Output Pads



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# RS Resistor Series



## Flip Chip-No Back Metallization

(Images for reference purposes only.)

**RS                    1005                    ZZ                    -                    XXXX                    W                    N                    -                    YY**

Flip Chip  
No Back Metal

Example Size  
.100" x .050"  
(see table below)

Termination  
Material and  
Finish

.1 Ohms to 1 Gigohm  
(see examples below)

Tolerance

Normal  
Inspection

Substrates

RS	Part No.	L x W	Pad Dim. (Min.)
RS	0202	.025" x .025"	.007"
RS	0302	.030" x .020"	.005"
RS	0402	.040" x .020"	.010"
RS	0502	.050" x .020"	.009"
RS	0503	.050" x .030"	.010"
RS	0505	.050" x .050"	.009"
RS	0603	.060" x .030"	.008"
RS	0605	.060" x .050"	.010"
RS	0802	.080" x .020"	.018"
RS	0805	.075" x .050"	.015"
RS	1005	.100" x .050"	.010"
RS	1010	.100" x .100"	.015"
RS	1206	.120" x .060"	.025"
RS	1505	.150" x .050"	.015"
RS	2010	.200" x .100"	**
RS	2207	.220" x .070"	**
RS	2335	.230" x .350"	**
RS	2512	.250" x .120"	.020"
RS	2525	.250" x .250"	.045"
RS	3725	.375" x .250"	**
RS	3737	.375" x .375"	**

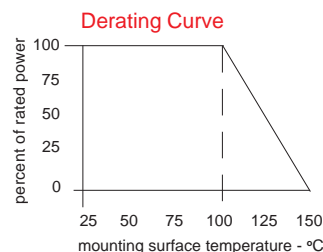
- 0.5 .... R500
- 1 ..... 1R00
- 10 ..... 10R0
- 50 ..... 50R0
- 100 ... 1000
- 150 ... 1500
- 1K ..... 1001
- 10K .. 1002
- 100K 1003
- 470K 4703
- 1M .... 1004

- F ..... 1%
- G ..... 2%
- J ..... 5%
- K .... 10%
- L .... 20%

- 90 ..... .010" Alumina
- 91 ..... .015" Alumina
- 93 ..... .025" Alumina
- 94 ..... .040" Alumina
- 95 ..... .010" BeO
- 96 ..... .015" BeO
- 98 ..... .025" BeO
- 99 ..... .040" BeO
- 9F ..... .060" BeO
- 2S ..... .025" AlN
- 2T ..... .040" AlN

\*\* Varies: Request Data Sheet-Pad Dimensions based on Substrate/M etallization

**Part Number Example:  
RS1005CB-50R0JN-90**



### Termination Material/Finish



**BeO    Alumina    ALN    Solder    Epoxy    Wirebond**

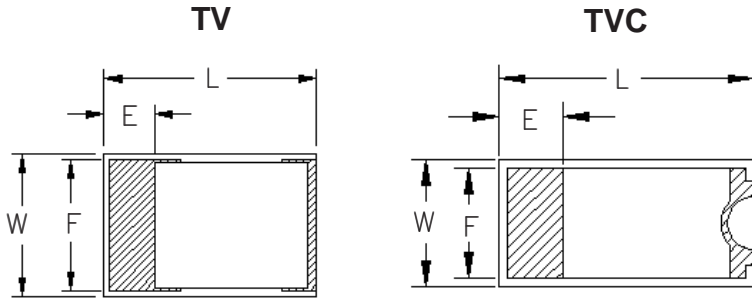
Termination	AS - Tin Lead over Platinum Palladium Gold	BA - Palladium Silver	CB - Tin Lead over Nickel over Silver	CT - Matte Tin over Nickel over Silver	GA - Gold	BeO	Alumina	ALN	Solder	Epoxy	Wirebond	
AS -	Tin Lead over Platinum Palladium Gold					No	Yes	Yes	No	Yes	No	No
BA -	Palladium Silver					Yes	No	Yes	Yes	No	Yes	No
CB -	Tin Lead over Nickel over Silver					No	Yes	Yes	No	Yes	No	No
CT -	Matte Tin over Nickel over Silver					Yes	Yes	Yes	Yes	Yes	No	No
GA -	Gold					Yes	No	Yes	Yes	No	Yes	Yes



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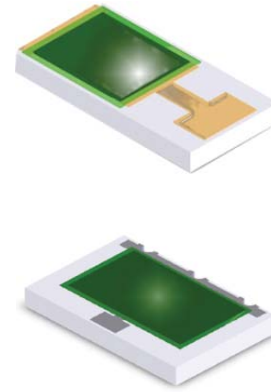


# TV/TVC Termination Series



Dimensions in inches  
Tolerance +/- .005"  
unless otherwise stated

Substrate Thickness  
and Material  
See Below -YY

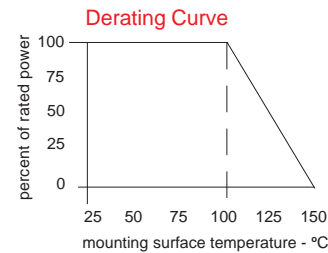


## Half Wrap Around Termination

(Images for reference purposes only.)

TV TVC	0505	ZZ	XXXX	W	N	YY
Half Wrap Around Termination	Example Size .050" x .050" (see table below)	Termination Material and Finish	.1 Ohms to 1 Gigohm (see examples below)	Tolerance	Normal Inspection	Substrates
	L x W	E	F	F ..... 1%		90 ..... .010" Alumina
TV 0202	.020" x .020"	.003"	.016"	G ..... 2%		91 ..... .015" Alumina
TV 0402	.040" x .022"	.012"	.020"	J ..... 5%		93 ..... .025" Alumina
TV 0502	.050" x .020"	.013"	.020"	K ..... 10%		94 ..... .040" Alumina
TV 0505	.050" x .050"	.011"	.046"	L ..... 20%		95 ..... .010" BeO
TV 0605	.065" x .055"	.020"	.048"			96 ..... .015" BeO
TV 0805	.075" x .050"	.018"	.046"			98 ..... .025" BeO
TV 1005	.100" x .050"	**	**			99 ..... .040" BeO
TVC 1206	.120" x .060"	.030"	.052"			9F ..... .060 BeO
TVC 1812	.180" x .120"	.035"	.060"			83 ..... .025" BeO Free
TVC 1835	.180" x .350"	.030"	.060"			84 ..... .040" BeO Free
TVC 2010	.200" x .100"	**	**			2P ..... .010" AlN
TVC 2335	.230" x .350"	**	**			2Q ..... .015" AlN
TV 2510	.250" x .100"	.040"	.095"			2S ..... .025" AlN
TVC 2525	.250" x .250"	**	**			2T ..... .040" AlN
TVC 3020	.300" x .200"	.030"	.190"			2U ..... .060" AlN
TVC 3725	.375" x .250"	**	**			
TVC 3737	.375" x .375"	**	**			

**Part Number Examples:**  
TV0605CB-50R0JN-90 or  
TVC1206CB-50R0JN-99



### Termination Material/Finish



BeO Alumina ALN Solder Epoxy Wirebond

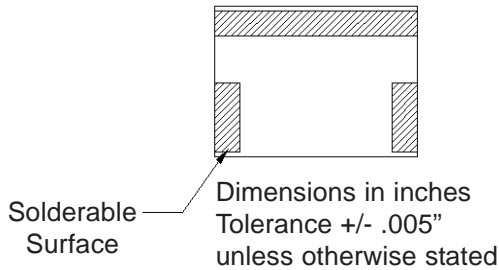
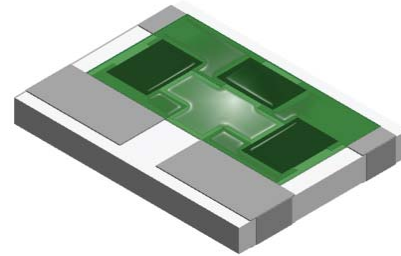
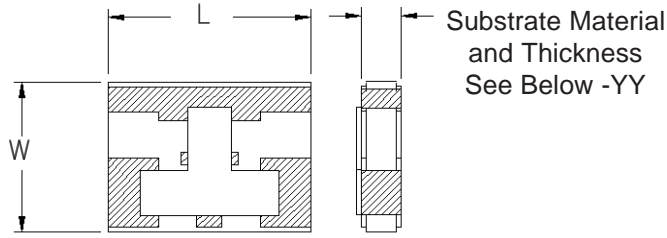
Termination	BeO	Alumina	ALN	Solder	Epoxy	Wirebond
AS - Tin Lead over Platinum Palladium Gold	No	Yes	Yes	No	Yes	No
BA - Palladium Silver	Yes	No	Yes	Yes	No	Yes
CB - Tin Lead over Nickel over Silver	No	Yes	Yes	No	Yes	No
CT - Matte Tin over Nickel over Silver	Yes	Yes	Yes	Yes	No	No
EA* - Gold I/O with Palladium Silver Ground	Yes	No	Yes	Yes (GND)	Yes	Yes (I/O)
FA* - Gold I/O with Platinum Palladium Gold Ground	Yes	No	Yes	Yes (GND)	Yes	Yes (I/O)
GA - Gold	Yes	No	Yes	No	Yes	Yes
HA* - Gold over Plat.Palladium Gold I/O with Plat.Palladium Gold Ground	Yes	Yes	No	Yes (GND)	Yes	Yes (I/O)
JA - Gold over Platinum Palladium Gold	Yes	Yes	No	No	Yes	Yes

\*I/O = Input/Output Pads



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# AP Attenuator Series

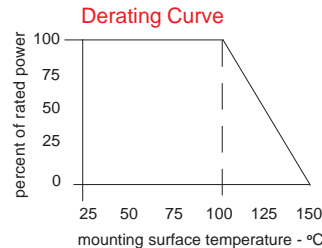


## Full Wrap Around

(Images for reference purposes only.)

AP	0405	ZZ	XXXX	W	N	YY														
Wrap Around Attenuator	Example Size .040" x .050" (see table below)	Termination Material and Finish	Values in Decibels 0.25 dB to 32 dB (see examples below)	Tolerance	Normal Inspection	Substrates														
<table border="1"> <tr><td>AP</td><td>0405</td><td>.040" x .050"</td></tr> <tr><td>AP</td><td>0706</td><td>.070" x .060"</td></tr> <tr><td>AP</td><td>1005</td><td>.100" x .050"</td></tr> <tr><td>AP</td><td>1007</td><td>.100" x .075"</td></tr> <tr><td>AP</td><td>1612</td><td>.160" x .120"</td></tr> </table>	AP	0405	.040" x .050"	AP	0706	.070" x .060"	AP	1005	.100" x .050"	AP	1007	.100" x .075"	AP	1612	.160" x .120"			1 ..... 0100 2.5 .... 0250 12 ..... 1200 18.5 .. 1850	F ..... +/- 0.25 dB G ..... +/- 0.50 dB J ..... +/- 1.00 dB K ..... +/- 1.50 dB L ..... +/- 2.00 dB <i>For frequency dependent tolerance specifications, please request individual data sheets.</i>	90 ..... .010" Alumina 91 ..... .015" Alumina 93 ..... .025" Alumin 94 ..... .040 Alumina 95 ..... .010" BeO 96 ..... .015" BeO 98 ..... .025" BeO 99 ..... .040" BeO 2S ..... .025" AlN
AP	0405	.040" x .050"																		
AP	0706	.070" x .060"																		
AP	1005	.100" x .050"																		
AP	1007	.100" x .075"																		
AP	1612	.160" x .120"																		

**Part Number Example:**  
**AP1612CB-1000JN-90**



### Termination Material/Finish



BeO    Alumina    ALN    Solder    Epoxy    Wirebond

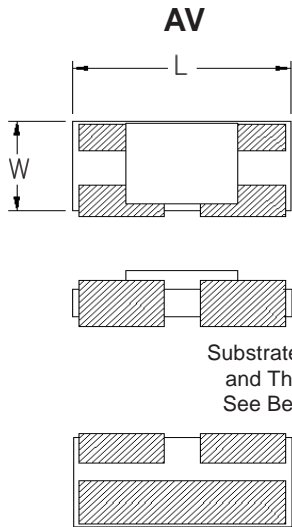
Termination	BeO	Alumina	ALN	Solder	Epoxy	Wirebond
AS - Tin Lead over Platinum Palladium Gold	No	Yes	Yes	No	Yes	No
BA - Palladium Silver	Yes	No	Yes	Yes	No	Yes
CB - Tin Lead over Nickel over Silver	No	Yes	Yes	No	Yes	No
EA* - Gold I/O with Palladium Silver Ground	Yes	No	Yes	No	Yes (GND)	Yes
FA* - Gold I/O with Platinum Palladium Gold Ground	Yes	No	Yes	No	Yes (GND)	Yes
GA - Gold	Yes	No	Yes	No	No	Yes

\*I/O = Input/Output Pads

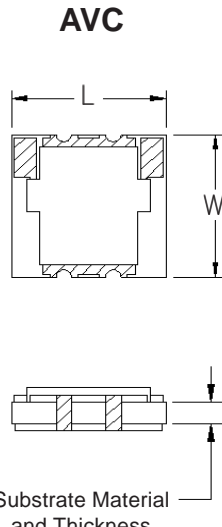


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# AV/AVC Attenuator Series

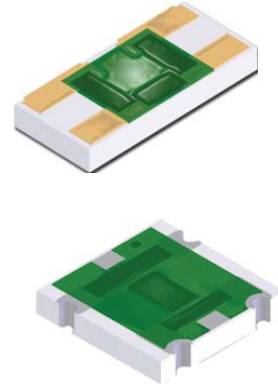


Substrate Material and Thickness  
See Below -YY



Substrate Material and Thickness  
See Below -YY

Dimensions in inches  
Tolerance +/- .005"  
unless otherwise stated



## Half Wrap Attenuator

(Images for reference purposes only.)

**AV**  
**AVC**

Half Wrap  
Attenuator

**0405**

Example Size  
.040" x .050"  
(see table below)

**ZZ**

Termination  
Material and  
Finish

**XXXX**

Values in Decibels  
0.25 dB to 32 dB  
(see examples below)

**W**

Tolerance

**N**

Normal  
Inspection

**YY**

Substrates

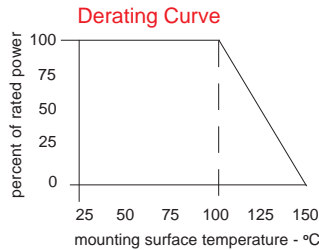
AV	0405	.040" x .050"
AV	0604	.060" x .040"
AV	0706	.070" x .060"
AV	0904	.090" x .040"
AV	0905	.090" x .050"
AV	1005	.100" x .050"
AV	1612	.160" x .120"
AVC	2335	.230" x .350"
AVC	2525	.250" x .250"
AVC	3725	.375" x .250"
AVC	3737	.375" x .375"

- 1 ..... 0100
- 2.5 .... 0250
- 12 ..... 1200
- 18.5 .. 1850

- F ..... +/- 0.25 dB
- G ..... +/- 0.50 dB
- J ..... +/- 1.00 dB
- K ..... +/- 1.50 dB
- L ..... +/- 2.00 dB

*For frequency dependent  
tolerance specifications,  
please request individual  
data sheets.*

- 90 ..... .010" Alumina
- 91 ..... .015" Alumina
- 93 ..... .025" Alumina
- 94 ..... .040" Alumina
- 95 ..... .010" BeO
- 96 ..... .015" BeO
- 98 ..... .025" BeO
- 99 ..... .040" BeO
- 9F ..... .060" BeO
- 2S ..... .025" AlN
- 2T ..... .040" AlN



**Part Number Examples:**  
**AV0405CB-0100JN-91**  
**AVC2335CB-0100JN-98**

### Termination Material/Finish



**BeO   Alumina   ALN   Solder   Epoxy   Wirebond**

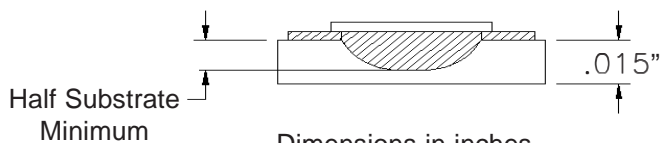
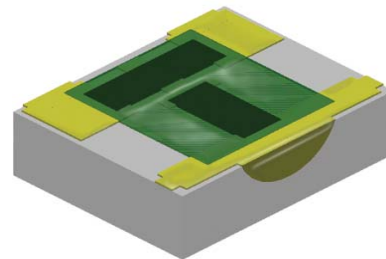
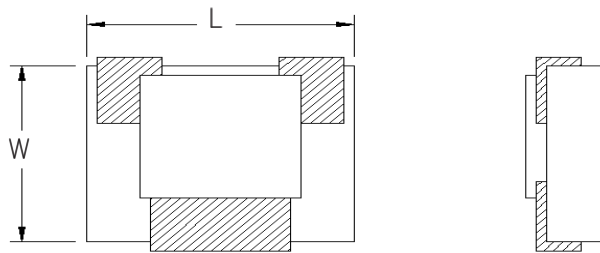
Termination Material/Finish	RoHS COMPLIANT	BeO	Alumina	ALN	Solder	Epoxy	Wirebond
AS - Tin Lead over Platinum Palladium Gold	No	Yes	Yes	No	Yes	No	No
BA - Palladium Silver	Yes	No	Yes	Yes	No	Yes	No
CB - Tin Lead over Nickel over Silver	No	Yes	Yes	No	Yes	No	No
CT - Matte Tin over Nickel over Silver	Yes	Yes	Yes	Yes	Yes	No	No
EA* - Gold I/O with Palladium Silver Ground	Yes	No	Yes	Yes	Yes (GND)	Yes	Yes (I/O)
FA* - Gold I/O with Platinum Palladium Gold Ground	Yes	No	Yes	Yes	Yes (GND)	Yes	Yes (I/O)
GA - Gold	Yes	No	Yes	No	No	Yes	Yes
HA* - Gold over Plat.Palladium Gold I/O with Plat.Palladium Gold Gr	Yes	Yes	No	No	Yes (GND)	Yes	Yes (I/O)
JA - Gold over Platinum Palladium Gold	Yes	Yes	No	No	No	Yes	Yes

\*I/O = Input/Output Pads



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# AK Attenuator Series



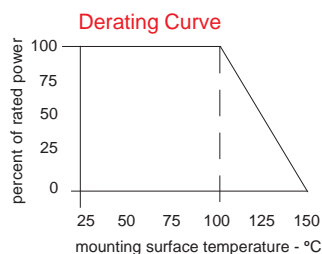
Dimensions in inches  
Tolerance +/- .005"  
unless otherwise stated

## Quarter Wrap Around

(Images for reference purposes only.)

AK	0405	ZZ	XXXX	W	N	YY
Quarter Wrap Attenuator	Size .040" x .050"	Termination Material and Finish	Values in Decibels 0.25 dB to 32 dB (see examples below)	Tolerance	Normal Inspection	Substrates
			1 ..... 0100 2.5 .... 0250 12 ..... 1200 18.5 .. 1850	F ..... +/- 0.25 dB G ..... +/- 0.50 dB J ..... +/- 1.00 dB K ..... +/- 1.50 dB L ..... +/- 2.00 dB For frequency dependent tolerance specifications, please request individual data sheets.		91 ..... .015" Alumina

**Part Number Example:**  
**AK0405CB-0500JN-91**



### Termination Material/Finish



### Alumina

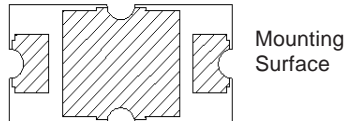
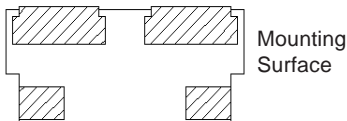
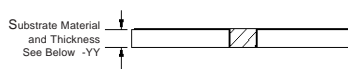
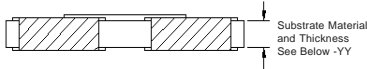
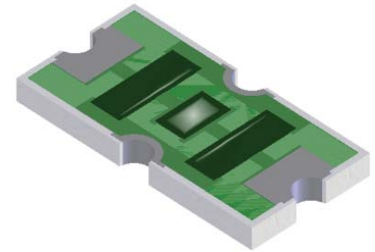
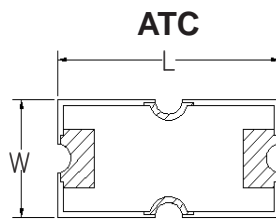
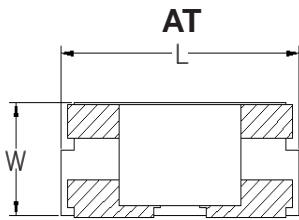
### Solder

AS - Tin Lead over Platinum Palladium Gold	No	Yes	Yes
CB - Tin Lead over Nickel over Silver	No	Yes	Yes



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# AT/ATC Attenuator Series

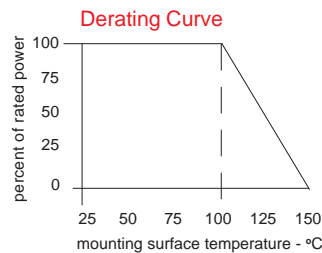


Dimensions in inches  
Tolerance +/- .005"  
unless otherwise stated

**3-Sided Wrap**  
(Images for reference purposes only.)

AT ATC	0405	ZZ	XXXX	W	N	YY
3-Sided Wrap Attenuator	Example Size .040" x .050" (see table below)	Termination Material and Finish	Values in Decibels 0.25 dB to 32 dB (see examples below)	Tolerance	Normal Inspection	Substrates
<b>AT</b>	<b>0405</b>	.040" x .050"	1 ..... 0100	F ..... +/- 0.25 dB	90 ..... .010" Alumina	
<b>AT</b>	<b>0706</b>	.075" x .060"	2.5 .... 0250	G ..... +/- 0.50 dB	91 ..... .015" Alumina	
<b>AT</b>	<b>0904</b>	.090" x .040"	12 ..... 1200	J ..... +/- 1.00 dB	93 ..... .025" Alumina	
<b>ATC</b>	<b>2010</b>	.200" x .010"	18.5 .. 1850	K ..... +/- 1.50 dB	94 ..... .040" Alumina	
<b>ATC</b>	<b>2525</b>	.250" x .250"		L ..... +/- 2.00 dB	95 ..... .010" BeO	
				<i>For frequency dependent tolerance specifications, please request individual data sheets.</i>	96 ..... .015" BeO	
					98 ..... .025" BeO	
					99 ..... .040" BeO	
					9F ..... .060" BeO	
					2S ..... .025" AlN	
					2T ..... .040" AlN	

**Part Number Examples:**  
**AT0405CB-0100JN-91**  
**ATC2010CT-0100JN-98**



**Termination Material/Finish**



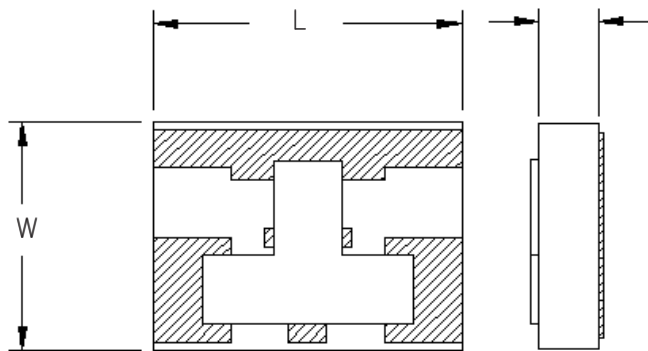
**BeO    Alumina    ALN    Solder    Epoxy    Wirebond**

Termination	BeO	Alumina	ALN	Solder	Epoxy	Wirebond
AS - Tin Lead over Platinum Palladium Gold	No	Yes	Yes	No	Yes	No
BA - Palladium Silver	Yes	No	Yes	Yes	No	Yes
CB - Tin Lead over Nickel over Silver	No	Yes	Yes	No	Yes	No
CT - Matte Tin over Nickel over Silver	Yes	Yes	Yes	Yes	Yes	No
GA - Gold	Yes	No	Yes	No	No	Yes

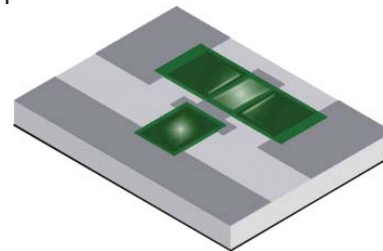


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# AM Attenuator Series



Substrate Thickness and Material  
See Below -YY



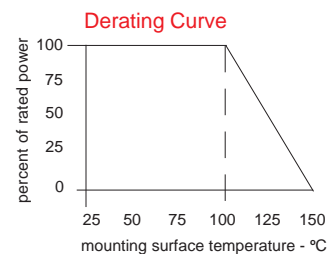
Dimensions in inches  
Tolerance +/- .005"  
unless otherwise stated

## Flip Chip w/Back Metallization

(Images for reference purposes only.)

AM	0706	ZZ	XXXX	W	N	YY
Flip Chip w/Back Metallization	Example Size .070" x .060" (see table below)	Termination Material and Finish	Values in Decibels 0.25 dB to 32 dB (see examples below)	Tolerance	Normal Inspection	Substrates
AM 0706	.070" x .060"		1 ..... 0100	F ..... +/- 0.25 dB		90 ..... .010" Alumina
AM 0904	.092" x .045"		2.5 .... 0250	G ..... +/- 0.50 dB		91 ..... .015" Alumina
AM 0905	.090" x .050"		12 ..... 1200	J ..... +/- 1.00 dB		95 ..... .010" BeO
AM 1005	.100" x .050"		18.5 .. 1850	K ..... +/- 1.50 dB		96 ..... .015" BeO
AM 1612	.160" x .120"			L ..... +/- 2.00 dB		
				For frequency dependent tolerance specifications, please request individual data sheets.		

**Part Number Example:**  
**AM0706CB-0100JN-90**



### Termination Material/Finish



BeO    Alumina    Solder    Epoxy    Wirebond

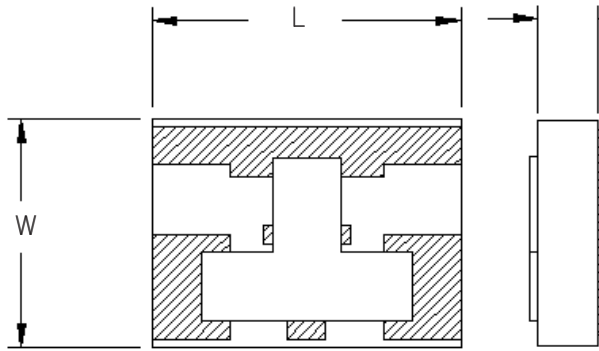
Termination	BeO	Alumina	Solder	Epoxy	Wirebond
AS - Tin Lead over Platinum Palladium Gold	No	Yes	Yes	No	No
BA - Palladium Silver	Yes	No	No	Yes	No
CB - Tin Lead over Nickel over Silver	No	Yes	Yes	No	No
CT - Matte Tin over Nickel over Silver	Yes	Yes	Yes	No	No
EA* - Gold I/O with Palladium Silver Ground	Yes	No	Yes (GND)	Yes	Yes (I/O)
FA* - Gold I/O with Platinum Gold Ground	Yes	No	Yes (GND)	Yes	Yes (I/O)
GA - Gold	Yes	Yes	No	Yes	Yes
HA* - Gold over Platinum Gold I/O with Platinum Gold Ground	Yes	No	Yes (GND)	Yes	Yes (I/O)
JA - Gold over Platinum Palladium Gold	Yes	No	No	Yes	Yes

\*I/O = Input/Output Pads

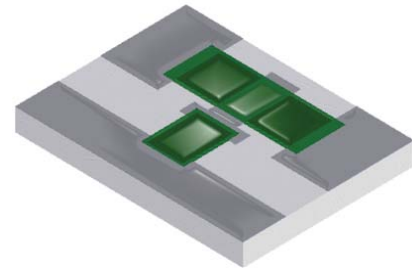


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# AS Attenuator Series



Substrate Thickness and Material  
See Below -YY



Dimensions in inches  
Tolerance +/- .005"  
unless otherwise stated

## Flip Chip-No Back Metallization

(Images for reference purposes only.)

**AS                    0706                    ZZ                    -                    XXXX                    W                    N                    -                    YY**

Flip Chip  
No Back  
Metallization

Example Size  
.070" x .060"  
(see table below)

Termination  
Material and  
Finish

Values in Decibels  
0.25 dB to 32 dB  
(see examples below)

Tolerance

Normal  
Inspection

Substrates

<b>AS</b>	<b>0706</b>	.070" x .060"
<b>AS</b>	<b>0904</b>	.092" x .045"
<b>AS</b>	<b>0905</b>	.090" x .050"
<b>AS</b>	<b>1005</b>	.100" x .050"
<b>AS</b>	<b>1612</b>	.160" x .120"
<b>AS</b>	<b>2525</b>	.250" x .250"

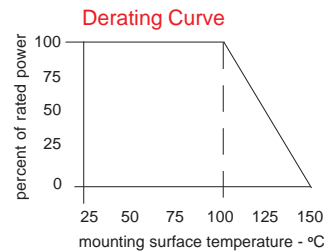
1	.....	0100
2.5	....	0250
12	.....	1200
18.5	..	1850

F	.....	+/- 0.25 dB
G	.....	+/- 0.50 dB
J	.....	+/- 1.00 dB
K	.....	+/- 1.50 dB
L	.....	+/- 2.00 dB

*For frequency dependent tolerance specifications, please request individual data sheets.*

90	.....	.010" Alumina
91	.....	.015" Alumina
95	.....	.010" BeO
96	.....	.015" BeO
2S	.....	.025" AlN

**Part Number Example:  
AS0706BA-0100JN-91**



Termination Material/Finish



**BeO    Alumina    ALN    Solder    Epoxy    Wirebond**

Termination Material/Finish	BeO	Alumina	ALN	Solder	Epoxy	Wirebond
AS - Tin Lead over Platinum Palladium Gold	No	Yes	Yes	No	Yes	No
BA - Palladium Silver	Yes	No	Yes	Yes	No	Yes
CB - Tin Lead over Nickel over Silver	No	Yes	Yes	No	Yes	No
CT - Matte Tin over Nickel over Silver	Yes	Yes	Yes	Yes	Yes	No
GA - Gold	Yes	No	Yes	No	No	Yes



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# High Power Components

High Power components offer high reliability and the highest levels of power dissipation in a variety of packages to meet your new or existing designs. Custom requests are welcome.

*Please reference High Power Notes on next page.*

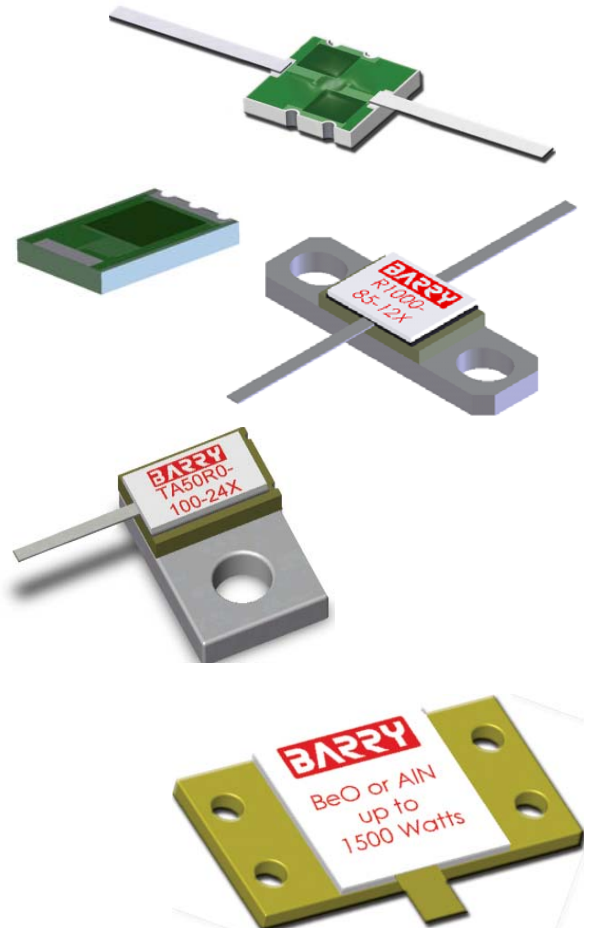
- √ Custom resistor values ranging from 0.1 Ohm to 1.0 Gigohm
- √ Custom attenuator values from 0.25 dB to 32 dB
- √ Available in a variety of configurations:
  - Flanged
  - Leaded
  - Chip
- √ BeO, Aluminum Nitride & BeO Free
- √ ITAR Registered
- √ All designs are RoHS Compliant.....



- √ ISO9001:2008 Certified by.....

## Several Package Styles to Select From:

Package	Page #'s
<b>TERMINATIONS - HIGH POWER</b>	
Flanged	18-19
Leaded	20-21
Chips	22-23
<b>RESISTORS - HIGH POWER</b>	
Flanged	24-25
Leaded	26
Chips	27
<b>ATTENUATORS - HIGH POWER</b>	
Flanged	28-29
Leaded	30-31
Chips	32-33
<b>SURFACE MOUNT RESISTORS &amp; TERMINATIONS - HIGH POWER</b>	
Chips	34-35
<b>PULSED POWER COMPONENTS FOR HIGH THERMAL CYCLING</b>	
Flanged Attenuators, Resistors and Terminations	36-37



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# High Power Notes

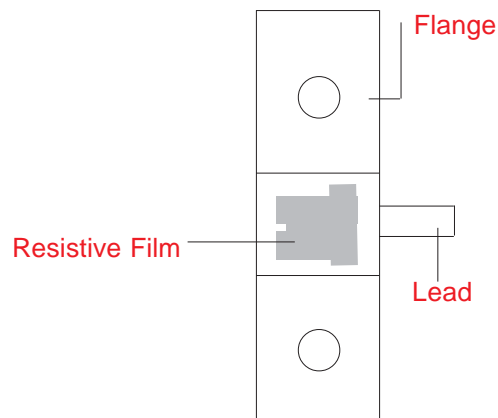
**Heat Sink Characteristics:** The primary thermal transfer mechanism for these devices is conduction through the mounting flange. The derating curve for each device shows the effect of elevated temperature on power handling capability. It is imperative that the heat sink be designed to maintain the design temperature while accepting the power dissipated by the device.

**Circuit Construction:** The electrical performance of these resistive products can vary significantly depending upon the parameters of the stripline or microstrip circuitry to which they are connected. Barry Industries has extensive experience in the design of high frequency circuits in many media and can provide assistance if desired.

**Mounting Method:** The use of a thermal conducting compound or preform between the mounting flange and the heat sink surface is strongly recommended. This greatly decreases the thermal resistance and therefore, the film temperature of the device. Make sure that the devices are mounted on flat surfaces, .001" under the device, to optimize the heat transfer. Drill and tap the heat sink for the appropriate thread size to be used. Position device on mounting surface and secure using socket head screws, flat and split washers. Torque screws to the appropriate value. Make sure that the device is flat against the heat sink.

Care should be taken to avoid upward pressure of the leads. Form leads to allow a small strain relief and solder leads in place using a 60/40 type solder with a temperature controlled soldering iron (210°C). Keep lead length as short as possible for RF applications. Use minimal amounts of flux and remove with solvent.

**Film Temperature:** As power is dissipated in the resistive film, its temperature increases until thermal equilibrium is reached. Excessive film temperature is the principal cause of device failure. Maintaining the temperature at the bottom of the flange, at or below the rated value, will ensure that the film temperature is maintained at an acceptable value.



Typical Resistive Device

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These notes apply to products for **CONTINUOUS WAVE** applications, pages 18 thru 35 of this catalog. For applications requiring **PULSED POWER** or **CYCLED** products, see pages 36-37 of this catalog. It is also recommended that you consult [sales@barryind.com](mailto:sales@barryind.com) with your design requirements so that we may recommend the product best suited for your **PULSED POWER** or **CYCLED** application.

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Tel: +1-508-226-3350 . Fax: +1-508-226-3317 . E-mail: [sales@barryind.com](mailto:sales@barryind.com)

# Flanged Terminations - BeO

CW Power Rating	CFG	A	B	C	D	E	F	G	H	J	K	Frequency Range	Typical VSWR	Part Number
10 watts	B	.300	.200	.100	.100	.040	.105	.140 max	.062	.116	.370 max	DC-2.0 GHz 2.0-4.0 GHz	1.30:1 1.50:1	T 50R0-10-1X
10 watts	A	.500	.200	.100	.300	.040	.105	.140 max	.062	.116	.370 max	DC-2.0 GHz 2.0-4.0 GHz	1.30:1 1.50:1	T 50R0-10-3X
30 watts	B	.515	.250	.250	.125	.060	.105	.140 max	.062	.130	.370 max	DC-6.0 GHz	1.30:1	T 50R0-30-10X
40 watts	A	.800	.230	.350	.560- .600	.040	.105	.140 max	.062	.130	.370 max	DC-2.0 GHz	1.20:1	T 50R0-40-1X
60 watts	B	.515	.250	.250	.125	.060	.105	.140 max	.062	.130	.370 max	DC-6.0 GHz	1.30:1	T 50R0-60-3X
100 watts	A	.800	.230	.350	.560- .600	.040	.105	.140 max	.062	.130	.370 max	DC-2.0 GHz 2.0-2.5 GHz	1.20:1 1.30:1	T 50R0-100-2X
150 watts	A	.800	.230	.350	.560- .600	.040	.105	.140 max	.062	.130	.370 max	DC-2.0 GHz 2.0-2.5 GHz	1.20:1 1.30:1	T 50R0-150-10X
150 watts	A	.870	.375	.250	.560	.040	.105	.140 max	.062	.160	.370 max	DC-4.0 GHz	1.20:1	T 50R0-150-25X
250 watts	A	.975	.375	.375	.725	.120	.105	.140 max	.062	.130	.370 max	DC-2.5 GHz 2.5-4.0 GHz	1.20:1 1.40:1	T 50R0-250-12X
350 watts					Contact Factory for Data Sheet							DC-1.0 GHz	1.10:1	T 50R0-350-1X
800 watts					Contact Factory for Data Sheet							DC-1.0 GHz	1.20:1	T 50R0-800-11X
1,000 watts					Contact Factory for Data Sheet							DC-1.0 GHz	1.20:1	T 50R0-1000-3X
1,500 watts					Contact Factory for Data Sheet							DC-123 MHz	1.06:1	T 50R0-1500-2X

# Flanged Terminations - Aluminum Nitride

CW Power Rating	CFG	A	B	C	D	E	F	G	H	J	K	Frequency Range	Typical VSWR	Part Number
30 watts	B	.515	.250	.250	.125	.060	.105	.140 max	.062	.130	.370 max	DC-2.5 GHz	1.15:1	TA 50R0-30-10X
40 watts	A	.800	.230	.350	.560- .600	.040	.105	.140 max	.062	.130	.370 max	DC-2.5 GHz	1.20:1	TA 50R0-40-1X
60 watts	B	.515	.250	.250	.125	.060	.105	.140 max	.062	.130	.370 max	DC-2.5 GHz	1.15:1	TA 50R0-60-3X
100 watts	B	.560	.375	.250	.155	.040	.105	.140 max	.062	.160	.370 max	DC-2.0 GHz 2.0-3.5 GHz	1.10:1 1.20:1	TA 50R0-100-24X*
100 watts	B	.560	.375	.250	.155	.040	.105	.140 max	.062	.160	.370 max	DC-2.0 GHz 2.0-3.5 GHz	1.10:1 1.20:1	TA 50R0-100-25X**
100 watts	A	.800	.230	.350	.560- .600	.040	.105	.140 max	.062	.130	.370 max	DC-4.5 GHz 4.5-6.0 GHz	1.15:1 1.30:1	TA50R0-100-27X
150 watts	A	.800	.230	.350	.560- .600	.040	.105	.140 max	.062	.130	.370 max	DC-2.50 GHz	1.20:1	TA 50R0-150-10X
150 watts	A	.870	.375	.250	.560- .600	.040	.105	.140 max	.062	.160	.370 max	DC-3.5 GHz	1.20:1	TA 50R0-150-25X
250 watts	A	.870	.375	.250	.560- .600	.040	.105	.140 max	.062	.160	.370 max	DC-2.5 GHz	1.25:1	TA 50R0-250-21X
250 watts	A	.975	.375	.375	.725	.120	.105	.140 max	.062	.130	.370 max	DC-3.0 GHz	1.25:1	TA 50R0-250-25X
800 watts					Contact Factory for Data Sheet							DC-860 MHz 860 MHz-1 GHz	1.10:1 1.20:1	TA 50R0-800-10X
1,000 watts					Contact Factory for Data Sheet							DC-860 MHz 860 MHz-1 GHz	1.10:1 1.20:1	TA 50R0-1000-2X

\* Lead comes off the left. \*\* Lead comes off the right.

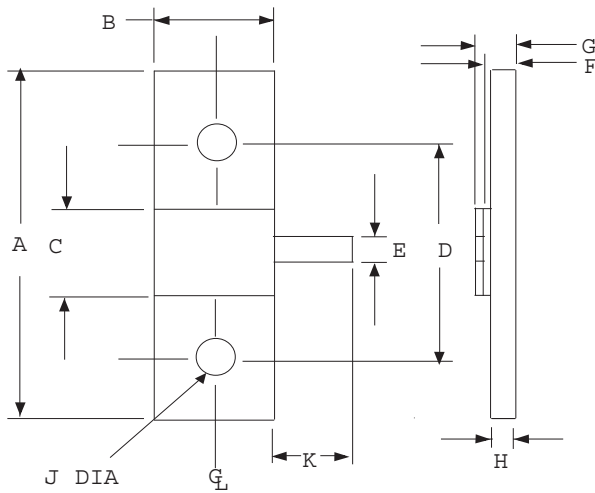


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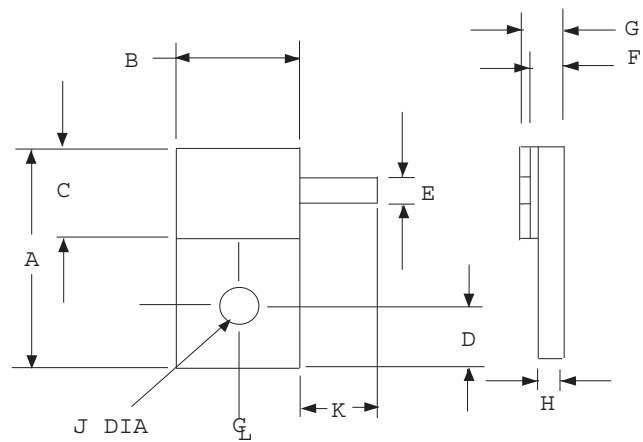
# Flanged Terminations - BeO Free

CW Power Rating	CFG	A	B	C	D	E	F	G	H	J	K	Frequency Range	Typical VSWR	Part Number
30 watts	B	.515	.250	.250	.125	.040	.105	.140 max	.062	.130	.370 max	DC-2.0 GHz	1.30:1	T 50R0-30-27X
40 watts	B	.515	.250	.250	.125	.040	.105	.140 max	.062	.130	.370 max	DC-5.0 GHz	1.20:1	T 50R0-40-13X
40 watts	A	.800	.230	.350	.560-.600	.040	.090	.125 max	.062	.130	.370 max	DC-2.5 GHz	1.20:1	T 50R0-40-14X
50 watts	B	.515	.250	.250	.125	.040	.090	.125 max	.062	.130	.370 max	DC-5.0 GHz	1.20:1	T 50R0-50-14X
50 watts	A	.800	.230	.350	.560-.600	.040	.105	.140 max	.062	.130	.370 max	DC-2.0 GHz	1.20:1	T 50R0-50-15X
70 watts	A	.870	.375	.250	.560-.600	.040	.090	.125 max	.062	.160	.370 max	DC-2.75 GHz	1.10:1	T 50R0-70-16X
100 watts	A	.870	.375	.250	.560	.040	.090	.125 max	.062	.160	.370 max	DC-2.0 GHz	1.10:1	T 50R0-100-22X

Configuration A



Configuration B



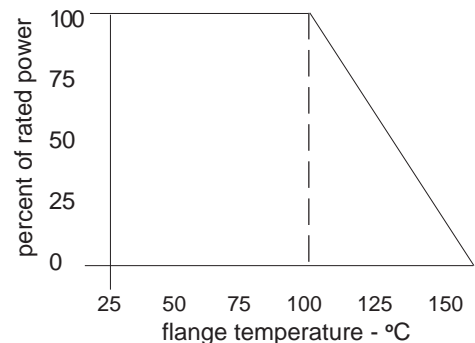
## General Specifications -

- Resistive Element ..... Proprietary Thick Film
- Substrate ..... BeO, ALN or BeO Free
- Mounting Flange ..... Copper Silver Plated
- Leads ..... Copper (.005" thick) Silver Plated

## General Notes -

- All power ratings assume an operating base plate temperature of 100°C
- All dimension are in inches.
- Resistance Tolerance: standard is +/- 5%; +/-2% available.
- Resistance Range: 0.5 to 20,000 ohms. Standard values: 50 & 100 ohms.
- Mechanical Tolerance: +/- .010, unless otherwise specified.
- Minimum lead length on all devices is .125 inches.
- Individual drawings available upon request.
- Other configurations available, custom requests welcome.

Derating Curve



For operations outside the derating curve, please consult with one of BARRY's application engineers.



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## Leaded Terminations - BeO

CW Power Rating	A	B	C	D	E	Frequency Range	Typical VSWR	Part Number
20 watts	.100	.050	.015	.025	.370 max	DC-18 GHz	1.30:1	A01Z-50R0J96-01A36-Y
20 watts	.120	.060	.025	.040	.370 max	DC-4.0 GHz	1.20:1	B02Z-50R0J98-00C36-Y
30 watts	.200	.100	.040	.040	.370 max	DC-2.0 GHz	1.20:1	D04Z-50R0J99-01C36-X
100 watts	.230	.350	.040	.040	.370 max	DC-3.0 GHz	1.15:1	D05Z-50R0J99-02C36-X
100 watts	.250	.250	.040	.040	.370 max	DC-6.0 GHz	1.20:1	D06Z-50R0J99-00C36-X
150 watts	.375	.250	.040	.040	.370 max	DC-4.0 GHz	1.20:1	D07Z-50R0J99-03C36-X
250 watts	.375	.375	.040	.040	.370 max	DC-2.5 GHz 2.5-4.0 GHz	1.20:1 1.40:1	D08Z-50R0J99-00C36-X

## Leaded Terminations - Aluminum Nitride

CW Power Rating	A	B	C	D	E	Frequency Range	Typical VSWR	Part Number
10 watts	.100	.050	.015	.025	.370 max	DC-3.0 GHz	1.15:1	A01Z-50R0J2Q-01A36-Y
20 watts	.120	.060	.025	.040	.370 max	DC-3.0 GHz	1.20:1	B02Z-50R0J2S-00C36-Y
30 watts	.200	.100	.040	.040	.370 max	DC-2.0 GHz	1.15:1	D04Z-50R0J2T-01C36-X
100 watts	.230	.350	.040	.040	.370 max	DC-4.0 GHz	1.20:1	D05Z-50R0J2T-14C36-X
150 watts	.250	.250	.040	.040	.370 max	DC-2.5 GHz	1.15:1	D06Z-50R0J2T-04C36-X
150 watts	.230	.350	.040	.040	.370 max	DC-2.5 GHz	1.15:1	D05Z-50R0J2T-05C36-X
150 watts	.375	.250	.040	.040	.370 max	DC-2.0 GHz 2.0-3.5 GHz	1.20:1 1.10:1	D07Z-50R0J2T-01C36-X
250 watts	.375	.250	.040	.040	.370 max	DC-2.5 GHz	1.25:1	D07Z-50R0J2T-09C36-X
250 watts	.370	.370	.040	.120	.370 max	DC-3.0 GHz	1.25:1	D08Z-50R0J2T-15J36-X



### General Specifications -

Resistive Element ..... Proprietary Thick Film  
 Substrate ..... BeO, ALN or BeO Free  
 Leads ..... Copper (.005" thick) Silver Plated

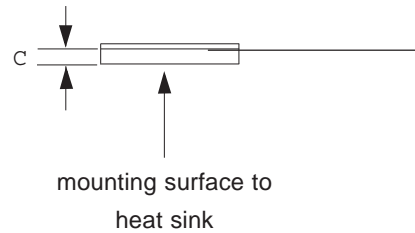
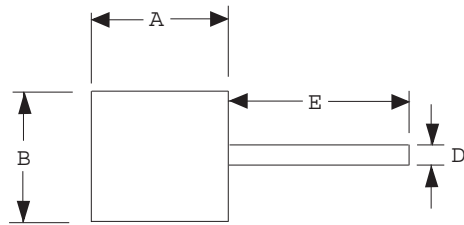
*Y at the end of part # ..... Indicates part does not take a cover, but may include a dab of epoxy*



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# Leaded Terminations - BeO Free

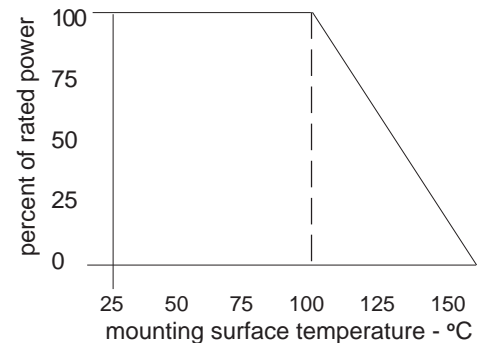
CW Power Rating	A	B	C	D	E	Frequency Range	Typical VSWR	Part Number
30 watts	.250	.250	.025	.040	.370 max	DC -2.0 GHz	1.30:1	D06Z-50R0J83-02C 36-X
40 watts	.230	.350	.025	.040	.370 max	DC -2.5 GHz	1.20:1	D05Z-50R0J83-03C 36-X
50 watts	.230	.350	.025	.040	.370 max	DC -2.0 GHz	1.20:1	D05Z-50R0J83-07C 36-X
60 watts	.250	.250	.025	.040	.370 max	DC -4.0 GHz	1.10:1	D06Z-50R0J83-03C 36-X
100 watts	.370	.370	.025	.040	.370 max	DC -2.0 GHz	1.20:1	D08Z-50R0J83-03C 36-X



## General Notes -

- All power ratings assume an operating base plate temperature of 100°C
- All dimension are in inches.
- Resistance Tolerance: standard is +/- 5%; +/-2% available.
- Resistance Range: 0.5 to 20,000 ohms. Standard values: 50 & 100 ohms.
- Mechanical Tolerance: +/- .010, unless otherwise specified.
- Minimum lead length on all devices is .125 inches.
- Individual drawings available upon request.
- *Outline depicts a covered device, castellations where used are not shown.*
- *Power ratings over 250 watts available upon request, contact sales@barryind.com.*
- Other configurations available, custom requests welcome.

## Derating Curve



*For operations outside the derating curve, please consult with one of BARRY's application engineers.*



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## Power Chip Terminations - BeO

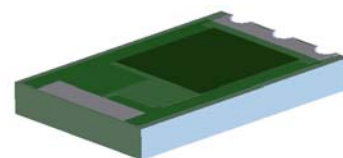
CW Power Rating	A	B	C	Frequency Range	Typical VSWR	Part Number
20 watts	.100	.050	.015	DC-18 GHz	1.20:1	TV1005CT-50R0JN-96-01
20 watts	.120	.060	.025	DC-4.0 GHz	1.20:1	TVC1206CT-50R0JN-98
60 watts	.200	.100	.040	DC-2.0 GHz	1.20:1	TVC2010CT-50R0JN-99-01
100 watts	.230	.350	.040	DC-3.0 GHz	1.15:1	TVC2335CT-50R0JN-99-02
100 watts	.250	.250	.040	DC-6.0 GHz	1.30:1	TVC2525CT-50R0JN-99
150 watts	.375	.250	.040	DC-4.0 GHz	1.20:1	TVC3725CT-50R0JN-99-03
250 watts	.375	.375	.040	DC-2.5 GHz 2.5-4.0 GHz	1.20:1 1.40:1	TVC3737CT-50R0JN-99

## Power Chip Terminations - Aluminum Nitride

CW Power Rating	A	B	C	Frequency Range	Typical VSWR	Part Number
10 watts	.100	.050	.015	DC-3.0 GHz	1.15:1	TV1005CT-50R0JN-2Q-01
20 watts	.120	.060	.025	DC-3.0 GHz	1.20:1	TVC1206CT-50R0JN-2S
30 watts	.200	.100	.040	DC-2.0 GHz	1.15:1	TVC2010CT-50R0JN-2T-01
100 watts	.250	.250	.040	DC-2.5 GHz	1.15:1	TVC2525CT-50R0JN-2T-04
150 watts	.230	.350	.040	DC-2.5 GHz	1.15:1	TVC2335CT-50R0JN-2T-05
150 watts	.375	.250	.040	DC-2.0 GHz 2.0-3.5 GHz	1.10:1 1.20:1	TVC3725CT-50R0JN-2T-01
250 watts	.375	.250	.040	DC-2.5 GHz	1.25:1	TVC3725CT-50R0JN-2T-09
250 watts	.375	.375	.040	DC-3.0 GHz	1.25:1	TVC3737CT-50R0JN-2T-15

### General Specifications -

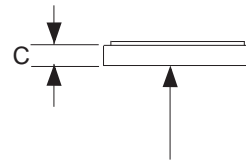
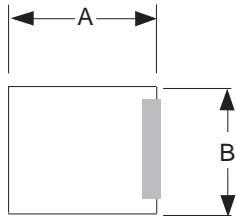
Resistive Element ..... Proprietary Thick Film  
 Contact Pads ..... Silver  
 CT = ..... Solderable Finish, Matte Tin over Nickel over Silver  
 Substrate ..... BeO, ALN or BeO Free



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# Power Chip Terminations - BeO Free

CW Power Rating	A	B	C	Frequency Range	Typical VSWR	Part Number
5 watts	.060	.050	.025	DC -4.0 GHz	1.20:1	TV0605CT-XXXXJN-83
5 watts	.100	.050	.025	DC -4.0 GHz	1.20:1	TV1005CT-XXXXJN-83
5 watts	.120	.060	.025	DC -4.0 GHz	1.20:1	TVC1206CT-XXXXJN-83
10 watts	.190	.075	.025	DC -3.0 GHz	1.25:1	TVC1907CT-XXXXJN-83
12 watts	.190	.075	.025	DC -2.0 GHz	1.20:1	TVC1907CT-XXXXJN-83-01
20 watts	.180	.120	.025	DC -2.0 GHz	1.30:1	TVC1812CT-XXXXJN-83
30 watts	.250	.250	.025	DC -2.5 GHz	1.15:1	TVC2525CT-XXXXJN-83-02
40 watts	.230	.350	.025	DC -2.5 GHz	1.20:1	TVC2335CT-XXXXJN-83-03
50 watts	.250	.250	.025	DC -4.0 GHz 4.0-5.0 GHz	1.20:1 1.40:1	TVC2525CT-XXXXJN-83-03
50 watts	.230	.350	.025	DC -2.0 GHz	1.20:1	TVC2335CT-XXXXJN-83-07
70 watts	.350	.180	.025	DC -1.0 GHz	1.20:1	TVC1835CT-XXXXJN-83
100 watts	.370	.370	.025	DC -2.0 GHz	1.20:1	TVC3737CT-XXXXJN-83-03

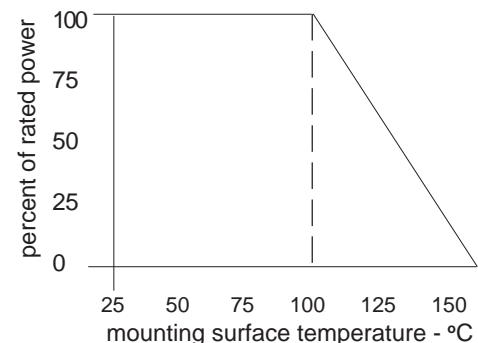


mounting surface to heat sink

## General Notes -

- All power ratings assume an operating base plate temperature of 100°C
- All dimension are in inches.
- Resistance Tolerance: standard is +/- 5%; +/-2% available.
- Resistance Range: 0.5 to 20,000 ohms. Standard values: 50 & 100 ohms.
- Mechanical Tolerance: +/- .010, unless otherwise specified.
- Individual drawings available upon request.
- *Outline depicts a basic chip, castellations where used are not shown.*
- *Power ratings over 250 watts available upon request, contact sales@barryind.com.*
- Other configurations available, custom requests welcome.

## Derating Curve



*For operations outside the derating curve, please consult with one of BARRY's application engineers.*



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# Low Capacitance Flanged Resistors - BeO

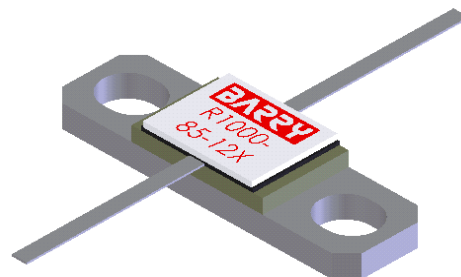
CW Power Rating	CFG	A	B	C	D	E	F	G	H	J	K	Capacitance at 1 MHz	Part Number
20 watts	B	.300	.200	.100	.100	.040	.105	.140 max	.062	.116	.375 max	.70	R 1000-20-10X
50 watts	A	.800	.230	.350	.560-.600	.040	.105	.140 max	.062	.130	.370 max	1.42	R 1000-50-12X
85 watts	A	.800	.230	.350	.560-.600	.040	.105	.140 max	.062	.130	.370 max	1.42	R 1000-85-12X
100 watts	A	.800	.230	.350	.560-.600	.040	.105	.140 max	.062	.130	.370 max	1.73	R 1000-100-10X
150 watts	A	.800	.230	.350	.560-.600	.040	.105	.140 max	.062	.130	.370 max	1.73	R 1000-150-10X
200 watts	A	.800	.230	.350	.560-.600	.040	.105	.140 max	.062	.130	.370 max	2.15	R 1000-200-7X

# Low Capacitance Flanged Resistors - Aluminum Nitride

CW Power Rating	CFG	A	B	C	D	E	F	G	H	J	K	Capacitance at 1 MHz	Part Number
20 watts	B	.300	.200	.100	.100	.040	.105	.140 max	.062	.116	.375 max	.73	RA 1000-20-8X
50 watts	A	.800	.230	.350	.560-.600	.040	.105	.140 max	.062	.130	.370 max	1.37	RA 1000-50-10X
50 watts	A	.800	.230	.350	.560-.600	.040	.125	.170 max	.062	.130	.370 max	1.42	RA 1000-50-11X
50 watts	B	.575	.230	.350	.100-.120	.040	.105	.140 max	.062	.130	.370 max	1.37	RA 1000-50-13X
50 watts	B	.575	.230	.350	.100-.120	.040	.125	.170 max	.062	.130	.370 max	1.37	RA 1000-50-14X
100 watts	A	.800	.230	.350	.560-.600	.040	.105	.140 max	.062	.130	.370 max	1.73	RA 1000-100-8X
100 watts	A	.800	.230	.350	.560-.600	.040	.125	.170 max	.062	.130	.370 max	1.58	RA 1000-100-9X

## General Specifications -

Resistive Element ..... Proprietary Thick Film  
 Substrate ..... BeO or ALN  
 Mounting Flange ..... Copper Silver Plated  
 Leads ..... Copper (.005" thick) Silver Plated

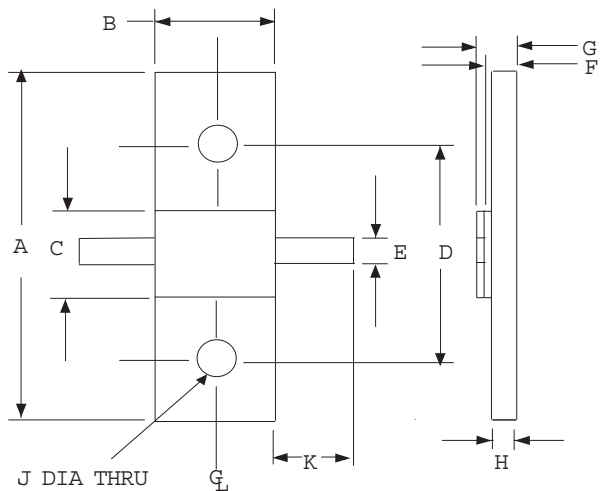


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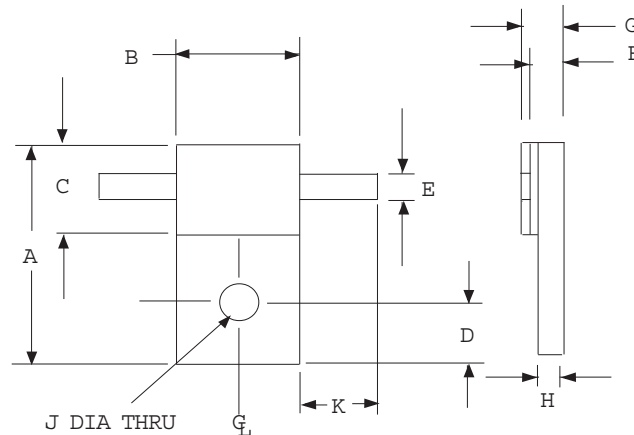


# Low Capacitance Flanged Resistor Notes:

Configuration A



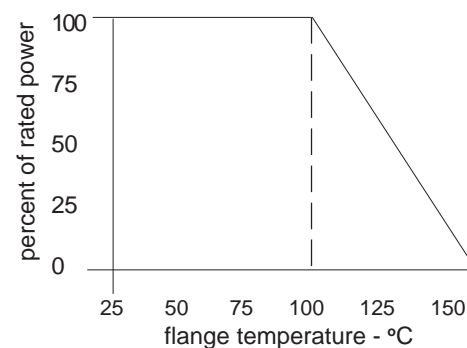
Configuration B



## General Notes -

- All power ratings assume an operating base plate temperature of 100°C
- All dimension are in inches.
- Resistance Tolerance: standard is +/- 5%; +/-2% available.
- Resistance Range: 0.5 to 20,000 ohms. Standard values: 50 & 100 ohms.
- Mechanical Tolerance: +/- .010, unless otherwise specified.
- Minimum lead length on all devices is .125 inches.
- Individual drawings available upon request.
- *Power ratings over 200 watts available upon request, contact sales@barryind.com.*
- Other configurations available, custom requests welcome.

Derating Curve



*For operations outside the derating curve, please consult with one of BARRY's application engineers.*



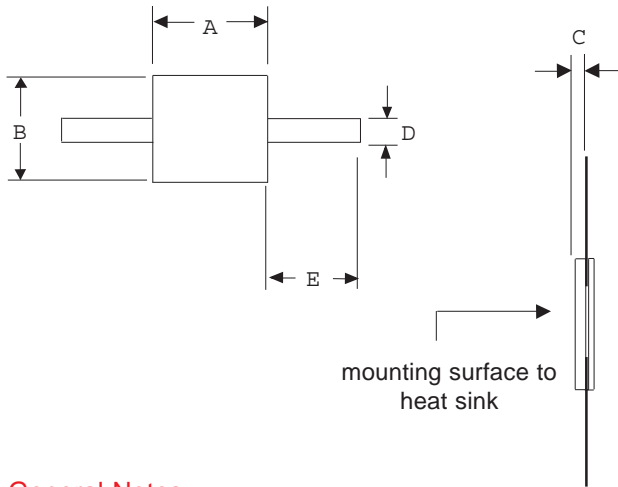
Barry Industries, Inc.  
60 Walton Street . Attleboro . Massachusetts . 02703 U.S.A.  
Tel: +1-508-226-3350 . Fax: +1-508-226-3317 . E-mail: sales@barryind.com

# Low Capacitance Leaded Resistors - BeO

CW Power Rating	A	B	C	D	E	Capacitance at 1 MHz	Part Number
40 watts	.200	.100	.040	.040	.375 max	.70	K04Z-1000G99-02C 36-X
50 - 85 watts	.230	.350	.040	.040	.370 max	1.42	K05Z-1000G99-05C 36-X
100 - 150 watts	.230	.350	.040	.040	.370 max	1.73	K05Z-1000G99-01C 36-X
200 watts	.230	.350	.040	.040	.370 max	2.15	K05Z-1000G99-06C 36-X

# Low Capacitance Leaded Resistors - Aluminum Nitride

CW Power Rating	A	B	C	D	E	Capacitance at 1 MHz	Part Number
20 watts	.200	.100	.040	.040	.375 max	.73	K04Z-1000G2T-02C 36-X
50 watts	.230	.350	.040	.040	.370 max	1.34	K05Z-1000G2T-05C 36-X
50 watts	.230	.350	.060	.040	.370 max	1.00	K05Z-1000G2U-02C 36-X
100 watts	.230	.350	.040	.040	.370 max	1.73	K05Z-1000G2T-01C 36-X
100 watts	.230	.350	.060	.040	.370 max	1.73	K05Z-1000G2U-03C 36-X



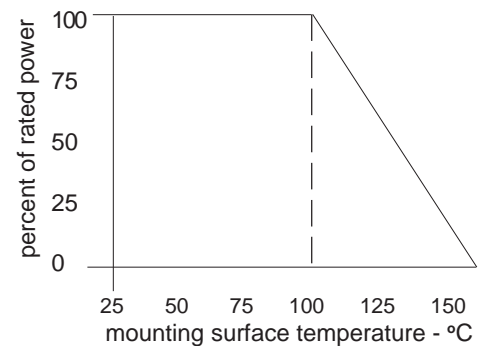
## General Specifications -

Resistive Element ..... Proprietary Thick Film  
 Substrate ..... BeO or ALN  
 Leads ..... Copper (.005" thick) Silver Plated

## General Notes -

- All power ratings assume an operating base plate temperature of 100°C
- All dimension are in inches.
- Resistance Tolerance: standard is +/- 5%; +/-2% available.
- Resistance Range: 0.5 to 20,000 ohms. Standard values: 50 & 100 ohms.
- Mechanical Tolerance: +/- .010, unless otherwise specified.
- Minimum lead length on all devices is .125 inches.
- Individual drawings available upon request.
- *Power ratings over 200 watts available upon request, contact sales@barryind.com.*
- Other configurations available, custom requests welcome.

## Derating Curve



For operations outside the derating curve, please consult with one of BARRY's application engineers.



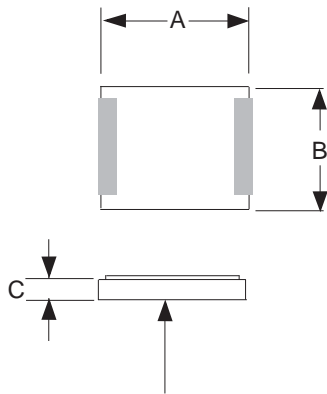
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 Tel: +1-508-226-3350 . Fax: +1-508-226-3317 . E-mail: sales@barryind.com

# Low Capacitance Chip Resistors - BeO

CW Power Rating	A	B	C	Capacitance at 1 MHz	Part Number
40 watts	.200	.100	.040	.70	RM2010CT-1000GN-99-02
50-85 watts	.230	.350	.040	1.42	RM2335CT-1000GN-99-05
100-150 watts	.230	.350	.040	1.73	RM2335CT-1000GN-99-01
200 watts	.230	.350	.040	2.15	RM2335CT-1000GN-99-06

# Low Capacitance Chip Resistors - Aluminum Nitride

CW Power Rating	A	B	C	Capacitance at 1 MHz	Part Number
20 watts	.200	.100	.040	.73	RM2010CT-1000GN-2T-02
50 watts	.230	.350	.040	1.34	RM2335CT-1000GN-2T-05
50 watts	.230	.350	.060	1.00	RM2335CT-1000-GN-2U-02
100 watts	.230	.350	.040	1.73	RM2335CT-1000GN-2T-01
100 watts	.230	.350	.060	1.73	RM2335CT-1000GN-2U-03



mounting surface to heat sink

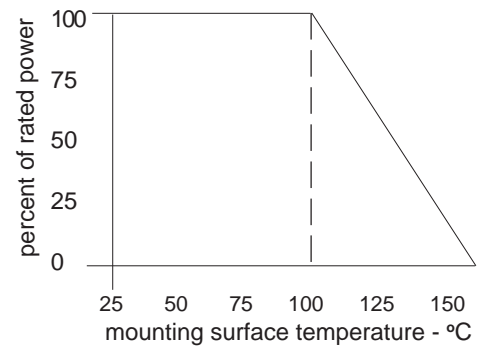
## General Specifications -

Resistive Element .....	Proprietary Thick Film
Contact Pads .....	Silver
CT = .....	Solderable Finish, Matte Tin over Nickel over Silver
Substrate .....	BeO or ALN

## General Notes -

- All power ratings assume an operating base plate temperature of 100°C
- All dimension are in inches.
- Resistance Tolerance: standard is +/- 5%; +/-2% available.
- Resistance Range: 0.5 to 20,000 ohms. Standard values: 50 & 100 ohms.
- Mechanical Tolerance: +/- .010, unless otherwise specified.
- Individual drawings available upon request.
- *Outline depicts a basic chip, castellations where used are not shown.*
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- Other configurations available, custom requests welcome.

## Derating Curve



For operations outside the derating curve, please consult with one of BARRY's application engineers.



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# Flanged Attenuators - BeO

CW Power Rating	CFG	A	B	C	D	E	F	G	H	J	K	*Frequency Range	*Typical VSWR	Part Number	Values
10 watts	B	.300	.200	.100	.100	.040	.105	.140 max	.062	.116	.370 max	DC-4.0 GHz	1.20:1	A XXXX-10-6X	1 - 30 dB
** 20 watts	B	.515	.250	.250	.125	.048	.105	.140 max	.062	.116	.370 max	DC-2.0 GHz	1.25:1	A XXXX-20-3X	1 - 20 dB
** 40 watts	B	.515	.250	.250	.125	.048	.105	.140 max	.062	.116	.370 max	DC-2.0 GHz	1.25:1	A XXXX-40-3X	1 - 20 dB
40 watts	A	.800	.230	.350	.560-.600	.040	.105	.140 max	.062	.130	.370 max	DC-2.5 GHz	1.25:1	A XXXX-40-1X	1 - 30 dB
100 watts	A	.975	.375	.375	.725	.040	.167	.210 max	.125	.130	.370 max	DC-2.0 GHz	1.10:1	A XXXX-100-2X	1 - 30 dB
150 watts	A	.800	.230	.350	.560-.600	.040	.105	.140 max	.062	.130	.370 max	DC-2.5 GHz	1.25:1	A XXXX-150-1X	20 - 30 dB
250 watts	A	.870	.375	.250	.560	.060	.105	.150 max	.062	.161	.370 max	DC-2.0 GHz	1.25:1	A 3000-250-4X	30 dB

\* Representative only, varies by frequency range and dB value.

\*\* Leads are off center.

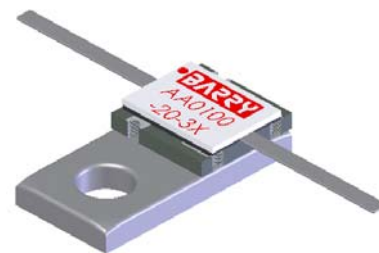
# Flanged Attenuators - Aluminum Nitride

CW Power Rating	CFG	A	B	C	D	E	F	G	H	J	K	*Frequency Range	*Typical VSWR	Part Number	Values
10 watts	B	.300	.200	.100	.100	.040	.105	.140 max	.062	.116	.370 max	DC-3.0 GHz	1.30:1	AA XXXX-10-3X	1 - 30 dB
20 watts	B	.515	.250	.250	.125	.048	.105	.140 max	.062	.116	.370 max	DC-3.0 GHz	1.20:1	AA XXXX-20-3X	1 - 30 dB
40 watts	B	.515	.250	.250	.125	.048	.105	.140 max	.062	.116	.370 max	DC-2.0 GHz	1.25:1	AA XXXX-40-3X	1 - 5 dB, 11-30 dB
100 watts	A	.800	.230	.350	.560-.600	.040	.105	.140 max	.062	.130	.370 max	DC-2.0 GHz	1.20:1	AA XXXX-100-9X	1 - 10 dB
100 watts	A	.800	.230	.350	.560-.600	.040	.105	.140 max	.062	.130	.370 max	DC-2.0 GHz	1.20:1	AA XXXX-100-8X	11 - 30 dB
150 watts	A	.800	.230	.350	.560-.600	.040	.105	.140 max	.062	.130	.370 max	DC-2.0 GHz	1.20:1	AA XXXX-150-1X	1-3, 15 & 20 dB
150 watts	A	.800	.230	.350	.560-.600	.040	.105	.140 max	.062	.130	.370 max	DC-2.5 GHz	1.10:1	AA 3000-150-5X	30 dB
250 watts	a	.975	.375	.375	.725	.040	.125	.170 max	.062	.130	.370 max	DC-2.5 GHz	1.17:1	AA 0500-250-10X	5 dB
250 watts	A	.975	.375	.375	.725	.040	.105	.140 max	.062	.130	.370 max	DC-2.0 GHz	1.30:1	AA 3000-250-6X	30 dB

\* Representative only, varies by frequency range and dB value.

## General Specifications -

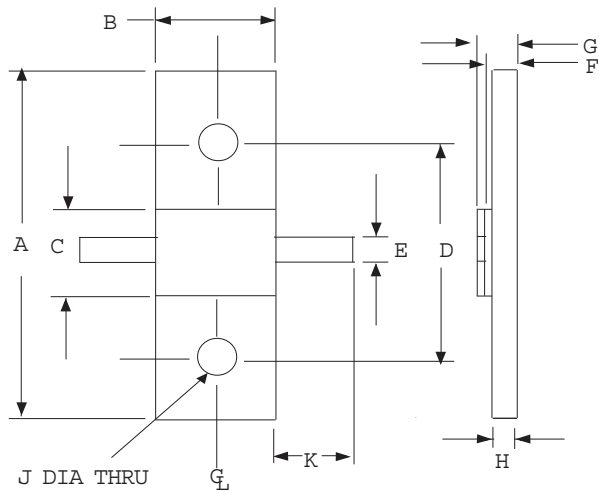
Resistive Element ..... Proprietary Thick Film  
 Substrate ..... BeO or ALN  
 Mounting Flange ..... Copper Silver Plated  
 Leads ..... Copper (.005" thick) Silver Plated



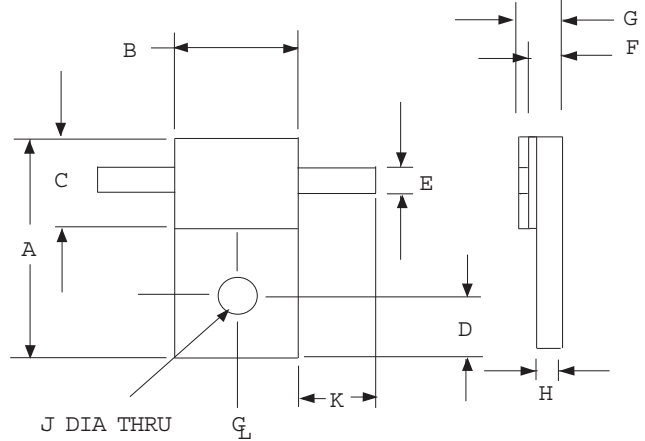
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# Flanged Attenuator Configurations:

Configuration A



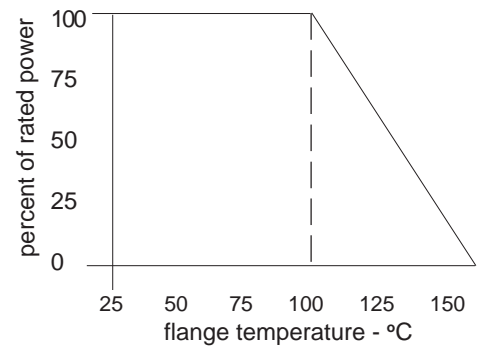
Configuration B



## General Notes -

- All power ratings assume an operating base plate temperature of 100°C
- All dimension are in inches.
- Resistance Tolerance: standard is +/- 5%; +/-2% available.
- XXXX = Value in decibels (2000=20dB; 3000=30dB; 0300=3dB)
- Mechanical Tolerance: +/- .010, unless otherwise specified.
- Minimum lead length on all devices is .125 inches.
- Individual drawings available upon request.
- *Power ratings over 250 watts available upon request, contact sales@barryind.com.*
- Other configurations available, custom requests welcome.

Derating Curve



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# Leaded Attenuators - BeO

CW Power Rating	CFG	A	B	C	D	E	*Frequency Range	*Typical VSWR	Part Number	Values
10 watts	A	.200	.100	.025	.040	.370 max	DC-4.0 GHz	1.35:1	H04Z-XXXXJ98-XX***C36-X	1 - 30 dB
**20-40 watts	B	.250	.250	.048	.040	.370 max	DC-2.0 GHz	1.25:1	H06Z-XXXXJ99-00C36-X	1 - 20 dB
40 watts	A	.230	.350	.040	.040	.370 max	DC-2.5 GHz	1.25:1	H05Z-XXXXJ99-00C36-X	1 - 30 dB
100 watts	A	.375	.375	.040	.040	.370 max	DC-2.0 GHz	1.25:1	H08Z-XXXXJ99-00C36-X	1 - 30 dB
150 watts	A	.230	.350	.040	.040	.370 max	DC-2.5 GHz	1.25:1	H05Z-XXXXJ99-00C36-X	20 - 30 dB
250 watts	A	.375	.250	.060	.040	.370 max	DC-2.0 GHz	1.25:1	H07Z-3000J99-13C36-X	30 dB

\* Representative only, varies by frequency range and dB value.

\*\* Leads are off center.

\*\*\* XX = Design number assigned by Engineering.

# Leaded Attenuators - Aluminum Nitride

CW Power Rating	CFG	A	B	C	D	E	*Frequency Range	*Typical VSWR	Part Number	Values
10 watts	A	.200	.100	.040	.040	.370 max	DC-3.0 GHz	1.30:1	H04Z-XXXXJ2T-00C36-X	1-30 dB
20 watts	A	.250	.250	.040	.040	.370max	DC-3.0 GHz	1.20:1	H06Z-XXXXJ2T-XX***C36-X	1-30 dB
40 watts	A	.250	.250	.040	.040	.370 max	DC-2.0 GHz	1.25:1	H06Z-XXXXJ2T-XX***C36-X	1- 5 dB, 11-30 dB
100 watts	A	.230	.350	.040	.040	.370 max	DC-2.0 GHz	1.20:1	H05Z-XXXXJ2T-23C36-X	1-10 dB
100 watts	A	.230	.350	.040	.040	.370 max	DC-2.0 GHz	1.20:1	H05Z-XXXXJ2T-04C36-X	11-30 dB
150 watts	A	.230	.350	.040	.040	.370 max	DC-2.0 GHz	1.20:1	H05Z-XXXXJ2T-04C36-X	1-3 dB
150 watts	A	.230	.350	.040	.040	.370 max	DC-2.0 GHz	1.20:1	H05Z-1500J2T-10C36-X	15 dB
150 watts	A	.230	.350	.040	.040	.370 max	DC-2.0 GHz	1.20:1	H05Z-2000J2T-03C36-X	20 dB
150 watts	A	.230	.350	.040	.040	.370 max	DC-2.5 GHz	1.20:1	H05Z-3000J2T-09C36-X	30 dB
150 watts	A	.230	.350	.040	.040	.370 max	DC-3.0 GHz	1.20:1	H05Z-3000J2T-17C36-X	30 dB
250 watts	A	.375	.375	.040	.040	.370 max	DC-2.0 GHz	1.30:1	H08Z-3000J2T-02C36-X	30 dB

\* Representative only, varies by frequency range and dB value.

\*\*\* XX = Design number assigned by Engineering.

## General Specifications -

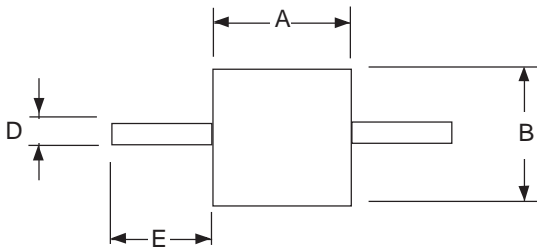
Resistive Element ..... Proprietary Thick Film  
 Substrate ..... BeO or ALN  
 Leads ..... Copper (.005" thick) Silver Plated



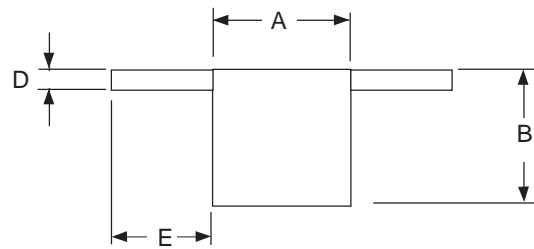
Barry Industries, Inc.  
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# Leaded Attenuator Configurations:

Configuration A



Configuration B

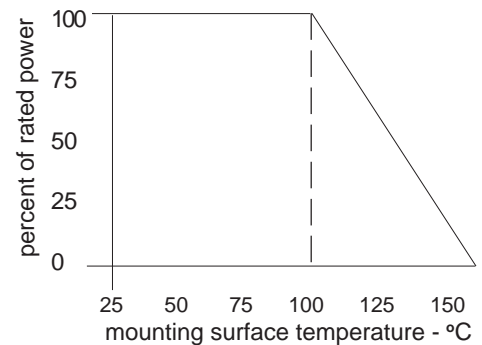


mounting surface to  
heat sink

## General Notes -

- All power ratings assume an operating base plate temperature of 100°C
- All dimension are in inches.
- Resistance Tolerance: standard is +/- 5%; +/-2% available.
- XXXX = Value in decibels (2000=20dB; 3000=30dB; 0300=3dB)
- Mechanical Tolerance: +/- .010, unless otherwise specified.
- Minimum lead length on all devices is .125 inches.
- Individual drawings available upon request.
- *Power ratings over 250 watts available upon request, contact sales@barryind.com.*
- Other configurations available, custom requests welcome.

Derating Curve



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# Chip Attenuators - BeO

CW Power Rating	CFG	A	B	C	*Frequency Range	*Typical VSWR	Part Number	Values
10 watts	A	.200	.100	.025	DC-4.0 GHz	1.35:1	ABC2010CT - XXXX JN - 98-XX***	1 - 30 dB
**20-40 watts	B	.250	.250	.048	DC-2.0 GHz	1.25:1	AVC2525CT - XXXX JN - 99	1 - 20 dB
40 watts	A	.230	.350	.040	DC-2.5 GHz	1.25:1	ABC2335CT - XXXX JN - 99	1 - 30 dB
100 watts	A	.375	.375	.040	DC-2.0 GHz	1.25:1	ABC3737CT - XXXX JN - 99	1 - 30 dB
150 watts	A	.230	.350	.040	DC-2.5 GHz	1.25:1	ABC2335CT - XXXX JN - 99	20 - 30 dB
250 watts	A	.375	.250	.040	DC-2.0 GHz	1.25:1	AVC3725CT - 3000 JN - 99-13	30 dB

\* Representative only, varies by frequency range and dB value.

\*\* Leads are off center.

\*\*\* XX = Design number assigned by Engineering.

# Chip Attenuators - Aluminum Nitride

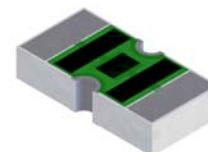
CW Power Rating	CFG	A	B	C	*Frequency Range	*Typical VSWR	Part Number	Values
10 watts	A	.200	.100	.040	DC-3.0 GHz	1.30:1	ABC2010CT - XXXXJN - 2T	1-30 dB
20 watts	A	.250	.250	.040	DC-3.0 GHz	1.20:1	AVC2525CT - XXXXJN -2T-XX***	1-30 dB
40 watts	A	.250	.250	.040	DC-2.0 GHz	1.25:1	AVC2525CT - XXXXJN -2T-XX***	1-5 dB, 11-30 dB
100 watts	A	.230	.350	.040	DC-2.0 GHz	1.20:1	AVC2335CT - XXXXJN - 2T-23	1-10 dB
100 watts	A	.230	.350	.040	DC-2.0 GHz	1.20:1	AVC2335CT - XXXXJN - 2T-04	11-30 dB
150 watts	A	.230	.350	.040	DC-2.0 GHz	1.20:1	AVC2335CT - XXXXJN - 2T-04	1-3 dB
150 watts	A	.230	.350	.040	DC-2.0 GHz	1.20:1	AVC2335CT - 1500JN - 2T-10	15 dB
150 watts	A	.230	.350	.040	DC-2.0 GHz	1.20:1	AVC2335CT - 2000JN - 2T-03	20 dB
150 watts	A	.230	.350	.040	DC-2.5 GHz	1.20:1	AVC2335CT - 3000JN - 2T-09	30 dB
150 watts	A	.230	.350	.040	DC-3.0 GHz	1.20:1	AVC2335CT - 3000JN - 2T-17	30 dB
150 watts	A	.375	.250	.040	DC-2.0 GHz	1.06:1	AVC3725CT - 3000JN - 2T - 07	30 dB
250 watts	A	.375	.375	.040	DC-2.0 GHz	1.30:1	AVC3737CT - 3000JN - 2T-02	30 dB

\* Representative only, varies by frequency range and dB value.

\*\*\* XX = Design number assigned by Engineering.

## General Specifications -

Resistive Element ..... Proprietary Thick Film  
 Contact Pads ..... Silver  
 CT = ..... Solderable Finish, Matte Tin over Nickel over Silver  
 Substrate ..... BeO or ALN

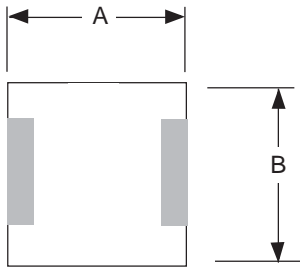


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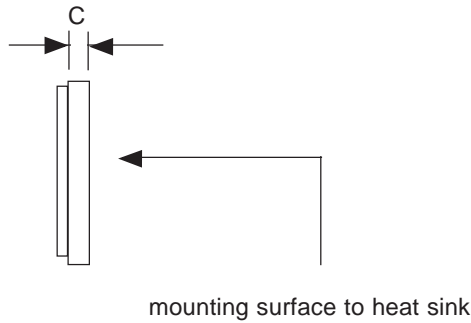
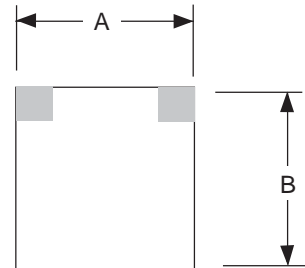


# Attenuator Chip Configurations:

Configuration A



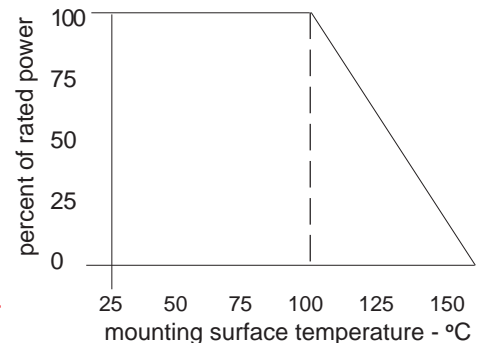
Configuration B



## General Notes -

- All power ratings assume an operating base plate temperature of 100°C
- All dimension are in inches.
- Resistance Tolerance: standard is +/- 5%; +/-2% available.
- XXXX = Value in decibels (2000=20 dB; 3000=30 dB; 0300=3 dB)
- Mechanical Tolerance: +/- .010, unless otherwise specified.
- Individual drawings available upon request.
- *Outline depicts a basic chip, castellations where used are not shown.*
- *Power ratings over 250 watts available upon request, contact sales@barryind.com.*
- Other configurations available, custom requests welcome.

Derating Curve



*For operations outside the derating curve, please consult with one of BARRY's application engineers.*



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## Power Surface Mount Resistors and Terminations - BeO

CW Power Rating	CFG	A	B	C	D	E	F	G	H	Part Number
5 watts	RY	.080	.050	.048	.013	.020	.014	.025	_	RY0805CT- XXXX JN-98
5 watts	RZ	.080	.050	.048	.013	.020	.047	.025	_	RZ0805CT- XXXX JN-98
5 watts	RE	.080	.050	.048	.030	.020	_	.025	_	RE0805CT- XXXX JN-98
8 watts	RY	.100	.050	.046	.015	.025	.020	.025	_	RY1005CT- XXXX JN-98
8 watts	RZ	.100	.050	.046	.015	.025	.060	.025	_	RZ1005CT- XXXX JN-98
8 watts	RE	.100	.050	.046	.0375	.025	_	.025	_	RE1005CT- XXXX JN-98
12 watts	RYC	.120	.062	.060	.018	.025	.034	.025	_	RYC1206CT- XXXX JN-98
12 watts	RZC	.120	.062	.060	.018	.025	.077	.025	_	RZC1206CT- XXXX JN-98
12 watts	REC	.120	.062	.060	.0475	.025	_	.025	_	REC1206CT- XXXX JN-98
30 watts	RYC	.206	.100	.090	.035	.030	.070	.040	_	RYC2010CT- XXXX JN-99
30 watts	REC	.206	.100	.090	.085	.030	_	.040	_	REC2010CT- XXXX JN-99
30 watts	RZC	.206	.100	.090	.020	.035	.151	.040	_	RZC2010CT- XXXX JN-99
100 watts	TZC	.250	.250	.240	.030	.040	.180	.040	.120	TZC2525CT- XXXX JN-99
150 watts	TZC	.375	.250	.240	.050	.050	.275	.040	.135	TZC3725CT- XXXX JN-99

## Power Surface Mount Resistors and Terminations - AlN



CW Power Rating	CFG	A	B	C	D	E	F	G	H	Part Number
5 watts	RY	.080	.050	.048	.013	.020	.014	.025	_	RY0805CT- XXXX JN-2S
5 watts	RZ	.080	.050	.048	.013	.020	.047	.025	_	RZ0805CT- XXXX JN-2S
5 watts	RE	.080	.050	.048	.030	.020	_	.025	_	RE0805CT- XXXX JN-2S
8 watts	RY	.100	.050	.046	.015	.025	.020	.025	_	RY1005CT- XXXX JN-2S
8 watts	RZ	.100	.050	.046	.015	.025	.060	.025	_	RZ1005CT- XXXX JN-2S
8 watts	RE	.100	.050	.046	.0375	.025	_	.025	_	RE1005CT- XXXX JN-2S
10 watts	RYC	.120	.062	.060	.018	.025	.034	.025	_	RYC1206CT- XXXX JN-2S
10 watts	RZC	.120	.062	.060	.018	.025	.077	.025	_	RZC1206CT- XXXX JN-2S
10 watts	REC	.120	.062	.060	.0475	.025	_	.025	_	REC1206CT- XXXX JN-2S
30 watts	RYC	.206	.100	.090	.035	.030	.070	.040	_	RYC2010CT- XXXX JN-2T
30 watts	RZC	.206	.100	.090	.020	.035	.151	.040	_	RZC2010CT- XXXX JN-2T
30 watts	REC	.206	.100	.090	.085	.030	_	.040	_	REC2010CT- XXXX JN-2T
100 watts	TZC	.250	.250	.240	.030	.040	.180	.040	.120	TZC2525CT- XXXX JN-2T-02
150 watts	TZC	.375	.250	.240	.050	.050	.275	.040	.135	TZC3725CT- XXXX JN-2T-01



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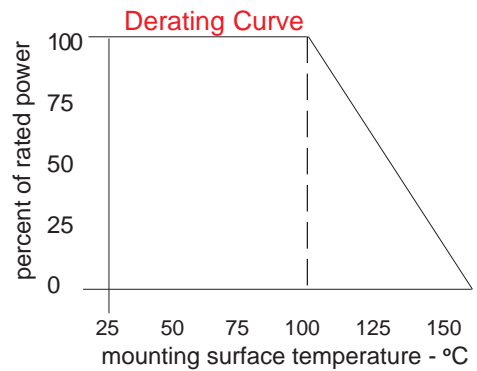
# Power Surface Mount Resistors and Terminations- BeO Free

CW Power Rating	CFG	A	B	C	D	E	F	G	H	Part Number
1 watt	RY	.080	.050	.048	.013	.020	.014	.025	—	RY0805CT- XXXX JN-83
1 watt	RZ	.080	.050	.048	.013	.020	.047	.025	—	RZ0805CT- XXXX JN-83
1 watt	RE	.080	.050	.048	.030	.020	—	.025	—	RE0805CT- XXXX JN-83
5 watts	RYC	.120	.062	.060	.018	.025	.034	.025	—	RYC1206CT- XXXX JN-83
5 watts	RZC	.120	.062	.060	.018	.025	.077	.025	—	RZC1206CT- XXXX JN-83
5 watts	REC	.120	.062	.060	.048	.025	—	.025	—	REC1206CT- XXXX JN-83
10 watts	RYC	.206	.100	.090	.035	.030	.070	.040	—	RYC2010CT- XXXX JN-83
10 watts	RZC	.206	.100	.090	.020	.035	.151	.040	—	RZC2010CT- XXXX JN-83
10 watts	REC	.206	.100	.090	.085	.030	—	.040	—	REC2010CT- XXXX JN-83
40 watts	RYC	.250	.250	.240	.035	.040	.090	.025	.070	RYC2525CT- XXXX JN-83
50 watts	TZC	.250	.250	.240	.030	.040	.180	.025	.120	TZC2525CT- XXXX JN-83-01

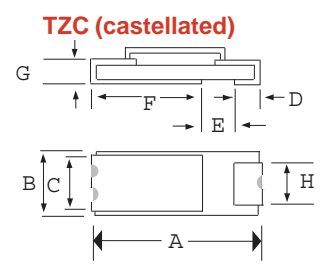
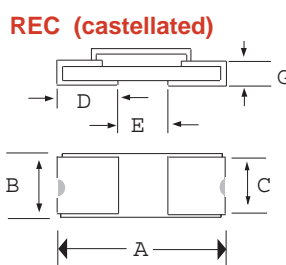
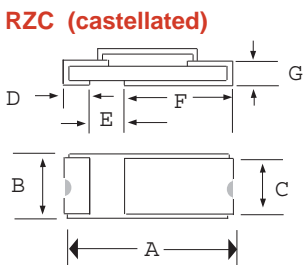
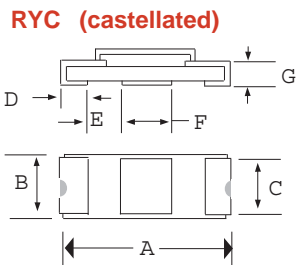
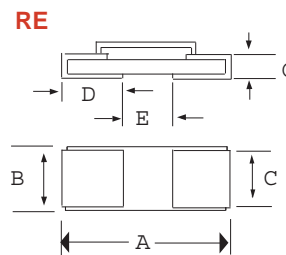
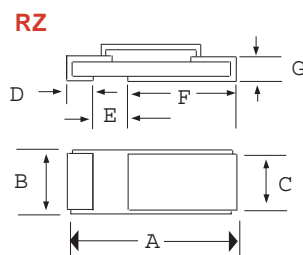
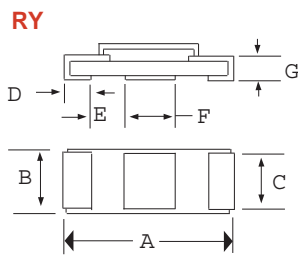
50 ohm and 100 ohm are standard values; other values and substrate thicknesses available.  
 XXXX = Values in ohms (50R0 = 50 ohms; 1000 = 100 ohms)  
 Available in bulk, waffle pack  or tape and reel. 

### General Notes

- Power rating assumes that the PC board thermal resistance is such that mounting surface is maintained at or below the temperature indicated in the derating curve, while dissipating the rated (CW) power.
- Circuit land areas should be designed in accordance with IPC-SM-782.
- Solder joint design should assure a maximum solder thickness of .002" and voids not to exceed 30%.



*For operations outside the derating curve, please consult with one of BARRY's application engineers.*



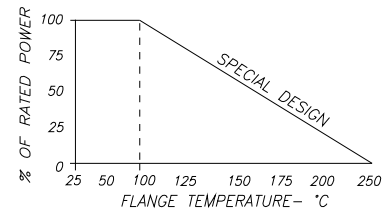
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# Pulsed Power Product - Attenuators/Resistors

Please contact factory for individual data sheets.

Utilizing a proprietary flange composite, Barry offers BeO Resistors and Terminations that are ideal for Pulsed Power/Cycled Applications. The devices feature all brazed construction which ensure that the assembly stays intact during interface. Devices are rated for operation at full power to 100°C and derated to 250°C.

DERATING CURVE:








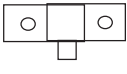
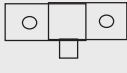
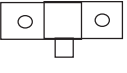
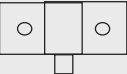
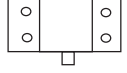

Device Type	Watts	CFG.	Flange Length	Flange Width	Flange Thickness	Chip Dimensions	Max. Height	Lead Width	Hole Dim.	Part Number
Attenuator	40		.515	.250	.062	.250 x .250	.140	.048	.130	A 3000 - 40 - 3E
Attenuator	100		.800	.230	.062	.230 x .350	.140	.040		A 0100 - 100 - 3E
Resistor	30		.515	.250	.062	.250 x .250	.140	.060	.130	R XXXX - 30 - 3E
Resistor	50		.560	.375	.125	.375 x .250	.200	.120	.161	R XXXX - 50 - 2E
Resistor	50		.515	.250	.062	.250 x .250	.140	.060	.130	R XXXX - 50 - 3E
Resistor	50		.515	.250	.125	.250 x .250	.200	.060	.130	R XXXX - 50 - 5E
Resistor	80		.515	.250	.062	.250 x .250	.160	.060	.130	R XXXX - 80 - 3E
Resistor	150		.800	.230	.062	.230 x .350	.140	.120		R XXXX - 150 - 4E
Resistor	150		.870	.375	.062	.375 x .250	.140	.120	.161	R XXXX - 150 - 8E
Resistor	150		.975	.250	.062	.375 x .250	.140	.120		R XXXX - 150 - 15E
Resistor	250		.975	.375	.125	.375 x .375	.190	.120	.130	R XXXX - 250 - 5E
Resistor	400		1.100	.500	.125	.500 x .500	.200	.250	.170	R XXXX - 400 - 1E
Resistor	800		1.900	1.04	.125	1.00 x 1.04	.250	.250	.170	R XXXX - 800 - 1E



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# Pulsed Power Product - Terminations

The use of Copper Tungsten flanges provides a good thermal expansion match between the ceramic and the flange. As power levels – and hence ceramic chip size – increase, this matching becomes more critical. This becomes even more important if the part is subject to power or temperature cycling. The all brazed Barry Copper Tungsten device solves this problem and provides the highest reliability part for all applications.

Device Type	Watts	CFG.	Flange Length	Flange Width	Flange Thickness	Chip Dimensions	Max. Height	Lead Width	Hole Dim.	Part Number
Termination	60		.515	.250	.062	.250 x .250	.140	.060	.130	T XXXX - 60 - 49E
Termination	60		.515	.250	.062	.250 x .250	.140	.060	.130	T XXXX - 60 - 50E
Termination	100		.515	.250	.062	.250 x .250	.140	.040	.130	T XXXX - 100-21E
Termination	100		.560	.375	.062	.375 x .250	.140	.040	.161	T XXXX - 100-28E
Termination	100		.560	.375	.062	.375 x .250	.140	.040	.161	T XXXX - 100 - 29E
Termination	150		.800	.230	.062	.230 x .350	.140	.040		T XXXX - 150 - 10E
Termination	200		.800	.230	.062	.230 x .350	.140	.040	.130	T XXXX - 200 - 1E
Termination	250		.975	.375	.062	.375 x .375	.140	.040	.130	T XXXX - 250 - 23E
Termination	350		1.10	.500	.125	.500 x .500	.200	.060	.170	T XXXX - 350 - 1E
Termination	800		1.900	1.04	.125	1.00 x 1.04	.250	.250	.170	T XXXX - 800- 1E
Termination	1500		1.900	1.64	.125	1.00 x 1.50	.220	.240	.170	T XXXX - 1500 - 1E

# Barry Reference Tools

+ dB	POWER	VOLTAGE
0.0	1.00	1.00
1.0	1.26	1.12
2.0	1.59	1.26
3.0	2.00	1.41
4.0	2.51	1.59
5.0	3.16	1.78
6.0	3.98	2.00
7.0	5.01	2.24
8.0	6.31	2.51
9.0	7.94	2.82
10.0	10.00	3.16
11.0	12.59	3.55
12.0	15.85	3.98
13.0	19.95	4.47
14.0	25.12	5.01
15.0	31.62	5.62
16.0	39.81	6.31
17.0	50.12	7.08
18.0	63.10	7.94
19.0	79.43	8.91
20.0	100.0	10.0
21.0	125.9	11.2
22.0	158.5	12.6
23.0	200.0	14.1
24.0	251.2	15.9
25.0	316.2	17.8
26.0	398.1	20.0
27.0	501.2	22.4
28.0	631.0	25.1
29.0	794.3	28.2
30.0	1000	31.6
31.0	1259	35.5
32.0	1585	39.8
33.0	1995	44.7
34.0	2512	50.1
35.0	3162	56.2
36.0	3981	63.1
37.0	5012	70.8
38.0	6310	79.4
39.0	7943	89.1
40.0	10000	100.0
41.0	12590	112.2
42.0	15850	125.9
43.0	19950	141.3
44.0	25120	158.5
45.0	31620	177.8
46.0	39810	199.5
47.0	50120	223.9
48.0	63100	251.2
49.0	79430	281.8
50.0	100000	316.2
51.0	125900	354.8
52.0	158500	398.1
53.0	199500	446.7
54.0	251200	501.2
55.0	316200	562.3
56.0	398100	631.0
57.0	501200	707.9
58.0	631000	794.3
59.0	794300	891.3
60.0	1000000	1000.0



## OHM'S LAW REFERENCE

$$P = EI \quad P = E^2 / R$$

$$P = I^2 R$$

$$R = E / I \quad R = E^2 / P$$

$$R = P / I^2$$

$$I = E / R \quad I = P / E$$

$$I = \sqrt{P / R}$$

$$E = IR \quad E = P / I$$

$$E = \sqrt{PR}$$

## SERIES

$$RT = R1 + R2 + R3 \dots$$

## PARALLEL

$$RT = \frac{1}{\frac{1}{R1} + \frac{1}{R2} + \frac{1}{R3} \dots}$$

## PHONETIC ALPHABET

A - ALPHA	N - NOVEMBER
B - BRAVO	O - OSCAR
C - CHARLIE	P - PAPA
D - DELTA	Q - QUEBEC
E - ECHO	R - ROMEO
F - FOXTROT	S - SIERRA
G - GOLF	T - TANGO
H - HOTEL	U - UNIFORM
I - INDIA	V - VICTOR
J - JULIETTE	W - WHISKEY
K - KILO	X - X-RAY
L - LIMA	Y - YANKEE
M - MIKE	Z - ZULU

## DECIBEL (dB)

Compares one value to a reference value (1) using common logarithms of their ratio.

$$\text{Power: dB} = 10 \log (P_2 / P_1)$$

$$\text{Voltage: dB} = 20 \log ((E_2 \sqrt{Z_1}) / (E_1 \sqrt{Z_2}))$$

$$\text{Current: dB} = 20 \log ((I_2 \sqrt{Z_2}) / (I_1 \sqrt{Z_1}))$$

The NEPER (Np), which is also called the Napier, is used by some in place of the decibel.

The conversions are:

$$Np = 8.686 \times \text{dB}$$

$$\text{dB} = 0.1151 \times Np$$

## VOLTAGE STANDING-WAVE RATIO (VSWR)

	RETURN LOSS	TRANS. LOSS	VOLT. REFL. COEF.	POWER REFL. %	POWER TRANS. %
VSWR	dB	dB			
1.00	∞	.000	.00	.0	100.0
1.01	46.1	.000	.00	.0	100.0
1.02	40.1	.000	.01	.0	100.0
1.03	36.6	.001	.01	.0	100.0
1.04	34.2	.002	.02	.0	100.0
1.05	32.3	.003	.02	.1	99.9
1.06	30.7	.004	.03	.1	99.9
1.07	29.4	.005	.03	.1	99.9
1.08	28.3	.006	.04	.1	99.9
1.09	27.3	.008	.04	.2	99.8
1.10	26.4	.010	.05	.2	99.8
1.11	25.7	.012	.05	.3	99.7
1.12	24.9	.014	.06	.3	99.7
1.13	24.3	.016	.06	.4	99.6
1.14	23.7	.019	.07	.4	99.6
1.15	23.1	.021	.07	.5	99.5
1.16	22.6	.024	.07	.5	99.5
1.17	22.1	.027	.08	.6	99.4
1.18	21.7	.030	.08	.7	99.3
1.19	21.2	.033	.09	.8	99.2
1.20	20.8	.036	.09	.8	99.2
1.25	19.1	.054	.11	1.2	98.8
1.30	17.7	.075	.13	1.7	98.3
1.40	15.6	.122	.17	2.8	97.2
1.50	14.0	.177	.20	4.0	96.0
1.60	12.7	.238	.23	5.3	94.7
1.70	11.7	.302	.26	6.7	93.3
1.80	10.9	.370	.29	8.2	91.8
1.90	10.2	.440	.31	9.6	90.4
2.00	9.5	.512	.33	11.1	88.9
3.00	6.0	1.249	.50	25.0	75.0
4.00	4.4	1.938	.60	36.0	64.0
5.00	3.5	2.553	.67	44.4	55.6
10.00	1.7	4.807	.82	66.9	33.1
20.00	0.9	7.413	.90	81.9	18.1

DECIMAL-INCHES (SMALL DIV. = .050")  
CENTIMETERS (SMALL DIV. = 1mm)

# Barry Reference Tools

Assorted Materials and Properties				Miscellaneous Reminders	
Material	M.P. °C	Thermal Conduct. W/m- °K	C.T.E. 10 <sup>-6</sup> /°K		
Gold	1063	316	14.1		
Silver	961	427	19.6		
Aluminum	660	218	23.8		
Copper	1083	397	16.8		
Nickel	1453	89	12.7		
Be/Cu #25	927	12	5.2		
Stainless Steel 304	1454	17	5.2		
F-15 Alloy	1450	17	5.9		
Tin	232	67	23.0		
Lead	327	35	29.5		
Indium	157	24	33.0		
Sn 62	189	49	25.4		
Sn 63	183	51	24.6		
Sn 96	221	33	30.2		
Au/Si 94/6	370	285	13.7		
Au/Ge 88/12	356	276	12.8		
Au/Sn 80/20	280	253	16.0		
Alumina 99%	2350	39	6.5		
Alumina 96%	2200	25	6.4		
Beryllium Oxide (BeO)	2530	196	7.6		
Aluminum Nitride (AlN)	SUB	165	5.2		
Silicon	1410	154	3.0		
Oxygen	-218	---	---		
Nitrogen	-210	---	---		
CO <sub>2</sub>	-78	---	---		
Helium	-272	---	---		

°C = 5 / 9 (°F - 32)    °F = (°C x 9 / 5) + 32  
 °C = °K - 273.16    °F = °R - 459.67  
 °K = °C + 273.16    °K = 5 / 9 (°F - 32) + 273.16

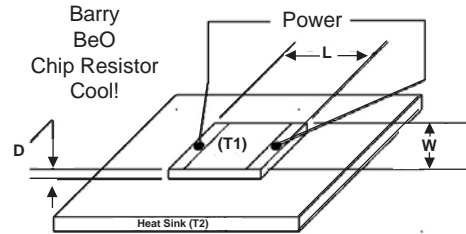
W / m • °K = 0.0254 (W / in • °C)  
 W / m • °K = 0.002397 (cal • cm / sec • cm<sup>2</sup> • °C)

R.M.S. = 0.707 (PEAK VOLTS)  
 R.M.S. = 1.11 (AVERAGE VOLTS)  
 PEAK = 1.41 (R.M.S.)

THREAD	4-40	6-32	8-32	10-32
TORQUE (IN - LBS)	6	8	12	18

1 MIL = 0.001 INCH = 25.4 MICRONS  
 1 MICRON = 10,000 ANGSTROMS = 0.0397 MILS  
 1 METER = 39.37 INCHES  
 1 NAUTICAL MILE = 6076.1 FT = 1.1508 MILES

SOUND SPEED = 1130 FT/SEC = 770 MILES/HR  
 FALLING OBJECT    SPEED (FT/SEC) = 32t  
 t = seconds    DIST. (FEET) = 16t<sup>2</sup>



### Thermal Approximations - Temperature, Size, Thickness

The following will simplify complicated thermal calculations needed to accurately determine temperature rise in power devices. Conduction cooling is considered, but convection, radiation and lateral heat dissipation are ignored. Complete contact to the heat sink is also assumed.

The temperature of the powered element can be estimated as follows:

$$\Delta T = \frac{PD}{KA}$$

Where P = Power (Watts) to be dissipated, D = Distance to heat sink  
 K = Thermal conductivity of substrate, A = Area of heat source

$\Delta T$  = Difference between heat source (T1) and the heat sink (T2) temperatures

For Example:    How hot will a resistor film get if powered to 60 watts, and its dimensions are 50 x 100 mils on a 25 mil thick substrate made of Alumina? .....Substrate made of Beryllium Oxide?

Assumption:    Heat sink is capable of maintaining a temperature of 40°C by means of its thermal conductivity and cooling methods.

Conversion of "K" needed to use same system - English.

Aluminum Oxide 99% - 39 W / m • °K    Times Factor 0.0254 = 0.99 W / in °C  
 Beryllium Oxide 99% - 196 W / m • °K    Times Factor 0.0254 = 4.97 W / in °C

$$(60 \times .025) / 0.99 (.050 \times .100) = 1.5 / 0.99 \times .005 = 1.5 / .00495 = 303 + 40 = \underline{343^\circ\text{C on Alumina}}$$

$$(60 \times .025) / 4.97 (.050 \times .100) = 1.5 / 4.97 \times .005 = 1.5 / .0249 = 60 + 40 = \underline{100^\circ\text{C on Beryllium Oxide}}$$

FRACTIONAL-INCHES (SMALL DIV. = 1/16")  
 POINTS - 72 / INCH (SMALL DIV. = 3 POINTS)



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

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