



## Surface Mount Solutions

Attenuators  
Resistors  
Terminations



## Surface Mount Solutions

# SERIES ANT, ANR RESISTORS & TERMINATIONS

**RoHS**  
Compliant

High Power, Aluminum Nitride, Thin Film, Drop-in – 10-600 Watts, DC-4 GHz



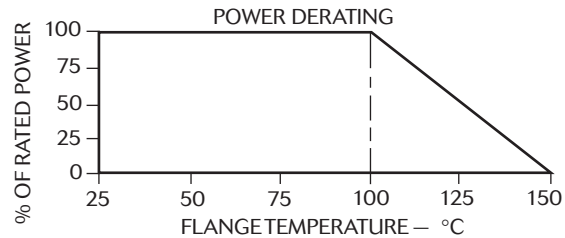
## GENERAL INFORMATION

These high power devices are designed to dissipate power in RF circuits when mounted to an appropriate heat sink. The terminations provide a low VSWR under maximum power conditions. The resistor configurations are typically used in "Wilkinson" type power divider networks, or to terminate 3 dB stripline or microstrip hybrids. Aluminum nitride is used for those applications where the use and disposal of beryllium oxide is a concern.

## NOTES

1. Input power ratings are based on flange temperature of 100° C maximum.
2. 50 and 100 Ohms standard. Other values from 10-500 Ohms available on special order. Contact factory for details. Standard tolerance  $\pm 5\%$ . Specify resistance value when ordering.
3. VSWR applies to termination style only.

## AVERAGE POWER DERATING CURVE





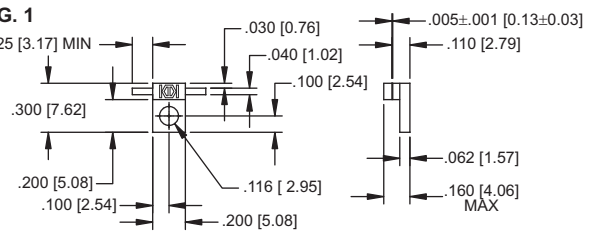


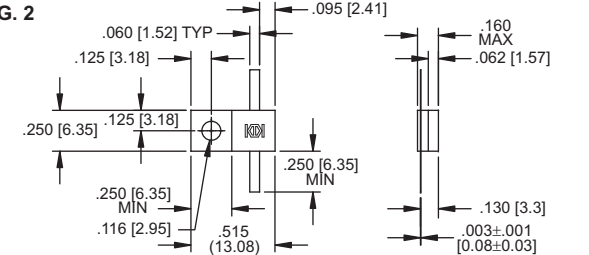
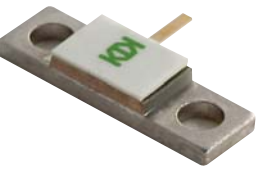
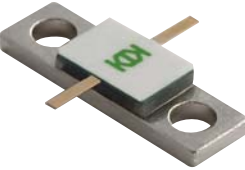
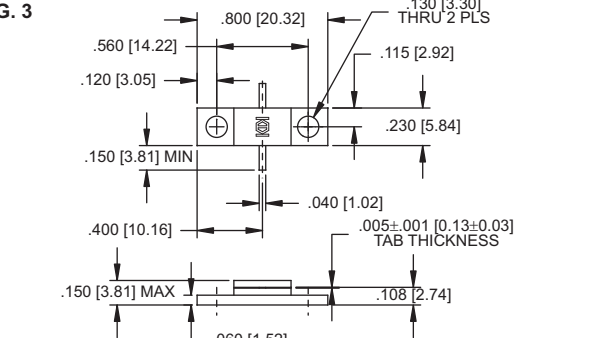
## GENERAL SPECIFICATIONS

Resistive Element	Thin Film
Substrate	Aluminum Nitride
Cover	Alumina Ceramic
Mounting Flange	Copper, Nickel Plated per QQ-N-290
Tab	Beryllium Copper, Gold Plated per MIL-G-4520 4

## PERFORMANCE SPECIFICATIONS

Model	Frequency Range	Input Power (Watts Avg.)	VSWR (Typical) (Note 3)	Capacitance (pF) (Typ.)	Figure No.
ANT & ANR 300-10	DC-4.0 GHz	10	1.25:1	1.0	1
ANT & ANR 515-40	DC-2.5 GHz	40	1.15:1	1.0	2
ANT & ANR 515-80	DC-1.0 GHz	80	1.25:1	1.6	2
ANT & ANR 800-100	DC-2.0 GHz	100	1.25:1	1.4	3
ANT & ANR 870-150	DC-2.0 GHz	150	1.25:1	4.5	4
ANT & ANR 975-200	DC-1.0 GHz	200	1.25:1	4.5	5
ANT & ANR 1250-400	DC-500 MHz	400	1.50:1	7.0	6
ANT & ANR 1900-600	DC-500 MHz	600	1.50:1	15.0	7




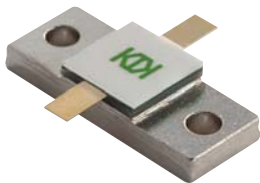


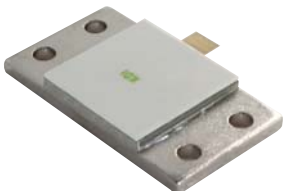
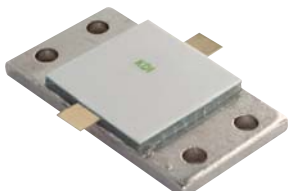
## PHYSICAL DIMENSIONS

TERMINATIONS (ANT) SERIES	RESISTORS (ANR) SERIES	FIGURES
<b>ANT 300-10 — 10 WATTS</b> Flange Mounted 	<b>ANR 300-10 — 10 WATTS</b> Flange Mounted 	<b>FIG. 1</b> 
<b>ANT 515-40 — 40 WATTS</b> <b>ANT 515-80 — 80 WATTS</b> Flange Mounted 	<b>ANR 515-40 — 40 WATTS</b> <b>ANR 515-80 — 80 WATTS</b> Flange Mounted 	<b>FIG. 2</b> 
<b>ANT 800-100 — 100 WATTS</b> Flange Mounted 	<b>ANR 800-100 — 100 WATTS</b> Flange Mounted 	<b>FIG. 3</b> 

KEY: Inches [Millimeters] .XX  $\pm$ .03 .XXX  $\pm$ .010 LX  $\pm$ 0.8 XX  $\pm$ 0.25]

# SERIES ANT, ANR RESISTORS & TERMINATIONS

## PHYSICAL DIMENSIONS

TERMINATIONS (ANT) SERIES	RESISTORS (ANR) SERIES	FIGURES
<b>ANT 870-150</b> — 150 WATTS Flange Mounted  	<b>ANR 870-150</b> — 150 WATTS Flange Mounted  	<b>FIG. 4</b> 
<b>ANT 975-200</b> — 200 WATTS Flange Mounted  	<b>ANR 975-200</b> — 200 WATTS Flange Mounted  	<b>FIG. 5</b> 
<b>ANT 1250-400</b> — 400 WATTS Flange Mounted  	<b>ANR 1250-400</b> — 400 WATTS Flange Mounted  	<b>FIG. 6</b> 
<b>ANT 1900-600</b> — 600 WATTS Flange Mounted  	<b>ANR 1900-600</b> — 600 WATTS Flange Mounted  	<b>FIG. 7</b> 

KEY: Inches [Millimeters] .XX ±.03 .XXX ±.010 [X ±0.8 .XX ±0.25]

# A3RS91.1

## High Power Chip Termination

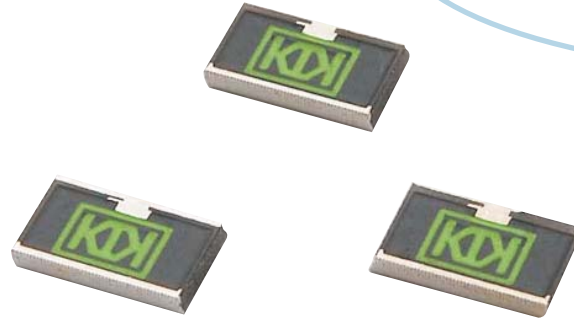
### 100 Watts

**RoHS**  
Compliant

**AEROFLEX**  
A passion for performance.

When properly mounted on an appropriate heat sink, this chip device provides high power dissipation capabilities. Ideal for ferrite isolator applications, the improved thin film design technology and laser trimming provide proven RF power capabilities to meet the demands of today's CDMA and WCDMA system requirements. Aluminum Nitride is featured for those applications where the use and disposal of Beryllium oxide is a concern.

- Environmentally friendly AlN substrate
- High performance, thin film element
- Power 100 Watts
- New adhesion process results in improved terminal strength
- On-chip matching network improves frequency performance over the DC-3 GHz frequency range

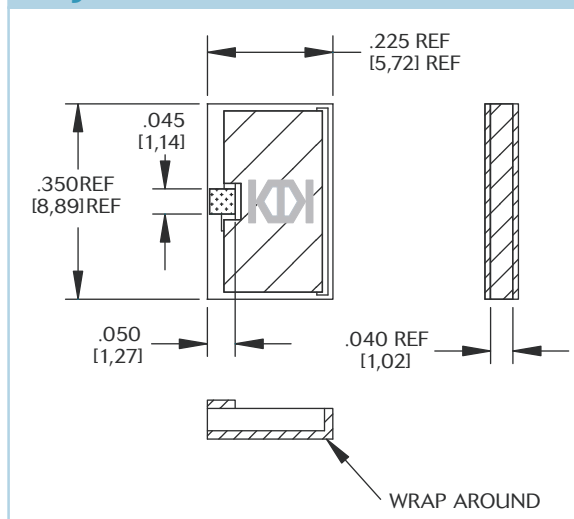


### SPECIFICATIONS

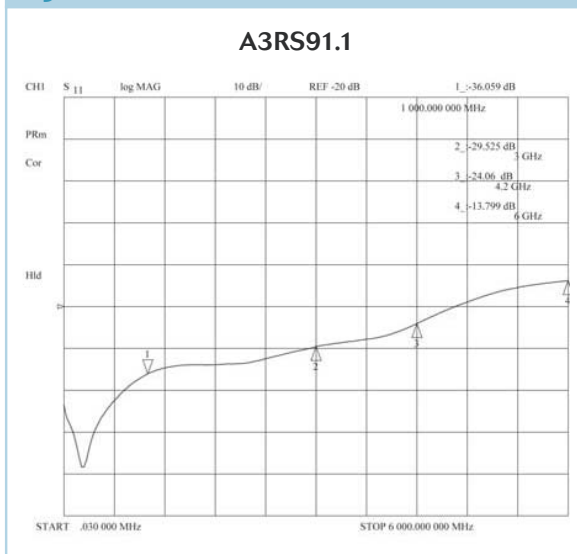
Parameters	Specifications
Frequency Range	DC to 3 GHz
Power	100 Watts*
VSWR	1.10:1 max
Resistance	50 Ohms +/- 5%
Operating Temperature	-55 °C to 150 °C
Substrate	Aluminum Nitride

\* Refer to average power derating curve chart.

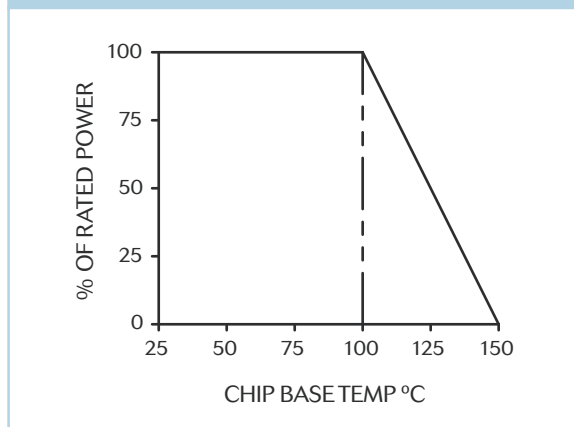
### PHYSICAL DIMENSIONS



### TYPICAL PERFORMANCE



### AVERAGE POWER DERATING CURVE



KEY: Inches [Millimeters] .XX ±.03 .XXX ±.010 [X ±0.8 .XX ±0.25]

**AEROFLEX**  
INMET

300 Dino Drive, Ann Arbor, MI 48103  
Tel: 888-244-6638 or 734-426-5553 • Fax: 734-426-5557  
www.aeroflex.com/inmet • inmet@aeroflex.com

REV 04/11

# SERIES ANC RESISTORS, TERMINATIONS

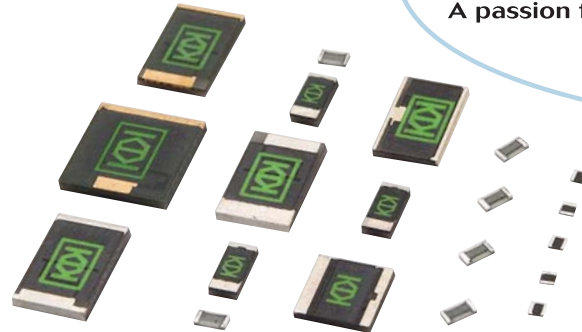
## High Power Chip, Aluminum Nitride – 50 & 100 Ohms

### GENERAL INFORMATION

When mounted on an appropriate heat sink, these chip devices provide high power dissipation in terminations and as balancing resistors in Wilkinson power divider networks. Laser trimming provides maximum RF power capability. Aluminum nitride is used for those applications where the use and disposal of beryllium oxide is a concern.

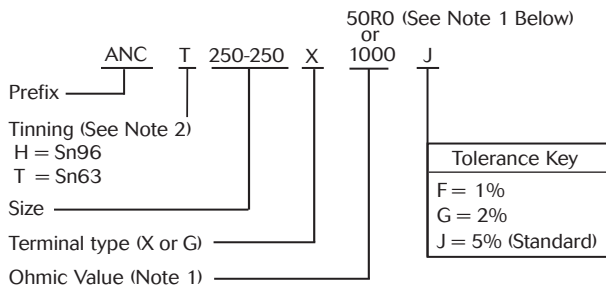
**RoHS**  
Compliant

**AEROFLEX**  
A passion for performance.



### ORDERING INFORMATION

EXAMPLE: Typical Model No.



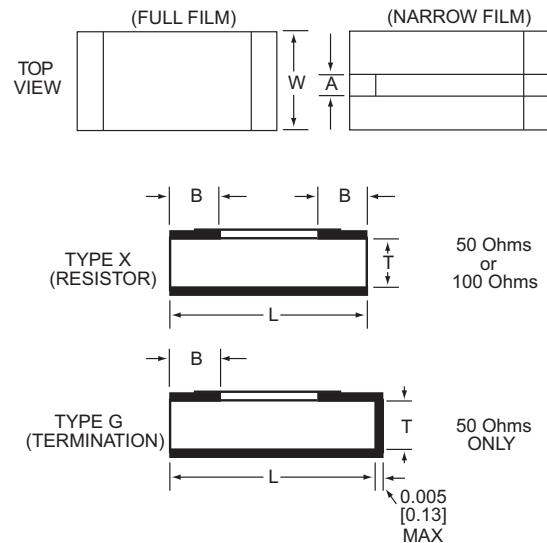
### NOTES

- Resistance value is expressed using military 4-digit call-out.  
50R0 = 50 Ohms  
1000 = 100 Ohms  
  
Other values from 10–500 Ohms may be available as special order.  
Contact factory for availability.
- Tinning with Sn96 "Lead Free" high temperature solder will maintain RoHS compliance.

### GENERAL SPECIFICATIONS

Solderable Terminals	Electroplated Silver over Nickel
Substrate	Aluminum Nitride
Resistive Element	Thin Film

### PHYSICAL DIMENSIONS



### PERFORMANCE SPECIFICATIONS

Model Prefix	W		L		T		A		B		Capacitance (pF) Typical	Termination VSWR Typical	Power CW	FREQ. GHz
	in	[mm]	in	[mm]	in	[mm]	in	[mm]	in	[mm]				
ANC 50-50	0.050	[1,27]	0.050	[1,27]	0.010	[0,25]	N/A		0.010	[0,25]	0.5	1.25	5	DC-4.0
ANC 50-100	0.050	[1,27]	0.100	[2,5]	0.010	[0,25]	N/A		0.020	[0,51]	1.0	1.25	10	DC-2.0
ANC 100-200	0.100	[2,5]	0.200	[5,1]	0.040	[1,02]	N/A		0.030	[0,76]	1.0	1.25	10	DC-4.0
ANC 200-200	0.200	[5,1]	0.200	[5,1]	0.040	[1,02]	0.085	[2,2]	0.040	[1,02]	1.2	1.25	30	DC-4.0
ANC 250-250-40	0.250	[6,4]	0.250	[6,4]	0.040	[1,02]	0.085	[2,2]	0.050	[1,27]	1.0	1.15	40	DC-2.5
ANC 250-250-80	0.250	[6,4]	0.250	[6,4]	0.040	[1,02]	N/A		0.050	[1,27]	1.6	1.25	80	DC-1.0
ANC 250-375	0.250	[6,4]	0.375	[9,5]	0.040	[1,02]	N/A		0.050	[1,27]	4.5	1.25	125	DC-1.0
ANC 350-225	0.350	[8,9]	0.225	[5,7]	0.040	[1,02]	0.045	[1,14]	0.050	[1,27]	1.4	1.25	100	DC-2.0
ANC 375-375	0.375	[9,5]	0.375	[9,5]	0.040	[1,02]	0.250	[6,4]	0.050	[1,27]	4.5	1.25	200	DC-1.0

KEY: Inches [Millimeters] .XX ±0.03 .XXX ±0.010 [X ±0.8 .XX ±0.25]

**AEROFLEX**  
INMET

300 Dino Drive, Ann Arbor, MI 48103  
Tel: 888-244-6638 or 734-426-5553 • Fax: 734-426-5557  
www.aeroflex.com/inmet • inmet@aeroflex.com

# SERIES KAC

## Surface Mount Terminations (SMT)

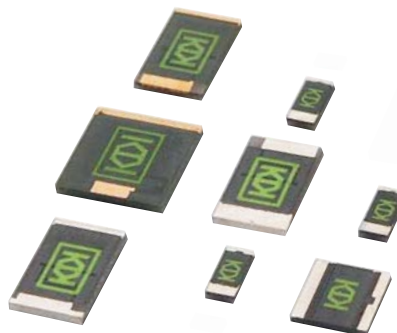
### High Power, Aluminum Nitride (AlN), 10 - 150 Watts



#### GENERAL INFORMATION

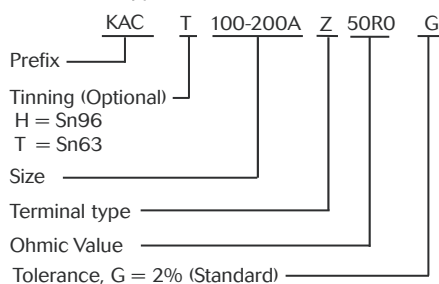
Aeroflex/Inmet's series of High Power Surface Mount Terminations are ideal for high frequency applications where small size and low costs are an important design criteria. The ability of these chips to be directly mounted to the PC Board eliminates the need for expensive mounting flanges and input tabs. Large solderable surface areas on the bottom of the chips allows for higher power dissipation in smaller sizes. All KAC series chips are manufactured using environmentally friendly Aluminum Nitride ceramic and are classified as RoHS compliant.

**RoHS**  
Compliant



#### ORDERING INFORMATION

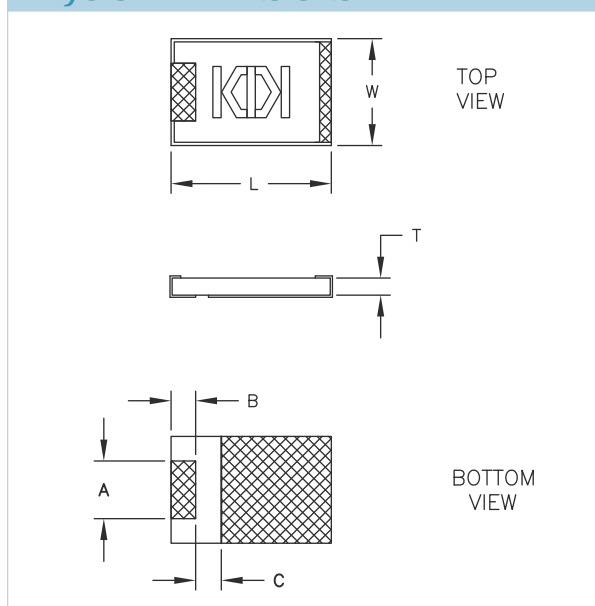
EXAMPLE: Typical Model No.



#### NOTE

Tinning with Sn96 "Lead Free" high temperature solder will maintain RoHS compliance.

#### PHYSICAL DIMENSIONS



#### GENERAL SPECIFICATIONS

Substrate	Aluminum Nitride
Solderable Terminals	Electroplated Silver over Nickel
Resistive Element	Proprietary Thick Film
Operating Temperature	-55 to +150°C
Impedance (Nominal)	50 Ohms

#### PERFORMANCE SPECIFICATIONS

Model Prefix	W in (mm)	L in (mm)	T in (mm)	A in (mm)	B in (mm)	C in (mm)	VSWR	Power CW	Frequency GHz
KAC 60 - 120A	0.060 (1,52)	0.120 (3,05)	0.025 (0,64)	0.054 (1,37)	0.026 (0,66)	0.013 (0,33)	1.25	10	DC - 4.0
KAC 100 - 200A	0.100 (2,5)	0.200 (5,1)	0.040 (1,02)	0.050 (1,27)	0.025 (0,64)	0.035 (0,89)	1.25	20	DC - 2.5
KAC 250 - 250A	0.250 (6,4)	0.250 (6,4)	0.040 (1,02)	0.040 (1,02)	0.043 (1,09)	0.020 (0,51)	1.25	75	DC - 4.0
KAC 250 - 375A	0.250 (6,4)	0.375 (9,5)	0.040 (1,02)	0.135 (3,43)	0.058 (1,47)	0.060 (1,52)	1.25	100	DC - 3.0
KAC 375 - 375A	0.375 (9,5)	0.375 (9,5)	0.040 (1,02)	0.125 (3,18)	0.057 (1,48)	0.030 (0,76)	1.25	150	DC - 3.0

KEY: Inches [Millimeters] .XX ±.03 .XXX ±.010 LX ±0.8 .XX ±0.25J



300 Dino Drive, Ann Arbor, MI 48103  
Tel: 888-244-6638 or 734-426-5553 • Fax: 734-426-5557  
www.aeroflex.com/inmet • inmet@aeroflex.com

# SERIES PCX HIGH POWER COAXIAL TERMINATIONS

DC to 6 GHz

**RoHS**  
Compliant

**AEROFLEX**  
A passion for performance.

## GENERAL INFORMATION

The PCX Series High Power Terminations are designed to dissipate RF power when mounted to a heat sink or chill plate. Power levels up to 500 watts in 50 ohm impedance are available in units with SMA or Type N, male or female connectors. High stability thin film resistive elements on beryllium oxide substrates are used to insure stable VSWR performance over temperature and environmental conditions.

## NOTES

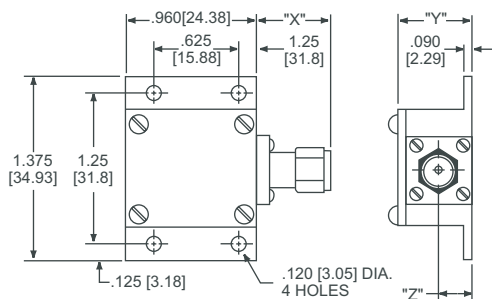
1. Input power ratings based on case temperature of 85°C maximum.
2. Connectors: SMA - Stainless Steel Passivated per MIL-C-39012, Type N - Nickel Plated Brass per MIL-C-39012
3. Housing: Copper, Nickel Plated per QQ-N-290



## PERFORMANCE SPECIFICATIONS

Part Number	Input Power (Watts) (Note 1)	Frequency Range	Connector Type (Note 2)	VSWR (Typical)	Outline
PCX050-F-50 PCX050-M-50	50	DC - 6 GHz	SMA Female SMA Male	DC-3 GHz: 1.25:1 3 - 6 GHz: 1.35:1	A
PCX050-F-100 PCX050-M-100	100	DC - 3 GHz	SMA Female SMA Male	DC- 3 GHz: 1.25:1	A
PCX050-F-150 PCX050-M-150 PCX100-F-150 PCX100-M-150	150	DC - 2 GHz	SMA Female SMA Male N Female N Male	DC - 1 GHz: 1.15:1 1 - 2 GHz: 1.40:1	B
PCX050-F-250 PCX050-M-250 PCX100-F-250 PCX100-M-250	250	DC - 800 MHz	SMA Female SMA Male N Female N Male	DC - 200 MHz: 1.15:1 200 - 400 MHz: 1.40:1 400-800 MHz: 1.30:1	B
PCX100-M-500	500	DC - 200 MHz	N Male	DC - 200 MHz: 1.15:1	B

## PHYSICAL DIMENSIONS

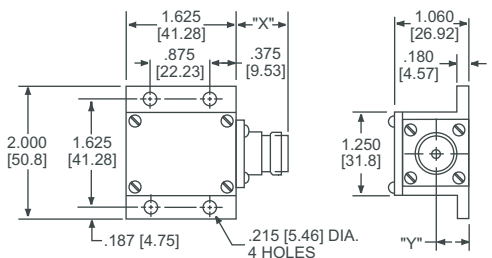


OUTLINE A (Shown with SMA)

MODEL	"x"	"y"	"z"
PCX050-F-50	.375 [9.53]	.560 [14.22]	.260 [6.60]
PCX050-M-50	.507 [12.88]	.560 [14.22]	.260 [6.60]
PCX050-F-100	.375 [9.53]	.560 [14.22]	.260 [6.60]
PCX050-M-100	.507 [12.88]	.560 [14.22]	.260 [6.60]



SMA 50 & 100 WATTS



OUTLINE B (Shown with TYPE N)

MODEL	"x"	"y"	"z"
PCX050-F-150, 250 [9.53]	.375 [9.53]	.515 [13.08]	.515 [13.08]
PCX050-M-150, 250 [9.53]	.375 [9.53]	.515 [13.08]	.515 [13.08]
PCX100-F-150, 250, 500 [18.69]	.736 [18.69]	.508 [12.9]	.508 [12.9]
PCX100-M-150, 250, 500 [20.8]	.819 [20.8]	.508 [12.9]	.508 [12.9]



SMA OR N CONNECTORS  
150, 250 & 500 WATTS

KEY: Inches [Millimeters] .XX ±.03 .XXX ±.010 LX ±0.8 .XX ±0.25J

**AEROFLEX**  
INMET

300 Dino Drive, Ann Arbor, MI 48103  
Tel: 888-244-6638 or 734-426-5553 • Fax: 734-426-5557  
www.aeroflex.com/inmet • inmet@inmet.com

REV 04/11

# SERIES PPC, NPC RESISTORS, TERMINATIONS

## High Power Chip – 50 & 100 Ohms

**RoHS  
Compliant**

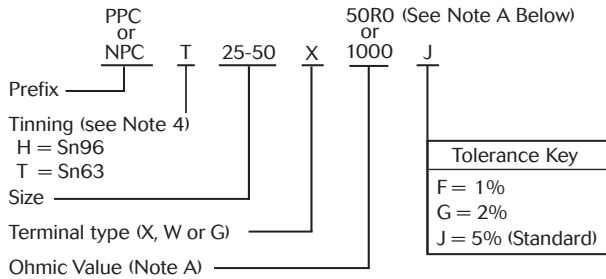
**AEROFLEX**  
A passion for performance.

### GENERAL INFORMATION

When mounted on an appropriate heat sink, these chip devices provide high power dissipation in terminations and as balancing resistors in Wilkinson power divider networks. Laser trimming provides maximum peak and average RF power capability.

### ORDERING INFORMATION

EXAMPLE: Typical Model No.



### NOTE A

Resistance value is expressed using military 4-digit call-out.  
50R0 = 50 Ohms  
1000 = 100 Ohms

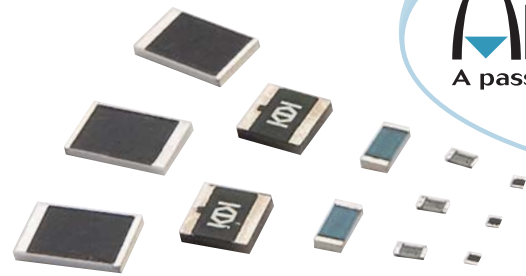
Other values from 10–500 Ohms may be available as special order.  
Contact factory for availability.

### GENERAL SPECIFICATIONS

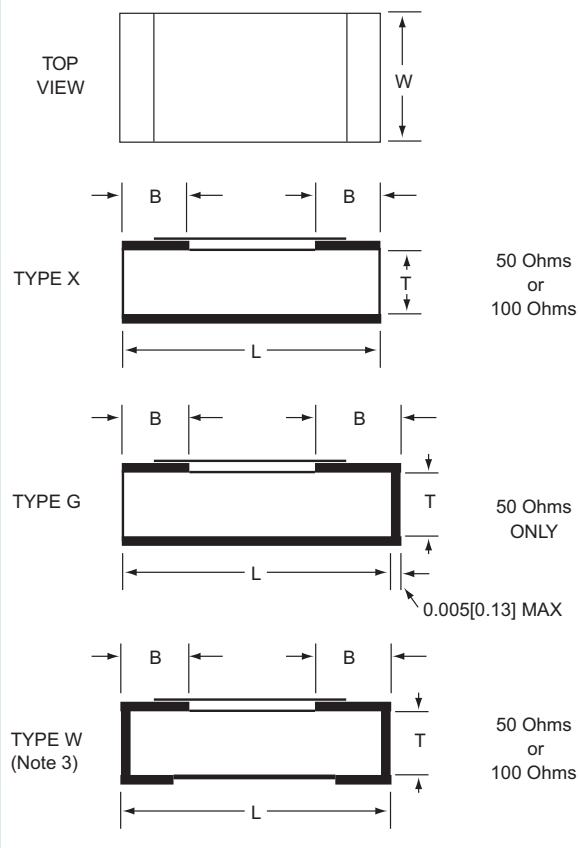
Solderable Terminals	Electroplated Silver over Nickel (PPC) Gold over Nickel alloy (NPC)
Substrate	Beryllium Oxide Ceramic
Resistive Element	Thin Film and Thick Film*

### NOTES

- The "L" and "T" dimensions are for the substrate only and do not include terminal thickness or optional tinning thickness.
- Thermal Resistance (R<sup>θ</sup>) is measured in °C/W between resistive film and mounting surface.
- The CW power rating is based on maximum film temperature of +150°C and with maximum heatsink temperature of +100°C. Power is based on infinite and ideal heatsink. Type "W" termination style does not have full back plane metallization and typically handles 1/10 the rated power.
- Tinning with Sn96 "Lead Free" high temperature solder will maintain RoHS compliance.



### Physical Dimensions



### PERFORMANCE SPECIFICATIONS

Model Prefix	W		L (Note 1)		T (Note 1)		B		Capacitance (pF) Typical	R <sup>θ</sup> ° C/W Max. (Note 2)	C/W Power	Freq. GHz (**)
	in	[mm]	in	[mm]	in	[mm]	in	[mm]				
*PPC 100-200A	0.100	[2,5]	0.200	[5,1]	0.040	[1,02]	0.030	[0,76]	0.8	0.80	20W	DC-4.0
*PPC 250-250A	0.250	[6,4]	0.250	[6,4]	0.040	[1,02]	0.050	[1,27]	1.2	0.30	40W	DC-2.5
*PPC 250-375A	0.250	[6,4]	0.375	[9,53]	0.040	[1,02]	0.050	[1,27]	3.5	0.15	150W	DC-1.0
NPC 25-50	0.025	[0,64]	0.050	[1,27]	0.010	[0,25]	0.012	[0,305]	0.3	3.90	3W	DC-12.4
*NPC 50-50	0.050	[1,27]	0.050	[1,27]	0.010	[0,25]	0.012	[0,305]	0.5	1.90	5W	DC-10
*NPC 50-100	0.050	[1,27]	0.100	[2,5]	0.010	[0,25]	0.017	[0,43]	1.0	0.72	10W	DC-4.0
NPC 75-150	0.075	[1,91]	0.150	[3,8]	0.010	[0,25]	0.020	[0,51]	1.8	0.29	15W	DC-4.0

\* Low cost thick film models available on these sizes. Consult factory for specifications.

\*\* Typical VSWR for all terminations is 1.25:1

KEY: Inches [Millimeters] .XX ±0.03 .XXX ±0.010 LX ±0.8 .XX ±0.25]

**AEROFLEX**  
INMET

300 Dino Drive, Ann Arbor, MI 48103  
Tel: 888-244-6638 or 734-426-5553 • Fax: 734-426-5557  
www.aeroflex.com/inmet • inmet@aeroflex.com

REV 04/11



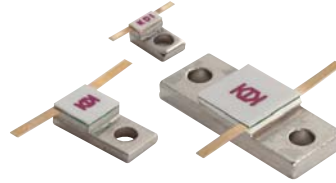
# SERIES PPA ATTENUATORS

## High Power – DC-4 GHz

**RoHS  
Compliant**



The Aeroflex/Inmet PPA Series of attenuators utilize a Beryllium Oxide chip and thin film technology to provide devices which can dissipate up to 100 Watts of RF power. The PPA series must be thermally bonded to a heat sink, using the mounting holes provided, in order to operate within the temperature rating indicated. The flange temperatures must not exceed 100°C under rated power conditions.



### ORDERING INFORMATION

The Power Attenuators listed are available in 1 dB increments from 1 thru 20 dB. Specify by selecting any of the series listed and add the attenuation value desired to the basic series designation. (See Note 3)

### EXAMPLE:



### GENERAL SPECIFICATIONS

Impedance	50 Ohms
Operating Temp.	-55°C to +150°C
Attenuation Stability	0.0001 dB/dB/°C
Substrate	Beryllium Oxide Ceramic
Resistive Element	Proprietary Thin Film
Flange	Copper, Nickel Plated per QQ-N-290
Tabs	Beryllium Copper, Gold Plated per MIL-G-45204
Cover	Alumina Ceramic

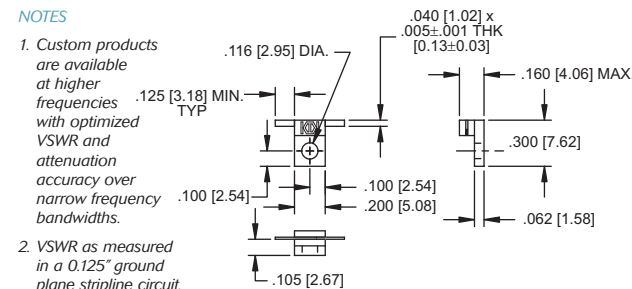
### PERFORMANCE SPECIFICATIONS

Model	Attenuation <sup>(1)</sup> 1 dB Increments (dB)	Frequency <sup>(1)</sup> Range	Input Power (Watts)	Attenuation Accuracy (1) (dB)			VSWR (Typical) <sup>2</sup>	
				dB	DC-1 GHz	1-2.5 GHz		2.5-4 GHz
PPA 10 11-20	1-20	DC-4 GHz	10	1-10	±0.5 ±1.0	±0.5 ±2.0	±1.0 ±3.0	1.3:1
PPA 20 6-9 10-15 16-20	1-20	DC-4 GHz	20	1-5	±0.5 ±0.5 ±0.75 ±1.0	±0.5 ±0.5 ±1.0 ±2.0	±0.5 ±1.0 ±1.5 ±3.0	1.15:1 – DC-1.0 GHz 1.35:1 – 1.0-2.5 GHz 1.50:1 – 2.5-4.0 GHz
PPA 50	1-20	DC-1 GHz	50		±0.3 DC-500 MHz ±0.5 500 MHz-1 GHz			1.25:1 – DC-500 MHz 1.50:1 – 500 MHz-1 GHz
PPA 100	1-20	DC-500 MHz	100		±0.5			1.25:1 – DC-200 MHz 1.50:1 – 200-500 MHz

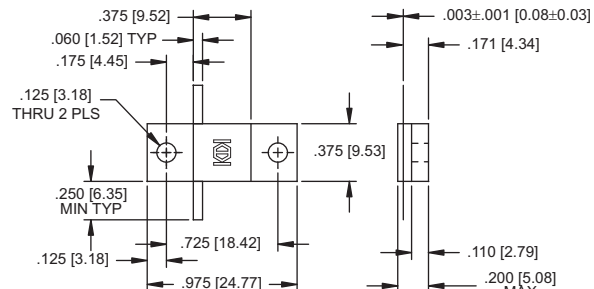
### PHYSICAL DIMENSIONS

#### NOTES

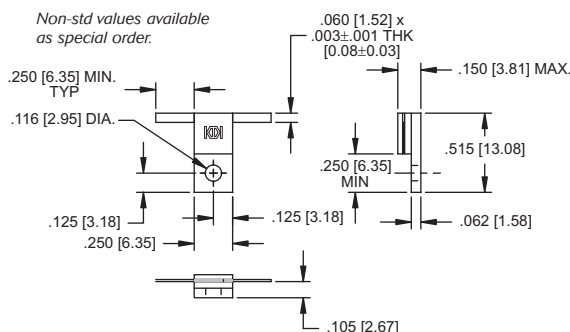
- Custom products are available at higher frequencies with optimized VSWR and attenuation accuracy over narrow frequency bandwidths.
- VSWR as measured in a 0.125" ground plane stripline circuit.
- Standard values 1, 2, 3, 4, 5, 6, 10, 20 dB.  
Non-std values available as special order.



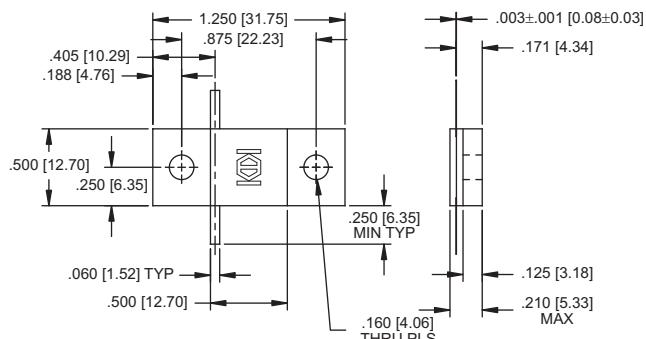
PPA10 OUTLINE



PPA50 OUTLINE



PPA20 OUTLINE



PPA100 OUTLINE

KEY: Inches [Millimeters] .XX ±.03 .XXX ±.010 LX ±0.8 .XX ±0.25]



300 Dino Drive, Ann Arbor, MI 48103  
Tel: 888-244-6638 or 734-426-5553 • Fax: 734-426-5557  
www.aeroflex.com/inmet • inmet-sales@eroflex.com

# SERIES PCA, PCAA ATTENUATORS, CHIP

## Low Power – DC-18 GHz

**RoHS**  
Compliant

**AEROFLEX**  
A passion for performance.

### FEATURES

- Laser Trimmed
- Temperature Stable

### GENERAL INFORMATION

The PCA and PCAA Series consists of a laser trimmed distributed thin film element on an alumina ceramic substrate with solderable terminals. Two sizes are available. The PCA size operates to 12.4 GHz and the PCAA size operates to 18.0 GHz. Both sizes are available with leads and wrap around conductors for ease of installation. The PCAF and PCAAF options are designed for “flip-chip” application in lower frequency circuits.

### PCA & PCAA SERIES DATA

- Substrate: 96% Alumina
- Solderable Terminals: Electroplated Silver over Nickel
- Resistive Element: Proprietary Thin Film
- Wrap around Ground Terminal available, “W” option
- Wrap around-all terminals—“F” option
- Standard values 1, 2, 3, 4, 5, 6, 10, 20 dB
- Non-std. values available as special order

### ORDERING INFORMATION

The attenuators listed are available in 1 dB increments from 1 through 20 dB. When ordering, to specify the correct part number for the desired attenuation value, select any of the series listed and add the attenuation value desired to the basic series designation.

#### Options (Note 4)

L = Lead/Tab (Gold Plated BeCu)

W = Wrap around ground only

F = Wrap around all terminals (flip-chip)

T = Tinned terminals (any terminal type) Sn63

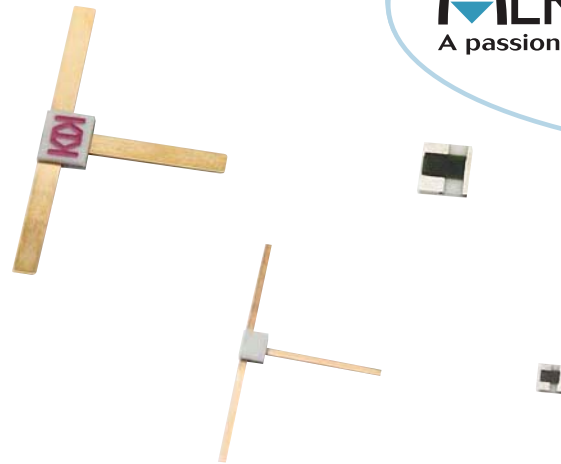
H = Tinned terminals (any terminal type) Sn96

G = Gold plated terminals

EXAMPLE:

PCA or PCAA	(x)	—	(x)	T
Basic Series	Option(s)		Option(s)	dB Value
	L		T	
	W		H	
	F		G	

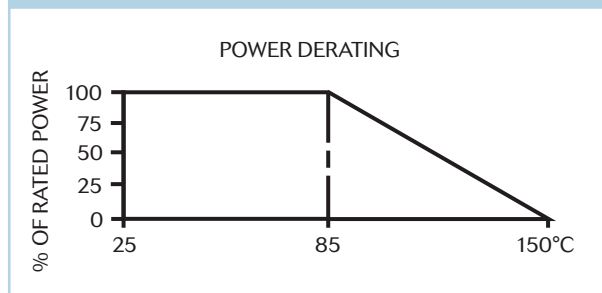
EXAMPLES: PCAW-T3  
PCAAF-G3



### GENERAL SPECIFICATIONS

Impedance	50 Ohms
Operating Temperature	-55°C to +150°C
Attenuation Stability	0.0001 dB/dB/°C

### AVERAGE POWER DERATING CURVE



#### NOTES

1. Performance of other dB values vary dependent on attenuation. Contact factory for specifications for fractional dB values.
2. Performance is based on device mounted in matched 50 Ohm line.
3. Rated power 1.5 Watts input PCA, 100 mw PCAA.
4. Tinning with Sn96 “Lead Free” high temperature solder will maintain RoHS compliance.

### PERFORMANCE SPECIFICATIONS

Increments (dB) Note 1	Attenuation Accuracy (dB) Note 2				VSWR (Typical) Note 2			
	DC - 4 GHz PCA, PCAA Series	4 - 8 GHz PCA, PCAA Series	8 - 12.4 GHz PCA, PCAA Series	12.4 - 18 GHz PCAA Series Only	DC - 4 GHz PCA, PCAA Series	4 - 8 GHz PCA, PCAA Series	8 - 12.4 GHz PCA, PCAA Series	12.4 - 18 GHz PCAA Series Only
1 - 3	± 0.5	± 0.5	± 0.5	± 0.5	1.25	1.35	1.50	1.50
4 - 6	± 0.5	± 0.5	± 0.5	± 0.75	1.25	1.35	1.50	1.50
7 - 10	± 0.5	± 0.5	± 0.75	± 1.0	1.25	1.35	1.50	1.50
11 - 15	± 0.75	+0.5 -3.0	+0.5 -4.0	—	1.25	1.35	1.50	—
16 - 20	± 1.0	+0.5 -4.0	—	—	1.25	1.35	—	—

KEY: Inches [Millimeters] .XX ±.03 .XXX ±.010 [X ±0.8 .XX ±0.25]

# SERIES PCA, PCAA ATTENUATORS, CHIP

Low Power – DC-18 GHz

## PHYSICAL DIMENSIONS

<p><b>PCA</b></p>	<p><b>PCAW (WRAP AROUND GROUND TERMINAL ONLY)</b></p>
<p><b>PCAL (LEAD/COVER)</b></p>	<p><b>PCAF (WRAP AROUND ALL TERMINALS)</b></p>
<p><b>PCAA</b></p>	<p><b>PCAAW (WRAP AROUND GROUND TERMINAL ONLY)</b></p>
<p><b>PCAAL (LEAD/COVER)</b></p>	<p><b>PCAAL (WRAP AROUND ALL TERMINALS)</b></p>

KEY: Inches [Millimeters] .XX ±.03 .XXX ±.010 LX ±0.8 .XX ±0.25

# SERIES PPR, PPT RESISTORS & TERMINATIONS

High Power, Thin Film, Drop-in – 10-650 Watts, DC-4 GHz

## GENERAL INFORMATION

These high power devices are designed to dissipate power in RF circuits when mounted to an appropriate heat sink. The terminations provide a low VSWR under maximum power conditions. The resistor configurations are typically used in “Wilkinson” type power divider networks, or to terminate 3 dB stripline or microstrip hybrids.

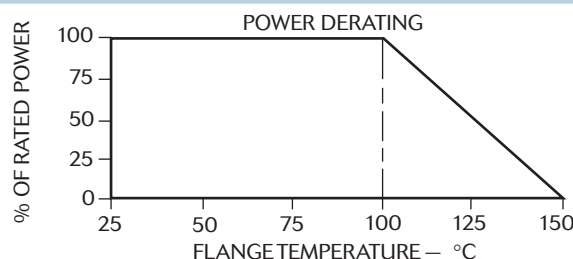
### NOTES

1. Input power ratings are based on flange temperature of 100° C maximum.
2. 50 and 100 Ohms standard. Other values from 10-500 Ohms available on special order. Contact factory for details. Standard tolerance  $\pm 5\%$ . Specify resistance value when ordering.
3. VSWR applies to termination style only.

**RoHS**  
Compliant

**AEROFLEX**  
A passion for performance.

## AVERAGE POWER DERATING CURVE



## GENERAL SPECIFICATIONS

Resistive Element	Thin Film and Thick Film*
Substrate	Beryllium Oxide Ceramic
Cover	Alumina Ceramic
Mounting Flange	Copper, Nickel Plated per QQ-N-290
Tab	Beryllium Copper, Gold Plated per MIL-G-45204

\* Low cost thick film models available on some sizes. Consult Factory for specifications.

## PERFORMANCE SPECIFICATIONS

Model	Frequency Range	Input Power (Watts Avg.)	VSWR (Typical) (Note 3)	Capacitance (pF) (Typ.)	Figure No.
PPR & PPT 300-10-3*	DC-4.0 GHz	10	1.35:1 –DC-4.0 GHz	0.8	1
PPR & PPT 515-20-3*	DC-2.0 GHz	20	1.10:1 –DC-1.0 GHz 1.25:1 –1.0-2.0 GHz	0.8	2
PPT 515-30-4	DC-4.0 GHz	30	1.20:1 –DC-4.0 GHz	1.2	3
PPR & PPT 515-30*	DC-2.0 GHz	30	1.10:1 –DC-1.0 GHz 1.25:1 –1.0-2.0 GHz	0.8	4
PPR & PPT 800-40-3	DC-4.0 GHz	40	1.25:1 –DC-4.0 GHz	1.4	5
PPT 800-100A	DC-2.0 GHz	100	1.25:1 –DC-2.0 GHz	1.4	6
PPR & PPT 870-150-3*	DC-1.0 GHz	150	1.20:1 –DC-500 MHz 1.35:1 –500-1000 MHz	3.5	7
PPR & PPT 975-250-3	DC-1.0 GHz	250	1.25:1 –DC-500 MHz 1.35:1 –500-1000 MHz	5.0	8
PPR & PPT 1250-400	DC-500 MHz	400	1.50:1 –DC-500 MHz	7.0	9
PPR & PPT 1900-800	DC-500 MHz	650	1.25:1 –DC-200 MHz 1.50:1 –200-500 MHz	10.2	10

## PHYSICAL DIMENSIONS

### TERMINATIONS (PPT) SERIES

### RESISTORS (PPR) SERIES

### FIGURES

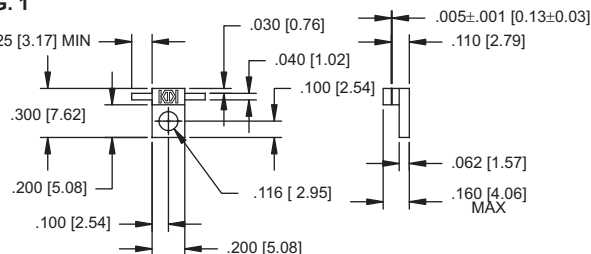
**PPT 300-10-3** — 10 WATTS  
Flange Mounted



**PPR 300-10-3** — 10 WATTS  
Flange Mounted



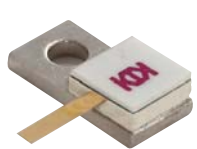
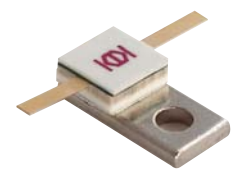
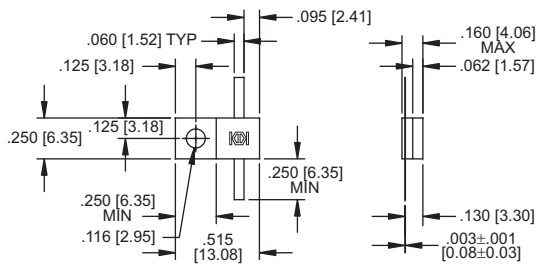

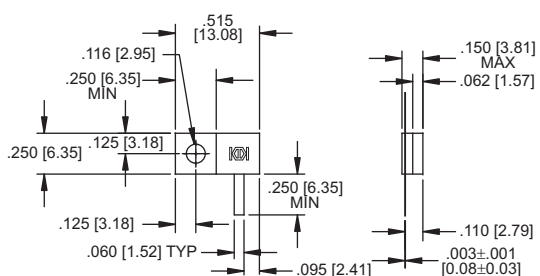
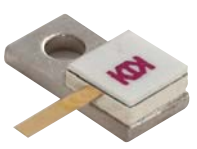
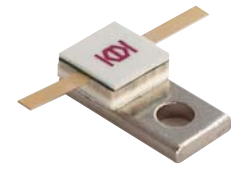
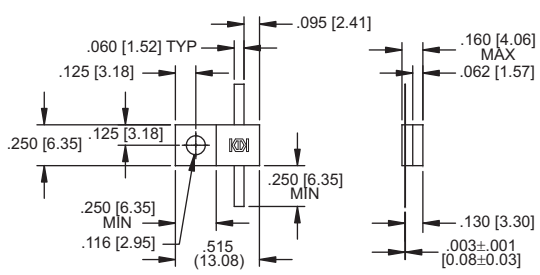

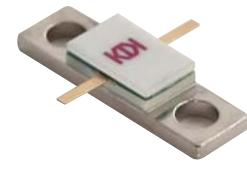
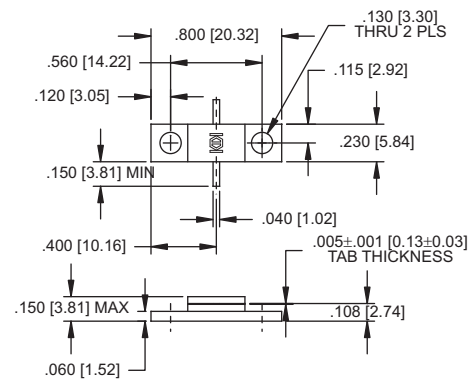
**FIG. 1**



KEY: Inches [Millimeters] .XX ±.03 .XXX ±.010 [X ±0.8 .XX ±0.25]

# SERIES PPR, PPT RESISTORS & TERMINATIONS


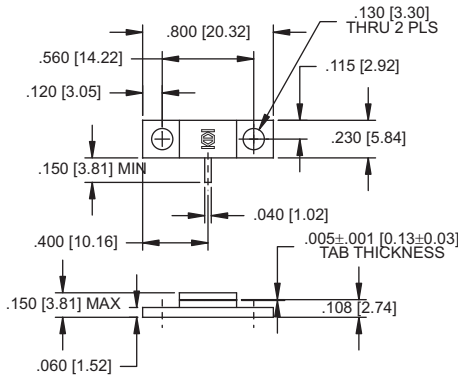

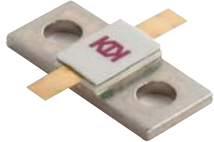
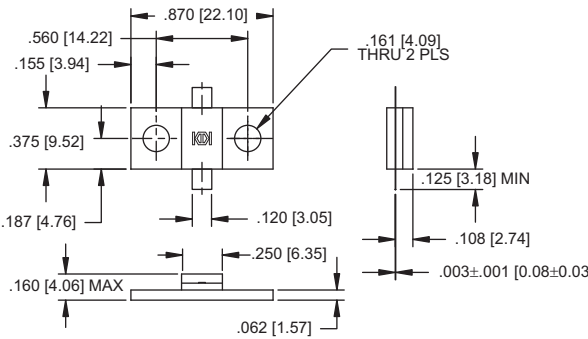


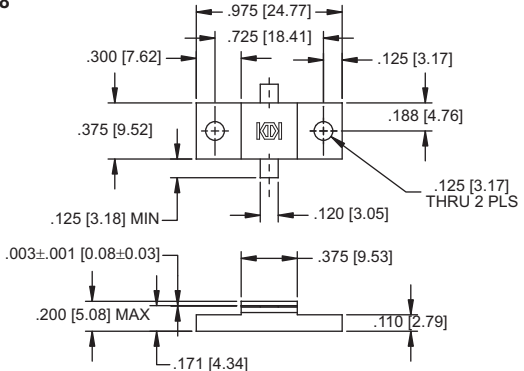


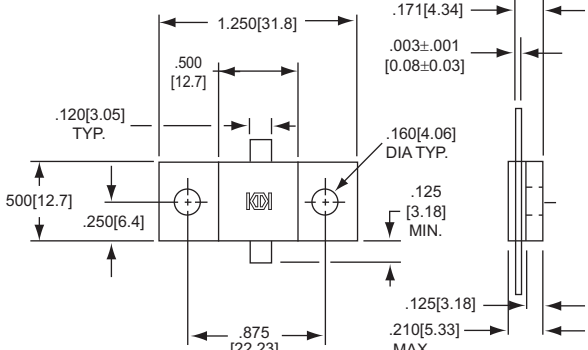
## PHYSICAL DIMENSIONS

TERMINATIONS (PPT) SERIES	RESISTORS (PPR) SERIES	FIGURES
<p><b>PPT 515-20-3</b> — 20 WATTS Flange Mounted</p> 	<p><b>PPR 515-20-3</b> — 20 WATTS Flange Mounted</p> 	<p><b>FIG. 2</b></p> 
<p><b>PPT 515-30-4</b> — 30 WATTS Flange Mounted</p> 	<p><i>Offered as a Termination Only!</i></p>	<p><b>FIG. 3</b></p> 
<p><b>PPT 515-30</b> — 30 WATTS Flange Mounted</p> 	<p><b>PPR 515-30</b> — 30 WATTS Flange Mounted</p> 	<p><b>FIG. 4</b></p> 
<p><b>PPT 800-40-3</b> — 40 WATTS Flange Mounted</p> 	<p><b>PPR 800-40-3</b> — 40 WATTS Flange Mounted</p> 	<p><b>FIG. 5</b></p> 

KEY: Inches [Millimeters] .XX ±.03 .XXX ±.010 [X ±0.8 .XX ±0.25]

# SERIES PPR, PPT RESISTORS & TERMINATIONS

## PHYSICAL DIMENSIONS

TERMINATIONS (PPT) SERIES	RESISTORS (PPR) SERIES	FIGURES
<p><b>PPT 800-100A</b> — 100 WATTS Flange Mounted</p> 	<p><i>Offered as a Termination Only!</i></p>	<p><b>FIG. 6</b></p> 
<p><b>PPT 870-150-3</b> — 150 WATTS Flange Mounted</p> 	<p><b>PPR 870-150-3</b> — 150 WATTS Flange Mounted</p> 	<p><b>FIG. 7</b></p> 
<p><b>PPT 975-250-3</b> — 250 WATTS Flange Mounted</p> 	<p><b>PPR 975-250-3</b> — 250 WATTS Flange Mounted</p> 	<p><b>FIG. 8</b></p> 
<p><b>PPT 1250-400</b> — 400 WATTS Flange Mounted</p> 	<p><b>PPR 1250-400</b> — 400 WATTS Flange Mounted</p> 	<p><b>FIG. 9</b></p> 

KEY: Inches [Millimeters] .XX ±.03 .XXX ±.010 [X ±0.8 .XX ±0.25]

# SERIES PPR, PPT RESISTORS & TERMINATIONS

PHYSICAL DIMENSIONS		
TERMINATIONS (PPT) SERIES	RESISTORS (PPR) SERIES	FIGURES
<b>PPT 1900-800</b> — 650 WATTS Flange Mounted	<b>PPR 1900-800</b> — 650 WATTS Flange Mounted	<b>FIG. 10</b> 

KEY: Inches [Millimeters] .XX ±.03 .XXX ±.010 [X ±0.8 .XX ±0.25]

# Mounting Application Notes

## Mounting of High Power Flange Devices

When mounting High Power Flange Devices in a circuit, there are several key issues that should be taken into account.

### Heat Sink Design

The heat sink the device is mounted to must be designed to maintain the temperature (design) while it is dissipating the power (heat) given it by the device. (The derating specifications are given in the applicable data sheets.)

### Flatness of mating surfaces

Flatness of the heat sink and of the mounting area of the device (flange) should be 0.001" maximum. The idea is to have the best possible contact between the heat sink and the device.

### Thermal Compound

To fill any microscopic voids or air gaps the use of thermal compound is recommended to a thickness of 0.002" maximum.

### Stress Relief on Tab

Although it is not always possible in High Frequency applications a small loop for stress relief on the solder tab is recommended. This reduces any mechanical stress on the joints.

Apply a small amount of thermal compound to the mounting area of the flange of the device. Spread it completely on the flange using a razor blade or other smooth tool. When seating the device, align the tab/tabs over the corresponding area on the circuit board. Screw down the device using the recommended torque for the appropriate screw size in the table below. Aeroflex / Inmet recommends the use of a lock washer and a flat washer in the installation. See Figure 1

Thread Size	Torque Setting
2-56	4 inch-pounds
4-40	6 inch pounds
6-32	8 inch pounds
8-32	12 inch pounds
10-32	18 inch pounds

Solder the tab/tabs using SN63 (179° C eutectic) solder and a small amount of RMA flux. After all the solder is complete all of the flux must now be removed using a cleaning agent.

## Mounting of Chip Devices

This application note covers the recommended mounting techniques for the proper conduction cooling and RF performance of a surface mounted (flangeless) chip attenuator, termination or resistor.

### Initial Considerations

There are two primary considerations for a surface mounted power device; Power Dissipation and RF Performance. In order to remove the dissipated power from this type chip they must be provided with adequate conductive cooling. This will prevent excessive chip temperatures leading to damage and early failure of the device. RF performance is also dependent on proper mounting. Since these devices are being mounted to a circuit board, inductance to ground is introduced by the vias to the ground plane. To reduce this effect and lower the thermal resistance between the component and ground plane, the following items are recommended:

1. Maximize the use of thermally conductive vias around and under the device.
2. Use of heavy copper cladding (2 oz.) on the circuit board as a heat spreader.

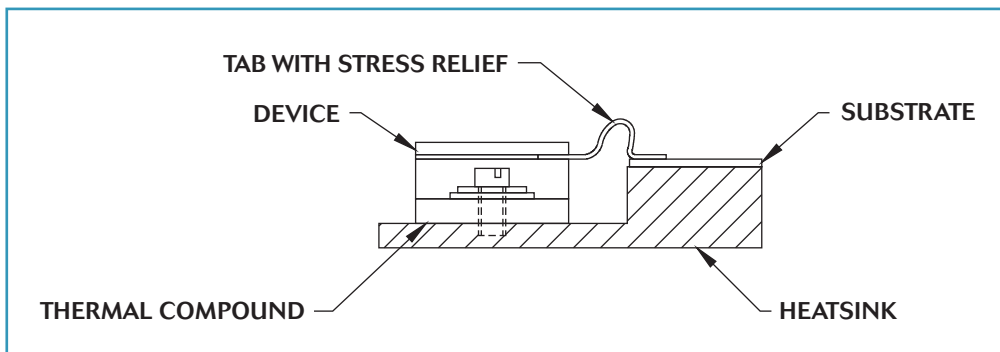
### Solders

Aeroflex / Inmet recommends the use of the solders in the chart below when installing a surface mount chip. Also listed are recommended platings for the heatsink/baseplate that a device might be mounted to instead of a circuit board.

### Mounting

The first step when mounting a chip device to the circuit board is to determine the proper size and location of the solder pads. Aeroflex / Inmet recommends providing pads that are 0.010" to 0.020" over the device's termination size and are centered on the axis of the chip. This allows for self-centering of the chip and a proper solder fillet formation. Skewing and "tombstoning" can occur if this is not followed. See Figure 2

Figure 1: High Power Flange Device Mounting





### Preparation

1. Before any solder attachment, parts and circuit boards must be free of any oils or dirt. Isopropyl alcohol can be used for this task.
2. Apply a small amount of RMA flux (MIL-F-14256) to the areas to be soldered.
3. SN63 solder is generally recommended for use. This may be a preform, solder paste or wire. If preforms are used, select a size that is 0.005" to 0.010" larger than the size of the pad.
4. When soldering is complete the circuit board must be cleaned to remove any flux residue. This can be done in an ultrasonic cleaner or vapor degreaser. Flux manufacturers have recommended solvents or cleaning solutions for their products.

### Pretinning

Pretinning can be done with either a solder pot or by depositing and reflowing solder on the device. (Aeroflex-Inmet can supply pretinned devices, SN63 or SN96).

### Tabs

When attaching tabs to a device we recommend using SN96 (221° C) to attach the tab to the chip. Then, solder the tab to the circuit board using SN63 (183° C).

### Wire Bonding

Attach the device to the circuit board using solder as described above. Clean and remove any flux residues. Ultrasonically bond wire or ribbon to gold termination pads using a wedge or ball bonder. NOTE: Gold plated chips are required for this method.

### Tuning

Maximum VSWR, as specified on the data sheet, can be achieved without additional tuning. Lower VSWR can be achieved with stub or lumped element tuning. However, this can result in a narrower useable bandwidth.

Solder Type	Liquidous Temp. (degrees C.)	Recommended Platings for Heatsink/Baseplates
SN63	183 eutectic	Nickel, Silver
SN96	221 eutectic	Nickel, Silver
80Au/20Sn	280 eutectic	Gold over Nickel

Figure 2: Proper Mounting Techniques

