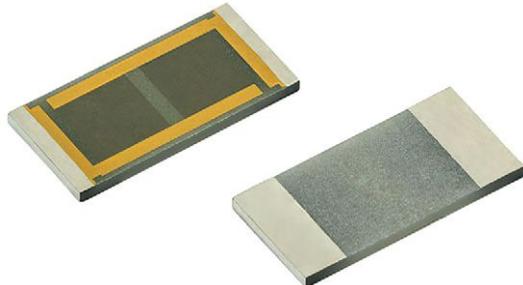


High Power Aluminum Nitride, Wraparound Surface Mount, Precision Thin Film Non-Magnetic Chip Resistor (up to 6 W)



PCNM series chip resistors are designed on aluminum nitride ceramic substrates with enlarged backside terminations to reduce the thermal resistance between the topside resistor layer and the solder joint on the end users circuit assembly.

Actual power handling capability is limited by the end user mounting process. As with any high power chip resistor the ability to remove the heat is critical to the overall performance of the device.

FEATURES

- High thermal conductivity aluminum nitride substrate
- Power rating up to 6.0 W
- Resistance range 2 Ω to 30.1 k Ω
- Resistor tolerance to $\pm 0.1\%$
- TCR to ± 25 ppm/ $^{\circ}$ C
- Flame resistant UL 94 V-0

APPLICATIONS

- Power supplies
- Power switching
- Braking system

TYPICAL PERFORMANCE

	ABSOLUTE
TCR	25
TOL.	0.1

STANDARD ELECTRICAL SPECIFICATIONS		
TEST	SPECIFICATIONS	CONDITIONS
Material	Nichrome	-
Resistance Range	2 Ω to 30.1 k Ω	-
TCR: Absolute	25 ppm/ $^{\circ}$ C (standard) and 100 ppm/ $^{\circ}$ C	-
Tolerance: Absolute	0.1 %, 0.25 %, 0.5 %, 1.0 % and 5.0 %	-55 $^{\circ}$ C to +150 $^{\circ}$ C
Power Rating: Resistor	0.5 W to 6.0 W ⁽¹⁾	Maximum at +70 $^{\circ}$ C
Stability: Absolute	ΔR 1.0 %	1000 h at +70 $^{\circ}$ C
Voltage Coefficient	< 0.1 ppm/V	-
Working Voltage	75 V to 100 V	-
Operating Temperature Range	-55 $^{\circ}$ C to +155 $^{\circ}$ C	-
Storage Temperature Range	-55 $^{\circ}$ C to +155 $^{\circ}$ C	-
Noise	< -30 dB	-
Shelf Life Stability: Absolute	$\pm 0.01\%$	1 year at +25 $^{\circ}$ C

Note

⁽¹⁾ Dependant on component mounting by user

COMPONENT RATINGS			
CASE SIZE	POWER RATING (mW)	WORKING VOLTAGE (V)	RESISTANCE RANGE (Ω)
1206	2000 ⁽¹⁾	100	2 to 30.1K
2512	6000 ⁽¹⁾	100	2 to 30.1K

Notes

- 0603 and 0805 case size under engineering qualification

⁽¹⁾ Dependant on component mounting by user

ENVIRONMENTAL TESTS		
ENVIRONMENTAL TEST⁽¹⁾	TEST LIMITS	TYPICAL VISHAY PERFORMANCE
Resistance temperature characteristic	$\pm 25 \text{ ppm}/^\circ\text{C}$	$\pm 15 \text{ ppm}/^\circ\text{C}$
Maximum ambient temperature at rated wattage	$+70 \text{ }^\circ\text{C}$	$+70 \text{ }^\circ\text{C}$
Maximum ambient temperature at power derating	$+150 \text{ }^\circ\text{C}$	$+150 \text{ }^\circ\text{C}$
Thermal shock	$\pm 0.25 \%$	$\pm 0.10 \%$
Low temperature operation	$\pm 0.25 \%$	$\pm 0.01 \%$
Short time overload	$\pm 0.5 \%$	$\pm 0.2 \%$
High temperature exposure	$\pm 0.2 \%$	$\pm 0.05 \%$
Resistance to soldering heat	$\pm 0.25 \%$	$\pm 0.02 \%$
Moisture resistance	$\pm 0.4 \%$	$\pm 0.01 \%$
Life at $+70 \text{ }^\circ\text{C}$ for 1000 h	$\pm 1.00 \%$	$\pm 0.02 \%$

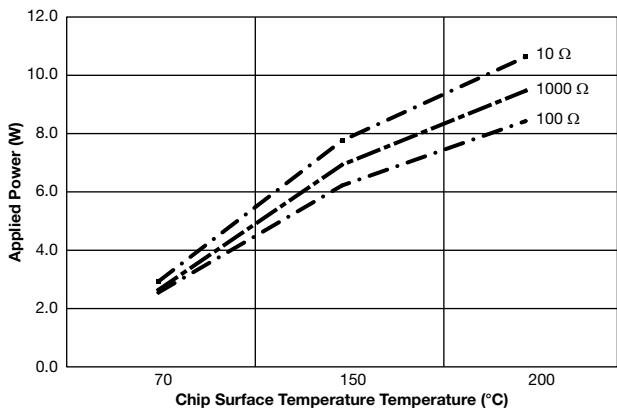
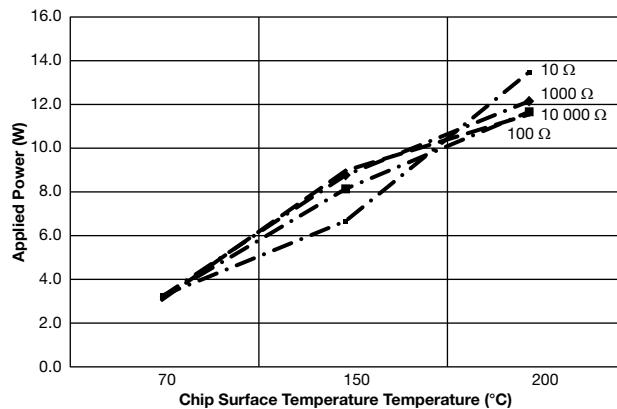
Note

⁽¹⁾ Environmental testing was performed based on MIL-STD-202 Standard Test Methods

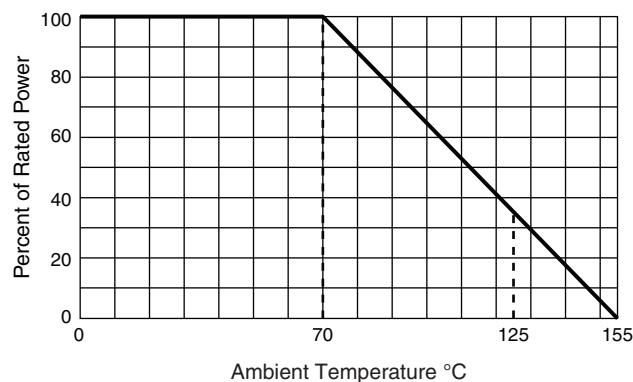
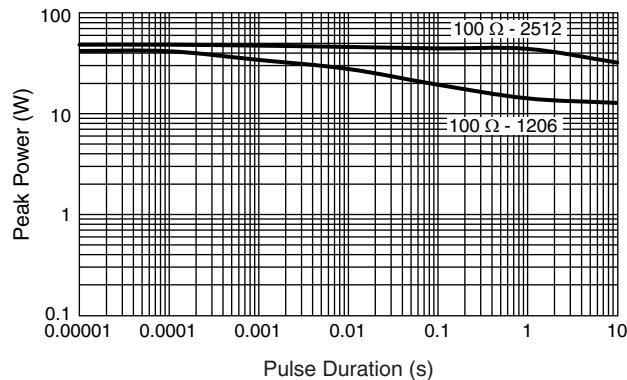
DIMENSIONS in inches					
CASE SIZE	LENGTH L	WIDTH W	THICKNESS T MIN./MAX.	TOP PAD D	BOTTOM PAD E
1206	0.126 ± 0.008	0.063 ± 0.005	0.015 ± 0.003	$0.020 + 0.005 / - 0.010$	0.040 ± 0.005
2512	$0.259 + 0.009 / - 0.015$	0.124 ± 0.005	0.015 ± 0.003	0.020 ± 0.005	0.050 ± 0.005

LAND PATTERN DIMENSIONS in inches					
1206 Land Pattern			2512 Land Pattern		
0.1730	0.0710	0.0755	0.2910	0.1260	0.0910
0.0220			0.1090		

STANDARD MATERIAL SPECIFICATIONS	
Resistive element	Nichrome
Substrate material	Aluminum nitride
Terminations (tin / lead)	Tin / lead solder over copper
Terminations (lead (Pb)-free)	Tin / silver / copper (Sn96.5 / Ag3.0 / Cu0.5) solder over copper

PCAN1206 CHIP TEMP VS. APPLIED POWER

PCNM2512 CHIP TEMP VS. APPLIED POWER

Notes

- Chip surface temperature measured using FLIR SC645 thermal imaging system with an approximate test card surface temperature of 85 °C
- Thermal imaging was conducted under ambient conditions resulting in a steady state test card surface temperature of 85 °C over the full range of power levels
- Thermal imaging and load life testing was conducted mounting one device to a 1.6" x 3.7" test card with 3.5 mil copper plating on both surfaces. Thermal vias on 50 mil centers were utilized for heat transfer between surfaces of the test card

DERATING CURVE

PULSE HANDLING RESULTS


GLOBAL PART NUMBER INFORMATION															
New Global Part Numbering: PCNM1206H1000BBT1															
P	C	N	M	1	2	0	6	H	1	0	0	B	B	T	1
GLOBAL MODEL		CASE SIZE		TCR CHARACTERISTIC		RESISTANCE		TOLERANCE		TERMINATION		PACKAGING			
PCNM		1206		E = \pm 25 ppm/ $^{\circ}$ C		RESISTANCE		B = \pm 0.1 % (2)		TERMINATION		PACKAGING			
		2512		H = \pm 50 ppm/ $^{\circ}$ C		The first 3 digits are significant figures and the last digit specifies the number of zeros to follow.		C = \pm 0.25 %		B = wraparound Sn/Pb solder w/ nickel barrier		BS = BULK 100 min., 1 mult			
				K = \pm 100 ppm/ $^{\circ}$ C (1)		"R" designates the decimal point.		D = \pm 0.5 %		S = wraparound lead (Pb)-free solder (e1)		WS = WAFFLE 100 min., 1 mult			
								F = \pm 1.0 % (1)		RoHS compliant		W0 = 100 pc min. waffle, 1 mult			
								G = \pm 2.0 %		G = wraparound Au, over Ni (gold) termination		WI = 100 min., 1 mult (package unit single lot date code)			
										Tape and Reel		TAPE AND REEL			
										T0 = 100 min., 100 mult		T0 = 100 min., 100 mult			
										T1 = 1000 min., 1000 mult		T1 = 1000 min., 1000 mult			
										T3 = 300 min., 300 mult		T3 = 300 min., 300 mult			
										T5 = 500 min., 500 mult		T5 = 500 min., 500 mult			
										TF = Full reel		TF = Full reel			
										TS = 100 min., 1 mult		TS = 100 min., 1 mult			
										T1 = 100 min., 1 mult		T1 = 100 min., 1 mult			
										(item single lot date code)					
										TP = 100 min., 1 mult		TP = 100 min., 1 mult			
										(package unit single lot date code)					

Notes

(1) Less than 10 Ω 100 ppm/ $^{\circ}$ C and 1 % tolerance best
 (2) Available on 10 Ω and higher

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