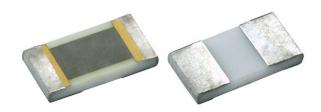




# **High Power Thin Film Wraparound Chip Resistor**



### **LINKS TO ADDITIONAL RESOURCES**





PHP series chip resistors are designed with enlarged backside terminations to reduce the thermal resistance between the topside resistor layer and the solder joint on the end users circuit board.

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

### **FEATURES**

- High purity ceramic substrate
- Power rating to 2.5 W
- Resistance range 10  $\Omega$  to 30.1 k $\Omega$
- Resistor tolerance to ± 0.1 %
- TCR to ± 25 ppm/°C
- Flame resistant UL 94 V-0

## **APPLICATIONS**

- Power supplies
- · Power switching
- · Braking system
- Test and measurement equipment
- Motor deflection circuits

### **TYPICAL PERFORMANCE**

	ABSOLUTE	
TCR	25	
TOL.	0.1	

STANDARD ELECTRICAL SPECIFICATIONS			
TEST	SPECIFICATIONS	CONDITIONS	
Material	Nichrome	-	
Resistance Range	10 Ω to 30.1 kΩ	-	
TCR: Absolute	25 ppm/°C, 50 ppm/°C (standard) and, 100 ppm/°C	-55 °C to +125 °C	
Tolerance: Absolute	0.1 %, 0.5 %, 1.0 % and, 5.0 %	+25 °C	
Power Rating: Resistor	0.375 W to 2.5 W <sup>(1)</sup>	Maximum at +70 °C	
Stability: Absolute	ΔR 0.1 %	2000 h at +70 °C	
Stability: Ratio	Not applicable	-	
Voltage Coefficient	< 0.1 ppm/V	-	
Working Voltage	75 V to 200 V	-	
Operating Temperature Range	-55 °C to +155 °C	-	
Storage Temperature Range	-55 °C to +155 °C	-	
Noise	< -30 dB	-	
Shelf Life Stability: Absolute	± 0.01 %	1 year at +25 °C	

COMPONENT RATINGS			
CASE SIZE	POWER RATING (mW)	WORKING VOLTAGE (V)	RESISTANCE RANGE ( $\Omega$ )
0603	375 <sup>(1)</sup>	75	10 to 30.1K
0805	625 <sup>(1)</sup>	100	10 to 30.1K
1206	1000 (1)	200	10 to 30.1K
2512	2500 <sup>(1)</sup>	200	10 to 30.1K

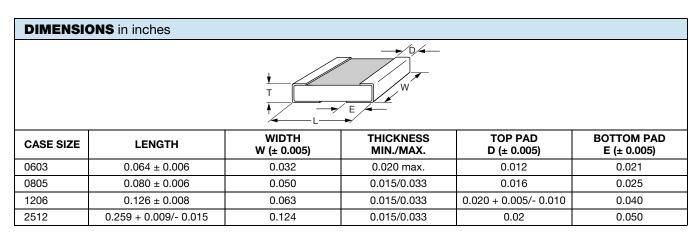
### Note

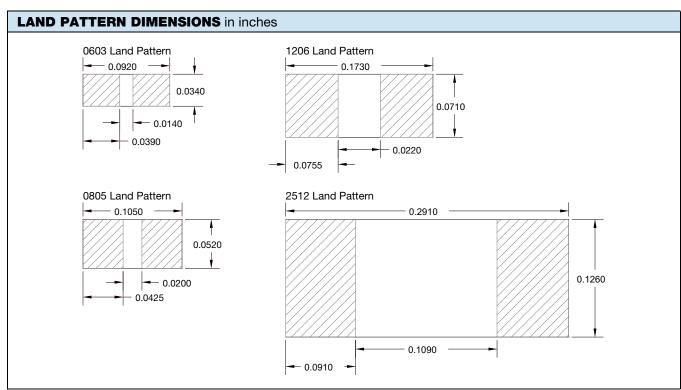
<sup>(1)</sup> Dependent on component mounting by user



## Vishay Dale Thin Film

ENVIRONMENTAL TESTS (Vishay Performance vs. MIL-PRF-55342 Requirements)			
ENVIRONMENTAL TEST	LIMITS MIL-PRF-55342 CHARACTERISTIC "E"	TYPICAL VISHAY PERFORMANCE	
Resistance Temperature Characteristic	± 25 ppm/°C	± 15 ppm/°C	
Maximum Ambient Temperature at Rated Wattage	+70 °C	+70 °C	
Maximum Ambient Temperature at Power Derating	+150 °C	+150 °C	
Thermal Shock	± 0.1 %	± 0.04 %	
Low Temperature Operation	± 0.1 %	± 0.001 %	
Short Time Overload	± 0.1 %	± 0.003 %	
High Temperature Exposure	± 0.1 %	± 0.030 %	
Resistance to Soldering Heat	± 0.2 %	± 0.007 %	
Moisture Resistance	± 0.2 %	± 0.002 %	
Life at +70 °C for 2000 h	± 0.5 %	± 0.100 %	

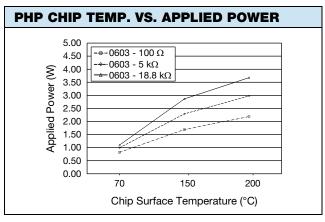






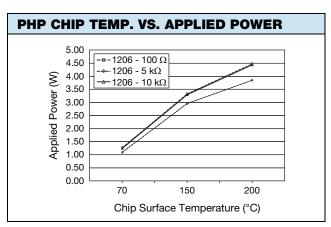
## Vishay Dale Thin Film

STANDARD MATERIAL SPECIFICATIONS			
Resistive Element	Nichrome		
Substrate Material	Alumina (Al <sub>2</sub> O <sub>3</sub> )		
Terminations (Tin/Lead)	Tin/lead solder over nickel barrier		
Terminations (Lead (Pb)-free)	Tin/silver/copper (Sn96.5Ag3.0Cu0.5) solder over nickel barrier		



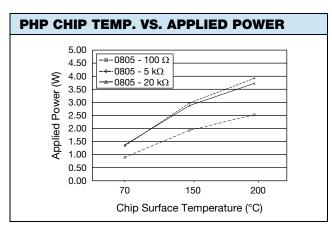
#### Note

 Chip surface temperature measured using FLIR SC645 thermal imaging system with an approximate test card surface temperature of 85 °C



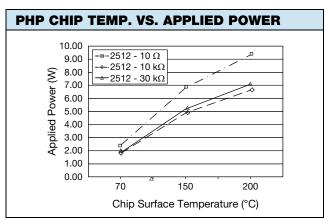
### Notes

- Chip surface temperature measured using FLIR A40 thermal imaging system with an approximate test card surface temperature of 25 °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 2" x 3" test cards with 2.5 mil copper plating on both surfaces. Thermal vias on 120 mil centers were utilized for heat transfer between surfaces of the test card



#### Note

 Chip surface temperature measured using FLIR SC645 thermal imaging system with an approximate test card surface temperature of 85 °C



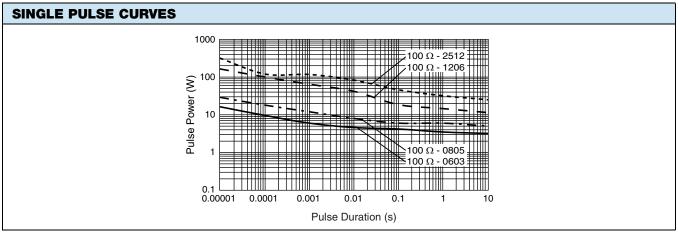
## Notes

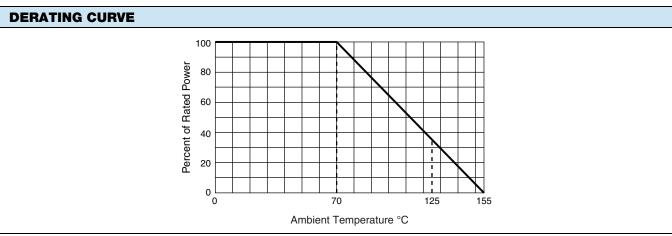
 Chip surface temperature measured using FLIR A40 thermal imaging system with an approximate test card surface temperature of 25 °C

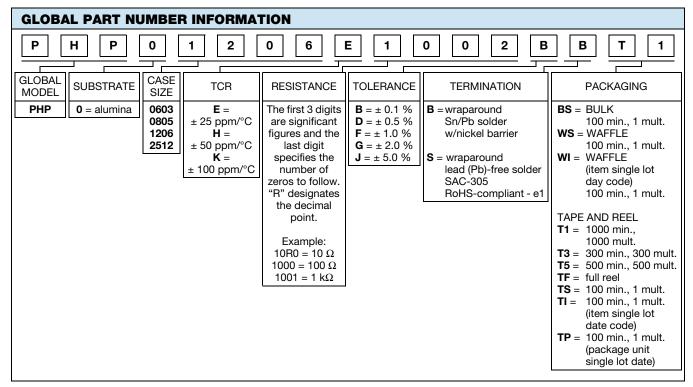
Case Size	2512	2512	2512
Resistance Value	Up to 10 $\Omega$	Up to 10 kΩ	Up to 30 $k\Omega$
Temperature	Power (W)		
70	2.44	1.81	1.87
150	6.82	4.89	5.19
200	9.33	6.63	7.09



## Vishay Dale Thin Film









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