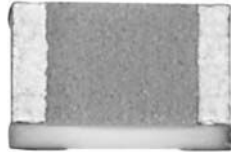


## High Stability - Very High Temperature (270 °C) Thin Film Wraparound Chip Resistors



### INTRODUCTION

For applications such as down hole applications, the need for parts able to withstand very severe conditions (temperature as high as 250 °C powered or up to 270 °C un-powered) has led Vishay Sfernice to push out the limit of the thin film technology.

Designers might read the application note: Power Dissipation Considerations in High Precision Vishay Sfernice Thin Film Chip Resistors and Arrays (P, PRA etc...) (High Temperature Application) [www.vishay.com/doc?53047](http://www.vishay.com/doc?53047) in conjunction with this datasheet to help them to properly design their PCBs and get the best performances of the PVHT.

Vishay Sfernice R&D engineers will be willing to support any customer design considerations.

### FEATURES

- Operating temperature range: - 55 °C; + 250 °C
- Storage temperature: - 55 °C; + 270 °C
- Gold terminations (< 1 µm thick)
- 5 sizes available (0402, 0603, 0805, 1206, 2010); other sizes upon request
- Temperature coefficient down to 5 ppm/°C typical, 10 ppm/°C maximum (- 55 °C; + 270 °C)
- Tolerance down to 0.05 %
- Load life stability: 0.5 % max. after 1000 h at 250 °C (ambient) at Pn
- Shelf life stability: 0.5 % max. after 1000 h at 270 °C and 0.1 % max. after 1000 h at 230 °C
- SMD wraparound
- 0.02 % upon request
- TCR remains constant after long term storage at 270 °C
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
**GREEN**  
(5-2008)

STANDARD ELECTRICAL SPECIFICATIONS						
MODEL	SIZE	RESISTANCE RANGE Ω	RATED POWER <sup>(1)(2)</sup> <i>P</i> <sub>250 °C</sub> W	LIMITING ELEMENT VOLTAGE V	TOLERANCE ± %	TEMPERATURE COEFFICIENT <sup>(3)</sup> ± ppm/°C
PVHT0402	0402	10 to 55K	0.031	50	0.05, 0.1, 0.5, 1	10, 15, 25, 30, 50, 55
PVHT0603	0603	10 to 150K	0.062	75	0.05, 0.1, 0.5, 1	10, 15, 25, 30, 50, 55
PVHT0805	0805	10 to 300K	0.100	150	0.05, 0.1, 0.5, 1	10, 15, 25, 30, 50, 55
PVHT1206	1206	10 to 1.1M	0.165	200	0.05, 0.1, 0.5, 1	10, 15, 25, 30, 50, 55
PVHT2010	2010	10 to 3M	0.2	300	0.05, 0.1, 0.5, 1	10, 15, 25, 30, 50, 55

#### Notes

- (1) For power handling improvement, please refer to application note 53047: Power Dissipation Considerations in High Precision Vishay Sfernice Thin Film Chip Resistors and Arrays (High Temperature Applications) [www.vishay.com/doc?53047](http://www.vishay.com/doc?53047) and consult Vishay Sfernice
- (2) See Table 2 on next page
- (3) See Table 1 on next page

CLIMATIC SPECIFICATIONS	
Operating temperature range	- 55 °C; + 250 °C
Storage temperature range	- 55 °C; + 270 °C

#### Caution:

Performances obtained with following mounting conditions:

PCB: Alumina

Solder paste: PbSnAg (93.5/5/1.5)

MECHANICAL SPECIFICATIONS	
Substrate	Alumina
Resistive Element	Thin Film
Passivation	Silicon nitride (Si <sub>3</sub> N <sub>4</sub> )
Protection	Epoxy + Silicone
Terminations	Gold (< 1 µm) over nickel barrier

#### Note

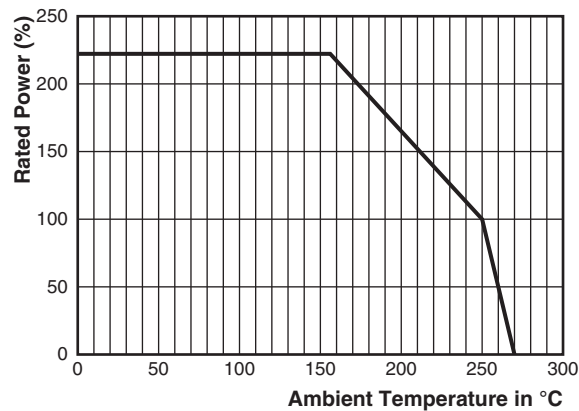
- For other terminations, please consult

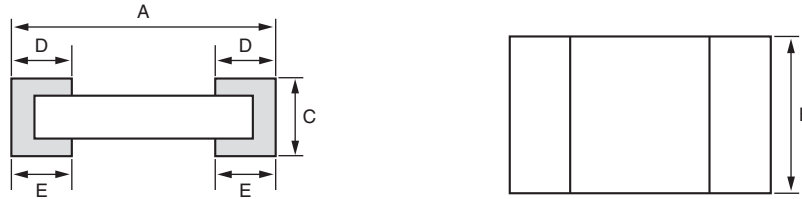


TABLE 1 - TEMPERATURE COEFFICIENT		
C	5 ppm/°C	- 55 °C; + 155 °C
	10 ppm/°C	- 55 °C; + 270 °C
Y	10 ppm/°C	- 55 °C; + 155 °C
	15 ppm/°C	- 55 °C; + 270 °C
E	25 ppm/°C	- 55 °C; + 155 °C
	30 ppm/°C	- 55 °C; + 270 °C
H	50 ppm/°C	- 55 °C; + 155 °C
	55 ppm/°C	- 55 °C; + 270 °C

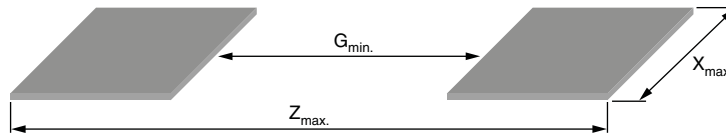
TABLE 2			
SERIES	RANGE (Ω)	TOL. (± %)	TCR CODE
0402	From 10R to 55K	0.05, 0.1, 0.5, 1	C; Y; E; H
0603	From 10R to 150K	0.05, 0.1, 0.5, 1	C; Y; E; H
0805	From 10R to 300K	0.05, 0.1, 0.5, 1	C; Y; E; H
1206	From 10R to 1.1M	0.05, 0.1, 0.5, 1	C; Y; E; H
2010	From 10R to 3M	0.05, 0.1, 0.5, 1	C; Y; E; H

**POWER DERATING CURVE**



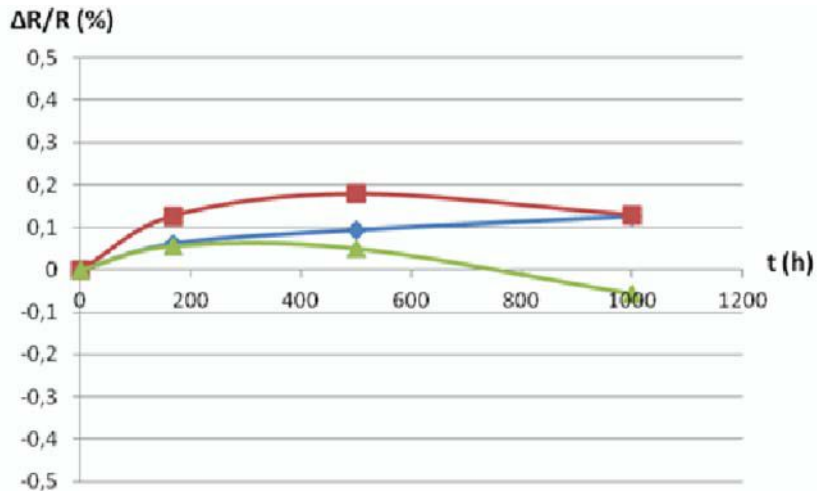
**DIMENSIONS** in millimeters (inches)


CASE SIZE	A	B	C	D/E	
	MAX. TOL. + 0.152 (+ 0.006) MIN. TOL. - 0.152 (- 0.006)	MAX. TOL. + 0.127 (+ 0.005) MIN. TOL. - 0.127 (- 0.005)		NOMINAL	NOMINAL
	NOMINAL	NOMINAL		NOMINAL	NOMINAL
0402	1.00 (0.039)	0.60 (0.024)	0.5 (0.02) ± 0.127 (0.005)	0.25 (0.010)	0.1 (0.004)
0603	1.52 (0.060)	0.85 (0.033)		0.38 (0.015)	0.13 (0.005)
0805	1.91 (0.075)	1.27 (0.050)		0.40 (0.016)	
1206	3.06 (0.120)	1.60 (0.063)		0.48 (0.019)	
2010	5.08 (0.200)	2.54 (0.100)			

**SUGGESTED LAND PATTERN (TO IPC-7351A)**


CHIP SIZE	DIMENSIONS (in millimeter)		
	Z <sub>max.</sub>	G <sub>min.</sub>	X <sub>max.</sub>
0402	1.55	0.15	0.73
0603	2.37	0.35	0.98
0805	2.76	0.74	1.40
1206	3.91	1.85	1.73
2010	5.93	3.71	2.67

**LOAD LIFE STABILITY CURVES**



PVHT2010: 0.2 W/250 °C

**Note**

- Test performed on samples of 3 different values coming from different lots.

**PACKAGING**

ESD packaging available: waffle-pack, and plastic tape and reel (low conductivity). Paper tape available upon request (ESD only).

SIZE	MOQ	NUMBER OF PIECES PER PACKAGE			TAPE WIDTH
		WAFFLE PACK 2" x 2"	TAPE AND REEL		
			MIN.	MAX.	
0402	100	100	100	5000	8 mm
0603				4000	
0805					
1206		140	2000	8 mm	
2010		60			

**PACKAGING RULES**

**Waffle Pack**

Can be filled up to maximum quantity indicated in the table here above, taking into account the minimum order quantity. When quantity ordered exceeds maximum quantity of a single waffle pack, the waffle packs are stacked up on the top of each other and closed by one single cover.

**To get "not stacked up" waffle pack in case of ordered quantity > maximum number of pieces per package: Please consult Vishay Sfernice for specific ordering code.**

**Tape and Reel**

Can be filled up to maximum quantity indicated in the table here above, taking into account the minimum order quantity. When quantity ordered is between the MOQ and the maximum reel capacity, only one reel is provided.

**When several reels are needed for ordered quantity within MOQ and maximum reel capacity: Please consult Vishay Sfernice for specific ordering code.**

**GLOBAL PART NUMBER INFORMATION**

Global Part Numbering: PVHT1206Y1001BGT63

P	V	H	T	1	2	0	6	Y	1	0	0	1	B	G	T	6	3
GLOBAL MODEL PVHT	SIZE 0402 0603 0805 1206 2010	TCR C Y E H	VALUE The first three digits are significant figures and the last digit specifies the number of zeros to follow, R designates decimal point  10R0 = 10 Ω 3901 = 3900 Ω 1004 = 1 MΩ	TOLERANCE W = 0.05 % B = 0.1 % D = 0.5 % F = 1 %	TERMINATION G = Gold	PACKAGING T = Tape and reel Blank = Waffle pack	OPTION Leave blank if no option										



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