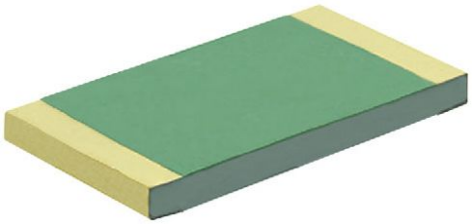
High Stability - Very High Temperature (270 °C) Thin Film Wraparound Chip Resistors, Sulfur Resistant



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: 0.8 % typical (1 % max.) after 2000 h at 250 °C (ambient) at Pn
- Shelf life stability: 1.5 % typical after 8000 h
- SMD wraparound
- 0.02 % upon request
- TCR remains constant after long term storage at 270 °C
- Sulfur resistant (per ASTM B809-95 humid vapor test)
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

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 in conjunction with this datasheet to help them to properly design their board and get the best performances of the PVHT.

Vishay Sfernice research and development engineers will be willing to support any customer design considerations.

STANDARD ELECTRICAL SPECIFICATIONS

MODEL	SIZE	RESISTANCE RANGE Ω	RATED POWER (1)(2) $P_{250\,°C}$ W	LIMITING ELEMENT VOLTAGE V	TOLERANCE ± %	TEMPERATURE COEFFICIENT (3) ± ppm/°C
PVHT0402	0402	39 to 45K	0.031	50	0.05, 0.1, 0.5, 1	5, 10, 15, 25, 30, 50, 55
PVHT0603	0603	39 to 108K	0.062	75	0.05, 0.1, 0.5, 1	5, 10, 15, 25, 30, 50, 55
PVHT0805	0805	39 to 240K	0.100	150	0.05, 0.1, 0.5, 1	5, 10, 15, 25, 30, 50, 55
PVHT1206	1206	39 to 900K	0.165	200	0.05, 0.1, 0.5, 1	5, 10, 15, 25, 30, 50, 55
PVHT2010	2010	39 to 2.5M	0.2	300	0.05, 0.1, 0.5, 1	5, 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 and consult Vishay Sfernice

(2) See derating curve 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

PERFORMANCE VS. HUMID SULFUR VAPOR

Test conditions	50 °C ± 2 °C, 85 % ± 4 % RH, exposure time 500 h
Test results	Resistance drift < (0.05 % R + 0.05 Ω), no corrosion products observed

MECHANICAL SPECIFICATIONS

Substrate	Alumina
Resistive Element	Thin Film
Passivation	Silicon nitride (Si_3N_4)
Protection	Epoxy + Silicone
Terminations	Gold (< 1 µm) over nickel barrier

Caution:

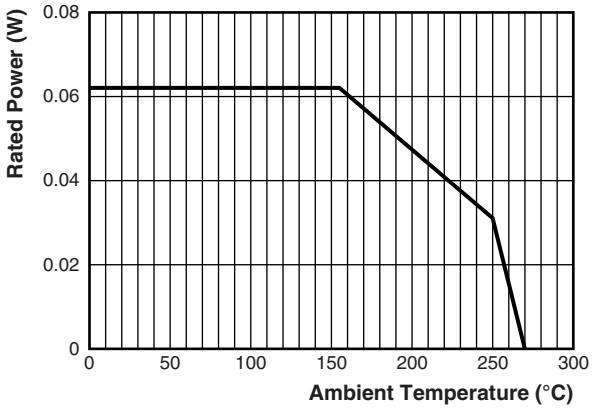
Performances obtained with following mounting conditions:

- Test board material: alumina
- Solder paste: PbSnAg (93.5/5/1.5)

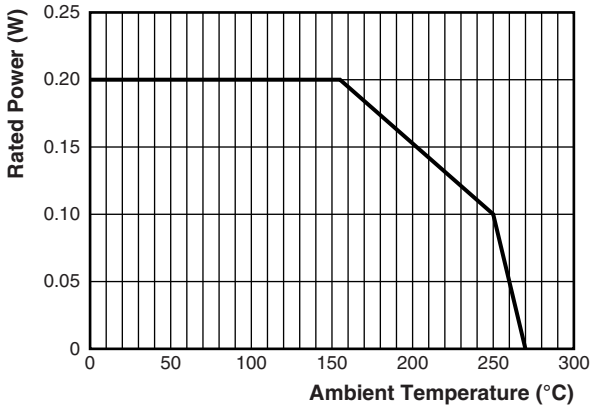
TABLE 1 - TEMPERATURE COEFFICIENT		
Z	5 ppm/°C	0 °C; +70 °C
	10 ppm/°C	-55 °C; +270 °C
Y	10 ppm/°C	-55 °C; +155 °C
	15 ppm/°C	-55 °C; +270 °C
E	25 ppm/°C	-55 °C; +155 °C
	30 ppm/°C	-55 °C; +270 °C
H	50 ppm/°C	-55 °C; +155 °C
	55 ppm/°C	-55 °C; +270 °C

TABLE 2			
SERIES	**RANGE (Ω)**	**TOL. (± %)**	**TCR CODE**
0402	From 39 to 45K	0.05, 0.1, 0.5, 1	Z; Y; E; H
0603	From 39 to 108K	0.05, 0.1, 0.5, 1	Z; Y; E; H
0805	From 39 to 240K	0.05, 0.1, 0.5, 1	Z; Y; E; H
1206	From 39 to 900K	0.05, 0.1, 0.5, 1	Z; Y; E; H
2010	From 39 to 2.5M	0.05, 0.1, 0.5, 1	Z; Y; E; H

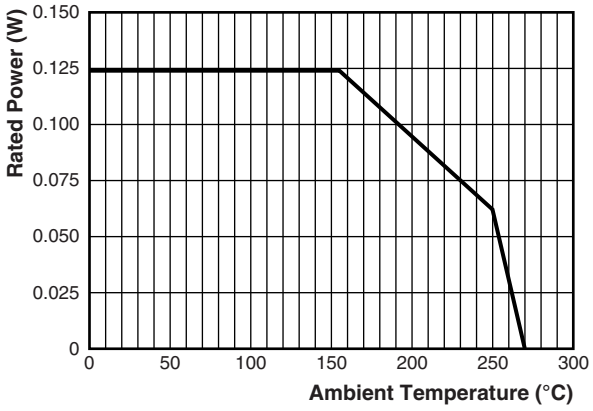
POWER DERATING CURVE



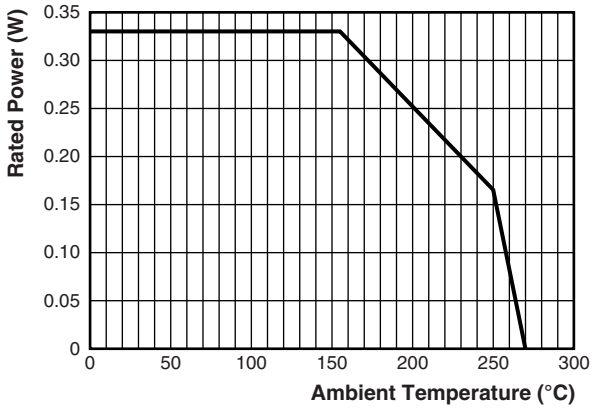
PVHT0402 Power Derating Curve



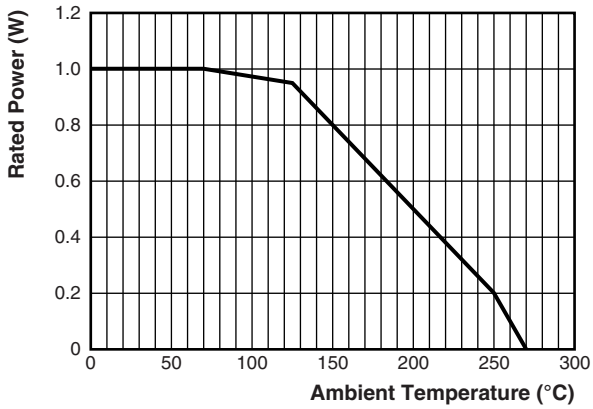
PVHT0805 Power Derating Curve



PVHT0603 Power Derating Curve

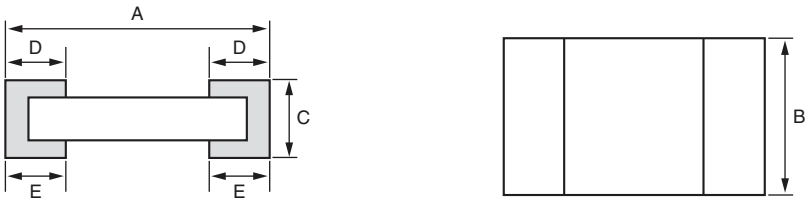


PVHT1206 Power Derating Curve



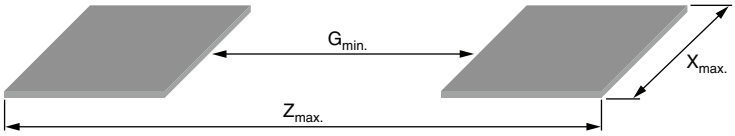
PVHT2010 Power Derating Curve

DIMENSIONS in millimeters (inches)



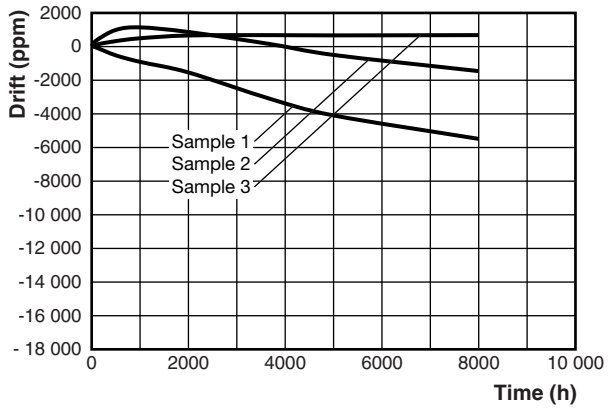
CASE SIZE	A	B	C	D/E	
	MAX. TOL. +0.152 (+0.006) MIN. TOL. -0.152 (-0.006)	MAX. TOL. +0.127 (+0.005) MIN. TOL. -0.127 (-0.005)			
	NOMINAL	NOMINAL		NOMINAL	TOLERANCE
0402	1.00 (0.039)	0.60 (0.024)	0.4 (0.016) ± 0.051 (0.002)	0.25 (0.010)	0.1 (0.004)
0603	1.52 (0.060)	0.85 (0.033)		0.38 (0.015)	0.13 (0.005)
0805	1.91 (0.075)	1.27 (0.050)			
1206	3.06 (0.120)	1.60 (0.063)		0.40 (0.016)	
2010	5.08 (0.200)	2.54 (0.100)		0.48 (0.019)	

SUGGESTED LAND PATTERN (TO IPC-7351A)



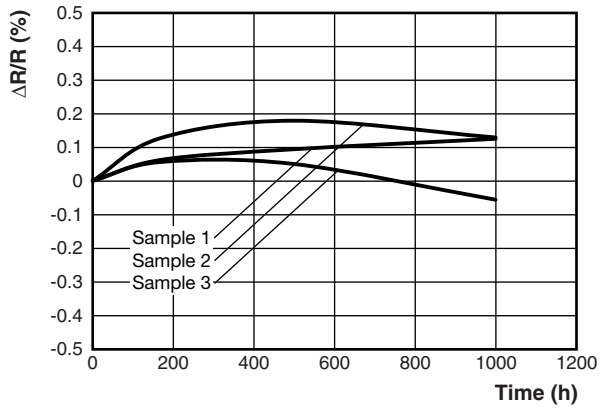
CHIP SIZE	DIMENSIONS (in millimeter)		
	$Z_{max.}$	$G_{min.}$	$X_{max.}$
0402	1.55	0.15	0.73
0603	2.37	0.35	0.98
0805	2.76	0.74	1.40
1206	3.91	1.85	1.73
2010	5.93	3.71	2.67

STORAGE CURVE



250 °C Drift (Storage) vs. Time

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" × 2"	TAPE AND REEL		
			MIN.	MAX.	
0402	200	100	100	5000	8 mm
0603					
0805				4000	
1206		140			
2010		60		2000	8 mm

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

See part numbering information to get the quantity desired by tape.

GLOBAL PART NUMBER INFORMATION

GLOBAL PART NUMBERING: PVHT1206Y1001BGT63

(Limited to 18 digits: If more digits are necessary a codification of some digits might be used)

P	V	H	T	1	2	0	6	Y	1	0	0	1	B	G	T	6	3

GLOBAL MODEL	SIZE	TCR	VALUE	TOLERANCE	TERMINATION	PACKAGING	OPTION
PVHT	**0402** **0603** **0805** **1206** **2010**	**Z** **Y** **E** **H**	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	**W** = 0.05 % **B** = 0.1 % **D** = 0.5 % **F** = 1 %	**G** = gold	1 or 2 digits: see codification of packaging table	Leave blank if no option

CODIFICATION OF PACKAGING	
CODE	**PACKAGING**
WAFFLE PACK	
W	100 min., 1 mult
WA	100 min., 100 mult (available only in size 1206)
PLASTIC TAPE (standard tape for all sizes, except 0402)	
T	100 min., 1 mult
TA	100 min., 100 mult
TB	250 min., 250 mult
TC	500 min., 500 mult
TD	1000 min., 1000 mult
TE	2500 min., 2500 mult
TF	Full tape (quantity depending on size of chips)
PAPER TAPE (standard for 0402, upon request for other sizes)	
PT	100 min., 1 mult
PA	100 min., 100 mult
PB	250 min., 250 mult
PC	500 min., 500 mult
PD	1000 min., 1000 mult
PE	2500 min., 2500 mult
PF	Full tape (quantity depending on size of chips)

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