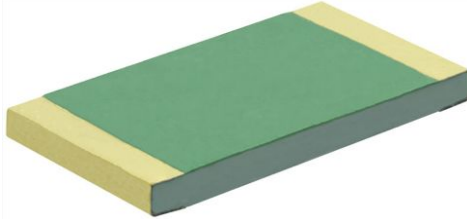


High Stability - Very High Temperature (270 °C) Thin Film Wraparound Chip Resistors, Sulfur Resistant


DESIGN SUPPORT TOOLS
[click logo to get started](#)
3D
Models
Available

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.

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


RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

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 ₃ N ₄)
Protection	Epoxy + Silicone
Terminations	Gold (< 1 μm) over nickel barrier

Caution:

Performances obtained with following mounting conditions:

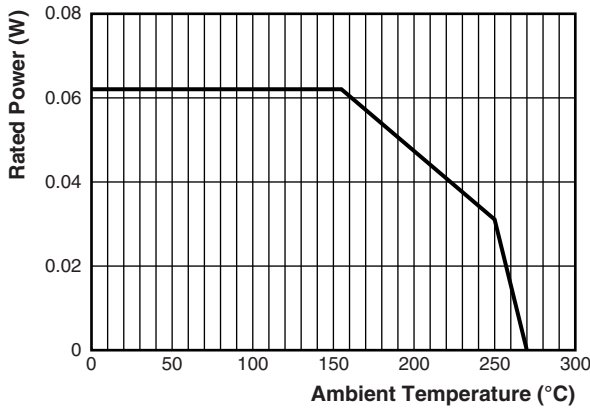
- Test board material: alumina
- Solder paste: PbSnAg (93.5/5/1.5)



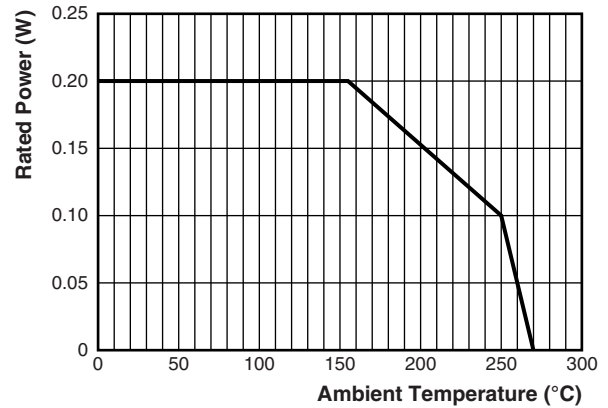
TABLE 1 - TEMPERATURE COEFFICIENT		
Z	5 ppm/°C	0 °C; +70 °C
	10 ppm/°C	-55 °C; +270 °C
Y	10 ppm/°C	-55 °C; +155 °C
	15 ppm/°C	-55 °C; +270 °C
E	25 ppm/°C	-55 °C; +155 °C
	30 ppm/°C	-55 °C; +270 °C
H	50 ppm/°C	-55 °C; +155 °C
	55 ppm/°C	-55 °C; +270 °C

TABLE 2			
SERIES	RANGE (Ω)	TOL. (± %)	TCR CODE
0402	39 to < 50	0.1, 0.5, 1	Z; Y; E; H
	50 to 45K	0.05, 0.1, 0.5, 1	Z; Y; E; H
0603	39 to < 50	0.1, 0.5, 1	Z; Y; E; H
	50 to 108K	0.05, 0.1, 0.5, 1	Z; Y; E; H
0805	39 to < 50	0.1, 0.5, 1	Z; Y; E; H
	50 to 240K	0.05, 0.1, 0.5, 1	Z; Y; E; H
1206	39 to < 50	0.1, 0.5, 1	Z; Y; E; H
	50 to 900K	0.05, 0.1, 0.5, 1	Z; Y; E; H
2010	39 to < 50	0.1, 0.5, 1	Z; Y; E; H
	50 to 2.5M	0.05, 0.1, 0.5, 1	Z; Y; E; H

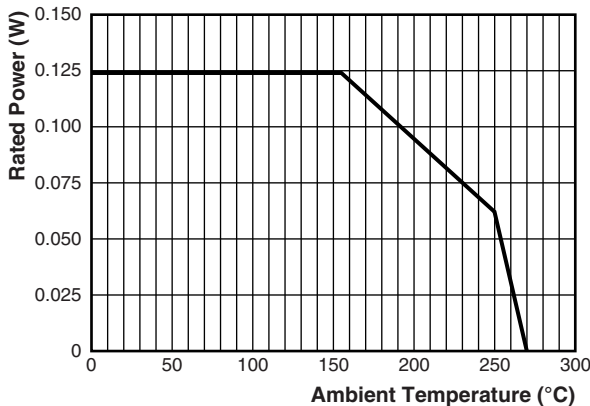
POWER DERATING CURVE



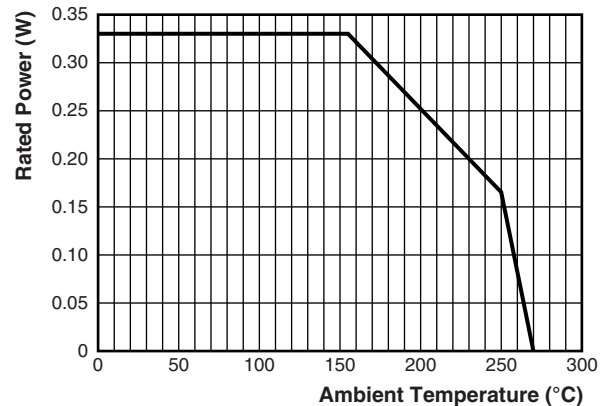
PVHT0402 Power Derating Curve



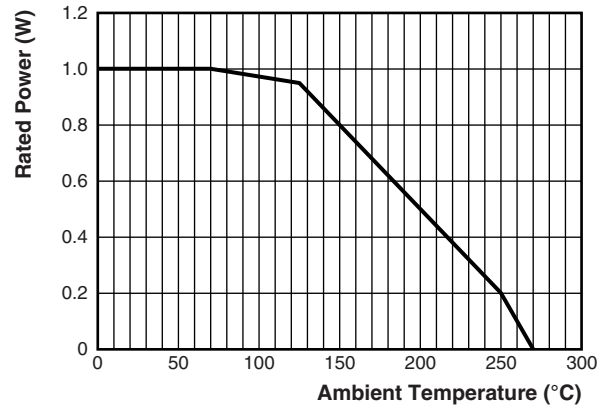
PVHT0805 Power Derating Curve



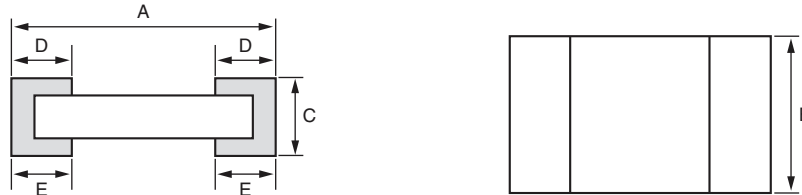
PVHT0603 Power Derating Curve



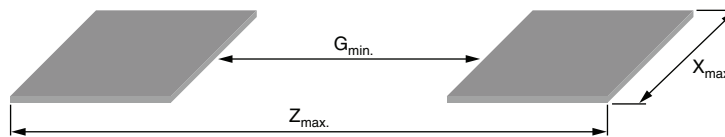
PVHT1206 Power Derating Curve



PVHT2010 Power Derating Curve

DIMENSIONS in millimeters (inches)


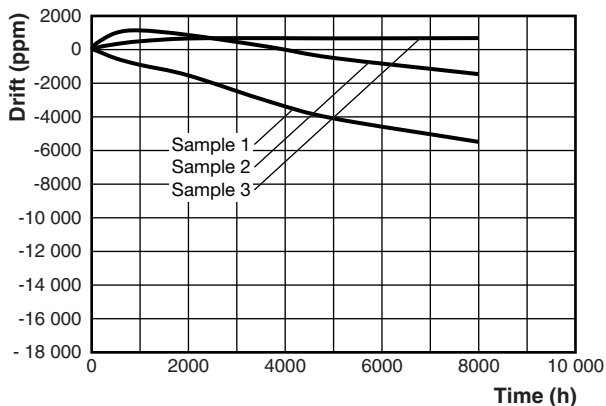
CASE SIZE	A	B	C	D/E	
	MAX. TOL. +0.152 (+0.006) MIN. TOL. -0.152 (-0.006)	MAX. TOL. +0.127 (+0.005) MIN. TOL. -0.127 (-0.005)		NOMINAL	TOLERANCE
	NOMINAL	NOMINAL		NOMINAL	TOLERANCE
0402	1.00 (0.039)	0.60 (0.024)	0.4 (0.016) ± 0.051 (0.002)	0.25 (0.010)	0.1 (0.004)
0603	1.52 (0.060)	0.85 (0.033)		0.38 (0.015)	0.13 (0.005)
0805	1.91 (0.075)	1.27 (0.050)		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 _{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

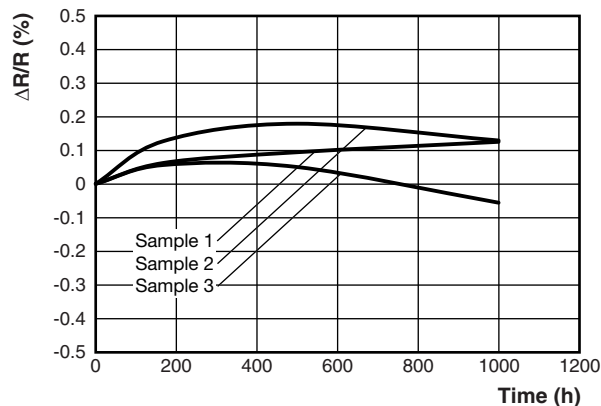


STORAGE CURVE



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 (for sizes 0402, 0603, 0805 and 1206).

SIZE	MOQ	NUMBER OF PIECES PER PACKAGE		TAPE WIDTH
		WAFFLE PACK 2" x 2"	TAPE AND REEL MIN. MAX.	
0402	200	100	100	8 mm
0603				
0805				
1206				
2010		60	1000	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)



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)	
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 (Available for 0402, 0603, 0805 and 1206. Please consult Vishay Sfernice for 2010 size.)	
PT	100 min., 1 mult
PA	100 min., 100 mult
PB	250 min., 250 mult
PC	500 min., 500 mult
PD (not available for size 0402)	1000 min., 1000 mult
PE (not available for size 0402)	2500 min., 2500 mult
PF (not available for size 0402)	Full tape (quantity depending on size of chips)



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.