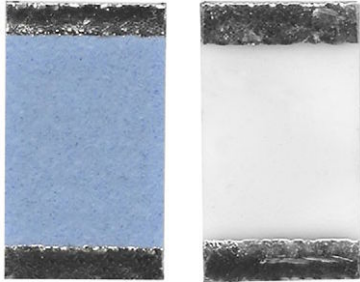


# High Precision Wraparound - Wide Ohmic Value Range Thin Film Chip Resistors, Sulfur Resistant



## LINKS TO ADDITIONAL RESOURCES



For low noise and precision applications, superior stability, low temperature coefficient of resistance, and low voltage coefficient, Vishay Sfernice's proven precision thin film wraparound resistors exceed requirements of MIL-PRF-55342G characteristics  $Y \pm 10 \text{ ppm}/^\circ\text{C}$  (-55 °C; +155 °C) down to  $\pm 5 \text{ ppm}/^\circ\text{C}$  (-55 °C; +155 °C).

## FEATURES

- Load life stability 0.02 % typical at 8000 h at 70 °C under Pd (0.033 % maximum)
- Low temperature coefficient down to **5 ppm/°C** (-55 °C; +155 °C)
- Very low noise < -35 dB and voltage coefficient < 0.01 ppm/V
- Wide resistance range: 10 Ω to 86 MΩ depending on size
- Tolerances to **± 0.01 %**
- In lot tracking  $\leq 5 \text{ ppm}/^\circ\text{C}$
- Termination: thin film technology
- Short circuits (jumpers)  $r < 50 \text{ mR}$ ,  $I < 2 \text{ A}$ , see PZR datasheet ([www.vishay.com/doc?53053](http://www.vishay.com/doc?53053))
- Withstand moisture resistance test of AEC-Q200
- Sulfur resistant (per ASTM B809-95 humid vapor test)
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS\***  
Available

**HALOGEN  
FREE**  
Available

**GREEN  
(5-2008)**  
Available

## Note

\* This datasheet provides information about parts that are RoHS-compliant and / or parts that are non RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details

## STANDARD ELECTRICAL SPECIFICATIONS

MODEL	SIZE	RESISTANCE RANGE <sup>(2)</sup> (Ω)	RATED POWER W Pn <sup>(1)</sup>	RATED POWER W Pd <sup>(1)</sup>	LIMITING ELEMENT VOLTAGE V	TOLERANCE ± %	TEMPERATURE COEFFICIENT ± ppm/°C
P0302	0302	10 to 420K	0.040	0.030	25	0.01, 0.02, 0.05, 0.1, 0.25, 0.5, 1, 2, 5	5, 10, 25, 50, 100
P0402	0402	10 to 1M	0.063	0.040	50	0.01, 0.02, 0.05, 0.1, 0.25, 0.5, 1, 2, 5	5, 10, 25, 50, 100
P0505	0505	10 to 4M	0.125	0.050	50	0.01, 0.02, 0.05, 0.1, 0.25, 0.5, 1, 2, 5	5, 10, 25, 50, 100
P0603	0603	10 to 3.2M	0.125	0.100	75	0.01, 0.02, 0.05, 0.1, 0.25, 0.5, 1, 2, 5	5, 10, 25, 50, 100
P0805 <sup>(3)</sup>	0805	10 to 8M	0.200	0.125	150	0.01, 0.02, 0.05, 0.1, 0.25, 0.5, 1, 2, 5	5, 10, 25, 50, 100
P1005	1005	10 to 7.5M	0.250	0.125	75	0.01, 0.02, 0.05, 0.1, 0.25, 0.5, 1, 2, 5	5, 10, 25, 50, 100
P1206	1206	10 to 22M	0.330	0.250	200	0.01, 0.02, 0.05, 0.1, 0.25, 0.5, 1, 2, 5	5, 10, 25, 50, 100
P1505	1505	10 to 13.8M	0.350	0.175	200	0.01, 0.02, 0.05, 0.1, 0.25, 0.5, 1, 2, 5	5, 10, 25, 50, 100
P2010	2010	10 to 62M	1 <sup>(4)</sup>	0.500	300	0.01, 0.02, 0.05, 0.1, 0.25, 0.5, 1, 2, 5	5, 10, 25, 50, 100
P2512	2512	10 to 86M	2 <sup>(4)</sup>	1	300	0.01, 0.02, 0.05, 0.1, 0.25, 0.5, 1, 2, 5	5, 10, 25, 50, 100

## Notes

- (1) Pn = nominal power; Pd = derated power intended to improve stability
- (2) **For ohmic range versus tolerance and TCR see detailed table on next page**
- (3) Model P0805 having the same size than P0705 and the same performances, only codification of P0805 remains
- (4) With special assembly care

## CLIMATIC SPECIFICATIONS

Operating temperature range	-55 °C; +155 °C
-----------------------------	-----------------

## Note

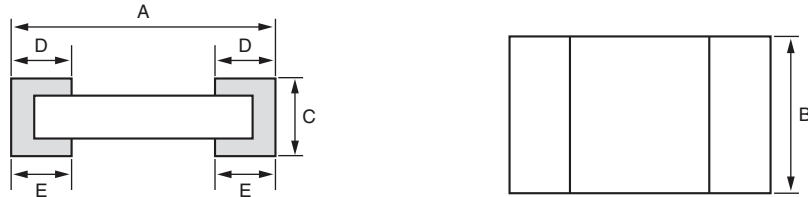
- For temperature up to 230 °C, see PHT datasheet ([www.vishay.com/doc?53050](http://www.vishay.com/doc?53050))

## 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

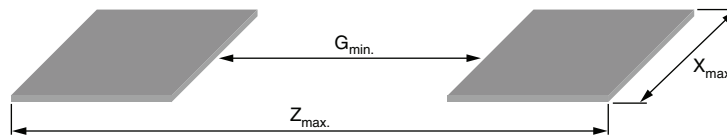
Substrate	Alumina
Technology	Thin film
Film	<b>Nickel chromium</b> with mineral passivation or <b>CrSi</b>
Protection	Epoxy + silicone
Terminations	<b>B type:</b> SnPb over nickel barrier for solder reflow <b>N type:</b> SnAg over nickel barrier <b>G type:</b> gold over nickel barrier for other applications

**DIMENSIONS** in millimeters (inches)


CASE SIZE	A		C	D/E	
	MAX. TOL. +0.152 (+0.006)	MAX. TOL. +0.127 (+0.005)		NOMINAL	TOLERANCE
	MIN. TOL. -0.152 (-0.006)	MIN. TOL. -0.127 (-0.005)			
NOMINAL	NOMINAL				
0302	0.75 (0.029)	0.60 (0.024)	0.5 (0.02) ± 0.127 (0.005)	0.15 (0.006)	0.08 (0.003)
0402	1.00 (0.039)	0.60 (0.024)		0.25 (0.010)	0.1 (0.004)
0505	1.27 (0.005)	1.27 (0.050)		0.38 (0.015)	0.13 (0.005)
0603	1.52 (0.060)	0.85 (0.033)			
0805	1.91 (0.075)	1.27 (0.050)			
1005	2.54 (0.100)	1.27 (0.050)		0.40 (0.016)	
1206	3.06 (0.120)	1.60 (0.063)		0.48 (0.019)	
1505	3.81 (0.150)	1.32 (0.052)		0.48 (0.019)	
2010	5.08 (0.200)	2.54 (0.100)			
2512	6.30 (0.248)	3.30 (0.130)			

**Note**

- Model P0805 having the same size than P0705 and the same performances, only codification of P0805 remains

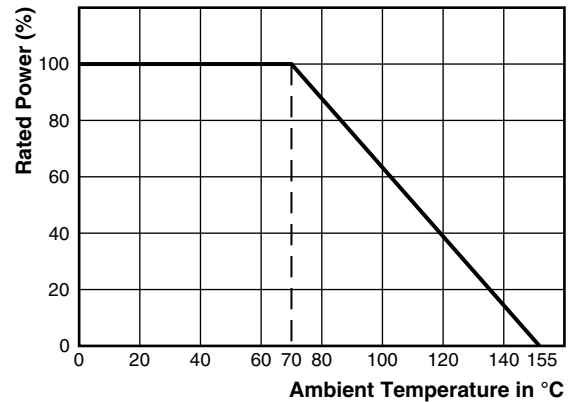
**SUGGESTED LAND PATTERN** (to IPC-7351A)


CHIP SIZE	DIMENSIONS in millimeters (inches)		
	Z <sub>max.</sub>	G <sub>min.</sub>	X <sub>max.</sub>
0302	1.30 (0.051)	0.15 (0.006)	0.73 (0.029)
0402	1.55 (0.061)	0.15 (0.006)	0.73 (0.029)
0505	1.82 (0.072)	0.10 (0.004)	1.40 (0.055)
0603	2.37 (0.093)	0.35 (0.014)	0.98 (0.039)
0805	2.76 (0.109)	0.74 (0.029)	1.40 (0.055)
1005	3.39 (0.133)	1.37 (0.054)	1.40 (0.055)
1206	3.91 (0.154)	1.85 (0.073)	1.73 (0.068)
1505	4.66 (0.183)	2.44 (0.096)	1.45 (0.057)
2010	5.93 (0.233)	3.71 (0.146)	2.67 (0.105)
2512	7.15 (0.281)	4.93 (0.194)	3.43 (0.135)



TEMPERATURE COEFFICIENT		
TCR	CODE	FILM
± 5 ppm/°C	C (-55 °C; +155 °C)	NiCr
± 5 ppm/°C	Z (0 °C; +70 °C)	NiCr
± 10 ppm/°C	Y	NiCr
± 25 ppm/°C	E	NiCr
± 50 ppm/°C	H	NiCr or CrSi
± 100 ppm/°C	K	NiCr or CrSi

**POWER DERATING CURVE**



BEST TOLERANCE AND TCR VS. OHMIC VALUE			
STYLE	RANGE (Ω)	TOLERANCE (± %)	TCR CODE
0302	10 to < 50	0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	50 to < 100	0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	100 to < 250	0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	250 to 30K	0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	> 30K to 40K	0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	Z; Y; E; H; K
	> 40K to 65K	0.05; 0.1; 0.25; 0.5; 1; 2; 5	E; H; K
	> 65K to 420K	0.1; 0.25; 0.5; 1; 2; 5 <sup>(1)</sup>	H; K
0402	10 to < 50	0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	50 to < 100	0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	100 to < 250	0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	250 to 67K	0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	> 67K to 200K	0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	Z; Y; E; H; K
	> 200K to 341K	0.05; 0.1; 0.25; 0.5; 1; 2; 5	E; H; K
	> 341K to 1M	0.1; 0.25; 0.5; 1; 2; 5 <sup>(1)</sup>	H; K
0505	10 to < 50	0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	50 to < 100	0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	100 to < 250	0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	250 to 187K	0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	> 187K to 260K	0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	Z; Y; E; H; K
	> 260K to 400K	0.05; 0.1; 0.25; 0.5; 1; 2; 5	E; H; K
	> 400K to 4M	0.1; 0.25; 0.5; 1; 2; 5 <sup>(1)</sup>	H; K
0603	10 to < 50	0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	50 to < 100	0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	100 to < 250	0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	250 to 160K	0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	> 160K to 332K	0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	Z; Y; E; H; K
	> 332K to 500K	0.05; 0.1; 0.25; 0.5; 1; 2; 5	E; H; K
	> 500K to 3M2	0.1; 0.25; 0.5; 1; 2; 5 <sup>(1)</sup>	H; K



BEST TOLERANCE AND TCR VS. OHMIC VALUE			
STYLE	RANGE ( $\Omega$ )	TOLERANCE ( $\pm$ %)	TCR CODE
0805	10 to < 50	0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	50 to < 100	0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	100 to < 250	0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	250 to 360K	0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	> 360K to 511K	0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	Z; Y; E; H; K
	> 511K to 750K	0.05; 0.1; 0.25; 0.5; 1; 2; 5	E; H; K
	> 750K to 8M	0.1; 0.25; 0.5; 1; 2; 5 <sup>(1)</sup>	H; K
1005	10 to < 50	0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	50 to < 100	0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	100 to < 250	0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	250 to 400K	0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	> 400K to 550K	0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	Z; Y; E; H; K
	> 550K to 810K	0.05; 0.1; 0.25; 0.5; 1; 2; 5	E; H; K
	> 810K to 7M5	0.1; 0.25; 0.5; 1; 2; 5 <sup>(1)</sup>	H; K
1206	10 to < 50	0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	50 to < 100	0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	100 to < 250	0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	250 to 1M3	0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	> 1M3 to 2M	0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	Z; Y; E; H; K
	> 2M to 3M5	0.05; 0.1; 0.25; 0.5; 1; 2; 5	E; H; K
	> 3M5 to 22M	0.1; 0.25; 0.5; 1; 2; 5 <sup>(1)</sup>	H; K
1505	10 to < 50	0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	50 to < 100	0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	100 to < 250	0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	250 to 720K	0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	> 720K to 1M	0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	Z; Y; E; H; K
	> 1M to 1M5	0.05; 0.1; 0.25; 0.5; 1; 2; 5	E; H; K
	> 1M5 to 13M8	0.1; 0.25; 0.5; 1; 2; 5 <sup>(1)</sup>	H; K
2010	10 to < 50	0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	50 to < 100	0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	100 to < 250	0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	250 to 3M8	0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	> 3M8 to 5M	0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	Z; Y; E; H; K
	> 5M to 7M5	0.05; 0.1; 0.25; 0.5; 1; 2; 5	E; H; K
	> 7M5 to 62M	0.1; 0.25; 0.5; 1; 2; 5 <sup>(1)</sup>	H; K
2512	10 to < 50	0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	50 to < 100	0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	100 to < 250	0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	250 to 6M4	0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	C; Z; Y; E; H; K
	> 6M4 to 8M6	0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5	Z; Y; E; H; K
	> 8M6 to 12M9	0.05; 0.1; 0.25; 0.5; 1; 2; 5	E; H; K
	> 12M9 to 86M	0.1; 0.25; 0.5; 1; 2; 5 <sup>(1)</sup>	H; K

**Note**

(1) Tolerance 0.05 % on request

**POPULAR OPTIONS**

For any option it is recommended to consult Vishay Sfernice for availability first.

**Option: Enlarged Terminations**

For stringent and special power dissipation requirements, the thermal resistance between the resistive layer and the solder joint can be reduced using enlarged terminations chip resistors which are soldered on large and thick copper pads acting as heatsink (see application note: 53048 Power Dissipation in High Precision Vishay Sfernice Chip Resistors and Arrays (P Thin Film, PRA Arrays, CHP Thick Film) [www.vishay.com/doc?53048](http://www.vishay.com/doc?53048)).

Option to order 0063: (applies to size 1206 / 1505 / 2010 / 2512).

<b>DIMENSIONS</b> (Option 0063) in millimeters							
CASE SIZE	A	B	E	D	F		
	MAX. TOL. +0.152 MIN. TOL. -0.152	MAX. TOL. +0.127 MIN. TOL. -0.127	MAX. TOL. +0.13 MIN. TOL. -0.13	MAX. TOL. +0.13 MIN. TOL. -0.13			
	NOMINAL	NOMINAL	NOMINAL	NOMINAL	NOMINAL	MIN.	MAX.
1206	3.06	1.60	0.40	1.215	0.63	0.50	0.76
1505	3.81	1.32	0.48	1.59			
2010	5.08	2.54		2.215			
2512	6.30	3.30		2.835			

<b>SUGGESTED LAND PATTERN</b> (Option 0063)			
CHIP SIZE	DIMENSIONS (IN MILLIMETER)		
	Z <sub>max.</sub>	G <sub>min.</sub>	X <sub>max.</sub>
1206	3.91	0.50	1.73
1505	4.66		1.45
2010	5.93		2.67
2512	7.15		3.43



Option: Marking

Option to order 0013:

Marking of ohmic value and tolerance:

Sizes: 0805 to 1005: 3 digits marking (according to EIA-96)

Sizes: 1206 to 2512: 4 digits marking (same codification than in the ordering procedure)

Tolerance indicated by a color dot.

Option to order 0014:

Marking of ohmic value:

Sizes: 0805 to 1005: 3 digits marking (according to EIA-96)

Sizes: 1206 to 2512: 4 digits marking (same codification than in the ordering procedure)

No standard marking available for smaller sizes.

A price adder will apply to the unit price of the parts for options 0013 and 0014.

Option: AEC-Q200

For moisture resistance test only.

Option to Order 0058:

Specific production process to withstand 85 °C/85 % at Pn/10

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.	
0302	250	340	100	5000	8 mm
0402				4000	
0505				5000	
0603	100	100	100	4000	
0805				5000	
1005				221	
1206				140	
1505				60	
2010	100	100	100	1000	
2512				50	2000

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

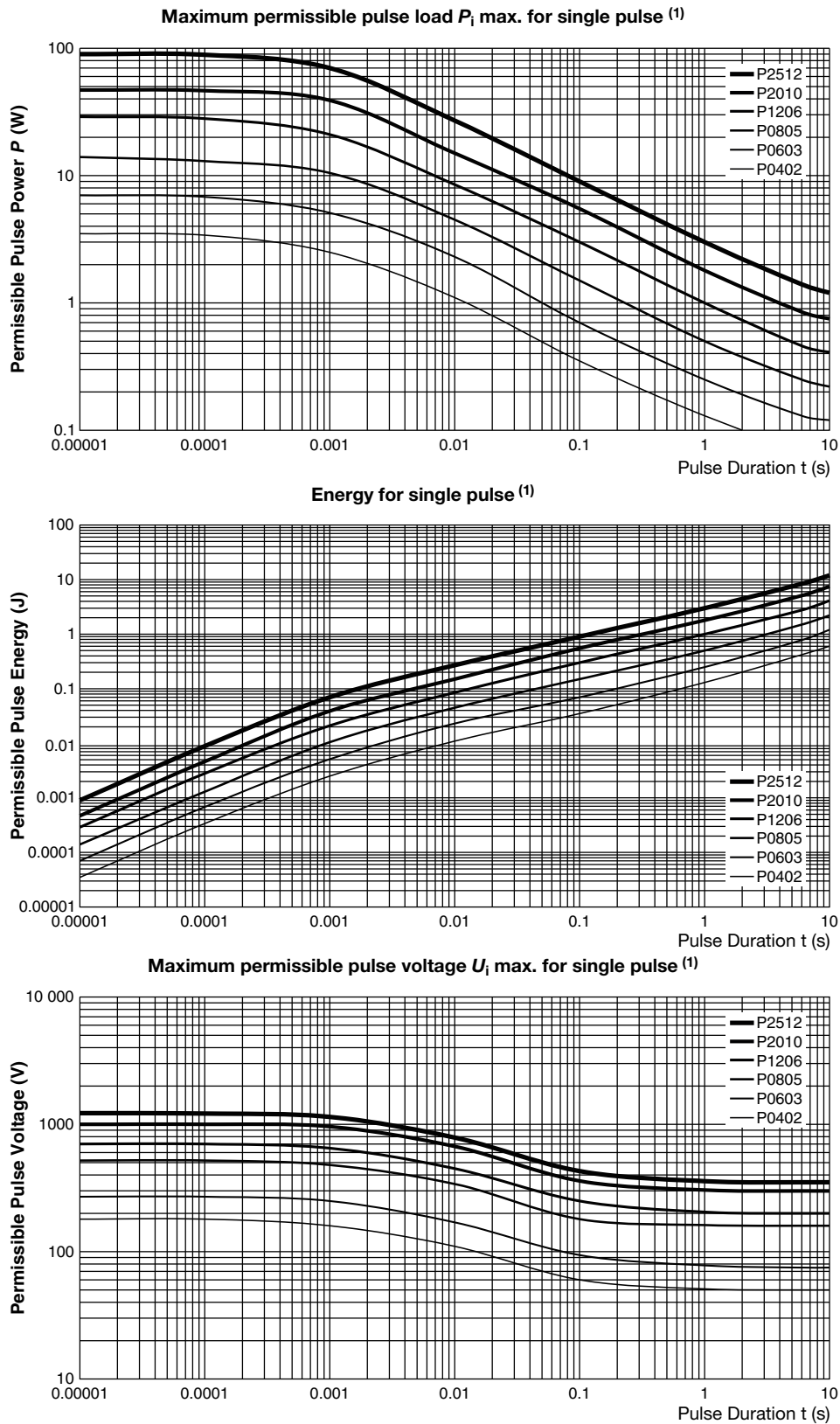
See Part Numbering information to get the quantity desired by tape.

PERFORMANCE			
TESTS	CONDITIONS	MIL OR CECC REQUIREMENTS	TYPICAL PERFORMANCES
Thermal shock	MIL-PRF-55342G MIL-STD-202 F-Method 107 F	± 0.05 %	± 0.02 %
Short time overload	MIL-PRF-55342G PARA 3.10.4.7.5	± 0.05 %	± 0.01 %
Low temperature operation	MIL-PRF-55342G PARA 3.9 and 4.7.4	± 0.05 %	± 0.01 %
Resistance to solder heat	MIL-PRF-55342G PARA 3.12, 4.7.7, 4.7.1.2	± 0.05 %	± 0.03 %
Moisture resistance	MIL-PRF-55342G PARA 3.13 and 4.7.8 MIL-STD-202 F-Method 106 E	± 0.10 %	± 0.01 %
	CECC 56 days/40 °C/93 % RH	± 0.10 %	± 0.01 %
	AEC-Q200 (1) 85 °C/85 % RH/Pn/10, 1000 h	± 0.5 % + 0.05 Ω	Max. < 0.3 % + 0.05 Ω
High temperature	MIL-PRF-55342G PARA 3.11 and 4.7.6	± 0.05 %	± 0.05 %
Load life	MIL-PRF-55342G 8000 h Pn at 70 °C MIL-STD-202 F-Method 108 A	± 0.5 %	± 0.1 % (2)

Notes

(1) Option to order 0058

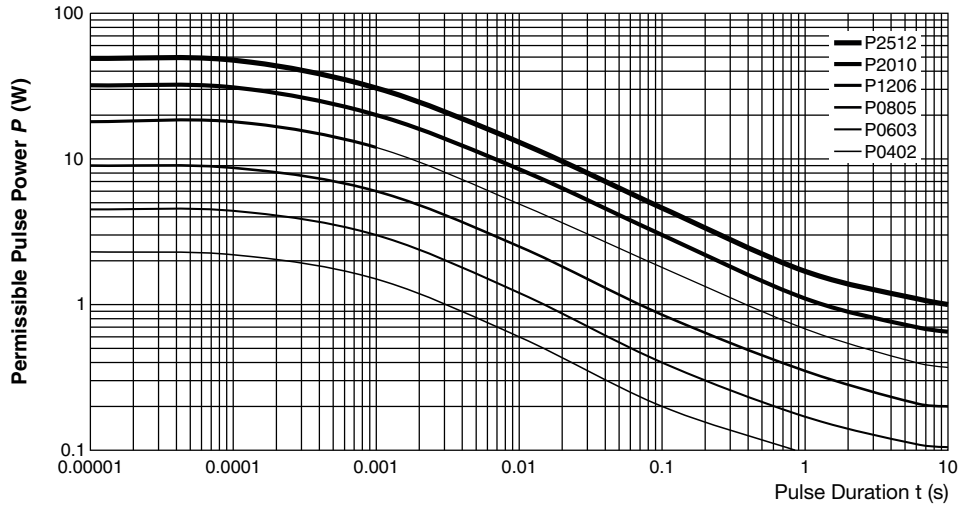
(2) Typical drift ± 0.02 % at Pd



**Note**

<sup>(1)</sup> One should apply the data mentioned on the 3 curves together to get the right performances

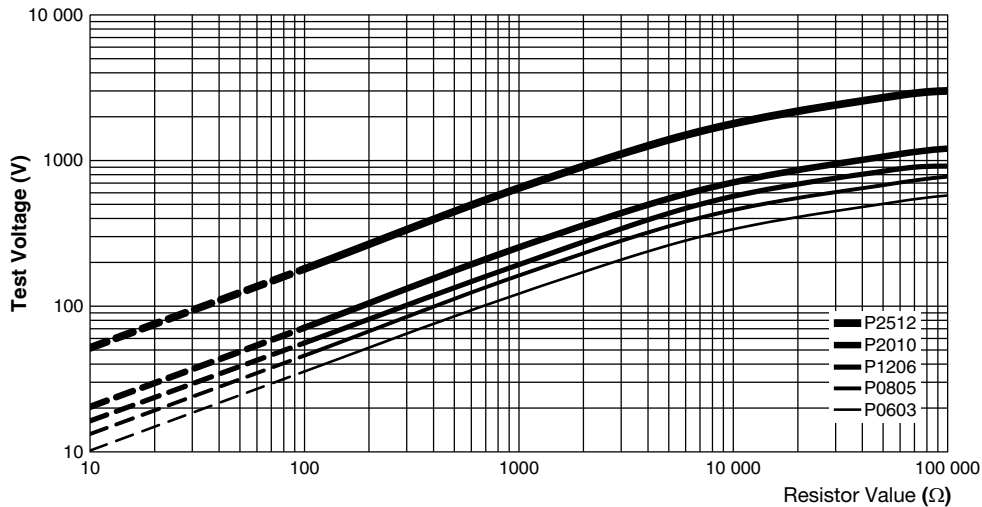
Maximum permissible pulse load  $P_i$  max.



1.2/50  $\mu$ s lightning surge



10/700  $\mu$ s lightning surge







GLOBAL PART NUMBER INFORMATION																
New Global Part Numbering: P0505Y1003BBT999																
P	0	5	0	5	Y	1	0	0	3	B	B	T		9	9	9
GLOBAL MODEL	SIZE	TCR	VALUE	TOLERANCE	TERMINATION	PACKAGING	OPTION									
P	0302 0402 0505 0603 0805 1005 1206 1505 2010 2512	K = ± 100 ppm/°C H = ± 50 ppm/°C E = ± 25 ppm/°C Y = ± 10 ppm/°C Z = ± 5 ppm (0 °C; +70 °C) C = ± 5 ppm (- 55 °C; + 155 °C)	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	L = ± 0.01 % P = ± 0.02 % W = ± 0.05 % B = ± 0.1 % C = ± 0.25 % D = ± 0.5 % F = ± 1 % G = ± 2 % J = ± 5 %	B: SnPb over nickel barrier N: SnAg over nickel barrier G: gold over nickel barrier  B: lead bearing version N and G: lead (Pb)-free/RoHS version	For more information see "Codification of packaging" table	From 1 to 3 digits, leave blank if no option									
<b>Historical Part Number Examples:</b>																
P1206Y1001LNT100 (tapes of 100 pieces)																
P1206H7151FBT250 (tapes of 250 pieces)																
P1206Y1503WNT1K032 (tapes of 1000 pieces and option 32)																
P1206Y2372BG (waffle pack)																
Historical part numbers are not recommended, but can still be used for ordering.																

CODIFICATION OF PACKAGING	
CODE 18	PACKAGING
<b>WAFFLE PACK</b>	
W	100 min., 1 mult.
WA	100 min., 100 mult. (available only in size 1206)
<b>PLASTIC TAPE (in standard for all sizes)</b>	
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)
<b>PAPER TAPE (available for 0402, 0603, 0805, and 1206. Please consult Vishay Sfernice for other sizes)</b>	
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)

**Notes**

- For CECC qualified, see RV datasheet ([www.vishay.com/doc?60022](http://www.vishay.com/doc?60022))
- For ESCC qualified, see PHR datasheet ([www.vishay.com/doc?53037](http://www.vishay.com/doc?53037)) or PFRR datasheet ([www.vishay.com/doc?53046](http://www.vishay.com/doc?53046))
- For high temperature (230 °C), see PHT datasheet ([www.vishay.com/doc?53050](http://www.vishay.com/doc?53050))
- For very high temperature (270 °C), see PVHT datasheet ([www.vishay.com/doc?53060](http://www.vishay.com/doc?53060))
- For strap (0 Ω), see PZR datasheet ([www.vishay.com/doc?53053](http://www.vishay.com/doc?53053))



## 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.