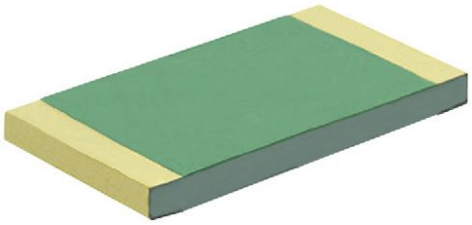
High Precision Wraparound - Power Enhanced Thin Film Chip Resistors



LINKS TO ADDITIONAL RESOURCES

3D Models

INTRODUCTION

PEP series chip resistors are designed for high power applications, low noise, superior stability, low temperature coefficient of resistance, and low voltage coefficient. The resistive thin film layer can withstand an established temperature as high as 250 °C: hence, the restrictions are mainly due to the robustness of terminations and solder joints.

PEP series is recommended for customers who need to switch to lower size devices, with the same power limits.

FEATURES

- Load life stability: 0.1 % typical (0.35 % max.) at 2000 h / P_n / 70° C
- Very low noise < -35 dB and voltage coefficient < 0.01 ppm/V
- Wide resistance range: 39 Ω to 900 kΩ depending on size
- Tolerances down to **± 0.05 %**
- Termination: thin film technology
- P_n: up to 1 W for 1206 size, without cooling under PCB required
- 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)

STANDARD ELECTRICAL SPECIFICATIONS

MODEL	SIZE	RESISTANCE RANGE Ω	RATED POWER W P_n (1)	RATED POWER W P_d (1)	LIMITING ELEMENT VOLTAGE V	TOLERANCE ± % (2)	TEMPERATURE COEFFICIENT (2) ± ppm/°C
PEP0402	0402	39 to 50K	0.125	0.063	50	0.05, 0.1, 0.5, 1	5, 10, 25, 50
PEP0603	0603	39 to 108K	0.320	0.125	75	0.05, 0.1, 0.5, 1	5, 10, 25, 50
PEP0805	0805	39 to 240K	0.500	0.200	150	0.05, 0.1, 0.5, 1	5, 10, 25, 50
PEP1206	1206	39 to 900K	0.660 (3)	0.330	200	0.05, 0.1, 0.5, 1	5, 10, 25, 50

Notes

(1) P_n = nominal power: P_d = derated power intended to improve stability

(2) **For ohmic range versus tolerance and TCR, see Best Tolerance and TCR vs. Ohmic Value" table**

(3) P_n = 1 W if PEP1206 is mounted on alumina board

CLIMATIC SPECIFICATIONS

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

PERFORMANCE VS. HUMID SULFUR VAPOR

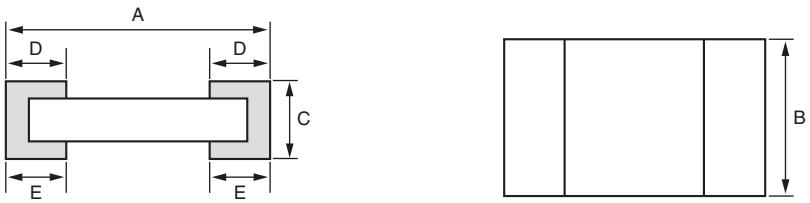
Test conditions	50 °C ± 2 °C, 85 % ± 4 % RH, exposure time 500 h
Test results	Resistance drift < (0.05 % R + 0.05 Ω), no corrosion products observed

MECHANICAL SPECIFICATIONS

Substrate	Alumina
Technology	Thin film
Film	**Nickel chromium based alloy** with mineral passivation
Protection	Epoxy + silicone
Terminations	**N type:** tin silver over nickel barrier **G type:** gold over nickel barrier

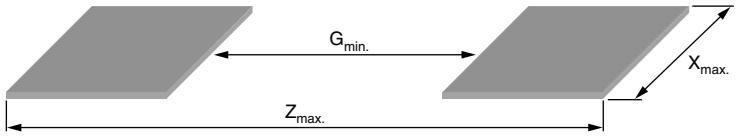
For technical questions, contact: sferthinfilm@vishay.com

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)	**Termination N:** 0.5 (0.02) ± 0.127 (0.005) **Termination G:** 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)	

SUGGESTED LAND PATTERN (to IPC-7351A)

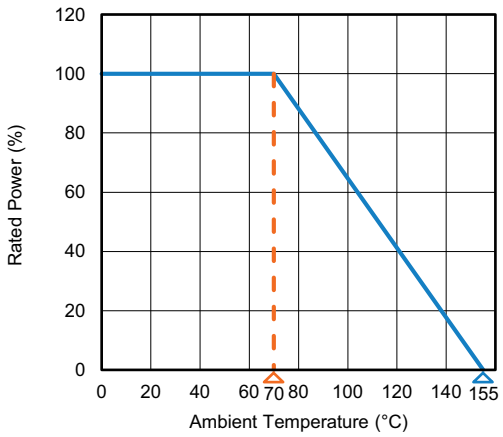


CHIP SIZE	DIMENSIONS in millimeter (inches)		
	$Z_{max.}$	$G_{min.}$	$X_{max.}$
0402	1.55 (0.061)	0.15 (0.006)	0.73 (0.029)
0603	2.37 (0.093)	0.35 (0.014)	0.98 (0.039)
0805	2.76 (0.109)	0.74 (0.029)	1.40 (0.055)
1206	3.91 (0.154)	1.85 (0.073)	1.73 (0.068)

TEMPERATURE COEFFICIENT

TCR (ppm/°C)	CODE (TEMPERATURE RANGE)
± 5	Z (0 °C; +70 °C)
± 10	Y (-55 °C; +155 °C)
± 25	E (-55 °C; +155 °C)
± 50	H (-55 °C; +155 °C)

POWER DERATING CURVE



BEST TOLERANCE AND TCR VS. OHMIC VALUE			
STYLE	**RANGE (Ω)**	**TOLERANCE (± %)**	**TCR CODE**
0402	39 to < 50	0.1, 0.5, 1	Z; Y; E; H
	50 to 50K	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

POPULAR OPTIONS

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

Option: Marking

Option to order 0013:

Marking of ohmic value and tolerance:
0805 size: 3 digits marking (according to EIA-96)
1206 size: 4 digits marking (same codification than in the ordering procedure)
Tolerance indicated by a color dot.

Option to order 0014:

Marking of ohmic value:
0805 size: 3 digits marking (according to EIA-96)
1206 size: 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.

PACKAGING

ESD packaging available: waffle-pack, plastic tape and reel (low conductivity), and paper tape and reel.

SIZE	MOQ	NUMBER OF PIECES PER PACKAGE			TAPE WIDTH
		WAFFLE PACK 2" × 2"	TAPE AND REEL		
			MIN.	MAX.	
0402	100	340	100	5000	8 mm
0603		100			
0805				4000	
1206		140			

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.

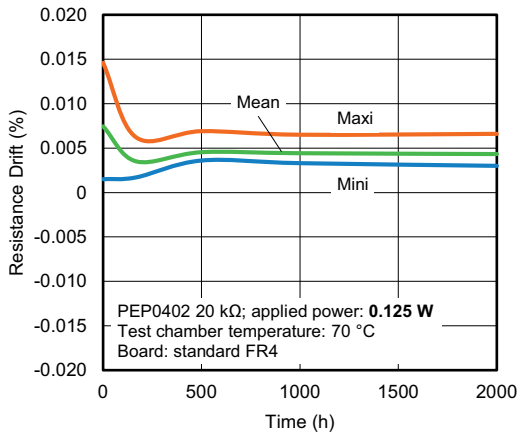
To get "not stacked up" waffle pack in case of ordered quantity > maximum number of pieces per package: Please consult Vishay Sfernice for specific ordering code.

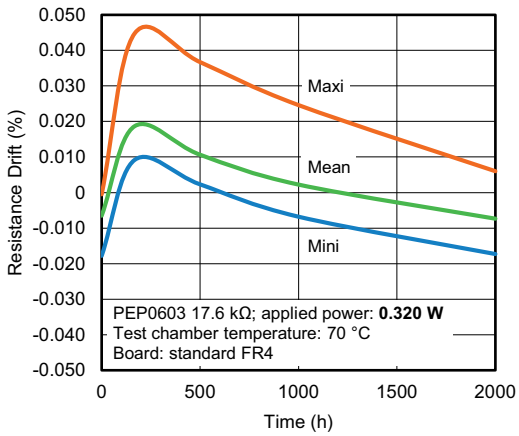
Tape and Reel

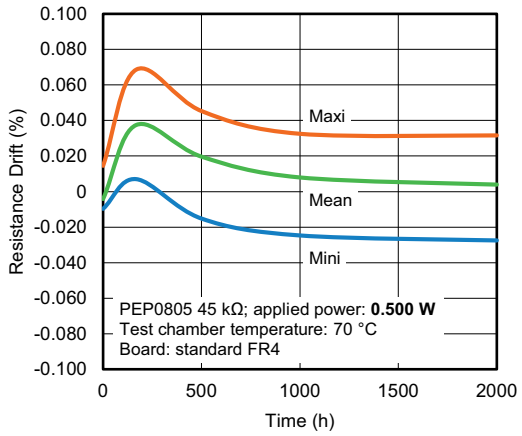
See Global Part Number Information to get the quantity desired by tape.

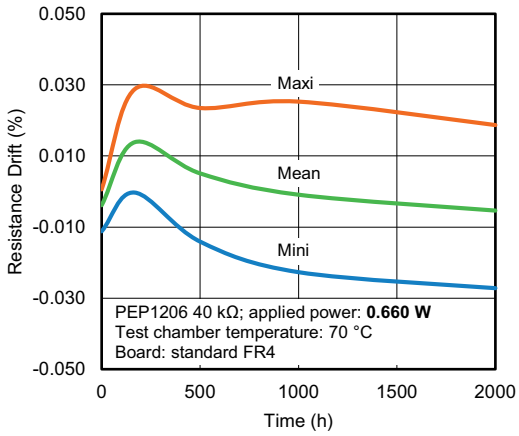
PERFORMANCES			
TESTS	**CONDITIONS**	**MIL OR CECC REQUIREMENTS**	**TYPICAL VISHAY PERFORMANCES**
Thermal shock	MIL-PRF-55342G MIL-STD-202 F-Method 107 F	± 0.05 %	± 0.02 %
Short time overload	MIL-PRF-55342G PARA 3.10.4.7.5	± 0.05 %	± 0.01 %
Resistance to solder heat	MIL-PRF-55342G PARA 3.12, 4.7.7, 4.7.1.2	± 0.05 %	± 0.03 %
Resistance of terminations (bending test)	CECC	± 0.05 %	± 0.01 %
Load life	MIL-PRF-55342G 2000 h P_n at 70 °C MIL-STD-202 F-Method 108 A	± 0.5 %	± 0.1 %

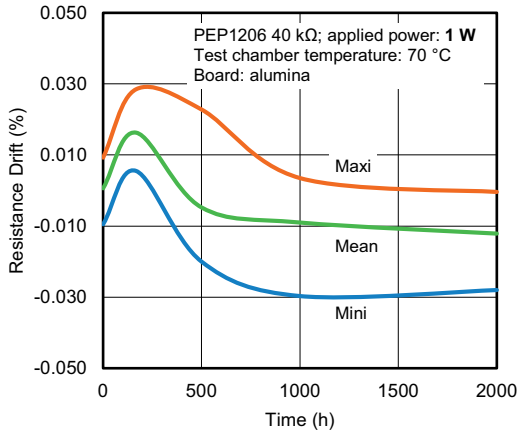
STABILITY TEST RESULTS











Note

- Note about stability test results: all parts reported by reflow with solder paste lead (Pb)-free SAC305 (Sn 96.5 % / Ag 3 % / Cu 0.5 %)

GLOBAL PART NUMBER INFORMATION

Global Part Numbering: PEP1206Y1003BGTB99

P	E	P	1	2	0	6	Y	1	0	0	3	B	G	T	B	9	9

GLOBAL MODEL	SIZE	TCR	VALUE	TOLERANCE	TERMINATION	PACKAGING	OPTION
PEP	**0402** **0603** **0805** **1206**	**Z =** ± 5 ppm (0 °C; +70 °C) **Y =** ± 10 ppm/°C **E =** ± 25 ppm/°C **H =** ± 50 ppm/°C	The first three digits are significant figures and the last digit specifies the number of zeros to follow, R designates decimal point Examples: 1000 = 100 Ω 3901 = 3900 Ω 1004 = 1 MΩ	**W** = ± 0.05 % **B** = ± 0.1 % **D** = ± 0.5 % **F** = ± 1 %	**N** = tin silver over nickel barrier **G** = gold over nickel barrier	For more information see “Codification of Packaging” table	For more information see “Codification of options on two digits” table **Leave blank if no option**

CODIFICATION OF OPTIONS ON TWO DIGITS

OPTION	OPTION 2 DIGITS
..	..
0099	99
0100	0A
0101	0A
0102	0C
0103	0D
0104	0E
0105	0F
..	..
0124	0Y
0125	0Z
0126	1A
0127	1B
0128	1C
..	..
0320	8M
0321	8N
0322	8O
0323	8P
0324	8Q
0325	8R
..	..

CODIFICATION OF SIZES

CODE 18	CODE 40
9	0402
C	0603
D	0805
H	1206

CODIFICATION OF PACKAGING

CODE 18	PACKAGING
WAFFLE PACK	
W	100 min., 1 mult.
WA	100 min., 100 mult. (available only on size 1206)
PLASTIC TAPE (in standard 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)

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