PAC.. Series

Vishay Draloric

Cemented Leaded Wirewound Precision Resistors



www.vishay.com

FEATURES

- High power dissipation in small volume
- Ideal for pulse application
- TCR ± 100 ppm/K
- Maximum permissible hot spot temperature is 275 $^{\circ}\mathrm{C}$
- Lead (Pb)-free
- Tolerance 1 %
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

The resistor element is a resistive wire which is wound in a single layer on a ceramic rod. Metal caps are pressed over the ends of the rod. The ends of the resistance wire and the leads are connected to the caps by welding. Tinned copper-clad iron leads with poor heat conductivity are employed permitting the use of relatively short leads to obtain stable mounting without overheating the solder joint.

The resistor is coated with a green silicon cement which is not resistant to aggressive fluxes. The coating is non-inflammable, will not drip even at high overloads and is resistant to most commonly used cleaning solvents, in accordance with IEC 60068-2-45.

| STANDARD ELECTRICAL SPECIFICATIONS | | | | | | | |
|------------------------------------|-----------------------------------------|------------------------------------------|---------------------------------------------|------------------|--|--|--|
| MODEL | POWER RATING P _{25 °C} W | LIMITING VOLTAGE U _{max.} | RESISTANCE RANGE ⁽²⁾ Ω | TOLERANCE ± % | | | |
| PAC01 | 1 | $\sqrt{P \times R}$ | 0.10 to 2.2K | 1 | | | |
| PAC02 ⁽¹⁾ | 2 | $\sqrt{P \times R}$ | 0.10 to 3.6K | 1 | | | |
| PAC03 | 3 | $\sqrt{P \times R}$ | 0.10 to 4.7K | 1 | | | |
| PAC04 | 4 | √P x R | 0.10 to 8.2K | 1 | | | |
| PAC05 | 5 | $\sqrt{P \times R}$ | 0.10 to 12K | 1 | | | |
| PAC06 | 6 | $\sqrt{P \times R}$ | 0.10 to 12K | 1 | | | |

Notes

• For Pulse Diagrams see AC.. Series (www.vishay.com/doc?28730)

⁽¹⁾ PAC02 WSZ: $P_{25 \circ C} = 1.8 \text{ W}$

⁽²⁾ Resistance value to be selected for ± 1 % tolerance from E24 and E96



COMPLIANT

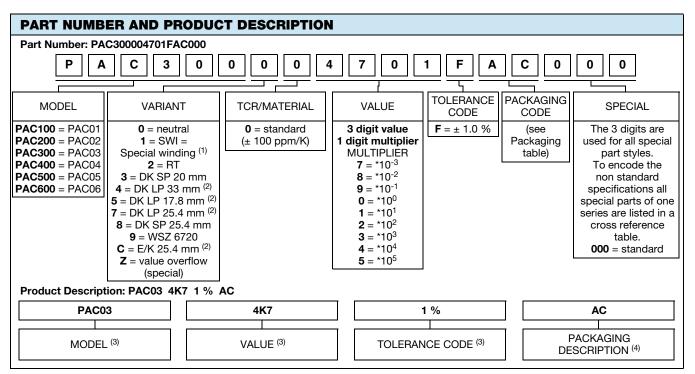
HALOGEN

GREEN

(5-2008)



Vishay Draloric



Notes

(1) Special winding on request

⁽²⁾ Other dimensions on request

⁽³⁾ See "Part Number and Product Description"

(4) See "Packaging Table"

| PACKAGING TABLE | | | | | | | | | |
|-----------------|--------|--------------|----------------|--------|--------------|----------------|---------|--------------|----------------|
| | АММО | | | LOOSE | | | BLISTER | | |
| MODEL | PIECES | PACK CODE | PACK. DESC. | PIECES | PACK CODE | PACK. DESC. | PIECES | PACK CODE | PACK. DESC. |
| PAC01 | 1000 | A1 | A1 | | | | | | |
| PAC01 DK/EK | | | | 500 | LC | LC | | | |
| PAC01RT | 2500 | AE | AE | | | | | | |
| PAC02 | 500 | AC | AC | | | | | | |
| PAC02 DK/EK | | | | 500 | LC | LC | | | |
| PAC02 WSZ | | | | | | | 1250 | BM | BM |
| PAC03 | 500 | AC | AC | | | | | | |
| PAC03 DK/EK | | | | 500 | LC | LC | | | |
| PAC04 | 500 | AC | AC | | | | | | |
| PAC04 DK/EK | | | | 500 | LC | LC | | | |
| PAC05 | 500 | AC | AC | | | | | | |
| PAC05 DK/EK | | | • | 250 | LB | LB | | | |
| PAC06 | 500 | AC | AC | | | | | | |
| PAC06 DK/EK | | | • | 250 | LB | LB | | | |

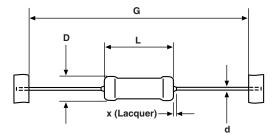
Revision: 14-Mar-17



www.vishay.com

Vishay Draloric

DIMENSIONS in millimeters [inches]



| MODEL | D _{max.} | L _{max.} | d | X _{max.} | G | WEIGHT g PER UNIT |
|-------|-------------------|-------------------|-----------------|-------------------|------------------------|----------------------|
| PAC01 | 4.3 [0.169] | 11 [0.433] | | 2 | 63 ± 1 [2.480 ± 0.039] | 0.52 |
| PAC02 | 4.8 [0.189] | 13 [0.512] | | 2 | 63 ± 1 [2.480 ± 0.039] | 0.75 |
| PAC03 | 5.5 [0.217] | 16.5 [0.650] | 0.8 ± 0.03 | 3 | 63 ± 1 [2.480 ± 0.039] | 1.10 |
| PAC04 | 7.5 [0.295] | 18 [0.709] | [0.031 ± 0.001] | 3 | 73 ± 1 [2.874 ± 0.039] | 1.90 |
| PAC05 | 7.5 [0.295] | 26 [1.024] | | 3 | 73 ± 1 [2.874 ± 0.039] | 2.60 |
| PAC06 | 7.5 [0.295] | 26 [1.024] | | 3 | 73 ± 1 [2.874 ± 0.039] | 2.60 |

Note

• For packaging dimensions see: <u>www.vishay.com/doc?28721</u>



PAC.. Series

Vishay Draloric

| BENDING FO | RMS | | | | | | | | |
|---------------------------------------------|-----|---------------------|---------------------|-----------------------------|---------------------------|------------------------------|-------------------|-------------------|---------|
| KINK TYPE S = EK | | | ØD + S | | ← L | | - Ø d | | |
| ТҮРЕ | Ød | 9 | Ø D _{max.} | ð D _{max.} L h ± 1 | | P±1 | | S _{max.} | |
| PAC01 | | | | | | | 17.8 | | |
| PAC02 - PAC04 | 0.8 | | (1) | (1) | | 8 | 25.4 | | 2 |
| PAC05 - PAC06 | | | | | | | 33.0 | | |
| DOUBLE KINK SP = DK SP $+ S + - O B P_2$ | | | | | | | | | |
| ТҮРЕ | ØD | Ø D _{max.} | L | h ± 1 | P ₁ ± 1 | P ₂ ± 3 | S _{max.} | ØВ | c |
| PAC01 PAC02 - PAC04 PAC05 - PAC06 | 0.8 | (1) | (1) | 8 | 19.8 22.0 27.4 35.0 | 17.8 20.0 25.4 33.0 | 2 | 1.0 ± 0.1 | 4.5 ± 1 |
| DOUBLE KINK LP = DK LP $S = S = P_2$ | | | | | | | | | |
| ТҮРЕ | ØD | Ø D _{max.} | L | h ± 1 | P ₁ ± 1 | P ₂ ± 3 | S _{max.} | ØВ | с |
| PAC01 - PAC02 | | | | | 17.8 | 17.8 | | | |
| PAC02 - PAC04 | 0.8 | (1) | (1) | 8 | 25.4 | 25.4 | 2 | 1.0 ± 0.1 | 4.5 ± 1 |
| PAC05 - PAC06 | | | | | 33.0 | 33.0 | | | |

Note

(1) See table DIMENSIONS

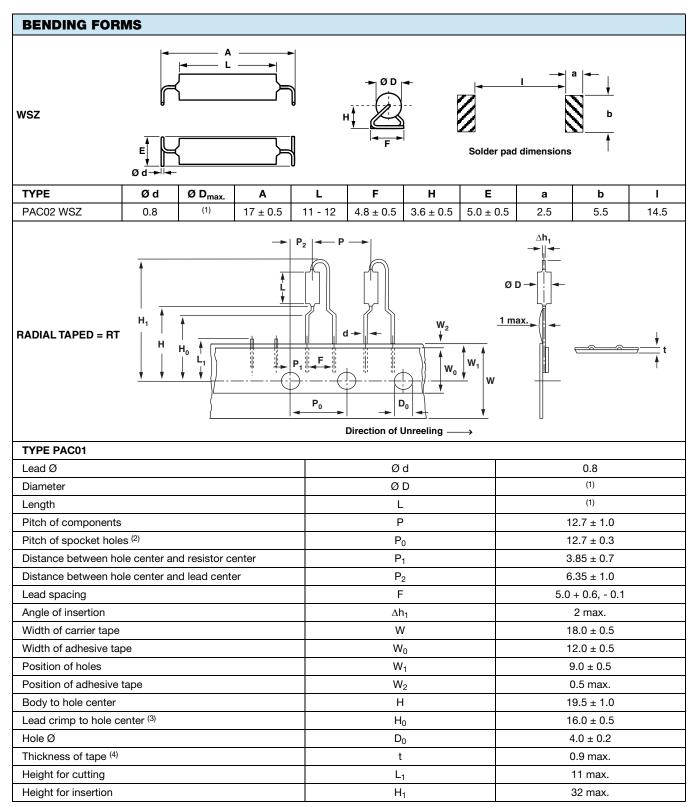
4



www.vishay.com

PAC.. Series

Vishay Draloric



Notes

⁽¹⁾ See table DIMENSIONS

 $^{(2)}$ Test over 10 holes - 9 intervals P_0 12.7 x 9 = 114.3 \pm 0.5

⁽³⁾ Parallelism, < 0.5 mm

 $^{(4)}$ Thickness of carrier tape: 0.55 mm \pm 0.1

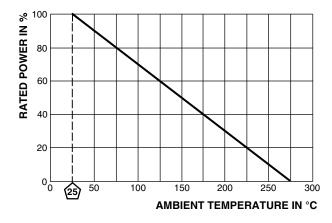
Revision: 14-Mar-17

5

Document Number: 28731



DERATING



Maximum dissipation ($P_{max.}$) as a function of the ambient temperature (T_{amb})

| PERFORMANCE | | | | | |
|--------------------------------------------------------------------------------------------|-------------------------------------------|--|--|--|--|
| TEST | PERMISSIBLE CHANGE | | | | |
| Climatic category (LCT/UCT/Days) | 55/200/56 | | | | |
| Climatic Sequence IEC 60115-1 4.23 | $\Delta R = \pm (0.5 \% R + 0.05 \Omega)$ | | | | |
| Damp Heat, Steady State, IEC 60115-1, 4.24 (40 ± 2) °C, 56 days, (93 ± 3) % RH | $\Delta R = \pm (1.0 \% R + 0.05 \Omega)$ | | | | |
| Endurance at room temperature (116 % <i>P</i> ₇₀), 1000 h, IEC 60115-1, 4.25.2 | $\Delta R = \pm (0.5 \% R + 0.05 \Omega)$ | | | | |
| Storage, UCT, IEC 60115-1, 4.25.3 1000 h, 200 °C, no load | $\Delta R = \pm (1.0 \% R + 0.05 \Omega)$ | | | | |
| Resistance to Soldering Heat, IEC 60115-1, 4.18 (260 \pm 5) °C, (10 \pm 1) s | $\Delta R = \pm (0.2 \% R + 0.05 \Omega)$ | | | | |
| Robustness of Termination, IEC 60115-1, 4.16 10N | $\Delta R = \pm (0.1 \% R + 0.05 \Omega)$ | | | | |
| Short Time Overload, IEC 60115-1, 4.13 10 x Rated Power for 5 s | $\Delta R = \pm (0.2 \% R + 0.05 \Omega)$ | | | | |

Vishay Draloric



HISTORICAL 12NC INFORMATION

- The resistors had a 12-digit ordering code staring with 2306 327
- The subsequent first digit indicated the resistor type and packaging.
- The remaining 4 digits indicated the resistance value:
 - The first 3 digits indicated the resistance value.
 - The last digit indicated the resistance decade in accordance with Resistance Decade table.

Resistance Decade

| RESISTANCE DECADE | LAST DIGIT |
|-------------------|------------|
| 0.10 to 0.976 Ω | 7 |
| 1 to 9.76 Ω | 8 |
| 10 to 97.6 Ω | 9 |
| 100 to 976 Ω | 1 |
| 1 to 9.76 kΩ | 2 |
| 10 to 12 kΩ | 3 |

Ordering Example

The ordering code for an PAC02, resistor value 47 Ω with \pm 1 % tolerance, supplied in ammopack of 500 units was: 2306 327 04709.

| HISTORICAL 12NC - Resistor type and packaging | | | | | | | | |
|-----------------------------------------------|-----------------------|------------|------------|--|--|--|--|--|
| | 2306 327 | | | | | | | |
| ТҮРЕ | BANDOLIER IN AMMOPACK | | | | | | | |
| | RADIAL | STRAIGH | IT LEADS | | | | | |
| | 2500 units | 500 units | 1000 units | | | | | |
| PAC01 | RT ⁽¹⁾ | - | 2306 327 5 | | | | | |
| PAC02 | - | 2306 327 0 | - | | | | | |
| PAC03 | - | 2306 327 1 | - | | | | | |
| PAC04 | - | 2306 327 2 | - | | | | | |
| PAC05 | - | 2306 327 3 | - | | | | | |
| PAC06 | - | 2306 327 4 | - | | | | | |

Note

⁽¹⁾ Radial parts with tin plated copper leads



Vishay

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.

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.