

Cemented Wirewound Resistors


FEATURES

- All welded construction
- Ceramic core
- Non-flammable cement coating
- Tinned copper-clad iron leads (for axial parts)
- High power dissipation in small volume
- Ideal for pulse application
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

| STANDARD ELECTRICAL SPECIFICATIONS | | | | | | | |
|------------------------------------|---|---|--------------------------------------|--|--|---|----------------------|
| MODEL | POWER RATING $P_{40^\circ\text{C}}$ W | POWER RATING $P_{70^\circ\text{C}}$ W | LIMITING VOLTAGE U_{max} | RESISTANCE RANGE ⁽¹⁾ Ω TCR = - 10 ppm/K to - 80 ppm/K | RESISTANCE RANGE ⁽¹⁾ Ω TCR = 100 ppm/K to 180 ppm/K | RESISTANCE RANGE ⁽¹⁾ Ω TCR= \pm 100 ppm/K | TOLERANCE \pm % |
| AC01 | 1 | 0.9 | $\sqrt{P \times R}$ | 0.10 to 33 | 36 to 2.4K | n/a | 5 |
| AC03 ⁽²⁾ | 3 | 2.5 | $\sqrt{P \times R}$ | 0.10 to 390 | 430 to 3.3K | 3.6K to 5.1K | 5 |
| AC04 | 4 | 3.5 | $\sqrt{P \times R}$ | 0.10 to 620 | 680 to 6.8K | n/a | 5 |
| AC05 | 5 | 4.7 | $\sqrt{P \times R}$ | 0.10 to 910 | 1K to 10K | n/a | 5 |
| AC07 | 7 | 5.8 | $\sqrt{P \times R}$ | 0.10 to 1.5K | 1.6K to 15K | n/a | 5 |
| AC10 | 10 | 8.4 | $\sqrt{P \times R}$ | 0.22 to 560 | 620 to 27K | n/a | 5 |

Notes

- ⁽¹⁾ Resistance value to be selected for \pm 5 % from E24
⁽²⁾ AC03 WSZ: $P_{40^\circ\text{C}}$ = 1.8 W; $P_{70^\circ\text{C}}$ = 1.5 W

| PART NUMBER AND PRODUCT DESCRIPTION | | | | | | |
|--|--|-------------------------------|---|-----------------|-----------------------|--|
| Part Number: AC0300001509JAC00 | | | | | | |
| A | C | 0 | 3 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 1 | 5 | 0 |
| 9 | J | A | C | 0 | 0 | |
| MODEL | VARIANT | TCR/MATERIAL | VALUE | TOLERANCE CODE | PACKAGING CODE | SPECIAL |
| AC01000 = AC01 AC03000 = AC03 AC04000 = AC04 AC05000 = AC05 AC07000 = AC07 AC10000 = AC10 | 0 = Neutral 1 = RT 2 = SWI = Special winding ⁽³⁾ 3 = DK SP 20 mm ⁽⁴⁾ 4 = DK LP 33 mm ⁽⁴⁾ 5 = DK LP 17.8 mm ⁽⁴⁾ 6 = NI = Non inductive ⁽⁷⁾ 7 = DK LP 25.4 mm ⁽⁴⁾ 9 = WSZ 6720 8 = DK SP 25.4 mm Z = Value overflow (Special) C = E/K 25.4 mm ⁽⁴⁾ | 0 = Standard | 3 digit value 1 digit multiplier MULTIPLIER 7 = $\times 10^{-3}$ 8 = $\times 10^{-2}$ 9 = $\times 10^{-1}$ 0 = $\times 10^0$ 1 = $\times 10^1$ 2 = $\times 10^2$ 5 = 10^{-4} | J = \pm 5.0 % | (See Packaging table) | The 5 digit BV number will be encoded using a 36 character code. This code contains numbers 0...9 and letters A...Z (36 characters total) and allows to encode at least 46 655 five digit BV numbers. 00 = Standard |
| Product Description: AC03 15R 5 % AC | | | | | | |
| AC03 | 15R | 5 % | AC | | | |
| MODEL ⁽⁵⁾ | VALUE ⁽⁵⁾ | TOLERANCE CODE ⁽⁵⁾ | PACKAGING DESCRIPTION ⁽⁶⁾ | | | |

Notes

- ⁽³⁾ Special winding on request
⁽⁴⁾ Other dimensions and variants on request
⁽⁵⁾ See "Part Number and Product Description"
⁽⁶⁾ See "Packaging Table"
⁽⁷⁾ Resistance range on request

| PACKAGING TABLE | | | | | | | | | |
|-----------------|--------|------------|-------------|--------|------------|-------------|---------|------------|-------------|
| MODEL | AMMO | | | LOOSE | | | BLISTER | | |
| | PIECES | PACK. CODE | PACK. DESC. | PIECES | PACK. CODE | PACK. DESC. | PIECES | PACK. CODE | PACK. DESC. |
| AC01 | 1000 | A1 | A1 | | | | | | |
| AC01 DK/EK | | | | 500 | LC | LC | | | |
| AC01RT | 2500 | AE | AE | | | | | | |
| AC03 | 500 | AC | AC | | | | | | |
| AC03 DK/EK | | | | 500 | LC | LC | | | |
| AC03 WSZ | | | | | | | 1250 | BM | BM |
| AC04 | 500 | AC | AC | | | | | | |
| AC04 DK/EK | | | | 500 | LC | LC | | | |
| AC05 | 500 | AC | AC | | | | | | |
| AC05 DK/EK | | | | 500 | LC | LC | | | |
| AC07 | 500 | AC | AC | | | | | | |
| AC07 DK/EK | | | | 250 | LB | LB | | | |
| AC10 | 250 | AB | AB | | | | | | |

DIMENSIONS



For packaging dimensions see: www.vishay.com/doc?28721

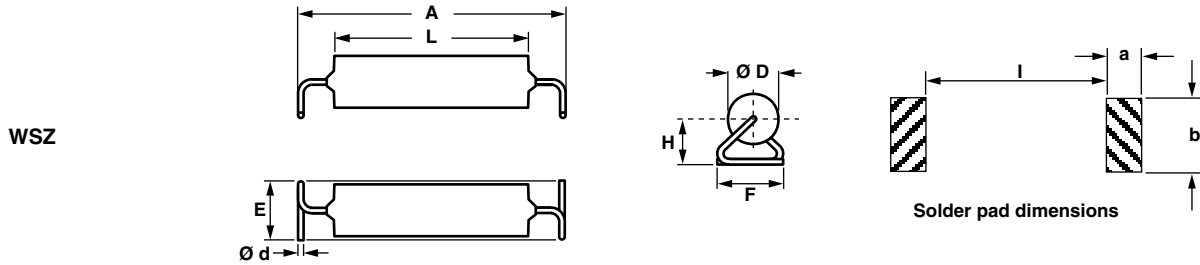
| DIMENSIONS - Resistor types, mass and relevant physical dimensions | | | | | | |
|--|------------------------------------|-------------------|-------------------------------|-------------------|------------------------|-------------------|
| MODEL | DIMENSIONS in millimeters [inches] | | | | | |
| | D _{max.} | L _{max.} | d | x _{max.} | G | WEIGHT g PER UNIT |
| AC01 | 4.3 [0.169] | 11 [0.433] | 0.8 ± 0.03 [0.031 ± 0.001] | 2 | 63 ± 1 [2.480 ± 0.039] | 0.52 |
| AC03 | 4.8 [0.189] | 13 [0.512] | | 2 | 63 ± 1 [2.480 ± 0.039] | 0.75 |
| AC04 | 5.5 [0.217] | 16.5 [0.650] | | 3 | 63 ± 1 [2.480 ± 0.039] | 1.10 |
| AC05 | 7.5 [0.295] | 18 [0.709] | | 3 | 63 ± 1 [2.480 ± 0.039] | 1.90 |
| AC07 | 7.5 [0.295] | 26 [1.024] | | 3 | 73 ± 1 [2.874 ± 0.039] | 2.60 |
| AC10 | 8.0 [0.315] | 44 [1.732] | | 3 | 88 ± 1 [3.465 ± 0.039] | 4.50 |

| BENDING FORMS | | | | | | | | | | |
|-------------------------------|------------|---------------------------|----------|--------------|--------------------------|--------------------------|-------------------------|------------|----------|------|
| KINK TYPE S = EK | | | | | | | | | | |
| TYPE | Ø d | Ø D_{max.} | L | h ± 1 | P ± 1 | S_{max.} | | | | |
| AC01 | 0.8 | (1) | (1) | 8 | 17.8 | 2 | | | | |
| AC03 - AC05 | | | | | | | | | | 25.4 |
| AC07 | | | | | | | | | | 33.0 |
| DOUBLE KINK SP = DK SP | | | | | | | | | | |
| TYPE | Ø d | Ø D_{max.} | L | h ± 1 | P₁ ± 1 | P₂ ± 3 | S_{max.} | Ø B | c | |
| AC01 | 0.8 | (1) | (1) | 8 | 19.8 | 17.8 | 2 | 1.0 ± 0.1 | 4.5 ± 1 | |
| AC03 - AC05 | | | | | 22.0 | 20.0 | | | | |
| | | | | | 27.4 | 25.4 | | | | |
| AC07 | | | | | 35.0 | 33.0 | | | | |
| DOUBLE KINK LP = DK LP | | | | | | | | | | |
| TYPE | Ø d | Ø D_{max.} | L | h ± 1 | P₁ ± 1 | P₂ ± 3 | S_{max.} | Ø B | c | |
| AC01 - AC03 | 0.8 | (1) | (1) | 8 | 17.8 | 17.8 | 2 | 1.0 ± 0.1 | 4.5 ± 1 | |
| AC03 - AC05 | | | | | 25.4 | 25.4 | | | | |
| AC07 | | | | | 33.0 | 33.0 | | | | |

Note

(1) See table DIMENSIONS

BENDING FORMS



| TYPE | $\varnothing d$ | $\varnothing D_{max.}$ | A | L | F | H | E | a | b | l |
|----------|-----------------|------------------------|--------------|---------|---------------|---------------|---------------|-----|-----|------|
| AC03 WSZ | 0.8 | (1) | 17 ± 0.5 | 11 - 12 | 4.8 ± 0.5 | 3.6 ± 0.5 | 5.0 ± 0.5 | 2.5 | 5.5 | 14.5 |



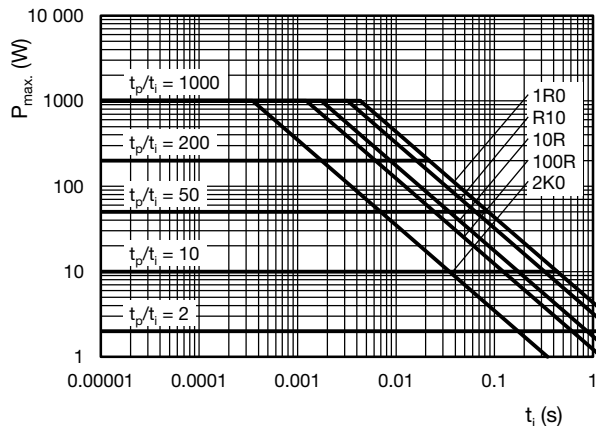
| TYPE AC01 | | |
|--|-----------------|--------------------|
| Lead \varnothing | $\varnothing d$ | 0.8 |
| Diameter | $\varnothing D$ | (1) |
| Length | L | (1) |
| Pitch of components | P | 12.7 ± 1.0 |
| Pitch of spocket holes (2) | P_0 | 12.7 ± 0.3 |
| Distance between hole center and resistor center | P_1 | 3.85 ± 0.7 |
| Distance between hole center and lead center | P_2 | 6.35 ± 1.0 |
| Lead spacing | F | $5.0 + 0.6, - 0.1$ |
| Angle of insertion | Δh_1 | 2 max. |
| Width of carrier tape | W | 18.0 ± 0.5 |
| Width of adhesive tape | W_0 | 12.0 ± 0.5 |
| Position of holes | W_1 | 9.0 ± 0.5 |
| Position of adhesive tape | W_2 | 0.5 max. |
| Body to hole center | H | 19.5 ± 1.0 |
| Lead crimp to hole center (3) | H_0 | 16.0 ± 0.5 |
| Hole \varnothing | D_0 | 4.0 ± 0.2 |
| Thickness of tape (4) | t | 0.9 max. |
| Height for cutting | L_1 | 11 max. |
| Height for insertion | H_1 | 32 max. |

Notes

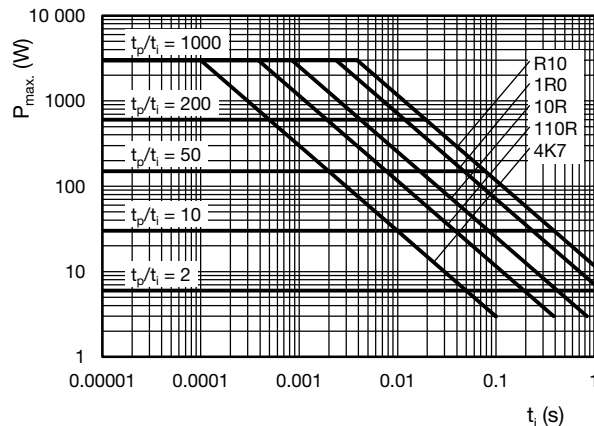
- (1) See table DIMENSIONS
- (2) Test over 10 holes - 9 intervals P_0 $12.7 \times 9 = 114.3 \pm 0.5$
- (3) Parallelism, < 0.5 mm
- (4) Thickness of carrier tape: $0.55 \text{ mm} \pm 0.1$



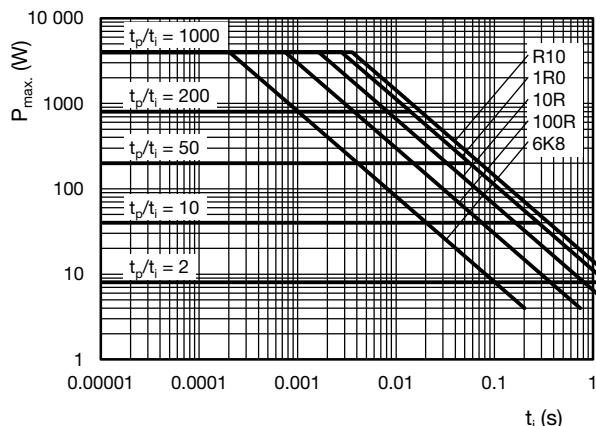
PULSE DIAGRAMS



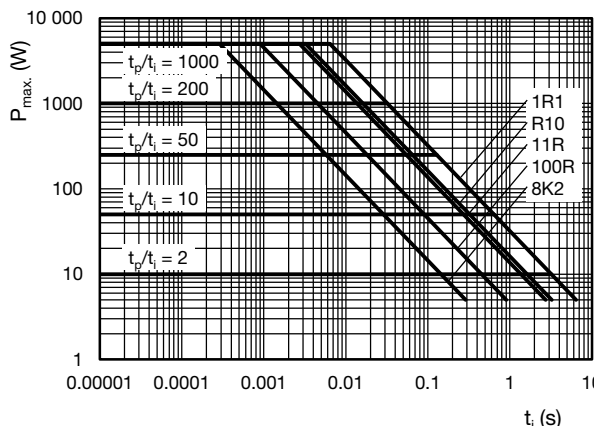
AC01 Pulse on a regular basis; maximum permissible peak pulse power (\hat{P}_{max}) as a function of pulse duration (t_i)



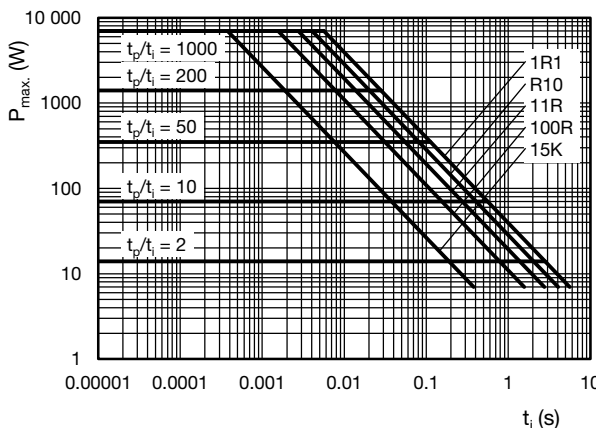
AC03 Pulse on a regular basis; maximum permissible peak pulse power (\hat{P}_{max}) as a function of pulse duration (t_i)



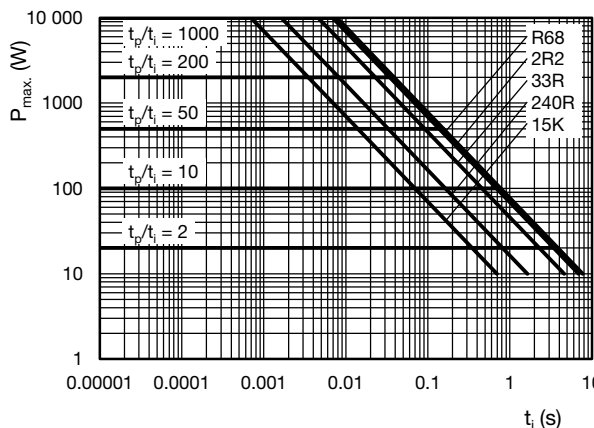
AC04 Pulse on a regular basis; maximum permissible peak pulse power (\hat{P}_{max}) as a function of pulse duration (t_i)



AC05 Pulse on a regular basis; maximum permissible peak pulse power (\hat{P}_{max}) as a function of pulse duration (t_i)



AC07 Pulse on a regular basis; maximum permissible peak pulse power (\hat{P}_{max}) as a function of pulse duration (t_i)



AC10 Pulse on a regular basis; maximum permissible peak pulse power (\hat{P}_{max}) as a function of pulse duration (t_i)



PULSE DIAGRAMS



AC01 Pulse capability; E (Ws) as a function of R (Ω)



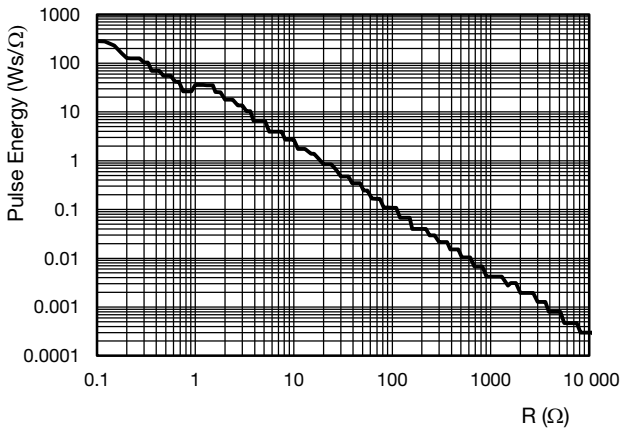
AC03 Pulse capability; E (Ws) as a function of R (Ω)



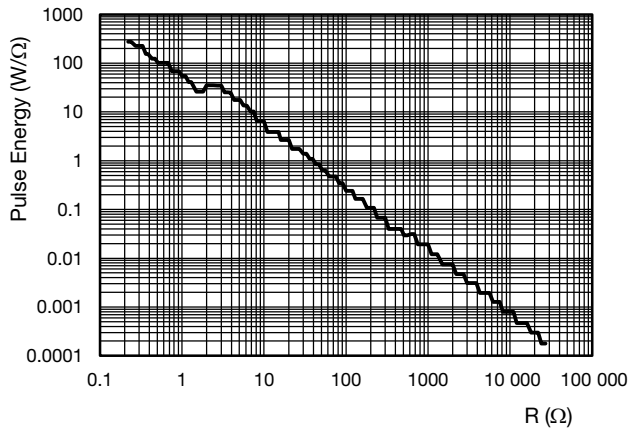
AC04 Pulse capability; E (Ws) as a function of R (Ω)



AC05 Pulse capability; E (Ws) as a function of R (Ω)



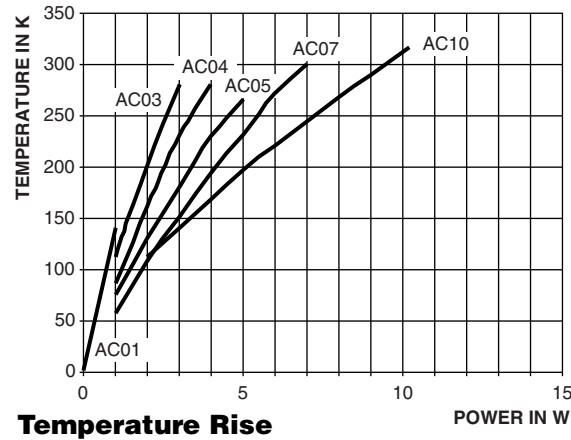
AC07 Pulse capability; E (Ws) as a function of R (Ω)



AC10 Pulse capability; E (Ws) as a function of R (Ω)



FUNCTIONAL PERFORMANCE



| PERFORMANCE | |
|---|---|
| TEST | PERMISSIBLE CHANGE |
| Climatic Category (LCT/UCT/Days) | 40/200/56 |
| Climatic Sequence, IEC 60115-1, 4.23 | $\Delta R = \pm (1 \% R + 0.05 \Omega)$ |
| Damp Heat, Steady State, IEC 60115-1, 4.24 (40 ± 2) °C, 56 days, (93 ± 3) % RH | $\Delta R = \pm (5 \% R + 0.1 \Omega)$ |
| Endurance at room temperature (116 % P70), 1000 h, IEC 60115-1, 4.25.2 | $\Delta R = \pm (5 \% R + 0.1 \Omega)$ |
| Endurance at UCT, 200 °C (30 % P70), 1000 h, IEC 60115-1, 4.25.3 | $\Delta R = \pm (5 \% R + 0.1 \Omega)$ |
| Resistance to Soldering Heat, IEC 60115-1, 4.18 (260 ± 5) °C, (10 ± 1) s | $\Delta R = \pm (0.5 \% R + 0.05 \Omega)$ |
| Robustness of Termination, IEC 60115-1, 4.16 10N | $\Delta R = \pm (0.5 \% R + 0.05 \Omega)$ |
| Short Time Overload, IEC 60115-1, 4.13 10 x Rated Power for 5 s | $\Delta R = \pm (2 \% R + 0.1 \Omega)$ |



HISTORICAL 12NC INFORMATION

- The resistors had a 12-digit ordering code starting with 23.
- The subsequent 7 digits indicated the resistor type, specification and packaging.
- The remaining 3 digits indicated the resistance value:
 - The first 2 digits indicated the resistance value.
 - The last digit indicated the resistance decade in accordance with resistance decade table.

Resistance Decade

| RESISTANCE DECADE | LAST DIGIT |
|-------------------|------------|
| 0.1 Ω to 0.91 Ω | 7 |
| 1 Ω to 9.1 Ω | 8 |
| 10 Ω to 91 Ω | 9 |
| 100 Ω to 910 Ω | 1 |
| 1 kΩ to 9.1 kΩ | 2 |
| 10 kΩ to 56 kΩ | 3 |

12NC Example

The 12NC code of an AC01 resistor, value 47 Ω supplied in ammpack of 1000 units was: 2306 328 33479.

| HISTORICAL 12NC - Resistor type and packaging | | | | |
|--|-----------------------------|----------------|--------------|--------------|
| TYPE | 23.. | | | |
| | BANDOLIER IN AMMOPACK | | | |
| | RADIAL | STRAIGHT LEADS | | |
| | 2500 units | 250 units | 500 units | 1000 units |
| AC01 | 06 328 90... ⁽²⁾ | - | - | 06 328 33... |
| AC03 ⁽¹⁾ | - | - | 22 329 03... | - |
| AC04 ⁽¹⁾ | - | - | 22 329 04... | - |
| AC05 ⁽¹⁾ | - | - | 22 329 05... | - |
| AC07 ⁽¹⁾ | - | - | 22 329 07... | - |
| AC10 | - | - | - | - |

Notes

- ⁽¹⁾ Products with bent leads and bulk packaging (100 pieces) are available on request
- ⁽²⁾ Radial parts with tin plated copper leads



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