

## Standard: AC, AEC-Q200 Qualified: AC-AT, Non-Inductive AC-NI Cemented Axial Leaded, WSZ (SMD) Wirewound Resistors



### LINKS TO ADDITIONAL RESOURCES



The AC, AC-AT and AC-NI series are the perfect choice for general purpose power electronics, industrial and automotive electronics applications. The robust silicone cement coating can handle challenging ambient and operating conditions. Typical applications include but not limited to pre-charging, discharging, snubber and in-rush current limiting. For a given application, requirements of ohmic value, rated power, peak voltage, pulse shape, pulse duration, lead bending, and environmental conditions may be submitted to recommend the most suitable product.

Various lead forms are available such as RT (radial taped), WSZ (Z-form), DK (double kink), EK (single kink) with defined mounting pitch.

### FEATURES

- Standard: AC series
- AEC-Q200 qualified: AC-AT series
- AEC-Q200 qualified, non-inductive: AC-NI series
- High power dissipation in small design
- Flameproof insulation coating meets UL 94 V-0 requirements
- Excellent pulse load capability
- WSZ-form lead bending available for SMD mounting
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
**HALOGEN FREE**  
**GREEN**  
(IS-2008)

### APPLICATIONS

- Automotive electronics:
  - Pre-charging / discharging applications in xEV
  - Snubber circuit
  - Energy absorber load resistor
- Industrial electronics, energy meter
- Power supplies
- White goods

### STANDARD ELECTRICAL SPECIFICATIONS

TYPE	RATED DISSIPATION $P_{40}$	RATED DISSIPATION $P_{70}$	LIMITING VOLTAGE $U_{max.}$	RESISTANCE RANGE <sup>(1)</sup> TCR = -10 ppm/K to -80 ppm/K <sup>(2)</sup>	RESISTANCE RANGE <sup>(1)</sup> TCR = +100 ppm/K to +180 ppm/K <sup>(2)</sup>	RESISTANCE RANGE <sup>(1)</sup> TCR = ± 100 ppm/K <sup>(2)</sup>	RESISTANCE TOLERANCE
AC01, AC01-AT	1 W	0.9 W	$\sqrt{P \times R}$	0.10 Ω to 33 Ω	36 Ω to 2.4 kΩ	-	± 5 %
AC03	3 W	2.5 W	$\sqrt{P \times R}$	0.10 Ω to 390 Ω	430 Ω to 3.3 kΩ	3.6 kΩ to 5.1 kΩ	± 5 %
AC03-AT	3 W	2.5 W	$\sqrt{P \times R}$	0.10 Ω to 390 Ω	430 Ω to 3.3 kΩ	-	± 5 %
AC04, AC04-AT	4 W	3.5 W	$\sqrt{P \times R}$	0.10 Ω to 620 Ω	680 Ω to 6.8 kΩ	-	± 5 %
AC05, AC05-AT	5 W	4.7 W	$\sqrt{P \times R}$	0.10 Ω to 910 Ω	1.0 kΩ to 10 kΩ	-	± 5 %
AC07, AC07-AT	7 W	5.8 W	$\sqrt{P \times R}$	0.10 Ω to 820 Ω	910 Ω to 15 kΩ	-	± 5 %
AC10, AC10-AT	10 W	8.4 W	$\sqrt{P \times R}$	0.22 Ω to 560 Ω	620 Ω to 27 kΩ	-	± 5 %

### ELECTRICAL SPECIFICATIONS FOR AC-NI

TYPE	RATED DISSIPATION $P_{40}$	RATED DISSIPATION $P_{70}$	LIMITING VOLTAGE $U_{max.}$	RESISTANCE RANGE <sup>(1)</sup> TCR = -10 ppm/K to -80 ppm/K <sup>(2)</sup>	RESISTANCE TOLERANCE	TYPICAL INDUCTANCE <sup>(3)</sup> nH
AC03-NI	3 W	2.5 W	$\sqrt{P \times R}$	0.10 Ω to 69 Ω	± 5 %	12 (for 0.1 Ω)
AC04-NI	4 W	3.5 W	$\sqrt{P \times R}$	0.10 Ω to 68 Ω	± 5 %	12 (for 0.1 Ω)
AC05-NI	5 W	4.7 W	$\sqrt{P \times R}$	0.18 Ω to 56 Ω	± 5 %	8 (for 0.18 Ω)

#### Notes

(1) Resistance value to be selected from E24 series

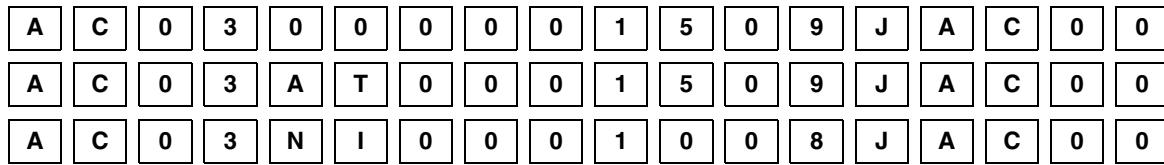
(2) Temperature coefficient of resistive wire

(3) Inductance values mentioned are typical, measured under controlled conditions.

For the product types and resistance ranges which are not given in above table, please contact factory at [ww1resistors@vishay.com](mailto:ww1resistors@vishay.com)

**PART NUMBER AND PRODUCT DESCRIPTION**

Part Number: AC03000001509JAC00  
AC03AT0001509JAC00  
AC03NI0001008JAC00



MODEL
AC01000 = AC01
AC03000 = AC03
AC04000 = AC04
AC05000 = AC05
AC07000 = AC07
AC10000 = AC10
AC01AT0 = AC01-AT
AC03AT0 = AC03-AT
AC04AT0 = AC04-AT
AC05AT0 = AC05-AT
AC07AT0 = AC07-AT
AC10AT0 = AC10-AT
AC03NI0 = AC03-NI
AC04NI0 = AC04-NI
AC05NI0 = AC05-NI

VARIANT <sup>(1)</sup>
0 = neutral
1 = RT
2 = SWI
3 = DK SP 20 mm
4 = DK LP 33 mm
5 = DK LP 17.8 mm
6 = not in use for new designs
7 = DK LP 25.4 mm
8 = DK SP 25.4 mm
9 = AC03 / AC03AT / AC03NI-WSZ
A = EK 22.5 mm
B = EK 17.8 mm
C = EK 25.4 mm
D = Cu wire 0.8 mm
E = EK 33 mm
G = DK SP 33 mm
H = EK 20 mm
I = DK SP 17.8 mm
K = AC05 / AC05AT / AC05NI-WSZ
N = AC10 EK 52 mm
P = AC10 DK SP 52 mm
Q = AC10 DK LP 52 mm

TCR /  
MATERIAL  
**0 = standard**

VALUE  
**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 =  $\times 10^2$

TOLERANCE  
CODE  
**J =  $\pm 5.0\%$**

PACKAGING  
CODE  
**AC LB**  
**A1 LC**  
**AB LA**  
**AE BM**  
**AQ BW**  
**R1 RC**

SPECIAL  
**00 = standard**  
**2 digit code = customized version**

Product Description: AC03 15R 5 % AC  
AC03AT 15R 5 % AC  
AC03NI 1R0 5 % AC

AC03	15R	5 %	AC
AC03-AT	15R	5 %	AC
AC03-NI	1R	5 %	AC
<b>TYPE</b>			
AC01	AC01-AT	AC03-NI	RESISTANCE
AC03	AC03-AT	AC04-NI	<b>R10 = 0.1 <math>\Omega</math></b>
AC04	AC04-AT	AC05-NI	<b>15R = 15 <math>\Omega</math></b>
AC05	AC05-AT		<b>1K2 = 1.2 k<math>\Omega</math></b>
AC07	AC07-AT		TOLERANCE
AC10	AC10-AT		<b>5 %</b>
<b>PACKAGING</b>			
AC	LB	A1	LC
AB	BM	AE	BW
AQ	RC	R1	LA

**Note**

<sup>(1)</sup> RT = radial taped lead bending (refer page 11)

SWI = special winding

EK = single kink lead bending (refer page 10)

DK LP = double kink large pitch lead bending (refer page 10)

DK SP = double kink small pitch lead bending (refer page 10)

WSZ = "Z" form leads (refer page 11)

<b>PACKAGING</b>									<b>PART NUMBER VARIANT (2)</b>
<b>TYPE / SIZE</b>	<b>PACKAGING CODE</b>	<b>DESCRIPTION</b>	<b>QUANTITY</b>	<b>PACKAGING STYLE</b>	<b>WIDTH</b>	<b>PITCH</b>	<b>DIMENSIONS</b>		
AC01 <sup>(1)</sup> AC01-AT <sup>(1)</sup>	A1	A1	1000	Axial taped acc. to IEC 60286-1 fan-folded in a box	63 mm	10 mm	260 mm x 85 mm x 70 mm 260 mm x 85 mm x 80 mm		0
AC01 EK/EK AC01-AT DK/EK	LC	EK 17.8MM	500	Bulk packaging	-	-	260 mm x 80 mm x 55 mm		B
		DK SP 17.8MM							I
		DK LP 17.8MM							5
AC01 RT AC01-AT RT	AE	AE	2500	Radial taped acc. to IEC 60286-2 fan-folded in a box	-	12.7 mm	200 mm x 46 mm x 334 mm		1
AC03 AC03-AT AC03-NI	AC	AC	500	Axial taped acc. to IEC 60286-1 fan-folded in a box	63 mm	10 mm	260 mm x 85 mm x 58 mm		0
AC03 DK/EK AC03-AT DK/EK	LC	EK 20MM	500	Bulk packaging	-	-	224 mm x 82 mm x 54 mm		H
		EK 25.4MM							C
		DK SP 20MM							3
		DK SP 25.4MM							8
		DK LP 17.8MM							5
		DK LP 25.4MM							7
AC03 RT AC03-AT RT	AQ	AQ	1800	Radial taped acc. to IEC 60286-2 fan-folded in a box	-	12.7 mm	200 mm x 46 mm x 334 mm		1
AC03 AC03-AT AC03-NI	R1	R1	1000	Axial taped acc. to IEC 60286-1 on reel	63 mm	10 mm	260 mm x 90 mm x 257 mm		0
AC03 WSZ <sup>(1)</sup> AC03-AT WSZ AC03-NI WSZ	BM	BM	1250	Z-form blister taped acc. to IEC 60286-3 on reel	-	8 mm	350 mm x 340 mm x 35 mm		9
AC04 <sup>(1)</sup> AC04-AT <sup>(1)</sup> AC04-NI <sup>(1)</sup>	AC	AC	500	Axial taped acc. to IEC 60286-1 fan-folded in a box	63 mm	10 mm	260 mm x 85 mm x 70 mm 260 mm x 85 mm x 58 mm		0
AC04 DK/EK AC04-AT DK/EK	LC	EK 25.4MM	500	Bulk packaging	-	-	224 mm x 82 mm x 54 mm		C
		DK SP 20MM							3
		DK SP 25.4MM							8
		DK LP 25.4MM							7
AC05 <sup>(1)</sup> AC05-AT <sup>(1)</sup> AC05-NI <sup>(1)</sup>	AC	AC	500	Axial taped acc. to IEC 60286-1 fan-folded in a box	63 mm	10 mm	270 mm x 86 mm x 118 mm 270 mm x 86 mm x 125 mm		0
AC05 DK/EK AC05-AT DK/EK	LC	EK 22.5MM	500	Bulk packaging	-	-	224 mm x 82 mm x 54 mm		A
		EK 25.4MM							C
		DK SP 20MM							3
AC05 AC05-AT AC05-NI	RC	RC	500	Axial taped acc. to IEC 60286-1 on reel	63 mm	10 mm	260 mm x 90 mm x 257 mm		0
AC05 WSZ <sup>(1)</sup> AC05-AT WSZ AC05-NI WSZ	BW	BW	350	Z-form blister taped acc. to IEC 60286-3 on reel	-	16 mm	350 mm x 340 mm x 55 mm		K
AC05 RT AC05-AT RT AC05-NI	GC	GC	500	Radial taped acc. to IEC 60286-2 on reel	-	12.7 mm	365 mm x 370 mm x 67 mm		1
AC07 AC07-AT	AC	AC	500	Axial taped acc. to IEC 60286-1 fan-folded in a box	73 mm	10 mm	265 mm x 90 mm x 118 mm		0
AC07 DK/EK AC07-AT DK/EK	LB	EK 33MM	250	Bulk packaging	-	-	224 mm x 82 mm x 54 mm		E
		DK SP 33MM							G
		DK LP 33MM							4
AC10 AC10-AT	AB	AB	250	Axial taped acc. to IEC 60286-1 fan-folded in a box	88 mm	10 mm	265 mm x 105 mm x 70 mm		0
AC10 DK/EK	LA	EK 52MM	100	Bulk packaging	-	-	224 mm x 82 mm x 54 mm		N
		DK SP 52MM							P
		DK LP 52MM							Q

**Notes**

<sup>(1)</sup> Manufacturing at different production locations may involve use of differently sized box

<sup>(2)</sup> Refer to "Dimensions" table on page 10 for more details

## DESCRIPTION

Wirewound resistors are best suited for use in high power, high current applications. The silicone cement lacquer coating enables AC, AC-AT, AC-NI series to withstand challenging operating and environmental conditions. The coating is resistant to cleaning solvents specified in IEC 60115-1<sup>(1)</sup>. Production is strictly controlled and follows an extensive set of instructions established for reproducibility.

The winding is done with a specific material on a specially developed fine ceramic body ( $\text{Al}_2\text{O}_3$ ). The ceramic meets the highest requirements against mechanical resistance, thermal shocks, dielectric strength, and insulation resistance at high temperatures. With different diameters and turn spacings of resistive wire, a large ohmic value range can be covered.

The resistors are marked with resistance, rated dissipation ( $P_{40}$ ) and tolerance. Product quality is verified by testing procedures, performed on all individual resistors.

Only accepted products are stuck directly on the adhesive tapes according to IEC 60286-1 for axial leaded version, according to IEC 60286-2 for the radial version or blister taped according to IEC 60286-3 for the WSZ version.

Resistance is measured on the lead wires at a distance of 6 mm from the resistor body. If a greater length of lead wire is used in the application, the user may need to consider the additional wire resistance, particularly with low resistance products.

## MATERIALS

Vishay acknowledges the following systems for the regulation of hazardous substances:

- IEC 62474, Material Declaration for Products of and for the Electrotechnical Industry, with the list of declarable substances given therein<sup>(2)</sup>
- The Global Automotive Declarable Substance List (GADSL)<sup>(3)</sup>
- The REACH regulation (1907/2006/EC) and the related list of substances with very high concern (SVHC)<sup>(4)</sup> for its supply chain

The products do not contain any of the banned substances as per IEC 62474, GADSL, or the SVHC list, see [www.vishay.com/how/leadfree](http://www.vishay.com/how/leadfree). Hence the products fully comply with the following directives:

- 2000/53/EC End-of-Life Vehicle Directive (ELV) and Annex II (ELV II)
- 2011/65/EU Restriction of the Use of Hazardous Substances Directive (RoHS) with amendment 2015/863/EU
- 2012/19/EU Waste Electrical and Electronic Equipment Directive (WEEE)

Vishay pursues the elimination of conflict minerals from its supply chain, see the Conflict Minerals Policy at [www.vishay.com/doc?49037](http://www.vishay.com/doc?49037)

## Notes

(1) Other cleaning solvents with aggressive chemicals should be evaluated in actual cleaning process for their suitability

(2) The IEC 62474 list of declarable substances is maintained in a dedicated database, which is available at <http://std.iec.ch/iec62474>

(3) The Global Automotive Declarable Substance List (GADSL) is maintained by the American Chemistry Council and available at [www.gadsl.org](http://www.gadsl.org)

(4) The SVHC list is maintained by the European Chemical Agency (ECHA) and available at <http://echa.europa.eu/candidate-list-table>

## ASSEMBLY

The resistors are axial or bend leads for soldering. Z bend leads offer SMD mounting compatibility. The terminals of the resistors are completely lead (Pb)-free, the special matte tin plating provides compatibility with lead (Pb)-free and lead-containing soldering processes.

Special lead forms may be available on request, please inquire at [ww1resistors@vishay.com](mailto:ww1resistors@vishay.com). As these components are high power dissipation resistors, customers are advised to use a high melting point solder.

## APPLICATION INFORMATION

The power dissipation of the resistor generates a temperature rise with respect to the ambient. The permissible dissipation is derated for temperatures above 40 °C, as shown in the derating diagram, in order to avoid overheating of the resistor. The heat dissipated from the resistor may affect adjacent components, hence proper clearance will be required in order to avoid overheating. The resistive wire is encapsulated by a protective lacquer coating.

All materials used are non-flammable and inorganic.

These resistors do not feature a limited lifetime when operated within the permissible limits. However, resistance value drift increasing over operating time may result in exceeding a limit acceptable to the specific application, thereby establishing a functional lifetime.

## APPROVALS

AC-AT, AC-NI series are AEC-Q200 qualified, specifically for the use in automotive applications.

## RELATED PRODUCTS

UL approved, special cement coated fusible resistor is also available. For details please see the datasheet:

“AC01-CS, AC03-CS, AC05-CS - Axial Cemented Fusible Wirewound Safety Resistors” [www.vishay.com/doc?28909](http://www.vishay.com/doc?28909)

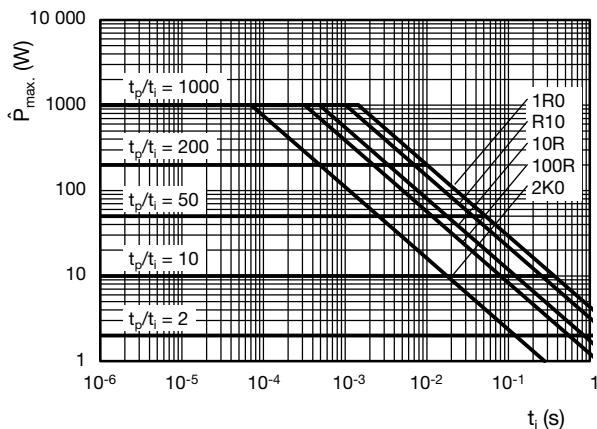
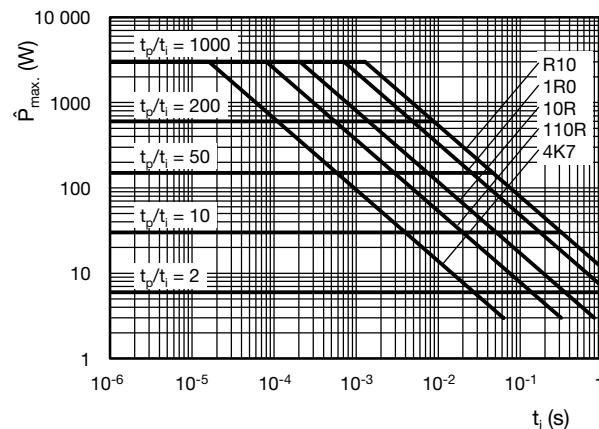
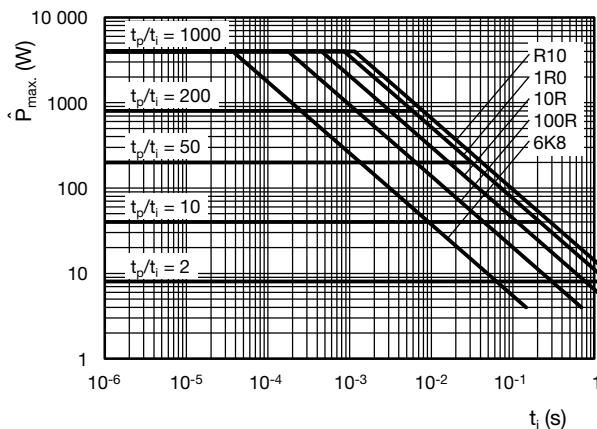
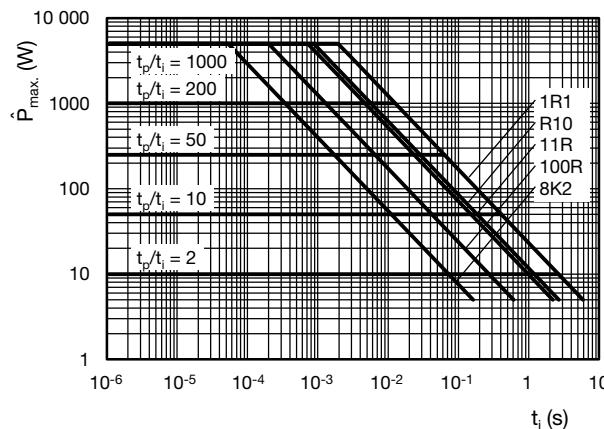
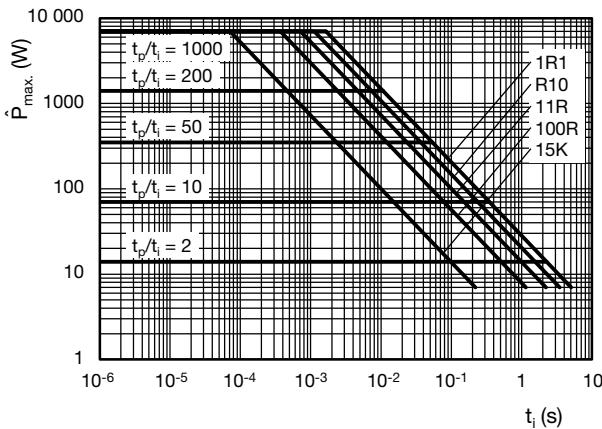
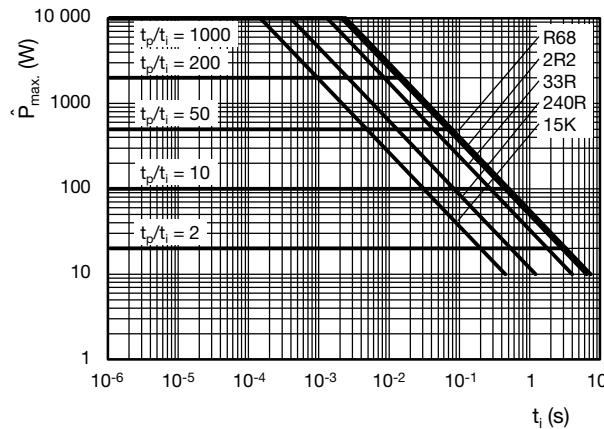
For high surge wirewound products, silicone cement coated Z300-Cxx series is available, see the datasheet:

“Z300-Cxx - High Surge Axial Cemented Wirewound Resistors” [www.vishay.com/doc?21027](http://www.vishay.com/doc?21027)

For precision applications, cemented leaded wirewound PAC series is available, see the datasheet:

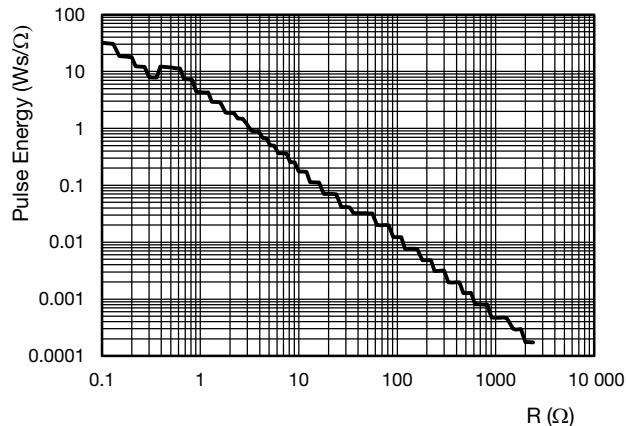
“PAC Series - Cemented Wirewound Precision Resistors” [www.vishay.com/doc?28731](http://www.vishay.com/doc?28731)

**PULSE DIAGRAMS FOR AC, AC-AT SERIES**

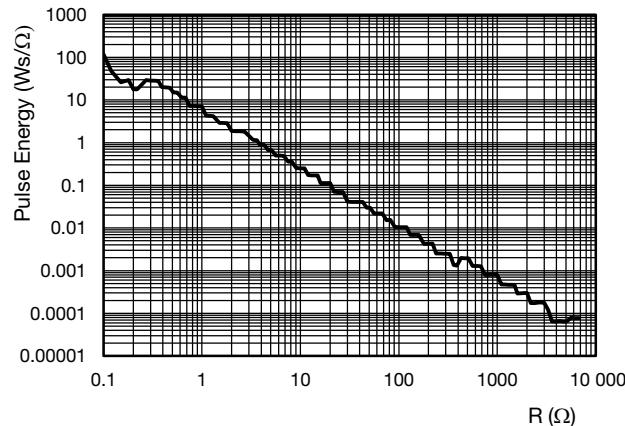
( $t_i$  = pulse duration;  $t_p$  = repetition time)

**AC01 and AC01-AT** Pulse on a regular basis; max. permissible peak pulse power ( $P_{\max}$ ) as a function of pulse duration ( $t_i$ )

**AC03 and AC03-AT** Pulse on a regular basis; max. permissible peak pulse power ( $P_{\max}$ ) as a function of pulse duration ( $t_i$ )

**AC04 and AC04-AT** Pulse on a regular basis; max. permissible peak pulse power ( $P_{\max}$ ) as a function of pulse duration ( $t_i$ )

**AC05 and AC05-AT** Pulse on a regular basis; max. permissible peak pulse power ( $P_{\max}$ ) as a function of pulse duration ( $t_i$ )

**AC07 and AC07-AT** Pulse on a regular basis; max. permissible peak pulse power ( $P_{\max}$ ) as a function of pulse duration ( $t_i$ )

**AC10 and AC10-AT** Pulse on a regular basis; max. permissible peak pulse power ( $P_{\max}$ ) as a function of pulse duration ( $t_i$ )

## PULSE DIAGRAMS FOR AC, AC-AT SERIES

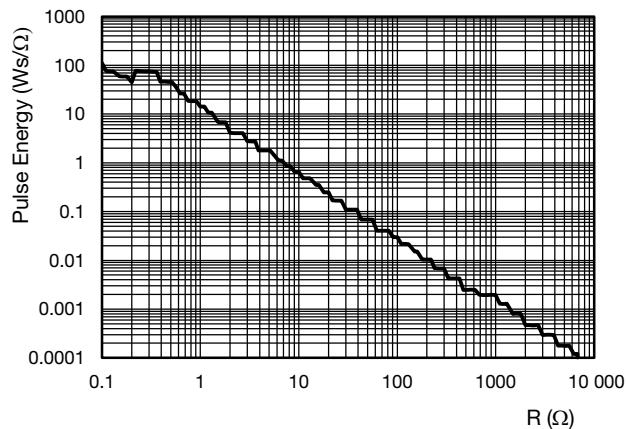
Pulse energy in joules or wattseconds is calculated with the help of the  $R$ -value to be used in the application. Choose the  $R$  value on X axis and look for the corresponding  $E$  ( $\text{Ws}/\Omega$ ) value on Y axis. Multiplying both the  $R$  ( $\Omega$ ) to corresponding  $E$  ( $\text{Ws}/\Omega$ ), will be resultant total pulse Energy ( $\text{Ws}$  or  $J$ ) for **adiabatic conditions** (for very short single pulses of duration typically  $\leq 10$  ms).



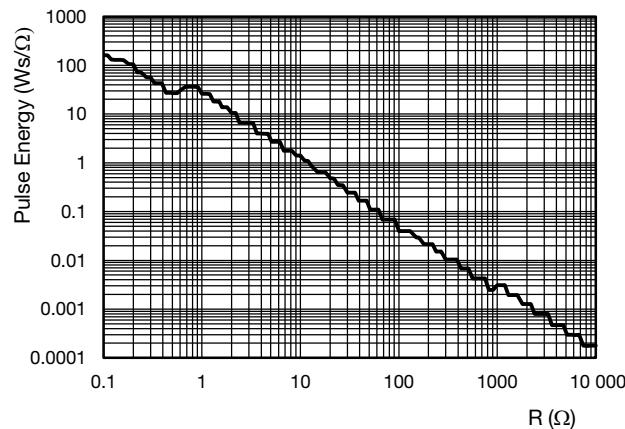
**AC01 and AC01-AT** Pulse capability;  $E$  ( $\text{Ws}$ ) as a function of  $R$  ( $\Omega$ )



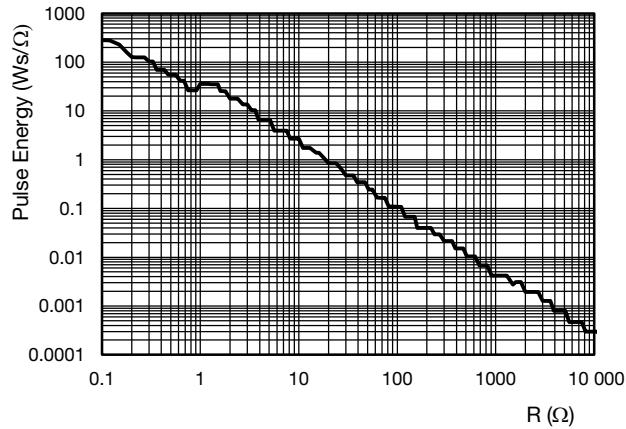
**AC03 and AC03-AT** Pulse capability;  $E$  ( $\text{Ws}$ ) as a function of  $R$  ( $\Omega$ )



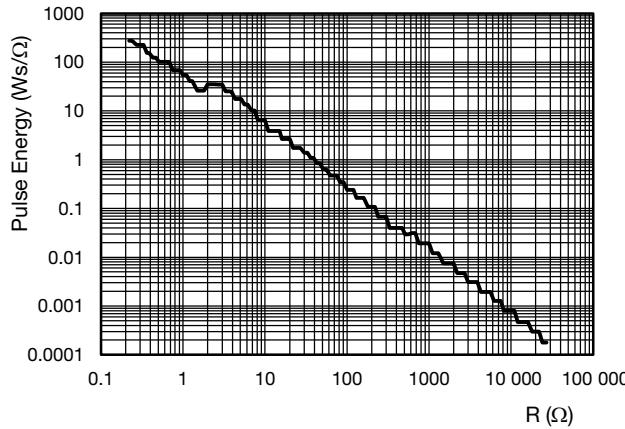
**AC04 and AC04-AT** Pulse capability;  $E$  ( $\text{Ws}$ ) as a function of  $R$  ( $\Omega$ )



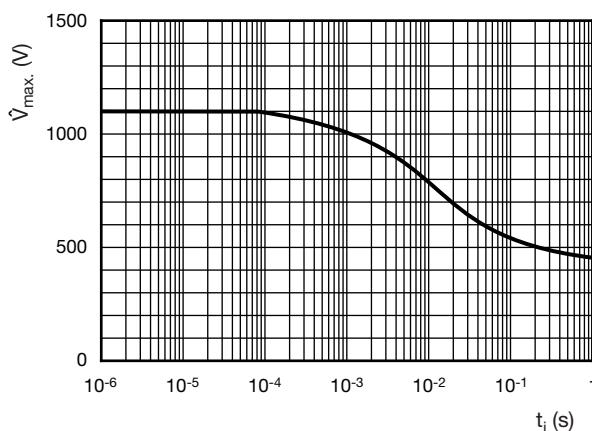
**AC05 and AC05-AT** Pulse capability;  $E$  ( $\text{Ws}$ ) as a function of  $R$  ( $\Omega$ )



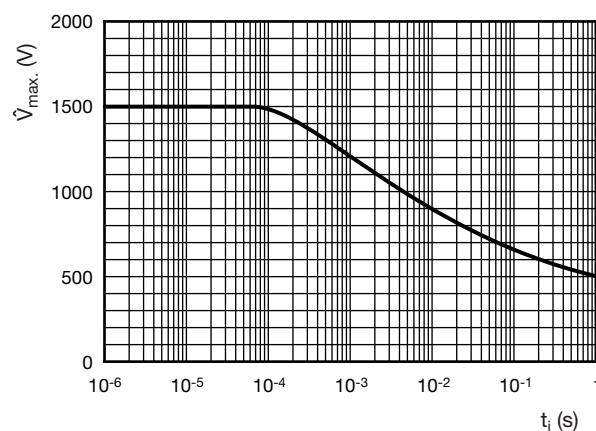
**AC07 and AC07-AT** Pulse capability;  $E$  ( $\text{Ws}$ ) as a function of  $R$  ( $\Omega$ )



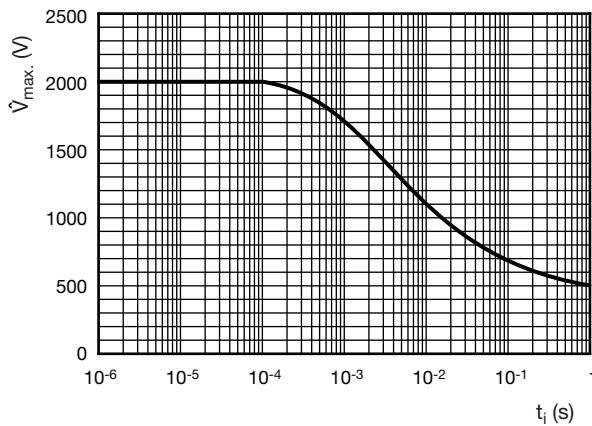
**AC10 and AC10-AT** Pulse capability;  $E$  ( $\text{Ws}$ ) as a function of  $R$  ( $\Omega$ )



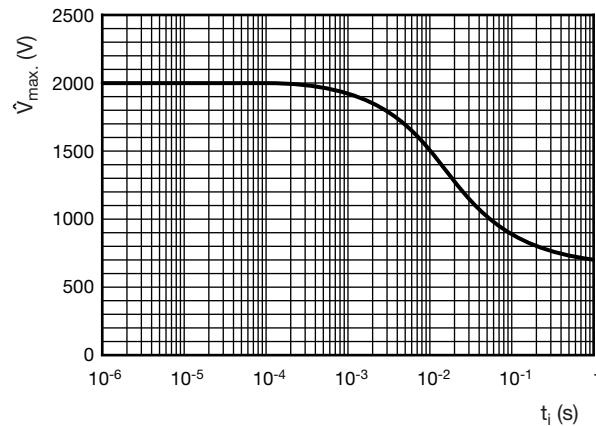
**AC01 and AC01-AT** Pulse on a regular basis; max. permissible peak pulse voltage ( $\hat{V}_{max.}$ ) as a function of pulse duration ( $t_i$ )



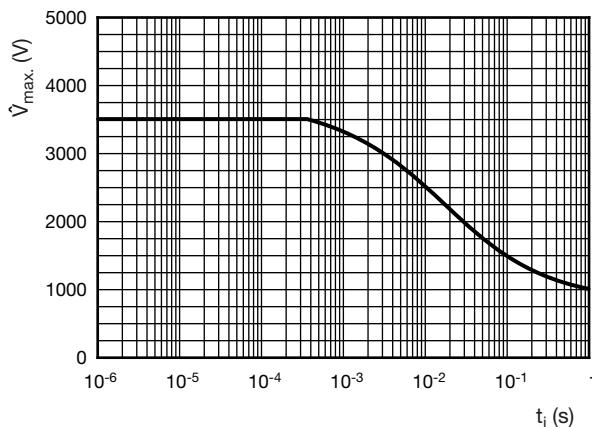
**AC03 and AC03-AT** Pulse on a regular basis; max. permissible peak pulse voltage ( $\hat{V}_{max.}$ ) as a function of pulse duration ( $t_i$ )



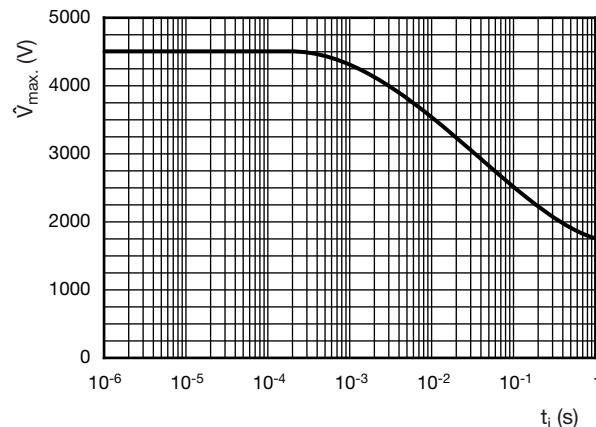
**AC04 and AC04-AT** Pulse on a regular basis; max. permissible peak pulse voltage ( $\hat{V}_{max.}$ ) as a function of pulse duration ( $t_i$ )



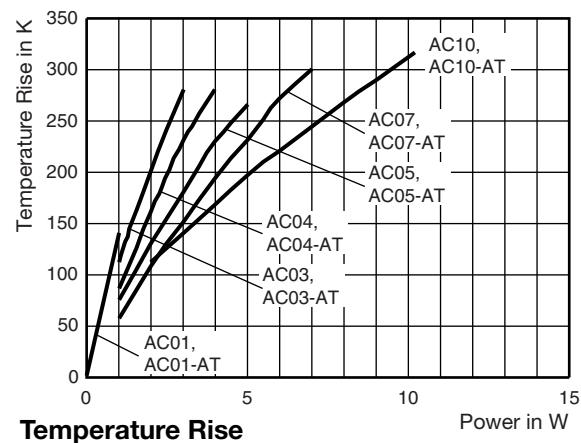
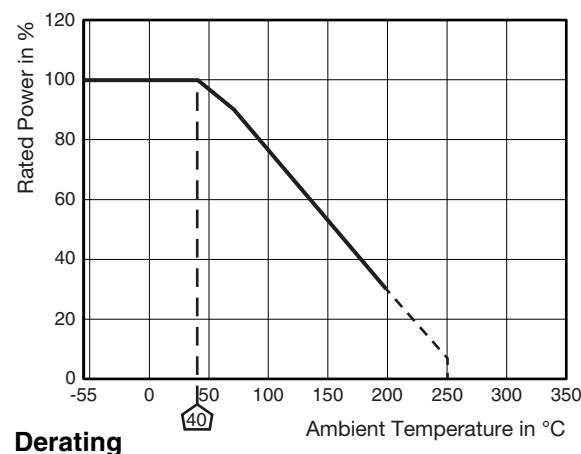
**AC05 and AC05-AT** Pulse on a regular basis; max. permissible peak pulse voltage ( $\hat{V}_{max.}$ ) as a function of pulse duration ( $t_i$ )



**AC07 and AC07-AT** Pulse on a regular basis; max. permissible peak pulse voltage ( $\hat{V}_{max.}$ ) as a function of pulse duration ( $t_i$ )



**AC10 and AC10-AT** Pulse on a regular basis; max. permissible peak pulse voltage ( $\hat{V}_{max.}$ ) as a function of pulse duration ( $t_i$ )

**FUNCTIONAL PERFORMANCE**


## TEST PROCEDURES AND REQUIREMENTS

All tests are carried out in accordance with the following specifications:

- IEC 60115-1, generic specification (includes tests)

The test and requirements table contains only the most important tests. For the full test schedule refer to the documents above.

The tests are carried out in accordance with IEC 60068-2-xx test method and under standard atmospheric conditions in accordance with IEC 60068-1, 4.3.

Climatic category -55 / 200 / 56 (rated temperature range: lower category temperature, upper category temperature; damp heat, steady state, test duration: 56 days) is valid.

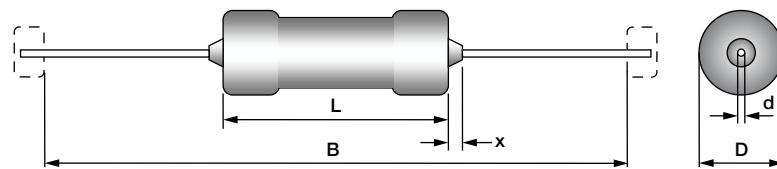
Unless otherwise specified the following values apply:

- Temperature: 15 °C to 35 °C
- Relative humidity: 25 % to 75 %
- Air pressure: 86 kPa to 106 kPa (860 mbar to 1060 mbar)

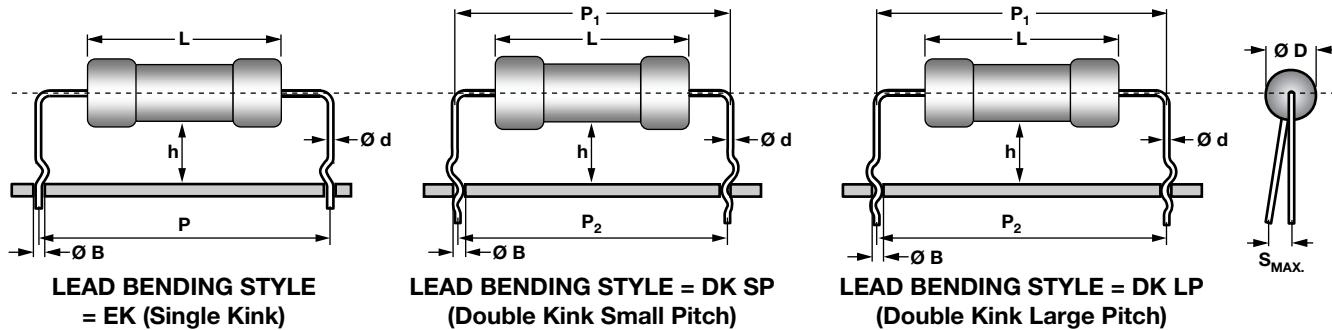
For performing some of the tests, the components are mounted on a test board in accordance with IEC 60115-1, 5.5.

In test procedures and requirements table, only the tests and requirements are listed with reference to the relevant clauses of IEC 60115-1 and IEC 60068-2-xx test methods. A short description of the test procedure is also given.

<b>TEST PROCEDURES AND REQUIREMENTS</b>				
<b>IEC 60115-1 CLAUSE</b>	<b>IEC 60068-2 TEST METHOD</b>	<b>TEST</b>	<b>PROCEDURE</b>	<b>REQUIREMENTS PERMISSIBLE CHANGE (<math>\Delta R_{MAX.}</math>)</b>
8.1	-	Short term overload	Room temperature; 10x rated power $P_{40}$ ; 5 s	$\pm (2 \% R + 0.1 \Omega)$
9.5	21 (Ua <sub>1</sub> ) 21 (Ub) 21 (Uc)	Robustness of terminations	Tensile, bending and torsion	No damage $\pm (0.5 \% R + 0.05 \Omega)$
11.2	20 (Tb)	Resistance to soldering heat	Unmounted components (260 ± 5) °C; (10 ± 1) s	$\pm (0.5 \% R + 0.05 \Omega)$
10.1	14 (Na)	Rapid change of temperature	30 min at -55 °C and 30 min at +200 °C; 5 cycles	$\pm (1.5 \% R + 0.05 \Omega)$
10.3	2 (Bb) 30 (Db)	Climatic sequence:  Dry heat  Damp heat (accelerated) 1st cycle  Cold  Low air pressure  Damp heat remaining cyclic	16 h; 200 °C  24 h; 55 °C; 90 % to 100 % RH  2 h; -55 °C  1 h; (1 ± 0.1) kPa; 15 °C to 35 °C  5 days; 55 °C; 95 % to 100 % RH; 5 cycles	$\pm (1 \% R + 0.05 \Omega)$
10.3.4.2				
10.3.4.3				
10.3.4.4				
10.3.4.5				
10.3.4.6				
10.4	78 (Cab)	Damp heat, (steady state)	56 days; (40 ± 2) °C; (93 ± 5) % RH	$\pm (5 \% R + 0.1 \Omega)$
7.2	-	Endurance (at room temperature)	1000 h; loaded with 116 % of $P_{70}$ 1.5 h ON and 0.5 h OFF	$\pm (5 \% R + 0.1 \Omega)$
7.3	-	Endurance at maximum temperature	200 °C; 30 % of $P_{70}$ ; 1000 h	$\pm (5 \% R + 0.1 \Omega)$
12.4	-	Passive flammability	IEC 60695-11-5 needle flame test; 10 s	No burning after 30 s
10.5	67 C(y)	Damp heat, steady state, accelerated	(85 ± 2) °C; RH (85 ± 3) %; 1000 h; 10 % of operation power ( $P_{70}$ ) $U \leq 0.3 \times U_{max.}$	$\pm (5 \% R + 0.1 \Omega)$
8.5	-	Electrostatic discharge test	2 discharges, 8 kV (1 positive, 1 negative)	$\pm (5 \% R + 0.1 \Omega)$

**DIMENSION AND MASS**

**DIMENSIONS** in millimeters

TYPE	L <sub>max.</sub>	D <sub>max.</sub>	d <sup>(1)</sup>	x <sub>max.</sub>	B	MASS PER UNIT (g)
AC01, AC01-AT	11.0	4.3	0.8 ± 0.03	2	63 ± 1	0.52
AC03, AC03-AT	13.0	4.8		2	63 ± 1	0.75
AC03-NI	13.0	4.8		2	63 ± 1	0.78
AC04, AC04-AT	16.5	5.5		3	63 ± 1	1.10
AC04-NI	16.5	5.5		3	63 ± 1	1.11
AC05, AC05-AT	18.0	7.5		3	63 ± 1	1.90
AC05-NI	18.0	7.5		3	63 ± 1	2.00
AC07, AC07-AT	26.0	7.5		3	73 ± 1	2.60
AC10, AC10-AT	44.0	8.0		3	88 ± 1	4.50

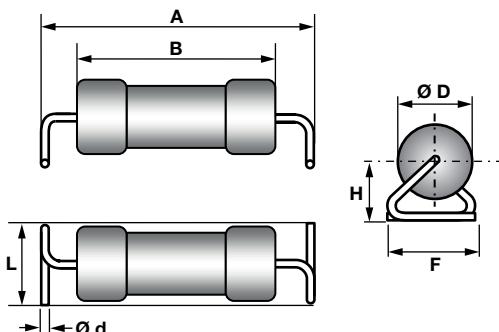
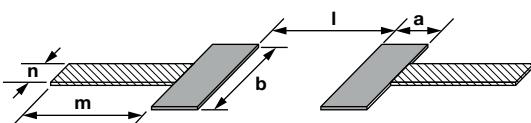
**LEAD TERMINATION BENDING FORMS FOR AC, AC-AT**

**DIMENSIONS** - Single and double kink lead type outline

TYPE	Ø D <sub>max.</sub> (mm)	L <sub>max.</sub> (mm)	KINK TYPE	TERMINATION WIRE DIAMETER <sup>(1)</sup> Ø d (mm)	h ± 1 (mm)	P ± 0.5 (mm)	P <sub>1</sub> ± 0.5 (mm)	P <sub>2</sub> ± 3 (mm)	S <sub>max.</sub> (mm)	Ø B ± 0.1 (mm)	MASS (g)	PART NUMBER VARIANT
AC01 AC01-AT	4.3	11.0	EK	0.8 ± 0.03	8.0	17.8	-	-	2	1.0	0.52	B
			DK SP	0.8 ± 0.03	8.0	-	19.8	17.8	2	1.0	0.52	I
			DK LP	0.8 ± 0.03	8.0	-	17.8	17.8	2	1.0	0.52	5
AC03 AC03-AT	4.8	13.0	EK	0.8 ± 0.03	8.0	20.0	-	-	2	1.0	0.75	H
			EK	0.8 ± 0.03	8.0	25.4	-	-	2	1.0	0.75	C
			DK SP	0.8 ± 0.03	8.0	-	22.0	20.0	2	1.0	0.75	3
			DK SP	0.8 ± 0.03	8.0	-	27.4	25.4	2	1.0	0.75	8
			DK LP	0.8 ± 0.03	8.0	-	17.8	17.8	2	1.0	0.75	5
			DK LP	0.8 ± 0.03	8.0	-	25.4	25.4	2	1.0	0.75	7
AC04 AC04-AT	5.5	16.5	EK	0.8 ± 0.03	8.0	25.4	-	-	2	1.0	1.10	C
			DK SP	0.8 ± 0.03	8.0	-	22.0	20.0	2	1.0	1.10	3
			DK SP	0.8 ± 0.03	8.0	-	27.4	25.4	2	1.0	1.10	8
			DK LP	0.8 ± 0.03	8.0	-	25.4	25.4	2	1.0	1.10	7
AC05 AC05-AT	7.5	18.0	EK	0.8 ± 0.03	8.0	22.5	-	-	2	1.0	1.90	A
			EK	0.8 ± 0.03	8.0	25.4	-	-	2	1.0	1.90	C
			DK SP	0.8 ± 0.03	8.0	-	22.0	20.0	2	1.0	1.90	3
AC07 AC07-AT	7.5	26.0	EK	0.8 ± 0.03	8.0	33.0	-	-	2	1.0	2.60	E
			DK SP	0.8 ± 0.03	8.0	-	35.0	33.0	2	1.0	2.60	G
			DK LP	0.8 ± 0.03	8.0	-	33.0	33.0	2	1.0	2.60	4
AC10	8.0	44.0	EK	0.8 ± 0.03	8.0	52.0	-	-	2	1.0	4.50	N
			DK SP	0.8 ± 0.03	8.0	-	54.0	52.0	2	1.0	4.50	P
			DK LP	0.8 ± 0.03	8.0	-	52.0	52.0	2	1.0	4.50	Q

**Note**
<sup>(1)</sup> Terminal wire material is FeCu with Sn coating

**Z-FORM LEADS FOR SMD MOUNTING** in millimeters

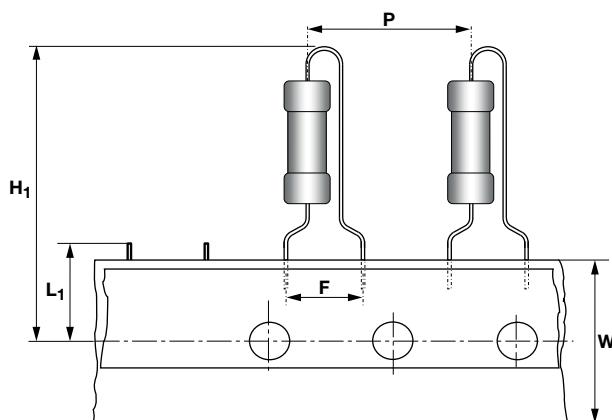
**LEAD BENDING  
STYLE = WSZ  
(Z-form)**


**Recommended solder pad dimensions**


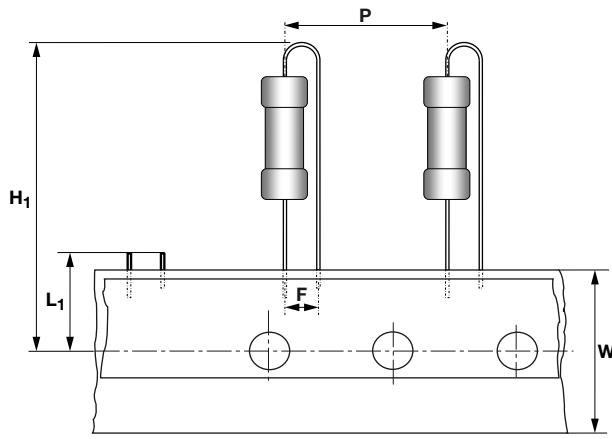
TYPE WSZ	$\varnothing d$ (1)	$\varnothing D_{max.}$	A	B	F	H	L	a	b	I	m	n
AC03, AC03-AT, AC03-NI	$0.8 \pm 0.03$	4.8	$17 \pm 0.3$	11 - 12	$4.8 \pm 0.3$	$3.6 \pm 0.2$	$5.0 \pm 0.5$	4	8	12.2	25	2
AC05, AC05-AT, AC05-NI	$0.8 \pm 0.03$	7.5	$23.5 \pm 0.5$	18 max.	$7.7 \pm 0.5$	$5.73 \pm 0.5$	$7.9 \pm 0.7$	4	10	18.7	25	2

**Notes**

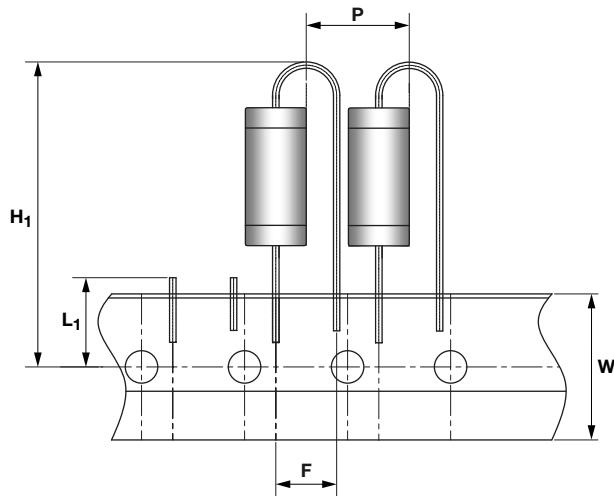
- (1) Terminal wire material is FeCu with Sn coating  
• Dimensions "m" and "n" present minimum conducting track area in actual PCB, based on test conditions at full rated power. Customers needs to reassess temperature restrictions based on the solder type, PCB material, and other factors specific to their application

**AC01 WITH RADIAL TAPING**
**LEAD BENDING STYLE = RT (Radial Taped)**

**DIMENSIONS** in millimeters

Pitch of components	P	$12.7 \pm 1.0$
Lead spacing	F	$5.0 + 0.6, - 0.1$
Width of carrier tape	W	$18.0 \pm 0.5$
Height for cutting (max.)	L <sub>1</sub>	11
Height for insertion (max.)	H <sub>1</sub>	32

**AC03 WITH RADIAL TAPING**
**LEAD BENDING STYLE = RT (Radial Taped)**

**DIMENSIONS** in millimeters

Pitch of components	P	$12.7 \pm 1.0$
Lead spacing	F	$5.0 + 0.4, - 0.2$
Width of carrier tape	W	$18.0 \pm 0.5$
Height for cutting (max.)	L <sub>1</sub>	11
Height for insertion (max.)	H <sub>1</sub>	32

**AC05 WITH RADIAL TAPING**
**LEAD BENDING STYLE = RT (Radial Taped)**

**DIMENSIONS** in millimeters

Pitch of components	<b>P</b>	$12.7 \pm 1.0$
Lead spacing	<b>F</b>	$7.50 \pm 0.5$
Width of carrier tape	<b>W</b>	$18.0 \pm 0.5$
Height for cutting (max.)	<b>L<sub>1</sub></b>	11
Height for insertion (max.)	<b>H<sub>1</sub></b>	37



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