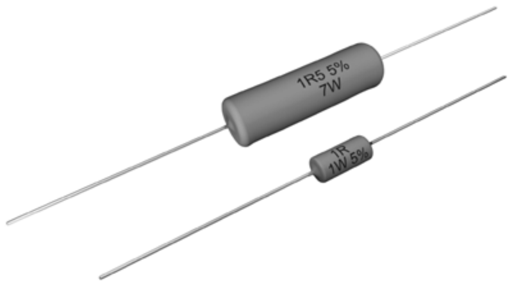
Cemented Wirewound Resistors



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

Pb-free
RoHS COMPLIANT
GREEN (5-2008)

STANDARD ELECTRICAL SPECIFICATIONS

MODEL	POWER RATING $P_{40\,°C}$ W	POWER RATING $P_{70\,°C}$ 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= ± 100 ppm/K	TOLERANCE ± %
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 ± 5 % from E24

(2) AC03 WSZ: $P_{40\,°C}$ = 1.8 W; $P_{70\,°C}$ = 1.5 W

PART NUMBER AND PRODUCT DESCRIPTION

Part Number: AC03000001509JAC00

A	C	0	3	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** = $*10^{-3}$ **8** = $*10^{-2}$ **9** = $*10^{-1}$ **0** = $*10^{0}$ **1** = $*10^{1}$ **2** = $*10^{2}$ **5** = 10^{-4}	**J** = ± 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

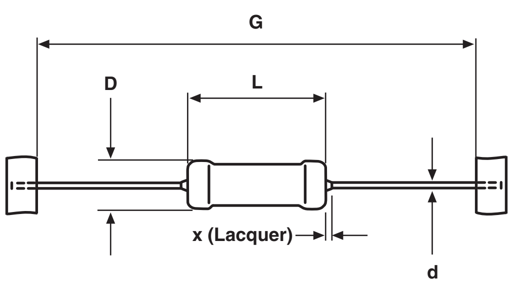
(5) See “Part Number and Product Description”

(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



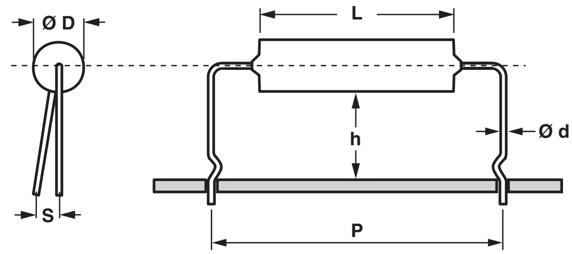
For packaging dimensions see: www.vishay.com/doc?28721

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

For technical questions, contact: ww1resistors@vishay.com

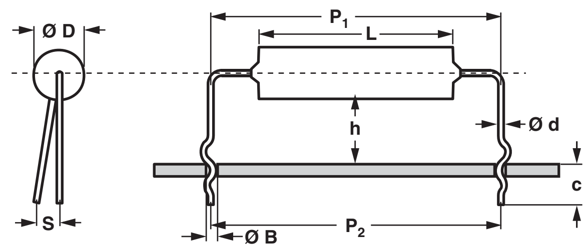
BENDING FORMS

KINK TYPE S = EK



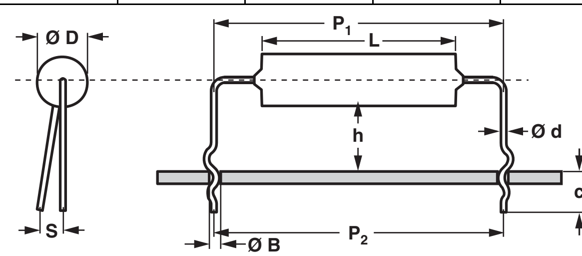
TYPE	Ø d	Ø $D_{max.}$	L	h ± 1	P ± 1	$S_{max.}$
AC01	0.8	(1)	(1)	8	17.8	2
AC03 - AC05					25.4	
AC07					33.0	

DOUBLE KINK SP = DK SP



TYPE	Ø d	Ø $D_{max.}$	L	h ± 1	P_1 ± 1	P_2 ± 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



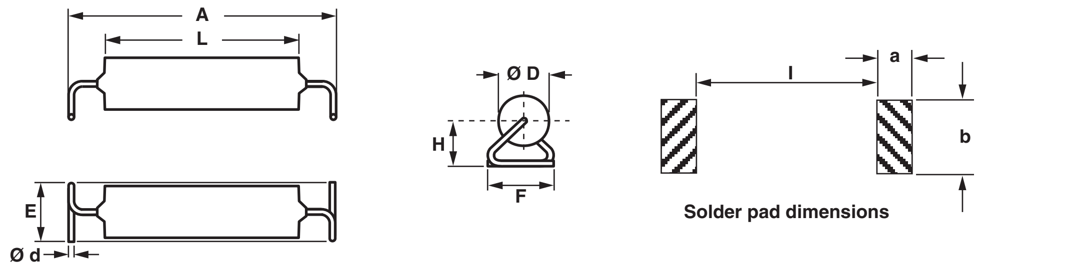
TYPE	Ø d	Ø $D_{max.}$	L	h ± 1	P_1 ± 1	P_2 ± 3	$S_{max.}$	Ø B	c
AC01 - AC03	0.8	(1)	(1)	8	17.8	17.8	2	1.0 ± 0.1	4.5 ± 1
AC03 - AC05					25.4	25.4			
AC07					33.0	33.0			

Note

(1) See table DIMENSIONS

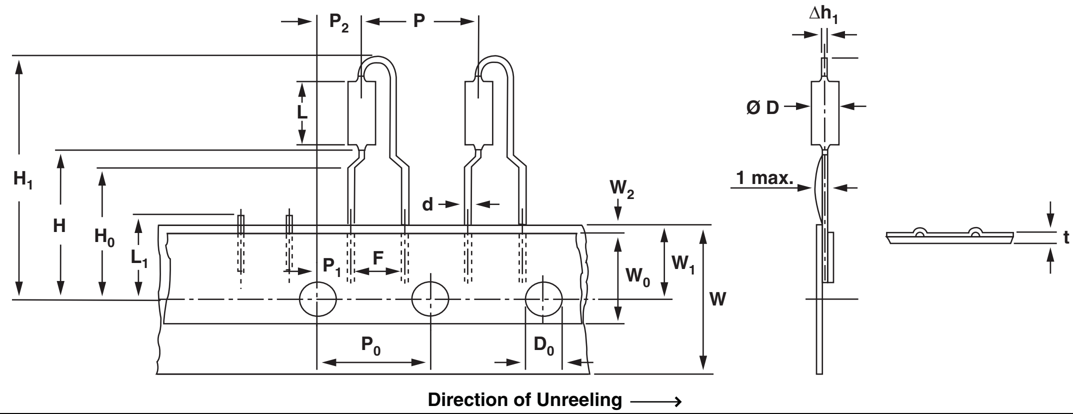
BENDING FORMS

WSZ



TYPE	Ø d	Ø $D_{max.}$	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

RADIAL TAPED = RT

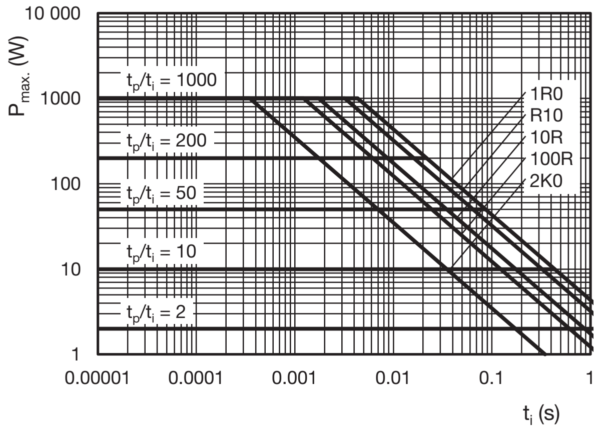


TYPE AC01		
Lead Ø	Ø d	0.8
Diameter	Ø D	(1)
Length	L	(1)
Pitch of components	P	12.7 ± 1.0
Pitch of spocket holes (2)	P_0	12.7 ± 0.3
Distance between hole center and resistor center	P_1	3.85 ± 0.7
Distance between hole center and lead center	P_2	6.35 ± 1.0
Lead spacing	F	5.0 + 0.6, - 0.1
Angle of insertion	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 Ø	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.

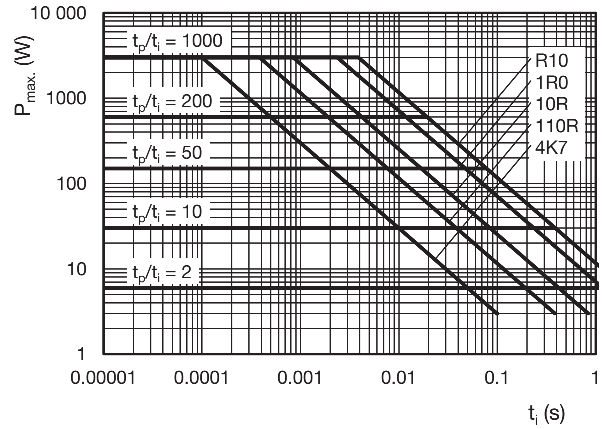
Notes

(1) See table DIMENSIONS
(2) Test over 10 holes - 9 intervals P_0 12.7 x 9 = 114.3 ± 0.5
(3) Parallelism, < 0.5 mm
(4) Thickness of carrier tape: 0.55 mm ± 0.1

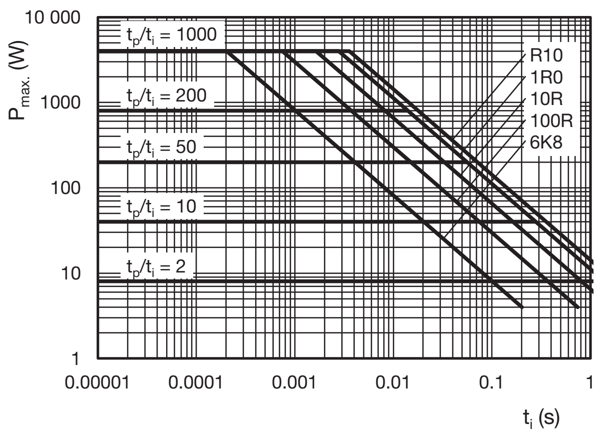
PULSE DIAGRAMS



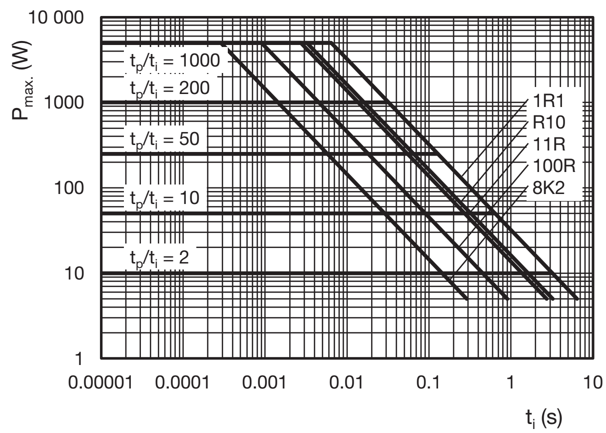
AC01 Pulse on a regular basis; maximum permissible peak pulse power ($\hat{P}_{max.}$) as a function of pulse duration (t_i)



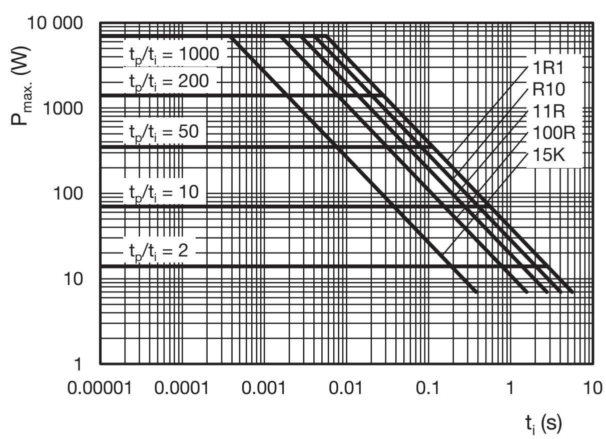
AC03 Pulse on a regular basis; maximum permissible peak pulse power ($\hat{P}_{max.}$) as a function of pulse duration (t_i)



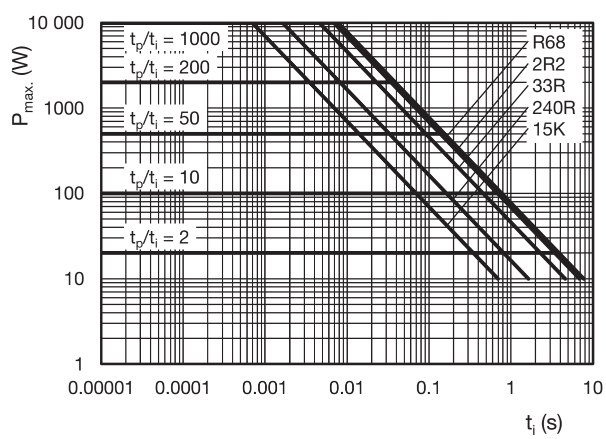
AC04 Pulse on a regular basis; maximum permissible peak pulse power ($\hat{P}_{max.}$) as a function of pulse duration (t_i)



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

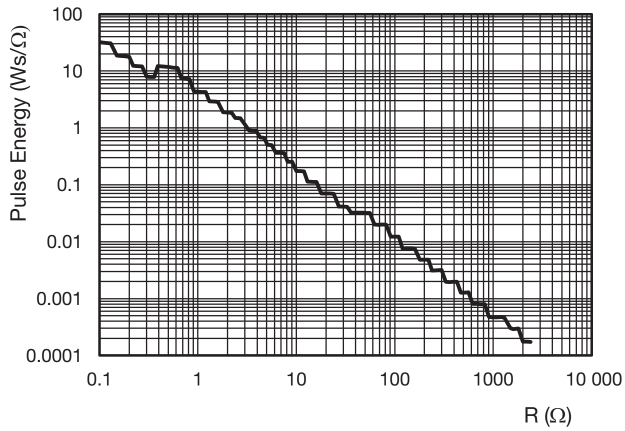


AC07 Pulse on a regular basis; maximum permissible peak pulse power ($\hat{P}_{max.}$) as a function of pulse duration (t_i)

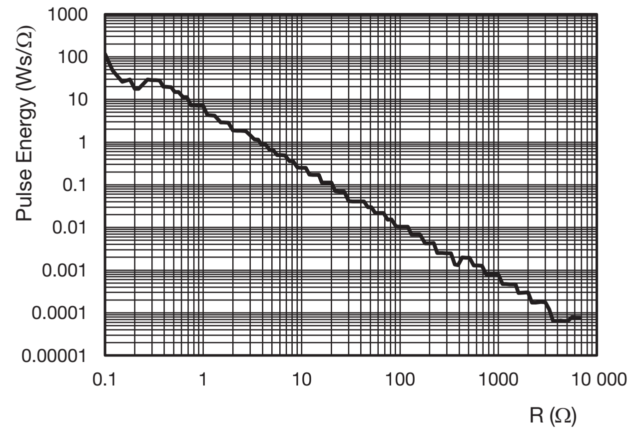


AC10 Pulse on a regular basis; maximum permissible peak pulse power ($\hat{P}_{max.}$) as a function of pulse duration (t_i)

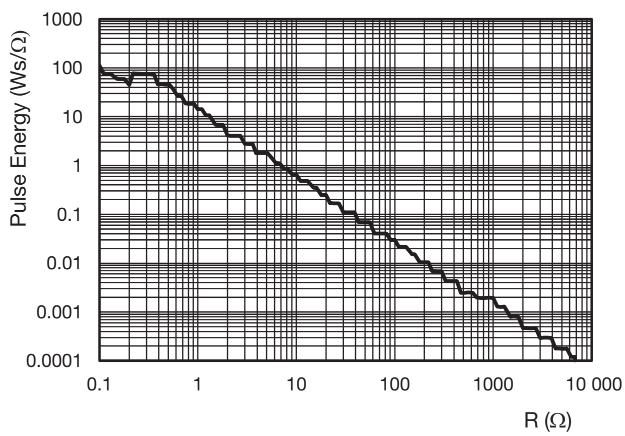
PULSE DIAGRAMS



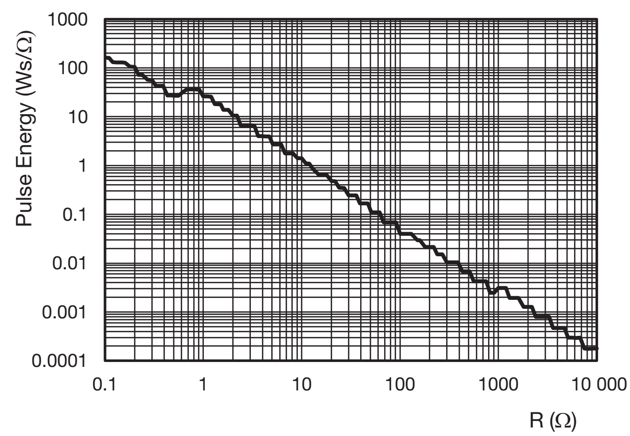
AC01 Pulse capability; E (Ws) as a function of R (Ω)



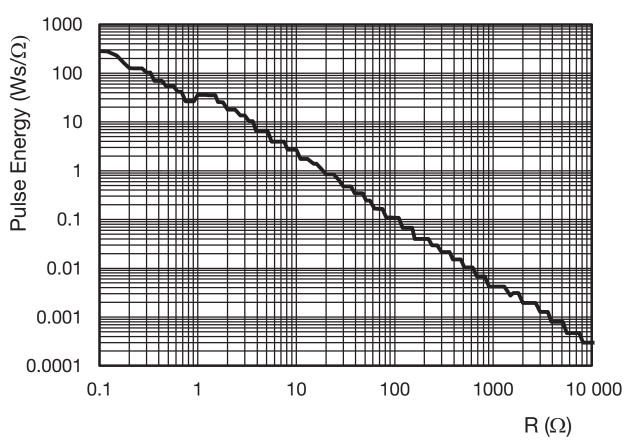
AC03 Pulse capability; E (Ws) as a function of R (Ω)



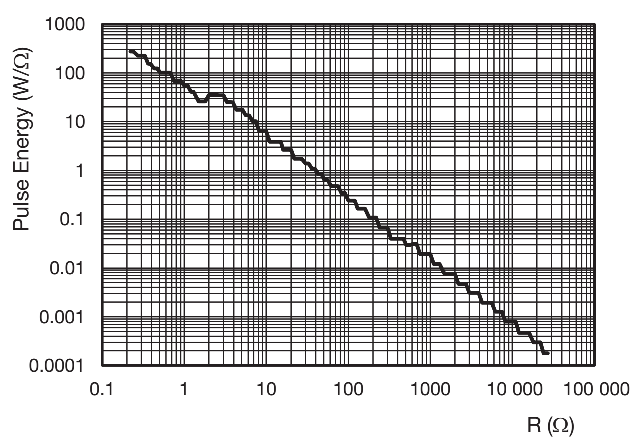
AC04 Pulse capability; E (Ws) as a function of R (Ω)



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

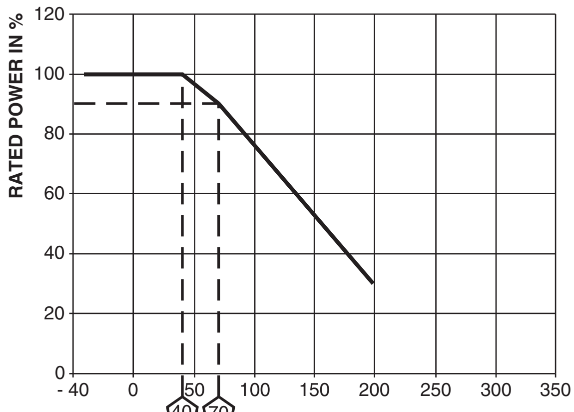


AC07 Pulse capability; E (Ws) as a function of R (Ω)

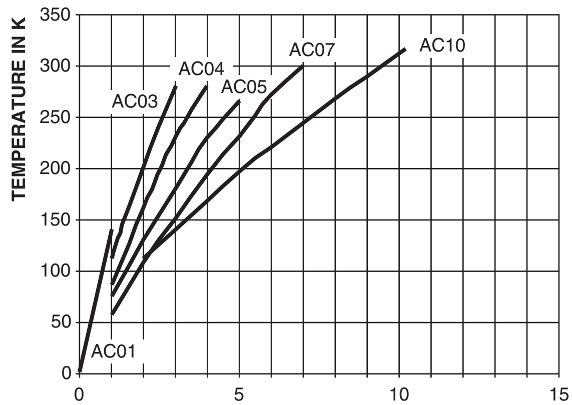


AC10 Pulse capability; E (Ws) as a function of R (Ω)

FUNCTIONAL PERFORMANCE



Derating



Temperature Rise

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

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 ammopack 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

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.

Material Category Policy

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.