

Cemented Wirewound Resistors



FEATURES

- All welded construction
- Ceramic core
- Non-flammable cement coating
- Tinned copper-clad iron leads (see note 3 in the 12NC Ordering Code table)
- High power dissipation in small volume
- Ideal for pulse application
- Lead (Pb)-free
- Compatible with "Restriction of the use of Hazardous Substances" (RoHS) directive 2002/95/EC (issue 2004)



STANDARD ELECTRICAL SPECIFICATIONS

GLOBAL MODEL	HISTORICAL MODEL	P _{40 °C} W	P _{70 °C} W	TOLERANCE E24 SERIES ± %	LIMITING VOLTAGE V	RESISTANCE RANGE Ω		
						TCR = - 10...- 80 ppm/K	TCR = 100...180 ppm/K	TCR = ± 100 ppm/K
AC01000	AC01	1	0.9	5	$\sqrt{P \times R}$	R10 - 33R	36R - 2K4	-
AC03000	AC03 ⁽¹⁾	3	2.5	5	$\sqrt{P \times R}$	R10 - 390R	430R - 3K3	3K6 - 5K1
AC04000	AC04	4	3.5	5	$\sqrt{P \times R}$	R10 - 620R	680R - 6K8	-
AC05000	AC05	5	4.7	5	$\sqrt{P \times R}$	R10 - 910R	1K0 - 10K	-
AC07000	AC07	7	5.8	5	$\sqrt{P \times R}$	R10 - 1K5	1K6 - 15K	-
AC10000	AC10	10	8.4	5	$\sqrt{P \times R}$	R22 - 560R	620R - 27K	-

Note:

⁽¹⁾ AC03 WSZ: P_{40 °C} = 1.8 W; P_{70 °C} = 1.5 W

GLOBAL PART NUMBER INFORMATION

New Global Part Numbering: AC03000001509JAC00 (preferred part number format)

A C 0 3 0 0 0 0 0 1 5 0 9 J A C 0 0

MODEL	SPECIAL CHARACTER	TCR/MATERIAL	VALUE	TOLERANCE	PACKAGING	SPECIAL
(See Standard Electrical Specifications table)	0 = Neutral 1 = RT 2 = SWI = Special winding ⁽²⁾ 3 = DK SP 20 mm ⁽³⁾ 4 = DK LP 33 mm ⁽³⁾ 5 = DK LP 17.8 mm ⁽³⁾ 6 = NI = Non inductive 7 = DK LP 25.4 mm ⁽³⁾ 9 = WSZ 6720 8 = DK SP 25.4 mm Z = value overflow (Special) A = E/K 22.5 mm ⁽³⁾	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 E0 = CECC E0 E6 = CECC E6

Historical Part Number Example: AC03 15R 5 % AC (will continue to be accepted)



Notes:

⁽²⁾ Special winding on request

⁽³⁾ Other dimensions and special character on request



PACKAGING TABLE		
SAP	DESCRIPTION	TYPE
AE	Bandolier in ammo pack, 2500 pieces radial taped	AC01RT
A1	Bandolier in ammopack straight leads, 1000 pieces	AC01
AB	Bandolier in ammopack straight leads, 250 pieces	AC10
AC	Bandolier in ammopack straight leads, 500 pieces	AC03, AC04, AC05, AC07
LC	Loose 500 pieces double kinked/kink type S	AC01 DK/EK, AC03 DK/EK, AC04 DK/EK, AC05 DK/EK
LB	Loose 250 pieces double kinked/kink type S	AC07 DK/EK
BM	Blister 1250 pieces WSZ	AC03 WSZ

12NC (HISTORICAL CODING REFERENCE) INDICATING RESISTOR TYPE AND PACKAGING				
TYPE	ORDERING CODE 23..			
	BANDOLIER IN AMMOPACK			
	RADIAL	STRAIGHT LEADS		
	2500 units	250 units	500 units	1000 units
AC01	06 328 90... (2) (3)	-	-	06 328 33...
AC03 (1)	-	-	22 329 03...	-
AC04 (1)	-	-	22 329 04...	-
AC05 (1)	-	-	22 329 05...	-
AC07 (1)	-	-	22 329 07...	-
AC10	-	Global part numbering	-	-

Notes:

- (1) Products with bent leads and bulk packaging (100 pieces) are available on request
- (2) Last 3 digits available on request
- (3) Radial parts with tin plated copper leads

12NC INFORMATION

- The resistors have a 12-digit ordering code starting with 23.
- The subsequent 7 digits indicate the resistor type, specification and packaging; see the 12NC Ordering Code table.
- The remaining 3 digits indicate the resistance value:
 - The first 2 digits indicate the resistance value.
 - The last digit indicates the resistance decade in accordance with the 12NC Indicating Resistance Decade table.

Last Digit of 12NC Indicating Resistance Decade

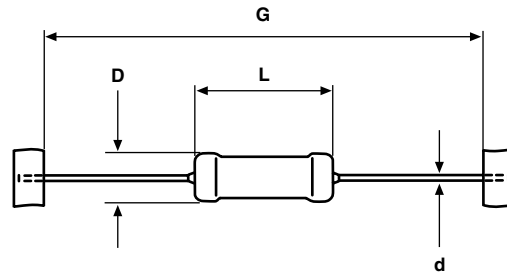
RESISTANCE DECADE	LAST DIGIT
0.1 Ω to 0.91 Ω	7
1 Ω to 9.1 Ω	8
10 Ω to 91 Ω	9
100 Ω to 910 Ω	1
1 k Ω to 9.1 k Ω	2
10 k Ω to 56 k Ω	3

Ordering Example

The ordering code of an AC01 resistor, value 47 k Ω supplied in ammopack of 1000 units is: 2306 328 33473.

Product specifications deviating from the standard values are available on request.

DIMENSIONS



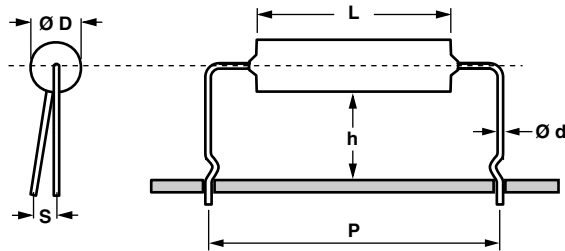
For packaging dimensions see separate packaging dimensions page.

DIMENSIONS - resistor types, mass and relevant physical dimensions					
MODEL	DIMENSIONS in millimeters [inches]				
	D _{max.}	L _{max.}	d	G	WEIGHT g PER 100 UNITS
AC01	4.3 [0.169]	11 [0.433]	0.8 ± 0.03 [0.031 ± 0.001]	63 ± 1 [2.480 ± 0.039]	52
AC03	4.8 [0.189]	13 [0.512]		63 ± 1 [2.480 ± 0.039]	75
AC04	5.5 [0.217]	16.5 [0.650]		63 ± 1 [2.480 ± 0.039]	110
AC05	7.5 [0.295]	18 [0.709]		63 ± 1 [2.480 ± 0.039]	190
AC07	7.5 [0.295]	26 [1.024]		73 ± 1 [2.874 ± 0.039]	260
AC10	8.0 [0.315]	44 [1.732]		88 ± 1 [3.465 ± 0.039]	450

PERFORMANCE	
TEST	TEST RESULTS
Climatic Category	40/200/56
Damp Heat, Steady State 56d	$\Delta R: \pm (5 \% R + 0.1 \Omega)$
Storage 1000 h, 200 °C, No Load	$\Delta R: \pm (5 \% R + 0.1 \Omega)$
Climatic Sequence	$\Delta R: \pm (1 \% R + 0.05 \Omega)$
Load Life 1000 h	$\Delta R: \pm (5 \% R + 0.1 \Omega)$
Resistance to Soldering Heat	$\Delta R: \pm (0.5 \% R + 0.05 \Omega)$
Robustness of Termination, 10N	$\Delta R: \pm (0.5 \% R + 0.05 \Omega)$
Short Time Overload, 10 x Rated Power for 5 s	$\Delta R: \pm (2 \% R + 0.1 \Omega)$

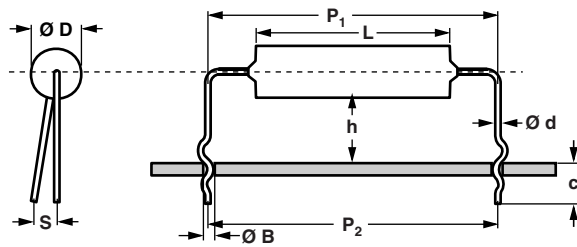
BENDING FORMS

KINK TYPE S = EK



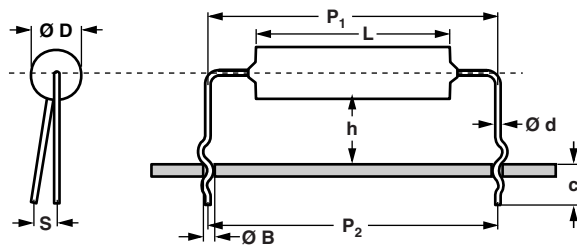
TYPE	Ø d	Ø D _{max.}	L	h ± 1	P ± 1	S _{max.}
AC01	0.8	(1)	(1)	8	17.8	2
AC03 - AC05					25.4	
AC07					33.0	

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

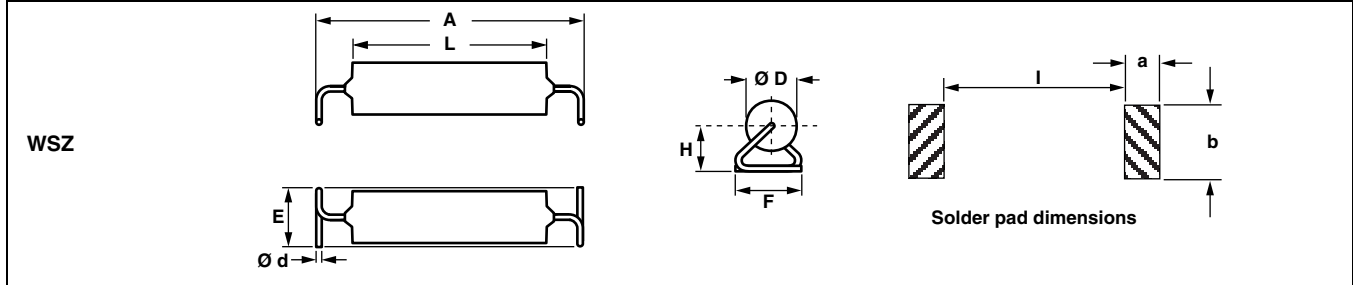


TYPE	Ø d	Ø D _{max.}	L	h ± 1	P ₁ ± 1	P ₂ ± 3	S _{max.}	Ø B	c
AC01 - AC03	0.8	(1)	(1)	8	17.8	17.8	2	1.0 ± 0.1	4.5 ± 1
AC03 - AC05					25.4	25.4			
AC07					33.0	33.0			

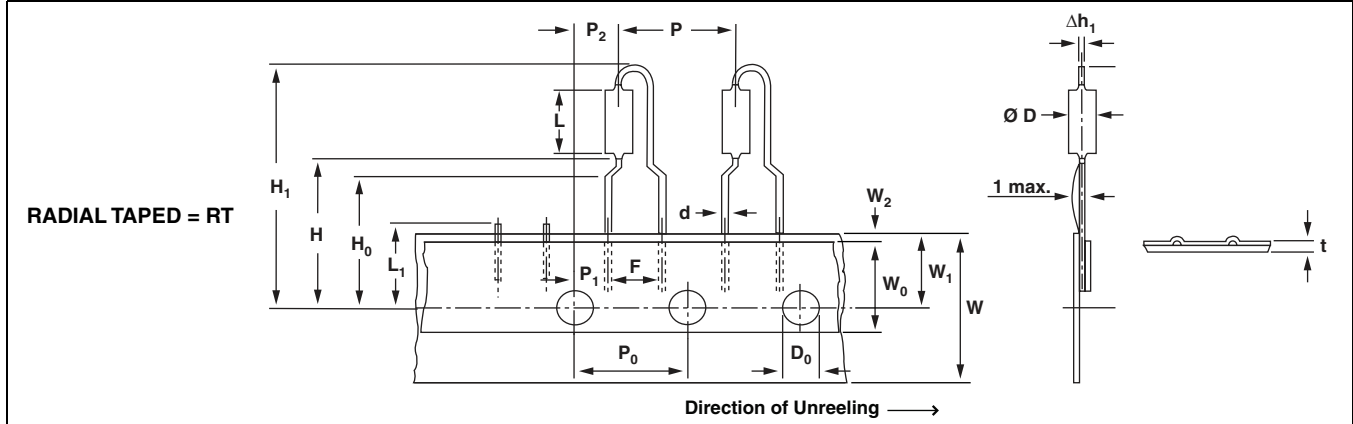
Note:

(1) See table DIMENSIONS

BENDING FORMS



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



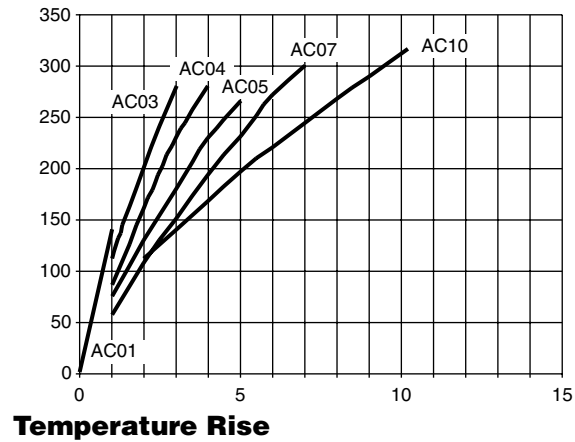
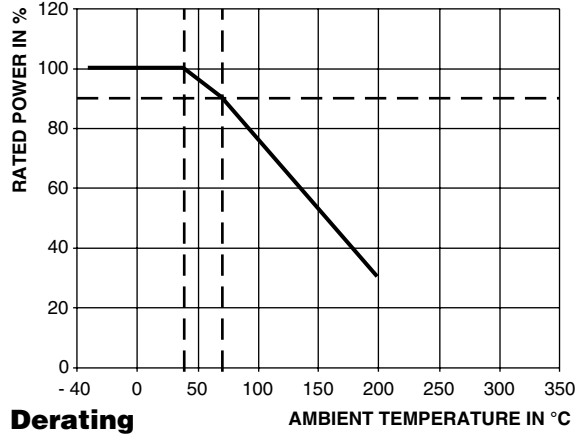
TYPE AC01			
Lead \varnothing		$\varnothing d$	0.8
Diameter		$\varnothing D$	(1)
Length		L	(1)
Pitch of components		P	12.7 ± 1.0
Pitch of spocket holes (2)		P_0	12.7 ± 0.3
Distance between hole center and resistor center		P_1	3.85 ± 0.7
Distance between hole center and lead center		P_2	6.35 ± 1.0
Lead 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.

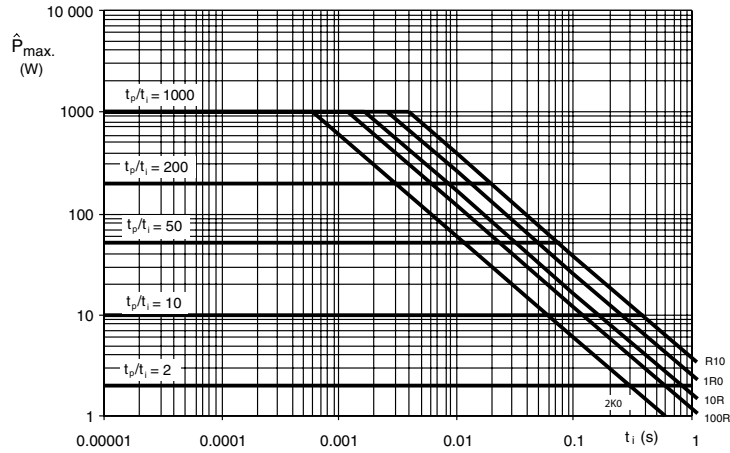
Notes:

- (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: $0.55 \text{ mm} \pm 0.1$

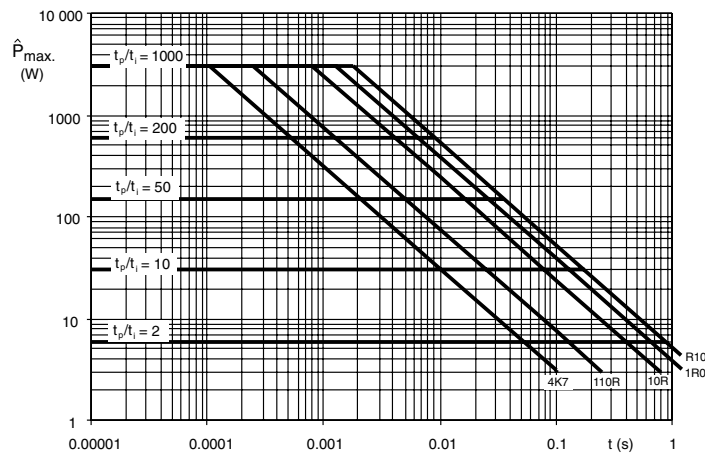


FUNCTIONAL PERFORMANCE

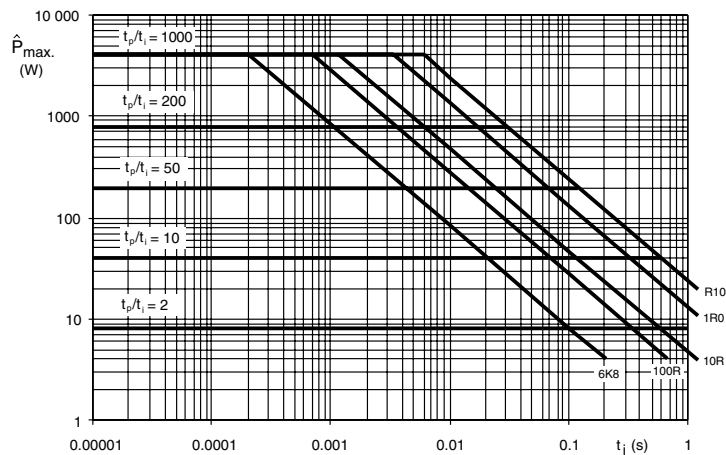




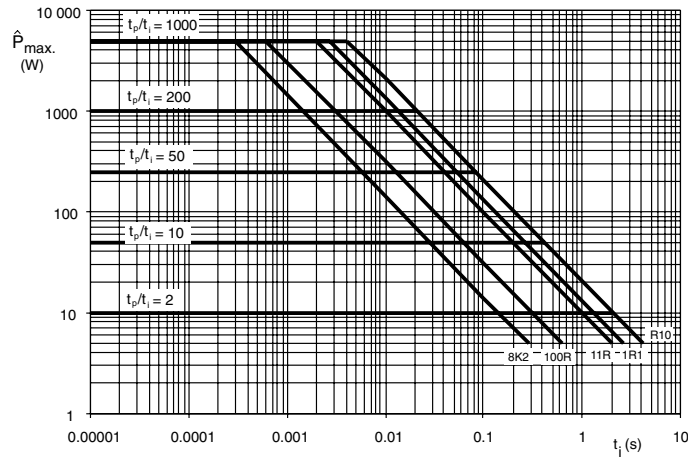
AC01 Pulse on a regular basis; maximum permissible peak pulse power (\hat{P}_{max}) as a function of pulse duration (t_i)



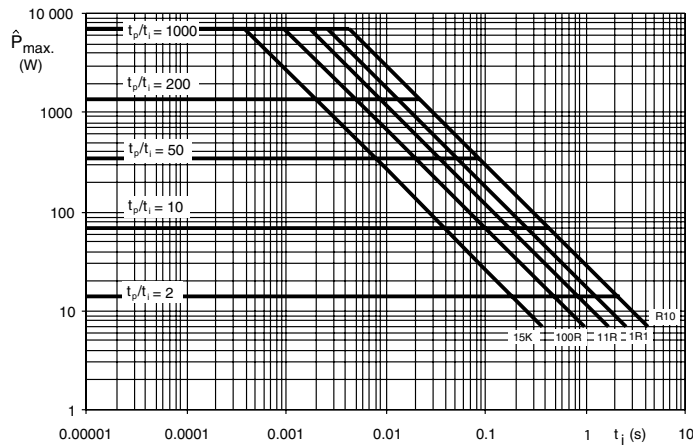
AC03 Pulse on a regular basis; maximum permissible peak pulse power (\hat{P}_{max}) as a function of pulse duration (t_i)



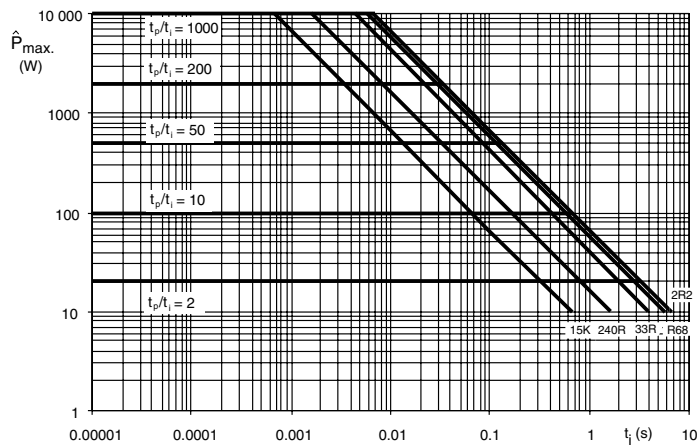
AC04 Pulse on a regular basis; maximum permissible peak pulse power (\hat{P}_{max}) as a function of pulse duration (t_i)



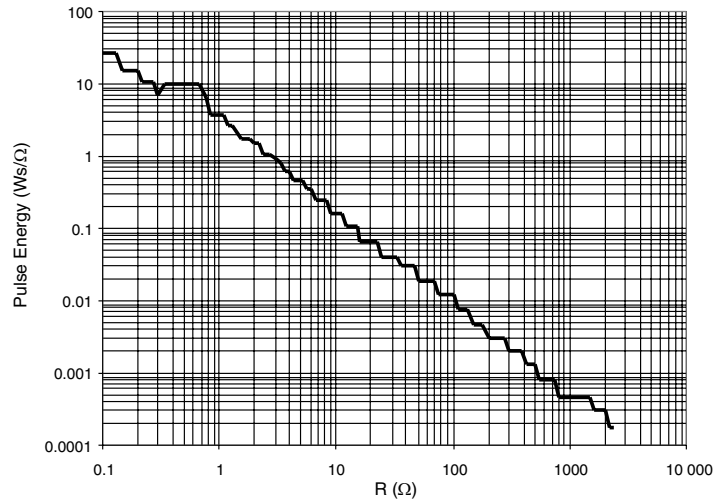
AC05 Pulse on a regular basis; maximum permissible peak pulse power (\hat{P}_{max}) as a function of pulse duration (t_i)



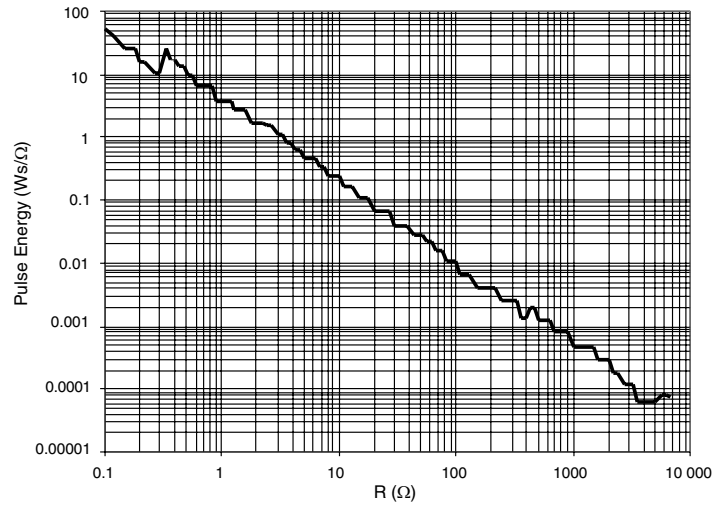
AC07 Pulse on a regular basis; maximum permissible peak pulse power (\hat{P}_{max}) as a function of pulse duration (t_i)



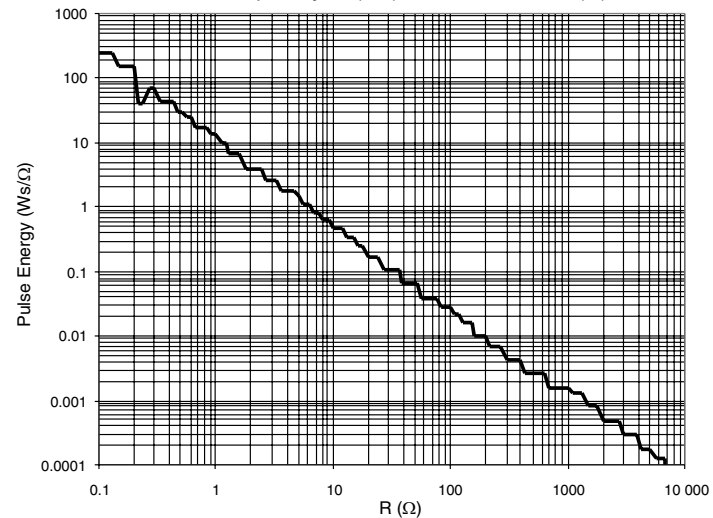
AC10 Pulse on a regular basis; maximum permissible peak pulse power (\hat{P}_{max}) as a function of pulse duration (t_i)



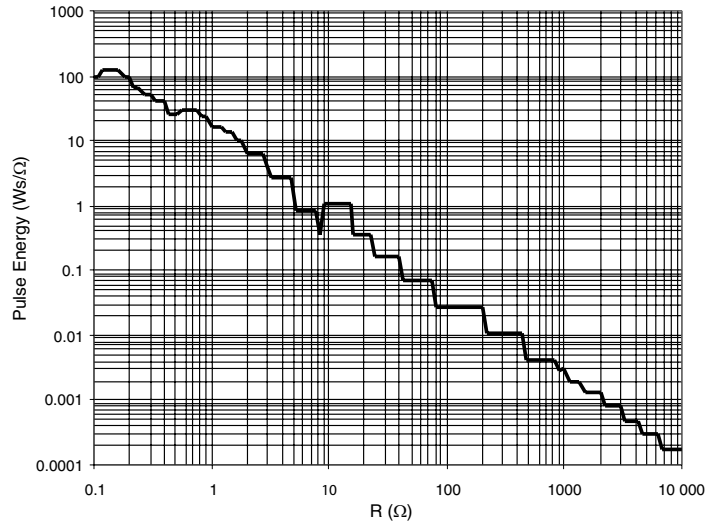
AC01 Pulse capability; E (Ws) as a function of R (Ω)



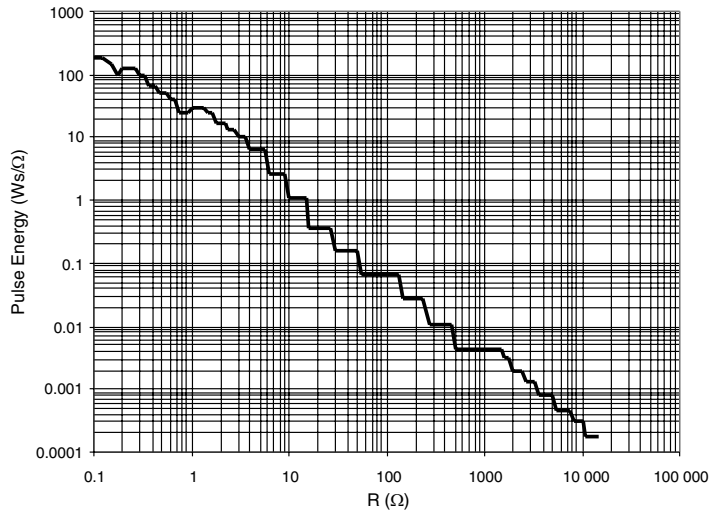
AC03 Pulse capability; E (Ws) as a function of R (Ω)



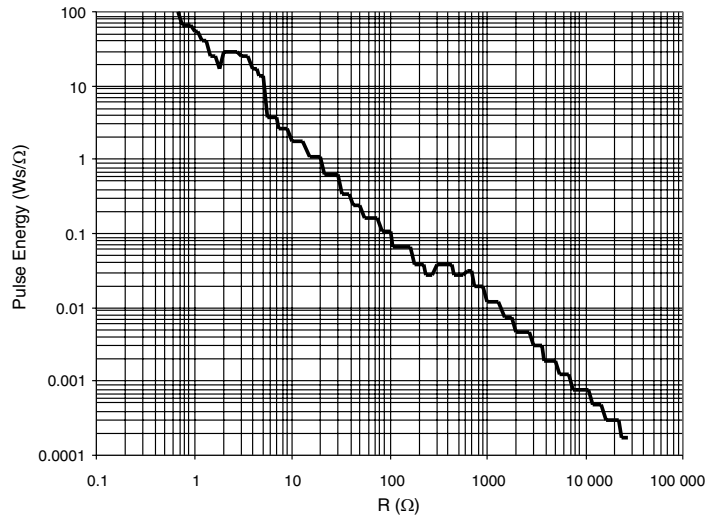
AC04 Pulse capability; E (Ws) as a function of R (Ω)



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)



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