

Cemented Leaded Wirewound Precision Resistors



FEATURES

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



RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

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 $P_{25\text{ °C}}$ 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	$\sqrt{P \times R}$	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: $P_{25\text{ °C}} = 1.8$ W

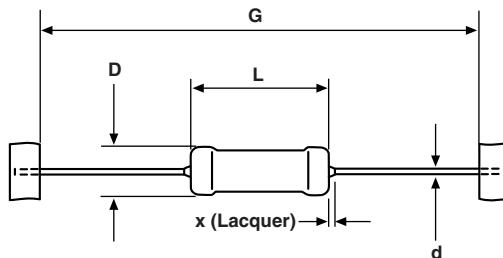
⁽²⁾ Resistance value to be selected for ± 1 % tolerance from E24 and E96

PART NUMBER AND PRODUCT DESCRIPTION																	
Part Number: PAC30004701FAC000																	
P	A	C	3	0	0	0	4	7	0	1	F	A	C	0	0	0	
MODEL		VARIANT		TCR/MATERIAL		VALUE		TOLERANCE CODE		PACKAGING CODE		SPECIAL					
PAC100 = PAC01		0 = neutral		0 = standard		3 digit value		F = $\pm 1.0\%$		(see Packaging table)		The 3 digits are used for all special part styles.					
PAC200 = PAC02		1 = SWI = Special winding ⁽¹⁾		$\pm 100 \text{ ppm/K}$		1 digit multiplier		To encode the non standard specifications all special parts of one series are listed in a cross reference table.		To encode the non standard specifications all special parts of one series are listed in a cross reference table.		000 = standard					
PAC300 = PAC03		2 = RT		3 = DK SP 20 mm		4 = DK LP 33 mm ⁽²⁾		5 = DK LP 17.8 mm ⁽²⁾		7 = DK LP 25.4 mm ⁽²⁾		8 = DK SP 25.4 mm					
PAC400 = PAC04		9 = WSZ 6720		C = E/K 25.4 mm ⁽²⁾		Z = value overflow (special)		0 = $*10^0$		1 = $*10^1$		2 = $*10^2$					
PAC500 = PAC05		3 = $*10^3$		4 = $*10^4$		5 = $*10^5$											
PAC600 = PAC06																	
Product Description: PAC03 4K7 1% AC																	
PAC03			4K7			1%			AC								
MODEL ⁽³⁾			VALUE ⁽³⁾			TOLERANCE CODE ⁽³⁾			PACKAGING DESCRIPTION ⁽⁴⁾								

Notes

- (1) Special winding on request
- (2) Other dimensions on request
- (3) See "Part Number and Product Description"
- (4) See "Packaging Table"

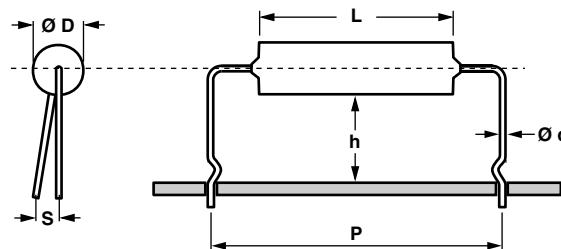
PACKAGING TABLE																										
MODEL	AMMO			LOOSE			BLISTER			PIECES	PACK CODE	PACK. DESC.														
	PIECES	PACK CODE	PACK. DESC.	PIECES	PACK CODE	PACK. DESC.	PIECES	PACK CODE	PACK. DESC.																	
PAC01	1000	A1	A1	500			1250			1250	BM	BM														
PAC01 DK/EK													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

DIMENSIONS in millimeters [inches]


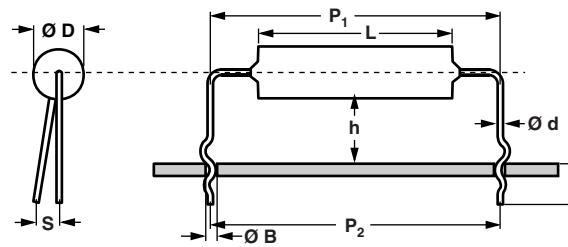
MODEL	D _{max.}	L _{max.}	d	X _{max.}	G	WEIGHT g PER UNIT
PAC01	4.3 [0.169]	11 [0.433]	0.8 ± 0.03 [0.031 ± 0.001]	2	63 ± 1 [2.480 ± 0.039]	0.52
PAC02	4.8 [0.189]	13 [0.512]		2	63 ± 1 [2.480 ± 0.039]	0.75
PAC03	5.5 [0.217]	16.5 [0.650]		3	63 ± 1 [2.480 ± 0.039]	1.10
PAC04	7.5 [0.295]	18 [0.709]		3	73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

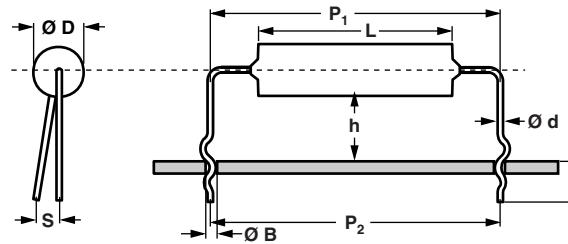
- For packaging dimensions see: www.vishay.com/doc?28721

BENDING FORMS
KINK TYPE S = EK


TYPE	$\varnothing d$	$\varnothing D_{max.}$	L	$h \pm 1$	$P \pm 1$	$S_{max.}$
PAC01	0.8	(1)	(1)	8	17.8	2
PAC02 - PAC04					25.4	
PAC05 - PAC06					33.0	

DOUBLE KINK SP = DK SP


TYPE	$\varnothing D$	$\varnothing D_{max.}$	L	$h \pm 1$	$P_1 \pm 1$	$P_2 \pm 3$	$S_{max.}$	$\varnothing B$	c
PAC01	0.8	(1)	(1)	8	19.8	17.8	2	1.0 ± 0.1	4.5 ± 1
PAC02 - PAC04					22.0	20.0			
PAC05 - PAC06					27.4	25.4			
					35.0	33.0			

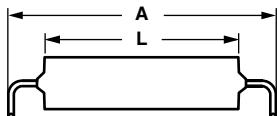
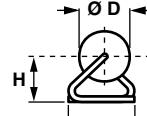
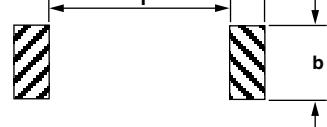
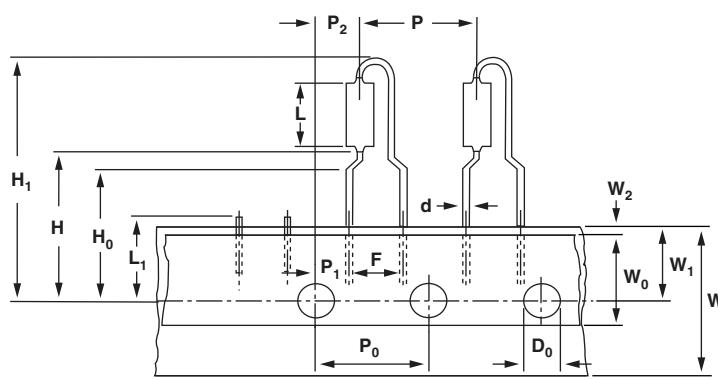
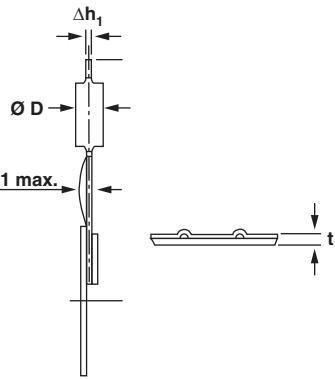
DOUBLE KINK LP = DK LP


TYPE	$\varnothing D$	$\varnothing D_{max.}$	L	$h \pm 1$	$P_1 \pm 1$	$P_2 \pm 3$	$S_{max.}$	$\varnothing B$	c
PAC01 - PAC02	0.8	(1)	(1)	8	17.8	17.8	2	1.0 ± 0.1	4.5 ± 1
PAC02 - PAC04					25.4	25.4			
PAC05 - PAC06					33.0	33.0			

Note

(1) See table DIMENSIONS

BENDING FORMS

WSZ											
		Solder pad dimensions									
TYPE	$\emptyset d$	$\emptyset D_{max.}$	A	L	F	H	E	a	b	I	
PAC02 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											
  <p>Direction of Unreeling →</p>											
TYPE PAC01											
Lead \emptyset			$\emptyset d$								0.8
Diameter			$\emptyset D$								(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 \emptyset			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.

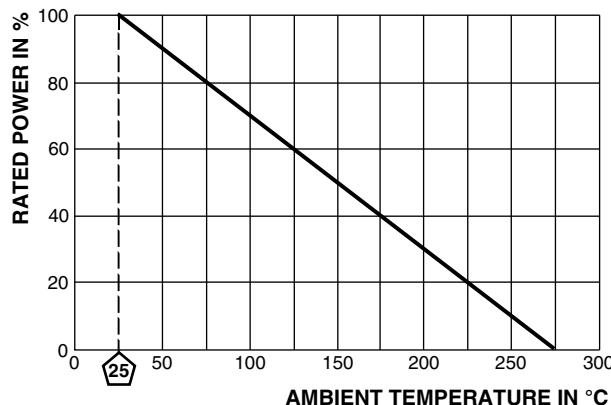
Notes

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

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 \pm 2) °C, 56 days, (93 \pm 3) % RH	$\Delta R = \pm (1.0 \% R + 0.05 \Omega)$
Endurance at room temperature (116 % P_{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	$\Delta R = \pm (0.2 \% R + 0.05 \Omega)$

HISTORICAL 12NC INFORMATION

- The resistors had a 12-digit ordering code starting 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 ± 1 % tolerance, supplied in ammopack of 500 units was:
2306 327 04709.

HISTORICAL 12NC - Resistor type and packaging

TYPE	2306 327		
	BANDOLIER IN AMMOPACK		
	RADIAL	STRAIGHT 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

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