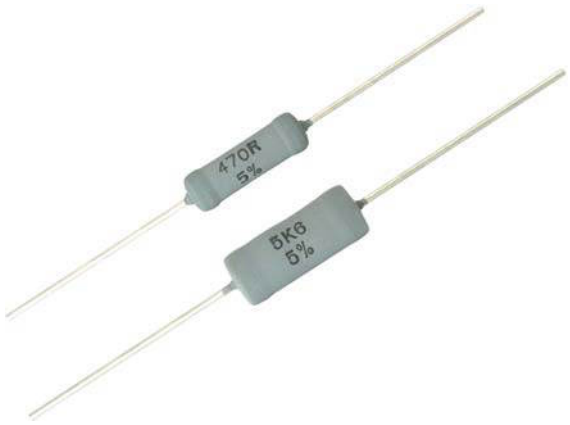
Commercial Axial Cemented Leaded Wirewound Resistors



FEATURES

- Non flammable silicon cement coating
- High grade ceramic core
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free
RoHS COMPLIANT
HALOGEN FREE
GREEN (5-2008)

APPLICATIONS

- Power supply
- Appliances
- Lighting
- Energy meters

DESIGN SUPPORT TOOLS

click logo to get started

3D Models Available

The Z300-C00 series, is the perfect choice for general purpose power applications. The robust silicon cement coating can handle challenging ambient and operating conditions. Typical applications include but are not limited to energy meters, power supplies, etc.

STANDARD ELECTRICAL SPECIFICATIONSS

TYPE	POWER RATING P_{40}	POWER RATING P_{70}	RESISTANCE RANGE	RESISTANCE TOLERANCE (1)	TEMPERATURE COEFFICIENT (2)(3)
Z301-C00	1 W	0.9 W	0.30 Ω to 2 kΩ	± 5 %, ± 10 %	± 200 ppm/K
ZDA0411-C00	2 W	1.8 W	0.47 Ω to 4.3 kΩ		
Z302-C00	3 W	2.7 W	0.22 Ω to 3.3 kΩ		
Z303-C00	4 W	3.5 W	0.47 Ω to 3.9 kΩ		
Z304-C00	5 W	4.4 W	0.62 Ω to 5.6 kΩ		
Z305-C00	6 W	5.3 W	0.15 Ω to 10 kΩ		

Notes

(1) Resistance value to be selected for ± 10 % tolerance from E12 and for ± 5 % from E24, 1 % tolerance available on request

(2) Lower TCR products are available on request

(3) TCR of values < 1R is ±400ppm/K

For technical questions, contact: ww1resistors@vishay.com

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PART NUMBER AND PRODUCT DESCRIPTION

Part Number: Z340818347 0 0 J 6 D C 0 0

Z	3	4	0	8	1	8	3	4	7	0	0	J	6	D	C	0	0

TYPE	TCR / MATERIAL	RESISTANCE	TOLERANCE CODE	PACKAGING CODE
Z310309 = Z301-C **ZDA0411** = ZDA0411-C **Z320414** = Z302-C **Z330617** = Z303-C **Z340818** = Z304-C **Z350922** = Z305-C	**1** = ± 100 ppm/K **3** = ± 200 ppm/K **4** = SWI (special winding)	**3 digit value** **1 digit multiplier** MULTIPLIER **7** = $*10^{-3}$ **8** = $*10^{-2}$ **9** = $*10^{-1}$ **0** = $*10^{0}$ **1** = $*10^{1}$ **2** = $*10^{2}$	**J** = ± 5.0 % **K** = ± 10.0 %	(see Packaging table)

Product Description: Z304-C 3 470R 5 % AB G63

Z304-C	3	470R	5 %	AB G63
TYPE	TCR / MATERIAL	RESISTANCE	TOLERANCE CODE	PACKAGING DESCRIPTION
Z301-C ZDA0411-C Z302-C Z303-C Z304-C Z305-C		15R 5K6	5 % 10 %	A1 G53 AC G53 AC G73 AC G83 AB G63 AB G83

PACKAGING

TYPE	CODE	DESCRIPTION	QUANTITY	PACKAGING STYLE	WIDTH	PITCH	DIMENSIONS
Z301-C00	21	A1 G53	1000	Taped acc. to IEC 60286-1 fan-folded in a box	53 mm	5 mm	84 mm x 73 mm x 326 mm
ZDA0411-C00	21	A1 G53	1000				84 mm x 73 mm x 326 mm
Z302-C00	2C	AC G53	500		53 mm	5 mm	82 mm x 29 mm x 324 mm
	4C	AC G73	500		73 mm		110 mm x 76 mm x 334 mm
	6C	AC G83	500		83 mm		110 mm x 87 mm x 324 mm
Z303-C00	2C	AC G53	500		53 mm	5 mm	82 mm x 49 mm x 324 mm
	6C	AC G83	500		83 mm	10 mm	110 mm x 87 mm x 324 mm
Z304-C00	6D	AB G63	250		63 mm	10 mm	84 mm x 73 mm x 326 mm
	6E	AB G83	250		83 mm		84 mm x 73 mm x 326 mm
Z305-C00	6B	AB G83	250		83 mm	10 mm	110 mm x 87 mm x 324 mm

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DESCRIPTION

Wirewound resistors are best suited for use in high power, high current applications. The silicon cement lacquer coating enables Z300-C00 to withstand challenging operating and ambient conditions.

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 (Al_2O_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 spacing's, a large ohmic value range can be covered. The coating is resistant to cleaning solvents specified in IEC 60115-1 (1). The resistors are marked with resistance and tolerance.

Product quality is verified by testing procedures, performed on all individual resistors. 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 (2)
- The Global Automotive Declarable Substance List (GADSL) (3)
- The REACH regulation (1907/2006/EC) and the related list of substances with very high concern (SVHC) (4) 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. 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.

ASSEMBLY

The resistors are axial leaded for soldering. The terminals of the resistors are completely lead (Pb)-free, the special 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.

These components are high dissipation power 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 hermetically encapsulated.

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.

RELATED PRODUCTS

In similar continuous power applications and challenging environmental conditions, see the datasheets:

- AC Series - Cemented Wirewound Resistors
  www.vishay.com/doc?28730
- Z300-Cxx - High Surge Axial Cemented Wirewound Resistors
  www.vishay.com/doc?21027

For precision applications, there is the cement coated PAC series, see the datasheet:

- PAC Series - Cemented Wirewound Precision Resistors
  www.vishay.com/doc?28731

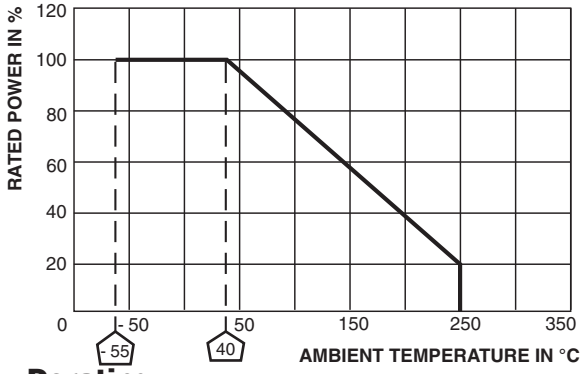
Notes

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

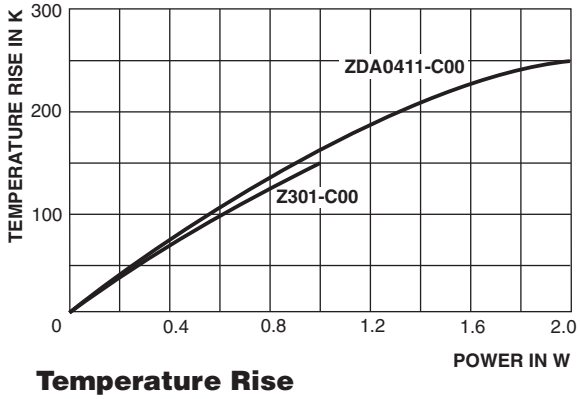
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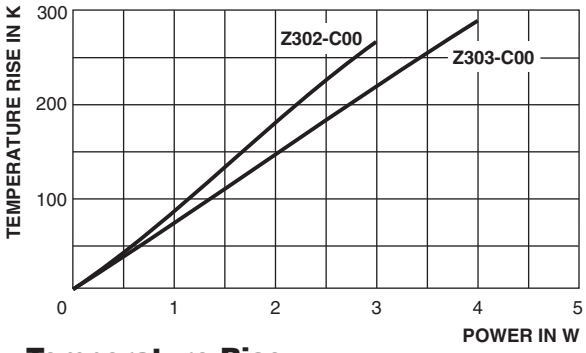
FUNCTIONAL PERFORMANCE



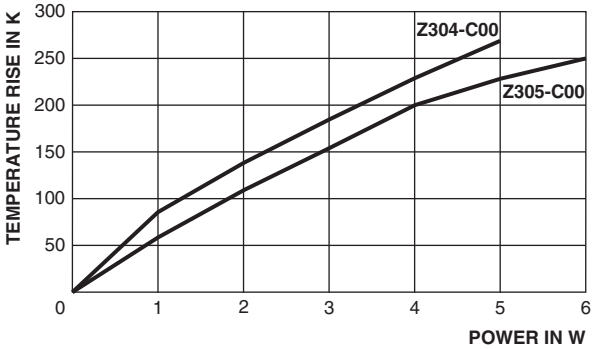
Derating



Temperature Rise



Temperature Rise



Temperature Rise

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TESTS 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 listed above.

The tests are carried out with reference to IEC 60115-1, in accordance with IEC 60068-2-xx test method and under standard atmospheric conditions in accordance with IEC 60068-1, 5.3.

A climatic category 40 / 200 / 56 is applied, defined by the lower category temperature (LCT = -40 °C), the upper category temperature (UCT = 200 °C), and the duration of exposure in the damp heat, steady state test (56 days).

Unless otherwise specified the following values apply:

- Temperature: 15 °C to 35 °C
- Relative humidity: 45 % 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, 4.31.

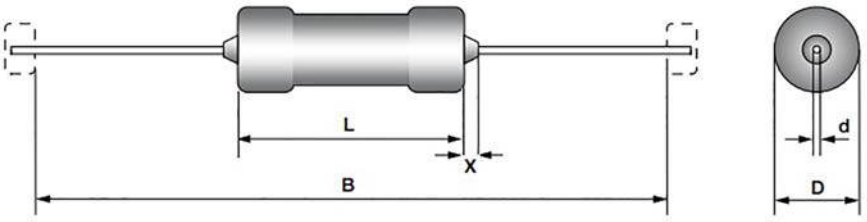
In test procedures and requirements table, only the tests and requirements are listed with reference to the relevant clauses of IEC 60115-1 and IEC 60068-2-xx test methods. A short description of the test procedure is also given.

TEST PROCEDURES AND REQUIREMENTS

IEC 60115-1 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE ($\Delta R_{MAX.}$)
4.13	-	Short time overload	Room temperature; 10x rated power P_{40}; 5 s	± (2 % R + 0.05 Ω)
4.16	21 (Ua_1) 21 (Ub) 21 (Uc)	Robustness of terminations	Tensile, bending and torsion	No damage ± (0.5 % R + 0.05 Ω)
4.18	20 (Tb)	Resistance to soldering heat	Unmounted components (260 ± 5) °C; (10 ± 1) s	± (1 % R + 0.05 Ω)
4.23		Climatic sequence:		± (3 % R + 0.1 Ω)
4.23.2	2 (Ba)	dry heat	16 h; 200 C	
4.23.3	30 (Db)	Damp heat (accelerated) 1st cycle	24 h; 55 °C; 90 % to 100 % RH	
4.23.4	1 (Aa)	cold	2 h; -55 °C	
4.23.5	13 (M)	low air pressure	2 h; 8.5 kPa; 15 °C to 35 °C	
4.23.6	30 (Db)	damp heat remaining cyclic	5 days; 55 °C; 95 % to 100 % RH; 5 cycles	
4.24	78 (Cab)	Damp heat, (steady state)	56 days; (40 ± 2) °C; (93 ± 5) % RH	± (3 % R + 0.1 Ω)
4.25.2	-	Endurance (at room temperature)	1000 h; loaded with 116 % of P_{70}; 1.5 h ON and 0.5 h OFF	± (3 % R + 0.1 Ω)
4.25.3	-	Endurance (at 200 °C)	1000 h; loaded with 30 % of P_{70}; 1.5 h ON and 0.5 h OFF	± (3 % R + 0.1 Ω)

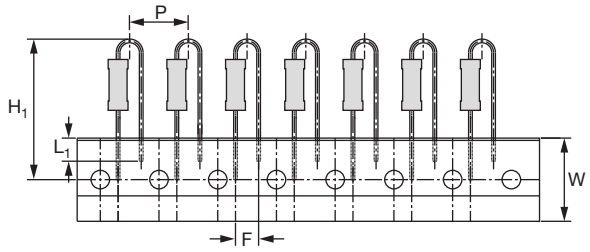
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DIMENSIONS



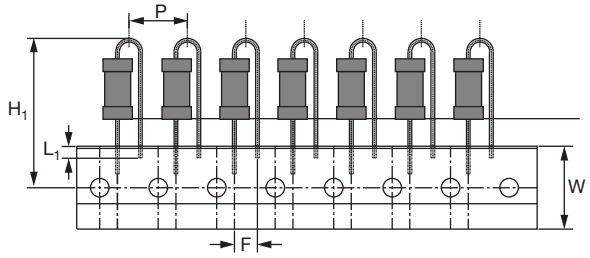
TYPE	DIMENSIONS in millimeters (inches)					
	$L_{MAX.}$	$D_{MAX.}$	$d_{MAX.}$	B	$X_{MAX.}$	MASS (g)
Z301-C00	8.5 (0.355)	3 (0.118)	0.7 (0.027)	53 ± 1 (2.087 ± 0.039)	2 (0.079)	0.5
ZDA0411-C00	11 (0.433)	4 (0.157)	0.7 (0.027)	53 ± 1 (2.087 ± 0.039)	2 (0.079)	0.8
Z302-C00	13 (0.512)	4.8 (0.189)	0.8 (0.031)	53 ± 1 (2.087 ± 0.039) 73 ± 1 (2.87 ± 0.039) 83 ± 1 (3.268 ± 0.039)	2 (0.079)	0.6 0.7 0.8
Z303-C00	15.8 (0.622)	5.5 (0.217)	0.8 (0.031)	53 ± 1 (2.087 ± 0.039) 83 ± 1 (3.268 ± 0.039)	2 (0.079)	1.0 1.1
Z304-C00	18 (0.709)	7.5 (0.295)	0.8 (0.031)	63 ± 1 (2.48 ± 0.039) 83 ± 1 (3.268 ± 0.039)	2 (0.079)	1.8 2.0
Z305-C00	22.3 (0.878)	8.7 (0.343)	0.8 (0.031)	83 ± 1 (3.268 ± 0.039)	2 (0.079)	3.8

ZDA0411-C RADIAL



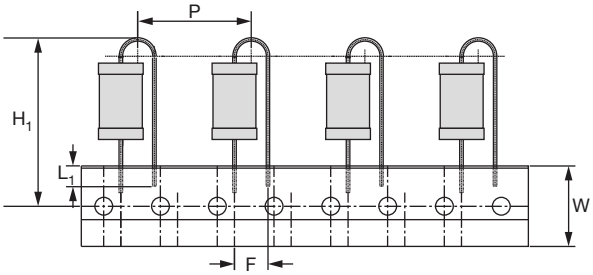
DIMENSIONS in millimeters		
Pitch of components	P	12.7 ± 1.0
Lead to lead distance	F	4.8 + 0.7 / - 0
Tape width	W	18 ± 0.5
Component height	H_1	30.0 ± 3
Min. lead wire (tape portion) shortest lead	L_1	4.3

Z302-C RADIAL



DIMENSIONS in millimeters		
Pitch of components	P	12.7 ± 1.0
Lead to lead distance	F	5.00 ± 0.5
Tape width	W	18 ± 0.5
Maximum component height	H_1	34
Min. lead wire (tape portion) shortest lead	L_1	2.5

Z304-C RADIAL



DIMENSIONS in millimeters		
Pitch of components	P	25.4 ± 1.0
Lead to lead distance	F	7.50 ± 0.5
Tape width	W	18 ± 0.5
Component height	H_1	37 ± 2
Min. lead wire (tape portion) shortest lead	L_1	4.3

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