

Axial Cemented Wirewound Resistors



FEATURES

- All welded construction
- Non flammable cement coating
- Ceramic core
- Various kinds of lead forming available
- Pure tin plating provides compatibility with lead (Pb)-free and lead containing soldering processes
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
GREEN
(5-2008)

STANDARD ELECTRICAL SPECIFICATIONS				
MODEL	POWER RATING W $P_{40^{\circ}\text{C}}$	RESISTANCE RANGE ⁽¹⁾ Ω		TOLERANCE \pm %
		TCR = - 10 ppm/K to - 80 ppm/K WM 50 (CLASS 1)	TCR = 100 ppm/K to 180 ppm/K WM 110 (CLASS 3)	
Z301	1	0.30 to 270	0.68 to 2K	10, 5
ZDA0411	2	0.47 to 560	1.50 to 4.30K	10, 5
ZDV0411	2	0.47 to 560	1.50 to 4.30K	10, 5
Z302	3	0.10 to 510	1.80 to 3.30K	10
	3	0.10 to 510	24 to 3.30K	5
	3	0.22 to 510	-	2
	3	1 to 510	-	1
Z303	4	0.10 to 1K	1.80 to 3.90K	10
	4	0.10 to 1K	12 to 3.90K	5
	4	0.10 to 1K	-	2
	4	1 to 1K	-	1
Z305	6	0.10 to 2.4K	3.90 to 10K	10
	6	0.10 to 2.4K	10 to 10K	5
	6	0.62 to 2.4K	-	2, 1
Z306	8	0.13 to 4.7K	6.80 to 16K	10, 5
	8	1 to 4.7K	-	2
	8	2.2 to 4.7K	-	1
Z307	10	0.20 to 8.2K	12 to 30K	10, 5
	10	1.80 to 8.2K	-	2
	10	3.30 to 8.2K	-	1

Note

⁽¹⁾ Resistance value to be selected for ± 10 % tolerance from E12 and for ± 5 %, ± 2 % and ± 1 % from E24



PART NUMBER AND PRODUCT DESCRIPTION

Part Number: Z32041411509K2C000

Z	3	2	0	4	1	4	1	1	5	0	9	K	2	C	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

MODEL	TCR/MATERIAL	VALUE	TOLERANCE CODE	PACKAGING CODE	SPECIAL
Z310309 = Z301 ZDA0411 = ZDA0411 ZDV0411 = ZDV0411 Z320414 = Z302 Z330617 = Z303 Z350922 = Z305 Z360933 = Z306 Z370947 = Z307	1 = - 10 ... - 80 ppm/K WM 50 Class 1 3 = 100 ... 180 ppm/K WM 110 Class 3 4 = SWI (special winding)	3 digit value 1 digit multiplier MULTIPLIER F = *10 ⁻⁴ 7 = *10 ⁻³ 8 = *10 ⁻² 9 = *10 ⁻¹ 0 = *10 ⁰ 1 = *10 ¹ 2 = *10 ²	F = ± 1.0 % G = ± 2.0 % J = ± 5.0 % K = ± 10.0 %	(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. 000 = Standard

Product Description: Z302 1 15R 10 % AC G53

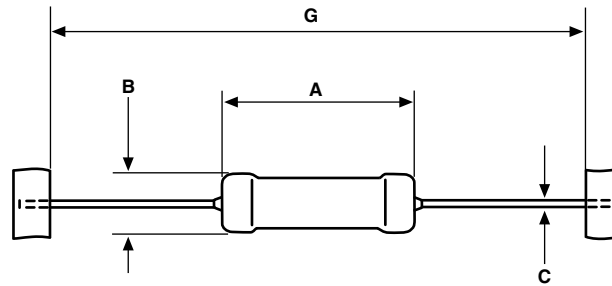
Z302	1	15R	10 %	AC G53
MODEL (1)	TCR/MATERIAL (1)	VALUE (1)	TOLERANCE CODE (1)	PACKAGING DESCRIPTION (2)

Notes

- (1) See "Part Number" above
- (2) See "Packaging Table"

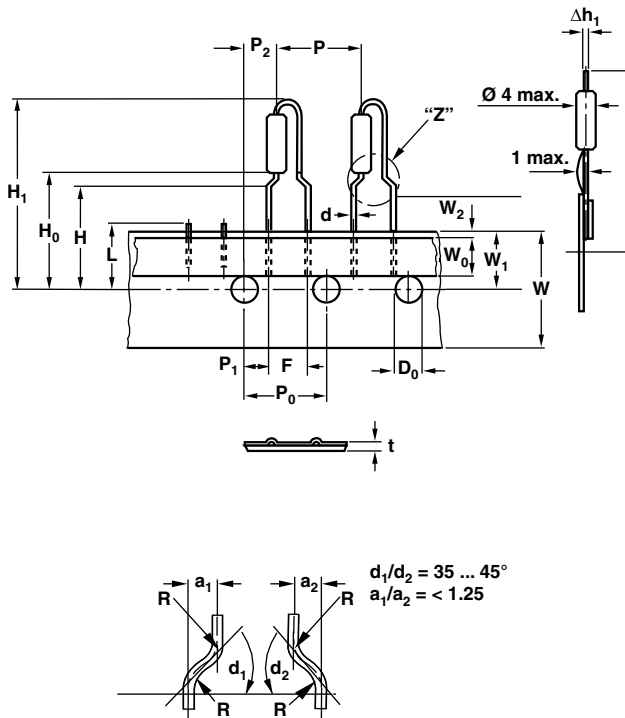
PACKAGING TABLE

MODEL	TAPE/LEAD LENGTH (mm)	AMMO PACK			REEL			LOOSE		
		PCS	PACKAGING CODE	PACKAGING DESCRIPTION	PCS	PACKAGING CODE	PACKAGING DESCRIPTION	PCS	PACKAGING CODE	PACKAGING DESCRIPTION
Z301	53	1000	21	A1 G53	7500	DS	RS R53			
					2000	D2	R2 R53			
Z302	53	500	2C	AC G53	7500	DS	RS R53			
		4000	24	A4 G53	2000	D2	R2 R53			
	63	4000	25	A4 G63						
	73	500	4C	AC G73						
	83	500	6C	AC G83	1000	H1	R1 R83			
					7500	HS	RS R83			
	94							500	LC	LC
108				7500	JS	RS R108				
Z303	53	500	2C	AC G53	1000	D1	R1 R53			
	83	500	6C	AC G83	1000	H1	R1 R83			
	94									
Z305	83	100	6A	AA G83						
		250	6B	AB G83	500	HC	RC R83			
Z306	83	250	6B	AB G83	500	HC	RC R83			
Z307	120							200	LJ	LJ
ZDA0411	73	1000	41	A1 G73	2000	F2	R2 R73			
ZDV0411	73	2000	40	A2 G73						

DIMENSIONS


For packaging dimensions see appropriate catalog or web page.

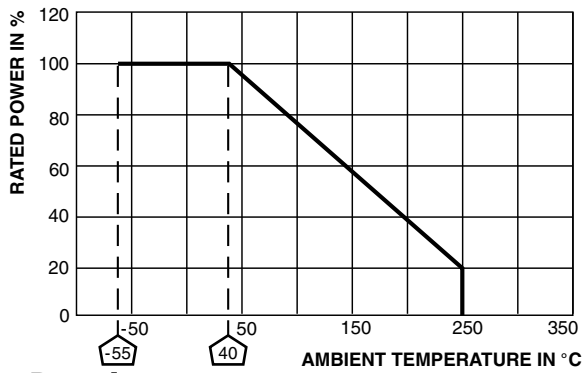
MODEL	DIMENSIONS in millimeters [inches]				
	A _{MAX.}	B _{MAX.}	C _{MAX.}	G	MASS (g)
Z301	8.5 [0.355]	3 [0.118]	0.7 [0.027]	53 ± 1 [2.087 ± 0.039]	0.5
ZDA0411	11 [0.433]	4 [0.157]	0.7 [0.027]	53 ± 1 [2.087 ± 0.039]	0.8
Z302	13 [0.512]	4.8 [0.189]	0.8 [0.031]	53 ± 1 [2.087 ± 0.039]	1.1
Z303	15.8 [0.622]	5.5 [0.217]	0.8 [0.031]	53 ± 1 [2.087 ± 0.039]	1.4
Z305	22.3 [0.878]	8.7 [0.343]	0.8 [0.031]	83 ± 1 [3.268 ± 0.039]	3.7
Z306	32.3 [1.272]	8.7 [0.343]	0.8 [0.031]	83 ± 1 [3.268 ± 0.039]	5
Z307	49.8 [1.961]	9 [0.354]	0.8 [0.031]	120 ± 2 [4.724 ± 0.079]	7

DIMENSIONS ZDV0411


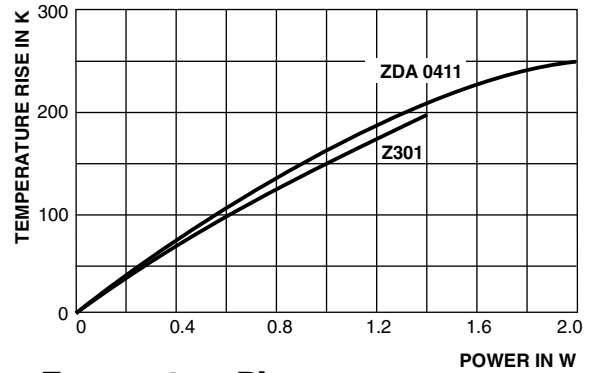
DIMENSIONS in millimeters			TOL.
Lead Ø	d	0.6	
Pitch of components	P	12.7	± 1.0
Pitch of sprocket holes ⁽¹⁾	P ₀	12.7	± 0.3
Distance between hole center and resistor center	P ₁	3.85	± 0.7
Distance between hole center and lead center	P ₂	6.35	± 0.7
Lead spacing	F	5	+ 0.6, - 0.1
Angle of Insertion	Δh ₁	2 max.	-
Width of carrier tape	W	18.0	+ 1, - 0.5
Width of adhesive tape	W ₀	12.0	± 0.5
Position of holes	W ₁	9	+ 0.75, - 0.5
Position of adhesive tape	W ₂	0.5	+ 0, - 0.5
Body to hole center	H	16.0	± 0.5
Lead crimp to hole center ⁽²⁾	H ₀	19.5	± 1.0
Hole Ø	D ₀	4.0	± 0.2
Thickness of tape ⁽³⁾	t	0.9 max.	-
Height of cutting	L	11 max.	-
Height of insertion	H ₁	32.3 max.	-

Notes

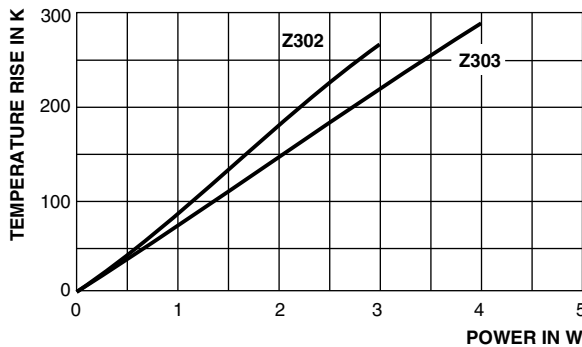
- (1) Test over 10 holes - 9 intervals P₀ 12 x 9 = 114.3 ± 0.5
- (2) Parallelism, < 0.5 mm
- (3) Thickness of carrier tape: 0.55 mm ± 0.1



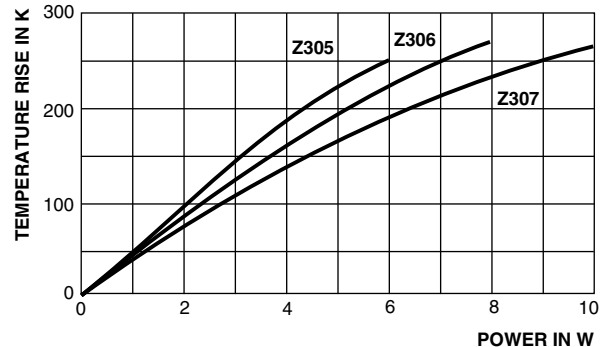
Derating



Temperature Rise



Temperature Rise



Temperature Rise

PERFORMANCE	
TEST	PERMISSIBLE CHANGE
Climatic category (LCT/UCT/Days)	40/200/56
Climatic sequence, IEC 60115-1, 4.23	$\Delta R = \pm (3 \% R + 0.05 \Omega)$
Damp heat, steady state, IEC 60115-1, 4.24 (40 ± 2) °C, 56 days, (93 ± 3) % RH	$\Delta R = \pm (3 \% R + 0.1 \Omega)$
Endurance at room temperature (116 % P_{70}), 1000 h, IEC 60115-1, 4.25.2	$\Delta R = \pm (3 \% R + 0.1 \Omega)$
Storage at UCT, 1000 h, no load, IEC60115-1,4.25.3	$\Delta R = \pm (3 \% R + 0.1 \Omega)$
Resistance to soldering heat, IEC 60115-1, 4.18 (260 ± 5) °C, (10 ± 1) s	$\Delta R = \pm (0.5 \% R + 0.05 \Omega)$
Robustness of Termination, IEC 60115-1, 4.16 10N	$\Delta R = \pm (0.5 \% R + 0.05 \Omega)$
Short time overload, IEC 60115-1, 4.13 10 x rated power for 5 s	$\Delta R = \pm (1 \% R + 0.1 \Omega)$



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.