

Cemented Wirewound Resistors with Lugs



FEATURES

- Complete welded construction
- Ceramic core
- Available in adjustable = "E" or non inductive design = "Ni"
- Lugs with various termination styles for soldering or bolt connection
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

STANDARD ELECTRICAL SPECIFICATIONS

MODEL	VARIANT/ TERMINAL	POWER RATING $P_{40\text{ }^{\circ}\text{C}}$ W	LIMITING VOLTAGE	RESISTANCE RANGE ⁽¹⁾ TCR -10 ppm/K to -80 ppm/K	RESISTANCE RANGE ⁽¹⁾ TCR 100 ppm/K to 180 ppm/K	TOLERANCE ± %
ZWS6	SL	6	$\sqrt{P \times R}$	0.82 to 5.1K	1.8 to 13K	10, 5
	E SL			2.7 to 5.1K	-	2
	Ni SL			0.82 to 130	1.8 to 4.7K	10, 5
				0.15 to 910	0.33 to 2.4K	10
				1 to 910	2 to 2.4K	5
ZWS8	SL, SS	8	$\sqrt{P \times R}$	0.68 to 7.5K	1.8 to 20K	10, 5
	E SL, E SS			3.3 to 7.5K	-	2
	Ni SL, Ni SS			0.62 to 200	1.8 to 6.8K	10, 5
				0.24 to 1.3K	0.56 to 3.6K	10
				1 to 1.3K	2 to 3.6K	5
ZWS12	SL, SS	12	$\sqrt{P \times R}$	0.62 to 10K	1.8 to 27K	10, 5
	E SL, E SS			3 to 10K	-	2
	Ni SL, Ni SS			0.56 to 270	1.8 to 9.1K	10, 5
				0.33 to 1.8K	0.75 to 5.1K	10
				1 to 1.8K	2 to 5.1K	5
ZWS15	SL, SS	15	$\sqrt{P \times R}$	0.68 to 12K	2.2 to 33K	10, 5
	E SL, E SS			2.2 to 12K	-	2
	Ni SL, Ni SS			0.68 to 330	2.2 to 11K	10, 5
				0.39 to 2.2K	0.82 to 6.2K	10
				1 to 2.2K	2.0 to 6.2K	5
ZWS20	SL, SS, SB, FST	20	$\sqrt{P \times R}$	0.62 to 16K	1.3 to 43K	10, 5
	E SL, E SS, E SB, E FST			2.7 to 16K	-	2
	Ni SL, Ni SS, Ni SB, Ni FST			0.62 to 430	1.3 to 15K	10, 5
				0.47 to 2.7K	1.1 to 8.2K	10
				1 to 2.7K	2 to 8.2K	5
ZWS35	SL, SS, SB, FST	35	$\sqrt{P \times R}$	1.1 to 30K	2.7 to 82K	10, 5
	E SL, E SS, E SB, E FST			1.3 to 30K	-	2
	Ni SL, Ni SS, Ni SB, Ni FST			1.1 to 750	2.7 to 27K	10, 5
				0.91 to 5.1K	2 to 15K	10, 5
ZWS50	SS, SSB, SB, FST	50	$\sqrt{P \times R}$	1.3 to 33K	3 to 91K	10, 5
	E SS, E SSB, E SB, E FST			2.2 to 33K	-	2
	Ni SS, Ni SSB, Ni SB, Ni FST			1.3 to 910	3 to 33K	10, 5
				1.1 to 6.2K	2.4 to 16K	10, 5



STANDARD ELECTRICAL SPECIFICATIONS

MODEL	VARIANT/ TERMINAL	POWER RATING $P_{40^{\circ}\text{C}}$ W	LIMITING VOLTAGE	RESISTANCE RANGE ⁽¹⁾ TCR -10 ppm/K to -80 ppm/K	RESISTANCE RANGE ⁽¹⁾ TCR 100 ppm/K to 180 ppm/K	TOLERANCE $\pm$ %
ZWS100	SS, SSB, SB, FST	100	$\sqrt{P \times R}$	2.7 to 68K	6.2 to 200K	10, 5
	E SS, E SSB, E SB, E FST			2.7 to 1.8K	-	2
	Ni SS, Ni SSB, Ni SB, Ni FST			2.2 to 13K	4.7 to 33K	10, 5
ZWS150	SS, SSB, SB, FST	150	$\sqrt{P \times R}$	4.7 to 130K	11 to 360K	10, 5
	E SS, E SSB, E SB, E FST			4.7 to 3.3K	-	2
	Ni SS, Ni SSB, Ni SB, Ni FST			3.9 to 22K	9.1 to 62K	10, 5
ZWS250	SS, SSB, SB, FST	250	$\sqrt{P \times R}$	8.2 to 220K	20 to 620K	10, 5
	E SS, E SSB, E SB, E FST			8.2 to 6.2K	-	2
	Ni SS, Ni SSB, Ni SB, Ni FST			6.8 to 39K	15 to 110K	10, 5
ZWS30/ 100	SS, SSB, SB, FST	75	$\sqrt{P \times R}$	2.4 to 62K	5.1 to 180K	10, 5
	E SS, E SSB, E SB, E FST			3 to 62K	-	2
	Ni SS, Ni SSB, Ni SB, Ni FST			2.4 to 1.6K	5.1 to 56K	10, 5
ZWS30/ 133	SS, SSB, SB, FST	110	$\sqrt{P \times R}$	3.3 to 91K	7.5 to 240K	10, 5
	E SS, E SSB, E SB, E FST			3.3 to 2.4K	-	2
	Ni SS, Ni SSB, Ni SB, Ni FST			2.7 to 16K	6.2 to 43K	10, 5

Notes

- For available "Mounting Accessories for Resistors", please see: www.vishay.com/doc?21015
- ⁽¹⁾ Resistance value to be selected for ± 10 % tolerance from E12 and for ± 5 % and ± 2 % from E24

PART NUMBER AND PRODUCT DESCRIPTION

Part Number: ZWS006331001KLX000

Z	W	S	0	0	6	3	3	1	0	0	1	K	L	X	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

MODEL	VARIANT/ TERMINAL	TCR/MATERIAL	VALUE	TOLERANCE CODE	PACKAGING CODE	SPECIAL
ZWS006 = ZWS6 ZWS008 = ZWS8 ZWS012 = ZWS12 ZWS015 = ZWS15 ZWS020 = ZWS20 ZWS035 = ZWS35 ZWS050 = ZWS50 ZWS100 = ZWS100 ZWS150 = ZWS150 ZWS250 = ZWS250 ZWSN68 = ZWS6/30 ZWSN84 = ZWS30/100 ZWSN91 = ZWS30/133 ZWSN94 = ZWS30/145 ZWSN97 = ZWS30/235 ZWSN98 = ZWS50/165 ZWSOSM = ZWS10/30	3 = SL 4 = SS 5 = SB 6 = SSB 7 = FST 8 = E SL 9 = E SS A = E SB B = E SSB C = E FST I = GSCH Z = Value overflow (BV)	1 = -10 ... -80 ppm/K WM 50 Class 1 3 = 100 ... 180 ppm/K WM 110 Class 3 See also note (2)	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 3 = 10^3	G = ± 2.0 % J = ± 5.0 % K = ± 10.0 %	LX = Loose pack, without quantity	000 = Standard 3 digit code = Special or NI version ⁽²⁾

Product Description: ZWS6 SL 3 1K0 10 % LX

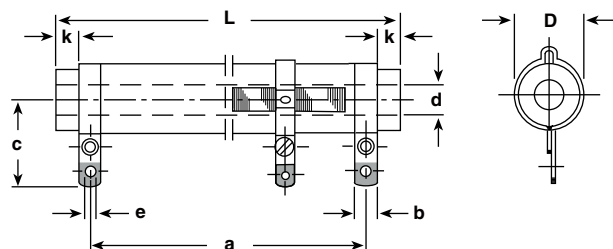
ZWS6	SL	3	1K0	10 %	LX
MODEL ⁽³⁾	VARIANT/ TERMINAL ⁽³⁾	TCR/MATERIAL ⁽³⁾	VALUE ⁽³⁾	TOLERANCE CODE ⁽³⁾	PACKAGING DESCRIPTION ⁽⁴⁾

Notes

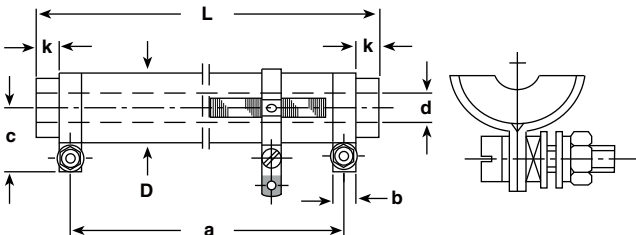
- ⁽²⁾ For special variants, special winding, or NI version, please contact: ww1resistors@vishay.com
- ⁽³⁾ See "Part Number" above
- ⁽⁴⁾ See "Packaging Code" above

DIMENSIONS

SL TERMINALS

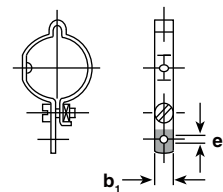


SS TERMINALS

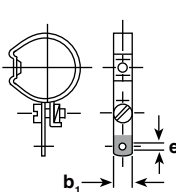


ADJUSTABLE LUGS

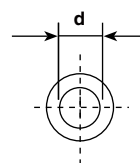
ZWS 6 E
ZWS 8 E



from ZWS 12 E

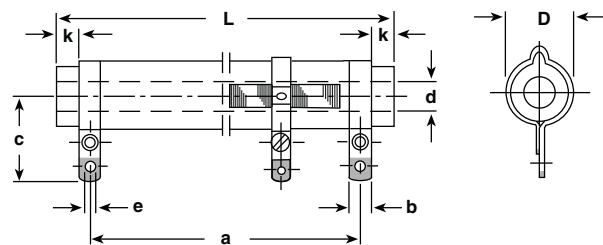
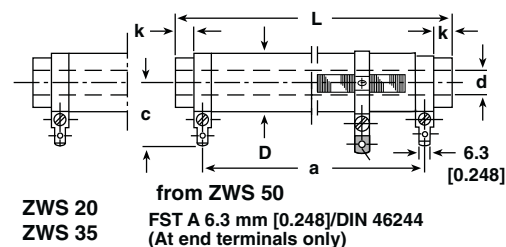
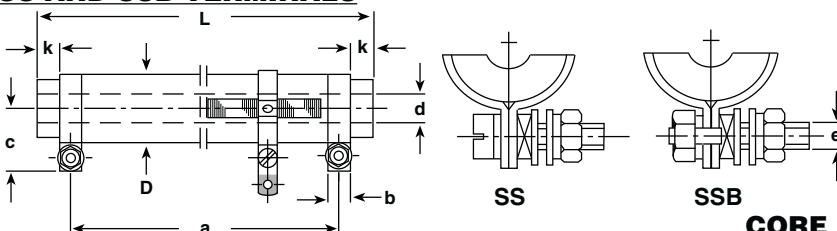
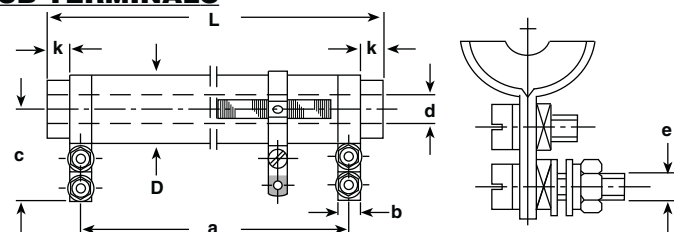
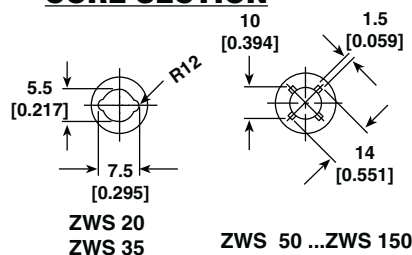
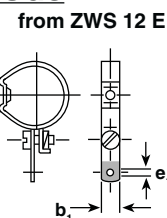


CORE SECTION



MODEL	DIMENSIONS in millimeters [inches]						
	ZWS 6 ZWS 6 E ZWS 6 Ni	ZWS 8 ZWS 8 E ZWS 8 Ni		ZWS 12 ZWS 12 E ZWS 12 Ni		ZWS 15 ZWS 15 E ZWS 15 Ni	
TERMINAL	SL	SL	SS	SL	SS	SL	SS
DIMENSION D	7.5 ± 0.5 [0.295 ± 0.020]	9.5 ± 0.5 [0.374 ± 0.020]		11.8 ± 0.8 [0.465 ± 0.031]		11.8 ± 0.8 [0.465 ± 0.031]	
L	45 ± 1.5 [1.772 ± 0.059]	50 ± 1.5 [1.969 ± 0.059]		55 ± 1.5 [2.165 ± 0.059]		62 ± 2 [2.441 ± 0.079]	
a	36 [1.417]	39 [1.535]	40 [1.575]	43 [1.693]	44 [1.732]	50 [1.969]	51 [2.008]
b	4 [0.157]	4 [0.157]	5 [0.197]	4 [0.157]	5 [0.197]	4 [0.157]	5 [0.197]
b ₁	4 [0.157]	4 [0.157]	4 [0.157]	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]
c	15.5 [0.610]	18 [0.709]	10.5 [0.413]	19 [0.748]	11.5 [0.453]	19 [0.748]	11.5 [0.453]
d	2.6 [0.102]	3.5 [0.138]	3.5 [0.138]	5.5 [0.217]	5.5 [0.217]	5.5 [0.217]	5.5 [0.217]
e	1.5 [0.059]	2 [0.079]	M3 × 12	2 [0.079]	M3 × 12	2 [0.079]	M3 × 12
e ₁	2.8 [0.110]	2.8 [0.110]	2.8 [0.110]	2.8 [0.110]	2.8 [0.110]	2.8 [0.110]	2.8 [0.110]
k	2.5 [0.098]	3.5 [0.138]	2.5 [0.098]	4 [0.157]	3 [0.118]	4 [0.157]	3 [0.118]
MASS (g)	5	6.5		11.5		12.5	

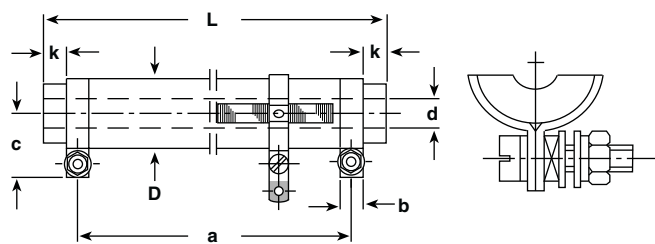
DIMENSIONS (continued)

SL TERMINALS

FST TERMINALS

SS AND SSB TERMINALS

SB TERMINALS

CORE SECTION

ADJUSTABLE LUGS


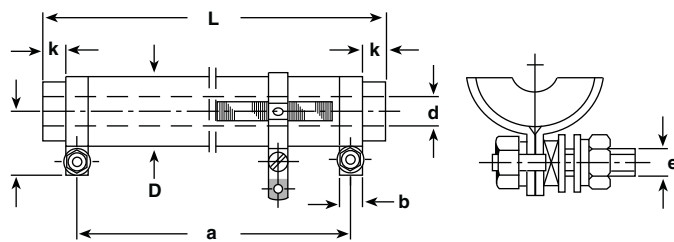
MODEL	DIMENSIONS in millimeters [inches]															
	ZWS 20 ZWS 20 E ZWS 20 Ni				ZWS 35 ZWS 35 E ZWS 35 Ni				ZWS 50 ZWS 50 E ZWS 50 Ni				ZWS 100 ZWS 100 E ZWS 100 Ni			
TERMINAL	SL	SS	SB	FST	SL	SS	SB	FST	SS	SSB	SB	FST	SS	SSB	SB	FST
DIMENSION D	14.8 ± 0.8 [0.583 ± 0.031]				14.8 ± 0.8 [0.583 ± 0.031]				22.3 ± 1.3 [0.878 ± 0.051]				22.3 ± 1.3 [0.878 ± 0.051]			
L	62 ± 2 [2.441 ± 0.079]				100 ± 2 [3.937 ± 0.079]				100 ± 2 [3.937 ± 0.079]				165 ± 2 [6.496 ± 0.079]			
a ± 2 [a ± 0.079]	50 [1.969]	51 [2.008]	51 [2.008]	48 [1.890]	86 [3.386]	87 [3.425]	87 [3.425]	84 [3.307]	71 [2.795]				136 [5.354]			
b	4 [0.157]	5 [0.197]	5 [0.197]	6.3 [0.248]	4 [0.157]	5 [0.197]	5 [0.197]	6.3 [0.248]	8 [0.315]	8 [0.315]	8 [0.315]	6.3 [0.248]	8 [0.315]	8 [0.315]	8 [0.315]	6.3 [0.248]
b₁	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]
c	20.5 [0.807]	13 [0.512]	23 [0.906]	23.5 [0.925]	20.5 [0.807]	13 [0.512]	23 [0.906]	23.5 [0.925]	18.5 [0.728]	18.5 [0.728]	29.5 [1.161]	27 [1.063]	18.5 [0.728]	18.5 [0.728]	29.5 [1.161]	27 [1.063]
d	5.5 [0.217]	5.5 [0.217]	5.5 [0.217]	5.5 [0.217]	5.5 [0.217]	5.5 [0.217]	5.5 [0.217]	5.5 [0.217]	10 [0.394]	10 [0.394]	10 [0.394]	10 [0.394]	10 [0.394]	10 [0.394]	10 [0.394]	10 [0.394]
e	2 [0.079]	M3 × 12	M3 × 12	-	2 [0.079]	M3 × 12	M3 × 12	-	M4 × 16	M4 × 18	M4 × 16	-	M4 × 16	M4 × 18	M4 × 16	-
e₁	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]
k	4 [0.157]	3 [0.118]	3 [0.118]	3 [0.118]	5 [0.197]	4 [0.157]	4 [0.157]	4 [0.157]	10.5 [0.413]	10.5 [0.413]	10.5 [0.413]	10.5 [0.413]	10.5 [0.413]	10.5 [0.413]	10.5 [0.413]	10.5 [0.413]
MASS (g)	25				33				80				113			

DIMENSIONS (CONTINUED)

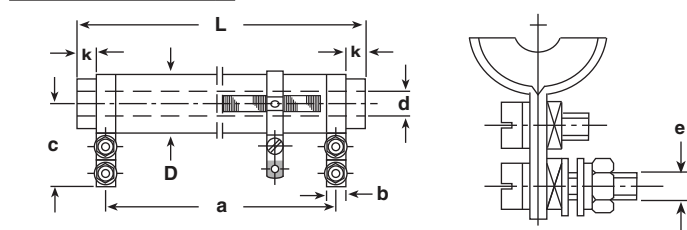
SS TERMINALS



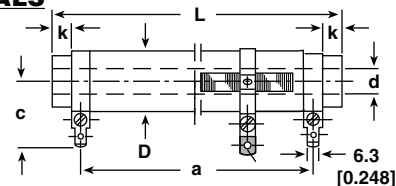
SSB TERMINALS



SB TERMINALS



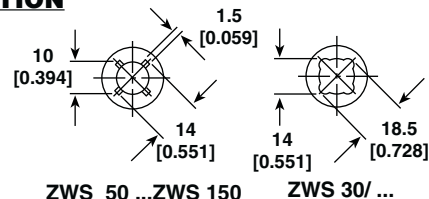
FST TERMINALS



from ZWS 50

FST A 6.3 mm [0.248]/DIN 46244
(At end terminals only)

CORE SECTION

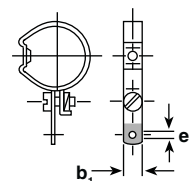


ZWS 50 ...ZWS 150

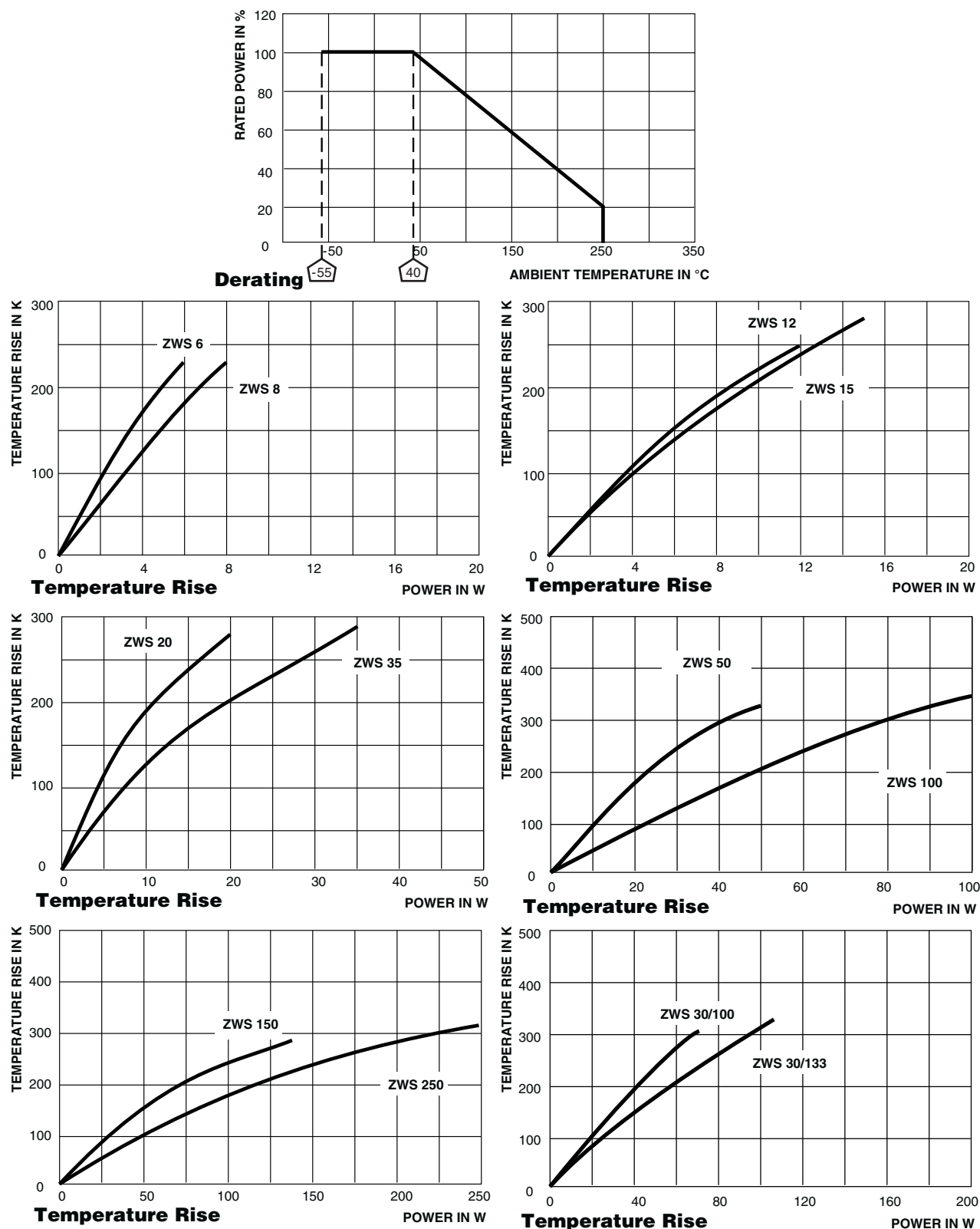
ZWS 30/ ...

ADJUSTABLE LUGS

from ZWS 12 E



MODEL	DIMENSIONS in millimeters [inches]															
	ZWS 150 ZWS 150 E ZWS 150 Ni				ZWS 250 ZWS 250 E ZWS 250 Ni				ZWS 30/100 ZWS 30/100 E ZWS 30/100 Ni				ZWS 30/133 ZWS 30/133 E ZWS 30/133 Ni			
TERMINAL	SS	SSB	SB	FST	SS	SSB	SB	FST	SS	SSB	SB	FST	SS	SSB	SB	FST
DIMENSION D	22.3 ± 1.3 [0.878 ± 0.051]				32.3 ± 1.5 [1.28 ± 0.059]				32.3 ± 1.5 [1.28 ± 0.059]				32.3 ± 1.5 [1.28 ± 0.059]			
L	265 ± 4 [10.433 ± 0.079]				330 ± 5 [12.992 ± 0.197]				100 ± 2.5 [3.937 ± 0.098]				133 ± 3 [5.236 ± 0.118]			
a	236 [9.291]				280 [11.024]				85 [3.346]				118 [4.646]			
b	8 [0.315]	8 [0.315]	8 [0.315]	6.3 [0.248]	8 [0.315]	8 [0.315]	8 [0.315]	6.3 [0.248]	8 [0.315]	8 [0.315]	8 [0.315]	6.3 [0.248]	8 [0.315]	8 [0.315]	8 [0.315]	6.3 [0.248]
b ₁	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	8 [0.315]	8 [0.315]	8 [0.315]	8 [0.315]	8 [0.315]	8 [0.315]	8 [0.315]	8 [0.315]	8 [0.315]	8 [0.315]	8 [0.315]	8 [0.315]
c	18.5 [0.728]	18.6 [0.732]	29.5 [1.161]	27 [1.063]	23.5 [0.925]	23.5 [0.925]	35 [1.378]	31.5 [1.24]	23.5 [0.925]	23.5 [0.925]	35 [1.378]	31.5 [1.24]	23.5 [0.925]	23.5 [0.925]	35 [1.378]	31.5 [1.24]
d	10 [0.394]	10 [0.394]	10 [0.394]	10 [0.394]	20 [0.787]	20 [0.787]	20 [0.787]	20 [0.787]	14 [0.551]	14 [0.551]	14 [0.551]	14 [0.551]	14 [0.551]	14 [0.551]	14 [0.551]	14 [0.551]
e	M4 × 16	M4 × 18	M4 × 16	-	M4 × 16	M4 × 18	M4 × 16	-	M4 × 16	M4 × 18	M4 × 16	-	M4 × 16	M4 × 18	M4 × 16	-
e ₁	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	4.2 [0.165]	4.2 [0.165]	4.2 [0.165]	4.2 [0.165]	4.2 [0.165]	4.2 [0.165]	4.2 [0.165]	4.2 [0.165]	4.2 [0.165]	4.2 [0.165]	4.2 [0.165]	4.2 [0.165]
k	10.5 [0.413]	10.5 [0.413]	10.5 [0.413]	10.5 [0.413]	21 [0.827]	21 [0.827]	21 [0.827]	21 [0.827]	3.5 [0.138]	3.5 [0.138]	3.5 [0.138]	3.5 [0.138]	3.5 [0.138]	3.5 [0.138]	3.5 [0.138]	3.5 [0.138]
MASS (g)	194				375				167				212			





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.