

High Power Metal Oxide Leaded Resistors



FEATURES

- Rugged metal oxide film
- High power dissipation in small size (1 W/0207 size to 4 W/0922 size)
- High temperature coating (up to 200 °C), non-flammable
- Lead (Pb)-free solder contacts
- Pure tin plating provides compatibility with lead (Pb)-free and lead containing soldering processes
- Compliant to RoHS directive 2002/95/EC



RoHS
COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS							
MODEL	SIZE	RATED DISSIPATION P_{70} W	LIMITING ELEMENT VOLTAGE $U_{max.}$ V_{\equiv}	TEMPERATURE COEFFICIENT ppm/K	TOLERANCE %	RESISTANCE RANGE	E-SERIES
WK2	0207	1.0	500	± 50	± 1	4.7 Ω to 1 M Ω	E24, E96
WK2	0207	1.0	500	± 100	± 2 ± 5	4.7 Ω to 1 M Ω 4.7 Ω to 1 M Ω	E24, E48 E24
WK2	0207	1.0	500	± 200	± 5	0.22 Ω to 1 M Ω	E24
WR4	0414	2.0	500	± 200	± 2 ± 5	1 Ω to 1 M Ω 0.33 Ω to 1 M Ω	E24, E48 E24
WR5	0617	3.0	750	± 200	± 2 ± 5	1 Ω to 100 k Ω 0.22 Ω to 560 k Ω	E24, E48 E24
WK8	0922	4.0	750	± 200	± 2 ± 5	1 Ω to 68 k Ω 0.22 Ω to 100 k Ω	E24, E48 E24

Notes

- Coating: Green
- Marking: WK2 and WR4 have color code band marking. TCR band will be given to only WK2, 100 ppm, 5 %. WR5 and WK8 are printed marked.

TECHNICAL SPECIFICATIONS						
PARAMETER	UNIT	WK2	WR4	WR5	WK8	
Rated Dissipation, P_{70}	W	1.0	2.0	3.0	4.0	
Limiting Element Voltage, $U_{max.}$ ⁽¹⁾	V_{\equiv}	500	500	750	750	
Insulation Voltage, U_{ins} (1 Min)	V	> 500	> 500	> 500	> 500	
Thermal Resistance, R_{th}	K/W	≤ 140	≤ 100	≤ 70	≤ 60	
Insulation Resistance	Ω	> 10^9				
Category Temperature Range ⁽²⁾	$^{\circ}C$	- 55 to + 200				
Failure Rate	$10^{-8}/h$	< 1				
Weight	g	0.2	0.7	1.5	3.5	

Notes

⁽¹⁾ Rated Voltage $\sqrt{P \times R}$

⁽²⁾ For values < 10R the upper limiting temperature is 155 °C. The power rating is correspondingly lower and can be calculated by R_{th} .



PART NUMBER AND PRODUCT DESCRIPTION WK2-SERIES

PART NUMBER: WK202070C1001FD500

W K 2 0 2 0 7 0 C 1 0 0 1 F D 5 0 0

MODEL/SIZE	VARIANT	TCR	VALUE	TOLERANCE	PACKAGING (1)	SPECIAL
WK20207	0 = Neutral	C = ± 50 ppm/K B = ± 100 ppm/K A = ± 200 ppm/K	3 digit value 1 digit multiplier MULTIPLIER	F = ± 1 % G = ± 2 % J = ± 5 %	22 = A2 25 = A5 D5 = R5	Up to 2 digits 00 = Standard

7 = *10 ⁻³	2 = *10 ²
8 = *10 ⁻²	3 = *10 ³
9 = *10 ⁻¹	4 = *10 ⁴
0 = *10 ⁰	5 = *10 ⁵
1 = *10 ¹	6 = *10 ⁶

PRODUCT DESCRIPTION: WK2 50 1K0 1 % R5

WK2	50	1K0	1 %	R5
MODEL	TCR	RESISTANCE VALUE	TOLERANCE	PACKAGING (1)
WK2	± 50 ppm/K ± 100 ppm/K ± 200 ppm/K	49K9 = 49.9 kΩ 50R1 = 50.1 Ω 1K0 = 1.0 kΩ	± 1 % ± 2 % ± 5 %	A2 A5 R5

PART NUMBER AND PRODUCT DESCRIPTION WK8-SERIES

PART NUMBER: WK80922001000J5C00

W K 8 0 9 2 2 0 0 1 0 0 0 J 5 C 0 0

MODEL/SIZE	VARIANT	TCR	VALUE	TOLERANCE	PACKAGING (1)	SPECIAL
WK80922	0 = Neutral	0 = Standard	3 digit value 1 digit multiplier MULTIPLIER	G = ± 2 % J = ± 5 %	5C = AC G1 = R1	Up to 2 digits 00 = Standard

7 = *10 ⁻³	2 = *10 ²
8 = *10 ⁻²	3 = *10 ³
9 = *10 ⁻¹	4 = *10 ⁴
0 = *10 ⁰	5 = *10 ⁵
1 = *10 ¹	

PRODUCT DESCRIPTION: WK8 100R 5 % AC

WK8	100R	5 %	AC
MODEL	TCR	TOLERANCE	PACKAGING (1)
WK8	100R = 100 Ω 47K = 47 kΩ	± 2 % ± 5 %	AC R1

PART NUMBER AND PRODUCT DESCRIPTION WR-SERIES

PART NUMBER: WR404140A1001GF00

W R 4 0 4 1 4 0 A 1 0 0 1 G F E 0 0

MODEL/SIZE	VARIANT	TCR	VALUE	TOLERANCE	PACKAGING (1)	SPECIAL
WR40414 WR50617	0 = Neutral	A = ± 200 ppm/K	3 digit value 1 digit multiplier MULTIPLIER	G = ± 2 % J = ± 5 %	41 = A1 G73 51 = A1 G77 FE = RE G73 GP = RP	Up to 2 digits 00 = Standard

7 = *10 ⁻³	2 = *10 ²
8 = *10 ⁻²	3 = *10 ³
9 = *10 ⁻¹	4 = *10 ⁴
0 = *10 ⁰	5 = *10 ⁵
1 = *10 ¹	6 = *10 ⁶

PRODUCT DESCRIPTION: WR4 1K0 2 % RE

WR4	1K0	2 %	RE
MODEL	RESISTANCE VALUE	TOLERANCE	PACKAGING (1)
WR4 WR5	1K0 = 1.0 kΩ 51R0 = 51.0 Ω	± 2 % ± 5 %	A1 (G73) A1 (G77) RE (G73) RP

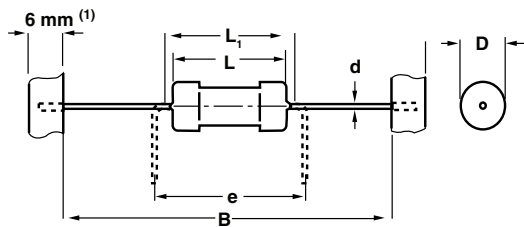
Notes

(1) Please refer to table PACKAGING

- The PART NUMBER shown above is to facilitate the unified part numbering system for ordering products

PACKAGING						
MODEL	REEL			BOX		
	PIECES/REEL	CODE	MIN. ORDER QTY PACKAGING UNITS	PIECES/BOX	CODE	MIN. ORDER QTY PACKAGING UNITS
WK2	5000	R5	1	5000 2000	A5 A2	1 1
WR4	2500	RE	2	1000	A1 (G73)	2
WR5	1500	RP	2	1000	A1 (G77)	2
WK8	1000	R1	2	500	AC	2

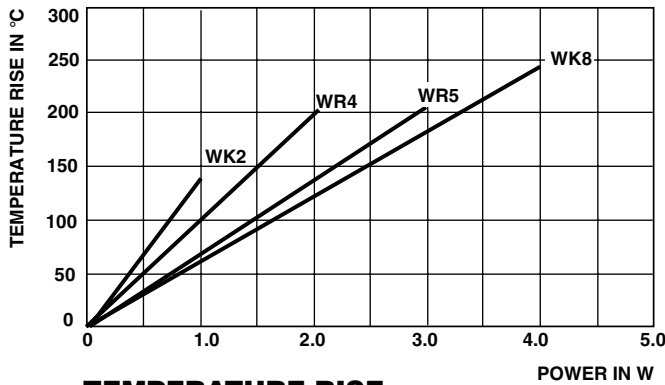
DIMENSIONS



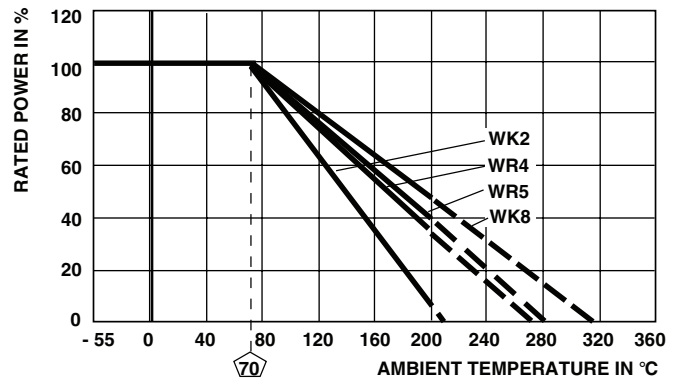
MODEL	DIMENSIONS [in millimeters]					
	D	L	L ₁ max.	B	d	e
WK2	2.5 - 0.5	6.5 - 0.5	8.0	53 ± 1	0.6	7.5
WR4	3.9 - 0.5	10.0 - 1.6	12.0	73 ± 1	0.8	15.0
WR5	6.0 - 0.5	16.5 - 1.5	20.0	77 ± 1	0.8	17.5
WK8	9.0 - 0.5	20.0 - 1.5	24.0	77 ± 1	0.8	22.5

Notes

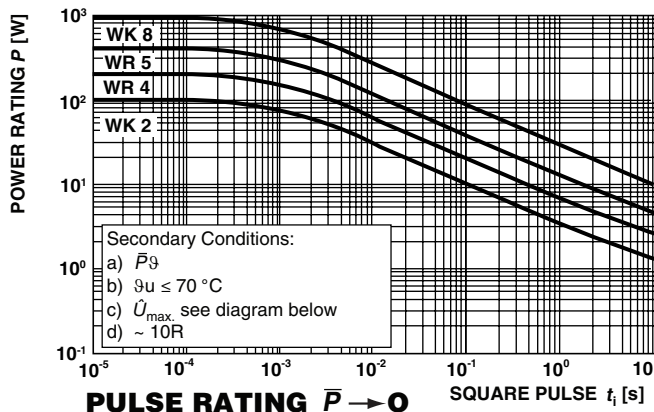
- (1) 9 mm for WR5/WK8
- Taping in acc. with IEC 60286-1
- D and L measured in acc. with IEC 60294
- d according to IEC 60301



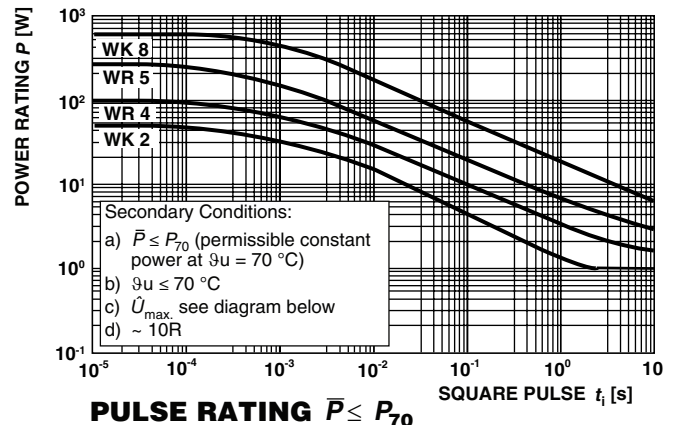
TEMPERATURE RISE



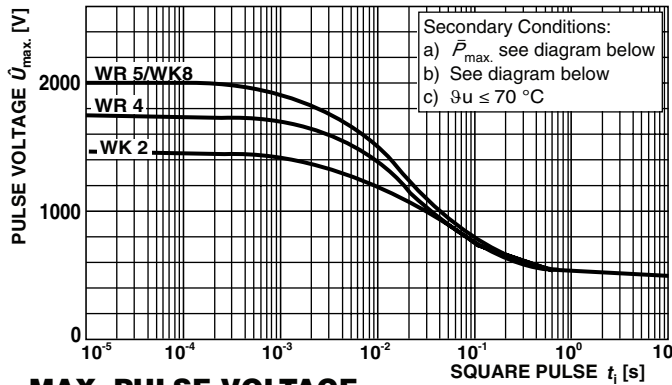
DERATING



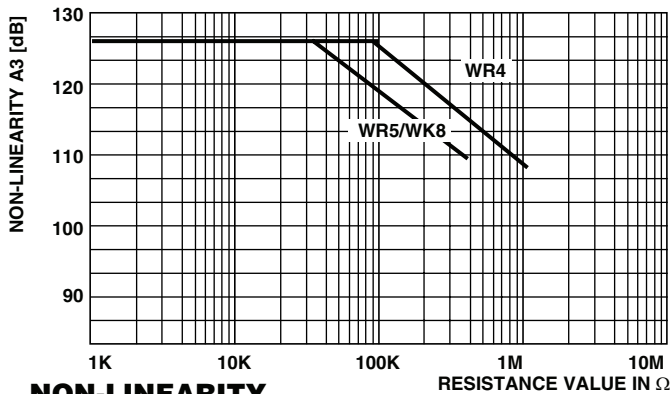
PULSE RATING $\bar{P} \rightarrow 0$



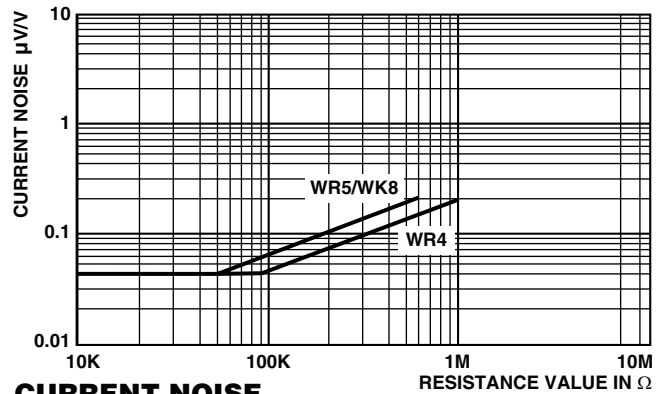
PULSE RATING $\bar{P} \leq P_{70}$



MAX. PULSE VOLTAGE



NON-LINEARITY



CURRENT NOISE

PERFORMANCE		
TEST	CONDITIONS OF TEST	REQUIREMENTS (ΔR MAX.) ⁽¹⁾
Rated Dissipation, P_{70} IEC 60115-1, 4.25.1	1000 h at 70 °C 1.5 h ON, 0.5 h OFF	WK2 ≤ ± (5 % R + 0.1 Ω) WK8 ≤ ± (2 % R + 0.1 Ω) WR4, WR5 ≤ ± (5 % R + 0.1 Ω)
Endurance at UCT IEC 60115-1, 4.25.3	1000 h at 200 °C without load	WK2, WR4 ≤ ± (5 % R + 0.1 Ω) WR5, WK8 ≤ ± (1 % R + 0.1 Ω)
Overload Test IEC 60115-1, 4.13	Short time overload 5 s at 2.5 x rated voltage or ≤ ± twice the limiting element voltage	≤ ± (0.25 % R + 0.05 Ω)
Thermal Shock IEC 60115-1, 4.19	Rapid change between upper and lower category temperature	≤ ± (0.25 % R + 0.05 Ω)
Climatic Sequence IEC 60115-1, 4.23	Dry heat, damp heat cycle, cold, low air pressure	≤ ± (0.5 % R + 0.1 Ω)
Damp Heat Steady State IEC 60115-1, 4.24	56 days; 40 °C; 90 % to 95 % RH; loaded with 0.01 P_{70}	≤ ± (1.5 % R + 0.1 Ω)
Resistance to Soldering Heat IEC 60115-1, 4.18	10 s at 260 °C solder bath temperature	≤ ± (0.25 % R + 0.05 Ω)
Robustness of Terminations IEC 60115-1, 4.16	Tensile, bending and torsion	≤ ± (0.25 % R + 0.05 Ω)
Vibration IEC 60115-1, 4.22	Frequency 10 Hz to 500 Hz; displacement 1.5 mm or acceleration 10 g; three directions; 6 h	≤ ± (0.25 % R + 0.05 Ω)

Note

⁽¹⁾ Limits for change of resistance at test

APPLICABLE SPECIFICATIONS
• EN140100, EN60115-1, IEC 60115-1



Disclaimer

All product specifications and data are subject to change without notice.

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 herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

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.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.