

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)
- WK2 is AEC-Q200 qualified
- 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
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS

MODEL	SIZE	RATED DISSIPATION P_{70} W	LIMITING ELEMENT VOLTAGE $U_{max.}$ V_{\cong}	TEMPERATURE COEFFICIENT \pm ppm/K	TOLERANCE \pm %	RESISTANCE RANGE Ω	E-SERIES
WK2	0207	1.0	500	50	1	4.7 to 1M	E24, E96
WK2	0207	1.0	500	100	2	4.7 to 1M	E24, E48
WK2	0207	1.0	500	100	5	4.7 to 1M	E24
WK2	0207	1.0	500	200	5	0.22 to 1M	E24
WR4	0414	2.0	500	200	2	1 to 1M	E24, E48
WR4	0414	2.0	500	200	5	0.33 to 1M	E24
WR5	0617	3.0	750	200	2	1 to 100K	E24, E48
WR5	0617	3.0	750	200	5	0.22 to 560K	E24
WK8	0922	4.0	750	200	2	1 to 68K	E24, E48
WK8	0922	4.0	750	200	5	0.22 to 100K	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_{\cong}	500	500	750	750
Insulation Voltage, U_{ins} (1 min)	V	> 500	> 500	> 500	> 500
Thermal Resistance, R_{th}	K/W	\leq 140	\leq 100	\leq 70	\leq 60
Insulation Resistance	Ω	> 10 ⁹			
Category Temperature Range ⁽²⁾	°C	-55 to +200			
Failure Rate	10 ⁻⁹ /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
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MODEL/SIZE WK20207	VARIANT 0 = Neutral	TCR C = ± 50 ppm/K B = ± 100 ppm/K A = ± 200 ppm/K	VALUE 3 digit value 1 digit multiplier MULTIPLIER 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	TOLERANCE F = ± 1 % G = ± 2 % J = ± 5 %	PACKAGING (1) 22 = A2 25 = A5 D5 = R5	SPECIAL Up to 2 digits 00 = Standard
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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
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MODEL/SIZE WK80922	VARIANT 0 = Neutral	TCR 0 = Standard	VALUE 3 digit value 1 digit multiplier MULTIPLIER 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	TOLERANCE G = ± 2 % J = ± 5 %	PACKAGING (1) 5C = AC G1 = R1	SPECIAL Up to 2 digits 00 = Standard
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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
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MODEL/SIZE WR40414 WR50617	VARIANT 0 = Neutral	TCR A = ± 200 ppm/K	VALUE 3 digit value 1 digit multiplier MULTIPLIER 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	TOLERANCE G = ± 2 % J = ± 5 %	PACKAGING (1) 41 = A1 G73 51 = A1 G77 FE = RE G73 GP = RP	SPECIAL Up to 2 digits 00 = Standard
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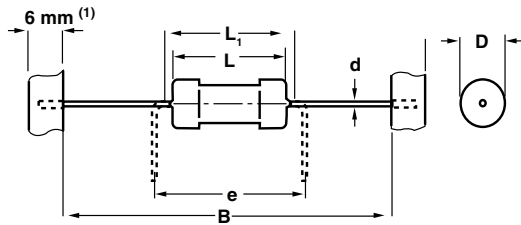
PRODUCT DESCRIPTION: WR4 1K0 2 % RE

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

Notes

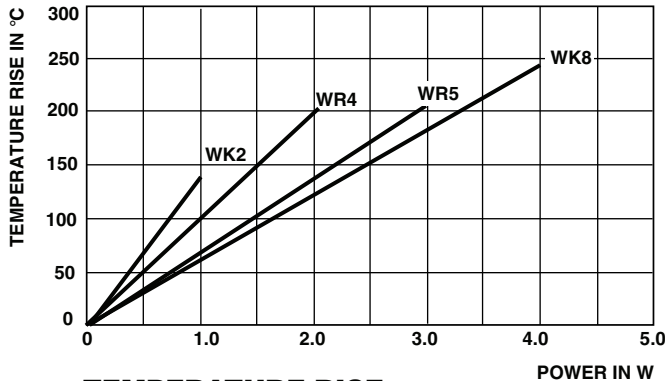
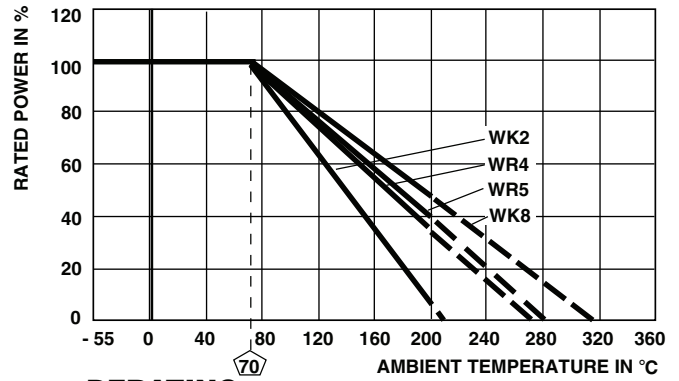
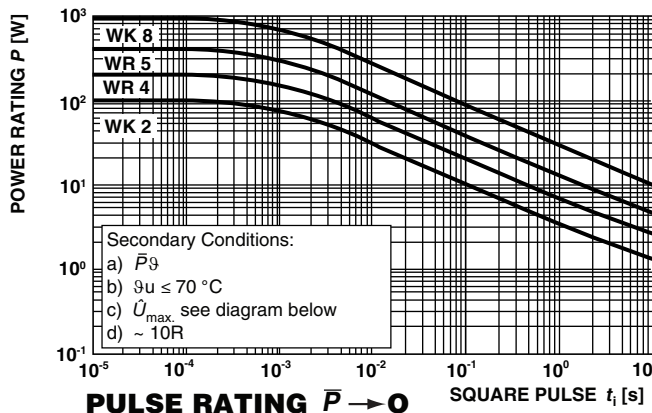
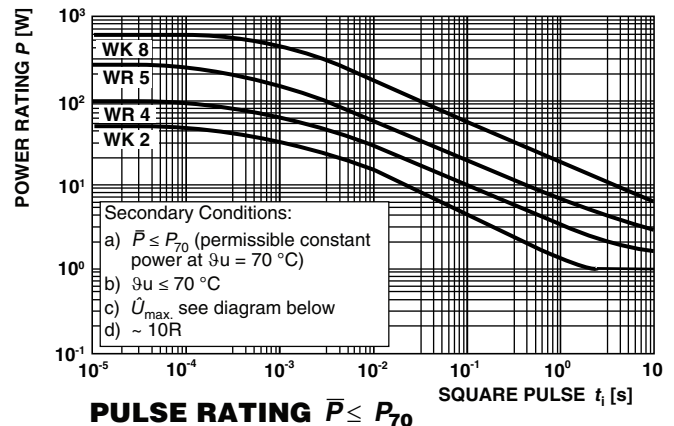
- The PART NUMBER shown above is to facilitate the unified part numbering system for ordering products
- (1) Please refer to table PACKAGING

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

Notes

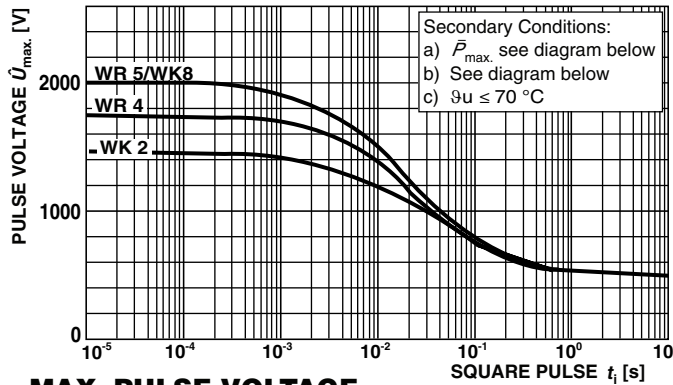
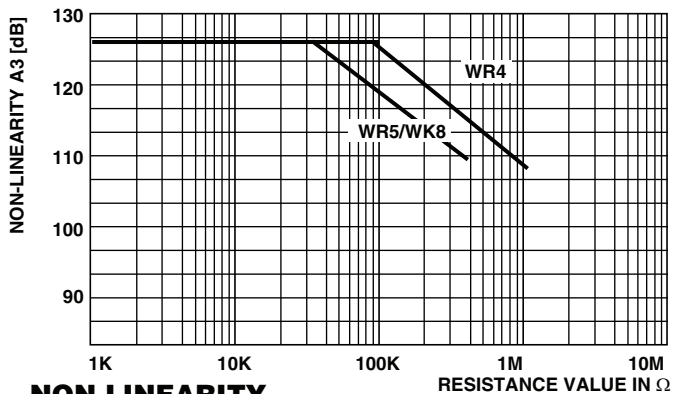
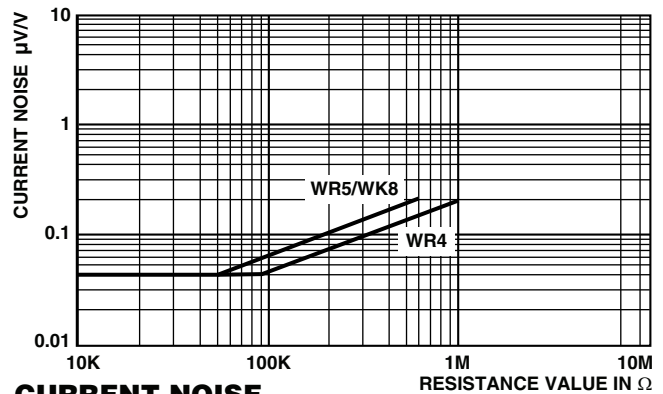
- Taping in acc. with IEC 60286-1
- D and L measured in acc. with IEC 60294
- d according to IEC 60301
- (1) 9 mm for WR5/WK8

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


TEMPERATURE RISE

DERATING

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

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

Secondary Conditions:
 a) $\bar{P} \vartheta$
 b) $\vartheta u \leq 70^\circ\text{C}$
 c) \dot{U}_{max} , see diagram below
 d) $\sim 10R$

Secondary Conditions:
 a) $\bar{P} \leq P_{70}$ (permissible constant power at $\vartheta u = 70^\circ\text{C}$)
 b) $\vartheta u \leq 70^\circ\text{C}$
 c) \dot{U}_{max} , see diagram below
 d) $\sim 10R$


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



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