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

Pb-free
RoHS COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS

MODEL	SIZE	RATED DISSIPATION P_{70} W	LIMITING ELEMENT VOLTAGE $U_{max.}$ V≅	TEMPERATURE COEFFICIENT ± ppm/K	TOLERANCE ± %	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≅	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	> 109			
Category Temperature Range (2)	°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}.

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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 **7** = $*10^{-3}$, **8** = $*10^{-2}$, **9** = $*10^{-1}$, **0** = $*10^{0}$, **1** = $*10^{1}$, **2** = $*10^{2}$, **3** = $*10^{3}$, **4** = $*10^{4}$, **5** = $*10^{5}$, **6** = $*10^{6}$	**F** = ± 1 % **G** = ± 2 % **J** = ± 5 %	**22** = A2 **25** = A5 **D5** = R5	Up to 2 digits **00** = Standard

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 **7** = $*10^{-3}$, **8** = $*10^{-2}$, **9** = $*10^{-1}$, **0** = $*10^{0}$, **1** = $*10^{1}$, **2** = $*10^{2}$, **3** = $*10^{3}$, **4** = $*10^{4}$, **5** = $*10^{5}$	**G** = ± 2 % **J** = ± 5 %	**5C** = AC **G1** = R1	Up to 2 digits **00** = Standard

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: WR404140A1001GFE00

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 **7** = $*10^{-3}$, **8** = $*10^{-2}$, **9** = $*10^{-1}$, **0** = $*10^{0}$, **1** = $*10^{1}$, **2** = $*10^{2}$, **3** = $*10^{3}$, **4** = $*10^{4}$, **5** = $*10^{5}$, **6** = $*10^{6}$	**G** = ± 2 % **J** = ± 5 %	**41** = A1 G73 **51** = A1 G77 **FE** = RE G73 **GP** = RP	Up to 2 digits **00** = Standard

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

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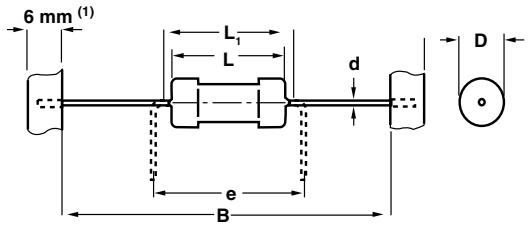
PACKAGING

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

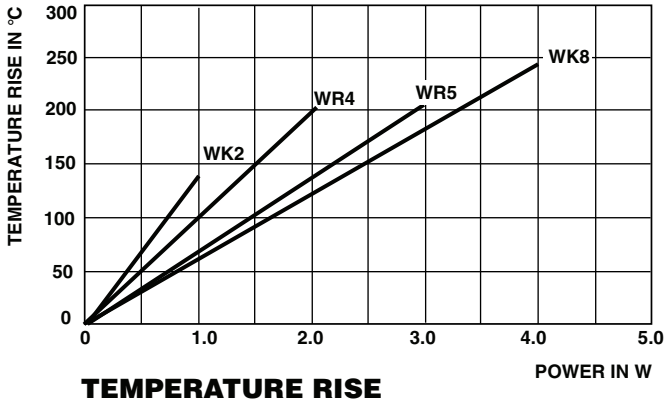
DIMENSIONS



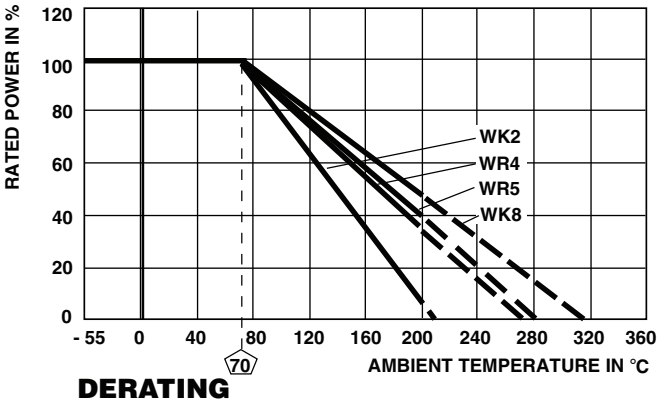
MODEL	DIMENSIONS (in millimeters)					
	D	L	$L_{1\ max.}$	B	d	e
WK2	$2.5_{-0.5}$	$6.5_{-0.5}$	8.0	53 ± 1	0.6	7.5
WR4	$3.9_{-0.5}$	$10.0_{-1.6}$	12.0	73 ± 1	0.8	15.0
WR5	$6.0_{-0.5}$	$16.5_{-1.5}$	20.0	77 ± 1	0.8	17.5
WK8	$9.0_{-0.5}$	$20.0_{-1.5}$	24.0	77 ± 1	0.8	22.5

Notes
- Taping in acc. with IEC 60286-1
- D and L measured in acc. with IEC 60294
- d according to IEC 60301

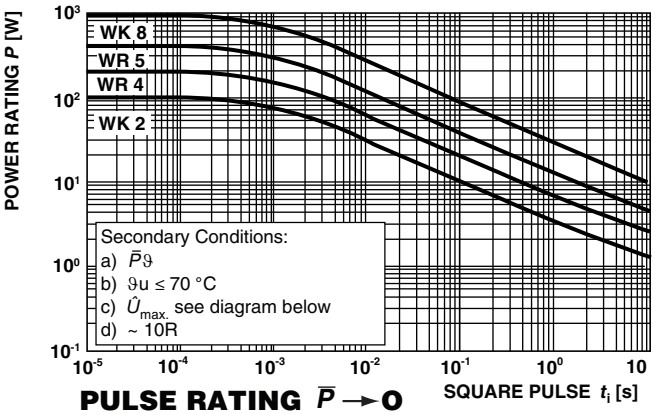
(1) 9 mm for WR5/WK8



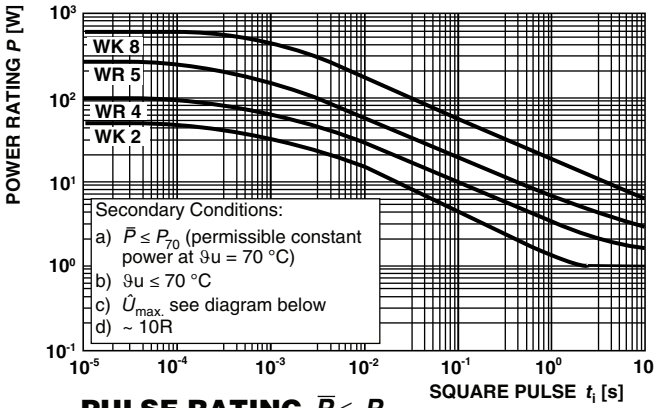
TEMPERATURE RISE



DERATING



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



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

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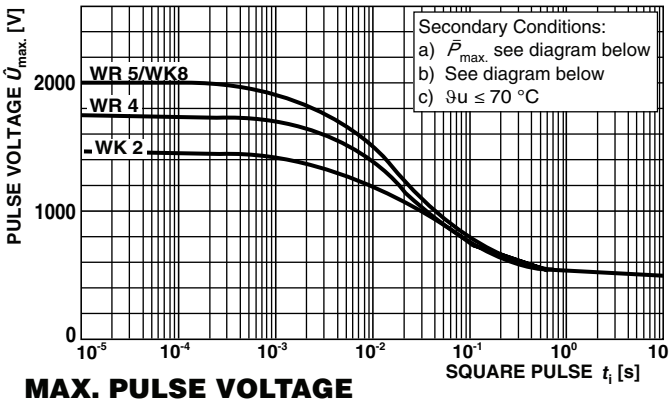
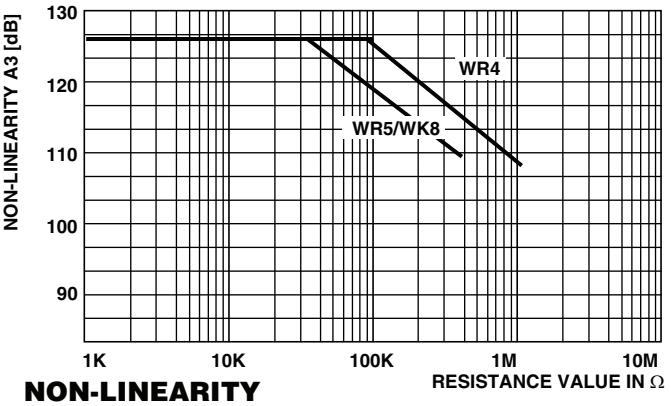
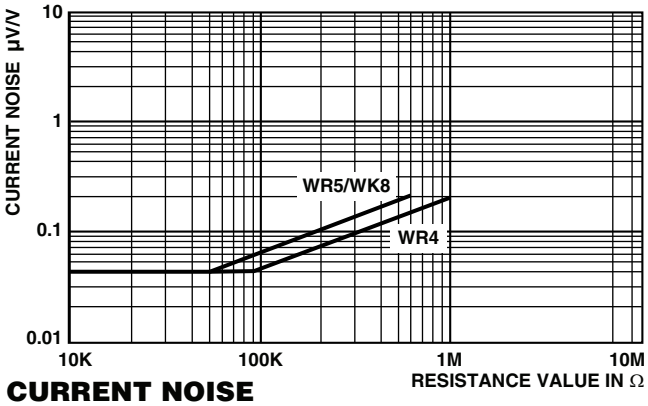


MAX. PULSE VOLTAGE



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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