

## 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 $\Omega$	E-SERIES
WK2	0207	1.0	500	$\pm 50$	$\pm 1$	4.7 to 1M	E24, E96
WK2	0207	1.0	500	$\pm 100$	$\pm 2$ $\pm 5$	4.7 to 1M 4.7 to 1M	E24, E48 E24
WK2	0207	1.0	500	$\pm 200$	$\pm 5$	0.22 to 1M	E24
WR4	0414	2.0	500	$\pm 200$	$\pm 2$ $\pm 5$	1 to 1M 0.33 to 1M	E24, E48 E24
WR5	0617	3.0	750	$\pm 200$	$\pm 2$ $\pm 5$	1 to 100K 0.22 to 560K	E24, E48 E24
WK8	0922	4.0	750	$\pm 200$	$\pm 2$ $\pm 5$	1 to 68K 0.22 to 100K	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, $U_{max.}$ <sup>(1)</sup>	$V_{\equiv}$	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	$\Omega$	> 109			
Category Temperature Range <sup>(2)</sup>	°C	- 55 to + 200			
Failure Rate	$10^{-8}/h$	< 1			
Weight	g	0.2	0.7	1.5	3.5

#### Notes

<sup>(1)</sup> Rated Voltage  $\sqrt{P \times R}$

<sup>(2)</sup> 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  7 = *10 <sup>-3</sup> 2 = *10 <sup>2</sup> 8 = *10 <sup>-2</sup> 3 = *10 <sup>3</sup> 9 = *10 <sup>-1</sup> 4 = *10 <sup>4</sup> 0 = *10 <sup>0</sup> 5 = *10 <sup>5</sup> 1 = *10 <sup>1</sup> 6 = *10 <sup>6</sup>	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 <sup>-3</sup> 2 = *10 <sup>2</sup> 8 = *10 <sup>-2</sup> 3 = *10 <sup>3</sup> 9 = *10 <sup>-1</sup> 4 = *10 <sup>4</sup> 0 = *10 <sup>0</sup> 5 = *10 <sup>5</sup> 1 = *10 <sup>1</sup>	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 <sup>-3</sup> 2 = *10 <sup>2</sup> 8 = *10 <sup>-2</sup> 3 = *10 <sup>3</sup> 9 = *10 <sup>-1</sup> 4 = *10 <sup>4</sup> 0 = *10 <sup>0</sup> 5 = *10 <sup>5</sup> 1 = *10 <sup>1</sup> 6 = *10 <sup>6</sup>	G = ± 2 % J = ± 5 %	41 = A1 G73 51 = A1 G77 FE = RE G73 GP = RP	Up to 2 digits 00 = Standard

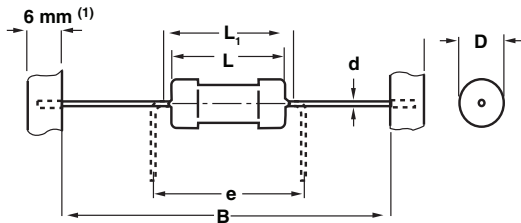
PRODUCT DESCRIPTION: WR4 1K0 2 % RE

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

**Notes**

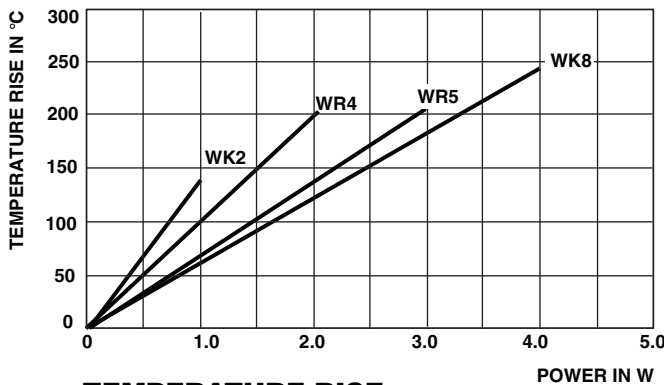
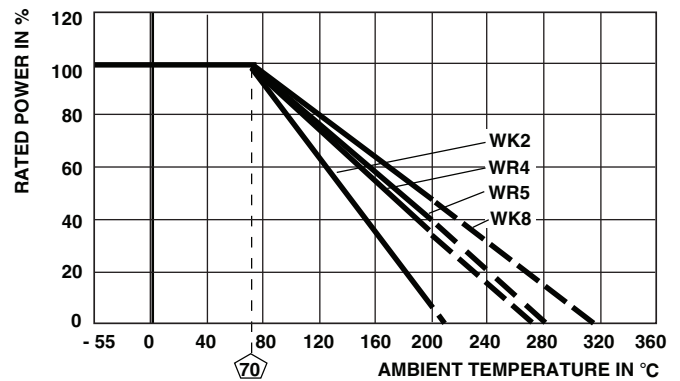
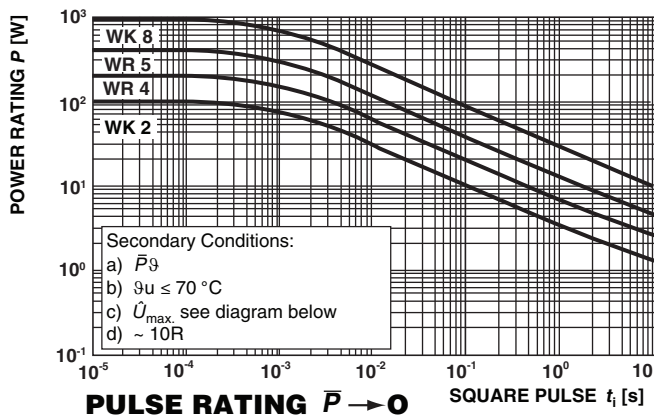
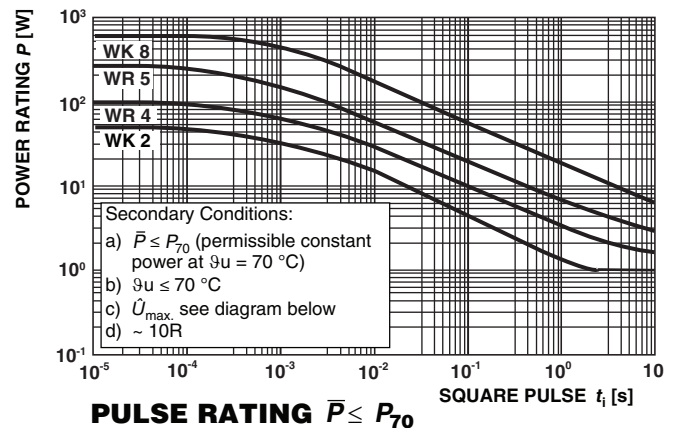
- The PART NUMBER shown above is to facilitate the unified part numbering system for ordering products
- (1) Please refer to table PACKAGING

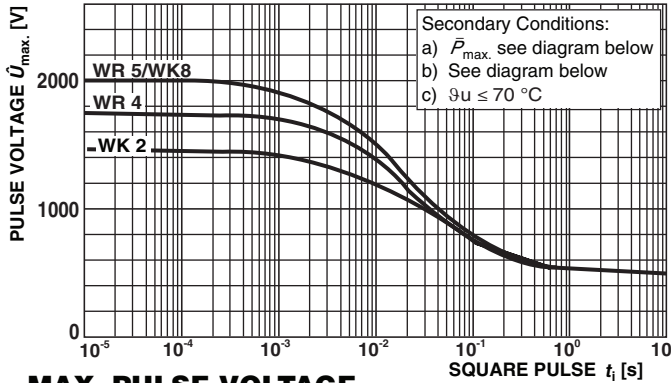
PACKAGING						
MODEL	REEL			BOX		
	PIECES/REEL	CODE	MIN. ORDER QTY PACKAGING UNITS	PIECES/BOX	CODE	MIN. ORDER QTY PACKAGING UNITS
WK2	5000	R5	1	5000 2000	A5 A2	1 1
WR4	2500	RE	2	1000	A1 (G73)	2
WR5	1500	RP	2	1000	A1 (G77)	2
WK8	1000	R1	2	500	AC	2

**DIMENSIONS**

**Notes**

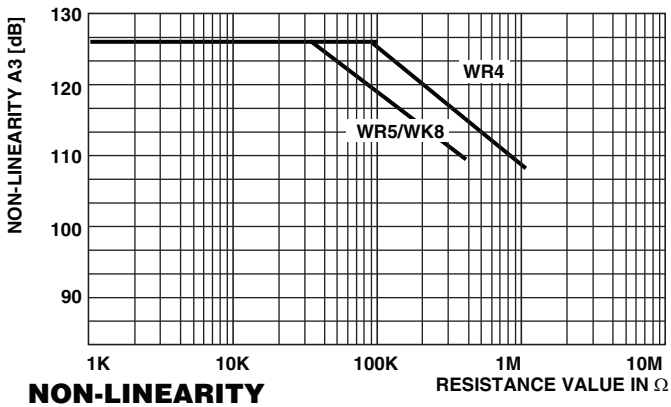
- Taping in acc. with IEC 60286-1
- D and L measured in acc. with IEC 60294
- d according to IEC 60301
- (1) 9 mm for WR5/WK8

MODEL	DIMENSIONS (in millimeters)					
	D	L	L <sub>1 max.</sub>	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

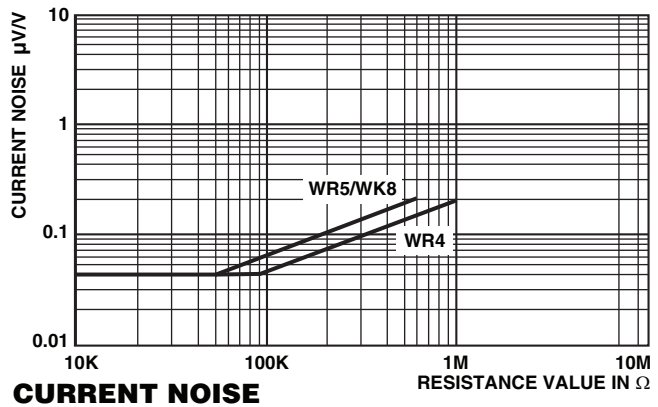

**TEMPERATURE RISE**

**DERATING**

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

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



MAX. PULSE VOLTAGE



NON-LINEARITY



CURRENT NOISE

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

Note

<sup>(1)</sup> Limits for change of resistance at test

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



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