

## 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](http://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 $\Omega$	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, $U_{max.}$ <sup>(1)</sup>	$V_{\cong}$	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	$\Omega$	> 10 <sup>9</sup>			
Category Temperature Range <sup>(2)</sup>	°C	-55 to +200			
Failure Rate	10 <sup>-9</sup> /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 <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>	
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 <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>	
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										

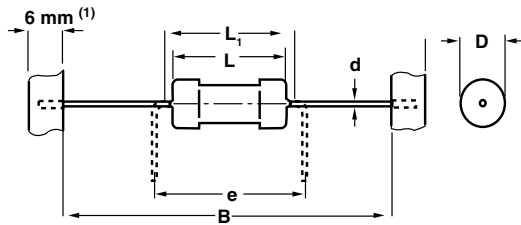
PART NUMBER AND PRODUCT DESCRIPTION WR-SERIES																			
PART NUMBER: WR404140A1001GFE00																			
W	R	4	0	4	1	4	0	A	1	0	0	1	G	F	E	0	0		
MODEL/SIZE	VARIANT			TCR			VALUE			TOLERANCE		PACKAGING (1)		SPECIAL					
WR40414 WR50617	0 = Neutral			A = ± 200 ppm/K			3 digit value 1 digit multiplier MULTIPLIER			G = ± 2 % J = ± 5 %		41 = A1 G73 51 = A1 G77 FE = RE G73 GP = RP		Up to 2 digits 00 = Standard					
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>	
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

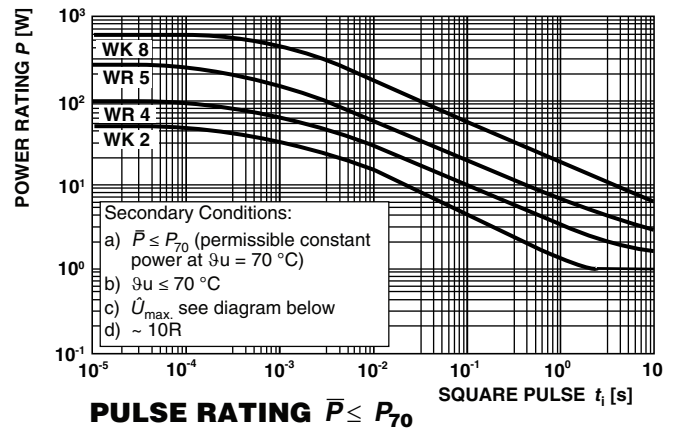
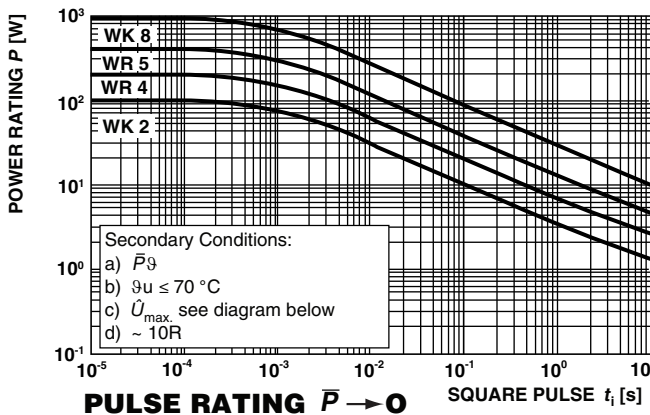
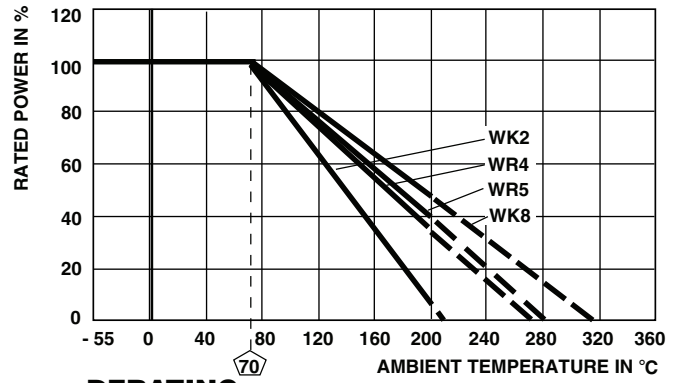
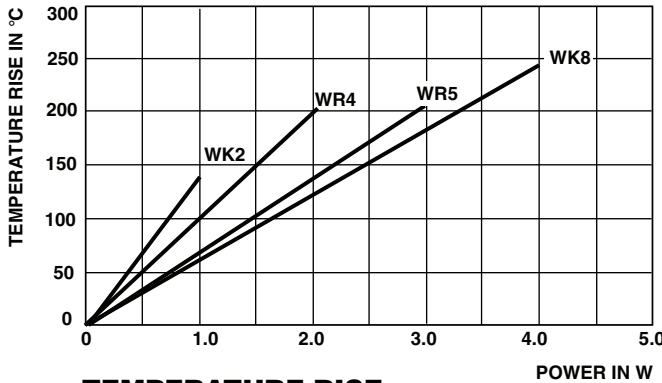
**DIMENSIONS**

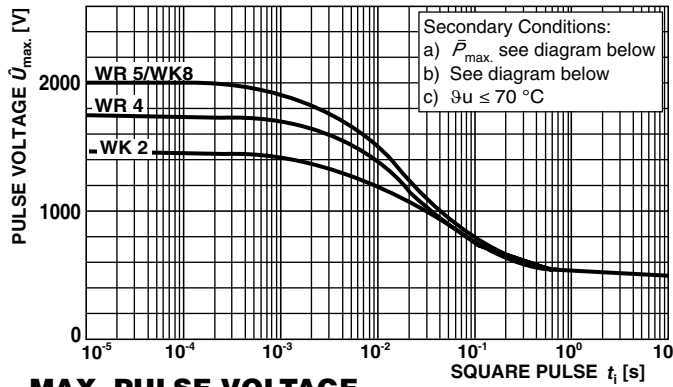
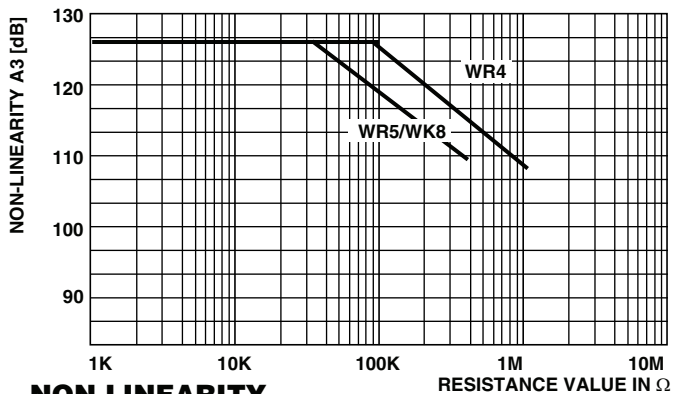
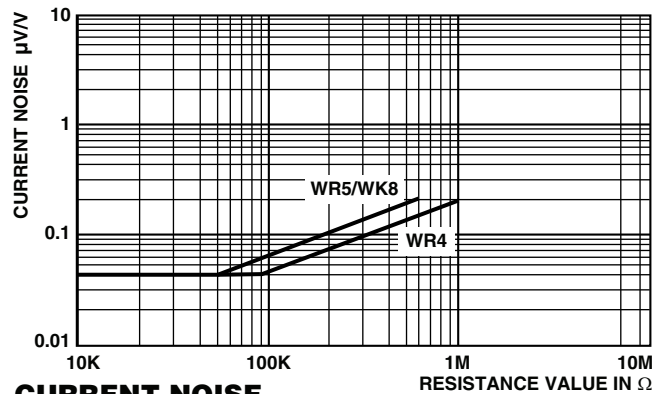


**Notes**

- 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 <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




**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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