

## Metal Foil Current Sense Resistors, 4-Terminal Low Value (Down to 0.001 Ω)



### FEATURES

- 4-terminal design
- Ultra low sensing resistance
- Low TCR (down to 100 ppm/°C)
- Sulfur resistant
- Material categorization:  
for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

### APPLICATIONS

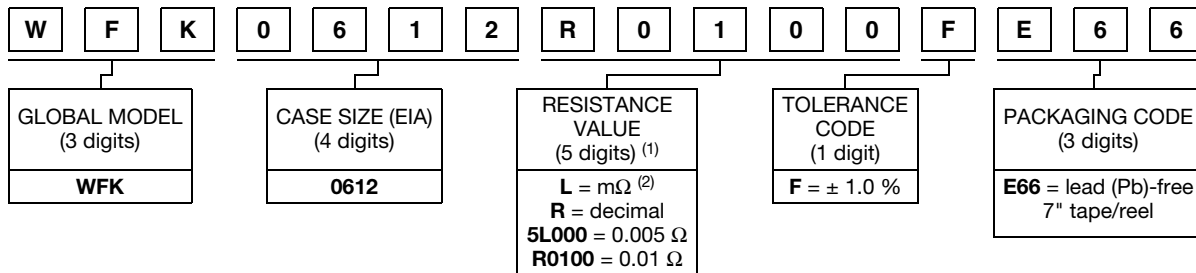
- Switching power supply
- Voltage regulation module
- DC/DC converter, adaptor, battery pack, charger
- Pad and cell phone
- Power management

### STANDARD ELECTRICAL SPECIFICATIONS

GLOBAL MODEL	SIZE	POWER RATING W	TOLERANCE %	RESISTANCE VALUE RANGE mΩ	WEIGHT (typical) g/1000 pieces
WFK0612	0612	1	± 1	1, 3, 5, 10	7.40

### GLOBAL PART NUMBER INFORMATION

Global Part Numbering Example: WFK0612R0100FE66



#### Notes

- <sup>(1)</sup> Resistance values are available per E12 and E24 decades; [www.vishay.com/doc?28372](http://www.vishay.com/doc?28372)  
<sup>(2)</sup> Use "L" for resistance values < 0.01 Ω

TECHNICAL SPECIFICATIONS		
PARAMETER	UNIT	RESISTOR CHARACTERISTICS
		WFK0612
Temperature coefficient	ppm/°C	-
		± 150 for 1 mΩ
		± 100 for 3 mΩ to 10 mΩ
Operating temperature range	°C	-55 to +170
Maximum working voltage	V	$(P \times R)^{1/2}$
Maximum element temperature	°C	170

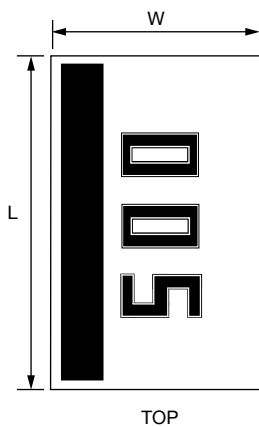
**DIMENSIONS** in inches (millimeters)


Fig. 1

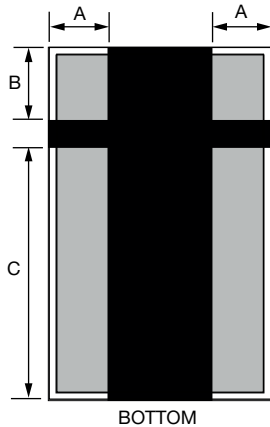
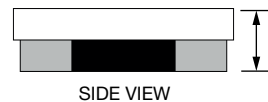


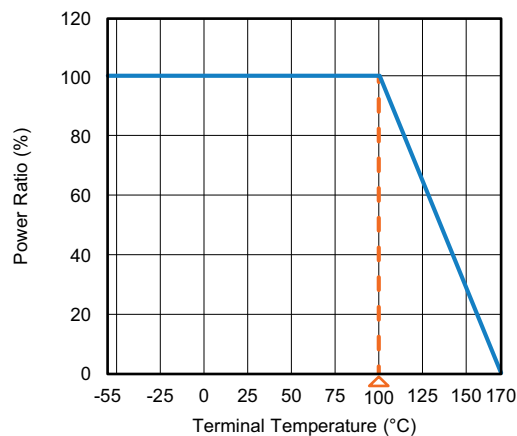
Fig. 2



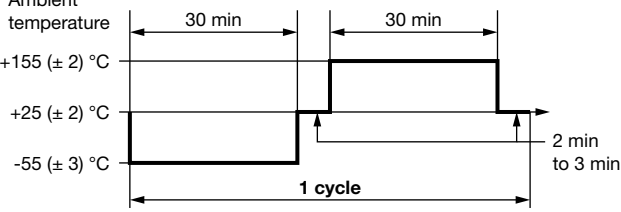
TYPE (INCH SIZE)	RESISTANCE RANGE (mΩ)	DIMENSIONS (in millimeters)					
		L	W	t	A	B	C
WFK0612	1 to 10	3.1 ± 0.20	1.6 ± 0.20	0.5 ± 0.20	0.45 ± 0.20	0.45 ± 0.20	2.2 ± 0.20

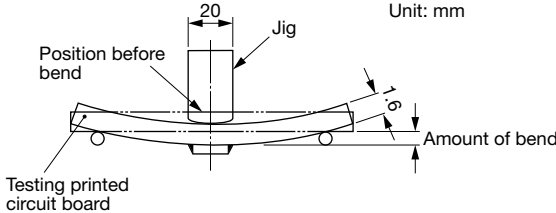
**Note**

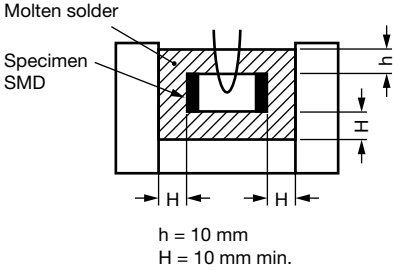
- 0402 has no marking; 0603, 0805, 1206 marking shows two digits for resistance

**DERATING**


**PERFORMANCES**

ENVIRONMENTAL PERFORMANCE			
NO.	ITEM	TEST CONDITION	SPECIFICATION
1	Short time overload	5 times rated power for 5 seconds (JIS-C5202-5.5)	$\Delta R: \pm (1 \% + 0.0005 \Omega)$
2	Temperature coefficient of resistance (TCR)	+25 °C / +125 °C (JIS-C5202-5.2) $TCR (ppm/^{\circ}C) = \frac{\Delta R}{R \times \Delta t} \times 10^6$	Refer to Electrical Specification
3	Damp heat with load	The specimens shall be placed in a chamber and subjected to a relative humidity of 90 % to 95 % and a temperature of 40 °C $\pm$ 2 °C for the period of 1000 hours with applying rated power 1.5 hours ON and 0.5 hour OFF. (MIL-STD-202, method 103)	$\Delta R: \pm (1 \% + 0.0005 \Omega)$
4	High temperature exposure	The chip (mounted on board) is exposed in the heat chamber 125 °C $\pm$ 3 °C for 1000 hours. (JIS-C5202-7.2)	$\Delta R: \pm (1 \% + 0.0005 \Omega)$
5	Load life	Apply rated power at 70 °C $\pm$ 2 °C for 1000 hours with 1.5 hours ON and 0.5 hour OFF. (JIS-C5202-7.10)	$\Delta R: \pm (1 \% + 0.0005 \Omega)$
6	Rapid change of temperature	The chip (mounted on board) is exposed, -55 °C $\pm$ 3 °C (30 min.) / +155 °C $\pm$ 2 °C (30 min.) for 5 cycles. The following conditions as the following figure. (JIS-C5202-7.4)  	$\Delta R: \pm (1 \% + 0.0005 \Omega)$

FUNCTION PERFORMANCE			
NO.	ITEM	TEST CONDITION	SPECIFICATION
1	Bending strength	Mount the chip to test substrate. Apply pressure in direction of arrow unit band width reaches 2 mm (+0.2 / -0 mm) illustrated in the figure below and hold for 10 s $\pm$ 1 s. (JIS-C5202-6.1)  	$\Delta R: \pm (1 \% + 0.0005 \Omega)$
2	Solvent resistance	Complete immersion of specimens in isopropyl alcohol for 3 (+5, -0) min. 25 °C $\pm$ 5 °C. (MIL-STD-202, method 215)	Verify marking permanency. (not required for laser etched parts or parts with no marking)
3	Resistance to solder heat	The specimen chip shall be immersed into the flux specified in the solder bath 260 °C $\pm$ 5 °C for 10 s $\pm$ 1 s. (MIL-STD-202, method 210)	$\Delta R: \pm (1 \% + 0.0005 \Omega)$

FUNCTION PERFORMANCE			
NO.	ITEM	TEST CONDITION	SPECIFICATION
4	Solderability	<p>The specimen chip shall be immersed into the flux specified in the solder bath <math>235\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}</math> for <math>2\text{ s} \pm 0.5\text{ s}</math>. It shall be immersed to a point 10 mm from its root. (Sn96.5 / Ag3.0 / Cu0.5) (JIS-C5 202-6.11)</p>  <p><math>h = 10\text{ mm}</math> <math>H = 10\text{ mm min.}</math></p>	Solder shall be covered 95 % or more of the electrode area.

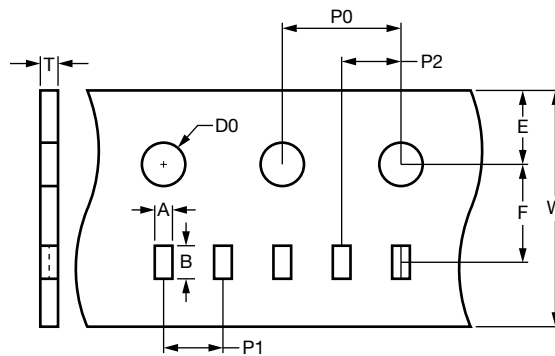
**Notes**

- 0.5 W with total solder pad trace size of  $100\text{ mm}^2$ . The surface temperature of component should below  $100\text{ }^{\circ}\text{C}$
- 1.0 W with total solder pad trace size of  $100\text{ mm}^2$ . The surface temperature of component should below  $100\text{ }^{\circ}\text{C}$

TAPE PACKAGING SPECIFICATIONS			
MODEL	REEL		
	TAPE WIDTH	DIAMETER	PIECES/REEL
WFK0612	Embossed paper tape	178 mm / 7"	5000

**Note**

- Embossed carrier tape per EIA (EIAJ)

**PAPER TAPE SPECIFICATIONS**


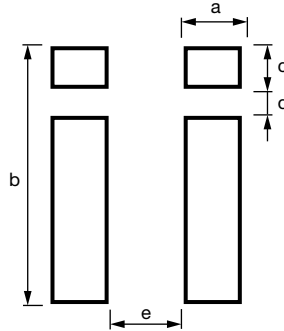
TYPE	RESISTANCE RANGE	CARRIER DIMENSIONS (in millimeters)									
		A	B	E	F	W	P0	P1	P2	D0	T
WFK0612	1 mΩ to 10 mΩ	$2.0 \pm 0.05$	$3.6 \pm 0.05$	$1.75 \pm 0.1$	$3.5 \pm 0.05$	$8.0 \pm 0.2$	$4.0 \pm 0.1$	$2.0 \pm 0.1$	$2.0 \pm 0.05$	$1.55 \pm 0.05$	$0.75 \pm 0.1$

**Notes**

- Embossed carrier tape per EIA (EIAJ)
- Additional packaging details at [www.vishay.com/doc?20051](http://www.vishay.com/doc?20051)

**STORAGE CONDITIONS**

Temperature: 5 °C to 35 °C, humidity: 40 % to 75 %

**RECOMMENDED SOLDER PAD LAYOUT**


TYPE	PAD LAYOUT DIMENSIONS (in millimeters)				
	a	b	c	d	e
0612 (1 mΩ to 10 mΩ)	1.0	3.8	0.80	0.30	0.60

**Note**

- Recommend to use the steel plate which thickness > 100 μm to avoid the insufficient solder height

**SOLDERING RECOMMENDATIONS**

- Peak reflow temperatures and durations:
  - IR reflow peak = 260 °C max. for 10 s
  - Wave solder = 260 °C max. for 10 s
- Compatible with lead and lead (Pb)-free solder reflow processes
- Recommended IR reflow profile for surface mount devices: [www.vishay.com/doc?31052](http://www.vishay.com/doc?31052)



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