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

Pb-free

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

W	F	K	0	6	1	2	R	0	1	0	0	F	E	6	6

GLOBAL MODEL (3 digits)	CASE SIZE (EIA) (4 digits)	RESISTANCE VALUE (5 digits) (1)	TOLERANCE CODE (1 digit)	PACKAGING CODE (3 digits)
WFK	**0612**	**L** = mΩ (2) **R** = decimal **5L000** = 0.005 Ω **R0100** = 0.01 Ω	**F** = ± 1.0 %	**E66** = lead (Pb)-free 7" tape/reel

Notes

(1) Resistance values are available per E12 and E24 decades; www.vishay.com/doc?28372

(2) Use "L" for resistance values < 0.01 Ω

For technical questions, contact: ww2bresistors@vishay.com

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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)

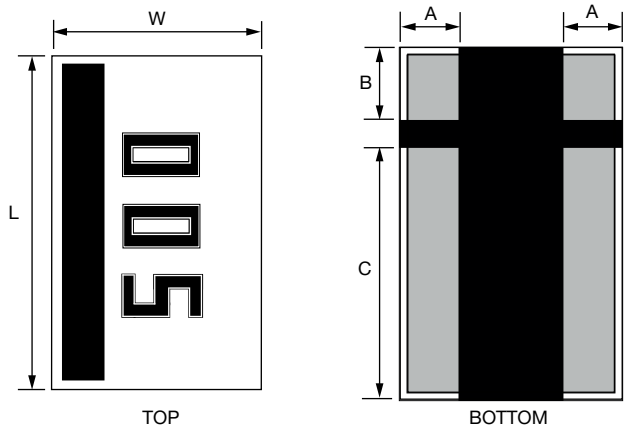


Fig. 1

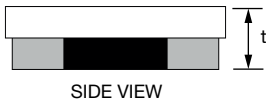


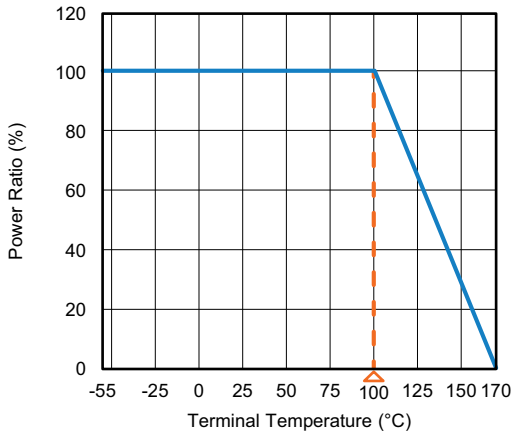
Fig. 2

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



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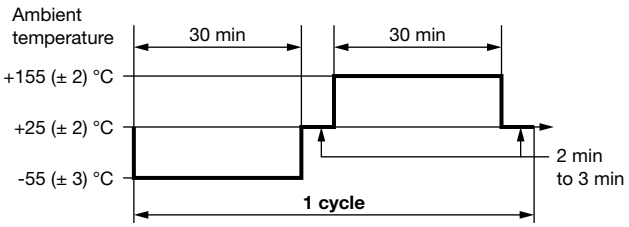
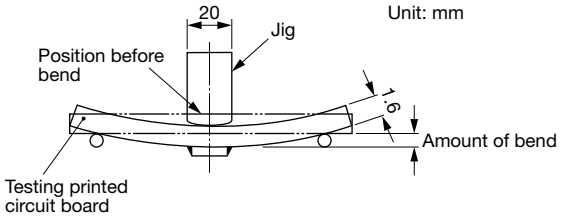
PERFORMANCES

ENVIRONMENTAL PERFORMANCE			
NO.	**ITEM**	**TEST CONDITION**	**SPECIFICATION**
1	Short time overload	5 times rated power for 5 seconds (JIS-C5202-5.5)	ΔR: ± (1 % + 0.0005 Ω)
2	Temperature coefficient of resistance (TCR)	+25 °C / +125 °C (JIS-C5202-5.2) $TCR\ (ppm/°C) = \frac{\Delta R}{R \times \Delta t} \times 10^6$	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 ± 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)	ΔR: ± (1 % + 0.0005 Ω)
4	High temperature exposure	The chip (mounted on board) is exposed in the heat chamber 125 °C ± 3 °C for 1000 hours. (JIS-C5202-7.2)	ΔR: ± (1 % + 0.0005 Ω)
5	Load life	Apply rated power at 70 °C ± 2 °C for 1000 hours with 1.5 hours ON and 0.5 hour OFF. (JIS-C5202-7.10)	ΔR: ± (1 % + 0.0005 Ω)
6	Rapid change of temperature	The chip (mounted on board) is exposed, -55 °C ± 3 °C (30 min.) / +155 °C ± 2 °C (30 min.) for 5 cycles. The following conditions as the following figure. (JIS-C5202-7.4) 	ΔR: ± (1 % + 0.0005 Ω)

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 ± 1 s. (JIS-C5202-6.1) 	ΔR: ± (1 % + 0.0005 Ω)
2	Solvent resistance	Complete immersion of specimens in isopropyl alcohol for 3 (+5, -0) min. 25 °C ± 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 ± 5 °C for 10 s ± 1 s. (MIL-STD-202, method 210)	ΔR: ± (1 % + 0.0005 Ω)

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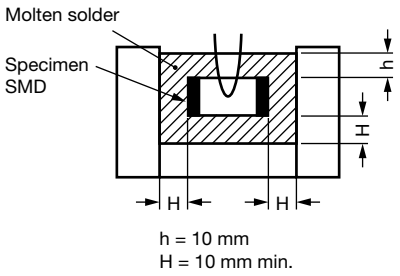
FUNCTION PERFORMANCE

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

Notes

- 0.5 W with total solder pad trace size of 100 mm^2. The surface temperature of component should below 100 °C
- 1.0 W with total solder pad trace size of 100 mm^2. The surface temperature of component should below 100 °C

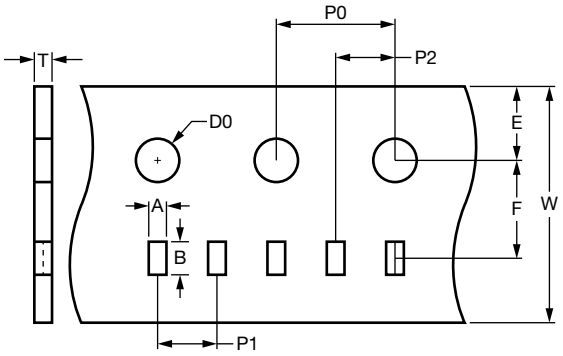
TAPE PACKAGING SPECIFICATIONS

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 ± 0.05	3.6 ± 0.05	1.75 ± 0.1	3.5 ± 0.05	8.0 ± 0.2	4.0 ± 0.1	2.0 ± 0.1	2.0 ± 0.05	1.55 ± 0.05	0.75 ± 0.1

Notes

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

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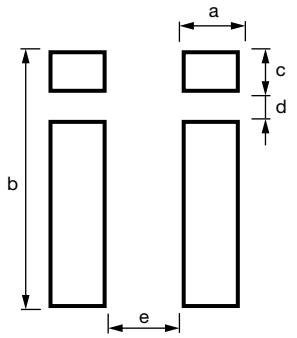
STORAGE CONDITIONS

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

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