CHIP RESISTORS

1005(0402) / 1608(0603) / 2012(0805) Series

Features

1. Small size and light weight
2. High reliability and stability
3. Suitable for both reflow soldering and wave soldering
4. Low noise

Applications

Any general circuit of portable equipment which compact size and high mounting densities are required.

Ordering Information

CODE : WR04 X 103 J T
(1) (2) (3) (4) (5)

(1) Size Code
WR08 : 2012(0805)
WR06 : 1608(0603)
WR04 : 1005(0402)

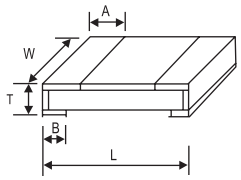
(2) Tape Code
X : Normal
Y : Special order

(3) Resistance Code
E24 : Two significant digits followed by no.of zeros
4.7Ω = 4R7
10Ω = 100
220Ω = 221
Jump = 000
E96 : Two significant digits followed by no.of zeros
102Ω = 1020
37.4kΩ = 3742
WR04 : No marking

(4) Tolerance
F = ±1%
G = ±2%
J = ±5%
P = Jumper

(5) Packaging Code
No Code = Bulk
T = Reel

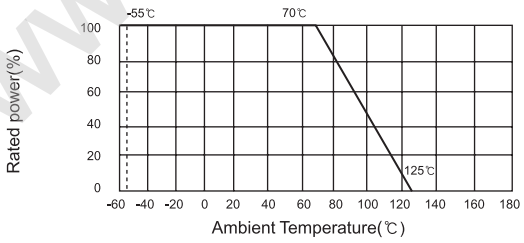
Shape and Dimensions



unit:mm

Size	L	W	A	B	T
WR08	2.0±0.1	1.25±0.1	0.4±0.2	0.4±0.2	0.5±0.15
WR06	1.6±0.1	0.8±0.1	0.3±0.1	0.3±0.2	0.45±0.15
WR04	1.0±0.05	0.5±0.05	0.2±0.1	0.25±0.1	0.35±0.05

Power Derating

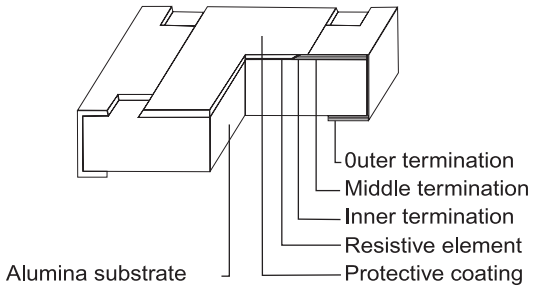


For resistors operated in ambient temperatures above 70℃, power rating must be derated according to the grape(left).

Ratings

Series No	Power rating at 70℃	TCR (ppm/℃)	Max RCWV (Note1)	Max Overload Voltage	Resistance Tolerance(±%)	Resistance Range(Note2)	Standard Res. Values	Working Temperature Range(℃)
WR08	1/8W	±100	100V	200V	1	10Ω ~ 1MΩ	E-96	-55 ~ 125℃
		±200	100V	200V	5	1Ω ~ 10MΩ	E-24	
WR06	1/10W	±100	50V	100V	1	10Ω ~ 1MΩ	E-96	
		±200	50V	100V	5	1Ω ~ 10MΩ	E-24	
WR04	1/16W	±200	50V	100V	1	6.8Ω ~2.2MΩ	E-96	
		±200	50V	100V	2,5	6.8Ω ~ 2.2MΩ	E-24	

Note1. RCWV (Rated Continuous Working Voltage) is determined by
RCWV = $\sqrt{(\text{Rated power x Resistance Value})}$, or Max. RCWV listed above, whichever is lower.
Note2. Resistance value other than specified range is also available.
Note3. E-96 is only available for 1% tolerance.

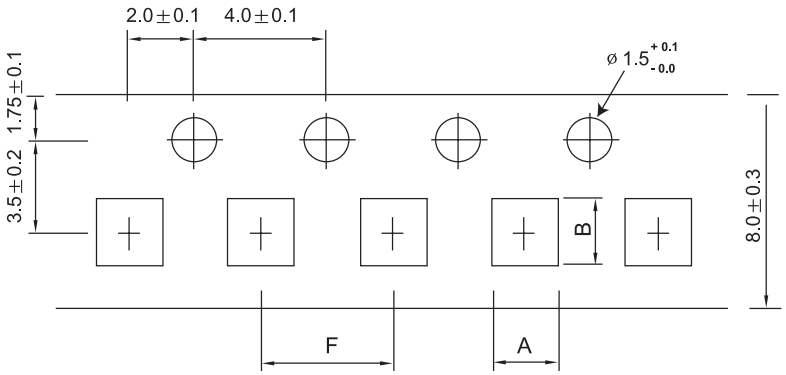


1.Outer termination : solder plated (Over 4㎛).
2.Middle termination : Nickel plated (2㎛ ~ 6㎛).
3.Inner termination : Ag layer.

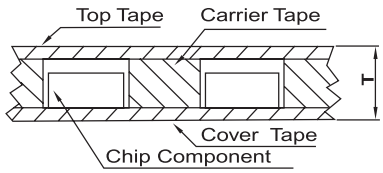
Tests and Specifications

Test Item	Specification			Test Method
	Chip Resistor		Jumper	
DC Resistance	With the specified tolerance		50mΩ lower	JIS C 5202 5.1 DC Resistance values measured at the test voltages specified below : Resistance nominal / Test voltage < 100Ω : 0.3V < 1kΩ : 1V < 10kΩ : 3V < 100kΩ : 10V < 1MΩ : 25V > 10MΩ : 50V
Temperature Coefficient of Resistance (TCR)	WR08	±100ppm/℃ for F product, ±200ppm/℃ for J product. -300~+500ppm/℃ for R<10Ω	-	JIS C 5202 5.2 / IEC 115-1 4.8.4.2 Natural resistance change per temperature degree centigrade $TCR(ppm/℃) = \frac{R_2 - R_1}{R_1 (t_2 - t_1)} X10^6$ R_1 : Resistance value at referance temperature R_2 : Resistance value at test temperature t_1 : Room temperature, t_2 : Test temperature
	WR06			
	WR04	0 ~ 500ppm/℃ for R≦10Ω ±200ppm/℃ for R>10Ω		
Short Time Overload (STOL)	±(2%+0.1Ω)		50mΩ lower	JIS C 5202 5.5 / IEC 115-1 4.13 Permanent resistance change after a 5 second application of a voltage 2.5 times RCWV or the maximum overload voltage specified in the above list, whichever is less.
Resistance to Solder Heat	±(1%+0.05Ω)		50mΩ lower	JIS C 5202 6.4 / IEC 115-1 4.18 With 260℃ ±5℃ for 10±1 second.
Solderability	95% coverage min		-	JIS C 5202 6.5 / IEC 115-1 4.17 After immersing flux, dip in the 235℃ ±5℃ molten solder bath for 2±0.5 second.
Temperature Cycle	WR08	±(1%+0.1Ω)	50mΩ lower	JIS C 5202 7.4 / IEC 115-1 4.19 Resistance change after continuous 5cycle for duty cycle are specified below : Step / Temperature / Time 1 / -55℃ ±3℃ / 30min 2 / Normal / 2~3min 3 / +125℃ ±3℃ / 30min 4 / Normal / 2~3min
	WR06			
	WR04	±(2%+0.1Ω)		
Load Life in Humidity	WR08	±(3%+0.1Ω) for 10Ω≦R<1MΩ ±(5%+0.1Ω) for R<10Ω R≧1MΩ	50mΩ lower	JIS C 5202 7.9 / IEC 115-1 4.24.2 Resistance change after 1000+48/-0 hours, 1.5 hours 「ON」, 0.5hour 「OFF」, at RCWV in a humidity chamber controlled at 40℃ ±2℃ and 90%~95% relative humidity
	WR06			
	WR04 (1%)	±(2%+0.1Ω)		
	WR04 (2%, 5%)	±(3%+0.1Ω)		
Load Life	WR08	±(3%+0.1Ω) for 10Ω≦R<1MΩ ±(5%+0.1Ω) for R<10Ω R≧1MΩ	50mΩ lower	JIS C 5202 7.10 / IEC 115-1 4.25.1 Permanent resistance change after 1000+48/-0 hours, operating at RCWV with duty cycle of 1.5 hours 「ON」, 0.5hour 「OFF」, at 70℃ ±2℃ ambient.
	WR06			
	WR04 (1%)	±(2%+0.1Ω)		
	WR04 (2%, 5%)	±(3%+0.1Ω)		
Terminal Strength	±(1%+0.05Ω) no evidence of mechanical demage		50mΩ lower	JIS C 5202 6.1.4 / IEC 115-1 4.33 Bending test : at Y/X = 3mm/90mm, one time, 10 seconds. Pulling test : 500 grams.

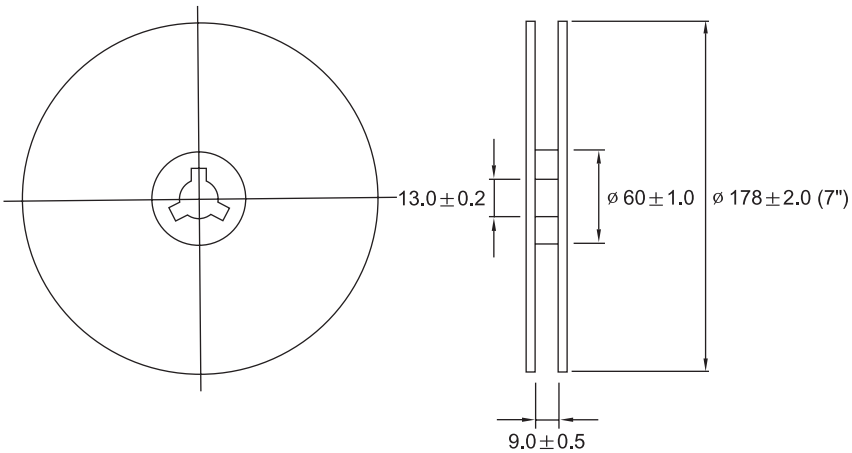
Packaging & Reel Dimension



Unit : mm



Reel Dimension(mm)



	A	B	F	T
WR08	1.65±0.2	2.4±0.2	4.0±0.1	1.0MAX
WR06	1.1±0.2	1.9±0.2	4.0±0.1	1.0MAX
WR04	0.7±0.05	1.2±0.05	2.0±0.1	0.4±0.05

Size	Tape Material	Tape Width	Pcs/Reel
WR06,08	paper	8mm	5,000
WR04	paper	8mm	10,000