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# PEWM1216

## High-Precision Low-Inductance Alloy Current Sensing Resistor

**Resistance** 0.3mΩ~1.0mΩ

**Tolerance** ±1.0%

**TCR** ±100ppm/°C

**Rated Current** 83A~182A

### Applications

Automotive Electronics

Precision Power Supply

Instrumentation

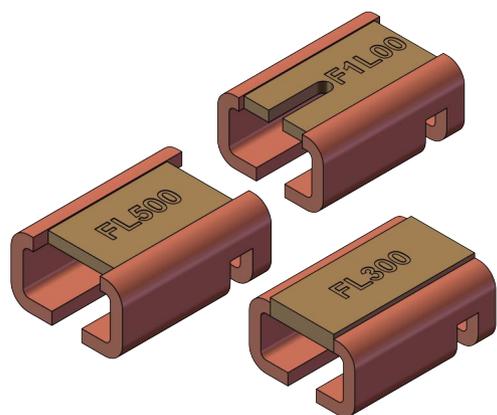
Formation & Sorting of Battery

Medical Equipment

**Better Solution for Sustainable High End Manufacturing**



### Tolerance of $\pm 0.5\%$ and TCR of $\pm 100\text{ppm}$ High Reliability and Stability



#### Introduction

High-precision low-Inductance molded alloy current sensing resistor adopts a resistive alloy independently developed by C&B Electronics, which undergoes precision processing, then is welded by a dedicated electron beam welding equipment independently designed and manufactured by C&B Electronics to achieve continuous welding, and then is shaped by precision stamping. Based on the control ability of the resistance alloy's consistency, precision processing ability, process control ability, and precision welding ability, the product can achieve a maximum target tolerance of  $\pm 1.0\%$ . TCR of PEWM series is  $\leq \pm 100\text{ppm}/^\circ\text{C}$  within the operating temperature range from  $+20^\circ\text{C}$  to  $+170^\circ\text{C}$ . Inductance  $< 3\text{nH}$ .

PEWM series, from raw materials, core equipment, to core processes, achieves independent and controllable production, stable quality, and timely delivery. If the standard specifications cannot meet your needs, please contact our sales for consultation. Resi is committed to providing the best precision resistor solutions to meet the needs of customers in testing and measurement, power equipment, medical equipment, precision power supply, automotive electronics, formation & sorting of battery.



#### Electrical Parameters

Series	Resistance	Rated Power (+70°C)	Max. Operating Current	Operating Temperature	TCR ppm/°C(+20°CRef)	Thermal Resistance	Tolerance %
PEWM1216	0.3mΩ	10W	182A	-55°C~+170°C	$\pm 100(+20^\circ\text{C}\sim+170^\circ\text{C})$	7.8°C/W	$\pm 1.0$ $\pm 5.0$
PEWM1216	0.5mΩ	9W	134A	-55°C~+170°C	$\pm 100(+20^\circ\text{C}\sim+170^\circ\text{C})$	12.1°C/W	$\pm 1.0$ $\pm 5.0$
PEWM1216	1.0mΩ	7W	83A	-55°C~+170°C	$\pm 100(+20^\circ\text{C}\sim+170^\circ\text{C})$	12.7°C/W	$\pm 1.0$ $\pm 5.0$

1. Internal thermal resistance: It represents the internal thermal resistance between the center of the resistance alloy and the copper electrode, because the heat dissipation power of the product is largely affected by the heat dissipation environment, connecting copper bars, PCB design and other factors, so this parameter is for reference only.

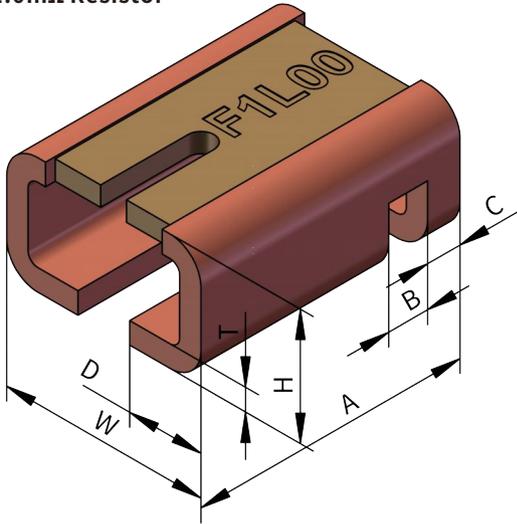
#### Applications

PEWM inductance  $< 3\text{nH}$ , PEWM is suitable for AC and DC low and high frequency sampling circuits.

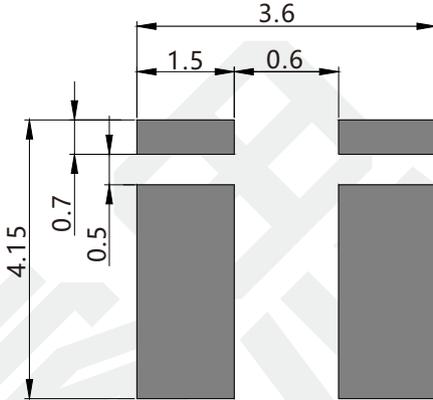
### Dimensions

Unit:mm

0.3mΩ~1.0mΩ Resistor



### Land Pattern

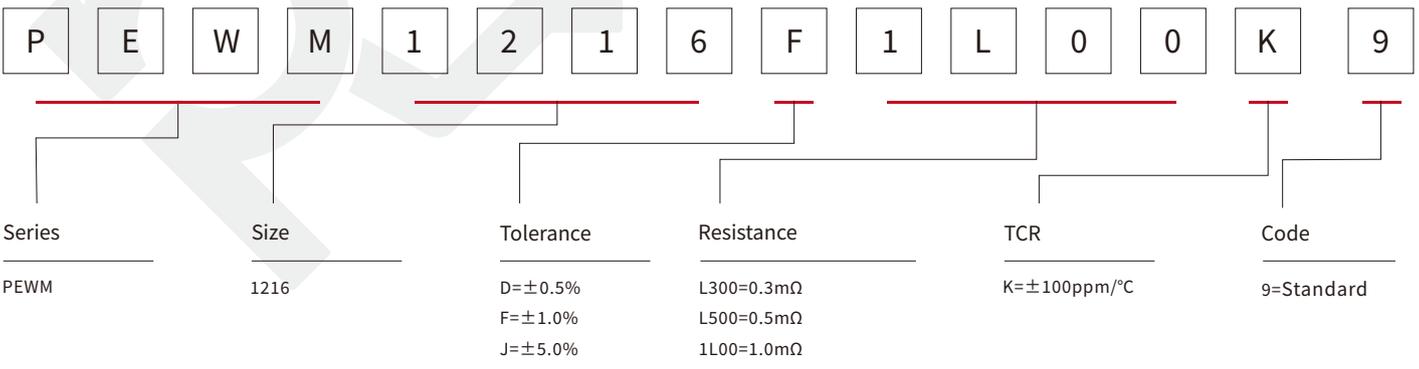


**Not following the recommended land pattern design can seriously affect the temperature coefficient measurement results and current sensing accuracy!**

Resistance	T	H	W	A	B	C	D	Packaging	Quantity Per Reel	Net Weight
0.3mΩ	0.33±0.2	1.92±0.5	3.0±0.2	4.0±0.2	0.6±0.2	0.5±0.1	1.1±0.2	Tape & Reel	3000pcs	0.1±0.05g
0.5mΩ	0.33±0.2	1.8±0.5	3.0±0.2	4.0±0.2	0.6±0.2	0.5±0.1	1.1±0.2	Tape & Reel	3000pcs	0.1±0.05g
1.0mΩ	0.33±0.2	1.8±0.5	3.0±0.2	4.0±0.2	0.6±0.2	0.5±0.1	1.1±0.2	Tape & Reel	3000pcs	0.07±0.03g

### Part Number Information

Example:PEWM1216F1L00K9( PEWM 1216 ±1.0% 1.0mΩ ±100ppm/°C Standard )

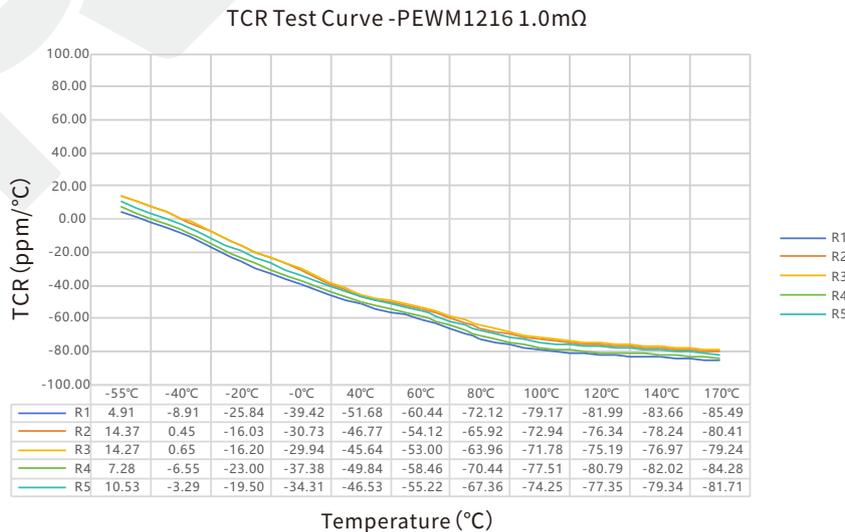
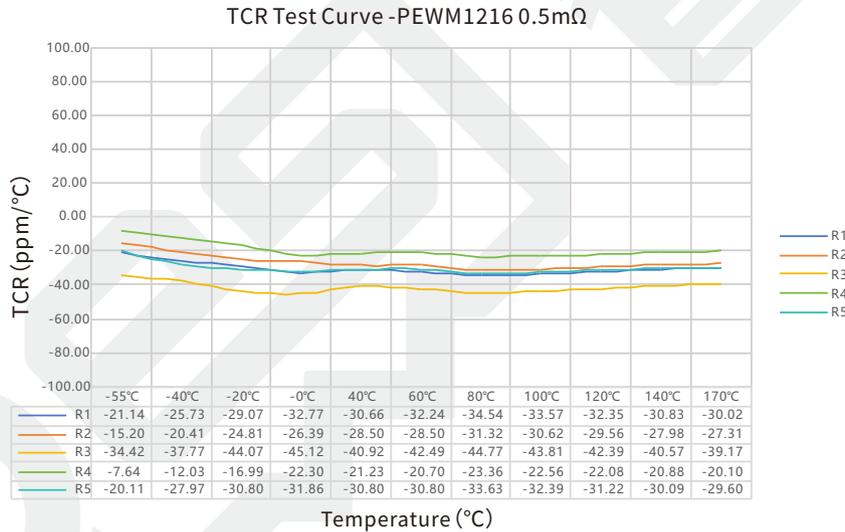
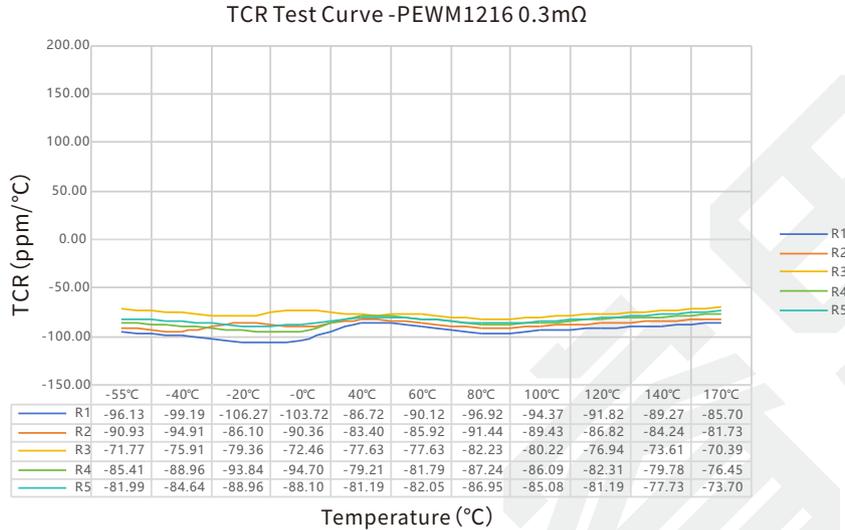


For higher/lower resistance, tighter tolerance, higher power, lower TCR and larger size, please contact us.

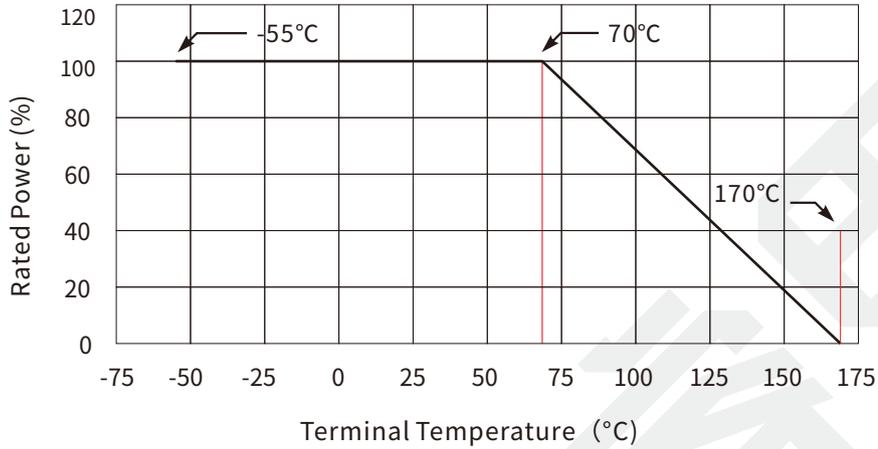
### Performance

Test	Test Method	Standards	Typical	Max.
High Temperature Storage	1000h@+170°C, unpowered	AEC-Q200 TEST 3 MIL-STD-202 Method 108	$\Delta R \leq \pm 0.5\%$	$\Delta R \leq \pm 1.0\%$
Thermal Shock	-55°C, 15min~ambient<20s~+155°C, 15min, 1000cycles	AEC-Q200 TEST 16 MIL-STD-202 Method 107	$\Delta R \leq \pm 0.5\%$	$\Delta R \leq \pm 1.0\%$
Bias Humidity	+85°C, 85%RH, powered 10% rated power for 1000h	AEC-Q200 TEST 7 MIL-STD-202 Method 103	$\Delta R \leq \pm 0.2\%$	$\Delta R \leq \pm 0.5\%$
Load Life	2000 h @ +70°C*, rated power, 90min on, 30min off *70°C is the terminal temperature	AEC-Q200 TEST 8 MIL-STD-202 Method 108	$\Delta R \leq \pm 0.5\%$	$\Delta R \leq \pm 1.0\%$
Resistance to Solvent	Immerse in solvent for 3 min and wipe 10 times. Three cycles of three solvents. Dry at ambient temperature after cleaning	AEC-Q200 TEST 12 MIL-STD-202 Method 215	Clear marking. No visible damage	
Mechanical Shock	Sine half-sine wave, peak acceleration 100g's, pulse duration 6ms, triaxial six-directional 3 times each	AEC-Q200 TEST 13 MIL-STD-202 Method 213	$\Delta R \leq \pm 0.05\%$	$\Delta R \leq \pm 0.2\%$
Vibration	10-2KHz, 5g's, 20 min per cycle, 12 in each of the three directions of X.Y.Z loops	AEC-Q200 TEST 14 MIL-STD-202 Method 204	$\Delta R \leq \pm 0.05\%$	$\Delta R \leq \pm 0.2\%$
Resistance to Solder Heat	+260°C, 10s	AEC-Q200 TEST 15 MIL-STD-202 Method 210	$\Delta R \leq \pm 0.2\%$	$\Delta R \leq \pm 0.5\%$
Solderability	+245°C tin bath for 3s	AEC-Q200 TEST 18 IEC 60115-1 4.17	No visible damage. 95% minimum coverage	
TCR	+20°C and +170°C, +20°C Ref.	AEC-Q200 TEST 19 IEC 60115-1 4.8	In the range of $\pm 100\text{ppm}/^\circ\text{C}$	
Substrate Bending	2mm, 60s	AEC-Q200 TEST 21 AEC-Q200-005	$\Delta R \leq \pm 0.1\%$	$\Delta R \leq \pm 0.5\%$
Short Time Overload	5x rated voltage, 5s	IEC 60115-1 4.13	$\Delta R \leq \pm 0.5\%$	$\Delta R \leq \pm 1.0\%$
Low Temperature Storage	-55°C, No Load, 96 h	IEC 60068-2-1	$\Delta R = 0$	$\Delta R \leq \pm 0.1\%$
Moisture Resistance	Apply T = 24 hours/cycle, zero power, 7a and 7b are not required in the method	MIL-STD-202 Method 106	$\Delta R = 0$	$\Delta R \leq \pm 0.2\%$

### Temperature Coefficient of Resistance Test Curve



### Derating Curve



### Reflow Soldering Profile

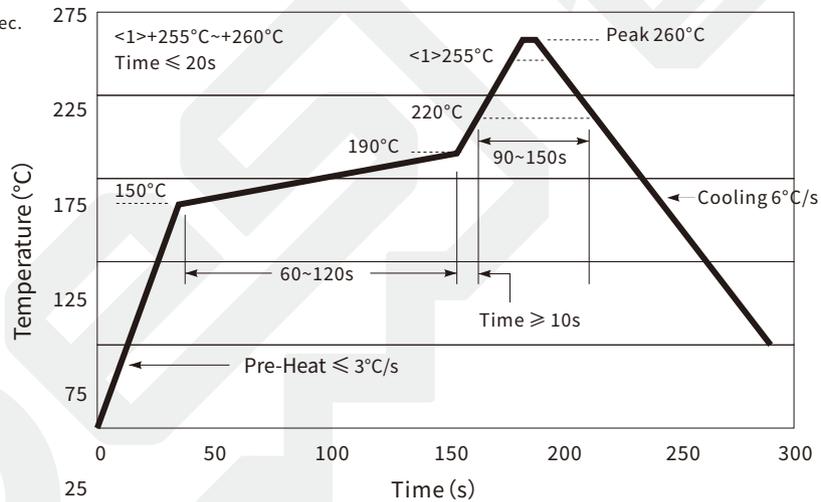
Resistor Surface Temperature:

Pre-Heat: +150°C~+190°C, 60~120sec.

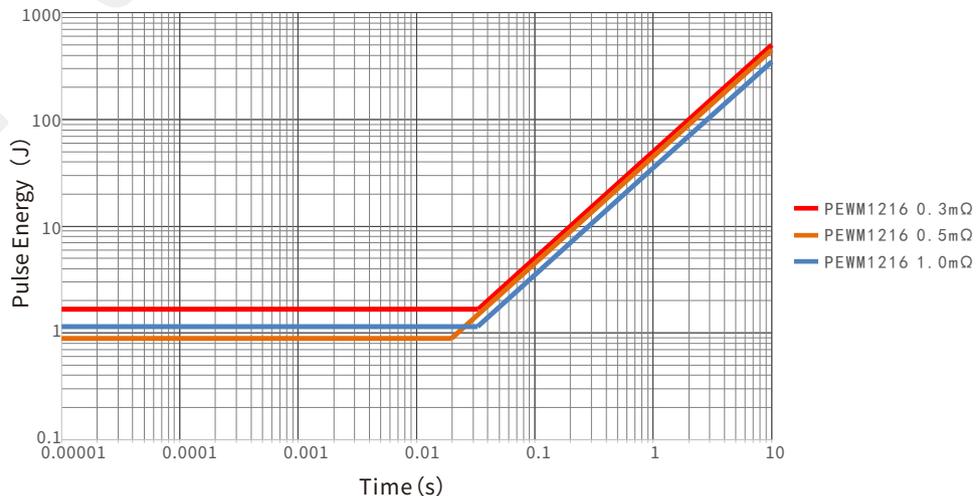
Reflow: +220°C以上, 90~150sec.

Applicable Solder Composition:

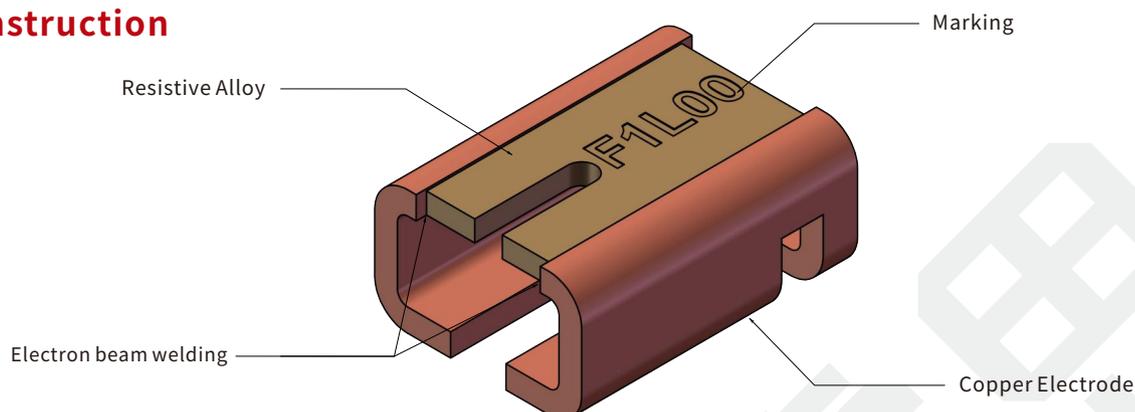
Sn-Ag-Cu solder.



### Maximum Pulse Energy Curve



### Construction



### Marking

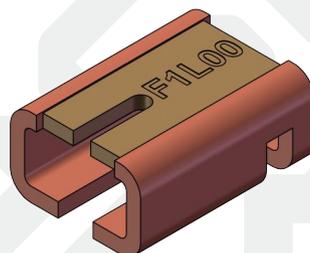
Marking: Tolerance+Resistance

#### Size

#### Illustration

#### Demonstration

1216



F:Tolerance  
1L00:Resistance

### Storage Instructions

- (1) Resistors should be stored at a temperature of 5 to 35°C, with a humidity of <60% RH. The humidity should be kept as low as possible.
- (2) Resistors should be protected from direct sunlight.
- (3) Resistors should be stored in a clean and dry environment free of harmful gases (HCl, Sulfuric acid, H<sub>2</sub>S, etc.)
- (4) Do not move the resistor from the packaging unless use it.
- (5) Under the above storage conditions, the resistor can be stored for at least 1 year.

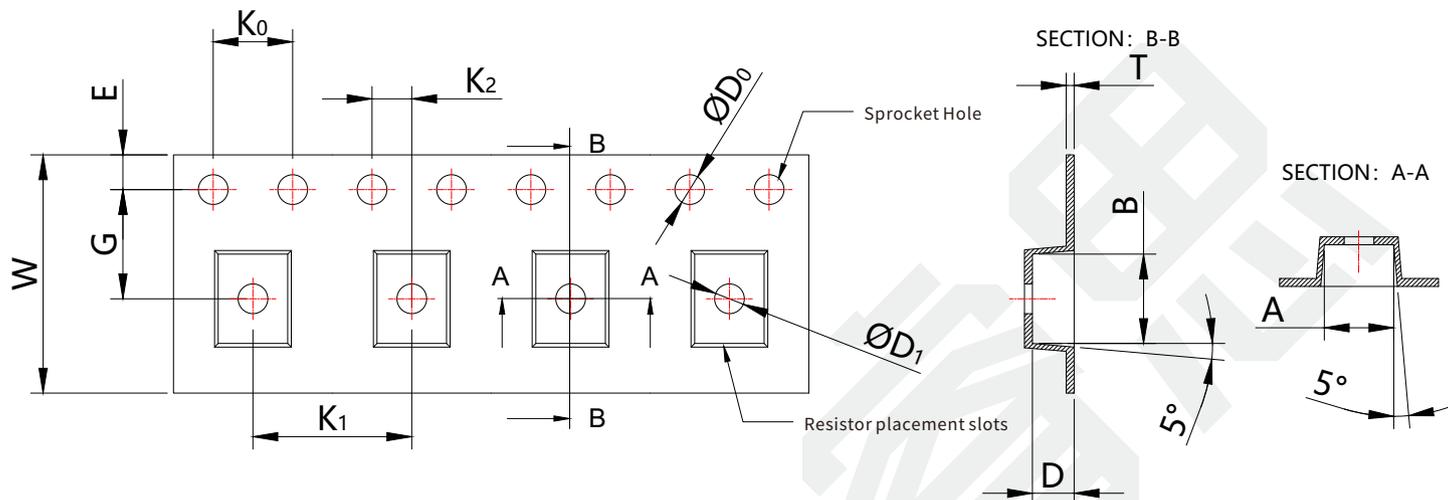
### Usage Suggestions

- (1) Please protect the surface of the resistor during use. Prevent defects such as scratches, bumps, and oil stains on the surface.
- (2) Do not use sharp tweezers to move the resistor. Scratches on the surface can cause resistance drift and resistor failure.
- (3) When installing and using resistors, avoid the impact of mechanical stress on the resistor.
- (4) The long-term operating power of resistors should be ≤ rated power to avoid resistance drift caused by long-term overload.
- (5) Please refer to the derating curve when operating under high temperature conditions or poor heat dissipation environment.
- (6) If the operating conditions exceed the pulse specified in the pulse curve, a systematic evaluation is required.
- (7) If the resistor is not used after being moved from the packaging, it should be stored under vacuum to avoid risks such as poor welding caused by oxidation of the resistor.

### Packaging

#### Tape Specifications

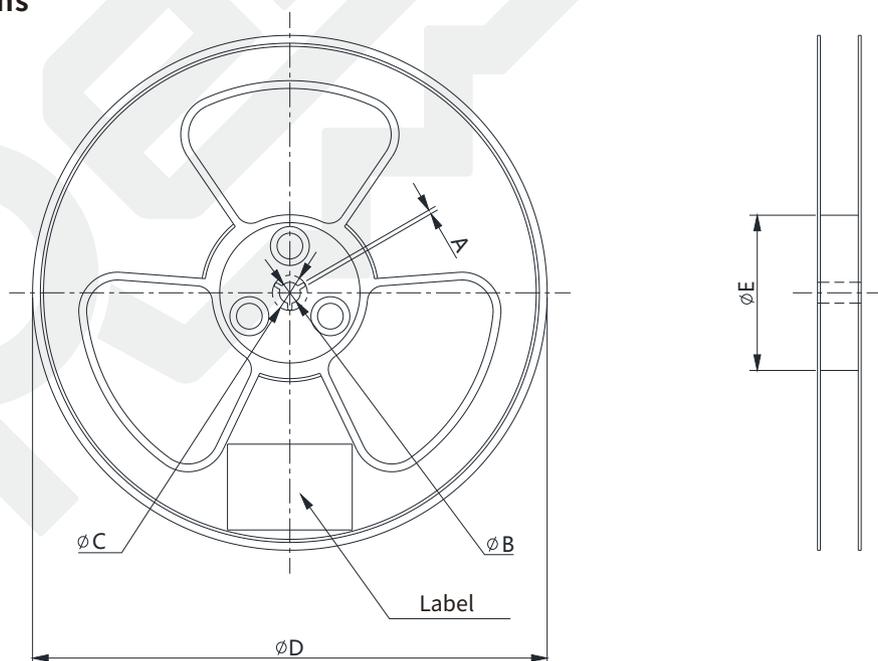
Unit: mm



阻值	A	B	φD <sub>0</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	E	G	W	D	T
0.3mΩ	3.5±0.1	4.5±0.1	1.5±0.1	4.0±0.1	8.0±0.1	2.0±0.1	1.75±0.1	5.5±0.1	12.0±0.3	2.1±0.1	0.4±0.05
0.5mΩ	3.5±0.1	4.5±0.1	1.5±0.1	4.0±0.1	8.0±0.1	2.0±0.1	1.75±0.1	5.5±0.1	12.0±0.3	2.1±0.1	0.4±0.05
1.0mΩ	3.5±0.1	4.5±0.1	1.5±0.1	4.0±0.1	8.0±0.1	2.0±0.1	1.75±0.1	5.5±0.1	12.0±0.3	2.1±0.1	0.4±0.05

#### Reel Specifications

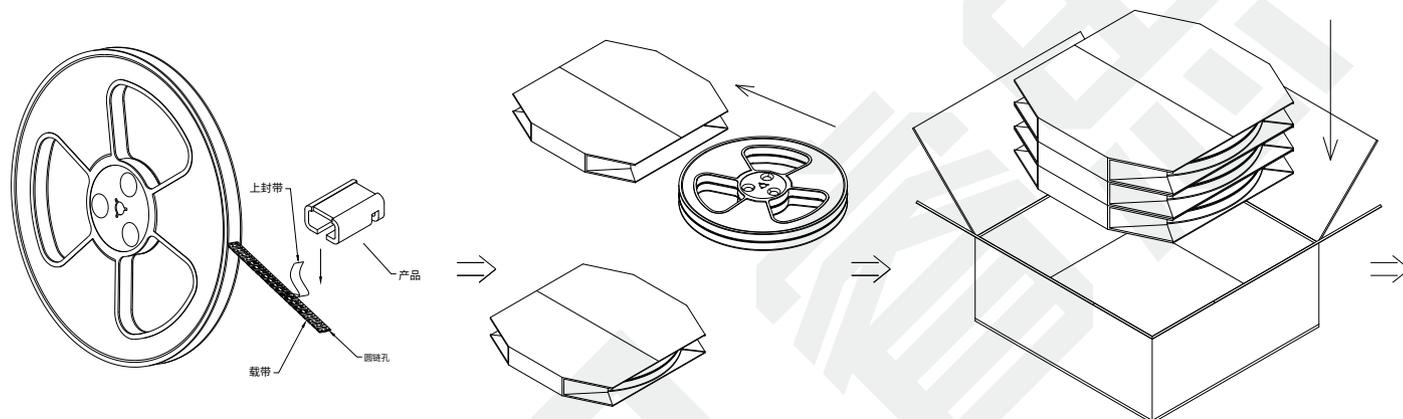
Unit: mm



A	φB	φC	φD	φE
1.5 Min.	13.0 +0.5/-0.2	20.2 Min.	330±2	100±2

## Packaging

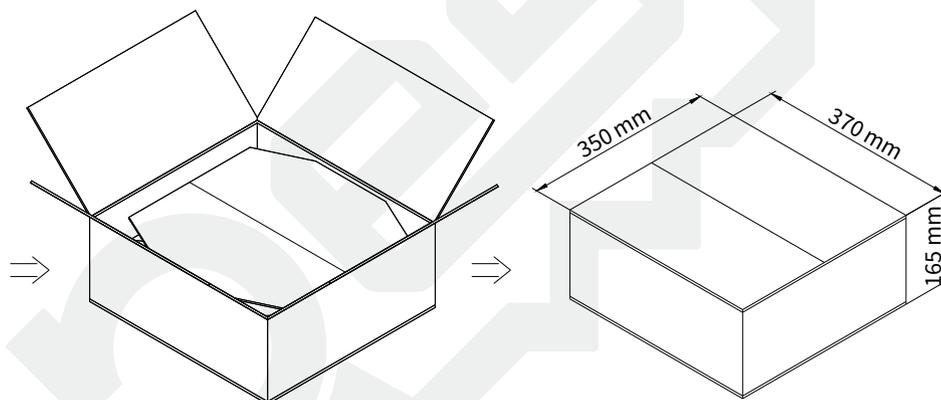
- (1) 3000 pcs. resistors are packed in a tape and wrapped in a reel;
- (2) Every 2 reels are packed by a cardboard sleeve case. The size of the cardboard is 335mm\*340mm\*37mm;
- (3) Place every 3 cases into a box ( 18000pcs. / box).



1.3000 pcs. resistors are packed in a tape and wrapped in a reel.

2. Every 2 reels are packed by a cardboard sleeve case.

3. Place every 3 cases into a box (18000 pcs. / box).



4. Fill with bubble wrap or pearl cotton to prevent the product from shaking inside the box.

5. Box size: 350mm\*370mm\*165 mm.

### Popular Part Numbers

Part Number	Size	Tolerance	Resistance	TCR	Power	Max. Operating Current
PEWM1216FL300K9	1216	±1.0%	0.3mΩ	±100ppm/°C	10W	182A
PEWM1216JL300K9	1216	±5.0%	0.3mΩ	±100ppm/°C	10W	182A
PEWM1216FL500K9	1216	±1.0%	0.5mΩ	±100ppm/°C	9W	134A
PEWM1216JL500K9	1216	±5.0%	0.5mΩ	±100ppm/°C	9W	134A
PEWM1216F1L00K9	1216	±1.0%	1.0mΩ	±100ppm/°C	7W	83A
PEWM1216J1L00K9	1216	±5.0%	1.0mΩ	±100ppm/°C	7W	83A

## Revision

Version	Revised Content	Date	Approver
V0	Initial Issue	2024.01.24	LWW

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