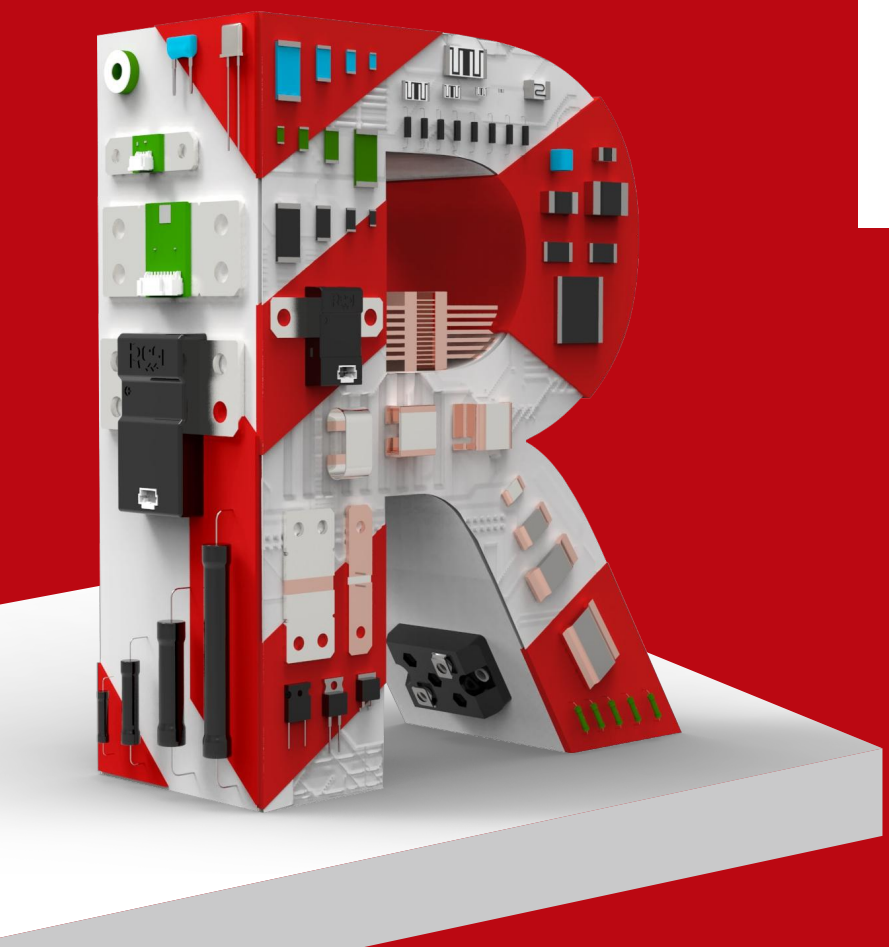
Data Sheet No：E16012
Version：V4
Date：2025/09/28

睿思

PEWM3920

High-Precision Low-Inductance Alloy Current Sensing Resistor

Resistance	0.2mΩ~1.0mΩ
Tolerance	±0.5%
TCR	±100~±150ppm/℃
Rated Current	89A~244A



Applications

Automotive Electronics
Precision Power Supply
Formation & Sorting of Battery
Electric Tools
Medical Equipment

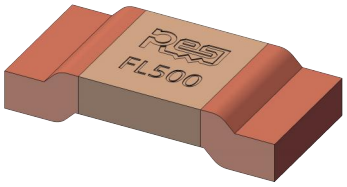
Better Solution for Sustainable High End Manufacturing

睿思

PEWM3920

High-Precision Low-Inductance Alloy Current Sensing Resistor

Low-Induct ance Alloy Current Sensing Resistor “Trimming Free” Technology, High Precision, Reliability



Introduction

High-precision, low-inductance pure alloy current-sensing resistors use precision resistor alloys independently developed by Kaibu Electronics. After precision processing, they are welded using specialized electron beam welding equipment independently designed and manufactured by Kaibu Electronics. By perfectly combining the control capability over resistor alloy consistency, precision processing capability, and efficient welding level, the product can achieve a target accuracy of up to ±0.5% without resistance trimming after stamping. This series of 0.3~1 mΩ products has a temperature coefficient within ±100 ppm/°C over a range of 20°C to 170°C, and 0.2 mΩ products can achieve within ±150 ppm/°C, with inductance less than 3 nH.

The “Trimming Free” technology avoids rated current loss caused by resistance trimming and also prevents current concentration hotspots caused by trimming gaps, significantly enhancing product reliability. At the same time, due to improved welding quality, the product's thermoelectric potential is significantly reduced, improving long-term stability.

This series of products achieves independent and controllable manufacturing, stable quality, and timely delivery from raw materials to core equipment and core processes. If standard specifications cannot meet your needs, please contact our sales team for consultation. Reesi is committed to providing users with the best precision resistor solutions, meeting the needs of customers in instruments, medical equipment, automotive electronics, precision power supplies, chemical component measurement, and test and measurement equipment.

RoHS AEC-Q200 3D

Electrical Parameters

Size	Resistance	Rated Power (+70°C)	Max. Operating Current	Operating Temperature	TCR ppm/°C(+20°C Ref)	Thermal Resistance [1] °C/W	Tolerance %
PEWM3920	0.2mΩ	12W	244A	-55°C~+170°C	±150(+20°C～+170°C)	3.6	±0.5 ±1.0 ±5.0
PEWM3920	0.3mΩ	10W	182A	-55°C~+170°C	±100(+20°C～+170°C)	3.8	±0.5 ±1.0 ±5.0
PEWM3920	0.5mΩ	9W	134A	-55°C~+170°C	±100(+20°C～+170°C)	6.3	±0.5 ±1.0 ±5.0
PEWM3920	0.7mΩ	8W	107A	-55°C~+170°C	±100(+20°C～+170°C)	8.7	±0.5 ±1.0 ±5.0
PEWM3920	1.0mΩ	8W	89A	-55°C~+170°C	±100(+20°C～+170°C)	12.6	±0.5 ±1.0 ±5.0

1、Thermal Resistance (Internal): It represents the internal thermal resistance between the center of the resistance alloy and the copper electrode. Since the heat dissipation power of the product is largely affected by comprehensive factors such as the heat dissipation environment, connecting copper busbars, and PCB design, this parameter is for reference only.

Applications

Inductance of PEWM3920 current sensing resistors is less than 3nH, suitable for AC, DC low and high frequency sampling circuits.

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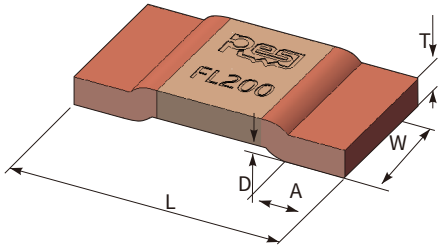
PEWM3920

High-Precision Low-Inductance Alloy Current Sensing Resistor

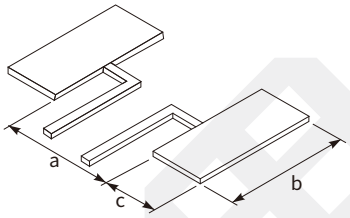
Dimensions

Unit:mm

Resistor



Land Pattern



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

Resistance	L	W	A	T	D	a	b	c	Packaging	Quantity	Net Weight
0.2mΩ	10.0±0.3	5.2±0.3	2.0±0.3	1.4±0.2	0.5±0.2	5.6±0.1	6.2±0.2	2.7±0.1	Tape&Reel	2000pcs	0.65±0.1g
0.3mΩ	10.0±0.3	5.2±0.3	2.0±0.3	1.3±0.2	0.5±0.2	5.6±0.1	6.2±0.2	2.7±0.1	Tape&Reel	2000pcs	0.59±0.1g
0.5mΩ	10.0±0.3	5.2±0.3	2.0±0.3	0.8±0.2	0.5±0.2	5.6±0.1	6.2±0.2	2.7±0.1	Tape&Reel	2000pcs	0.36±0.1g
0.7mΩ	10.0±0.3	5.2±0.3	2.0±0.3	0.6±0.2	0.5±0.2	5.6±0.1	6.2±0.2	2.7±0.1	Tape&Reel	2000pcs	0.27±0.1g
1.0mΩ	10.0±0.3	5.2±0.3	2.0±0.3	0.4±0.2	0.5±0.2	5.6±0.1	6.2±0.2	2.7±0.1	Tape&Reel	2000pcs	0.18±0.05g

Part Number Information

Example: PEWM3920FL500K9 (PEWM 3920 ±1.0% 0.5mΩ ±100ppm/°C Standard)

P	E	W	M	3	9	2	0	F	L	5	0	0	K	9

Series	Size	Tolerance	Resistance	TCR	Code
PEWM	3920	D=±0.5% F=±1.0% J=±5.0%	L200=0.2mΩ L300=0.3mΩ L500=0.5mΩ L700=0.7mΩ 1L00=1.0mΩ	K=±100ppm/°C R=±150ppm/°C	9=Standard

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

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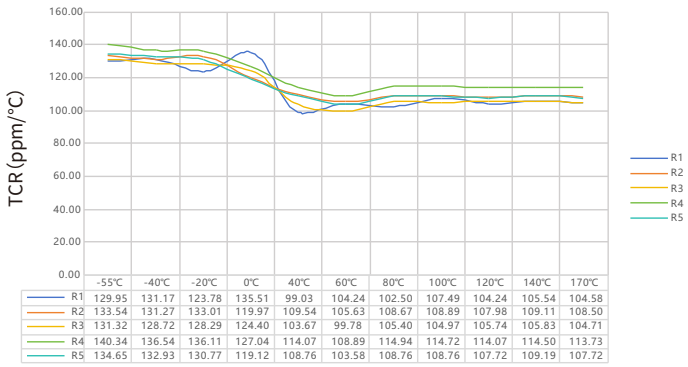
Performance

Test	Test Method	Standards	Typical	Max.
High Temperature Storage	1000h@+170°C, unpowered	AEC-Q200 TEST 3 MIL-STD-202 Method 108	△R≤±0.5%	△R≤±1.0%
Thermal Shock	-55°C, 15min~ambient temperature<20s~+155°C, 15min, 1000 cycles	MIL-STD-202 Method 107	△R≤±0.1%	△R≤±0.5%
Bias Humidity	+85°C, 85%RH, powered 10% rated power for 1000h	AEC-Q200 TEST 7 MIL-STD-202 Method 103	△R≤±0.2%	△R≤±0.5%
Load Life	2000h @ +70°C, rated power, 90min on, 30min off +70°C refers to terminal temperature	AEC-Q200 TEST 8 MIL-STD-202 Method 108	△R≤±0.5%	△R≤±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	Half Sine Wave, peak acceleration 100g's, pulse duration 6ms, 3 times in each of six directions, on three different axes	AEC-Q200 TEST 13 MIL-STD-202 Method 213	△R≤±0.05%	△R≤±0.2%
Vibration	10-2KHz, 5g's, 20min/cycle, 12 cycles in each directions of X Y Z	AEC-Q200 TEST 14 MIL-STD-202 Method 204	△R≤±0.05%	△R≤±0.2%
Resistance to Solder Heat	Keep at +260°C on the heating platform for 10 seconds.	AEC-Q200 TEST 15 MIL-STD-202 Method 210	△R≤±0.2%	△R≤±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	Measurement points: +20°C and +170°C, reference point: +20°C	AEC-Q200 TEST 19 IEC 60115-1 4.8	Refer to the measured curve. The maximum temperature coefficient is within ±200ppm/°C for 0.1mΩ and within ±100ppm/°C for resistances from 0.2 to 1.0mΩ.	
Board Flex	2mm. Duration: 60s.	AEC-Q200 TEST 21 AEC-Q200-005	△R≤±0.1%	△R≤±0.5%
Short Time Overload	5x rated power, 5s	IEC 60115-1 4.13	△R≤±0.1%	△R≤±0.5%
Low Temperature Storage	-55°C for 96h, unpowered	IEC 60068-2-1	△R≤±0.1%	△R≤±0.5%
Moisture Resistance	Apply T=24 h/cycle, zero power, method 7a and 7b are not required	MIL-STD-202 Method 106	△R≤±0.1%	△R≤±0.5%

Temperature Coefficient of Resistance Test Curve

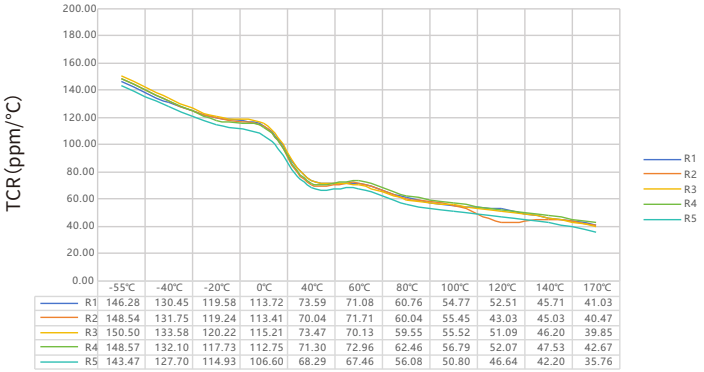
TCR Test Curve - PEWM3920 0.2mΩ



	-55℃	-40℃	-20℃	0℃	40℃	60℃	80℃	100℃	120℃	140℃	170℃
R1	129.95	131.17	123.78	135.51	99.03	104.24	102.50	107.49	104.24	105.54	104.58
R2	133.54	131.27	133.01	119.97	109.54	105.63	108.67	108.89	107.98	109.11	108.50
R3	131.32	128.72	128.29	124.40	103.67	99.78	105.40	104.97	105.74	105.83	104.71
R4	140.34	136.54	136.11	127.04	114.07	108.89	114.94	114.72	114.07	114.50	113.73
R5	134.65	132.93	130.77	119.12	108.76	103.58	108.76	108.76	107.72	109.19	107.72

Temperature (°C)

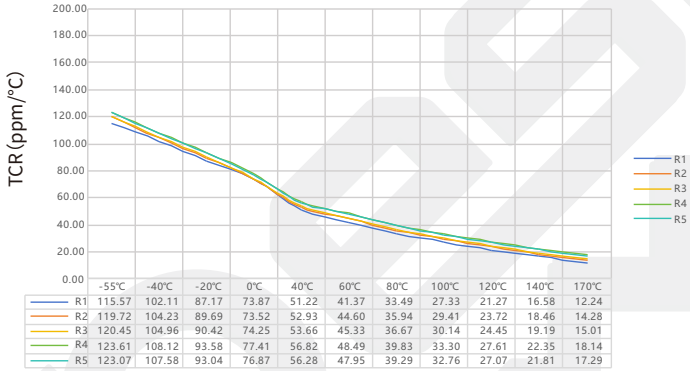
TCR Test Curve - PEWM5930 0.3mΩ



	-55℃	-40℃	-20℃	0℃	40℃	60℃	80℃	100℃	120℃	140℃	170℃
R1	146.28	130.45	119.58	113.72	73.59	71.08	60.76	54.77	52.51	45.71	41.03
R2	148.54	131.75	119.24	113.41	70.04	71.71	60.04	55.45	43.03	45.03	40.47
R3	150.50	133.58	120.22	115.21	73.47	70.13	59.55	55.52	51.09	46.20	39.85
R4	148.57	132.10	117.73	112.75	71.30	72.96	62.46	56.79	52.07	47.53	42.67
R5	143.47	127.70	114.93	106.60	68.29	67.46	56.08	50.80	46.64	42.20	35.76

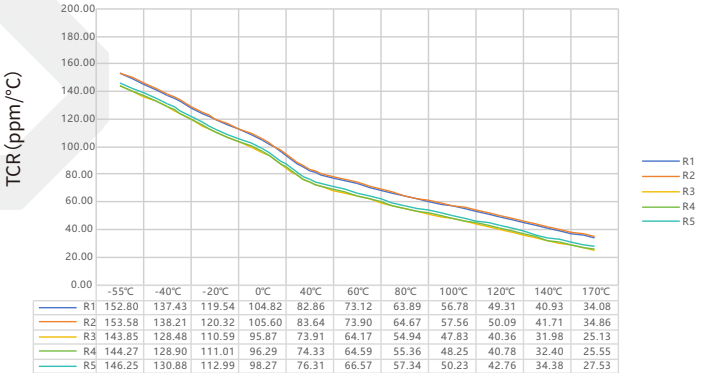
Temperature (°C)

TCR Test Curve - PEWM5930 0.5mΩ



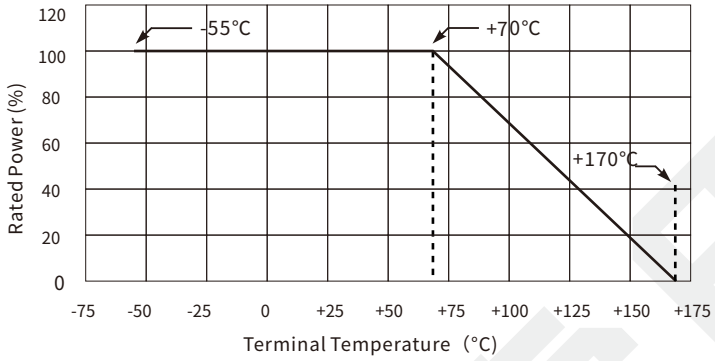
	-55℃	-40℃	-20℃	0℃	40℃	60℃	80℃	100℃	120℃	140℃	170℃
R1	115.57	102.11	87.17	73.87	51.22	41.37	33.49	27.33	21.27	16.58	12.24
R2	119.72	104.23	89.69	73.52	52.93	44.60	35.94	29.41	23.72	18.46	14.28
R3	120.45	104.96	90.42	74.25	53.66	45.33	36.67	30.14	24.45	19.19	15.01
R4	123.61	108.12	93.58	77.41	56.82	48.49	39.83	33.30	27.61	22.35	18.14
R5	123.07	107.58	93.04	76.87	56.28	47.95	39.29	32.76	27.07	21.81	17.29

TCR Test Curve - PEWM5930 1.0mΩ



	-55℃	-40℃	-20℃	0℃	40℃	60℃	80℃	100℃	120℃	140℃	170℃
R1	152.80	137.43	119.54	104.82	82.86	73.12	63.89	56.78	49.31	40.93	34.08
R2	153.58	138.21	120.32	105.60	83.64	73.90	64.67	57.56	50.09	41.71	34.86
R3	143.85	128.48	110.59	95.87	73.91	64.17	54.94	47.83	40.36	31.98	25.13
R4	144.27	128.90	111.01	96.29	74.33	64.59	55.36	48.25	40.78	32.40	25.55
R5	146.25	130.88	112.99	98.27	76.31	66.57	57.34	50.23	42.76	34.38	27.53

Derating Curve



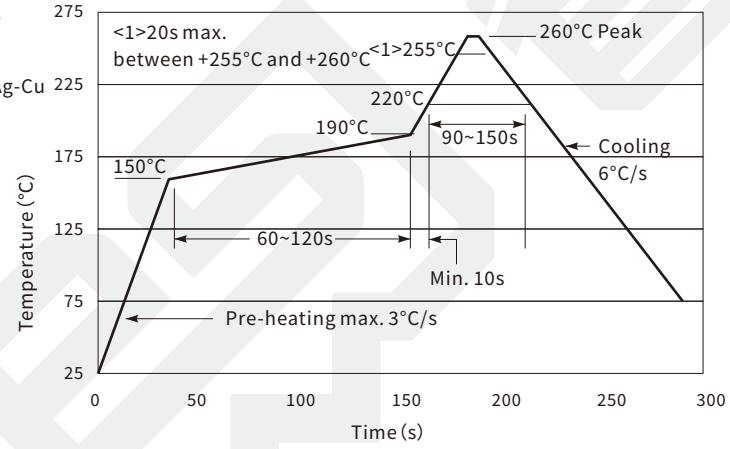
Reflow Soldering Profile

Resistor Surface Temperature:

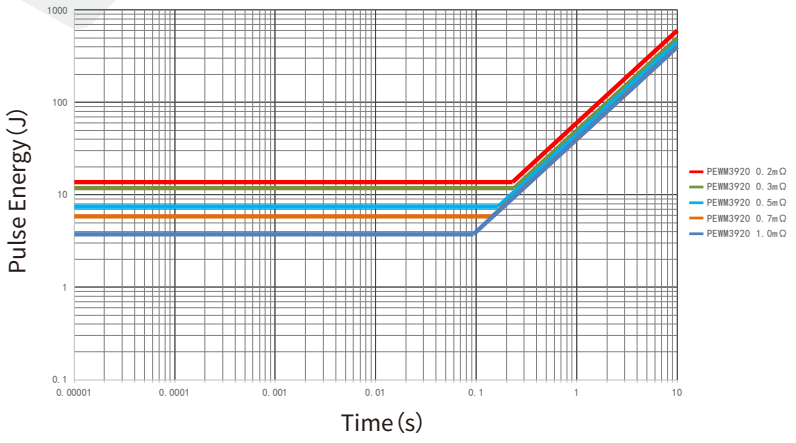
Pre-Heat: +150°C~+190°C,60~120sec.

Reflow: Above +220°C,90~150sec.

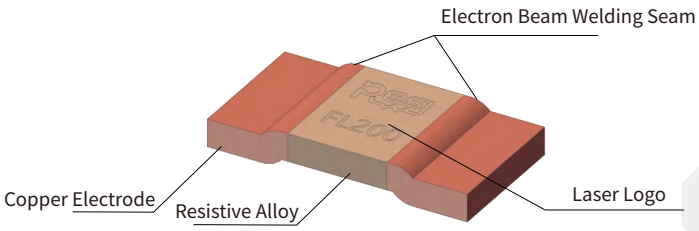
Applicable Solder Composition: Sn-Ag-Cu



Maximum Pulse Energy Curve



Construction



Marking

The first line (four digits) represents brand. The second line (five digits) represents tolerance and resistance.

Size	Illustration	Demonstration
3920		RESI：Brand F：Tolerance L200：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_2S, 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 less than the 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 solderability caused by oxidation of the resistor.

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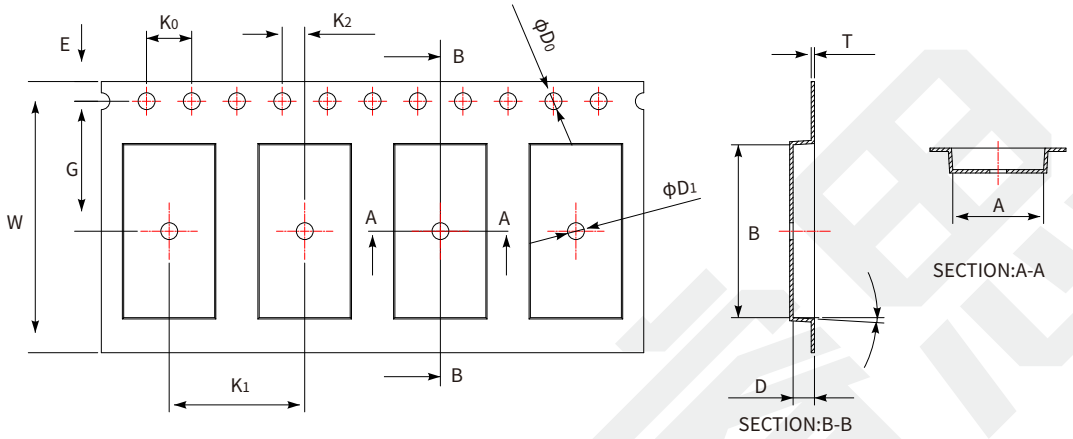
Packaging

Tape Specifications

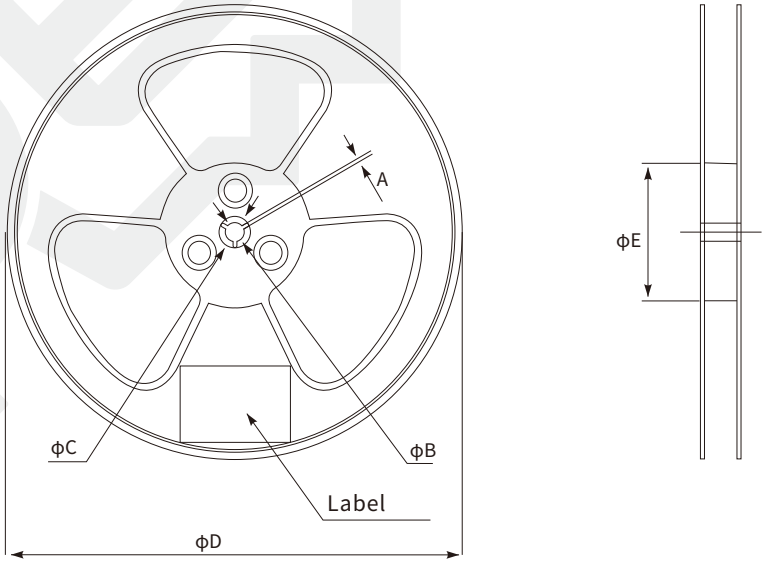
Unit:mm



Resistance	A	B	φD0	φD1	K0	K1	K2	E	G	W	D	T
0.2mΩ	5.5±0.2	10.5±0.2	1.5±0.1	1.5±0.1	4.0±0.1	8.0±0.1	2.0±0.1	1.75±0.1	7.5±0.1	16.0±0.3	2.7±0.1	0.3±0.05
0.3mΩ	5.5±0.2	10.5±0.2	1.5±0.1	1.5±0.1	4.0±0.1	8.0±0.1	2.0±0.1	1.75±0.1	7.5±0.1	160±0.3	2.1±0.1	0.3±0.05
0.5mΩ	5.5±0.2	10.5±0.2	1.5±0.1	1.5±0.1	4.0±0.1	8.0±0.1	2.0±0.1	1.75±0.1	7.5±0.1	16.0±0.3	1.5±0.1	0.3±0.05
0.7mΩ	5.5±0.2	10.5±0.2	1.5±0.1	1.5±0.1	4.0±0.1	8.0±0.1	2.0±0.1	1.75±0.1	7.5±0.1	16.0±0.3	1.5±0.1	0.3±0.05
1.0mΩ	5.5±0.2	10.5±0.2	1.5±0.1	1.5±0.1	4.0±0.1	8.0±0.1	2.0±0.1	1.75±0.1	7.5±0.1	16.0±0.3	1.5±0.1	0.3±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

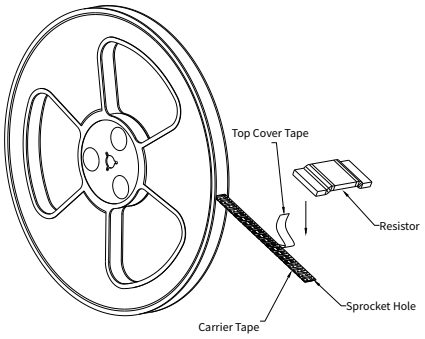
Packaging

(1) Tape and reel the PEWM 3920 series resistors into a single plastic tray according to quantity.

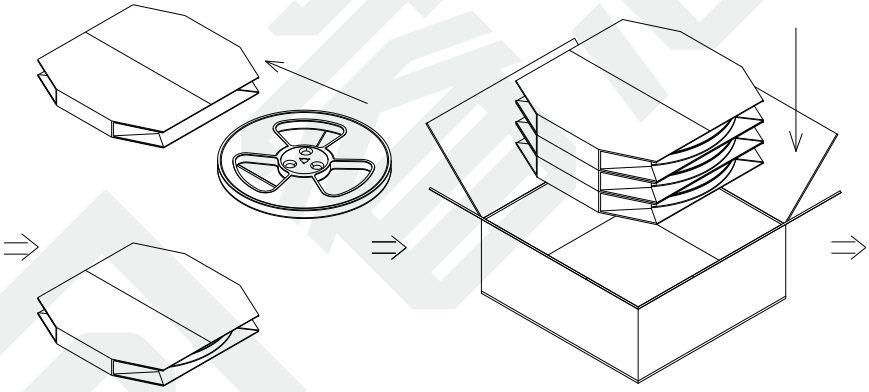
(2) Secure each plastic tray with a paper splint, with the paper splint dimensions approximately 335mm × 340mm × 37mm.

(3) Place every three paper splints into an outer carton for packaging.

(4) The standard outer carton dimensions are approximately 350mm × 370mm × 165mm.

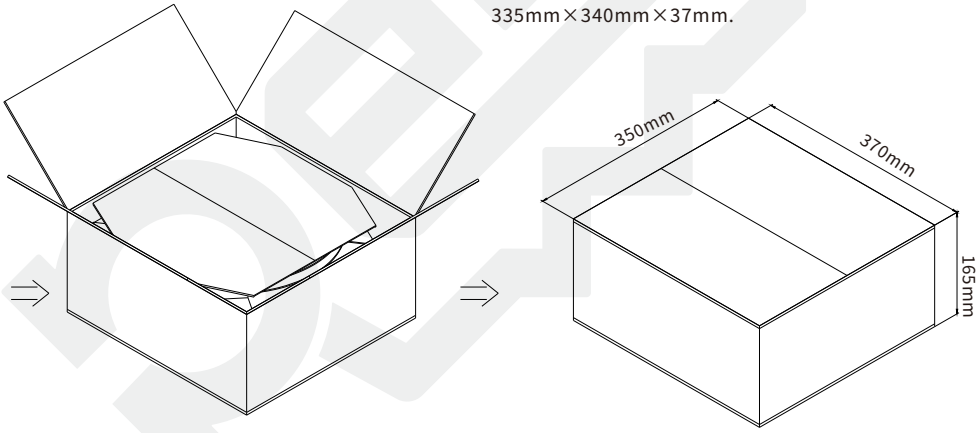


1. Tape the PEWM 3920 series resistors into a plastic tray according to quantity.



2. Fix each plastic tray with a paper splint, and the size of the paper splint is approximately 335mm×340mm×37mm.

3. Place every three paper splints into an outer carton for packaging.



4. Before and after placing the paper splints, fill the space with bubble wrap or pearl cotton to prevent the products from shaking inside the carton.

5. The standard outer carton dimensions are approximately 350mm×370mm×165mm.

Popular Part Numbers

Part Number	Size	Tolerance	Resistance	TCR	Power	Max. Operating Current
PEWM3920DL200R9	3920	±0.5%	0.2mΩ	±150ppm/°C	12W	244A
PEWM3920FL200R9	3920	±1.0%	0.2mΩ	±150ppm/°C	12W	244A
PEWM3920JL200R9	3920	±5.0%	0.2mΩ	±150ppm/°C	12W	244A
PEWM3920DL300K9	3920	±0.5%	0.3mΩ	±100ppm/°C	10W	182A
PEWM3920FL300K9	3920	±1.0%	0.3mΩ	±100ppm/°C	10W	182A
PEWM3920JL300K9	3920	±5.0%	0.3mΩ	±100ppm/°C	10W	182A
PEWM3920DL500K9	3920	±0.5%	0.5mΩ	±100ppm/°C	9W	134A
PEWM3920FL500K9	3920	±1.0%	0.5mΩ	±100ppm/°C	9W	134A
PEWM3920JL500K9	3920	±5.0%	0.5mΩ	±100ppm/°C	9W	134A
PEWM3920DL700K9	3920	±0.5%	0.7mΩ	±100ppm/°C	8W	107A
PEWM3920FL700K9	3920	±1.0%	0.7mΩ	±100ppm/°C	8W	107A
PEWM3920JL700K9	3920	±5.0%	0.7mΩ	±100ppm/°C	8W	107A
PEWM3920D1L00K9	3920	±0.5%	1.0mΩ	±100ppm/°C	8W	89A
PEWM3920F1L00K9	3920	±1.0%	1.0mΩ	±100ppm/°C	8W	89A
PEWM3920J1L00K9	3920	±5.0%	1.0mΩ	±100ppm/°C	8W	89A

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Revision

Version	Revised Content	Date	Approver
V0	Initial Issue	2022.07.28	LWW
V1	Increase the measured data curve of the temperature coefficient	2022.12.28	LWW
V2	Add 0.3mΩ product specifications and improve the description of material information for each specification.	2023.08.06	LWW
V3	Add 0.2mΩ product specifications and improve the description of material information for each specification. Add pad design guidelines; update vibration and mechanical shock parameter values; add packaging specification instructions	2024.03.17	LWW
V4	Add 0.7mΩ product specifications and improve the description of material information for each specification.	2025.09.25	LWW

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