

SEWF3920

High-Precision Low-TCR Alloy Current Sensing Resistor

Resistance	1.0mΩ~5.0mΩ
Tolerance	±0.5%
TCR	≤±25ppm/°C
Rated Current	25A~89A

Applications

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

**Better Solution for Sustainable
High End Manufacturing**

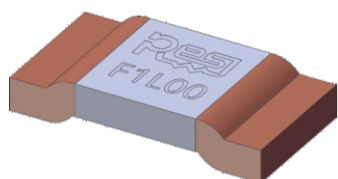


High-Precision Low-TCR Alloy Current Sensing Resistor

“Trimming Free” Technology, High Precision, Low TCR, Reliability

Introduction

SEWF3920 series is based on a precision resistive alloy, welded by a specialized electron beam welding equipment. Both resistive alloy and welding equipment are independently designed and manufactured by C&B Electronics. Because of controlling the consistency of resistive alloys, precision processing ability and efficient welding, SEWF3920 achieves a maximum target tolerance of $\pm 0.5\%$ after stamping without trimming. TCR of SEWF3920 series within the temperature range of -55°C to $+170^{\circ}\text{C}$ is $\leq \pm 25\text{ppm}/^{\circ}\text{C}$.



"Trimming Free" technology avoids the loss of rated current caused by trimming and also avoids current accumulation hotspots caused by trimmed notch, greatly improving the reliability of the product. Meanwhile, due to the improvement of welding quality, thermal EMF of the product is significantly reduced, improving its long-term stability.

SEWF3920 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 instrumentation, medical equipment, automotive electronics, precision power supplies, formation & sorting of battery, testing and measurement equipment and other fields.



Electrical Parameters

Size	Resistance	Rated Power (+70°C)	Max. Operating Current	Operating Temperature	TCR ppm/°C(+20°C Ref)	Thermal Resistance*	Tolerance %
SEWF3920	1mΩ	8W	89A	-55°C~+170°C	± 25 (-55°C~+170°C)	7.8°C/W	± 0.5 ± 1.0 ± 5.0
SEWF3920	2mΩ	6W	55A	-55°C~+170°C	± 25 (-55°C~+170°C)	15.4°C/W	± 0.5 ± 1.0 ± 5.0
SEWF3920	3mΩ	5W	41A	-55°C~+170°C	± 25 (-55°C~+170°C)	23°C/W	± 0.5 ± 1.0 ± 5.0
SEWF3920	4mΩ	4W	32A	-55°C~+170°C	± 25 (-55°C~+170°C)	31.1°C/W	± 0.5 ± 1.0 ± 5.0
SEWF3920	5mΩ	3W	25A	-55°C~+170°C	± 25 (-55°C~+170°C)	38.4°C/W	± 0.5 ± 1.0 ± 5.0

* Thermal Resistance: Refers to the internal thermal resistance between the center of the resistive alloy and the copper electrode. As the heat dissipation efficiency is influenced by operating environment, copper bus bars, PCB design, etc., this parameter is only for reference.

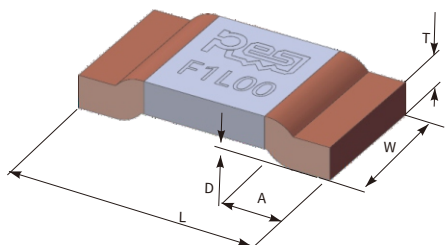
Applications

SEWF3920 series is only applicable to DC low-frequency sampling circuit. If needs of AC or high-frequency applications are present, please contact us.

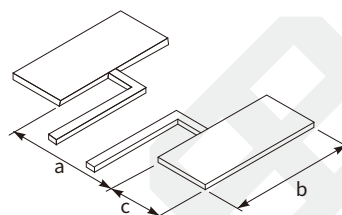
Dimensions

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
										Per Reel	
1mΩ	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±0.2	Tape&Reel	2000pcs	0.56±0.1g
2mΩ	10.0±0.3	5.2±0.3	2.0±0.3	0.65±0.2	0.5±0.2	5.6±0.1	6.2±0.2	2.7±0.2	Tape&Reel	2000pcs	0.28±0.1g
3mΩ	10.0±0.3	5.2±0.3	2.0±0.3	0.45±0.2	0.5±0.2	5.6±0.1	6.2±0.2	2.7±0.2	Tape&Reel	2000pcs	0.20±0.1g
4mΩ	10.0±0.3	5.2±0.3	2.0±0.3	0.33±0.15	0.5±0.2	5.6±0.1	6.2±0.2	2.7±0.2	Tape&Reel	2000pcs	0.15±0.1g
5mΩ	10.0±0.3	5.2±0.3	2.0±0.3	0.27±0.15	0.5±0.2	5.6±0.1	6.2±0.2	2.7±0.2	Tape&Reel	2000pcs	0.12±0.05g

Part Number Information

Example:SEWF3920F1L00P9 (SEWF 3920 ±1.0% 1.0mΩ ±25ppm/°C Standard)

S	E	W	F	3	9	2	0	F	1	L	0	0	P	9
Series		Size		Tolerance		Resistance		TCR		Code				
SEWF		3920		D=±0.5% F=±1.0% J=±5.0%		1L00=1.0mΩ 2L00=2.0mΩ 3L00=3.0mΩ 4L00=4.0mΩ 5L00=5.0mΩ		P=±25ppm/°C		9=Standard 0-8=Custom				

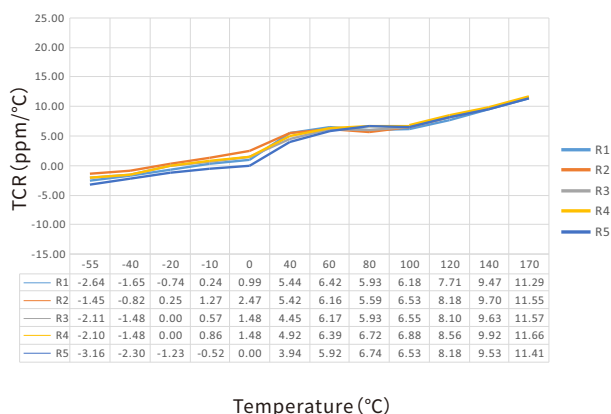
For higher/lower resistance, tighter tolerance, higher power, lower TCR and larger size, please contact us.

Performance

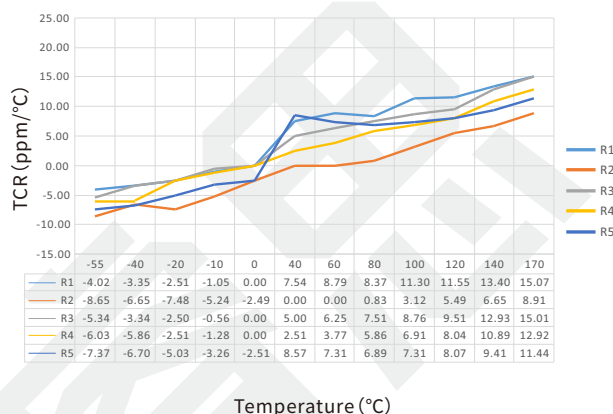
Test	Test Method	Standards	Typical	Max.
High Temperature Storage	1000h@+170°C, unpowered	AEC-Q200 TEST 3 MIL-STD-202 Method 108	$\Delta R \leq \pm 0.5\%$	$\Delta R \leq \pm 1.0\%$
Thermal Shock	-55°C, 15min~ambient temperature<20s~+155°C, 15min, 1000 cycles	AEC-Q200 TEST 16 MIL-STD-202 Method 107	$\Delta R \leq \pm 0.1\%$	$\Delta R \leq \pm 0.5\%$
Bias Humidity	+85°C, 85%RH, powered no less than 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	2000h @ +70°C, rated power, 90min on, 30min off +70°C refers to 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	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	$\Delta R \leq \pm 0.01\%$	$\Delta R \leq \pm 0.2\%$
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	$\Delta R \leq \pm 0.01\%$	$\Delta R \leq \pm 0.2\%$
Resistance to Solder Heat	+260°C tin bath for 10s	AEC-Q200 TEST 15 MIL-STD-202 Method 210	$\Delta R \leq \pm 0.2\%$	$\Delta R \leq \pm 0.5\%$
Solderability	+235°C tin bath for 3s	AEC-Q200 TEST 18 IEC 60115-1 4.17	No visible damage. 95% minimum coverage	
TCR	-55°C and +170°C, +20°C Ref.	AEC-Q200 TEST 19 IEC 60115-1 4.8	Refer to tested curve, max. value $\leq 25\text{ppm}/^\circ\text{C}$	
Substrate Bending	2mm. Duration: 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 power, 5s	IEC 60115-1 4.13	$\Delta R \leq \pm 0.1\%$	$\Delta R \leq \pm 0.5\%$
Low Temperature Storage	-55°C for 96h, unpowered	IEC 60068-2-1	$\Delta R \leq \pm 0.1\%$	$\Delta R \leq \pm 0.5\%$
Moisture Resistance	Apply T=24 h/cycle, zero power, method 7a and 7b are not required	MIL-STD-202 Method 106	$\Delta R \leq \pm 0.1\%$	$\Delta R \leq \pm 0.5\%$
Low Temperature Operating	-55°C, unpowered for 1h, load rated power for 45min, unpowered for 15min	IEC 60068-2-1 4.36	$\Delta R \leq \pm 0.1\%$	$\Delta R \leq \pm 0.5\%$

Temperature Coefficient of Resistance Test Curve

TCR Test Curve - SEWF3920 1mΩ



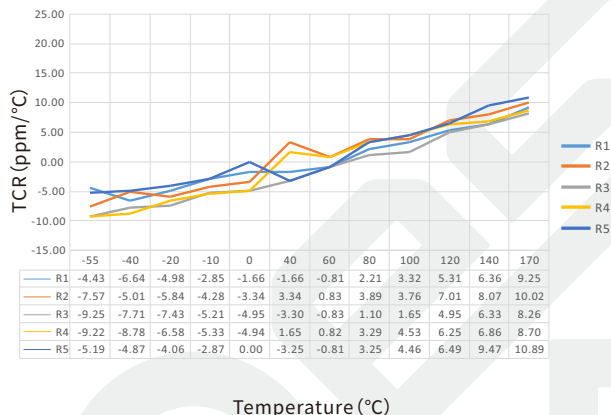
TCR Test Curve - SEWF3920 2mΩ



Temperature (°C)

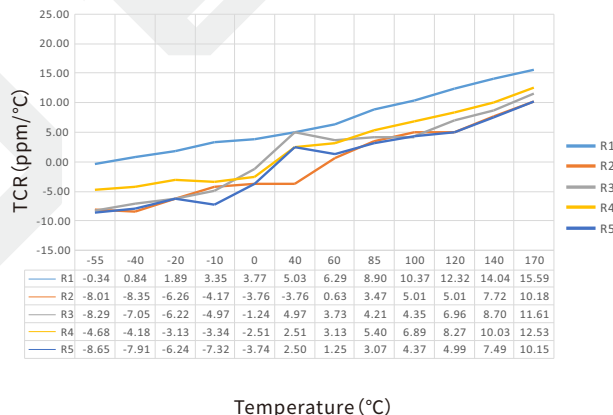
Temperature (°C)

TCR Test Curve - SEWF3920 3mΩ



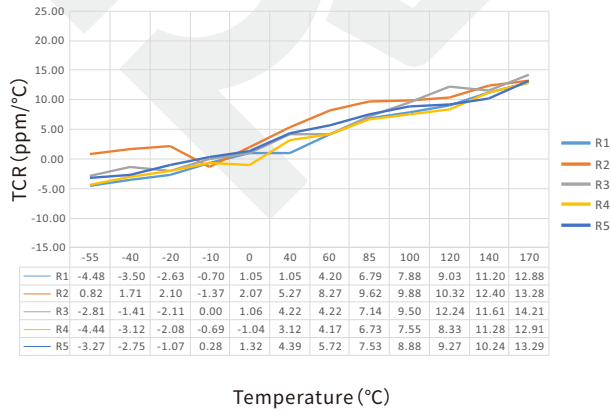
Temperature (°C)

TCR Test Curve - SEWF3920 4mΩ



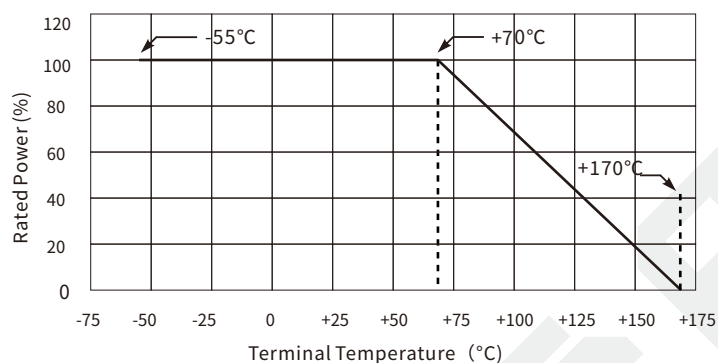
Temperature (°C)

TCR Test Curve - SEWF3920 5mΩ



Temperature (°C)

Derating Curve



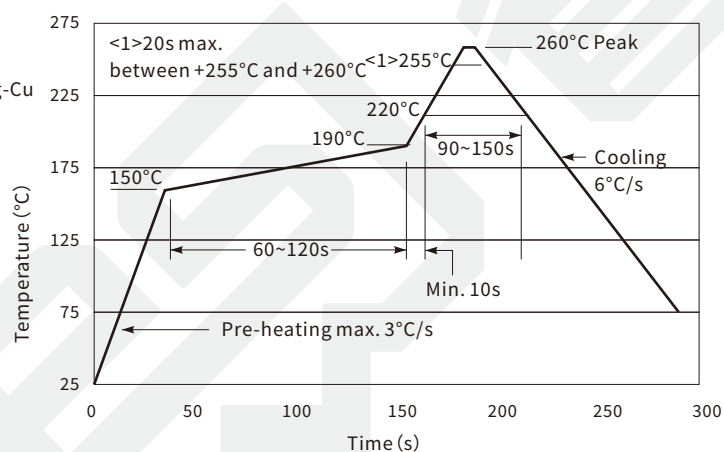
Reflow Soldering Profile

Resistor Surface Temperature:

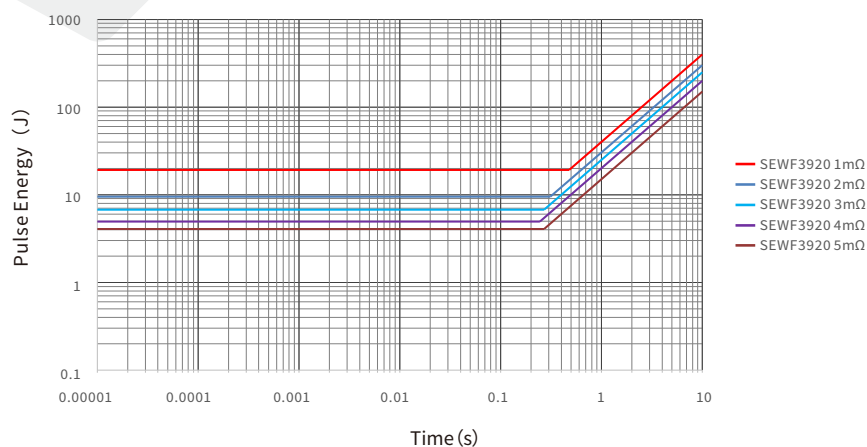
Pre-Heat: +150°C~+190°C, 60~120sec.

Reflow: Above +220°C, 90~150sec.

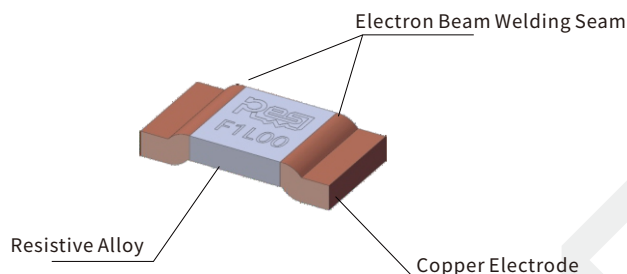
Applicable Solder Composition: Sn-Ag-Cu



Maximum Pulse Energy Curve

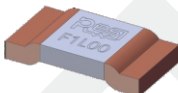


Construction



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 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, H₂S, 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.

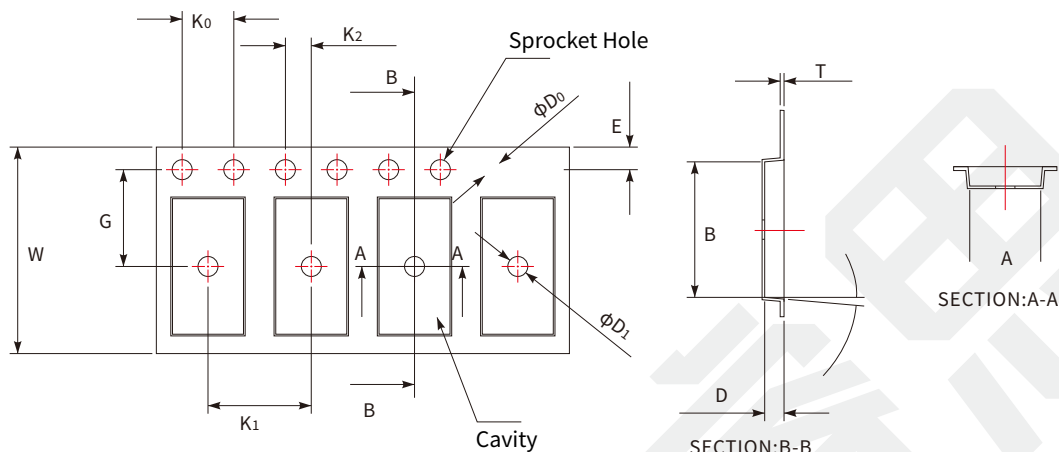
Usage Suggestions

- (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 $\leq$ 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

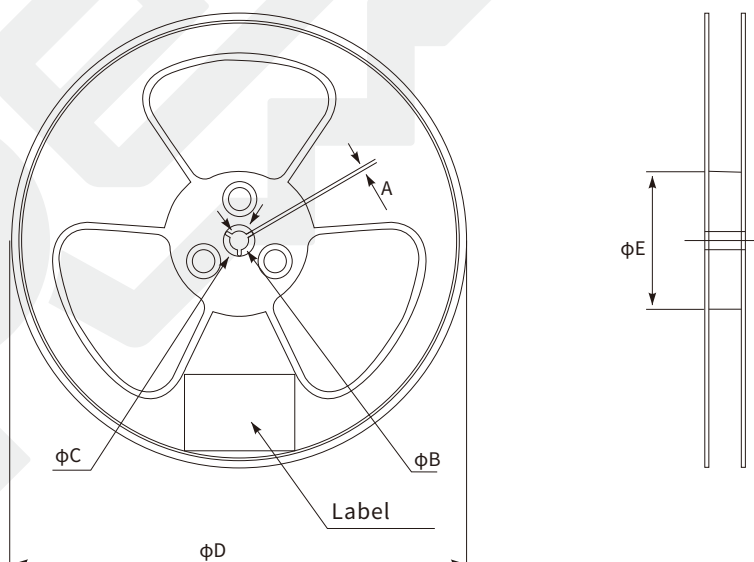
Unit: mm



Resistance	A	B	φD0	φD1	K0	K1	K2	E	G	W	D	T
1mΩ	5.5±0.2	10.5±0.2	1.5±0.1	1.5±0.1	4.00±0.1	8.00±0.1	2.00±0.1	1.75±0.1	7.50±0.1	16.00±0.3	2.1±0.1	0.3±0.05
2mΩ	5.5±0.2	10.5±0.2	1.5±0.1	1.5±0.1	4.00±0.1	8.00±0.1	2.00±0.1	1.75±0.1	7.50±0.1	16.00±0.3	1.5±0.1	0.3±0.05
3mΩ	5.5±0.2	10.5±0.2	1.5±0.1	1.5±0.1	4.00±0.1	8.00±0.1	2.00±0.1	1.75±0.1	7.50±0.1	16.00±0.3	1.5±0.1	0.3±0.05
4mΩ	5.65±0.2	10.41±0.2	1.5±0.1	1.5±0.1	4.00±0.1	8.00±0.1	2.00±0.1	1.75±0.1	7.50±0.1	16.00±0.3	1.14±0.1	0.4±0.05
5mΩ	5.65±0.2	10.41±0.2	1.5±0.1	1.5±0.1	4.00±0.1	8.00±0.1	2.00±0.1	1.75±0.1	7.50±0.1	16.00±0.3	1.14±0.1	0.4±0.05

Reel Specifications

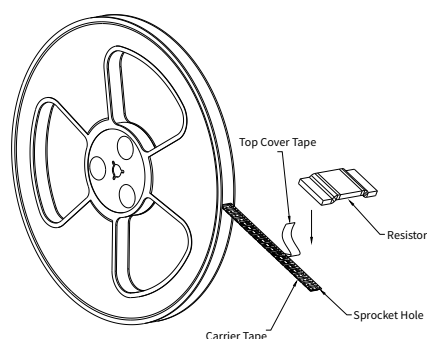
Unit: mm



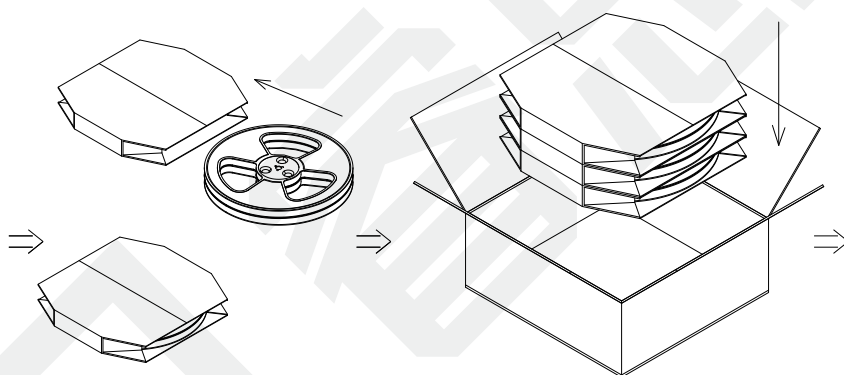
A	φB	φC	φD	φE
1.5 Min.	13.0 +0.5/-0.2	20.2 Min.	330±2	100±2

Packaging

- (1) 2000 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 (12000 pcs. / box);
- (4) Box size: 350mm*370mm*165mm.

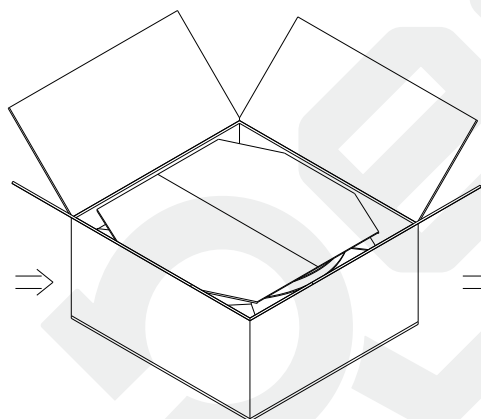


1. 2000 pcs. resistors are packed in a tape and wrapped in a reel.

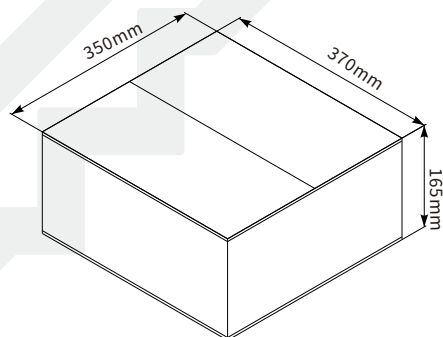


2. Every 2 reels are packed by a cardboard sleeve case. The size of the cardboard is 335mm*340mm*37mm.

3. Place every 3 cases into a box (12000 pcs. / box).



4. For the last box which is less than 12000 pcs., bubble wrap or EPE should be placed to prevent products from shaking or vibration.



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

Popular Part Numbers

Part Number	Size	Tolerance	Resistance	TCR	Power	Max. Operating Current
SEWF3920D1L00P9	3920	±0.5%	1.0mΩ	≤±25ppm/°C	8.0W	89A
SEWF3920F1L00P9	3920	±1.0%	1.0mΩ	≤±25ppm/°C	8.0W	89A
SEWF3920J1L00P9	3920	±5.0%	1.0mΩ	≤±25ppm/°C	8.0W	89A
SEWF3920D2L00P9	3920	±0.5%	2.0mΩ	≤±25ppm/°C	6.0W	55A
SEWF3920F2L00P9	3920	±1.0%	2.0mΩ	≤±25ppm/°C	6.0W	55A
SEWF3920J2L00P9	3920	±5.0%	2.0mΩ	≤±25ppm/°C	6.0W	55A
SEWF3920D3L00P9	3920	±0.5%	3.0mΩ	≤±25ppm/°C	5.0W	41A
SEWF3920F3L00P9	3920	±1.0%	3.0mΩ	≤±25ppm/°C	5.0W	41A
SEWF3920J3L00P9	3920	±5.0%	3.0mΩ	≤±25ppm/°C	5.0W	41A
SEWF3920D4L00P9	3920	±0.5%	4.0mΩ	≤±25ppm/°C	4.0W	32A
SEWF3920F4L00P9	3920	±1.0%	4.0mΩ	≤±25ppm/°C	4.0W	32A
SEWF3920J4L00P9	3920	±5.0%	4.0mΩ	≤±25ppm/°C	4.0W	32A
SEWF3920D5L00P9	3920	±0.5%	5.0mΩ	≤±25ppm/°C	3.0W	25A
SEWF3920F5L00P9	3920	±1.0%	5.0mΩ	≤±25ppm/°C	3.0W	25A
SEWF3920J5L00P9	3920	±5.0%	5.0mΩ	≤±25ppm/°C	3.0W	25A

Revision

Version	Revised Content	Date	Approver
V0	Initial Issue	2022.07.28	LWW
V1	Add temperature coefficient of resistance test curve	2022.10.28	LWW
V2	Add new resistance 4mR & 5mR; Change datasheet to the new template	2023.08.12	LWW
V3	Modify carrier tape specifications of 4mΩ and 5mΩ	2024.01.02	LWW
V4	Add the dimensions of solder pad; Update the test results of vibration and mechanical shock	2024.01.02	LWW

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