

ARN series

Thin Film High Precision Chip Resistor

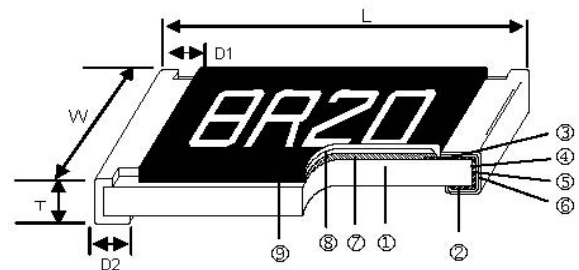
◆ Features

- » Advanced thin film technology
- » Very tight tolerance down to $\pm 0.01\%$
- » Extremely low TCR down to $\pm 5\text{ppm}/^\circ\text{C}$
- » Wide resistance range 1ohm-3Mega ohm
- » Miniature size 0201 available

◆ Applications

- » Medical equipment
- » Testing/ Measurement equipment
- » Printer equipment
- » Automatic equipment controller
- » Converters
- » Communication device, Smart phone
- » Navigation system

◆ Construction



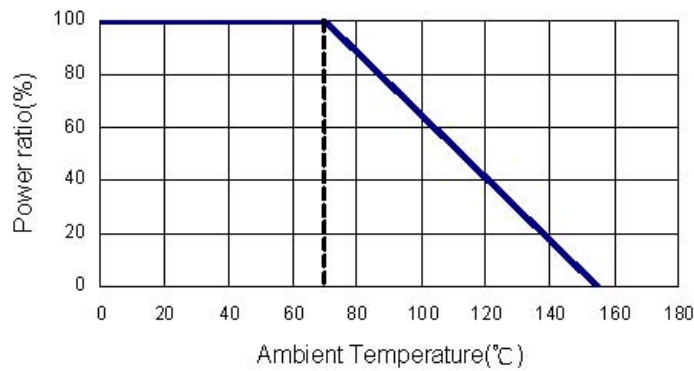
1	Alumina Substrate	4	Edge Electrode (NiCr)	7	Resistor Layer (NiCr)
2	Bottom Electrode (Ag)	5	Barrier Layer (Ni)	8	Overcoat (Epoxy)
3	Top Electrode (Ag-Pd)	6	External Electrode (Sn)	9	Marking

◆ Dimensions

Unit: mm

Type	L	W	T	D1	D2
ARN0201	0.58 $\pm$ 0.05	0.29 $\pm$ 0.05	0.23 $\pm$ 0.05	0.12 $\pm$ 0.05	0.15 $\pm$ 0.05
ARN0402	1.00 $\pm$ 0.10	0.50 $\pm$ 0.05	0.30 $\pm$ 0.05	0.20 $\pm$ 0.10	0.20 $\pm$ 0.10
ARN0603	1.60 $\pm$ 0.20	0.80 $\pm$ 0.15	0.45 $\pm$ 0.10	0.30 $\pm$ 0.20	0.30 $\pm$ 0.20
ARN0805	2.00 $\pm$ 0.20	1.25 $\pm$ 0.15	0.55 $\pm$ 0.10	0.30 $\pm$ 0.20	0.40 $\pm$ 0.25
ARN1206	3.05 $\pm$ 0.15	1.60 $\pm$ 0.20	0.55 $\pm$ 0.15	0.42 $\pm$ 0.20	0.45 $\pm$ 0.25
ARN1210	3.10 $\pm$ 0.15	2.50 $\pm$ 0.20	0.55 $\pm$ 0.15	0.40 $\pm$ 0.20	0.55 $\pm$ 0.25
ARN1812	4.50 $\pm$ 0.10	3.00 $\pm$ 0.10	0.55 $\pm$ 0.05	0.55 $\pm$ 0.10	0.80 $\pm$ 0.10
ARN1218	3.10 $\pm$ 0.15	4.60 $\pm$ 0.10	0.55 $\pm$ 0.10	0.45 $\pm$ 0.10	0.40 $\pm$ 0.10
ARN2010	5.00 $\pm$ 0.20	2.50 $\pm$ 0.20	0.55 $\pm$ 0.10	0.60 $\pm$ 0.30	0.60 $\pm$ 0.25
ARN2512	6.30 $\pm$ 0.20	3.10 $\pm$ 0.20	0.55 $\pm$ 0.10	0.60 $\pm$ 0.30	0.60 $\pm$ 0.25

◆ Derating Curve



◆ Standard Electrical Specifications

Item Type	Power Rating At 70℃	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range					TCR (PPM/℃)
					±0.05%	±0.1%	±0.25%	±0.5%	±1%	
ARN0201	1/32W	-55~+155℃	15V	30V	---	49.9Ω-4.99KΩ				±25
						49.9Ω-33KΩ				±50
ARN0402	1/16W		25V	50V	49.9Ω-12KΩ	10Ω – 205KΩ			±25	
						10Ω – 205KΩ		1Ω – 205KΩ	±50	
ARN0603	1/16W		50V	100V	4.7Ω	4.7Ω	2Ω-1MΩ		±25	
					-332KΩ	-1MΩ	1Ω-1MΩ		±50	
ARN0805	1/10W		100V	200V	4.7Ω	4.7Ω	1Ω-2MΩ		±25	
					-511KΩ	-2MΩ			±50	
ARN1206	1/8W		150V	300V	4.7Ω	4.7Ω	1Ω-2.49MΩ		±25	
ARN1210	1/4W				-1MΩ	-2.49MΩ			±50	
ARN1218	1/2W		150V	300V	24.9Ω	10Ω-499KΩ				±10
		-100KΩ			1Ω-1MΩ				±25 ±50	
ARN2010	1/4W	150V	300V	4.7Ω	4.7Ω	1Ω-3MΩ		±25		
ARN2512	1/2W			-1MΩ	-3MΩ			±50		

Operating Voltage = $\sqrt{P \times R}$ or Max. operating voltage listed above, whichever is lower.

Overload Voltage = $2.5 \times \sqrt{P \times R}$ or Max. overload voltage listed above whichever is lower.

Faithful Link is capable of manufacturing the optional spec based on customer's requirement.

Lower Resistance: 1~10Ω

◆ Special Electrical Specifications

Item Type	Power Rating At 70℃	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range			TCR (PPM/℃)
					±0.01%	±0.05%	±0.1%	
ARN0402	1/16W	-55~+155℃	25V	50V	49.9Ω-4.99KΩ			±2 ±3 ±5
					49.9Ω-12KΩ			±10
					49.9Ω-12KΩ		49.9Ω-69.8KΩ	±15
ARN0603	1/16W		50V	100V	24.9Ω-15KΩ			±2 ±3 ±5
					24.9Ω-100KΩ	4.7Ω-332KΩ		±10 ±15
ARN0805	1/10W		100V	200V	24.9Ω-30KΩ			±2 ±3 ±5
					24.9Ω-200KΩ	4.7Ω-511KΩ		±10 ±15
ARN1206	1/8W		150V	300V	24.9R-49.9KΩ			±2 ±3 ±5
					24.9Ω-499KΩ	4.7Ω-1MΩ		±10 ±15
ARN1210	1/4W		150V	300V	24.9Ω-49.9KΩ			±2 ±3 ±5
					24.9Ω-499KΩ	4.7Ω-1MΩ		±10 ±15
ARN2010	1/4W		150V	300V	24.9Ω-100KΩ			±2 ±3 ±5
					24.9Ω-499KΩ	4.7Ω-1MΩ		±10 ±15
ARN2512	1/2W		150V	300V	24.9Ω-100KΩ			±2 ±3 ±5
					24.9Ω-499KΩ	4.7Ω-1MΩ		±10 ±15

Operating Voltage = $\sqrt{P \times R}$ (P x R) or Max. operating voltage listed above, whichever is lower.

Overload Voltage = $2.5 \times \sqrt{P \times R}$ (P x R) or Max. overload voltage listed above whichever is lower.

◆ High Power Rating Electrical Specifications

Item Type	Power Rating At 70 ℃	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range					TCR (PPM/ ℃)
					±0.05%	±0.1%	±0.25%	±0.5%	±1%	
ARN0402	1/10W	-55~+155℃	50V	100V	49.9Ω-4.99KΩ					±5
					49.9Ω-12KΩ		49.9Ω-60KΩ			±10
					49.9Ω-12KΩ		49.9Ω-68KΩ			±15
					49.9Ω-12KΩ	10Ω-255KΩ	4.7Ω-255KΩ		±25 ±50	
ARN0603	1/10W		75V	150V	24.9Ω-15KΩ		---			±5
					24.9Ω -100KΩ	4.7Ω -332KΩ	4.7Ω-332KΩ		±10 ±15	
	1/6W		100V	150V	---		4.7Ω-1MΩ		4.7Ω-1.21MΩ	±25 ±50
					10Ω-332KΩ					±25 ±50
ARN0805	1/8W		150V	300V	24.9Ω-30KΩ					±5
					24.9Ω -200KΩ	4.7Ω -511KΩ	4.7Ω-511KΩ		±10	
							4.7Ω-1MΩ		±15	
	1/4W				---		10Ω-499KΩ			±25 ±50
ARN1206		1/4W	200V	400V	24.9Ω-49.9KΩ					±5
	24.9Ω -499KΩ				4.7Ω-1MΩ			±10 ±15 ±25 ±50		
	1/3W	200V	400V	---		10Ω-1MΩ			±25 ±50	
ARN1210	1/3W	200V	400V	24.9Ω-49.9KΩ					±5	
				24.9Ω -499KΩ	4.7Ω-1MΩ			±10 ±15 ±25 ±50		
ARN2010	1/3W	200V	400V	24.9Ω-49.9KΩ					±5	
				24.9Ω -499KΩ	4.7Ω-1MΩ			±10 ±15 ±25 ±50		
ARN2512	3/4W	200V	400V	24.9Ω -2KΩ	4.7Ω-2KΩ		1Ω-2KΩ		±10 ±15 ±25 ±50	
	---			4.7Ω -100Ω	1Ω-100Ω		±25 ±50			

Operating Voltage= $\sqrt{P \times R}$; Overload Voltage listed above, whichever is lower

Overload Voltage = $2.5 \times \sqrt{P \times R}$ or Max. overload voltage listed above, whichever is lower

Faithful Link is capable of manufacturing the optional spec based on customer's requirement

Lower Resistance: 1~10Ω; high Power Rating

◆ Part Number

ARN	0603	F	T	B	Y	1K
Type	size	Tolerance	Packing	TCR (ppm/°C)	Watt	R Value
ARN	0201	T: ±0.01%	T: Taping Reel	X: ±2	Blank: Standard	1Ω = 1R
	0402	A: ±0.05%		O: ±3	Y: 1/16W	4.7Ω = 4R7
	0603	B: ±0.1%		S: ±5	X: 1/10W	1KΩ = 1K
	0805	C: ±0.25%		B: ±10	W: 1/8W	1MΩ = 1M
	1206	D: ±0.5%		N: ±15	M: 1/6W	
	1210	F: ±1%		C: ±25	P: 1/5W	
	1218			D: ±50	V: 1/4W	
	2010				O: 1/3W	
	2512				U: 1/2W	
					Q: 3/4W	
					T: 1W	
					Z: 1/32W	

◆ Environmental Characteristics

(Except the tolerance 0.05%, 0.01%)

Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (T.C.R)	JIS-C-5201-1 4.8 IEC-60115-1 4.8	At 25 / -55°C and 25°C / +125°C, 25°C is the reference temperature	Refer to Standard Electrical Specifications
Short Time Overload	JIS-C-5201-1 4.13 IEC-60115-1 4.13	2.5 times RCWV or Max. Overload voltage whichever is less for 5 seconds.	±(0.5%+0.05Ω) No Visual damage
Insulation Resistance	JIS-C-5201-1 4.6 IEC-60115-1 4.6	Applied 100VDC for 1 minute.	≥ 10GΩ
Solderability	JIS-C-5201-1 4.17 IEC-60115-1 4.17	245±5°C for 3 seconds.	>95% Coverage No Visual damage
Resistance to Soldering Heat	JIS-C-5201-1 4.18 IEC-60115-1 4.18	260±5°C for 10 seconds.	±(0.5%+0.05Ω) No Visual damage
Leaching	JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1	260±5°C for 30 seconds.	>95% Coverage No Visual damage
Rapid Change of Temperature	JIS-C-5201-1 4.19 IEC-60115-1 4.19	-55°C to +155°C, 300 cycles	±(0.5%+0.05Ω) No Visual damage
High Temperature Exposure	JIS-C-5201-1 4.25 IEC 60068-2-2	At 155±5°C for 1000 +48/-0 hours.	±(0.5%+0.05Ω)
Resistance to Solvent	JIS-C-5201-1 4.29	The tested resistor be immersed into isopropyl alcohol of 20~25°C for 60 secs. Then the resistor is left in the room for 48 hrs.	±(0.5%+0.05Ω) No Visual damage
Damp Heat with Load	JIS-C-5201-1 4.24 IEC-60115-1 4.24	40±2°C, 90~95% R.H. RCWV or Max. working voltage whichever is less for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"	±(0.5%+0.05Ω)
Biased Humidity	MIL-STD-202 Method 103	1,000 hours; 85°C / 85% RH, 10% of operating power. Measurement at 24±4 hours after test conclusion.	±(0.5%+0.05Ω)
Load Life (Endurance)	JIS-C-5201-1 4.25 IEC-60115-1 4.25.1	70±2°C, RCWV or Max. working voltage whichever is less for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF" .	±(0.5%+0.05Ω)
Bending Strength	JIS-C-5201-1 4.33 IEC-60115-1 4.33	Bending once for 5 seconds D : 0201、0402、0603、0805 = 5mm 1206、1210 = 3mm 2010、2512 = 2mm	±(0.5%+0.05Ω) No Visual damage

(for the tolerance: 0.01%, 0.05%)

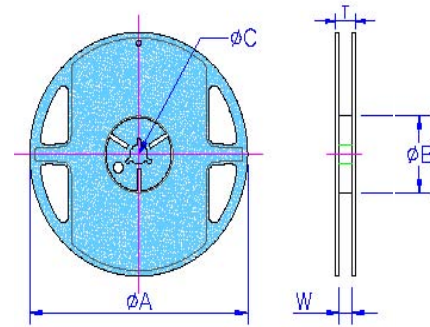
Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (T.C.R)	JIS-C-5201-1 4.8 IEC-60115-1 4.8	At 25 / -55°C and 25°C / +125°C, 25°C is the reference temperature	Refer to Standard Electrical Specifications
Short Time Overload	JIS-C-5201-1 4.13 IEC-60115-1 4.13	2.5 times RCWV or Max. Overload voltage whichever is less for 5 seconds.	±(0.1%+0.05Ω) No Visual damage
Insulation Resistance	JIS-C-5201-1 4.6 IEC-60115-1 4.6	Applied 100VDC for 1 minute.	≥10GΩ
Solderability	JIS-C-5201-1 4.17 IEC-60115-1 4.17	245±5°C for 3 seconds.	>95% Coverage No Visual damage
Resistance to Soldering Heat	JIS-C-5201-1 4.18 IEC-60115-1 4.18	260±5°C for 10 seconds.	±(0.1%+0.05Ω) No Visual damage
Leaching	JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1	260±5°C for 30 seconds.	>95% Coverage No Visual damage
Rapid Change of Temperature	JIS-C-5201-1 4.19 IEC-60115-1 4.19	-55°C to +155°C, 300 cycles	±(0.2%+0.05Ω) No Visual damage
High Temperature Exposure	JIS-C-5201-1 4.25 IEC 60068-2-2	At 155±5°C for 1000 +48/-0 hours.	±(0.2%+0.05Ω)
Resistance to Solvent	JIS-C-5201-1 4.29	The tested resistor be immersed into isopropyl alcohol of 20~25°C for 60 secs. Then the resistor is left in the room for 48 hrs.	±(0.1%+0.05Ω) No Visual damage
Damp Heat with Load	JIS-C-5201-1 4.24 IEC-60115-1 4.24	40±2°C, 90~95% R.H. RCWV or Max. working voltage whichever is less for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"	±(0.1%+0.05Ω)
Biased Humidity	MIL-STD-202 Method 103	1,000 hours; 85°C / 85% RH, 10% of operating power. Measurement at 24±4 hours after test conclusion.	±(0.1%+0.05Ω)
Load Life (Endurance)	JIS-C-5201-1 4.25 IEC-60115-1 4.25.1	70±2°C, RCWV or Max. working voltage whichever is less for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF" .	±(0.1%+0.05Ω)
Bending Strength	JIS-C-5201-1 4.33 IEC-60115-1 4.33	Bending once for 5 seconds D : 0402、0603、0805 = 5mm 1206、1210 = 3mm 2010、2512 = 2mm	±(0.1%+0.05Ω) No Visual damage

◆ Packaging

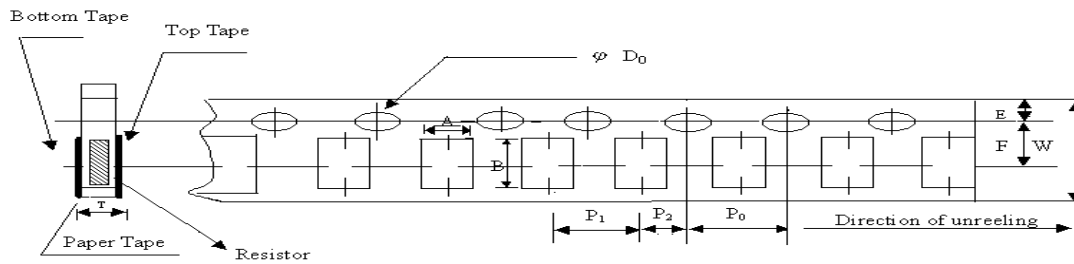
Packaging Quantity & Reel Specifications

Unit: mm

Size	øA	øB	øC	W	T	Paper Tape(EA)	Embossed Plastic Tape(EA)
ARN0201	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	10,000	-
ARN0402	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	10,000	-
ARN0603	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
ARN0805	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
ARN1206	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
ARN1210	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
ARN1218	178.0±1.0	60.0±1.0	13.5±0.7	13.5±1.0	15.5±1.0	4,000	-
ARN2010	178.0±1.0	60.0±1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000
ARN2512	178.0±1.0	60.0±1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000



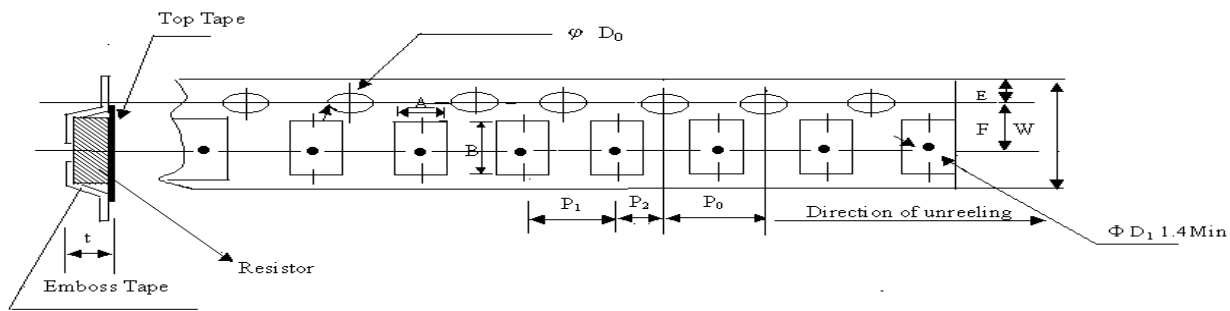
Paper Tape Specifications



Unit: mm

Size	A	B	W	E	F	P ₀	P ₁	P ₂	ΦD ₀	T
ARN0201	0.40±0.05	0.70±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.0±0.10	2.0±0.05	2.0±0.05	1.55±0.03	0.42±0.02
ARN0402	0.70±0.05	1.20±0.05	8.00±0.20	1.75±0.10	3.5±0.05	4.0±0.10	2.0±0.05	2.0±0.05	1.55±0.05	0.45±0.10
ARN0603	1.10±0.05	1.90±0.20	8.00±0.20	1.75±0.10	3.5±0.05	4.0±0.10	4.0±0.10	2.0±0.05	1.55±0.05	0.60±0.10
ARN0805	1.60±0.05	2.37±0.20	8.00±0.20	1.75±0.10	3.5±0.05	4.0±0.10	4.0±0.10	2.0±0.05	1.55±0.05	0.75±0.10
ARN1206	2.00±0.05	3.55±0.20	8.00±0.20	1.75±0.10	3.5±0.05	4.0±0.10	4.0±0.10	2.0±0.05	1.55±0.05	0.75±0.10
ARN1210	2.75±0.05	3.50±0.20	8.00±0.20	1.75±0.10	3.5±0.05	4.0±0.05	4.0±0.10	2.0±0.05	1.60±0.10	0.75±0.10

Embossed Plastic Tape Specifications

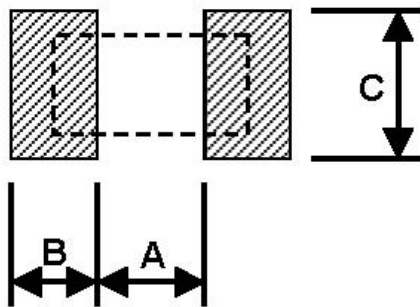


Unit: mm

Type	A	B	W	E	F	P_0	P_1	P_2	$\varnothing D_0$	T
ARN1218	3.30 ± 0.20	4.60 ± 0.20	12 ± 0.10	1.75 ± 0.10	5.5 ± 0.05	4.0 ± 0.05	4.0 ± 0.10	2.0 ± 0.05	1.5 ± 0.10	0.85 ± 0.15
ARN2010	2.85 ± 0.20	5.45 ± 0.10	12.0 ± 0.10	1.75 ± 0.10	5.5 ± 0.05	4.0 ± 0.05	4.0 ± 0.10	2.0 ± 0.05	1.5 ± 0.10	1.00 ± 0.20
ARN2512	3.40 ± 0.10	6.65 ± 0.10	12.0 ± 0.10	1.75 ± 0.10	5.5 ± 0.05	4.0 ± 0.05	4.0 ± 0.10	2.0 ± 0.05	1.5 ± 0.10	1.00 ± 0.20

◆ Recommend Land Pattern

Unit: mm



Size	A	B	C
ARN0201	0.25	0.30	0.40 ± 0.2
ARN0402	0.50	0.50	0.60 ± 0.2
ARN0603	0.80	1.00	0.90 ± 0.2
ARN0805	1.00	1.00	1.35 ± 0.2
ARN1206	2.00	1.15	1.70 ± 0.2
ARN1210	2.00	1.15	2.50 ± 0.2
ARN1812	3.11	1.40	3.00
ARN1218	2.04	1.10	4.5 ± 0.2
ARN2010	3.60	1.40	2.50 ± 0.2
ARN2512	4.90	1.60	3.10 ± 0.2

◆ Storage and handling condition

1. Products are recommended to be used up within two years under the following recommendable storing conditions:

◎Ambient temperature: 5~40℃

◎Relative humidity: 20%~70%

2. Caution:

◎Don't store products in a corrosive environment such as sulfide, chloride gas, or acid. It may cause oxidization of electrode, which easily be resulted in poor soldering.

◎To store products on the shelf and avoid exposure to moisture.

◎Don't expose products to excessive shock, vibration, direct sunlight and so on.