

CPP Series PTC Power Thermistor



◆ Product Introduction

The PTC power thermistor is a circuit protection and control component with a positive temperature coefficient characteristic, functioning as a "self-recovering safety guard" for equipment. Its core is based on barium titanate ceramic or polymer materials, enabling precise protection and regulation through nonlinear resistance changes with temperature. Its operational mechanism is highly intelligent: at room temperature, it remains in a low-resistance state (several ohms to several thousand ohms) and has minimal impact on normal circuit operation when connected in series. When faults such as overcurrent or short circuits occur, heat generated by the excessive current rapidly raises its temperature to the critical Curie point (typically 60°C–125°C), causing resistance to instantaneously increase by 3–8 orders of magnitude. This shift from low to high resistance quickly limits the current to a safe range, effectively "disconnecting" hazardous currents. Once the fault is resolved and temperature decreases, it automatically returns to the low-resistance state without replacement, allowing reuse for over 100,000 cycles—a significant advantage over traditional one-time fuses.

◆ Features

1. Complies with RoHS requirements
2. Radial leaded type
3. Voltage range: 140~500Vac, 200~1000Vdc
4. Resistance range: 3.8~2000Ω
5. Long-term stability
6. Operating temperature range:
-20 ~ +85°C (V=Vmax)
-40 ~ +125°C (V=0)
7. Safety certifications:
UL/cUL Certificate No.: E138827
TÜV Certificate No.: R50426392 and R50499186
8. Products qualified through AEC-Q200 stress testing are available in this series.

◆ Applications

1. Air conditioners
2. Servers
3. LED lighting
4. Switching mode power supplies (SMPS) / Switching power supplies

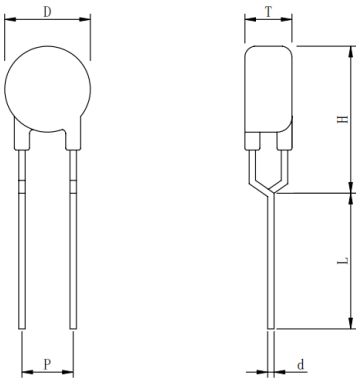
◆ Coding Principles

1	2	3	4	5	6	7	8	9	10		11	
Product type			Body size		25°C(R ₂₅) Zore power resistance			Resistance value tolerance	Package method		Lead length	
CPP	PTC temperature thermistor		06	Φ 6mm	0R5		0.5 Ω	M: ±20% H: ±25% N: ±30% T: ±40% P: ±50%	R	Radial	A	The code does not represent a specific length unit. It is only used to distinguish different length options.
			11	Φ 11mm	2R5		2.5 Ω					
			16	Φ 16mm	080		8 Ω					
			20	Φ 20mm	200		20 Ω					
			25	Φ 25mm	500		50 Ω					
					121		120 Ω					

YAGEO SENSOR

◆ Structure and Dimensions

● Structure



● Dimensions

P/N	D		T		H	D	P	L
	min	max	min	max	max	±0.02	±1.0	Min.
CPP123R8□	10.5	13.0	3.0	5.0	17.5	0.6	5	25
CPP09160□	8.5	11.0	3.0	5.0	14.5	0.6	5	25
CPP19100□	19.0	21.5	6.5	10.7	25.5	1.0	10	25
CPP16270□	15.5	18.0	5.0	7.0	21.5	1.0	10	25
CPP16350□	15.5	18.0	5.0	7.0	21.5	1.0	10	25
CPP16500□	15.5	18.0	5.0	7.0	21.5	1.0	10	25
CPP16800□	15.5	18.0	5.0	7.5	21.5	1.0	10	25
CPP19150□	19.0	21.5	6.5	10.7	25.5	1.0	10	25
CPP20400□	19.0	22.0	6.0	10.0	25.5	0.8	7.5	25
CPP20600□	19.0	22.0	6.5	10.7	25.5	1.0	10	25
CPP20330□	19.5	22.0	6.5	10.7	25.5	1.0	10	25
CPP20470□	19.5	22.0	6.5	10.7	25.5	0.8	7.5	25
CPP06121□	5.0	8.0	3.0	6.0	13.8	0.5	5	25
CPP11250□	10.5	13.0	4.0	6.0	17.0	0.6	5	25
CPP115008□	10.5	13.0	5.0	7.0	17.0	0.6	5	25
CPP11800□	10.5	13.0	5.0	7.0	17.0	0.6	5	25
CPP19500□	19.0	21.5	6.5	10.7	25.5	1.0	10	25
CPP11121□	10.5	13.0	5.0	7.0	17.0	0.6	5	25
CPP11151□	10.5	13.0	5.0	7.0	17.0	0.6	5	25
CPP16101□	15.5	18.0	5.0	7.5	21.5	1.0	10	25
CPP11201□	10.5	13.0	5.0	7.5	17.0	0.6	5	25
CPP16151□	15.5	18.0	5.0	7.5	21.5	1.0	10	25

Note: = R25 tolerance

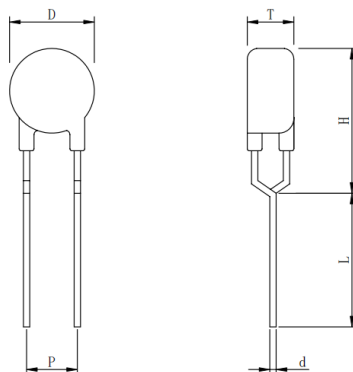
● Dimensions

P/N	D		T		H	D	P	L
	min	max	min	max	max	±0.02	±1.0	Min.
CPP14121□	12.5	15.0	5.0	7.5	19.5	0.8	5	25
CPP14560□	12.5	15.0	5.0	7.5	19.5	0.8	5	25
CPP19102□	19.0	21.5	6.5	10.7	25.5	1.0	10	25
CPP16251□	15.5	18.0	5.0	7.0	21.5	1.0	10	25
CPP11501□	10.5	13.0	5.0	7.0	17.0	0.6	5	25

Note: = R25 tolerance

◆ Structure and Dimensions

● Structure



● Dimensions

P/N	D		T		H	D	P	L
	min	max	min	max	max	±0.05	±1.0	Min.
CPP25601□	25	28	7	9.5	35	1.0	10	25
CPP25251□	25	28.5	7	9.5	35	1.0	10	25
CPP25102□	25	28.5	7.5	10.5	35	1.0	10	25
CPP25102□	25	28	7	9.5	35	1.0	10	25
CPP25301□	25	28.5	6	9.5	35	1.0	10	25
CPP25501□	25	28.5	6	9.5	35	1.0	10	25
CPP25801□	25	28.5	6	9.5	35	1.0	10	25
CPP25102□	25	28.5	6	9.5	35	1.0	10	25
CPP25132□	25	28.5	6	9.5	35	1.0	10	25
CPP25152□	25	28.5	6	9.5	35	1.0	10	25
CPP25182□	25	28.5	6	9.5	35	1.0	10	25
CPP25202□	25	28.5	6	9.5	35	1.0	10	25
CPP25301□	25	28.5	6	9.5	35	1.0	10	25
CPP25501□	25	28.5	6	9.5	35	1.0	10	25
CPP25801□	25	28.5	6	9.5	35	1.0	10	25
CPP25102□	25	28.5	6	9.5	35	1.0	10	25
CPP25132□	25	28.5	6	9.5	35	1.0	10	25
CPP25152□	25	28.5	6	9.5	35	1.0	10	25
CPP25182□	25	28.5	6	9.5	35	1.0	10	25
CPP25202□	25	28.5	6	9.5	35	1.0	10	25

Note: = R25 tolerance

◆ electrical characteristics

Part No	Maximum Voltage	Maximum DC Link Voltage	Zero Power Resistance at 25°C	Curie Temperature	Heat Capacity	Maximum Non-Operating Energy at 60°C	Safety Certification	
	V _{max} (Vac)	V _{linkmax} (Vdc)	R ₂₅ (Ω)	T _c (°C)	C _{th} (J/K)	E _{Non60} (J)	UL/cUL	TUV
CPP123R8□	140	160	3.8	140	0.8	64	√	√
CPP09160□	220	310	16	120	0.4	24	√	√
CPP19100□	270	380	10	110	3.5	175	√	√
CPP19150□	270	380	15	120	3.5	210	√	√
CPP16270□	270	380	27	120	2.3	138	√	√
CPP20330□	270	380	33	130	3.8	266	√	√
CPP16350□	270	380	35	120	2.3	138	√	√
CPP20400□	270	380	40	120	3.2	192	√	√
CPP16500□	270	380	50	120	2.3	138	√	√
CPP20600□	270	380	60	120	3.8	228	√	√
CPP16800□	270	380	80	120	2.3	138	√	√
CPP20470□	280	400	47	130	3.8	266	√	√
CPP06121□	280	400	120	130	0.12	8	√	√
CPP11250□	380	540	25	115	1	55	√	√
CPP11500□	380	540	50	115	1.4	77	√	√
CPP19500□	380	540	50	100	3.5	140	√	√
CPP11800□	380	540	80	115	1.4	77	√	√
CPP16101□	380	540	100	120	2.3	138	√	√
CPP11121□	380	540	120	115	1.4	77	√	√
CPP11151□	380	540	150	115	1.4	77	√	√
CPP16151□	420	600	150	120	2.3	138	√	√
CPP11201□	420	600	200	120	1.4	84	√	√
CPP14560□	440	620	56	130	2.1	147	√	√
CPP14121□	440	620	120	130	2.1	147	√	√
CPP19102□	480	680	1000	100	3.8	152	√	√
CPP16251□	500	710	250	120	2.3	138	√	√
CPP11501□	500	710	500	115	1.4	77	√	√

Note: = R25 tolerance

◆ electrical characteristics

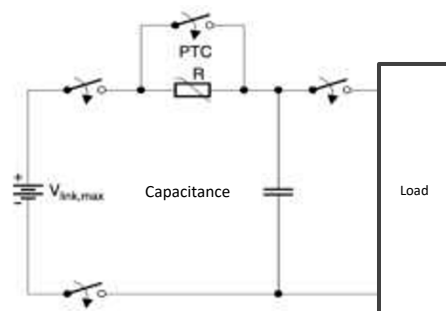
Part No	Maximum Voltage	Maximum DC Link Voltage	Zero Power Resistance at 25°C	Curie Temperature	Heat Capacity	Maximum Non-Operating Energy at 60°C	
	V _{max} (Vac)	R ₂₅ (Ω)	T _c (°C)	C _{th} (J/K)	E _{Non60} (J)	UL/cUL	TUV
CPP25601□	750	600	140	6.2	496	√	√
CPP25251□	850	250	120	6.2	372	√	√
CPP25102□	1000	1000	120	6.2	396	√	√
CPP25102□	1000	1000	140	6.2	496	√	√
CPP25301□	1000	300	185	6.2	775	-	-
CPP25501□	1000	500	185	6.2	775	-	-
CPP25801□	1000	800	185	6.2	775	-	-
CPP25102□	1000	1000	185	6.2	775	-	-
CPP25132□	1000	1300	185	6.2	775	-	-
CPP25152□	1000	1500	185	6.2	775	-	-
CPP25182□	1000	1800	185	6.2	775	-	-
CPP25202□	1000	2000	185	6.2	775	-	-
CPP25301□	1000	300	220	6.2	992	-	-
CPP25501□	1000	500	220	6.2	992	-	-
CPP25801□	1000	800	220	6.2	992	-	-
CPP25102□	1000	1000	220	6.2	992	-	-
CPP25132□	1000	1300	220	6.2	992	-	-
CPP25152□	1000	1500	220	6.2	992	-	-
CPP25182□	1000	1800	220	6.2	992	-	-
CPP25202□	1000	2000	220	6.2	992	-	-

Note: = R25 tolerance

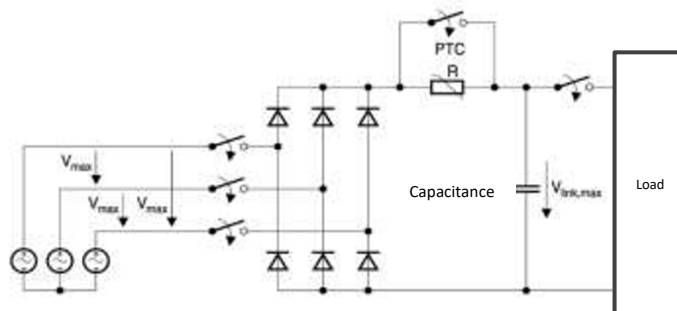
◆ Applications and Selection Guide

- Typical Application Circuits:

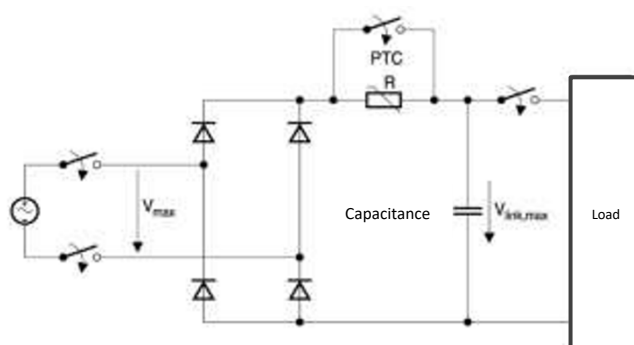
1. DC circuits



2. Three-phase bridge rectifier circuits



3. Single-phase bridge rectifier circuits



- Selection Guide

Calculate the required number of PTC components

$$N \geq \frac{K * C * V^2}{2 * C_{th} * (T_c - T_a)}$$

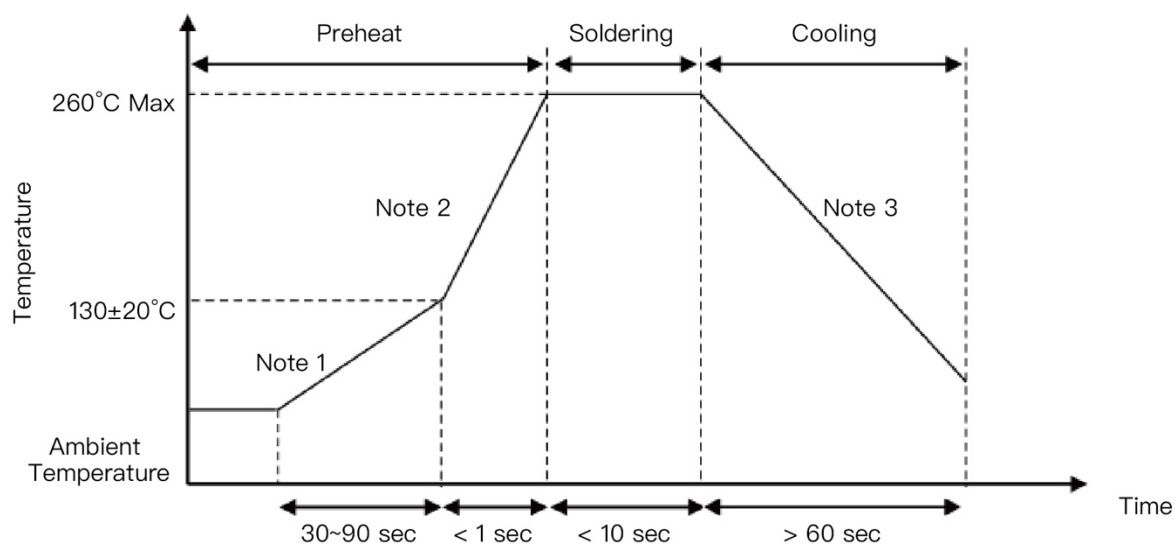
ENon60: Maximum non-operating energy at 60°C (Ta = 60°C)

$$ENon60 = (T_c - T_a) * C_{th}$$

K	Coefficient
	K=1 DC circuit
	K=0.96 Three-phase bridge rectifier circuit
	K=0.76 Single-phase bridge rectifier circuit
N	Number of parallel-connected PTC thermistors
C	Capacitance of the filter capacitor or DC circuit capacitor, unit: F
V	Capacitor charging voltage (V = 1.414 × Vac = Vlink,max)
Cth	Thermal capacity, unit: J/K
Tc	Curie temperature of PTC
Ta	Ambient temperature

◆ Recommended Soldering Conditions

● Wave Soldering Profile



Remarks:

1: (1~3°C) /sec

2: Approx. 200°C/sec

3: 5°C/sec (Max)

● Rework Soldering Conditions by Soldering Iron

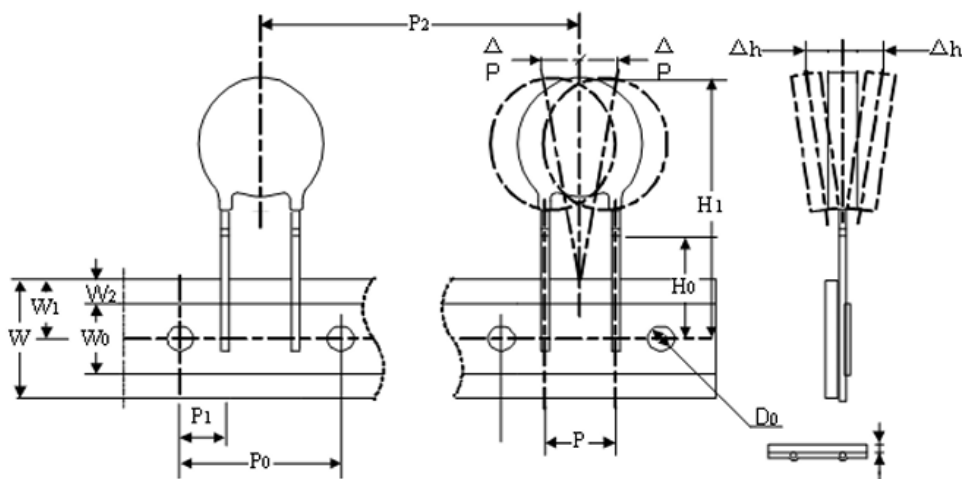
Item	Condition
Soldering iron tip temperature	360°C (max.)
Soldering time	3 sec. (max.)
Distance between soldering position and coating layer	2 mm (min.)

◆ Reliability

Test Item	Test Standard	Test Conditions / Method	Performance Requirements															
Lead Wire Pull Strength	IEC 60738-1	Apply the specified load gradually and maintain it at a fixed position for 10 ± 1 seconds. <table><tr><td>Lead Diameter (mm)</td><td>Lead Pull Strength T(N)</td></tr><tr><td>0.35<d ≤ 0.5</td><td>5.0</td></tr><tr><td>0.5<d ≤ 0.8</td><td>10.0</td></tr><tr><td>0.8<d ≤ 1.25</td><td>20.0</td></tr></table>	Lead Diameter (mm)	Lead Pull Strength T(N)	0.35<d ≤ 0.5	5.0	0.5<d ≤ 0.8	10.0	0.8<d ≤ 1.25	20.0	ΔR25/R25 ≤20% No visible damage							
Lead Diameter (mm)	Lead Pull Strength T(N)																	
0.35<d ≤ 0.5	5.0																	
0.5<d ≤ 0.8	10.0																	
0.8<d ≤ 1.25	20.0																	
Solderability Test	IEC 60738-1	245±3 °C , 2±0.5 seconds	Solder coverage≥ 95%															
Resistance to Soldering Heat Test	IEC 60738-1	260±3 °C , 10±1 seconds	ΔR25/R25 ≤20% No visible damage															
Vibration Test	IEC 60738-1	Vibration frequency:10~55Hz Amplitude:0.75mm or 98m/s2 Direction: 3 mutually perpendicular directions Duration: 6 hours (3 × 2 hours) Pulse duration: 30ms	ΔR25/R25 ≤20% No visible damage															
Shock Test	IEC 60738-1	Place the product in the shock testing device. Shock waveform: Half-sine wave Velocity changeΔV:1.0m/s Acceleration:50 m/s2 Pulse duration:30ms	ΔR25/R25 ≤20% No visible damage															
Rapid Temperature Change Test	IEC 60738-1	Temperature cycling: 5 cycles (see table below). <table><tr><td>Step</td><td>Temperature(°C)</td><td>Duration (min.)</td></tr><tr><td>1</td><td>-30±5</td><td>30±3</td></tr><tr><td>2</td><td>Room Temperature</td><td>5±3</td></tr><tr><td>3</td><td>125±5</td><td>30±3</td></tr><tr><td>4</td><td>Room Temperature</td><td>5±3</td></tr></table>	Step	Temperature(°C)	Duration (min.)	1	-30±5	30±3	2	Room Temperature	5±3	3	125±5	30±3	4	Room Temperature	5±3	ΔR25/R25 ≤20% No visible damage
Step	Temperature(°C)	Duration (min.)																
1	-30±5	30±3																
2	Room Temperature	5±3																
3	125±5	30±3																
4	Room Temperature	5±3																
Climatic Sequence Test	IEC 60738-1	Dry heat: 125°C for 16 hours Damp heat (cyclic), 1st cycle: 40°C, 95% R.H., cycle duration: 24 hours Cold: -40°C for 2 hours Damp heat (cyclic), remaining cycles: additional 5 cycles Test according to IEC 60068-2-30	ΔR25/R25 ≤20% No visible damage															
Damp Heat, Steady State Test	IEC 60738-1	40±2°C,90~95%RH, 1000±2 hours	ΔR25/R25 ≤20% No visible damage															
Endurance Test at Maximum Operating Temperature and Maximum Voltage	IEC 60738-1	85± 2°C, Vmax, 1000±2 hours	ΔR25/R25 ≤20% No visible damage															
Capacitor Charging Load Test	Specific Specification	Operating cycles at maximum voltage: 100,000 cycles (capacitor charging)	ΔR25/R25 < 25% No visible damage															

◆ Packaging Method

- Tape Packaging Description
- Parameter List



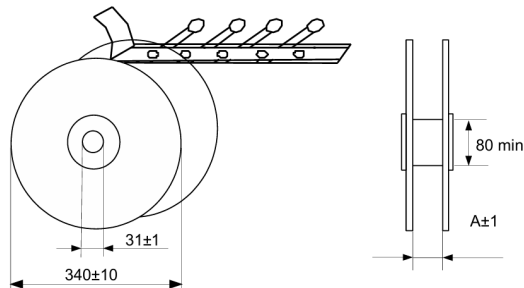
(Unit: mm)

Symbol	Parameter	Standard Dimension		Tolerance
P	Lead Pitch	5		±1
P ₀	Pitch of Sprocket Holes	12.7	15	±0.3
P ₁	Distance from Center of Sprocket Hole to Center of Adjacent Component Lead	3.85	5	±1
P ₂	Distance Between Centers of Two Components	12.7 (D ≤ 10) 25.4 (D > 10)	15.0 (D ≤ 10) 30.0 (D > 10)	±1
H ₀	Distance from Center of Sprocket Hole to Lower Edge of Bend Point (Bent Lead)	16	16	±0.5
H ₁	Distance from Center of Sprocket Hole to Top of Component Body	33.5 (D = 11) 36.0 (D = 14)		Max.
W	Carrier Tape Width	18	18	±1
W ₀	Adhesive Tape Width	12	12	±1.5
W ₁	Sprocket Hole Position	9	9	±1
W ₂	Distance Between Top Edge of Carrier Tape and Top Edge of Adhesive Tape	3	3	Max.
ΔP	Lateral Deviation of Component Body	1	1	Max.
Δh	Distance of Component Deviation from Carrier Tape Plane	2	2	Max.
D ₀	Hole Diameter	4	4	±0.2
t	Carrier Tape Thickness	0.6	0.6	±0.2

Note: D indicates the PTC body diameter.

◆ Quantity

● Bulk Packaging



Body Size (mm)	Quantity (pcs/bag)
$06 \leq \Phi \leq 10$	200
$11 \leq \Phi \leq 16$	100
$19 \leq \Phi \leq 20$	50
$\Phi = 25$	30

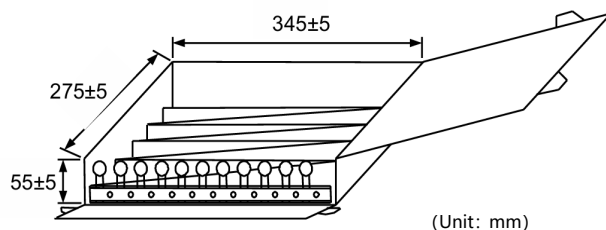
● Reel Packaging

Body Size (mm)	Quantity (pcs/reel)
$\Phi = 06$	1,500
$\Phi = 11$	500
$\Phi = 12$	750
$\Phi = 14$	500
$\Phi \geq 16$	500 ($V_r \leq 270V$) 250 ($V_r > 270V$)

Body Size	$\Phi < 16$	$\Phi \geq 16$
A	46	55

● Reel Packaging

Body Size (mm)	Quantity (pcs/box)
$\Phi = 06$	1,500
$\Phi = 11$	750
$\Phi = 12$	1,000
$\Phi = 14$	500
$\Phi \geq 16$	500



(Unit: mm)

◆ Warehouse Storage Conditions

- Storage Conditions:

1. Storage Temperature: -10°C to $+40^{\circ}\text{C}$
2. Relative Humidity: $\leq 75\%$ RH
3. Do not store this product in environments containing corrosive gases or exposed to direct sunlight.

- Storage Period: 1 year

◆ Precautions

Please avoid exposing the product to the following conditions, as they may cause product damage or deterioration of electrical characteristics.

1. Corrosive gases or deoxidizing gases (Cl_2 , H_2S , NH_3 , SO_x , NO_x , etc.)
2. Exposure to vacuum conditions or excessive pressure
3. Salt water, oil, solvents, or chemical liquids
4. Flammable gases
5. Locations with high humidity, such as areas where water splashing or condensation may occur
6. Any locations where the above conditions may occur