



THINKING ELECTRONIC INDUSTRIAL CO., LTD.

HEAD OFFICE: 12F, No.93, Dashun 1st Rd., Zuoying Dist., Kaohsiung, Taiwan
TEL: 886-7-5577660 FAX: 886-7-5570560

MANUFACTURING SITE

- ☐ KAOHSIUNG FACTORY: No.6, Xinjian S. Rd., Nanzi Dist., Kaohsiung City 811644, Taiwan
TEL: 886-7-9616668 FAX: 886-7-3866990
- ☐ KAOHSIUNG FACTORY 2: No. 2-2, Xinjian S. Rd., N.E.P.Z., Kaohsiung City 81170, Taiwan
TEL: 886-7-9630001 FAX: 886-7-3635113
- ☒ CHANGZHOU FACTORY: No.6 Longmen Rd., Wujin High & New-Tech Industrial Development Zone, Changzhou, Jiangsu, China 213161
TEL: 86-519-86578999 FAX: 86-519-86558643
- ☐ DONG GUAN FACTORY: No.45, East Rd., Sha-Tao Dist., Chang-An Town, Dongguan City, Guangdong, China 523863
TEL: 86-769-85542016 FAX: 86-769-85546890
- ☐ YICHANG FACTORY: No. 283 Xiaoting Avenue, Xiaoting Dist., Yichang City 443007, Hubei, China
TEL: 86-717-6510010 FAX: 86-717-6511430
- ☒ JIANGXI FACTORY: Tangying Road, Ceramics Industry Garden, Jingdezhen City, Jiangxi, China 333400
TEL: 86-798-2621372 FAX: 86-798-2126372



SPECIFICATION FOR APPROVAL

CUSTOMER	Blume-Benning
CERTIFIED	
MODEL/TYPE	PPL11500-A2C8
PART NO.	PPL11500HA2C8CKB(RoHS+HF)
APPLICATION	
CUSTOMER P/N	
ISSUE DATE	Dec.26.2024
REV. NO.	
REV. DATE	

FOR CUSTOMER APPROVAL	CHECKED BY
	<i>Haili Gong</i>
	APPROVED BY
	<i>Huaifang Zhang</i>





REVISED RECORD SHEET

REV. NO	REV. DATE	REVISED CONTENT



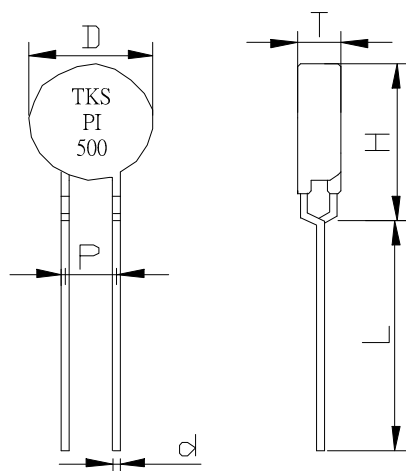
INDEX	Page
■ Part Number Code	1
■ Structure and Dimensions	2
■ Electrical Characteristics	2
■ Reliability	3
■ Soldering Recommendation	4
■ Circuit diagrams	5
■ Calculation of the number of required PTC elements	5
■ RoHS Compliant Declaration	6
■ Restriction of Weapon and Military End-Use	6
■ Warehouse Storage Conditions of Products	6
■ Safety Approvals	7
■ Certificates	7

Part Number Code

Example :

PP **L** **11** **500** **H** **A2** **C8** **C** **KB**
(1) (2) (3) (4) (5) (6) (7) (8) (9)

No.	Item	Digit	Specification
(1)	Product Type	PP	Thinking overcurrent/inrush current Protection PP type
(2)	Type Series	L	Lead type
(3)	Size	11	φ11mm
(4)	Resistance(R ₂₅)	500	50*10 ⁰ Ω=50Ω
(5)	Tolerance of R ₂₅	H	± 25%
(6)	Curie Temperature	A2	Refer to "Optional Suffix"
(7)	Max Voltage	C8	Refer to "Optional Suffix"
(8)	Packaging	C	RoHS+HF compliance &Bulk
(9)	Optional Suffix	KB	Silicone Coating Tc:115°C typ. Vmax:420Vac

Structure and Dimensions

(unit : mm)

Item.	D	T	H	L	P	d
Max	13.0	7.0	17.0	---	6.0	0.62
Min	10.5	5.5	---	25.0	4.0	0.58

Electrical Characteristics

Part No.	Curie Temperature	Zero-power Resistance at 25±2℃	Max. Voltage	Thermal Capacity	Max. Non-operating Energy at 60℃	Trip Current at 25±2℃	Non-operating Current at 25±2℃
	T _c (℃)	R ₂₅ (Ω)	V _{max} (Vac)	C _{th} (J/K)	E _{Non60} (J)	I _t (mA)	I _n (mA)
PPL11500HA2C8CKB	115(typ)	50±25%	420	1.4typ.	54typ.	220	87

Part No.	Minimum resistance (at V _r 25±2℃)	Max. Current at V _{max}	Remains Current at V _{max}	Tripping Time at V _{max} , I _{max}	Operating Temperature Range (V=V _{max})	Operating Temperature Range (V=0)
	R _{min} (Ω)	I _{max} (A)	I _r (mA)	t _s (s)	(℃)	(℃)
PPL11500HA2C8CKB	> 25	2(typ)	4.8(typ.)	0.8 (typ)	-20~+85	-40~+125

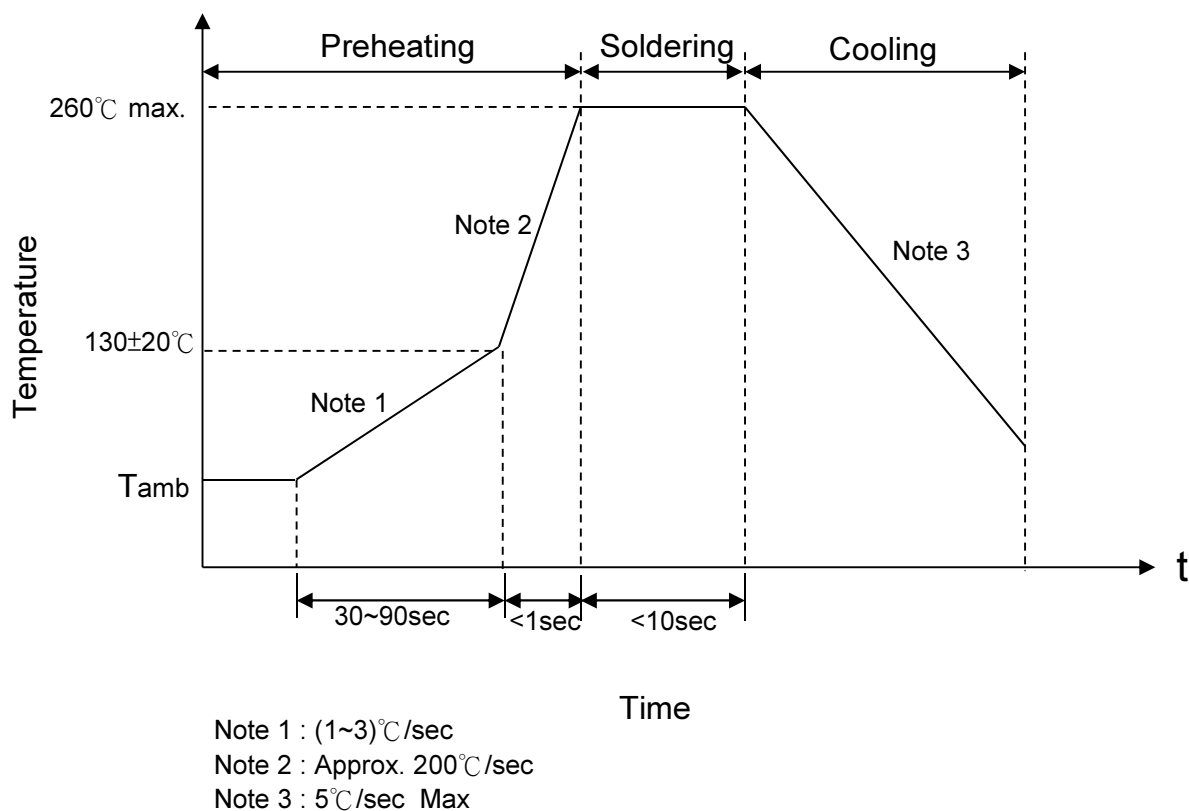
Note: Due to the mechanical force, which is acted on the wire lead, the coating may have cracks and chips. However, it does not affect the performance and reliability of the component.

Reliability

Item	Standard	Test conditions / Methods		Specifications															
Robustness of Terminations	IEC 60738-1	Gradually apply the specified force and keep the unit fixed for 10±1 sec. <table><tr><td>Terminal diameter (mm)</td><td>Force 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>		Terminal diameter (mm)	Force T(N)	0.35<d≤0.5	5.0	0.5<d≤0.8	10.0	0.8<d≤1.25	20.0	ΔR ₂₅ /R ₂₅ ≤20% No visible damage							
Terminal diameter (mm)	Force T(N)																		
0.35<d≤0.5	5.0																		
0.5<d≤0.8	10.0																		
0.8<d≤1.25	20.0																		
Solderability	IEC 60738-1	245 ± 3 °C , 2 ± 0.5 sec		At least 95% of terminal electrode is covered by new solder															
Resistance to Soldering Heat	IEC 60738-1	260 ± 3 °C , 10 ± 1 sec		ΔR ₂₅ /R ₂₅ ≤20% No visible damage															
Vibration	IEC 60738-1	Frequency range:10~55Hz Amplitude:0.75mm or 98m/S ² Direction:3 mutually perpendicular directions Duration :6HRS(3x2HRS)		ΔR ₂₅ /R ₂₅ ≤20% No visible damage															
Shock	IEC 60738-1	Wave:half-sine ΔV:1.0m/s Acceleration:50m/s2 Pulse time: 30ms		ΔR ₂₅ /R ₂₅ ≤20% No visible damage															
Rapid Change of Temperature	IEC 60738-1	The thermal shock conditions shown below shall be repeated 5 cycles <table><tr><td>Step</td><td>Temperature(°C)</td><td>Period(minutes)</td></tr><tr><td>1</td><td>-40 ± 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>85 ± 5</td><td>30 ± 3</td></tr><tr><td>4</td><td>Room temperature</td><td>5 ± 3</td></tr></table>		Step	Temperature(°C)	Period(minutes)	1	-40 ± 5	30 ± 3	2	Room temperature	5 ± 3	3	85 ± 5	30 ± 3	4	Room temperature	5 ± 3	ΔR ₂₅ /R ₂₅ ≤20% No visible damage
Step	Temperature(°C)	Period(minutes)																	
1	-40 ± 5	30 ± 3																	
2	Room temperature	5 ± 3																	
3	85 ± 5	30 ± 3																	
4	Room temperature	5 ± 3																	
Climatic Sequence	IEC60738-1	Dry heat: 125 °C for 16 hrs Damp heat first cycle: 40°C , 95% R.H ,cycle time: 24 hrs Cold: -40°C for 2 hrs Damp heat (cyclic), remaining cycles: 5 cycles Test according to IEC60068-2-30		ΔR ₂₅ /R ₂₅ ≤20% No visible damage															
Damp Heat, Steady State	IEC60738-1	40±2°C,90~95%RH, for 1000±2hrs		ΔR ₂₅ /R ₂₅ ≤20% No visible damage															
Endurance at maximum operating temperature and maximum voltage	IEC60738-1	General Technical Data for Inrush Current Limiter	General Technical Data for Overcurrent protection																
		85±5°C, Vmax , for 1000±2hrs	UCT=60°C , VR, It≤I≤Imax , 1000±2hrs	ΔR ₂₅ /R ₂₅ ≤20% No visible damage															
General Technical Data for Inrush Current Limiter																			
Endurance Test for Charging of Capacitor	Specification Standard	Operating cycles at Vmax, 100,000 cycles (charging of capacitor)		ΔR ₂₅ /R ₂₅ <25% No visible damage															
General Technical Data for Overcurrent protection																			
Endurance at Maximum Voltage	IEC 60738-1	25±5°C , VR, It ≤ I ≤ Imax 1min. on and 5min. Off ×100cycles		ΔR ₂₅ /R ₂₅ ≤20% No visible damage															

Soldering Recommendation

■ Wave Soldering Profile

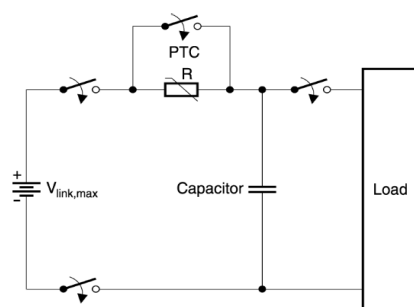


■ Recommended Reworking Conditions with Soldering Iron

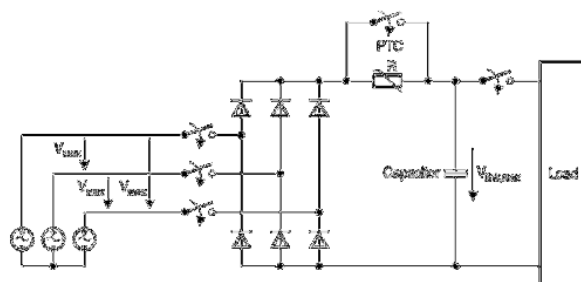
Item	Conditions
Temperature of Soldering Iron-tip	360°C (max.)
Soldering Time	3 sec (max.)
Distance from Thermistor	2 mm (min.)

Circuit diagrams

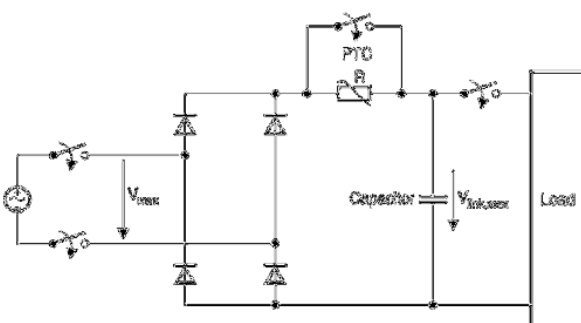
① DC circuit



② Three phases circuit



③ Single phase circuit

Calculation of the number of required PTC elements

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

K	K factor
	K = 1 for DC source
	K = 0.96 for 3-phase bridge rectifier
	K = 0.76 for single phase bridge rectifier
N	Number of required PTC thermistors connected in parallel
C	Capacitance of smoothing or DC link capacitor in F
V	Voltage of capacitor charging ($V=1.414 \times V_{ac}$)= $V_{link,max}$
C _{th}	Heat capacity in J/K
T _c	Curie temperature of PTC
T _a	Ambient temperature

RoHS Compliant Declaration

We hereby declare that the components delivered to your company are compliant with RoHS directive 2015/863/EU.

Restriction of Weapon and Military End-Use

Thinking has established and implemented the fundamental policy on none of our product should be used or sold, through any channels, for use in the design, development, production, utilization, maintenance or operation of, or otherwise contribution to any weapons (Weapons of Mass Destruction [nuclear, chemical or biological weapons or missiles] or conventional weapons) or goods or systems specially designed or intended for military end-use or utilization by military end-users.

Warehouse Storage Conditions of Products

(I) Storage Conditions :

- 1.Storage Temperature : -10°C ~+40°C
- 2.Relative Humidity : $\leq 75\%RH$
- 3.Keep away from corrosive atmosphere and sunlight.

(II) Period of Storage : 1 year

Safety Approvals (Certified Model/Type : PPL11500-A2C8)



* UL 1434 / cUL recognized (File # E138827)



* TÜV recognized (File # R50426392)

Certificates

- (1) IATF 16949 certificate
- (2) ISO 9001 certificate

Test Report

- (1) RoHS test report
- (2) Halogen-free test report