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SPECIFICATION FOR APPROVAL

CUSTOMER	Blume-Benning
CERTIFIED MODEL/TYPE	PPL11501-A2E0
PART NO.	PPL11501HA2E0EI017(RoHS)
APPLICATION	
CUSTOMER P/N	
ISSUE DATE	Dec.26.2024
REV. NO.	
REV. DATE	

FOR CUSTOMER APPROVAL	CHECKED BY
	Haili Gong
	APPROVED BY
	Huaifang Zhang

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
Taping and Dimensions	7
Standard Packing	8
Safety Approvals	9
Certificates	9

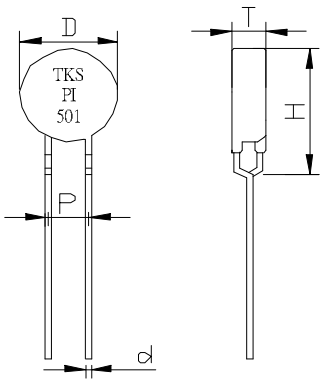
Part Number Code

Example :

PP	L	11	501	H	A2	E0	E	I	017
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

No.	Item	Digit	Specification
(1)	Product Type	PP	Thinking PP type
(2)	Type Series	L	Lead type
(3)	Size	11	φ11 mm
(4)	Resistance(R_{25})	501	$50*10^{1}=500\Omega$
(5)	Tolerance of R_{25}	H	± 25 %
(6)	Curie Temperature	A2	Refer to "Optional Suffix"
(7)	Rated Voltage	E0	500V
(8)	Packaging	E	RoHS compliance &Taping&Reel
(9)	App code	I	Inrush Current & Overload protection
(10)	Optional Suffix	017	Silicone coating e Tc:115℃typ.

Structure and Dimensions



(unit : mm)

Item.	D	T	H	P	d
Max	13.0	7.5	18.0	6.0	0.62
Min	10.5	5.0	---	4.0	0.58

Electrical Characteristics(Overcurrent protection)

Part No.	Curie Temperature	Zero-power Resistance at 25±2℃	Max. Voltage	Rated Voltage	Maximum switching Current (V=Vmax)
	Tc (℃)	R_{25} (Ω)	Vmax (Vac)	V_R (Vac)	Ismax (A)
PPL11501HA2E0EI017	115(typ)	500±25%	550	500	1.4

Part No.	Residual Current (V= Vmax)	Trip Current at 25±2℃	Non-operating Current at 25±2℃	Operating Temperature Range (V=Vmax)	Operating Temperature Range (V=0)
	Ir (mA)	It (mA)	I_N (mA)	(℃)	(℃)
PPL11501HA2E0EI017	2 typ.	55	28	0~+60	-40~+125

Electrical Characteristics(Inrush Current Limiter)

Part No.	Curie Temperature	Zero-power Resistance at 25±2℃	Max. Voltage	Thermal Capacity	Maximum link voltage	Operating Temperature Range (V=Vmax)	Operating Temperature Range (V=0)
	Tc (℃)	R_{25} (Ω)	Vmax (Vac)	Cth(J/K)	Vlink，max (Vdc)	(℃)	(℃)
PPL11501HA2E0EI017	115(typ)	500±25%	560	1.4(typ)	800	0~+60	-40~+125

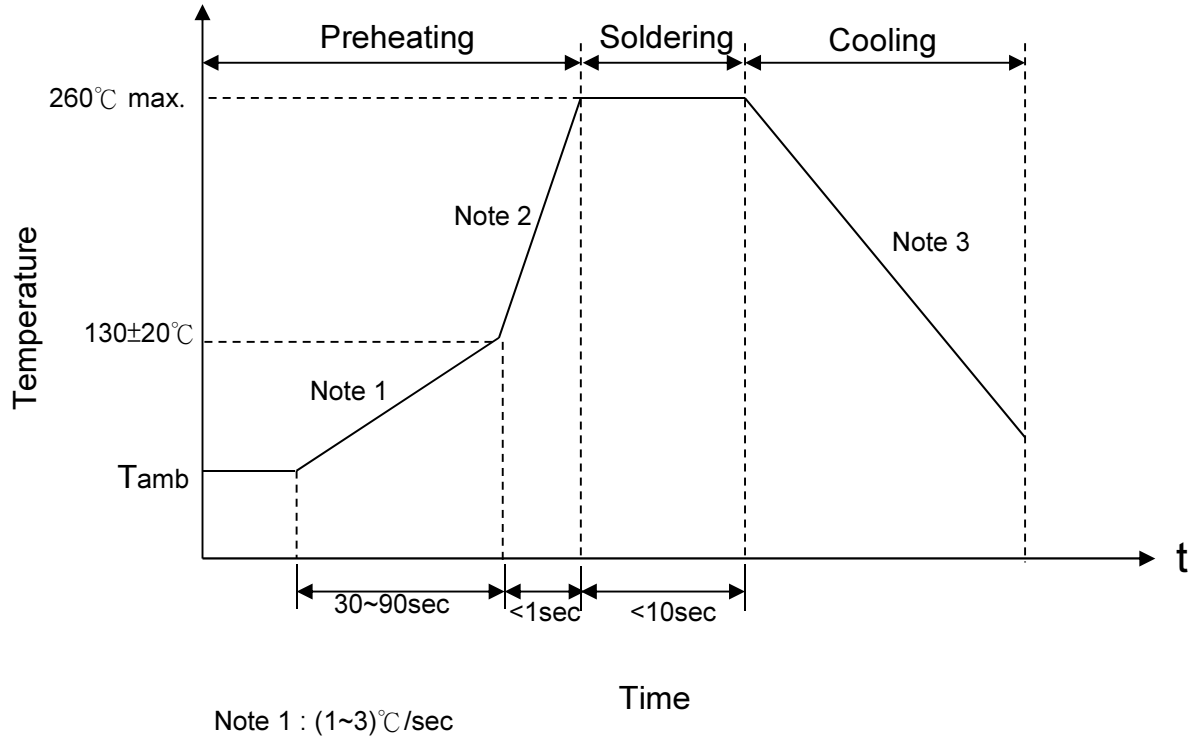
Note:Due to the mechanical force, which is acted on the wire lead, the coating may have cracks and chips. However, it does not affect the performance and reliability of the component.

Reliability

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

Soldering Recommendation

Wave Soldering Profile



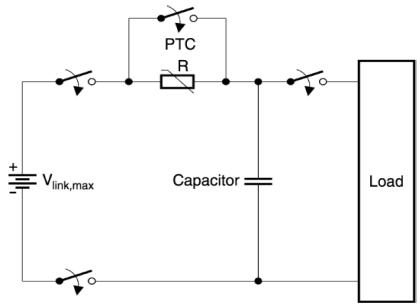
Note 1 : (1~3)℃/sec
Note 2 : Approx. 200℃/sec
Note 3 : 5℃/sec Max

Recommended Reworking Conditions with Soldering Iron

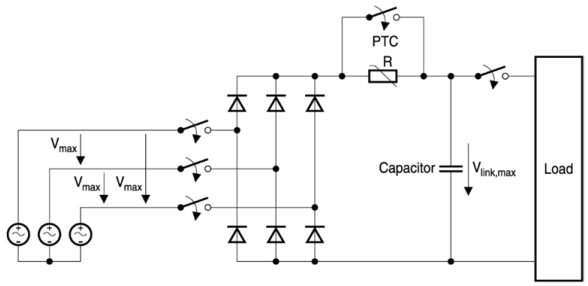
Item	Conditions
Temperature of Soldering Iron-tip	360℃ (max.)
Soldering Time	3 sec (max.)
Distance from Thermistor	2 mm (min.)

Circuit diagrams

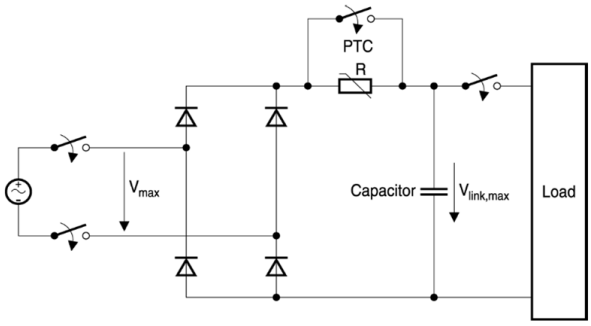
① DC circuit



② Three phases circuit



③ Single phase circuit



Calculation of the number of required PTC elements

$$N \geq \frac{K * C * V^2}{2 * Cth * (Tc-Ta)}$$

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=1.414x Vac)=Vlink,max
Cth	Heat capacity in J/K
Tc	Curie temperature of PTC
Ta	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 :

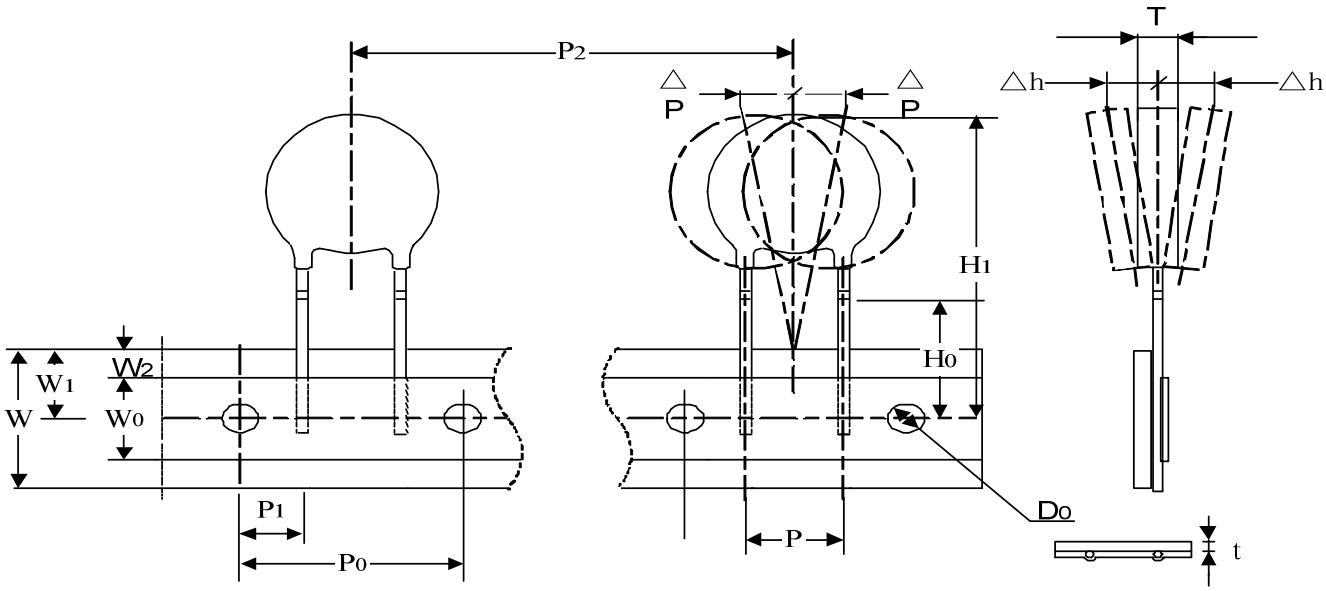
1.Storage Temperature : -10℃~+40℃

2.Relative Humidity : ≦75%RH

3.Keep away from corrosive atmosphere and sunlight.

(II) Period of Storage : 1 year

Taping and Dimensions

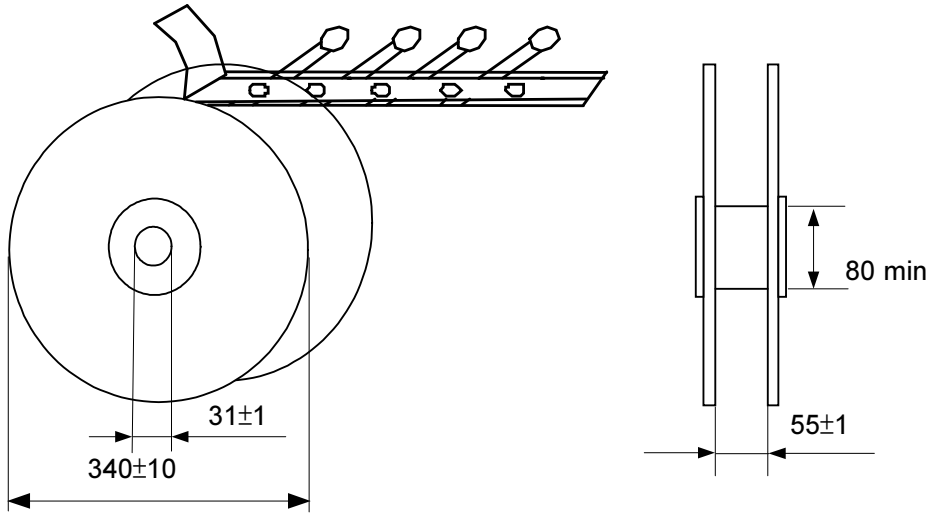


(unit : mm)

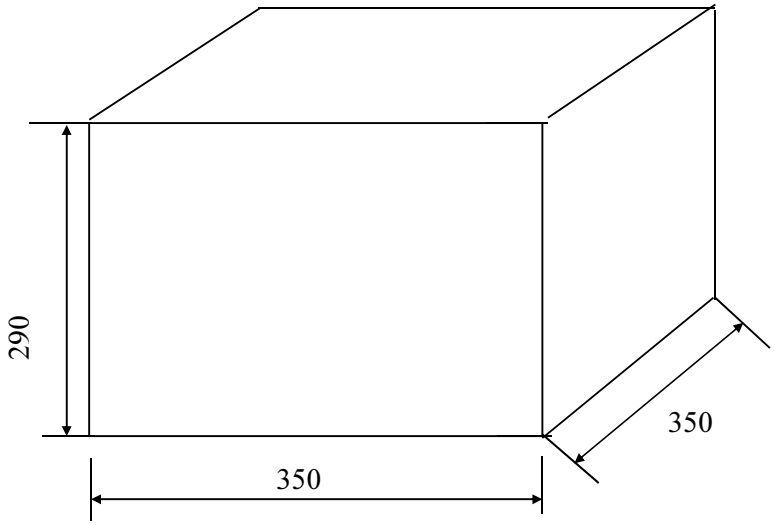
ITEM	P_0	P	P_1	H_0	W_0	W_1	W_2 max	W	T	△P max	△h max	D_0	t	P_2	H1 max
Nor.	12.7	5	3.85	16	12	9	3	18	6.25	1.0	2.0	4	0.6	25.4	34.5
ToL.	±0.3	±1	±1	±0.5	±1.5	±1	---	±1	±1.25	---	---	±0.2	±0.2	±1	---

Standard Packing

(1) : Quantity (500pcs /reel)



(2) Outer Box : (4 Reel /Carton)



(Unit:mm)

Safety Approvals **(Certified Model/Type : PPL11501-A2E0)**

* UL 1434 / cUL recognized (File # E138827)

* TÜV recognized (File # R50499186)

Certificates

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

Test Report

(1) RoHS test report