SMD SLR Series Surface Mount PTC Devices

U.S. Patent#6377467

- The SMD SLR series, a Super Low Resistance polymer-based Positive Temperature Coefficient (PTC) device to protect electrical circuits against over-current conditions with resettable feature, is fully compatible with current industrial standards.
- The SMD SLR series provides surface mount over-current protection with superior performance that is compliant with IEC 61249-2-21:2003 and RoHS Directive 2002/95/EC.
- Application: The SMD SLR series is ideal for computers, peripherals, cellular phones, battery applications, or anywhere in which a load needs to be protected from a low voltage power supply.
- The solder plated termination is designed to meet or exceed solderability specifications and provide excellent solder joint inspectability.
- Agency Approval: **UL/CSA File No. E201431**

  TÜV Certificate No. R50099121

RoHS Halogen Free

POLYTRONICS TECHNOLOGY CORP. REGISTERED TO ISO 9001, TL 9000, ISO/TS 16949, AND ISO 14001 FILE NUMBER A8727 AND A10971

ELECTRICAL CHARACTERISTICS

Part Number	I_{hold} (A)	I_{trip} (A)	V_{max} (Vdc)	I_{max} (A)	$P_{d\,max.}$ (W)	Maximum Time To Trip		Resistance		Agency Approval	
						Current (A)	Time (Sec.)	R_{min} (Ω)	R_{1max} (Ω)	UL/CSA	TÜV
SMD1206P110SLR	1.10	2.20	6	50	0.80	8.00	0.30	0.015	0.100	✓	✓
SMD1206P200SLR	2.00	3.50	6	50	0.80	8.00	0.50	0.005	0.055	✓	✓
SMD1210P175SLR	1.75	3.50	6	50	0.80	8.00	2.50	0.006	0.040	✓	✓
SMD1210P200SLR	2.00	4.00	6	50	0.80	8.00	3.00	0.005	0.020	✓	✓
SMD1812P190SLR	1.90	4.90	6	50	1.00	9.50	4.50	0.003	0.025	✓	✓
SMD1812P370SLR	3.70	9.10	6	50	1.00	18.50	2.00	0.003	0.018	✓	✓

Note: I_{hold} = Hold current: maximum current device will pass without tripping in 23°C still air.

I_{trip} = Trip current: minimum current at which the device will trip in 23°C still air.

V_{max} = Maximum voltage device can withstand without damage at rated current (I_{max})

I_{max} = Maximum fault current device can withstand without damage at rated voltage (V_{max})

P_d = Power dissipated from device when in the tripped state at 23°C still air.

R_{min}= Minimum resistance of device in initial (un-soldered) state.

R_{1max}= Maximum resistance of device at 23°C measured one hour after tripping or reflow soldering of 260°C for 20 sec.

*Value specified were determined using the PWB with 0.030"*1.5oz copper traces.

Caution: Operation beyond the specified rating may result in damage and possible arcing and flame.

◎Specifications are subject to change without notice.

*Customer should verify the device performance in their specified conditions.

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How to Select a Polymer PTC fuse

(1) Determine the following operating parameters for the circuits:
   (A) Normal Operating Current (I hold)
   (B) Maximum Circuit Voltage (V max)
   (C) Maximum Interrupt Current (I max)
   (D) Normal Operating Temperature (min°C/max°C)

(2) Select the device form factor and dimension suitable for the application:
   Surface Mount Device (SMD Series)
   Radial Leaded Device (RLD Series)
   Axial Leaded Strap Device (STD Series)
   Other Custom-designed Device (Disc/Chip)

(3) Compare the maximum ratings for V max and I max of the PTC device with the circuit in application and make sure that the circuit's requirement does not exceed the device ratings.

(4) Check that the PTC device's trip time (time-to-trip) will protect the circuit.

(5) Verify that the circuit operating temperatures are within the PTC device's normal operating temperature range.

(6) Verify the performance and suitability of the chosen PTC device in the application.

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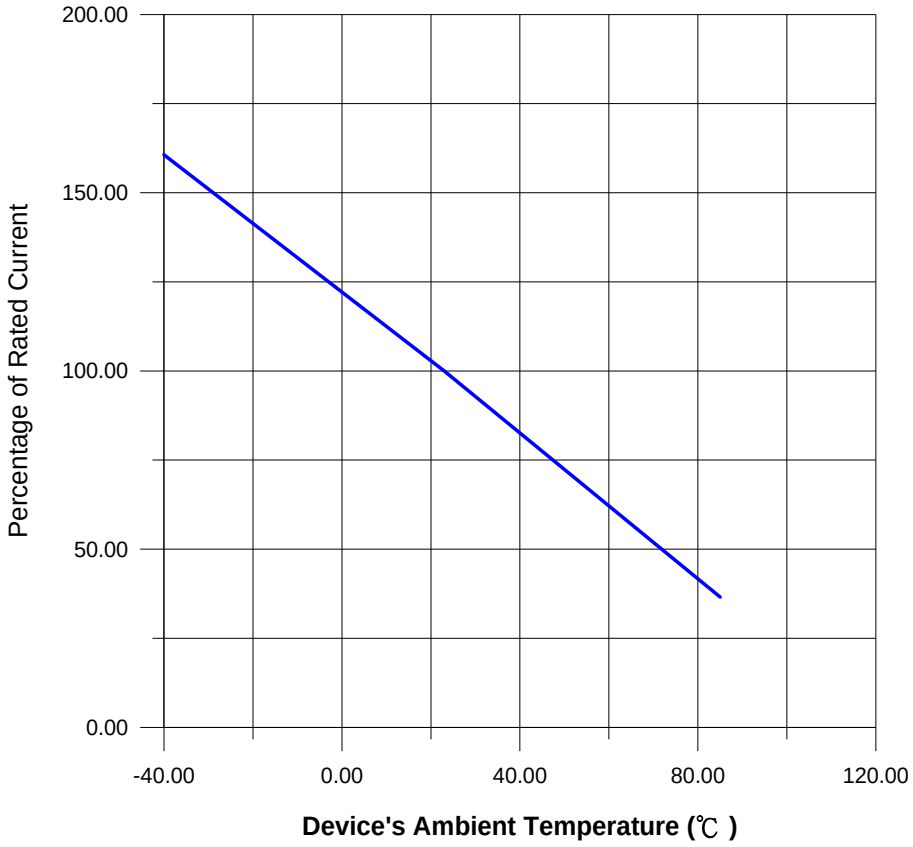
THERMAL DERATING CURVE FOR SMD SLR SERIES



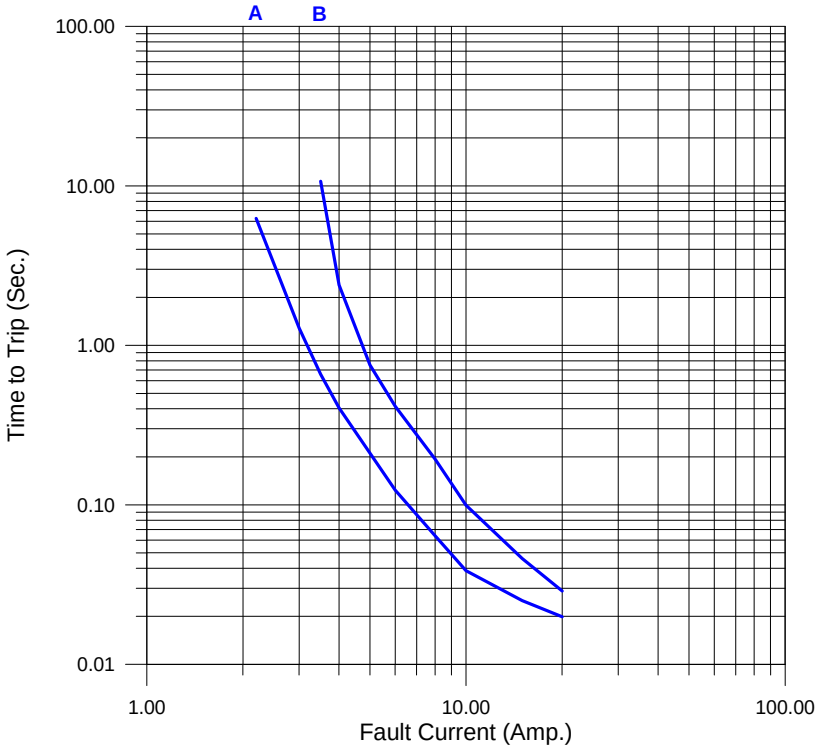
THERMAL DERATING CHART FOR SMD SLR SERIES – I_{hold} (Amps)

RECOMMENDED DATA

Model	Ambient Operation Temperature								
	-40°C	-20°C	0°C	23°C	40°C	50°C	60°C	70°C	85°C
SMD1206P110SLR	1.75	1.60	1.30	1.10	0.90	0.80	0.70	0.55	0.40
SMD1206P200SLR	3.05	2.70	2.35	2.00	1.40	1.30	1.05	0.80	0.55
SMD1210P175SLR	2.65	2.30	2.05	1.75	1.40	1.20	1.05	0.90	0.60
SMD1210P200SLR	3.30	2.80	2.40	2.00	1.90	1.75	1.60	1.40	1.00
SMD1812P190SLR	2.91	2.57	2.20	1.90	1.78	1.65	1.50	1.40	1.05
SMD1812P370SLR	5.70	5.00	4.50	3.70	3.00	2.60	2.20	1.70	1.10

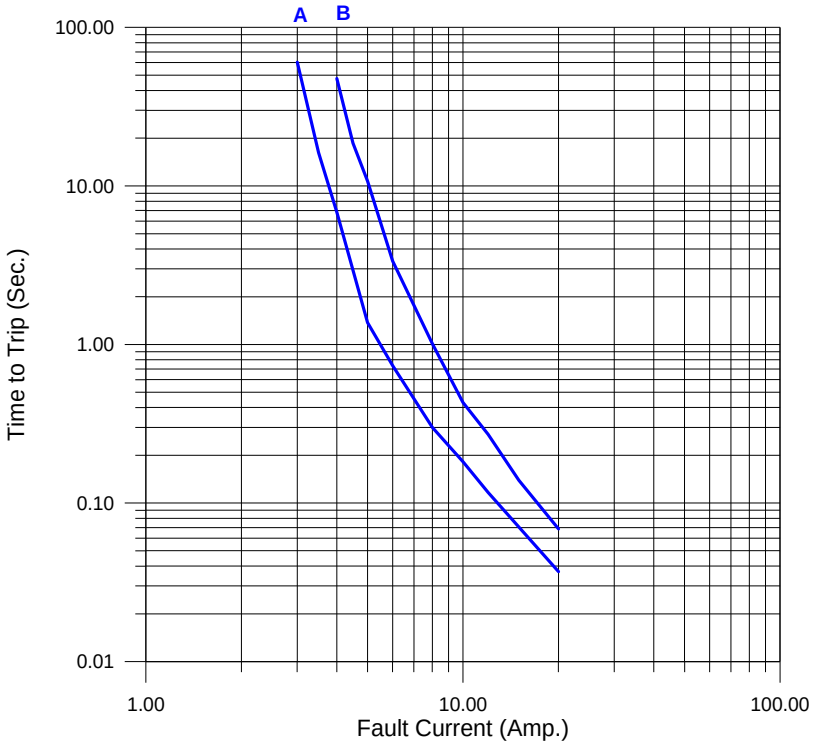
*Customer should verify the device performance in their specified conditions.

AVERAGE TIME-CURRENT CURVE FOR SMD1206 SLR SERIES



A—SMD1206P110SLR
B—SMD1206P200SLR

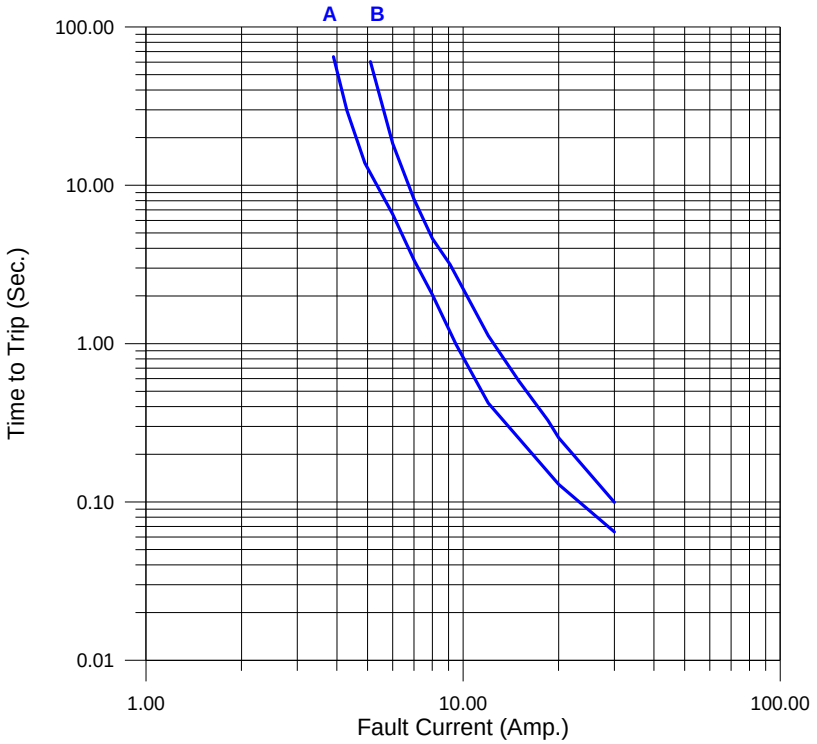
AVERAGE TIME-CURRENT CURVE FOR SMD1210 SLR SERIES



A—SMD1210P175SLR
B—SMD1210P200SLR

*Customer should verify the device performance in their specified conditions.

AVERAGE TIME-CURRENT CURVE FOR SMD1812 SLR SERIES



A — SMD1812P190SLR
B — SMD1812P370SLR

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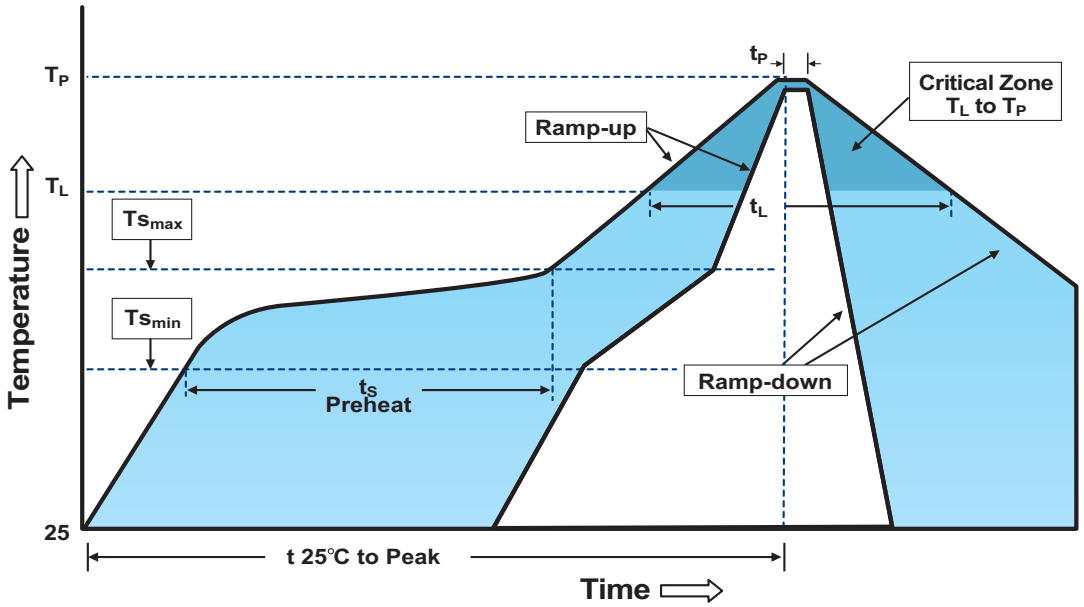
SOLDER REFLOW



RECOMMENDED CONDITIONS

Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate (Ts_{max} to T_P)	3°C/second max.
Preheat -Temperature Min (Ts_{min}) -Temperature Max (Ts_{max}) -Time (Ts_{min} to Ts_{max})	 150°C 200°C 60-180 seconds
Time maintained above: -Temperature (T_L) -Time (t_L)	 217°C 60-150 seconds
Peak Temperature (T_P)	260°C
Time within 5°C of actual Peak Temperature (t_P)	 20-40 seconds
Ramp-Down Rate	6°C/second max.
Time 25°C to Peak Temperature	8 minutes max.
Storage Condition	0°C~35°C, ≦70%RH

Note 1: All temperature refer to topside of the package, measured on the package body surface.

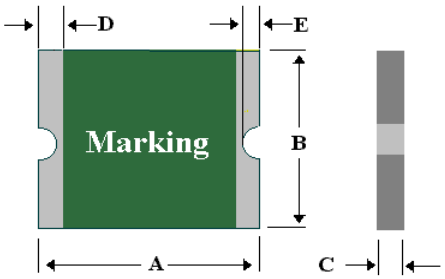
Note 2: If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

- Recommended reflow methods: IR, vapor phase oven, hot air oven, N_2 environment for lead-free
- Recommended maximum paste thickness is 0.25mm (0.010 inch)
- Devices can be cleaned using standard industry methods and solvents.
- Devices can be reworked using the standard industry practices.

*Customer should verify the device performance in their specified conditions.

PHYSICAL DIMENSIONS (mm)

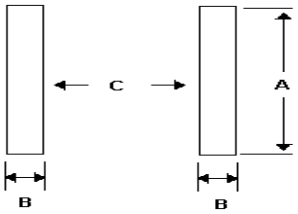
FIGURE



Part Number	A		B		C		D		E	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
SMD1206P110SLR	3.00	3.40	1.50	1.80	0.40	0.75	0.25	0.75	0.10	0.45
SMD1206P200SLR	3.00	3.40	1.50	1.80	0.40	0.75	0.25	0.75	0.10	0.45
SMD1210P175SLR	3.00	3.43	2.35	2.80	0.40	0.70	0.25	0.75	0.20	0.50
SMD1210P200SLR	3.00	3.43	2.35	2.80	0.40	0.70	0.25	0.75	0.20	0.50
SMD1812P190SLR	4.37	4.73	3.07	3.41	0.40	0.70	0.30	1.20	0.25	0.65
SMD1812P370SLR	4.37	4.73	3.07	3.41	0.40	0.70	0.30	1.20	0.25	0.65

PACKAGING

SOLDER PAD LAYOUTS
(Dimension in mm)



Part Number	Tape & Reel Quantity	Recommended Pad layout Figure (mm)		
		Dimension (A)	Dimension (B)	Dimension (C)
SMD1206P110SLR	4000	1.80	1.00	1.80
SMD1206P200SLR	4000	1.80	1.00	1.80
SMD1210P175SLR	4000	2.50	1.00	2.00
SMD1210P200SLR	4000	2.50	1.00	2.00
SMD1812P190SLR	2000	3.15	1.78	3.45
SMD1812P370SLR	2000	3.15	1.78	3.45

*Customer should verify the device performance in their specified conditions.

PHYSICAL SPECIFICATIONS

Terminal Material	Solder-Plated Copper (Solder Material: Matte Tin (Sn))
Lead Solderability	Meets EIA Specification RS186-9E, ANSI/J-STD-002 Category 3.

◎ Specifications are subject to change without notice.

TAPE SPECIFICATIONS: EIA-481-1

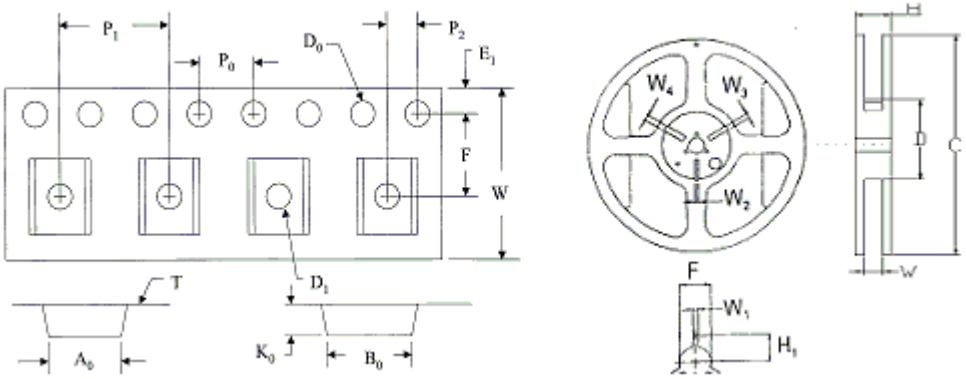
	SMD1206 P110SLR P200SLR	SMD1210 P175SLR P200SLR	SMD1812 P190SLR P370SLR
W	8.20 +0.1 / -0.3	8.00 ± 0.30	12.00 ± 0.30
F	3.50 ± 0.05	3.50 ± 0.05	5.50 ± 0.05
E_1	1.75 ± 0.10	1.75 ± 0.10	1.75 ± 0.10
D_0	1.55 ± 0.05	1.55 ± 0.05	1.55 ± 0.05
D_1	1.00 (MIN)	1.00 (MIN)	1.55 (MIN)
P_0	4.00 ± 0.10	4.00 ± 0.10	4.00 ± 0.10
P_1	4.00 ± 0.10	4.00 ± 0.10	8.00 ± 0.10
P_2	2.00 ± 0.05	2.00 ± 0.05	2.00 ± 0.05
A_0	2.82 ± 0.10	2.82 ± 0.10	3.58 ± 0.10
B_0	3.46 ± 0.10	3.46 ± 0.10	4.93 ± 0.10
T	0.25 ± 0.10	0.25 ± 0.10	0.25 ± 0.10
K_0	1.00 ± 0.10	1.00 ± 0.10	0.87 ± 0.06
Leader min.	390	390	390
Trailer min.	160	160	160

(mm)

REEL DIMENSIONS: EIA-481-1

	SMD1206 P110SLR P200SLR	SMD1210 P175SLR P200SLR	SMD1812 P190SLR P370SLR
C	Ø178 ± 1.0	Ø178 ± 1.0	Ø178 ± 1.0
D	Ø 60 ± 0.2	Ø 60 ± 0.2	Ø60.2 ± 0.5
F	Ø 13 ± 0.5	Ø 13 ± 0.5	Ø13.0 ± 0.5
W1	2.2 ± 0.5	2.2 ± 0.5	2.5 + 0.5
W2	3.0 + 0.5	3.0 + 0.5	3.0 + 0.5
W3	4.0 + 0.5	4.0 + 0.5	4.0 + 0.5
W4	5.0 + 0.5	5.0 + 0.5	5.0 + 0.5
W	9.0 ± 1.5	9.0 ± 1.5	13.2 ± 1.5
H	11.0 ± 0.5	11.0 ± 0.5	16.0 ± 0.5

(mm)

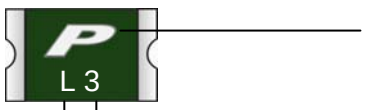


PART NUMBERING SYSTEM

SMD 1210 P □□□ SLR

- **Super Low Resistance**
- **Current Rating**
- **Polytronics Symbol**
- **Device Dimensions: Length/Width (Unit: 1/100 inch)**
- **Surface Mount Device**

PART MARKING SYSTEM



P Polytronics / Polystar Logo

Part identification

Note: Polystar is Polytronics's manufacturing site in China. The Polystar ID marking shall appear on smallest package.

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