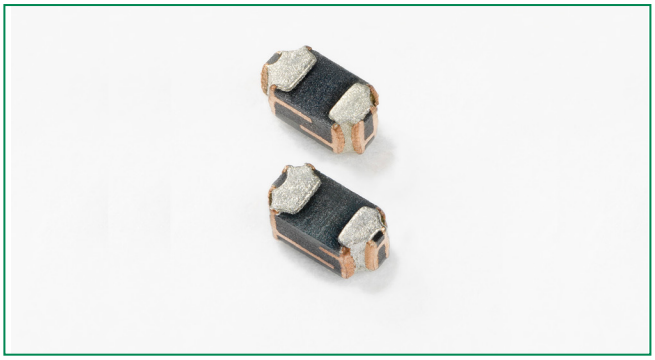
POLY-FUSE® Resettable PTCs

Surface Mount > 0402L Series

Littelfuse®
Expertise Applied | Answers Delivered

0402L Series



Description

The 0402L Series PTC provides surface mount overcurrent protection for applications where space is at a premium and resettable protection is desired.

Features

- RoHS compliant, lead-free and halogen free
- Fast response to fault currents
- Compact design saves board space
- Low resistance
- Low-profile
- Compatible with high temperature solders
- 0402 size- the smallest PPTC in the market compatible with high temperature solders

Applications

- USB peripherals
- Disk drives
- CD-ROMs
- Plug and play protection for motherboards and peripherals
- PDAs / digital cameras
- Game console port protection
- Tablet and Notebook PCs
- E-readers

Agency Approvals

AGENCY	AGENCY FILE NUMBER
c UL us	E183209
	R50119118

Additional Information

Datasheet | Resources | Samples

Electrical Characteristics

Part Number	I_{hold} (A)	I_{trip} (A)	V_{max} (Vdc)	I_{max} (A)	P_d typ. (W)	Maximum Time To Trip		Resistance		Agency Approvals	
						Current (A)	Time (Sec.)	R_{min} (Ω)	R_{1max} (Ω)	c UL us	
0402L010SL	0.10	0.30	6	40	0.5	0.50	1.00	0.150	2.000	X	X
0402L020SL	0.20	0.50	6	40	0.5	1.00	1.00	0.100	1.250	X	X
0402L035SL	0.35	0.70	6	50	0.5	8.00	0.10	0.050	0.700	X	X
0402L050SL	0.50	1.00	6	50	0.5	8.00	0.10	0.040	0.400	X	X

I_{hold} = Hold current: maximum current device will pass without tripping in 20°C still air.
I_{trip} = Trip current: minimum current at which the device will trip in 20°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 20°C still air.
R_{min} = Minimum resistance of device in initial (un-soldered) state.
R_{1max} = Maximum resistance of device at 20°C measured one hour after tripping or reflow soldering of 260°C for 20 sec.
Caution: Operation beyond the specified rating may result in damage and possible arcing and flame.

WARNING

- Users shall independently assess the suitability of these devices for each of their applications
- Operation of these devices beyond the stated maximum ratings could result in damage to the devices and lead to electrical arcing and/or fire
- These devices are intended to protect against the effects of temporary over-current or over-temperature conditions and are not intended to perform as protective devices where such conditions are expected to be repetitive or prolonged in duration
- Exposure to silicon-based oils, solvents, electrolytes, acids, and similar materials can adversely affect the performance of these PPTC devices
- These devices undergo thermal expansion under fault conditions, and thus shall be provided with adequate space and be protected against mechanical stresses
- Circuits with inductance may generate a voltage (L di/dt) above the rated voltage of the PPTC device.

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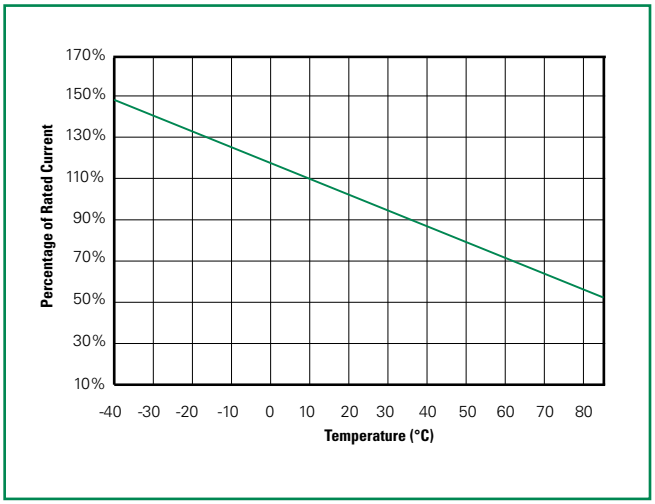
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Temperature Rerating

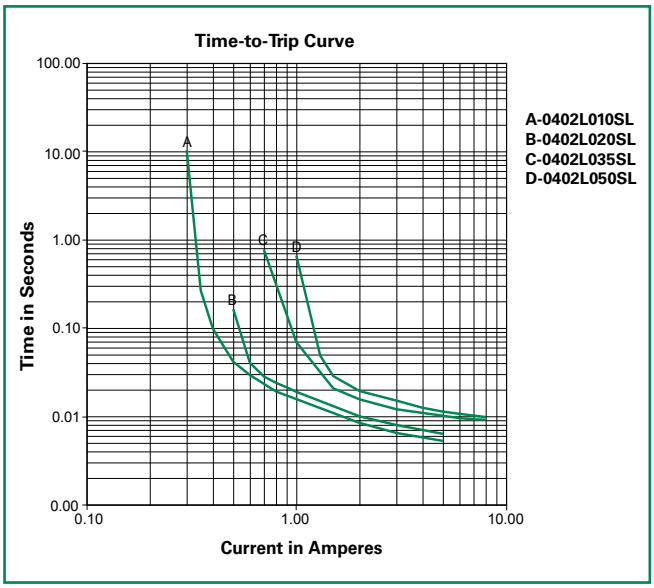
	Ambient Operation Temperature								
	-40°C	-20°C	0°C	20°C	40°C	50°C	60°C	70°C	85°C
Part Number	Hold Current (A)								
0402L010SL	0.15	0.13	0.12	0.10	0.09	0.07	0.06	0.05	0.01
0402L020SL	0.29	0.27	0.24	0.20	0.17	0.14	0.11	0.10	0.03
0402L035SL	0.51	0.47	0.41	0.35	0.30	0.25	0.20	0.18	0.07
0402L050SL	0.74	0.67	0.59	0.50	0.43	0.36	0.29	0.26	0.10

Temperature Rerating Curve



Note:
Typical Temperature rerating curve, refer to table for derating data

Average Time Current Curves

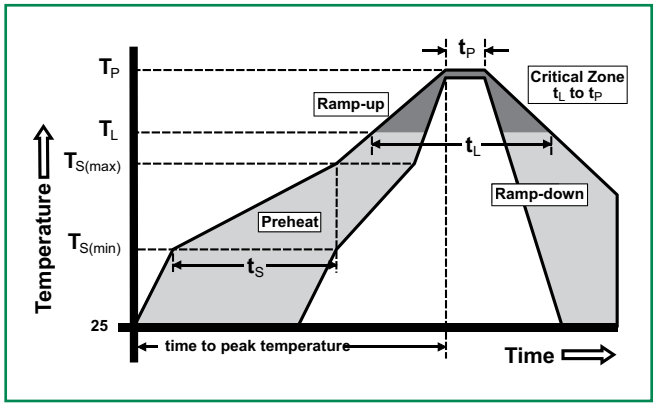


The average time current curves and Temperature Rerating curve performance is affected by a number or variables, and these curves provided as guidance only. Customer must verify the performance in their application.

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Soldering Parameters

Profile Feature		Pb-Free Assembly
Average Ramp-Up Rate ($T_{S(max)}$ to T_P)		3°C/second max
Pre Heat:	Temperature Min ($T_{s(min)}$)	150°C
	Temperature Max ($T_{s(max)}$)	200°C
	Time (Min to Max) (t_s)	60 – 180 secs
Time Maintained Above:	Temperature (T_L)	217°C
	Temperature (t_L)	60 – 150 seconds
Peak / Classification Temperature (T_P)		$260^{+0/-5}$ °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 (T_P)		8 minutes Max.



- All temperature refer to topside of the package, measured on the package body surface
- If reflow temperature exceeds 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
- Recommended maximum paste thickness is 0.25mm (0.010inch)
- Devices can be cleaned using standard industry methods and solvents
- Devices can be reworked using the standard industry practices

Physical Specifications

Terminal Material	Solder-Plated Copper (Solder Material: Matte Tin (Sn))
Lead Solderability	Meets ANSI/J-STD-002, Category C.

Environmental Specifications

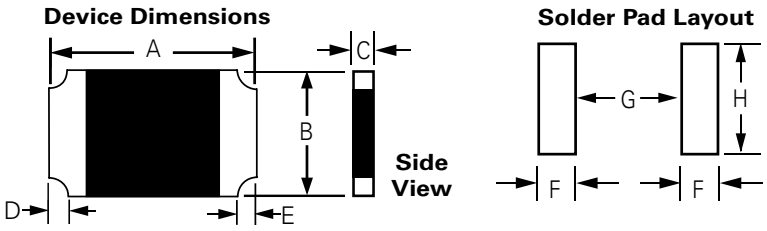
Operating/Storage Temperature	-40°C to +85°C
Maximum Device Surface Temperature in Tripped State	125°C
Solvent Resistance	MIL–STD–202, Method 215 No change
Vibration	MIL–STD–883, Method 2007, Condition A No change
Moisture Sensitivity Level	Level 1, J–STD–020

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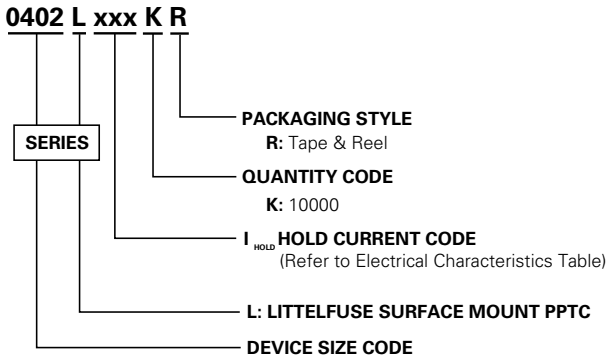
Dimensions



Device Top and Bottom Marking and Dimensions are Similar

Part Number	Device Dimension																				Solder Pad					
	A				B				C				D				E				F		G		H	
	inch		mm		inch		mm		inch		mm		inch		mm		inch		mm		inch	mm	inch	mm	inch	mm
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max						
0402L010SL	0.03	0.05	0.85	1.15	0.01	0.03	0.35	0.65	0.01	0.02	0.20	0.60	0.004	0.02	0.10	0.45	-	0.02	-	0.40	0.02	0.60	0.02	0.40	0.03	0.70
0402L020SL	0.03	0.05	0.85	1.15	0.01	0.03	0.35	0.65	0.01	0.02	0.20	0.60	0.004	0.02	0.10	0.45	-	0.02	-	0.40	0.02	0.60	0.02	0.40	0.03	0.70
0402L035SL	0.03	0.05	0.85	1.15	0.01	0.03	0.35	0.65	0.01	0.02	0.20	0.60	0.004	0.02	0.10	0.45	-	0.02	-	0.40	0.02	0.60	0.02	0.40	0.03	0.70
0402L050SL	0.03	0.05	0.85	1.15	0.01	0.03	0.35	0.65	0.01	0.02	0.20	0.60	0.004	0.02	0.10	0.45	-	0.02	-	0.40	0.02	0.60	0.02	0.40	0.03	0.70

Part Ordering Number System



Packaging

Part Number	Ordering Number	I_{hold} (A)	I_{hold} Code	Packaging Option	Quantity	Quantity & Packaging Codes
0402L010SL	0402L010SLKR	0.10	010	Tape & Reel	10,000	KR
0402L020SL	0402L020SLKR	0.20	020		10,000	KR
0402L035SL	0402L035SLKR	0.35	035		10,000	KR
0402L050SL	0402L050SLKR	0.50	050		10,000	KR

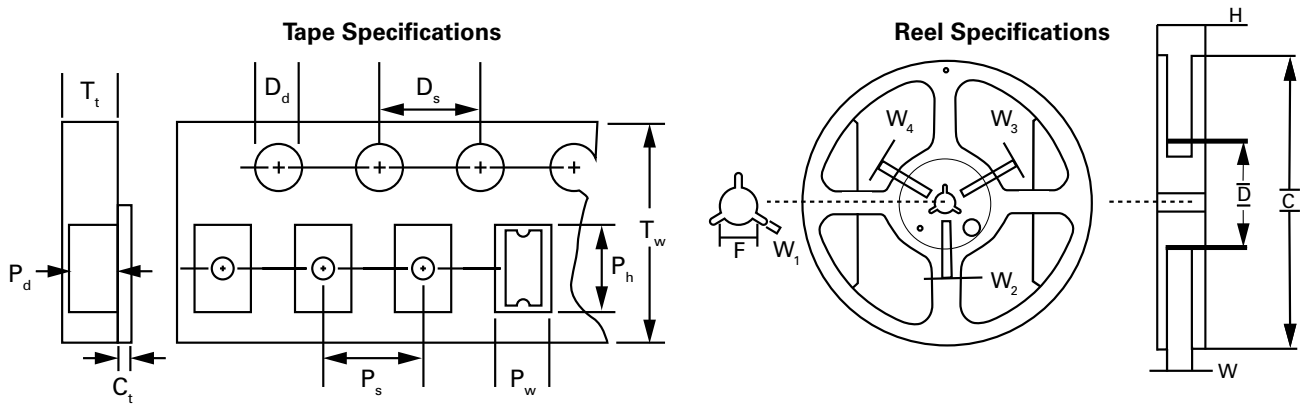
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Tape and Reel Specifications

TAPE SPECIFICATIONS: EIA-481-1 (mm)	
	0402L010SL 0402L020SL 0402L035SL 0402L050SL
C_t	0.05 ± 0.01
D_d	1.5 ± 0.1
D_s	4.0± 0.1
P_d	0.41± 0.1
P_h	1.12± 0.1
P_s	2.0 ± 0.1
P_w	0.65 ± 0.03
T_t	0.61 ± 0.1
T_w	8.0 ± 0.1
Leader min.	390
Trailer min.	160

REEL DIMENSIONS: EIA-481-1 (mm)	
H	12.0± 0.5
W	9.0 ± 0.5
D	Ø60 ± 0.5
F	Ø13.0 ± 0.2
C	Ø178 ± 1
W_1	2.2 ± 0.5
W_2	3.0± 0.5
W_3	4.0 ± 0.5
W_4	5.5 ± 0.5
W_4	5.5+0.5

Tape and Reel Diagram



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