



### Description

The 0603L 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



### Applications

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

### Agency Approvals

AGENCY	AGENCY FILE NUMBER
	E183209
	R50119118

### Electrical Characteristics

Part Number	Marking	I <sub>hold</sub> (A)	I <sub>trip</sub> (A)	V <sub>max</sub> (Vdc)	I <sub>max</sub> (A)	P <sub>d</sub> typ. (W)	Maximum Time To Trip		Resistance		Agency Approvals	
							Current (A)	Time (Sec.)	R <sub>min</sub> (Ω)	R <sub>1max</sub> (Ω)		
0603L004	-	0.04	0.12	24	20	0.5	0.20	1.00	4.00	40.00	X	X
0603L010	C	0.10	0.30	15	40	0.5	0.50	1.00	0.900	6.000	X	X
0603L020	H	0.20	0.50	9	40	0.5	1.00	0.60	0.550	3.500	X	X
0603L025	I	0.25	0.55	9	40	0.5	8.00	0.08	0.500	3.000	X	X
0603L035	F	0.35	0.75	6	40	0.5	8.00	0.10	0.200	1.000	X	X
0603L050	J	0.50	1.00	6	40	0.5	8.00	0.10	0.100	0.680	X	X

I<sub>hold</sub> = Hold current: maximum current device will pass without tripping in 20°C still air.

I<sub>trip</sub> = Trip current: minimum current at which the device will trip in 20°C still air.

V<sub>max</sub> = Maximum voltage device can withstand without damage at rated current (I<sub>max</sub>)

I<sub>max</sub> = Maximum fault current device can withstand without damage at rated voltage (V<sub>max</sub>)

P<sub>d</sub> = Power dissipated from device when in the tripped state at 20°C still air.

R<sub>min</sub> = Minimum resistance of device in initial (un-soldered) state.

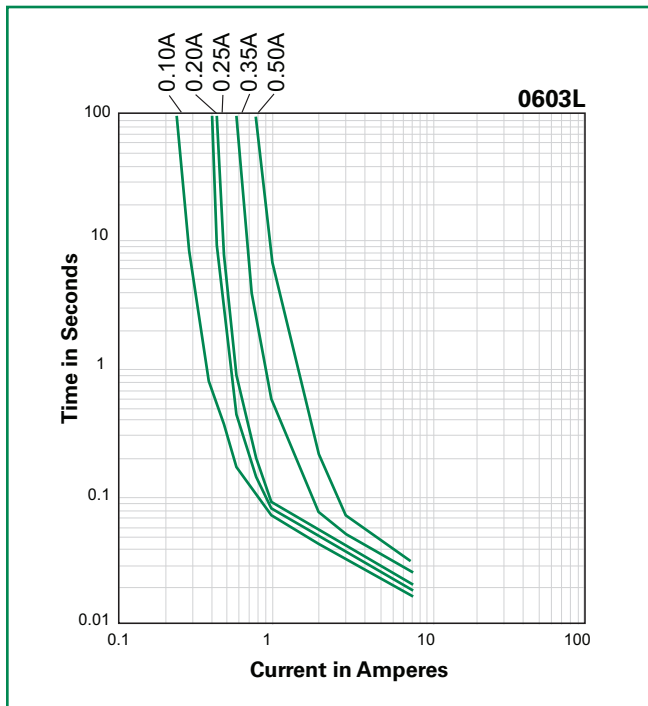
R<sub>1max</sub> = Maximum resistance of device at 20°C measured one hour after tripping or reflow soldering of 260°C for 20 sec.

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

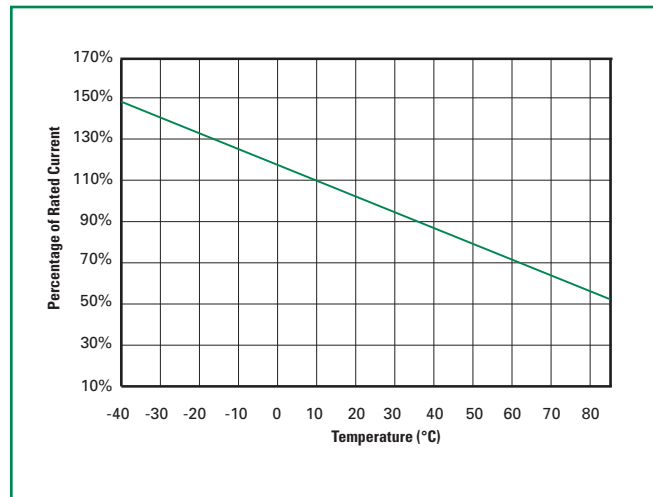
### Temperature Derating

Part Number	Ambient Operation Temperature								
	-40°C	-20°C	0°C	20°C	40°C	50°C	60°C	70°C	85°C
0603L004	0.05	0.05	0.04	0.04	0.03	0.03	0.02	0.02	0.01
0603L010	0.13	0.12	0.11	0.10	0.08	0.07	0.06	0.05	0.03
0603L020	0.27	0.25	0.23	0.20	0.17	0.14	0.12	0.10	0.07
0603L025	0.32	0.29	0.27	0.25	0.21	0.18	0.16	0.14	0.10
0603L035	0.47	0.41	0.38	0.35	0.29	0.26	0.24	0.20	0.14
0603L050	0.73	0.66	0.60	0.50	0.44	0.40	0.37	0.31	0.22

### Average Time Current Curves



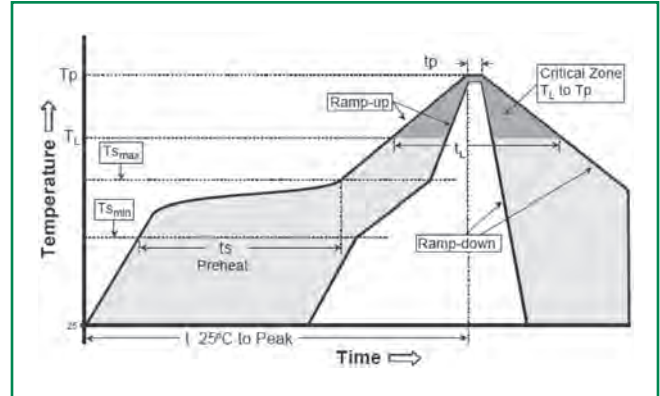
### Temperature Derating Curve



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

### 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 <sup>+0/-5</sup> °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<sub>2</sub> 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

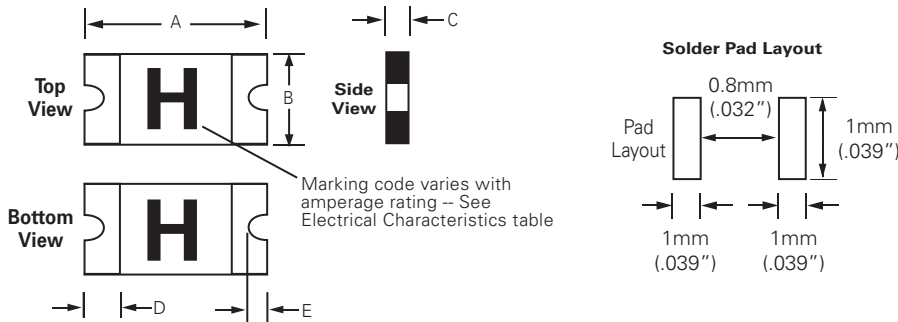
### Physical Specifications

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

### Environmental Specifications

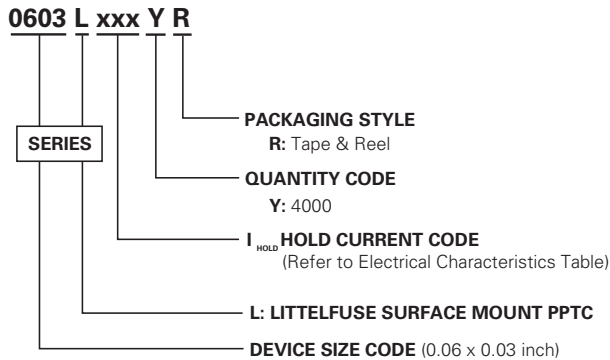
<b>Operating/Storage Temperature</b>	-40°C to +85°C
<b>Maximum Device Surface Temperature in Tripped State</b>	125°C
<b>Passive Aging</b>	+85°C, 1000 hours -/+10% typical resistance change
<b>Humidity Aging</b>	+85°C, 85% R.H., 100 hours -/+15% typical resistance change
<b>Thermal Shock</b>	MIL-STD-202, Method 107G +85°C/-40°C 20 times -30% typical resistance change
<b>Solvent Resistance</b>	MIL-STD-202, Method 215 No change
<b>Vibration</b>	MIL-STD-883C, Method 2007.1, Condition A No change
<b>Moisture Sensitivity Level</b>	Level 1, J-STD-020C

**Dimensions**



Part Number	A				B				C				D				E			
	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
0603L004	.055	.071	1.40	1.80	.024	.039	0.60	1.00	.016	.030	0.40	0.75	.006	.020	0.15	0.50	.004	.016	0.10	0.40
0603L010	.055	.071	1.40	1.80	.024	.039	0.60	1.00	.016	.030	0.40	0.75	.006	.020	0.15	0.50	.004	.016	0.10	0.40
0603L020	.055	.071	1.40	1.80	.024	.039	0.60	1.00	.016	.030	0.40	0.75	.006	.020	0.15	0.50	.004	.016	0.10	0.40
0603L025	.055	.071	1.40	1.80	.024	.039	0.60	1.00	.016	.030	0.40	0.75	.006	.020	0.15	0.50	.004	.016	0.10	0.40
0603L035	.055	.071	1.40	1.80	.024	.039	0.60	1.00	.030	.061	0.75	1.55	.006	.020	0.15	0.50	.004	.016	0.10	0.40
0603L050	.055	.071	1.40	1.80	.024	.039	0.60	1.00	.030	.061	0.75	1.55	.006	.020	0.15	0.50	.004	.016	0.10	0.40

**Part Ordering Number System**



**Packaging**

Part Number	Ordering Number	Halogen Free	I <sub>hold</sub> (A)	I <sub>hold</sub> Code	Packaging Option	Quantity	Quantity & Packaging Codes
0603L004	0603L004YR	Yes	0.04	004	Tape and Reel	4000	YR
0603L010	0603L010YR	Yes	0.10	010	Tape and Reel	4000	YR
0603L020	0603L020YR	Yes	0.20	020	Tape and Reel	4000	YR
0603L025	0603L025YR	Yes	0.25	025	Tape and Reel	4000	YR
0603L035	0603L035YR	Yes	0.35	035	Tape and Reel	4000	YR
0603L050	0603L050YR	Yes	0.50	050	Tape and Reel	4000	YR

**Tape and Reel Specifications**

TAPE SPECIFICATIONS: EIA-481-1 (mm)		
	0603L004 0603L010 0603L020 0603L025	0603L035 0603L050
<b>W</b>	8.0+/- 0.30	8.0+/- 0.30
<b>F</b>	3.5+/- 0.05	3.5+/- 0.05
<b>E<sub>1</sub></b>	1.75+/- 0.10	1.75+/- 0.10
<b>D<sub>0</sub></b>	1.55+/- 0.05	1.55+/- 0.05
<b>D<sub>1</sub></b>	0.5(min)	0.5 (min)
<b>P<sub>0</sub></b>	4.0+/- 0.10	4.0+/- 0.10
<b>P<sub>1</sub></b>	4.0+/- 0.10	4.0+/- 0.10
<b>P<sub>2</sub></b>	2.0+/- 0.05	2.0+/- 0.05
<b>A<sub>0</sub></b>	1.10+/- 0.10	1.10+/- 0.10
<b>B<sub>0</sub></b>	1.92+/- 0.10	1.92+/- 0.10
<b>T</b>	0.20+/- 0.10	0.20+/- 0.10
<b>K<sub>0</sub></b>	0.72+/- 0.10	0.96+/- 0.10
<b>Leader min.</b>	390	390
<b>Trailer min.</b>	160	160

REEL DIMENSIONS: EIA-481-1 (mm)	
<b>H</b>	12.0+/- 0.05
<b>W</b>	9.0+/- 0.5
<b>D</b>	Ø60+0.5
<b>F</b>	Ø13.0 +/- 0.2
<b>C</b>	Ø178 +/- 1.0
<b>H<sub>1</sub></b>	11+/- 0.5
<b>W<sub>1</sub></b>	2.2+/- 0.5
<b>W<sub>2</sub></b>	3.0+0.5
<b>W<sub>3</sub></b>	4.0+0.5
<b>W<sub>4</sub></b>	5.5+0.5

**0603L Series**

**Tape and Reel Diagram**

