

### 0603L Series



#### Agency Approvals

| AGENCY  | AGENCY FILE NUMBER |
|---|--------------------|
|  | E183209            |
|  | R50119118          |

#### 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

#### 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.

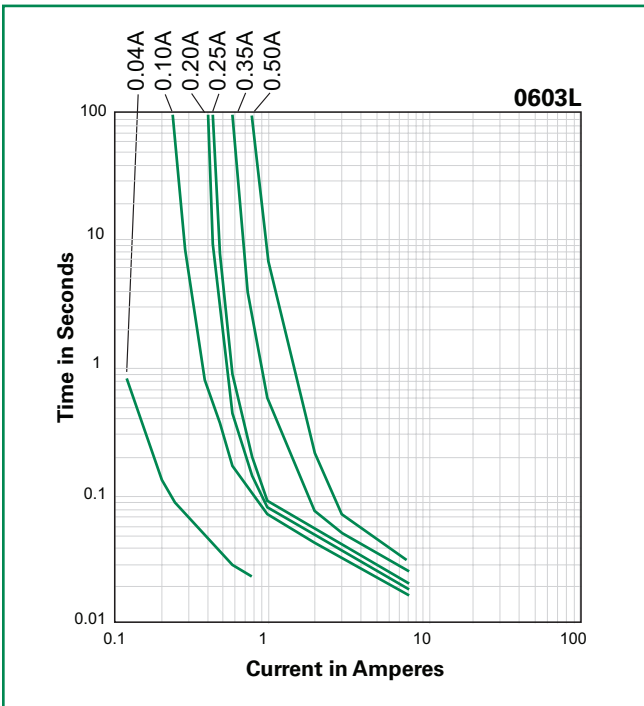
#### WARNING

- 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.

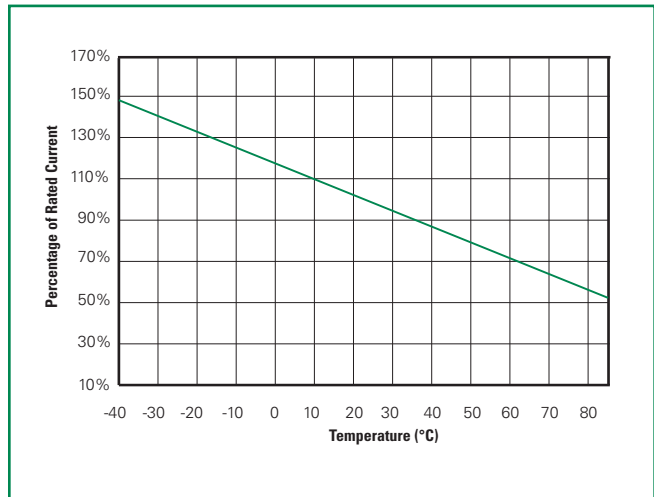
**Temperature Derating**

| Part Number | Ambient Operation Temperature |       |       |       |       |       |       |       |       |
|-------------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
|             | -40°C                         | -20°C | 0°C   | 20°C  | 40°C  | 50°C  | 60°C  | 70°C  | 85°C  |
| 0603L004    | 0.052                         | 0.048 | 0.044 | 0.040 | 0.032 | 0.028 | 0.024 | 0.020 | 0.012 |
| 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    | 0.67                          | 0.59  | 0.54  | 0.50  | 0.41  | 0.37  | 0.34  | 0.29  | 0.20  |

**Average Time Current Curves**



**Temperature Derating Curve**

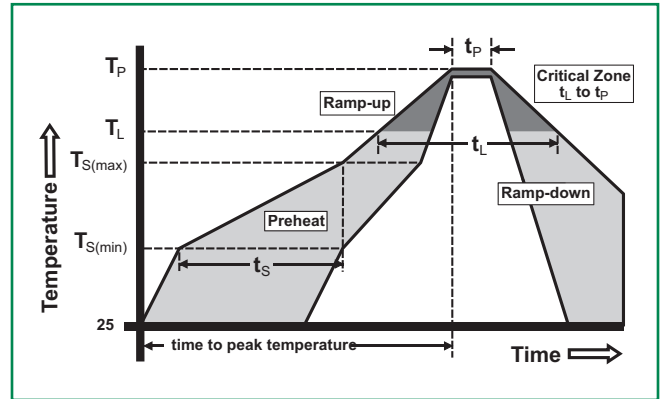


Note:  
Typical Temperature derating curve, refer to table for derating data

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

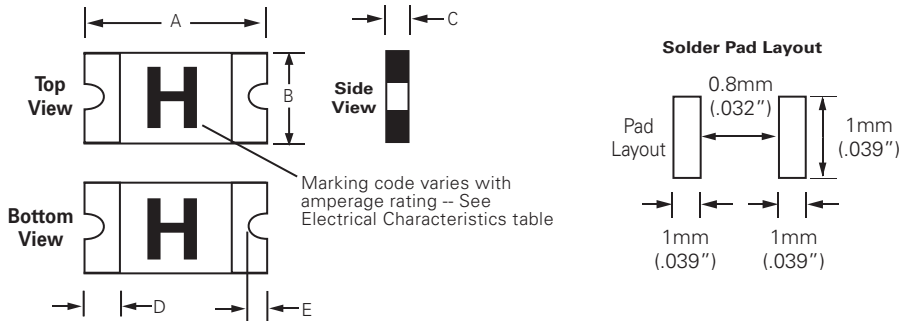
### Physical Specifications

|                           |  |
|---------------------------|--|
| <b>Terminal Material</b>  | Solder-Plated Copper<br>(Solder Material: Matte Tin (Sn))        |
| <b>Lead Solderability</b> | Meets EIA Specification RS186-9E,<br>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<br>-/+10% typical resistance change                             |
| <b>Humidity Aging</b>                                      | +85°C, 85% R.H., 100 hours<br>-/+15% typical resistance change                    |
| <b>Thermal Shock</b>                                       | MIL-STD-202, Method 107<br>+85°C/-40°C 20 times<br>-30% typical resistance change |
| <b>Solvent Resistance</b>                                  | MIL-STD-202, Method 215<br>No change  |
| <b>Vibration</b>   | MIL-STD-883, Method 2007,<br>Condition A<br>No change                             |
| <b>Moisture Sensitivity Level</b>                          | Level 1, J-STD-020  |

**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**

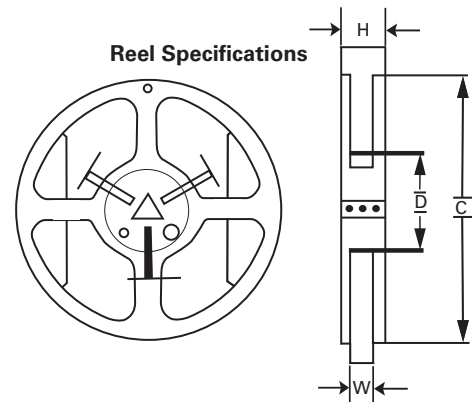
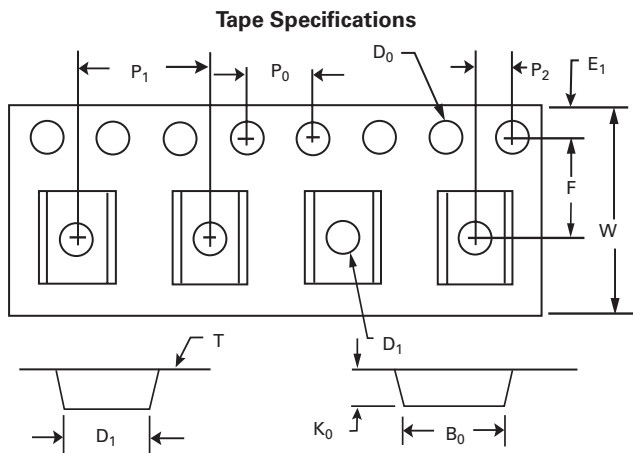
| Part Number | Ordering Number | Halogen Free | $I_{hold}$ (A) | $I_{hold}$ Code | Packaging Option | Quantity | Quantity & Packaging Codes |
|-------------|-----------------|--------------|----------------|-----------------|------------------|----------|----------------------------|
| 0603L004    | 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<br>0603L010<br>0603L020<br>0603L025 | 0603L035<br>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>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:<br>EIA-481-1 (mm) |              |
|------------------------------------|--------------|
| <b>C</b>                           | Ø178+/-1.0   |
| <b>D</b>                           | Ø60.2+/- 0.5 |
| <b>H</b>                           | 11.0+0.5     |
| <b>W</b>                           | 9.0+/- 1.5   |

### Tape and Reel Diagram



Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкуренеспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



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