# RoHS Pb HF 0603L Series



## 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

## Agency Approvals

| AGENCY | AGENCY FILE NUMBER |
|---|---|
| c UL us | E183209 |
| TÜV | R50119118 |

## 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 | $I_{hold}$ (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 | TÜV |
| 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 |

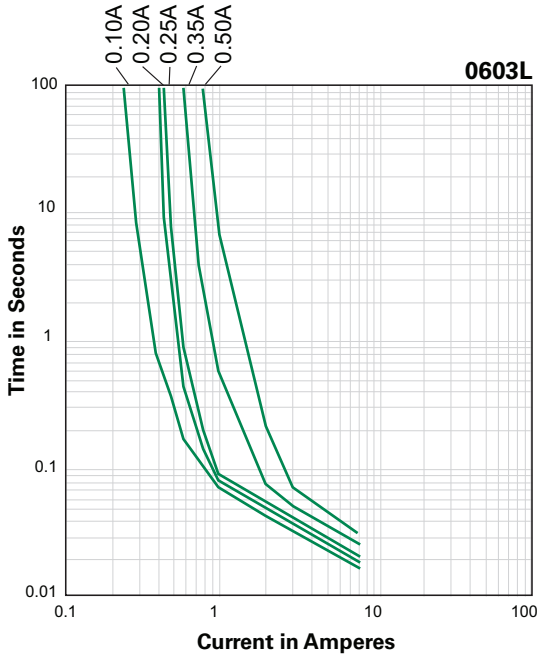
$I_{hold}$ = Hold current: maximum current device will pass without tripping in 20°C still air.
$I_{trip}$ = Trip current: minimum current at which the device will trip in 20°C still air.
$V_{max}$ = Maximum voltage device can withstand without damage at rated current (I max)
$I_{max}$ = Maximum fault 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.

© 2012 Littelfuse, Inc
Specifications are subject to change without notice.
Please refer to www.littelfuse.com/series/0603L.html for current information.

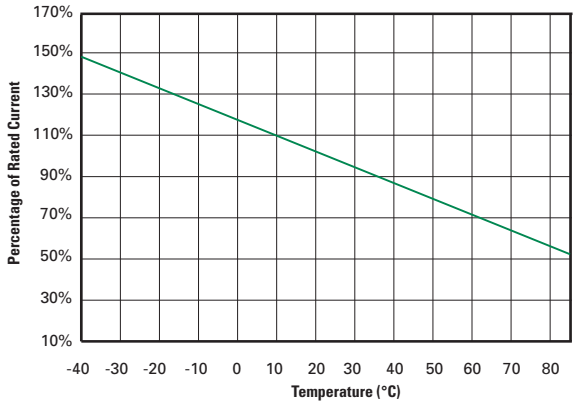
## Temperature Rerating

| | 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) | | | | | | | | |
| 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 Rerating Curve

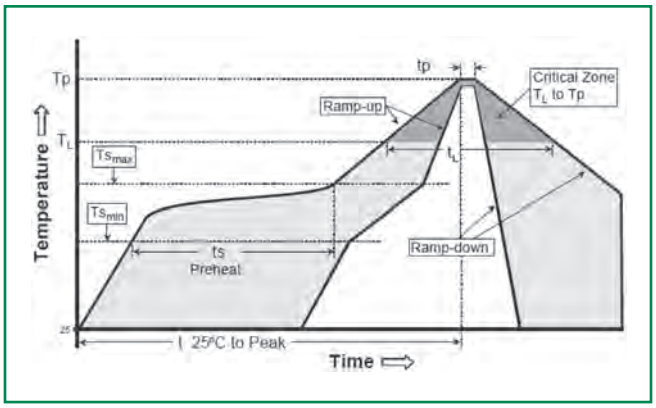



The average time current curves and Temperature Rerating curve performance is affected by a number or variables, and these curves provided as guidance only. Customer must verify the performance in their application.


© 2012 Littelfuse, Inc.
Specifications are subject to change without notice.
Please refer to www.littelfuse.com/series/0603L.html for current information.

## 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 EIA Specification RS186-9E, ANSI/J-STD-002, Category 3. |

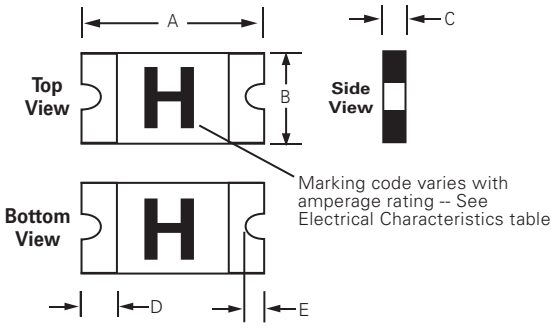
## Environmental Specifications

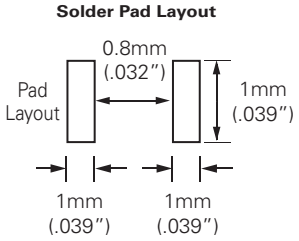
| | |
|---|---|
| **Operating/Storage Temperature** | -40°C to +85°C |
| **Maximum Device Surface Temperature in Tripped State** | 125°C |
| **Passive Aging** | +85°C, 1000 hours<br>-/+10% typical resistance change |
| **Humidity Aging** | +85°C, 85% R.H.,100 hours<br>-/+15% typical resistance change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



© 2012 Littelfuse, Inc
Specifications are subject to change without notice.
Please refer to www.littelfuse.com/series/0603L.html for current information.

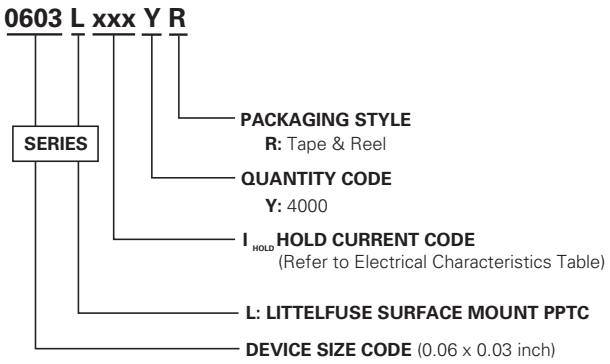
## Dimensions




| 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 |

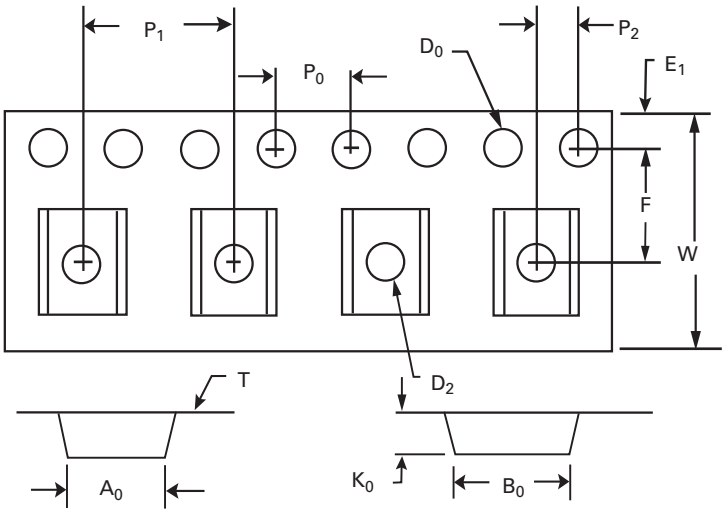

© 2012 Littelfuse, Inc.
Specifications are subject to change without notice.
Please refer to www.littelfuse.com/series/0603L.html for current information.

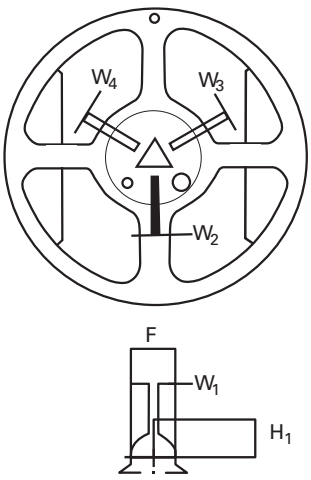
## Tape and Reel Specifications

| TAPE SPECIFICATIONS: EIA-481-1 (mm) | | |
|---|---|---|
| | 0603L004<br>0603L010<br>0603L020<br>0603L025 | 0603L035<br>0603L050 |
| W | 8.0+/- 0.30 | 8.0+/- 0.30 |
| F | 3.5+/- 0.05 | 3.5+/- 0.05 |
| $E_1$ | 1.75+/- 0.10 | 1.75+/- 0.10 |
| $D_0$ | 1.55+/- 0.05 | 1.55+/- 0.05 |
| $D_1$ | 0.5(min) | 0.5 (min) |
| $P_0$ | 4.0+/- 0.10 | 4.0+/- 0.10 |
| $P_1$ | 4.0+/- 0.10 | 4.0+/- 0.10 |
| $P_2$ | 2.0+/- 0.05 | 2.0+/- 0.05 |
| $A_0$ | 1.10+/- 0.10 | 1.10+/- 0.10 |
| $B_0$ | 1.92+/- 0.10 | 1.92+/- 0.10 |
| T | 0.20+/- 0.10 | 0.20+/- 0.10 |
| $K_0$ | 0.72+/- 0.10 | 0.96+/- 0.10 |
| Leader min. | 390 | 390 |
| Trailer min. | 160 | 160 |

| REEL DIMENSIONS: EIA-481-1 (mm) | |
|---|---|
| H | 12.0+/- 0.05 |
| W | 9.0+/- 0.5 |
| D | Ø60+0.5 |
| F | Ø13.0 +/- 0.2 |
| C | Ø178 +/- 1.0 |
| $H_1$ | 11+/- 0.5 |
| $W_1$ | 2.2+/- 0.5 |
| $W_2$ | 3.0+0.5 |
| $W_3$ | 4.0+0.5 |
| $W_4$ | 5.5+0.5 |

## Tape and Reel Diagram






© 2012 Littelfuse, Inc
Specifications are subject to change without notice.
Please refer to www.littelfuse.com/series/0603L.html for current information.

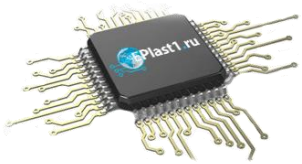
Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.




**Как с нами связаться**

**Телефон:** 8 (812) 309 58 32 (многоканальный)
**Факс:** 8 (812) 320-02-42
**Электронная почта:** org@eplast1.ru
**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.