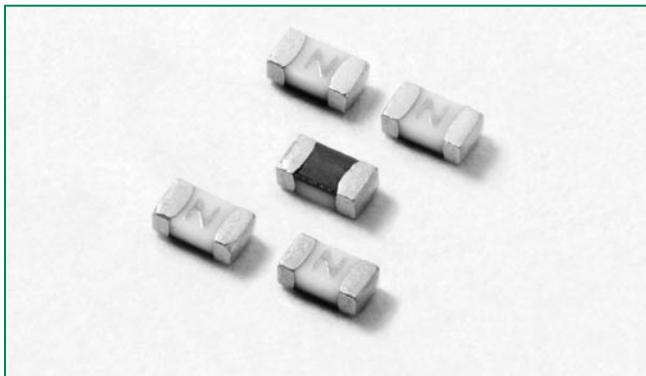


RoHS HF 441 Series – 0603 High I²t Fuse





Description

This 100% Lead-free, RoHS compliant and Halogen-free fuse series has been designed specifically to provide over current protection to circuits that see high working ambient temperatures (up to 150°C) and high inrush currents.

The general design ensures excellent temperature stability and performance reliability.

This high I²t fuse series is designed to have ultra high inrush current withstand capability to avoid nuisance fuse open.

Agency Approvals

| AGENCY | AGENCY FILE NUMBER | AMPERE RANGE |
|---|--------------------|--------------|
|  | E10480 | 2A - 6A |
|  | LR29862 | 2A - 6A |

Features

- Operating Temperature from -55°C to 150°C
- 100% Lead-free and RoHS compliant
- Suitable for both leaded and lead-free reflow / wave soldering
- Ultra high I²t values



Electrical Characteristics

| % of Ampere Rating | Ampere Rating | Opening Time at 25°C |
|--------------------|---------------|----------------------|
| 100% | 2A - 6A | 4 Hours Minimum |
| 350% | 2A - 6A | 5 Seconds Maximum |

Applications

- Handheld Electronics
- LCD Displays
- Battery Packs
- Hard Disk Drives
- SD Memory Cards
- Automotive Electronics

Electrical Specifications by Item

| Ampere Rating (A) | Amp Code | Max. Voltage Rating (V) | Interrupting Rating | Nominal Resistance (Ohms) ² | Nominal Melting I ² t (A ² Sec.) ³ | Nominal Voltage Drop At Rated Current (V) ⁴ | Nominal Power Dissipation At Rated Current (W) | Agency Approvals | |
|-------------------|----------|-------------------------|---------------------|--|---|--|--|---|---|
| | | | | | | | |  |  |
| 2 | 002. | 32 | 50 A @ 32 VDC | 0.0302 | 0.3103 | 0.0551 | 0.110 | X | X |
| 2.5 | 02.5 | 32 | | 0.0200 | 0.5520 | 0.0534 | 0.134 | X | X |
| 3 | 003. | 32 | | 0.0158 | 0.8165 | 0.0531 | 0.159 | X | X |
| 3.5 | 03.5 | 32 | | 0.0117 | 0.9438 | 0.0468 | 0.164 | X | X |
| 4 | 004. | 32 | | 0.0097 | 1.2659 | 0.0475 | 0.190 | X | X |
| 5 | 005. | 32 | | 0.0073 | 1.6287 | 0.0472 | 0.236 | X | X |
| 6 | 006. | 32 | | 0.0056 | 2.6049 | 0.0464 | 0.278 | X | X |

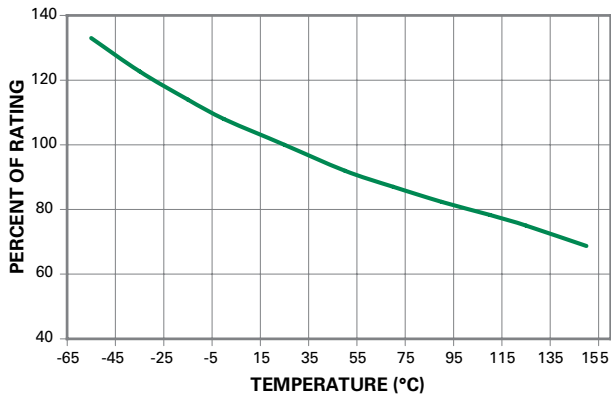
Notes:

- DC Interrupting Rating tested at rated voltage with time constant < 0.8 msecs.
- Nominal Resistance measured with < 10% rated current.
- Nominal Melting I²t measured at 1 msec. opening time.
- Nominal Voltage Drop measured at rated current after temperature has stabilized.

Devices designed to carry out rated current for 4 hours minimum. It is recommended that devices be operated continuously at no more than 80% rated current. See "Temperature Derating Curve" for additional derating information.

Devices designed to be mounted with marking code facing up.

Temperature Derating Curve



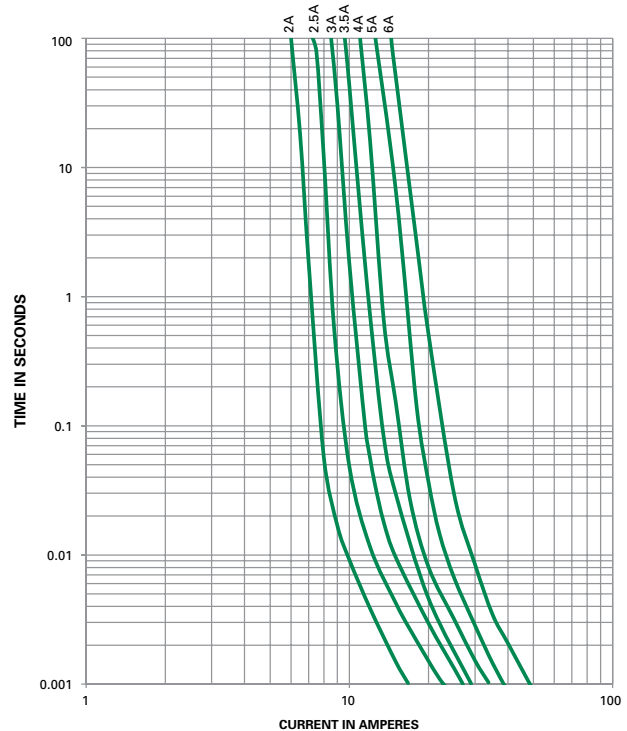
Note:

1. Derating depicted in this curve is in addition to the standard derating of 20% for continuous operation.

For continuous operation at 75 degrees celsius, the fuse should be derated as follows:

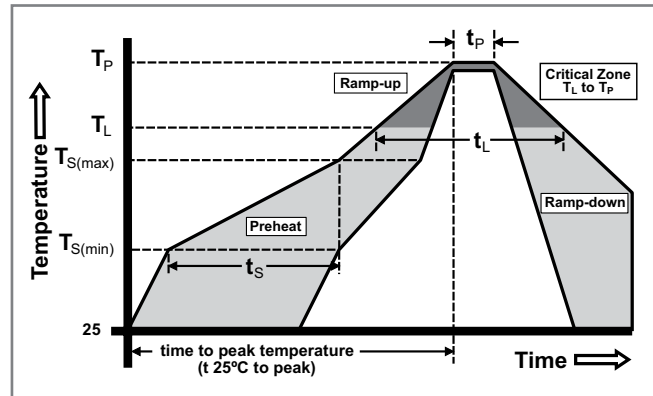
$$I = (0.80)(0.85)I_{RAT} = (0.68)I_{RAT}$$

Average Time Current Curves



Soldering Parameters

| | | |
|--|------------------------------------|-------------------------|
| Reflow Condition | | Pb – free assembly |
| Pre Heat | - Temperature Min ($T_{s(min)}$) | 150°C |
| | - Temperature Max ($T_{s(max)}$) | 200°C |
| | - Time (Min to Max) (t_s) | 60 – 180 seconds |
| Average Ramp-up Rate (Liquidus Temp (T_L) to peak) | | 3°C/second max. |
| $T_{s(max)}$ to T_L - Ramp-up Rate | | 5°C/second max. |
| Reflow | - Temperature (T_L) (Liquidus) | 217°C |
| | - Temperature (t_L) | 60 – 150 seconds |
| Peak Temperature (T_p) | | 260 ^{+0/-5} °C |
| Time within 5°C of actual peak Temperature (t_p) | | 10 – 30 seconds |
| Ramp-down Rate | | 6°C/second max. |
| Time 25°C to peak Temperature (T_p) | | 8 minutes max. |
| Do not exceed | | 260°C |



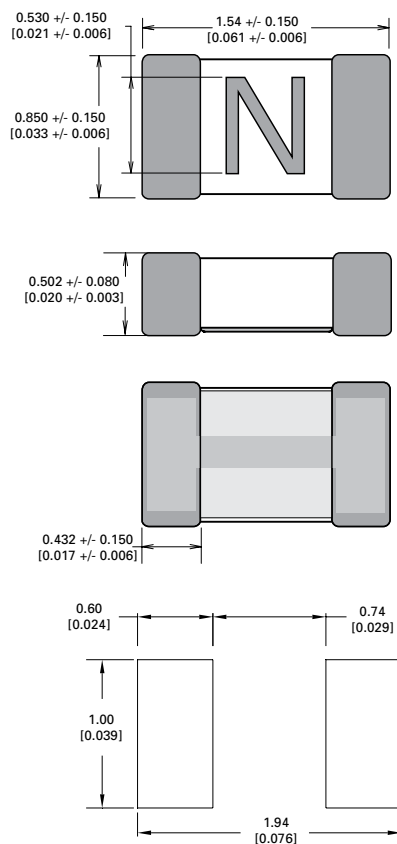
| | |
|----------------|------------------------|
| Wave Soldering | 260°C, 10 seconds max. |
|----------------|------------------------|

Product Characteristics

| | |
|-----------------------------------|--|
| Materials | Body: Advanced Ceramic Terminations: Ag / Ni / Sn (100% Lead-free) Element Cover Coating: Lead-free Glass |
| Moisture Sensitivity Level | IPC/JEDEC J-STD-020C, Level 1 |
| Solderability | IPC/ECA/JEDEC J-STD-002C, Condition C |
| Humidity | MIL-STD-202, Method 103B, Conditions D |
| Resistance to Solder Heat | MIL-STD-202, Method 210F, Condition B |

| | |
|-------------------------------------|---------------------------------------|
| Moisture Resistance | MIL-STD-202, Method 106G |
| Thermal Shock | MIL-STD-202, Method 107G, Condition B |
| Mechanical Shock | MIL-STD-202, Method 213B, Condition A |
| Vibration | MIL-STD-202, Method 201A |
| Vibration, High Frequency | MIL-STD-202, Method 204D, Condition D |
| Dissolution of Metallization | IPC/ECA/JEDEC J-STD-002C, Condition D |
| Terminal Strength | IEC 60127-4 |

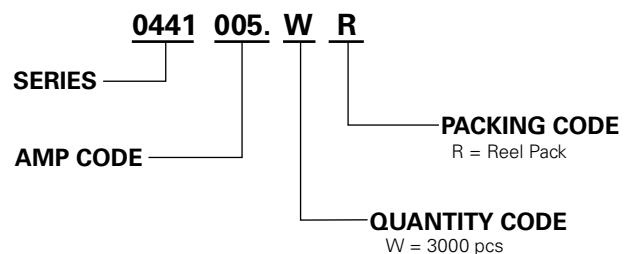
Dimensions



Part Marking System

| Amp Code | Marking Code |
|----------|--------------|
| 002. | N |
| 02.5 | O |
| 003. | P |
| 03.5 | R |
| 004. | S |
| 005. | T |
| 006. | U |

Part Numbering System



Packaging

| Packaging Option | Packaging Specification | Quantity | Quantity & Packaging Code |
|-------------------|----------------------------|----------|---------------------------|
| 8mm Tape and Reel | EIA-481, IEC 60286, Part 3 | 3000 | WR |

