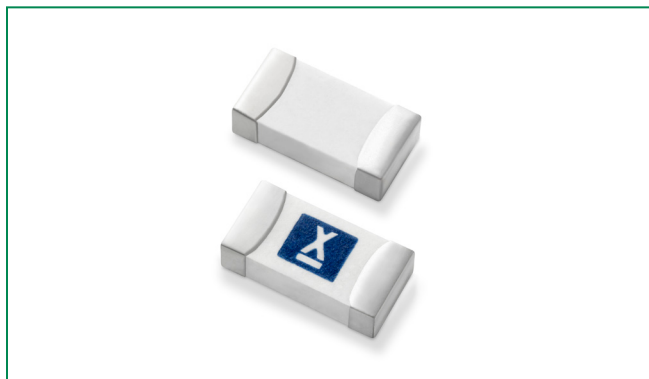


### 407 Series – 1206 Time-Lag Fuse



#### Agency Approvals

| AGENCY | AGENCY FILE NUMBER | AMPERE RANGE |
|--------|--------------------|--------------|
|        | E10480             | 1A – 8A      |

#### Electrical Characteristics

| % of Ampere Rating | Ampere Rating | Opening Time at 25°C         |
|--------------------|---------------|------------------------------|
| 100%               | 1A – 8A       | 4 hours Minimum              |
| 200%               | 1A – 8A       | 1 sec Min; 120 secs Max      |
| 300%               | 1A – 8A       | 0.1 sec Min; 3 secs Max      |
| 800%               | 1A – 8A       | 0.002 sec Min; 0.05 secs Max |

#### Additional Information



**Datasheet**



**Samples**

#### Description

Littelfuse 407 Series is a 100% lead-free, RoHS compliant and halogen-free fuse designed specifically to provide overcurrent protection to circuits that operate under high working ambient temperatures up to 150° C and high in-rush currents. The general design ensures excellent temperature stability and performance reliability. This high I<sup>2</sup>t time lag fuse is designed to have ultra-high in-rush current withstand capability to avoid nuisance fuse open.

#### Features

- Operating Temperature from -55° C to +150° C
- UL Recognized to UL/CSA/NMX 248-1 and UL/CSA/NMX 248-14
- 100% Lead-free, RoHS
- compliant and Halogen-free
- Suitable for both leaded and lead-free reflow/wave soldering
- Ultra high I<sup>2</sup>t values

#### Benefits

- Avoids nuisance opening due to high inrush and surge current inherent in the system
- High current ratings in small size

#### Applications

- Displays
- Servers
- Computers
- Printers
- Scanners
- Data Modems
- Gaming Consoles

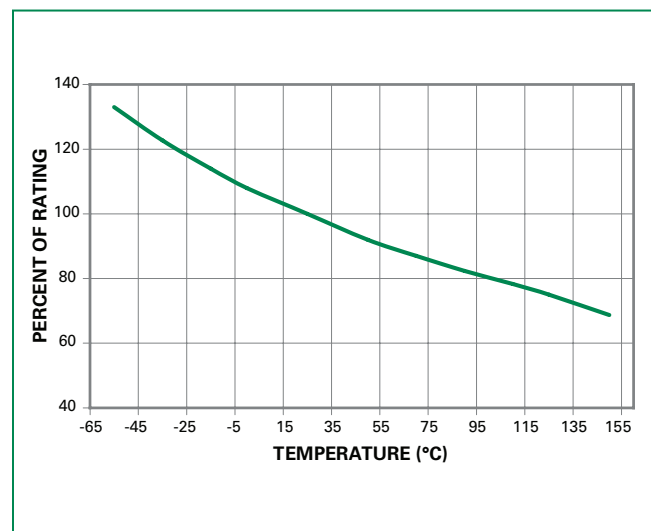
### Electrical Specifications by Item

| Ampere Rating (A) | Amp Code | Max. Voltage Rating (V) | Interrupting Rating (AC/DC) <sup>1</sup> | Nominal Resistance (Ohms) <sup>2</sup> | Nominal Melting I <sup>2</sup> t (A <sup>2</sup> Sec.) <sup>3</sup> | Nominal Voltage Drop At Rated Current (V) <sup>4</sup> | Nominal Power Dissipation At Rated Current (W) | Agency Approval |
|-------------------|----------|-------------------------|------------------------------------------|----------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------|------------------------------------------------|-----------------|
| 1.00              | 001.     | 63                      | 50A@63VDC                                | 0.360                                  | 0.142                                                               | 0.456                                                  | 0.456                                          | x               |
| 1.25              | 1.25     | 63                      |                                          | 0.200                                  | 0.329                                                               | 0.404                                                  | 0.500                                          | x               |
| 1.50              | 01.5     | 63                      |                                          | 0.180                                  | 0.567                                                               | 0.347                                                  | 0.525                                          | x               |
| 2.00              | 002.     | 63                      |                                          | 0.100                                  | 0.870                                                               | 0.323                                                  | 0.640                                          | x               |
| 2.50              | 02.5     | 32                      | 50A@32VDC                                | 0.055                                  | 1.000                                                               | 0.252                                                  | 0.625                                          | x               |
| 3.00              | 003.     | 32                      |                                          | 0.040                                  | 1.300                                                               | 0.187                                                  | 0.570                                          | x               |
| 3.50              | 03.5     | 32                      |                                          | 0.030                                  | 2.260                                                               | 0.153                                                  | 0.525                                          | x               |
| 4.00              | 004.     | 32                      |                                          | 0.025                                  | 4.180                                                               | 0.142                                                  | 0.560                                          | x               |
| 4.50              | 04.5     | 32                      |                                          | 0.020                                  | 5.200                                                               | 0.134                                                  | 0.585                                          | x               |
| 5.00              | 005.     | 32                      |                                          | 0.016                                  | 7.800                                                               | 0.133                                                  | 0.650                                          | x               |
| 5.50              | 05.5     | 24                      | 50A@24VDC                                | 0.014                                  | 8.550                                                               | 0.130                                                  | 0.715                                          | x               |
| 6.00              | 006.     | 24                      | 60A@24VDC                                | 0.012                                  | 15.560                                                              | 0.128                                                  | 0.780                                          | x               |
| 7.00              | 007.     | 24                      |                                          | 0.010                                  | 16.230                                                              | 0.110                                                  | 0.770                                          | x               |
| 8.00              | 008.     | 24                      |                                          | 0.009                                  | 24.120                                                              | 0.097                                                  | 0.800                                          | x               |

#### Note:

- AC Interrupting Rating tested at rated voltage with unity power factor. DC Interrupting Rating tested at rated voltage with time constant < 0.8 msec.
  - Nominal Resistance measured with < 10% rated current.
  - Nominal Melting I<sup>2</sup>t measured at 1 msec opening time.
  - Nominal Voltage Drop measured at rated current after temperature has stabilized.
- Devices designed to carry rated current for 4 hours minimum. It is recommended that devices be operated continuously at no more than 80% rated current. See *Temperature Re-rating Curve* for additional derating information.
  - Devices designed to be mounted with marking code facing up.

### Temperature Re-rating Curve



#### Note:

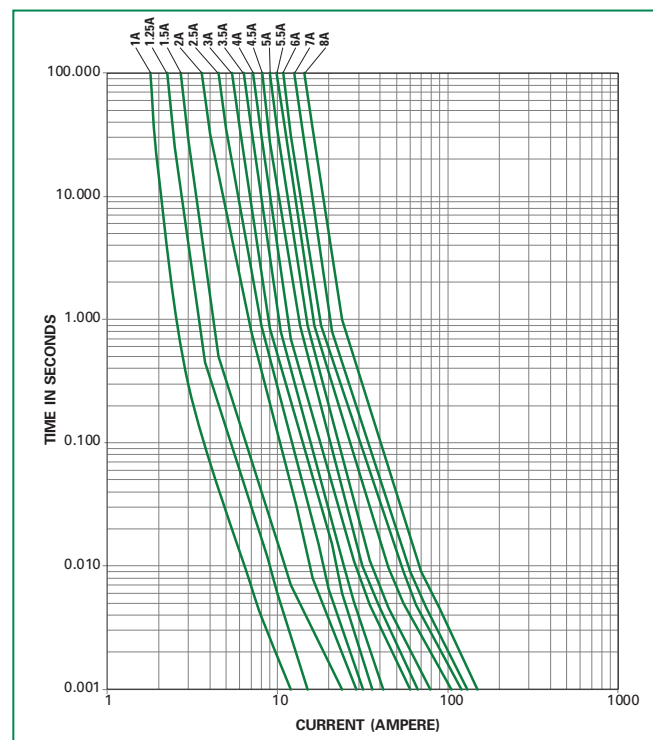
Re-rating depicted in this curve is in addition to the standard re-rating of 20% for continuous operation.

#### Example:

For continuous operation at 75° C, the fuse should be rerated as follows:

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

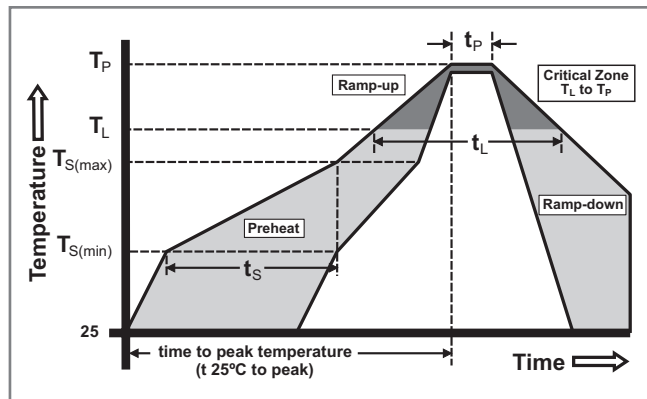
### Average Time Current Curves



### 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 <sup>+0/-5</sup> ° 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. |
|----------------|------------------------|

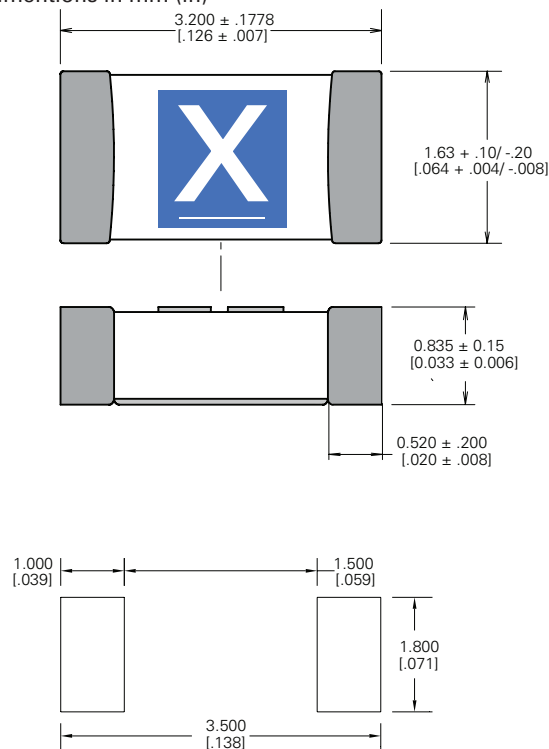


### Product Characteristics

|                                     |                                                                                                                                      |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>Materials</b>                    | <b>Body:</b> Advanced Ceramic<br><b>Terminations:</b> Ag / Ni / Sn (100% Lead-free)<br><b>Element Cover Coating:</b> Lead-free Glass |
| <b>Moisture Sensitivity Level</b>   | IPC/JEDEC J-STD-020, Level 1                                                                                                         |
| <b>Solderability</b>                | IPC/ECA/JEDEC J-STD-002, Condition C                                                                                                 |
| <b>Humidity Test</b>                | MIL-STD-202, Method 103, Conditions D                                                                                                |
| <b>Resistance to Solder Heat</b>    | MIL-STD-202, Method 210, Condition B                                                                                                 |
| <b>Moisture Resistance</b>          | MIL-STD-202, Method 106                                                                                                              |
| <b>Thermal Shock</b>                | MIL-STD-202, Method 107, Condition B                                                                                                 |
| <b>Mechanical Shock</b>             | MIL-STD-202, Method 213, Condition A                                                                                                 |
| <b>Vibration</b>                    | MIL-STD-202, Method 201                                                                                                              |
| <b>Vibration, High Frequency</b>    | MIL-STD-202, Method 204, Condition D                                                                                                 |
| <b>Dissolution of Metallization</b> | IPC/ECA/JEDEC J-STD-002, Condition D                                                                                                 |
| <b>Terminal Strength</b>            | IEC 60127-4                                                                                                                          |

### Dimensions

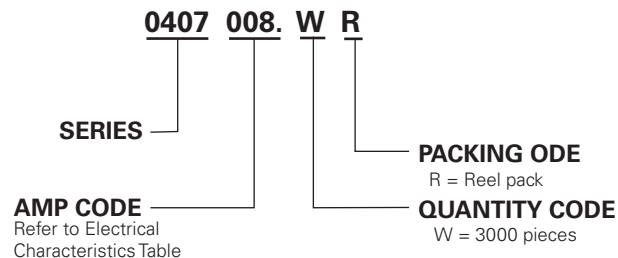
All dimensions in mm (in)



### Part Marking System

| Amp Code | Marking Code | Amp Code | Marking Code |
|----------|--------------|----------|--------------|
| 001.     | <b>H</b>     | 004.     | <b>S</b>     |
| 1.25     | <b>J</b>     | 04.5     | <b>S.</b>    |
| 01.5     | <b>K</b>     | 005.     | <b>T</b>     |
| 002.     | <b>N</b>     | 05.5     | <b>U</b>     |
| 02.5     | <b>Q</b>     | 006.     | <b>V</b>     |
| 003.     | <b>P</b>     | 007.     | <b>W</b>     |
| 03.5     | <b>R</b>     | 008.     | <b>X</b>     |

### Part Numbering System



### Packaging

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

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