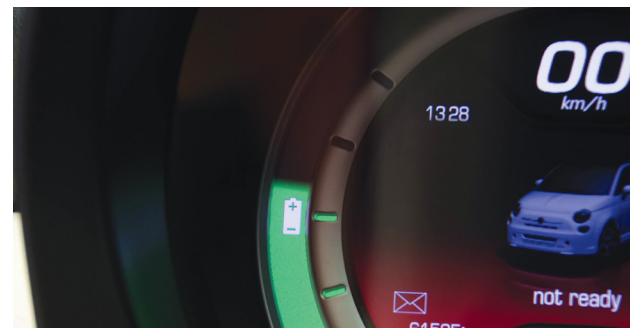




Expertise Applied | Answers Delivered



## AUTOMOTIVE PASSENGER CAR CATALOG

**BLADE FUSES**  
**HIGH VOLTAGE FUSES**  
**SMD COMPONENTS**

**CARTRIDGE FUSES**  
**MASTERFUSES**  
**CABLE PROTECTION**

**HIGH CURRENT FUSES**  
**PAL FUSES**  
**SPECIALTY PRODUCTS**





# Our offering encompasses a wide range of applications

|                     |                                                                        |
|---------------------|------------------------------------------------------------------------|
| <b>Powertrain</b>   | Engine Management<br>Transmission Control<br>Cooling Fan<br>Water Pump |
| <b>Safety</b>       | ABS<br>EPAS<br>Air Bag<br>Chassis Control                              |
| <b>Comfort</b>      | Window Lift<br>Sun Roof<br>Door Lock<br>Power Seat<br>HVAC             |
| <b>Infotainment</b> | Dashboard<br>Navigation<br>In-Car Entertainment                        |
| <b>Fuse Box</b>     | Wire Harness                                                           |
| <b>Power Supply</b> | Generator                                                              |
| <b>Lighting</b>     | HID Headlight<br>Headlight Leveling<br>Directional Lighting            |



# Helping to make the World a Cleaner Place to Live



## Littelfuse and the Environment

As members of the global community, we at Littelfuse have always strived to understand the impact of what we do, and of what we create, on the world around us. Because of this, our concern for the environment has always been an integral and fundamental part of our business. We continually work to balance our business objectives with the need to protect and improve the local and global environment.

## Our Strategy for the Design of Eco-friendly Products

Littelfuse has established a focused program committed to developing high-performance eco-friendly products along with a comprehensive set of processing/reliability data and technical process expertise. This includes processes for eliminating, detecting and documenting the presence of hazardous materials such as

- Lead
- Cadmium
- Hexavalent Chromium
- Mercury
- Brominated flame-retardants (PBBs and PBDEs)

The Littelfuse strategy for eco-friendly products is specifically designed to help support our worldwide customers in their transition to Lead-Free processing.



All products considered to be lead-free are marked with this symbol.

Littelfuse defines lead-free as products which contain less than 1000ppm (0.1%) Lead, measured by weight of the entire product.



All RoHS compliant products are marked with this symbol.

Littelfuse follows the requirement set by the European Union for all RoHS compliant products. The European Union Directive 2002/95/EC RoHS restricts the use of Lead, Mercury, Hexavalent Chromium, Cadmium and Brominated flame-retardants (PBBs and PBDEs)

Visit [www.littelfuse.com/lead-free](http://www.littelfuse.com/lead-free) for further information.

# Portfolio of Littelfuse automotive technologies, products & services

Passenger Automobiles | Aftermarket

## SERVICES

### Product Technologies Plus Application Design Evaluation Services

Littelfuse is the world leader in circuit protection. We offer an extensive selection of circuit protection technologies for Automotive applications. Littelfuse circuit protection expert staff can assist you in designing circuit protection for your most demanding applications. Solutions for over-current applications as well as over-voltage applications are available from Littelfuse.



## CIRCUIT PROTECTION TECHNOLOGIES (1-9)

### 1. Fuses/Footprint Reduction

MICRO2™, MICRO3™ fuses

### 2. Medium Current Cartridge Fuses

MCASE+™ cartridge fuses; considerably smaller than JCASE® and Low Profile JCASE® fuses

### 3. Discrete High Current Fuses

High Current Bolt Down fuses and fuse arrays

### 4. ZCase Masterfuse

Smallest high current distribution product in the industry

### 5. Masterfuse

High current distribution array

### 6. ZCase Single MEGA

Minimal Footprint Bolt Down fuse

### 7. High Voltage Fuses

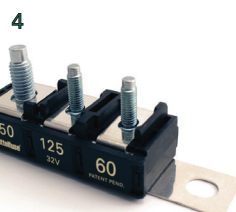
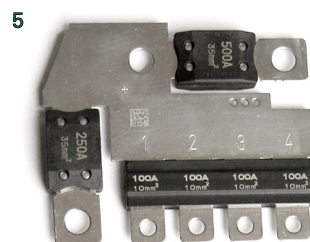
Low-current fuses for Electric and Hybrid Electric Vehicles

### 8. Battery Cable Protection

CABLE PRO® protectors for mounting directly inline as part of a high power cable assembly

### 9. SMD Autofuse

SMD fuses for printed circuit boards







Littelfuse® products are not designed for, and shall not be used for, any purpose (including, without limitation, automotive, military, aerospace, medical, life-saving, life-sustaining or nuclear facility applications, devices intended for surgical implant into the body, or any other application in which the failure or lack of desired operation of the product may result in personal injury, death, or property damage) other than those expressly set forth in applicable Littelfuse® product documentation. Warranties granted by Littelfuse® shall be deemed void for products used for any purpose not expressly set forth in applicable Littelfuse® documentation. Littelfuse® shall not be liable for any claims or damages arising out of products used in applications not expressly intended by Littelfuse® as set forth in applicable Littelfuse® documentation. The sale and use of Littelfuse® products is subject to Littelfuse Terms and Conditions of Sale, unless otherwise agreed by Littelfuse®.



|                    |    |
|--------------------|----|
| BLADE FUSES        | 1  |
| CARTRIDGE FUSES    | 22 |
| HIGH CURRENT FUSES | 30 |
| SMD FUSES          | 71 |
| CABLE & PAL FUSES  | 74 |
| HIGH VOLTAGE FUSES | 78 |
| SPECIALTY PRODUCTS | 87 |
| FUSEOLOGY          | 90 |



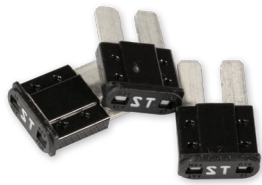


BLADE FUSES

|                                        |    |
|----------------------------------------|----|
| MICRO2™ Blade Fuse 32V                 | 2  |
| MICRO3™ Blade Fuse 32V                 | 4  |
| Low Profile MINI® Fuses Rated 58V      | 6  |
| Low Profile MINI® 10.9 Fuses Rated 58V | 8  |
| MINI® Blade Fuse Rated 32V             | 10 |
| MINI® Blade Fuse Rated 58V             | 12 |
| ATOF® Blade Fuse Rated 32V             | 14 |
| MAXI® Blade Fuse Rated 32V             | 16 |
| MAXI® Blade Fuse Rated 58V             | 18 |
| MAXI+® Blade Fuse Rated 32V            | 20 |



MICRO2™ Blade Fuses



MICRO2™ Shunt

## MICRO2™ Blade Fuses Rated 32V

The MICRO2™ Fuse is the new standard for vehicle circuit protection. Its sub-miniature design meets the need for more circuits to be protected while utilizing less space and its ability to cope with high temperatures in adverse environments makes the MICRO2™ Fuse of recommended choice for protection. Black amperage stamps are used on the 20A & 25A / light colored housings to improve contrast for vision system inspection.

### Specifications

|                                         | MICRO2<br>(Silver Plated)                  | MICRO2 Sn<br>(Tin Plated)                  |
|-----------------------------------------|--------------------------------------------|--------------------------------------------|
| Voltage Rating:                         | 32 VDC                                     | 32 VDC                                     |
| Interrupting Ratings:                   | 1000A @ 32 VDC                             | 1000A @ 32 VDC                             |
| *Recommended Environmental Temperature: | -40°C to +125°C                            | -40°C to +125°C                            |
| Terminals Material:                     | Silver plated zinc alloy                   | Tin plated zinc alloy                      |
| Housing Material:                       | PA66<br>(U.L. 94 Flammability rating – V2) | PA66<br>(U.L. 94 Flammability rating – V2) |
| Net Weight Per Fuse:                    | 0.53±5% gr                                 | 0.53±5% gr                                 |
| Complies with:                          | SAE 2741, ISO 8820-12:2020                 |                                            |

\*Tin plating's temperature limit is ≈130°C. Silver plating allows up to 150°C at the terminal interface.

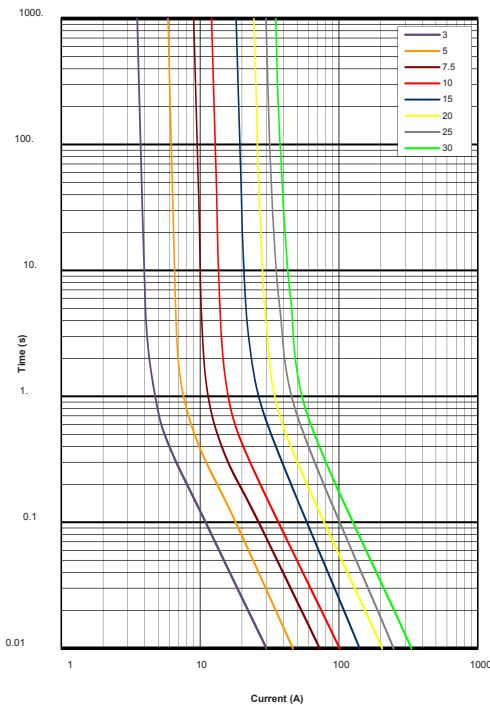
### RoHS

### Ordering Information

| Part Number            | Rating       | Package Size | % of Rating | Opening Time Min / Max (s) |
|------------------------|--------------|--------------|-------------|----------------------------|
| MICRO2 (Silver Plated) |              |              | 110         | 360,000 / ∞                |
| 0327xxx.YX2S           | 3-30 & SHUNT | 4000         | 135         | 0.75 / 120                 |
|                        |              |              | 160         | 0.3 / 50                   |
|                        |              |              | 200         | 0.15 / 5                   |
| 0327xxx.UXS            | 3-30         | 500          | 350         | 0.04 / 0.5                 |
| 0327xxx.LXS            | 3-30         | 50           | 600         | 0.02 / 0.1                 |
| MICRO2 (Tin Plated)    |              |              |             |                            |
| 0327xxx.YX2T           | 5-30         | 4000         |             |                            |

### Time-Current Characteristics

### Time-Current Characteristic Curves



### Ratings

| Part Number | Current Rating (A) | Housing Material Color | Test Cable Size (mm <sup>2</sup> ) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | Typ. I <sup>2</sup> t (A <sup>2</sup> s) |
|-------------|--------------------|------------------------|------------------------------------|------------------------|---------------------------|------------------------------------------|
| 0327003_    | 3 (*)              |                        | 0.35                               | 113                    | 31.7                      | 9                                        |
| 0327005_    | 5                  |                        | 0.5                                | 116                    | 17.4                      | 17                                       |
| 032707.5_   | 7.5                |                        | 0.75                               | 106                    | 10.8                      | 47                                       |
| 0327010_    | 10                 |                        | 1                                  | 102                    | 7.7                       | 90                                       |
| 0327015_    | 15                 |                        | 1.5                                | 94                     | 4.9                       | 190                                      |
| 0327020_    | 20                 |                        | 2.5                                | 91                     | 3.5                       | 400                                      |
| 0327025_    | 25                 |                        | 2.5                                | 90                     | 2.6                       | 580                                      |
| 0327030_    | 30                 |                        | 4                                  | 88                     | 2.1                       | 1,000                                    |
| 0327900_    | SHUNT              |                        | -                                  | -                      | -                         | -                                        |

\* 3 A rating is available only as Silver Plated version

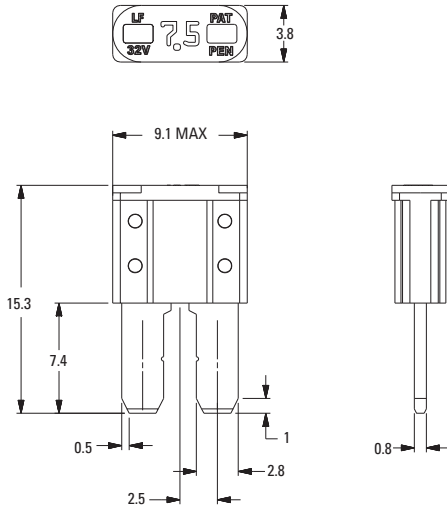
The typical I<sup>2</sup>t is an average value calculated from the breaking capacity tests by using the melting time before the arcing occurs.



## MICRO2™ Blade Fuses Rated 32V

### Dimensions

Dimensions in mm for reference only.  
See outline drawing for dimensions and tolerances.



### Temperature Table

|             | max. allowed current load [A] at ambient temperature (typical derating) |     |      |      |      |       |       |
|-------------|-------------------------------------------------------------------------|-----|------|------|------|-------|-------|
|             | -40°C                                                                   | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| <b>3A</b>   | 3                                                                       | 3   | 3    | 3    | 2    | 2     | 2     |
| <b>5A</b>   | 5                                                                       | 5   | 5    | 4    | 4    | 3     | 3     |
| <b>7.5A</b> | 7.5                                                                     | 7.5 | 7    | 6    | 5    | 5     | 4     |
| <b>10A</b>  | 10                                                                      | 10  | 10   | 8    | 7    | 6     | 5     |
| <b>15A</b>  | 15                                                                      | 15  | 14   | 12   | 10   | 9     | 8     |
| <b>20A</b>  | 20                                                                      | 20  | 18   | 15   | 14   | 12    | 10    |
| <b>25A</b>  | 25                                                                      | 23  | 22   | 18   | 17   | 14    | 12    |
| <b>30A</b>  | 30                                                                      | 27  | 26   | 22   | 20   | 17    | 14    |

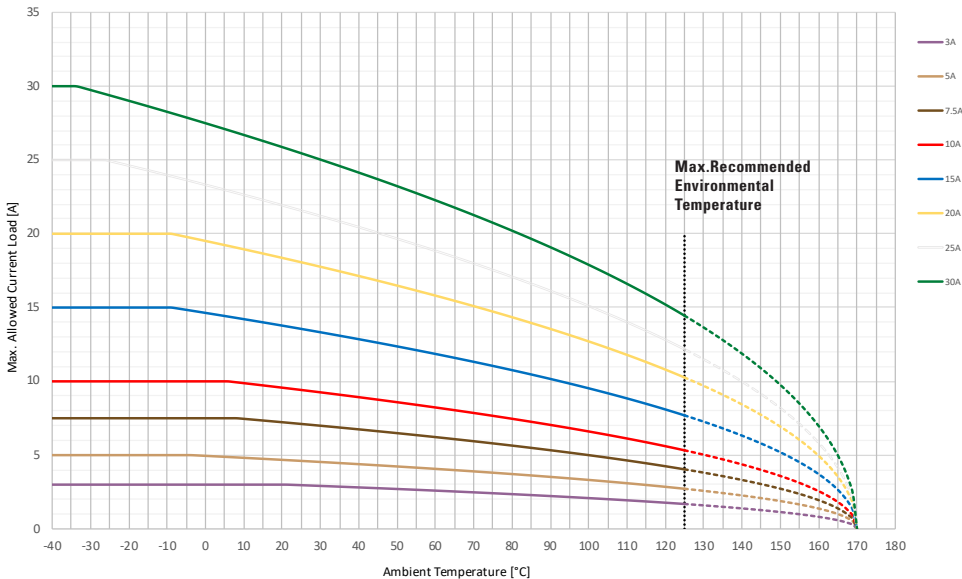
MICRO2 SHUNT Maximum Continuous Load: 20A.

### Typical Derating Of Fuse Melting Element

Temperature Security Margin is 20%

Wire Cross Section And Fixture Test Set Up Refer To ISO 8820-12

Please Contact Littelfuse® For Details Regarding Derating Test Set Up



Derating curves may change depending on the final condition of the application (terminals characteristics, wire size exc..). Please ask Littelfuse® for more information.

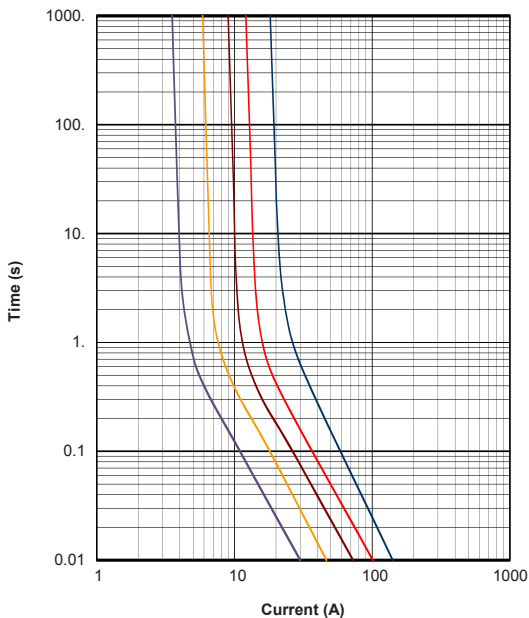


MICRO3™ Blade Fuses



MICRO3™ Shunt

## Time-Current Characteristic Curves



## MICRO3™ Blade Fuses Rated 32V

The MICRO3™ Fuse has 3 terminals and 2 fuse elements with a common center terminal. Its sub-miniature design meets the need for more circuits to be protected while utilizing less space and its ability to cope with high temperatures in adverse environments makes the MICRO3™ Fuse of recommended choice for protection.

### Specifications

|                                         |                                                                                                           |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Voltage Rating:                         | 32 VDC                                                                                                    |
| Interrupting Ratings:                   | 1000A @ 32 VDC                                                                                            |
| *Recommended Environmental Temperature: | -40°C to +125°C                                                                                           |
| Terminals Material:                     | Silver plated zinc alloy                                                                                  |
| Housing Material:                       | PA66 (U.L. 94 Flammability rating – V2)                                                                   |
| Net Weight Per Fuse:                    | 0.95±10% gr                                                                                               |
| Complies with:                          | SAE 2741 and ISO 8820-3 in reference to electrical, mechanical and environmental performance requirements |

### RoHS

\*Silver plating allows up to 150°C at the terminal interface.

## Ordering Information

| Part Number  | Rating            | Package Size |
|--------------|-------------------|--------------|
| 0337xxx.PX2S | 3 - 15<br>& SHUNT | 2000         |
| 0337xxx.LXS  | 3 - 15            | 50           |

## Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |
|-------------|----------------------------|
| 110         | 360,000 / ∞                |
| 135         | 0.75 / 120                 |
| 160         | 0.3 / 50                   |
| 200         | 0.15 / 5                   |
| 350         | 0.04 / 0.5                 |
| 600         | 0.02 / 0.1                 |

## Ratings

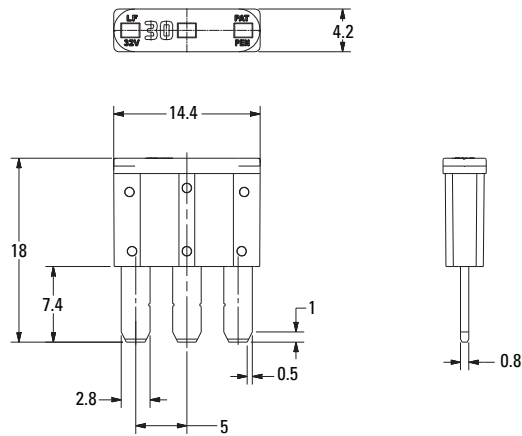
| Part Number | Current Rating (A) | Housing Material Color | Test Cable Size (mm <sup>2</sup> ) |                    | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | Typ. I <sup>2</sup> t (A <sup>2</sup> s) |
|-------------|--------------------|------------------------|------------------------------------|--------------------|------------------------|---------------------------|------------------------------------------|
|             |                    |                        | Side Fuse Blades                   | Center Fuse Blades |                        |                           |                                          |
| 0337003._   | 3                  |                        | 0.5                                | 1                  | 113                    | 31.7                      | 9                                        |
| 0337005._   | 5                  |                        | 0.5                                | 1                  | 116                    | 17.4                      | 17                                       |
| 033707.5._  | 7.5                |                        | 0.75                               | 1.5                | 106                    | 10.8                      | 47                                       |
| 0337010._   | 10                 |                        | 1                                  | 2.5                | 102                    | 7.8                       | 89                                       |
| 0337015._   | 15                 |                        | 1.5                                | 4                  | 94                     | 4.9                       | 189                                      |
| 0337900._   | SHUNT              |                        | -                                  | -                  | -                      | -                         | -                                        |

The typical I<sup>2</sup>t is an average value calculated from the breaking capacity tests by using the melting time before the arcing occurs.

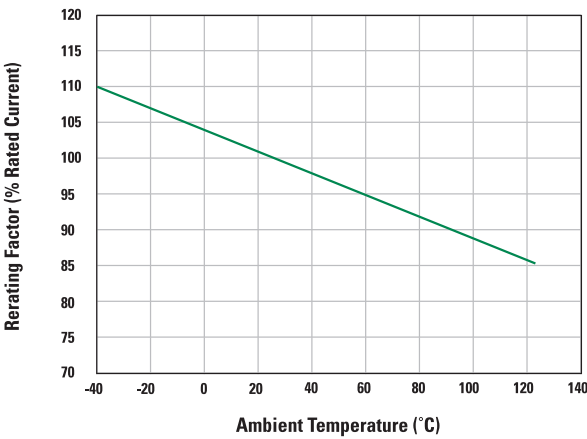
MICRO3™ Blade Fuses Rated 32V

Dimensions

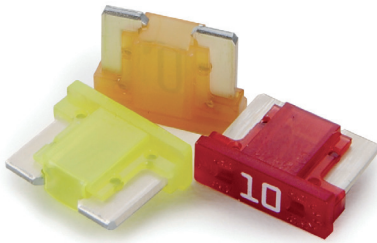
Dimensions in mm for reference only.  
See outline drawing for dimensions and tolerances.



Temperature Derating Curve







Low Profile MINI®  
Blade Fuses

## Low Profile MINI® Blade Fuses Rated 58V

The Low Profile MINI® fuse has similar performance characteristics as the standard MINI® fuse. The lower overall height allows for more space and weight savings. The Low Profile MINI® fuse is designed to mate with tuning-fork terminals, which provides additional weight and material savings in fuse box designs by eliminating the need for female box terminals.

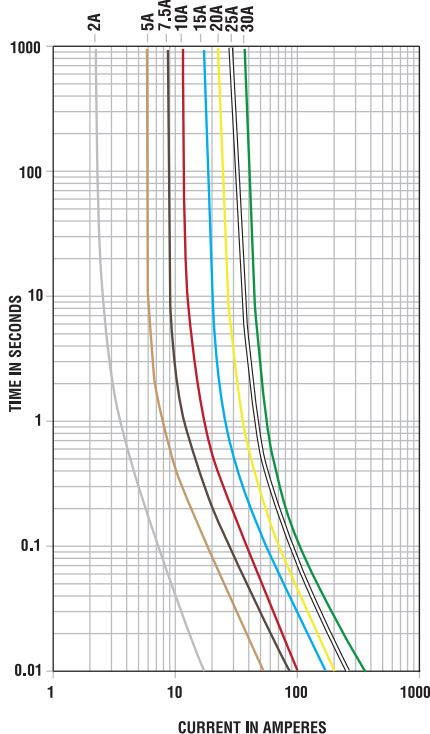
### Specifications

|                                         |                                         |
|-----------------------------------------|-----------------------------------------|
| Voltage Rating:                         | 58 VDC                                  |
| Interrupting Rating:                    | 1000A @ 58 VDC                          |
| *Recommended Environmental Temperature: | -40°C to +125°C                         |
| Terminals Material:                     | Silver plated zinc                      |
| Housing Material:                       | PA66 (U.L. 94 Flammability rating – HB) |
| Net Weight Per Fuse:                    | 0.4±15% gr                              |
| Complies with:                          | ISO 8820-9                              |

\*Silver plating allows up to 150°C at the interface.

**RoHS**

### Time-Current Characteristic Curves



### Ordering Information

| Part Number | Rating | Package Size |
|-------------|--------|--------------|
| 0891xxx.NXS | 2 - 30 | 5000         |
| 0891xxx.U   | 2 - 30 | 500          |
| 0891xxx.H   | 2 - 30 | 100          |

### Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |
|-------------|----------------------------|
| 110         | 360,000 / ∞                |
| 135         | 0.75 / 120                 |
| 200         | 0.15 / 5                   |
| 350         | 0.08 / 0.25                |
| 600         | 0.03 / 0.1                 |

### Ratings

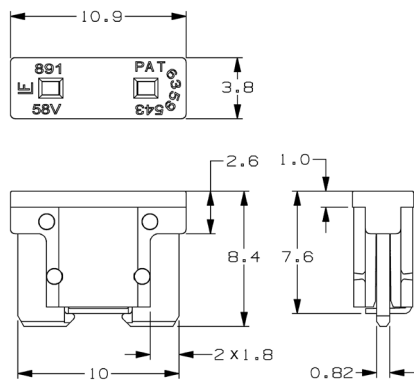
| Part Number | Current Rating (A) | Housing Material Color | Test Cable Size (mm²) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | Typ. I²t (A²s) |
|-------------|--------------------|------------------------|-----------------------|------------------------|---------------------------|----------------|
| 0891002._   | 2                  | Grey                   | 0.5                   | 151                    | 54.2                      | 3              |
| 0891005._   | 5                  | Orange                 | 0.5                   | 114                    | 17.21                     | 22             |
| 089107.5._  | 7.5                | Brown                  | 0.75                  | 105                    | 10.65                     | 53             |
| 0891010._   | 10                 | Red                    | 1                     | 97                     | 7.59                      | 102            |
| 0891015._   | 15                 | Blue                   | 1.5                   | 75                     | 4.70                      | 198            |
| 0891020._   | 20                 | Yellow                 | 2.5                   | 99                     | 3.35                      | 420            |
| 0891025._   | 25                 | White                  | 2.5                   | 96                     | 2.56                      | 613            |
| 0891030._   | 30                 | Green                  | 4                     | 96                     | 2.06                      | 1,100          |

The typical I²t is an average value calculated from the breaking capacity tests by using the melting time before the arcing occurs.

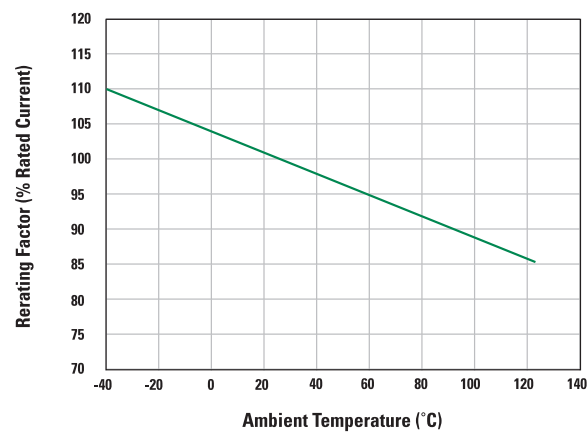
## Low Profile MINI® Blade Fuses Rated 58V

### Dimensions

Dimensions in mm for reference only.  
See outline drawing for dimensions and tolerances.



### Temperature Derating Curve





Low Profile MINI® 10.9mm  
Blade Fuses

## Low Profile MINI® 10.9 Blade Fuses Rated 58V

The Low Profile MINI® fuse has similar performance characteristics as the standard MINI® fuse. The lower overall height allows for more space and weight savings. The Low Profile MINI® fuse is designed to mate with tuning-fork terminals, which provides additional weight and material savings in fuse box designs by eliminating the need for female box terminals.

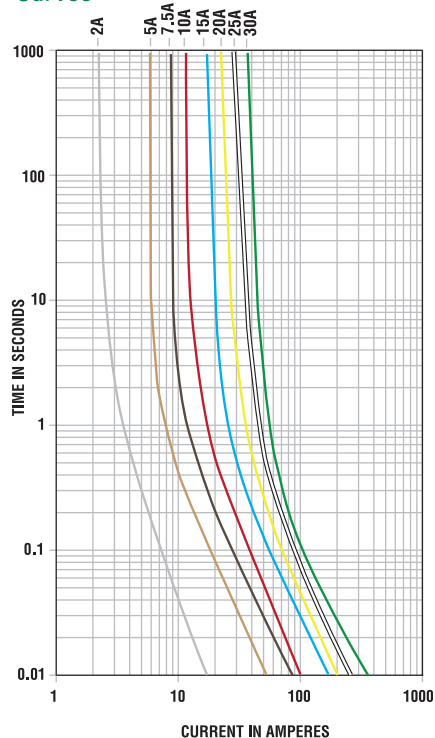
### Specifications

|                                         |                                         |
|-----------------------------------------|-----------------------------------------|
| Voltage Rating:                         | 58 VDC                                  |
| Interrupting Rating:                    | 1000A @ 58 VDC                          |
| *Recommended Environmental Temperature: | -40°C to +125°C                         |
| Terminals Material:                     | Silver plated zinc                      |
| Housing Material:                       | PA66 (U.L. 94 Flammability rating – HB) |
| Net Weight Per Fuse:                    | 0.4±15% gr                              |
| Complies with:                          | ISO 8820-9                              |

\*Silver plating allows up to 150°C at the interface.



### Time-Current Characteristic Curves



### Ordering Information

| Part Number  | Rating | Package Size |
|--------------|--------|--------------|
| 0891xxx.NXWS | 5 - 30 | 5000         |

### Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |
|-------------|----------------------------|
| 110         | 360,000 / ∞                |
| 135         | 0.75 / 120                 |
| 200         | 0.15 / 5                   |
| 350         | 0.08 / 0.25                |
| 600         | 0.03 / 0.1                 |

### Ratings

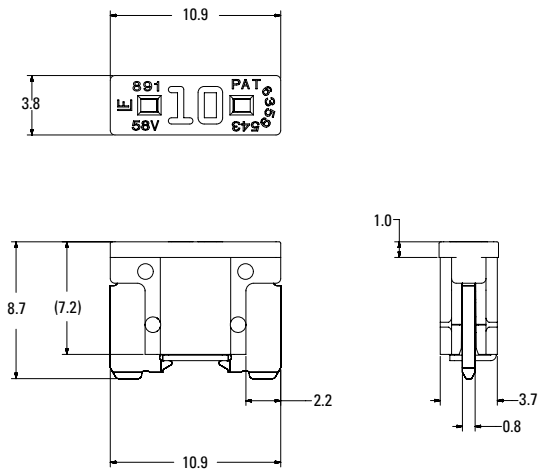
| Part Number | Current Rating (A) | Housing Material Color | Test Cable Size (mm²) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | Typ. I²t (A²s) |
|-------------|--------------------|------------------------|-----------------------|------------------------|---------------------------|----------------|
| 0891005_    | 5                  | Orange                 | 0.5                   | 114                    | 17.21                     | 22             |
| 089107.5_   | 7.5                | Brown                  | 0.75                  | 105                    | 10.65                     | 53             |
| 0891010_    | 10                 | Red                    | 1                     | 97                     | 7.59                      | 102            |
| 0891015_    | 15                 | Blue                   | 1.5                   | 75                     | 4.70                      | 198            |
| 0891020_    | 20                 | Yellow                 | 2.5                   | 99                     | 3.35                      | 420            |
| 0891025_    | 25                 | White                  | 2.5                   | 96                     | 2.56                      | 613            |
| 0891030_    | 30                 | Green                  | 4                     | 96                     | 2.06                      | 1,100          |

The typical I²t is an average value calculated from the breaking capacity tests by using the melting time before the arcing occurs.

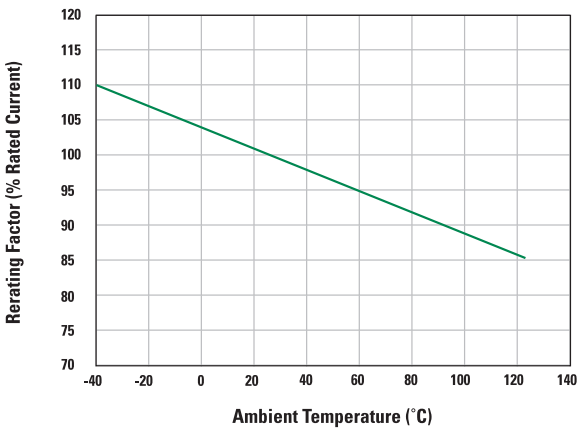
Low Profile MINI® 10.9 Blade Fuses Rated 58V

Dimensions

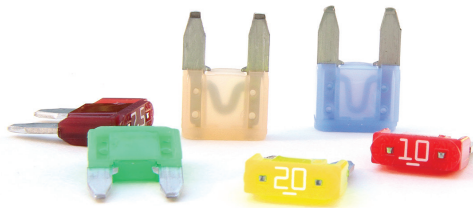
Dimensions in mm for reference only.  
See outline drawing for dimensions and tolerances.



Temperature Derating Curve







MINI® Blade Fuses



MINI® Shunt

## MINI® Blade Fuses Rated 32V

The MINI® Fuse is the standard for vehicle circuit protection. Its miniature design meets the need for more circuits to be protected while utilizing less space, and its ability to cope with high temperatures in adverse environments makes the MINI® Fuse of recommended choice for protection.

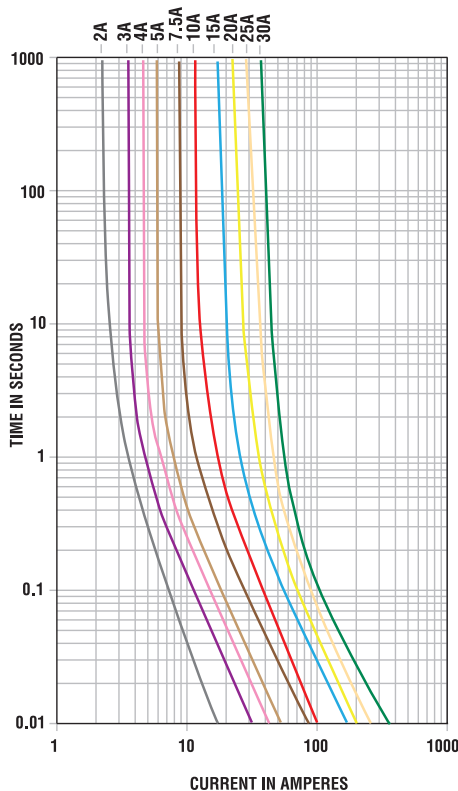
### Specifications

|                                         | MINI<br>(Silver Plated)                                | MINI Sn<br>(Tin Plated)                    |
|-----------------------------------------|--------------------------------------------------------|--------------------------------------------|
| Voltage Rating:                         | 32 VDC                                                 | 32 VDC                                     |
| Interrupting Rating:                    | 1000A @ 32 VDC                                         | 1000A @ 32 VDC                             |
| *Recommended Environmental Temperature: | -40°C to +125°C                                        | -40°C to +125°C                            |
| Terminals Material:                     | Silver plated zinc alloy                               | Tin plated zinc alloy                      |
| Housing Material:                       | PA66<br>(U.L. 94 Flammability rating – V2)             | PA66<br>(U.L. 94 Flammability rating – V2) |
| Net Weight Per Fuse:                    | 0.57±5% gr                                             | 0.57±5% gr                                 |
| Complies with:                          | SAE J2077, ISO 8820-3,<br>UL 248 Special Purpose Fuses | SAE J2077, ISO 8820-3<br>not UL recognized |



\*Tin plating's temperature limit is ~130°C. Silver plating allows up to 150°C at the terminal interface.

### Time-Current Characteristic Curves



### Ordering Information

| Part Number     | Rating            | Package Size |
|-----------------|-------------------|--------------|
| 0297xxx.WXNV    | 2 - 30<br>& SHUNT | 3000         |
| 0297xxx.WXNV-CN | 5 - 30            | 3000         |
| 0297xxx.U       | 2 - 30            | 500          |
| 0297xxx.H       | 2 - 30            | 100          |
| 0297xxx.L       | 2 - 30            | 50           |

### MINI® Sn Fuse

|             |        |      |
|-------------|--------|------|
| 0297xxx.WXT | 2 - 30 | 3000 |
|-------------|--------|------|

### Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |
|-------------|----------------------------|
| 110         | 360,000 / ∞                |
| 135         | 0.75 / 600                 |
| 200         | 0.15 / 5                   |
| 350         | 0.08 / 0.5                 |
| 600         | 0.03 / 0.1                 |

### Ratings

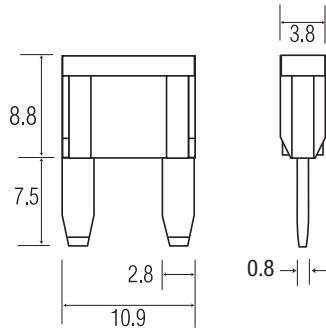
| Part Number | Current Rating (A) | Housing Material Color | Test Cable Size (mm²) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | Typ. I²t (A²s) |
|-------------|--------------------|------------------------|-----------------------|------------------------|---------------------------|----------------|
| 0297002_    | 2                  |                        | 0.5                   | 171                    | 55.60                     | 2.8            |
| 0297003_    | 3                  |                        | 0.5                   | 153                    | 33.75                     | 9.4            |
| 0297004_    | 4                  |                        | 0.5                   | 121                    | 23.48                     | 17             |
| 0297005_    | 5                  |                        | 0.5                   | 129                    | 17.75                     | 25             |
| 029707.5_   | 7.5                |                        | 0.75                  | 135                    | 10.85                     | 68             |
| 0297010_    | 10                 |                        | 1                     | 108                    | 7.42                      | 93             |
| 0297015_    | 15                 |                        | 1.5                   | 98                     | 4.58                      | 270            |
| 0297020_    | 20                 |                        | 2.5                   | 96                     | 3.21                      | 380            |
| 0297025_    | 25                 |                        | 2.5                   | 86                     | 2.36                      | 625            |
| 0297030_    | 30                 |                        | 4                     | 87                     | 1.85                      | 1,100          |
| 0297900_    | SHUNT              |                        | -                     | -                      | -                         | -              |

The typical I²t is an average value calculated from the breaking capacity tests by using the melting time before the arcing occurs.

## MINI® Blade Fuses Rated 32V

### Dimensions

Dimensions in mm for reference only. See outline drawing for dimensions and tolerances.



### Temperature Table

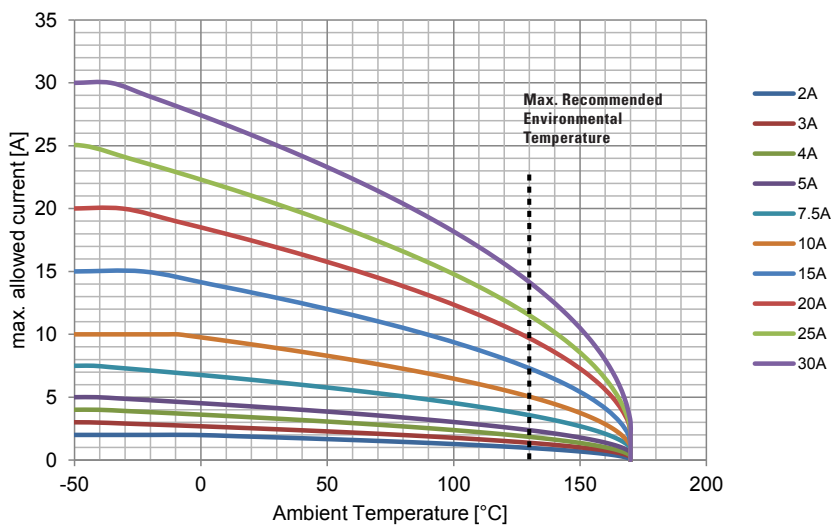
|             | max. allowed current load [A] at ambient temperature (typical derating) |       |     |      |      |      |      |       |
|-------------|-------------------------------------------------------------------------|-------|-----|------|------|------|------|-------|
|             | -40°C                                                                   | -20°C | 0°C | 20°C | 40°C | 60°C | 80°C | 100°C |
| <b>2A</b>   | 2.0                                                                     | 2.0   | 2.0 | 1.9  | 1.7  | 1.6  | 1.4  | 1.3   |
| <b>3A</b>   | 3.0                                                                     | 2.8   | 2.7 | 2.5  | 2.4  | 2.2  | 2.0  | 1.8   |
| <b>4A</b>   | 4.0                                                                     | 3.8   | 3.6 | 3.4  | 3.2  | 2.9  | 2.7  | 2.4   |
| <b>5A</b>   | 5.0                                                                     | 4.8   | 4.5 | 4.3  | 4.0  | 3.7  | 3.4  | 3.0   |
| <b>7.5A</b> | 7.5                                                                     | 7.1   | 6.8 | 6.4  | 6.0  | 5.5  | 5.1  | 4.5   |
| <b>10A</b>  | 10                                                                      | 10    | 9.8 | 9.2  | 8.6  | 8.0  | 7.3  | 6.5   |
| <b>15A</b>  | 15                                                                      | 15    | 14  | 13   | 12   | 12   | 11   | 9.0   |
| <b>20A</b>  | 20                                                                      | 19    | 18  | 17   | 16   | 15   | 14   | 12    |
| <b>25A</b>  | 25                                                                      | 24    | 22  | 21   | 20   | 18   | 17   | 15    |
| <b>30A</b>  | 30                                                                      | 29    | 27  | 26   | 24   | 22   | 20   | 18    |

MINI SHUNT Maximum Continuous Load at 85°C: 20A

### Typical Derating of Fuse Melting Element

Temperature Security Margin is 20%

Please contact Littelfuse® for Details Regarding Derating Test Set-Up.



Derating curves may change depending on the final condition of the application (terminals characteristics, wire size etc.). Please ask Littelfuse® for more information.

## MINI® Blade Fuses Rated 58V

MINI® style fuse for use in 42V Systems. Same Time-Current characteristic as the 32V MINI® fuse. Fits into standard MINI® fuse sockets. Has a rejection feature to prevent fuses with lower voltage rating from being wrongfully inserted into the circuit. Current rating 2A - 30A @58 VDC max.

### Specifications

Voltage Rating:

Interrupting Rating:

\*Recommended Environmental Temperature:

Terminals Material:

Housing Materials:

Net Weight Per Fuse:

Complies with:

58 VDC

1000A @ 58 VDC

-40°C to +125°C

Silver plated zinc alloy

PA66 (U.L. 94 Flammability rating – V2)

0.57±5% gr

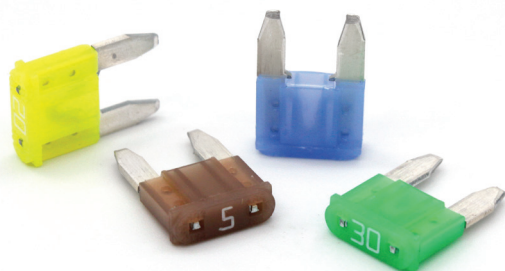
SAE J2077, SAE 2576

ISO 8820

UL 248 Special Purpose Fuses

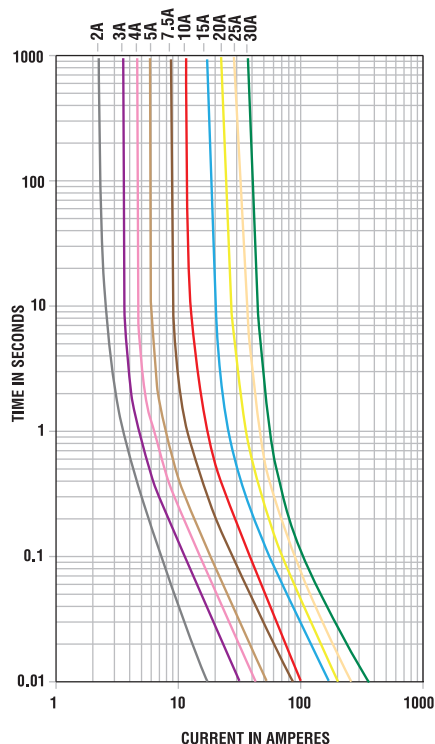


\*Silver plating allows up to 150°C at the terminal interface.



MINI® Blade Fuses

### Time-Current Characteristic Curves



### Ordering Information

| Part Number | Rating | Package Size |
|-------------|--------|--------------|
| 0997xxx.WXN | 2 - 30 | 3000         |

### Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |
|-------------|----------------------------|
| 110         | 360,000 / ∞                |
| 135         | 0.75 / 600                 |
| 200         | 0.15 / 5                   |
| 350         | 0.08 / 0.5                 |
| 600         | 0.03 / 0.1                 |

### Ratings

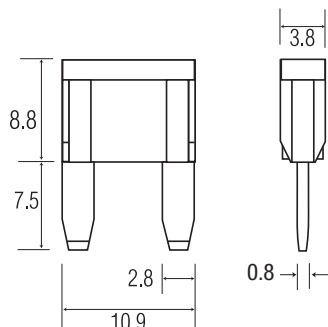
| Part Number | Current Rating (A) | Housing Material Color | Test Cable Size (mm²) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | Typ. I²t (A²s) |
|-------------|--------------------|------------------------|-----------------------|------------------------|---------------------------|----------------|
| 0997002_    | 2                  |                        | 0.5                   | 171                    | 55.60                     | 2.8            |
| 0997003_    | 3                  |                        | 0.5                   | 153                    | 33.75                     | 9.4            |
| 0997004_    | 4                  |                        | 0.5                   | 121                    | 23.48                     | 17             |
| 0997005_    | 5                  |                        | 0.5                   | 129                    | 17.75                     | 25             |
| 099707.5_   | 7.5                |                        | 0.75                  | 135                    | 10.85                     | 68             |
| 0997010_    | 10                 |                        | 1                     | 108                    | 7.42                      | 93             |
| 0997015_    | 15                 |                        | 1.5                   | 98                     | 4.58                      | 270            |
| 0997020_    | 20                 |                        | 2.5                   | 96                     | 3.21                      | 380            |
| 0997025_    | 25                 |                        | 2.5                   | 86                     | 2.36                      | 625            |
| 0997030_    | 30                 |                        | 4                     | 87                     | 1.85                      | 1,100          |

The typical I²t is an average value calculated from the breaking capacity tests by using the melting time before the arcing occurs.

## MINI® Blade Fuses Rated 58V

### Dimensions

Dimensions in mm for reference only.  
See outline drawing for dimensions and tolerances.



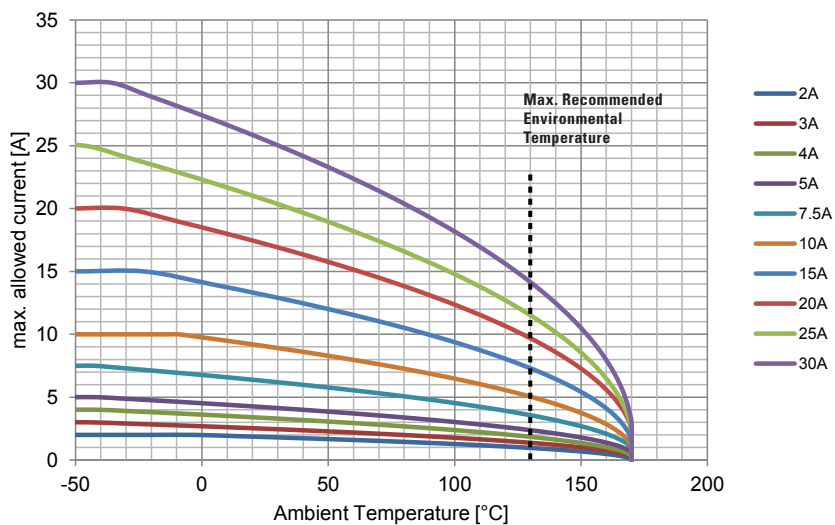
### Temperature Table

|             | max. allowed current load [A] at ambient temperature (typical derating) |       |     |      |      |      |      |       |
|-------------|-------------------------------------------------------------------------|-------|-----|------|------|------|------|-------|
|             | -40°C                                                                   | -20°C | 0°C | 20°C | 40°C | 60°C | 80°C | 100°C |
| <b>2A</b>   | 2.0                                                                     | 2.0   | 2.0 | 1.9  | 1.7  | 1.6  | 1.4  | 1.3   |
| <b>3A</b>   | 3.0                                                                     | 2.8   | 2.7 | 2.5  | 2.4  | 2.2  | 2.0  | 1.8   |
| <b>4A</b>   | 4.0                                                                     | 3.8   | 3.6 | 3.4  | 3.2  | 2.9  | 2.7  | 2.4   |
| <b>5A</b>   | 5.0                                                                     | 4.8   | 4.5 | 4.3  | 4.0  | 3.7  | 3.4  | 3.0   |
| <b>7.5A</b> | 7.5                                                                     | 7.1   | 6.8 | 6.4  | 6.0  | 5.5  | 5.1  | 4.5   |
| <b>10A</b>  | 10                                                                      | 10    | 9.8 | 9.2  | 8.6  | 8.0  | 7.3  | 6.5   |
| <b>15A</b>  | 15                                                                      | 15    | 14  | 13   | 12   | 12   | 11   | 9.0   |
| <b>20A</b>  | 20                                                                      | 19    | 18  | 17   | 16   | 15   | 14   | 12    |
| <b>25A</b>  | 25                                                                      | 24    | 22  | 21   | 20   | 18   | 17   | 15    |
| <b>30A</b>  | 30                                                                      | 29    | 27  | 26   | 24   | 22   | 20   | 18    |

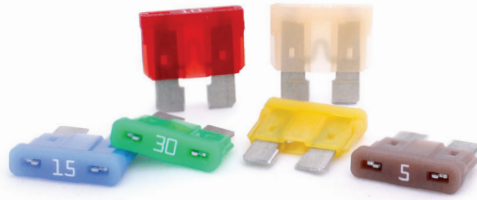
### Typical Derating of Fuse Melting Element

Temperature Security Margin is 20%

Please contact Littelfuse® for Details Regarding Derating Test Set-Up.



Derating curves may change depending on the final condition of the application (terminals characteristics, wire size etc.).  
Please ask Littelfuse® for more information.



ATOF® Blade Fuses



ATO® Ag (Silver plated)  
Blade Fuses

## ATOF® Blade Fuses Rated 32V

Developed by Littelfuse for the automotive industry, the ATOF® fuse has become the original equipment circuit protection standard for foreign and domestic automobiles and trucks. Readily identifiable and easily replaced, this fuse can be specified for a variety of low voltage electronic applications.

### Specifications

Voltage Rating:

Interrupting Rating:

\*Recommended Environmental Temperature:

Terminals Material:

Housing Material:

Net Weight Per Fuse:

Complies with:

UL Listed:

CSA Certified:

ATOF®

(Tin Plated)

32 VDC

1000A @ 32 VDC

-40°C to +125°C

Tin plated zinc alloy

PA66

(U.L. 94 Flammability rating – V2)

1.4±5% gr

SAE J1284,ISO 8820-3

File AU1410

File No. 29862

ATO Ag

(Silver Plated)

32 VDC

1000A @ 32 VDC

-40°C to +125°C

Silver plated zinc alloy

PA66

(U.L. 94 Flammability rating – V2)

1.4±5% gr

SAE J1284,ISO 8820-3

File AU1410

File No. 29862



\*Tin plating's temperature limit is ≈130°C, Silver plating allows up to 150°C at the terminal interface.

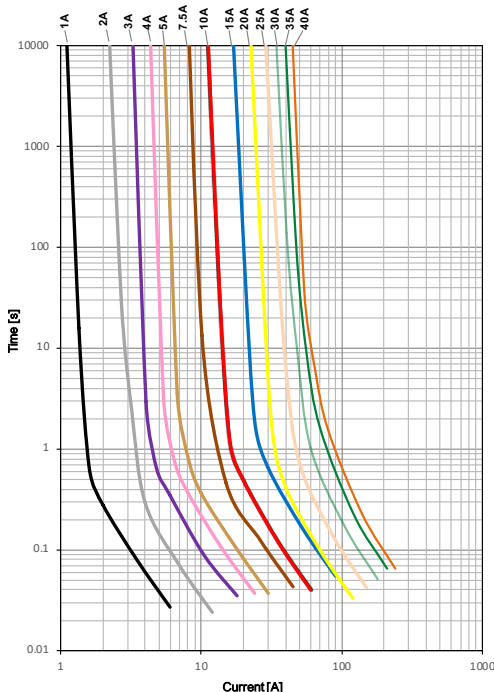
### Ordering Information

| Part Number                   | Rating | Package Size |
|-------------------------------|--------|--------------|
| <b>ATOF® (Tin Plated)</b>     |        |              |
| 0287xxx.PXC.N                 | 1 - 40 | 2000         |
| 0287xxx.U                     | 1 - 40 | 500          |
| 0287xxx.H                     | 1 - 40 | 100          |
| 0287xxx.L                     | 1 - 40 | 50           |
| <b>ATO Ag (Silver Plated)</b> |        |              |
| 0287xxx.PXS                   | 1 - 40 | 2000         |

### Time-Current Characteristics

| % of Rating | Current Rating      | Opening Time Min / Max (s) |
|-------------|---------------------|----------------------------|
| 100         | 35A & 40A           | 360,000 / ∞                |
| 110         | 1A-30A              | 360,000 / ∞                |
| 135         | 1A & 2A<br>3A-40A   | 0.35 / 600<br>0.750 / 600  |
| 160         | 1A-40A              | 0.250 / 50                 |
| 200         | 1A & 2A<br>3A-40A   | 0.1 / 5<br>0.15 / 5        |
| 350         | 1A & 2A<br>3A-40A   | 0.02 / 0.5<br>0.08 / 0.5   |
| 600         | 1A-30A<br>35A & 40A | 0.1 max<br>0.15 max        |

### Time-Current Characteristic Curves



### Ratings

| Part Number | Current Rating (A) | Housing Material Color | Test Cable Size (mm²) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | Typ. I²t (A²s) |
|-------------|--------------------|------------------------|-----------------------|------------------------|---------------------------|----------------|
| 0287001_    | 1                  |                        | 0.35                  | 176                    | 123                       | 0.4            |
| 0287002_    | 2                  |                        | 0.35                  | 141                    | 53.5                      | 1.4            |
| 0287003_    | 3                  |                        | 0.35                  | 137                    | 31.1                      | 7.4            |
| 0287004_    | 4                  |                        | 0.35                  | 136                    | 22.8                      | 14             |
| 0287005_    | 5                  |                        | 0.5                   | 128                    | 17.85                     | 26             |
| 028707.5_   | 7.5                |                        | 0.75                  | 116                    | 10.91                     | 60             |
| 0287010_    | 10                 |                        | 1                     | 109                    | 7.70                      | 115            |
| 0287015_    | 15                 |                        | 1.5                   | 102                    | 4.80                      | 340            |
| 0287020_    | 20                 |                        | 2.5                   | 98                     | 3.38                      | 520            |
| 0287025_    | 25                 |                        | 2.5                   | 92                     | 2.52                      | 1,000          |
| 0287030_    | 30                 |                        | 4                     | 84                     | 1.97                      | 1,500          |
| 0287035_    | 35                 |                        | 6                     | 87                     | 1.61                      | 2,300          |
| 0287040_    | 40                 |                        | 6                     | 96                     | 1.44                      | 3,300          |

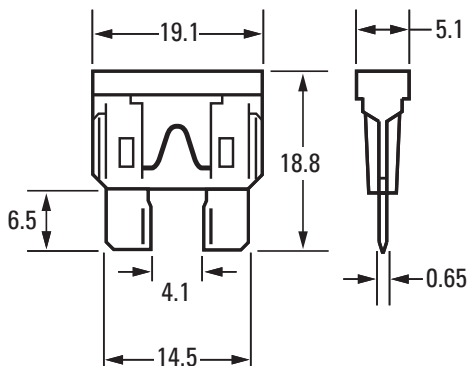
The typical I²t is an average value calculated from the breaking capacity tests by using the melting time before the arcing occurs.



## ATOF® Blade Fuses Rated 32V

### Dimensions

Dimensions in mm for reference only.  
See outline drawing for dimensions and tolerances.



### Temperature Table

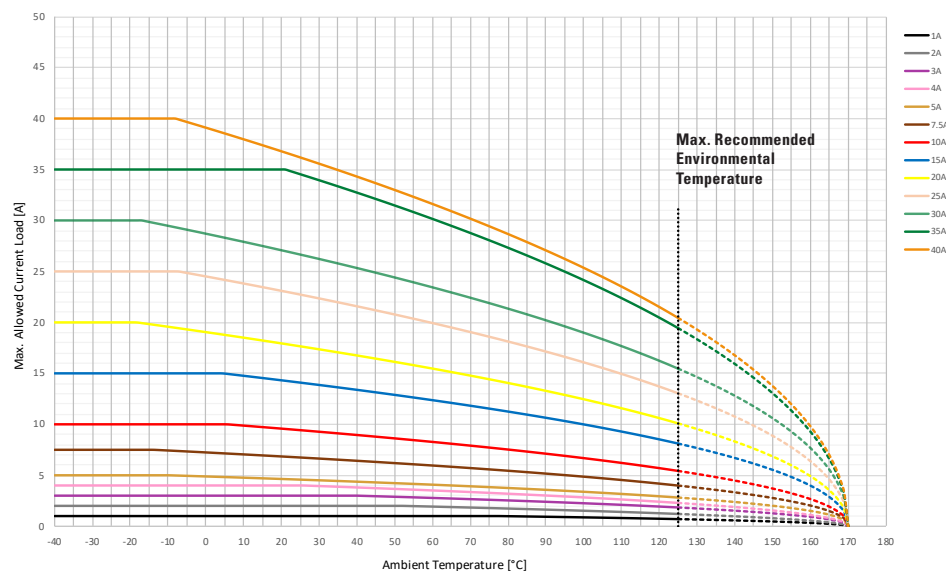
|      | max. allowed current load [A] at ambient temperature (typical derating) |     |      |      |      |       |       |
|------|-------------------------------------------------------------------------|-----|------|------|------|-------|-------|
|      | -40°C                                                                   | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| 1A   | 1                                                                       | 1   | 1    | 1    | 1    | 1     | 1     |
| 2A   | 2                                                                       | 2   | 2    | 2    | 2    | 1     | 1     |
| 3A   | 3                                                                       | 3   | 3    | 3    | 2    | 2     | 2     |
| 4A   | 4                                                                       | 4   | 4    | 3    | 3    | 3     | 2     |
| 5A   | 5                                                                       | 5   | 5    | 4    | 4    | 3     | 3     |
| 7.5A | 8                                                                       | 7   | 7    | 6    | 5    | 5     | 4     |
| 10A  | 10                                                                      | 10  | 10   | 8    | 7    | 6     | 5     |
| 15A  | 15                                                                      | 15  | 14   | 12   | 11   | 9     | 8     |
| 20A  | 20                                                                      | 19  | 18   | 15   | 14   | 12    | 10    |
| 25A  | 25                                                                      | 25  | 23   | 19   | 18   | 15    | 13    |
| 30A  | 30                                                                      | 29  | 27   | 23   | 21   | 18    | 15    |
| 35A  | 35                                                                      | 35  | 35   | 29   | 27   | 22    | 19    |
| 40A  | 40                                                                      | 39  | 37   | 31   | 28   | 24    | 20    |

### Typical Derating of Fuse Melting Element

Temperature Security Margin is 20%

Wire Cross Section And Fixture Test Set Up Refer To ISO 8820-3

Please Contact Littelfuse® For Details Regarding Derating Test Set Up



Derating curves may change depending on the final condition of the application (terminals characteristics, wire size etc.).  
Please ask Littelfuse® for more information.

## MAXI Blade Fuses Rated 32V

The MAXI® fuse uses “Diffusion Pill Technology” to provide predictable time delay characteristics and low heat dissipation.

### Specifications

Voltage Rating:  
Interrupting Rating:  
\*Recommended Environmental Temperature:  
Terminals Material:  
Housing Material:

**MAXI  
(Silver Plated)**  
32 VDC  
1000A @ 32 VDC  
-40°C to +125°C  
Silver plated zinc alloy  
PA66  
(U.L. 94 Flammability rating – V2)  
5.7±5% gr  
SAE J 1888, SAE 2576,  
ISO 8820-3:2002(E)

**MAXI Sn  
(Tin Plated)**  
32 VDC  
1000A @ 32 VDC  
-40°C to +125°C  
Tin plated zinc alloy  
PA66  
(U.L. 94 Flammability rating – V2)  
5.7±5% gr  
SAE J 1888, SAE 2576,  
ISO 8820-3:2002(E)

Net Weight Per Fuse:  
Complies with:

\*Tin plating's temperature limit is ~130°C, Silver plating allows up to 150°C at the interface.

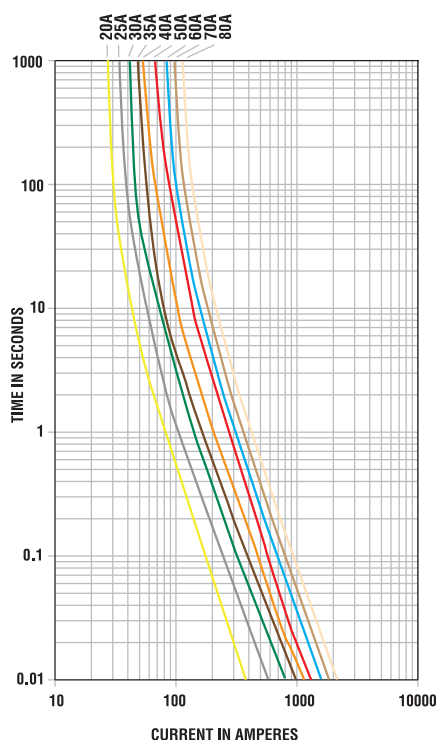


MAXI Blade Fuses



MAXI Sn Fuse (tin plated)

### Time-Current Characteristic Curves



### Ordering Information

| Part Number         | Rating  | Package Size |
|---------------------|---------|--------------|
| 0299xxx.ZXNV        | 20 - 80 | 1200         |
| 0299xxx.L           | 20 - 80 | 50           |
| 0299xxx.TXN         | 20 - 80 | 10           |
| <b>MAXI Sn Fuse</b> |         |              |
| 0299xxx.ZXT         | 20 - 80 | 1200         |

### Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |
|-------------|----------------------------|
| 100         | 360,000 / ∞                |
| 135         | 60 / 1,800                 |
| 200         | 2 / 60                     |
| 350         | 0.2 / 7                    |
| 600         | 0.04 / 1                   |

### Ratings

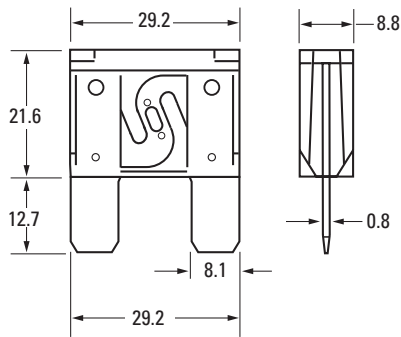
| Part Number | Current Rating (A) | Housing Material Color | Test Cable Size (mm <sup>2</sup> ) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | Typ. I <sup>2</sup> t (A <sup>2</sup> s) |
|-------------|--------------------|------------------------|------------------------------------|------------------------|---------------------------|------------------------------------------|
| 0299020_    | 20                 | Yellow                 | 4                                  | 76                     | 3.10                      | 1,100                                    |
| 0299025_    | 25                 | Grey                   | 4                                  | 75                     | 2.39                      | 2,100                                    |
| 0299030_    | 30                 | Green                  | 4                                  | 77                     | 1.95                      | 4,100                                    |
| 0299035_    | 35                 | Brown                  | 4                                  | 75                     | 1.71                      | 6,000                                    |
| 0299040_    | 40                 | Orange                 | 4                                  | 75                     | 1.42                      | 8,500                                    |
| 0299050_    | 50                 | Red                    | 6                                  | 73                     | 1.10                      | 11,300                                   |
| 0299060_    | 60                 | Blue                   | 6                                  | 77                     | 0.89                      | 15,300                                   |
| 0299070_    | 70                 | Tan                    | 10                                 | 61                     | 0.64                      | 21,200                                   |
| 0299080_    | 80                 | Light Orange           | 10                                 | 62                     | 0.54                      | 43,600                                   |

The typical I<sup>2</sup>t is an average value calculated from the breaking capacity tests by using the melting time before the arcing occurs.

MAXI Blade Fuses Rated 32V

Dimensions

Dimensions in mm for reference only.  
See outline drawing for dimensions and tolerances.

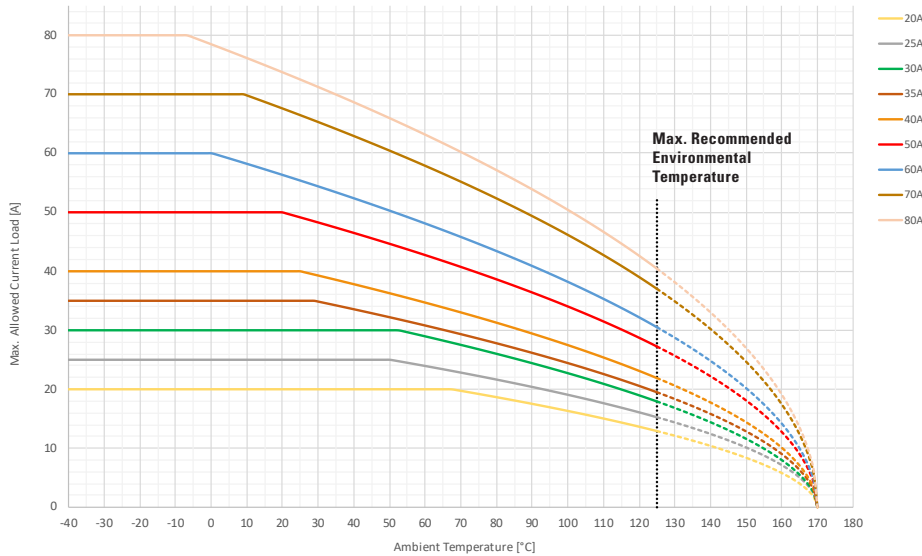


Temperature Table

|     | max. allowed current load [A] at ambient temperature (typical derating) |     |      |      |      |       |       |
|-----|-------------------------------------------------------------------------|-----|------|------|------|-------|-------|
|     | -40°C                                                                   | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| 20A | 20                                                                      | 20  | 20   | 20   | 18   | 15    | 13    |
| 25A | 25                                                                      | 25  | 25   | 23   | 21   | 18    | 15    |
| 30A | 30                                                                      | 30  | 30   | 28   | 25   | 21    | 18    |
| 35A | 35                                                                      | 35  | 35   | 30   | 27   | 23    | 19    |
| 40A | 40                                                                      | 40  | 40   | 34   | 30   | 25    | 22    |
| 50A | 50                                                                      | 50  | 50   | 42   | 38   | 31    | 27    |
| 60A | 60                                                                      | 60  | 56   | 47   | 42   | 35    | 31    |
| 70A | 70                                                                      | 70  | 68   | 57   | 51   | 43    | 37    |
| 80A | 80                                                                      | 78  | 74   | 62   | 56   | 47    | 40    |

Typical Derating of Fuse Melting Element

Temperature Security Margin is 20%  
Please contact Littelfuse® for Details Regarding Derating Test Set-Up.



Derating curves may change depending on the final condition of the application (terminals characteristics, wire size etc.).  
Please ask Littelfuse® for more information.



MAXI Blade Fuses

## MAXI Blade Fuses Rated 58V

The MAXI® style fuse for use in 42V Systems. Same Time-Current characteristic as the 32V MAXI fuse using "Diffusion Pill Technology" to provide predictable time delay characteristics and low heat dissipation. Fits into standard MAXI® fuse sockets. Has a rejection feature to prevent fuses with lower voltage rating from being wrongfully inserted into the circuit. Current rating 20A - 80A @58 VDC max.

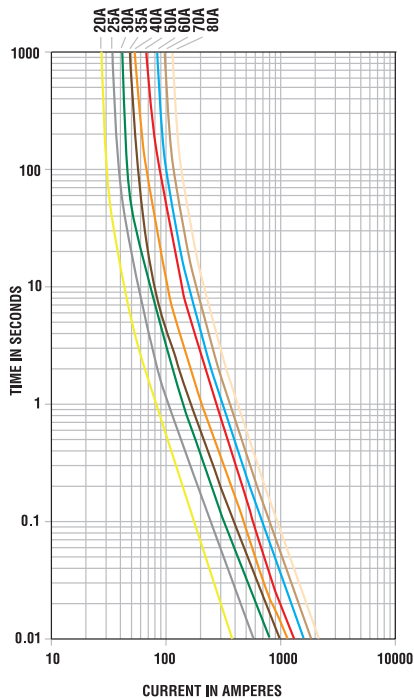
### Specifications

|                                         |                                         |
|-----------------------------------------|-----------------------------------------|
| Voltage Rating:                         | 58 VDC                                  |
| Interrupting Rating:                    | 1000A @ 58 VDC                          |
| *Recommended Environmental Temperature: | -40°C to +125°C                         |
| Terminals Material:                     | Silver plated zinc alloy                |
| Housing Material:                       | PA66 (U.L. 94 Flammability rating – V2) |
| Net Weight Per Fuse:                    | 5.7±5% gr                               |
| Complies with:                          | SAE J 1888, SAE 2576 ISO 8820-3:2002(E) |



\*Silver plating allows up to 150°C at the terminal interface.

### Time-Current Characteristic Curves



### Ordering Information

| Part Number | Rating  | Package Size |
|-------------|---------|--------------|
| 0999xxx.ZXN | 20 - 80 | 1200         |

### Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |
|-------------|----------------------------|
| 110         | 360,000 / ∞                |
| 135         | 60 / 1,800                 |
| 200         | 2 / 60                     |
| 350         | 0.2 / 7                    |
| 600         | 0.04 / 1                   |

### Ratings

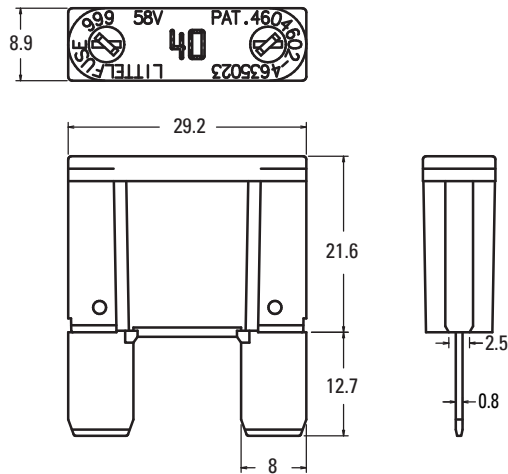
| Part Number | Current Rating (A) | Housing Material Color | Test Cable Size (mm²) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | Typ. I²t (A²s) |
|-------------|--------------------|------------------------|-----------------------|------------------------|---------------------------|----------------|
| 0999020._   | 20                 | Yellow                 | 4                     | 76                     | 3.10                      | 1,100          |
| 0999025._   | 25                 | Grey                   | 4                     | 75                     | 2.39                      | 2,100          |
| 0999030._   | 30                 | Green                  | 4                     | 77                     | 1.95                      | 4,070          |
| 0999035._   | 35                 | Brown                  | 4                     | 75                     | 1.71                      | 6,00           |
| 0999040._   | 40                 | Orange                 | 4                     | 75                     | 1.42                      | 8,500          |
| 0999050._   | 50                 | Red                    | 6                     | 73                     | 1.10                      | 11,300         |
| 0999060._   | 60                 | Blue                   | 6                     | 77                     | 0.89                      | 15,300         |
| 0999070._   | 70                 | Tan                    | 10                    | 61                     | 0.64                      | 21,200         |
| 0999080._   | 80                 | Light Orange           | 10                    | 62                     | 0.54                      | 43,600         |

The typical I²t is an average value calculated from the breaking capacity tests by using the melting time before the arcing occurs.

MAXI Blade Fuses Rated 58V

Dimensions

Dimensions in mm for reference only.  
See outline drawing for dimensions and tolerances.

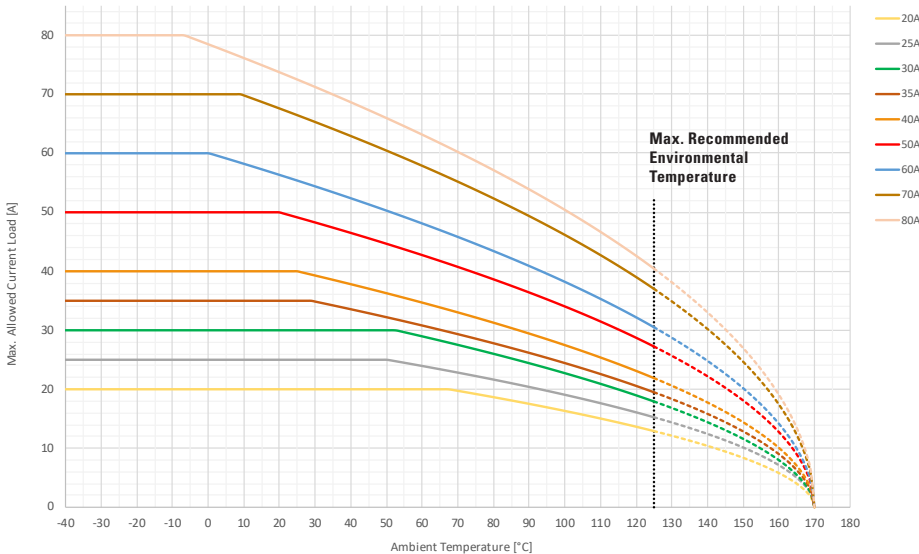


Temperature Table

|     | max. allowed current load [A] at ambient temperature (typical derating) |     |      |      |      |       |       |
|-----|-------------------------------------------------------------------------|-----|------|------|------|-------|-------|
|     | -40°C                                                                   | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| 20A | 20                                                                      | 20  | 20   | 20   | 18   | 15    | 13    |
| 25A | 25                                                                      | 25  | 25   | 23   | 21   | 18    | 15    |
| 30A | 30                                                                      | 30  | 30   | 28   | 25   | 21    | 18    |
| 35A | 35                                                                      | 35  | 35   | 30   | 27   | 23    | 19    |
| 40A | 40                                                                      | 40  | 40   | 34   | 30   | 25    | 22    |
| 50A | 50                                                                      | 50  | 50   | 42   | 38   | 31    | 27    |
| 60A | 60                                                                      | 60  | 56   | 47   | 42   | 35    | 31    |
| 70A | 70                                                                      | 70  | 68   | 57   | 51   | 43    | 37    |
| 80A | 80                                                                      | 78  | 74   | 62   | 56   | 47    | 40    |

Typical Derating of Fuse Melting Element

Temperature Security Margin is 20%  
Please Contact Littelfuse® for Details Regarding Derating Test Set-Up.



Derating curves may change depending on the final condition of the application (terminals characteristics, wire size etc.).  
Please ask Littelfuse® for more information.





MAXI+ Blade Fuses

## MAXI+® Blade Fuses Rated 32V

The MAXI+® Fuse is new standard for vehicle circuit protection. Its miniature design meets the need for more circuits to be protected while utilizing less space, and its ability to cope with high temperatures in adverse environments makes the MAXI+® Fuse of recommended choice for protection.

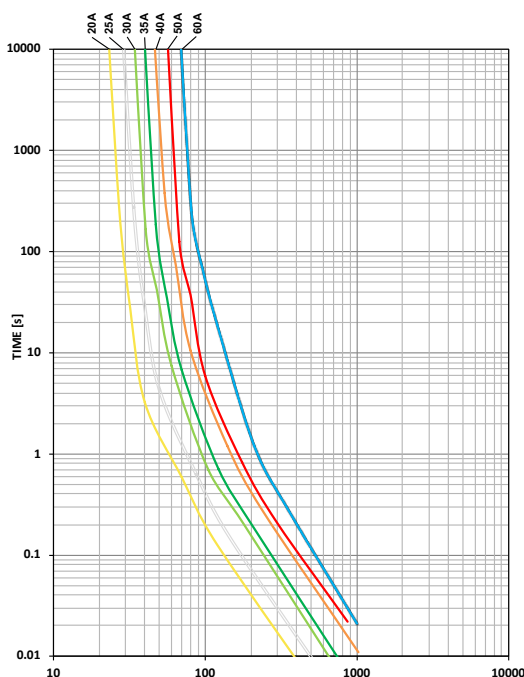
### Specification

|                                         |                                         |
|-----------------------------------------|-----------------------------------------|
| Voltage Rating:                         | 32 VDC                                  |
| Interrupting Rating:                    | 1000A @ 32 VDC                          |
| *Recommended Environmental Temperature: | -40°C to +125°C                         |
| Terminals Material:                     | Silver plated zinc alloy                |
| Housing Material:                       | PA66 (U.L. 94 Flammability rating – V2) |
| Net Weight Per Fuse:                    | 2±10% gr                                |
| Refers to:                              | ISO 8820-10:2020                        |

### RoHS

\*Silver plating allows up to 150°C at the terminal interface.

### Time-Current Characteristic Curves



### Ordering Information

| Part Number | Rating | Package Size |
|-------------|--------|--------------|
| 0899xxx.Z   | 20-60  | 1000         |

### Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |
|-------------|----------------------------|
| 100         | 360,000 / ∞                |
| 135         | 60 / 900                   |
| 160         | 10 / 100                   |
| 200         | 2 / 50                     |
| 350         | 0.2 / 7                    |
| 600         | 0.04 / 1                   |

### Ratings

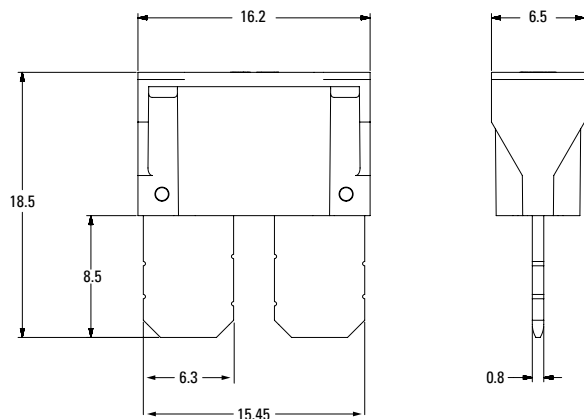
| Part Number | Current Rating (A) | Housing Material Color | Test Cable Size (mm²) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | I²t (A²s) |
|-------------|--------------------|------------------------|-----------------------|------------------------|---------------------------|-----------|
| 0899020.Z   | 20                 | Yellow                 | 1.5                   | 80                     | 3.0                       | 1,300     |
| 0899025.Z   | 25                 | White                  | 2.5                   | 77                     | 2.3                       | 2,200     |
| 0899030.Z   | 30                 | Light Green            | 2.5                   | 60                     | 1.7                       | 3,900     |
| 0899035.Z   | 35                 | Dark Green             | 4                     | 58                     | 1.2                       | 4,900     |
| 0899040.Z   | 40                 | Orange                 | 4                     | 55                     | 1.0                       | 9,400     |
| 0899050.Z   | 50                 | Red                    | 6                     | 50                     | 0.7                       | 16,500    |
| 0899060.Z   | 60                 | Blue                   | 6                     | 62                     | 0.5                       | 17,500    |

The I²t value is calculated from the breaking capacity tests by using the current time profile before the arcing occurs.

## MAXI+® Blade Fuses Rated 32V

### Dimensions

Dimensions in mm for reference only. See outline drawing for dimensions and tolerances.



### Temperature Table

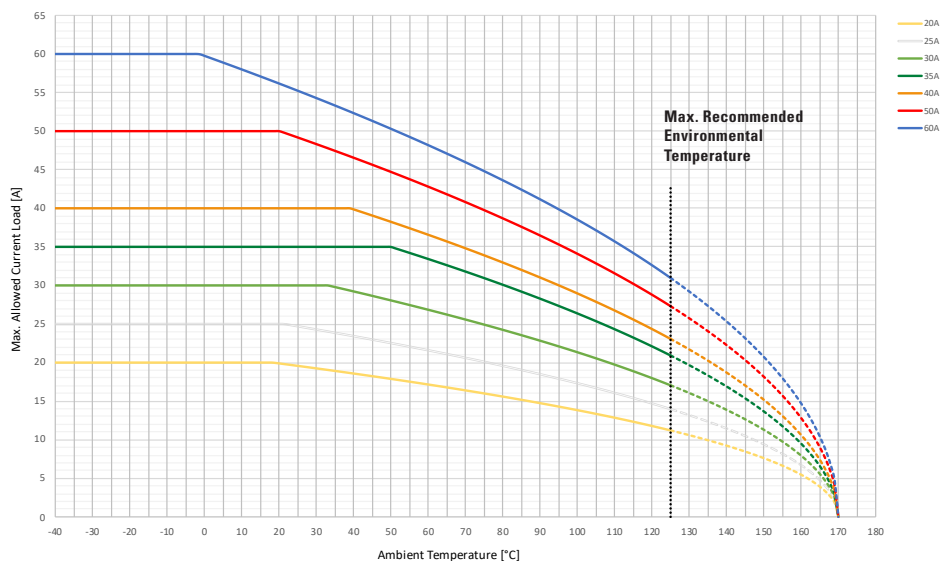
|            | max. allowed current load [A] at ambient temperature (typical derating) |     |      |      |      |       |       |
|------------|-------------------------------------------------------------------------|-----|------|------|------|-------|-------|
|            | -40°C                                                                   | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| <b>20A</b> | 20                                                                      | 20  | 20   | 17   | 15   | 13    | 11    |
| <b>25A</b> | 25                                                                      | 25  | 25   | 21   | 19   | 16    | 14    |
| <b>30A</b> | 30                                                                      | 30  | 30   | 26   | 24   | 20    | 17    |
| <b>35A</b> | 35                                                                      | 35  | 35   | 33   | 29   | 24    | 21    |
| <b>40A</b> | 40                                                                      | 40  | 40   | 36   | 32   | 27    | 23    |
| <b>50A</b> | 50                                                                      | 50  | 50   | 42   | 38   | 32    | 27    |
| <b>60A</b> | 60                                                                      | 60  | 56   | 47   | 42   | 36    | 31    |

### Typical Derating Of Fuse Melting Element

Temperature Security Margin is 20%

Wire Cross Section And Fixture Test Set Up Refer To ISO 8820-10:2020

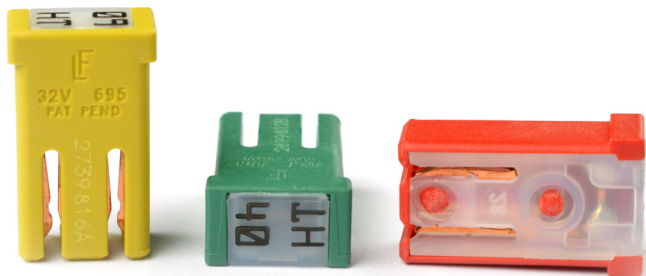
Please contact Littelfuse® for details regarding Derating Test Set Up.

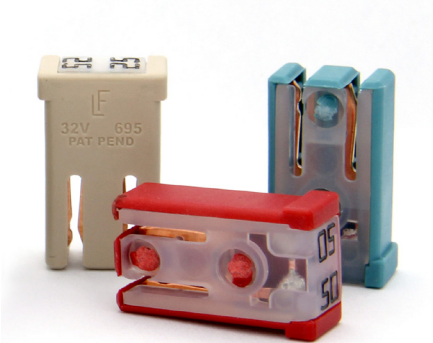


Derating curves may change depending on the final condition of the application (terminals characteristics, wire size etc..). Please ask Littelfuse® for more information

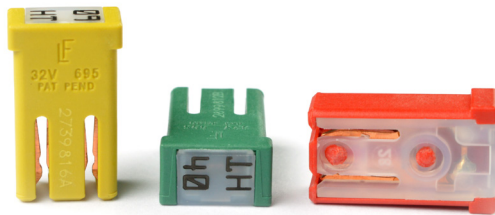
## CARTRIDGE FUSES

|                                   |    |
|-----------------------------------|----|
| MCASE+ Cartridge Fuses Rated 32V  | 23 |
| Low Profile JCASE® Fuse Rated 58V | 26 |
| JCASE® Fuse Rated 32V             | 28 |

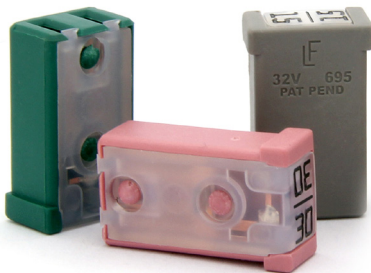




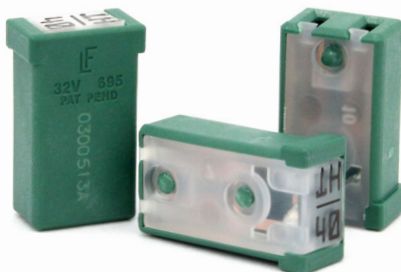
MCASE+™ Slotted



MCASE+™ Slotted HT



MCASE+™ Unslotted



MCASE+™ Unslotted HT

## MCASE+™ Cartridge Fuses Rated 32V

MCASE+™ is a time delayed fuse designed to withstand inrush currents within a miniaturized footprint for optimal performance in minimal space. The Unslotted MCASE+™ cartridge style fuse can protect up to 40A with female terminals for 2.8 mm male terminals. The Slotted MCASE+™ Fuse is rated up to 60A and can mate with 6.3mm male terminals or even mount performance in minimal space directly onto a busbar. MCASE+ High Temperature (HT) have a lower voltage drop and are designed to operate with a lower temperature rise in harsher environmental applications.

### Specification

|                                        |                                                                                                            |
|----------------------------------------|------------------------------------------------------------------------------------------------------------|
| Voltage Rating                         | 32VDC                                                                                                      |
| Interrupting Rating:                   | 1000 @ 32VDC                                                                                               |
| Recommended Environmental Temperature: | -40°C to +125°C                                                                                            |
| Housing Material:                      | PPA-GF33 (U.L. 94 Flammability rating - HB)                                                                |
| Cover Material:                        | PA66 (U.L. 94 Flammability rating - V2)                                                                    |
| Net Weight Per Fuse:                   | 1.15g ±10%                                                                                                 |
| Fuse Insertion Force:                  | 50N (11.2 lb) - Typical                                                                                    |
| Extraction Force:                      | 4N Min. (0.9 lb) / 24.5N Max (5.5 lb) - Single Terminal                                                    |
| Complies with:                         | SAE 2741 and ISO 8820-4 in reference to electrical, mechanical and environmental performance requirements. |

### RoHS

### Ordering Information

| Part Number     | Type      | Rating | Package Size |
|-----------------|-----------|--------|--------------|
| 0695xxx.PXPS    | Slotted   | 15-60  | 2000         |
| 0695xxx.PXPS-HT | Slotted   | 40-60  | 2000         |
| 0695xxx.PXP     | Unslotted | 15-40  | 2000         |
| 0695xxx.PXP-HT  | Unslotted | 40     | 2000         |

### Time-Current Characteristics

| % of Rating | Opening Time<br>Min / Max (s) |
|-------------|-------------------------------|
| 110         | 360,000 / ∞                   |
| 135         | 60 / 1,800                    |
| 200         | 2 / 60                        |
| 350         | 0.2 / 7                       |
| 600         | 0.04 / 1                      |

### Ratings

| Part Number     | Type      | Current Rating (A) | Housing Material Color | Test Cable Size (mm²) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | Typ. I²t (A²s) |
|-----------------|-----------|--------------------|------------------------|-----------------------|------------------------|---------------------------|----------------|
| 0695015.PXPS    | Slotted   | 15                 | Grey                   | 1.25                  | 97                     | 4.8                       | 295            |
| 0695020.PXPS    | Slotted   | 20                 | Blue                   | 1.25                  | 100                    | 3.4                       | 570            |
| 0695025.PXPS    | Slotted   | 25                 | Yellow                 | 2                     | 99                     | 2.5                       | 1,370          |
| 0695030.PXPS    | Slotted   | 30                 | Pink                   | 2                     | 112                    | 1.8                       | 1,030          |
| 0695040.PXPS    | Slotted   | 40                 | Green                  | 3                     | 107                    | 1.1                       | 1,400          |
| 0695050.PXPS    | Slotted   | 50                 | Red                    | 5                     | 109                    | 0.77                      | 3,800          |
| 0695060.PXPS    | Slotted   | 60                 | Yellow                 | 5                     | 102                    | 0.54                      | 8,000          |
| 0695040.PXPS-HT | Slotted   | 40                 | Green                  | 3                     | 111                    | 0.89                      | 2,500          |
| 0695050.PXPS-HT | Slotted   | 50                 | Red                    | 5                     | 74                     | 0.64                      | 5,700          |
| 0695060.PXPS-HT | Slotted   | 60                 | Yellow                 | 5                     | 90                     | 0.46                      | 13,000         |
| 0695015.PXP     | Unslotted | 15                 | Grey                   | 1.25                  | 97                     | 4.8                       | 300            |
| 0695020.PXP     | Unslotted | 20                 | Blue                   | 1.25                  | 106                    | 3.4                       | 600            |
| 0695025.PXP     | Unslotted | 25                 | Yellow                 | 2                     | 114                    | 2.5                       | 1,200          |
| 0695030.PXP     | Unslotted | 30                 | Pink                   | 2                     | 96                     | 1.8                       | 1,000          |
| 0695040.PXP     | Unslotted | 40                 | Green                  | 3                     | 101                    | 1                         | 1,700          |
| 0695040.PXP-HT  | Unslotted | 40                 | Green                  | 3                     | 109                    | 0.89                      | 2,500          |

Please Note: The performance of the male terminal is critical to ensuring the fuse will function as designed. The current carrying capability of the mating terminal must be verified to ensure proper system operation. Fixture Test Set Up Refer To ISO 8820 4 (Plated Mating Tab Terminals). Please contact Littelfuse® for details regarding Test Set Up Definition.

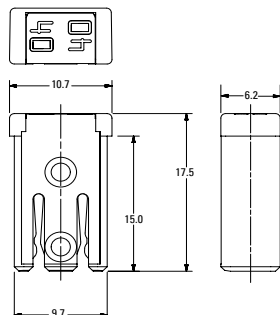
The typical I²t is an average value calculated from the breaking capacity tests by using the melting time before the arcing occurs.

## MCASE+™ Cartridge Fuses Rated 32V

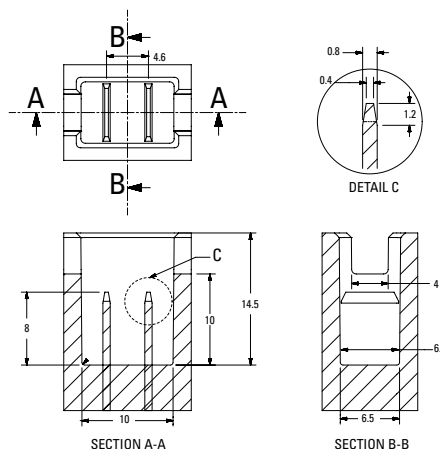
### Dimensions

Dimensions in mm for reference only. See outline drawing for dimensions and tolerances.

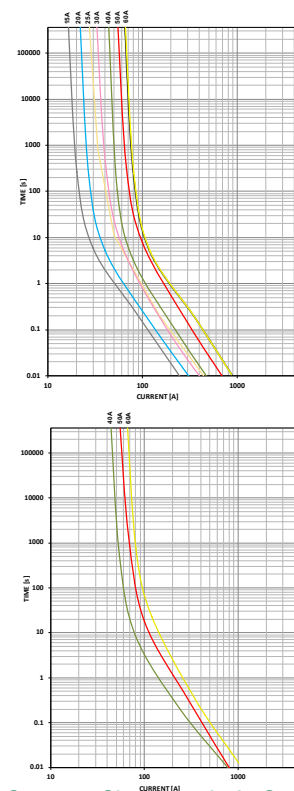
### MCASE+™ Slotted



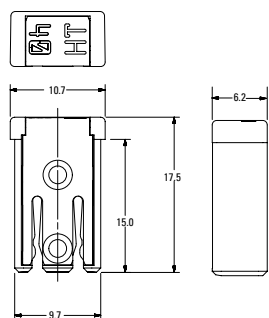
### Slotted Recommended Mating Cavity



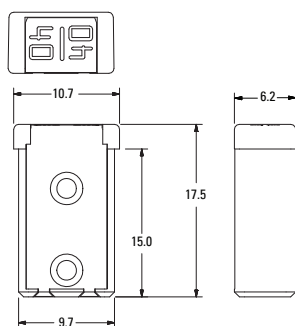
### Time-Current Characteristic Curves



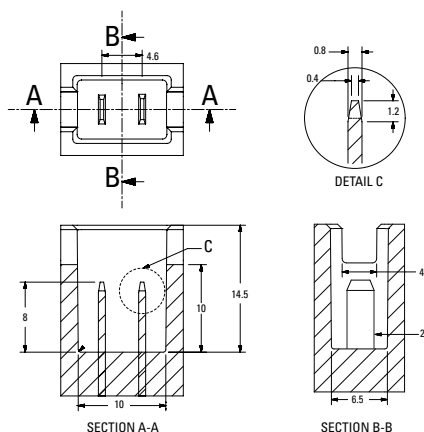
### MCASE+™ Slotted HT



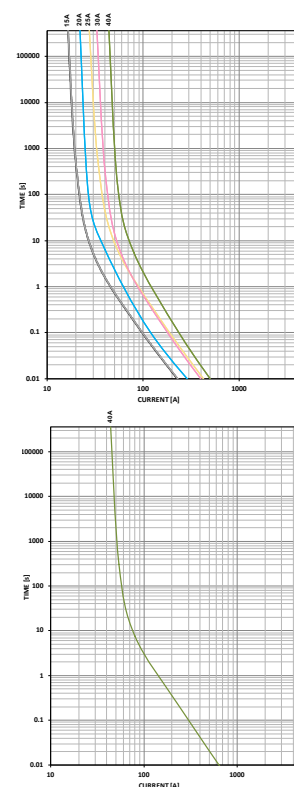
### MCASE+™ Unslotted



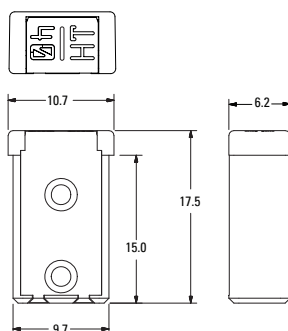
### Unslotted Recommended Mating Cavity



### Time-Current Characteristic Curves



### MCASE+™ Unslotted HT



**Recommended MCASE Fuse Puller**  
MATERIAL NUMBER 00970054XPA

REV07082021

## MCASE+™ Cartridge Fuses Rated 32V

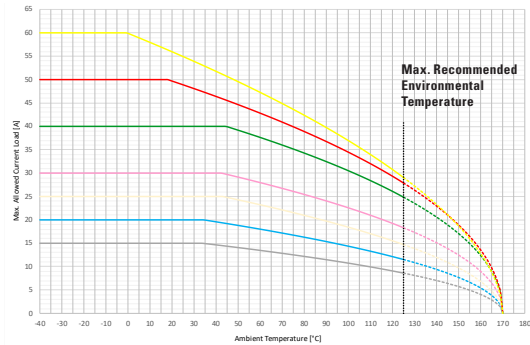
### Typical Derating Of Fuse Melting Element

Temperature Security Margin is 20%

Fixture Test Set Up Refer To ISO 8820-4 With (Plated Mating Tab Terminals)

Please contact Littelfuse® for details regarding derating test set up.

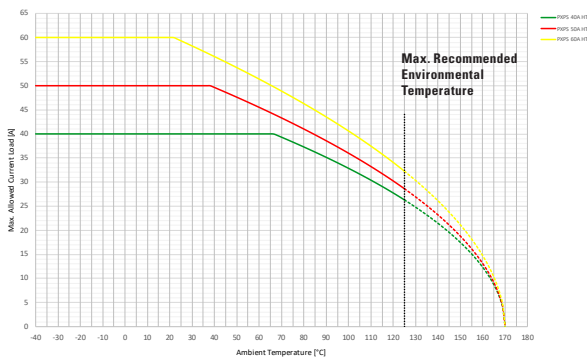
### MCASE+™ Slotted



### Temperature Table

|            | max. allowed current load [A] at ambient temperature) |     |      |      |      |       |       |
|------------|-------------------------------------------------------|-----|------|------|------|-------|-------|
|            | -40°C                                                 | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| <b>15A</b> | 15                                                    | 15  | 15   | 13   | 12   | 10    | 9     |
| <b>20A</b> | 20                                                    | 20  | 20   | 18   | 16   | 13    | 12    |
| <b>25A</b> | 25                                                    | 25  | 25   | 23   | 20   | 17    | 15    |
| <b>30A</b> | 30                                                    | 30  | 30   | 27   | 25   | 21    | 18    |
| <b>40A</b> | 40                                                    | 40  | 40   | 37   | 33   | 28    | 25    |
| <b>50A</b> | 50                                                    | 50  | 50   | 42   | 38   | 32    | 28    |
| <b>60A</b> | 60                                                    | 60  | 56   | 46   | 41   | 34    | 29    |

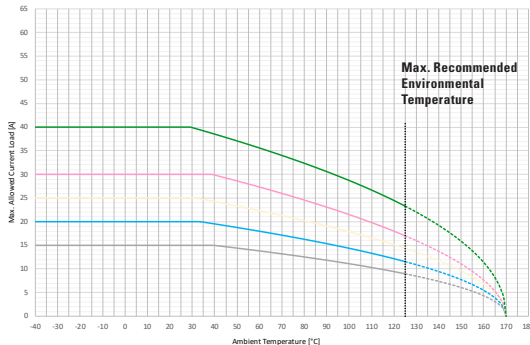
### MCASE+™ Slotted HT



### Temperature Table

|               | max. allowed current load [A] at ambient temperature) |     |      |      |      |       |       |
|---------------|-------------------------------------------------------|-----|------|------|------|-------|-------|
|               | -40°C                                                 | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| <b>40A HT</b> | 40                                                    | 40  | 40   | 40   | 36   | 30    | 26    |
| <b>50A HT</b> | 50                                                    | 50  | 50   | 44   | 40   | 33    | 29    |
| <b>60A HT</b> | 60                                                    | 60  | 60   | 50   | 45   | 37    | 32    |

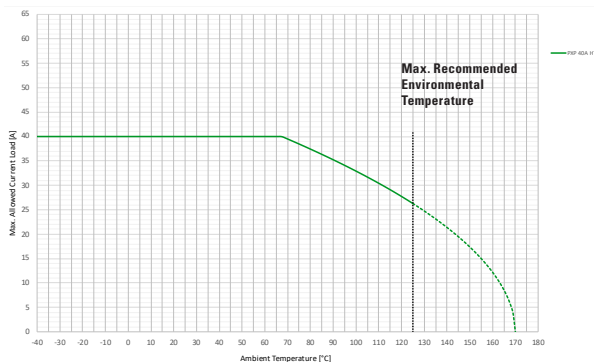
### MCASE+™ Unslotted



### Temperature Table

|            | max. allowed current load [A] at ambient temperature) |     |      |      |      |       |       |
|------------|-------------------------------------------------------|-----|------|------|------|-------|-------|
|            | -40°C                                                 | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| <b>15A</b> | 15                                                    | 15  | 15   | 14   | 12   | 10    | 9     |
| <b>20A</b> | 20                                                    | 20  | 20   | 18   | 16   | 13    | 12    |
| <b>25A</b> | 25                                                    | 25  | 25   | 22   | 20   | 17    | 14    |
| <b>30A</b> | 30                                                    | 30  | 30   | 27   | 24   | 20    | 17    |
| <b>40A</b> | 40                                                    | 40  | 40   | 35   | 31   | 27    | 23    |

### MCASE+™ Unslotted HT



### Temperature Table

|               | max. allowed current load [A] at ambient temperature) |     |      |      |      |       |       |
|---------------|-------------------------------------------------------|-----|------|------|------|-------|-------|
|               | -40°C                                                 | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| <b>40A HT</b> | 40                                                    | 40  | 40   | 40   | 36   | 30    | 26    |

Derating curves may change depending on the final condition of the application (terminals characteristics, wire size etc.).

Please ask Littelfuse® for more information.





Low Profile JCASE®  
Cartridge Fuses

## Low Profile JCASE® Cartridge Fuses Rated 58V

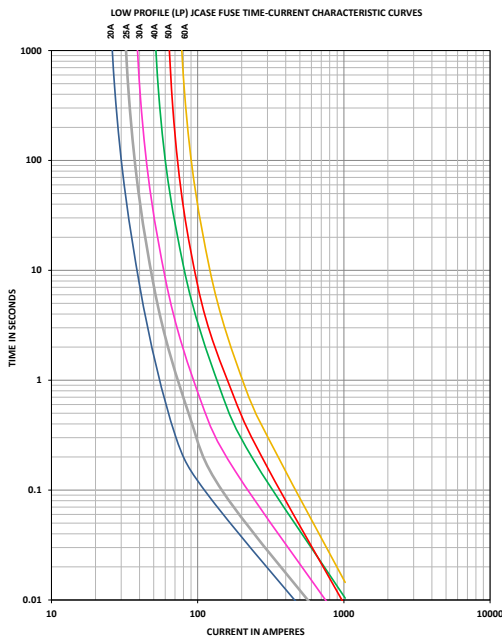
The Low Profile JCASE® fuse has similar performance characteristics as the standard JCASE® fuse. The lower overall height reduction allows for more space and weight savings and also allows for a shorter male blade terminal, saving additional weight and material savings in fuse box designs.

### Specifications

|                                        |                                                                                                           |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Voltage Rating:                        | 58 VDC                                                                                                    |
| Interrupting Rating:                   | 1000A @ 58 VDC                                                                                            |
| Recommended Environmental Temperature: | -40°C to + 125°C                                                                                          |
| Housing Material:                      | PA66-GF13 (U.L. 94 Flammability rating – HB)                                                              |
| Cover Material:                        | PSU (U.L. 94 Flammability rating – HB)                                                                    |
| New Weight Per Fuse:                   | 2.4g ±10%                                                                                                 |
| Insertion Force:                       | 53N Max. (12 lb.)                                                                                         |
| Extraction Force:                      | 9N Min (2 lb.)                                                                                            |
| Complies With:                         | SAE 2741 and ISO 8820-4 except for the life test – LF specification is 100-hours at 100% of rated current |

**RoHS**

### Time-Current Characteristic Curves



### Ordering Information

| Part Number | Rating  | Package Size |
|-------------|---------|--------------|
| 0895xxx.Z   | 20 - 60 | 2000         |
| 0895xxx.U   | 20 - 60 | 500          |
| 0895xxx.T   | 20 - 60 | 10           |

### Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |
|-------------|----------------------------|
| 100         | 360,000 / ∞                |
| 135         | 60 / 1800                  |
| 200         | 4 / 60                     |
| 350         | 0.2 / 7                    |
| 600         | 0.04 / 1                   |

### Ratings

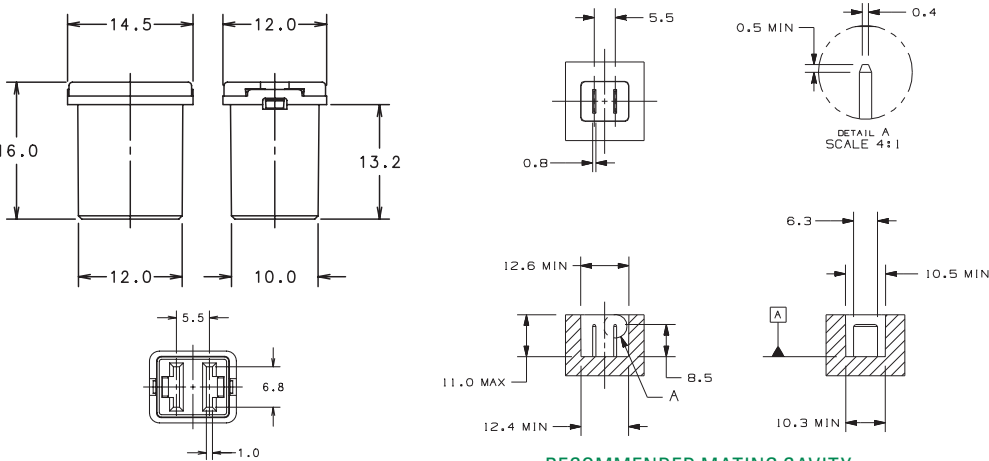
| Part Number | Current Rating (A) | Housing Material Color | Test Cable Size (mm²) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | Typ. I²t (A²s) |
|-------------|--------------------|------------------------|-----------------------|------------------------|---------------------------|----------------|
| 0895020_    | 20                 | Blue                   | 4                     | 104                    | 4.48                      | 400            |
| 0895025_    | 25                 | White                  | 4                     | 113                    | 3.39                      | 680            |
| 0895030_    | 30                 | Pink                   | 4                     | 107                    | 2.68                      | 1,800          |
| 0895040_    | 40                 | Green                  | 4                     | 102                    | 1.89                      | 5,500          |
| 0895050_    | 50                 | Red                    | 6                     | 96                     | 1.08                      | 4,900          |
| 0895060_    | 60                 | Yellow                 | 6                     | 96                     | 0.83                      | 9,600          |

The typical I²t is an average value calculated from the breaking capacity tests by using the melting time before the arcing occurs.

Low Profile JCASE® Cartridge Fuses Rated 58V

Dimensions

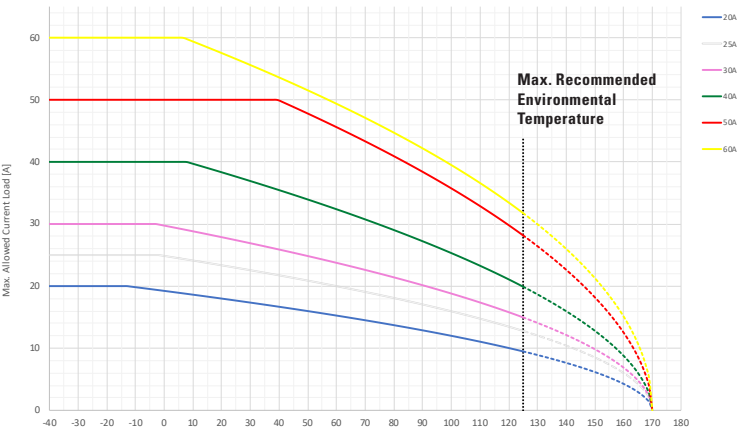
Dimensions in mm  
Dimensions in mm for reference only. See outline drawing for dimensions and tolerances.



**RECOMMENDED MATING CAVITY**  
(Please refer to the OL drawing for further details)

Typical Derating of Fuse Melting Element

Temperature Security Margin is 20%  
Please Contact Littelfuse® for Details Regarding Derating Test Set-Up



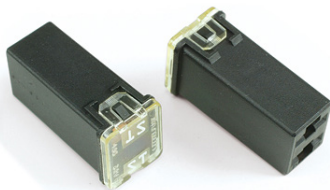
Derating curves may change depending on the final condition of the application (terminals characteristics, wire size etc.).  
Please ask Littelfuse for more information.

Temperature Table

|     | max. allowed current load [A] at ambient temperature (typical derating) |     |      |      |      |       |       |
|-----|-------------------------------------------------------------------------|-----|------|------|------|-------|-------|
|     | -40°C                                                                   | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| 20A | 20                                                                      | 19  | 18   | 15   | 13   | 11    | 9     |
| 25A | 25                                                                      | 25  | 23   | 20   | 18   | 15    | 13    |
| 30A | 30                                                                      | 30  | 28   | 23   | 21   | 17    | 15    |
| 40A | 40                                                                      | 40  | 38   | 32   | 28   | 23    | 20    |
| 50A | 50                                                                      | 50  | 50   | 44   | 40   | 33    | 28    |
| 60A | 60                                                                      | 60  | 58   | 48   | 43   | 37    | 32    |



JCASE®  
Cartridge Fuses



JCASE® Shunt

## JCASE® Cartridge Fuses Rated 32V

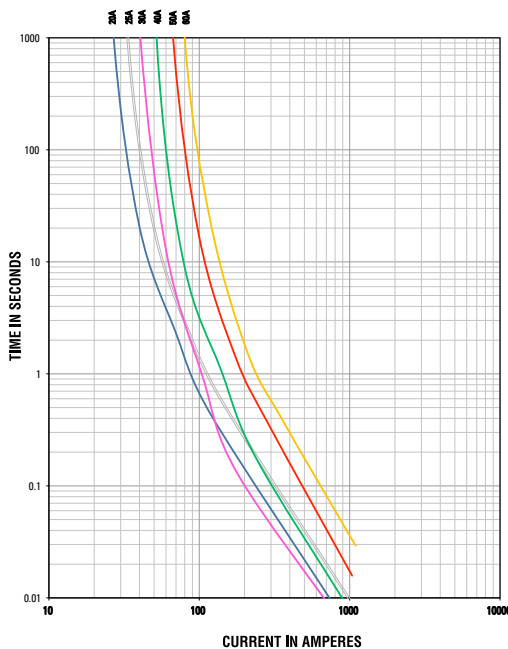
The JCASE® is a cartridge style fuse with female terminal design. JCASE® provides both increased time delay and low voltage drop to protect high current circuits. JCASE® has the ability to handle inrush currents.

### Specifications

|                                        |                                                |
|----------------------------------------|------------------------------------------------|
| Voltage Rating:                        | 32 VDC                                         |
| Interrupting Rating:                   | 1000A @ 32 VDC                                 |
| Recommended Environmental Temperature: | -40°C to +125°C                                |
| Housing Material:                      | PA66-GF13 (U.L. 94 Flammability rating – HB)   |
| Housing Material (60A):                | PA66-GF13HS (U.L. 94 Flammability rating – HB) |
| Cover Material:                        | PC (U.L. 94 Flammability rating – HB)          |
| New Weight Per Fuse:                   | 3.8g ±10%                                      |
| Insertion Force:                       | 53N max. (12 lb.)                              |
| Extraction Force:                      | 9N min. (2 lb.)                                |
| Complies with:                         | SAE 2741, ISO 8820-4                           |



### Time-Current Characteristic Curves



### Ordering Information

| Part Number  | Rating  | Package Size |
|--------------|---------|--------------|
| 0495xxx.ZXA  | 20 - 60 | 2200         |
| 0495xxx.IUXA | 20 - 60 | 500          |
| 0495xxx.TXA  | 20 - 60 | 10           |
| 0495900.Z    | SHUNT   | 2200         |
| 0495900.X    | SHUNT   | 1            |

### Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |
|-------------|----------------------------|
| 110         | 360,000 / ∞                |
| 135         | 60 / 1800                  |
| 200         | 4 / 60                     |
| 350         | 0.2 / 7                    |
| 600         | 0.04 / 1                   |

### Ratings

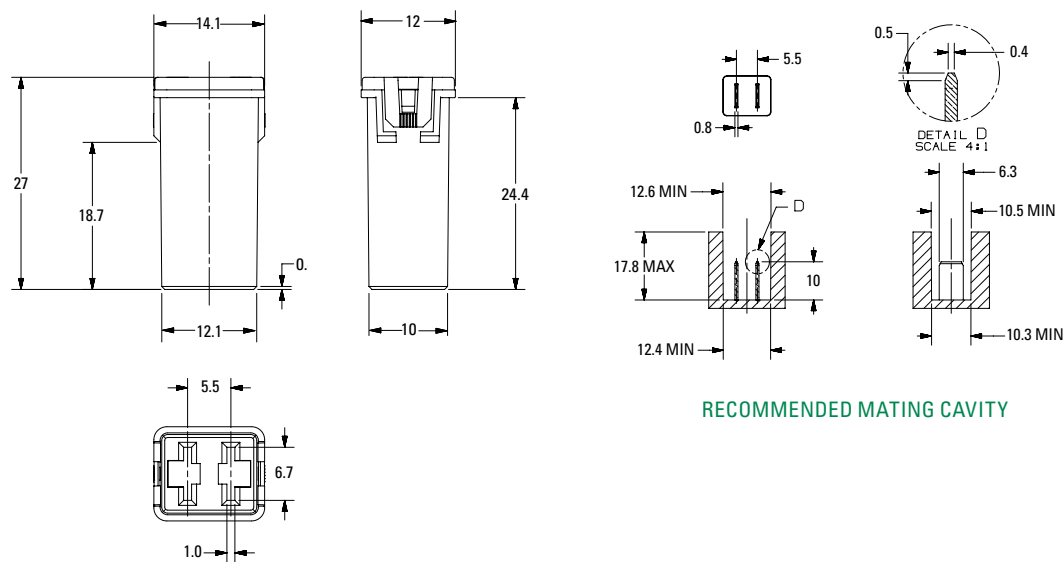
| Part Number | Current Rating (A) | Housing Material Color | Test Cable Size (mm²) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | Typ. I²t (A²s) |
|-------------|--------------------|------------------------|-----------------------|------------------------|---------------------------|----------------|
| 0495020_    | 20                 | Blue                   | 4                     | 106                    | 4.29                      | 1,700          |
| 0495025_    | 25                 | White                  | 4                     | 101                    | 3.28                      | 3,200          |
| 0495030_    | 30                 | Pink                   | 4                     | 91                     | 2.12                      | 1,500          |
| 0495040_    | 40                 | Green                  | 4                     | 87                     | 1.30                      | 3,700          |
| 0495050_    | 50                 | Red                    | 6                     | 88                     | 0.99                      | 8,800          |
| 0495060_    | 60                 | Yellow                 | 6                     | 87                     | 0.76                      | 19,500         |
| 0495900_    | SHUNT              | Black                  | -                     | -                      | -                         | -              |

The typical I²t is an average value calculated from the breaking capacity tests by using the melting time before the arcing occurs.

JCASE® Cartridge Fuses Rated 32V

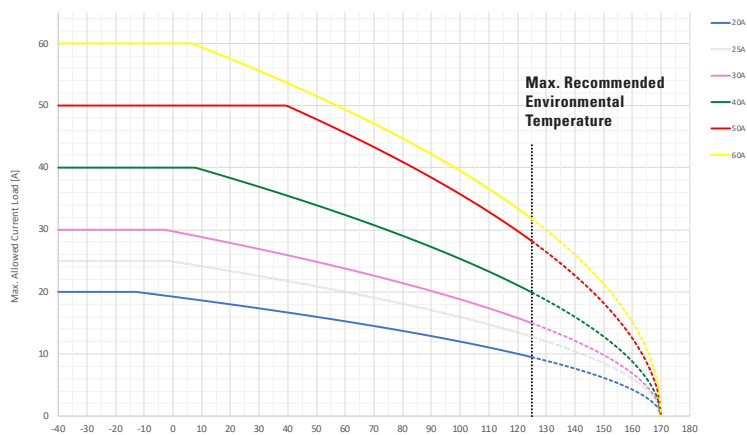
Dimensions

Dimensions in mm for reference only. See outline drawing for dimensions and tolerances.



Typical Derating of Fuse Melting Element

Temperature Security Margin is 20%  
Please contact Littelfuse® for Details Regarding Derating Test Set-Up.

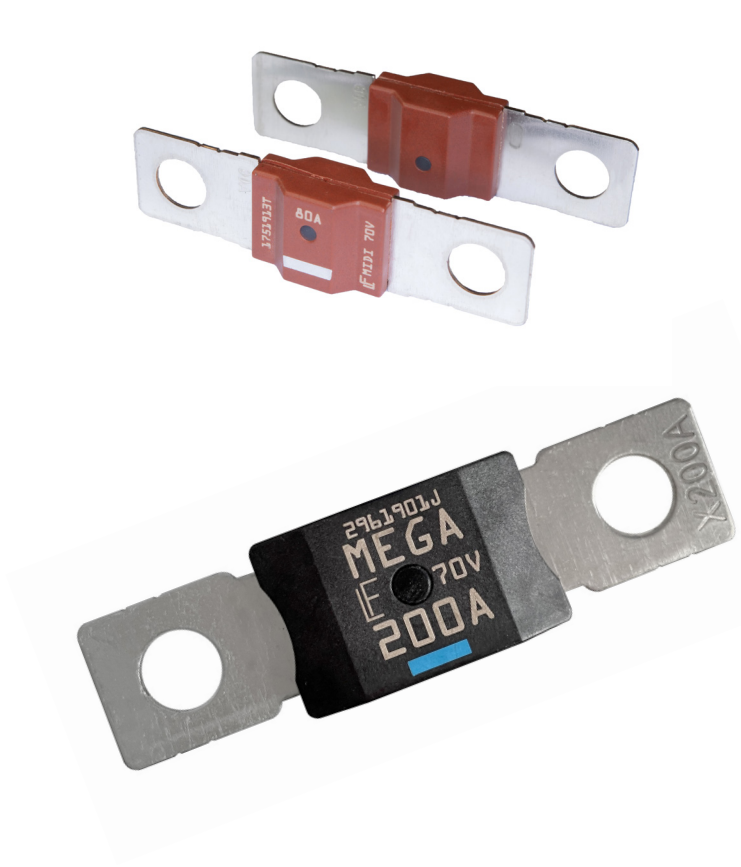


Temperature Table

|     | max. allowed current load [A] at ambient temperature (typical derating) |     |      |      |      |       |       |
|-----|-------------------------------------------------------------------------|-----|------|------|------|-------|-------|
|     | -40°C                                                                   | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| 20A | 20                                                                      | 20  | 20   | 17   | 15   | 12    | 10    |
| 25A | 25                                                                      | 25  | 25   | 20   | 18   | 15    | 13    |
| 30A | 30                                                                      | 30  | 30   | 28   | 25   | 21    | 18    |
| 40A | 40                                                                      | 40  | 40   | 37   | 33   | 27    | 23    |
| 50A | 50                                                                      | 50  | 49   | 40   | 36   | 29    | 25    |
| 60A | 60                                                                      | 60  | 60   | 51   | 46   | 38    | 33    |

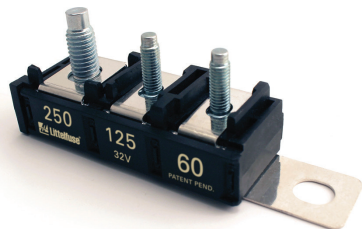
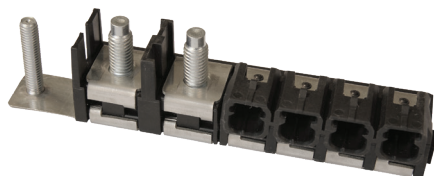
SHUNT Maximum Continuous Load: 50A

Derating curves may change depending on the final condition of the application (terminals characteristics, wire size etc..).  
Please ask Littelfuse for more information.



## HIGH CURRENT FUSES

|                                                       |    |
|-------------------------------------------------------|----|
| ZCase Masterfuse                                      | 31 |
| Masterfuse                                            | 32 |
| ZCase M6/M8 Single Starter                            | 33 |
| ZCase M10 Bolt-Down Single Fuse Rated 32V             | 35 |
| ZCase M10 Material Handling                           | 37 |
| MEGA® Fuse Rated 32V                                  | 39 |
| MEGA® High Performance Fuse Rated 70V - ISO SF51      | 41 |
| MEGA® High Performance Fuse Rated 70V - ISO SF56      | 43 |
| MEGA® Fuse Rated 32V                                  | 45 |
| MEGA® Low Temperature Fuse Rated 32V                  | 47 |
| MEGA® Fuse Rated 120V                                 | 49 |
| UL Recognized MEGA® Fuse Rated 32V                    | 51 |
| MIDI® Style Bolt-Down Fuse Rated 32V                  | 53 |
| MIDI® Style Bolt-Down High Performance Fuse Rated 70V | 55 |
| BF1 Fuse Rated 32V                                    | 57 |
| BF1 Fuse Rated 58V                                    | 59 |
| BF2 Fuse Rated 32V                                    | 61 |
| BF2 Fuse Rated 58V                                    | 63 |
| CF Fuse Rated 58V                                     | 65 |
| Fuse Strips                                           | 66 |



ZCASE Masterfuses

## ZCASE Masterfuse

The ZCASE Masterfuse product is the smallest high current distribution product in the industry. It utilizes the Z-Axis effectively to create a compact design which takes one third the footprint of a traditional solution. This package allows the user to replace multiple discrete fuses in a power distribution box with a single component, thus eliminating additional bolts, bus bars and interconnects. The output bolt is integrated into the fuse creating a reliable interface to the mating terminal due to its high torque withstandability. Keying features are available on each bolt position to ensure the correct mating ring terminal is used during assembly. The solution can also be connectorized to mate to high current terminals. This compact design enables the integration of the high current distribution into the main junction box due to its small footprint. This eliminates the need for a separate fuse box for high current distribution. By reducing the number of components required, overall system costs are reduced.

The ZCASE Masterfuse product is available as a standard design with customized fuse ratings. The modular manufacturing approach enables a wide range of configurations within a product family. In addition, the form factor can be fully customized for specific applications to further optimize the system. Contact Littelfuse to review your application needs.

### Features and Benefits:

**Miniaturization:** Compact design enables a 2/3 footprint reduction when compared to a traditional solution.

**Integration:** Enables the integration of the prefuse function into the main junction box due to its small footprint.

### Specifications

|                              |                                                            |
|------------------------------|------------------------------------------------------------|
| Mating Terminal Options:     | M10, M8, M6, M5 bolt-down connections or female terminals  |
| Operating Temperature Range: | -40°C to 125°C                                             |
| Housing Material:            | PPA-GF33HS                                                 |
| Fuse Ratings Available:      | 30-500A                                                    |
| Voltage Rating:              | 32Vdc                                                      |
| Materials:                   | Copper terminals (silver or tin plating options available) |
| Complies with:               | ISO 8820-5                                                 |

**RoHS**

### Ordering Information

| Part Number  | Description                       | Package Size |
|--------------|-----------------------------------|--------------|
| 05980015Z-CN | MFUSE ZCASE 32V 2-Way 125A - 200A | 200          |
| 05980016Z-CN | MFUSE ZCASE 32V 2-Way 125A - 125A | 200          |
| 05980017Z-CN | MFUSE ZCASE 32V 2-Way 275A - 200A | 200          |
| 05980019Z    | MFUSE ZCASE 32V 1-MEGA + 4-MIDI   | 100          |
| 05980020Z    | MFUSE ZCASE 32V 2-MEGA + 2-MIDI   | 50           |





Masterfuses

## MASTERFUSE

The MASTERFUSE product is a configurable fuse solution combining several different fuse types (i.e. MEGA and MIDI) and ratings in one compact package. This fuse package allows the user to replace multiple discrete fuses in a power distribution box with a single component, thus eliminating additional bolts, bus bars, and interconnects that are currently used. By reducing the number of connections required, overall system reliability is increased while cost is decreased.

Each MASTERFUSE is customized to the user's application creating an optimized circuit protection package. Contact Littelfuse to review your application needs.

### Features and Benefits:

#### Increased Reliability:

due to reduced number of terminal interfaces

#### System Cost Savings:

Material savings due to reduced number of components required. Assembly cost savings due to reduced number of operations required for installation.

**Fuse Array Customization:** Ability to mix different fuse types (i.e. MEGA, MIDI, etc.) in one compact package

#### Termination Options:

Ability to mate to female terminals to enable "bolt-less" design

#### Marking:

Custom marking options available

### Specifications

Mating Terminal Options:

M10, M8, M6, M5 bolt-down connections or female terminals

Operating Temperature Range:

-40°C to 125°C

Housing Material:

PPA-GF33HS

Fuse Ratings Available:

30A-250A Full Range  
300A-600A Short Circuit

Voltage Rating:

32Vdc

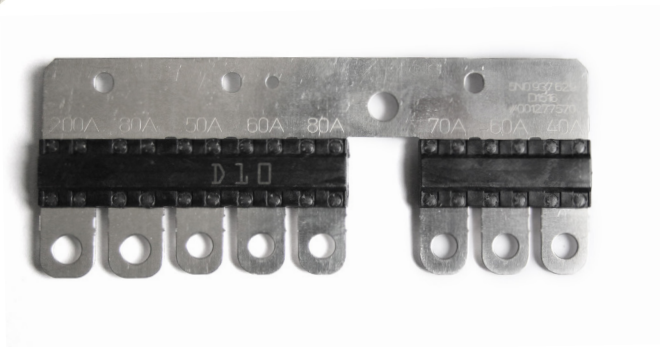
Materials:

Copper terminals (silver or tin plating options available)

Complies with:

ISO 8820-5

Note: Short circuit protected fuses have a limited continuous current.

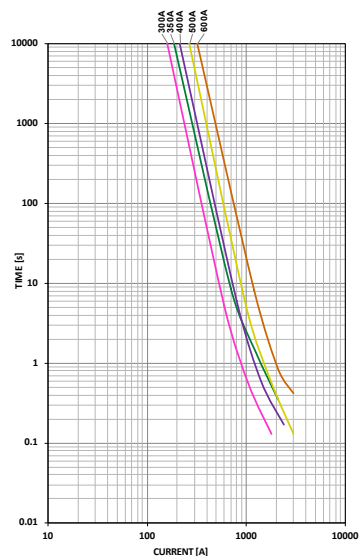
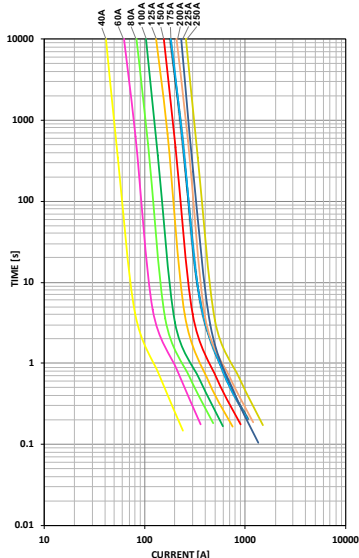




ZCASE Single Mega/Starter Fuse

## Time-Current Characteristic Curves

See note on next page regarding Test Set-Up



## ZCASE Single MEGA/Starter Fuse

The Single ZCASE is a Minimal Footprint Bolt Down Fuse with a wide rating range up to 600A in the same packaging size. The Time Current characteristic is similar to the well known MEGA Design and can be used as full wire protection until 250A. Higher ratings mostly used for typically Starter Fuse application as a protector fuse. The fuse design is optimized for a one bolt connection M6 (40A - 250A) or M8 (300A - 600A) and can be used directly on a battery post or busbar connection. Littelfuse is offering a complete solution for the necessary stud and different busbar connections including some battery clamps.

### Specifications

|                                        |                                               |
|----------------------------------------|-----------------------------------------------|
| Voltage Rating:                        | 32V DC                                        |
| Interrupting Rating:                   | 2000A @ 32V VDC                               |
| Recommended Environmental Temperature: | -40 to 125°C                                  |
| Terminal Material:                     | Tin plated Copper                             |
| Housing Material:                      | PPA-GF33HS (U.L. 94 Flammability rating - HB) |
| Insulating Tube:                       | Out of ceramic                                |
| Mounting Torque M6:                    | 9.8Nm±1.4Nm                                   |
| Mounting Torque M8:                    | 14Nm±2Nm                                      |

### Ordering Information

| Part Number   | Rating         | Package Size |
|---------------|----------------|--------------|
| 3298XXX.ZXSTA | 300 - 600      | 480          |
| 3298XXX.Z     | 40 - 250 SHUNT | 480          |
| 3298XXX.H     | 40 - 600       | 100          |

### Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |             |            |
|-------------|----------------------------|-------------|------------|
|             | 40A - 250A                 | 300A - 500A | 600A       |
| 50          | - / -                      | 14,400 / ∞  | 14,400 / ∞ |
| 100         | 14,400 / ∞                 | - / -       | - / -      |
| 135         | 120 / 1800                 | - / -       | - / -      |
| 200         | 1 / 15                     | 1 / 40      | 1 / 40     |
| 350         | 0.3 / 5                    | 0.3 / 5     | 0.3 / 5    |
| 500         | - / -                      | - / -       | 0.1 / 1    |
| 600         | 0.1 / 1                    | 0.1 / 1     | - / -      |

### Ratings

| Part number               | Current Rating (A) | Test Cable Size (mm²) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | I²t (A²s) |
|---------------------------|--------------------|-----------------------|------------------------|---------------------------|-----------|
| 3298040.Z / 3298040.H     | 40                 | 4                     | 86                     | 1.53                      | 5,000     |
| 3298060.Z / 3298060.H     | 60                 | 6                     | 83                     | 0.98                      | 18,000    |
| 3298080.Z / 3298080.H     | 80                 | 10                    | 80                     | 0.72                      | 15,500    |
| 3298100.Z / 3298100.H     | 100                | 16                    | 88                     | 0.57                      | 31,000    |
| 3298125.Z / 3298125.H     | 125                | 16                    | 71                     | 0.39                      | 45,000    |
| 3298150.Z / 3298150.H     | 150                | 25                    | 83                     | 0.32                      | 75,000    |
| 3298175.Z / 3298175.H     | 175                | 25                    | 82                     | 0.26                      | 140,000   |
| 3298200.Z / 3298200.H     | 200                | 35                    | 92                     | 0.23                      | 235,000   |
| 3298225.Z / 3298225.H     | 225                | 35                    | 86                     | 0.18                      | 95,000    |
| 3298250.Z / 3298250.H     | 250                | 50                    | 88                     | 0.17                      | 160,000   |
| 3298300.ZXSTA / 3298300.H | 300 <sup>1</sup>   | 35                    | 29 <sup>2</sup>        | 0.13                      | 310,000   |
| 3298350.ZXSTA / 3298350.H | 350 <sup>1</sup>   | 35                    | 30 <sup>2</sup>        | 0.10                      | 570,000   |
| 3298400.ZXSTA / 3298400.H | 400 <sup>1</sup>   | 50                    | 30 <sup>2</sup>        | 0.08                      | 870,000   |
| 3298500.ZXSTA / 3298500.H | 500 <sup>1</sup>   | 50                    | 34 <sup>2</sup>        | 0.07                      | 1,550,000 |
| 3298600.ZXSTA / 3298600.H | 600 <sup>1</sup>   | 50                    | 36 <sup>2</sup>        | 0.05                      | 3,000,000 |
| 3298900.Z /               | SHUNT              | 50                    | -                      | -                         | -         |

Note 1 STARTER fuses

Note 2 Voltage Drop taken at 50% of Rated Current

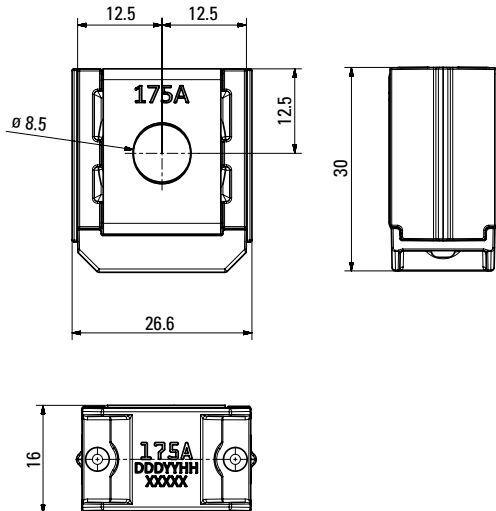
The typical I²t is an average value calculated from the breaking capacity tests by using the melting time before the arcing occurs.

# High Current Fuses

## ZCASE Single Mega/Starter Fuse

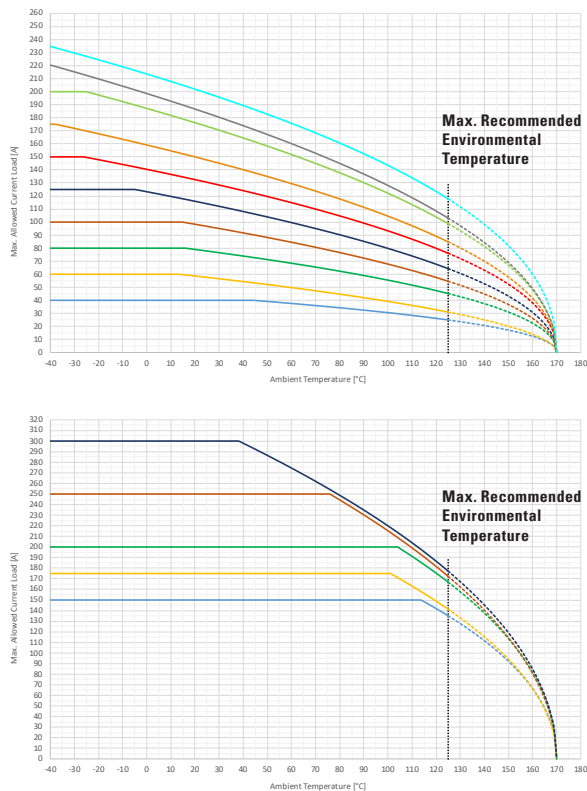
### Dimensions

Dimensions in mm for reference only.  
See outline drawing for dimensions and tolerances.



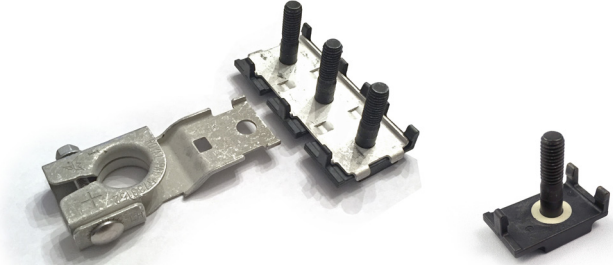
### Typical Derating of Fuse Melting Element

Temperature Security Margin is 20%  
Please contact Littelfuse® for Details Regarding Derating Test Set-Up.



Derating curves may change depending on the final condition of the application (terminals characteristics, wire size etc.).  
Please ask Littelfuse for more information.

### Assembly Components (sold separately)



| Part No.     | Description                                      |
|--------------|--------------------------------------------------|
| 882-853      | 3-Way Bus Bar with M8 Insulating Bolts Assembly* |
| 882-854      | 2-Way Bus Bar with M8 Insulating Bolts Assembly* |
| 876-199      | Battery Terminal Mount                           |
| 32980001ZXM8 | M8 Insulating Bolt                               |

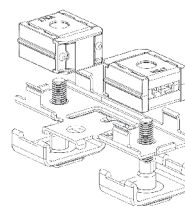
\*M8 Nuts not included

Please contact your Littelfuse representative for application support and information on mating hardware.

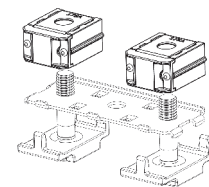
### Temperature Table

| max. allowed current load [A] at ambient temperature |       |     |      |      |      |       |       |
|------------------------------------------------------|-------|-----|------|------|------|-------|-------|
|                                                      | -20°C | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| 40A                                                  | 40    | 40  | 40   | 37   | 33   | 28    | 25    |
| 60A                                                  | 60    | 60  | 59   | 49   | 43   | 36    | 31    |
| 80A                                                  | 80    | 80  | 79   | 67   | 61   | 52    | 45    |
| 100A                                                 | 100   | 100 | 98   | 83   | 75   | 63    | 55    |
| 125A                                                 | 125   | 123 | 116  | 97   | 88   | 74    | 64    |
| 150A                                                 | 150   | 140 | 133  | 112  | 102  | 87    | 76    |
| 175A                                                 | 175   | 159 | 150  | 127  | 115  | 97    | 85    |
| 200A                                                 | 200   | 187 | 176  | 148  | 134  | 113   | 99    |
| 225A                                                 | 220   | 199 | 187  | 157  | 141  | 119   | 103   |
| 250A                                                 | 235   | 214 | 202  | 172  | 157  | 134   | 118   |
| 300A                                                 | 150   | 150 | 150  | 150  | 150  | 150   | 135   |
| 350A                                                 | 175   | 175 | 175  | 175  | 175  | 163   | 141   |
| 400A                                                 | 200   | 200 | 200  | 200  | 200  | 191   | 167   |
| 500A                                                 | 250   | 250 | 250  | 250  | 238  | 199   | 172   |
| 600A                                                 | 300   | 300 | 300  | 268  | 242  | 204   | 177   |

All tests were performed on the left or right side of the metal bar as shown in the pictures. A 50mm<sup>2</sup> Cu wire was mounted at the mid hole (M8) as current feed.



Zcase Mega Fixture

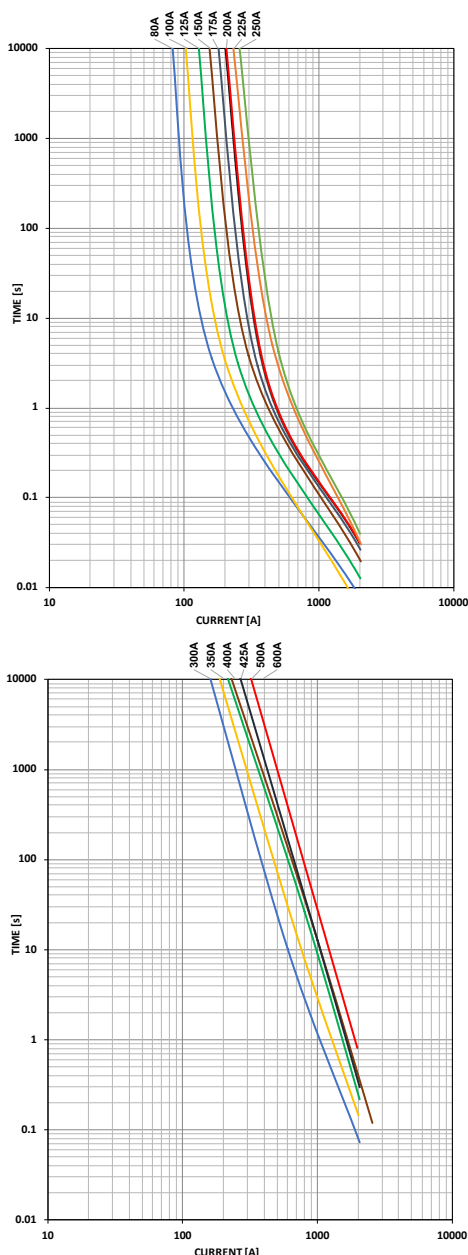


Zcase Starter Fixture



ZCASE M10 Bolt Down Single 32V Fuse

## Time-Current Characteristic Curves



## ZCASE M10 Bolt Down Single 32V Fuse

The Single ZCASE is a Minimal Footprint Bolt Down Fuse with a wide rating range up to 600A in the same packaging size. The Time Current characteristic is similar to the well known MEGA Design and can be used as full wire protection until 250A. Higher ratings mostly used for typically Starter Fuse application as a protector fuse. The fuse design is optimized for a one bolt connection M10 and can be used directly on a battery post or busbar connection

### Specifications

|                                        |                                               |
|----------------------------------------|-----------------------------------------------|
| Voltage Rating:                        | 32 VDC                                        |
| Interrupting Rating:                   | 2000A @ 32 VDC                                |
| Recommended Environmental Temperature: | -40°C to +125°C                               |
| Housing Material:                      | PPA-GF33HS (U.L. 94 Flammability rating - HB) |
| Terminals Material:                    | Tin Plated Copper Alloy                       |
| Insulating Tube:                       | Out of Ceramic                                |
| Net Weight Per Fuse:                   | 22±10% gr                                     |
| Mounting Torque M10:                   | 18±2 Nm                                       |

**RoHS**

### Ordering Information

| Part Number   | Rating           | Package Size |
|---------------|------------------|--------------|
| 3298XXX.ZXM10 | 80 - 600 & SHUNT | 480          |

### Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |             |            |
|-------------|----------------------------|-------------|------------|
|             | 40A - 250A                 | 300A - 500A | 600A       |
| 50          | - / -                      | 14,400 / ∞  | 14,400 / ∞ |
| 100         | 14,400 / ∞                 | - / -       | - / -      |
| 135         | 120 / 1800                 | - / -       | - / -      |
| 200         | 1 / 15                     | 1 / 40      | 1 / 40     |
| 350         | 0.3 / 5                    | 0.3 / 5     | 0.3 / 5    |
| 500         | - / -                      | - / -       | 0.1 / 1    |
| 600         | 0.1 / 1                    | 0.1 / 1     | - / -      |

### Ratings

| Part number              | Current Rating (A) | Test Cable Size (mm²) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | I²t (A²s) |
|--------------------------|--------------------|-----------------------|------------------------|---------------------------|-----------|
| 3298080._                | 80                 | 10                    | 95                     | 0.78                      | 32,000    |
| 3298100._                | 100                | 16                    | 80                     | 0.57                      | 23,200    |
| 3298125._                | 125                | 16                    | 90                     | 0.46                      | 51,000    |
| 3298150._                | 150                | 25                    | 78                     | 0.34                      | 81,600    |
| 3298175._                | 175                | 25                    | 97                     | 0.29                      | 108,600   |
| 3298200._                | 200                | 35                    | 94                     | 0.26                      | 126,400   |
| 3298225._                | 225                | 35                    | 80                     | 0.18                      | 126,900   |
| 3298250._                | 250                | 50                    | 82                     | 0.17                      | 160,900   |
| 3298300._ <sup>2</sup>   | 300                | 35                    | 28 <sup>3</sup>        | 0.14                      | 305,300   |
| 3298350._ <sup>2</sup>   | 350                | 35                    | 29 <sup>3</sup>        | 0.10                      | 583,900   |
| 3298400._ <sup>2</sup>   | 400                | 50                    | 27 <sup>3</sup>        | 0.08                      | 913,300   |
| 3298425._ <sup>1 2</sup> | 425                | 50                    | 27 <sup>3</sup>        | 0.08                      | 602,770   |
| 3298500._ <sup>2</sup>   | 500                | 50                    | 32 <sup>3</sup>        | 0.08                      | 1,250,000 |
| 3298600._ <sup>1 2</sup> | 600                | 50                    | 32 <sup>3</sup>        | 0.05                      | 3,140,000 |
| 3298900._ <sup>1</sup>   | SHUNT              | 50                    | 34                     | ---                       | ---       |

\* Note 1: Not mentioned in ISO standards

\* Note 2: Short Circuit Protector only

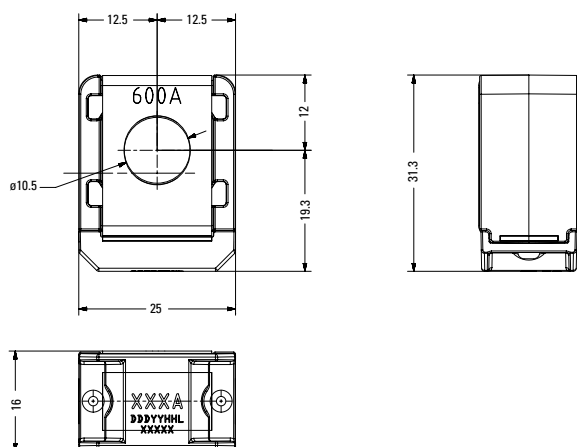
\* Note 3: Voltage Drop measurements for short circuit protectors taken at 50% of rated current.

The I²t value is calculated from the breaking capacity tests by using the current time profile before the arcing occurs.

## ZCASE M10 Bolt Down Single 32V Fuse

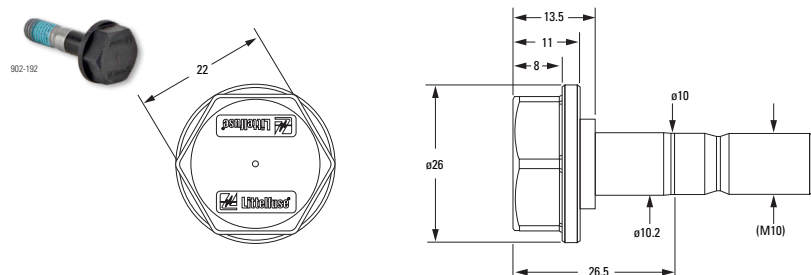
### Dimensions

Dimensions in mm for reference only. See outline drawing for dimensions and tolerances.



### Assembly Components (sold separately)

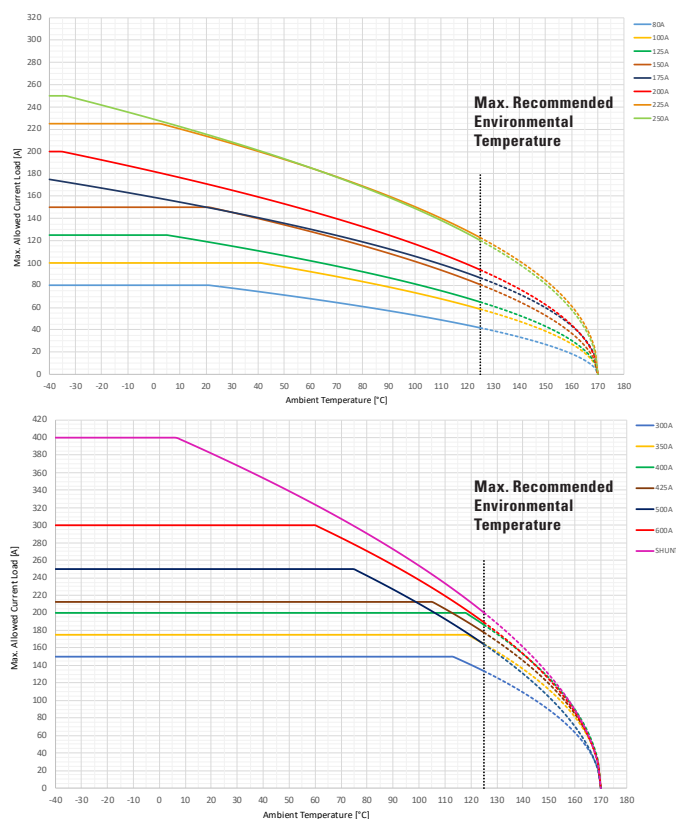
| Part No. | Description                                              |
|----------|----------------------------------------------------------|
| 902-192  | Insulated M10 Bolt (Required for installation/operation) |



Please contact your Littelfuse representative for application support and information on mating hardware.

### Typical Derating Of Fuse Melting Element

Temperature Security Margin is 20%  
Please Contact Littelfuse® For Details Regarding Derating Test Set Up



### Temperature Table

|       | max. allowed current load [A] at ambient temperature (typical derating) |     |      |      |      |       |       |
|-------|-------------------------------------------------------------------------|-----|------|------|------|-------|-------|
|       | -40°C                                                                   | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| 80A   | 80                                                                      | 80  | 80   | 66   | 59   | 49    | 42    |
| 100A  | 100                                                                     | 100 | 100  | 90   | 81   | 68    | 59    |
| 125A  | 125                                                                     | 125 | 119  | 100  | 89   | 75    | 65    |
| 150A  | 150                                                                     | 150 | 150  | 125  | 112  | 94    | 81    |
| 175A  | 175                                                                     | 159 | 150  | 128  | 116  | 99    | 87    |
| 200A  | 200                                                                     | 182 | 171  | 143  | 129  | 108   | 94    |
| 225A  | 225                                                                     | 225 | 214  | 181  | 165  | 140   | 123   |
| 250A  | 250                                                                     | 229 | 215  | 181  | 164  | 138   | 120   |
| 300A  | 150                                                                     | 150 | 150  | 150  | 150  | 150   | 134   |
| 350A  | 175                                                                     | 175 | 175  | 175  | 175  | 175   | 164   |
| 400A  | 200                                                                     | 200 | 200  | 200  | 200  | 200   | 186   |
| 425A  | 213                                                                     | 213 | 213  | 213  | 213  | 205   | 178   |
| 500A  | 250                                                                     | 250 | 250  | 250  | 235  | 193   | 164   |
| 600A  | 300                                                                     | 300 | 300  | 293  | 263  | 219   | 189   |
| SHUNT | 400                                                                     | 400 | 382  | 316  | 282  | 234   | 200   |

All ZCASE Derating curves were performed on the specific fixture as shown in the picture.

A 50mm<sup>2</sup> Cu wire was mounted at the opposite fuse side of the metal bar as current feed.



Derating curves may change depending on the final condition of the application (terminals characteristics, wire size exc...). Please ask Littelfuse® for more information.





A log-log plot showing the relationship between Time [s] (Y-axis, ranging from 0.01 to 10000) and Current [A] (X-axis, ranging from 10 to 10000). The graph displays several curves representing different current limits: 70A, 100A, 125A, 150A, 175A, 200A, 225A, and 250A. The curves show that as the current limit increases, the time required to reach that limit decreases for a given current value. The curves are labeled with their respective current limits at the top.

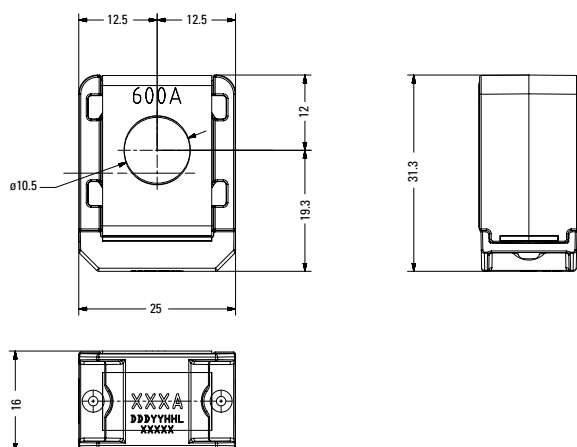




## ZCASE M10 Bolt Down Down Single Material Handling

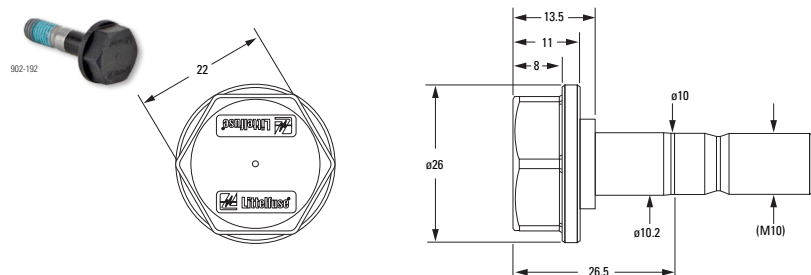
### Dimensions

Dimensions in mm for reference only.  
See outline drawing for dimensions and tolerances.



### Assembly Components (sold separately)

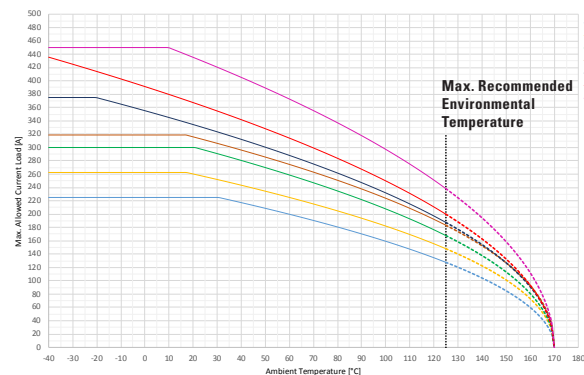
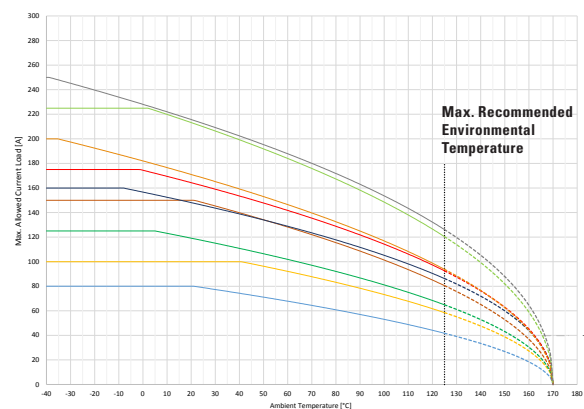
| Part No. | Description                                              |
|----------|----------------------------------------------------------|
| 902-192  | Insulated M10 Bolt (Required for installation/operation) |



Please contact your Littelfuse representative for application support and information on mating hardware.

### Typical Derating Of Fuse Melting Element

Temperature Security Margin is 20%  
Please Contact Littelfuse® For Details Regarding Derating Test Set Up



### max. allowed current load [A] at ambient temperature (typical derating)

|              | -40°C     | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
|--------------|-----------|-----|------|------|------|-------|-------|
| <b>70A</b>   | Coming Up |     |      |      |      |       |       |
| <b>80A</b>   | 80        | 80  | 80   | 66   | 59   | 49    | 42    |
| <b>100A</b>  | 100       | 100 | 100  | 90   | 81   | 68    | 59    |
| <b>125A</b>  | 125       | 125 | 119  | 100  | 89   | 75    | 65    |
| <b>150A</b>  | 150       | 150 | 150  | 125  | 112  | 94    | 81    |
| <b>160A</b>  | 160       | 157 | 148  | 126  | 115  | 98    | 86    |
| <b>175A</b>  | 175       | 159 | 150  | 128  | 116  | 99    | 87    |
| <b>200A</b>  | 200       | 182 | 171  | 143  | 129  | 108   | 94    |
| <b>225A</b>  | 225       | 225 | 214  | 181  | 165  | 140   | 123   |
| <b>250A</b>  | 250       | 229 | 215  | 181  | 164  | 138   | 120   |
| <b>300A</b>  | 225       | 225 | 225  | 225  | 225  | 197   | 170   |
| <b>350A</b>  | 263       | 263 | 263  | 263  | 263  | 226   | 197   |
| <b>400A</b>  | 300       | 300 | 300  | 300  | 300  | 257   | 224   |
| <b>425A</b>  | 319       | 319 | 316  | 269  | 244  | 209   | 183   |
| <b>500A</b>  | 375       | 355 | 334  | 282  | 255  | 215   | 188   |
| <b>600A</b>  | 436       | 391 | 367  | 307  | 276  | 231   | 200   |
| <b>SHUNT</b> | 450       | 450 | 435  | 364  | 328  | 275   | 238   |

All ZCASE Derating curves were performed on the specific fixture as shown in the picture.

A 50 mm<sup>2</sup> Cu wire was mounted at the opposite fuse side of the metal bar as current feed. (Only for the SHUNT, a 70 mm<sup>2</sup> wire size was used as current feed).



Derating curves may change depending on the final condition of the application (terminals characteristics, wire size exc...). Please ask Littelfuse® for more information.



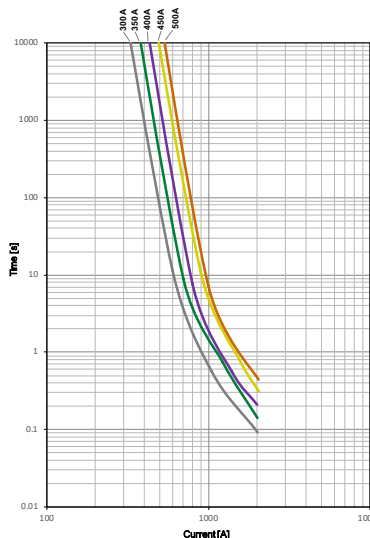
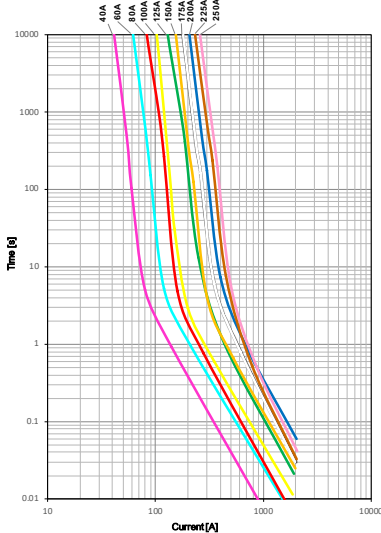
Bolt Down Versions



Clinch Versions  
(1 Hole and No Holes variants)

## Time-Current Characteristic Curves

TIME-CURRENT CHARACTERISTIC CURVES (RECORDED @ 23°C)



## MEGA+® Fuse Rated 32V

The MEGA+® Fuse is designed for high current circuit protection up to 500A with “Diffusion Pill Technology.” The MEGA+® Fuse also provides time delay characteristics. Designed and patented by Littelfuse, the MEGA+® Fuse is ideal for battery and alternator protection application and other heavy gauge cables requiring ultra-high current protection.

### Specifications

|                                        |                                                                                   |
|----------------------------------------|-----------------------------------------------------------------------------------|
| Voltage Rating:                        | 32VDC                                                                             |
| Interrupting Rating:                   | 2000A @ 32VDC                                                                     |
| Recommended Environmental Temperature: | -40°C to + 125°C                                                                  |
| Terminals Material:                    | Tin Plated Copper Alloy                                                           |
| Housing Material:                      | PET-GF30FR (U.L. 94 Flammability rating - V-0)                                    |
| Net Weight Per Fuse:                   | 11.6±15% gr                                                                       |
| M6 Mounting Torque:                    | 8-14Nm - Recommended Range Value                                                  |
| M8 Mounting Torque:                    | 12-18Nm - Recommended Range Value (25Nm Max Allowed)<br>(ISO prescription 12±1Nm) |
| Refers to:                             | ISO 8820-5                                                                        |

**RoHS**

### Ordering Information

| Part Number     | Rating   | Package Size | Bolt Size | Bolt Hole Qty | % of Rating | Opening Time Min / Max (s) |            |            |
|-----------------|----------|--------------|-----------|---------------|-------------|----------------------------|------------|------------|
|                 |          |              |           |               |             | 40A-250A                   | 300A       | 350A-500A  |
| 0298XXX.UXP-2M8 | 40 - 500 | 500          | M8        | 2             | 75          | - / -                      | 14,400 / ∞ | 14,400 / ∞ |
| 0298XXX.UXP-1M8 | 40 - 500 | 500          | M8        | 1             | 100         | 14,400 / ∞                 | - / -      | - / -      |
| 0298XXX.UXP-2M6 | 40 - 500 | 500          | M6        | 2             | 135         | 120 / 1800                 | - / -      | - / -      |
| 0298XXX.UXP-1M6 | 40 - 500 | 500          | M6        | 1             | 150         | 20 / 450                   | - / -      | - / -      |
| 0298XXX.UXP-NH  | 40 - 500 | 500          | N/A       | 0             | 200         | 1 / 15                     | 1 / 15     | 1 / 15     |
|                 |          |              |           |               | 350         | 0.3 / 5                    | 0.5 / 5    | 0.5 / 5    |
|                 |          |              |           |               | 500         | - / -                      | 0.1 / 2    | 0.1 / 2    |
|                 |          |              |           |               | 600         | 0.1 / 1                    | 0.1 / 1    | - / -      |

### Time-Current Characteristics

### Ratings

| Part Number            | Current Rating (A) | Color Code <sup>4</sup> | Test Cable size (mm <sup>2</sup> ) | Typ. Voltage Drop at 100% I <sub>r</sub> (mV) | Typ. Cold Resistance (mΩ) | I <sup>2</sup> t (A <sup>2</sup> s) |
|------------------------|--------------------|-------------------------|------------------------------------|-----------------------------------------------|---------------------------|-------------------------------------|
| 0298040._ <sup>1</sup> | 40                 |                         | 4                                  | 86.9                                          | 1.52                      | 6,600                               |
| 0298060._ <sup>1</sup> | 60                 |                         | 6                                  | 88.5                                          | 0.95                      | 22,200                              |
| 0298080._              | 80                 |                         | 10                                 | 77.1                                          | 0.66                      | 22,900                              |
| 0298100._              | 100                |                         | 16                                 | 85.9                                          | 0.55                      | 27,600                              |
| 0298125._              | 125                |                         | 16                                 | 79.0                                          | 0.41                      | 78,000                              |
| 0298150._              | 150                |                         | 25                                 | 90.9                                          | 0.34                      | 97,300                              |
| 0298175._              | 175                |                         | 25                                 | 77.3                                          | 0.28                      | 205,500                             |
| 0298200._              | 200                |                         | 35                                 | 92.8                                          | 0.26                      | 245,800                             |
| 0298225._              | 225                |                         | 35                                 | 83.5                                          | 0.21                      | 135,300                             |
| 0298250._              | 250                |                         | 50                                 | 85.8                                          | 0.19                      | 176,200                             |
| 0298300._ <sup>2</sup> | 300                |                         | 70                                 | 45.3 <sup>3</sup>                             | 0.16                      | 378,900                             |
| 0298350._ <sup>2</sup> | 350                |                         | 70                                 | 48.2 <sup>3</sup>                             | 0.13                      | 573,000                             |
| 0298400._ <sup>2</sup> | 400                |                         | 70                                 | 52.0 <sup>3</sup>                             | 0.12                      | 844,400                             |
| 0298450._ <sup>2</sup> | 450                |                         | 70                                 | 58.3 <sup>3</sup>                             | 0.11                      | 1,323,600                           |
| 0298500._ <sup>2</sup> | 500                |                         | 70                                 | 57.5 <sup>3</sup>                             | 0.09                      | 1,850,200                           |

Note 1: Not mentioned in ISO standards

Note 2: Short Circuit Protector only

Note 3: Voltage Drop measurements for short circuit protectors taken at 75% of rated current.

Note 4: Color Code Applicable for the UXP-2M8 and UXP-2M6 versions only - Not applicable for UXP-1M6, UXP-1M8 and UXP-NH clinch versions that have the High Contrast Mark (White Color Only)

The I<sup>2</sup>t value is calculated from the breaking capacity tests by using the current time profile before the arcing occurs.

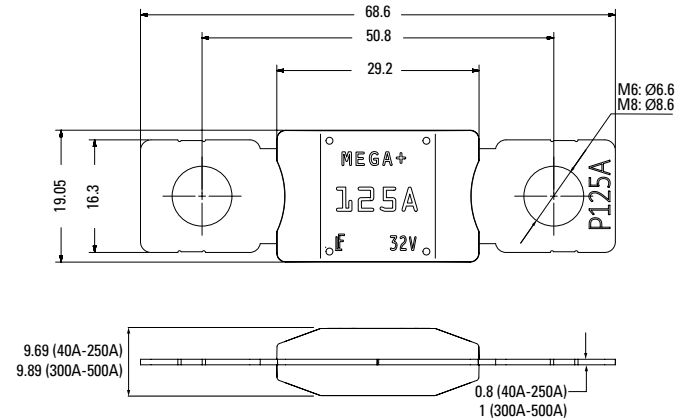
## MEGA+® Fuses Rated 32V

### Dimensions

Dimensions in mm for reference only. See outline drawing for dimensions and tolerances

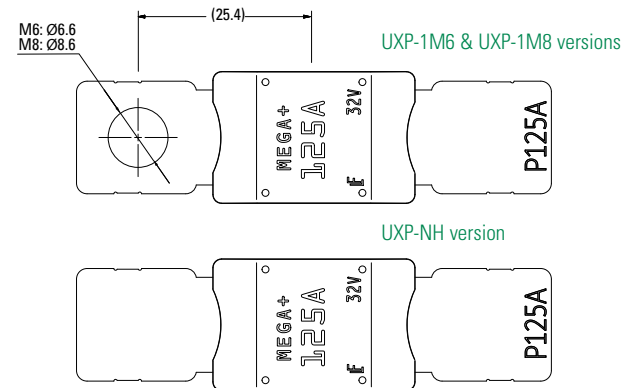
### Marking Type "A"

Color Code Rating Mark Applicable for the UXP-2M8 and UXP-2M6 versions only



### Marking Type "B"

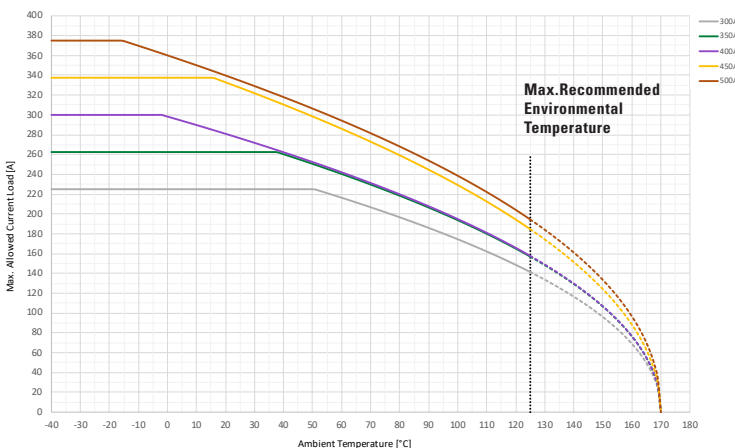
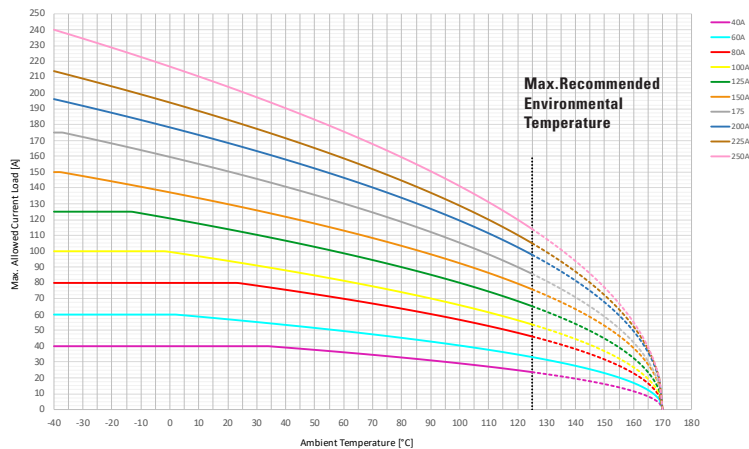
High Contrast Mark (White Color Only - No Color Code) applicable for UXP-1M6, UXP-1M8 and UXP-NH clinch versions



### Typical Derating Of Fuse Melting Element

Temperature Security Margin is 20%

Please Contact Littelfuse® For Details Regarding Derating Test Set Up



### Temperature Table

|      | max. allowed current load [A] at ambient temperature (typical derating) |     |      |      |      |       |       |
|------|-------------------------------------------------------------------------|-----|------|------|------|-------|-------|
|      | -40°C                                                                   | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| 40A  | 40                                                                      | 40  | 40   | 35   | 32   | 27    | 24    |
| 60A  | 60                                                                      | 60  | 57   | 49   | 44   | 38    | 33    |
| 80A  | 80                                                                      | 80  | 80   | 68   | 62   | 53    | 46    |
| 100A | 100                                                                     | 100 | 94   | 80   | 72   | 61    | 54    |
| 125A | 125                                                                     | 121 | 114  | 97   | 88   | 75    | 65    |
| 150A | 150                                                                     | 137 | 130  | 111  | 101  | 86    | 76    |
| 175A | 175                                                                     | 160 | 151  | 127  | 115  | 98    | 86    |
| 200A | 196                                                                     | 178 | 168  | 143  | 130  | 111   | 98    |
| 225A | 214                                                                     | 194 | 183  | 155  | 141  | 120   | 105   |
| 250A | 240                                                                     | 217 | 204  | 172  | 155  | 131   | 114   |
| 300A | 225                                                                     | 225 | 225  | 212  | 191  | 162   | 141   |
| 350A | 263                                                                     | 263 | 263  | 235  | 213  | 180   | 157   |
| 400A | 300                                                                     | 298 | 281  | 237  | 214  | 181   | 158   |
| 450A | 338                                                                     | 338 | 333  | 280  | 252  | 213   | 185   |
| 500A | 375                                                                     | 360 | 340  | 288  | 261  | 222   | 194   |

Derating curves may change depending on the final condition of the application (terminals characteristics, wire size exc.). Please ask Littelfuse for more information.



MEGA® 70V HP Fuse-SF51

## MEGA® High Performance Fuse Rated 70V-SF51

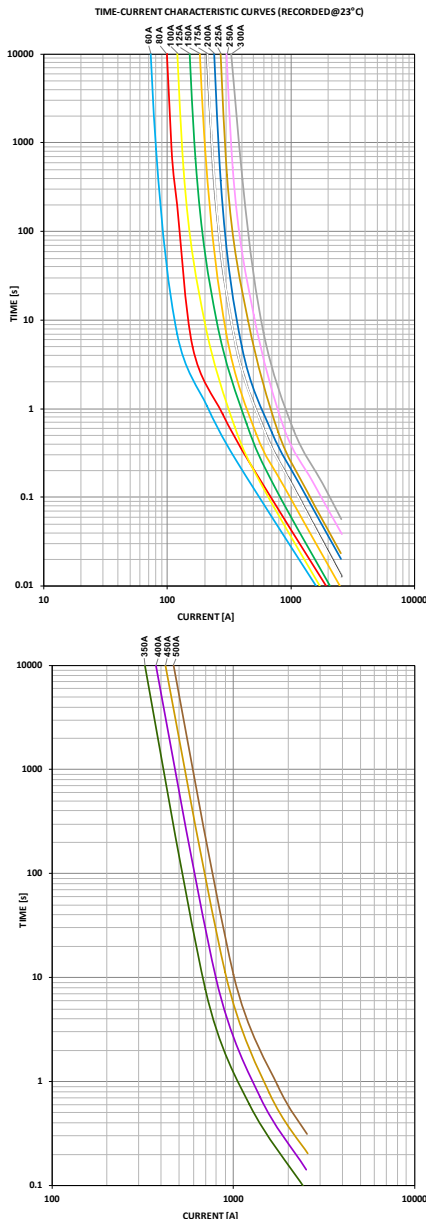
The MEGA® 70V-SF51 High Performance (HP) Fuse is designed for high current circuit protection up to 500A with "Diffusion Pill Technology." The MEGA 70V HP features 1MOhm Open State Resistance after fuse opening to guarantee safe interruption at any voltage up to 70V. The MEGA® 70V HP Fuse is ideal for battery and alternator protection application and other heavy gauge cables requiring ultra-high current protection.

### Specifications

|                                            |                                             |
|--------------------------------------------|---------------------------------------------|
| Voltage Rating:                            | 70 VDC                                      |
| Interrupting Rating:                       | 2500A @ 70 VDC                              |
| Recommended Environmental Temperature:     | -40°C to + 125°C                            |
| Terminals Material:                        | Tin Plated Copper                           |
| Housing Material:                          | PPA-GF33 (U.L. 94 Flammability rating – HB) |
| Mounting Torque M6:                        | 9Nm+/-1Nm                                   |
| Mounting Torque M8:                        | 20Nm+/-1Nm                                  |
| Open State Resistance (after fuse opening) | >1MOhm                                      |
| Complies With:                             | ISO 20934 - Type SF51                       |



### Time-Current Characteristic Curves



### Ordering Information

| Part Number    | Rating   | Package Size | Bolt Size | Bolt Hole Qty |
|----------------|----------|--------------|-----------|---------------|
| 0998xxx.UX-2M8 | 60 - 500 | 500          | M8        | 2             |
| 0998xxx.UX-1M8 | 60 - 500 | 500          | M8        | 1             |
| 0998xxx.UX-2M6 | 60 - 500 | 500          | M6        | 2             |
| 0998xxx.UX-1M6 | 60 - 500 | 500          | M6        | 1             |
| 0998xxx.UX-NH  | 60 - 500 | 500          | N/A       | 0             |

### Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |            |              |
|-------------|----------------------------|------------|--------------|
|             | 60-250A                    | 300A       | 350-500A     |
| 75          | -/-                        | 14,400 / ∞ | 14,400 s / ∞ |
| 100         | 14,400 / ∞                 | -/-        | -/-          |
| 135         | 120 / 1800                 | 120 / 1800 | -/-          |
| 150         | 20 / 450                   | 20 / 450   | -/-          |
| 200         | 1 / 15                     | 1 / 15     | 1 / 15       |
| 350         | 0.3 / 5                    | 0.3 / 5    | 0.5 / 5      |
| 600         | 0.1 / 1                    | 0.1 / 1    | 0.1 / 1      |

### Ratings

| Part Number | Current Rating (A) | Font Color | Test Cable Size (mm²) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | I²t (A²s) |
|-------------|--------------------|------------|-----------------------|------------------------|---------------------------|-----------|
| 0998060_    | 60                 |            | 6                     | 75.5                   | 0.90                      | 22,800    |
| 0998080_    | 80                 |            | 10                    | 88.0                   | 0.75                      | 34,900    |
| 0998100_    | 100                |            | 10                    | 66.7                   | 0.46                      | 24,000    |
| 0998125_    | 125                |            | 16                    | 70.4                   | 0.37                      | 38,000    |
| 0998150_    | 150                |            | 25                    | 70.6                   | 0.32                      | 58,100    |
| 0998175_    | 175                |            | 25                    | 79.2                   | 0.28                      | 79,300    |
| 0998200_    | 200                |            | 35                    | 76.9                   | 0.24                      | 123,600   |
| 0998225_    | 225                |            | 35                    | 76.6                   | 0.21                      | 142,500   |
| 0998250_    | 250                |            | 50                    | 66.0                   | 0.17                      | 220,000   |
| 0998300_    | 300                |            | 50                    | 46.9 <sup>2</sup>      | 0.15                      | 340,000   |
| 0998350_    | 350 <sup>1</sup>   |            | 50                    | 50.7 <sup>2</sup>      | 0.14                      | 495,000   |
| 0998400_    | 400 <sup>1</sup>   |            | 70                    | 50.1 <sup>2</sup>      | 0.12                      | 872,000   |
| 0998450_    | 450 <sup>1</sup>   |            | 70                    | 52.9 <sup>2</sup>      | 0.10                      | 1,224,000 |
| 0998500_    | 500 <sup>1</sup>   |            | 70                    | 56.3 <sup>2</sup>      | 0.09                      | 1,800,000 |

<sup>1</sup> Short Circuit Protector only

<sup>2</sup> Voltage Drop measurements for short circuit protectors taken at 75% of rated current.

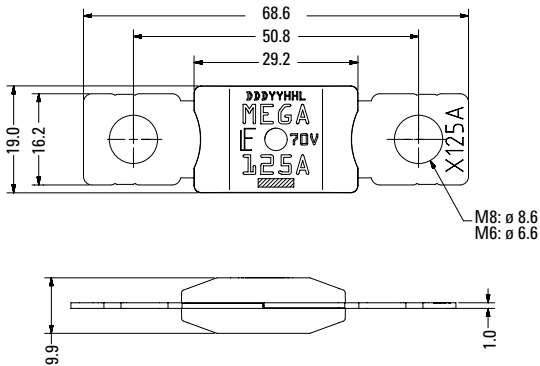
The I²t value is calculated from the breaking capacity tests by using the current time profile before the arcing occurs.

## MEGA® High Performance Fuse Rated 70V-SF51

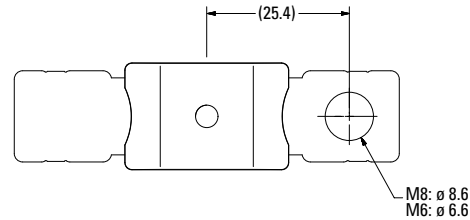
### Dimensions

Dimensions in mm for reference only.  
See outline drawing for dimensions and tolerances.

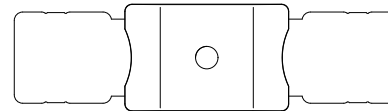
#### MEGA HP SF51 2 Holes M8/M6 versions



#### MEGA HP SF51 1 Hole M8/M6 versions

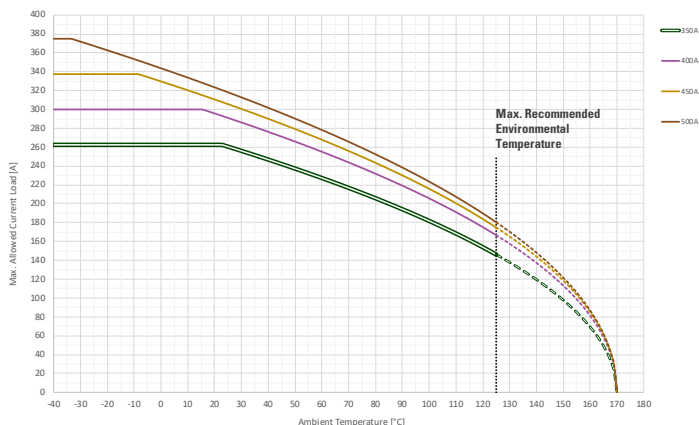
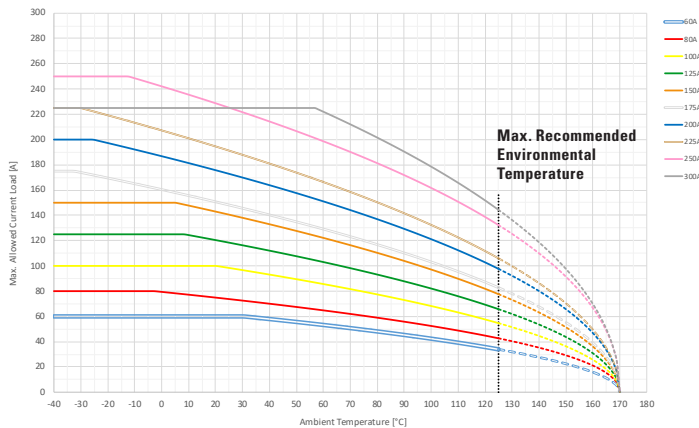


#### MEGA HP SF51 No-Holes version



### Typical Derating Of Fuse Melting Element

Temperature Security Margin is 20%  
Please Contact Littelfuse For Details Regarding Derating Test Set Up



### Temperature Table

|             | max. allowed current load [A] at ambient temperature |     |      |      |      |       |       |
|-------------|------------------------------------------------------|-----|------|------|------|-------|-------|
|             | -40°C                                                | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| <b>60A</b>  | 60                                                   | 60  | 60   | 52   | 47   | 39    | 34    |
| <b>80A</b>  | 80                                                   | 79  | 75   | 63   | 57   | 49    | 43    |
| <b>100A</b> | 100                                                  | 100 | 100  | 84   | 75   | 63    | 55    |
| <b>125A</b> | 125                                                  | 125 | 120  | 101  | 90   | 76    | 66    |
| <b>150A</b> | 150                                                  | 150 | 143  | 119  | 107  | 90    | 78    |
| <b>175A</b> | 175                                                  | 160 | 151  | 126  | 114  | 95    | 83    |
| <b>200A</b> | 200                                                  | 187 | 176  | 148  | 133  | 112   | 98    |
| <b>225A</b> | 225                                                  | 207 | 195  | 163  | 146  | 123   | 106   |
| <b>250A</b> | 250                                                  | 242 | 229  | 194  | 177  | 151   | 132   |
| <b>300A</b> | 225                                                  | 225 | 225  | 217  | 196  | 166   | 144   |
| <b>350A</b> | 263                                                  | 263 | 263  | 222  | 200  | 168   | 146   |
| <b>400A</b> | 300                                                  | 300 | 296  | 250  | 226  | 191   | 167   |
| <b>450A</b> | 338                                                  | 330 | 311  | 262  | 237  | 201   | 175   |
| <b>500A</b> | 375                                                  | 344 | 323  | 272  | 246  | 207   | 180   |

Derating curves may change depending on the final condition of the application (terminals characteristics, wire size etc.).  
Please ask Littelfuse® for more information.



MEGA® 70V HP Fuse-SF56

## MEGA® High Performance Fuse Rated 70V-SF56

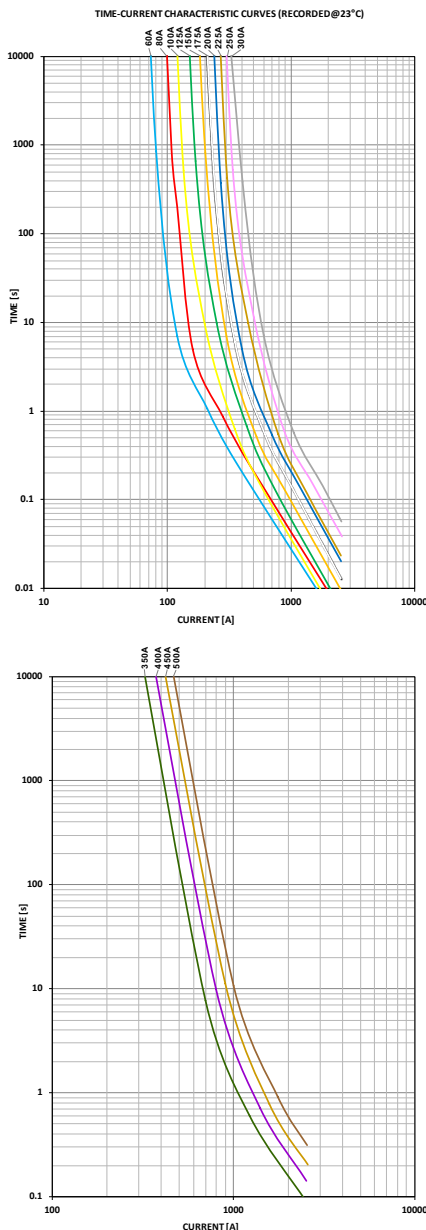
The MEGA® 70V-SF56 High Performance (HP) Fuse is designed for high current circuit protection up to 500A with "Diffusion Pill Technology." The MEGA 70V HP features 1MΩm Open State Resistance after fuse opening to guarantee safe interruption at any voltage up to 70V. The MEGA® 70V HP Fuse is ideal for battery and alternator protection application and other heavy gauge cables requiring ultra-high current protection. The bigger pitch of 56mm serves as a mechanical coding feature to avoid standard SF51 fuses being mounted.

### Specifications

|                                            |                                        |
|--------------------------------------------|----------------------------------------|
| Voltage Rating:                            | 70 VDC                                 |
| Interrupting Rating:                       | 2500A @ 70 VDC                         |
| Recommended Environmental Temperature:     | -40°C to +125°C                        |
| Terminals Housing:                         | Tin Plated ETP Copper                  |
| Housing Material:                          | PPA-GF33HS (UL Flammability rate - HB) |
| Mounting Torque M6:                        | 9Nm+/-1Nm                              |
| Mounting Torque M8:                        | 20Nm+/-1Nm                             |
| Open State Resistance (after fuse opening) | >1MΩm                                  |
| Complies With:                             | ISO 20934 - Type SF56                  |

### RoHS

### Time-Current Characteristic Curves



### Ordering Information

| Part Number   | Rating   | Package Size | Bolt Size | Bolt Hole Qty |
|---------------|----------|--------------|-----------|---------------|
| 0898xxx.U-2M8 | 60 - 500 | 500          | M8        | 2             |
| 0898xxx.U-1M8 | 60 - 500 | 500          | M8        | 1             |
| 0898xxx.U-2M6 | 60 - 500 | 500          | M6        | 2             |
| 0898xxx.U-1M6 | 60 - 500 | 500          | M6        | 1             |
| 0898xxx.U-NH  | 60 - 500 | 500          | N/A       | 0             |

### Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |            |              |
|-------------|----------------------------|------------|--------------|
|             | 60-250A                    | 300A       | 350-500A     |
| 75          | -/-                        | 14,400 / ∞ | 14,400 s / ∞ |
| 100         | 14,400 / ∞                 | -/-        | -/-          |
| 135         | 120 / 1800                 | 120 / 1800 | -/-          |
| 150         | 20 / 450                   | 20 / 450   | -/-          |
| 200         | 1 / 15                     | 1 / 15     | 1 / 15       |
| 350         | 0.3 / 5                    | 0.3 / 5    | 0.5 / 5      |
| 600         | 0.1 / 1                    | 0.1 / 1    | 0.1 / 1      |

### Ratings

| Part Number | Current Rating (A) | Color Code | Test Cable Size (mm²) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | I²t (A²s) |
|-------------|--------------------|------------|-----------------------|------------------------|---------------------------|-----------|
| 0898060._   | 60                 |            | 6                     | 75.5                   | 0.90                      | 22,800    |
| 0898080._   | 80                 |            | 10                    | 88                     | 0.75                      | 34,900    |
| 0898100._   | 100                |            | 10                    | 66.7                   | 0.46                      | 24,000    |
| 0898125._   | 125                |            | 16                    | 70.4                   | 0.37                      | 38,000    |
| 0898150._   | 150                |            | 25                    | 70.6                   | 0.32                      | 58,100    |
| 0898175._   | 175                |            | 25                    | 79.2                   | 0.28                      | 79,300    |
| 0898200._   | 200                |            | 35                    | 76.9                   | 0.24                      | 123,600   |
| 0898225._   | 225                |            | 35                    | 76.6                   | 0.21                      | 142,500   |
| 0898250._   | 250                |            | 50                    | 66                     | 0.17                      | 220,000   |
| 0898300._   | 300                |            | 50                    | 46.9 <sup>2</sup>      | 0.15                      | 340,000   |
| 0898350._   | 350 <sup>1</sup>   |            | 50                    | 50.7 <sup>2</sup>      | 0.14                      | 495,000   |
| 0898400._   | 400 <sup>1</sup>   |            | 70                    | 50.1 <sup>2</sup>      | 0.12                      | 872,000   |
| 0898450._   | 450 <sup>1</sup>   |            | 70                    | 52.9 <sup>2</sup>      | 0.10                      | 1,224,000 |
| 0898500._   | 500 <sup>1</sup>   |            | 70                    | 56.3 <sup>2</sup>      | 0.09                      | 1,800,000 |

<sup>1</sup> Short Circuit Protector only

<sup>2</sup> Voltage Drop measurements for short circuit protectors taken at 75% of rated current.

The I²t value is calculated from the breaking capacity tests by using the current time profile before the arcing occurs.

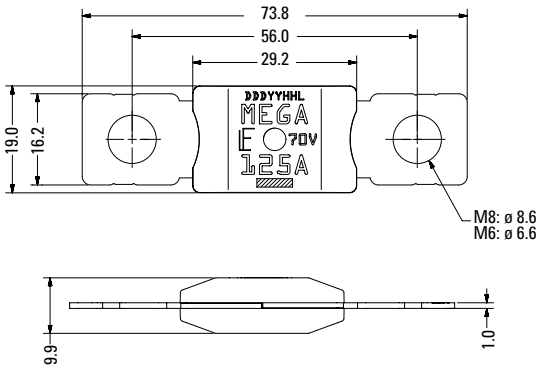


## MEGA® High Performance Fuse Rated 70V-SF56

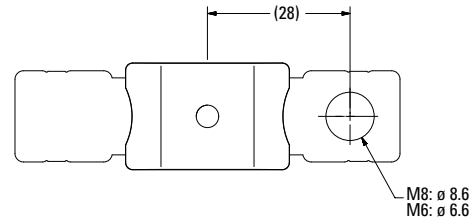
### Dimensions

Dimensions in mm for reference only.  
See outline drawing for dimensions and tolerances.

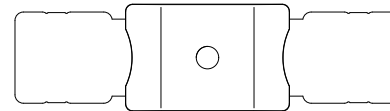
#### MEGA HP SF56 2 Holes M8/M6 versions



#### MEGA HP SF56 1 Hole M8/M6 versions

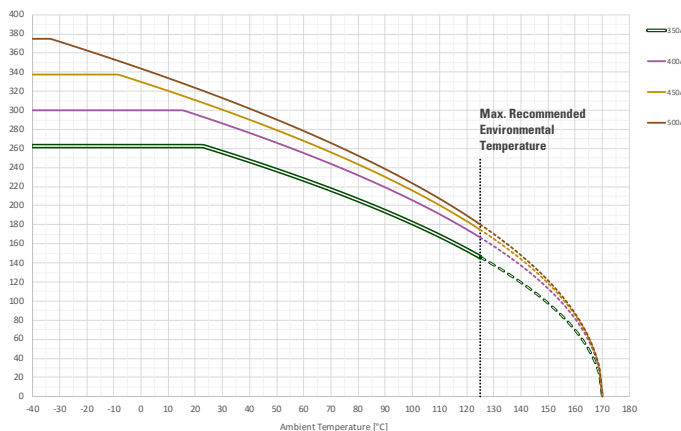
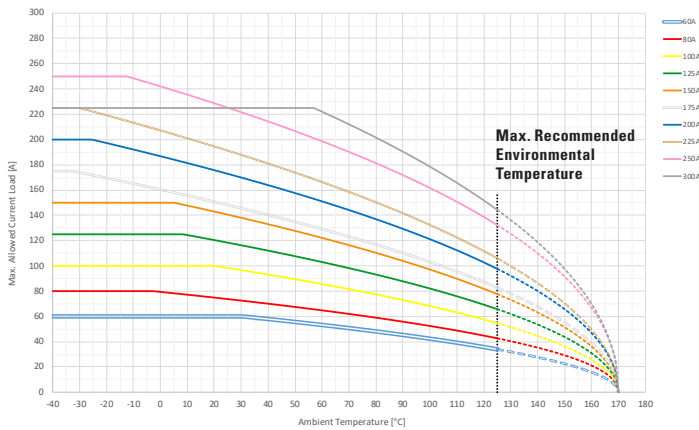


#### MEGA HP SF56 No-Holes version



### Typical Derating Of Fuse Melting Element

Temperature Security Margin is 20%  
Please Contact Littelfuse For Details Regarding Derating Test Set Up



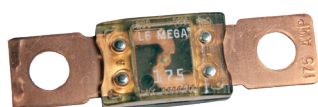
### Temperature Table

|             | max. allowed current load [A] at ambient temperature |     |      |      |      |       |       |
|-------------|------------------------------------------------------|-----|------|------|------|-------|-------|
|             | -40°C                                                | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| <b>60A</b>  | 60                                                   | 60  | 60   | 52   | 47   | 39    | 34    |
| <b>80A</b>  | 80                                                   | 79  | 75   | 63   | 57   | 49    | 43    |
| <b>100A</b> | 100                                                  | 100 | 100  | 84   | 75   | 63    | 55    |
| <b>125A</b> | 125                                                  | 125 | 120  | 101  | 90   | 76    | 66    |
| <b>150A</b> | 150                                                  | 150 | 143  | 119  | 107  | 90    | 78    |
| <b>175A</b> | 175                                                  | 160 | 151  | 126  | 114  | 95    | 83    |
| <b>200A</b> | 200                                                  | 187 | 176  | 148  | 133  | 112   | 98    |
| <b>225A</b> | 225                                                  | 207 | 195  | 163  | 146  | 123   | 106   |
| <b>250A</b> | 250                                                  | 242 | 229  | 194  | 177  | 151   | 132   |
| <b>300A</b> | 225                                                  | 225 | 225  | 217  | 196  | 166   | 144   |
| <b>350A</b> | 263                                                  | 263 | 263  | 222  | 200  | 168   | 146   |
| <b>400A</b> | 300                                                  | 300 | 296  | 250  | 226  | 191   | 167   |
| <b>450A</b> | 338                                                  | 330 | 311  | 262  | 237  | 201   | 175   |
| <b>500A</b> | 375                                                  | 344 | 323  | 272  | 246  | 207   | 180   |

Derating curves may change depending on the final condition of the application (terminals characteristics, wire size etc.).  
Please ask Littelfuse® for more information.



MEGA® Fuses



MEGA® Clear Top Housing Fuse

## MEGA® and MEGA® Clear Top Fuse Rated 32V

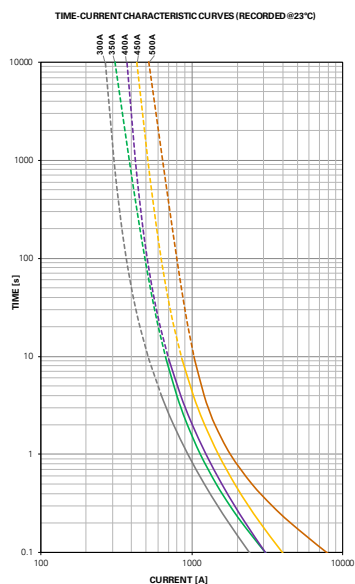
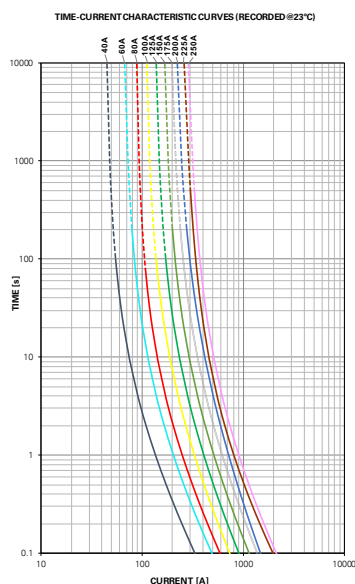
The MEGA® Fuse is designed for high current circuit protection up to 500A with “Diffusion Pill Technology.” The MEGA® Fuse also provides time delay characteristics. Designed and patented by Littelfuse, the MEGA® Fuse is ideal for battery and alternator protection application and other heavy gauge cables requiring ultra-high current protection.

### Specifications

|                                        |                                                                                                        |
|----------------------------------------|--------------------------------------------------------------------------------------------------------|
| Voltage Rating:                        | 32 VDC                                                                                                 |
| Interrupting Rating:                   | 2000A @ 32 VDC                                                                                         |
| Recommended Environmental Temperature: | -40°C to + 125°C                                                                                       |
| Terminals Materials:                   | Copper (Silver plated copper available)                                                                |
| Housing Material:                      | PPA-GF33HS (U.L. 94 Flammability rating - HB)                                                          |
| Clear Top Housing Material:            | PES (top) (U.L. 94 Flammability rating - V0)<br>PPA-GF33HS (bottom) (U.L. 94 Flammability rating - HB) |
| Mounting Torque M6:                    | 8-14 Nm                                                                                                |
| Mounting Torque M8:                    | 12-18 Nm                                                                                               |
| Complies with:                         | ISO 8820-5                                                                                             |

### RoHS

## Time-Current Characteristic Curves



## Ordering Information

| Part Number   | Rating    | Package Size | Plating | Bolt Size | Bolt Hole Qty |
|---------------|-----------|--------------|---------|-----------|---------------|
| 0298xxx.ZXEH  | 80 - 250  | 500          | None    | M8        | 2             |
| 0298xxx.ZXH   | 300 - 500 | 500          | None    | M8        | 2             |
| 0298xxx.UX1M8 | 80 - 500  | 500          | None    | M8        | 1             |
| 0298xxx.ZXB   | 40 - 250  | 500          | Ag      | M8        | 2             |
| 0298xxx.ZXA   | 80 - 500  | 500          | None    | M6        | 2             |
| 0298xxx.UXT   | 40 - 250  | 500          | None    | M8        | 2             |

### MEGA Clear Top Housing Material Fuse

## Ratings

| Part Number            | Current Rating (A) | Color Code <sup>3</sup> | Test Cable Size (mm <sup>2</sup> ) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | Typ. I <sup>2</sup> t (A <sup>2</sup> s) |
|------------------------|--------------------|-------------------------|------------------------------------|------------------------|---------------------------|------------------------------------------|
| 0298040._ <sup>1</sup> | 40                 | —                       | 4                                  | 132                    | 2.51                      | 8,700                                    |
| 0298060._ <sup>1</sup> | 60                 | —                       | 6                                  | 119                    | 1.50                      | 21,000                                   |
| 0298080._              | 80                 | Red                     | 10                                 | 87                     | 0.72                      | 21,500                                   |
| 0298100._              | 100                | Yellow                  | 16                                 | 87                     | 0.56                      | 31,100                                   |
| 0298125._              | 125                | Green                   | 16                                 | 80                     | 0.42                      | 57,800                                   |
| 0298150._              | 150                | Orange                  | 25                                 | 92                     | 0.35                      | 100,000                                  |
| 0298175._              | 175                | White                   | 25                                 | 86                     | 0.29                      | 168,000                                  |
| 0298200._              | 200                | Blue                    | 35                                 | 83                     | 0.26                      | 204,000                                  |
| 0298225._              | 225                | Brown                   | 35                                 | 82                     | 0.22                      | 257,000                                  |
| 0298250._              | 250                | Pink                    | 50                                 | 82                     | 0.20                      | 389,000                                  |
| 0298300._ <sup>2</sup> | 300                | Grey                    | 70                                 | 74 <sup>4</sup>        | 0.17                      | 315,000                                  |
| 0298350._ <sup>2</sup> | 350                | Dark Green              | 70                                 | 68 <sup>4</sup>        | 0.14                      | 500,000                                  |
| 0298400._ <sup>2</sup> | 400                | Purple                  | 70                                 | 64 <sup>4</sup>        | 0.13                      | 610,000                                  |
| 0298450._ <sup>2</sup> | 450                | Gold                    | 70                                 | 60 <sup>4</sup>        | 0.11                      | 1,050,000                                |
| 0298500._ <sup>2</sup> | 500                | Brown                   | 70                                 | 58 <sup>4</sup>        | 0.09                      | 2,050,000                                |

1: Not mentioned in ISO standards, 2: Short Circuit Protector only, 3: 0298xxx.ZXB has white font color on all ratings. 4: Voltage Drop measurements for short circuit protectors taken at 75% of rated current.

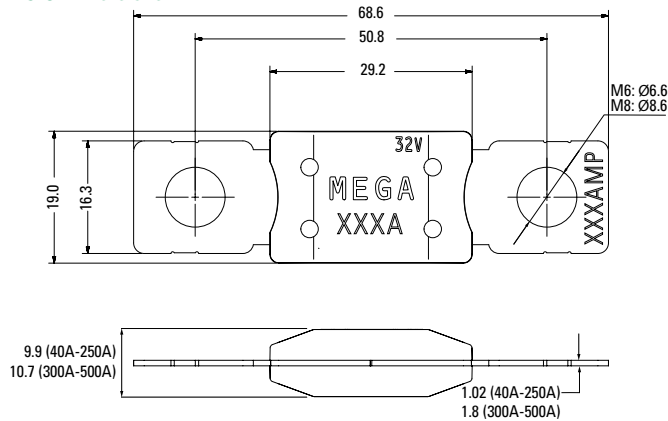
The typical I<sup>2</sup>t is an average value calculated from the breaking capacity tests by using the melting time before the arcing occurs.

## MEGA® Fuse Rated 32V

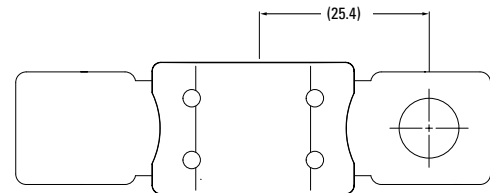
### Dimensions

Dimensions in mm for reference only.  
See outline drawing for dimensions and tolerances.

#### ZX & UXT Versions

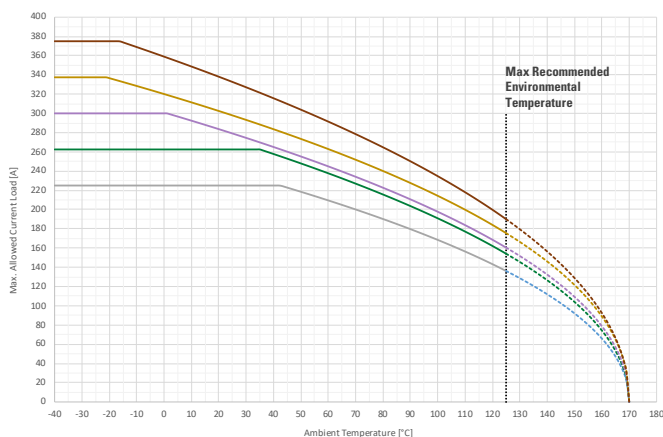
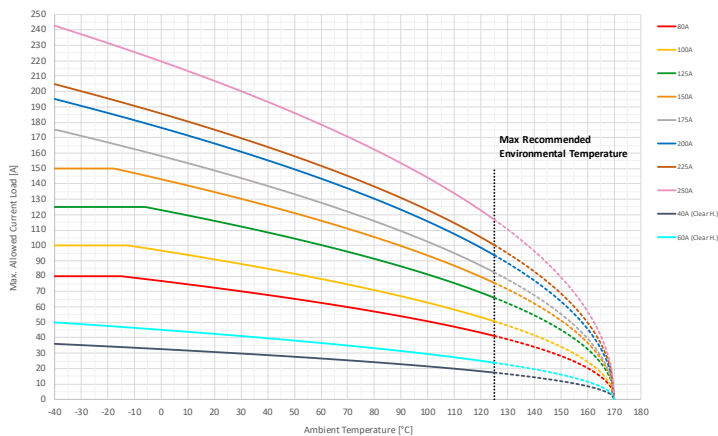


#### UX1M8 Version



### Typical Derating

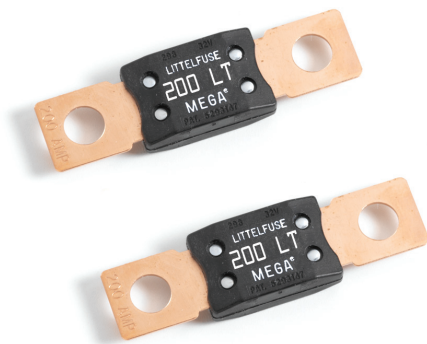
Temperature Security Margin is 20%  
Please contact Littelfuse® for Details Regarding Derating Test Set-Up.



### Temperature Table

| max. allowed current load [A] at ambient temperature |       |     |      |      |      |       |       |
|------------------------------------------------------|-------|-----|------|------|------|-------|-------|
|                                                      | -40°C | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| <b>40A</b>                                           | 36    | 33  | 31   | 26   | 23   | 20    | 17    |
| <b>60A</b>                                           | 50    | 45  | 43   | 36   | 32   | 27    | 24    |
| <b>80A</b>                                           | 80    | 77  | 73   | 61   | 56   | 47    | 41    |
| <b>100A</b>                                          | 100   | 97  | 91   | 76   | 69   | 58    | 51    |
| <b>125A</b>                                          | 125   | 123 | 116  | 98   | 89   | 76    | 66    |
| <b>150A</b>                                          | 150   | 143 | 135  | 114  | 103  | 87    | 76    |
| <b>175A</b>                                          | 175   | 158 | 149  | 125  | 113  | 95    | 83    |
| <b>200A</b>                                          | 195   | 176 | 166  | 140  | 127  | 107   | 94    |
| <b>225A</b>                                          | 205   | 186 | 175  | 148  | 135  | 115   | 100   |
| <b>250A</b>                                          | 243   | 220 | 207  | 175  | 158  | 134   | 117   |
| <b>300A</b>                                          | 225   | 225 | 225  | 205  | 185  | 156   | 136   |
| <b>350A</b>                                          | 263   | 263 | 263  | 232  | 210  | 177   | 154   |
| <b>400A</b>                                          | 300   | 300 | 284  | 240  | 217  | 184   | 160   |
| <b>450A</b>                                          | 338   | 320 | 302  | 257  | 234  | 200   | 176   |
| <b>500A</b>                                          | 375   | 359 | 338  | 285  | 258  | 218   | 190   |

Derating curves may change depending on the final condition of the application (terminals characteristics, wire size etc.).  
Please ask Littelfuse for more information.



MEGA® Low Temperature Fuses

## MEGA® Low Temperature Fuse Rated 32V

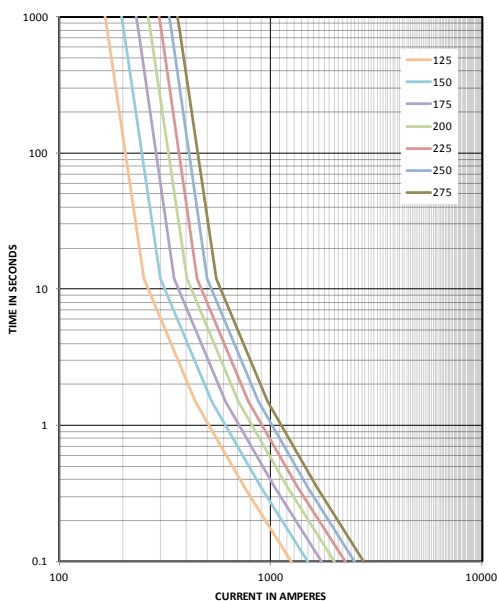
The MEGA® Fuse is designed for high current circuit protection up to 275A with “Diffusion Pill Technology.” The MEGA® Fuse also provides time delay characteristics. Designed and patented by Littelfuse, the MEGA® Fuse is ideal for battery and alternator protection application and other heavy gauge cables requiring ultra-high current protection.

### Specifications

|                                        |                                               |
|----------------------------------------|-----------------------------------------------|
| Voltage Rating:                        | 32 VDC                                        |
| Interrupting Rating:                   | 2000A @ 32 VDC                                |
| Recommended Environmental Temperature: | -40°C to + 125°C                              |
| Terminals Materials:                   | Copper (Silver plated copper available)       |
| Housing Material:                      | PPA-GF33HS (U.L. 94 Flammability rating - HB) |
| Mounting Torque M8:                    | 12-18 Nm                                      |

**RoHS**

### Time-Current Characteristic Curves



### Ordering Information

| Part Number     | Rating  | Package Size | Plating | Bolt Hole Qty |
|-----------------|---------|--------------|---------|---------------|
| 0298125.ZXBLT   | 125     | 500          | Ag      | 2             |
| 0298xxx.ZXEH-LT | 150-275 | 500          | None    | 2             |
| 0298xxx.UX1M8LT | 150-275 | 500          | None    | 1             |

### Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |            |
|-------------|----------------------------|------------|
|             | 125                        | 150-275    |
| 100         | 14,400 / ∞                 | 14,400 / ∞ |
| 135         | 120 / 1800                 | 120 / 1800 |
| 200         | 1 / 50                     | 1 / 150    |
| 350         | 0.3 / 5                    | 0.3 / 5    |
| 600         | 0.1 / 1                    | 0.1 / 1    |

### Ratings

| Part Number     | Current Rating (A) | Font Color | Test Cable Size (mm2) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | Typ. I²t (A²s) |
|-----------------|--------------------|------------|-----------------------|------------------------|---------------------------|----------------|
| 0298125.ZXBLT   | 125                | □          | 16                    | 67                     | 0.33                      | 57,000         |
| 0298150.ZXEH-LT | 150                | □          | 25                    | 62                     | 0.26                      | 59,000         |
| 0298175.ZXEH-LT | 175                | □          | 25                    | 65                     | 0.23                      | 123,000        |
| 0298200.ZXEH-LT | 200                | □          | 35                    | 61                     | 0.21                      | 140,000        |
| 0298225.ZXEH-LT | 225                | □          | 35                    | 57                     | 0.18                      | 317,000        |
| 0298250.ZXEH-LT | 250                | □          | 50                    | 54                     | 0.14                      | 637,000        |
| 0298275.ZXEH-LT | 275                | □          | 50                    | 53                     | 0.12                      | 800,000        |

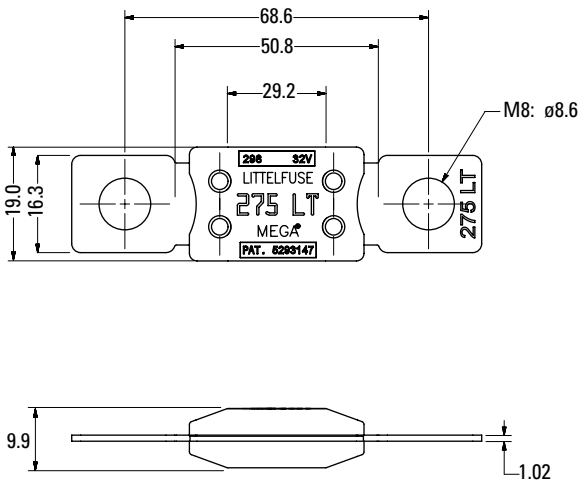
The typical I²t is an average value calculated from the breaking capacity tests by using the melting time before the arcing occurs.

MEGA® Low Temperature Fuse Rated 32V

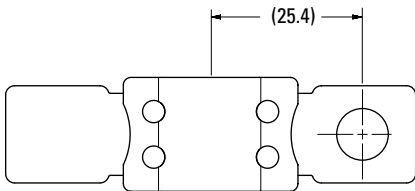
Dimensions

Dimensions in mm for reference only.  
See outline drawing for dimensions and tolerances.

ZXBLT & ZXEHLT Versions

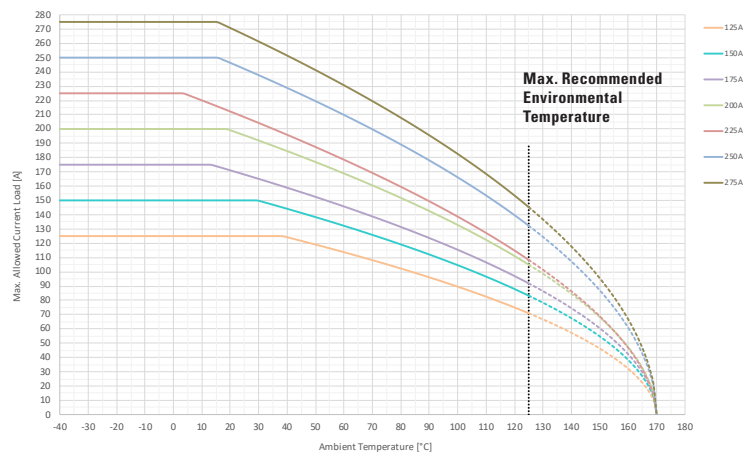


UX1M8LT Version



Typical Derating of Fuse Melting Element

Temperature Security Margin is 20%  
Please contact Littelfuse® for Details Regarding Derating Test Set-Up.



Temperature Table

|      | max. allowed current load [A] at ambient temperature (typical derating) |     |      |      |      |       |       |
|------|-------------------------------------------------------------------------|-----|------|------|------|-------|-------|
|      | -40°C                                                                   | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| 125A | 125                                                                     | 125 | 125  | 111  | 99   | 83    | 71    |
| 150A | 150                                                                     | 150 | 150  | 129  | 116  | 97    | 83    |
| 175A | 175                                                                     | 175 | 171  | 142  | 128  | 107   | 92    |
| 200A | 200                                                                     | 200 | 199  | 165  | 147  | 122   | 105   |
| 225A | 225                                                                     | 225 | 212  | 174  | 155  | 127   | 108   |
| 250A | 250                                                                     | 250 | 246  | 205  | 184  | 153   | 132   |
| 275A | 275                                                                     | 275 | 271  | 225  | 202  | 169   | 145   |

Derating curves may change depending on the final condition of the application (terminals characteristics, wire size etc..).  
Please ask Littelfuse® for more information.



MEGA® 120V HP Fuse-SF56

## MEGA® High Performance Fuse Rated 120V-SF56

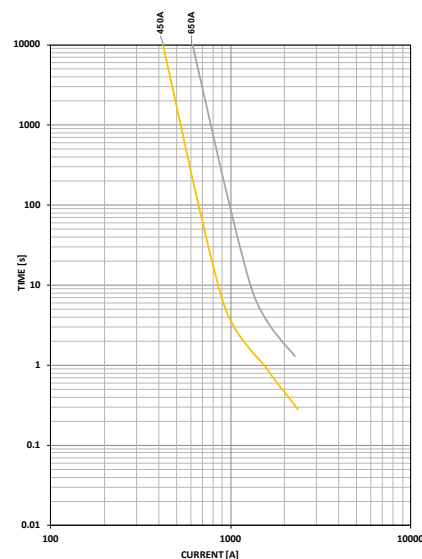
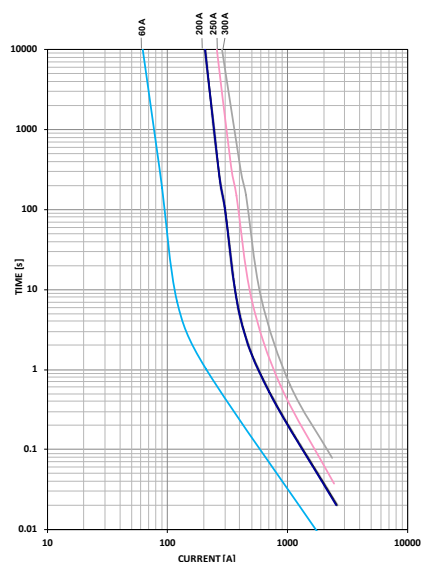
The MEGA® 120V-SF56 High Performance (HP) Fuse is designed for high current circuit protection up to 650A with "Diffusion Pill Technology." The MEGA® 120V HP Fuse is ideal for battery and alternator protection application and other heavy gauge cables requiring ultra-high current protection. The bigger pitch of 56mm serves as a mechanical coding feature to avoid standard SF51 fuses being mounted.

### Specifications

|                                        |                                             |
|----------------------------------------|---------------------------------------------|
| Voltage Rating:                        | 120 VDC                                     |
| Interrupting Rating:                   | 2500A @ 120 VDC                             |
| Recommended Environmental Temperature: | -40°C to +125°C                             |
| Terminals Material:                    | Tin Plated Copper Alloy                     |
| Housing Material:                      | PPA-GF33 (U.L. 94 Flammability rating - HB) |
| Net Weight Per Fuse:                   | 12.1±15% gr                                 |
| Mounting Torque M6:                    | 9Nm+/-1Nm                                   |
| Mounting Torque M8:                    | 20Nm+/-1Nm                                  |
| Refers to:                             | ISO 20934 – Type SF56                       |

### RoHS

### Time-Current Characteristic Curves



### Ordering Information

| Part Number   | Rating   | Package Size | Bolt Size | Bolt Hole Qty |
|---------------|----------|--------------|-----------|---------------|
| 0888xxx.U-2M8 | 60 - 500 | 500          | M8        | 2             |
| 0888xxx.U-1M8 | 60 - 500 | 500          | M8        | 1             |
| 0888xxx.U-2M6 | 60 - 500 | 500          | M6        | 2             |
| 0888xxx.U-1M6 | 60 - 500 | 500          | M6        | 1             |
| 0888xxx.U-NH  | 60 - 500 | 500          | N/A       | 0             |

### Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |            |             |
|-------------|----------------------------|------------|-------------|
|             | 60A - 250A                 | 300A       | 450A - 650A |
| 75          | -/-                        | 14,400 / ∞ | 14,400 / ∞  |
| 100         | 14,400 / ∞                 | -/-        | -/-         |
| 135         | 120 / 1800                 | 120 / 1800 | -/-         |
| 150         | 20 / 450                   | 20 / 450   | -/-         |
| 200         | 1 / 15                     | 1 / 15     | 1 / 15      |
| 350         | 0.3 / 5                    | 0.3 / 5    | 0.5 / 5     |
| 600*        | 0.1 / 1                    | 0.1 / 1    | 0.1 / 1     |

\* Not applicable for 650A.

### Ratings

| Part Number | Current Rating (A) | Color Code | Test Cable Size (mm²) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | I²t (A²s) |
|-------------|--------------------|------------|-----------------------|------------------------|---------------------------|-----------|
| 0888060._   | 60                 | Blue       | 6                     | 75.5                   | 0.92                      | 27,800    |
| 0888200._   | 200                | Dark Blue  | 35                    | 76.9                   | 0.25                      | 129,600   |
| 0888250._   | 250                | Pink       | 50                    | 66                     | 0.18                      | 223,200   |
| 0888300._   | 300                | Grey       | 50                    | 46.9²                  | 0.15                      | 434,000   |
| 0888450._   | 450¹               | Yellow     | 70                    | 52.9²                  | 0.10                      | 1,579,000 |
| 0888650._   | 650¹               | White      | 95                    | 53.7²                  | 0.07                      | 5,262,500 |

Note 1: Short Circuit Protector only

Note 2: Voltage Drop measurements taken at 75% of rated current.

The I²t value is calculated from the breaking capacity tests by using the current time profile before the arcing occurs.

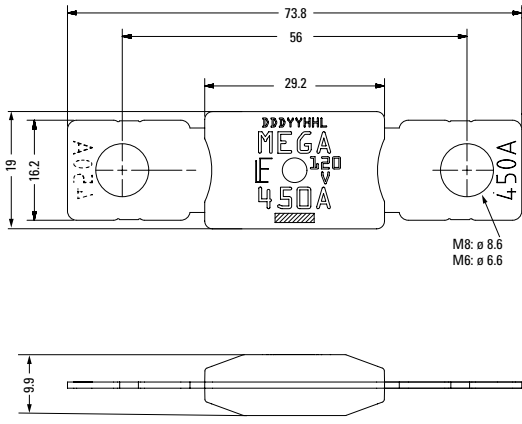


## MEGA® High Performance Fuse Rated 120V-SF56

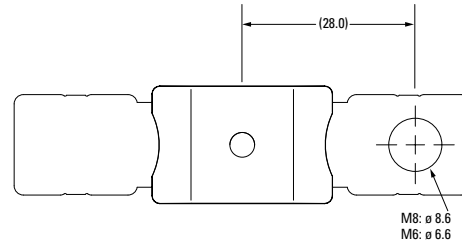
### Dimensions

Dimensions in mm for reference only. See outline drawing for dimensions and tolerances.

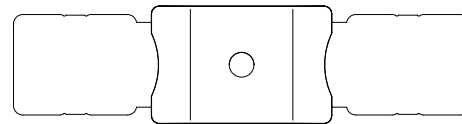
#### MEGA 2 Holes M8/M6



#### MEGA 1 Hole M8/M6



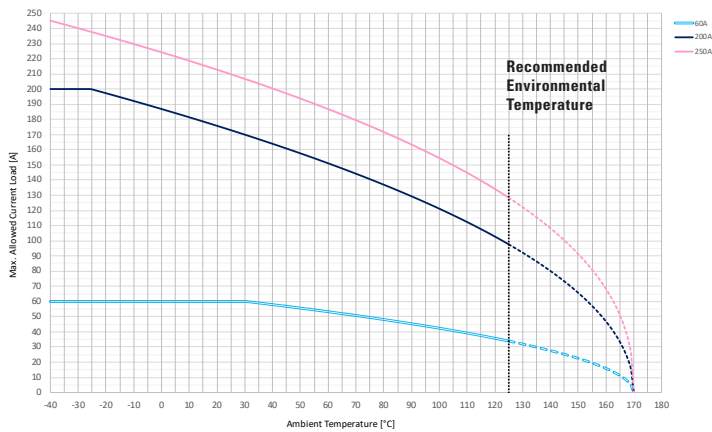
#### MEGA No-Holes Version



### Typical Derating of Fuse Melting Element

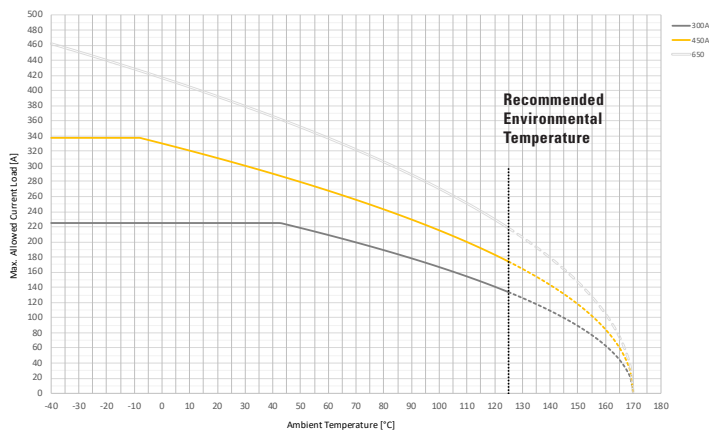
Temperature Security Margin is 20%

Please Contact Littelfuse® For Details Regarding Derating Test Set Up.



### Temperature Table

|             | max. allowed current load [A] at ambient temperature (typical derating) |     |      |      |      |       |       |
|-------------|-------------------------------------------------------------------------|-----|------|------|------|-------|-------|
|             | -40°C                                                                   | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| <b>60A</b>  | 60                                                                      | 60  | 60   | 52   | 47   | 39    | 34    |
| <b>200A</b> | 200                                                                     | 187 | 176  | 148  | 133  | 112   | 98    |
| <b>250A</b> | 245                                                                     | 224 | 213  | 183  | 168  | 145   | 128   |
| <b>300A</b> | 225                                                                     | 225 | 225  | 204  | 184  | 154   | 134   |
| <b>450A</b> | 338                                                                     | 330 | 311  | 262  | 236  | 200   | 174   |
| <b>650A</b> | 462                                                                     | 417 | 392  | 330  | 297  | 251   | 218   |



Derating curves may change depending on the final condition of the application (terminals characteristics, wire size etc...). Please ask Littelfuse for more information.



UL Recognized MEGA® Fuses

## UL Recognized MEGA® Fuses Rated 32V

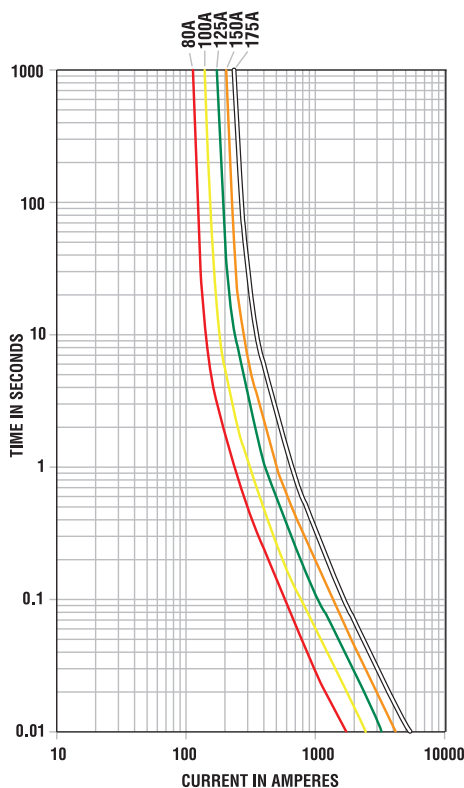
The MEGA® Fuse is designed for high current circuit protection with “Diffusion Pill Technology.” The MEGA® Fuse also provides time delay characteristics. Designed and patented by Littelfuse, the MEGA® Fuse is ideal for battery and alternator protection application and other heavy gauge cables requiring ultra-high current protection.

### Specifications

|                                        |                                               |
|----------------------------------------|-----------------------------------------------|
| Voltage Rating:                        | 32 VDC                                        |
| Interrupting Rating:                   | 2000A @ 32 VDC                                |
| Recommended Environmental Temperature: | -40°C to + 125°C                              |
| Terminals Material:                    | Copper                                        |
| Housing Material:                      | PPA-GF30FR (U.L. 94 Flammability rating - VO) |
| Mounting Torque M8:                    | 12-18 Nm                                      |
| Complies with:                         | ISO 8820-5 ,UL 248 Special Purpose Fuses      |



### Time-Current Characteristic Curves



### Ordering Information

| Part Number     | Rating   | Package Size | Bolt Size |
|-----------------|----------|--------------|-----------|
| 0298xxx.ZXEH-UL | 80 - 175 | 500          | M8        |

### Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |
|-------------|----------------------------|
|             | 80A-175A                   |
| 75          | - / -                      |
| 100         | 14,400 / ∞                 |
| 135         | 120 / 1800                 |
| 200         | 1 / 15                     |
| 350         | 0.3 / 5                    |
| 500         | - / -                      |
| 600         | 0.1 / 1                    |

### Ratings

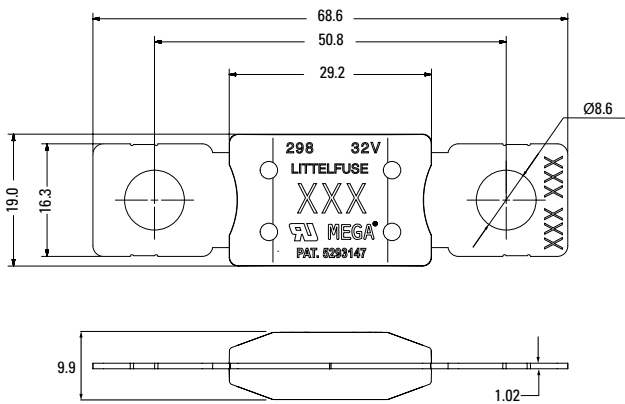
| Part Number     | Current Rating (A) | Color Code | Test Cable Size (mm²) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | Typ. I²t (A²s) |
|-----------------|--------------------|------------|-----------------------|------------------------|---------------------------|----------------|
| 0298080.ZXEH-UL | 80                 | Red        | 10                    | 87                     | 0.72                      | 21,500         |
| 0298100.ZXEH-UL | 100                | Yellow     | 16                    | 87                     | 0.56                      | 31,100         |
| 0298125.ZXEH-UL | 125                | Green      | 16                    | 80                     | 0.42                      | 57,800         |
| 0298150.ZXEH-UL | 150                | Orange     | 25                    | 92                     | 0.35                      | 100,000        |
| 0298175.ZXEH-UL | 175                | White      | 25                    | 62                     | 0.23                      | 168,000        |

The typical I²t is an average value calculated from the breaking capacity tests by using the melting time before the arcing occurs.

## UL Recognized MEGA® Fuses Rated 32V

### Dimensions

Dimensions in mm for reference only.  
See outline drawing for dimensions and tolerances.

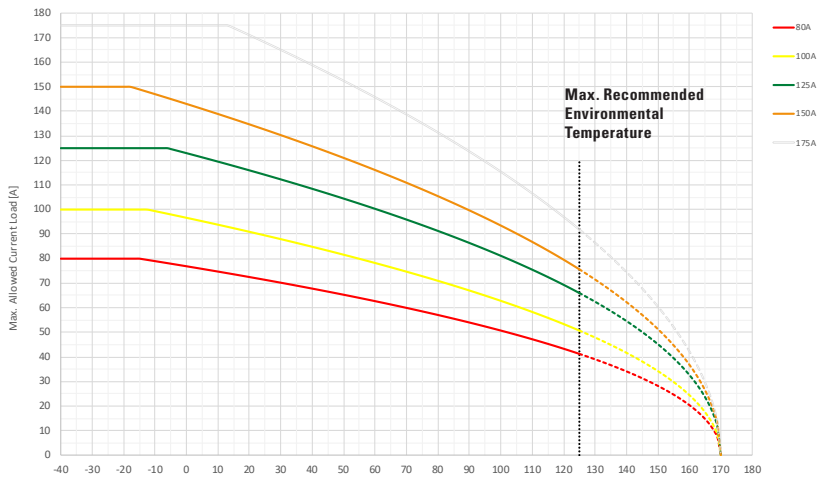


### Temperature Table

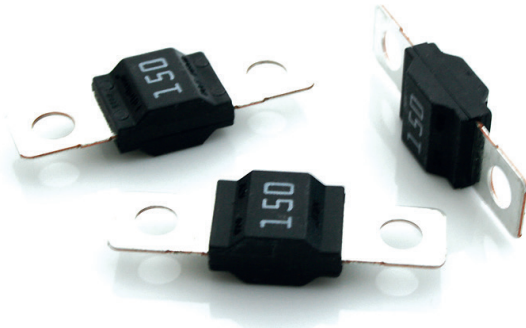
|      | max. allowed current load [A] at ambient temperature (typical derating) |     |      |      |      |       |       |
|------|-------------------------------------------------------------------------|-----|------|------|------|-------|-------|
|      | -40°C                                                                   | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| 80A  | 80                                                                      | 77  | 73   | 61   | 56   | 47    | 41    |
| 100A | 100                                                                     | 97  | 91   | 76   | 69   | 58    | 51    |
| 125A | 125                                                                     | 123 | 116  | 98   | 89   | 76    | 66    |
| 150A | 150                                                                     | 143 | 135  | 114  | 103  | 87    | 76    |
| 175A | 175                                                                     | 175 | 171  | 142  | 128  | 107   | 92    |

### Typical Derating of Fuse Melting Element

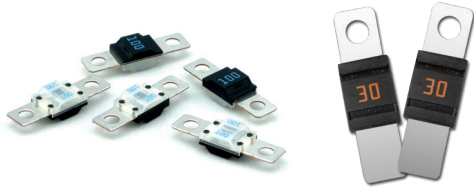
Temperature Security Margin is 20%  
Please contact Littelfuse® for Details Regarding Derating Test Set-Up.



Derating curves may change depending on the final condition of the application (terminals characteristics, wire size etc.).  
Please ask Littelfuse® for more information.



MIDI® Fuses



Clear MIDI® Fuses  
(clear nylon composite cover)

One Hole MIDI® Fuses

## MIDI®, Clear MIDI®, and One Hole MIDI® Style Bolt-down Fuse Rated 32V

This MIDI® style fuse offers a bolt-on space saving fuse for high current wiring protection and provides time delay characteristics with "Diffusion Pill Technology".

### Specifications

|                                        |                                                                                                   |
|----------------------------------------|---------------------------------------------------------------------------------------------------|
| Voltage Rating:                        | 32 VDC                                                                                            |
| Interrupting Rating:                   | 2000A @ 32 VDC                                                                                    |
| Recommended Environmental Temperature: | -40°C to + 125°C                                                                                  |
| Terminals Material:                    | Tin plated Copper                                                                                 |
| Black Housing Material:                | PA66-GF25 (U.L. 94 Flammability rating – V0)                                                      |
| Clear Housing Material:                | PA6/66 (U.L. 94 Flammability rating – HB)                                                         |
| Mounting Torque M5:                    | 4.5 Nm +/- 1Nm                                                                                    |
| Mounting Torque M6:                    | 6.0 Nm +/- 1Nm                                                                                    |
| Refers to:                             | ISO 8820-5:2015                                                                                   |
| Complies with:                         | Standard UL 248-1 as a Special Purpose Fuses in UL file E71611 (40-100A) and Directive 2011/65/EU |



### Ordering Information

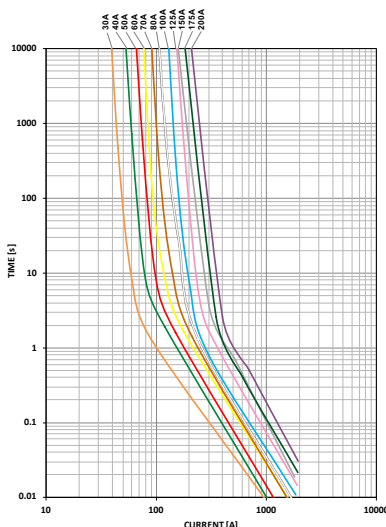
| Part Number      | Rating   | Package Size | Housing Color | Bolt Size | Bolt Hole Qty | Mfg Location |
|------------------|----------|--------------|---------------|-----------|---------------|--------------|
| 0498xxx.M        | 30 - 200 | 1000         | Black         | M5        | 2             | Mexico       |
| 0498xxx.M-CN     | 30 - 200 | 1000         | Black         | M5        | 2             | China        |
| 0498xxx.H        | 30 - 200 | 100          | Black         | M5        | 2             | Mexico       |
| 0498xxx.MXM6     | 30 - 200 | 1000         | Black         | M6        | 2             | Mexico       |
| 0498xxx.MXM6-CN  | 30 - 200 | 1000         | Black         | M6        | 2             | China        |
| 0498xxx.MX1M5    | 30 - 200 | 1000         | Black         | M5        | 1             | Mexico       |
| 0498xxx.MX1M5-CN | 30 - 200 | 1000         | Black         | M5        | 1             | China        |
| 0498xxx.MX1M6    | 30 - 200 | 1000         | Black         | M6        | 1             | Mexico       |
| 0498xxx.MX1M6-CN | 30 - 200 | 1000         | Black         | M6        | 1             | China        |
| 0498xxx.MXT      | 30 - 200 | 1000         | Clear         | M5        | 2             | Mexico       |
| 0498xxx.MXT-CN   | 30 - 200 | 1000         | Clear         | M5        | 2             | China        |
| 0498xxx.MXTM6    | 30 - 200 | 1000         | Clear         | M6        | 2             | Mexico       |
| 0498xxx.MXTM6-CN | 30 - 200 | 1000         | Clear         | M6        | 2             | China        |

Materials manufactured in Asia are produced with the same specifications as materials manufactured in North America and meets the same test requirements. Multiple production locations are for capacity expansion only.

### Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |             |
|-------------|----------------------------|-------------|
|             | 30A-125A                   | 150A-200A   |
| 75          | - / -                      | 360,000 / ∞ |
| 100         | 360,000 / ∞                | - / -       |
| 110         | 14,400 / ∞                 | - / -       |
| 150         | 90 / 3,600                 | - / -       |
| 200         | 3 / 100                    | 1 / 15      |
| 300         | 0.3 / 3                    | - / -       |
| 350         | - / -                      | 0.3 / 5     |
| 500         | 0.1 / 1                    | - / -       |
| 600         | - / -                      | 0.1 / 1     |

### Time-Current Characteristic Curves



### Ratings

| Part Number   | Current Rating (A) | Color Code | Test Cable size (mm2) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | Typ. I²t (A²s) |
|---------------|--------------------|------------|-----------------------|------------------------|---------------------------|----------------|
| 0498030_2     | 30                 | Orange     | 2.5                   | 65                     | 2.06                      | 4,200          |
| 0498040_      | 40                 | Green      | 4                     | 65                     | 1.40                      | 10,000         |
| 0498050_      | 50                 | Red        | 6                     | 65                     | 1.02                      | 13,000         |
| 0498060_      | 60                 | Yellow     | 6                     | 68                     | 0.87                      | 21,700         |
| 0498070_      | 70                 | Brown      | 10                    | 70                     | 0.72                      | 24,000         |
| 0498080_      | 80                 | White      | 10                    | 58                     | 0.54                      | 24,600         |
| 0498100_      | 100                | Blue       | 16                    | 60                     | 0.46                      | 51,300         |
| 0498125_2     | 125                | Pink       | 25                    | 71                     | 0.39                      | 73,200         |
| 0498150_1,2   | 150                | Grey       | 25                    | 77 4                   | 0.32                      | 81,900         |
| 0498175_1,2,3 | 175                | Dark Green | 25                    | 77 4                   | 0.26                      | 100,000        |
| 0498200_1,2   | 200                | Purple     | 25                    | 77 4                   | 0.26                      | 125,000        |

Note 1: Short Circuit Protector only  
Note 2: Not UL Recognized  
Note 3: Color Coding deviating from ISO standard  
Note 4: Measured at 75% I<sub>r</sub>

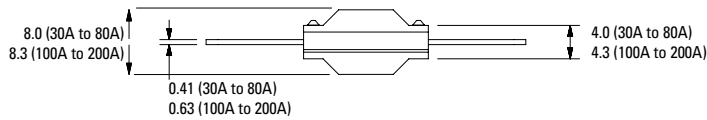
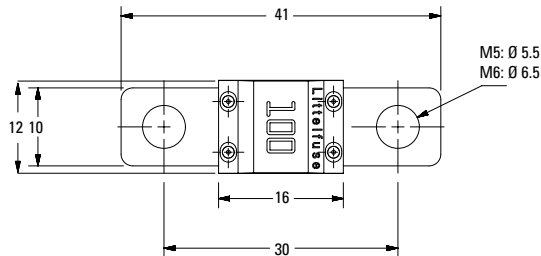
The typical I²t is an average value calculated from the breaking capacity tests by using the melting time before the arcing occurs.

## MIDI®, Clear MIDI®, and One Hole MIDI® Style Bolt-down Fuse Rated 32V

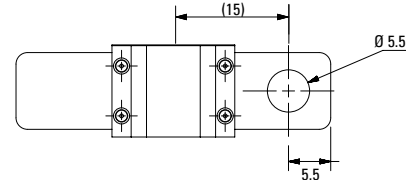
### Dimensions

Dimensions in mm for reference only. See outline drawing for dimensions and tolerances.

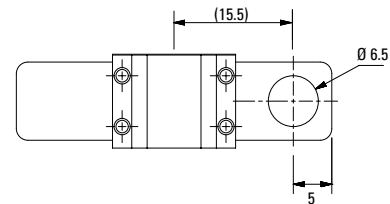
#### MIDI 2 Holes M5/M6 versions



#### MIDI 1 Hole M5 versions



#### MIDI 1 Hole M6 versions

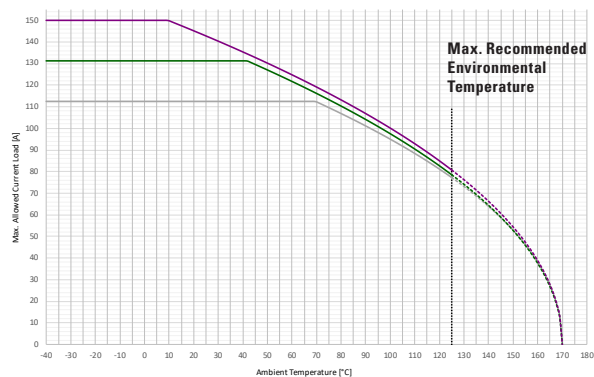
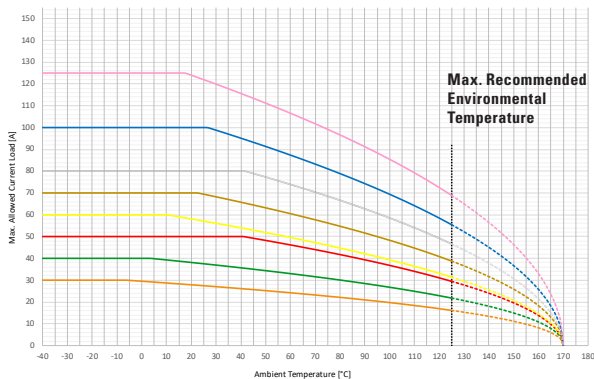


### Typical Derating of Fuse Melting Element

Temperature Security Margin is 20%

Wire Cross Section And Fixture Test Set Up Refer To ISO 8820-5

Please Contact Littelfuse® For Details Regarding Derating Test Set Up



### Temperature Table

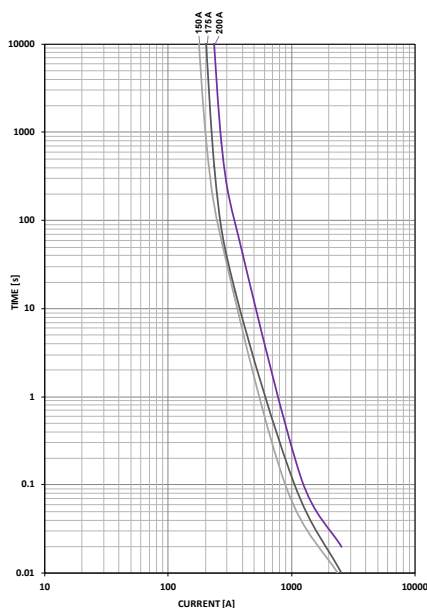
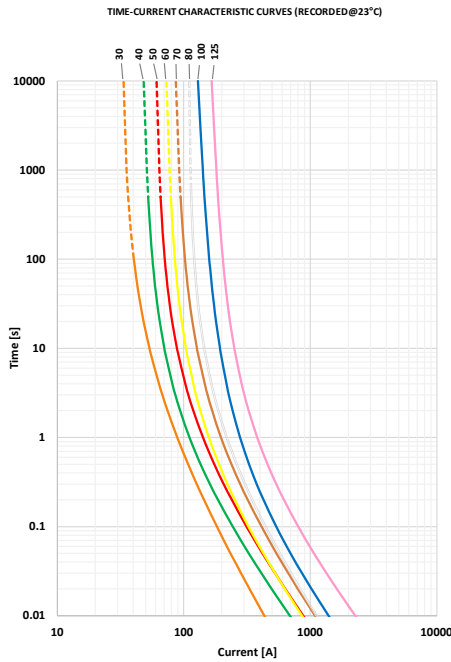
|      | max. allowed current load [A] at ambient temperature (typical derating) |     |      |      |      |       |       |
|------|-------------------------------------------------------------------------|-----|------|------|------|-------|-------|
|      | -20°C                                                                   | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| 30A  | 30                                                                      | 30  | 28   | 24   | 22   | 18    | 16    |
| 40A  | 40                                                                      | 40  | 38   | 32   | 29   | 25    | 22    |
| 50A  | 50                                                                      | 50  | 50   | 45   | 41   | 34    | 29    |
| 60A  | 60                                                                      | 60  | 58   | 48   | 43   | 36    | 31    |
| 70A  | 70                                                                      | 70  | 70   | 59   | 53   | 45    | 39    |
| 80A  | 80                                                                      | 80  | 80   | 72   | 65   | 54    | 47    |
| 100A | 100                                                                     | 100 | 100  | 85   | 77   | 64    | 55    |
| 125A | 125                                                                     | 125 | 124  | 104  | 94   | 79    | 69    |
| 150A | 113                                                                     | 113 | 113  | 113  | 104  | 88    | 77    |
| 175A | 131                                                                     | 131 | 131  | 119  | 107  | 90    | 79    |
| 200A | 150                                                                     | 150 | 145  | 122  | 110  | 93    | 81    |

Derating curves may change depending on the final condition of the application (terminals characteristics, wire size etc.). Please ask Littelfuse for more information.



MIDI® 70V HP Fuse

## Time-Current Characteristic Curves



## MIDI® High Performance Fuse Rated 70V

The MIDI® 70V High Performance (HP) Fuse is designed for high current circuit protection up to 125A with "Diffusion Pill Technology." The MIDI® 70V HP features 1MΩ Open State Resistance after fuse opening to guarantee safe interruption at any voltage up to 70V. The MIDI® 70V HP Fuse is an ideal solution for any high current application like fans, heaters and high inrush peak loads. The new added 135% overload gate provides much better wire protection.

### Specifications

|                                            |                                                 |
|--------------------------------------------|-------------------------------------------------|
| Voltage Rating:                            | 70 VDC                                          |
| Interrupting Rating:                       | 2500A @ 70 VDC                                  |
| Recommended Environmental Temperature:     | -40°C to +125°C                                 |
| Terminals Material:                        | Tin Plated Copper                               |
| Housing Material:                          | PA66 GF25 FR (U.L. 94 Flammability rating – V0) |
| Mounting Torque M6:                        | 9Nm+/-1Nm                                       |
| Open State Resistance (after fuse opening) | >1MΩ                                            |
| Refers To:                                 | ISO 20934 - Type SF36                           |

Complies With:



### Ordering Information

| Part Number   | Rating   | Package Size | Bolt Hole Qty |
|---------------|----------|--------------|---------------|
| 4998xxx.M-M6  | 30 - 200 | 500          | 2             |
| 4998xxx.M-1M6 | 30 - 200 | 500          | 1             |
| 4998xxx.M-NH  | 30 - 200 | 500          | 0             |

### Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |             |
|-------------|----------------------------|-------------|
|             | 30A-125A                   | 150A-200A   |
| 100         | 360,000 / ∞                | 360,000 / ∞ |
| 135         | 300 / 3,600                | -           |
| 150         | 90 / 500                   | -           |
| 200         | 1 / 50                     | 1 / 50      |
| 300         | 0.3 / 4                    | 0.3 / 4     |
| 500         | 0.1 / 1                    | 0.1 / 1     |
| 600         | 0.07 / 0.7                 | 0.07 / 0.7  |

### Ratings

| Part Number | Current Rating (A) | Color Code | Test Cable Size (mm²) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | Typ. I²t (A²s) |
|-------------|--------------------|------------|-----------------------|------------------------|---------------------------|----------------|
| 4998030.M_  | 30                 | Orange     | 2.5                   | 100                    | 2.20                      | 3,200          |
| 4998040.M_  | 40                 | Green      | 4                     | 94                     | 1.56                      | 4,700          |
| 4998050.M_  | 50                 | Red        | 6                     | 86                     | 1.16                      | 7,500          |
| 4998060.M_  | 60                 | Yellow     | 6                     | 81                     | 0.94                      | 6,800          |
| 4998070.M_  | 70                 | Brown      | 10                    | 76                     | 0.74                      | 10,900         |
| 4998080.M_  | 80                 | White      | 10                    | 64                     | 0.57                      | 10,500         |
| 4998100.M_  | 100                | Blue       | 10                    | 68                     | 0.44                      | 18,300         |
| 4998125.M_  | 125                | Pink       | 16                    | 66                     | 0.35                      | 51,300         |
| 4998150.M_  | 150 <sup>1</sup>   | Grey       | 25                    | <100                   | -                         | 50,200         |
| 4998175.M_  | 175 <sup>1</sup>   | Brown      | 25                    | <100                   | -                         | 57,700         |
| 4998200.M_  | 200 <sup>1</sup>   | Purple     | 35                    | <100                   | -                         | 119,100        |

The typical I²t is an average value calculated from the breaking capacity tests by using the melting time before the arcing occurs.

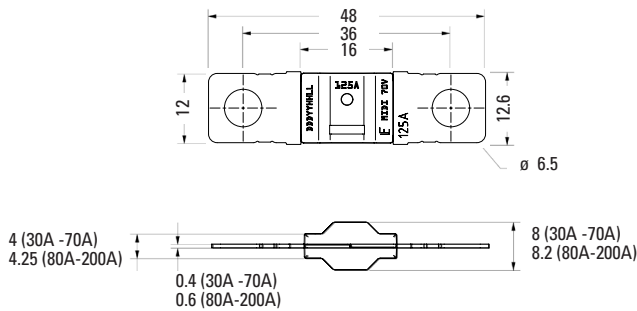
<sup>1</sup> Short Circuit Protectors Only.



## MIDI® High Performance Fuse Rated 70V

### Dimensions

Dimensions in mm for reference only. See outline drawing for dimensions and tolerances.



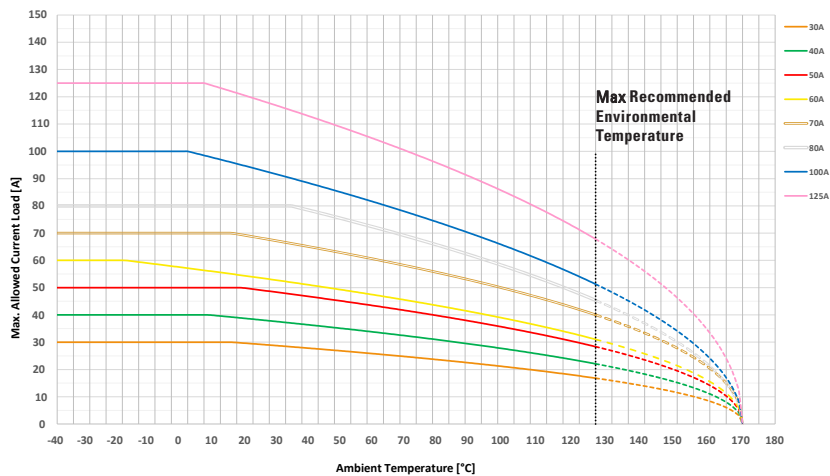
### Temperature Table

|      | max. allowed current load [A] at ambient temperature (typical derating) |     |      |      |      |       |       |
|------|-------------------------------------------------------------------------|-----|------|------|------|-------|-------|
|      | -40°C                                                                   | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| 30A  | 30                                                                      | 30  | 29   | 25   | 23   | 19    | 17    |
| 40A  | 40                                                                      | 40  | 38   | 33   | 30   | 25    | 22    |
| 50A  | 50                                                                      | 50  | 49   | 42   | 38   | 32    | 28    |
| 60A  | 60                                                                      | 57  | 54   | 46   | 42   | 35    | 31    |
| 70A  | 70                                                                      | 70  | 69   | 59   | 53   | 46    | 40    |
| 80A  | 80                                                                      | 80  | 80   | 70   | 63   | 52    | 45    |
| 100A | 100                                                                     | 100 | 94   | 78   | 71   | 59    | 51    |
| 125A | 125                                                                     | 125 | 120  | 101  | 91   | 78    | 68    |

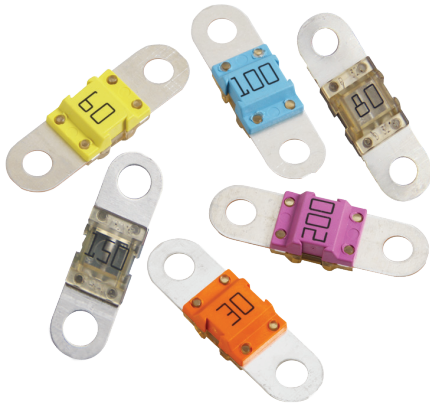
### Typical Derating of Fuse Melting Element

Temperature Security Margin is 20%

Please Contact Littelfuse® for Details Regarding Derating Test Set-Up



Derating curves may change depending on the final condition of the application (terminals characteristics, wire size etc..). Please ask Littelfuse for more information.

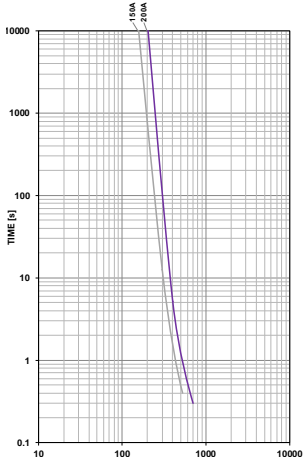
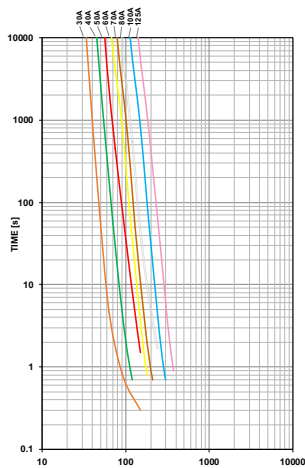


BF1 Fuses



One Hole BF1 Fuses

## Time-Current Characteristic Curves



## BF1 Fuse Rated 32V

This BF1 fuse is rated at 32V and offers a bolt-on fuse for high current wiring protection. Current rating 23A - 200A; with transparent housing material for easy detection of blown fuses. One-Hole BF1 fuses have a current rating 60-125A.

### Specifications

|                                        |                                                                        |
|----------------------------------------|------------------------------------------------------------------------|
| Voltage Rating:                        | 32 VDC                                                                 |
| Interrupting Rating:                   | 30A: 1000A @32 VDC<br>40A - 150A: 2000A @32 VDC<br>200A: 1500A @32 VDC |
| Recommended Environmental Temperature: | -40° to 125°C                                                          |
| Terminals Material:                    | Tin plated copper alloy                                                |
| Housing Material:                      | PET-GF33 (U.L. 94 Flammability rating – V0)                            |
| Clear Housing Material:                | PES (U.L. 94 Flammability rating – V0)                                 |
| Mounting Torque M5:                    | 4.5 Nm +/- 1Nm                                                         |
| Mounting Torque M6:                    | 6.0 Nm +/- 1Nm                                                         |
| Refers to:                             | ISO 8820-5:2015, UL 248 Special Purpose Fuses                          |



## Ordering Information

| Part Number   | Rated    | Package Size | Bolt Size | Bolt Hole Qty |
|---------------|----------|--------------|-----------|---------------|
| 153.5631.xxx2 | 30A-200A | 1000         | M5        | 2             |
| 153.5631.xxx1 | 30A-200A | 10           | M5        | 2             |
| 153.7010.xxx2 | 30A-150A | 1000         | M6        | 2             |
| 153.7000.xxx2 | 150-200A | 500          | M6        | 2             |
| 153.0010.xxx2 | 60A-125A | 1000         | M6        | 1             |
| 153.0020.xxx2 | 30A-200A | 500          | --        | 0             |

## Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |             |
|-------------|----------------------------|-------------|
|             | 30-125A                    | 150-200A    |
| 75          | – / –                      | 360,000 / ∞ |
| 100         | 360,000 / ∞                | – / –       |
| 110         | 14,400 / ∞                 | – / –       |
| 150         | 90 / 3,600                 | – / –       |
| 200         | 3 / 100                    | 1 / 15      |
| 300         | 0.3 / 3                    | – / –       |
| 350         | – / –                      | 0.3 / 5     |
| 500         | 0.1 / 1                    | – / –       |
| 600         | – / –                      | 0.1 / 1     |

## Ratings

| Part Number    | Current Rating (A) | Housing Material Color | Test Cable Size (mm <sup>2</sup> ) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | Typ. I <sup>2</sup> t (A <sup>2</sup> s) |
|----------------|--------------------|------------------------|------------------------------------|------------------------|---------------------------|------------------------------------------|
| 153.xxxx.530_  | 30                 | Orange                 | 2.5                                | 105                    | 2.70                      | 5,100                                    |
| 153.xxxx.540_  | 40                 | Green                  | 4                                  | 90                     | 1.56                      | 6,800                                    |
| 153.xxxx.550_  | 50                 | Red                    | 6                                  | 80                     | 1.03                      | 6,900                                    |
| 153.xxxx.560_  | 60                 | Yellow                 | 6                                  | 75                     | 0.75                      | 16,200                                   |
| 153.xxxx.570_  | 70                 | Brown                  | 10                                 | 70                     | 0.64                      | 22,000                                   |
| 153.xxxx.580_  | 80                 | White                  | 10                                 | 70                     | 0.55                      | 25,600                                   |
| 153.xxxx.610_  | 100                | Blue                   | 16                                 | 70                     | 0.44                      | 42,500                                   |
| 153.xxxx.612_  | 125                | Pink                   | 25                                 | 70                     | 0.34                      | 62,500                                   |
| 153.xxxx.615_1 | 150                | Grey                   | 25                                 | 70                     | 0.29                      | 83,400                                   |
| 153.xxxx.620_3 | 200                | Purple                 | 35                                 | 70                     | 0.24                      | 126,000                                  |

Note 1: Short Circuit Protector only

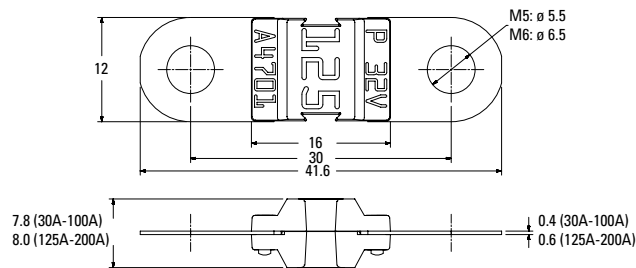
The typical I<sup>2</sup>t is an average value calculated from the breaking capacity tests by using the melting time before the arcing occurs.

## BF1 Fuse Rated 32V

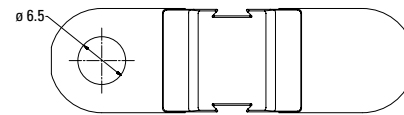
### Dimensions

Dimensions in mm for reference only.  
See outline drawing for dimensions and tolerances

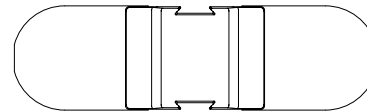
### BF1 2 Holes M5/M6 versions



### BF1 1 Hole M6 version

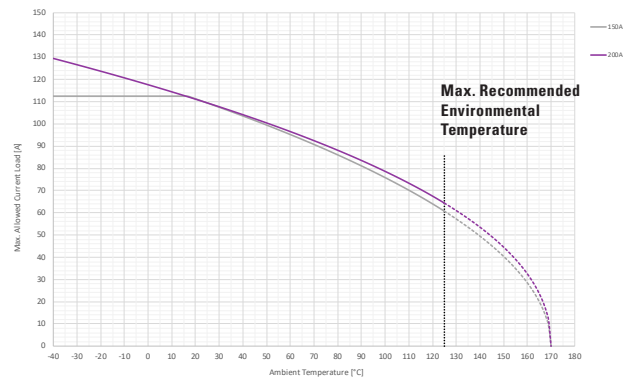
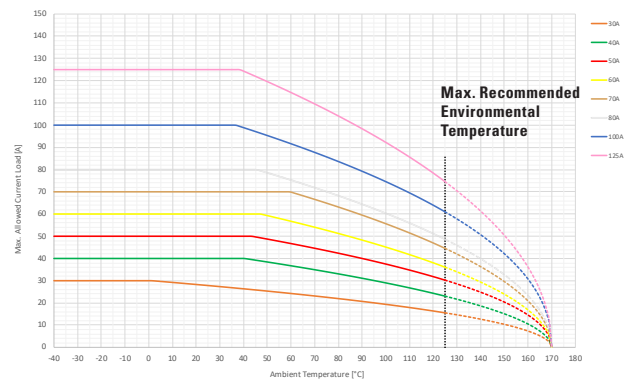


### BF1 No Holes versions



### Typical Derating of Fuse Melting Element

Temperature Security Margin is 20%  
Please contact Littelfuse® for Details Regarding Derating Test Set-Up.



### Temperature Table

|             | max. allowed current load [A] at ambient temperature (typical derating) |     |      |      |      |       |       |
|-------------|-------------------------------------------------------------------------|-----|------|------|------|-------|-------|
|             | -40°C                                                                   | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| <b>30A</b>  | 30                                                                      | 30  | 28   | 24   | 21   | 18    | 16    |
| <b>40A</b>  | 40                                                                      | 40  | 40   | 36   | 32   | 27    | 23    |
| <b>50A</b>  | 50                                                                      | 50  | 50   | 46   | 41   | 35    | 30    |
| <b>60A</b>  | 60                                                                      | 60  | 60   | 55   | 50   | 42    | 36    |
| <b>70A</b>  | 70                                                                      | 70  | 70   | 68   | 61   | 51    | 45    |
| <b>80A</b>  | 80                                                                      | 80  | 80   | 74   | 66   | 56    | 49    |
| <b>100A</b> | 100                                                                     | 100 | 100  | 90   | 81   | 70    | 61    |
| <b>125A</b> | 125                                                                     | 125 | 125  | 112  | 101  | 86    | 75    |
| <b>150A</b> | 113                                                                     | 113 | 111  | 93   | 84   | 70    | 61    |
| <b>200A</b> | 129                                                                     | 118 | 111  | 95   | 86   | 73    | 64    |

Derating curves may change depending on the final condition of the application (terminals characteristics, wire size etc.).  
Please ask Littelfuse for more information.

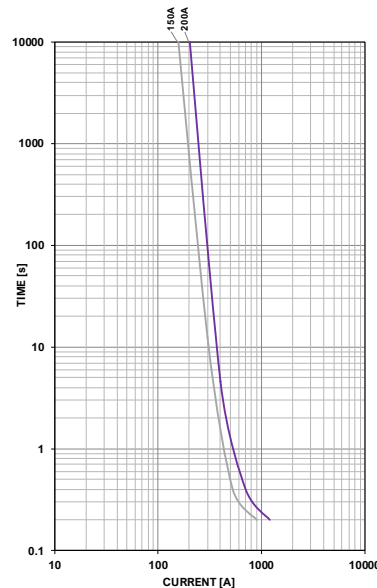
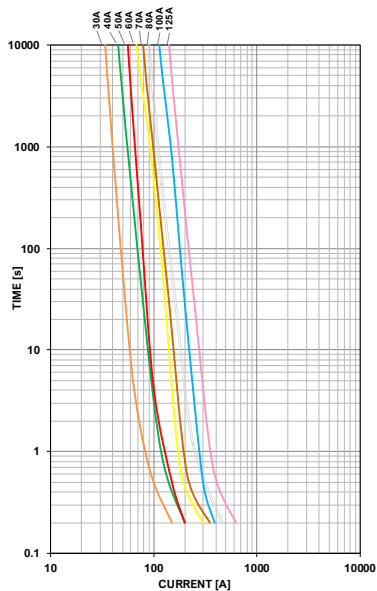
## BF1 Fuses Rated 58V

This BF1 fuse is rated at 58V and offers a bolt-on fuse for high current wiring protection. Current rating 30A - 200A; with transparent housing material for easy detection of blown fuses.

### Specifications

|                                        |                                               |
|----------------------------------------|-----------------------------------------------|
| Voltage Rating:                        | 58 VDC                                        |
| Interrupting Rating:                   | 1000A @58 VDC                                 |
| Recommended Environmental Temperature: | -40° to 125°C                                 |
| Terminals Material:                    | Tin plated copper alloy                       |
| Housing Material:                      | PET-GF33 (U.L. 94 Flammability rating – V0)   |
| Clear Housing Material:                | PES (U.L. 94 Flammability rating – V0)        |
| Mounting Torque M5:                    | 4.5 Nm +/- 1Nm                                |
| Mounting Torque M6:                    | 6.0 Nm +/- 1Nm                                |
| Refers to:                             | ISO 8820-5:2015, UL 248 Special Purpose Fuses |

### Time-Current Characteristic Curves



### Ordering Information

| Part Number   | Rating   | Package Size | Bolt Size | Bolt Hole Qty |
|---------------|----------|--------------|-----------|---------------|
| 142.5631.xxxx | 30 - 200 | 500          | M5        | 2             |
| 142.7010.xxxx | 30 - 200 | 500          | M6        | 2             |
| 142.0020.xxxx | 30 - 200 | 500          | N/A       | 0             |

### Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |             |
|-------------|----------------------------|-------------|
|             | 30-125A                    | 150-200A    |
| 75          | - / -                      | 360,000 / ∞ |
| 100         | 360,000 / ∞                | - / -       |
| 110         | 14,400 / ∞                 | - / -       |
| 150         | 90 / 3,600                 | - / -       |
| 200         | 3 / 100                    | 1 / 15      |
| 300         | 0.3 / 3                    | - / -       |
| 350         | - / -                      | 0.3 / 5     |
| 500         | 0.1 / 1                    | - / -       |
| 600         | - / -                      | 0.1 / 1     |

### Ratings

| Part Number M5 | Part Number M6 | Current Rating (A) | Housing Material Color | Test Cable Size (mm²) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | Typ. I²t (A²s) |
|----------------|----------------|--------------------|------------------------|-----------------------|------------------------|---------------------------|----------------|
| 142.5631.5302¹ | 142.7010.5302¹ | 30                 | Orange                 | 2.5                   | 105                    | 2.70                      | 5,100          |
| 142.5631.5402  | 142.7010.5402  | 40                 | Green                  | 4                     | 90                     | 1.56                      | 6,800          |
| 142.5631.5502  | 142.7010.5502  | 50                 | Red                    | 6                     | 80                     | 1.03                      | 6,900          |
| 142.5631.5602  | 142.7010.5602  | 60                 | Yellow                 | 6                     | 75                     | 0.75                      | 16,200         |
| 142.5631.5702  | 142.7010.5702  | 70                 | Brown                  | 10                    | 70                     | 0.64                      | 22,000         |
| 142.5631.5802  | 142.7010.5802  | 80                 | White                  | 10                    | 70                     | 0.55                      | 25,600         |
| 142.5631.6102  | 142.7010.6102  | 100                | Blue                   | 16                    | 70                     | 0.44                      | 42,500         |
| 142.5631.6122  | 142.7010.6122  | 125                | Pink                   | 25                    | 70                     | 0.34                      | 62,500         |
| 142.5631.6152  | 142.7010.6152  | 150                | Grey                   | 25                    | 70                     | 0.29                      | 83,400         |
| 142.5631.6202² | 142.7010.6202  | 200                | Purple                 | 35                    | 70                     | 0.24                      | 126,000        |

Note 1: Not UL rated  
Note 2: Short Circuit Protector only

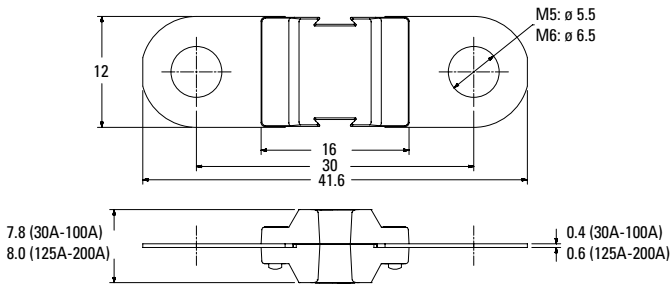
The typical I²t is an average value calculated from the breaking capacity tests by using the melting time before the arcing occurs.

## BF1 Fuse Rated 58V

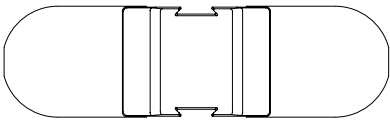
### Dimensions

Dimensions in mm for reference only.  
See outline drawing for dimensions and tolerances.

#### BF1 2 Holes M5/M6

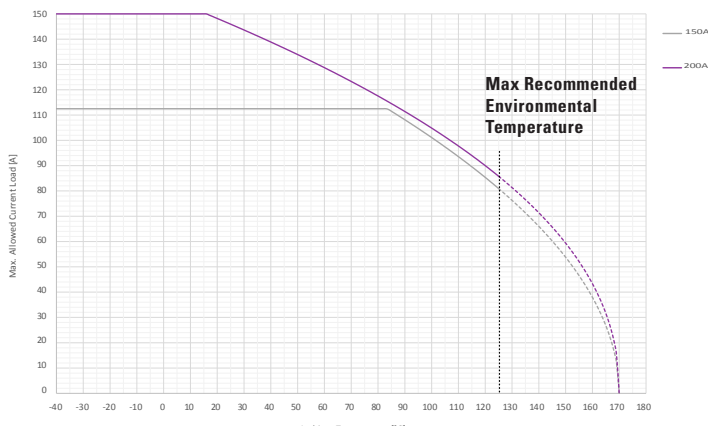
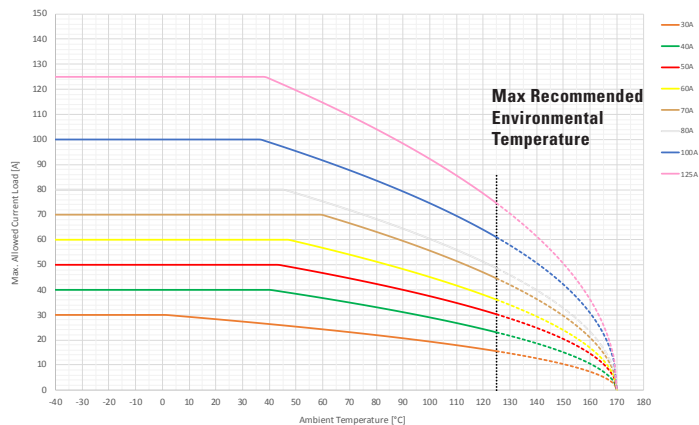


#### BF1 No Holes versions



### Typical Derating of Fuse Melting Element

Temperature Security Margin is 20%  
Please contact Littelfuse® for Details Regarding Derating Test Set-Up.



### Temperature Table

|      | max. allowed current load [A] at ambient temperature (typical derating) |     |      |      |      |       |       |
|------|-------------------------------------------------------------------------|-----|------|------|------|-------|-------|
|      | -40°C                                                                   | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| 30A  | 30                                                                      | 30  | 28   | 24   | 21   | 18    | 16    |
| 40A  | 40                                                                      | 40  | 40   | 36   | 32   | 27    | 23    |
| 50A  | 50                                                                      | 50  | 50   | 46   | 41   | 35    | 30    |
| 60A  | 60                                                                      | 60  | 60   | 55   | 50   | 42    | 36    |
| 70A  | 70                                                                      | 70  | 70   | 68   | 61   | 51    | 45    |
| 80A  | 80                                                                      | 80  | 80   | 74   | 66   | 56    | 49    |
| 100A | 100                                                                     | 100 | 100  | 90   | 81   | 70    | 61    |
| 125A | 125                                                                     | 125 | 125  | 112  | 101  | 86    | 75    |
| 150A | 113                                                                     | 113 | 113  | 113  | 111  | 94    | 81    |
| 200A | 150                                                                     | 150 | 148  | 126  | 115  | 98    | 86    |

Derating curves may change depending on the final condition of the application (terminals characteristics, wire size etc.).  
Please ask Littelfuse for more information.



BF2 Fuses

## BF2 Fuses Rated 32V

This BF2 fuse is rated at 32V and offers a bolt-on fuse for high current wiring protection. Current rating 100A - 500A; with transparent housing material for easy detection of blown fuses.

### Specifications

|                                        |                                                            |
|----------------------------------------|------------------------------------------------------------|
| Voltage Rating:                        | 32 VDC                                                     |
| Interrupting Ratings:                  | 100A - 300A: 2000A @ 32 VDC<br>400A - 500A: 1500A @ 32 VDC |
| Recommended Environmental Temperature: | -40°C to + 125°C                                           |
| Terminals Material:                    | Tin plated copper alloy                                    |
| Housing Material:                      | PET-GF33 (U.L. 94 Flammability rating – V0)                |
| Clear Housing Material:                | PES (U.L. 94 Flammability rating – V0)                     |
| Mounting Torque M8:                    | 12.0 Nm +/- 1Nm                                            |
| Mounting Torque M6:                    | 6.0 Nm +/- 1Nm                                             |
| Refers to:                             | ISO 8820-5:2015, UL 248 Special Purpose                    |



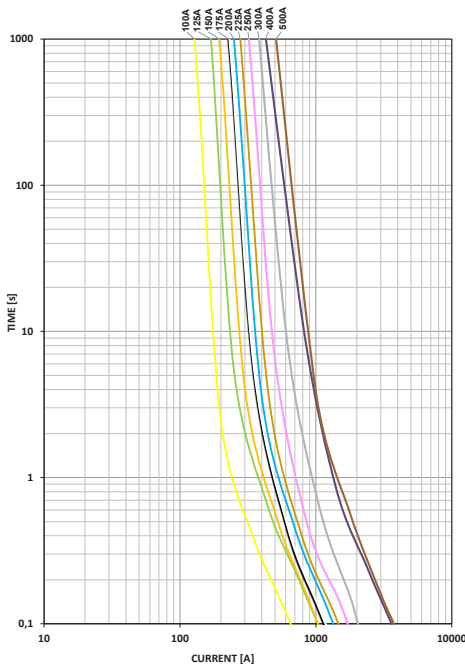
### Ordering Information

| Part Number              | Rating    | Package Size |
|--------------------------|-----------|--------------|
| <b>Standard M8 Holes</b> |           |              |
| 153.5395.xxxx            | 100 - 500 | 200          |
| <b>M6 Holes</b>          |           |              |
| 153.7011.xxxx            | 100 - 500 | 200          |

### Time Current Characteristics

| % of Rating | Opening Time Min / Max (s) |             |
|-------------|----------------------------|-------------|
|             | 100A - 250A                | 300A - 500A |
| 75          | – / –                      | 14,400 / ∞  |
| 100         | 14,400 / ∞                 | – / –       |
| 135         | 120 / 1,800                | – / –       |
| 200         | 1 / 15                     | 1 / 15      |
| 350         | 0.3 / 5                    | 0.5 / 5     |
| 600         | 0.1 / 1                    | 0.1 / 1     |

### Time-Current Characteristic Curves



### Ratings

| Part Number    | Current Rating (A) | Housing Color | Test Cable Size (mm²) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | Typ. I²t (A²s) |
|----------------|--------------------|---------------|-----------------------|------------------------|---------------------------|----------------|
| 153.xxxx.6102  | 100                | Yellow        | 16                    | 102                    | 0.70                      | 46,800         |
| 153.xxxx.6122  | 125                | Green         | 25                    | 81                     | 0.52                      | 118,100        |
| 153.xxxx.6152  | 150                | Orange        | 25                    | 77                     | 0.42                      | 113,400        |
| 153.xxxx.6172  | 175                | White         | 25                    | 104                    | 0.36                      | 154,400        |
| 153.xxxx.6202  | 200                | Blue          | 35                    | 102                    | 0.34                      | 288,000        |
| 153.xxxx.6222  | 225                | Brown         | 35                    | 107                    | 0.29                      | 236,000        |
| 153.xxxx.6252  | 250                | Pink          | 50                    | 86                     | 0.25                      | 292,500        |
| 153.xxxx.6302¹ | 300                | Grey          | 70                    | 68                     | 0.21                      | 486,000        |
| 153.xxxx.6402¹ | 400                | Purple        | 70                    | 70                     | 0.13                      | 964,000        |
| 153.xxxx.6502¹ | 500                | Brown         | 70                    | 60                     | 0.12                      | 1,449,000      |

Note 1: Short Circuit Protector only

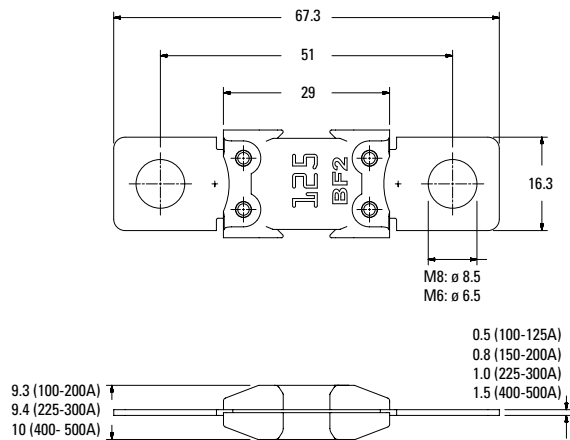
The typical I²t is an average value calculated from the breaking capacity tests by using the melting time before the arcing occurs.



BF2 Fuse Rated 32V

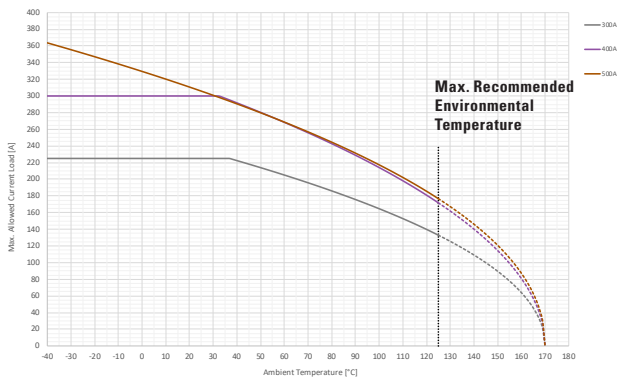
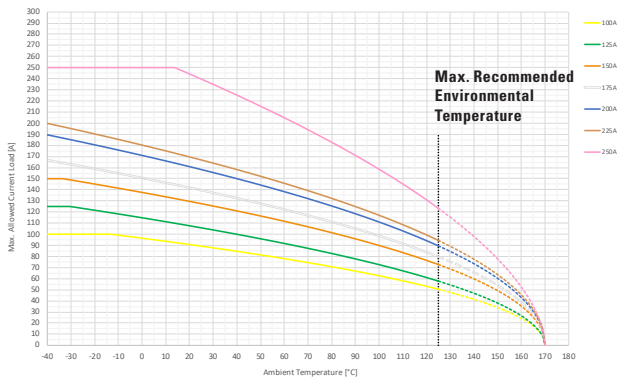
Dimensions

Dimensions in mm for reference only.  
See outline drawing for dimensions and tolerances.



Typical Derating of Fuse Melting Element

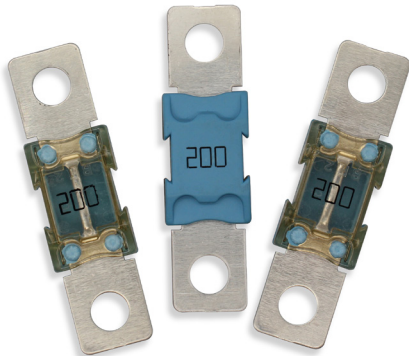
Temperature Security Margin is 20%  
Please contact Littelfuse® for Details Regarding Derating Test Set-Up.



Temperature Table

|      | max. allowed current load [A] at ambient temperature (typical derating) |     |      |      |      |       |       |
|------|-------------------------------------------------------------------------|-----|------|------|------|-------|-------|
|      | -40°C                                                                   | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| 100A | 100                                                                     | 96  | 91   | 76   | 69   | 58    | 50    |
| 125A | 125                                                                     | 115 | 108  | 90   | 80   | 67    | 58    |
| 150A | 150                                                                     | 138 | 130  | 109  | 99   | 83    | 73    |
| 175A | 167                                                                     | 151 | 142  | 120  | 108  | 92    | 80    |
| 200A | 189                                                                     | 171 | 161  | 135  | 122  | 103   | 90    |
| 225A | 200                                                                     | 180 | 170  | 143  | 129  | 109   | 94    |
| 250A | 250                                                                     | 250 | 244  | 200  | 177  | 145   | 123   |
| 300A | 225                                                                     | 225 | 225  | 201  | 181  | 153   | 133   |
| 400A | 300                                                                     | 300 | 300  | 262  | 236  | 198   | 172   |
| 500A | 364                                                                     | 329 | 311  | 263  | 238  | 202   | 177   |

Derating curves may change depending on the final condition of the application (terminals characteristics, wire size etc.).  
Please ask Littelfuse for more information.



BF2 Fuses

## BF2 Fuses Rated 58V

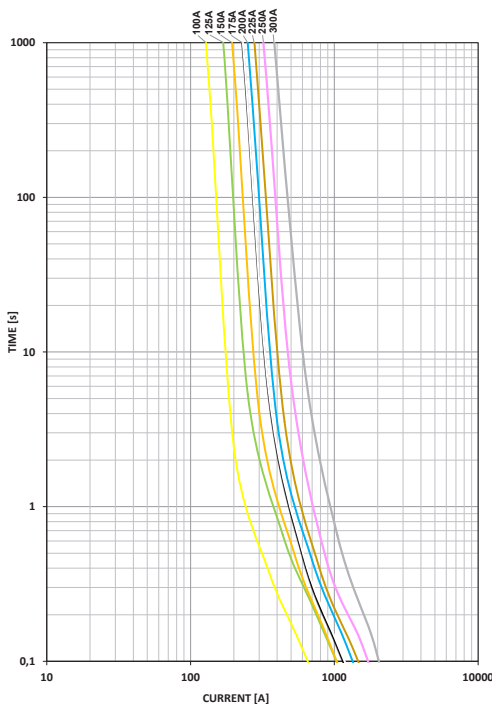
This BF2 fuse is rated at 58V and offers a bolt-on fuse for high current wiring protection. Current rating 100A - 300A; with transparent housing material for easy detection of blown fuses.

### Specifications

|                                        |                                             |
|----------------------------------------|---------------------------------------------|
| Voltage Rating:                        | 58 VDC                                      |
| Interrupting Ratings:                  | 1000A @ 58 VDC                              |
| Recommended Environmental Temperature: | -40°C to + 125°C                            |
| Terminals Material:                    | Tin plated copper alloy                     |
| Housing Material:                      | PET-GF33 (U.L. 94 Flammability rating – V0) |
| Clear Housing Material:                | PES (U.L. 94 Flammability rating – V0)      |
| Mounting Torque M8:                    | 12.0 Nm +/- 1Nm                             |
| Refers to:                             | ISO 8820-5:2015, UL 248 Special Purpose     |



### Time-Current Characteristic Curves



### Ordering Information

| Part Number   | Rating    | Package Size |
|---------------|-----------|--------------|
| 142.5395.xxxx | 100 - 300 | 200          |

### Time Current Characteristics

| % of Rating | Opening Time Min / Max (s) |            |
|-------------|----------------------------|------------|
|             | 100A - 250A                | 300A       |
| 75          | - / -                      | - / -      |
| 100         | 14,400 / ∞                 | 14,400 / ∞ |
| 135         | 120 / 1,800                | - / -      |
| 200         | 1 / 15                     | 1 / 15     |
| 350         | 0.3 / 5                    | 0.5 / 5    |
| 600         | 0.1 / 1                    | 0.1 / 1    |

### Ratings

| Part Number    | Current Rating (A) | Housing Color | Test Cable Size (mm²) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | Typ. I²t (A²s) |
|----------------|--------------------|---------------|-----------------------|------------------------|---------------------------|----------------|
| 142.5395.6102  | 100                | Yellow        | 16                    | 102                    | 0.70                      | 46,800         |
| 142.5395.6122  | 125                | Green         | 25                    | 81                     | 0.52                      | 118,100        |
| 142.5395.6152  | 150                | Orange        | 25                    | 77                     | 0.42                      | 113,400        |
| 142.5395.6172  | 175                | White         | 25                    | 104                    | 0.36                      | 154,400        |
| 142.5395.6202  | 200                | Blue          | 35                    | 102                    | 0.34                      | 288,000        |
| 142.5395.6222  | 225                | Brown         | 35                    | 107                    | 0.29                      | 236,000        |
| 142.5395.6252  | 250                | Pink          | 50                    | 86                     | 0.25                      | 292,500        |
| 142.5395.6302¹ | 300                | Grey          | 70                    | 68                     | 0.21                      | 486,000        |

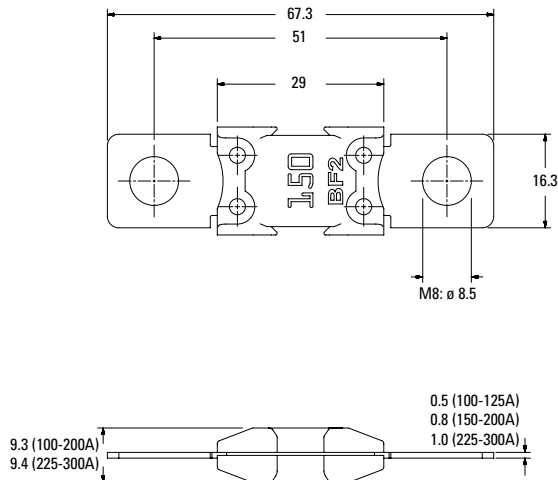
Note 1: Short Circuit Protector only

The typical I²t is an average value calculated from the breaking capacity tests by using the melting time before the arcing occurs.

BF2 Fuse Rated 58V

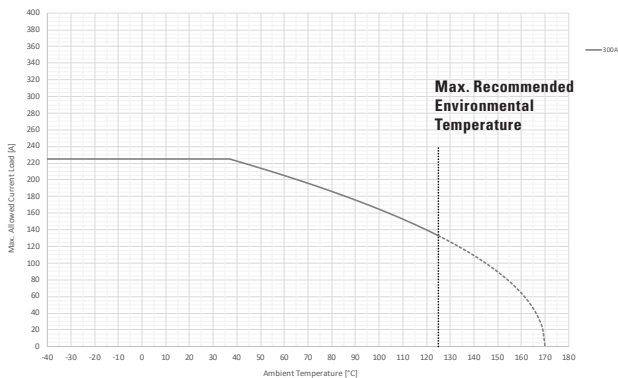
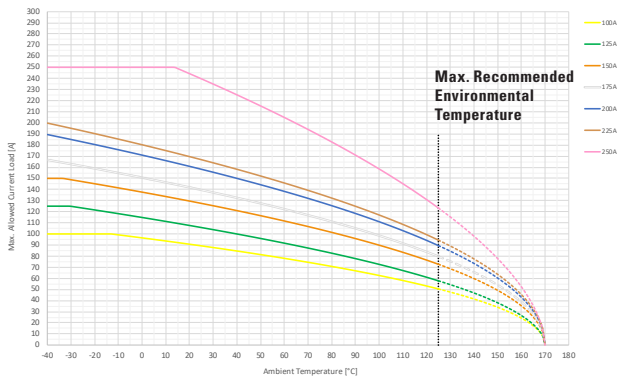
Dimensions

Dimensions in mm for reference only.  
See outline drawing for dimensions and tolerances.



Typical Derating of Fuse Melting Element

Temperature Security Margin is 20%  
Wire Cross Section And Fixture Test Set Up Refer To ISO 8820-5:2015  
Please contact us for the details of Test Set Up Definition



Temperature Table

|      | max. allowed current load [A] at ambient temperature (typical derating) |     |      |      |      |       |       |
|------|-------------------------------------------------------------------------|-----|------|------|------|-------|-------|
|      | -40°C                                                                   | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| 100A | 100                                                                     | 96  | 91   | 76   | 69   | 58    | 50    |
| 125A | 125                                                                     | 115 | 108  | 90   | 80   | 67    | 58    |
| 150A | 150                                                                     | 138 | 130  | 109  | 99   | 83    | 73    |
| 175A | 167                                                                     | 151 | 142  | 120  | 108  | 92    | 80    |
| 200A | 189                                                                     | 171 | 161  | 135  | 122  | 103   | 90    |
| 225A | 200                                                                     | 180 | 170  | 143  | 129  | 109   | 94    |
| 250A | 250                                                                     | 250 | 244  | 200  | 177  | 145   | 123   |
| 300A | 225                                                                     | 225 | 225  | 201  | 181  | 153   | 133   |

Derating curves may change depending on the final condition of the application (terminals characteristics, wire size etc.).  
Please ask Littelfuse for more information.



CF Fuses

## CF Fuses Rated 58V from 50A-300A

Main Fuse for mounting with battery clamp on the battery pole with transparent cover material for visual inspection of melting element.

### Specifications

|                              |                                                       |
|------------------------------|-------------------------------------------------------|
| Ratings up to 125A           |                                                       |
| Operating Temperature Range: | -40°C to +105°C                                       |
| Terminals:                   | Sn plated zinc alloy                                  |
| Ratings higher than 125A     |                                                       |
| Operating Temperature Range: | -40°C to +125°C                                       |
| Terminals:                   | Sn plated copper alloy                                |
| Insulating Body Material:    | Ceramic                                               |
| Cover Material:              | PES                                                   |
|                              | Visible melting-element                               |
| Interrupting Rating:         | 2,000A @58VDC                                         |
| Complies with:               | ISO 8820-6, DIN 72581-5, UL 248 Special Purpose Fuses |
| cULus Recognized:            | File No. E211637                                      |



### Ordering Information

### Time-Current Characteristics

| Part Number   | Package Size | % of Rating | Opening Time Min / Max (s) |
|---------------|--------------|-------------|----------------------------|
| 155.0892.xxx1 | 100          | 100         | 360,000 s / -              |
|               |              | 135         | - / 3,600 s                |
|               |              | 150         | 1 s / 600 s                |
|               |              | 200         | 0.200 s / 60 s             |
|               |              | 300         | 0.050 s / 1.5 s            |
|               |              | 400         | 0.020 s / 0.50 s           |
|               |              | 600         | - / 0.20 s                 |

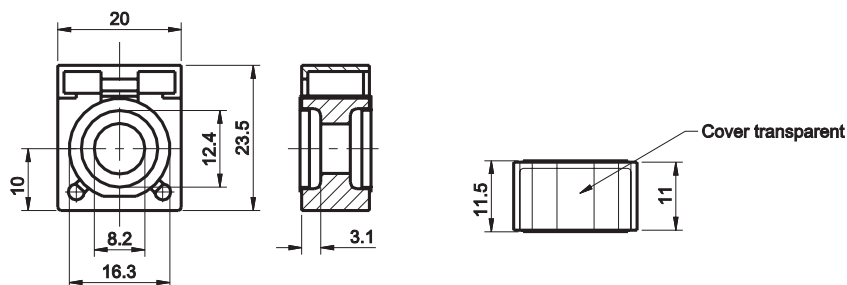
### Ratings

| Part Number   | Current Rating (A) | Typ. Voltage Drop (mV) | Cold Resistance (mΩ) | I <sup>2</sup> t (A <sup>2</sup> s) |
|---------------|--------------------|------------------------|----------------------|-------------------------------------|
| 155.0892.5501 | 50                 | 100                    | 1.20                 | 1,900                               |
| 155.0892.5751 | 75                 | 90                     | 0.60                 | 12,000                              |
| 155.0892.6101 | 100                | 80                     | 0.60                 | 14,000                              |
| 155.0892.6121 | 125                | 75                     | 0.45                 | 51,000                              |
| 155.0892.6151 | 150                | 70                     | 0.35                 | 63,800                              |
| 155.0892.6171 | 175                | 70                     | 0.25                 | 120,000                             |
| 155.0892.6201 | 200                | 65                     | 0.25                 | 172,800                             |
| 155.0892.6251 | 250                | 70                     | 0.20                 | 330,000                             |
| 155.0892.6301 | 300                | 70                     | 0.15                 | 372,000                             |

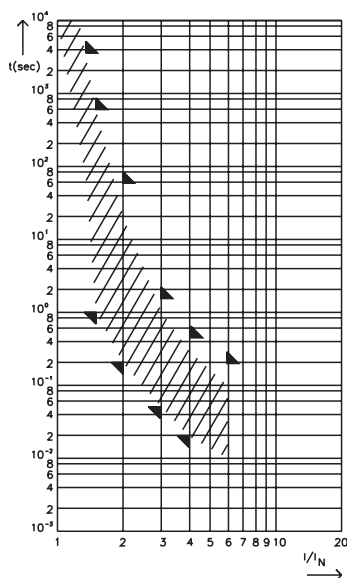
Insert CF8-Fuse links only in conjunction with the insulating nuts, see Section "Fuse Holders."  
Corresponding battery clamp see Section "Fuse Holders."

### Dimensions

Dimensions in mm



### Pre-Arcing Time-Limits



FI = 1.25 (max. operating current:  
0.8 x I<sub>rat</sub> at 23°C)



## Fuse Strips with Housing Rated 36V - SPECIAL PURPOSE FUSES (NOT INTENDED FOR AUTOMOTIVE or TRUCK APPLICATIONS)

Housed fuse strips with window for visual inspection of melting element. Current rating 30A - 150A, 36 VDC. 90° fork type lugs.

### Specifications

|                              |                |
|------------------------------|----------------|
| Voltage Rating:              | 36 VDC         |
| Interrupt Ratings:           | up to 375A     |
| Operating Temperature Range: | -40° to 125°C  |
| Insulating Body:             | Out of ceramic |
| Metal Parts:                 | Zinc-alloy     |
| Complies with:               | DIN 72581/2    |

**RoHS**

### Ordering Information

| Part Number   | Package Size |
|---------------|--------------|
| 156.5611.xxx1 | 50           |

### Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |
|-------------|----------------------------|
| 130         | 3,600 s / -                |
| 250         | - / 60 s                   |

### Ratings

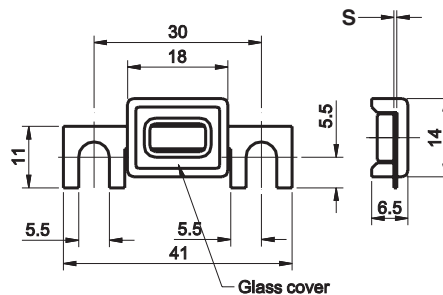
| Part Number   | Current Rating (A)* | Typ. Voltage Drop (mV) | Material Thickness "S" (mm) |
|---------------|---------------------|------------------------|-----------------------------|
| 156.5611.5301 | 30                  | 70                     | 0.25                        |
| 156.5611.5401 | 40                  | 70                     | 0.20                        |
| 156.5611.5501 | 50                  | 70                     | 0.25                        |
| 156.5611.5601 | 60                  | 70                     | 0.40                        |
| 156.5611.5701 | 70                  | 70                     | 0.45                        |
| 156.5611.5801 | 80                  | 70                     | 0.50                        |
| 156.5611.6101 | 100                 | 70                     | 0.70                        |
| 156.5611.6111 | 120                 | 70                     | 0.70                        |
| 156.5611.6121 | 125                 | 70                     | 0.70                        |
| 156.5611.6151 | 150                 | 70                     | 1.00                        |

Corresponding holder see Section "Fuse Holders."

\*Metal parts in compliance with DIN 72581/2. Fuses with housings not mentioned in the standards.

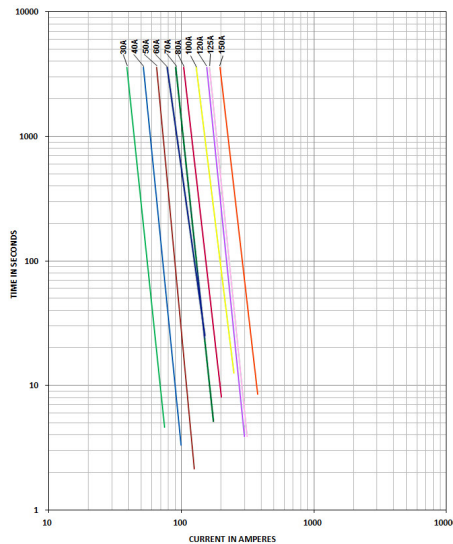
### Dimensions

Dimensions in mm

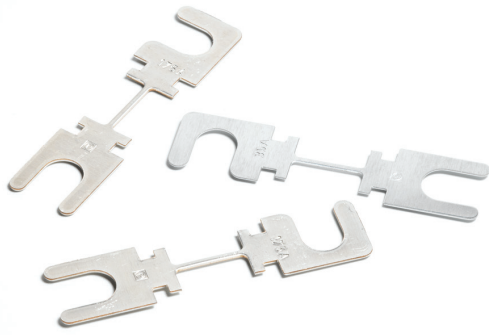


### Pre-Arcing Time-Limits

TIME-CURRENT CHARACTERISTIC CURVES



FI = 1.00 (max. operating current :  $1.0 \times I_{rat}$  at 23°C)



## Fuse Strips Rated 48V - SPECIAL PURPOSE FUSES (NOT INTENDED FOR AUTOMOTIVE OR TRUCK APPLICATIONS)

Non-housed fuse strips for battery powered fuses rated at 48VDC. 90° and straight fork type lugs.

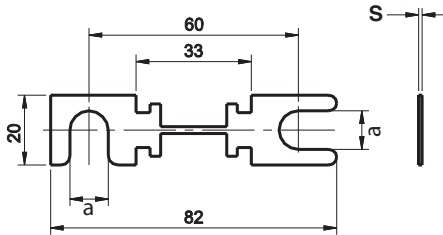
### Specifications

|                              |                                                             |
|------------------------------|-------------------------------------------------------------|
| Voltage Rating:              | 48 VDC                                                      |
| Interrupt Ratings:           | up to 3000A                                                 |
| Operating Temperature Range: | -40° to 125°C                                               |
| Metal Parts:                 | 35 A - 80 A: Zinc-alloy<br>100A - 500 A: Copper Cu, gal. Sn |
| Complies with:               | DIN 43560-1                                                 |

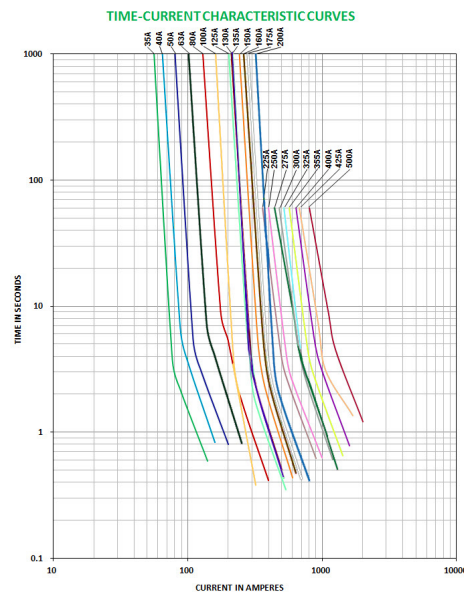
**RoHS**

### Dimensions

Dimensions in mm



### Pre-Arcing Time-Limits



FI = 1.00 (max. operating current:  $1.0 \times I_{rat}$  at 23°C)

### Ordering Information

| Part Number   | Package Size |
|---------------|--------------|
| 157.5700.xxx1 | 50           |
| 157.5916.xxx1 | 50           |

### Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |           |
|-------------|----------------------------|-----------|
|             | 35-200                     | 225 - 500 |
| 150         | 3,600 s / -                | - / -     |
| 160         | - / -                      | 60 s / -  |
| 220         | - / 60 s                   |           |
| 250         | 0.8 s / 10 s               |           |
| 400         | 0.20 / 2 s                 |           |

### Ratings

| Part Number   |               | Current Rating (A) | Typ. Voltage Drop (mV) | Breaking Capacity (VDC/A) | Material Thickness "S" (mm) |
|---------------|---------------|--------------------|------------------------|---------------------------|-----------------------------|
| a = 11 mm     | a = 9 mm*     |                    |                        |                           |                             |
| 157.5700.5351 | 157.5916.5351 | 35                 | 125                    | 48/210                    | 0.6                         |
| 157.5700.5401 | -             | 40                 | 125                    | 48/240                    | 0.6                         |
| 157.5700.5501 | 157.5916.5501 | 50                 | 125                    | 48/300                    | 0.6                         |
| 157.5700.5631 | 157.5916.5631 | 63                 | 125                    | 48/378                    | 0.6                         |
| 157.5700.5801 | 157.5916.5801 | 80                 | 125                    | 48/480                    | 0.6                         |
| 157.5700.6101 | 157.5916.6101 | 100                | 125                    | 48/600                    | 0.5                         |
| 157.5700.6121 | 157.5916.6121 | 125                | 125                    | 48/750                    | 0.8                         |
| 157.5700.6131 | 157.5916.6131 | 130                | 125                    | 48/780                    | 0.8                         |
| 157.5700.6141 | -             | 135                | 125                    | 48/810                    | 0.8                         |
| 157.5700.6151 | -             | 150                | 125                    | 48/900                    | 0.8                         |
| 157.5700.6161 | 157.5916.6161 | 160                | 125                    | 48/960                    | 1.0                         |
| 157.5700.6171 | -             | 175                | 125                    | 48/1050                   | 1.0                         |
| 157.5700.6201 | 157.5916.6201 | 200                | 125                    | 48/1200                   | 0.8                         |
| 157.5700.6231 | -             | 225                | 125                    | 48/1350                   | 0.5                         |
| 157.5700.6251 | 157.5916.6251 | 250                | 125                    | 48/1500                   | 0.5                         |
| 157.5700.6271 | -             | 275                | 125                    | 48/1650                   | 0.8                         |
| 157.5700.6301 | -             | 300                | 125                    | 48/1800                   | 0.8                         |
| 157.5700.6331 | -             | 325                | 125                    | 48/1950                   | 0.8                         |
| 157.5700.6351 | -             | 355                | 125                    | 48/2130                   | 0.8                         |
| 157.5700.6401 | -             | 400                | 125                    | 48/2400                   | 0.8                         |
| 157.5700.6421 | -             | 425                | 125                    | 48/2550                   | 1.0                         |
| 157.5700.6501 | -             | 500                | 125                    | 48/3000                   | 1.0                         |

Corresponding holders = 177.5701.0001 and 177.5702.0001."





## Fuse Strips with Housing Rated 48V - SPECIAL PURPOSE FUSES (NOT INTENDED FOR AUTOMOTIVE OR TRUCK APPLICATIONS)

Housed fuse strips for battery-powered vehicles. Current rating 35A - 500A, 48 VDC. 90° and straight fork type lugs. With window for visual inspection of melting element.

### Specifications

|                              |                                                          |
|------------------------------|----------------------------------------------------------|
| Voltage Rating:              | 48 VDC                                                   |
| Interrupt Ratings:           | up to 3000A                                              |
| Operating Temperature Range: | -40° to 125°C                                            |
| Metal Parts:                 | 35A - 80A: Zinc-alloy<br>100A - 500A: Copper Cu, gal. Sn |
| Complies with:               | UL 248 Special Purpose Fuses                             |
| cULus Recognized:            | File No. E211637                                         |



### Ordering Information

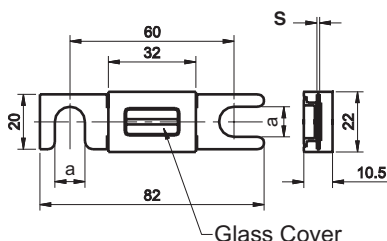
| Part Number   | Package Size |
|---------------|--------------|
| 157.5701.xxx1 | 50           |
| 157.5917.xxx1 | 50           |

### Time-Current Characteristics

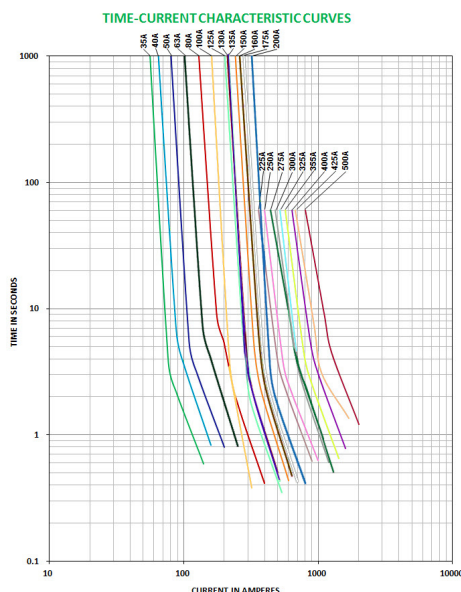
| % of Rating | Opening Time Min / Max (s) |           |
|-------------|----------------------------|-----------|
|             | 35-200                     | 225 - 500 |
| 150         | 3,600 s / -                | - / -     |
| 160         | - / -                      | 60 s / -  |
| 220         | - / 60 s                   |           |
| 250         | 0.8 s / 10 s               |           |
| 400         | 0.20 / 2 s                 |           |

### Dimensions

Dimensions in mm



### Pre-Arcing Time-Limits

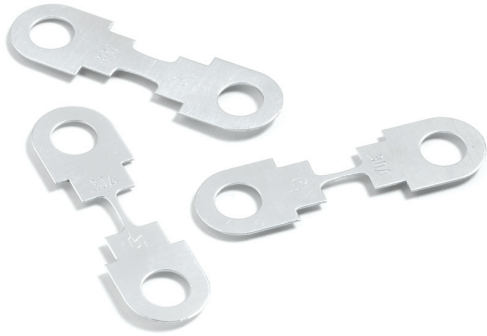


FI = 1.00 (max. operating current:  $1.0 \times I_{rat}$  at 23°C)

### Ratings

| Part Number   |               | Current Rating (A) | Typ. Voltage Drop (mV) | Breaking Capacity (VDC/A) | Material Thickness "S" (mm) |
|---------------|---------------|--------------------|------------------------|---------------------------|-----------------------------|
| a = 11 mm     | a = 9 mm*     |                    |                        |                           |                             |
| 157.5701.5351 | 157.5917.5351 | 35                 | 125                    | 48/210                    | 0.6                         |
| 157.5701.5401 | -             | 40                 | 125                    | 48/240                    | 0.6                         |
| 157.5701.5501 | 157.5917.5501 | 50                 | 125                    | 48/300                    | 0.6                         |
| 157.5701.5631 | 157.5917.5631 | 63                 | 125                    | 48/378                    | 0.6                         |
| 157.5701.5801 | 157.5917.5801 | 80                 | 125                    | 48/480                    | 0.6                         |
| 157.5701.6101 | 157.5917.6101 | 100                | 125                    | 48/600                    | 0.5                         |
| 157.5701.6121 | 157.5917.6121 | 125                | 125                    | 48/750                    | 0.8                         |
| 157.5701.6131 | -             | 130                | 125                    | 48/780                    | 0.8                         |
| 157.5701.6141 | -             | 135                | 125                    | 48/810                    | 0.8                         |
| 157.5701.6151 | 157.5917.6151 | 150                | 125                    | 48/900                    | 0.8                         |
| 157.5701.6161 | 157.5917.6161 | 160                | 125                    | 48/960                    | 1.0                         |
| 157.5701.6171 | 157.5917.6171 | 175                | 125                    | 48/1050                   | 1.0                         |
| 157.5701.6201 | 157.5917.6201 | 200                | 125                    | 48/1200                   | 0.8                         |
| 157.5701.6231 | 157.5917.6231 | 225                | 125                    | 48/1350                   | 0.5                         |
| 157.5701.6251 | 157.5917.6251 | 250                | 125                    | 48/1500                   | 0.5                         |
| 157.5701.6271 | 157.5917.6281 | 275                | 125                    | 48/1650                   | 0.8                         |
| 157.5701.6301 | -             | 300                | 125                    | 48/1800                   | 0.8                         |
| 157.5701.6331 | 157.5917.6331 | 325                | 125                    | 48/1950                   | 0.8                         |
| 157.5701.6351 | 157.5917.6351 | 355                | 125                    | 48/2130                   | 0.8                         |
| 157.5701.6401 | -             | 400                | 125                    | 48/2400                   | 0.8                         |
| 157.5701.6421 | 157.5917.6421 | 425                | 125                    | 48/2550                   | 1.0                         |
| 157.5701.6501 | 157.5917.6501 | 500                | 125                    | 48/3000                   | 1.0                         |

Corresponding holder see Section "Fuse Holders."



## HSB Fuses Rated 32V

Non-housed fuse strips for rated voltage up to 32 VDC. Current rating 30 A -175 A. Ring type lugs.

### Specifications

|                              |                              |
|------------------------------|------------------------------|
| Voltage Rating:              | 32 VDC                       |
| Interrupt Ratings:           | 1000A                        |
| Operating Temperature Range: | -40° to 125°C                |
| Material:                    | Zinc-alloy                   |
| Connections:                 | Zinc-alloy                   |
|                              | 2 x M6 bolts, distance 30 mm |
| Torque:                      | 4 Nm +/- 1 Nm                |

**RoHS**

### Ordering Information

| Part Number   | Package Size |
|---------------|--------------|
| 156.5677.xxx1 | 100          |
| 156.5677.xxx2 | 10000        |

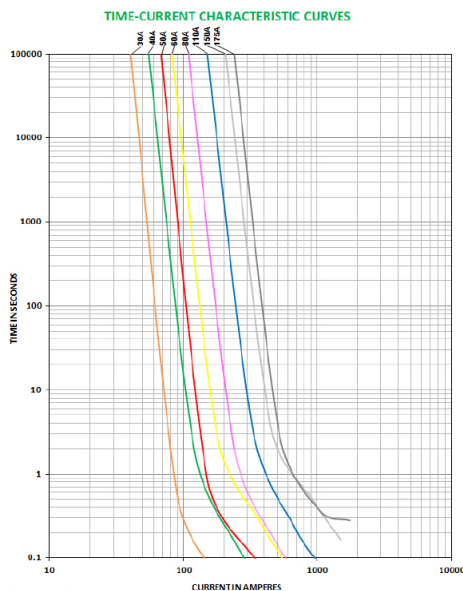
### Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |
|-------------|----------------------------|
| 100         | ∞ / -                      |
| 125         | 360,000 s / -              |
| 300         | 0.100 s / 10 s             |
| 600         | 0.020 s / 1 s              |
| 1000        | 0.010 s / 0.300 s          |

### Ratings

| Part Number   | Current Rating (A) | Typ. Voltage Drop (mV) | Cold Resistance (mΩ) | I <sup>2</sup> t (A <sup>2</sup> s) | Material Thickness "S" (mm) |
|---------------|--------------------|------------------------|----------------------|-------------------------------------|-----------------------------|
| 156.5677.530_ | 30                 | 44                     | 1.33                 | 3800                                | 0.4                         |
| 156.5677.540_ | 40                 | 40                     | 0.89                 | 11200                               | 0.4                         |
| 156.5677.550_ | 50                 | 44                     | 0.72                 | 21300                               | 0.4                         |
| 156.5677.560_ | 60                 | 38                     | 0.58                 | 41400                               | 0.4                         |
| 156.5677.580_ | 80                 | 40                     | 0.43                 | 44800                               | 0.8                         |
| 156.5677.611_ | 110                | 40                     | 0.31                 | 139000                              | 0.8                         |
| 156.5677.615_ | 150                | 52                     | 0.23                 | 465000                              | 0.8                         |
| 156.5677.617_ | 175                | 46                     | 0.22                 | 560000                              | 0.8                         |

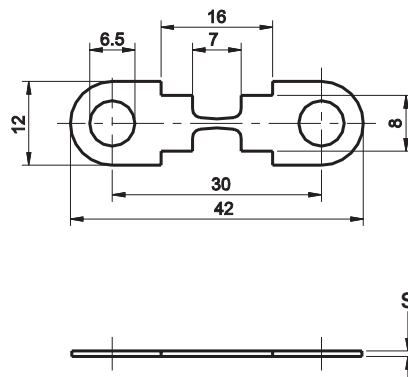
### Pre-Arcing Time-Limits



FI = 1.00 (max. operating current:  
1.0 x I<sub>rat</sub> at 23°C)

### Dimensions

Dimensions in mm





## Fuse Strips with Rated 36V - SPECIAL PURPOSE FUSES (NOT INTENDED FOR AUTOMOTIVE OR TRUCK APPLICATIONS)

Non-housed fuse strips for Diesel vehicles. Current rating 25A - 150A, 36 VDC. 90° fork type lugs.

### Specifications

|                              |               |
|------------------------------|---------------|
| Voltage Rating:              | 36 VDC        |
| Interrupt Ratings            | up to 625A    |
| Operating Temperature Range: | -40° to 125°C |
| Material:                    | Zinc-alloy    |
| Complies with:               | DIN 72581/2   |

**RoHS**

### Ordering Information

| Part Number   | Package Size | % of Rating | Opening Time Min / Max (s) |
|---------------|--------------|-------------|----------------------------|
| 156.5610.xxx1 | 100          | 130         | 3,600 s / -                |
| 156.5610.xxx2 | 2000         | 250         | - / 60 s                   |

### Time-Current Characteristics

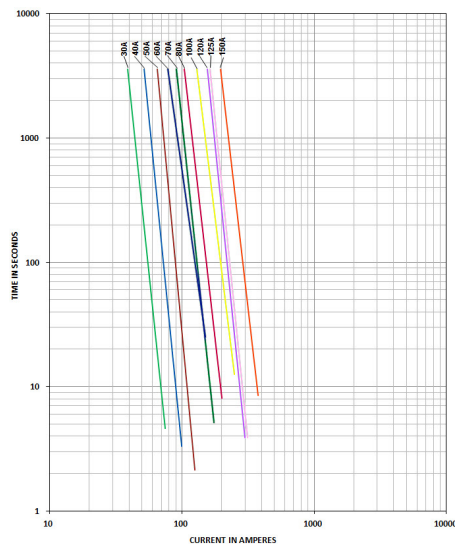
### Ratings

| Part Number   | Current Rating (A) | Typ. Voltage Drop (mV) | Material Thickness "S" (mm) |
|---------------|--------------------|------------------------|-----------------------------|
| 156.5610.525_ | 25*                | 70                     | 0.20                        |
| 156.5610.530_ | 30                 | 70                     | 0.25                        |
| 156.5610.540_ | 40*                | 70                     | 0.20                        |
| 156.5610.550_ | 50                 | 70                     | 0.25                        |
| 156.5610.560_ | 60*                | 70                     | 0.40                        |
| 156.5610.570_ | 70*                | 70                     | 0.45                        |
| 156.5610.580_ | 80                 | 70                     | 0.50                        |
| 156.5610.610_ | 100                | 70                     | 0.70                        |
| 156.5610.611_ | 120*               | 70                     | 0.70                        |
| 156.5610.612_ | 125*               | 70                     | 0.70                        |
| 156.5610.615_ | 150*               | 70                     | 1.00                        |
| 156.5610.625_ | 250*               | 70                     | 2.00                        |

\*Not mentioned in the standards  
Corresponding holder see Section "Fuse Holders."

### Pre-arcing Time-limits

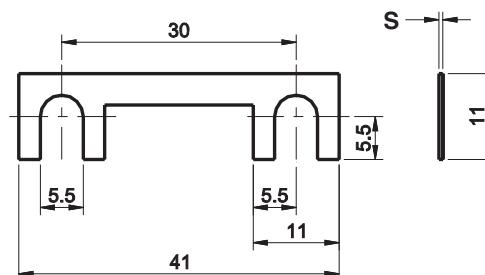
TIME-CURRENT CHARACTERISTIC CURVES



FI = 1.00 (max. operating current:  $1.0 \times I_{rat}$  at 23°C)

### Dimensions

Dimensions in mm





## SMD FUSES

---

Low Current SMD Fuses Rated 18V

72



SMD Autofuse

SMD Autofuse Rated 18V

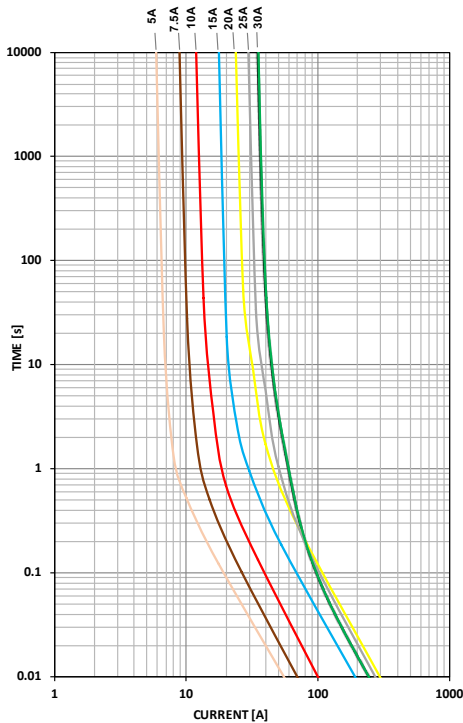
The SMD Autofuse is a new surface-mountable fuse that’s designed to perform similarly to traditional automotive blade fuses where ease of replacement is not desired or required. The implementation of the SMD autofuse offers space savings and systems savings without performance sacrifices.

Specifications

|                                        |                                                                                                |
|----------------------------------------|------------------------------------------------------------------------------------------------|
| Voltage Rating:                        | 18 VDC                                                                                         |
| Interrupting Rating:                   | 1000A @18 VDC                                                                                  |
| Recommended Environmental Temperature: | -40°C to +105°C                                                                                |
| Terminals Material:                    | Tin plated zinc alloy                                                                          |
| Housing Material:                      | LCP (U.L. 94 Flammability Rating - HB)                                                         |
| Net Weight Per Fuse:                   | 0.27±15% gr                                                                                    |
| Complies with:                         | SAE 2741 and ISO 8820-12 in reference to electrical and environmental performance requirements |



Time-Current Characteristic Curves



Ordering Information

| Part Number | Rating         | Package Size |
|-------------|----------------|--------------|
| 0317xxx.M   | 5 - 30 & SHUNT | 1000         |

Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |
|-------------|----------------------------|
| 110         | 360,000 / ∞                |
| 135         | 0.75 / 120                 |
| 160         | 0.3 / 50                   |
| 200         | 0.15 / 5                   |
| 350         | 0.04 / 0.5                 |
| 600         | 0.02 / 0.1                 |

Ratings

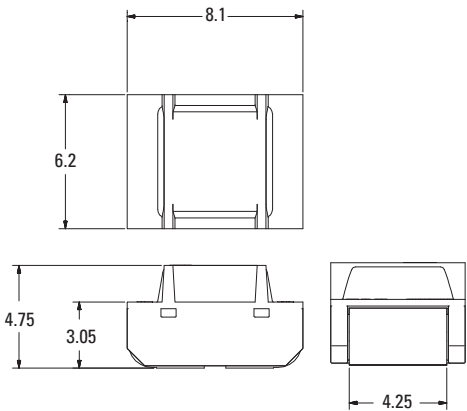
| Part Number            | Current Rating (A) | Typ. Voltage Drop (mV) | Typ. Cold Resistance (mΩ) | Typ. I²t (A²s) |
|------------------------|--------------------|------------------------|---------------------------|----------------|
| 0317005.M <sup>1</sup> | 5                  | 121                    | 16.24                     | 26             |
| 031707.5M <sup>1</sup> | 7.5                | 104                    | 9.81                      | 36             |
| 0317010.M              | 10                 | 90                     | 6.73                      | 71             |
| 0317015.M <sup>1</sup> | 15                 | 109                    | 4.61                      | 320            |
| 0317020.M              | 20                 | 84                     | 3.21                      | 728            |
| 0317025.M <sup>1</sup> | 25                 | 87                     | 2.43                      | 652            |
| 0317030.M <sup>1</sup> | 30                 | 75                     | 1.85                      | 503            |
| 0317900.M <sup>1</sup> | SHUNT              | 50                     | 1.39                      | --             |

Note 1: Under development

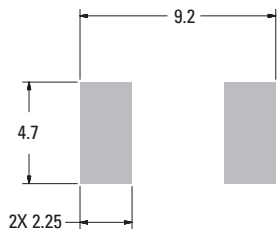
The typical I²t is an average value calculated from the breaking capacity tests by using the melting time before the arcing occurs.

Dimensions

Dimensions in mm for reference only. See outline drawing for dimensions and tolerances



Recommended Pad Printing



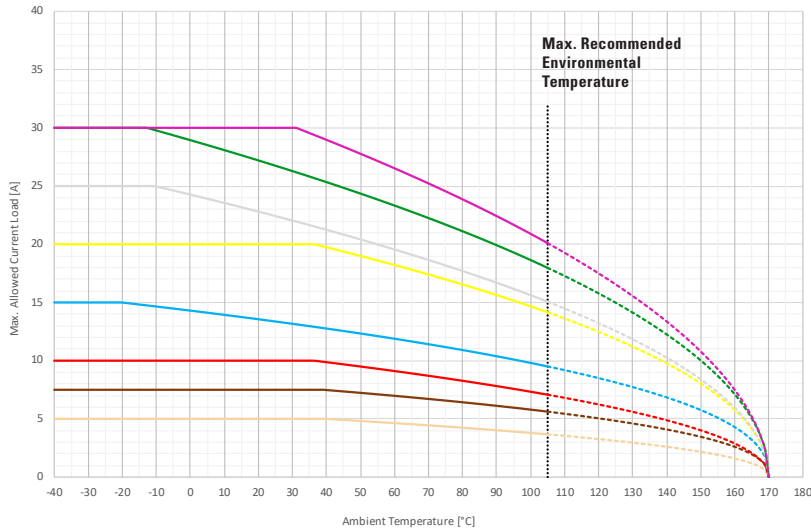
## SMD Autofuse Rated 18V

### Typical Derating Of Fuse Melting Element

Temperature Security Margin is 20%

Trace Cross-Section Based On IPC Standard (70% In and 30K rise)

Please contact Littelfuse® for details regarding Derating Test Set Up.

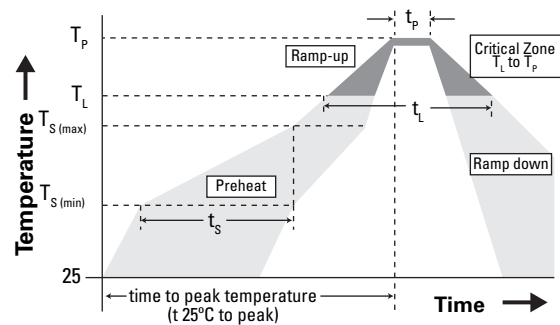


### Temperature Table

|       |     | max. allowed current load [A] at ambient temperature (typical derating) |     |      |      |      |       |       |
|-------|-----|-------------------------------------------------------------------------|-----|------|------|------|-------|-------|
|       |     | -40°C                                                                   | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| 5A    | 5   | 5                                                                       | 5   | 5    | 5    | 4    | 4     | 3     |
| 7.5A  | 7.5 | 8                                                                       | 8   | 8    | 7    | 6    | 5     | 5     |
| 10A   | 10  | 10                                                                      | 10  | 10   | 9    | 8    | 7     | 6     |
| 15A   | 15  | 14                                                                      | 14  | 14   | 12   | 11   | 9     | 8     |
| 20A   | 20  | 20                                                                      | 20  | 20   | 18   | 16   | 14    | 12    |
| 25A   | 25  | 24                                                                      | 23  | 23   | 19   | 17   | 14    | 13    |
| 30A   | 30  | 29                                                                      | 27  | 27   | 23   | 21   | 17    | 15    |
| SHUNT | 30  | 30                                                                      | 30  | 30   | 26   | 23   | 19    | 17    |

### Soldering Parameters

|                            |                                  |                |
|----------------------------|----------------------------------|----------------|
| Pre Heat                   | Temperature Min ( $T_s$ min)     | 150 °C         |
|                            | Temperature Max ( $T_s$ max)     | 200 °C         |
|                            | Time (min to max) ( $t_s$ )      | 40 - 80 secs   |
| Reflow                     | Temperature ( $T_L$ ) (Liquidus) | 220 °C         |
|                            | Time ( $t_L$ )                   | 45 - 90 secs   |
| Peak Temperature ( $T_p$ ) |                                  | 235 - 250 °C   |
| Ramp-down Rate             |                                  | < 2.5 °C / Sec |
| Do not exceed              |                                  | 260 °C         |



### Packaging

| Packaging Option   | Package Specification | Quantity          | Quantity & Packaging Code |
|--------------------|-----------------------|-------------------|---------------------------|
| 16mm Tape and Reel | EIA-481               | 1000 pcs per reel | MR                        |



## CABLE/PAL FUSES

|                                           |    |
|-------------------------------------------|----|
| BF-Inline Fuses Rated 32V                 | 75 |
| CABLEPRO® Cable Protector Fuses Rated 32V | 76 |
| PAL Fuses                                 | 77 |





## BF-Inline Fuse Rated 32V

Inline fuse to protect specific cable cross-sections and insulations; Cross-section 10mm<sup>2</sup> to 35mm<sup>2</sup>. For rated voltage up to 32 VDC.

Assembly notes: The wire integrated fuse has to be insulated by using a self-adhesive shrinking tube. The wire has to be fixed on both sides of the fuse to minimize the wire forces. Recommended shrinking tube: DERAY(R)-IAKT 4:1, 24mm

### Specifications

|                              |                             |
|------------------------------|-----------------------------|
| Voltage Rating:              | 32 VDC                      |
| Housing Material:            | PETGF30                     |
| Insulating Housing Material: | PAGF30                      |
| Terminals:                   | Crimp, Copper alloy, tinned |
| Interrupting Rating:         | 2000A @32VDC                |

### Ordering Information

| Part Number | Package Size |
|-------------|--------------|
| 153.0000    | 300          |

### Time-Current Characteristics 100A-190A

| % of Rating | Opening Time Min / Max (s) |        |
|-------------|----------------------------|--------|
| 100         | 360,000 s                  | —      |
| 150         | 90 s                       | 1800 s |
| 200         | 3 s                        | 240 s  |
| 300         | 0.3 s                      | 60 s   |
| 500         | 0.1 s                      | 10 s   |

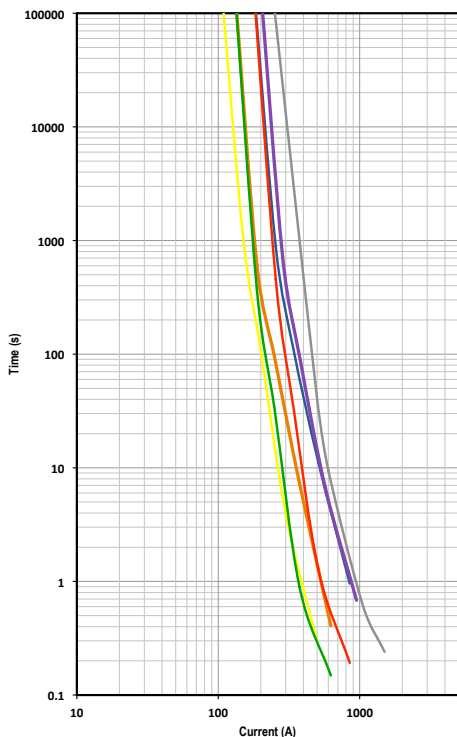
### Time-Current Characteristics 300A

| % of Rating | Opening Time Min / Max (s) |       |
|-------------|----------------------------|-------|
| 75          | 360,000 s                  | —     |
| 165         | 10 s                       | 100 s |
| 200         | 1 s                        | 15 s  |
| 350         | 0.3 s                      | 5 s   |
| 500         | 0.1 s                      | 1 s   |

### Ratings

| Part Number | Current Rating (A) | Wire Size/Type/Marking    | Typ. Voltage Drop (mV) | Cold Resistance (mΩ) | I <sup>2</sup> t (A <sup>2</sup> s) |
|-------------|--------------------|---------------------------|------------------------|----------------------|-------------------------------------|
| 153.1002    | 100                | 10mm <sup>2</sup> /FLY/P  | 60                     | 0.42                 | 27,000                              |
| 153.1012    | 125                | 10mm <sup>2</sup> /FL2G/S | 70                     | 0.32                 | 87,500                              |
| 153.1602    | 125                | 16mm <sup>2</sup> /FLY/P  | 75                     | 0.41                 | 29,600                              |
| 153.1612    | 170                | 16mm <sup>2</sup> /FL2G/S | 60                     | 0.22                 | 248,000                             |
| 153.2502    | 170                | 25mm <sup>2</sup> /FLY/P  | 70                     | 0.29                 | 78,500                              |
| 153.2512    | 190                | 25mm <sup>2</sup> /FL2G/S | 52                     | 0.22                 | 248,000                             |
| 153.3502    | 300                | 35mm <sup>2</sup> /FLY/P  | 70                     | 0.20                 | 373,000                             |

### Time-Current Characteristics Curve



|                 |
|-----------------|
| 153.1002(100A)  |
| 153.1012 (125A) |
| 153.1602(125A)  |
| 153.1612(170A)  |
| 153.2502(170A)  |
| 153.2512(190A)  |
| 153.3502(300A)  |



## CABLEPRO® Cable Protector Fuses Rated 32V

### Available in AWG and metric cables

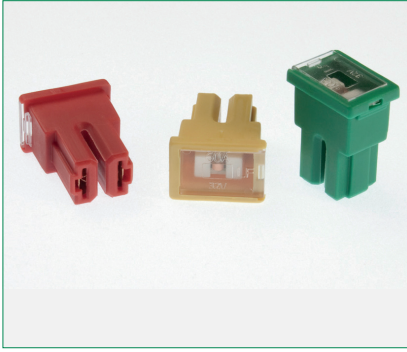
The CABLEPRO® fuse is designed to replace conventional wire fusible links in high current automotive applications. The slim package of the CABLEPRO® and the predictable and reliable performance characteristics (similar to MEGA® fuse) make this far superior over wire fusible links. Interrupting rating 2000A @ 32 VDC. CablePro is not a sealed product. To seal it a shrink tube should be used.

### Specifications

|                              |                                                            |
|------------------------------|------------------------------------------------------------|
| Voltage Rating:              | 32V                                                        |
| Interrupting rating:         | 2000A @ 32 VDC                                             |
| Housing Material:            | PPAGF33HS                                                  |
| Operating Temperature Range: | -40°C to +125°C                                            |
| Cable Types Available:       | SAE J1127 SXT, SAE J1128 TXL, ISO 6722: Type FL2G          |
| Operating Temperature Range: | -40°C to +150°C - Optional for 150A, 175A and 200A ratings |
| Cable Type:                  | Thin wall irradiated XLPE (SAE 4GA)                        |

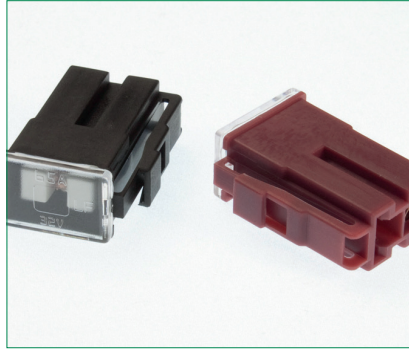
Available with UL recognized in 60, 100, 150 & 200 at 32V  
(UL not available with the thin wall irradiated XLPE SAE 4GA cable)

**RoHS**



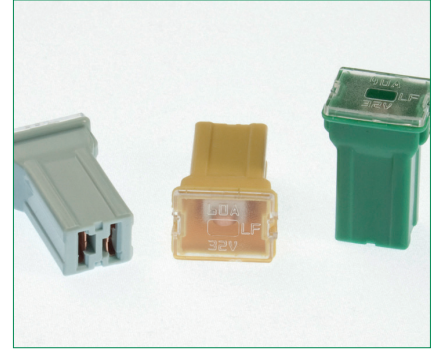
## 293 Series

Auto Link PAL 293 Series Fuse  
Amps (A): 20, 30, 40, 50, 60, 70, 80, 100



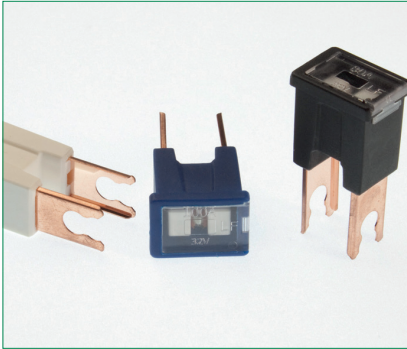
## 2935 Series

Auto Link PAL 2935 Series Fuse  
Amps (A): 25, 30, 45, 65, 75



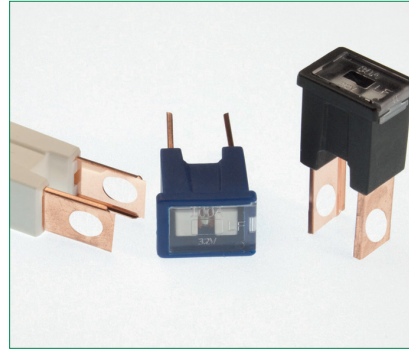
## 2938 Series

Auto Link PAL 2938 Series Fuse  
Amps (A): 20, 30, 40, 50, 60, 70, 80



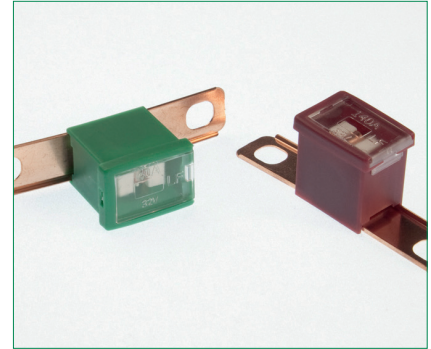
## 294 Series

Auto Link PAL 294 Series Fuse  
Amps (A): 30, 40, 50, 60, 70, 80, 100, 120



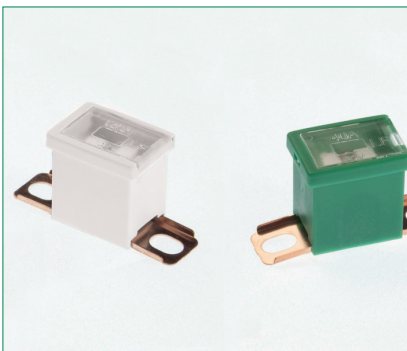
## 294C Series

Auto Link PAL 294C Series Fuse  
Amps (A): 20, 30, 40, 50, 60, 70, 80, 100, 120



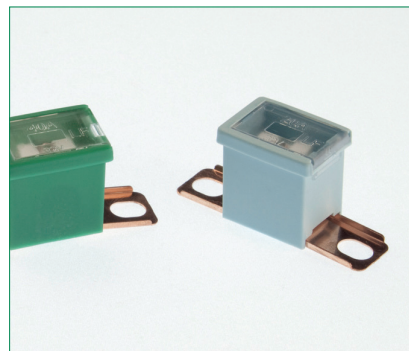
## 295 Series

Auto Link PAL 295 Series Fuse  
Amps (A): 20, 30, 40, 50, 60, 70, 80, 100, 120, 140



## 283B Series

Auto Link PAL 283B Series Fuse  
Amps (A): 20, 30, 40, 50, 60, 70, 80, 100, 120, 140



## 283 Series

Auto Link PAL 283 Series Fuse  
Amps (A): 20, 30, 40, 50, 60, 70, 80, 100, 120, 140



## HIGH VOLTAGE FUSES

|                                    |    |
|------------------------------------|----|
| Low Current HEV Fuses              | 79 |
| Low Current High Voltage 50A Fuses | 81 |
| Low Current 10EV Fuses             | 83 |
| High Current 20EV Fuses            | 85 |
| High Current SHEV Fuses            | 86 |



Low Current HEV Fuses



OHEV040.ZXBD

## Low Current HEV Fuse

The LC HEV fuse is designed for protection of high-voltage accessory circuits in electric and hybrid electric vehicles.

### Specifications

|                                            |                 |
|--------------------------------------------|-----------------|
| Voltage Rating (10A, 15A, 20A, 30A):       | 450 VDC         |
| Voltage Rating (40A):                      | 425 VDC         |
| Note: The OHEV040.ZXBD is rated at 450 VDC |                 |
| Interrupting Rating (10A, 15A, 20A, 30A):  | 10kA @ 450 VDC  |
| Interrupting Rating (40A):                 | 10kA @ 425 VDC  |
| Operating Temperature Range:               | -40°C to +125°C |

### Ordering Information

| Part Number    | Termination       | Package Size | % of Rating | Opening Time Min / Max (s) 10A | Opening Time Min / Max (s) 15A, 20A, 30A | Opening Time Min / Max (s) 40A |
|----------------|-------------------|--------------|-------------|--------------------------------|------------------------------------------|--------------------------------|
| OHEVxxx.ZXC    | Cartridge         | 240          | 100         | 100 hrs / -                    | 100 hrs / -                              | 100 hrs / -                    |
| OHEVxxx.ZXISO  | Bolt Down (ISO)   | 240          | 110         | 4 hrs / -                      | 4 hrs / -                                | -                              |
| OHEVxxx.ZXPY   | Blade             | 240          | 135         | 100 / 3600                     | 150 / 3600                               | 150 / 3600                     |
| OHEVxxx.ZXBD   | Bolt Down (Axial) | 240          | 150         | 10 / 1000                      | 10 / 1000                                | 10 / 1000                      |
| OHEVxxx.ZXPCB  | PCB Mount         | 240          | 200         | 0.5 / 100                      | 0.5 / 100                                | 0.5 / 100                      |
| OHEVxxx.ZXPCBL | PCB Mount (Long)  | 240          | 300         | 0.1 / 15                       | 0.1 / 15                                 | 0.1 / 15                       |
|                |                   |              | 500         | 0.05 / 1                       | 0.05 / 1                                 | 0.05 / 1                       |

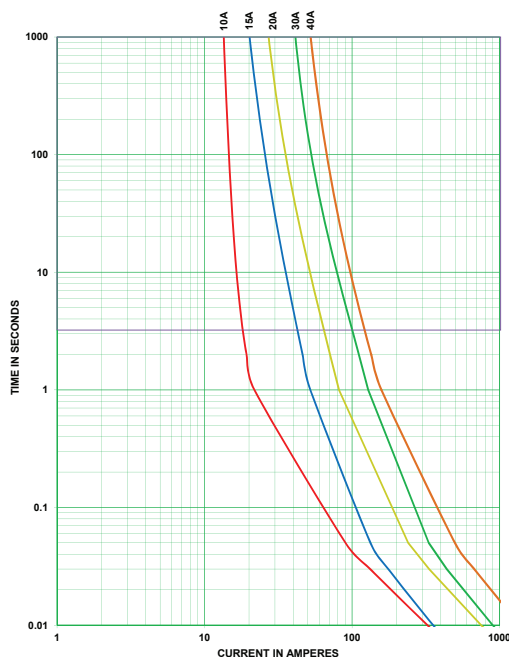
### Time-Current Characteristics

### Ratings

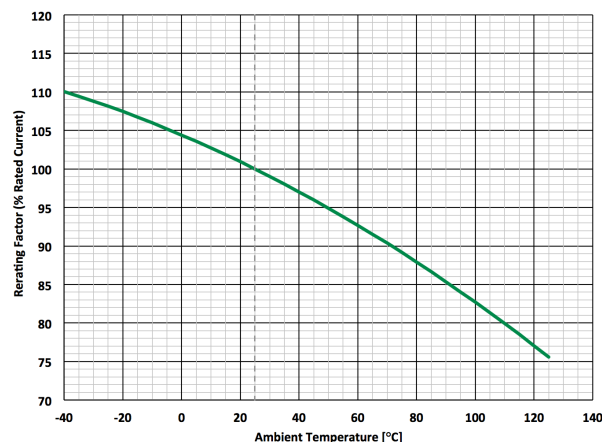
| Part Number | Current Rating (A) | Color Code | Typical Voltage Drop at 70% I <sub>R</sub> (mV) | Maximum Voltage Drop Spec at 100% I <sub>R</sub> (mV) | Typical Cold Resistance (mΩ) | Minimum Melting I <sup>2</sup> t (A <sup>2</sup> s) |
|-------------|--------------------|------------|-------------------------------------------------|-------------------------------------------------------|------------------------------|-----------------------------------------------------|
| OHEV010.xxx | 10                 | Red        | 114                                             | 300                                                   | 12.8                         | 255                                                 |
| OHEV015.xxx | 15                 | Blue       | 96                                              | 200                                                   | 7.9                          | 133                                                 |
| OHEV020.xxx | 20                 | Yellow     | 79                                              | 200                                                   | 5.0                          | 268                                                 |
| OHEV030.xxx | 30                 | Green      | 67                                              | 200                                                   | 2.7                          | 993                                                 |
| OHEV040.xxx | 40                 | Orange     | 69                                              | 200                                                   | 2.0                          | 1495                                                |

(Average Initial Measurements)

### Time-Current Characteristic Curves



### Temperature Derating Curve

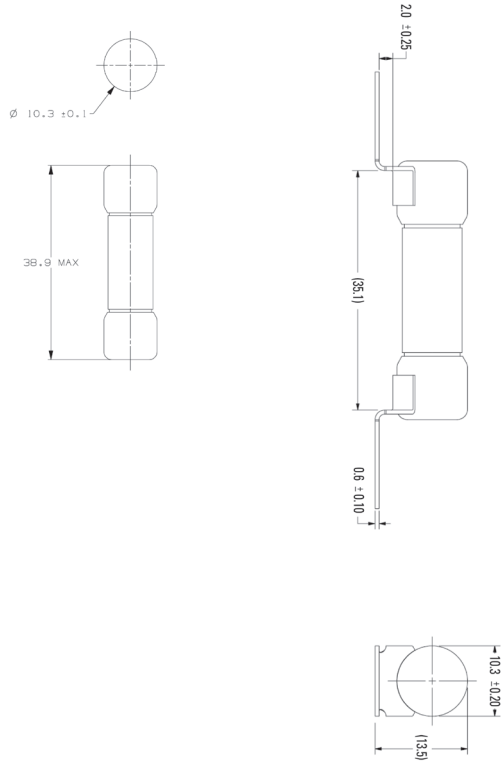


## Low Current HEV Fuse

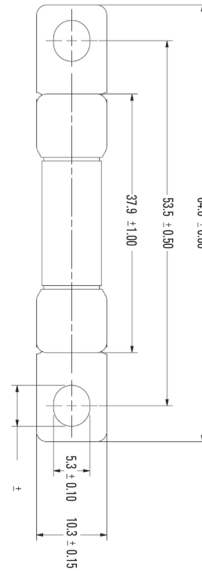
### Dimensions

Dimensions in mm

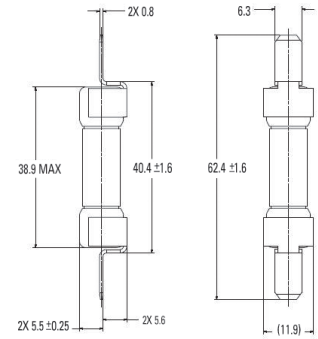
ZXC Cartridge



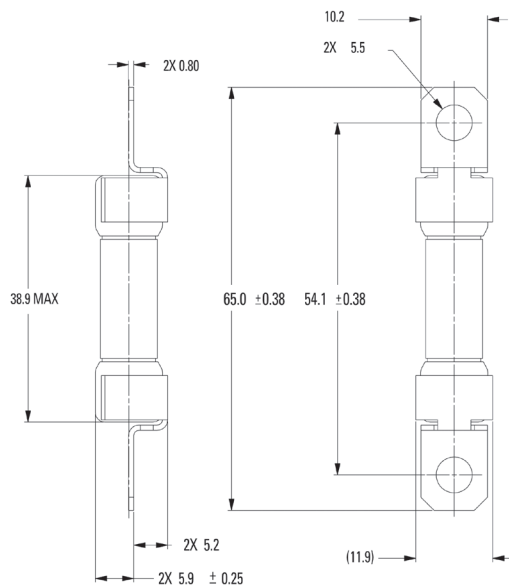
ZXISO Bolt Down (ISO)



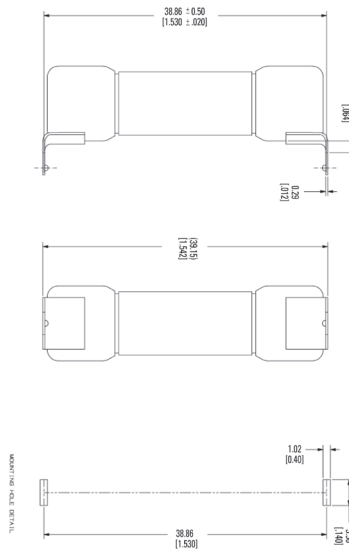
ZXPY Blade



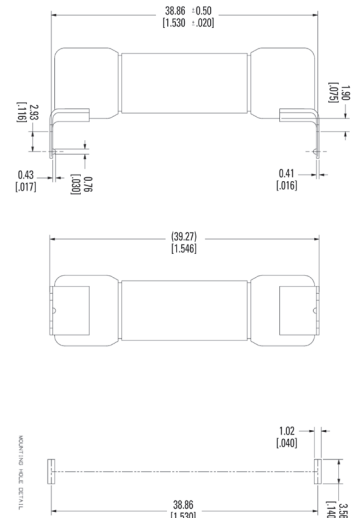
ZXBD Bolt Down (Axial)



ZXPCB PCB Mount



ZXPCBL PCB Mount (Long)





Low Current  
High Voltage 50A Fuses

## Low Current High Voltage 50A Fuse

The LC HEV fuse is designed for protection of high-voltage accessory circuits in electric and hybrid electric vehicles.

### Specifications

|                              |                   |
|------------------------------|-------------------|
| Voltage Rating (50A):        | 275 VAC           |
| Interrupting Rating (50A):   | 10,000A @ 275 VAC |
| Operating Temperature Range: | -40°C to +125°C   |

### Ordering Information

| Part Number     | Termination       | Package Size |
|-----------------|-------------------|--------------|
| 0HEVxxx.ZXC2    | Cartridge         | 240          |
| 0HEVxxx.ZXISO2  | Bolt Down (ISO)   | 240          |
| 0HEVxxx.ZXP2Y   | Blade             | 240          |
| 0HEVxxx.ZXPCB2  | PCB Mount         | 240          |
| 0HEVxxx.ZXPCBL2 | PCB Mount (Long)  | 240          |
| 0HEVxxx.ZXBD2   | Bolt Down (Axial) | 240          |

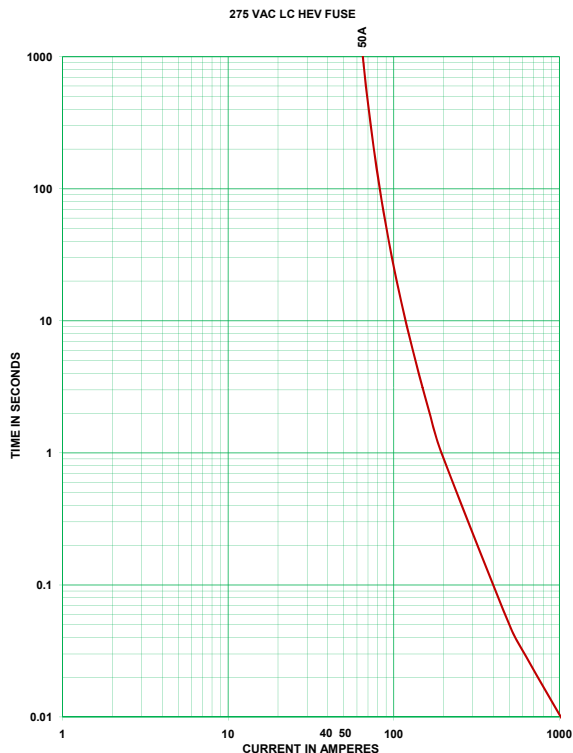
### Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |
|-------------|----------------------------|
| 100         | 100 hrs / -                |
| 110         | 4 hrs / -                  |
| 135         | -                          |
| 150         | -                          |
| 200         | 0.5 / 100                  |
| 300         | 0.1 / 15                   |
| 500         | 0.05 / 1                   |

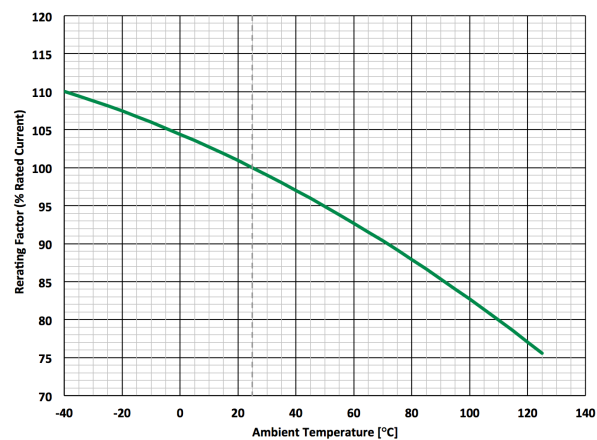
### Ratings

| Part Number | Current Rating (A) | Voltage Rating (VAC) | Color Code | Typical Voltage Drop at 70% I <sub>R</sub> (mV) | Maximum Voltage Drop Spec at 100% I <sub>R</sub> (mV) | Typical Cold Resistance (mΩ) | Minimum Melting I <sup>2</sup> t (A <sup>2</sup> s) |
|-------------|--------------------|----------------------|------------|-------------------------------------------------|-------------------------------------------------------|------------------------------|-----------------------------------------------------|
| 0HEV050.XXX | 50                 | 275                  |            | 57                                              | 200                                                   | 1.2                          | 1495                                                |

### Time-Current Characteristic Curves



### Temperature Derating Curve



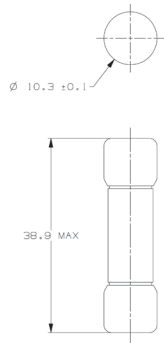


## Low Current High Voltage 50A Fuse

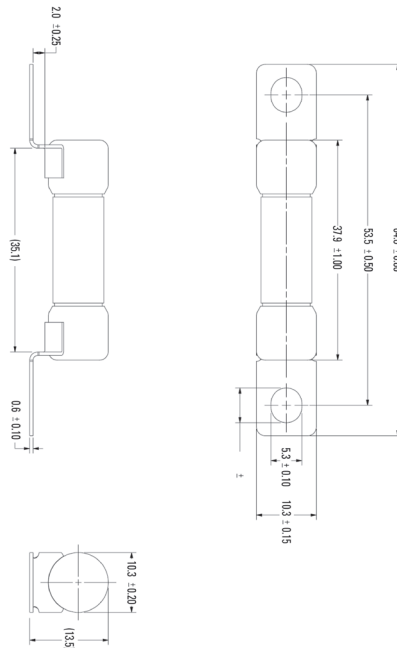
### Dimensions

Dimensions in mm

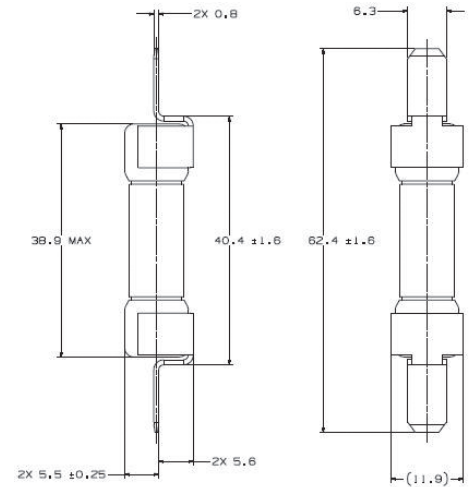
ZXC2 Cartridge



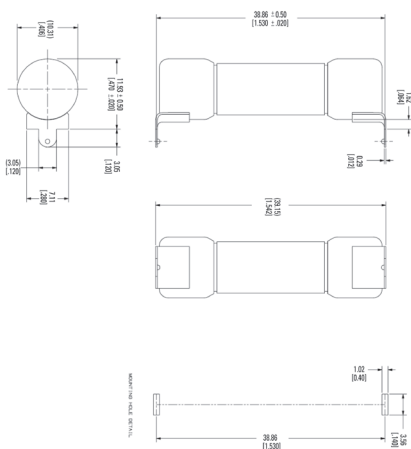
ZXIS02 Bolt Down (ISO)



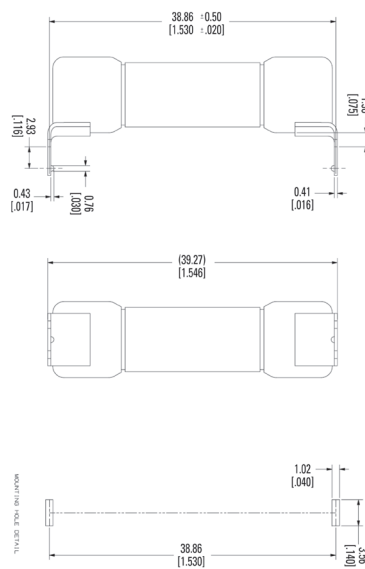
ZXP2Y Blade



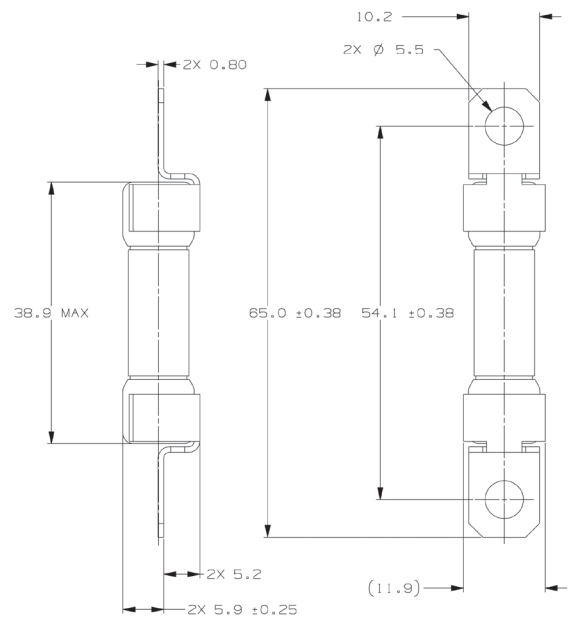
ZXPCB2 PCB Mount



ZXPCBL2 PCB Mount (Long)



ZXBD2 Bolt Down (Axial)





10EV Fuses

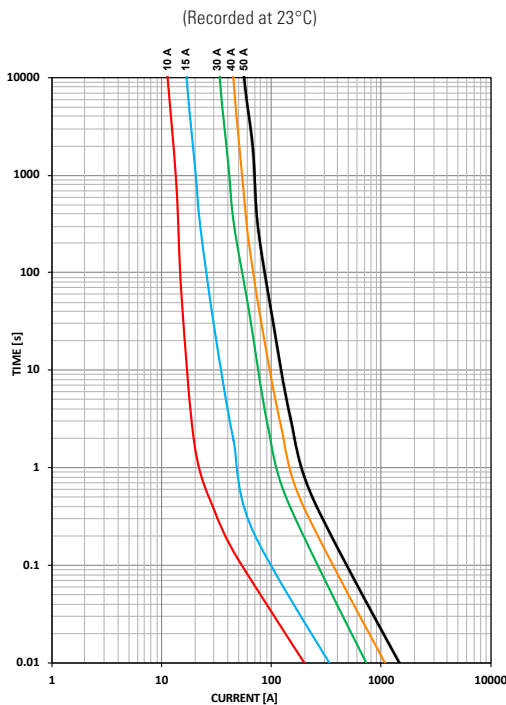
## Low Current 10EV Fuse

The 10EV fuse is designed for protection of high-voltage accessory circuits in electric and hybrid electric vehicles.

### Specifications

|                              |                                                                                                                                                                               |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Voltage Rating:              | 500 VDC/VAC                                                                                                                                                                   |
| Interrupting Rating:         | 20kA @ 500VDC/VAC                                                                                                                                                             |
| Operating Temperature Range: | -40°C to +125°C                                                                                                                                                               |
| Material:                    | Body - Melamine (U.L. 94 Flammability rating - V-0)<br>End Caps - Brass / Nickel Plated<br>Terminals - Copper Alloy / Tin Plated<br>(Nickel for ZXISO and ZXBPD version only) |
| Recommended Mounting Torque: | 4,5 ±1 Nm M5 (ISO prescription for ZXISO and ZXBPD version)                                                                                                                   |
| Refers To:                   | ISO 8820-8 JASO D622                                                                                                                                                          |

## Time-Current Characteristic Curves



## Ordering Information

| Weight ±10% (g) | Part Number    | Termination       | Package Qty |
|-----------------|----------------|-------------------|-------------|
| 7.8             | 10EVxxx.ZXC    | Cartridge         | 320         |
| 10              | 10EVxxx.ZXISO  | Bolt Down (ISO)   | 320         |
| 11.6            | 10EVxxx.ZXPY   | Blade             | 320         |
| 10.8            | 10EVxxx.ZXBPD  | Bolt Down (Axial) | 320         |
| 8.2             | 10EVxxx.ZXPCB  | PCB Mount         | 320         |
| 8.3             | 10EVxxx.ZXPCBL | PCB Mount (Long)  | 320         |

## Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |
|-------------|----------------------------|
| 110         | 4 hrs / ∞                  |
| 135         | 150 / 3600                 |
| 150         | 10 / 1000                  |
| 200         | 0.5 / 100                  |
| 300         | 0.1 / 15                   |
| 500         | 0.05 / 1                   |

## Ratings

| Part Number | Current Rating (A) | Color Code | Typical Voltage Drop at 70% I <sub>R</sub> (mV) | Maximum Voltage Drop Spec at 100% I <sub>R</sub> (mV) | Test Cable Size (mm <sup>2</sup> ) | Typical Cold Resistance (mΩ) | Typical Melting I <sup>2</sup> t (A <sup>2</sup> s) |
|-------------|--------------------|------------|-------------------------------------------------|-------------------------------------------------------|------------------------------------|------------------------------|-----------------------------------------------------|
| 10EV010.xxx | 10                 | Red        | 114                                             | 300                                                   | 1                                  | 12.8                         | 316                                                 |
| 10EV015.xxx | 15                 | Blue       | 83                                              | 200                                                   | 1.5                                | 7.4                          | 803                                                 |
| 10EV020.xxx | 20 (*)             | Yellow     | Coming up                                       | 200                                                   | 2.5                                | Coming up                    | Coming up                                           |
| 10EV030.xxx | 30                 | Green      | 67                                              | 200                                                   | 5                                  | 3                            | 1527                                                |
| 10EV040.xxx | 40                 | Orange     | 69                                              | 200                                                   | 5                                  | 2.1                          | 4450                                                |
| 10EV050.xxx | 50                 | Black      | 74                                              | 200                                                   | 5                                  | 1.3                          | 7803                                                |

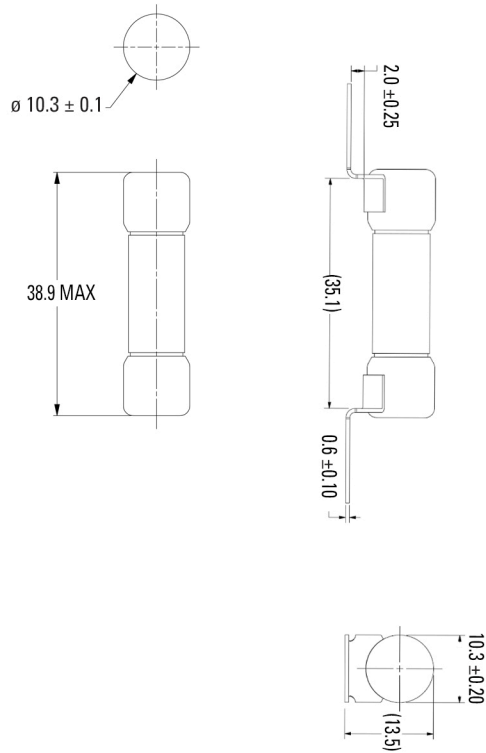
Final values for voltage drop, resistance, melting I<sup>2</sup>t and T/C curves will be generated from PV tests data  
(\*) Products in development - please contact Littelfuse® for more details regarding availability timing.

## Low Current 10EV Fuse

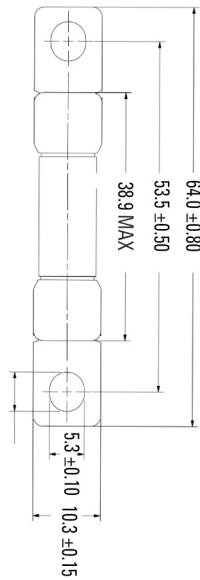
### Dimensions

Dimensions in mm

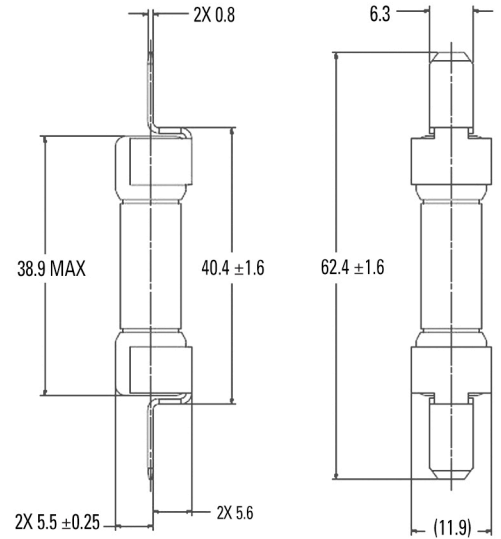
ZXC Cartridge



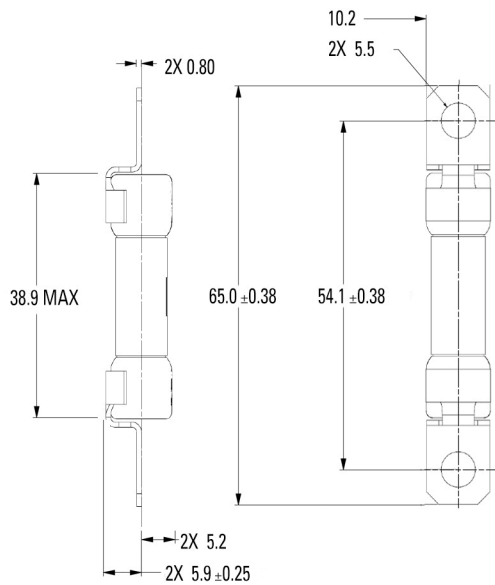
ZXISO Bolt Down (ISO)



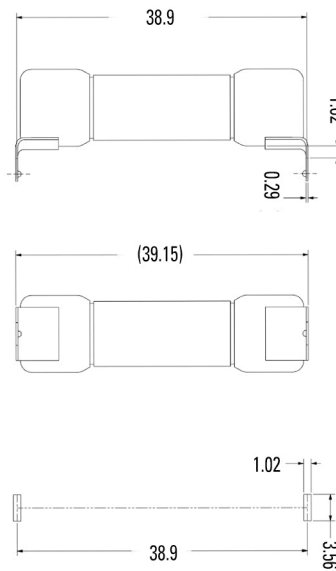
ZXPY Blade



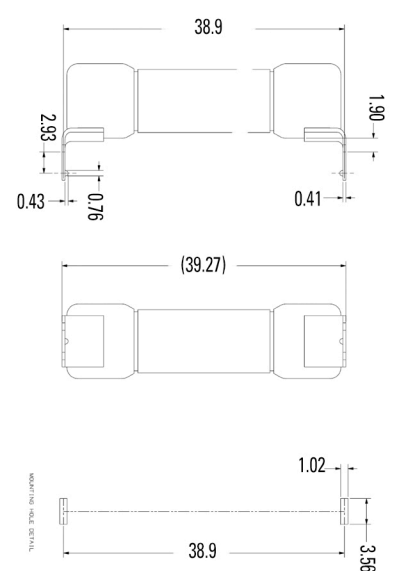
ZXBDP Bolt Down (Axial)



ZXPCB PCB Mount



ZXPCBL PCB Mount (Long)





High Current 20EV Fuses

## High Current 20EV Fuse

The HC EV fuse is designed for protection of high-current / high-voltage circuits in electric and hybrid electric vehicles.

### Specifications

|                              |                                                                                                                                         |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Interrupting Rating:         | 20kA @ 500VDC                                                                                                                           |
| Voltage Rating:              | 500VDC                                                                                                                                  |
| Operating Temperature Range: | -40°C to +125°C                                                                                                                         |
| Net Weight Per Fuse:         | 35±5 gr                                                                                                                                 |
| Material:                    | Body: Melamine (U.L. 94 Flammability rating – V0)<br>Retaining Pins: Stainless Steel<br>Endbells: Zinc Alloy<br>Terminals: Copper Alloy |
| Mounting Torque:             | 5-7 Nm M6 (ISO prescription)<br>10 Nm M6 (Max allowed)                                                                                  |
| Refers To:                   | ISO 8820-8 JASO D622                                                                                                                    |

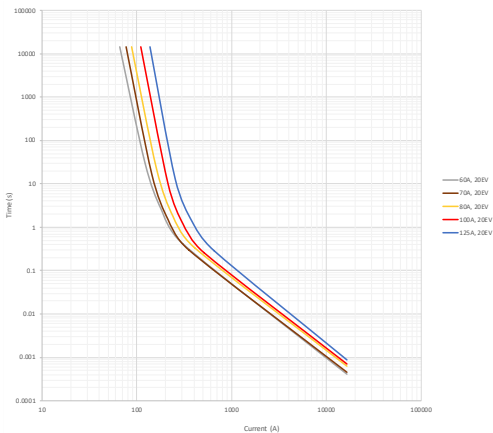
### Ordering Information

| Part Number   | Termination  | Package Size |
|---------------|--------------|--------------|
| 20EVxxx.ZXBDM | M6 Bolt Down | 320          |

### Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |
|-------------|----------------------------|
| 110         | 4 hrs / ∞                  |
| 200         | 1.0 / 300                  |
| 300         | 0.2 / 30                   |
| 500         | 0.05 / 1.0                 |

### Time-Current Characteristic Curves



### Ratings

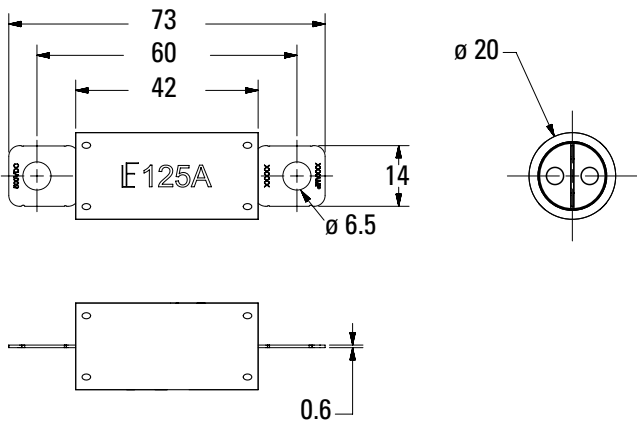
| Part Number   | Current Rating (A) | Typ. Voltage Drop (mV) | Max. Voltage Drop Spec at 100% IR (mV) | Test Cable Size (mm²) | Typical Cold Resistance (mΩ) | Typical Melting I²t (A²s) |
|---------------|--------------------|------------------------|----------------------------------------|-----------------------|------------------------------|---------------------------|
| 20EV060.ZXBDM | 60                 | 137                    | 200                                    | 5                     | 1.70                         | 6539                      |
| 20EV070.ZXBDM | 70                 | 142                    | 200                                    | 10                    | 1.43                         | 8459                      |
| 20EV080.ZXBDM | 80                 | 145                    | 200                                    | 10                    | 1.25                         | 17836                     |
| 20EV100.ZXBDM | 100                | 132                    | 200                                    | 20                    | 0.83                         | 22215                     |
| 20EV125.ZXBDM | 125                | 160                    | 200                                    | 20                    | 0.69                         | 33856                     |

(Average Initial Measurements)

## High Current 20EV Fuse

### Dimensions

Dimensions in mm



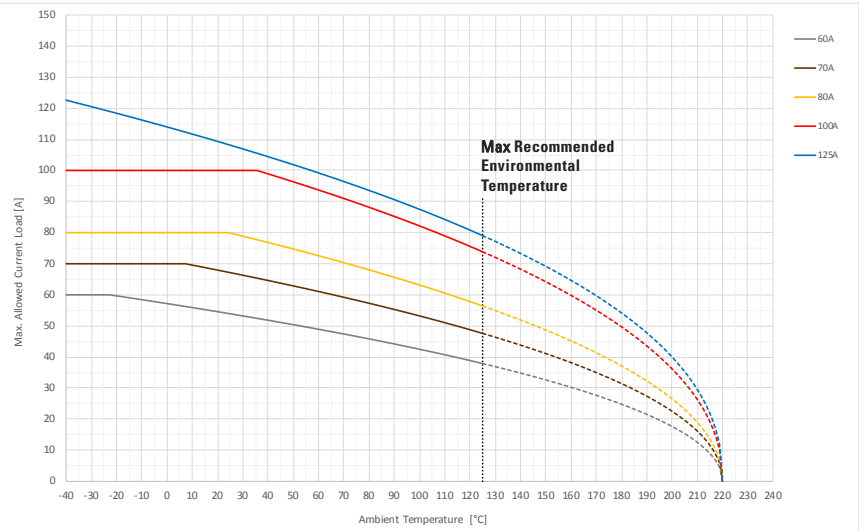
### Temperature Table

|      | max. allowed current load [A] at ambient temperature (typical derating) |     |      |      |      |       |       |
|------|-------------------------------------------------------------------------|-----|------|------|------|-------|-------|
|      | -40°C                                                                   | 0°C | 20°C | 65°C | 85°C | 110°C | 125°C |
| 60A  | 60                                                                      | 57  | 55   | 48   | 45   | 41    | 38    |
| 70A  | 70                                                                      | 70  | 68   | 60   | 56   | 51    | 48    |
| 80A  | 80                                                                      | 80  | 80   | 72   | 67   | 61    | 56    |
| 100A | 100                                                                     | 100 | 100  | 92   | 87   | 79    | 74    |
| 125A | 123                                                                     | 114 | 109  | 98   | 92   | 84    | 79    |

### Typical Derating Of Fuse Melting Element

Temperature Security Margin is 20%

Please Contact Littelfuse® For Details Regarding Derating Test Set Up



Derating curves may change depending on the final condition of the application (terminals characteristics, wire size exc..). Please ask Littelfuse for more information.



High Current SHEV Fuses

## High Current SHEV Fuse

The HC HEV fuse is designed for protection of high-current / high-voltage circuits in electric and hybrid electric vehicles employing an industry-standard footprint. The HC HEV fuse provides time-delay characteristics with "Diffusion Pill Technology."

### Specifications

|                              |                                                                                                           |
|------------------------------|-----------------------------------------------------------------------------------------------------------|
| Interrupting Rating:         | 10KA @ 450VDC                                                                                             |
| Voltage Rating:              | 450VDC                                                                                                    |
| Operating Temperature Range: | -40°C to +125°C                                                                                           |
| Net Weight Per Fuse:         | 30±5 gr                                                                                                   |
| Material:                    | Body: Melamine (U.L. 94 Flammability rating – V0)<br>End Caps: Stainless Steel<br>Terminals: Copper Alloy |
| Recommended Mounting Torque: | 5-7 Nm M6 (ISO prescription)<br>10 Nm M6 (Max allowed)                                                    |
| Refers To:                   | ISO 8820-8 first edition 2012-08-01 (Type J2) - JASO D622                                                 |

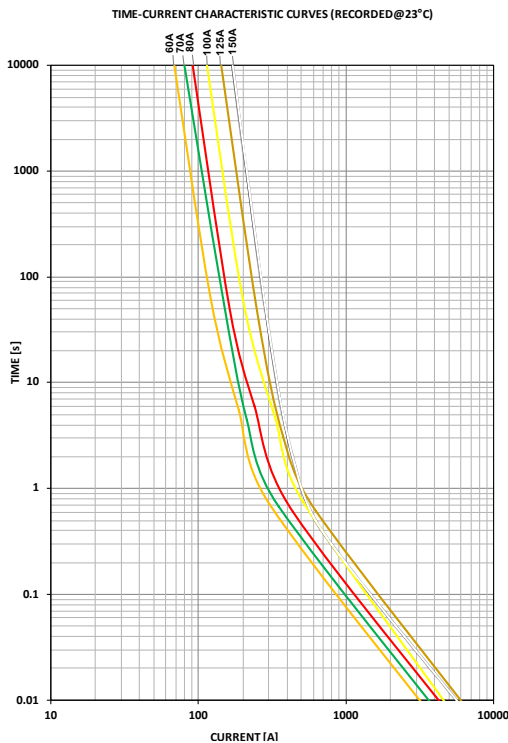
### Ordering Information

| Part Number  | Termination  | Package Size |
|--------------|--------------|--------------|
| SHEVxxx.ZXBD | M6 Bolt Down | 320          |

### Time-Current Characteristics

| % of Rating | Opening Time Min / Max (s) |
|-------------|----------------------------|
| 110         | 4 hrs / ∞                  |
| 200         | 1.0 / 300                  |
| 300         | 0.2 / 30                   |
| 500         | 0.05 / 1.0                 |

### Time-Current Characteristic Curves



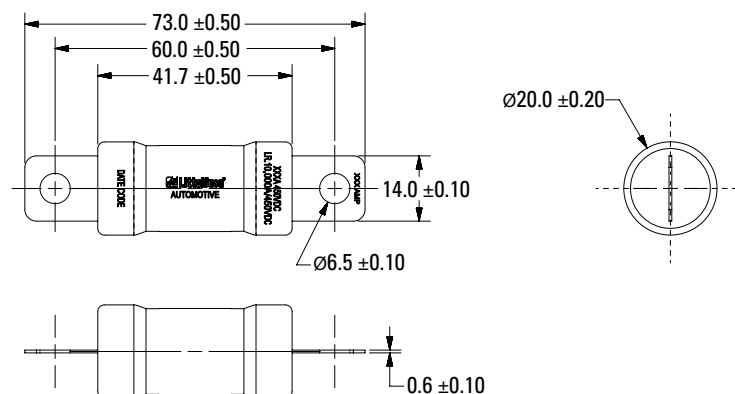
### Ratings

| Part Number  | Current Rating (A) | Typ. Voltage Drop (mV) | Max. Voltage Drop Spec at 100% IR (mV) | Cold Resistance (mΩ) | Minimum Melting I <sup>2</sup> t (A <sup>2</sup> s) |
|--------------|--------------------|------------------------|----------------------------------------|----------------------|-----------------------------------------------------|
| SHEV060.ZXBD | 60                 | 110                    | 200                                    | 1.4                  | 7745                                                |
| SHEV070.ZXBD | 70 (*)             | 115                    | 200                                    | 1.2                  | Coming up                                           |
| SHEV080.ZXBD | 80                 | 90                     | 200                                    | 0.8                  | 16002                                               |
| SHEV100.ZXBD | 100                | 95                     | 200                                    | 0.62                 | 27079                                               |
| SHEV125.ZXBD | 125 (*)            | 95                     | 200                                    | 0.48                 | Coming up                                           |
| SHEV150.ZXBD | 150 (*)            | 140                    | 200                                    | 0.48                 | Coming up                                           |

(\*) Products in development - please contact Littelfuse® for more details regarding availability timing  
Final values for voltage drop, resistance, melting I<sup>2</sup>t and T/C curves will be generated from PV tests data

### Dimensions

Dimensions in mm





## SPECIALITY PRODUCTS

---

|                  |    |
|------------------|----|
| Shunts           | 88 |
| Diodes/Resistors | 89 |





ATO<sup>®</sup> Shunt

Specifications

- Recommended Enviornmental Temp\*:

-40°C to +125°C
- Maximum Continuous Load Rating:

35A\*\*
- Housing Material:

Thermoplastic (UL 94 Flammability Rating V0)
- Terminal Material:

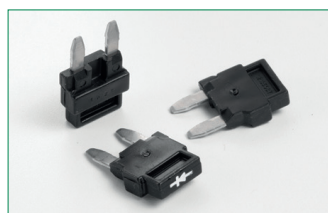
Tin Plated Brass

\*Tin plating's temperature limit is ≈130°C  
\*\*Rating varies based on mating terminal performance

| Part Number | Max Continuous Load Rating* (A) | Housing Material        | Terminal Material | Part Quantity |
|-------------|---------------------------------|-------------------------|-------------------|---------------|
| 02400094P   | 35                              | Thermoplastic (UL 94V0) | Tin Plated Brass  | 2000          |



ATO® Diode



MINI® Diode

## ATO® / MINI® Diodes

### Specifications

|                   |                       |
|-------------------|-----------------------|
| Operating Temp.:  | -40°C to +125°C       |
| Power Rating:     | ¼ W Max               |
| Housing Material: | Thermoplastic         |
| Term. Material:   | C.R.S. (Ni/Zn Plated) |
| Term. Retention:  | 25 N                  |

### Ratings

| Part Number | Current Rating (A) | Type | Housing Material Color | Peak Inverse Voltage (Volts) | Part Quantity       |
|-------------|--------------------|------|------------------------|------------------------------|---------------------|
| 02400103_   | 1                  | ATO  | Black                  | 400                          | Z = 1500 / LXN = 50 |
| 02400113P   | 1                  | MINI | Black                  | 400                          | 2000                |
| 02400115P   | 1                  | MINI | Green                  | 1000                         | 2000                |
| 02400120P   | 1.5                | MINI | Brown                  | 400                          | 2000                |

\* 1 A Diode in ATO® size housing. The cathode connector is rotated 90°



ATO® Resistor



MINI® Resistor

## ATO® / MINI® Resistors

### Specifications

|                   |                       |
|-------------------|-----------------------|
| Housing Material: | Thermoplastic         |
| Term. Material:   | C.R.S. (Ni/Zn Plated) |
| Term. Retention:  | 25 N                  |

### ATO® Resistor

|                  |                 |
|------------------|-----------------|
| Operating Temp.: | -20°C to +125°C |
| Power Rating:    | 1/4 W Max       |

### MINI® Resistor

|                  |                 |
|------------------|-----------------|
| Operating Temp.: | -40°C to +125°C |
| Power Rating:    | up to 1/2 W     |

| Part Number | Type | Resistance (ohm) | Wattage (Watt) | Housing Material Color | Part Quantity |
|-------------|------|------------------|----------------|------------------------|---------------|
| 02400105Z   | ATO  | 10K              | ¼              | White                  | 1500          |
| 02400106P   | MINI | 620              | ½              | Grey                   | 2000          |
| 02400107P   | MINI | 121              | ½              | Grey                   | 2000          |
| 02400108P   | MINI | 5.1K             | ¼              | Blue                   | 2000          |
| 02400111P   | MINI | 16.9             | ¼              | Red                    | 2000          |
| 02400112P   | MINI | 121              | ½              | Green                  | 2000          |
| 02400118P   | MINI | 500              | ½              | Grey                   | 2000          |



# FUSEOLOGY

## I. Introduction

The purpose of this Fuseology section is to promote a better understanding of fuses and some of the more common application details. The fuses to be considered are current-sensitive devices which are designed as the intentional weak link in the electrical circuit. The function of a fuse is to provide discrete component or complete circuit protection by reliably melting under overcurrent conditions and thus safely interrupting the flow of current.

## II. Types of Overcurrents

An overcurrent is any current which exceeds the ampere rating of wiring, equipment or devices under conditions of use. The term "overcurrent" includes both overloads and short circuits.

### A. Overloads

An overload is an overcurrent which is confined to normal current paths. An overload occurs when the current exceeds the value for which the wires or equipment are rated. This can happen when too many devices are connected to the circuit, or when a device connected to the circuit malfunctions in a way that causes it to draw higher than normal current, usually in the range of one to six times normal current. Sustained overloads eventually overheat circuit components. Therefore, fuses must open circuits experiencing sustained overloads before damage occurs.

### B. Short Circuits

A short circuit is current out of its normal path. It occurs when accident or malfunction creates an unintended path for the electricity to flow from the battery or alternator to ground. This shorter, more direct path to ground bypasses the resistance normally offered by the wiring and devices connected to the circuit. With virtually no resistance left to impede current flow, the voltage forces higher and higher current to flow through the wires to the point of the short. Under such a condition, the current will quickly build to such a high level that the heat generated can cause insulation to burn and equipment to be damaged unless the circuit is opened through the use of a fuse.

## III. Fuse Selection Parameters

Since overcurrent protection is crucial to reliable electrical system operation and safety, fuse selection and application should be carefully considered. When selecting fuses, the following parameters should be evaluated:

### A. Voltage Rating

The voltage rating, as marked on a fuse, indicates the maximum voltage of the circuit for which the fuse is designed to operate safely in the event of an overcurrent. Therefore, the fuse's voltage rating must equal or exceed the available circuit voltage where the fuse will be installed. System voltage exceeding the fuse's rated voltage may result in fuse damage. The voltage rating is 32 volts DC for the MINI®, MAXI®, ATO®, MIDI®, MEGA®, and CABLEPRO® Fuses.

### B. Interrupting Rating

The interrupting rating (also known as breaking capacity or short circuit rating) is the maximum current, as stated by the manufacturer, which the fuse can safely interrupt at rated voltage. During a fault or short circuit condition, a fuse may receive an instantaneous current many times greater than its normal operating current. Safe operation requires that the fuse remain intact (no body rupture) and clear the circuit. The interrupting rating is 1000A @ 32 volts DC for the MINI®, MAXI®, ATO®, JCASE®, and MIDI® Fuses, and 2000A @ 32 volts DC for the MEGA® and CABLEPRO® Fuses.

### C. Time-Current Characteristics

A fuse's time-current characteristics determine how fast it responds to different overcurrents. All fuses have inverse time-current characteristics, so opening time decreases as overcurrents increase. Time-current characteristics are presented graphically on standardized "log-log" paper. Figure 1 is a sample time-current curve for the MAXI Fuse series for fuses rated 20-60A. Current values increase from left to right, and time increases from bottom to top. The average melting time for any current can be determined from the curve. For example, from Figure 1 it can be determined that a 20A MAXI Fuse experiencing an overload of 100A will open in about 0.5 seconds. At 40A, the same 20A MAXI Fuse would open in about 9 seconds.

Time-current curves are also used to compare fuses of the same series but of different current ratings. Suppose it was desired to compare the opening times of 20A and 60A MAXI Fuses at an overload of 100A. From the curve in Figure 1, one can see that the 20A fuse opens in about 0.5 seconds at 100 amps, whereas the 60A fuse does not open until about 50 seconds.

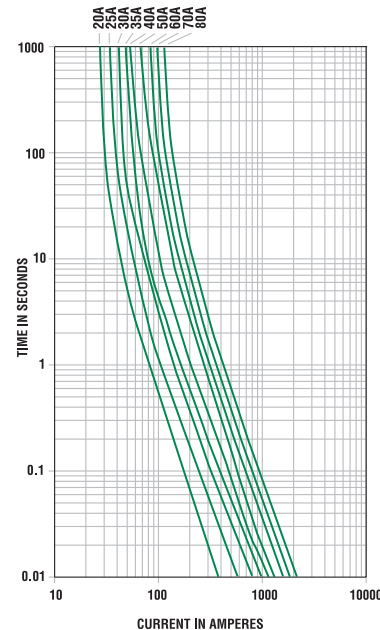


Figure 1: Average Melting-Current Curve for the MAXI Fuse Series (20-60A)

It is important to note that time-current curves give only average melting times and are presented as a design aid but are not considered as part of the fuse specifications.

The term used in fuse design that describes how rapidly a fuse responds to various overcurrents is the fuse's "characteristics." Automotive fuse characteristics are determined by the fuse's degree of time delay. Initial or start-up pulses are normal for many automotive applications and require fuses to have a time delay designed in to enable them to survive these pulses and still provide protection against prolonged overloads. Fuses such as the MINI® Fuse and ATO® Fuse have a moderate degree of time delay, whereas fuses like the MAXI® Fuse and MEGA® Fuse have a high degree of time delay which enables them to handle high inrush currents like those caused by motor start-ups. Figure 2 compares sample time-current curves of a 30A MINI Fuse to a 30A MAXI Fuse. To see that the MAXI Fuse has more time delay than the MINI Fuse, compare their opening times at an overload of 100A. Despite the fact that the fuses are the same rating, the MINI Fuse opens in about 0.1 seconds while the MAXI Fuse opens in about 2.2 seconds.

When selecting a fuse, the start-up pulse should be defined and then compared to the time-current curve for the fuse.

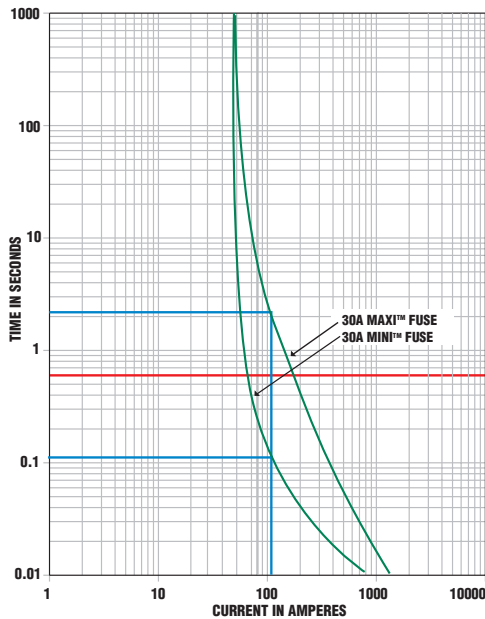


Figure 2: Average Melting-Current Curve Comparing 30A MINI Fuse to 30A MAXI Fuse

## D. Current Rating

The current rating is the maximum current which the fuse can continuously carry under specified conditions.

### 1. Normal Operating Current Based On Rerating

#### 1.1 At Room Temperature

The current rating of a fuse is typically derated 25% for operation at 25°C to avoid nuisance blowing. This means that the new current carrying capability of the fuse is equal to 75% of its rating.

For example, a fuse with a current rating of 10A is not usually recommended for operation at more than 7.5A in a 25°C ambient.

#### 1.2 At a Different Ambient Temperature

The Rerating curve is based on a voltage drop adjustment at different ambient temperatures.

The current carrying capacity of fuses is affected by changes in ambient temperature.

At higher ambient temperatures, a fuse will respond faster to a given overload. Conversely, at lower ambient temperatures, a fuse will respond slower to a given overload. In addition, the temperature of the fuse increases as the normal operating current approaches or exceeds the rating of the fuse.

Figure 3 is the temperature rerating curve for the MAXI® Fuse.

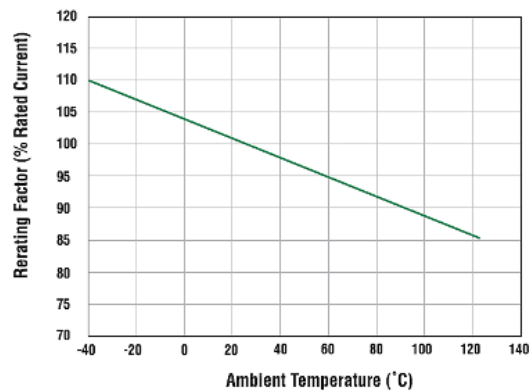


Figure 3: MAXI Temperature Rerating Curve

Suppose there is a normal operating current of 26 amperes in a particular circuit, and the ambient temperature will be 100°C instead of 25°C. Which MAXI® Fuse rating should be used? From Figure 3, the percent of rated current to be used at an ambient temperature of 100°C is 89%, so:

$$\text{Ideal Fuse Rating} = \frac{\text{Nominal Operating Current}}{\text{Temp Rerating Factor} \times 0.75}$$

$$\text{Ideal Fuse Rating} = \frac{26\text{A}}{0.89 \times 0.75} = 38.9\text{ A}$$

Therefore, a next higher fuse rating like 40A or larger should be used.

Please review wire gauge selection at various ambient temperatures in section "IV" of fuseology guide to properly match wire gauge at highest ambient temperature.

## 2. Normal Operating Current Based On Derating

The Derating curve is based on an individual temperature rise curve.

The Derating curve defines the maximum current load that a component (typically, the fuse melting element) can continuously carry without exceeding its maximum temperature limit.

The maximum admitted temperature of a specific component is strictly correlated to the material (and the plating, if present) of the component itself and expected life time.

The derating curve is deduced from the temperature rise of the component when it is crossed by a certain current: the higher is the current, the higher is the temperature reached. This is reached as a result of the Joule effect.

Derating curve graphs are calculated with a safety temperature margin of 20%

Main characteristics of the derating curve:

- It is specific for each single fuse rating of a fuse series (MINI®, MEGA®, ZCASE®...);
- It is affected by the ambient temperature surrounding of the component;
- It is affected by the system set-up (connections, wires size etc..)

Figure 4 is an example of a Derating curve for a MAXI® 40 A fuse element.

The following example shows how to use such a curve.

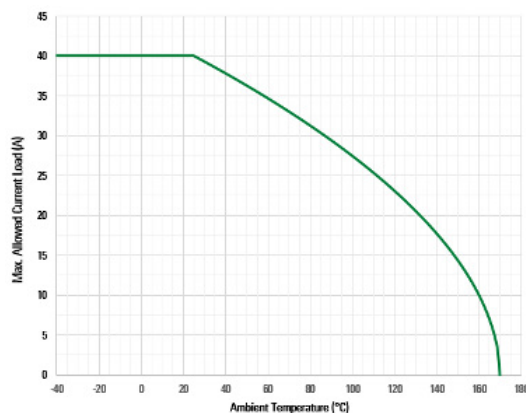


Figure 4: MAXI fuse 40 A Derating Curve

Suppose to have this fuse operating at an ambient temperature of 100 °C.

Which is the current capability of the fuse?

From Figure 4, the maximum current that the fuse can bear at 100 °C is 27.5 A.

## 3. Comparison between rerating and derating curve

Let's try to obtain the same information using both curves, considering again a MAXI® fuse 40 A and an ambient temperature of 100 °C.

In the previous point 2 we already defined that – according to the Derating Curve (Figure 4) – a MAXI® fuse 40 A can bear 27.5 A at a temperature of 100 °C.

Doing the same calculation using the Rerating curve (Figure 3), we'll obtain:

$$\text{Fuse rating} \times \text{Temp rerating factor} \times 0.75 = 40 \text{ A} \times 0.89 \times 0.75 = 26.7 \text{ A}$$

Littelfuse® recommendation is to use the rerating rule as a first and quick method to identify the most suitable fuse rating based on the current load of a specific circuit.

The Derating curve allows to have a more precise information about the maximum current capability of every single fuse\* (or any other component in the circuit) in relation to the ambient temperature.

\*Derating curves may change depending on the final condition of the application (terminals characteristics, wire size etc..). Please ask Littelfuse® for more information.

## E. Transient Overcurrent Considerations

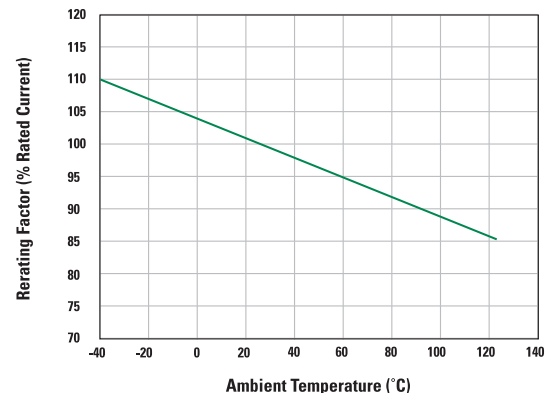


Figure 5: MINI Auto Fuse 297 Series Temperature Rerating Curve

Transient pulses of inrush current are commonplace in vehicle electrical systems. The transient overcurrent pulses affect the life of automotive fuses.



## 1. $I^2t$

$I^2t$  is an expression of the available thermal energy resulting from current flow. With regard to fuses, the term is usually expressed as melting, arcing, and total clearing  $I^2t$ . The units for  $I^2t$  are expressed in ampere-squared-seconds [ $A^2s$ ].

**Melting  $I^2t$ :** the thermal energy required to melt a specific fuse element.

**Arcing  $I^2t$ :** the thermal energy passed by a fuse during the arcing time. The magnitude of arcing  $I^2t$  is a function of the available voltage and stored energy in the circuit.

**Total Clearing  $I^2t$ :** the thermal energy through the fuse from overcurrent inception until current is completely interrupted. Total clearing  $I^2t$  = (melting  $I^2t$ ) + (arcing  $I^2t$ ).

$I^2t$  has two important applications to fuse selection. The first is pulse cycle withstand capability and the second is selective coordination.

## 2. Pulse Cycle Withstand Capability

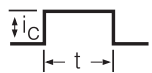
Electrical pulses produce thermal cycling and possible mechanical fatigue that could affect the life of the fuse.

For this reason, it is important to know the pulse cycle withstand capability of the fuse, which is defined as the number of pulses of a given  $I^2t$  value that can be withstood by the fuse without opening, assuming that there is sufficient cool down time between pulses.

### WAVESHAPE

### FUNCTION AND VALUE

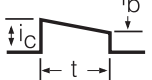
Square



$$i = k$$

$$I^2t = i_c^2 t$$

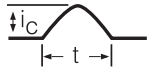
Trapezoidal



$$i = i_c \pm kt$$

$$I^2t = (1/3)(i_c^2 + i_b i_c + i_b^2)t$$

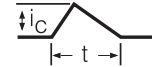
Sine



$$i = i_c \sin t$$

$$I^2t = (1/2)i_c^2 t$$

Triangular



$$i = \pm kt$$

$$I^2t = (1/3)i_c^2 t$$

Second order power



$$i = kt^2$$

$$I^2t = (1/5)i_c^2 t$$

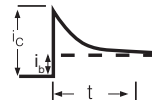
Natural decay to zero



$$i = i_c e^{-t/\tau}$$

$$I^2t = (1/2)i_c^2 \tau$$

Natural decay to non-zero value



$$I^2t = i_b^2 t - 2\tau i_b (i_c - i_b)(e^{-t/\tau} - 1) - \tau/2 (i_c - i_b)^2 (e^{-2t/\tau} - 1)$$

Figure 6: Evaluating the  $I^2t$  of a Variety of Current Wave Shapes

Figure 6 shows how  $I^2t$  of the pulse can be calculated from the graph of the pulse current as a function of time.

Figure 7 is a graph of the pulse cycle withstand capability of blade fuses. Because electrical pulse conditions can vary considerably from one application to another, application testing is recommended to establish the ability of the fuse design to withstand the pulse condition.

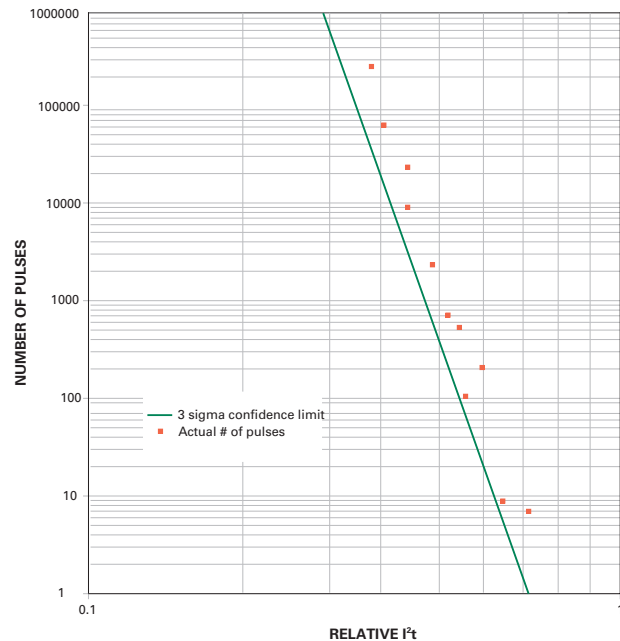


Figure 7: Pulse Cycle Withstand Capability for Blade Fuses

## 3. Selective Coordination

In a selectively coordinated system, only the fuse immediately on the line side of an overcurrent opens. Upstream fuses remain closed and undamaged. All other equipment remains in service, which simplifies locating overloaded equipment or short circuits. In Figure 8, if a short circuit arises behind fuse #1, fuse #1 should open and fuse #2 should stay closed and undamaged. The condition necessary to assure this result is that the minimum melting  $I^2t$  of the supply side fuse (fuse #2) must be greater than the total clearing  $I^2t$  of the load side fuse (fuse #1). This condition results in the load side fuse opening before the supply side fuse begins to melt. Minimum melting and total clearing  $I^2t$  data are given in this catalog.

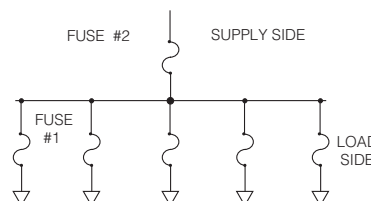


Figure 8: Selective Coordination for Fuses in Series



## IV. Voltage Drop Across Terminals

A fuse is only as good as the system in which it is used. One aspect of the electrical system that has considerable effects on the performance of the fuse is the quality of the connection between the fuse and the cable it protects. High voltage drop across the fuse/terminal interface creates additional thermal loading, which in turn causes shifts in the time-current characteristics of the fuse. Table 1 below gives the maximum recommended voltage drop per terminal for automotive fuses. Figure 9 indicates the measurement locations used to determine the voltage drop across the terminal. The voltage drop across the left terminal would be  $V_{2-4}$  and the voltage drop across the right terminal would be  $V_{1-3}$ .

| Type       | Maximum Recommended Voltage Drop Per Terminal [mV]<br>(between points 1-3 or 2-4) |
|------------|-----------------------------------------------------------------------------------|
| ATO® FUSE  | 30                                                                                |
| MINI® FUSE | 30                                                                                |
| MAXI® FUSE | 30                                                                                |
| MEGA® FUSE | 15                                                                                |

Table 1: Maximum Recommended Voltage Drop per Terminal

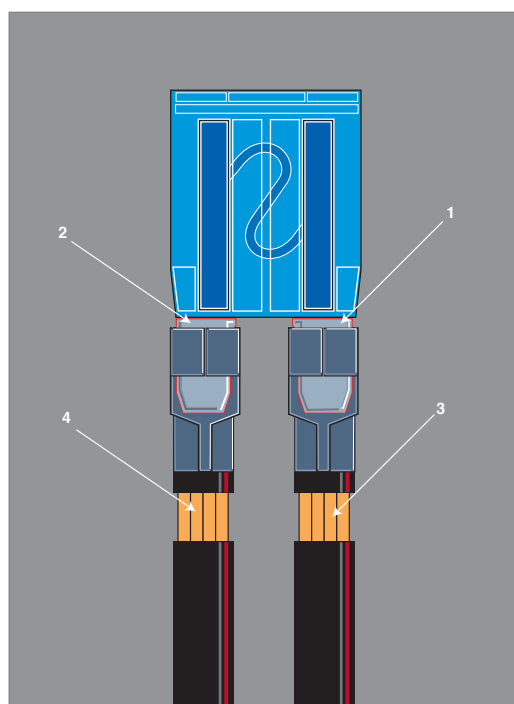


Figure 9: Measurement Locations along the Fuse/Terminal/Cable System Used to Determine the Voltage Drop across the Terminal

## V. Diffusion

Diffusion Pill Technology is a mixing of molecules, atoms or crystals in the solid, liquid or gaseous state. Diffusion Pill Technology is often used in the design of fuses for automotive, electronic and industrial fuse applications.

“M-effect” is the method of diffusing one metal into another to form a new alloy with a lower melting point. Littelfuse uses the “M-effect” to produce three very desirable characteristics in fuse designs: lower melting temperature, time delay, and lower voltage drop.

By affixing a diffusion pill tin to the element, the melting temperature is decreased. This decrease in melting temperature reduces the fuse rating. In order to reestablish its original rating the fuse elements’ cross section needs to increase. An increase in cross section increases the blow time at higher overload condition. A higher degree of time delay enables a fuse to withstand higher current inrush pulses. This increase in cross section reduces the overall fuse resistance and voltage drop.

## VI. Match Wire Gauge to Fuse

In order to protect wiring under all overload and short circuit conditions, it is necessary to standardize the fuse and wire selection process.

Fuses have controlled opening characteristics, and each wire gauge has its respective current carrying capacity. Fuses need to be selected to always protect the wire insulation from damage.

In the selection of wire gauge at various ambient temperatures, it is important to consider the worst case or highest ambient temperature for the application. Wires derate to a much higher degree than fuses, because wire insulation temperature capability is affected much more severely.

### Maximum Recommended Continuous Current

| Wire Size |          | Max Continuous Current (A) |         |         |         |          |
|-----------|----------|----------------------------|---------|---------|---------|----------|
|           |          | At 25°C                    |         | At 80°C |         | At 105°C |
| mm²       | Gage No. | GXL (1)                    | GPT (2) | GXL (1) | GPT (2) | GXL (1)  |
| 0.3       |          | 15                         | 10      | 11      | 4       | 9        |
| 0.5       | 20       | 21                         | 15      | 16      | 6       | 13       |
| 0.75      |          | 27                         | 21      | 20      | 7       | 17       |
| 0.8       | 18       | 31                         | 22      | 23      | 7       | 19       |
| 1         | 16       | 33                         | 23      | 25      | 9       | 20       |
| 1.5       |          | 43                         | 30      | 33      | 12      | 27       |
| 2         | 14       | 50                         | 36      | 37      | 14      | 32       |
| 2.5       |          | 60                         | 42      | 45      | 15      | 38       |
| 3         | 12       | 68                         | 47      | 51      | 18      | 42       |
| 4         |          | 80                         | 56      | 61      | 22      | 50       |
| 5         | 10       | 90                         | 65      | 68      | 23      | 58       |
| 6         |          | 103                        | 73      | 78      | 28      | 64       |
| 8         | 8        | 125                        | 87      | 96      | 30      | 79       |
| 10        |          | 146                        | 103     | 111     | 40      | 90       |
| 13        | 6        | 170                        | 120     | 129     | 47      | 105      |
| 19        | 4        | 221                        | 156     | 166     | 61      | 137      |

(1) = General purpose cross link polyethylene insulation wire with a maximum insulation temperature of 155°C.

(2) = General purpose thermoplastic insulation wire with a maximum insulation temperature of 90°C.

This image shows a single sheet of white paper with horizontal green ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



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**Low Current Distribution (LCD)** MICRO2, MICRO3, LP MINI, MINI, ATOF, MAXI, MCASE, LP JCASE, JCASE

**High Current Distribution (HCD)** ZCASE MASTERFUSE, MASTERFUSE, ZCASE MEGA, MIDI, BF1, MEGA, CF

**High Voltage Fuses (HEV)** OHEV

**Battery Cable Protection (BCP)** CABLE PRO and BF-Inline products for mounting directly inline as part of a high-power cable assembly

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