

# POWR-SPEED® Fuse

## ESR Series High-Speed Square Body

Battery Protection Fuses • 1500 V Dc • Class aBat • 125 - 630 A

c    **REACH HF**



### Description

The Littelfuse Energy Storage Rack (ESR) series of fuses is designed specifically to protect battery racks in energy storage systems, inverters, and many other dc applications. The 1500 V dc high-speed square body fuse is extremely fast-acting to respond quickly to a range of fault currents to safeguard the battery module or other devices.

This Class aBat partial range fuse has superior short circuit protection and a low minimum breaking capacity (MBC)—from 300 % or 3 times the fuse's rated current to 250 kA—to cover a range of over currents that traditional high-speed partial range fuses do not protect against.

The ESR fuse safely interrupts most faults in a battery storage system to avoid catastrophic failures and costly shutdowns.

### Features & Benefits

| FEATURES  | BENEFITS   |
|---|--|
| <b>High dc interrupting rating</b>                  | Provides superior short-circuit protection and the ability to scale-up systems without the need to redesign the existing circuit protection, saving time and costs |
| <b>Low minimum breaking current</b>                 | Offers easy coordination with battery modules and reduces size and rating of dc contactors to save space and costs   |
| <b>Extremely fast acting</b>                        | Delivers high-speed performance  |
| <b>Low watt loss</b>                                | Maximizes efficiency by preventing energy loss and minimizing the wasted power of components   |
| <b>Conforms to the IEC 60269-7 battery standard</b> | Specifically design to safeguard evolving battery technologies with fuse circuit protection  |
| <b>Compact NH 1XL and 3XL size</b>                  | Saves space and offers design flexibility  |

### Applications

- Battery energy storage systems (BESSs)
  - Battery Protection Unit (BPU) and battery racks
- Power conversion systems
- Dc common bus systems
- Hybrid PV-BESS inverters

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### Specifications

|                              |  |
|------------------------------|--|
| <b>Voltage Rating</b>        | 1500 V dc  |
| <b>Amperage Rating</b>       | 125 - 630 A  |
| <b>Interrupting Rating</b>   | 250 kA   |
| <b>Time Constant</b>         | </= 3 ms   |
| <b>Mounting</b>              | Bolted-blade style, DIN-blade style                |
| <b>Material</b>              | Body: ceramic<br>Contacts: plated copper (bladed)  |
| <b>Applicable Standards</b>  | UL 248-13, IEC 60269-7                             |
| <b>Environmental</b>         | RoHS Compliant, REACH, Halogen Free                |
| <b>Operating Temperature</b> | -55 °C to +125 °C (-67 °F to +257 °F)              |
| <b>Storage Temperature</b>   | Up to +35 °C (+95 °F) with relative humidity <65 % |
| <b>Country of Origin</b>     | Mexico   |

### Certification & Compliance

|                     |   |
|---------------------|---|
| <b>cURus</b>        | cURus Recognized (File: E71611)                         |
| <b>CE</b>           | EU_DOC-ESR_DB_UB_240201                                 |
| <b>RoHS</b>         | RoHS 2 Directive 2011/65/EU/<br>Directive (EU) 2015/863 |
| <b>REACH</b>        | Regulation (EC) 1907/2006                               |
| <b>Halogen Free</b> | Yes   |

### Ordering Information - DIN Blade

| CASE SIZE | CATALOG NUMBER | ORDERING NUMBER | UPC         | BOX QUANTITY | WEIGHT             |
|-----------|----------------|-----------------|-------------|--------------|--------------------|
| NH 1XL    | ESR1XLDB0125   | ESR1XLDB0125X   | 07945830630 | 1 pc/box     | 2.2 lbs. (998 g.)  |
| NH 1XL    | ESR1XLDB0160   | ESR1XLDB0160X   | 07945837030 | 1 pc/box     | 2.2 lbs. (998 g.)  |
| NH 1XL    | ESR1XLDB0200   | ESR1XLDB0200X   | 07945837032 | 1 pc/box     | 2.2 lbs. (998 g.)  |
| NH 1XL    | ESR1XLDB0250   | ESR1XLDB0250X   | 07945837782 | 1 pc/box     | 2.2 lbs. (998 g.)  |
| NH 3XL    | ESR3XLDB0250   | ESR3XLDB0250X   | 07945837033 | 1 pc/box     | 4.4 lbs. (1996 g.) |
| NH 3XL    | ESR3XLDB0315   | ESR3XLDB0315X   | 07945837034 | 1 pc/box     | 4.4 lbs. (1996 g.) |
| NH 3XL    | ESR3XLDB0350   | ESR3XLDB0350X   | 07945837035 | 1 pc/box     | 4.4 lbs. (1996 g.) |
| NH 3XL    | ESR3XLDB0400   | ESR3XLDB0400X   | 07945837036 | 1 pc/box     | 4.4 lbs. (1996 g.) |
| NH 3XL    | ESR3XLDB0450   | ESR3XLDB0450X   | 07945837037 | 1 pc/box     | 4.4 lbs. (1996 g.) |
| NH 3XL    | ESR3XLDB0500   | ESR3XLDB0500X   | 07945837038 | 1 pc/box     | 4.4 lbs. (1996 g.) |
| NH 3XL    | ESR3XLDB0550   | ESR3XLDB0550X   | 07945837780 | 1 pc/box     | 4.4 lbs. (1996 g.) |
| NH 3XL    | ESR3XLDB0630   | ESR3XLDB0630X   | 07945837778 | 1 pc/box     | 4.4 lbs. (1996 g.) |

# POWR-SPEED® Fuse

## ESR Series High-Speed Square Body

### Ordering Information - Bolted Blade

| CASE SIZE | CATALOG NUMBER | ORDERING NUMBER | UPC         | BOX QUANTITY | WEIGHT             |
|-----------|----------------|-----------------|-------------|--------------|--------------------|
| NH 1XL    | ESR1XLUB0125   | ESR1XLUB0125X   | 07945830629 | 1 pc/box     | 2.2 lbs. (998 g.)  |
| NH 1XL    | ESR1XLUB0160   | ESR1XLUB0160X   | 07945837039 | 1 pc/box     | 2.2 lbs. (998 g.)  |
| NH 1XL    | ESR1XLUB0200   | ESR1XLUB0200X   | 07945837040 | 1 pc/box     | 2.2 lbs. (998 g.)  |
| NH 1XL    | ESR1XLUB0250   | ESR1XLUB0250X   | 07945837781 | 1 pc/box     | 2.2 lbs. (998 g.)  |
| NH 3XL    | ESR3XLUB0250   | ESR3XLUB0250X   | 07945837042 | 1 pc/box     | 4.4 lbs. (1996 g.) |
| NH 3XL    | ESR3XLUB0315   | ESR3XLUB0315X   | 07945837043 | 1 pc/box     | 4.4 lbs. (1996 g.) |
| NH 3XL    | ESR3XLUB0350   | ESR3XLUB0350X   | 07945837044 | 1 pc/box     | 4.4 lbs. (1996 g.) |
| NH 3XL    | ESR3XLUB0400   | ESR3XLUB0400X   | 07945837045 | 1 pc/box     | 4.4 lbs. (1996 g.) |
| NH 3XL    | ESR3XLUB0450   | ESR3XLUB0450X   | 07945837046 | 1 pc/box     | 4.4 lbs. (1996 g.) |
| NH 3XL    | ESR3XLUB0500   | ESR3XLUB0500X   | 07945837048 | 1 pc/box     | 4.4 lbs. (1996 g.) |
| NH 3XL    | ESR3XLUB0550   | ESR3XLUB0550X   | 07945837779 | 1 pc/box     | 4.4 lbs. (1996 g.) |
| NH 3XL    | ESR3XLUB0630   | ESR3XLUB0630X   | 07945837777 | 1 pc/box     | 4.4 lbs. (1996 g.) |

### Electrical Specifications

| CASE SIZE | CATALOG NUMBER    |                | AMPERE RATING (A) | VOLTAGE RATING (V) | INTERRUPTING RATING | MINIMUM BREAKING CAPACITY (A) | MELTING (PRE-ARC) I <sup>2</sup> T (A <sup>2</sup> S) | TOTAL CLEARING I <sup>2</sup> T (A <sup>2</sup> S) AT RATED VOLTAGE | WATTS LOSS AT 100 % RATED CURRENT (W) | AGENCY CERTIFICATION |
|-----------|-------------------|----------------|-------------------|--------------------|---------------------|-------------------------------|---|---|---------------------------------------|----------------------|
|           | BOLTED BLADE (UB) | DIN BLADE (DB) |                   | DC                 | DC                  |                               |   | DC  |                                       | cURus                |
| NH 1XL    | ESR1XLUB0125      | ESR1XLDB0125   | 125               | 1500               | 250 kA              | 375                           | 1850  | 30700   | 53                                    | •                    |
| NH 1XL    | ESR1XLUB0160      | ESR1XLDB0160   | 160               | 1500               | 250 kA              | 480                           | 3400  | 48400   | 50                                    | •                    |
| NH 1XL    | ESR1XLUB0200      | ESR1XLDB0200   | 200               | 1500               | 250 kA              | 600                           | 5100  | 62800   | 89                                    | •                    |
| NH 1XL    | ESR1XLUB0250      | ESR1XLDB0250   | 250               | 1500               | 250 kA              | 750                           | 9000  | 95300   | 107                                   | •                    |
| NH 3XL    | ESR3XLUB0250      | ESR3XLDB0250   | 250               | 1500               | 250 kA              | 750                           | 9500  | 143400  | 96                                    | •                    |
| NH 3XL    | ESR3XLUB0315      | ESR3XLDB0315   | 315               | 1500               | 250 kA              | 945                           | 17500   | 279500  | 102                                   | •                    |
| NH 3XL    | ESR3XLUB0350      | ESR3XLDB0350   | 350               | 1500               | 250 kA              | 1050                          | 23000   | 232400  | 133                                   | •                    |
| NH 3XL    | ESR3XLUB0400      | ESR3XLDB0400   | 400               | 1500               | 250 kA              | 1200                          | 29000   | 324700  | 158                                   | •                    |
| NH 3XL    | ESR3XLUB0450      | ESR3XLDB0450   | 450               | 1500               | 250 kA              | 1350                          | 42000   | 581800  | 156                                   | •                    |
| NH 3XL    | ESR3XLUB0500      | ESR3XLDB0500   | 500               | 1500               | 250 kA              | 1500                          | 60000   | 843000  | 164                                   | •                    |
| NH 3XL    | ESR3XLUB0550      | ESR3XLDB0550   | 550               | 1500               | 250 kA              | 1650                          | 85000   | 1207000   | 164                                   | •                    |
| NH 3XL    | ESR3XLUB0630      | ESR3XLDB0630   | 630               | 1500               | 250 kA              | 1890                          | 124800  | 1402000   | 191                                   | •                    |

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### Dimensions

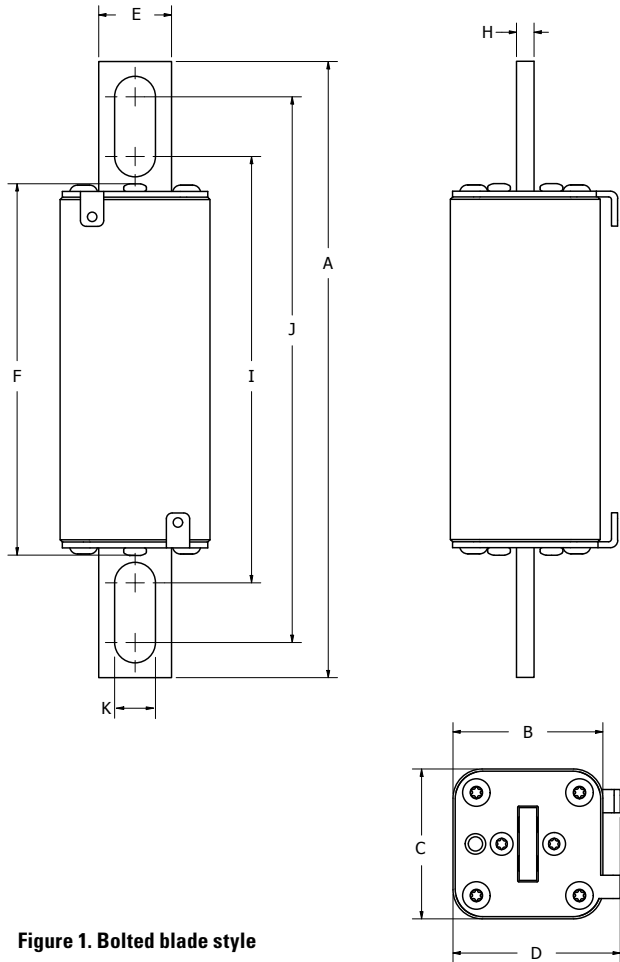


Figure 1. Bolted blade style

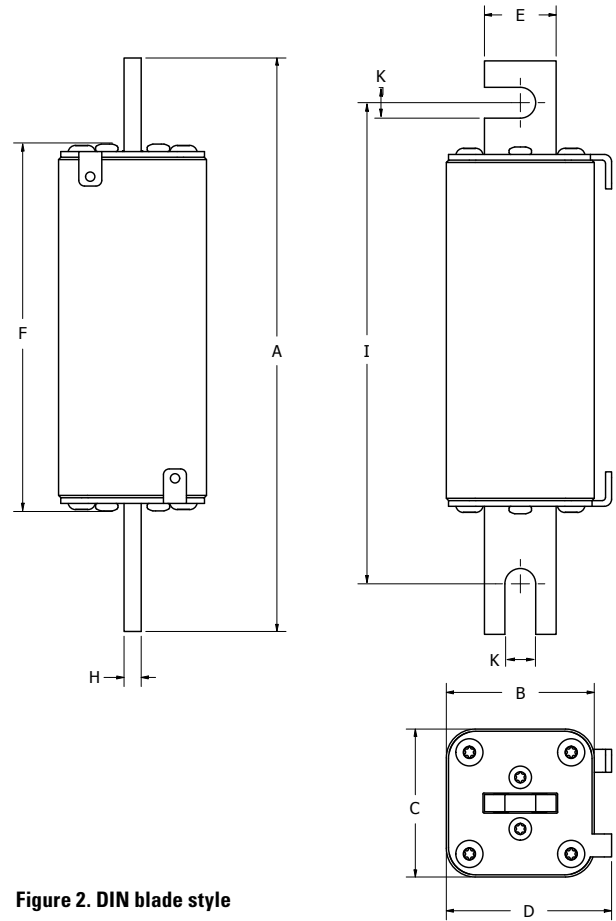


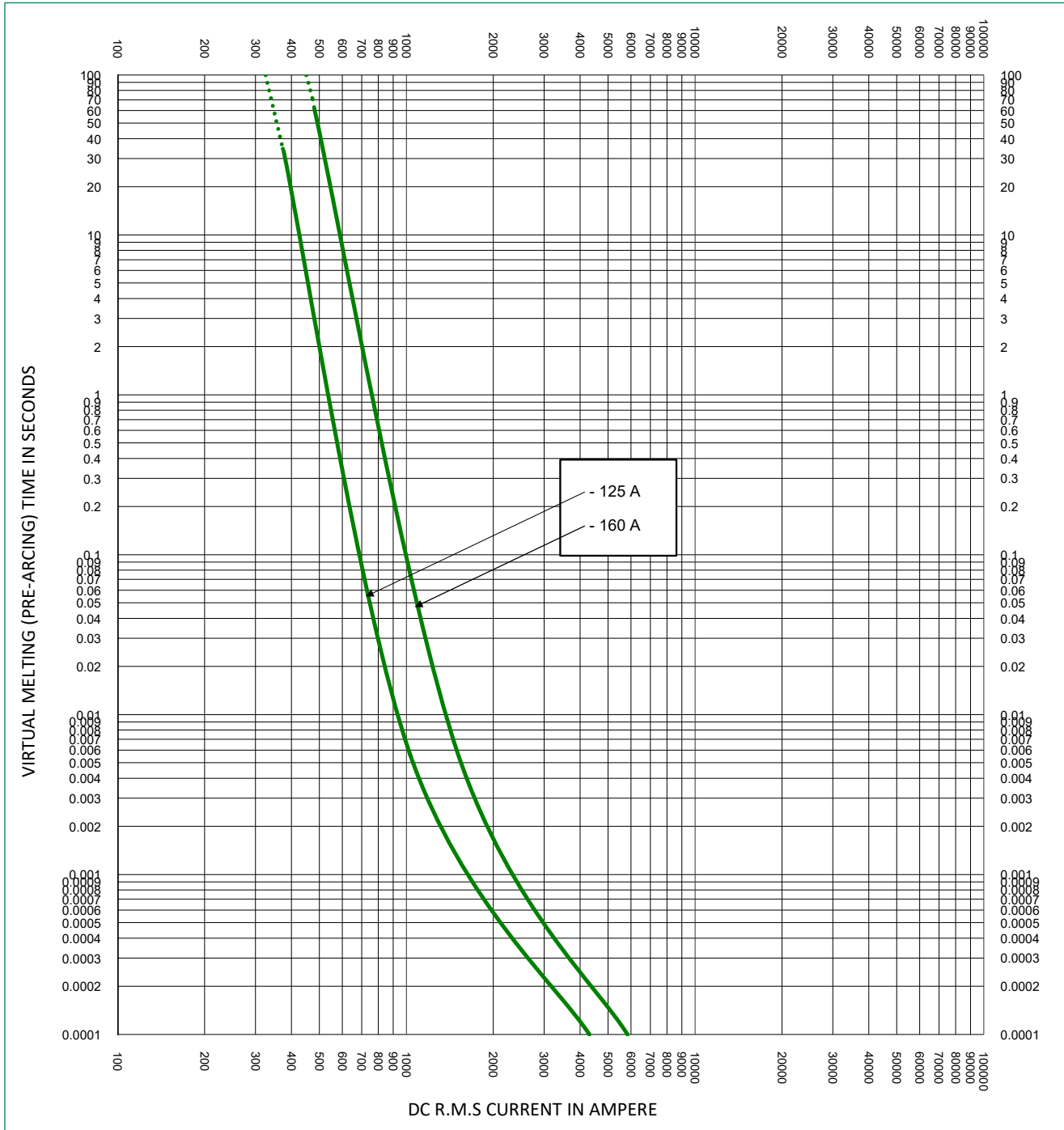
Figure 2. DIN blade style

| DIMENSIONS MM (IN) |                   |        |                 |                |                |                |                |                 |               |                 |                 |                          |                      |                    |
|--------------------|-------------------|--------|-----------------|----------------|----------------|----------------|----------------|-----------------|---------------|-----------------|-----------------|--------------------------|----------------------|--------------------|
| CASE SIZE          | MOUNTING STYLE    | FIGURE | A               | B              | C              | D              | E              | F               | H             | I               | J               | K                        | RECOMMENDED FASTENER | RECOMMENDED TORQUE |
| NH 1XL             | BOLTED BLADE (UB) | 1      | 211.7<br>(8.33) | 51.5<br>(2.03) | 51.5<br>(2.03) | 57.5<br>(2.26) | 25.0<br>(0.98) | 127.7<br>(5.03) | 6.0<br>(0.24) | 146.5<br>(5.77) | 187.5<br>(7.38) | 14.0<br>(0.55)           | 12<br>(1/2)          | 64 Nm              |
| NH 1XL             | DIN BLADE (DB)    | 2      | 199.7<br>(7.86) | 51.5<br>(2.03) | 51.5<br>(2.03) | 57.5<br>(2.26) | 25.0<br>(0.98) | 127.7<br>(5.03) | 6.0<br>(0.24) | 167.5<br>(6.59) | -               | 10.5-11.0<br>(0.41-0.43) | 10<br>(3/8)          | 26 Nm              |
| NH 3XL             | BOLTED BLADE (UB) | 1      | 213.9<br>(8.42) | 73.5<br>(2.89) | 73.5<br>(2.89) | 79.5<br>(3.13) | 36.0<br>(1.42) | 128.7<br>(5.07) | 6.0<br>(0.24) | 153.5<br>(6.04) | 186.5<br>(7.34) | 16.0<br>(0.63)           | 14<br>(9/16)         | 92 Nm              |
| NH 3XL             | BOLTED BLADE (DB) | 2      | 199.7<br>(7.86) | 73.5<br>(2.89) | 73.5<br>(2.89) | 79.5<br>(3.13) | 36.0<br>(1.42) | 128.7<br>(5.07) | 6.0<br>(0.24) | 167.5<br>(6.59) | -               | 10.5-11.0<br>(0.41-0.43) | 10<br>(3/8)          | 26 Nm              |

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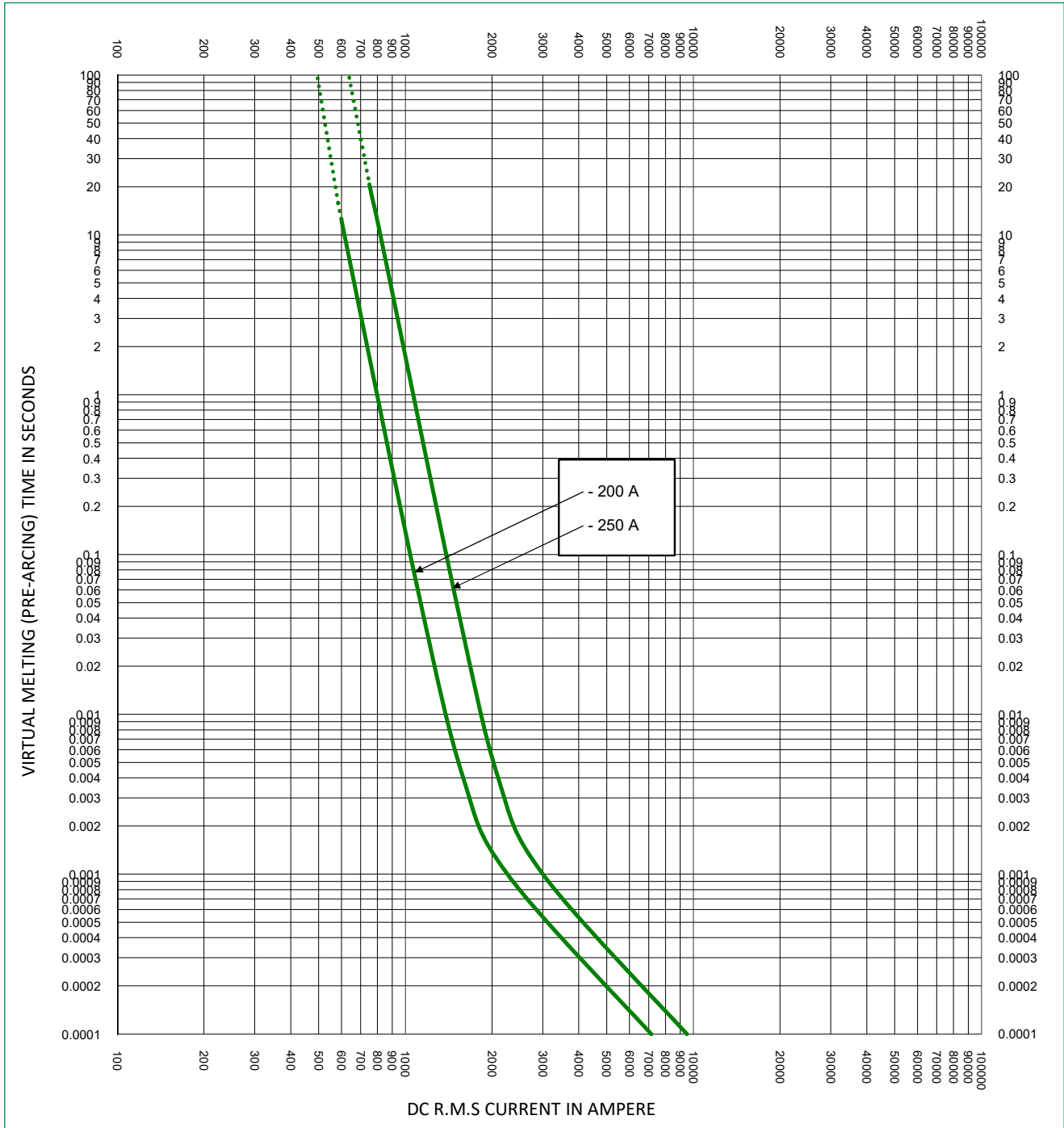
### Time Current Curve (1XL Case Size)



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## ESR Series High-Speed Square Body

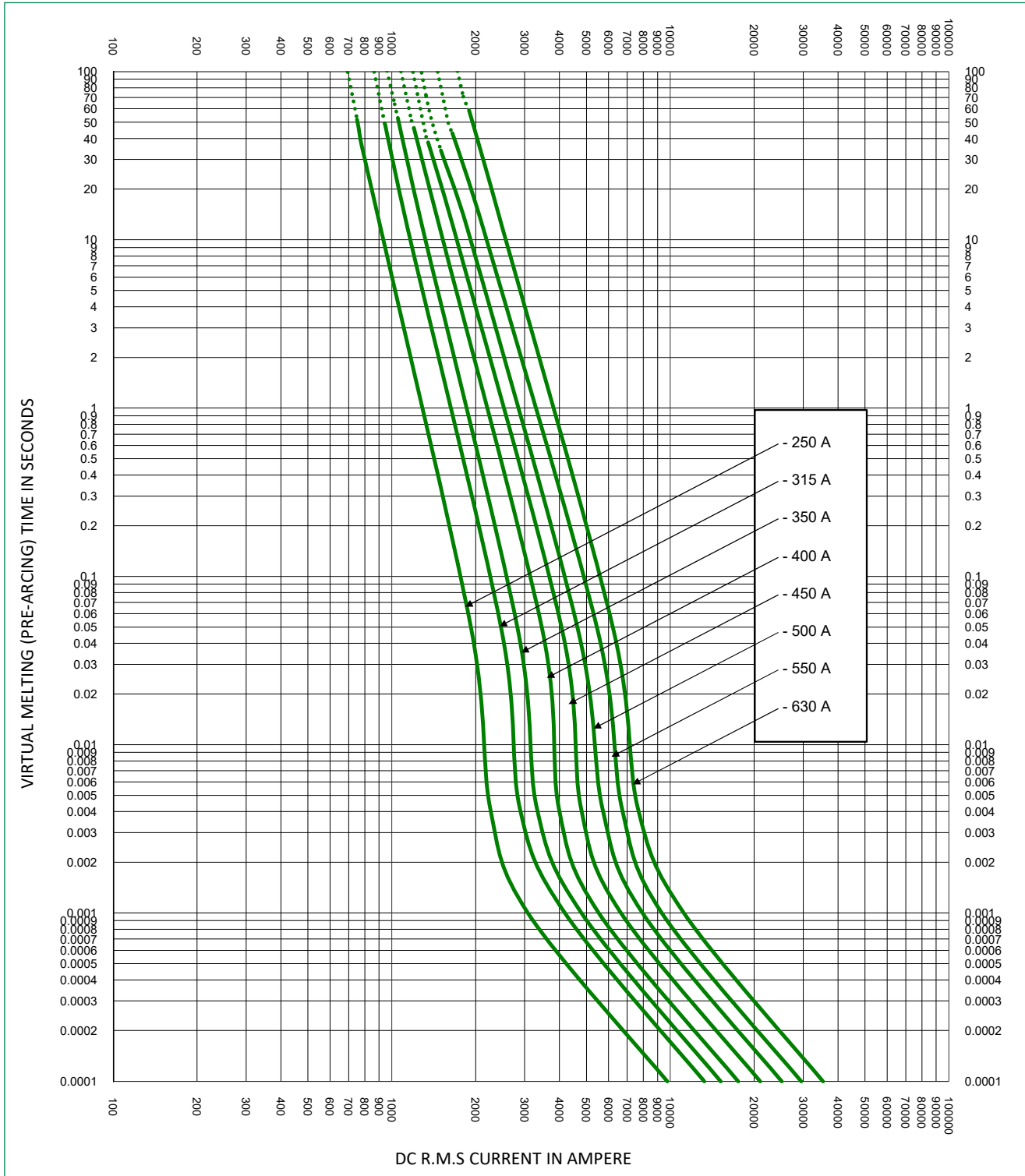
### Time Current Curve (1XL Case Size)



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## ESR Series High-Speed Square Body

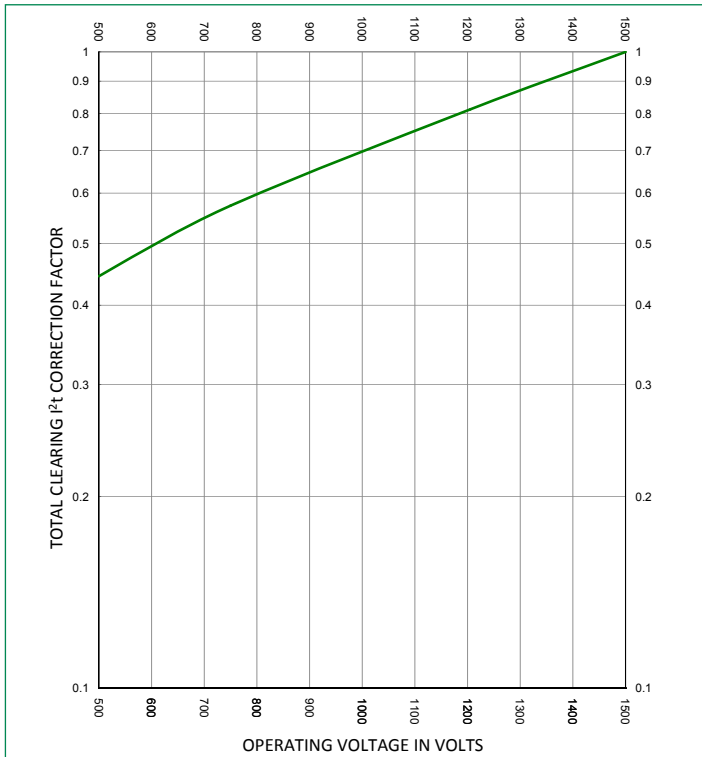
### Time Current Curve (3XL Case Size)



# POWR-SPEED® Fuse

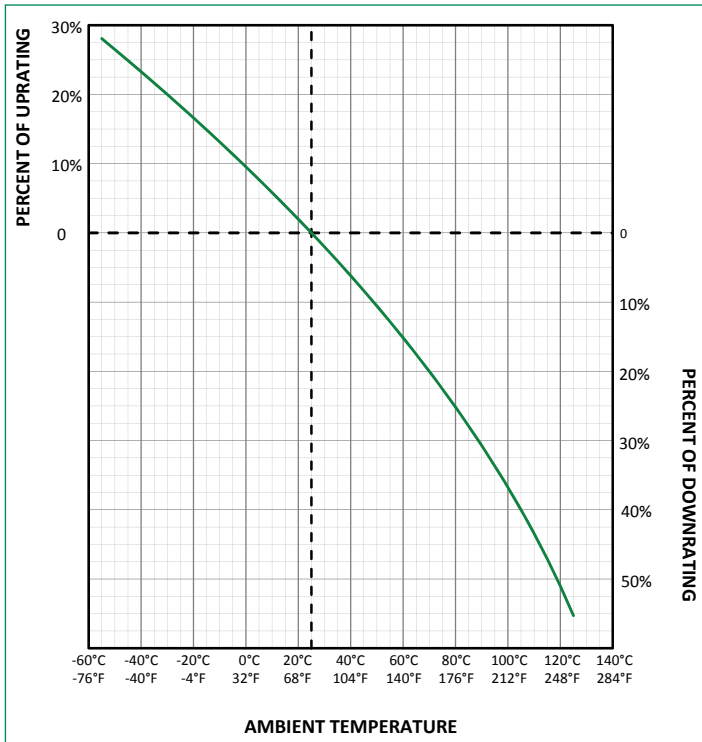
## ESR Series High-Speed Square Body

### Total Clearing I<sup>2</sup>T Correction Factor Curve (1XL and 3XL)



### Temperature Derating Curve

Ambient temperature: temperature of air immediately surrounding fuse

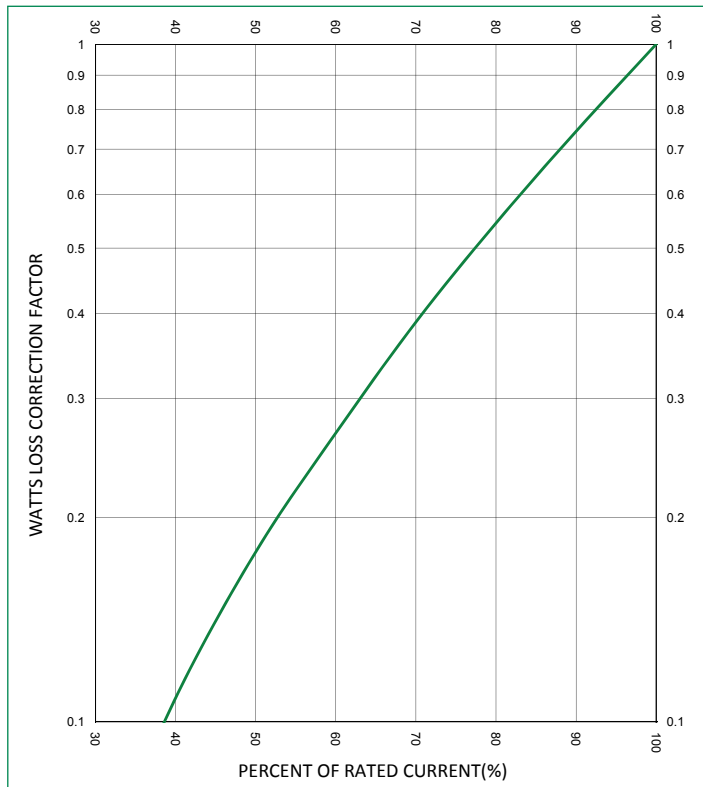




# POWR-SPEED® Fuse

## ESR Series High-Speed Square Body

### Watts Loss Correction Factor Curve



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