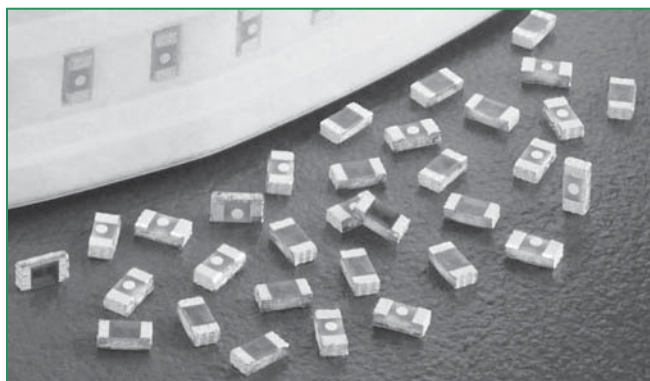


**RoHS  HF 435 Series Fuse**

**Description**



The 435 Series are fast-acting surface mount thin-film fuses. Their ultra-small size (0402 size) makes them ideal for secondary protection of circuits used in space constrained applications such as hand-held portable electronic devices.

This series is 100% lead-free and meet the requirements of the RoHS directive. New Halogen-Free 435 Series fuses are available—to order use the “HF” suffix. See Part Numbering section for additional information.

**Features**

- 35A interrupt rating at 32VDC
- Small size with current ratings of 0.25 to 5.0 amperes
- RoHS compliant, lead-free and halogen-free
- Maximum protection of sensitive circuits as fuses are designed to open consistently in <5sec at 200% overload.
- Enhanced Breaking Capacity, High I<sup>2</sup>t

**Agency Approvals**

| AGENCY  | AGENCY FILE NUMBER | AMPERE RANGE |
|---|--------------------|--------------|
|  | E10480             | 0.250 - 5.0A |
|  | 029862_0_000       | 0.250 - 5.0A |

**Electrical Characteristics for Series**



| % of Ampere Rating | Opening Time at 25°C |
|--------------------|----------------------|
| 100%               | 4 hours, Minimum     |
| 200%               | 5 sec., Maximum      |
| 300%               | 0.2 sec., Maximum    |

**Applications**

Secondary protection for space constrained applications such as:

- Cell phones
- Battery packs
- Digital cameras
- DVD players
- Hard disk drives.

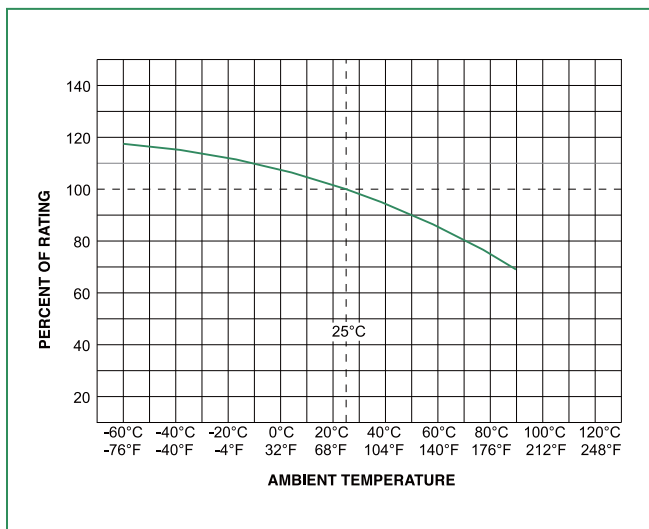
**Electrical Specifications by Item**

| Ampere Rating (A) | Amp Code | Max Voltage Rating (V) | Interrupting Rating | Nominal Cold Resistance (Ohms) | Nominal Melting I <sup>2</sup> t (A <sup>2</sup> sec) | Nom Voltage Drop (mV) | Nom Power Dissipation (W) | Agency Approvals  |   |
|-------------------|----------|------------------------|---------------------|--------------------------------|---|-----------------------|---------------------------|---|---|
|                   |          |                        |                     |                                |   |                       |                           |  |  |
| 0.250             | .250     | 32                     | 35A @32V DC         | 0.400                          | 0.0025  | 110.53                | 0.027635                  | x   | x   |
| 0.375             | .375     | 32                     |                     | 0.1930                         | 0.0035  | 84.64                 | 0.03174                   | x   | x   |
| 0.500             | .500     | 32                     |                     | 0.1600                         | 0.0053  | 93.35                 | 0.04668                   | x   | x   |
| 0.750             | .750     | 32                     |                     | 0.1050                         | 0.0120  | 101.84                | 0.07638                   | x   | x   |
| 1.00              | 001.     | 32                     |                     | 0.0730                         | 0.0200  | 87.45                 | 0.08745                   | x   | x   |
| 1.25              | 1.25     | 32                     |                     | 0.0600                         | 0.0350  | 96.37                 | 0.12046                   | x   | x   |
| 1.50              | 01.5     | 32                     |                     | 0.0470                         | 0.0560  | 86.70                 | 0.13005                   | x   | x   |
| 1.75              | 1.75     | 32                     |                     | 0.0390                         | 0.0750  | 81.13                 | 0.14198                   | x   | x   |
| 2.00              | 002.     | 32                     |                     | 0.0300                         | 0.1000  | 70.62                 | 0.14120                   | x   | x   |
| 2.50              | 02.5     | 32                     |                     | 0.0185                         | 0.1560  | 55.25                 | 0.13813                   | x   | x   |
| 3.00              | 003.     | 32                     |                     | 0.0165                         | 0.2032  | 60.58                 | 0.18740                   | x   | x   |
| 3.50              | 03.5     | 32                     |                     | 0.0135                         | 0.3017  | 57.84                 | 0.20244                   | x   | x   |
| 4.00              | 004.     | 32                     |                     | 0.0115                         | 0.3084  | 57.00                 | 0.22800                   | x   | x   |
| 5.00              | 005.     | 32                     |                     | 0.0085                         | 0.5310  | 52.44                 | 0.26220                   | x   | x   |

1. Measured at 10% of rated current, 25°C.

2. Measured at rated voltage.

## Temperature Derating Curve



Note:

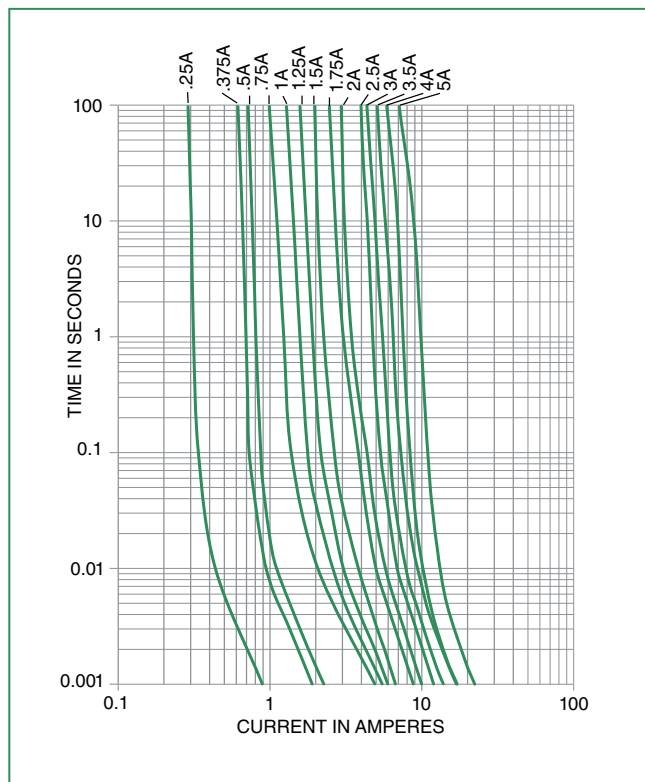
- Derating depicted in this curve is in addition to the standard derating of 25% for continuous operation.

Example:

For continuous operation at 70 degrees celsius, the fuse should be derated as follows:

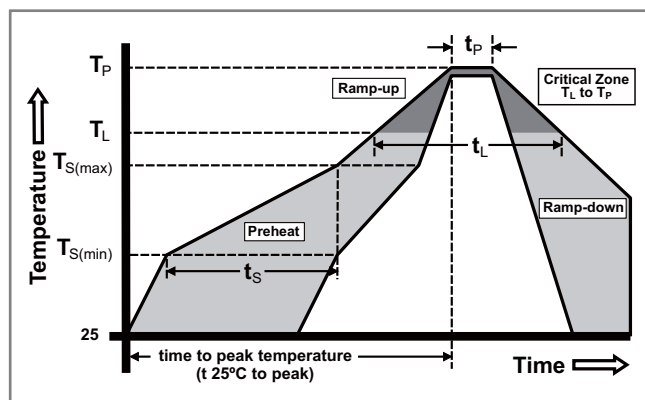
$$I = (0.75)(0.80)I_{RAT} = (0.60)I_{RAT}$$

## Average Time Current Curves



## Soldering Parameters

|  |                                    |                         |
|--|------------------------------------|-------------------------|
| Reflow Condition                                       |                                    | Pb – Free assembly      |
| Pre Heat   | - Temperature Min ( $T_{s(min)}$ ) | 150°C                   |
|  | - Temperature Max ( $T_{s(max)}$ ) | 200°C                   |
|  | - Time (Min to Max) ( $t_s$ )      | 60 – 120 secs           |
| Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak) |                                    | 5°C/second max          |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate                   |                                    | 5°C/second max          |
| Reflow   | - Temperature ( $T_L$ ) (Liquidus) | 217°C                   |
|  | - Temperature ( $t_L$ )            | 60 – 150 seconds        |
| Peak Temperature ( $T_p$ )                             |                                    | 250 <sup>+0/-5</sup> °C |
| Time within 5°C of actual peak Temperature ( $t_p$ )   |                                    | 20 – 40 seconds         |
| Ramp-down Rate   |                                    | 5°C/second max          |
| Time 25°C to peak Temperature ( $T_p$ )                |                                    | 8 minutes Max.          |
| Do not exceed  |                                    | 260°C                   |



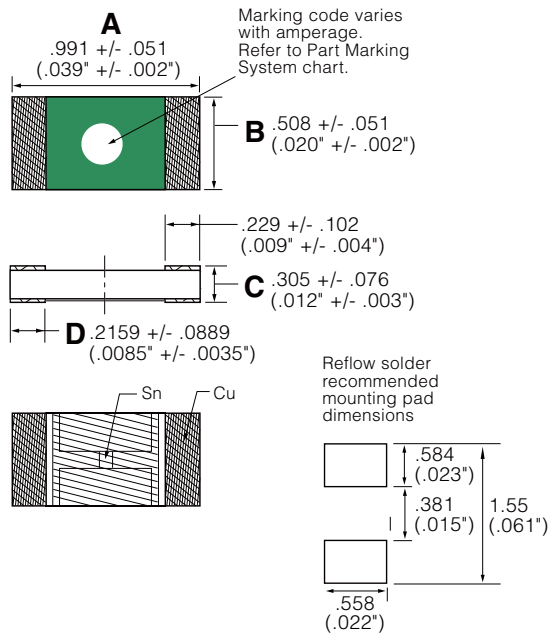
|                |                        |
|----------------|------------------------|
| Wave Soldering | 260°C, 10 seconds max. |
|----------------|------------------------|

### Product Characteristics

|                              |   |
|------------------------------|---|
| <b>Materials</b>             | <b>Body:</b> Epoxy / Glass Substrate;<br>Parts with 'HF' suffix: Halogen Free Epoxy / Glass<br><b>Terminations:</b> 100% Tin over Nickel over Copper<br><b>Device Weight:</b> 0.316mg |
| <b>Terminal Strength</b>     | MIL-STD-202F, Method 211A, Test Condition A   |
| <b>Insulation Resistance</b> | After Opening: Greater than 10,000Ohms  |

|                              |  |
|------------------------------|--|
| <b>Operating Temperature</b> | -55°C to 90°C.<br>Consult temperature derating curve chart.<br>For operation above 90°C please contact Littelfuse. |
| <b>Thermal Shock</b>         | Withstands 5 cycles of -55°C to 125°C  |
| <b>Vibration</b>             | MIL-STD-202F   |

### Dimensions

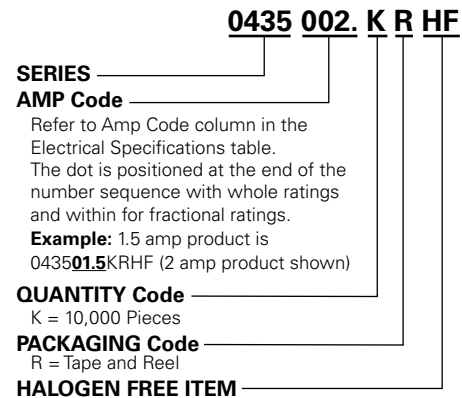


|          | A     | B     | C     | D     |
|----------|-------|-------|-------|-------|
| inch min | 0.037 | 0.018 | 0.009 | 0.005 |
| inch max | 0.041 | 0.022 | 0.015 | 0.012 |
| mm min   | 0.94  | 0.457 | 0.229 | 0.127 |
| mm max   | 1.04  | 0.559 | 0.381 | 0.305 |

### Part Marking System

| Amp Code | Marking Code |
|----------|--------------|
| .250     |              |
| .375     |              |
| .500     |              |
| .750     |              |
| 001.     |              |
| 1.25     |              |
| 01.5     |              |
| 1.75     |              |
| 002.     |              |
| 02.5     |              |
| 003.     |              |
| 03.5     |              |
| 004.     |              |
| 005.     |              |

### Part Numbering System



### Packaging

| Packaging Option  | Packaging Specification        | Quantity | Quantity & Packaging Code |
|-------------------|--------------------------------|----------|---------------------------|
| 8mm Tape and Reel | EIA RS-481-2 (IEC 286, part 3) | 10000    | KR                        |



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