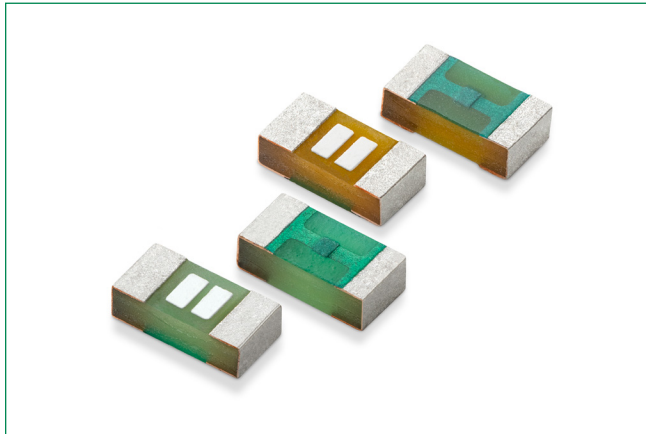


435 Series

0402 Fast-Acting 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 & Benefits

- 50A interrupt rating at 32VDC
- Small size with current ratings of 0.25 to 5.0 amperes
- RoHS compliant, Lead-Free and Halogen-Free
- Enhanced Breaking Capacity, High I²t
- Maximum protection of sensitive circuits as fuses are designed to open consistently in <5sec at 200% overload.
- Recognized to UL/CSA/NMX 248-1 and UL/CSA/NMX 248-14

Additional Information



Resources



Accessories



Samples

Applications

Secondary protection for space constrained applications such as:

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

Agency Approvals

| Agency | Agency File Number | Ampere Range |
|--------|--------------------|-----------------|
| | E10480 | 0.250 A - 5.0 A |
| | 29862 | 0.250 A - 5.0 A |
| | J50481982 | 0.250 A - 5.0 A |

Electrical Characteristics

| % of Ampere Rating | Ampere Rating | Opening Time at 25°C |
|--------------------|---------------|----------------------|
| 100% | 0.250A - 5A | 4 hours, Minimum |
| 200% | 0.375A - 5A | 5 secs., Maximum |
| 300% | 0.250A | 5 secs., Maximum |
| 300% | 0.375A - 5A | 0.2 sec., Maximum |

Electrical Specifications

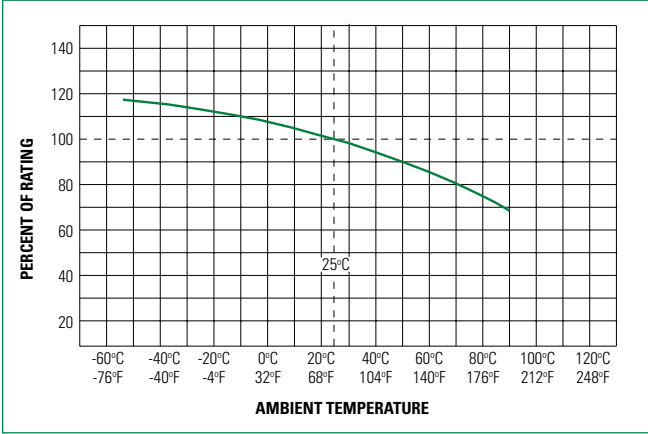
| Ampere Rating (A) | Amp Code | Max Voltage Rating (V) | Interrupting Rating | Nominal Cold Resistance (Ohms) | Nominal Melting I ² t (A ² sec) | Nom Voltage Drop (mV) | Nom Power Dissipation (W) | Agency Approvals | | |
|-------------------|----------|------------------------|-------------------------|--------------------------------|---|-----------------------|---------------------------|------------------|---|---|
| | | | | | | | | | | |
| 0.250 | .250 | 32 | 50A @32VDC ² | 0.3600 ¹ | 0.0025 | 92.49 | 0.0231 | x | x | x |
| 0.375 | .375 | 32 | | 0.1930 ¹ | 0.0035 | 84.64 | 0.03174 | x | x | x |
| 0.500 | .500 | 32 | | 0.1600 ¹ | 0.0053 | 93.35 | 0.04668 | x | x | x |
| 0.750 | .750 | 32 | | 0.1050 ¹ | 0.0120 | 101.84 | 0.07638 | x | x | x |
| 1.00 | 001. | 32 | | 0.0730 ¹ | 0.0200 | 87.45 | 0.08745 | x | x | x |
| 1.25 | 1.25 | 32 | | 0.0600 ¹ | 0.0350 | 96.37 | 0.12046 | x | x | x |
| 1.50 | 01.5 | 32 | | 0.0470 ¹ | 0.0560 | 86.70 | 0.13005 | x | x | x |
| 1.75 | 1.75 | 32 | | 0.0390 ¹ | 0.0750 | 81.13 | 0.14198 | x | x | x |
| 2.00 | 002. | 32 | | 0.0300 ¹ | 0.1000 | 70.62 | 0.14120 | x | x | x |
| 2.50 | 02.5 | 32 | | 0.0200 ¹ | 0.1560 | 55.25 | 0.13813 | x | x | x |
| 3.00 | 003. | 32 | | 0.0170 ¹ | 0.2032 | 60.58 | 0.18740 | x | x | x |
| 3.50 | 03.5 | 32 | | 0.0150 ¹ | 0.3017 | 57.84 | 0.20244 | x | x | x |
| 4.00 | 004. | 32 | | 0.0105 ¹ | 0.3084 | 57.00 | 0.22800 | x | x | x |
| 5.00 | 005. | 32 | 0.0085 ¹ | 0.5310 | 52.44 | 0.26220 | x | x | x | |

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

435 Series

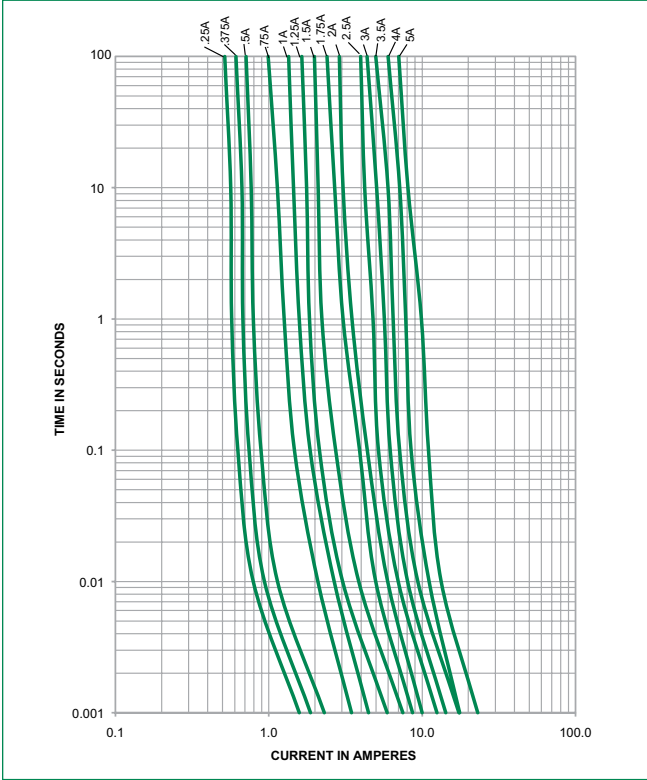
0402 Fast-Acting Fuse

Temperature Re-rating Curve



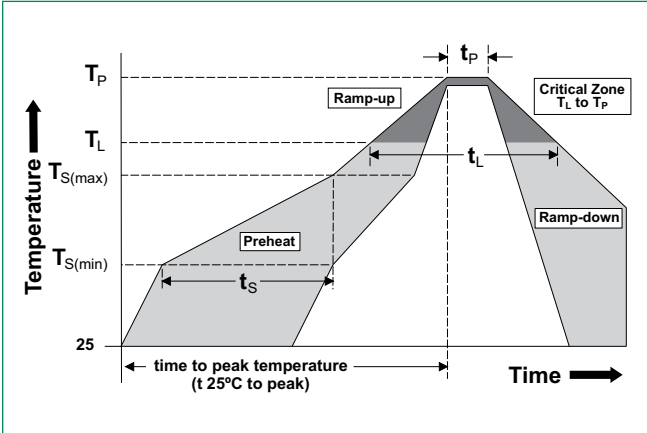
Notes:
 1. Derating depicted in this curve is in addition to the standard derating of 25% for continuous operation.
Example:
 For continuous operation at 70 degrees celsius, the fuse should be derated as follows:
 $I = (0.75)(0.80)_{\text{RAT}} = (0.60)_{\text{RAT}}$
 2. The temperature derating curve represents the nominal conditions. For questions about temperature derating curve, please consult Littelfuse technical support for assistance.

Average Time Current Curves



Soldering Parameters

| | | |
|--|---|------------------|
| Reflow Condition | Pb – Free assembly | |
| Pre Heat | - Temperature Min ($T_{s(\text{min})}$) | 150°C |
| | - Temperature Max ($T_{s(\text{max})}$) | 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 | |
| $T_{s(\text{max})}$ 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 ^{+0/-5} °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. | |



435 Series

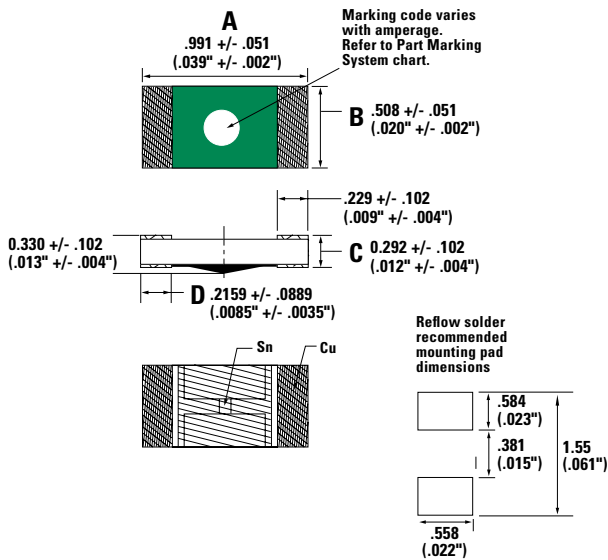
0402 Fast-Acting Fuse

Product Characteristics

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

| | |
|------------------------------|---|
| Operating Temperature | -55°C to 90°C. Consult temperature re-rating curve chart. For operation above 90°C please contact Littelfuse. |
| Thermal Shock | Withstands 5 cycles of -55°C to 125°C |
| Vibration | MIL-STD-202, Method 201 |

Dimensions



| Unit | A | B | C | D |
|----------|-------|-------|-------|-------|
| inch min | 0.037 | 0.018 | 0.008 | 0.005 |
| inch max | 0.041 | 0.022 | 0.016 | 0.012 |
| mm min | 0.94 | 0.457 | 0.190 | 0.127 |
| mm max | 1.04 | 0.559 | 0.394 | 0.305 |

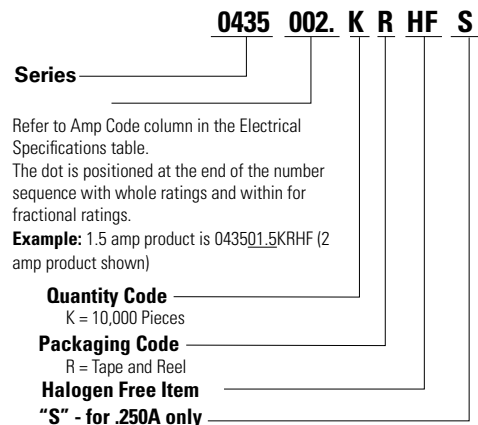
Packaging

| Packaging Option | Packaging Specification | Quantity | Quantity & Packaging Code |
|-------------------|------------------------------------|----------|---------------------------|
| 8mm Tape and Reel | EIA-481 Rev. D (IEC 60286, part 3) | 10000 | KR |

Part Marking System

| Amp Code | Marking Code |
|----------|--------------|
| 0.250 | □X□ |
| 0.375 | □▪□ |
| 0.500 | □•□ |
| 0.750 | □▨□ |
| 001. | □□□ |
| 1.25 | □▪□ |
| 01.5 | □□□ |
| 1.75 | □X□ |
| 002. | □•□ |
| 02.5 | □▨□ |
| 003. | □□□□ |
| 03.5 | □▪□ |
| 004. | □□□□ |
| 005. | □▨□ |

Part Numbering System



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