



Surface Mount Fuses

Thin Film > 0603 Size > Fast-Acting > 494 Series

494 Series Fuse, NRA Special Series Integrated Circuit Protector



Agency Approvals

| AGENCY | AGENCY FILE NUMBER | AMPERE RANGE |
|-----------------------------------------------------------------------------------|--------------------|--------------|
|  | E10480 | 250mA - 5A |
|  | LR29862 | 250mA - 5A |

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 |

Additional Information



Datasheet



Resources



Samples

Description

The 494 Series Fast-Acting SMF is an ultra small (0603 size) thin-film device designed for secondary protection of circuits used in space constrained applications such as hand-held portable electronic devices. This series is 100% lead-free and meets the requirements of the RoHS directive. New Halide-Free 494 Series fuses are available to order using the "HF" suffix. See Part Numbering section for additional information.

Features

- Compatible with lead-free solders and higher temperature profiles
- High performance materials provide improved performance in elevated ambient temperature applications
- Marked on top surface with code to allow ampere rating identification without testing
- Low profile for height sensitive applications
- Flat top surface for pick-and-place operations
- Element-covering material is resistant to industry standard cleaning operations
- Mounting pad and electrical performance are identical to Littelfuse 431 and 434 Series products
- Alloy-based element construction provides superior inrush withstand characteristics (I²t) over ceramic or glass-based 0603 fuse products

Applications

Secondary protection for space constrained applications:

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

Electrical Specifications by Item

| 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 @32V AC/DC | 0.5450 | 0.0030 | 158.56 | 0.0396 | x | x |
| 0.375 | .375 | 32 | | 0.2900 | 0.0053 | 128.03 | 0.0480 | x | x |
| 0.500 | .500 | 32 | | 0.1870 | 0.0087 | 115.71 | 0.0579 | x | x |
| 0.750 | .750 | 32 | | 0.1170 | 0.0171 | 107.33 | 0.0805 | x | x |
| 1.00 | 001. | 32 | | 0.0710 | 0.0212 | 89.10 | 0.0891 | x | x |
| 1.25 | 1.25 | 32 | 35A @32V AC/DC | 0.0530 | 0.0518 | 84.32 | 0.1054 | x | x |
| 1.40 | 01.4 | 32 | | 0.049 | 0.05529 | 74.84 | 0.1048 | x | x |
| 1.50 | 01.5 | 32 | | 0.0410 | 0.0766 | 81.14 | 0.1217 | x | x |
| 1.75 | 1.75 | 32 | | 0.0320 | 0.0903 | 78.75 | 0.1378 | x | x |
| 2.00 | 002. | 32 | | 0.0300 | 0.1103 | 78.22 | 0.1564 | x | x |
| 2.50 | 02.5 | 32 | | 0.0220 | 0.1440 | 76.10 | 0.1903 | x | x |
| 3.00 | 003. | 32 | | 0.0180 | 0.2403 | 75.04 | 0.2251 | x | x |
| 3.15 | 3.15 | 32 | | 0.017 | 0.27405 | 63.78 | 0.2009 | x | x |
| 3.50 | 03.5 | 32 | | 0.0150 | 0.4306 | 74.25 | 0.2599 | x | x |
| 4.00 | 004. | 32 | | 0.0130 | 0.5760 | 73.72 | 0.2949 | x | x |
| 5.00 | 005. | 32 | 0.0090 | 0.9000 | 72.71 | 0.3635 | x | x | |

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

Temperature Derating Curve



Average Time Current Curves



Soldering Parameters

| | | |
|--------------------------------------------------------|------------------------------------|-------------------------|
| Reflow Condition | | Pb – free assembly |
| Pre Heat | - Temperature Min ($T_{s(min)}$) | 150°C |
| | - Temperature Max ($T_{s(max)}$) | 200°C |
| | - Time (Min to Max) (t_s) | 60 – 180 seconds |
| Average Ramp-up Rate (Liquidus Temp (T_L) to peak) | | 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 ^{+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 |



Product Characteristics

| | |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Materials | Body: Advanced High Temperature Substrate Terminations: 100% Tin over Nickel over Copper Element Cover Coat: Conformal Coating |
| Operating Temperature | - 55°C to 90°C. Consult temperature derating curve chart. For operation above 90°C contact Littelfuse. |
| Humidity | MIL-STD-202F, Method 103B, Condition D |

| | |
|----------------------------------------------|------------------------------------------------------------|
| Thermal Shock | Withstands 5 cycles of - 55°C to 125°C |
| Vibration | Per MIL-STD-202F |
| Insulation Resistance (After Opening) | Greater than 10,000 ohms |
| Resistance to Soldering Heat | Withstands 60 seconds above 200°C and up to 260°C, maximum |

Dimensions



Part Marking System

| Amp Code | Marking Code |
|----------|--------------|
| .250 | D |
| .375 | E |
| .500 | F |
| .750 | G |
| 001. | H |
| 1.25 | J |
| 01.4 | III |
| 01.5 | K |
| 1.75 | L |
| 002. | N |
| 02.5 | O |
| 003. | P |
| 3.15 | III |
| 03.5 | R |
| 004. | S |
| 005. | T |

Packaging

| Packaging Option | Packaging Specification | Quantity | Quantity & Packaging Code |
|-------------------|--------------------------------|----------|---------------------------|
| 8mm Tape and Reel | EIA RS-481-2 (IEC 286, part 3) | 5000 | NR |

Part Numbering System

0494002.NRHF

SERIES

AMP Code

Refer to Amp Code column in the Electrical Specifications table.
NOTE: The dot is positioned before the Packaging Suffix with whole ratings and within the numbering sequence for fractional ratings.

PACKAGING Code

NR = Tape and Reel, 5000 pcs

'HF' SUFFIX HALIDE FREE ITEM