

501A Series – High Current 1206 Fast-Acting Fuse



Description

The 501A series AECQ-Compliant fuses and Halogen free fuse series are specifically tested to cater to secondary circuit protection needs of compact auto electronics application.

The general design ensures excellent temperature stability and performance reliability. The high I²t values which are typical in the Littelfuse Ceramic Fuse family, ensure high inrush current withstanding capability.

Features

- Operating Temperature from -55°C to +125°C
- Meets Littelfuse's automotive qualifications*
- 100% Lead-free, RoHS compliant and Halogen-free
- Suitable for both leaded and lead-free reflow/wave soldering

* Largely based on Littelfuse internal AEC-Q200 test plan

Agency Approvals

| AGENCY | AGENCY FILE NUMBER | AMPERE RANGE |
|--------|--------------------|--------------|
| | E10480 | 10A - 20A |
| | 29862 | 10A - 20A |

Electrical Characteristics for Series

| % of Ampere Rating | Ampere Rating | Opening Time at 25°C |
|--------------------|---------------|----------------------|
| 100% | 10A – 20A | 4 Hours, Minimum |
| 350% | 10A – 20A | 5 Seconds, Maximum |

Applications

- Li-ion Battery
- LED Head-Lights
- Automotive Navigation System
- TFT Display
- Battery Management System (BMS)
- Clusters

Additional Information



Datasheet



Resources



Samples

Electrical Specifications by Item

| Ampere Rating (A) | Amp Code | Max. Voltage Rating (V) | Interrupting Rating (DC) ¹ | Nominal Resistance (Ohms) ² | Nominal Melting I ² t (A ² Sec.) ³ | Nominal Voltage Drop at Rated Current (V) ⁴ | Nominal Power Dissipation at Rated Current (W) | Agency Approvals | |
|-------------------|----------|-------------------------|---------------------------------------|--|---|--|--|------------------|---|
| | | | | | | | | | |
| 10 | 010. | 32 | 150A @ 32VDC | 0.00362 | 10.385 | 0.04407 | 0.4407 | x | x |
| 12 | 012. | 32 | | 0.00311 | 20.341 | 0.04927 | 0.5912 | x | x |
| 15 | 015. | 32 | | 0.00250 | 39.700 | 0.04843 | 0.7265 | x | x |
| 20 | 020. | 32 | | 0.00194 | 86.360 | 0.05888 | 1.1776 | x | x |

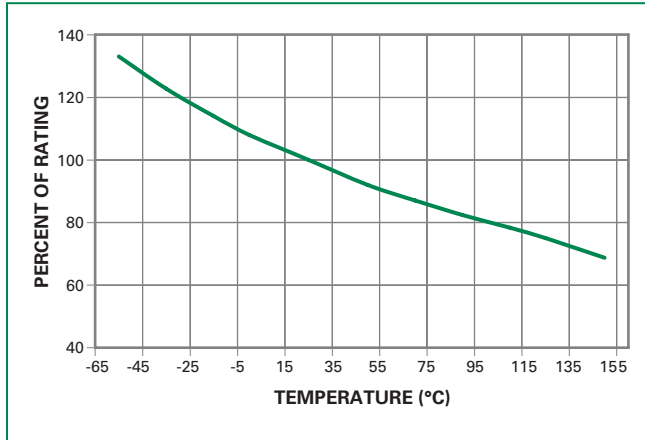
Notes:

1. DC Interrupting Rating tested at rated voltage with time constant <0.5msec.
2. Nominal Resistance measured with <10% rated current.
3. Nominal Melting I²t measured at 1 msec. opening time. For other I²t data refer to chart.
4. Nominal Voltage Drop measured at rated current after temperature has stabilized and with fuse mounted on board with 3oz Cu trace.

Devices designed to carry rated current for four hours minimum. It is recommended that devices be operated continuously at no more than 80% rated current. See "Temperature Re-rating Curve" for additional re-rating information.

Devices designed to be mounted with marking code facing up.

Temperature Re-rating Curve



Note:

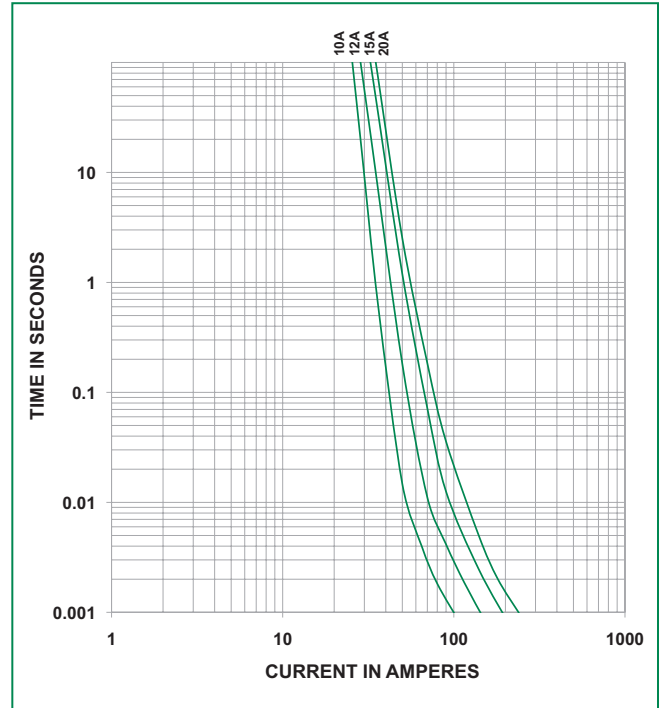
1. Re-rating depicted in this curve is in addition to the standard re-rating of 20% for continuous operation.

Example:

For continuous operation at 75 degrees celsius, the fuse should be re-rated as follows:

$$I = (0.80)(0.85)I_{RAT} = (0.68)I_{RAT}$$

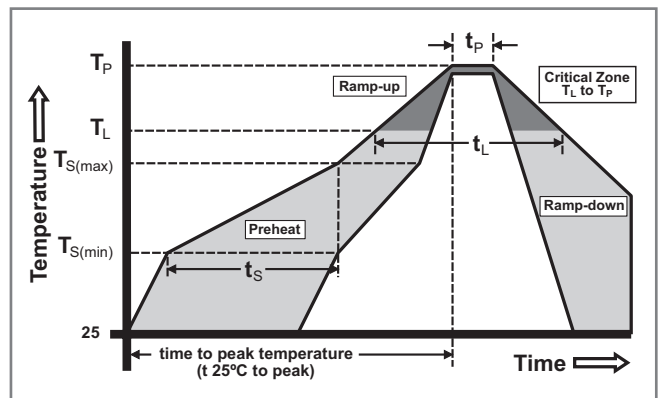
Average Time Current Curves



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 – 180 seconds |
| Average Ramp-up Rate (Liquidus Temp (T_L) to peak) | 3°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) | 260 ^{+0/-5} °C | |
| Time within 5°C of actual peak Temperature (t_p) | 10 – 30 seconds | |
| Ramp-down Rate | 6°C/second max. | |
| Time 25°C to peak Temperature (T_p) | 8 minutes max. | |
| Do not exceed | 260°C | |

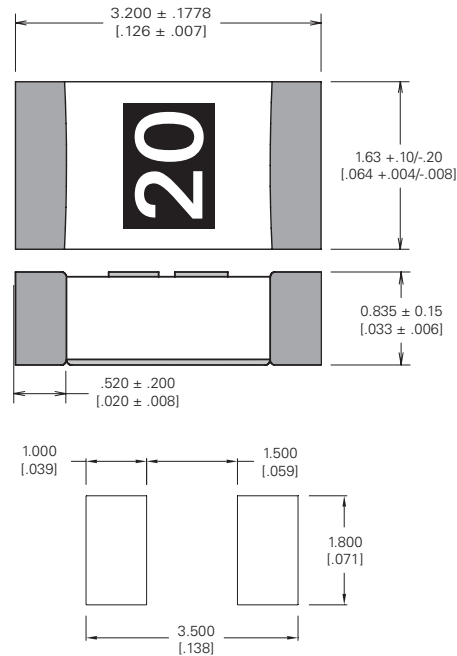
| | |
|----------------|------------------------|
| Wave Soldering | 260°C, 10 seconds max. |
|----------------|------------------------|



Product Characteristics

| | |
|-------------------------------------|---|
| Materials | Body: Advanced Ceramic |
| | Terminations: Ag / Ni / Sn (100% Lead-free) |
| | Element Cover Coating: Lead-free Glass |
| Moisture Sensitivity Level | IPC/JEDEC J-STD-020, Level 1 |
| Solderability | IPC/ECA/JEDEC J-STD-002, Condition C |
| Humidity Test | MIL-STD-202, Method 103, Conditions D |
| Resistance to Solder Heat | MIL-STD-202, Method 210, Condition B |
| Moisture Resistance | MIL-STD-202, Method 106 |
| Thermal Shock | MIL-STD-202, Method 107, Condition B |
| Mechanical Shock | MIL-STD-202, Method 213, Condition A |
| Vibration | MIL-STD-202, Method 201 |
| Vibration, High Frequency | MIL-STD-202, Method 204, Condition D |
| Dissolution of Metallization | IPC/ECA/JEDEC J-STD-002, Condition D |
| Terminal Strength | IEC 60127-4 |
| High Temperature Storage | MIL-STD-202, Method 108 with exemptions |
| Thermal Shock Test | JESD22 Method JA-104, Test Conditions B and N |
| Biased Humidity | MIL-STD-202, Method 103, 85°C/85% RH with 10% operating power for 1000hrs |
| Operational Life | MIL-STD-202, Method 108, Test Condition D |
| Resistance to Solvents | MIL-STD-202, Method 215 |
| Mechanical Shock | MIL-STD-202, Method 213, Test Condition C |
| High Frequency Vibration | MIL-STD-202, Method 204 |
| Resistance to Soldering Heat | MIL-STD-202, Method 210, Test Condition B |
| Solderability | JESD22-B102E Method 1 |
| Terminal Strength for SMD | AEC Q200-006 |
| Board Flex | AEC Q200-005 |
| Electrical Characterization | Three Temperature Electrical |

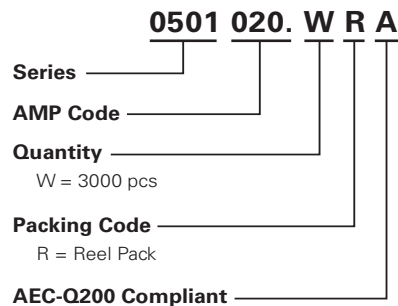
Dimensions



Part Marking System

| Amp Code | Marking Code |
|----------|--------------|
| 010. | 10 |
| 012. | 12 |
| 015. | 15 |
| 020. | 20 |

Part Numbering System



Packaging

| Packaging Option | Packaging Specification | Quantity | Quantity and Packaging Code |
|-------------------|----------------------------|----------|-----------------------------|
| 8mm Tape and Reel | EIA-481, IEC 60286, Part 3 | 3000 | WR |

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