

501 Series – High Current 1206 Fast-Acting Fuse



Description

The 501 Series is a 100% Lead-free, RoHS compliant and Halogen-free fuse series designed specifically to provide over-current protection to circuits that operate under high working ambient temperature up to 150°C.

The general design ensures excellent temperature stability and performance reliability.

The high I²t values which is typical in the Littelfuse Ceramic Fuse family, ensure high inrush current withstand capability.

Features

- Operating Temperature from -55°C to +150°C
- Designed to provide over-current protection in high current voltage regulator module (VRM) applications
- 100% Lead-free, RoHS compliant and Halogen-free
- Suitable for both leaded and lead-free reflow / wave soldering

Applications

- Voltage Regulator Module (VRM) Equipment
- Notebook PC
- DC-DC Converter

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 |

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 | 150 A @ 32 VDC | 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 |

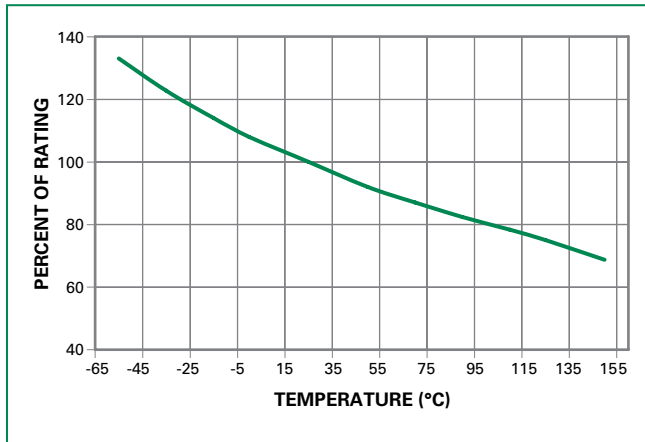
Notes:

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

Devices designed to carry rated current for 4 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:

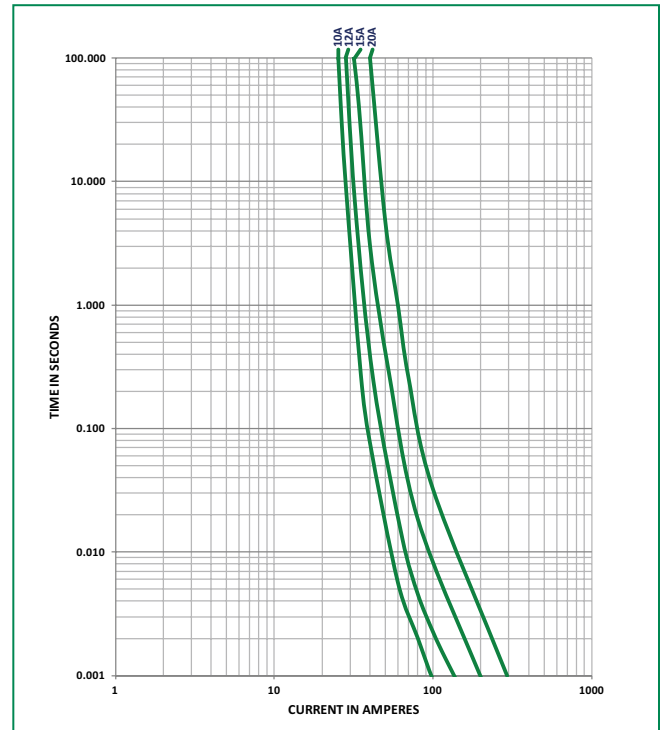
1. Re-rating depicted in this curve is in addition to the standard re-rating of 20% for continuous operation.

Example:

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

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

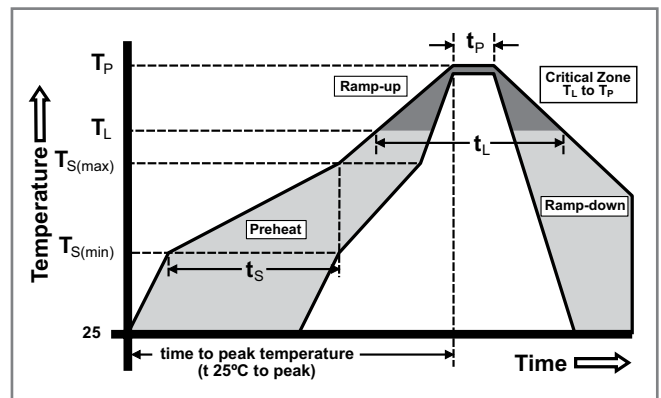
Average Time Current Curves



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 (LiquidusTemp (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. |
|----------------|------------------------|

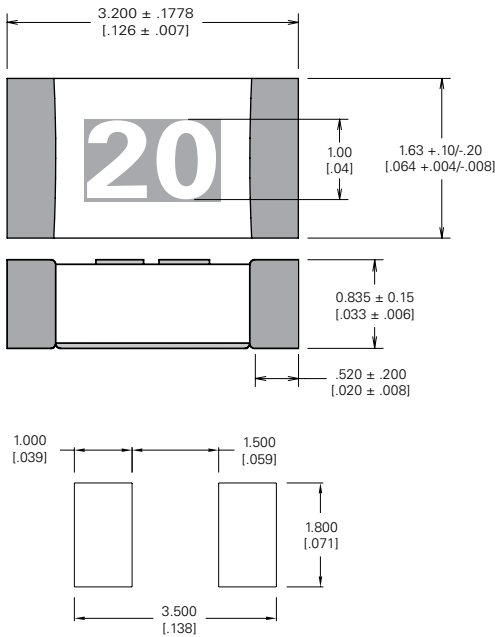


Product Characteristics

| | |
|-----------------------------------|--|
| 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 B |
| Humidity Test | MIL-STD-202, Method 103, Conditions D |
| Resistance to Solvents | 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 |

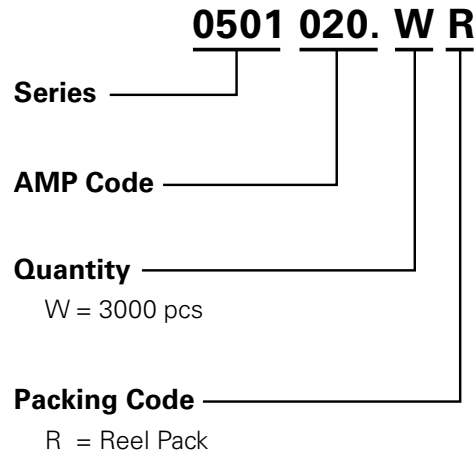
Dimensions



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

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