

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 |

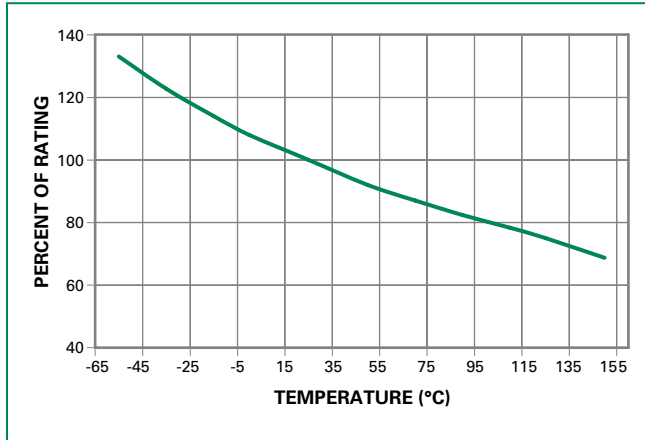
Notes:

1. DC Interrupting Rating tested at rated voltage with time constant < 0.5 msec.
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 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:

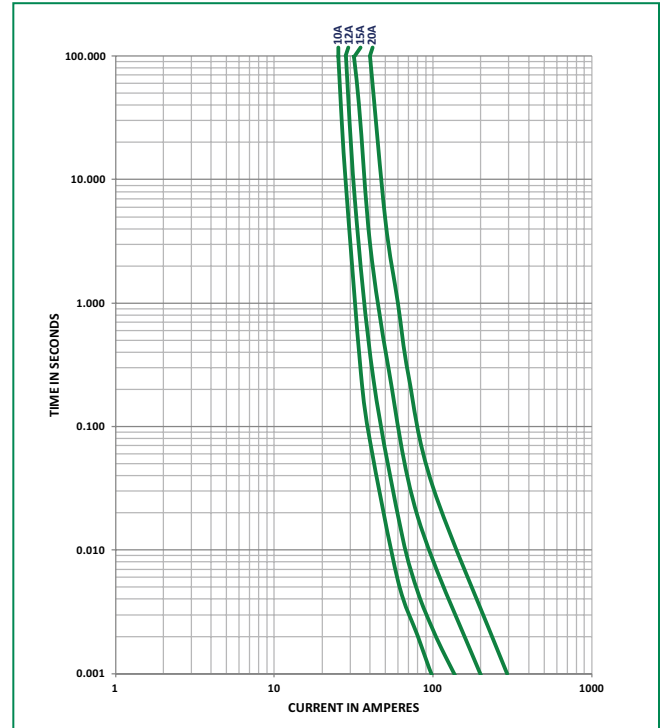
1. Re-rating depicted in this curve is in addition to the standard re-rating of 20% for continuous operation.

Example:

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

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

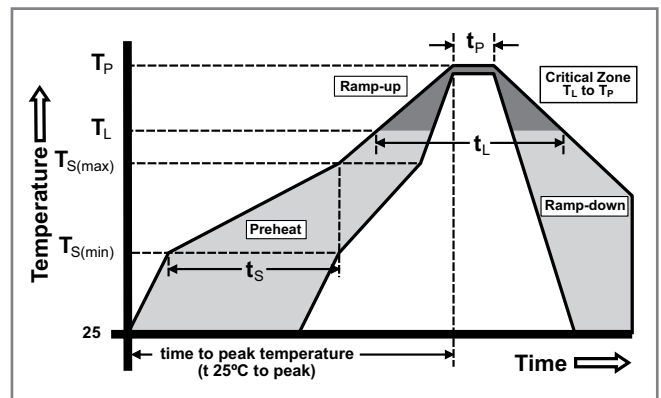
Average Time Current Curves



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. |
|----------------|------------------------|

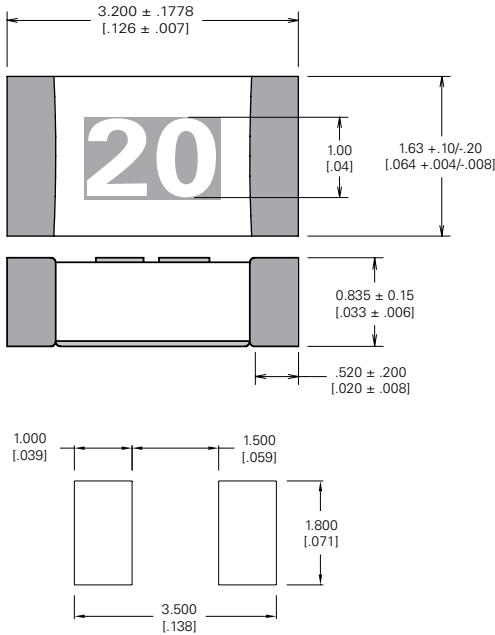


Product Characteristics

| | |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| 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 |

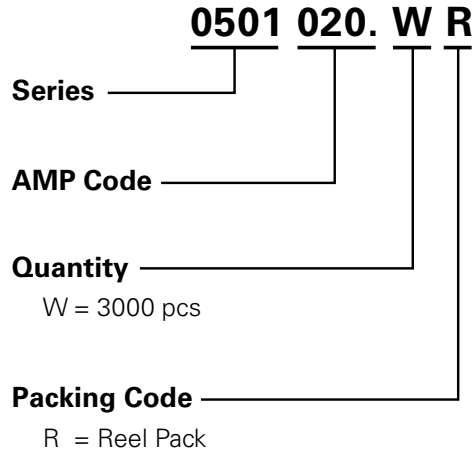
Dimensions



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 |

Disclaimer Notice - Littelfuse products are not designed for, and shall not be used for, any purpose (including, without limitation, automotive, military, aerospace, medical, life-saving, life-sustaining or nuclear facility applications, devices intended for surgical implant into the body, or any other application in which the failure or lack of desired operation of the product may result in personal injury, death, or property damage) other than those expressly set forth in applicable Littelfuse product documentation. Warranties granted by Littelfuse shall be deemed void for products used for any purpose not expressly set forth in applicable Littelfuse documentation. Littelfuse shall not be liable for any claims or damages arising out of products used in applications not expressly intended by Littelfuse as set forth in applicable Littelfuse documentation. The sale and use of Littelfuse products is subject to Littelfuse Terms and Conditions of Sale, unless otherwise agreed by Littelfuse. Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/disclaimer-electronics.