

### 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 I<sup>2</sup>t 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
- 100% Lead-free, RoHS compliant and Halogen-free
- Designed to provide over-current protection in high current voltage regulator module (VRM) applications
- 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) <sup>1</sup>	Nominal Resistance (Ohms) <sup>2</sup>	Nominal Melting I <sup>2</sup> T (A <sup>2</sup> Sec.) <sup>3</sup>	Nominal Voltage Drop At Rated Current (V) <sup>4</sup>	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

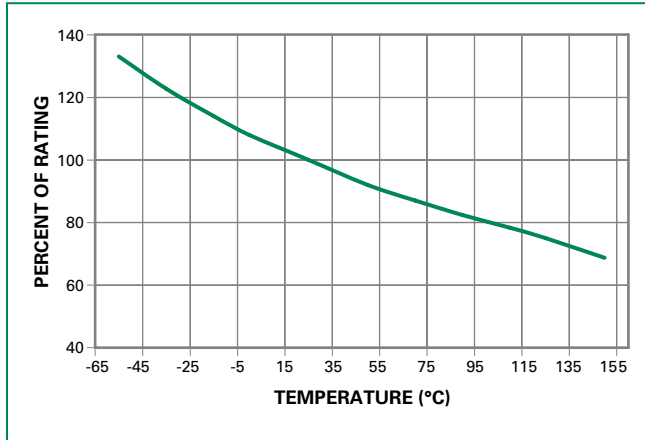
#### Notes:

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 I<sup>2</sup>t measured at 1 msec. opening time. For other I<sup>2</sup>t 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:

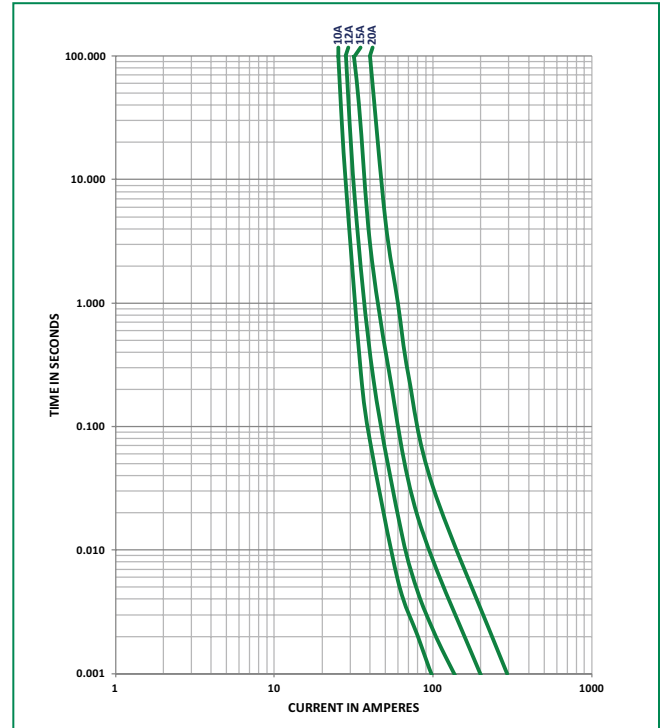
1. Re-rating depicted in this curve is in addition to the standard re-rating of 20% for continuous operation.

Example:

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

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

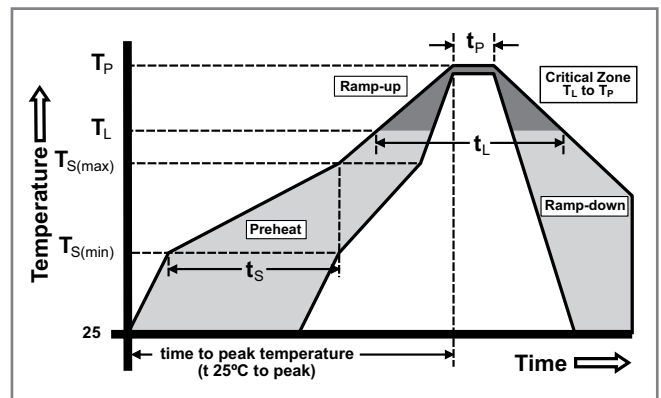
### Average Time Current Curves



### 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 <sup>+0/-5</sup> °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.
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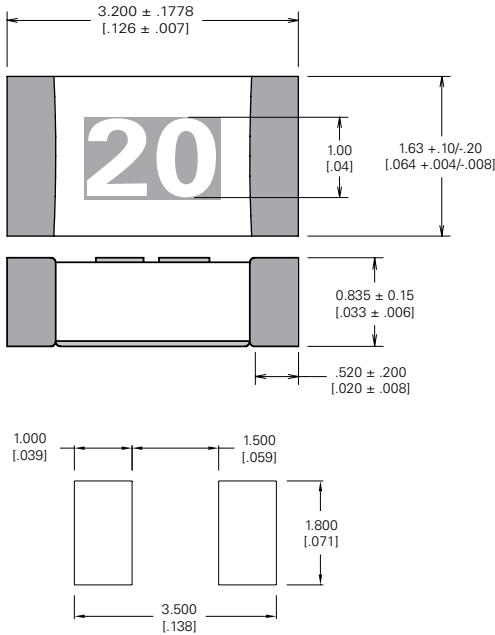


**Product Characteristics**

<b>Materials</b>	<b>Body:</b> Advanced Ceramic <b>Terminations:</b> Ag / Ni / Sn (100% Lead-free) <b>Element Cover Coating:</b> Lead-free Glass
<b>Moisture Sensitivity Level</b>	IPC/JEDEC J-STD-020, Level 1
<b>Solderability</b>	IPC/ECA/JEDEC J-STD-002, Condition B
<b>Humidity Test</b>	MIL-STD-202, Method 103, Conditions D
<b>Resistance to Solvents</b>	MIL-STD-202, Method 210, Condition B

<b>Moisture Resistance</b>	MIL-STD-202, Method 106
<b>Thermal Shock</b>	MIL-STD-202, Method 107, Condition B
<b>Mechanical Shock</b>	MIL-STD-202, Method 213, Condition A
<b>Vibration</b>	MIL-STD-202, Method 201
<b>Vibration, High Frequency</b>	MIL-STD-202, Method 204, Condition D
<b>Dissolution of Metallization</b>	IPC/ECA/JEDEC J-STD-002, Condition D
<b>Terminal Strength</b>	IEC 60127-4

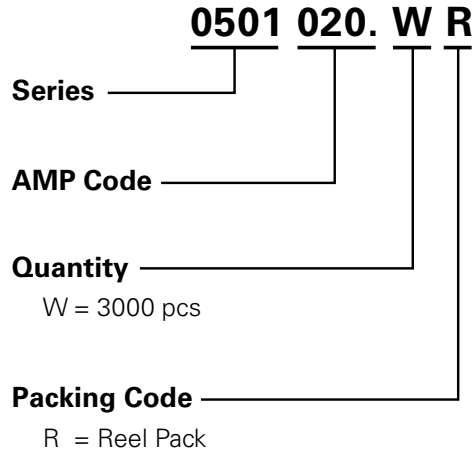
**Dimensions**



**Part Marking System**

Amp Code	Marking Code
010.	<b>10</b>
012.	<b>12</b>
015.	<b>15</b>
020.	<b>20</b>

**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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