

### Description

The 2016L Series PTC provides surface mount overcurrent protection for low voltage ( $\leq 60V$ ) applications where resettable protection is desired.



### Features

- RoHS compliant, lead-free and halogen-free
- High voltage
- Fast response to fault currents
- Low-profile



### Applications

- IEE1394 port protection
- Powered ethernet port protection (IEEE 802.3 af)
- Automotive electronic control module protection
- Low voltage telecom equipment protection

### Agency Approvals

AGENCY	AGENCY FILE NUMBER
	E183209
	R50119118

### Electrical Characteristics

Part Number	Marking	$I_{hold}$ (A)	$I_{trip}$ (A)	$V_{max}$ (Vdc)	$I_{max}$ (A)	$P_d$ typ. (W)	Maximum Time To Trip		Resistance			Agency Approvals	
							Current (A)	Time (Sec.)	$R_{min}$ ( $\Omega$ )	$R_{typ}$ ( $\Omega$ )	$R_{1max}$ ( $\Omega$ )		
2016L030	LF030	0.30	0.60	60	20	1.40	1.5	3.0	0.500	1.40	2.30	X	X
2016L050	LF050	0.55	1.10	60	20	1.40	2.5	5.0	0.200	0.70	1.00	X	X
2016L075/60	LF075-60	0.75	1.50	60	20	1.40	8.0	0.5	0.130	0.50	0.90	*	*
2016L100	LF100	1.10	2.20	15	40	1.40	8.0	0.5	0.100	0.25	0.40	X	X
2016L100/33	LF100-33	1.10	2.20	33	40	1.40	8.0	0.5	0.100	0.25	0.40	X	X
2016L150	LF150	1.50	3.00	15	40	1.40	8.0	1.0	0.070	0.13	0.18	X	X
2016L200	LF200	2.00	4.20	6	40	1.40	8.0	3.0	0.048	0.07	0.10	X	X

$I_{hold}$  = Hold current: maximum current device will pass without tripping in 20°C still air.

$I_{trip}$  = Trip current: minimum current at which the device will trip in 20°C still air.

$V_{max}$  = Maximum voltage device can withstand without damage at rated current ( $I_{max}$ )

$I_{max}$  = Maximum fault current device can withstand without damage at rated voltage ( $V_{max}$ )

$P_d$  = Power dissipated from device when in the tripped state at 20°C still air.

$R_{min}$  = Minimum resistance of device in initial (un-soldered) state.

$R_{typ}$  = Typical resistance of device in initial (un-soldered) state.

$R_{1max}$  = Maximum resistance of device at 20°C measured one hour after tripping or reflow soldering of 260°C for 20 sec.

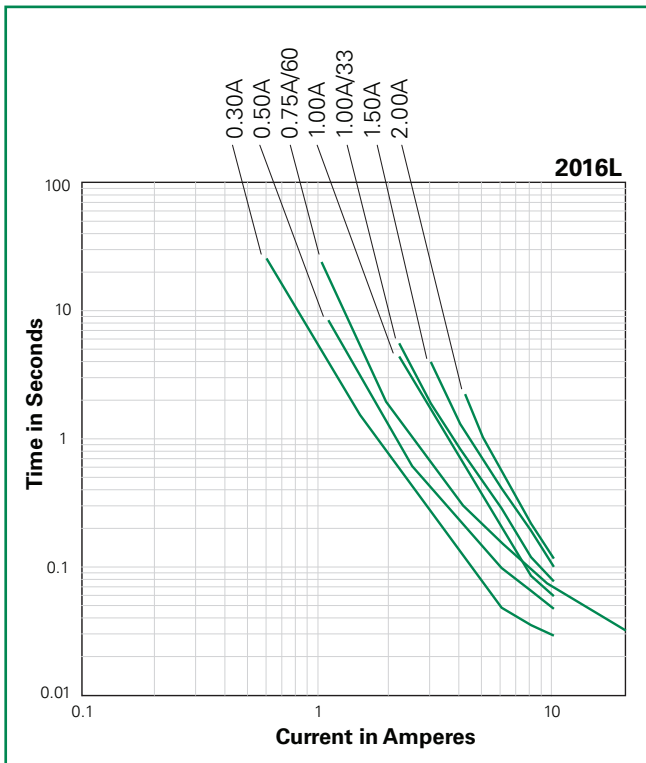
**Caution:** Operation beyond the specified rating may result in damage and possible arcing and flame.

\* Agency Approval is Pending

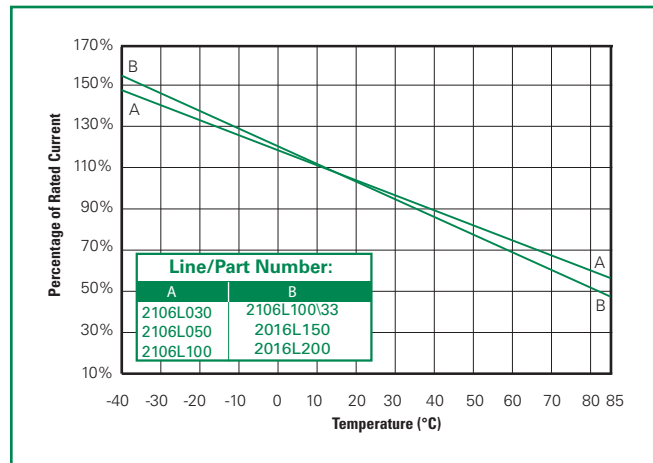
**Temperature Derating**

Part Number	Ambient Operation Temperature								
	-40°C	-20°C	0°C	23°C	40°C	50°C	60°C	70°C	85°C
2016L030	0.45	0.40	0.35	0.30	0.25	0.23	0.20	0.18	0.14
2016L050	0.93	0.80	0.65	0.50	0.38	0.32	0.25	0.19	0.09
2016L075/60	1.21	1.06	0.91	0.75	0.61	0.54	0.45	0.38	0.26
2016L100	1.66	1.47	1.29	1.10	0.91	0.83	0.73	0.64	0.50
2016L100/33	1.66	1.47	1.29	1.10	0.91	0.83	0.73	0.64	0.50
2016L150	2.26	2.00	1.76	1.50	1.24	1.13	1.00	0.87	0.68
2016L200	2.80	2.50	2.19	2.00	1.84	1.74	1.50	1.34	1.14

**Average Time Current Curves**



**Temperature Derating Curve**



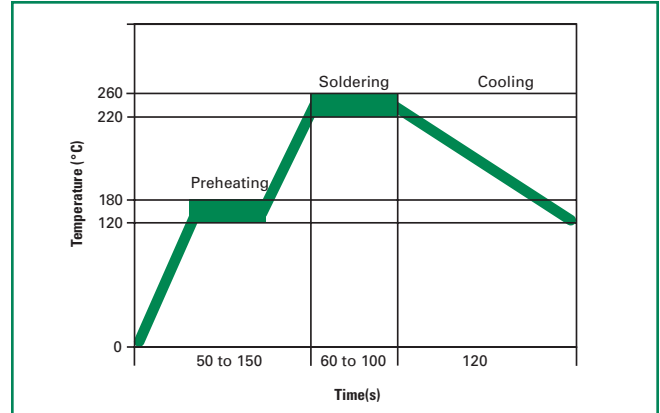
The average time current curves and Temperature Derating curve performance is affected by a number of variables, and these curves provided as guidance only. Customer must verify the performance in their application.

**Soldering Parameters**

Condition	Reflow
Peak Temp/ Duration Time	260°C / 10 Sec
Time above liquids (TAL) 220°C	60 Sec ~ 100 Sec
Preheat 120°C~ 180°C	50 Sec ~ 150 Sec
Storage Condition	0°C~35°C, ≤70%RH

- Recommended reflow methods: IR, vapor phase oven, hot air oven, N<sub>2</sub> environment for lead-free
- Recommended maximum paste thickness is 0.25mm (0.010 inch)
- Devices can be cleaned using standard industry methods and solvents.

**Note:** If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

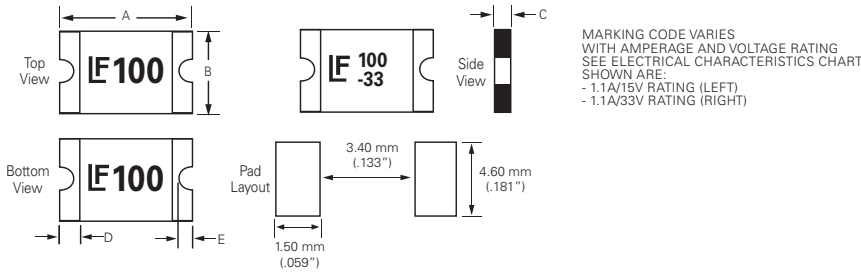

**Physical Specifications**

<b>Terminal Material</b>	Solder-Plated Copper (Solder Material: Matte Tin(Sn))
<b>Lead Solderability</b>	Meets EIA Specification RS186-9E, ANSI/J-STD-002 Category 3.

**Environmental Specifications**

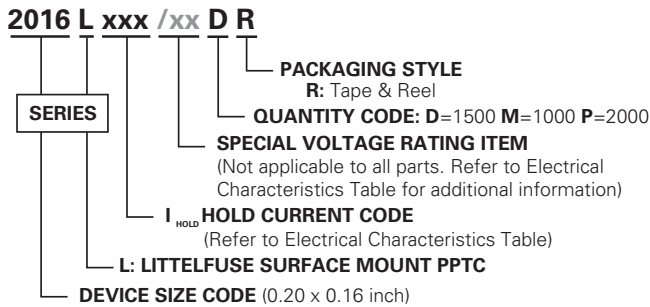
<b>Operating/Storage Temperature</b>	-40°C to +85°C
<b>Maximum Device Surface Temperature in Tripped State</b>	125°C
<b>Passive Aging</b>	+85°C, 1000 hours -/+5% typical resistance change
<b>Humidity Aging</b>	+85°C, 85%, R.H., 1000 hours -/+5% typical resistance change
<b>Thermal Shock</b>	MIL-STD-202, Method 107G +85°C/-40°C 20 times -30% typical resistance change
<b>Solvent Resistance</b>	MIL-STD-202, Method 215 No change
<b>Vibration</b>	MIL-STD-883C, Method 2007.1, Condition A No change
<b>Moisture Sensitivity Level</b>	Level 1, J-STD-020C

**Dimensions (mm)**



Part Number	A		B		C		D		E											
	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm										
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max										
2016L030					0.03	0.05	0.75	1.25												
2016L050					0.05	0.08	1.2	2												
2016L075/60					0.05	0.08	1.2	2												
2016L100	0.19	0.21	4.72	5.44	0.15	0.17	3.7	4.43	0.02	0.03	0.5	0.75	0.01	0.06	0.3	1.5	0.01	0.03	0.25	0.65
2016L100/33									0.03	0.05	0.75	1.25								
2016L150									0.03	0.06	0.75	1.55								
2016L200									0.02	0.03	0.5	0.75								

**Part Ordering Number System**



**Packaging**

Part Number	Ordering Number	Halogen Free	I <sub>hold</sub> (A)	I <sub>hold</sub> Code	Voltage Option	Packaging Option	Quantity	Quantity & Packaging Codes
2016L030	2016L030DR	Yes	0.30	030		Tape and Reel	1500	DR
2016L050	2016L050MR	Yes	0.55	050		Tape and Reel	1000	MR
2016L075/060	2016L075/60MR	Yes	0.75	075	/60	Tape and Reel	1000	MR
2016L100	2016L100PR	Yes	1.10	110		Tape and Reel	2000	PR
2016L100/33	2016L100/33DR	Yes	1.10	110	/33	Tape and Reel	1500	DR
2016L150	2016L150DR	Yes	1.50	150		Tape and Reel	1500	DR
2016L200	2016L200PR	Yes	2.00	200		Tape and Reel	2000	PR

**Tape and Reel Specifications**

TAPE SPECIFICATIONS: EIA-481-1 (mm)			
	2016L100 2016L200	2016L030 2016L100/33 2016L150	2016L050 2016L075/60
<b>W</b>	12.0+/-0.30	12.0+/-0.30	12.0+/-0.30
<b>F</b>	5.50+/-0.05	5.50+/-0.05	5.50+/-0.05
<b>E<sub>1</sub></b>	1.75+/-0.10	1.75+/-0.10	1.75+/-0.10
<b>D<sub>0</sub></b>	1.55+/-0.05	1.55+/-0.05	1.55+/-0.05
<b>D<sub>1</sub></b>	1.50 (MIN)	1.50 (MIN)	1.50 (MIN)
<b>P<sub>0</sub></b>	4.0+/-0.10	4.0+/-0.10	4.0+/-0.10
<b>P<sub>1</sub></b>	8.0+/-0.10	8.0+/-0.10	8.0+/-0.10
<b>P<sub>2</sub></b>	2.0+/-0.05	2.0+/-0.05	2.0+/-0.05
<b>A<sub>0</sub></b>	4.40+/-0.10	4.48+/-0.10	4.45+/-0.10
<b>B<sub>0</sub></b>	5.50+/-0.10	5.40+/-0.10	5.48+/-0.10
<b>T</b>	0.25+/-0.10	0.25+/-0.10	0.25+/-0.10
<b>K<sub>0</sub></b>	0.80+/-0.10	1.36+/-0.10	1.86+/-0.10
<i>Leader Min.</i>	390	390	390
<i>Trailer Min.</i>	160	160	160

REEL DIMENSIONS: EIA-481-1 (mm)	
<b>H</b>	12.0+/-0.05
<b>W</b>	13.2+/-1.5
<b>D</b>	Ø 60+0.5
<b>F</b>	Ø13.0+/-0.2
<b>C</b>	Ø178+/-1.0
<b>H<sub>1</sub></b>	11+/-0.5
<b>W<sub>1</sub></b>	2.2+/-0.5
<b>W<sub>2</sub></b>	3.0+0.5
<b>W<sub>3</sub></b>	4.0+0.5
<b>W<sub>4</sub></b>	5.5+0.5

2016L Series

**Tape and Reel Diagram**

