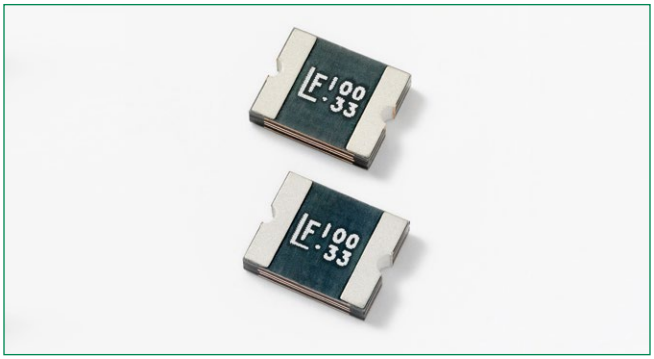
2016L Series



Description

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

Features

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

Agency Approvals

Agency	Agency File Number
c UL us	E183209
	R50119118

Applications

- IEEE 1394 port protection
- Powered ethernet port protection (IEEE 802.3 af)
- Automotive electronic control module protection
- Low voltage telecom equipment protection

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} (Ω)	R_{1max} (Ω)	c UL us	
2016L030	LF030	0.30	0.60	60	20	1.40	1.5	3.0	0.500	2.300	X	X
2016L050	LF050	0.55	1.10	60	20	1.40	2.5	5.0	0.200	1.000	X	X
2016L075/60	LF075	0.75	1.50	60	20	1.40	8.0	0.5	0.130	0.900	X	X
2016L100	LF100	1.10	2.20	15	40	1.40	8.0	0.5	0.100	0.400	X	X
2016L100/33	LF100-33	1.10	2.20	33	40	1.40	8.0	0.5	0.100	0.400	X	X
2016L150	LF150	1.50	3.00	15	40	1.40	8.0	1.0	0.070	0.180	X	X
2016L150/33	LF150-33	1.50	3.00	33	40	2.0	8.00	1.00	0.070	0.180	X	X
2016L200	LF200	2.00	4.20	6	40	1.40	8.0	3.0	0.048	0.100	X	X
2016L260/24	LF260-24	2.60	5.00	24	40	1.6	8.00	5.00	0.025	0.075	X	X
2016L300/16	LF300	3.00	5.00	16	40	1.6	8.00	10.00	0.015	0.048	X	X
2016L500	LF500	5.00	10.00	6	100	2.0	25.00	2.00	0.005	0.025	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

WARNING

- Users shall independently assess the suitability of these devices for each of their applications
- Operation of these devices beyond the stated maximum ratings could result in damage to the devices and lead to electrical arcing and/or fire
- These devices are intended to protect against the effects of temporary over-current or over-temperature conditions and are not intended to perform as protective devices where such conditions are expected to be repetitive or prolonged in duration
- Exposure to silicon-based oils, solvents, electrolytes, acids, and similar materials can adversely affect the performance of these PPTC devices
- These devices undergo thermal expansion under fault conditions, and thus shall be provided with adequate space and be protected against mechanical stresses
- Circuits with inductance may generate a voltage (L di/dt) above the rated voltage of the PPTC device.

Revised: 05/10/19

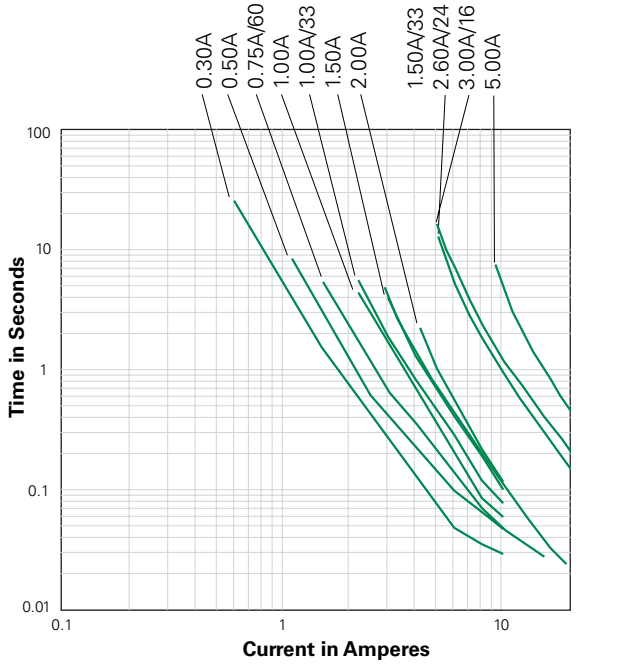
POLY-FUSE® Resettable PTCs

Surface Mount > 2016L Series

Temperature Rerating

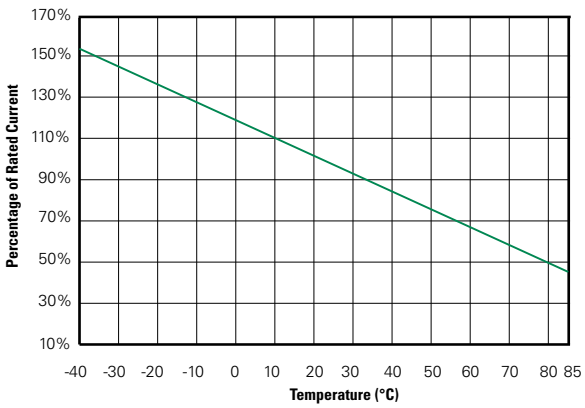
	Ambient Operation Temperature								
	-40°C	-20°C	0°C	20°C	40°C	50°C	60°C	70°C	85°C
Part Number	**Hold Current (A)**								
2016L030	0.45	0.40	0.35	0.30	0.25	0.23	0.20	0.18	0.14
2016L050	0.93	0.95	0.65	0.55	0.42	0.38	0.33	0.30	0.23
2016L075/60	1.05	1.06	0.85	0.75	0.60	0.55	0.45	0.40	0.30
2016L100	1.66	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
2016L150/33	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
2016L260/24	3.82	3.46	3.06	2.60	2.24	2.03	1.82	1.60	1.26
2016L300/16	4.40	3.96	3.52	3.00	2.65	2.43	2.20	1.96	1.59
2016L500	7.29	6.57	5.86	5.00	4.38	4.02	3.66	3.26	2.66

Average Time Current Curves



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

Temperature Rerating Curve



Note:
Typical Temperature rerating curve, refer to table for derating data

Additional Information

Datasheet | **Resources** | **Samples**

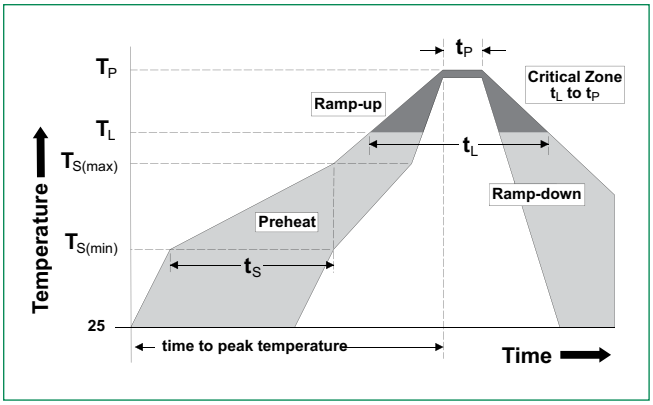
Revised: 05/10/19

POLY-FUSE® Resettable PTCs

Surface Mount > 2016L Series

Soldering Parameters

Profile Feature		Pb-Free Assembly
Average Ramp-Up Rate ($T_{S(max)}$ to T_P)		3°C/second max
Pre Heat:	Temperature Min ($T_{s(min)}$)	150°C
	Temperature Max ($T_{s(max)}$)	200°C
	Time (Min to Max) (t_s)	60 – 180 secs
Time Maintained Above:	Temperature (T_L)	217°C
	Temperature (t_L)	60 – 150 seconds
Peak / Classification Temperature (T_P)		$260^{+0/-5}$ °C
Time within 5°C of actual peak Temperature (t_p)		20 – 40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes Max.



- All temperature refer to topside of the package, measured on the package body surface
- If reflow temperature exceeds the recommended profile, devices may not meet the performance requirements
- Recommended reflow methods: IR, vapor phase oven, hot air oven, N_2 environment for lead
- Recommended maximum paste thickness is 0.25mm (0.010inch)
- Devices can be cleaned using standard industry methods and solvents
- Devices can be reworked using the standard industry practices

Physical Specifications

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

Environmental Specifications

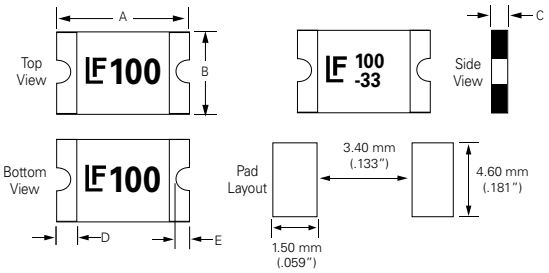
Operating/Storage Temperature	-40°C to +85°C
Maximum Device Surface Temperature in Tripped State	125°C
Passive Aging	+85°C, 1000 hours -/+5% typical resistance change
Humidity Aging	+85°C, 85%,R.H.,1000 hours -/+5% typical resistance change
Thermal Shock	MIL–STD–202, Method 107 +85°C/-40°C 20 times -30% typical resistance change
Solvent Resistance	MIL–STD–202, Method 215 No change
Vibration	MIL–STD–883, Method 2007, Condition A No change
Moisture Sensitivity Level	Level 1, J–STD–020

Revised: 05/10/19

POLY-FUSE® Resettable PTCs

Surface Mount > 2016L Series

Dimensions (mm)



MARKING CODE VARIES
WITH AMPERAGE AND VOLTAGE RATING
SEE ELECTRICAL CHARACTERISTICS CHART
SHOWN ARE:
- 1.1A/15V RATING (LEFT)
- 1.1A/33V RATING (RIGHT)

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	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2016L030									0.03	0.05	0.75	1.25								
2016L050									0.05	0.08	1.20	2.00								
2016L075/60								4.43	0.05	0.08	1.20	2.00								
2016L100									0.02	0.03	0.50	0.75								
2016L100/33									0.03	0.05	0.75	1.25								
2016L150	0.19	0.21	4.72	5.44	0.15	0.17	3.7		0.03	0.06	0.75	1.55	0.01	0.06	0.3	1.5	0.01	0.03	0.25	0.65
2016L150/33								4.43	0.03	0.06	0.80	1.60								
2016L200								4.43	0.02	0.03	0.50	0.75								
2016L260/24																				
2016L300/16								4.43	0.03	0.06	0.80	1.60								
2016L500																				

Part Ordering Number System

2016 L xxx /xx D R - A

- **-A:** Automotive grade
  Blank: Standard version
- **PACKAGING STYLE**
  R: Tape & Reel
- **QUANTITY CODE: D**=1500 **M**=1000 **P**=2000
- **SPECIAL VOLTAGE RATING ITEM**
  (Not applicable to all parts. Refer to Electrical Characteristics Table for additional information)
- **I_{HOLD} HOLD CURRENT CODE**
  (Refer to Electrical Characteristics Table)
- **L: LITTELFUSE SURFACE MOUNT PPTC**
- **SERIES**
- **DEVICE SIZE CODE** (0.20 x 0.16 inch)

Packaging

Part Number	Ordering Number	Halogen Free	I_{hold} (A)	I_{hold} 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
2016L150/33	2016L150/33DR	Yes	1.50	150	/33	Tape and Reel	1,500	DR
2016L200	2016L200PR	Yes	2.00	200		Tape and Reel	2000	PR
2016L260/24	2016L260/24MR	Yes	2.60	260	/24	Tape and Reel	1,000	MR
2016L300/16	2016L300/16MR	Yes	3.00	300	/16	Tape and Reel	1,000	MR
2016L500	2016L500DR	Yes	5.00	500	/6	Tape and Reel	1,500	DR

Revised: 05/10/19

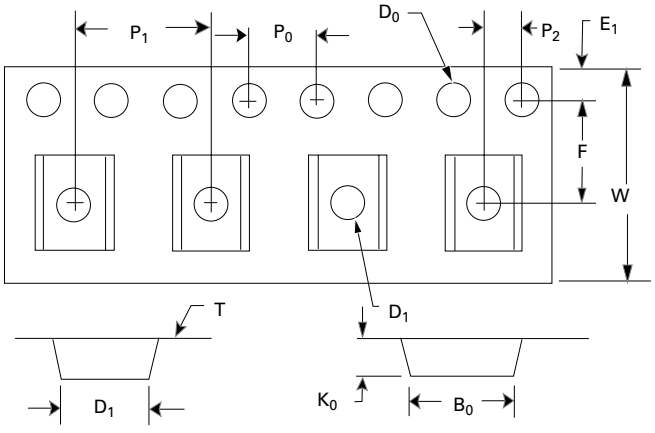
Tape and Reel Specifications

TAPE SPECIFICATIONS: EIA-481-1 (mm)			
	2016L100 2016L200	2016L030 2016L100/33 2016L150 2016L150/33 2016L500	2016L050 2016L075/60 2016L260/24 2016L300/16
W	12.0+/-0.30	12.0+/-0.30	12.0+/-0.30
F	5.50+/-0.05	5.50+/-0.05	5.50+/-0.05
E_1	1.75+/-0.10	1.75+/-0.10	1.75+/-0.10
D_0	1.55+/-0.05	1.55+/-0.05	1.55+/-0.05
D_1	1.50 (MIN)	1.50+/-0.10	1.50+/-0.10
P_0	4.0+/-0.10	4.0+/-0.10	4.0+/-0.10
P_1	8.0+/-0.10	8.0+/-0.10	8.0+/-0.10
P_2	2.0+/-0.05	2.0+/-0.05	2.0+/-0.05
A_0	4.40+/-0.10	4.48+/-0.10	4.45+/-0.10
B_0	5.50+/-0.10	5.40+/-0.10	5.48+/-0.10
T	0.25+/-0.10	0.25+/-0.10	0.25+/-0.10
K_0	0.75+/-0.10	1.36+/-0.10	1.86+/-0.10
Leader Min.	390	390	390
Trailer Min.	160	160	160

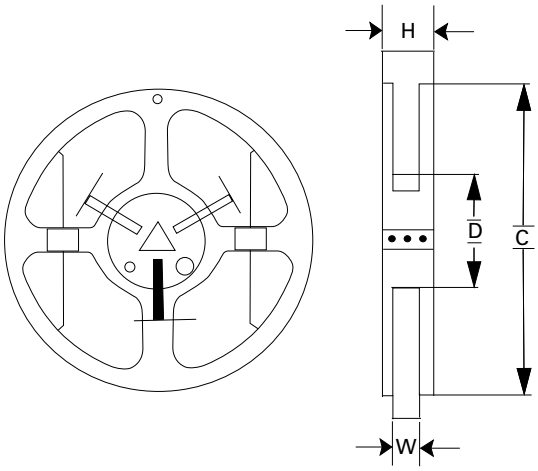
REEL DIMENSIONS: EIA-481-1 (mm)	
C	Ø178.0+/-1.0
D	Ø60.2+/-0.5
H	16.0+/-0.5
W	13.2+/-1.5

Tape and Reel Diagram

Tape Specifications



Reel Specifications



Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001
Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

Данный компонент на территории Российской Федерации

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http://moschip.ru/get-element

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