POLYTRONICS
POLYTRONICS TECHNOLOGY CORP.

PRODUCT
DATASHEET

CLM1612 15A C Series Device

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Description

Current Limiting Module (CLM) is a chip type surface mountable device that can protect against both overcurrent and overcharging. It comprises a fuse element to ensure stable operation under normal electrical current and to cut off the current when overcurrent occurs. It also comprises a resistive heating element that could be used in combination with a voltage detecting means, such as IC and FET. When overvoltage is detected, the heating element is electrically excited to generate heat to blow the fuse element to achieve overvoltage protection.

Features

- Halogen-free
- Overcharging protection
- Overcurrent protection
- Surface mountable
- Fast response time

Application

- Notebook
- Cell phone
- Camera
- Ultrabook
- Tablet PC
- Automotive applications
- Printer
- Security systems

Agency Approval and Environmental Compliance

Agency	File Number
c UL us	E331807
TÜVRheinland CERTIFIED	TA 50359102

Regulation	Standard
Halogen Free	IEC 61249-2-21:2003

Electrical Specifications

Part Number	I_{rated} (A)	Cells in series	V_{max} (V_{DC})	I_{break} (A)	V_{OP} (V)	Resistance		Agency Approval	
						R_{heater} (Ω)	R_{fuse} (mΩ)	c UL us	TÜVRheinland
CLM1612P0415C	15	1	36	50	3.0 ~ 4.5	0.6 ~ 1.5	1.0 ~ 3.0	✓	✓
CLM1612P0815C	15	2	36	50	5.0 ~ 9.0	2.2 ~ 3.3	1.0 ~ 3.0	✓	✓
CLM1612P1215C	15	3	36	50	7.4 ~ 13.8	5.5 ~ 8.4	1.0 ~ 3.0	✓	✓
CLM1612P1415C	15	4	36	50	10.5 ~ 19.6	10.4 ~ 15.8	1.0 ~ 3.0	✓	✓
CLM1612P2015C	15	5	36	50	14.4 ~ 23.5	17.9 ~ 29.1	1.0 ~ 3.0	✓	✓

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Electrical Characteristics

Current Capacity	100% x I_{rated} No Melting
Cut Time	200% x I_{rated} < 1 min
Interrupting Current	5 x I_{rated}, power on 5 ms, power off 995 ms, 10000 cycles No Melting

Note on Electrical Specifications & Characteristics

■ **Vocabulary**

I_{rated}	= Current carrying capacity that is measured at 40°C thermal equilibrium condition.
I_{break}	= The current that the fuse element is able to interrupt.
V_{max}	= The maximum voltage that can be cut off by fuse.
R_{heater}	= The resistance of the heating element.
R_{fuse}	= The resistance of the fuse element.
Cells in series	= Number of battery cells connected in series in the circuit for CLM device to protect.

■ **Value specified is determined by using the PWB with 2mm*2oz copper traces, AWG18 covered wire, and 0.6mm glass epoxy PCB.**

■ **Specifications are subject to change without notice.**

⚠WARNING

■ **General**

- Before and after mounted, the ultrasonic-cleaning or immersion-cleaning must not be done to CLM device. The flux on element would flow, and it would not be satisfied its specification when cleaning is done. In addition, a similar influence happens when the product comes in contact with cleaning-solution. These products after cleaning will not be guaranteed.
- Silicone-based oils, oils, solvents, gels, electrolytes, fuels, acids, and the like will adversely affect the properties of CLM devices, and shall not be used or applied.
- Please Do Not reuse the CLM device removed by the soldering process.
- CLM devices are secondary protection devices and are used solely for sporadic, accidental over-current or over-temperature error condition, and shall NOT be used if or when constant or repeated fault conditions (such fault conditions may be caused by, among others, incorrect pin-connection of a connector) or over-extensive trip events may occur.
- Operation over the maximum rating or other forms of improper use may cause failure, arcing, flame and/or other damage to the CLM devices.
- The performance of CLM devices will be adversely affected if they are improperly used under electronic, thermal and/or mechanical procedures and/or conditions non-conformant to those recommended by manufacturer.
- Customers shall be responsible for determining whether it is necessary to have back-up, failsafe and/or fool-proof protection to avoid or minimize damage that may result from extra-ordinary, irregular function or failure of CLM devices.

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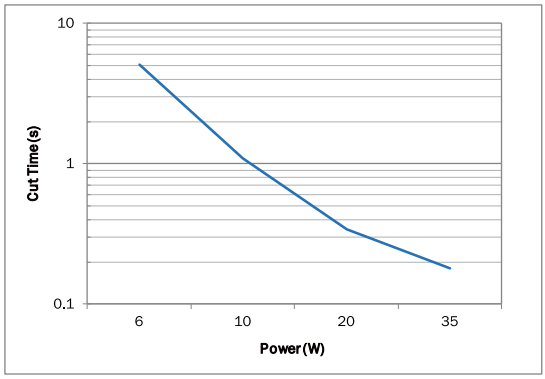
Thermal Derating Characteristics

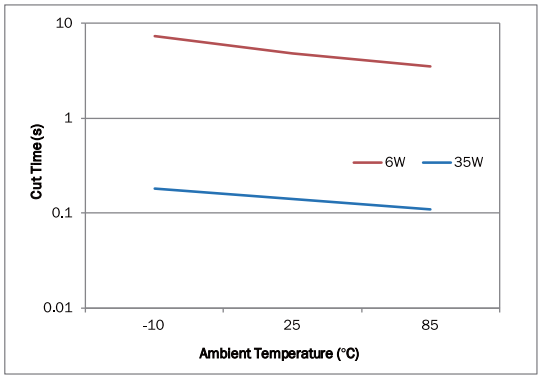
Ambient Temperature (°C)	25	40	60
Recommend Rated Current (A)	18.0	16.0	13.5

Cut Time by Heater Operation

■ Various heater wattage at 25°C ambient temperature.

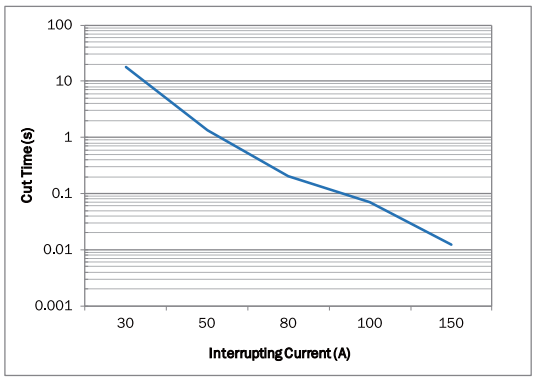


■ Constant heater wattage at various ambient temperature.

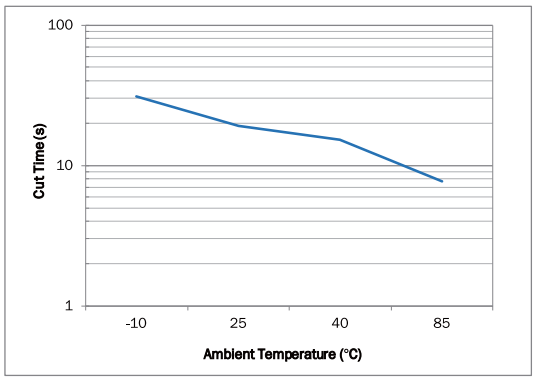


Cut Time by Current Operation

■ Various interrupting current at 25°C ambient temperature.



■ Constant 2x rated current at various ambient temperature.



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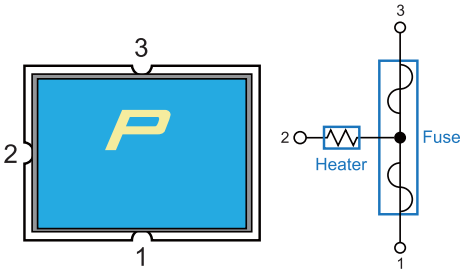
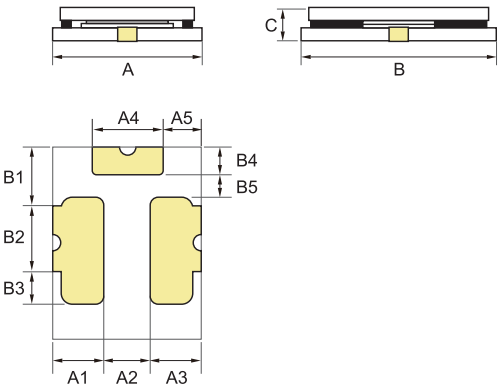
Device Circuit



Physical Dimensions (mm.)



A	3.00 ± 0.2
B	4.00 ± 0.3
C	0.90 max
A1	1.03 ± 0.1
A2	0.96 ± 0.1
A3	1.03 ± 0.1
A4	1.44 ± 0.1
A5	0.80 ± 0.1

B1	1.26 ± 0.1
B2	1.35 ± 0.1
B3	0.67 ± 0.1
B4	0.58 ± 0.1
B5	0.50 ± 0.1

Part Number System

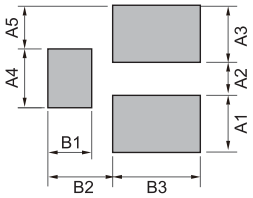
CLM 1612 P 04 15 C

- C — Ceramic Cover
- 15 — Rated Current (15A)
- 04 — Operation Voltage (4V)
- P — Company Symbol
- 1612 — Device Size (L: 0.16", W: 0.12")
- CLM — Current Limiting Module

Environmental Specifications

Operating/Storage Temperature	-10°C to +65 °C / <40°C,<60%RH
Hot Passive Aging	100±5°C, 250 hours No structural damage and functional failure
Humidity Aging	60°C±2°C, 90~95%R.H. 250 hours No structural damage and functional failure
Cold Passive Aging	-20±3°C, 500 hours No structural damage and functional failure
Thermal Shock	MIL-STD-202 Method 107G +125°C /-55°C, 100 times No structural damage and functional failure
Solvent Resistance	MIL-STD-202, Method 215
Vibration	MIL-STD-883C, Method 2007.1, Condition A No structural damage and functional failure
Moisture Level Sensitivity	Level 1, J-STD-020C

Board and Solder Layout Recommend (mm)

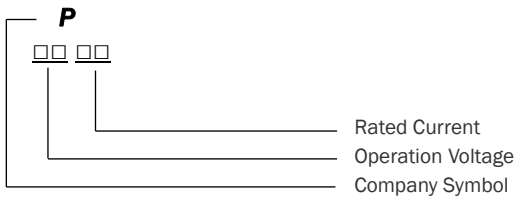


Material	Glass Epoxy PCB
Base Thickness	0.6mm
Copper Thickness	0.07mm
Covered Wire	AWG18

A1	1.55 ± 0.1
A2	0.90 ± 0.1
A3	1.55 ± 0.1
A4	1.60 ± 0.1
A5	1.20 ± 0.1

B1	1.20 ± 0.1
B2	1.55 ± 0.1
B3	2.40 ± 0.1

Part Marking System



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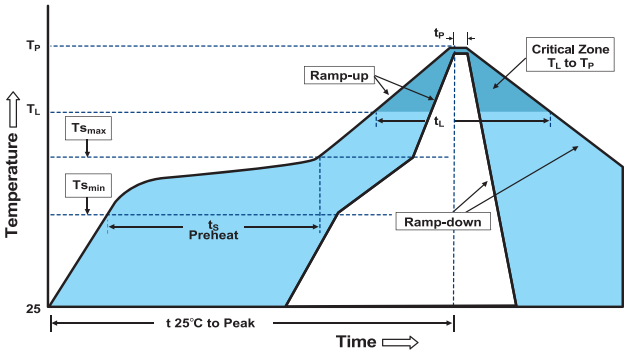
Soldering Parameters

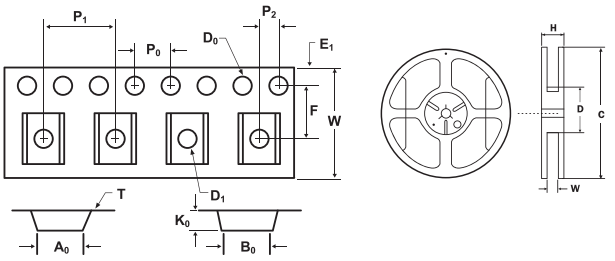


Average Ramp-Up Rate (Ts_{max} to T_P)	3°C/second max.
Preheat	
-Temperature Min (Ts_{min})	150°C
-Temperature Max (Ts_{max})	200°C
-Time (Ts_{min} to Ts_{max})	60-180 seconds
Time maintained above:	
-Temperature (T_L)	217°C
-Time (t_L)	60-150 seconds
Peak Temperature (T_P)	260°C
Time within 5°C of actual Peak Temperature (t_P)	20-40 seconds
Ramp-Down Rate	6°C /second max.
Time 25°C to Peak Temperature	5 minutes max.
Storage Condition	0°C ~35°C, ≦ 70%RH 3 months after shipment

Note 1: The temperature shown above is the top-side surface temperature of the device.
Note 2: If the soldering temperature profile deviates from the recommended profile, devices may not meet the performance requirements

Tape & Reel Specification (mm.)

Devices are packaged per EIA481 and EIA-2 standard



W	12.0 ± 0.30
F	5.50 ± 0.05
E_1	1.75 ± 0.10
D_0	1.55 ± 0.05
D_1	1.50 ± 0.10
P_0	4.00 ± 0.10
P_1	8.00 ± 0.10
P_2	2.00 ± 0.10
A_0	3.32 ± 0.10
B_0	4.32 ± 0.10
T	0.23 ± 0.05
K_0	1.3 ± 0.10

H	16.5 ± 0.1
W	12.5 ± 1.5
D	Ø62.5 ± 0.5
C	Ø330 ± 1.0

Packaging Quantity

Part Number	Tape & Reel Quantity
CLM1612PXX15C	5000