

HCRTP-mini-C

Reflowable Thermal Protectors



Description

High Current Reflowable Thermal Protection Mini (HCRTP-MINI-C) Device is a low-resistance, robust surface mountable thermal protector. It has a set open temperature and can be installed using reliable, lead-free, Surface Mount Device (SMD) assembly and reflow processes.

The HCRTP-MINI-C device, recently added to the RTP family, can help withstand the demanding environmental, life and reliability requirements of automotive and industrial applications, including shock, vibration, temperature cycling and humidity exposures. In the field, the HCRTP-MINI-C device opens if its internal junction exceeds the device's specified open temperature. Temperature increases can have multiple sources, one of which is component failure (e.g., when using power components such as a powerFET, capacitor, resistor, triac, etc.) The HCRTP-MINI-C device open temperature is selected so that the device does not open within normal component operating windows, but it does open in a thermal runaway event and before the melt temperature of typical lead-free solders.

Applications

- Automotive HVAC, ABS, power steering, DC/DC converters, diesel heaters, engine cooling fans, body control modules, PTC heaters, etc.
- IT servers, telecom power converters, etc.
- Other industrial applications with high demanding environmental, life and reliability requirements
- Other DC thermal protection

[See Disclaimer Notice](#)

Features & Benefits

- Capable of high hold current
- Low profile, compact footprint
- Compatible with SMD solder reflow process up to 260°C
- Low series resistance; DC interrupt voltage capable
- Helps prevent failed components from causing damage in case of a thermal event
- Allows the use of standard surface-mount production methods so that no special assembly costs are required
- Low power dissipation and voltage drop
- Supports DC electronic circuits
- AEC-Q200 qualified

Additional Information



Resources



Samples

Specifications

| | |
|-------------------------------------|--------------------|
| Voltage Rating: | 500A @ 16 VDC |
| Interrupting Rating: | 16 VDC |
| Operating Temperature Range: | -55°C to + 150°C |
| Initial Resistance: | 53μΩ Min, 91μΩ Max |

HCRTP-mini-C

Reflowable Thermal Protectors

Ordering Information

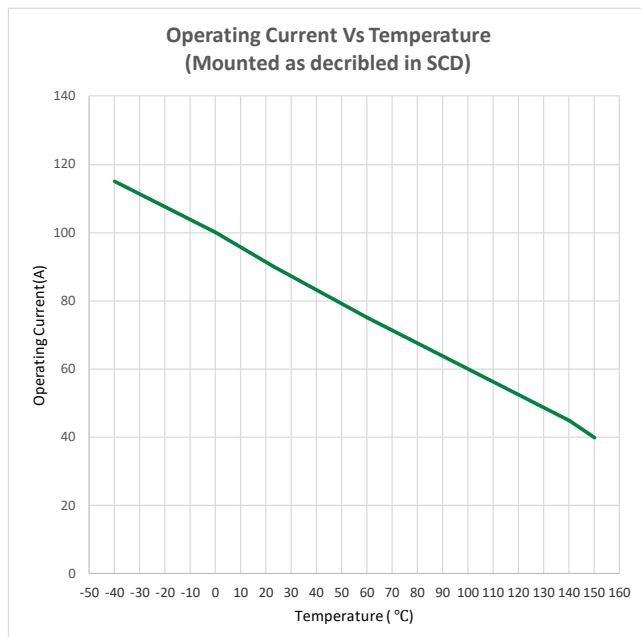
| Part Number | Part Description | Package Size |
|-------------|------------------|--------------|
| RF4678-000 | HCRTP-MINI-C | 4000 |

Referenced Performance

Results obtained on 44.4mm x 57.2 mm x1.6mm of 2-sided FR4 board T4485 with 4.0 oz. Copper Trace. HCRTP-mini-C device surface-mounted on test board T4485 using solder paste SAC 305 with recommended pad layout and solder stencil opening and thickness. Post reflow resistance based on SMT 1x reflow as outlined in solder reflow recommendation. Results are highly installation-dependent. Users should confirm for their own application.

| Performance | | Min | Typ. | Max | Units |
|--------------------------------|-------------|-----|------|-----|-------|
| Post Reflow Resistance* | @ 23+/-3°C | 60 | 110 | 160 | μΩ |
| | @ 150+/-3°C | 120 | 165 | 210 | |
| Hold Current | @ 23+/-3°C | | | 90 | A |
| | @ 140+/-3°C | | | 45 | |
| Max Interrupt Current | 16 VDC | | | 500 | A |
| Open Temperature | Zero Bias | 212 | 220 | 228 | °C |

*Post reflow Resistance should be measured by a 4 wired method



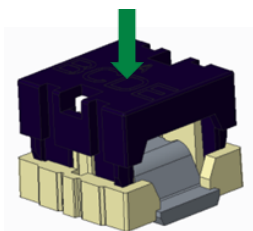
* Halogen Free refers to: Br≤900ppm, Cl≤900ppm, Br+C≤1500ppm.

HCRTP-mini-C

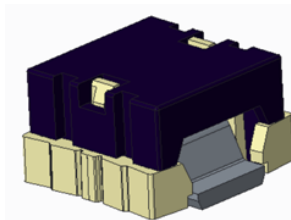
Reflowable Thermal Protectors

Arming method

Arming is to occur after surface mount installation. **Method:** Cap depressed manually or by mechanical plunger.



Downward force required for mechanical arming



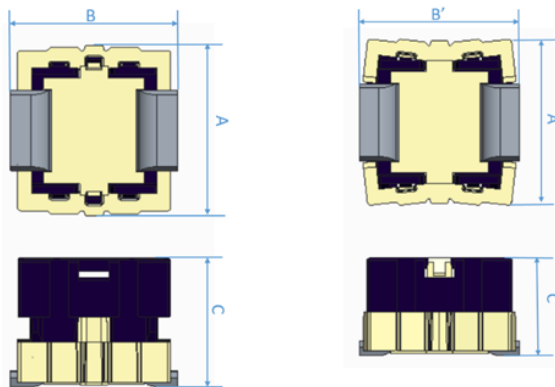
Device after mechanical arming completed

Warning: The device will not function without proper arming. If the device will be depressed by mechanical plunger, the plunger speed should be verified in the user's process.

| Description | Min. | Typ. | Max. | Units |
|--------------------------------------|------|------|------|-------|
| Arming Force (Normal to PCB surface) | 25 | 32.5 | 40 | N |
| Distance of travel | 0.94 | 1.00 | 1.06 | mm |

Dimensions

Dimensions in mm.



Before Mechanical Arming

| | A | | B | | C | |
|----|-------|-------|-------|-------|-------|-------|
| | Min | Max | Min | Max | Min | Max |
| mm | 6.14 | 7.14 | 6.10 | 7.10 | 4.80 | 5.20 |
| in | 0.242 | 0.281 | 0.240 | 0.280 | 0.189 | 0.205 |

After Mechanical Arming

| | A' | | B' | | C' | |
|----|-------|-------|-------|-------|-------|-------|
| | Min | Max | Min | Max | Min | Max |
| mm | 6.83 | 7.83 | 6.10 | 7.10 | 3.80 | 4.20 |
| in | 0.269 | 0.308 | 0.240 | 0.280 | 0.150 | 0.165 |

Rev 11162023

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.

Disclaimer Notice - 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 <https://www.littelfuse.com/legal/disclaimers/product-disclaimer.aspx>