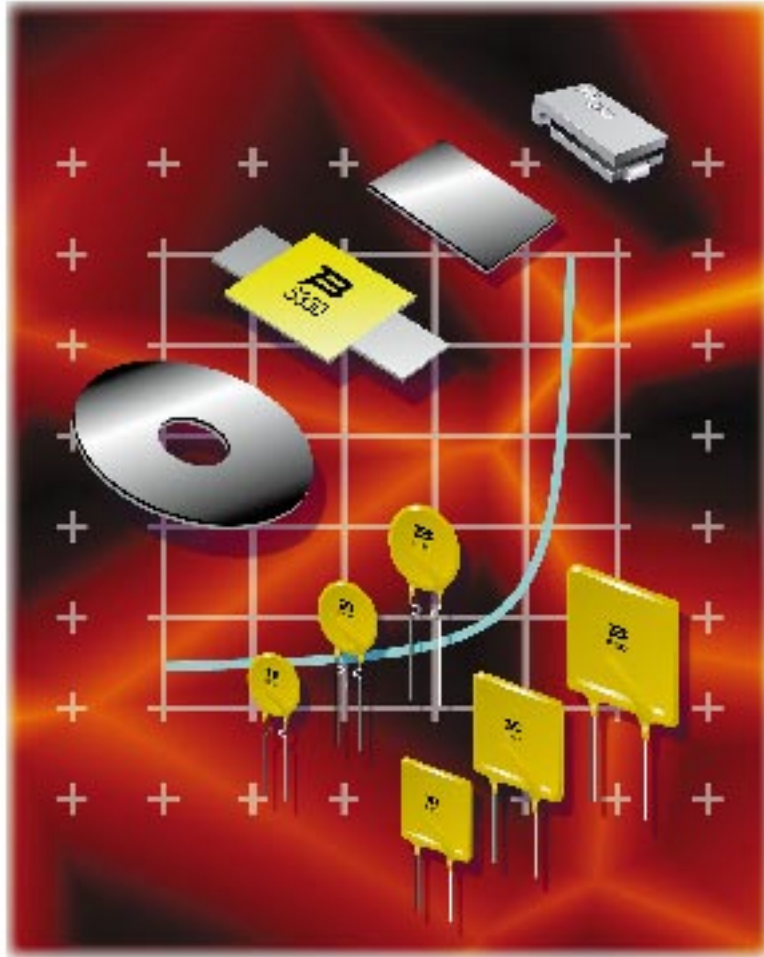


R E S E T T A B L E O V E R C U R R E N T
P R O T E C T O R S

Reset Your Current Thinking™



Multi-use®

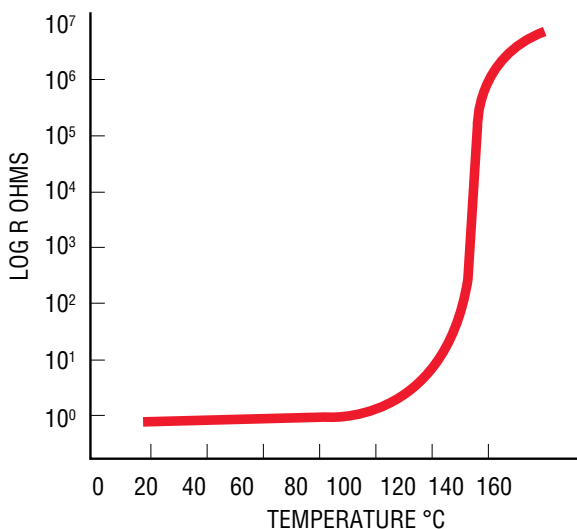
Reset Your Current Thinking™

CIRCUIT PROTECTION

When it comes to Polymeric Positive Temperature Coefficient (PPTC) circuit protection, you now have a choice. If you need a reliable source, look to MULTIFUSE Resettable Overcurrent Protectors from Bourns.

MULTIFUSE products are made from a conductive plastic formed into thin sheets, with electrodes attached to either side. The conductive plastic is manufactured from a non-conductive crystalline polymer and a highly conductive carbon black. The electrodes ensure even distribution of power through the device, and provide a surface for leads to be attached or for custom mounting.

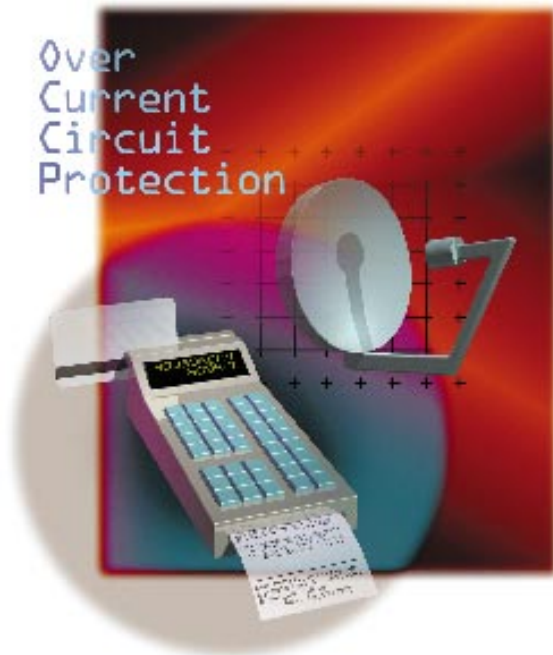
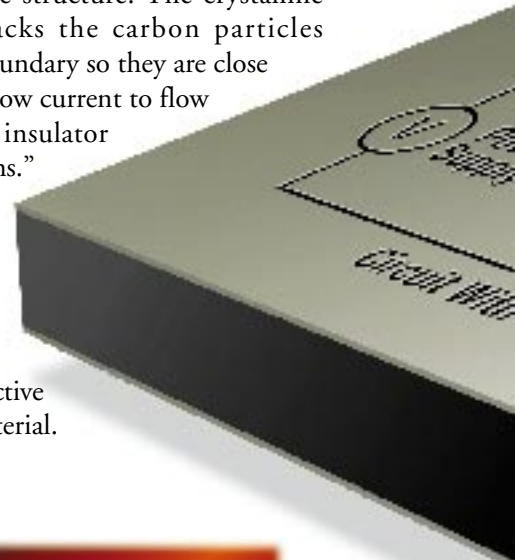
The phenomenon that allows conductive plastic materials to be used for resettable overcurrent protection devices is that they exhibit a very large non-linear Positive Temperature Coefficient (PTC) effect when heated. PTC is a characteristic that many materials exhibit whereby resistance increases with temperature. What makes the MULTIFUSE conductive plastic material unique is the magnitude of its resistance increase. At a specific transition temperature, the increase in resistance is so great that it is typically expressed on a log scale.



HOW MULTIFUSE RESETTABLE OVERCURRENT PROTECTORS WORK

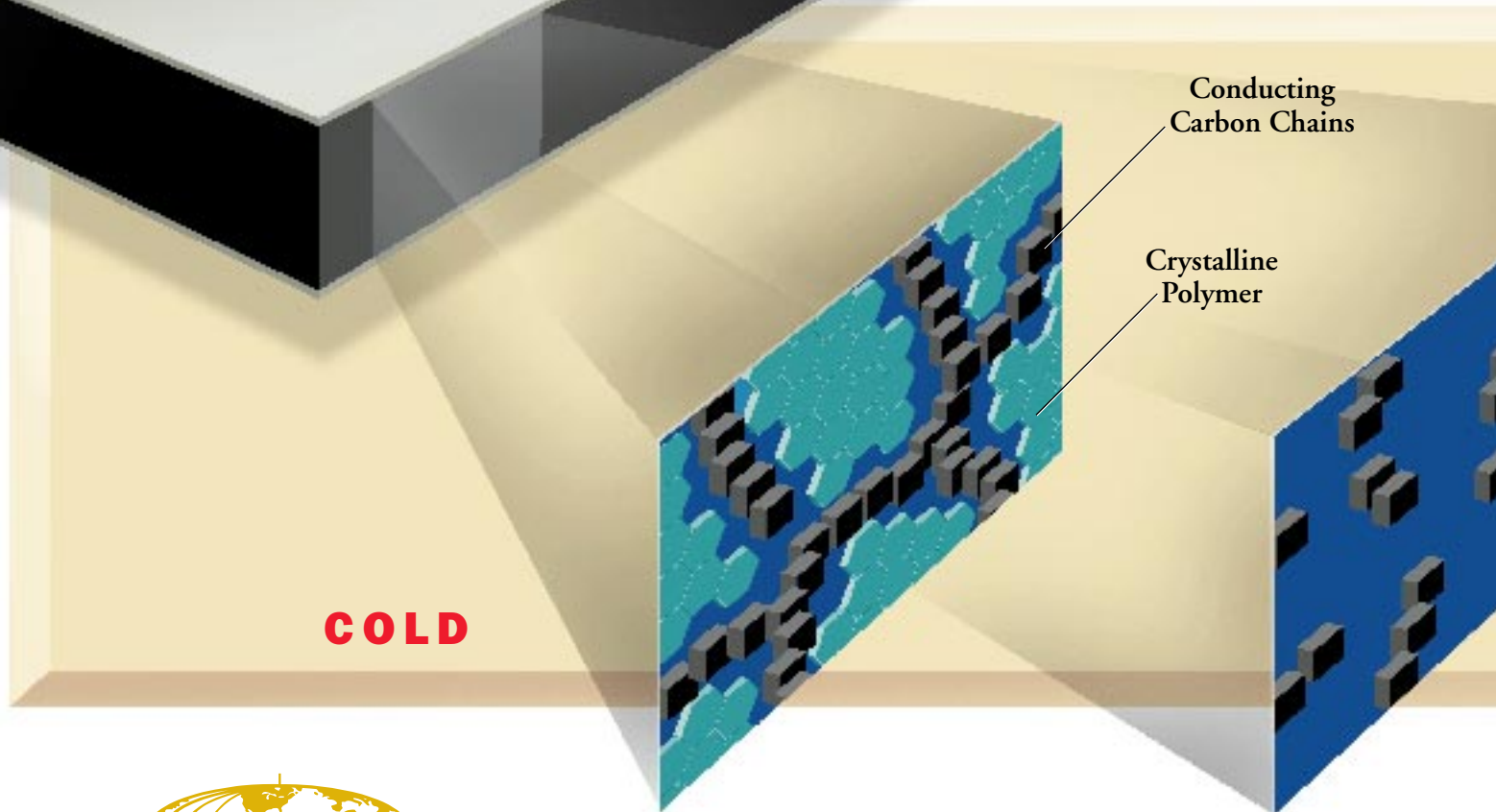
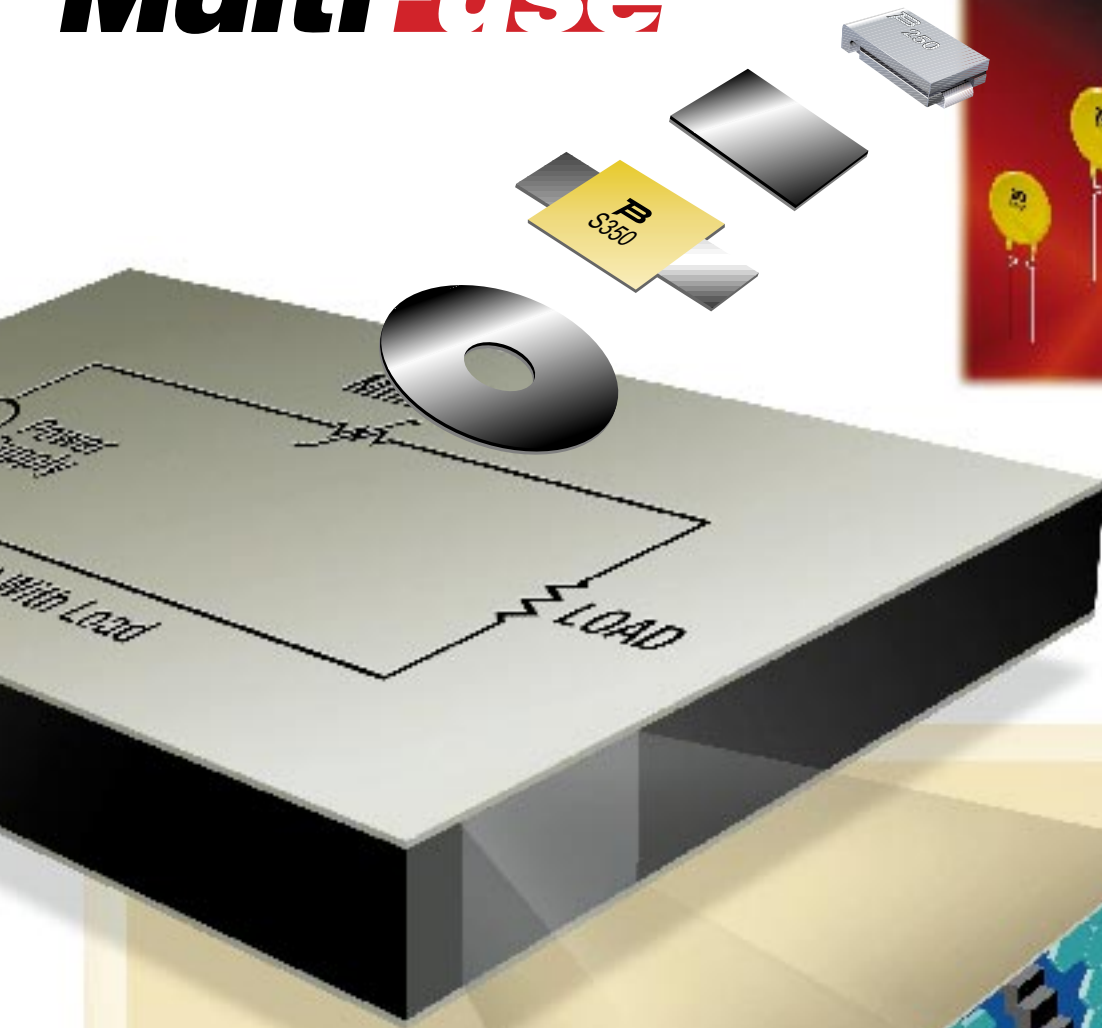
The conductive carbon black filler material in the MULTIFUSE device is dispersed in a polymer that has a crystalline structure. The crystalline structure densely packs the carbon particles into its crystalline boundary so they are close enough together to allow current to flow through the polymer insulator via these carbon “chains.”

When the conductive plastic material is at normal room temperature, there are numerous carbon chains forming conductive paths through the material.



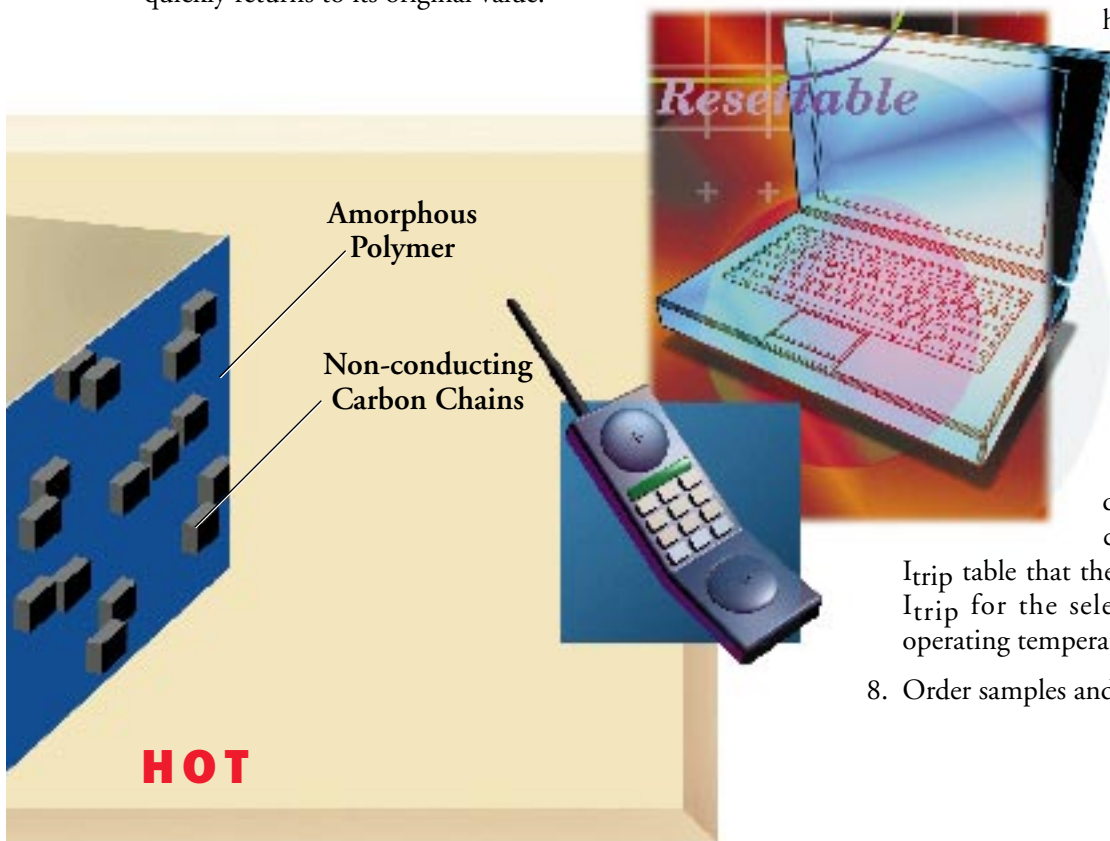
Under fault conditions, excessive current flows through the MULTIFUSE device. I²R heating causes the conductive plastic material's temperature to rise. As this self heating continues, the

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material's temperature continues to rise until it exceeds its phase transformation temperature. As the material passes through this phase transformation temperature, the densely packed crystalline polymer matrix changes to an amorphous structure. This phase change is accompanied by a small expansion. As the conductive particles move apart from each other, most of them no longer conduct current and the resistance of the device increases sharply.

The material will stay "hot," remaining in this high resistance state as long as the power is applied. The device will remain latched, providing continuous protection, until the fault is cleared and the power is removed. Reversing the phase transformation allows the carbon chains to re-form as the polymer re-crystallizes. The resistance quickly returns to its original value.

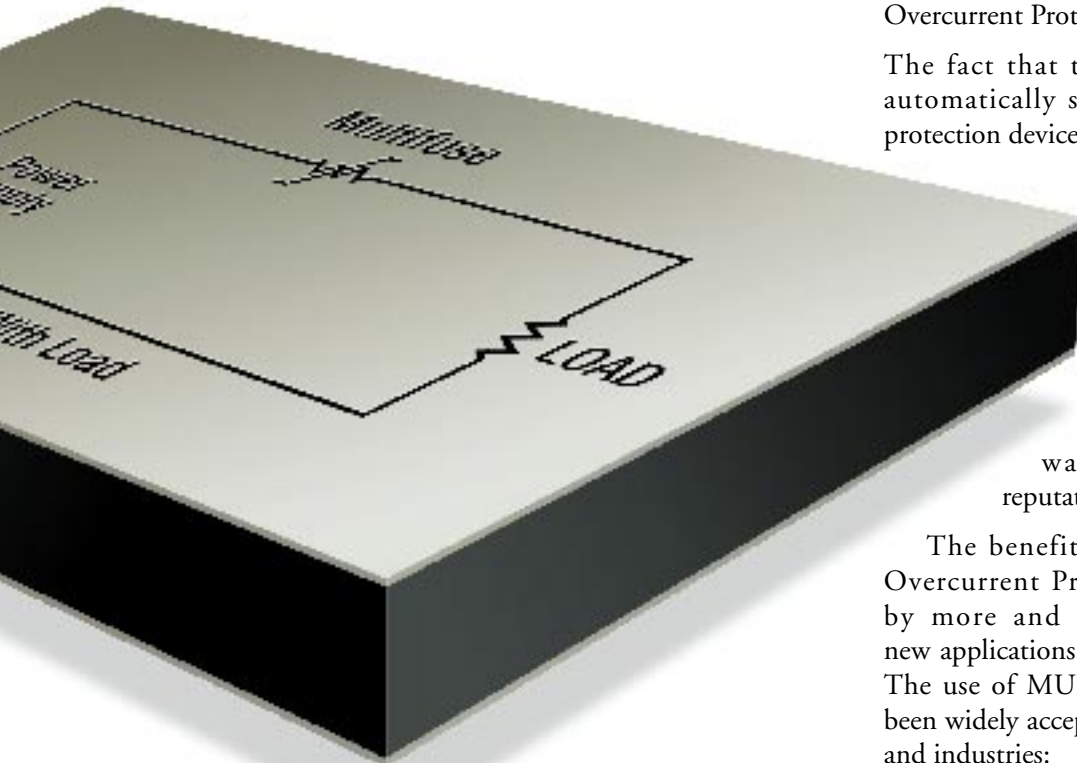


PRODUCT SELECTION

To select the correct MULTIFUSE circuit protection device, complete the information listed below for the application, and then refer to the MULTIFUSE resettable overcurrent protector data sheets.

1. Determine the normal operating current:
_____ amps
2. Determine the maximum circuit voltage (V_{max}): _____ volts
3. Determine the fault current (I_{max}):
_____ amps
4. Determine the operating temperature range:
Minimum Temperature: _____ °C
Maximum Temperature: _____ °C
5. Select a product family so that the maximum rating for V_{max} and I_{max} is higher than the maximum circuit voltage and fault current in the application.
6. Using the I_{hold} vs. Temperature Table on the product family data sheet, select the MULTIFUSE device at the maximum operating temperature with an I_{hold} greater than or equal to the normal operating current.
7. Verify that the selected device will trip under fault conditions by checking in the I_{trip} table that the fault current is greater than I_{trip} for the selected device, at the lowest operating temperature.
8. Order samples and test in application.

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APPLICATIONS

Almost anywhere there is a low-voltage power source and a load, a MULTIFUSE Resettable Overcurrent Protector can be used.

The fact that these protection devices reset automatically sets them apart among circuit protection devices.

Circuit designers know there are circumstances they have no control over which can result in potentially damaging overcurrent conditions. Fuses work well, *once*, and in many applications, replacement is not an option due to inconvenience, warranty costs or damaged reputations.

The benefits of MULTIFUSE Resettable Overcurrent Protectors are being recognized by more and more design engineers, and new applications are being discovered every day. The use of MULTIFUSE types of devices have been widely accepted in the following applications and industries:

- Personal computers
- Laptop computers
- Personal digital assistants
- Transformers
- Small and medium electric motors
- Audio equipment and speakers
- Test and measurement equipment
- Security and fire alarm systems
- Medical electronics
- Personal care products
- Point-of-sale equipment
- Industrial controls
- Automotive electronics and harness protection
- Marine electronics
- Battery-operated toys

Worldwide Sales Offices

Benelux: 070-387 44 00, FAX: 070-387 62 30
China: 86-21-6482-1250, FAX: 86-21-6482-1249
France: 54 73 51 51, FAX: 54 73 51 59
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Modular Contacts (USA): 909 781-5264, FAX: 909 781-5700
Pressure Products (USA): 800 X-DUCERS, FAX: 909 781-5178
Resistor Networks (USA): 801 750-7200, FAX: 801 750-7253
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www.bourns.com

Bourns® products are available through an extensive network of manufacturer's representatives, agents and distributors. To obtain technical applications assistance, a quotation, or to place an order, contact a Bourns representative in your area.

