Search

Thursday, September 06, 2012 Wednesday, November 17, 2004

Hi-Flow® 300 is one of the highest performing insulated phase change thermal interface materials on the market

Hi-Flow® 300 provides superior thermal performance as well as easy handling characteristics. Click Here

Bourns Multifuse Circuit Protection Product Spotlight

With five decades of experience in the electronics industry, nobody understands better than Bourns the need to protect circuits from high current and transient voltage. The trend toward packaging as much functionality into limited board space has made the need for circuit protection even more acute.

A key focus for Bourns is on an innovative circuit protection technology called Polymer Positive Temperature Coefficient (PPTC).

In an overcurrent or fault condition, this unique conductive polymer increases resistance many times over, protecting circuit components from high current, then returns to its original conductive state once the fault is removed.

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.

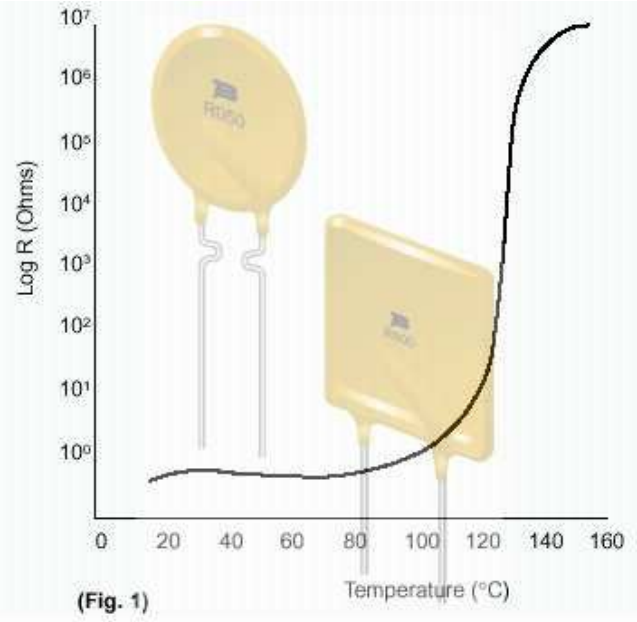
The phenomenon that allows conductive plastic materials to be used for resettable overcurrent protection devices is that they exhibit a very large non-linear Positive Temperature Coefficient (PTC) effect when heated. PTC is a characteristic that many materials exhibit whereby resistance increases with 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

All MF type fuses are manufactured using the latest polymeric Positive Temperature Coefficient (P.T.C.) Circuit protection technology. The devices are constructed from sheets of conductive plastic 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.

Polymeric devices in general, exhibit a very large non-linear positive temperature coefficient when heated. What makes the MF fuses unique

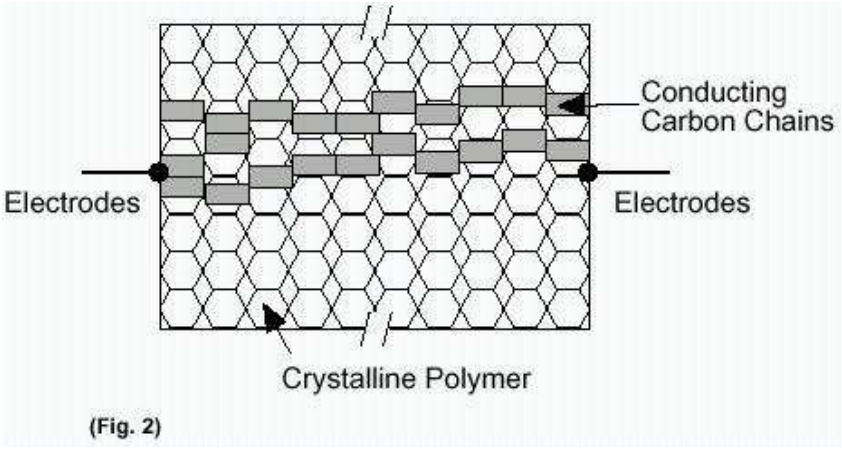
is the magnitude of the resistance increase. This rate of increase is so great that is typically expressed on a log scale. (Fig. 1)



(Fig. 1)

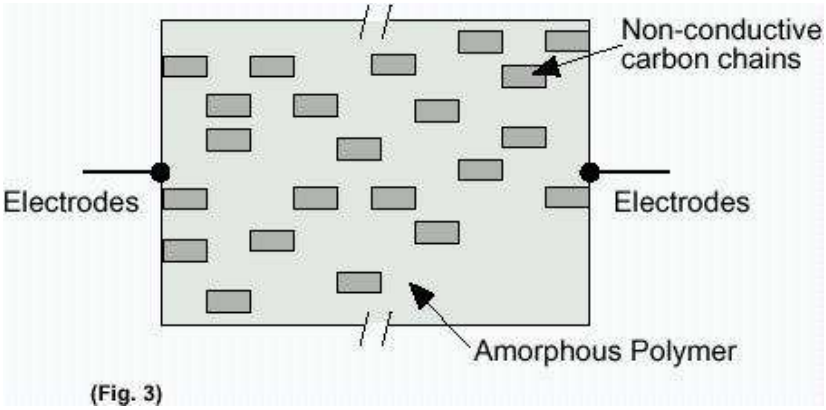
The conductive carbon black filler in the MF devices is dispersed in a polymer that has a crystalline structure.

This structure densely packs the carbon particles into its crystalline boundary so they are close enough to each other to allow current to flow through the polymer insulator via these carbon "chains." (Fig. 2)



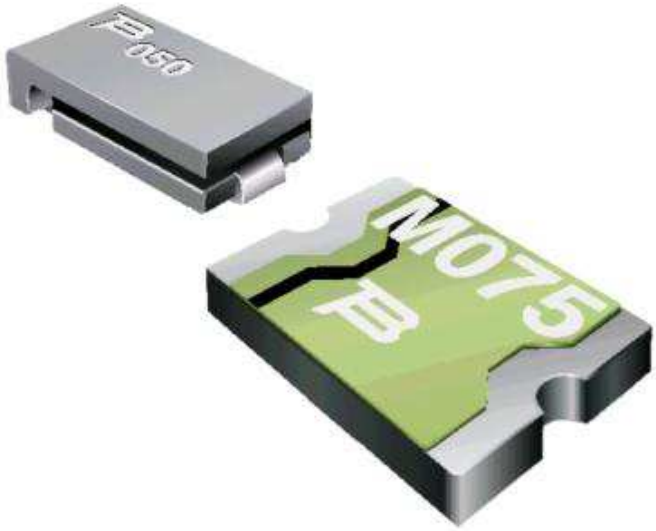
(Fig. 2)

When the conductive plastic is at room ambient temperature, numerous conductive "chains" exist within the material. Under fault conditions, excessive current flows through the device, causing a rise in heat due to increased I = R losses. Once the heat rise exceeds the phase transformation temperature of the material, the densely packed crystalline polymer matrix changes to an amorphous structure. This phase change creates a small expansion, causing the conductive particles to move apart from each other. Since most of these particles no longer conduct current, the resistance of the device rapidly increases. (Fig. 3)



(Fig. 3)

Whilst the power is maintained, the material will stay "hot" and the resistance remain high. In this state, the device will continue to be latched, providing continuous protection until the fault is cleared and the power removed. Reversing the phase transformation allows the carbon chains to re-form as the polymer re-crystallises. The resistance then quickly returns to its original value.



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 over-current 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 recognised by more and more design engineers, and new applications are being discovered every day.

MULTIFUSE® Resettable Fuses take advantage of this development, offering circuit designers a self-resetting alternative to traditional fuses. MULTIFUSE® Resettable Fuses provide protection for computers, portable electronics, battery-operated devices, automotive electronics, security and fire alarm systems - just about anywhere there is a power source and a load!

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

PRODUCT DATA

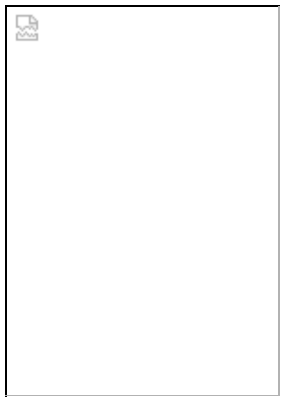
Click on the links below to download product data in Adobe Acrobat .pdf format.

Fuses

- Radial, P.T.C Resettable
  - 0.1A - 9A hold, 0.2A - 18A trip
  - 1.1A - 3.75A hold, 2.2A - 7.5A trip
- Axial, P.T.C. Resettable
  - 1.2A - 4.2A hold, 2.7A - 7.6A trip
  - 1.9A - 7.3A hold, 3.9A - 14.6A trip
  - 1A - 3.4A hold, 2.5A - 6.8A trip
- Surface Mount, P.T.C. Resettable
  - 0.3A - 2.6A hold, 0.6A - 5.2A trip
  - 0.2A - 1.1A hold, 0.4A - 2.2A trip

For the full selection of Multifuse, download the Multifuse PTC Resettable Fuse Solutions Guide. a 43 page document in Adobe Acrobat .pdf format.

This is just one of the comprehensive range of electronic components distributed by Anglia and listed in our exclusive Bourns Technical Guide.



You can download a copy of this as a fully functioning electronic document by clicking on the graphic above.

If you would like to visit the main Anglia website, click on the graphic below to go to the homepage.

5/1/04