

A Review on Polyfuse

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Date of Submission: 25-12-2020

Date of Acceptance: 06-01-2021

ABSTRACT: A traditional fuse is a one time over current protection device employing fusible link that melts after the current exceeds a certain level for a certain length of time. Here a wire or chemical compound breaks the circuit when the current exceeds the rated current that is applicable for the equipment. Like the conventional fuses, polyfuse limits the flow of highly dangerous current that is flowing through equipment during the fault conditions. The polyfuse resets after the fault condition is cleared and the power to the circuit is removed. This is the main advantage of polyfuse over the conventional fuses or the traditional fuses. They provide with over current protection

KEYWORDS: Polymeric Positive Temperature Coefficient, Fault condition, over current load.

I. INTRODUCTION

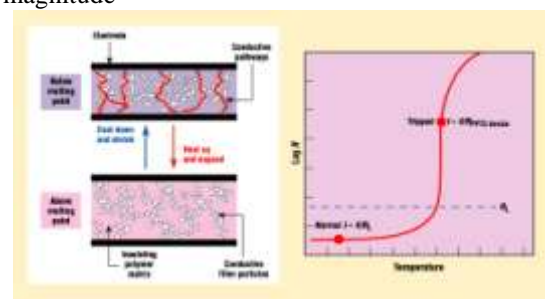
Polyfuse is a new standard for circuit protection. It is a resettable by itself. Polyfuses are known as Polymeric Positive temperature Coefficient Thermistors (PPTC). Resistors are rarely an acceptable solution because the high power resistors required are expensive. One shot fuses can be used but they might fatigue and they must be replaced after a fault event. Another good solution available is the resettable Ceramic Positive Temperature Coefficient (CPTC) device

The electrical shots and electrical overloaded circuits can causes over current and over temperature damage. The PPTC device does not usually have to be replaced after it trips and because it is small enough to be mounted directly into a motor or on a circuit board, it can be located inside electronic modules, junction boxes and power distribution centres

Polyfuse are usually packaged in radial, axial, surface mounted, chip or washer form. The electrodes ensure the distribution of power through the circuit. We can use several circuit protection schemes in power supplies to provide protection against fault condition and resultant over current.

II. PRINCIPLE OF OPERATION

PPTC Circuit protection device are formed from a composite of semi crystalline polymer and conductive carbon particles. At normal temperature the carbon chains form low resistance conductive network through the polymer. In case on excessive current flow through the device, the temperature of the conductive plastic material rises. When the temperature exceeds the devices switching temperature, the crystallides in the polymer suddenly melts and becomes amorphous. The increase in volume during melting of the crystalline phase causes separation of the conductive particles in a large non-linear increase in the resistance of the device. The resistance typically increase by 3 or orders of magnitude



Thus the polyfuse acts like a self-resetting solid-state circuit breaker, which makes it suitable for providing low cost over protection. The resistance of polyfuse at room temperature is in the order of few ohms.

III. TYPES OF POLYFUSE

There are mainly 3 types of polyfuse types:

Surface Mounted Resettable Fuse: This surface mount polyfuse family of polymer of polymer based resettable fuses provides reliable over current protection for a wide range of products such as computer motherboards, USB hubs and ports. Each of these polyfuse series features low voltage drops and fast trip times while offering full resetability. This makes each an ideal choice for protection in datacom and battery powered applications

Radial- Leaded Resettable Fuses: Due to the automatic resetting of the polyfuse, these components are ideal for the application, where temporary fault conditions can occur.

Battery Strap Resettable Fuses: This type profile strap type polyfuse family of resettable fuses provides thermal and over charge protection for rechargeable battery packs commonly used in portable electronics such as mobile phones, notebook computers and camcorders. Lithium designs are enhanced with 0.8mm high form factor on the VTD-719 series

IV. ADVANTAGES OF POLYFUSE

1. Over current protection.
2. Low base resistance
3. Latching operation
4. Short time to trip
5. No accidental hot plugging
6. Life time up to 10 times longer than the conventional fuses

V. APPLICATIONS

Polyfuses are used in automobile, batteries and computers and in industrial controls

1. For the protection of speakers
2. For protection of Transformers
3. For protecting Batteries

VI. CONCLUSION

Polymeric Positive Temperature Coefficient device provide net cost savings through reduced component count and reduction in wire size. They can help provide protection against short circuits in wire traces and electronic components. The low resistance, relatively fast time to trip and low profile of these devices improve reliability. In addition, these devices provide manufacturing compatibility with high volume electronic assembly techniques and later design flexibility through a wide range of product options.

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