Massive Electro-Pyrotechnic Ignitor Chip (MEPIC) Resistor

KEY BENEFITS

- Firing energy down to 1.5 mJ
- Firing time down to 250 µs
- Ohmic value: 2 Ω (typical) ± 12.5 % (typical)
- Joule effect ignition or flash
- Unique SMD mounting ignitor
- Easy set-up by design of firing levels
- Very predictable, reproducible, and reliable behavior
- Size 0805
- ESD withstanding of 25 kV without additional protection
- Compatible with various pyrotechnic compositions

APPLICATIONS

- Mining

RESOURCES

- Datasheet: MEPIC - http://www.vishay.com/doc?53058
- MEPIC Design Guide: http://www.vishay.com/doc?53054
- For technical questions contact: sferthinfilm@vishay.com

A WORLD OF SOLUTIONS

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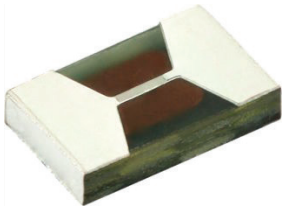

The Massive Electro-Pyrotechnic Initiator Chips (MEPIC) are resistors dedicated to pyrotechnic applications. The MEPIC resistors are the Surface Mount Device (SMD) variants from the established NiCr on FR type substrate technology from Vishay Sfernice. The standard case geometry (SMD) enables the implementation of assembly process commonly used in the electronic component industry (pick and place, reflow soldering on flat PCB used as header) providing high productivity. The principle of MEPIC is to convert electrical energy into heat energy in a precise electro-thermal profile for the purpose of initiating a series of pyrotechnic events in a controlled energetic reaction. In the mining industry this effect is commonly used for the ignition of electronic detonators (digital blasting). Other industries such as firework (e-match manufacturing) and demolition (various electric detonators) are also focused applications.

The MEPIC design has been developed specifically to offer an alternative to the Bridge Wire (BW) technology, insuring at least the same level of performances, while providing cost efficient assembly process and initiator design alternatives.

FEATURES

Pb-free Available

RoHS* Available

- Surface Mount Design for standard assembly process
- SMD version only
- Active area designed upon performances
- Case size 0805
- Firing energy down to 1.5 mJ
- Firing time down to 250 µs
- Ohmic value: 1 Ω to 8 Ω ± 10 % (typical) (1)
- Joule effect ignition
- Easy set up by design of firing levels
- Very predictable, reproducible and reliable behavior
- Compatibility with pyrotechnic element has to be tested in real environment
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Notes

* This datasheet provides information about parts that are RoHS-compliant and / or parts that are non-RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details.

(1) For ohmic value < 3 Ω the tolerance will be discussed with Vishay Sfernice

TECHNOLOGY

The MEPIC active area (heating zone) will be impregnated by the user with a primary pyrotechnic material (usually wet primer followed by drying) in such way to ensure an intimate contact for an optimum heat transfer of thermal energy. The geometry of the active area of the MEPIC, and both the primer chemistry and its impregnation method, will determine the global performances. Note that the active area of MEPIC shall not be put in direct contact with explosive powder as grain size will not ensure intimate contact and will induce non reproducible and non reliable performances.

The two main characteristics of a MEPIC resistor are their “All Fire” (AF) and “No Fire” (NF) performances:

- “All Fire” (AF) represents the command pulse where the major amount of the dissipated energy will be transferred to the primer to generate the ignition. Customer will have to provide Vishay Sfernice with “All Fire” conditions, usually with capacitance discharge parameters or with Minimum Current or Voltage and corresponding short pulse duration.
- “No Fire” (NF) represents the immunity of the resistor with primer to the environmental electro-magnetic pollution and electric continuity test, where the major amount of the dissipated energy will be transferred to the substrate to ensure no ignition. Customer will have to provide Vishay Sfernice with “No Fire” conditions, usually maximum current or voltage and corresponding longest duration. In case of applicable capacitance discharge test the parameters shall also be provided.

ASSEMBLY PRECAUTIONS

In order to obtain reproducible ignition performances it is important that the assembly process fulfills the following criteria:

- Do not use iron soldering method to mount the MEPIC on its header because uncontrolled amount of solder could impact the heat transfer (potential misfire or ignition delay) and local over heating may damage the MEPIC (deformation that may cause active area cracks).
- Take specific precautions , such as no air bubble during preparation and application of primer, in order to ensure the intimate contact of pyrotechnic primer and MEPIC active area (potential misfire).
- Take specific handling precaution in order not to damage MEPIC active area (ex: pickup head design for pick and place or specific fixing tools in the entire assembly process.
- All along the assembly process, take specific care to extreme thermo-mechanic stress that could be applied to the MEPIC (such as stress induced during over molding) because the active area of MEPIC is subjected to crack (and generate unstable resistance value).
- The MEPIC reliability is only guaranteed for one single reflow profile.
- In case of necessity to dismantle a MEPIC, another MEPIC must be used (no rework is allowed).
- Pay specific attention to the cleaning process after reflow soldering in order not to damage the active area and to keep it clean from various pollutions.

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