

Isabellenhütte develops low-ohmic snubber shunt for high pulse loads

Damping voltage peaks: Protection for sensitive components

In the case of fast switching operations in power electronics, such as in the automotive sector, voltage peaks can cause inductances, which can damage or destroy sensitive downstream components in the circuit. To dampen these voltage peaks, a so-called RC snubber shunt can be used, which dissipates the excess energy outwards. Isabellenhütte has developed a powerful low-ohmic snubber shunt, SMT-V, which has a particularly high pulse power rating.

An RC member consists of a resistor (R) and a capacitor (C), which are connected in series. The resistor is used to convert the energy discharged from the capacitor into heat. Snubbers are used in conjunction with power relays, contactors, thyristors/triacs, IGBTs [insulated-gate bipolar transistors], MOSFETs [metal-oxide semiconductor field-effect transistors] or bipolar transistors. Special IGBTs, triacs and MOSFETs are used to precisely control motors. Very quick switching operations of the IGBTs and MOSFETs are required to ensure this.

Low-ohmic snubber shunt for high pulse loads

The SMT-V developed by Isabellenhütte has a low resistance value at 17.5 mOhm and a very small compact design. It is based on the existing current measuring resistor SMT, which due to a very large Cu legs allows for a very good heat dissipation from the respective component and already has a high pulse power rating and long-term stability. The design and material of the new SMT-V, however, were adapted so that they can better withstand this particular pulse load. The development arose from a customer request, since no adequate standard component with this resistance value was available on the market. The special feature of this snubber shunt compared to other shunt series from Isabellenhütte is that it is not used for current measurement, but rather is intended to specifically absorb high pulse loads.

Optimised film design with NOVENTIN®

The high pulse power rating is achieved by using the in-house resistance material NOVENTIN®, which has a specific resistance that is nearly twice as high as MANGANIN® used in current measuring resistors. The component's basic structure was retained. Only the film design was optimised and the resistance material was adjusted accordingly. This makes much higher pulse loads and power losses at the resistor possible.

The SMT-V is able to absorb a pulse energy of 2.5 J at a pulse duration of 0.1 s (figure 2) at a terminal temperature of 120°C and a number of 50 pulses over the life cycle with a corresponding gap time. This corresponds to a power loss per pulse of 25 W.

Application example of protective circuitry in hybrid vehicle

Snubber shunts can, for example, be used as part of a protective circuit for semi-conductors in an AC/DC converter of a 48 V mild hybrid vehicle (MHEV).

C-samples can already be provided. The series production of the SMT-V is also starting this quarter. Other resistance values and installation sizes (such as the 2512 installation size) can be checked on customers request.

About Isabellenhütte USA

Isabellenhütte USA is headquartered in Swansea MA and has developed an industry-wide reputation for providing high-quality products and unparalleled customer support. We are known worldwide in industries ranging from aerospace and medical to energy and automotive.

500 years ago, a simple copper smelter perfected techniques to serve a customer base. Today, Isabellenhütte is one of the world's leading manufacturers of precision measurement systems, resistance, and thermo alloys as well as high power resistors. We call this journey "Innovation by tradition."

Isabellenhütte USA is a wholly owned subsidiary of Isabellenhütte Heusler GmbH KG, located in Dillenburg, Germany.

Backed by decades of manufacturing and engineering expertise, and a representative network that spans all of North America, Mexico, and Brazil, our mission is to support our customers by applying our expertise to help people whenever and wherever we can.

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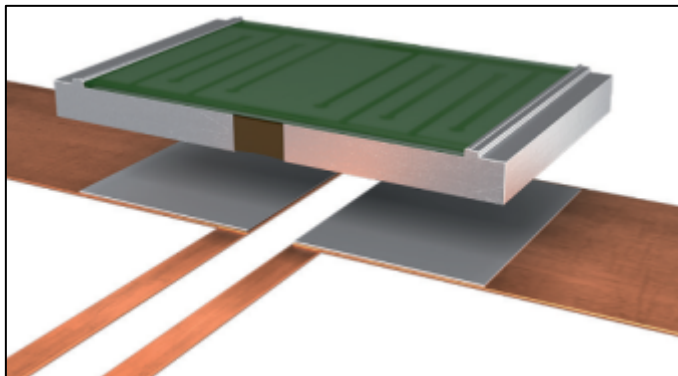


Image 1: Snubber shunt SMT-V with optimised film design with the resistance material NOVENTIN®. Image: ©Isabellenhütte Heusler GmbH & Co. KG

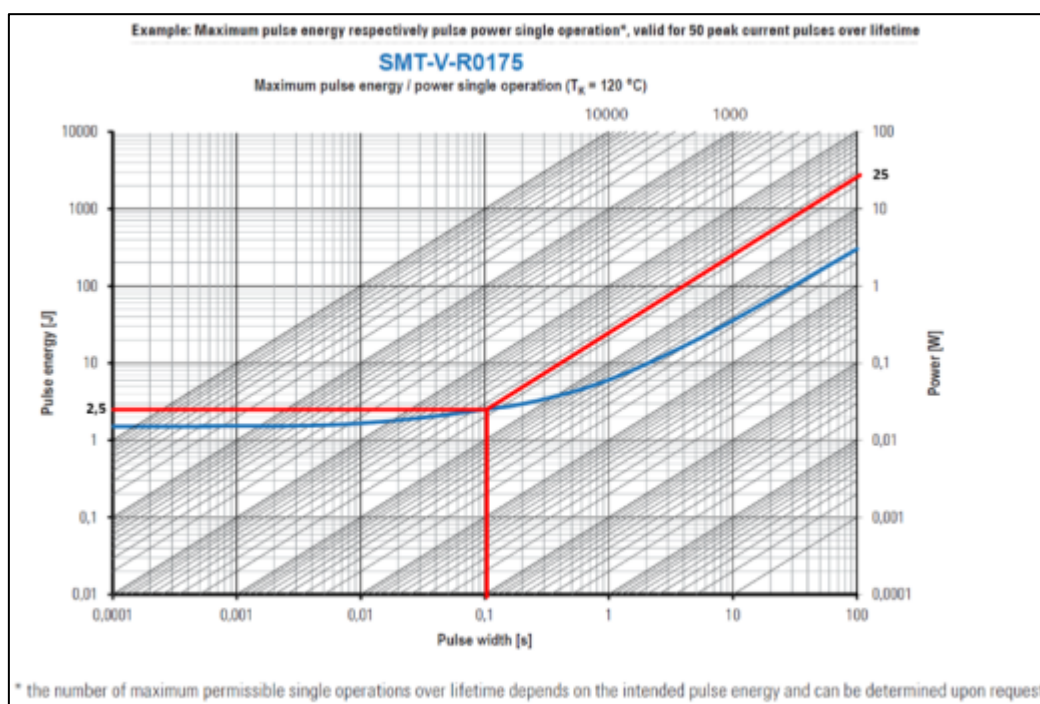


Image 2: Example of a possible pulse load scenario over a life time. Image: ©Isabellenhütte Heusler GmbH & Co. KG

Media Contact:

Uwe Keller, General Manager
ISABELLENHÜTTE // USA
937-926-1636
uwe.keller@isabellenuetteusa.com