

1200-V SiC MOSFET Chips Improve On-Resistance And Robustness

[Infineon Technologies'](#) CoolSiC MOSFET 1200 V M1H is an advanced SiC chip that will be implemented in a widely extended portfolio using the popular Easy module family, along with discrete packages using .XT interconnect technology. The M1H chip offers high flexibility and is suitable for photovoltaic inverters that have to meet peak demand as well as for applications such as fast EV charging, energy storage systems and other industrial applications.

The latest advancements of the CoolSiC base technology enable a significantly larger gate operation window that improves the on-resistance for a given die size. Simultaneously, the larger gate operation window provides a high robustness against driver- and layout-related voltage peaks at the gate, without any restrictions even at higher switching frequencies. Along with the M1H chip technology, the related housings have been adopted in technology and package variants to enable higher power densities and more options for design engineers to improve on application performance.

The M1H will be integrated into the popular Easy family to further improve the Easy 1B and 2B modules (Fig. 1). In addition, a new product which enhances the Easy 3B module with the new 1200 V CoolSiC MOSFET, will also be launched. The roll-out of new chip sizes maximizes flexibility and ensures the broadest industrial portfolio. With the M1H chip, the on-resistance of the modules can be significantly improved, making the devices more reliable and efficient.

Furthermore, with a maximum temporary junction temperature of 175°C, overload capability increases, enabling higher power density and coverage of failure events. Compared to its predecessor, the M1, the M1H has implemented a small adoption of the internal RG, enabling the switching behavior to be easily optimized. The dynamic behavior is maintained with the M1H chip.

In addition to the Easy module family, the CoolSiC MOSFET 1200 V M1H portfolio includes new ultra-low on-resistances 7 mΩ, 14 mΩ and 20 mΩ in the TO-247-3 and TO-247-4 discrete packages (Fig. 2). According to the vendor, the new devices are easy to design-in, especially due to the gate voltage overshoots and undershoots with the new maximum gate-source voltage down to -10 V, and come with avalanche and short-circuit capability specifications.

Infineon's .XT interconnection technology, previously introduced in the D2PAK-7L package, is now also implemented in a TO-footprint. With this technology, the thermal dissipation capabilities are enhanced by more than 30% compared to a standard interconnection. As a result, such thermal benefit can be used to increase the output power of up to 15%. Alternatively it can be used to increase the switching frequency to further reduce the passive components in applications such as electric vehicle (EV) charging, energy storage or photovoltaic systems for enhanced power density and reduced system cost.

Furthermore, without changing the system operating conditions, the .XT technology will lower the SiC MOSFET junction temperature, therefore significantly increasing the system lifetime and power cycling capabilities. This is a key requirement in applications like e.g. servo drives.

The module and discrete variants can be ordered now. More information is available at www.infineon.com/sic-mosfet.

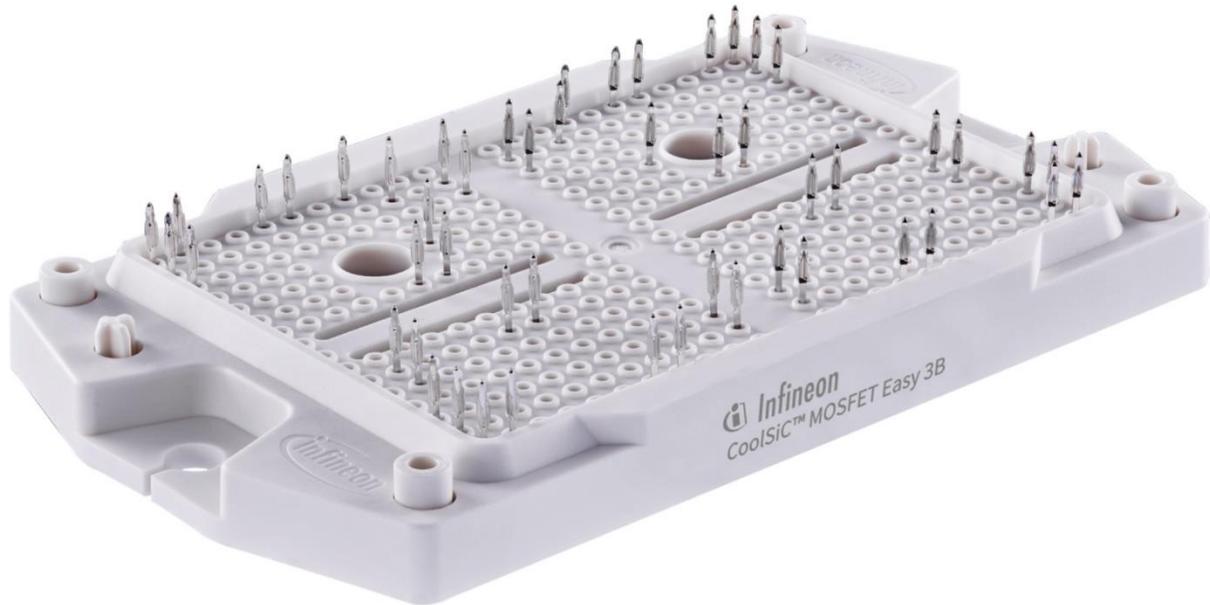


Fig. 1. The CoolSiC M1H 1200-V SiC MOSFETs will be integrated into the popular Easy module family to further improve the Easy 1B and 2B modules. In addition, a new product which enhances the Easy 3B module will also be launched. The roll-out of new chip sizes maximizes flexibility and ensures the broadest industrial portfolio. With the M1H chip, the on-resistance of the modules can be significantly improved, making the devices more reliable and efficient.

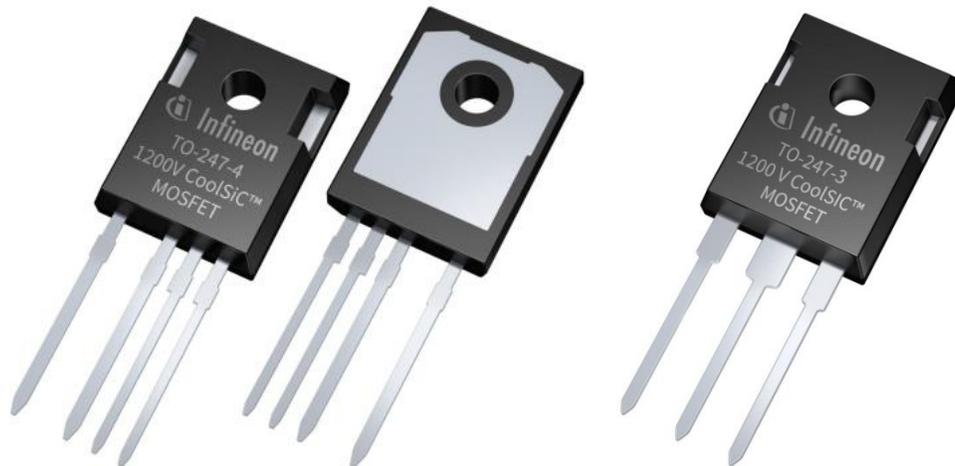


Fig. 2. In addition to the power modules, the CoolSiC MOSFET 1200-V M1H portfolio includes TO247-3 and TO247-4 discrete packages with ultra-low on-resistances of 7 m Ω , 14 m Ω and 20 m Ω . According to the vendor, they are easy to design-in, especially due to the gate voltage overshoots and undershoots with the new maximum gate-source voltage down to -10 V. The discrete devices feature the .XT interconnection technology which leads to a thermal benefit that can be used to increase the output power up to 15%.