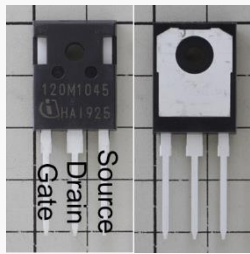


INFINEON IMW120R045M1 CoolSiC 1,200V SiC MOSFET SHORT CIRCUIT ROBUSTNESS ANALYSIS REPORTS

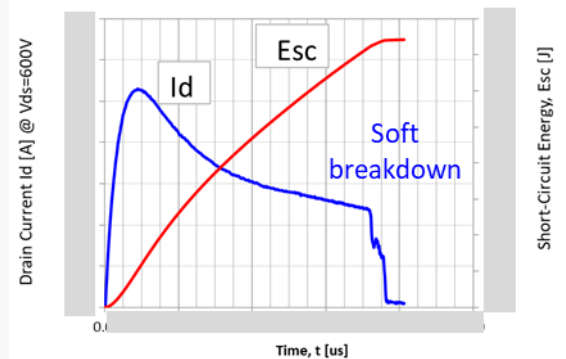
February 2020. The short-circuit (SC) capability of power transistors, especially SiC power MOSFETs, is one of the most critical reliability-related specifications. Compared to Si-based IGBTs, the size of the SiC transistor is smaller. This leads to significant reduction in SC endurance time (tsc).



Package



Die image



Drain current waveform and short-circuit energy Esc

Abstract

This report evaluates short-circuit capability and the behavior under fault condition when the device is brought to damage-causing overstress. **Compared with other SiC MOSFETs, INFINEON's CoolSiC MOSFETs exhibits a "soft" failure without exploding.** Other SiC MOSFETs explode at the moment of the onset of short-circuit fault.

The report includes:

- Identification of the mechanisms limiting short-circuit capability, measurement, physical analysis results, and extraction of the critical temperature ($T_j(\text{crit})$) at the onset of failure.
- Comparison of short circuit robustness with other makers' 1,200V SiC MOSFETs. Examination of the differences in semiconductor structure, process, and their effect on short circuit robustness.
- Comparison of the electrical characteristics (off-leakage current and temperature dependence) and identification of differences and limitations.

Use value of the evaluation results in this report

- The minimum response time of the short-circuit protection circuit can be estimated.
- The internal device temperature can be estimated by performing electrothermal SPICE simulation using measured short-circuit drain current waveform and endurance time ($t_{sc, f}$).

Report price: \$7,500

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