

Bodo's Power Systems®

Electronics in Motion and Conversion

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Low-Cost Highly Integrated Gate Driver Core

SCALE-2 Simplifies Custom-Specific Solutions

The highly integrated SCALE-2 chipset allows the time-to-market, development effort and production cost of custom-specific IGBT gate drivers to be dramatically reduced. As an example, the new 2SD300C17 is presented that is compatible with the 2ED300C17 from Infineon in mechanical, functional and parametric terms. The chipset has been developed on the basis of two independent semiconductor processes (true second source) while retaining full functional and parametric compatibility. The SCALE-2 implementation offers competitive advantages such as exceptional cost performance, long-term availability and tried-and-tested SCALE technology.

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The demands made on recent IGBTs and power converters may lead to greatly increased complexity of the respective gate drivers. Application specific integrated circuits (ASICs) are advantageous here because they reduce system complexity and therefore lower manufacturing costs while increasing reliability and system performance.

Concept Technologie AG - an independent and highly experienced gate driver supplier

The best price-performance ratio can be achieved by large volume production. However, very few products currently reach this level of market demand. It is the inherent strength of CONCEPT as an independent and highly experienced gate-driver supplier for medium and high-power applications to overcome the obstacles of monolithic integration in this highly specific market. Broad application coverage and a large combined quantity of drivers delivered to a great variety of customers allows all common functions of a driver to be combined on a platform of dedicated ASICs.

Highly integrated SCALE-2 platform

The SCALE-2 driver chipset integrates the full functionality of a dual-channel gate driver core, i.e. DC-to-DC conversion with dedicated startup sequence, bidirectional signal transmission via external transformers or fiber optics, large driver stages with a scalable gate interface, advanced protection, monitoring, interface and fault processing

functions, and support of advanced IGBT turn-off such as active clamping and di/dt and dV_{ce}/dt control.

Highly integrated gate driver compatible with the 2ED300C17 from Infineon

The highly integrated SCALE-2 chipset also allows a dramatic reduction of time to market, development effort and production cost of custom-specific IGBT gate drivers. As an example, the new 2SD300C17 is presented, see Figure 1. It is compatible with the 2ED300C17 from Infineon in mechanical, functional and parametric terms.



Figure 1: SCALE-2 driver core 2SD300C17

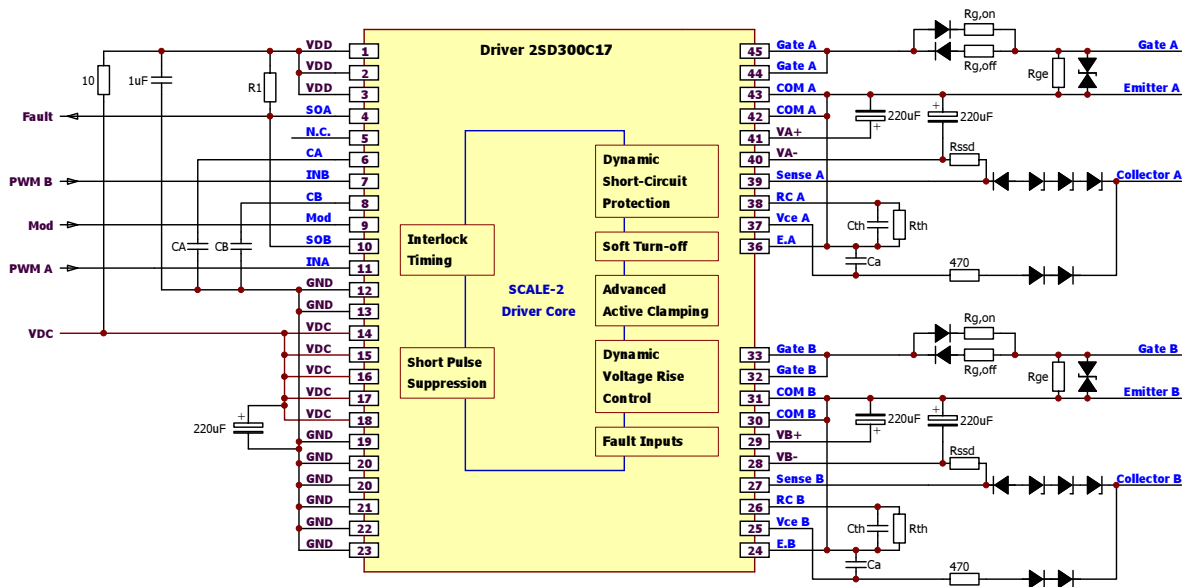


Figure 2: Application schematics of the SCALE-2 driver core 2SD300C17

Moreover, the chipset has been developed on the basis of two independent semiconductor processes (true second source) while retaining full functional and parametric compatibility.

The new SCALE-2 driver 2SD300C17 offers special features such as:

- half-bridge control with interlock and adjustable dead time
- dynamic short-circuit detection and protection
- short-pulse suppression
- active clamping, soft turn-off, dynamic voltage-rise control
- external fault inputs
- scalable IGBT gate interface using bipolar junction transistors
- providing +/- 15V gate emitter voltage as well as 4W and 30A per driver channel

Beyond that, a long service life and safe operation are achieved thanks to increased thermal, frequency, and gate current capability at high ambient temperatures and superior EMI immunity.

The SCALE-2 implementation offers competitive advantages such as exceptional cost performance, long-term availability and tried-and-tested SCALE technology. An application schematic of the 2SD300C17 is shown in Figure 2. A soft turn-off under short-circuit conditions is shown in Figure 3.

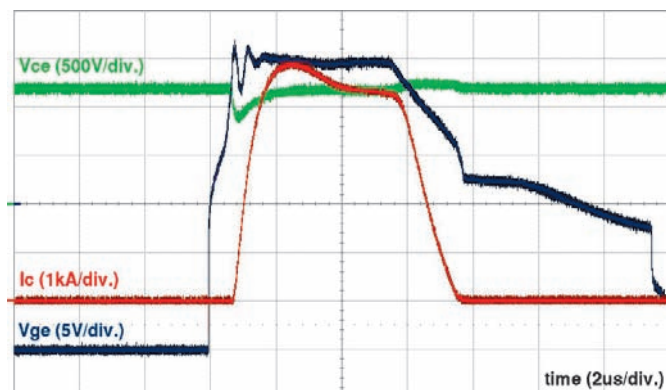


Figure 3: Soft turn-off under short-circuit condition with SCALE-2 driver core 2SD300C17

The overall component count is dramatically reduced compared to a conventional solution based on standard analog devices, CMOS logic and discrete components. The estimated MTBF is about 2.7 times that of a conventional solution.

Safe isolation to EN 50178, class II

The driver is designed for use in industrial and traction Gate applications offering the following features:

- fully UL-compliant design
- safe isolation to EN 50178, class II
- insulation test voltage 5kV AC between primary and secondary side and 2.5kV AC between secondary sides applied for 1 second (to EN 50178 Table 18 as a series test)
- insulation surge voltage testing according to EN 50178 Table 17 at a level of 11.4kV peak; 1.2/50µs
- partial discharge extinction voltage above 1937V to EN 50178 Table 19
- conformal coating available
- RoHS compliance

Pricing and availability

The pricing of the 2SD300C17 is very competitive, thanks to the exceptional level of integration achieved with the SCALE-2 chipset. At quantities of 1000 items, the driver will be priced at US\$43. The 2SD300C17 is being shipped in volume quantities.

www.IGBT-Driver.com