

Application Note

Avoiding Electrostatic Discharge (ESD) when using CONCEPT IGBT Gate Drivers



Introduction

Any handling of electronic devices must be subject to specific procedures for protecting electrostatic-sensitive devices, as described in the IEC 60747-1 standard. CONCEPT gate drive units must be handled accordingly.

This Application Note describes the minimum requirements for preventing ESD during handling and assembly of all CONCEPT gate driver devices. CONCEPT products are sensitive to electrostatic discharge (ESD), as are MOSFETs and IGBT modules.

IGBT Gate Driver Structure

CONCEPT gate drivers are based on highly integrated ASIC chipsets of the SCALE™ (SCALE™-1, SCALE™-2) series. These ASIC chipsets are based on bipolar (SCALE-1) and CMOS (SCALE-2) technology respectively. They provide only limited protection against ESD. ESD-appropriate handling is therefore mandatory in order to guarantee correct operation and high reliability.

Fig. 1 shows a schematic of the SCALE-2 gate driver core 2SC0108T, including the direct input and output signals of the chipset.

All driver pins on the high- and low-voltage sides are directly connected to the SCALE-2 chipset. Even though the chipset has integrated ESD protection, its physical limits are specified: the ASIC cannot withstand excessive ESD events and requires sensitive handling with regard to electrostatic discharges.

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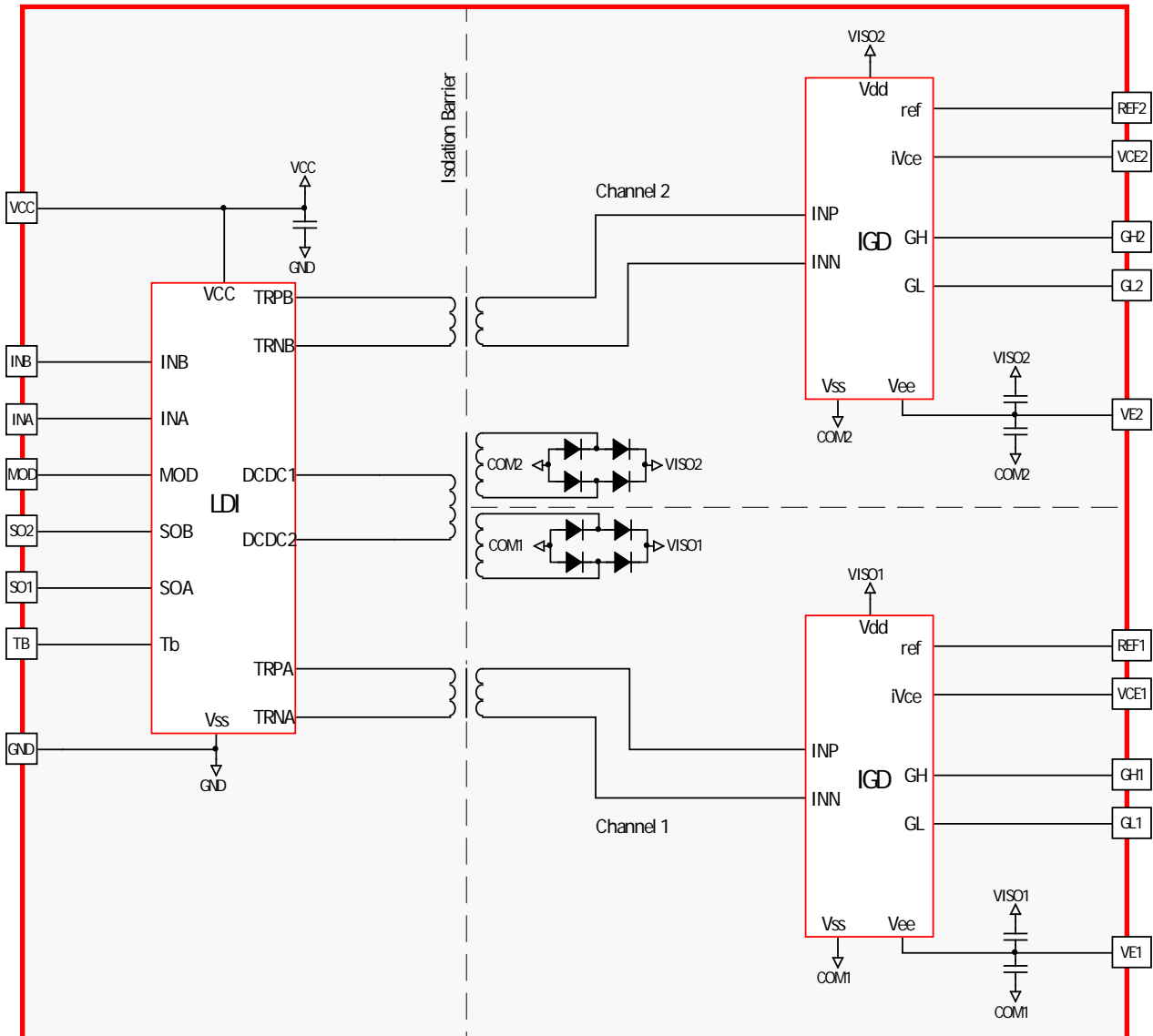


Fig. 1 Schematics of gate driver core 2SC0108T

Overall ESD Requirements

Overall ESD protection is required starting from incoming inspection up to final assembly including all intermediate stations in order to avoid possible damage to the gate drivers. ESD protection must also be considered during development work. Please also refer to the "Safety Notice" in the CONCEPT product data sheets.

The required ESD protection must include the following:

- Employees in direct contact with the gate drivers must use an ESD wrist strap or a metal band ESD wrist strap (Fig. 2) connected to earth. Alternatively, they can use ESD heel straps, or even better ESD shoes (Fig. 3) in combination with an ESD floor.
- The workplace, especially tables, chairs and deposit stations, as well as the tools, especially soldering equipment, screwdrivers, etc. must comply with the ESD standards. See also Fig. 2.

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- The packaging material must comply with the ESD standards if the drivers have to be packaged or stored.

CONCEPT gate driver products **must not be** handled or even touched **without this ESD protection**. Neglect of this condition may lead to gate driver damage or reduced product reliability.

Note that the packaging materials used by CONCEPT provide reliable ESD protection.



Fig. 2 ESD screwdriver and ESD wrist strap



Fig. 3 ESD heel strap (left) or ESD shoe (right)

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