



User Manual

SCS08HBGD250

(SiC MOSFET/GaN Half Bridge Gate Driver)



Prepared By: SCS



This document serves as a user guide for the installation and operation of SCS hardware. It has been written in English. All cautionary information is also provided in English. If the final user of this hardware is not proficient in English, it is the responsibility of the provider or intermediary to ensure that the user fully comprehends the information outlined in this document, particularly the terms, conditions, safety warnings, and operational hazards associated with the hardware.

Note: This hardware, developed by SCS, is a delicate, high-voltage, and high-temperature power electronics system. It is intended strictly for handling and operation by qualified professionals, such as experienced engineers or certified technicians.

When not in use, the hardware must be stored in an environment with a temperature range between -10°C and 70°C . During transportation, appropriate precautions must be taken to prevent mechanical or electrostatic damage. The device should be securely packaged, ideally in an ESD-safe bag or enclosure, equivalent to what SCS uses for safe shipment. For any queries regarding transportation safety, please reach out to info@scspower.in.

CAUTION

PLEASE CAREFULLY REVIEW THE FOLLOWING PAGES, AS THEY CONTAIN IMPORTANT INFORMATION REGARDING THE HAZARDS AND SAFE OPERATING REQUIREMENTS RELATED TO THE HANDLING AND USE OF THIS BOARD. DO NOT TOUCH THE BOARD WHEN IT IS ENERGIZED AND ALLOW THE BULK CAPACITORS TO COMPLETELY DISCHARGE PRIOR TO HANDLING THE BOARD. THERE CAN BE VERY HIGH VOLTAGES PRESENT ON THIS EVALUATION BOARD WHEN CONNECTED TO AN ELECTRICAL SOURCE, AND SOME COMPONENTS ON THIS BOARD CAN REACH TEMPERATURES ABOVE 50° CELSIUS. FURTHER, THESE CONDITIONS WILL CONTINUE FOR A SHORT TIME AFTER THE ELECTRICAL SOURCE IS DISCONNECTED UNTIL THE BULK CAPACITORS ARE FULLY DISCHARGED.

Please ensure that appropriate safety procedures are followed when operating this board, as any of the following can occur if you handle or use this board without following proper safety precautions:

DEATH ▲ SERIOUS INJURY ▲ ELECTROCUTION ▲ ELECTRICAL SHOCK ▲ ELECTRICAL BURNS ▲ SEVERE HEAT BURNS

You must read this document in its entirety before operating this board. It is not necessary for you to touch the board while it is energized. All test and measurement probes or attachments must be attached before the board is energized. You must never leave this board unattended or handle it when energized, and you must always ensure that all bulk capacitors have completely discharged prior to handling the board. Do not change the devices to be tested until the board is disconnected from the electrical source and the bulk capacitors have fully discharged.



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1. System Overview

1.1 Description

SCS08HBGD250 is a compact yet powerful half bridge (two output channels) gate driver for all types of power semiconductor switches (Si, SiC & GaN) and can work up to 250 kHz switching frequency, preferable for new generation SiC and GaN power switches for high-speed operation.

It has several protection features with on board isolated supplies that ensure reliability and efficient switching performance.

1.1.1 Features

- Up to 250 kHz switching frequency
- Standard +15/-5 volts drive (can be provided with other preferable options)
- Direct 3.3v and 15v pulse support, no need of additional interfacing circuit
- 8A peak current drive capability
- On board isolated supplies
- Half-bridge drive with inbuilt dead band option available
- Buffered inputs for low noise
- Under voltage lock out protection
- Short-circuit protection using V_{CESAT} and Fault feedback
- Up to 1000 volts DC link support
- Power and fault indication LED

1.1.2 Application

This gate driver is suitable for any application for switching frequency up to 250kHz. Some of targeted applications are:

- Motor & traction drives
- PFC converters
- DAB converters
- Multi-level converters
- Industrial automation & testing



Table 1: Input Pins

Symbol	Description
G	Ground.
NC	No Connection.
F2	Active low fault output for switch 2. In condition of fault pin voltage would be zero. Please connect the semiconductor switch as shown in fig-1 otherwise gate driver will consider it as open circuit and fault indication will be ON.
F1	Active low fault output for switch 1. In condition of fault pin voltage would be zero. Please connect the semiconductor switch as shown in fig-1 otherwise gate driver will consider it as open circuit and fault indication will be ON.
P1	Input pulse from microcontroller or DSP for switch 1.
P2	Input pulse from microcontroller or DSP for switch 2.
Vs	Power supply, +15Vdc nominal.

Table 2: Output Pins

Symbol	Description
A/D1	First switch drain/collector.
B/G1	First switch gate.
C/S1	First switch source/emitter.
D/D2	Second switch drain/collector.
E/G2	Second switch gate.
F/S2	Second switch source/emitter.



1.2 Connection Schematic & Characteristics

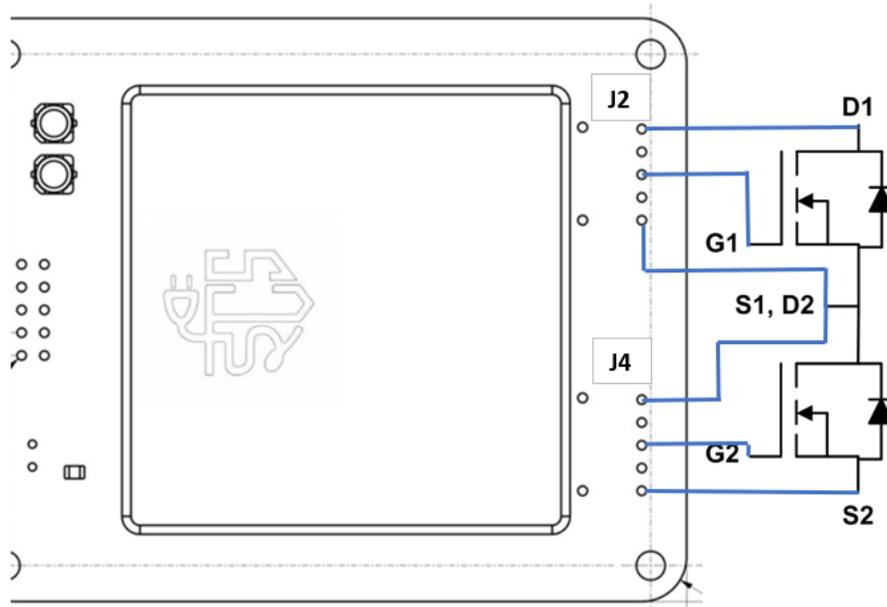


Figure 1: Connection of gate driver points with semiconductor switch

Indications

Green LED: Power ON

Red LED: Fault Condition

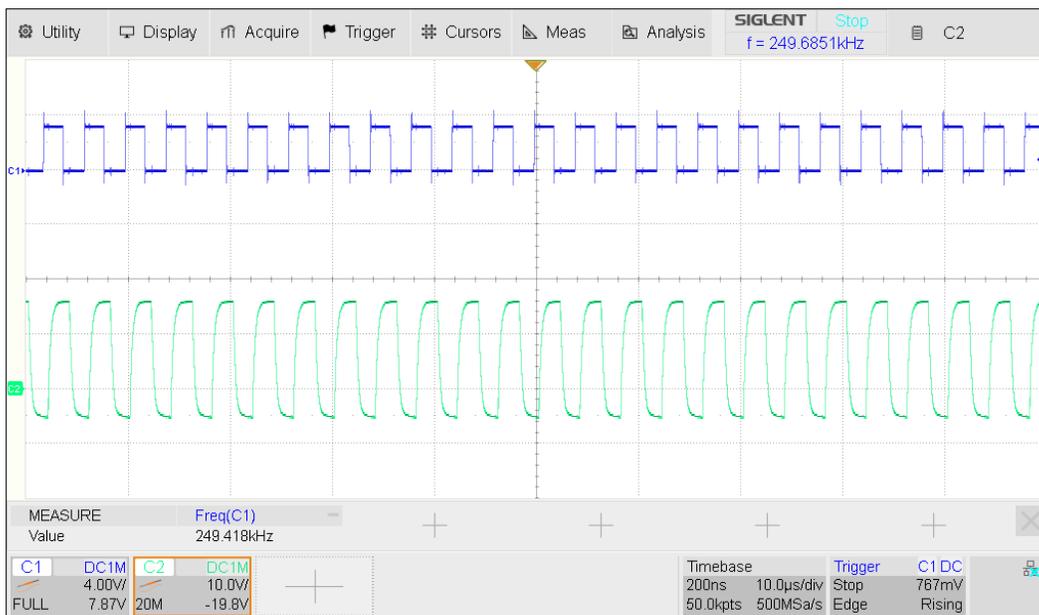


Figure 2: Operation around 250kHz

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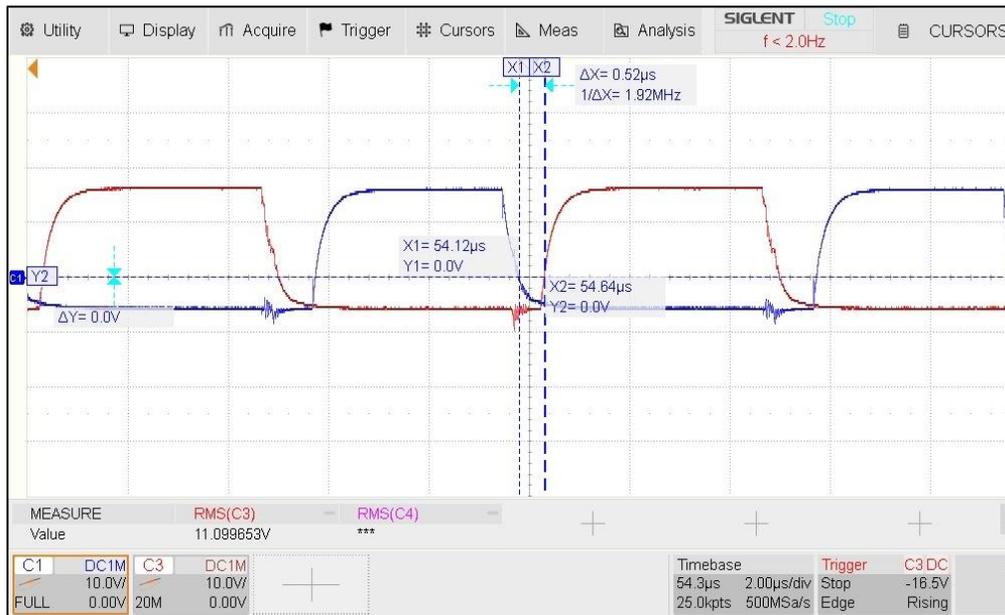


Figure 3: Deadband between two pulses

1.3 Deadband Configuration

The deadband between the high-side and low-side gate pulses is configured using on-board passive components. Resistors R2, R6 and capacitors C1, C3 are designated for deadband setting on the gate driver board.

The deadband duration can be adjusted by changing the values of R2, R6 and C1, C3 to suit the switching device and application requirements.

2 Mechanical Dimensions

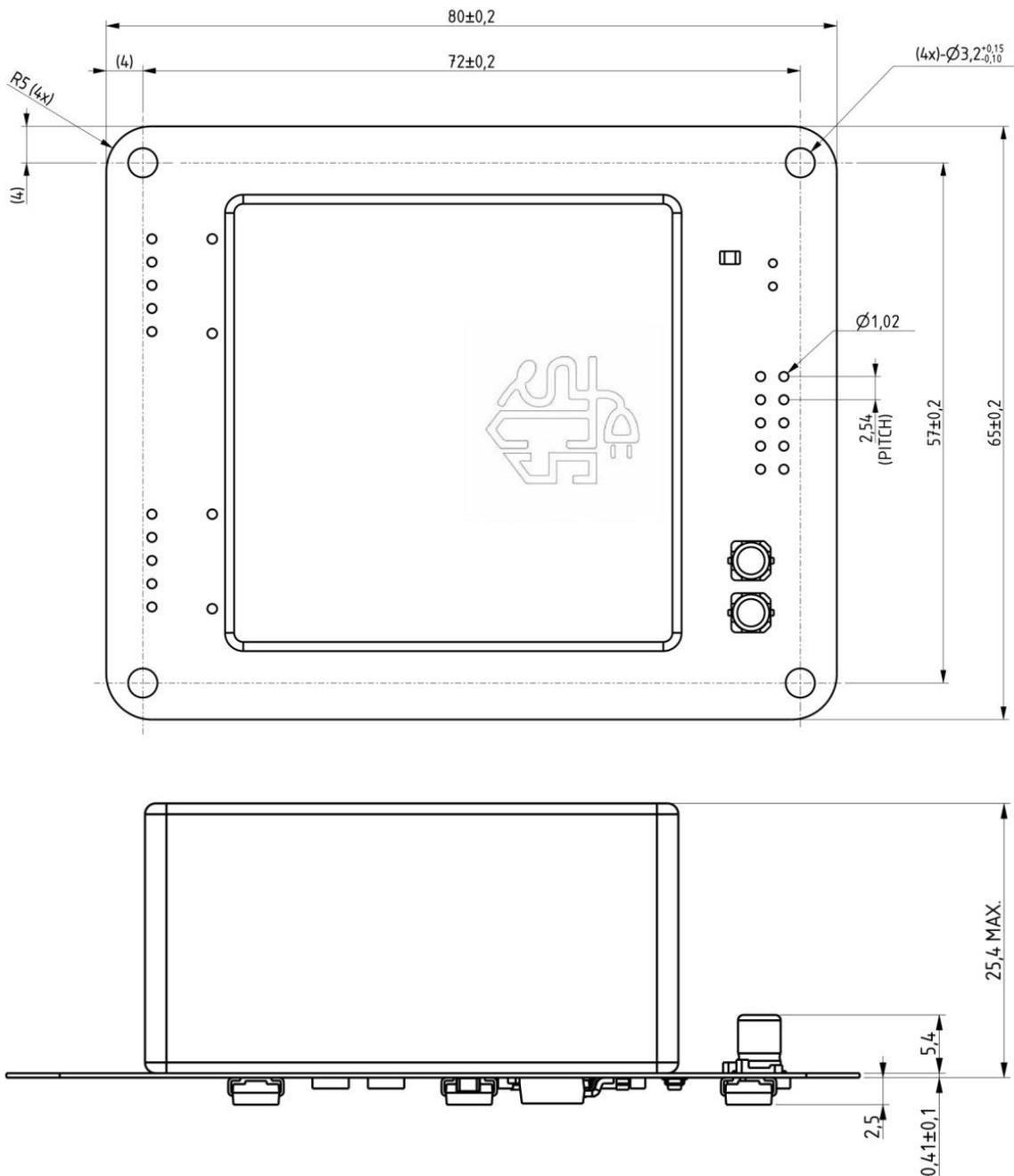


Figure 4: Dimensions

Note: All dimensions are in mm.

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