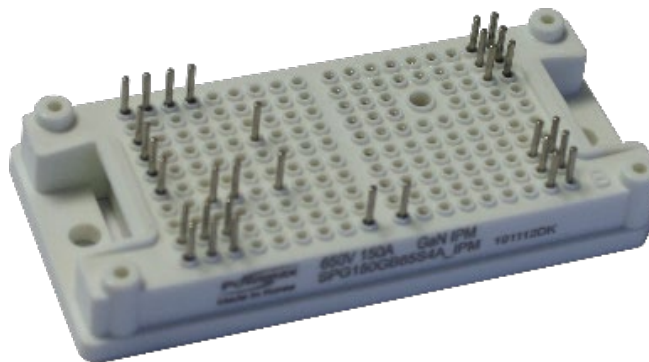


GS-EVM-HB-650V150A-SP1

650V 150A Half-Bridge Intelligent Power Module with Integrated Gate Drive

Technical Manual



SEMIPOWEREX[®]

Visit www.gansystems.com for the latest version of this technical manual.



WARNING:

PCB surface can become hot. Contact may cause burns. Do not touch!



CAUTION!

This product contains parts that are susceptible to damage by electrostatic discharge (ESD). Always follow ESD prevention procedures when handling the product.

Overview

GS-EVM-HB-650V150A-SP1 is 650V 150A half-bridge Intelligent Power Module with integrated gate drive. This 650V 150A GaN E-mode IPM provides ultra-low E_{sw} (switching loss), integrated gate drive, ultra-small system form factor, and low $R_{DS(on)}$. The module is designed for high-efficiency high switching frequency applications such as PV Inverters, energy storage systems, UPS, and VFD and other general-purpose use. GS-EVM-HB-650V150A-SP1 is created in partnership with SemiPowerEx and intended for testing and evaluation purposes only.

Features

- Includes 2 GS-065-150-1-D (650V 150A E-mode Die)
- Isolated, integrated gate drive
- Ultra low 0.2°C/W $R_{Q_JUNC_PLATE}$
- Low $R_{DS(on)}$ and low switching losses (E_{sw})
- Industry-standard case with Press-Fit Pins

Applications

- PV Inverters
- Energy storage systems
- UPS
- VFD
- EV Chargers

Contents

The GS-EVM-HB-650V150A-SP1 includes the following hardware.

Table 1 GS-EVM-HB-650V150A-SP1 Evaluation Kit Contents

Quantity	Description
1	GS-EVM-HB-650V150A-SP1 150A Half-Bridge Intelligent Power Module with Integrated Gate Drive

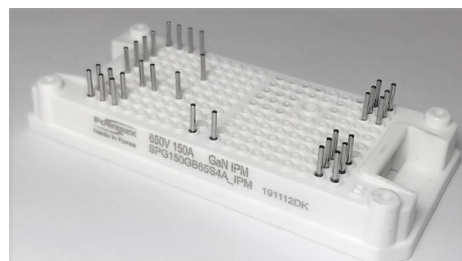


Figure 1 650V 150A GaN IPM

Please refer to the Evaluation Board/Kit Important Notice on page 9

Electrical Characteristics

($T_j=25^{\circ}\text{C}$, and $V_{GS} = 6\text{V}$, unless otherwise noted)

Symbol	Parameter	Conditions	Values	Units
V_{DSS}	Drain-Source Blocking Voltage	$V_{GS}=0\text{V}$, $I_{DSS}=250\text{mA}$	650	V
V_{GSS}	Gate-Source Voltage, continuous		-10 ~ 7	V
I_{DSS}	Drain-Source Leakage Current	$V_{GS}=0\text{V}$, $V_{DS}=650\text{V}$	3 (~100)	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=6\text{V}$	0.25 (~1.0)	mA
I_{DS}^*	Continuous Drain Current	$T_C=25^{\circ}\text{C}$	188	A
		$T_C=71^{\circ}\text{C}$	150	A
$V_{GS(th)}$	Gate-Source Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=21\text{mA}$	1.2 (0.8~2.5)	V
$R_{DS(ON)}$	Drain-Source ON Resistance	$V_{GS}=6\text{V}$, $T_j=25^{\circ}\text{C}$, $I_{DS}=120\text{A}$	10 (~17)	$\text{m}\Omega$
		$V_{GS}=6\text{V}$, $T_j=150^{\circ}\text{C}$, $I_{DS}=120\text{A}$	20	$\text{m}\Omega$
$T_{j(op)}$	Operating Junction Temperature (Chip)		-55 ~ 150	$^{\circ}\text{C}$
T_{stg}	Storage Temperature (Module)		-40 ~ 125	$^{\circ}\text{C}$
V_{ISO}	Isolation Voltage	RMS, $f=50\text{Hz}$, $t=1\text{ minutes}$	2,500	V
$R_{th(j-c)}$	Thermal Resistance		0.14	$^{\circ}\text{C/W}$
Weight	Module		35.4	g

Test Results

Double Pulse Test (GS-EVM-HB-650V150A-SP1)

- Test Condition: $V_{DS} = 400V$, $I_D = 150A$, $R_{g-ON} = 13.5\Omega$, $R_{g-OFF} = 11\Omega$

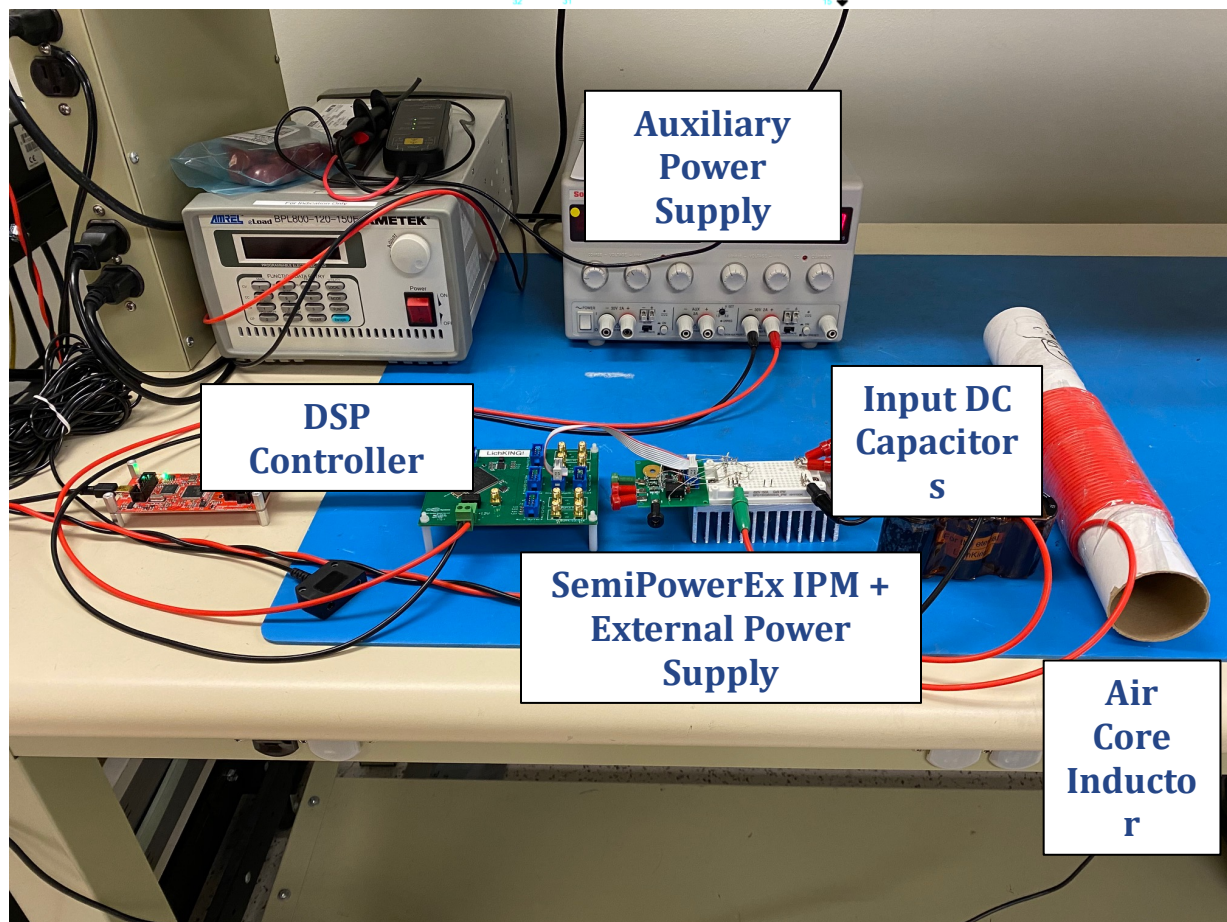
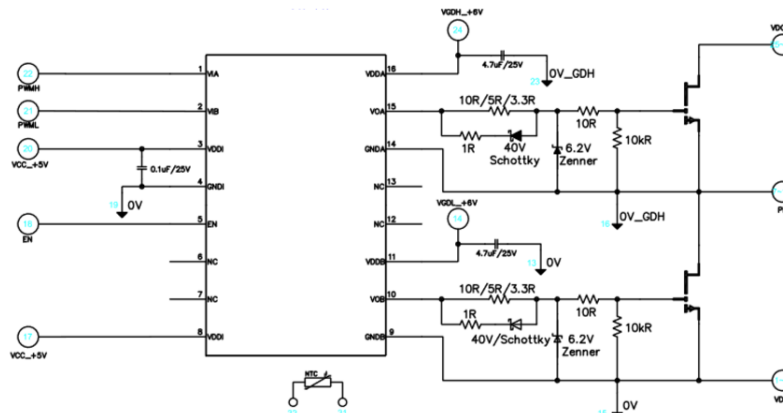


Figure 3 Double pulse test setup

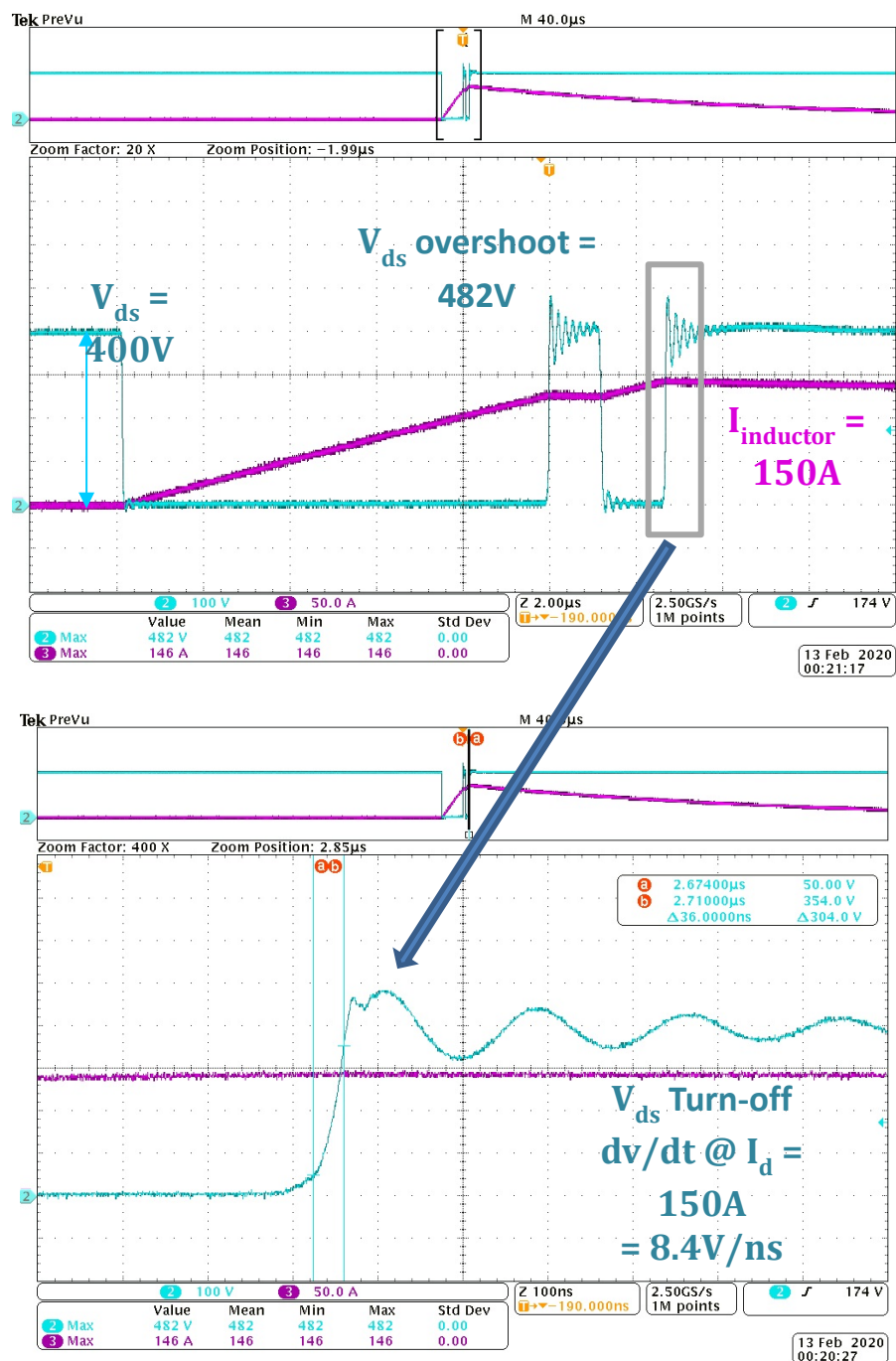


Figure 4 Double pulse test Switching OFF waveforms

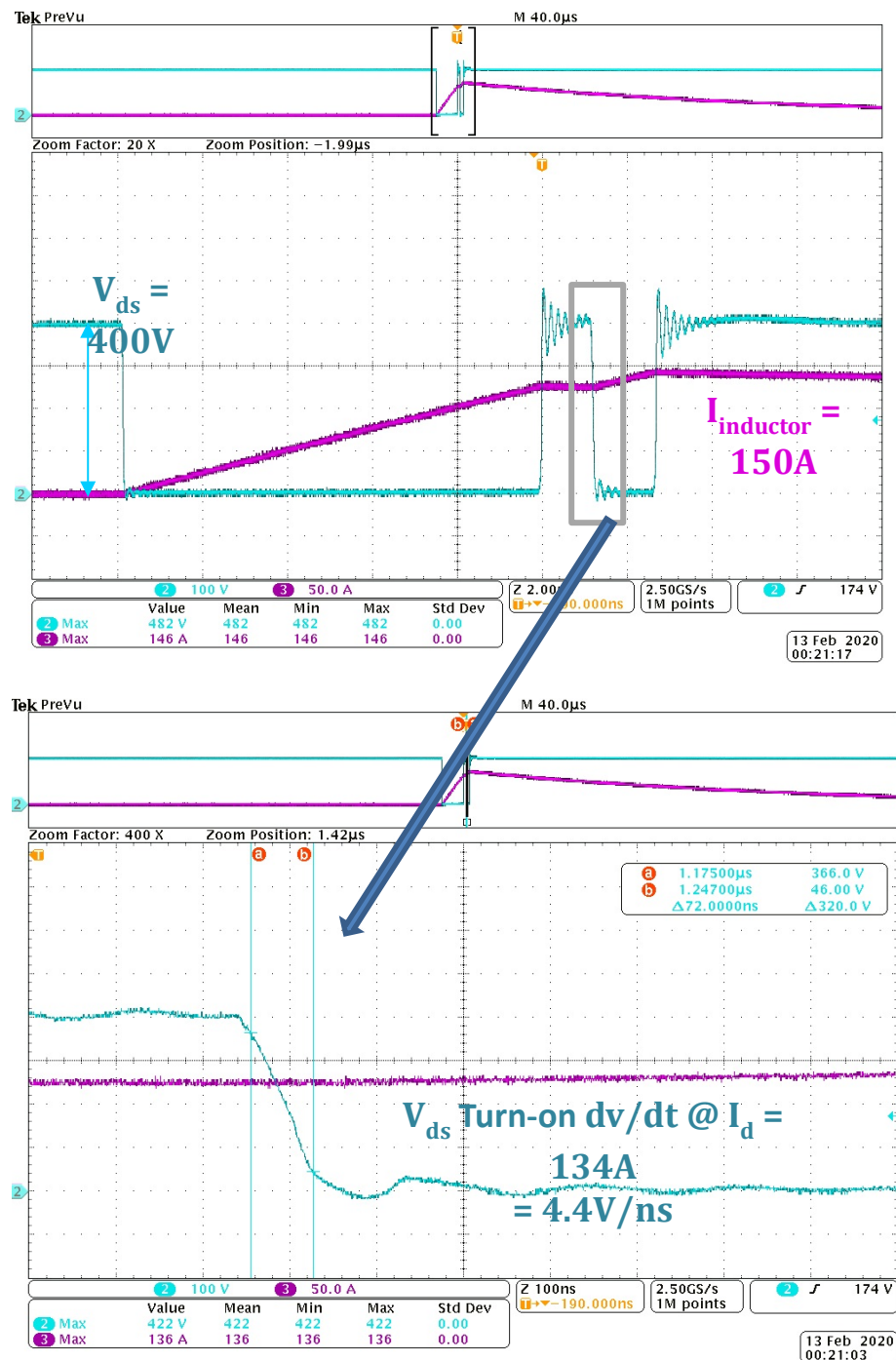


Figure 5 Double pulse test Switching ON waveforms

Mechanical Drawing

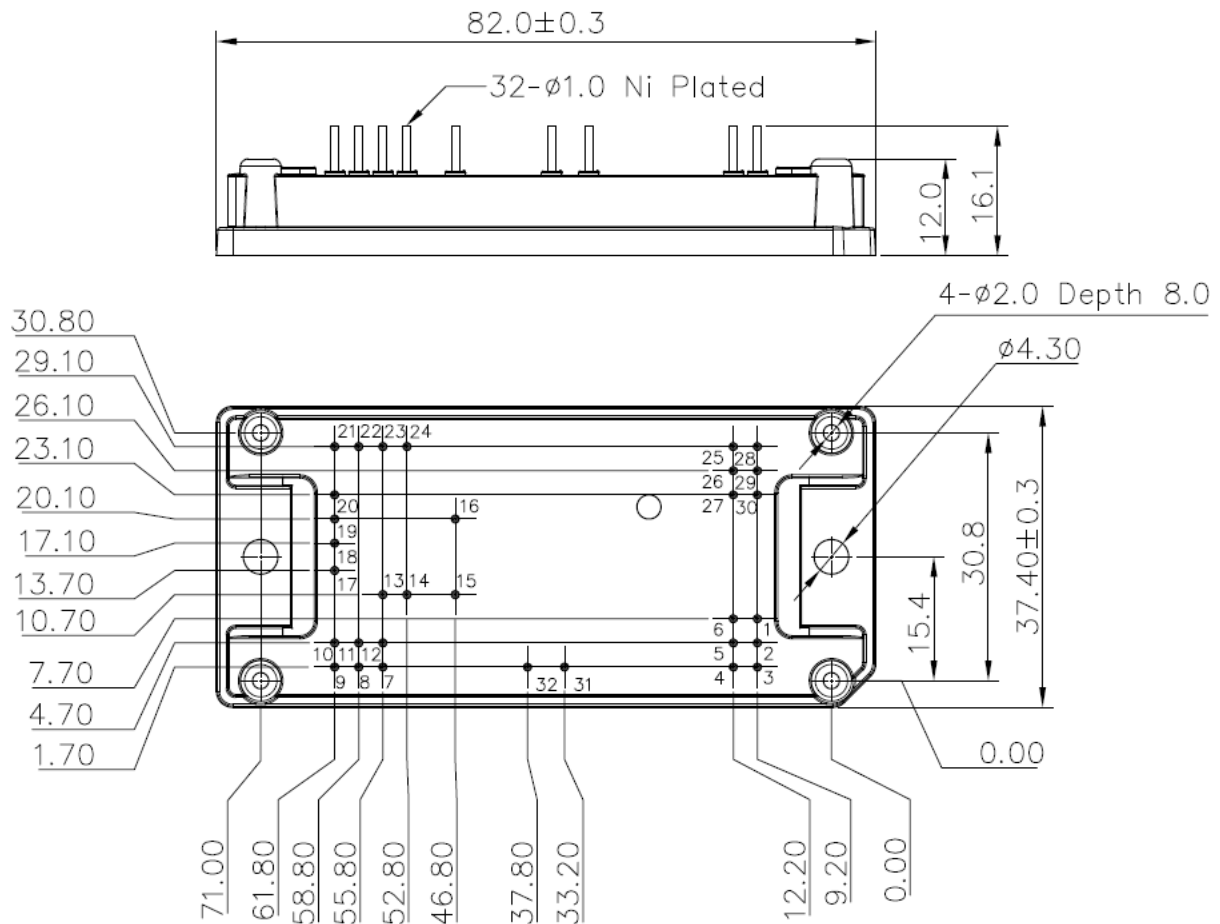


Figure 6 650V 150A GaN IPM Package Outline

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