

# GSID200A170S3B1

## IGBT Module



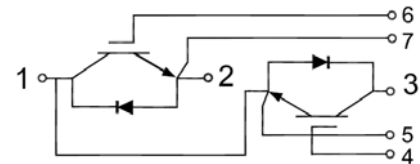
### Features:

- Low Saturation Voltage:  $V_{CE(sat)} = 1.60V @ I_C = 200A, T_C = 25^\circ C$
- Low Switching Loss
- 100% RBSOA Tested ( $2 \times I_C$ )
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement



### Applications:

- High Power Converters
- Motor Drives
- UPS Systems
- Wind Turbines



### Maximum Rated Values of IGBT( $T_C = 25^\circ C$ unless otherwise specified)

$V_{CES}$	Collector-Emitter Blocking Voltage		1700	V
$V_{GES}$	Gate-Emitter Voltage		$\pm 20$	V
$I_C$	Continuous Collector Current	$T_C = 80^\circ C$	200	A
		$T_C = 25^\circ C$	400	A
$I_{CM}$	Repetitive Peak Collector Current	$T_J = 175^\circ C$	400	A
$t_{SC}$	Short Circuit Withstand Time		>10	$\mu s$
$P_D$	Maximum Power Dissipation per IGBT	$T_C = 25^\circ C$ $T_{Jmax} = 175^\circ C$	1630	W

### Electrical Characteristics of IGBT ( $T_C=25^\circ\text{C}$ unless otherwise specified)

#### Static characteristics

Symbol	Description	Conditions	Min	Typ	Max	Unit	
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C = 1\text{mA}, V_{CE} = V_{GE}$	5.0	5.6	6.8	V	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 200\text{A}, V_{GE} = 15\text{V}$	$T_J = 25^\circ\text{C}$		1.60	1.90	V
			$T_J = 125^\circ\text{C}$		1.90		V
			$T_J = 150^\circ\text{C}$		2.00		V
$I_{CES}$	Collector-Emitter Leakage Current	$V_{GE} = 0\text{V}, V_{CE} = V_{CES}, T_J = 25^\circ\text{C}$			1	mA	
$I_{GES}$	Gate-Emitter Leakage Current	$V_{GE} = \pm 20\text{V}, V_{CE} = 0\text{V}, T_J = 25^\circ\text{C}$			400	nA	
$C_{ies}$	Input Capacitance	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		26		nF	
$C_{oes}$	Output Capacitance			0.58		nF	
$C_{res}$	Reverse Transfer Capacitance			0.42		nF	

#### Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC} = 900\text{V}, I_C = 200\text{A}, R_G = 10\ \Omega, V_{GE} = \pm 15\text{V},$ Inductive Load	$T_J = 25^\circ\text{C}$		263		ns
			$T_J = 125^\circ\text{C}$		260		
			$T_J = 150^\circ\text{C}$		261		
$t_r$	Rise Time		$T_J = 25^\circ\text{C}$		114		ns
			$T_J = 125^\circ\text{C}$		120		
			$T_J = 150^\circ\text{C}$		119		
$t_{d(off)}$	Turn-off Delay Time		$T_J = 25^\circ\text{C}$		1081		ns
			$T_J = 125^\circ\text{C}$		1200		
			$T_J = 150^\circ\text{C}$		1198		
$t_f$	Fall Time		$T_J = 25^\circ\text{C}$		451		ns
			$T_J = 125^\circ\text{C}$		632		
			$T_J = 150^\circ\text{C}$		636		
$E_{on}$	Turn-on Switching Loss	$T_J = 25^\circ\text{C}$		40		mJ	
		$T_J = 125^\circ\text{C}$		51			
		$T_J = 150^\circ\text{C}$		54			

E <sub>off</sub>	Turn-off Switching Loss	V <sub>CC</sub> = 900V, I <sub>C</sub> = 200A, R <sub>G</sub> = 10 Ω, V <sub>GE</sub> = ±15V, Inductive Load	T <sub>J</sub> = 25°C		40		mJ
			T <sub>J</sub> = 125°C		44		
			T <sub>J</sub> = 150°C		48		
Q <sub>g</sub>	Total Gate Charge		T <sub>J</sub> = 25°C		1810		nC
			T <sub>J</sub> = 125°C		1831		
			T <sub>J</sub> = 150°C		1839		
RBSOA	Reverse Bias Safe Operation Area	I <sub>C</sub> =400A, V <sub>CC</sub> =1630V, V <sub>p</sub> =1700V, R <sub>G</sub> = 10Ω, V <sub>GE</sub> =+15V to 0V, T <sub>J</sub> =150°C	Trapezoid				
SCSOA	Short Circuit Safe Operation Area	V <sub>CC</sub> ≤ 900V, V <sub>GE</sub> = 15V, T <sub>J</sub> = 150°C	10			μs	
R <sub>θJC</sub>	IGBT Thermal Resistance: Junction-To-Case				0.092		°C/W

### Maximum Rated Values of Diode (T<sub>C</sub>=25°C unless otherwise specified)

V <sub>RRM</sub>	Repetitive Peak Reverse Voltage	1700	V
I <sub>F</sub>	Diode Continuous Forward Current	100	A
I <sub>FM</sub>	Diode Maximum Forward Current	200	A

### Electrical Characteristics of Diode (T<sub>C</sub>=25°C unless otherwise specified)

Symbol	Description	Conditions	Min	Typ	Max	Unit
V <sub>FM</sub>	Forward Voltage	I <sub>F</sub> = 200A , V <sub>GE</sub> = 0V	T <sub>J</sub> = 25°C	2.10		V
			T <sub>J</sub> = 125°C	2.20		
I <sub>rr</sub>	Peak Reverse Recovery Current	I <sub>F</sub> =200A, di/dt =896A/μs, V <sub>rr</sub> = 900V, V <sub>GE</sub> = -15V	T <sub>J</sub> = 25°C	110		A
			T <sub>J</sub> = 125°C	144		
Q <sub>rr</sub>	Reverse Recovery Charge		T <sub>J</sub> = 25°C	20.5		μC
			T <sub>J</sub> = 125°C	38.1		
E <sub>rec</sub>	Reverse Recovery Energy		T <sub>J</sub> = 25°C	9.8		mJ
			T <sub>J</sub> = 125°C	20.6		
R <sub>θJC</sub>	Diode Thermal Resistance: Junction-To-Case			0.111		°C/W

### Module

Symbol	Description	Min	Typ	Max	Unit
V <sub>iso</sub>	Isolation Voltage(All Terminals Shorted) <span style="float: right;">f = 50Hz, 1minute</span>			2500	V
T <sub>J</sub>	Maximum Junction Temperature			175	°C
T <sub>JOP</sub>	Maximum Operating Junction Temperature Range	-40		+150	°C
T <sub>stg</sub>	Storage Temperature	-40		+125	°C
R <sub>θCS</sub>	Case-To-Sink (Conductive Grease Applied)		0.03		°C/W
T	Power Terminals Screw:M6	3.0		5.0	N·m
T	Mounting Screw:M6	4.0		6.0	N·m
G	Weight		300		g

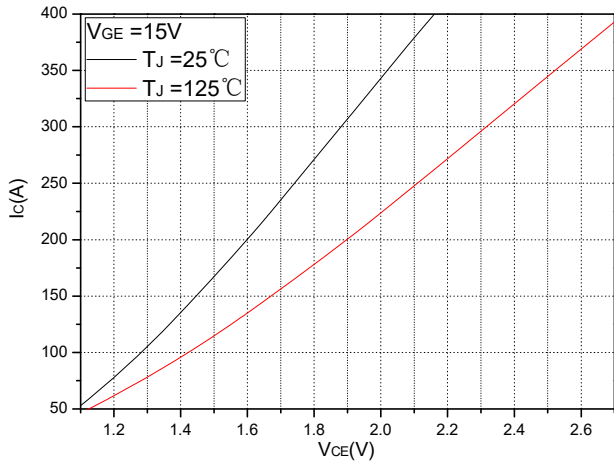


Fig.1 Typical Saturation Voltage Characteristics

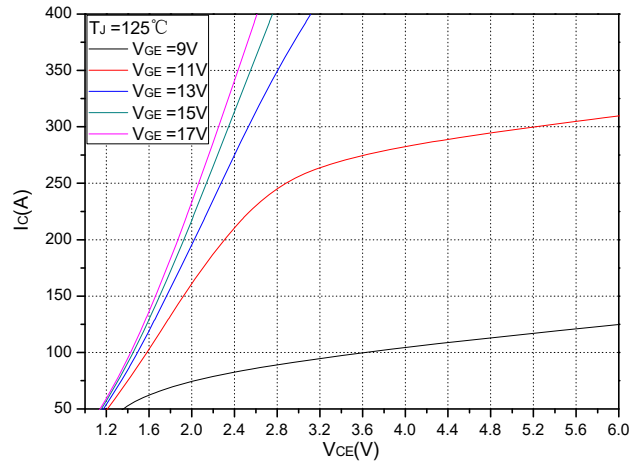


Fig.2 Typical Output Characteristics

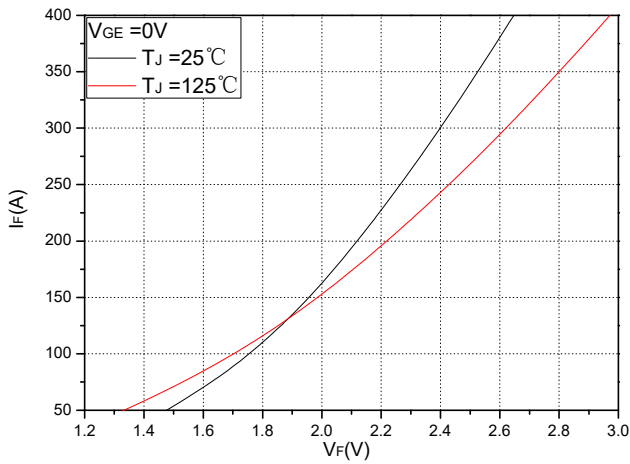


Fig.3 Forward Characteristics of FWD

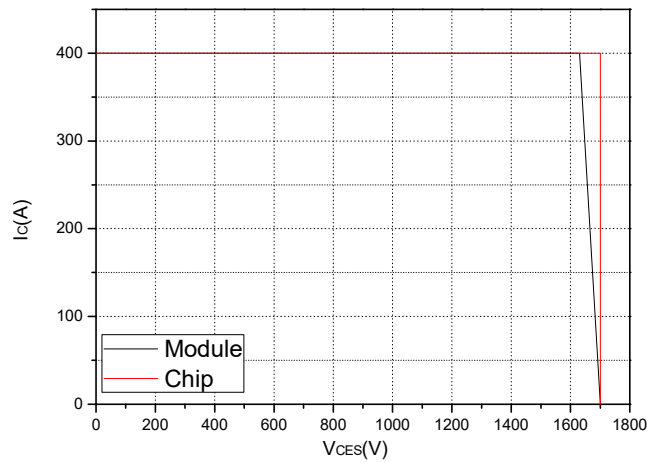


Fig.4 Reverse Bias Safe Operation Area (RBSOA)

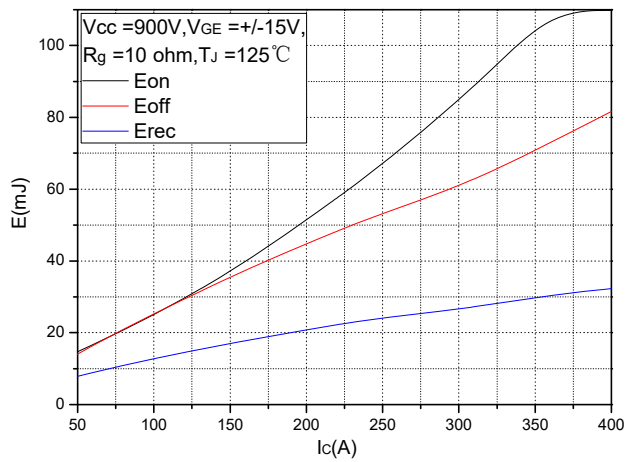


Fig.5 Typical Switching Loss vs. Collector Current

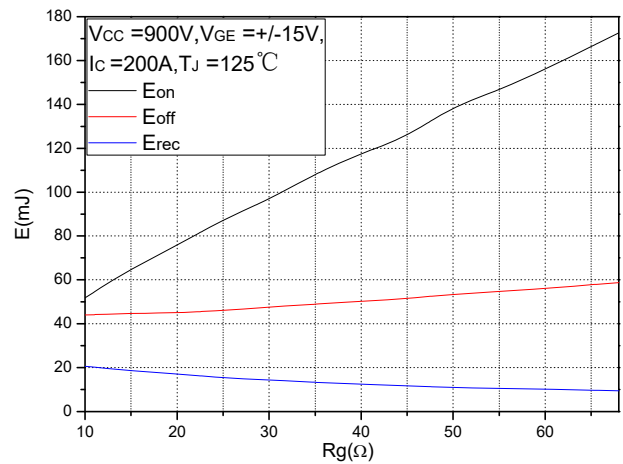
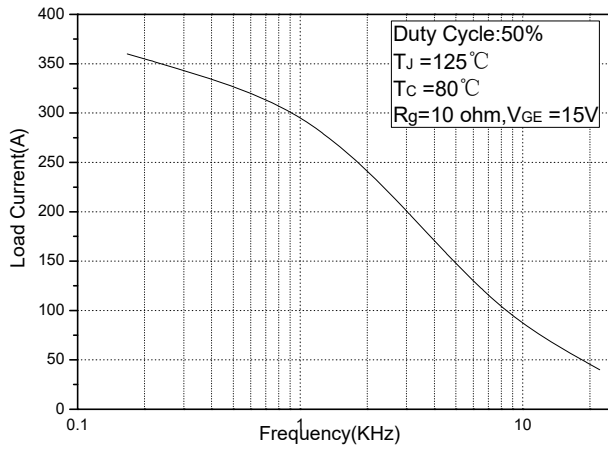
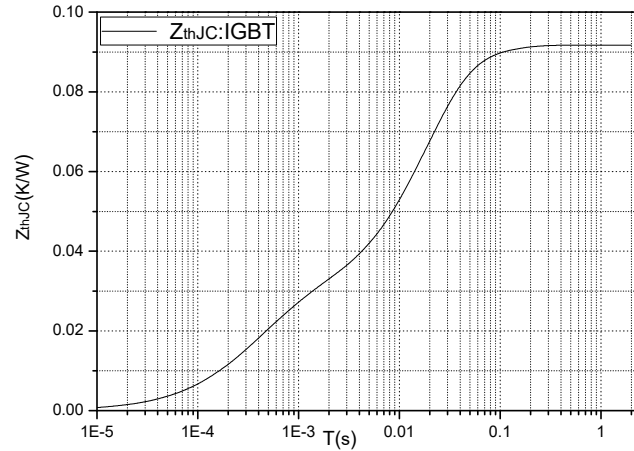


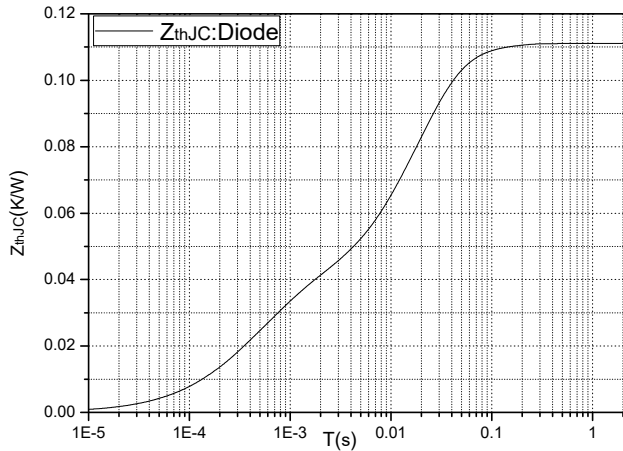
Fig.6 Typical Switching Losses vs. Gate Resistance



**Fig.7 Typical Load Current vs. Frequency**

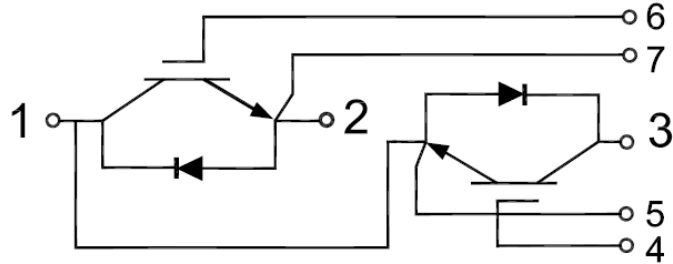


**Fig.8 Transient thermal impedance (IGBT)**

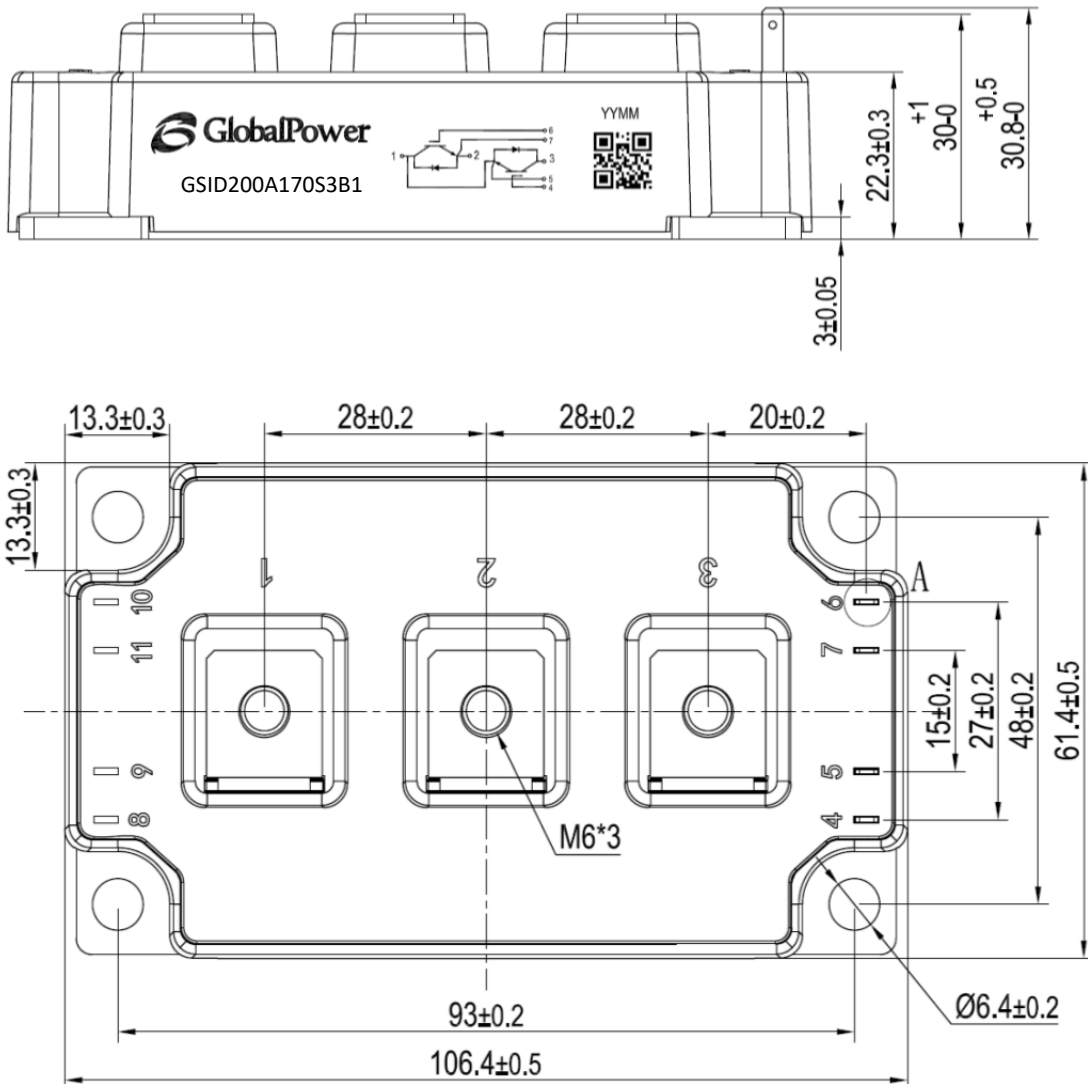


**Fig.9 Transient thermal impedance (Diode)**

**Internal Circuit**



**Package Outline (Unit: mm):**



### Revision History

Date	Revision	Notes
10/23/2015	0.1	Initial release
01/03/2020	0.2	Applied company name change

#### Notes

##### RoHS Compliance

The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/65/EC (RoHS2), as implemented March, 2013. RoHS Declarations for this product can be obtained from the Product Documentation sections of [www.SemiQ.com](http://www.SemiQ.com).

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