



GT300HF65A5H

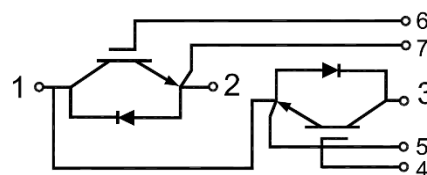
IGBT Module

Preliminary Data

Features:

- Field Stop Trench Gate IGBT
- Short Circuit Rated $>6\mu\text{s}$
- Low Saturation Voltage
- Low Switching Loss
- 100% RBSOA Tested($2\times I_c$)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement

Circuit Diagram



Applications:

- Welding
- HEV Inverter
- Industrial Motor Drives
- UPS

IGBT, Inverter

Maximum Rated Values ($T_c=25^\circ\text{C}$ unless otherwise specified)

V_{CES}	Collector-Emitter Blocking Voltage		650	V
V_{GES}	Gate-Emitter Voltage		± 20	V
I_c	Continuous Collector Current	$T_c=100^\circ\text{C}$	300	A
		$T_c=25^\circ\text{C}$	380	A
I_{CM}	Peak Collector Current Repetitive	$t_p=1\text{ms}$	600	A
P_D	Maximum Power Dissipation (IGBT)	$T_c=25^\circ\text{C}$ $T_J=175^\circ\text{C}$	1130	W



Electrical Characteristics of IGBT

Static Characteristics

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=4mA, V_{CE}=V_{GE}$	4.0	4.7	6.0	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=300A, V_{GE}=15V$	$T_J=25^{\circ}C$	1.50	1.80	V
			$T_J=125^{\circ}C$	1.70		V
			$T_J=150^{\circ}C$	1.75		V
I_{CES}	Collector-Emitter Leakage Current	$V_{GE}=0V, V_{CE}=V_{CES}, T_J=25^{\circ}C$			1	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=\pm 20V, V_{CE}=0V, T_J=25^{\circ}C$			± 400	nA
C_{ies}	Input Capacitance	$V_{CE}=25V, V_{GE}=0V, f=100kHz$		18.4		nF
C_{oes}	Output Capacitance			1.44		nF
C_{res}	Reverse Transfer Capacitance			0.55		nF

Switching Characteristics

Switching Characteristics							
$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=300V, I_C=300A,$ $R_{Gon}=4.7\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		412		ns
			$T_J=125^{\circ}C$		417		
			$T_J=150^{\circ}C$		421		
t_r	Rise Time	$V_{CC}=300V, I_C=300A,$ $R_{Gon}=4.7\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		217		ns
			$T_J=125^{\circ}C$		220		
			$T_J=150^{\circ}C$		226		
$t_{d(off)}$	Turn-off Delay Time	$V_{CC}=300V, I_C=300A,$ $R_{Goff}=4.7\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		432		ns
			$T_J=125^{\circ}C$		436		
			$T_J=150^{\circ}C$		438		
t_f	Fall Time	$V_{CC}=300V, I_C=300A,$ $R_{Goff}=4.7\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		118		ns
			$T_J=125^{\circ}C$		129		
			$T_J=150^{\circ}C$		130		
E_{on}	Turn-on Switching Loss	$V_{CC}=300V, I_C=300A,$ $R_{Gon}=4.7\Omega, V_{GE}=\pm 15V,$ $di/dt=1134A/\mu s$ ($T_J=150^{\circ}C$) Inductive Load	$T_J=25^{\circ}C$		8.2		mJ
			$T_J=125^{\circ}C$		10.4		
			$T_J=150^{\circ}C$		10.8		



E _{off}	Turn-off Switching Loss	V _{CC} =300V, I _C =300A, R _{Goff} =4.7Ω, V _{GE} =±15V, du/dt=2160V/μs (T _J =150°C) Inductive Load	T _J =25°C		12.5		mJ
			T _J =125°C		15.8		
			T _J =150°C		17.2		
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C		1.47		μC
R _{G(int)}	Internal Gate Resistance		T _J =25°C		1		Ω
SCSOA	V _{CC} =300V, V _{GE} =±15V, T _J =150°C			6			μs
R _{θJC}	IGBT Thermal Resistance: Junction-to-Case (per IGBT)					0.13	°C/W

Diode, Inverter

Maximum Rated Values of Diode

V _{RRM}	Repetitive Peak Reverse Voltage	T _J =25°C	650	V
I _F	Diode Continuous Forward Current	T _C =100°C	300	A
I _{FM}	Peak Diode Current Repetitive	t _p =1ms	600	A

Electrical Characteristics of Diode

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V _{FM}	Forward Voltage	I _F =300A	T _J =25℃		1.60		V
			T _J =125℃		1.65		
			T _J =150℃		1.60		
t _{rr}	Reverse Recovery Time	I _F =300A, -diF/dt=1449A/μs(T _J =150℃), V _R =300V, V _{GE} =-15V	T _J =25℃		125		ns
			T _J =125℃		169		
			T _J =150℃		174		
I _{rr}	Peak Reverse Recovery Current		T _J =25℃		80		A
			T _J =125℃		113		
			T _J =150℃		122		
Q _{rr}	Reverse Recovery Charge		T _J =25℃		5.99		μC
			T _J =125℃		11.6		
			T _J =150℃		12.8		



E _{rec}	Reverse Recovery Energy	I _F =300A, -diF/dt=1449/μs(T _J =150°C), V _R =300V, V _{GE} =-15V	T _J =25°C		0.6		mJ
			T _J =125°C		2.0		
			T _J =150°C		2.4		
R _{θJC}	Diode Thermal Resistance: Junction-to-Case (per Diode)					0.18	°C/W

Module

Symbol	Description		Min.	Typ.	Max.	Units
V _{iso}	Isolation Voltage (All Terminals Shorted)	RMS, f=50Hz, 1minute	2500			V
T _J	Maximum Junction Temperature				175	°C
T _{JOP}	Maximum Operating Junction Temperature Range		-40		+150	°C
T _{stg}	Storage Temperature		-40		+125	°C
CTI	Comparative Tracking Index		200			
R _{θCS}	Case-to-Sink Thermally (Conductive Grease Applied)				0.05	°C/W
M	Power Terminals Screw:M5		3.0		5.0	N·m
M	Mounting Screw:M6		4.0		6.0	N·m
G	Weight			200		g



Ordering Information Table

Device code	G	T	300	HF	65	A5	H
	①	②	③	④	⑤	⑥	⑦

- ①-IGBT Module
- ②-Trench, Low Switching Losses IGBT
- ③-Rated Current (300=300A)
- ④-Circuit Configuration (HF=Half Bridge)
- ⑤-Rated Voltage (65=650V)
- ⑥-Package Type
- ⑦-Test Level (Pass the Important Reliability Test-Industrial Grade)

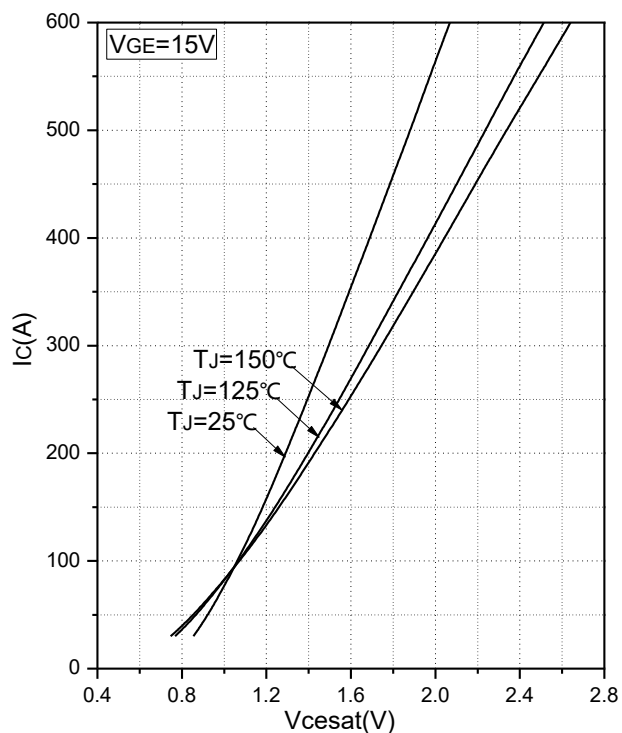


Fig.1 Typical Saturation Voltage Characteristics

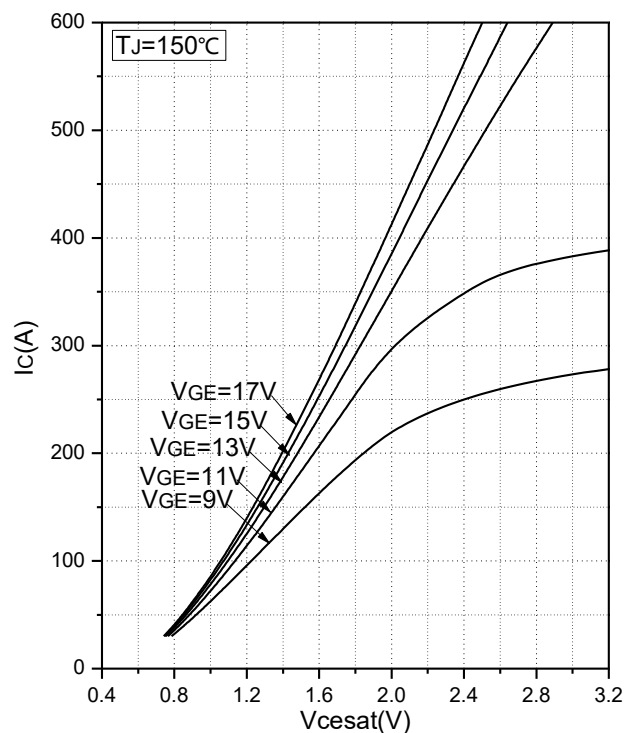


Fig.2 Typical Output Characteristics

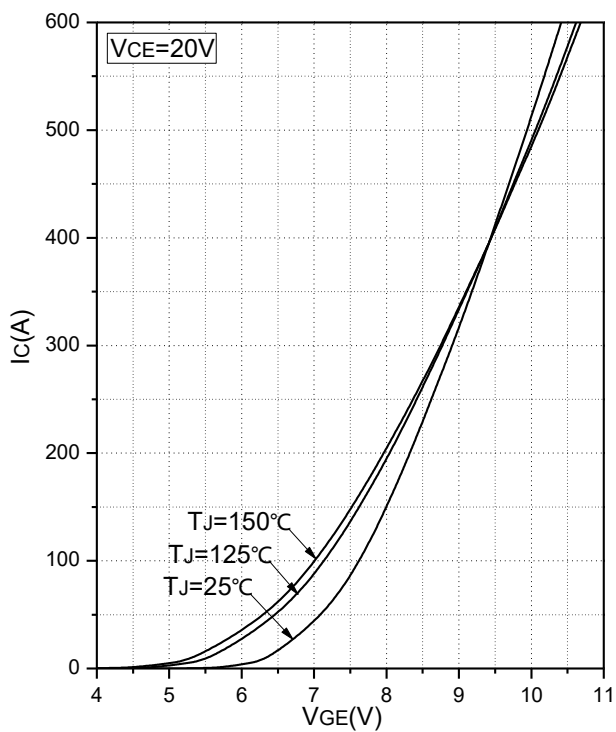


Fig.3 Transfer Characteristic

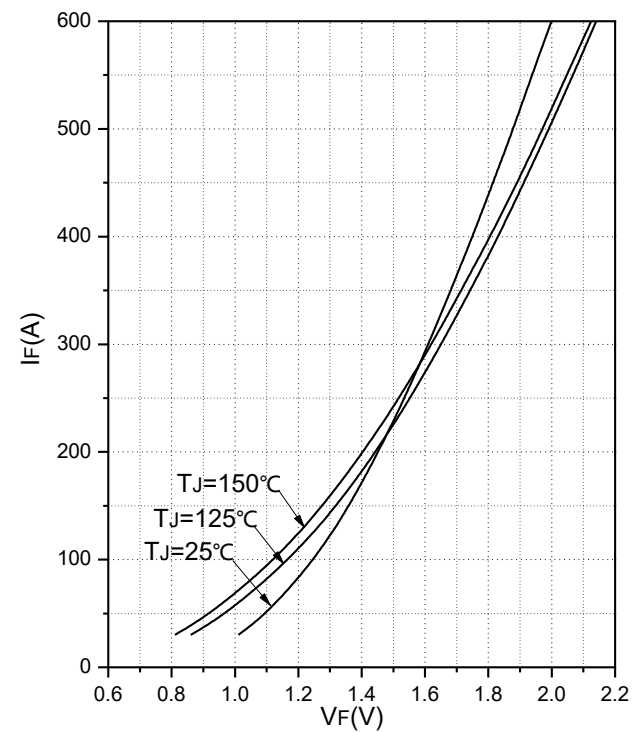


Fig.4 Forward Characteristics of Diode

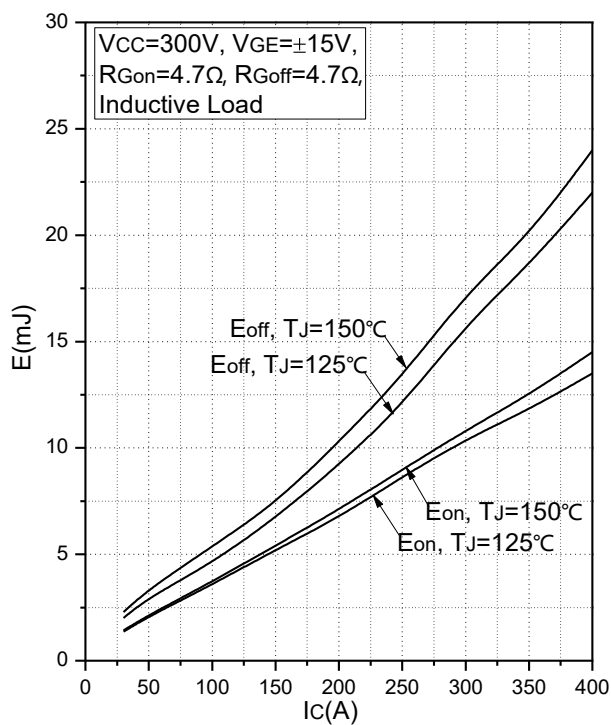


Fig.5 Typical Switching Loss vs. Collector Current

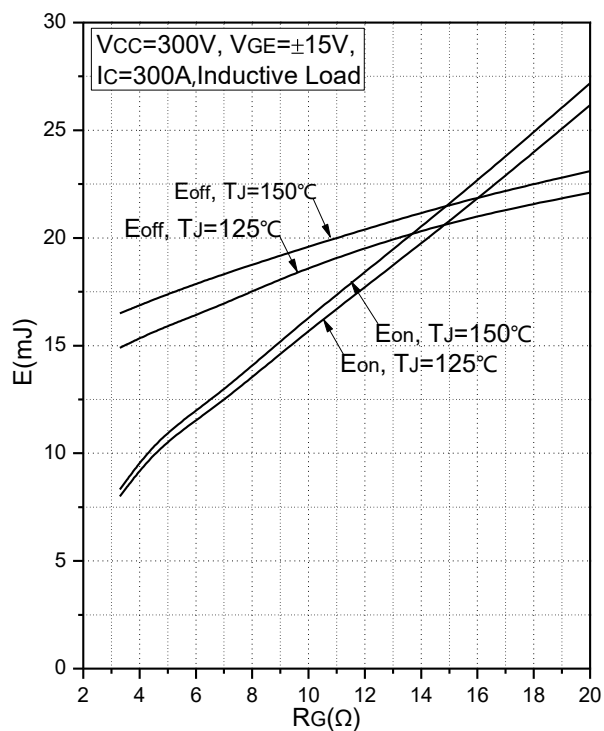


Fig.6 Typical Switching Loss vs. Gate Resistance

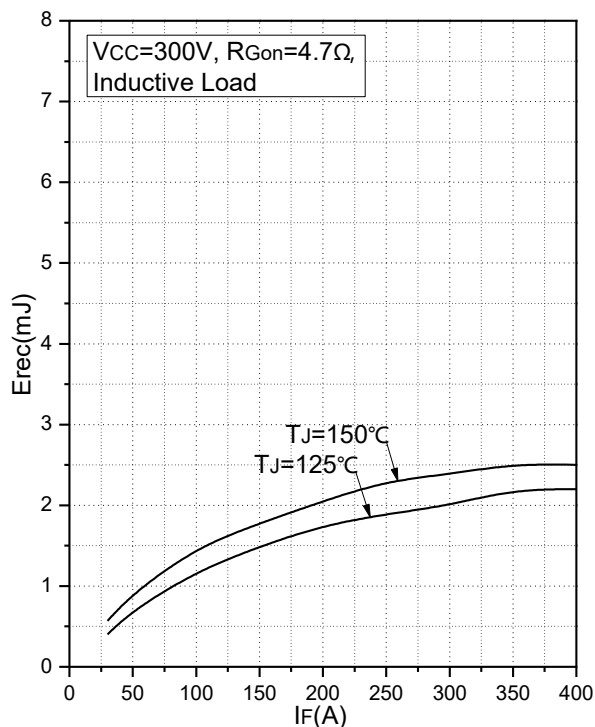


Fig.7 Typical Switching Loss vs. Forward Current

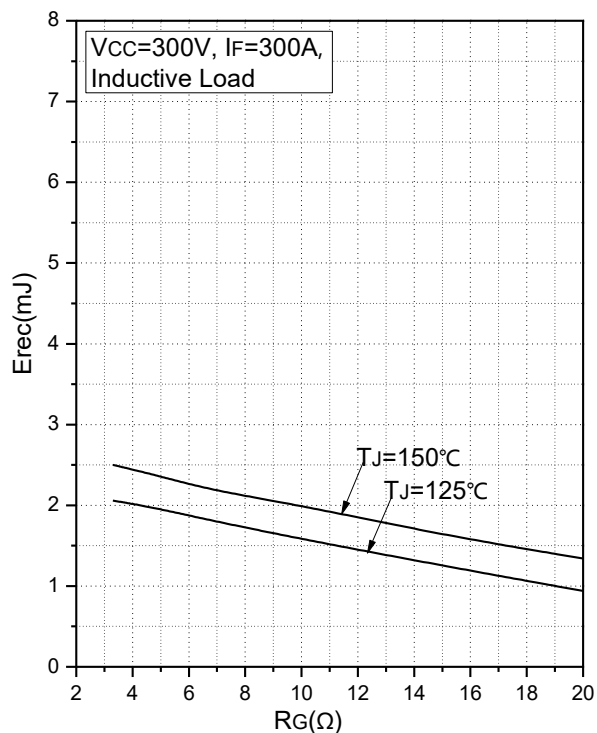


Fig.8 Typical Switching Loss vs. Gate Resistance

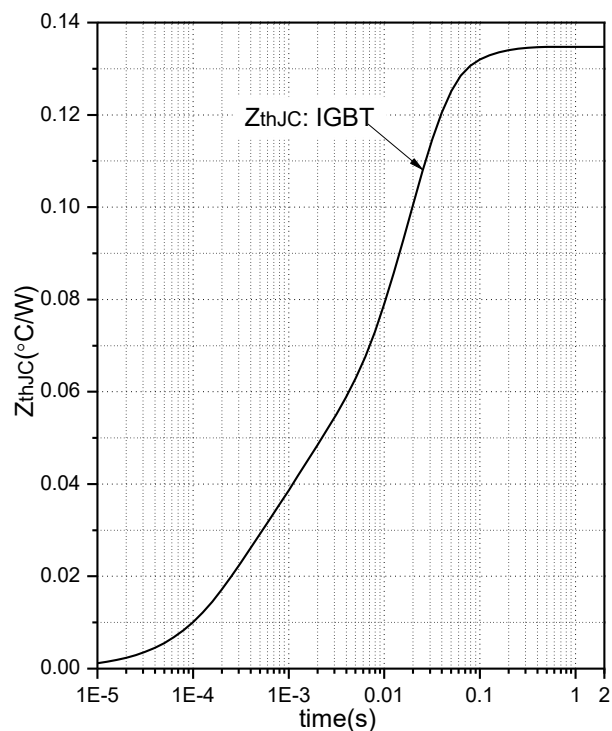


Fig.9 Transient Thermal Impedance (IGBT)

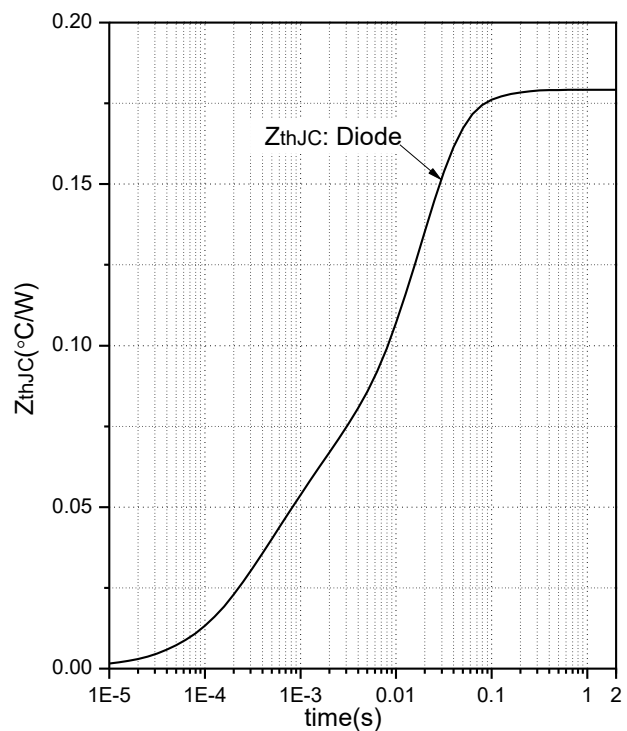


Fig.10 Transient Thermal Impedance (Diode)

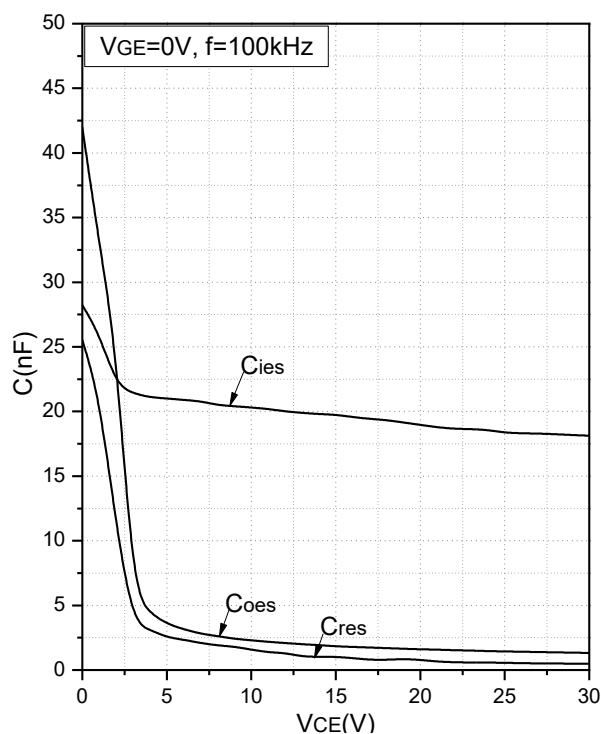


Fig.11 Capacitance Characteristics

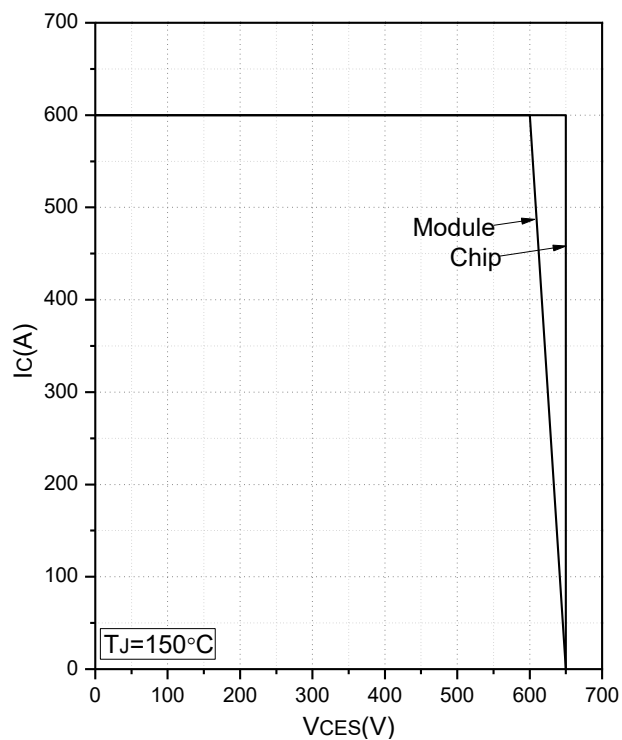
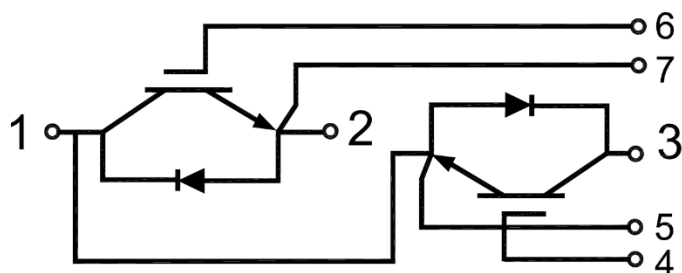


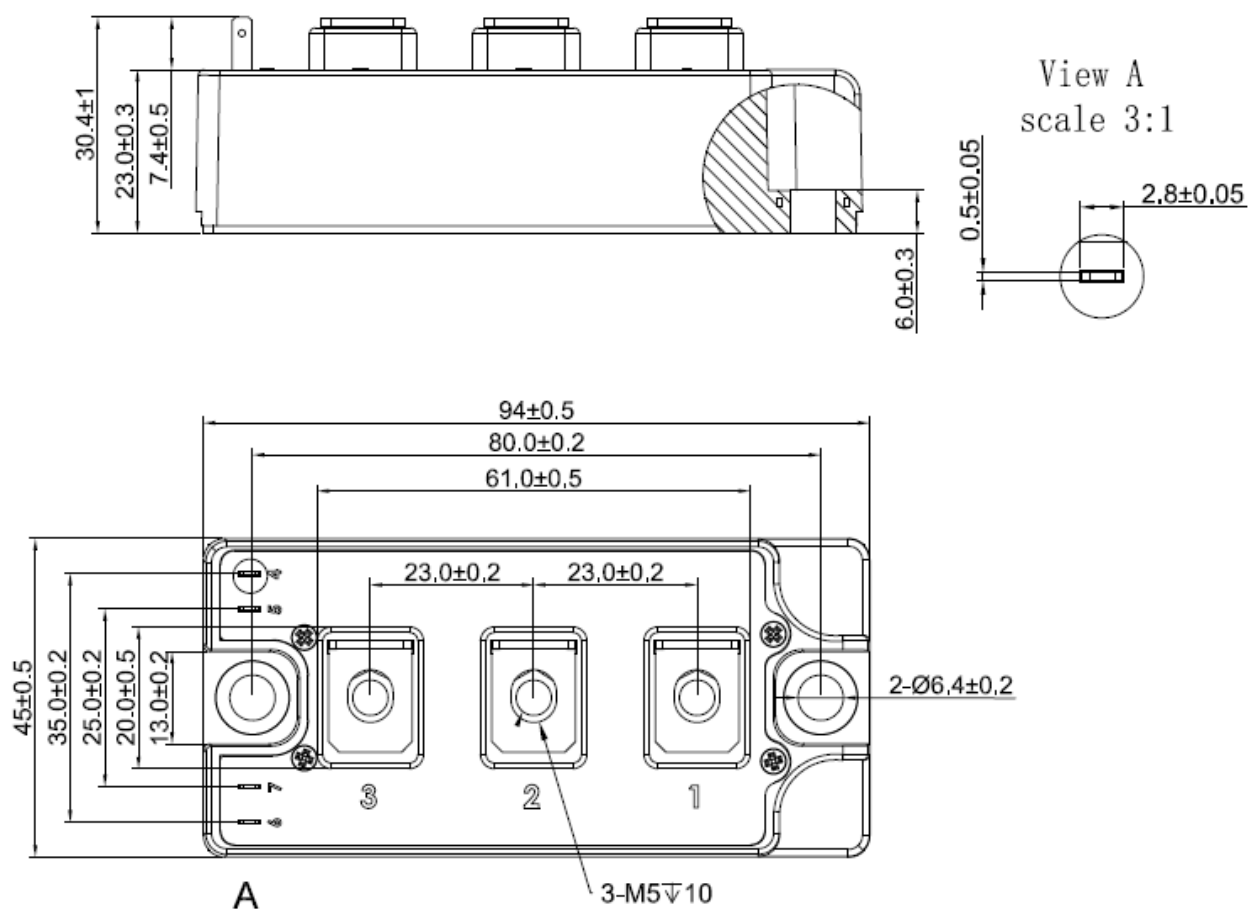
Fig.12 Reverse Bias Safe Operation Area (RBSOA)



Internal Circuit



Package Outline (Unit: mm):





Revision	Notes
01	Initial Release

Announcements

Information in this document is believed to be accurate and reliable. However, NJSME does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information.

Right to Make Changes

NJSME reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

The datasheet with “REV.” + “Arabic numerals” is based on engineering data for initial reference purpose only.

The released datasheet would be issued with “REV.” + “alphabet characters”.