



GT300CU120T2VH

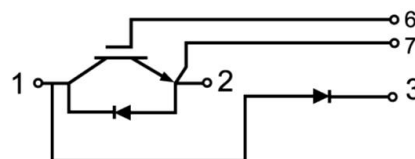
IGBT Module

Preliminary Datasheet

Features:

- Field Stop Trench Gate IGBT
- Short Circuit Rated >10 μ 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:

- Industrial Inverters
- Motor Drives
- UPS Systems

IGBT, Brake-Chopper

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

V _{CES}	Collector-Emitter Blocking Voltage		1200	V
V _{GES}	Gate-Emitter Voltage		$\pm$ 20	V
I _C	Continuous Collector Current	T _C =100 $^{\circ}$ C	300	A
		T _C =25 $^{\circ}$ C	530	A
I _{CM}	Peak Collector Current Repetitive	t _p =1ms	600	A
P _D	Maximum Power Dissipation (IGBT)	T _C =25 $^{\circ}$ C, T _{Jmax} =175 $^{\circ}$ C	1910	W



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

Static Characteristics

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=11.5\text{mA}$, $V_{CE}=V_{GE}$	5.0		6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=300\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^{\circ}\text{C}$	1.80		V
			$T_J=125^{\circ}\text{C}$	2.20		V
			$T_J=150^{\circ}\text{C}$	2.30		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	$V_{GE}=20\text{V}$, $V_{CE}=0\text{V}$, $T_J=25^{\circ}\text{C}$			400	nA
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$		34.1		nF
C_{oes}	Output Capacitance			1.7		nF
C_{res}	Reverse Transfer Capacitance			0.3		nF

Switching Characteristics

Switching Characteristics							
$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V, I_C=300A,$ $R_G=2\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		154		ns
			$T_J=125^{\circ}C$		164		
			$T_J=150^{\circ}C$		166		
t_r	Rise Time		$T_J=25^{\circ}C$		74		ns
			$T_J=125^{\circ}C$		80		
			$T_J=150^{\circ}C$		84		
$t_{d(off)}$	Turn-off Delay Time	$T_J=25^{\circ}C$		382		ns	
		$T_J=125^{\circ}C$		428			
		$T_J=150^{\circ}C$		436			
t_f	Fall Time	$T_J=25^{\circ}C$		144		ns	
		$T_J=125^{\circ}C$		234			
		$T_J=150^{\circ}C$		278			
E_{on}	Turn-on Switching Loss	$V_{CC}=600V, I_C=300A,$ $R_G=2\Omega, V_{GE}=\pm 15V,$ $di/dt=2966A/\mu s$ ($T_J=150^{\circ}C$) Inductive Load	$T_J=25^{\circ}C$		19.5		mJ
		$T_J=125^{\circ}C$		23.6			
		$T_J=150^{\circ}C$		26.3			



E _{off}	Turn-off Switching Loss	V _{CC} =600V, I _C =300A, R _G =2Ω, V _{GE} =±15V, du/dt=5400V/μs (T _J =150°C) Inductive Load	T _J =25°C		20.1		mJ
			T _J =125°C		31.2		
			T _J =150°C		32.3		
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C		2.79		uC
R _{G(int)}	Internal Gate Resistance		T _J =25°C		1.5		Ω
I _{sc}	V _{CC} =600V, V _{GE} =±15V, t _p =10μs, T _J =150°C				908		A
R _{θJC}	IGBT Thermal Resistance: Junction-to-Case (per IGBT)					0.079	°C/W

Diode, Brake-Chopper

Maximum Rated Values of Diode (T_C=25°C unless otherwise specified)

V _{RRM}	Repetitive Peak Reverse Voltage	T _J =25°C	1200	V
I _F	Diode Continuous Forward Current		300	A
I _{FM}	Peak Diode Current Repetitive	t _p =1ms	600	A

Electrical Characteristics of Diode (T_C=25°C unless otherwise specified)

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V _{FM}	Forward Voltage	I _F =300A	T _J =25℃		1.80		V
			T _J =125℃		1.95		
			T _J =150℃		1.95		
t _{rr}	Reverse Recovery Time	I _F =300A, -diF/dt=3129A/μs(T _J =150℃), V _R =600V, V _{GE} =-15V	T _J =25℃		204		ns
			T _J =125℃		552		
			T _J =150℃		644		
I _{rr}	Peak Reverse Recovery Current		T _J =25℃		158		A
			T _J =125℃		162		
			T _J =150℃		173		
Q _{rr}	Reverse Recovery Charge		T _J =25℃		19.5		μC
			T _J =125℃		38.1		
			T _J =150℃		42.1		



E _{rec}	Reverse Recovery Energy	I _F =300A, -diF/dt=3129A/μs(T _J =150℃), V _R =600V, V _{GE} =-15V	T _J =25℃		5.5		mJ
			T _J =125℃		11.4		
			T _J =150℃		12.6		
R _{θJC}	Diode Thermal Resistance: Junction-to-Case (per Diode)					0.163	℃/W

Diode, Reverse

Maximum Rated Values of Diode (T_C=25°C unless otherwise specified)

V _{RRM}	Repetitive Peak Reverse Voltage	T _J =25°C	1200	V
I _F	Diode Continuous Forward Current		200	A
I _{FM}	Peak Diode Current Repetitive	t _p =1ms	400	A

Electrical Characteristics of Diode (T_C=25°C unless otherwise specified)

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V _{FM}	Forward Voltage	I _F =200A	T _J =25°C		1.56		V
			T _J =125°C		1.62		
			T _J =150°C		1.65		
t _{rr}	Reverse Recovery Time	I _F =200A, -di _F /dt=3700A/μs (T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C		305		ns
			T _J =125°C		470		
			T _J =150°C		557		
I _{rr}	Peak Reverse Recovery Current		T _J =25°C		128		A
			T _J =125°C		132		
			T _J =150°C		144		
Q _{rr}	Reverse Recovery Charge		T _J =25°C		18.7		μC
			T _J =125°C		30.6		
			T _J =150°C		38.8		
E _{rec}	Reverse Recovery Energy		T _J =25°C		4.5		mJ
			T _J =125°C		10.3		
			T _J =150°C		10.9		
R _{θJC}	Thermal Resistance: Junction-to-Case (per Diode)					0.215	°C/W



Module

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
V _{iso}	Isolation Voltage (All Terminals Shorted)	f=50Hz, 60s	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)				0.03	°C/W
T	Power Terminals Screw:M6		3.0		5.0	N·m
T	Mounting Screw:M6		3.0		6.0	N·m
G	Weight			300		g

Ordering Information Table

Device code

G	T	300	CU	120	T2V	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: Chopper, CU(Diode on High Side)
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

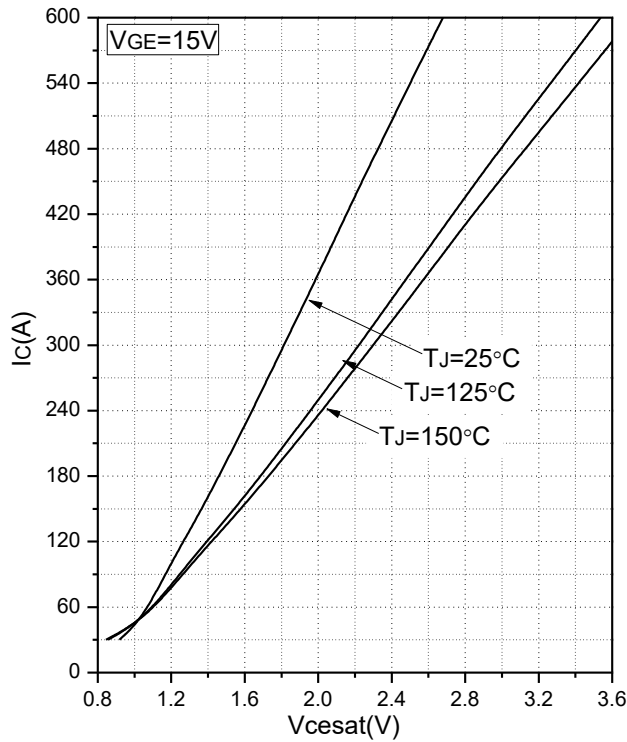


Fig.1 Typical Saturation Voltage Characteristics

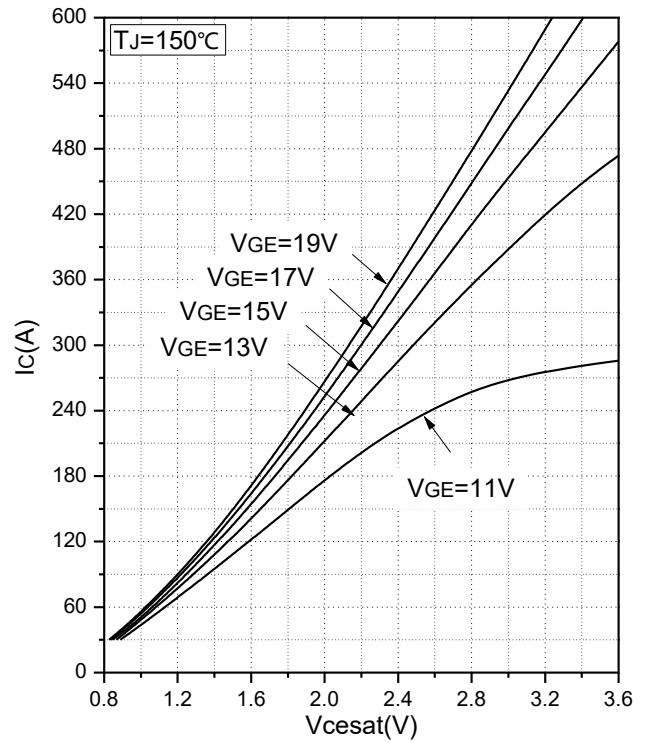


Fig.2 Typical Output Characteristics

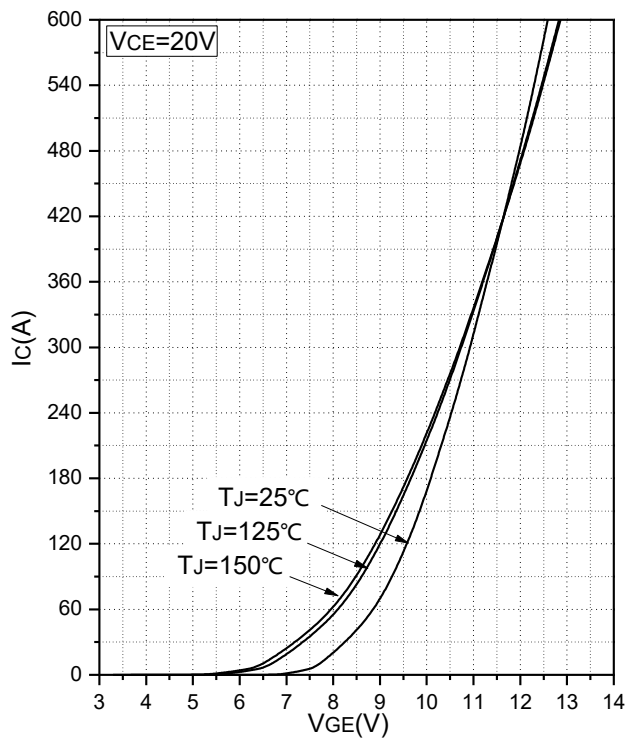


Fig.3 Transfer Characteristics

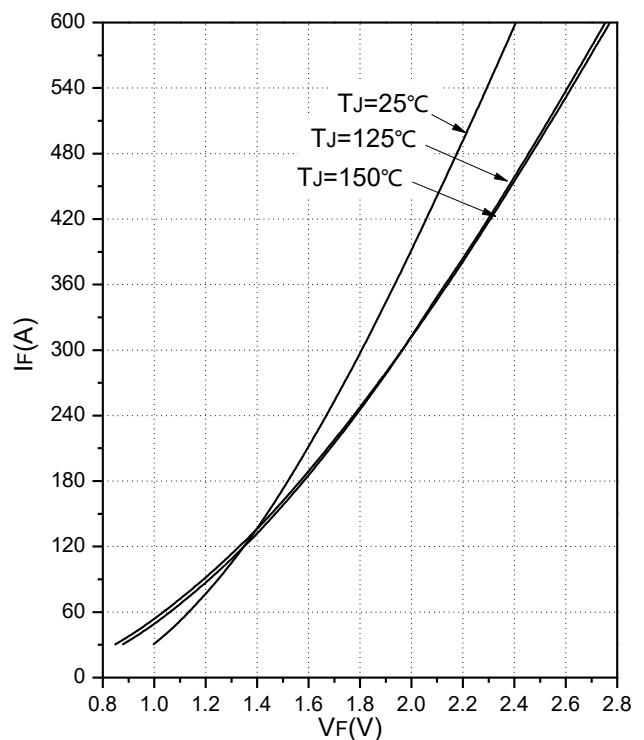


Fig.4 Forward Characteristics of Diode
(Brake-Chopper r)

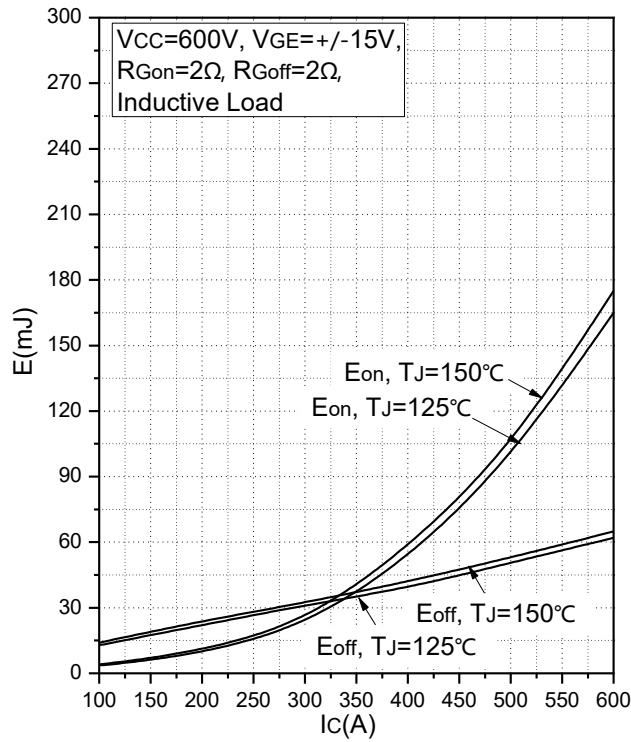


Fig.5 Typical Switching Loss vs. Collector Current

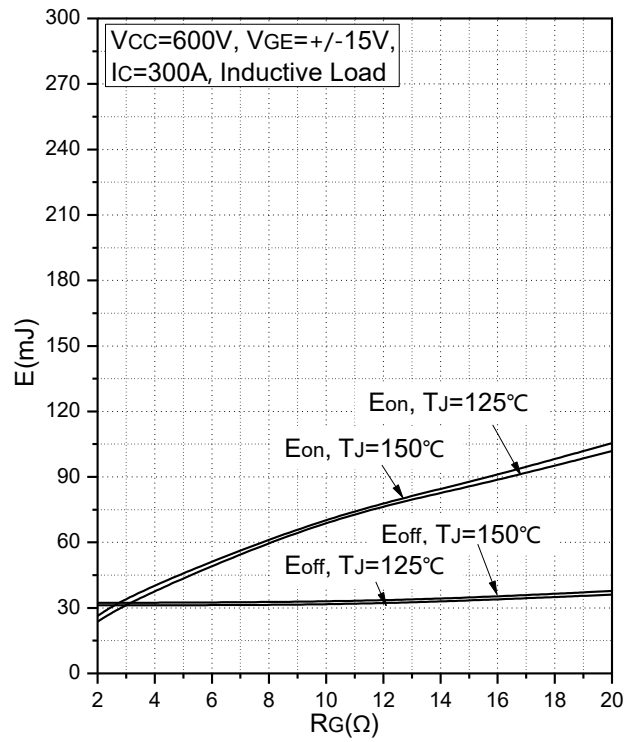


Fig.6 Typical Switching Loss vs. Gate Resistance

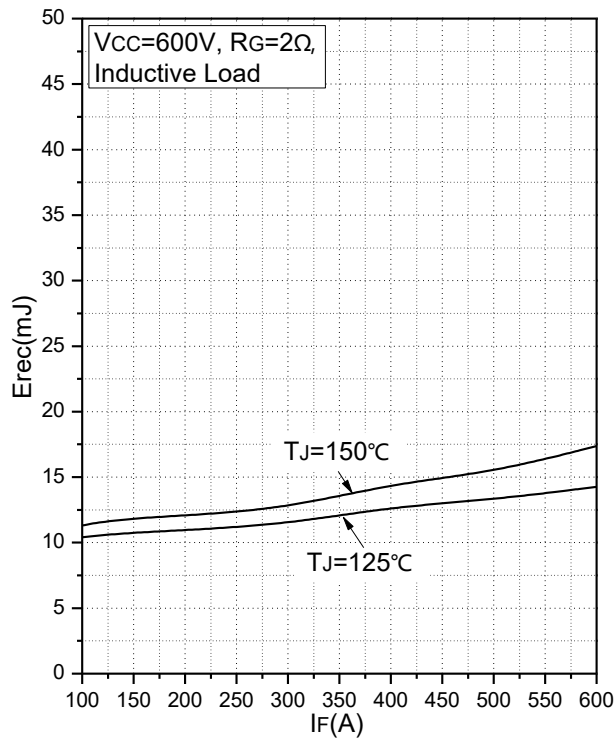


Fig.7 Typical Switching Loss vs. Forward Current

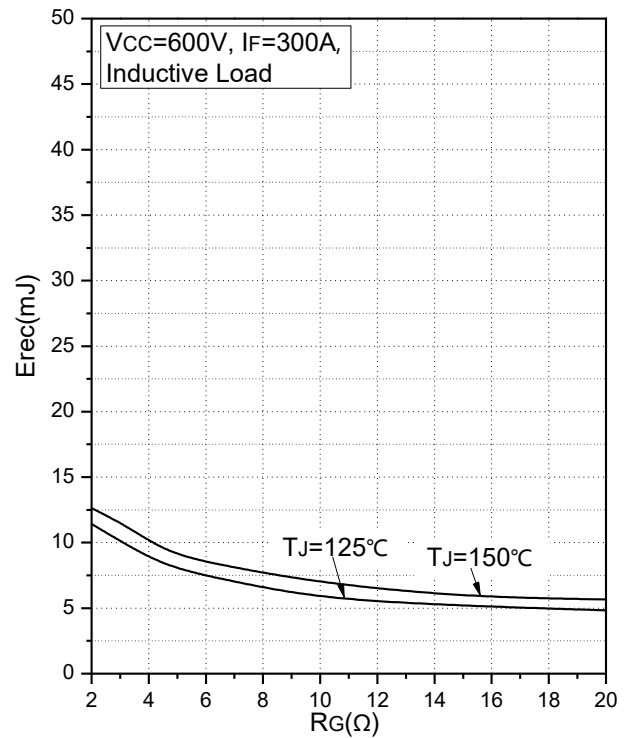
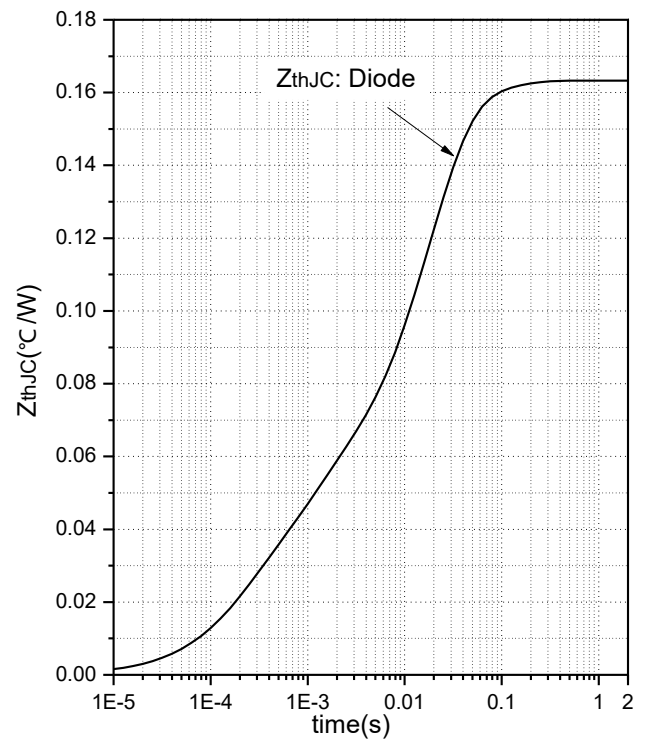
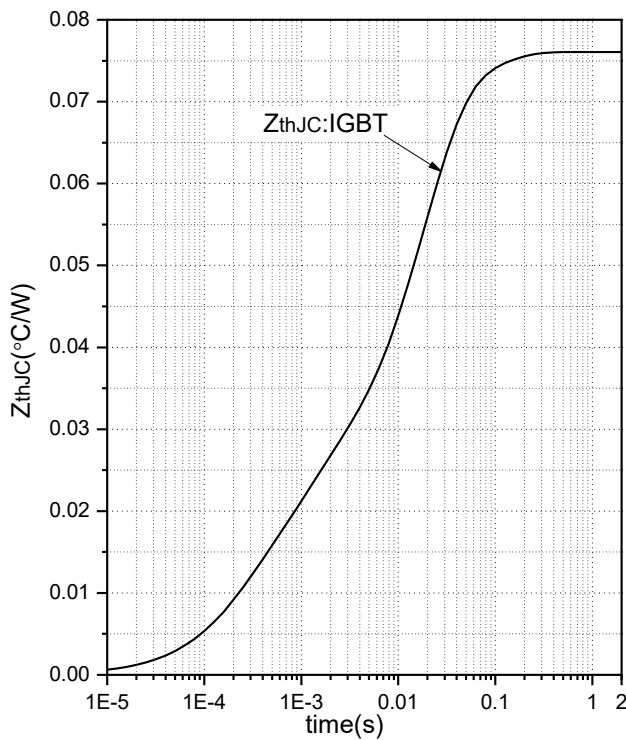
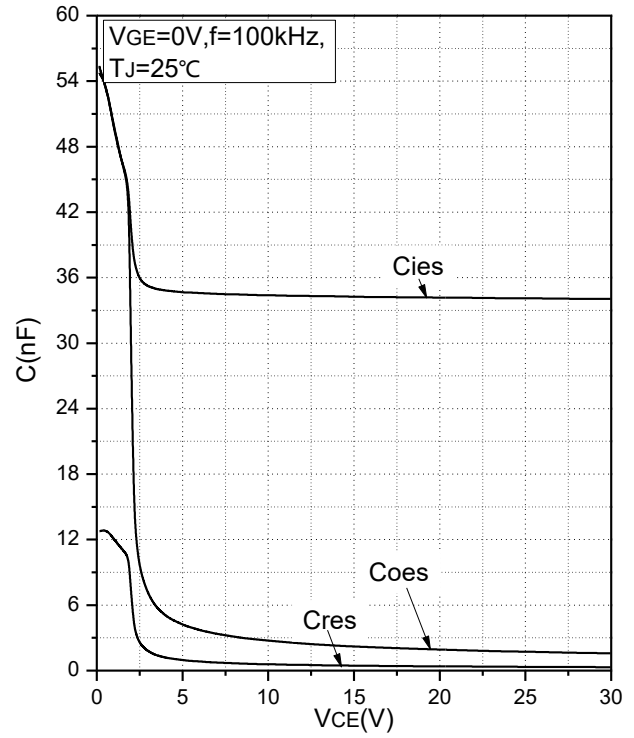
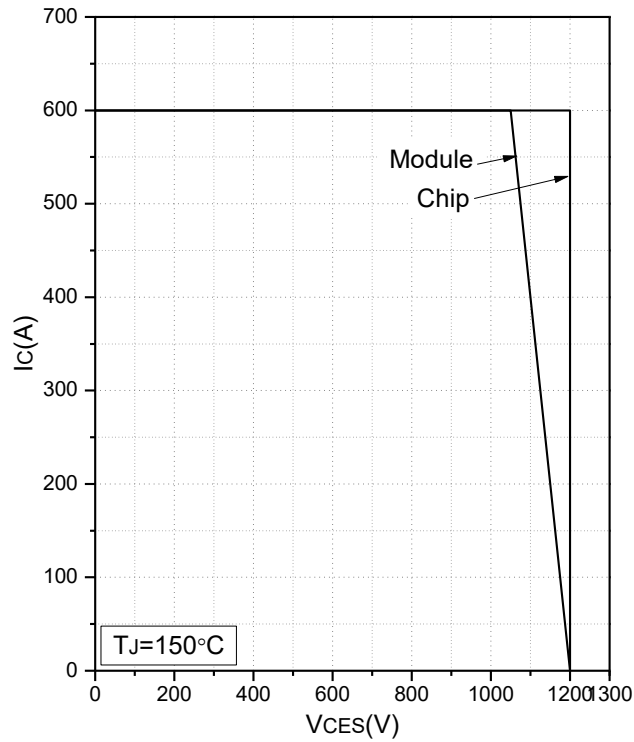


Fig.8 Typical Switching Loss vs. Gate Resistance



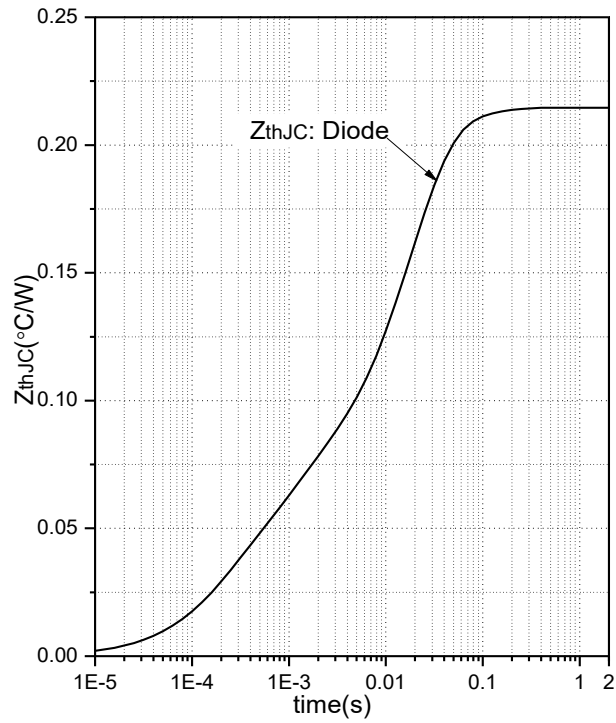
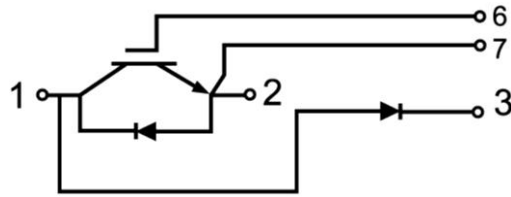


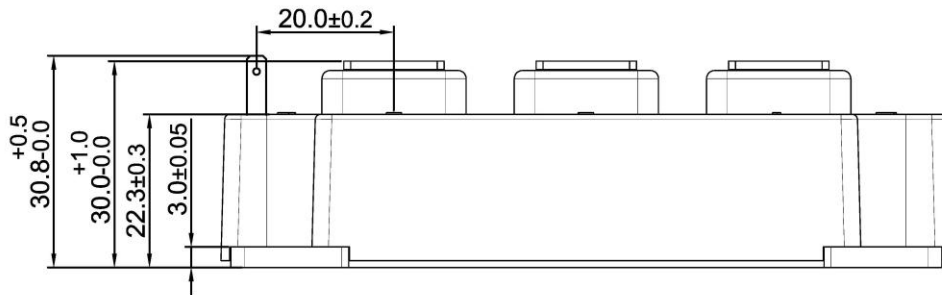
Fig.13 Transient Thermal Impedance (Reverse Diode)



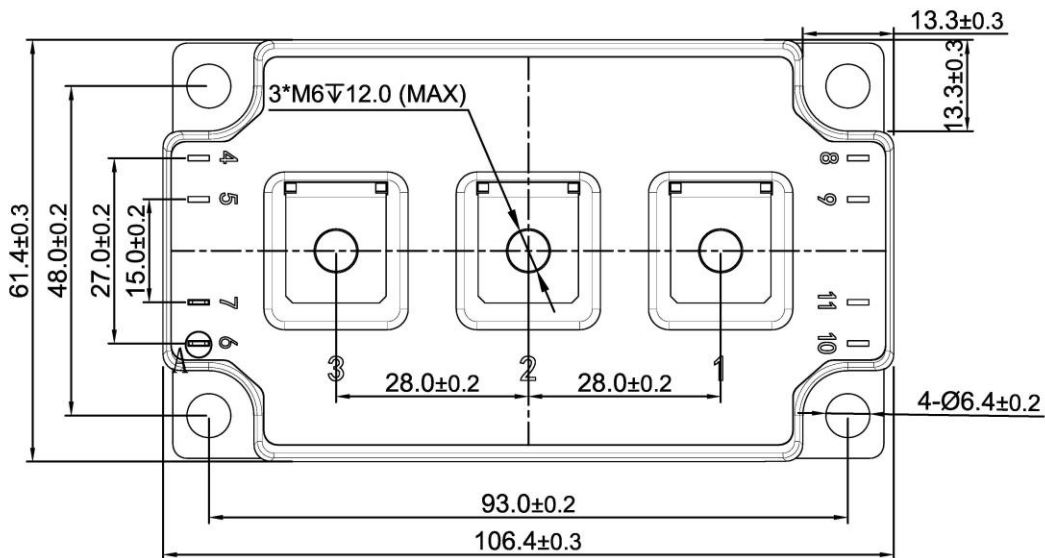
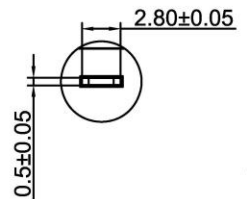
Internal Circuit:



Package Outline (Unit: mm):



View A
scale 3:1





Revision	Notes
01	Initial release

Announcement

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”.