



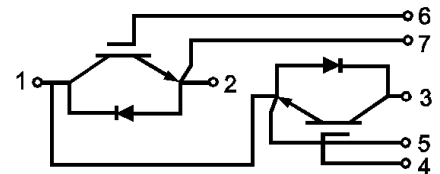
GT600HF120T2NH

IGBT Module

Features:

- Field Stop Trench Gate IGBT
- Short Circuit Rated $>10\mu\text{s}$
- 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:

- Wind Turbines
- Motor Drives
- Servo Drives
- UPS Systems
- Energy Storage Applications

IGBT, Inverter

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

V_{CES}	Collector-Emitter Blocking Voltage		1200	V
V_{GES}	Gate-Emitter Voltage		± 20	V
I_c	Continuous Collector Current	$T_c=100^\circ\text{C}$	600	A
		$T_c=25^\circ\text{C}$	1200	A
I_{CM}	Peak Collector Current Repetitive	$t_p=1\text{ms}$	1200	A
P_D	Maximum Power Dissipation (IGBT)	$T_c=25^\circ\text{C}$ $T_{Jmax}=175^\circ\text{C}$	2704	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	$I_C=23\text{mA}$, $V_{CE}=V_{GE}$	5.0	5.9	6.7	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=600\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^{\circ}\text{C}$	1.75	2.00	V
			$T_J=125^{\circ}\text{C}$	2.00		V
			$T_J=150^{\circ}\text{C}$	2.10		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	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$		99.8		nF
C_{oes}	Output Capacitance			2.81		nF
C_{res}	Reveres Transfer Capacitance			0.94		nF

Switching Characteristics

Switching Characteristics							
$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V, I_C=600A,$ $R_{Gon}=1\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		1115		ns
			$T_J=125^{\circ}C$		1136		
			$T_J=150^{\circ}C$		1141		
t_r	Rise Time		$T_J=25^{\circ}C$		279		ns
			$T_J=125^{\circ}C$		301		
			$T_J=150^{\circ}C$		313		
$t_{d(off)}$	Turn-off Delay Time	$V_{CC}=600V, I_C=600A,$ $R_{Goff}=1\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		940		ns
			$T_J=125^{\circ}C$		942		
			$T_J=150^{\circ}C$		970		
t_f	Fall Time		$T_J=25^{\circ}C$		159		ns
			$T_J=125^{\circ}C$		183		
			$T_J=150^{\circ}C$		191		
E_{on}	Turn-on Switching Loss	$V_{CC}=600V, I_C=600A,$ $R_{Gon}=1\Omega, V_{GE}=\pm 15V,$ $di/dt=1585A/\mu s(T_J=150^{\circ}C),$ Inductive Load	$T_J=25^{\circ}C$		71		mJ
			$T_J=125^{\circ}C$		96		
			$T_J=150^{\circ}C$		100		



E _{off}	Turn-off Switching Loss	V _{CC} =600V, I _C =600A, R _{Goff} =1Ω, V _{GE} =±15V, du/dt=2008V/μs(T _J =150°C), Inductive Load	T _J =25°C		83		mJ
			T _J =125°C		93		
			T _J =150°C		97		
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C		6.85		μC
R _{G(int)}	Internal Gate Resistor				0		Ω
I _{SC}	V _{CC} =600V, V _{GE} =+/-15V, R _{Gon} =1Ω, R _{Goff} =1Ω, T _J =150°C				3431		A
R _{θJC}	Thermal Resistance: Junction-to-Case (per IGBT)					0.056	°C/W

Diode, Inverter

Maximum Rated Values (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	T _C =100°C	600	A
I _{FP}	Peak Diode Current Repetitive	t _p =1ms	1200	A

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

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V _F	Forward Voltage	I _F =600A	T _J =25°C		1.90		V
			T _J =125°C		2.05		
			T _J =150°C		2.05		
t _{rr}	Reverse Recovery Time	I _F =600A, -diF/dt=1974A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C		324		ns
			T _J =125°C		504		
			T _J =150°C		557		
I _{rr}	Peak Reverse Recovery Current		T _J =25°C		234		A
			T _J =125°C		272		
			T _J =150°C		274		
Q _{rr}	Reverse Recovery Charge		T _J =25°C		43.3		μC
			T _J =125°C		71.0		
			T _J =150°C		79.6		



E _{rec}	Reverse Recovery Energy	I _F =600A, -diF/dt=1974A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C		15.3		mJ
			T _J =125°C		25.4		
			T _J =150°C		28.4		
R _{θJC}	Thermal Resistance: Junction-to-Case (per Diode)					0.065	°C/W

Module

Symbol	Description		Min.	Typ.	Max.	Units
V _{iso}	Isolation Voltage (All Terminals Shorted)	Rms, f=50Hz, 30s	4500			V
Internal Isolation			Al ₂ O ₃			
T _J	Maximum Junction Temperature				175	°C
T _{JOP}	Maximum Operating Junction Temperature Range		-40		+150	°C
T _{stg}	Storage Temperature		-40		+150	°C
CTI	Comparative Tracking Index		200			
R _{θCS}	Case-to-Sink Thermally (Conductive Grease Applied)				0.03	°C/W
M	Power Terminals Screw:M6		3.0		5.0	N·m
M	Mounting Screw:M6		4.0		6.0	N·m
G	Weight			300		g

Ordering Information Table

Device code

G	T	600	HF	120	T2N	H
①	②	③	④	⑤	⑥	⑦

- ① - IGBT Module
- ② - Trench, Low Switching Losses IGBT
- ③ - Rated Current (600=600A)
- ④ - Circuit Configuration: HF (Half Bridge)
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

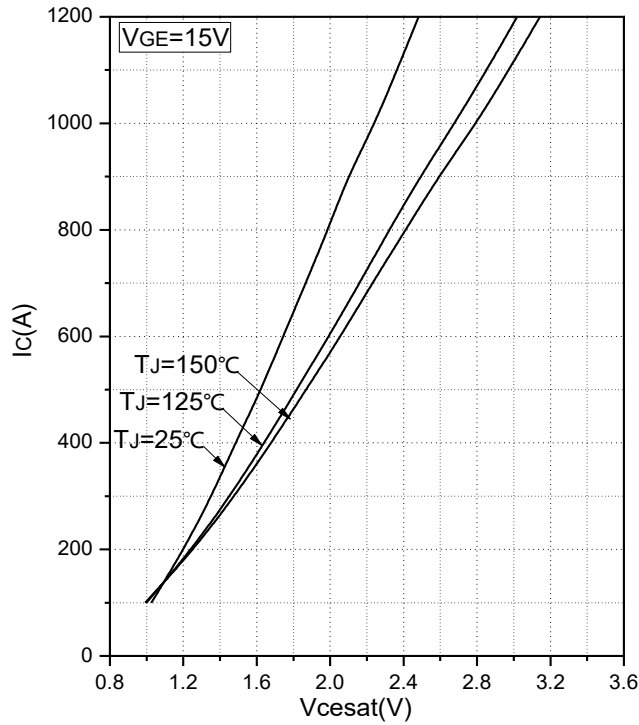


Fig.1 Typical Saturation Voltage Characteristics

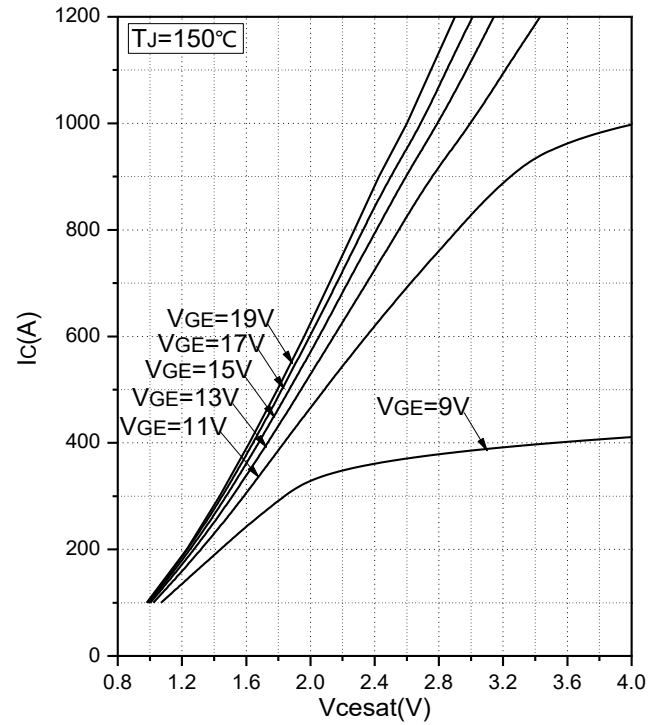


Fig.2 Typical Output Characteristics

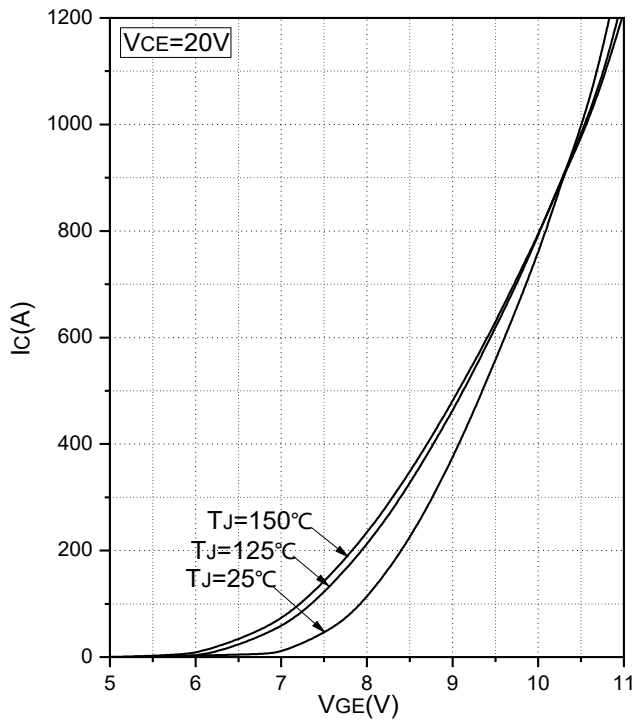


Fig.3 Transfer Characteristics

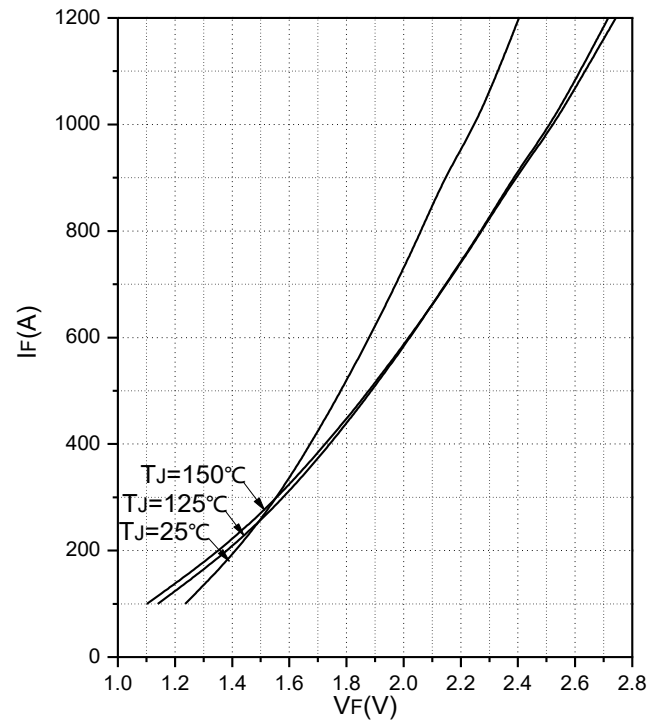


Fig.4 Forward Characteristics of Diode

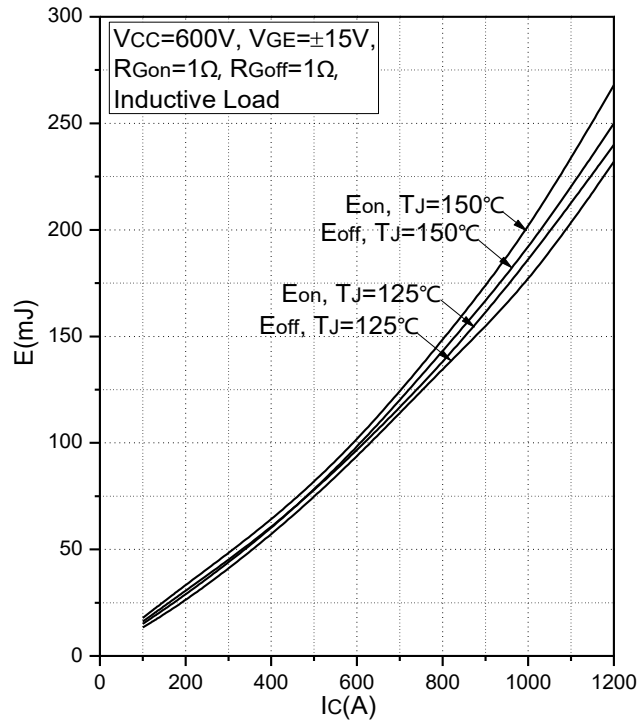


Fig.5 Typical Switching Loss vs. Collector Current

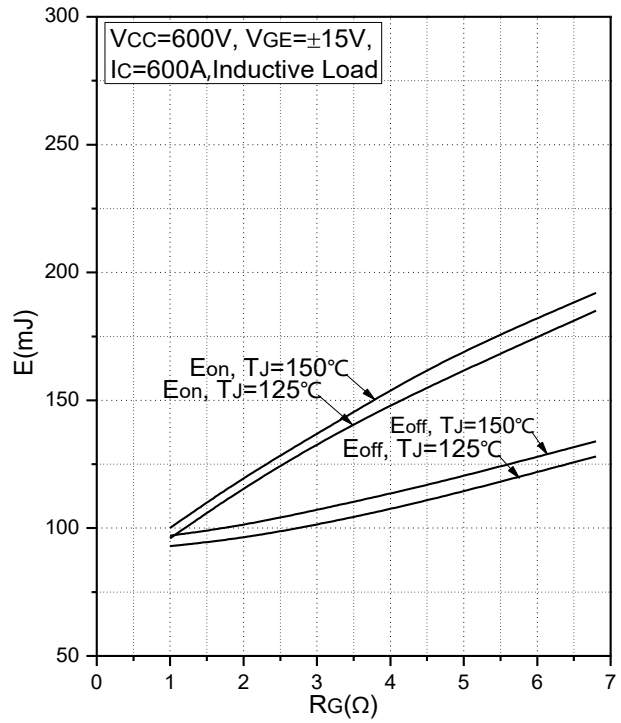


Fig.6 Typical Switching Loss vs. Gate Resistance

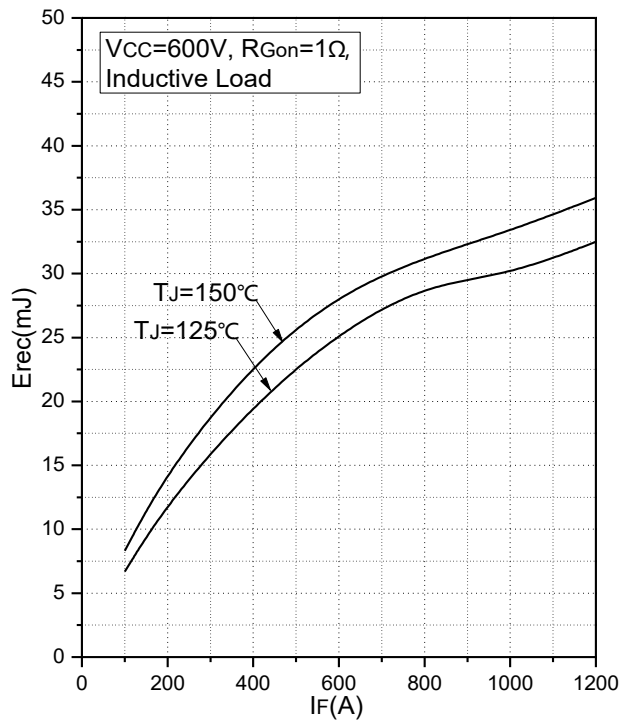


Fig.7 Typical Switching Loss vs. Forward Current

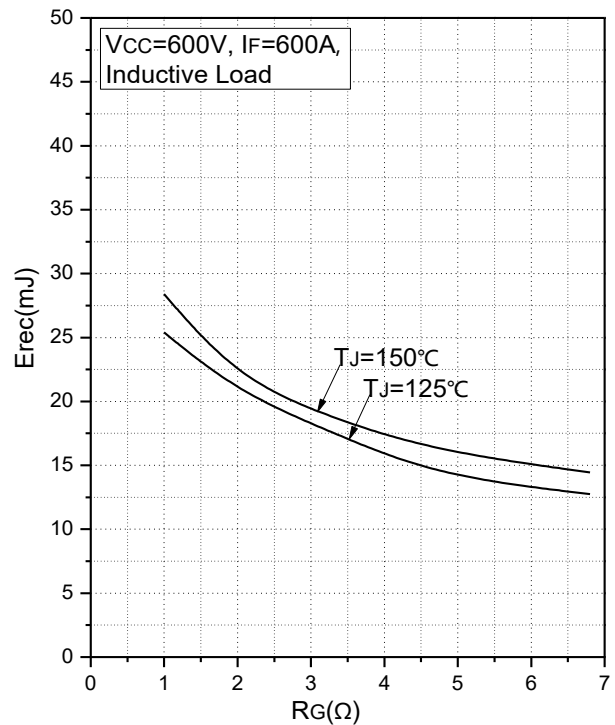
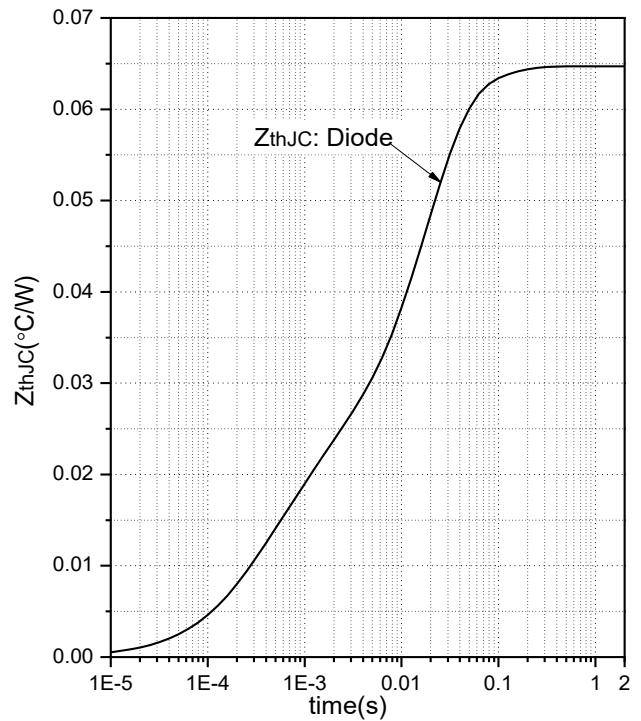
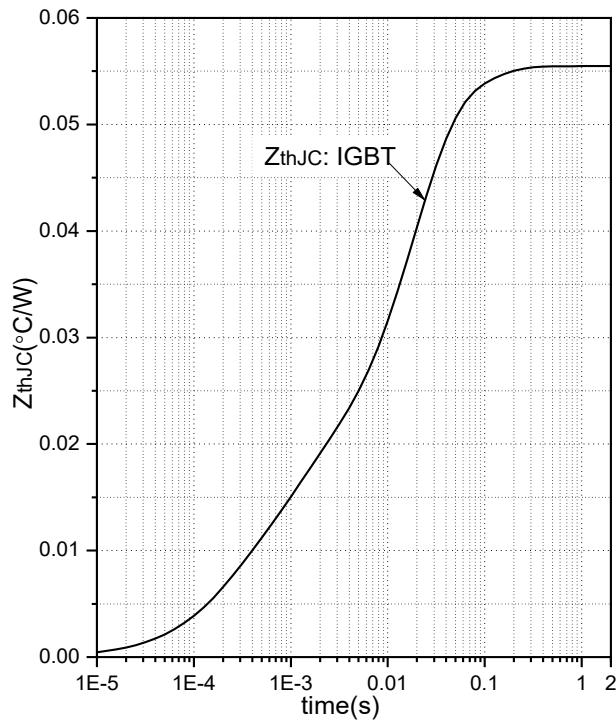
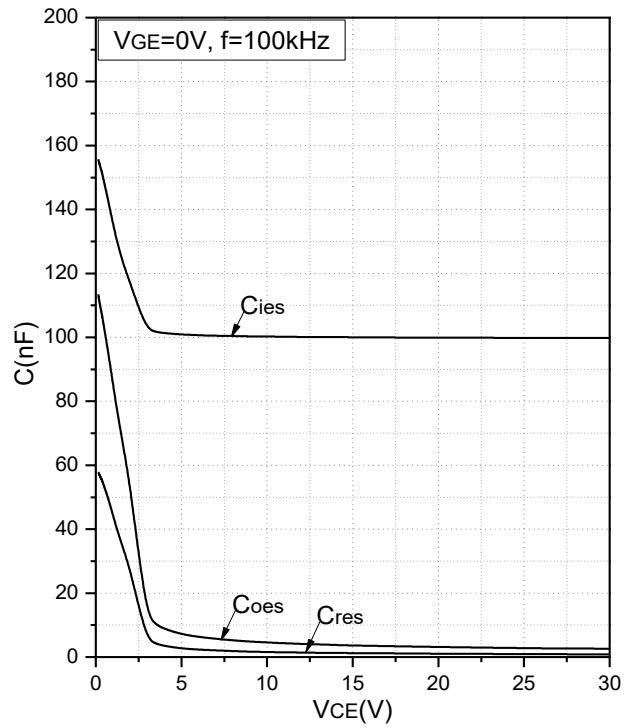
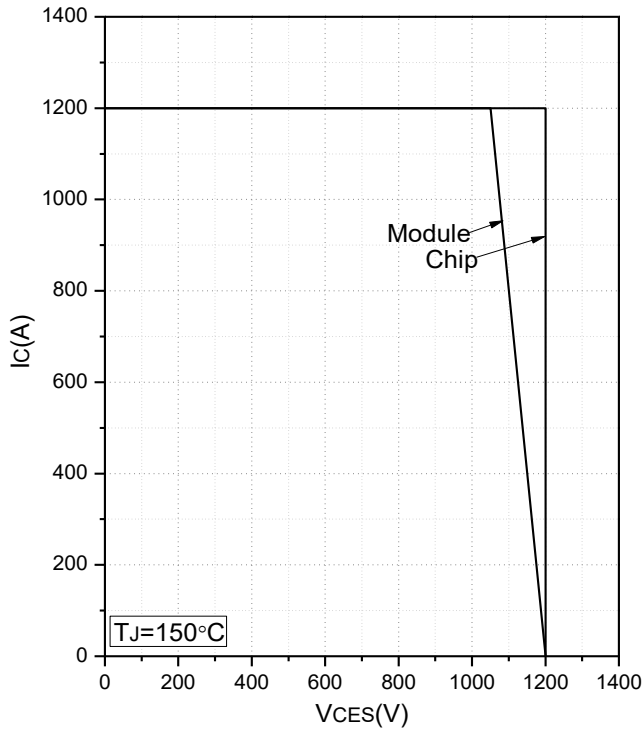
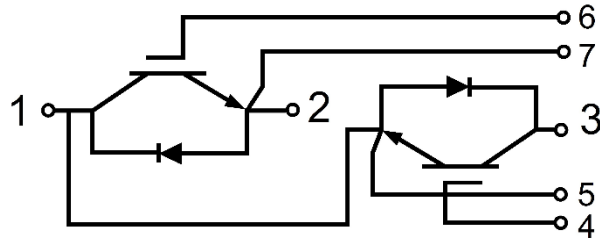


Fig.8 Typical Switching Loss vs. Gate Resistance

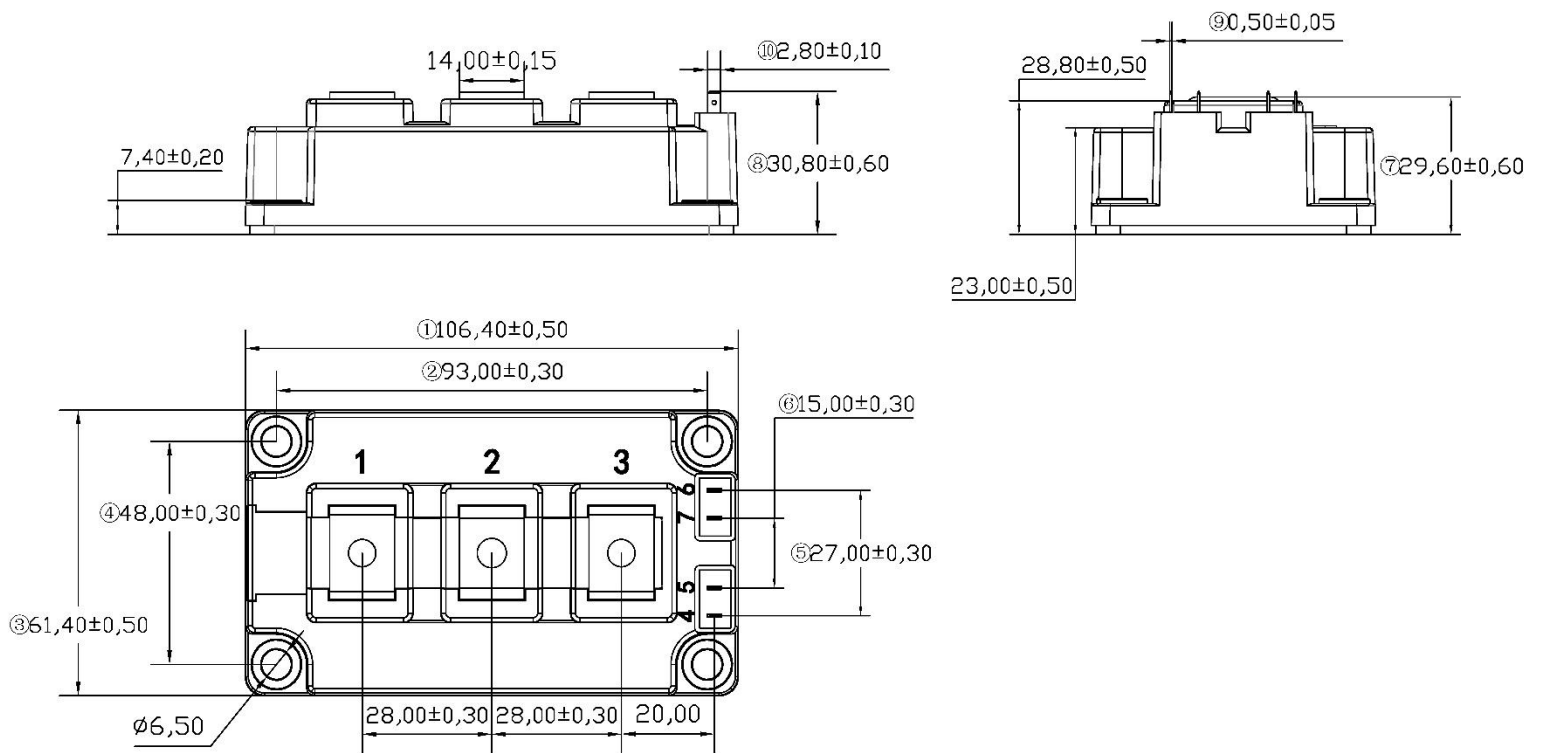




Internal Circuit:



Package Outline (Unit: mm):





Revision	Notes
A	Final Version

Announcement

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