



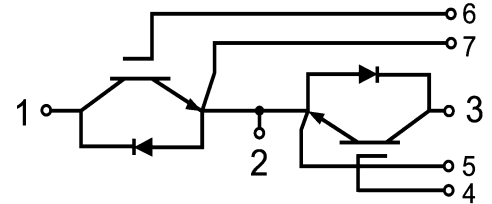
GT450CE120T2NH

IGBT Module

Preliminary Data

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



Applications:

- Industrial Inverters
- Servo 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	$T_c=100^\circ\text{C}$	450	A
		$T_c=25^\circ\text{C}$	900	A
I_{CM}	Peak Collector Current Repetitive	$t_p=1\text{ms}$	900	A
P_D	Maximum Power Dissipation (IGBT)	$T_c=25^\circ\text{C}$ $T_{Jmax}=175^\circ\text{C}$	2885	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	$I_C=15\text{mA}$, $V_{CE}=V_{GE}$	5.0	5.8	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=450\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^{\circ}\text{C}$	1.80	2.00	V
			$T_J=125^{\circ}\text{C}$	2.05		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	$V_{GE}=\pm 20\text{V}$, $V_{CE}=0\text{V}$, $T_J=25^{\circ}\text{C}$			± 200	nA
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$		49.42		nF
C_{oes}	Output Capacitance			7.59		nF
C_{res}	Reveres Transfer Capacitance			1.59		nF

Switching Characteristics

t _{d(on)}	Turn-on Delay Time	V _{CC} =600V, I _C =450A, R _{Gon} =2.3Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		536		ns
			T _J =125℃		809		
			T _J =150℃		854		
t _r	Rise Time		T _J =25℃		124		ns
			T _J =125℃		147		
			T _J =150℃		155		
t _{d(off)}	Turn-off Delay Time	V _{CC} =600V, I _C =450A, R _{Goff} =2.3Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		452		ns
			T _J =125℃		486		
			T _J =150℃		492		
t _f	Fall Time		T _J =25℃		277		ns
			T _J =125℃		494		
			T _J =150℃		503		
E _{on}	Turn-on Switching Loss	V _{CC} =600V, I _C =450A, R _{Gon} =2.3Ω, V _{GE} =±15V, di/dt=2480A/μs(T _J =150℃), Inductive Load	T _J =25℃		48.8		mJ
			T _J =125℃		62.6		
			T _J =150℃		64.8		



E _{off}	Turn-off Switching Loss	V _{CC} =600V, I _C =450A, R _{Goff} =2.3Ω, V _{GE} =±15V, du/dt=3207V/μs(T _J =150°C), Inductive Load	T _J =25°C		31.2		mJ
			T _J =125°C		46.2		
			T _J =150°C		48.0		
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C		3493		nC
R _{G(int)}	Internal Gate Resistor				1.5		Ω
SCSOA	V _{CC} =600V, t _p =10μs, V _{GE} =+/-15V, R _{Gon} =2Ω, R _{Goff} =2Ω, T _J =25°C				1833		A
R _{θJC}	Thermal Resistance: Junction-to-Case (per IGBT)					0.052	°C/W

Diode, Inverter

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

V _{RRM}	Repetitive Peak Reverse Voltage	1200	V
I _F	Diode Continuous Forward Current	450	A
I _{FP}	Peak FWD Current Repetitive	900	A

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

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V _F	Forward Voltage	I _F =450A	T _J =25°C		1.90		V
			T _J =125°C		2.00		
			T _J =150°C		2.00		
t _{rr}	Reverse Recovery Time	I _F =450A, -diF/dt=3027A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C		315		ns
			T _J =125°C		519		
			T _J =150°C		530		
I _{rr}	Peak Reverse Recovery Current		T _J =25°C		192		A
			T _J =125°C		277		
			T _J =150°C		298		
Q _{rr}	Reverse Recovery Charge		T _J =25°C		31		μC
			T _J =125°C		65		
			T _J =150°C		68		



E _{rec}	Reverse Recovery Energy	I _F =450A, -diF/dt=3027A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C		8.33		mJ
			T _J =125°C		21.78		
			T _J =150°C		22.75		
R _{θJC}	Thermal Resistance: Junction-to-Case (per Diode)					0.086	°C/W

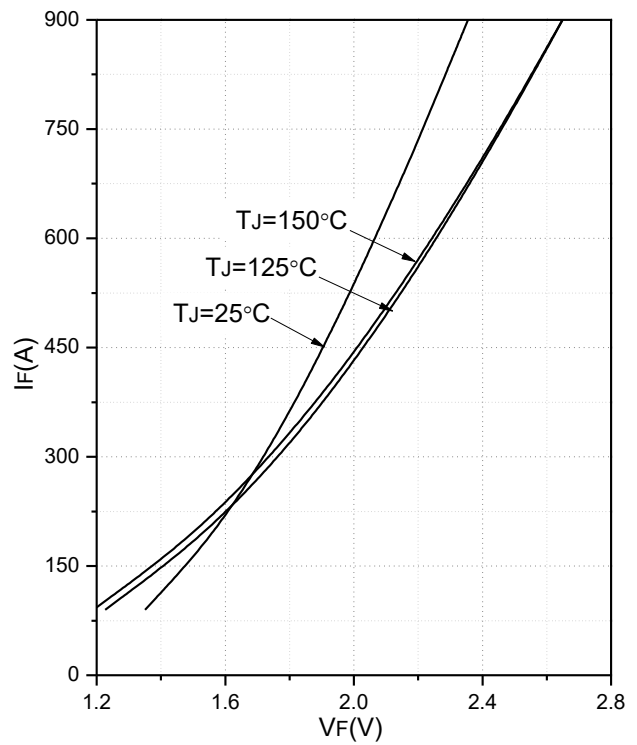
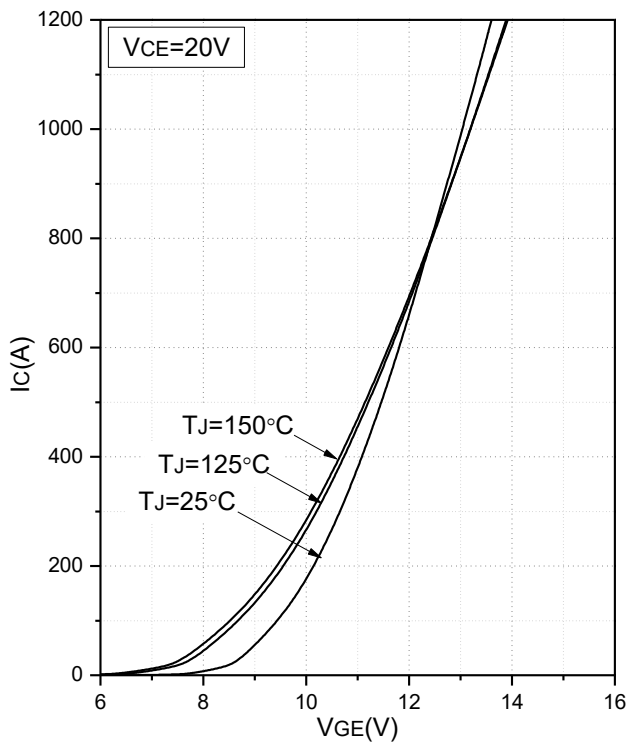
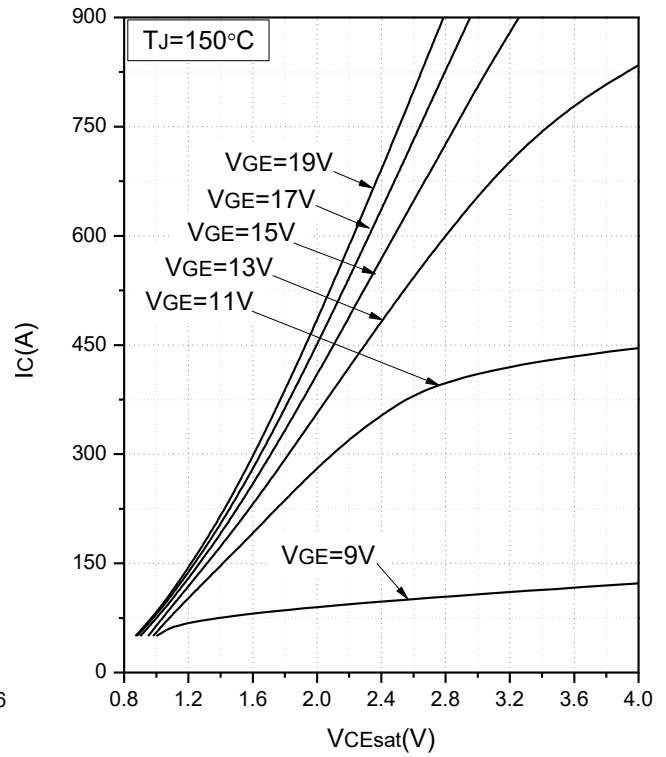
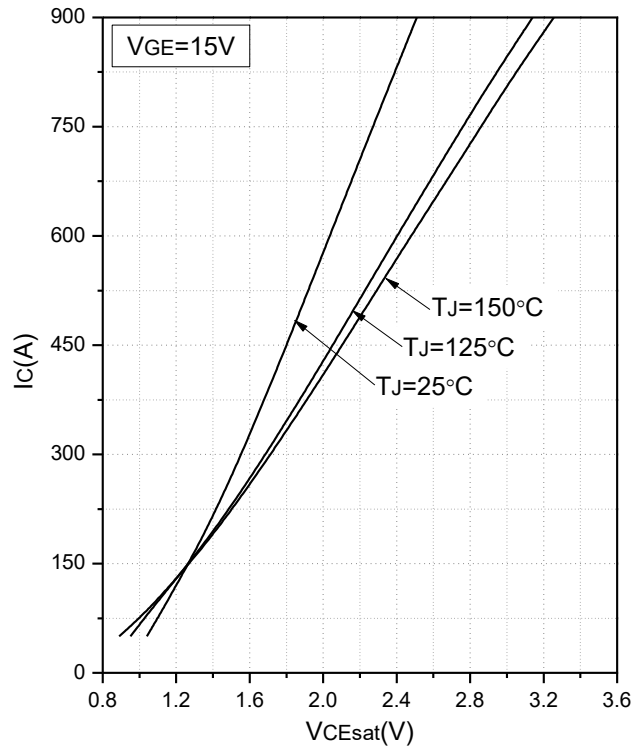
Module

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
V_{iso}	Isolation Voltage (All Terminals Shorted)	$f=50Hz$, 30s	4500			V
T_J	Maximum Junction Temperature				175	$^{\circ}C$
T_{JOP}	Maximum Operating Junction Temperature Range		-40		+150	$^{\circ}C$
T_{stg}	Storage Temperature		-40		+150	$^{\circ}C$
CTI	Comparative Tracking Index		200			
$R_{\theta CS}$	Case-To-Sink Thermally (Conductive Grease Applied)				0.03	$^{\circ}C/W$
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

Ordering Information Table

Device code	G	T	450	CE	120	T2N	H
	①	②	③	④	⑤	⑥	⑦

- ① - IGBT Module
- ② - Trench, Low Switching Losses IGBT
- ③ - Rated Current (450=450A)
- ④ - Circuit Configuration: CE (Common Emitter)
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)



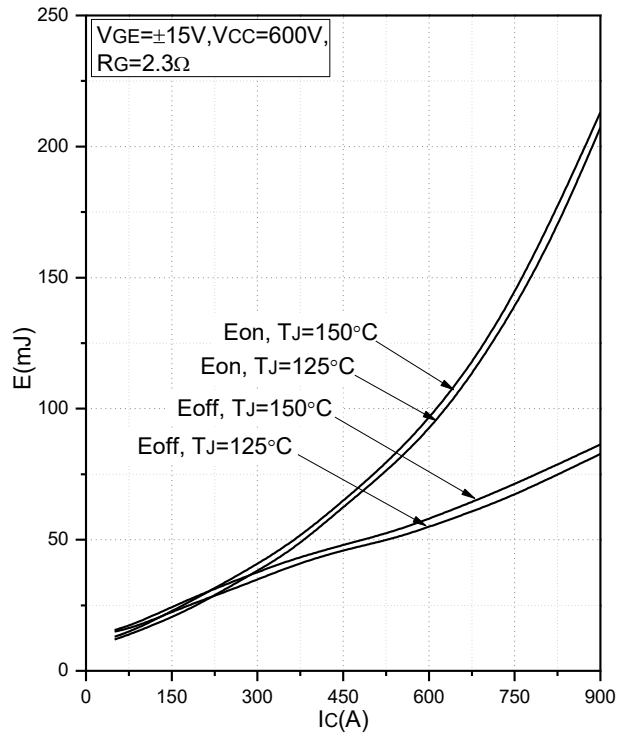


Fig.5 Typical Switching Loss vs. Collector Current

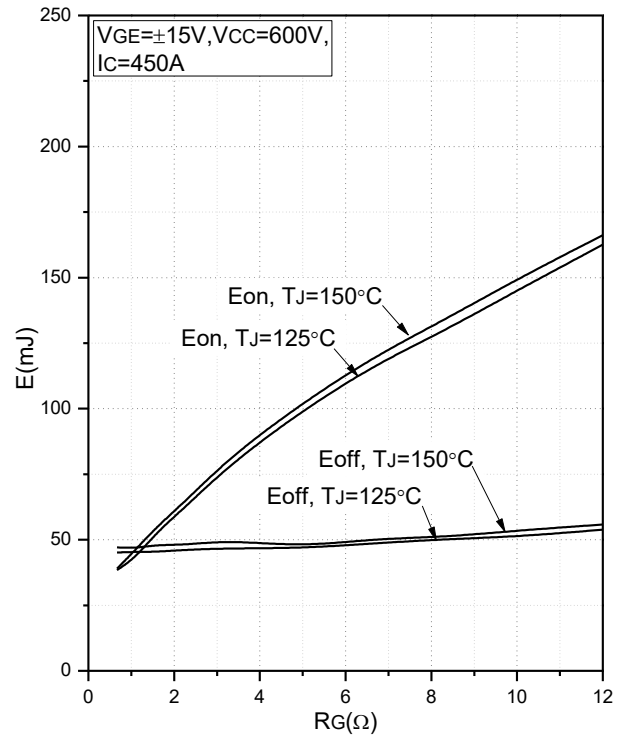


Fig.6 Typical Switching Loss vs. Gate Resistance

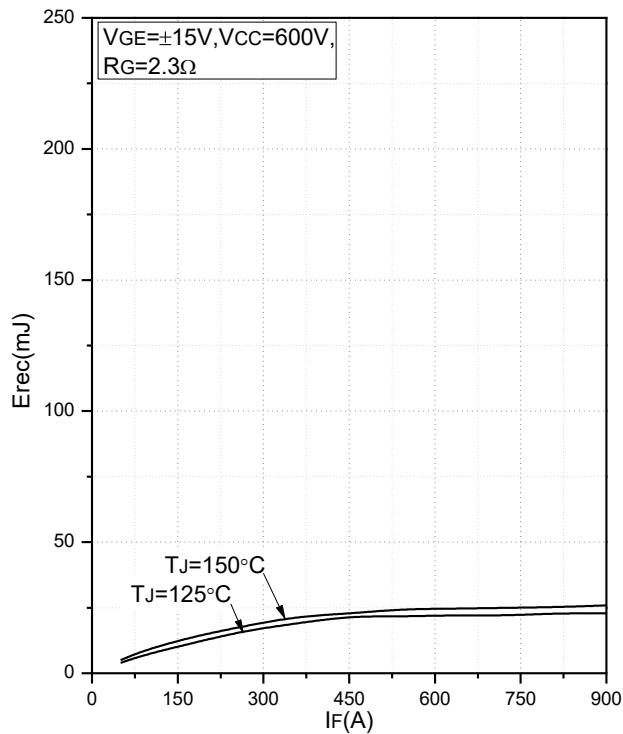


Fig.7 Typical Switching Loss vs. Forward Current

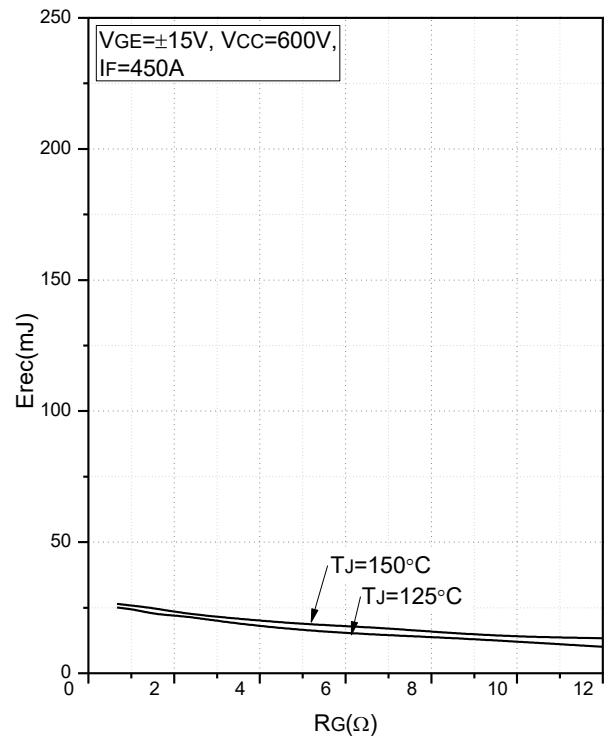


Fig.8 Typical Switching Loss vs. Gate Resistance

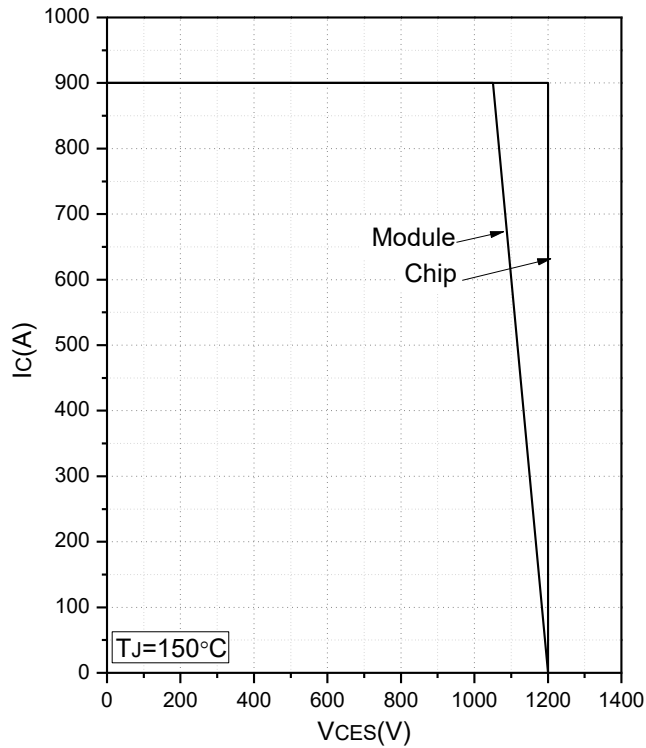


Fig.9 Reverse Bias Safe Operation Area (RBSOA)

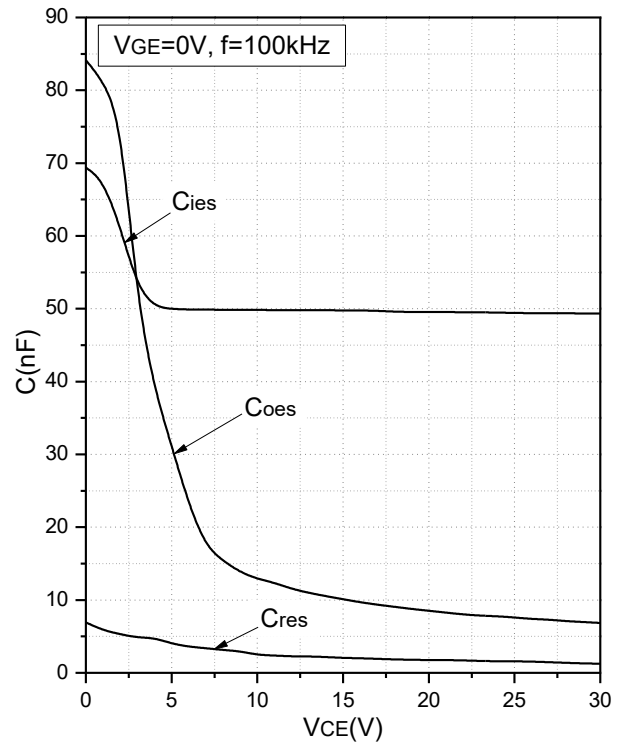


Fig.10 Capacitance Characteristics

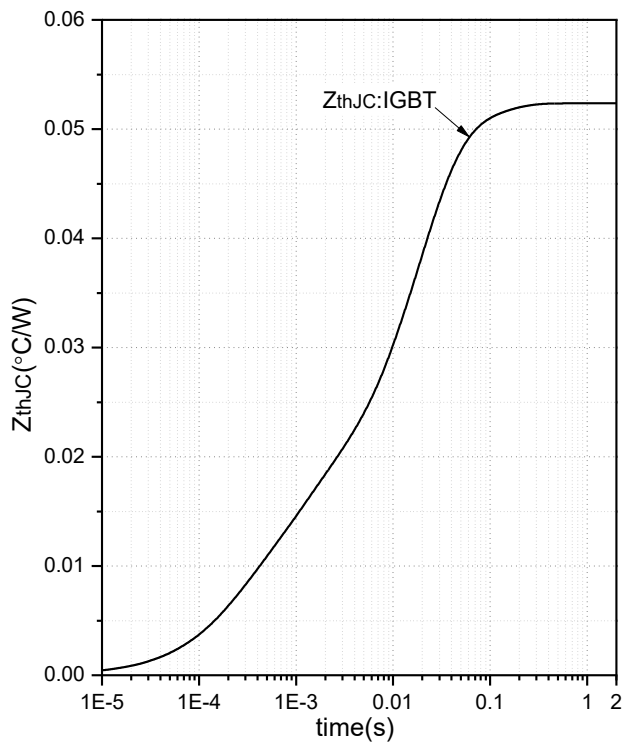


Fig.11 Transient Thermal Impedance

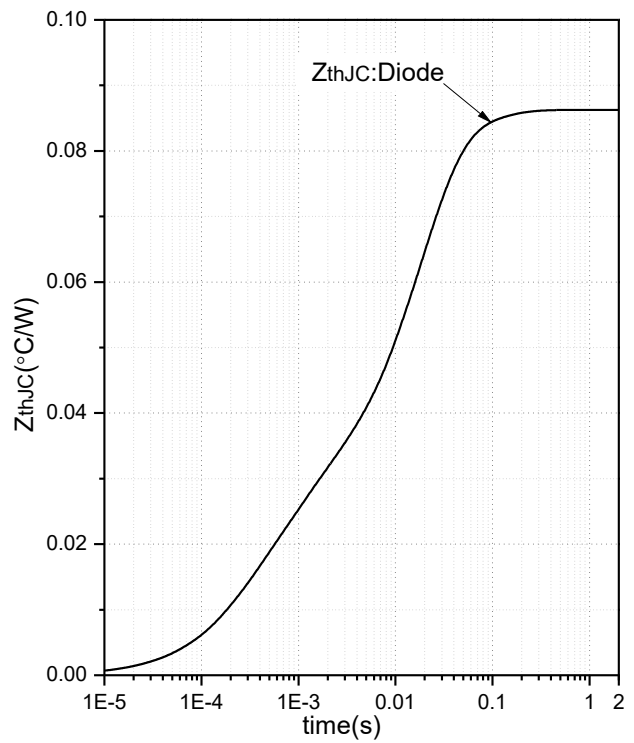
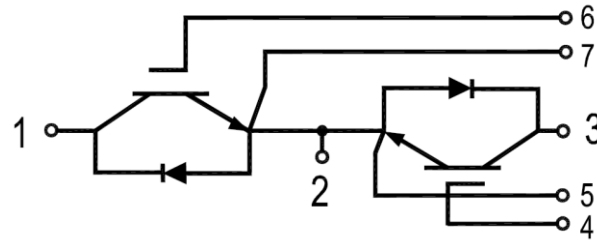


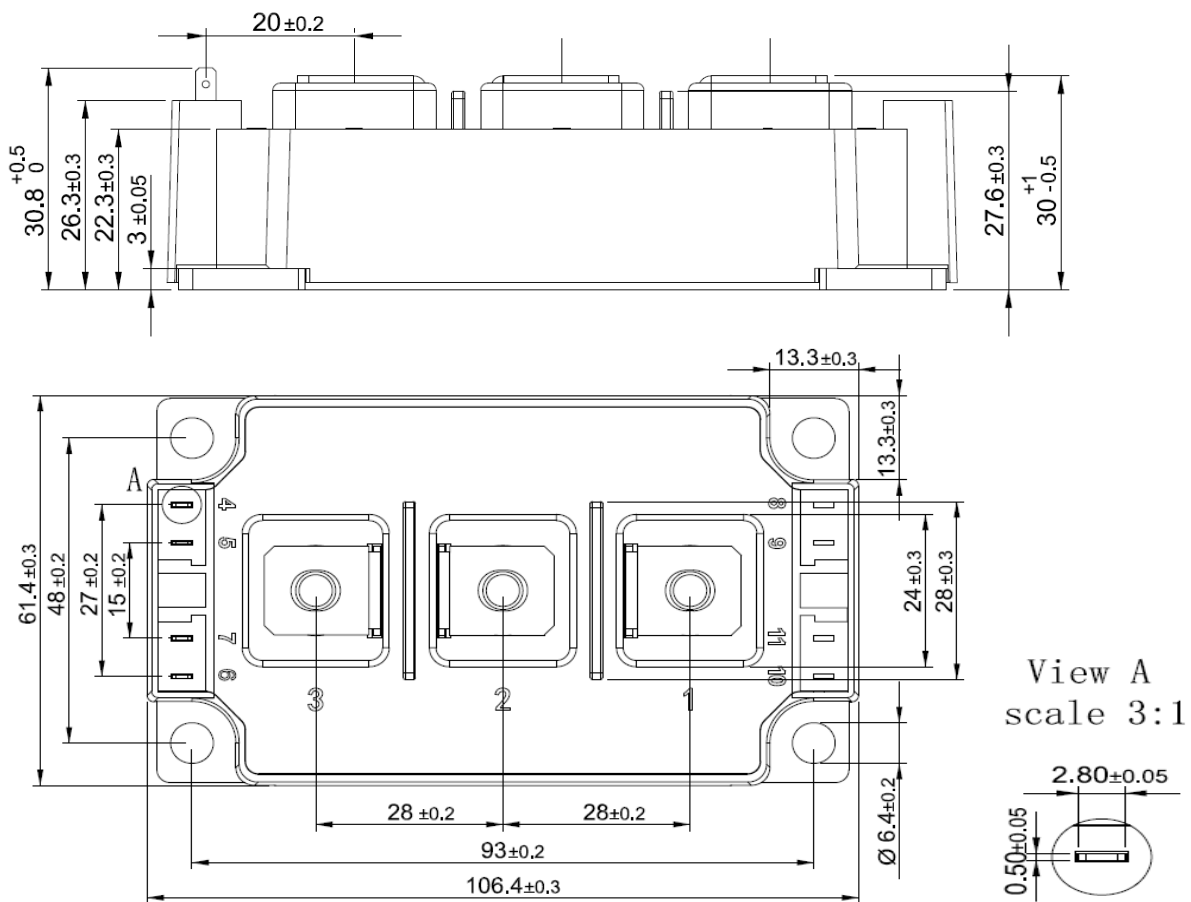
Fig.12 Transient Thermal Impedance



Internal Circuit:



Package Outline (Unit: mm):





Date	Revision	Notes
06/06/2024	01	Initial release

Announcement

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