



GT300CU120A5H

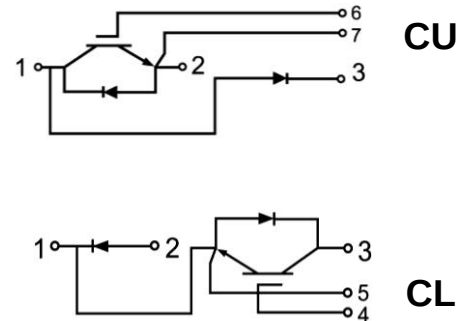
GT300CL120A5H

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
- Power Supply
- Chopper Applications
- Three-level Applications

IGBT, Chopper

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	$T_C=100^\circ\text{C}$	300	A
		$T_C=25^\circ\text{C}$	600	A
I_{CM}	Peak Collector Current Repetitive	$t_P=1\text{ms}$	600	A
P_D	Maximum Power Dissipation (IGBT)	$T_C=25^\circ\text{C}$ $T_{Jmax}=175^\circ\text{C}$	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	$I_C=10.6\text{mA}$, $V_{CE}=V_{GE}$	5.0	5.8	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=300\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^{\circ}\text{C}$	1.65	2.10	V
			$T_J=125^{\circ}\text{C}$	1.90		V
			$T_J=150^{\circ}\text{C}$	1.95		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	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$		32.95		nF
C_{oes}	Output Capacitance			5.06		nF
C_{res}	Reveres Transfer Capacitance			1.06		nF

Switching Characteristics

t _{d(on)}	Turn-on Delay Time	V _{CC} =600V, I _C =300A, R _G =2Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		516		ns
			T _J =125℃		518		
			T _J =150℃		521		
t _r	Rise Time		T _J =25℃		167		ns
			T _J =125℃		179		
			T _J =150℃		183		
t _{d(off)}	Turn-off Delay Time	V _{CC} =600V, I _C =300A, R _G =2Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		409		ns
			T _J =125℃		437		
			T _J =150℃		439		
t _f	Fall Time		T _J =25℃		154		ns
			T _J =125℃		211		
			T _J =150℃		282		
E _{on}	Turn-on Switching Loss	V _{CC} =600V, I _C =300A, R _G =2Ω, V _{GE} =±15V, di/dt=1357A/μs (T _J =150℃) Inductive Load	T _J =25℃		31.9		mJ
			T _J =125℃		38.5		
			T _J =150℃		40.0		



E _{off}	Turn-off Switching Loss	V _{CC} =600V, I _C =300A, R _G =2Ω, V _{GE} =±15V, du/dt=4943V/μs (T _J =150°C) Inductive Load	T _J =25°C		20.1		mJ
			T _J =125°C		32.6		
			T _J =150°C		35.6		
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C		1.16		uC
R _{G(int)}	Internal Gate Resistor		T _J =25°C		2.3		Ω
I _{SC}	V _{CC} =600V, V _{GE} =±15V, R _G =2Ω, t _p =10μs, T _J =150°C				1260		A
R _{θJC}	Thermal Resistance: Junction-to-Case (per IGBT)					0.079	°C/W

Diode, Chopper

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	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℃		1.75		V
			T _J =125℃		1.90		
			T _J =150℃		1.90		
t _{rr}	Reverse Recovery Time	I _F =300A, -diF/dt=1612A/μs(T _J =150℃), V _R =600V, V _{GE} =-15V	T _J =25℃		353		ns
			T _J =125℃		538		
			T _J =150℃		597		
I _{rr}	Peak Reverse Recovery Current		T _J =25℃		153		A
			T _J =125℃		169		
			T _J =150℃		172		
Q _{rr}	Reverse Recovery Charge		T _J =25℃		29.1		μC
			T _J =125℃		46.3		
			T _J =150℃		52.0		



E _{rec}	Reverse Recovery Energy	I _F =300A, -diF/dt=1612A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C		11.6		mJ
			T _J =125°C		18.5		
			T _J =150°C		19.2		
R _{θJC}	Thermal Resistance: Junction-to-Case (per Diode)					0.129	°C/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	T _C =100°C	200	A
I _{FM}	Diode Maximum Forward Current	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		1.70		V
			T _J =125°C		1.80		
			T _J =150°C		1.80		
t _{rr}	Reverse Recovery Time	I _F =200A, -diF/dt=2427A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C		288		ns
			T _J =125°C		598		
			T _J =150°C		730		
I _{rr}	Peak Reverse Recovery Current		T _J =25°C		126		A
			T _J =125°C		128		
			T _J =150°C		137		
Q _{rr}	Reverse Recovery Charge		T _J =25°C		19		μC
			T _J =125°C		34		
			T _J =150°C		41		
E _{rec}	Reverse Recovery Energy		T _J =25°C		6.6		mJ
			T _J =125°C		11.5		
			T _J =150°C		14.1		
R _{θJC}	Thermal Resistance: Junction-to-Case (per Diode)					0.166	°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	°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)				0.05	°C/W
T	Power Terminals Screw:M5		3.0		5.0	N·m
T	Mounting Screw:M6		4.0		6.0	N·m
G	Weight			200		g

Ordering Information Table

Device code

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

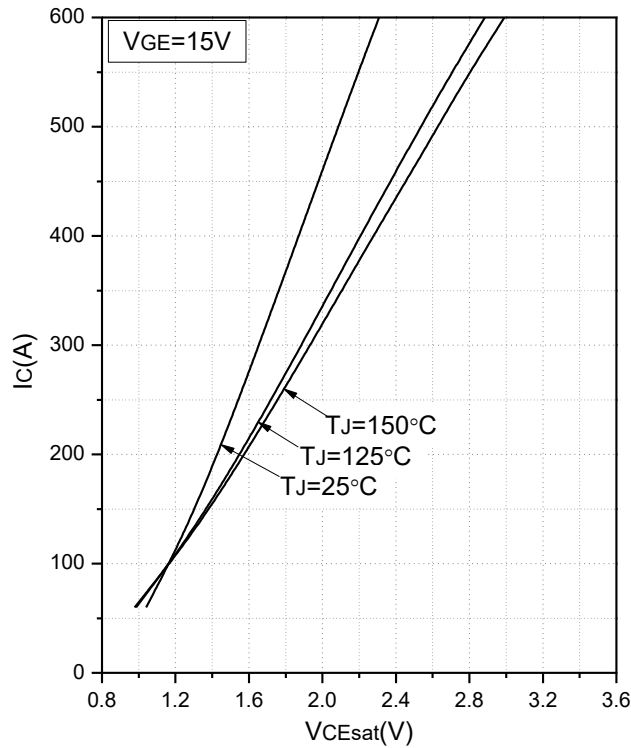


Fig.1 Typical Saturation Voltage Characteristics

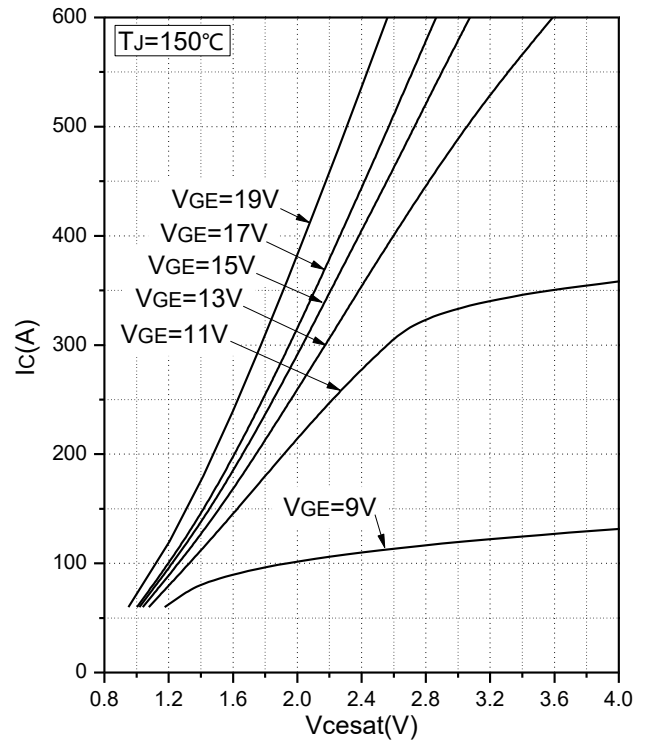


Fig.2 Typical Output Characteristics

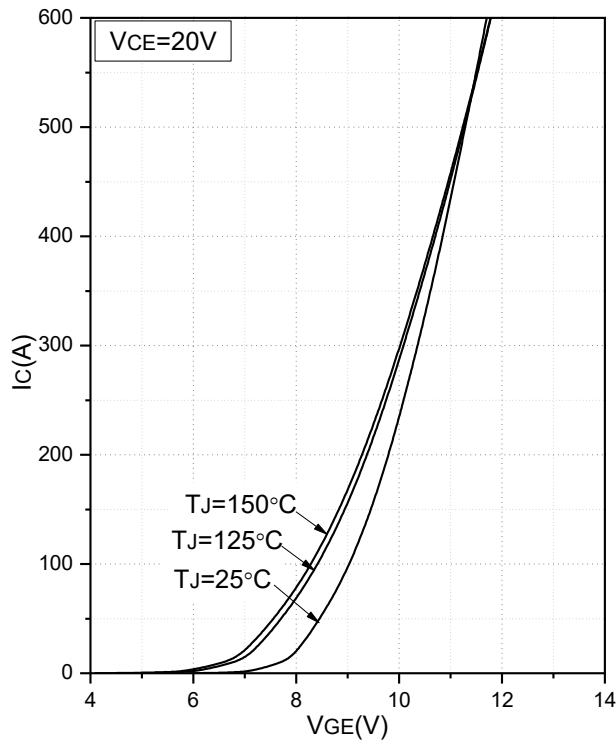


Fig.3 Transfer Characteristics

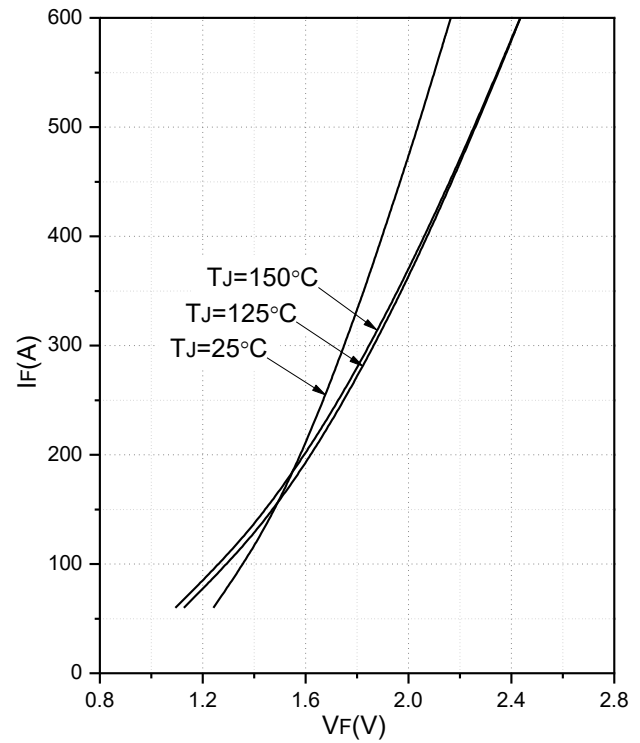


Fig.4 Forward Characteristics of Diode

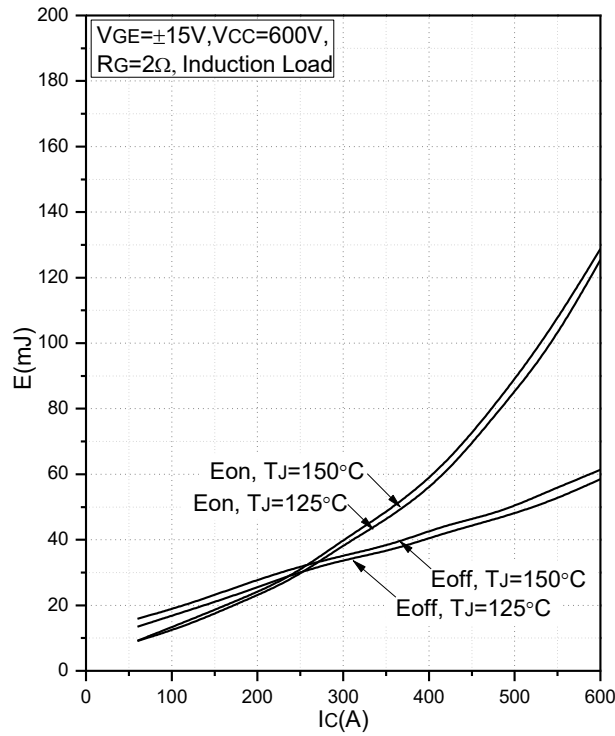


Fig.5 Typical Switching Loss vs. Collector Current

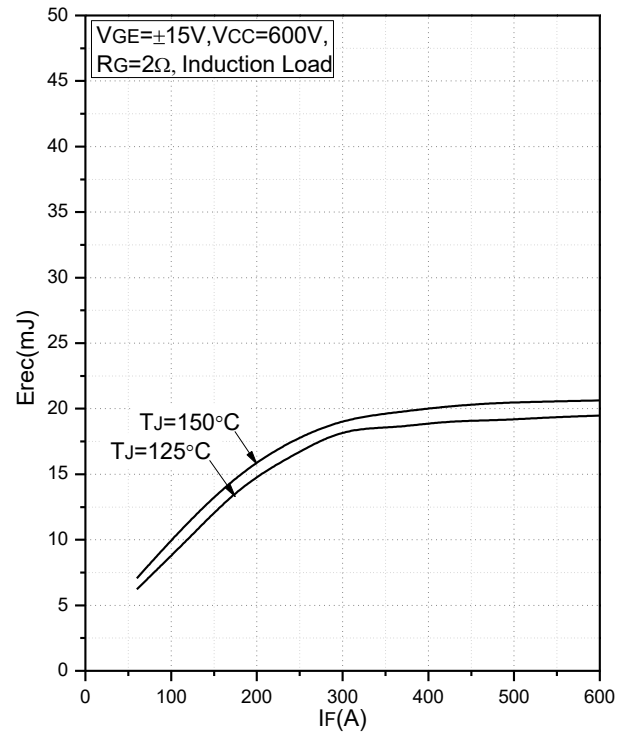


Fig.6 Typical Switching Loss vs. Forward Current

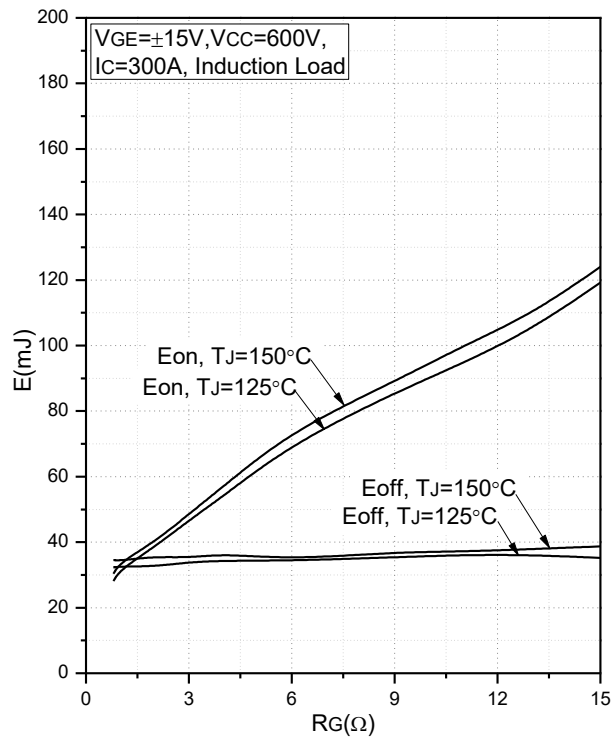


Fig.7 Typical Switching Loss vs. Gate Resistance

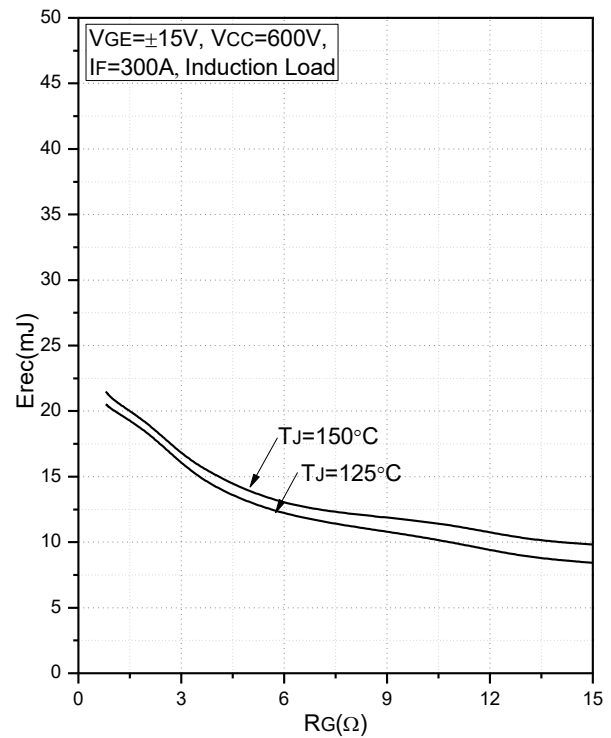
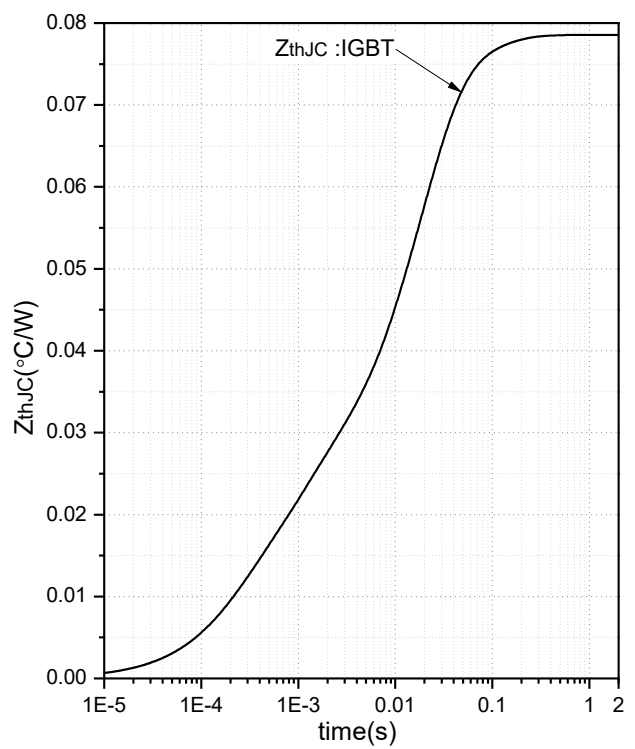
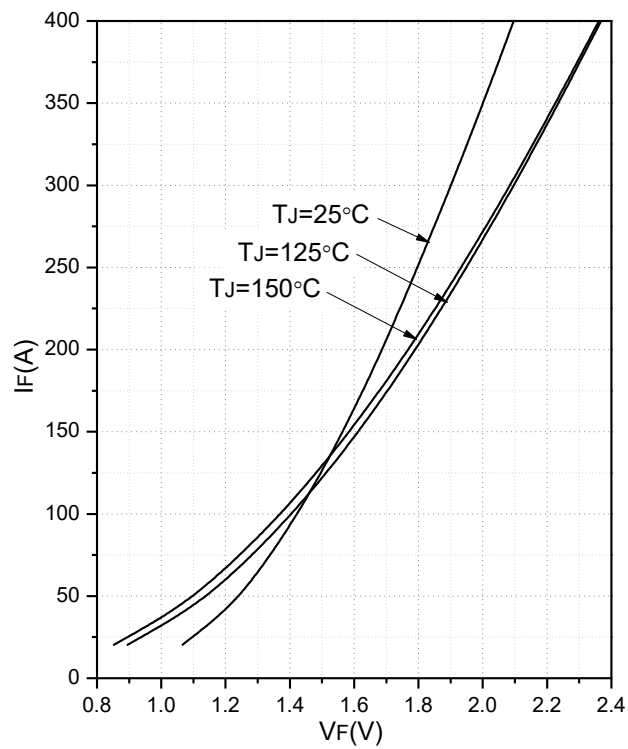
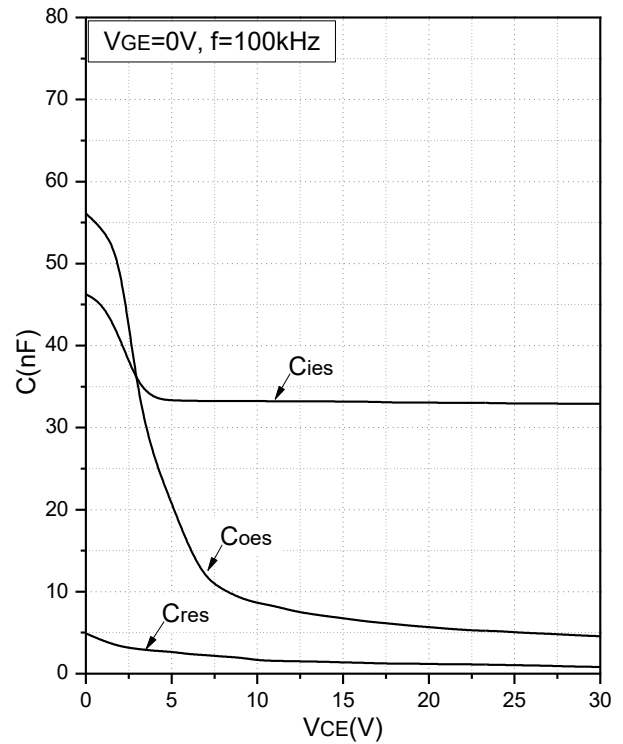
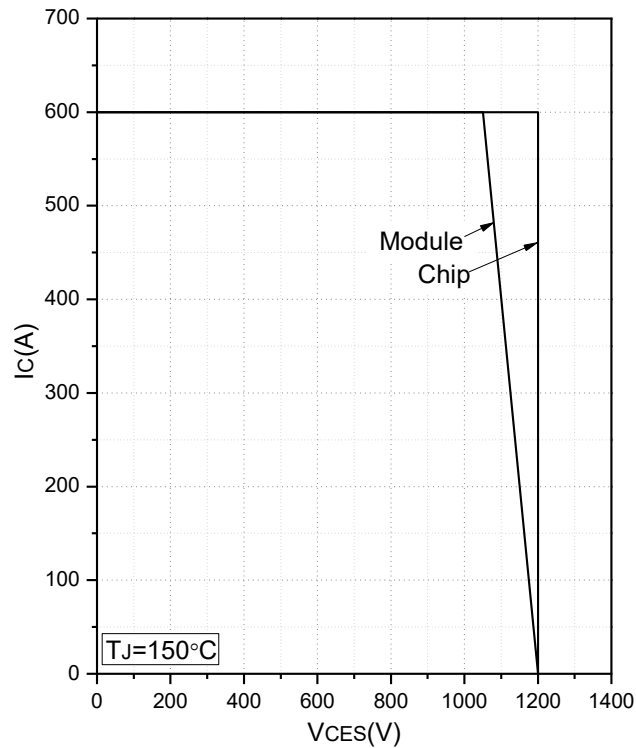


Fig.8 Typical Switching Loss vs. Gate Resistance



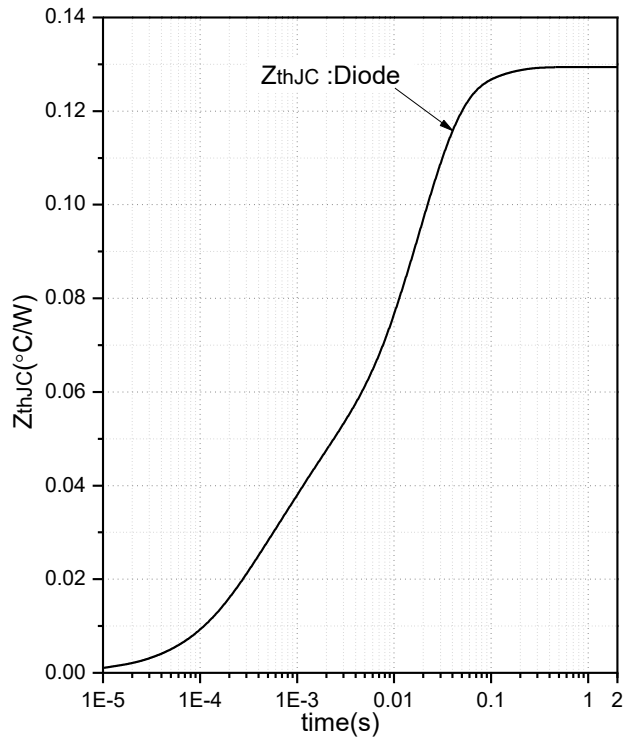
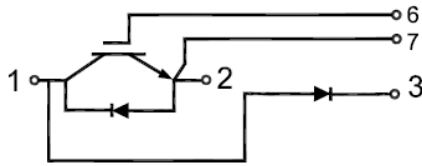


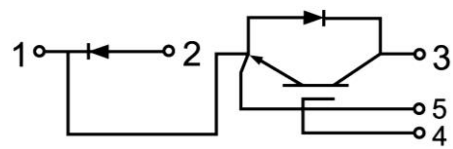
Fig.13 Transient Thermal Impedance (Chopper-Diode)



Internal Circuit:

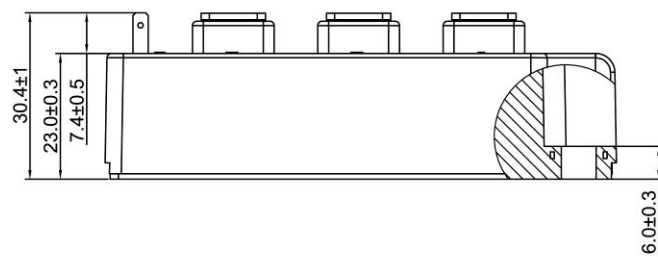


CU

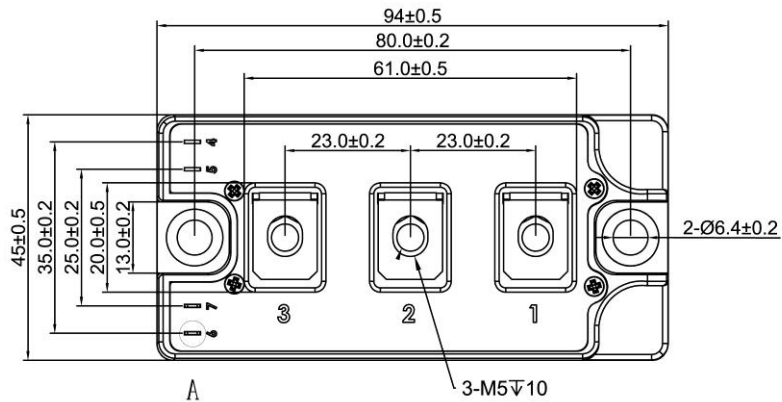


CL

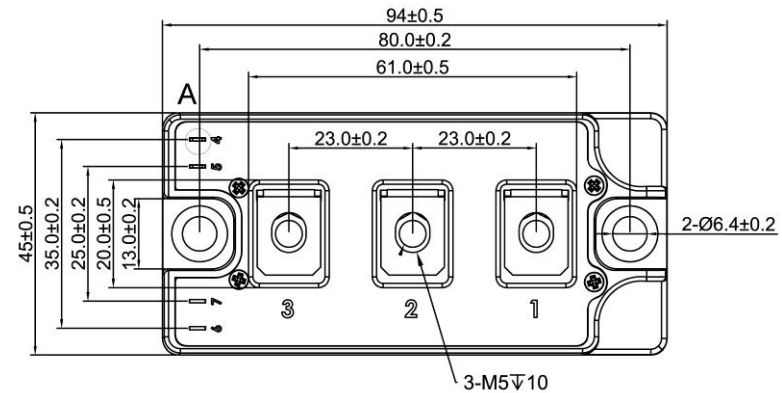
Package Outline (Unit: mm):



View A
scale 3:1



CU



CL



Revision	Notes
01	Initial release

Announcement

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