



GT150CU120T1VH

GT150CL120T1VH

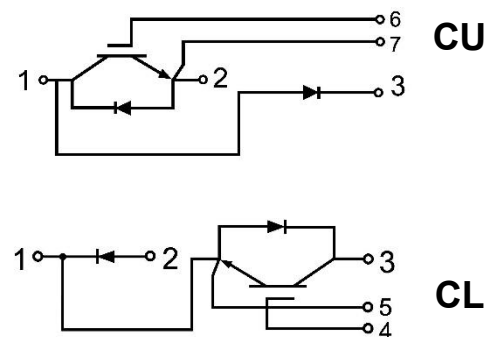
IGBT Module

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

Circuit Diagram



Applications:

- Welding Machine、Cutting Machine
- Plating Power Supply、Induction Heating
- SMPS、UPS

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	$T_c=100^\circ\text{C}$	150	A
		$T_c=25^\circ\text{C}$	289	A
I_{CM}	Repetitive Peak Collector Current	$t_p=1\text{ms}$	300	A
P_D	Maximum Power Dissipation (per IGBT)	$T_c=25^\circ\text{C}$ $T_{Jmax}=175^\circ\text{C}$	955	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	$I_C=5.3\text{mA}$, $V_{CE}=V_{GE}$	5.0	5.8	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=150\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^{\circ}\text{C}$	1.65	2.00	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	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$		16.5		nF
C_{oes}	Output Capacitance			2.5		nF
C_{res}	Reverse Transfer Capacitance			0.5		nF

Switching Characteristics

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V, I_C=150A,$ $R_{Gon}=6.8\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		153		ns
			$T_J=125^{\circ}C$		162		
			$T_J=150^{\circ}C$		165		
t_r	Rise Time		$T_J=25^{\circ}C$		64		ns
			$T_J=125^{\circ}C$		74		
			$T_J=150^{\circ}C$		78		
$t_{d(off)}$	Turn-off Delay Time		$T_J=25^{\circ}C$		392		ns
			$T_J=125^{\circ}C$		440		
			$T_J=150^{\circ}C$		446		
t_f	Fall Time	$T_J=25^{\circ}C$		186		ns	
		$T_J=125^{\circ}C$		264			
		$T_J=150^{\circ}C$		288			
E_{on}	Turn-on Switching Loss	$V_{CC}=600V, I_C=150A,$ $R_{Gon}=6.8\Omega, V_{GE}=\pm 15V,$ $di/dt=1655A/\mu s(T_J=150^{\circ}C),$ Inductive Load	$T_J=25^{\circ}C$		6.5		mJ
		$T_J=125^{\circ}C$		10.1			
		$T_J=150^{\circ}C$		10.9			



E _{off}	Turn-off Switching Loss	V _{CC} =600V, I _C =150A, R _{Goff} =6.8Ω, V _{GE} =±15V, du/dt=5316V/μs(T _J =150°C), Inductive Load	T _J =25°C		13.2		mJ
			T _J =125°C		17.3		
			T _J =150°C		18.2		
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C		2860		nC
R _{g internal}	Internal Gate Resistor				3.0		Ω
I _{SC}	V _{CC} =600V, V _{GE} =+/-15V, tp=10μs, T _J =150°C				880		A
R _{θJC}	IGBT Thermal Resistance: Junction-to-Case					0.16	°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	100	A
I _{FM}	Diode Maximum Forward Current	tp=1ms	200	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 =100A	T _J =25°C		1.75		V
			T _J =125°C		1.90		
			T _J =150°C		1.85		
t _{rr}	Reverse Recovery Time	I _F =100A, -diF/dt=1674A/μs(T _J =150°C), V _{rr} =600V, V _{GE} =-15V	T _J =25°C		171		ns
			T _J =125°C		322		
			T _J =150°C		341		
I _{rr}	Peak Reverse Recovery Current		T _J =25°C		68		A
			T _J =125°C		107		
			T _J =150°C		115		
Q _{rr}	Reverse Recovery Charge		T _J =25°C		8.1		μC
			T _J =125°C		18.8		
			T _J =150°C		20.6		



E _{rec}	Reverse Recovery Energy	I _F =100A, -diF/dt=1674A/μs(T _J =150°C), V _{rr} =600V, V _{GE} =-15V	T _J =25°C		2.8		mJ
			T _J =125°C		6.7		
			T _J =150°C		7.0		
R _{θJC}	Diode Thermal Resistance: Junction-to-Case					0.33	°C/W

Diode, 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	T _C =100°C	150	A
I _{FM}	Diode Maximum Forward Current	t _p =1ms	300	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 =150A	T _J =25℃		1.85		V
			T _J =125℃		2.00		
			T _J =150℃		2.05		
t _{rr}	Reverse Recovery Time	I _F =150A, -diF/dt=2085A/μs(T _J =150℃), V _{rr} =600V, V _{GE} =-15V	T _J =25℃		160		ns
			T _J =125℃		290		
			T _J =150℃		322		
I _{rr}	Peak Reverse Recovery Current		T _J =25℃		130		A
			T _J =125℃		131		
			T _J =150℃		135		
Q _{rr}	Reverse Recovery Charge		T _J =25℃		12.4		μC
			T _J =125℃		20.3		
			T _J =150℃		22.8		
E _{rec}	Reverse Recovery Energy		T _J =25℃		4.6		mJ
			T _J =125℃		7.0		
			T _J =150℃		7.4		
R _{θJC}	Diode Thermal Resistance: Junction-to-Case					0.33	℃/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)				0.07	°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			165		g

Ordering Information Table

Device code

G	T	150	CU	120	T1V	H
①	②	③	④	⑤	⑥	⑦

- ① - IGBT Module
- ② - Trench, Low Switching Losses IGBT
- ③ - Rated Current (150=150A)
- 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)

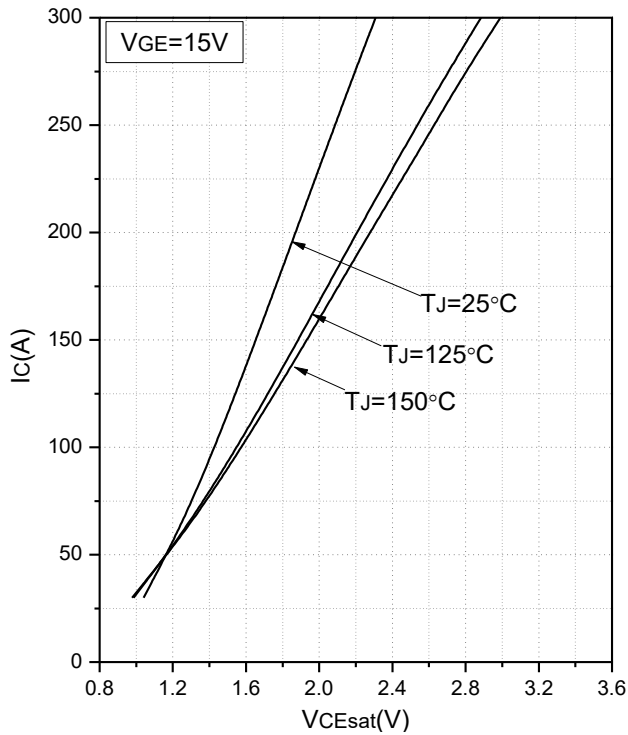


Fig.1 Typical Saturation Voltage Characteristics

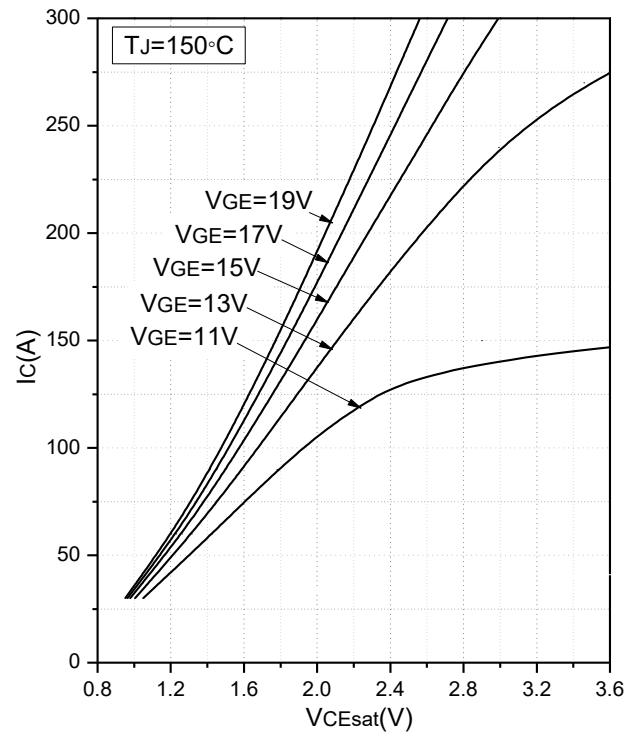


Fig.2 Typical Output Characteristics

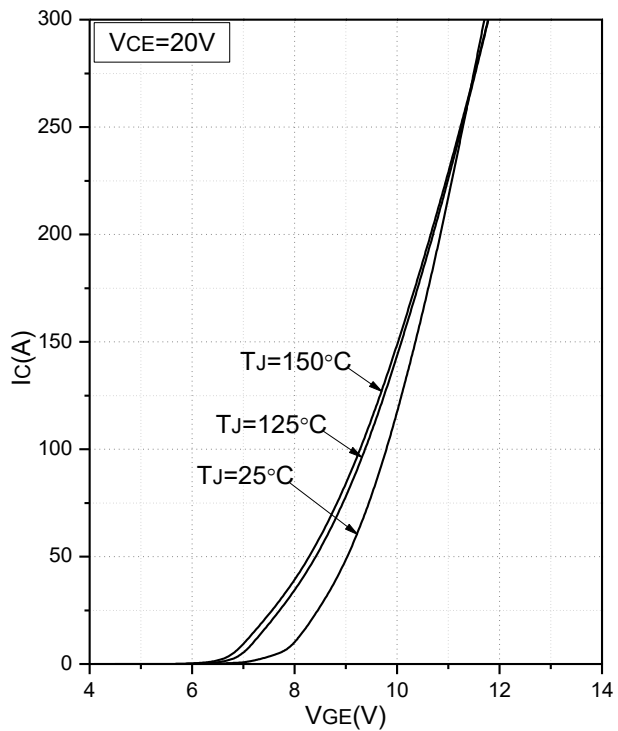


Fig.3 Transfer Characteristic

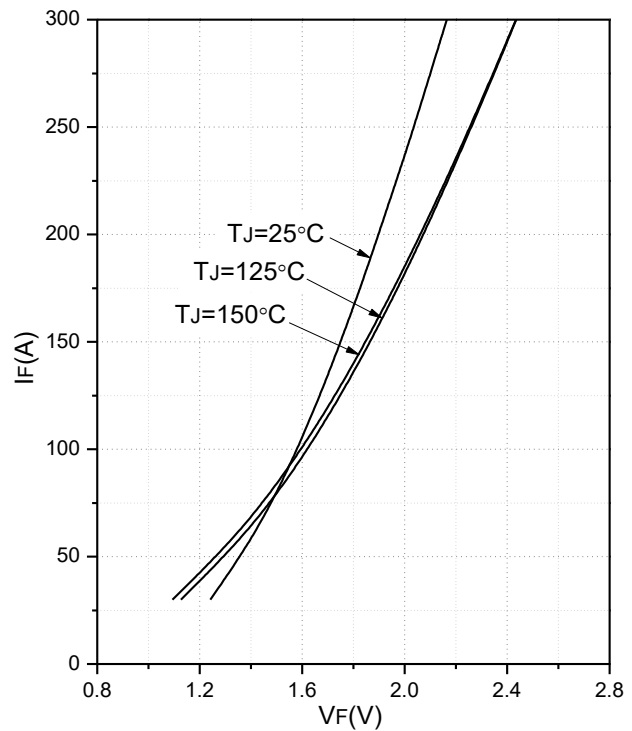


Fig.4 Forward Characteristics of Chopper Diode

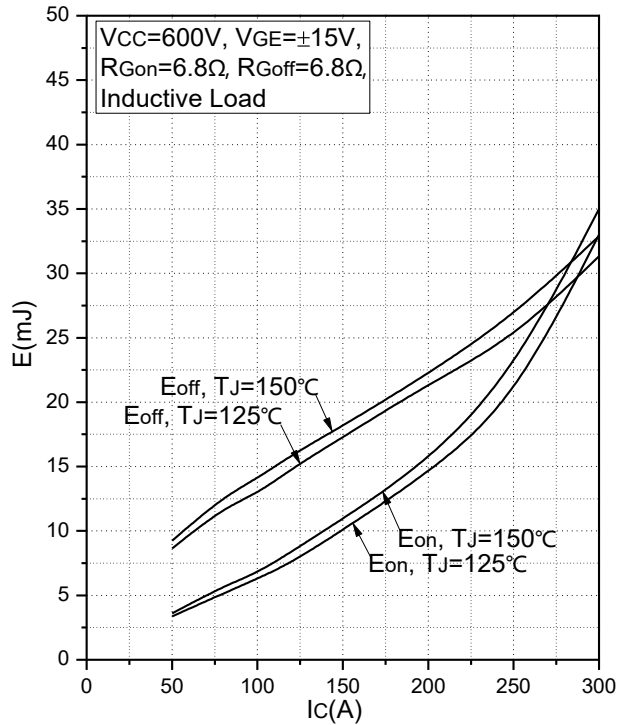


Fig.5 Typical Switching Loss vs. Collector Current

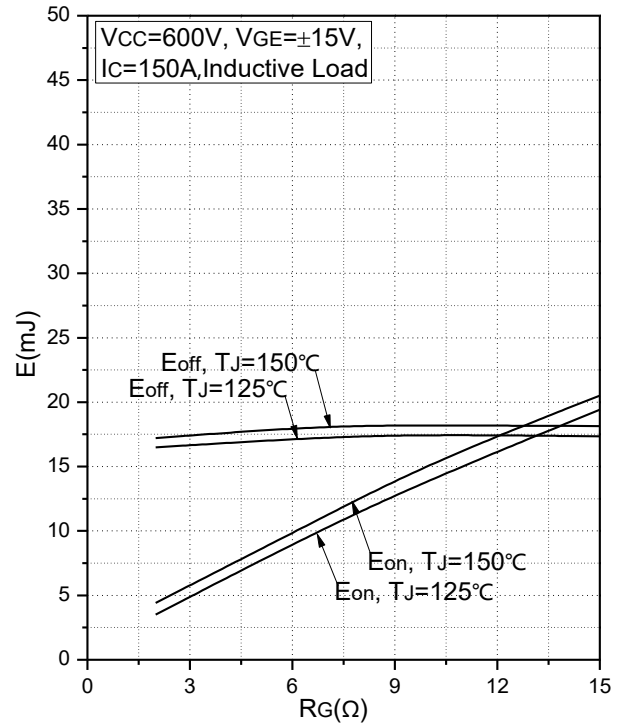


Fig.6 Typical Switching Loss vs. Gate Resistance

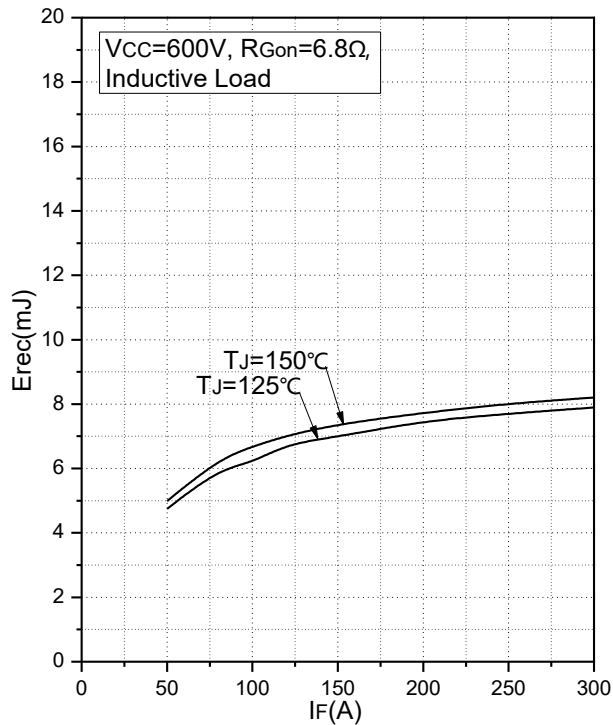


Fig.7 Typical Switching Loss vs. Forward Current (Chopper-Diode)

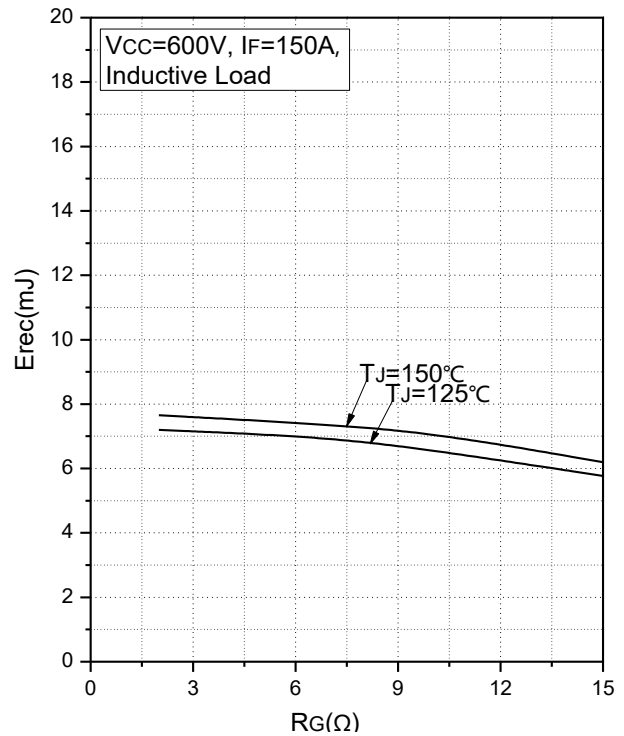
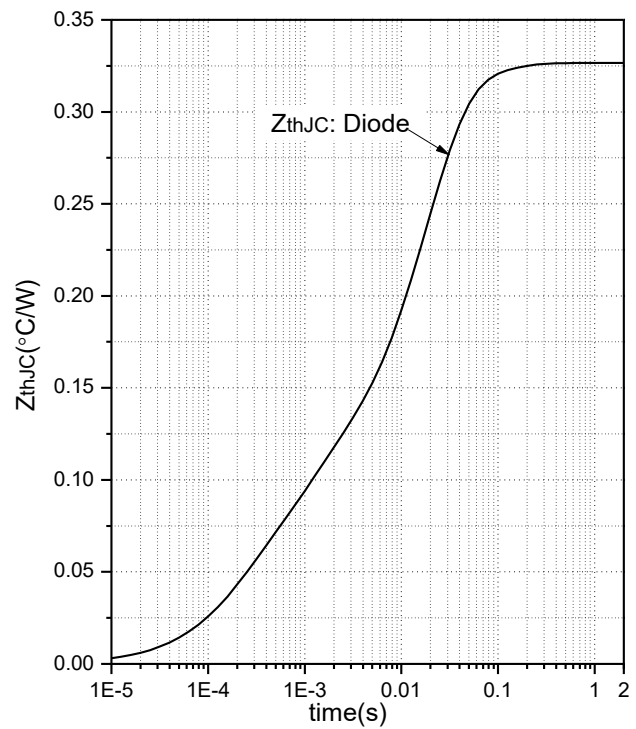
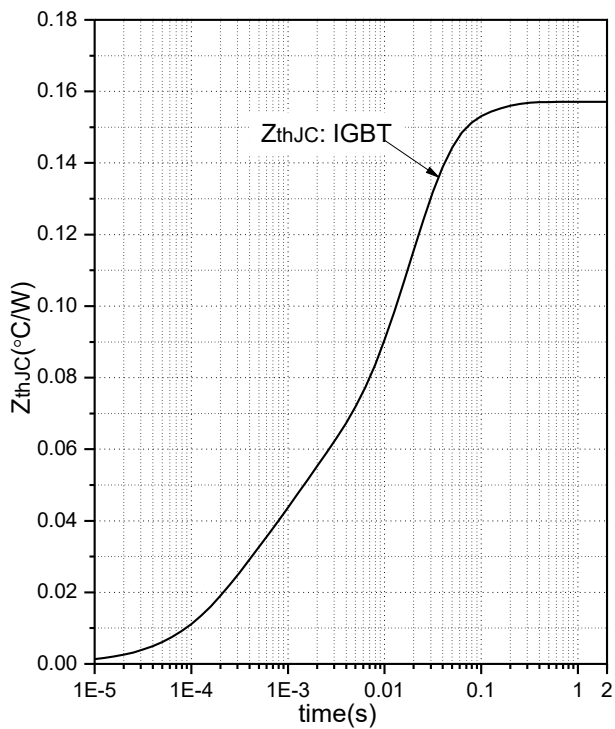
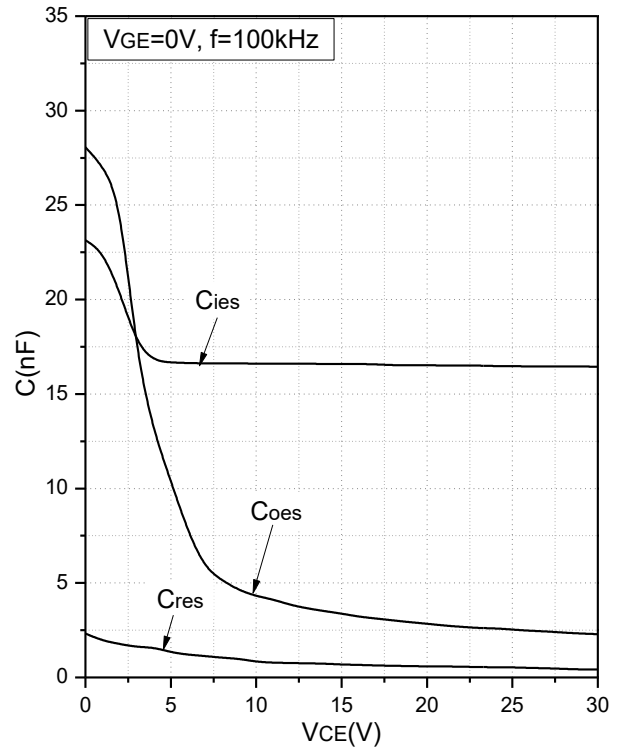
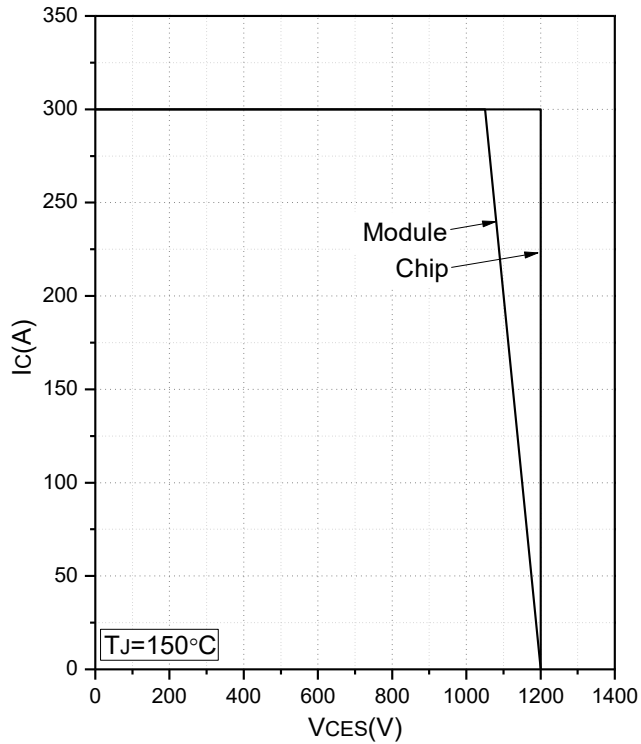


Fig.8 Typical Switching Loss vs. Gate Resistance (Chopper-Diode)



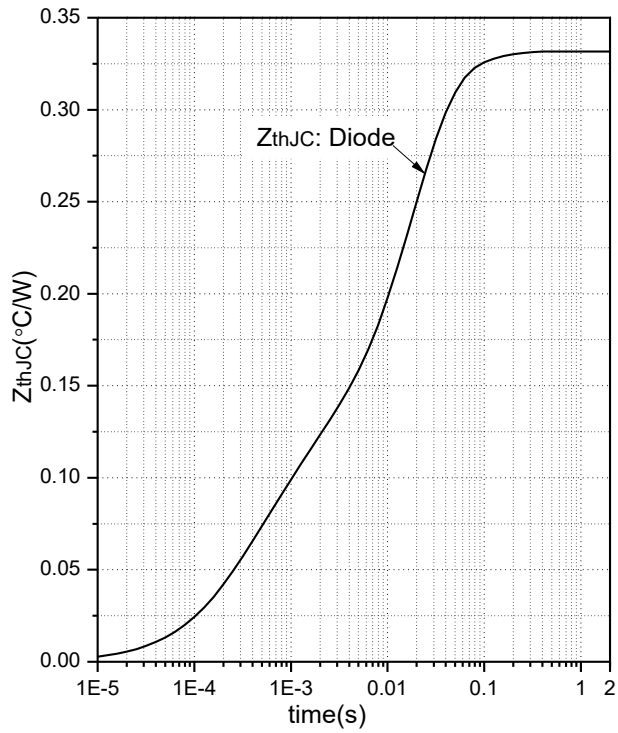
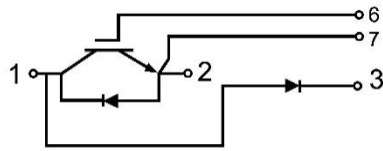


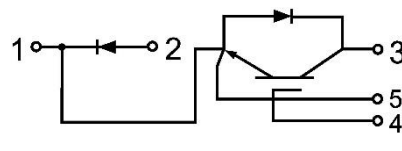
Fig.13 Transient Thermal Impedance (Reverse-Diode)



Internal Circuit

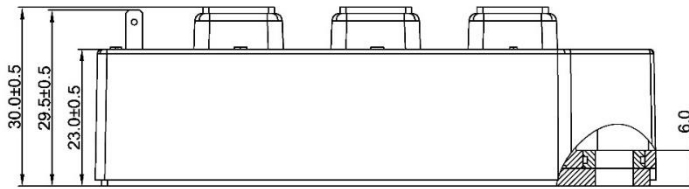


CU

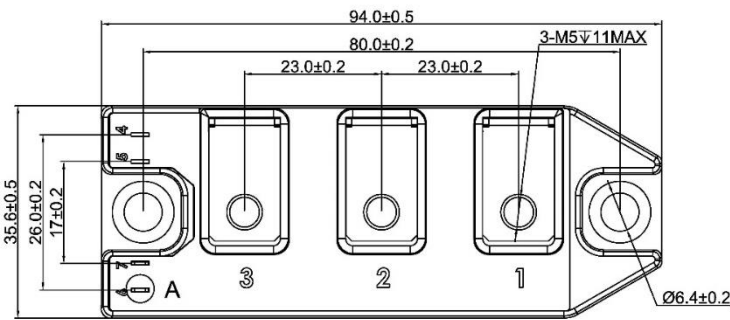


CL

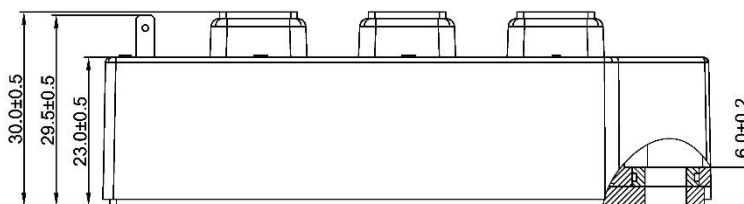
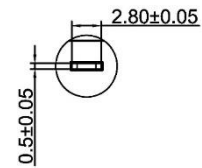
Package Outline (Unit: mm):



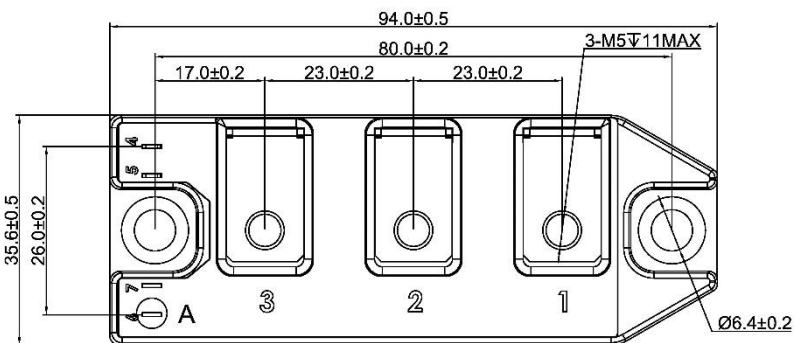
CU



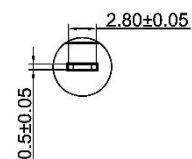
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CL



View A
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Revision	Notes
01	Initial Release

Announcements

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