



GT150CU120T2VH

GT150CL120T2VH

Preliminary Data

IGBT Module

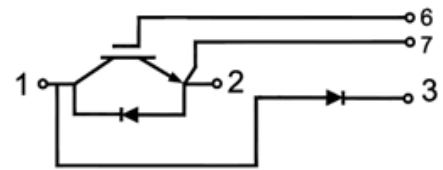
Features:

- Field Stop Trench Gate IGBT
- Short Circuit Rated $>10\mu\text{s}$
- Low Switching Loss
- 100% RBSOA Tested($2\times I_c$)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement

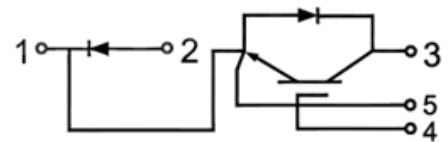
Applications:

- Welding
- HEV Inverter
- Industrial Motor Drives
- UPS

Circuit Diagram



CU



CL

IGBT, Chopper

Maximum Rated Values of IGBT ($T_c=25^\circ\text{C}$ 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
		$T_c=25^\circ\text{C}$	300	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	$I_C=5.3\text{mA}$, $V_{CE}=V_{GE}$	5.00	5.80	6.50	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	$V_{GE}=0\text{V}$, $V_{CE}=V_{CES}$, $T_J=25^\circ\text{C}$			100	μA
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} =6.8Ω, V _{GE} =±15V, Inductive Load	T _J =25 °C		537		ns
			T _J =125 °C		449		
			T _J =150 °C		454		
t _r	Rise Time		T _J =25 °C		141		ns
			T _J =125 °C		130		
			T _J =150 °C		133		
t _{d(off)}	Turn-off Delay Time	V _{CC} =600V, I _C =150A, R _{Goff} =6.8Ω, V _{GE} =±15V, Inductive Load	T _J =25 °C		439		ns
			T _J =125 °C		409		
			T _J =150 °C		414		
t _f	Fall Time		T _J =25 °C		262		ns
			T _J =125 °C		454		
			T _J =150 °C		454		
E _{on}	Turn-on Switching Loss	V _{CC} =600V, I _C =150A, R _{Gon} =6.8Ω, V _{GE} =±15V, di/dt=964A/μs(T _J =150 °C), Inductive Load	T _J =25 °C		15.6		mJ
			T _J =125 °C		21.2		
			T _J =150 °C		22.6		



E _{off}	Turn-off Switching Loss	V _{CC} =600V, I _C =150A, R _{Goff} =6.8Ω, V _{GE} =±15V, du/dt=3545V/μs(T _J =150°C), Inductive Load	T _J =25°C		10.4		mJ
			T _J =125°C		15.4		
			T _J =150°C		16.0		
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C		1164		nC
R _{g internal}	Internal Gate Resistor		T _J =25°C		4.5		Ω
SCSOA	V _{CC} =600V, t _p =10μs, V _{GE} =+/-15V, R _{Gon} =6.8Ω, R _{Goff} =6.8Ω, T _J =150°C				630		A
R _{θJC}	IGBT Thermal Resistance: Junction-to-Case					0.16	°C/W

Diode, Reverse Maximum Rated Values of Diode

V _{RRM}	Repetitive Peak Reverse Voltage	T _J = 25°C	1200	V
I _F	Diode Continuous Forward Current		100	A
I _{FM}	Diode Maximum Forward Current	tp=1ms	200	A

Electrical Characteristics of Diode

Symbol	Description	Conditions		Min.	Typ.	Max.	Units.
V _{FM}	Forward Voltage	I _F =100A	T _J =25℃		1.70		V
			T _J =125℃		1.80		
			T _J =150℃		1.80		
t _{rr}	Reverse Recovery Time	I _F =100A, -diF/dt=1911A/μs(T _J =150℃), V _R =600V, V _{GE} =-15V	T _J =25℃		260		ns
			T _J =125℃		396		
			T _J =150℃		454		
I _{rr}	Peak Reverse Recovery Current		T _J =25℃		52		A
			T _J =125℃		74		
			T _J =150℃		75		
Q _{rr}	Reverse Recovery Charge		T _J =25℃		10.2		μC
			T _J =125℃		16.8		
			T _J =150℃		19.2		



E _{rec}	Reverse Recovery Energy	I _F =100A, -diF/dt=1911A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C		2.6		mJ
			T _J =125°C		7.0		
			T _J =150°C		7.3		
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		150	A
I _{FM}	Diode Maximum Forward Current	tp=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℃		1.75		V
			T _J =125℃		1.90		
			T _J =150℃		1.85		
t _{rr}	Reverse Recovery Time	I _F =150A, -diF/dt=1245A/μs(T _J =150℃), V _{rr} =600V, V _{GE} =-15V	T _J =25℃		296		ns
			T _J =125℃		507		
			T _J =150℃		528		
I _{rr}	Peak Reverse Recovery Current		T _J =25℃		64.1		A
			T _J =125℃		92.5		
			T _J =150℃		99.5		
Q _{rr}	Reverse Recovery Charge		T _J =25℃		10.3		μC
			T _J =125℃		21.5		
			T _J =150℃		22.7		
E _{rec}	Reverse Recovery Energy		T _J =25℃		2.8		mJ
			T _J =125℃		7.3		
			T _J =150℃		7.6		
R _{θJC}	Diode Thermal Resistance: Junction-to-Case					0.26	℃/W



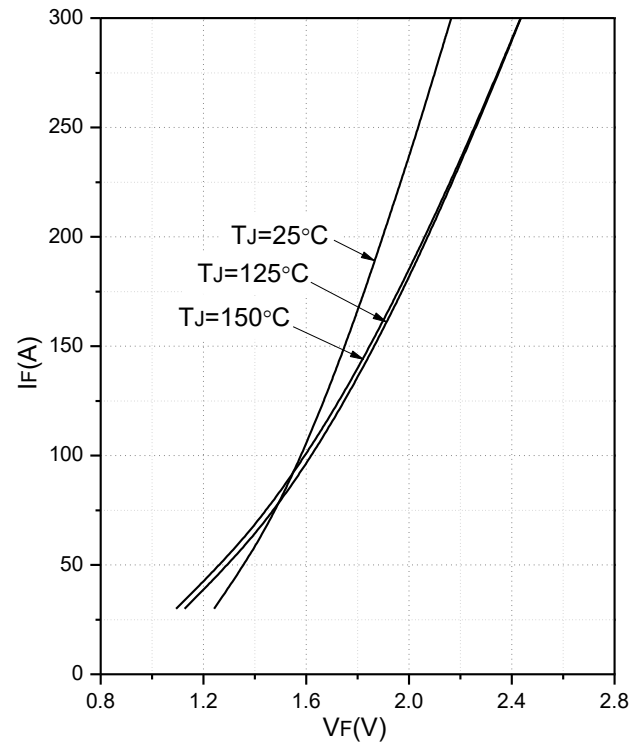
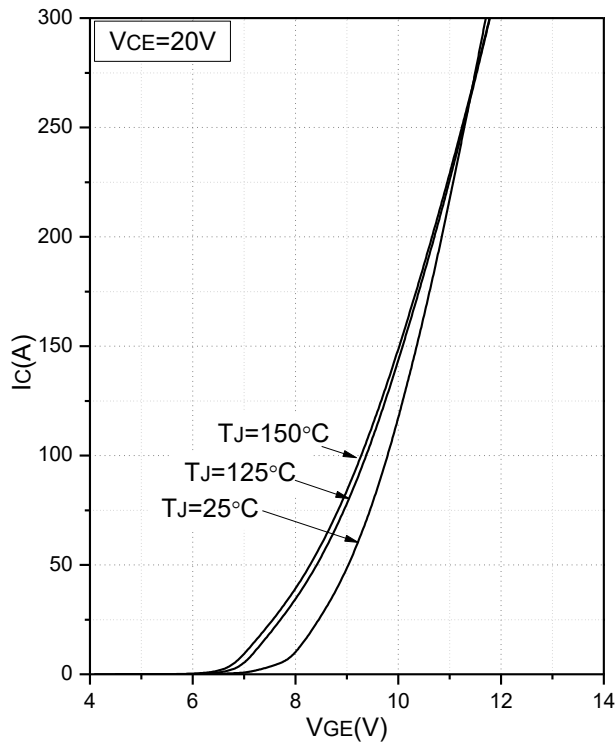
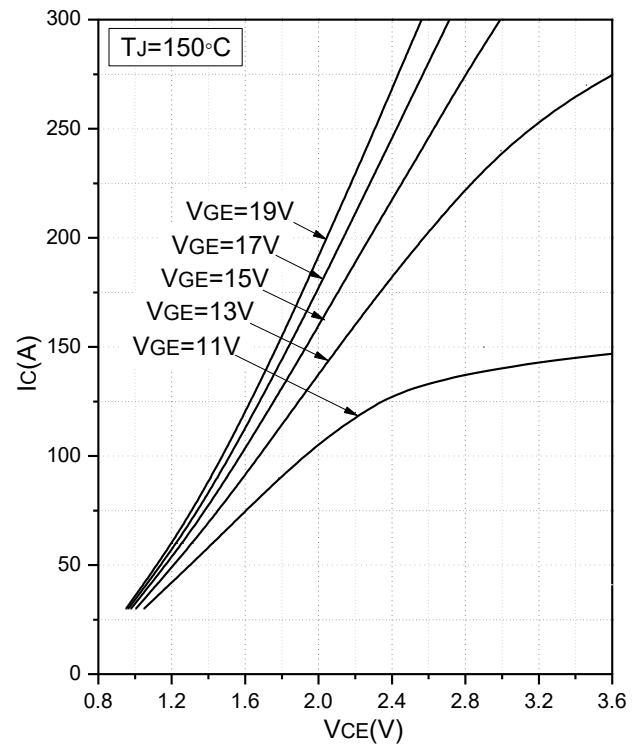
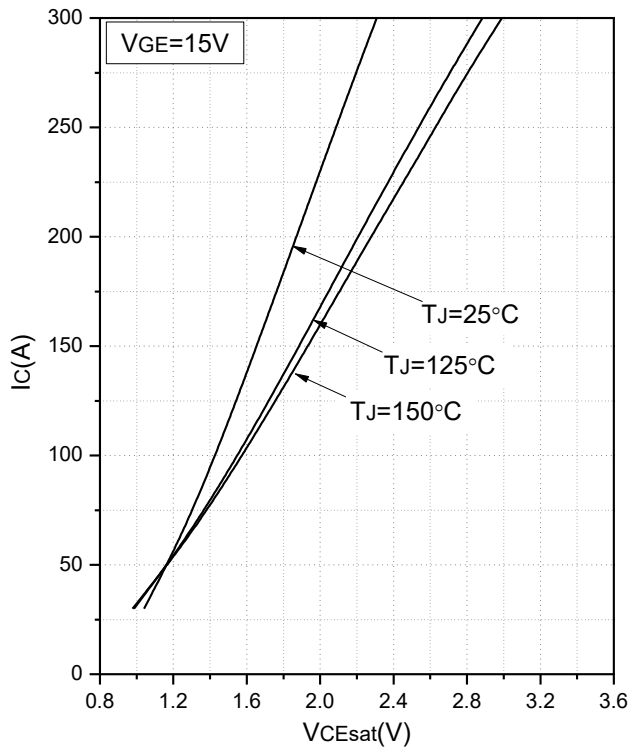
Module

Symbol	Description		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 _{ecs}	Case-to-Sink Thermally (Conductive Grease Applied)				0.03	°C/W
T	Power Terminals Screw:M6		2.5		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	150	CU	120	T2V	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)



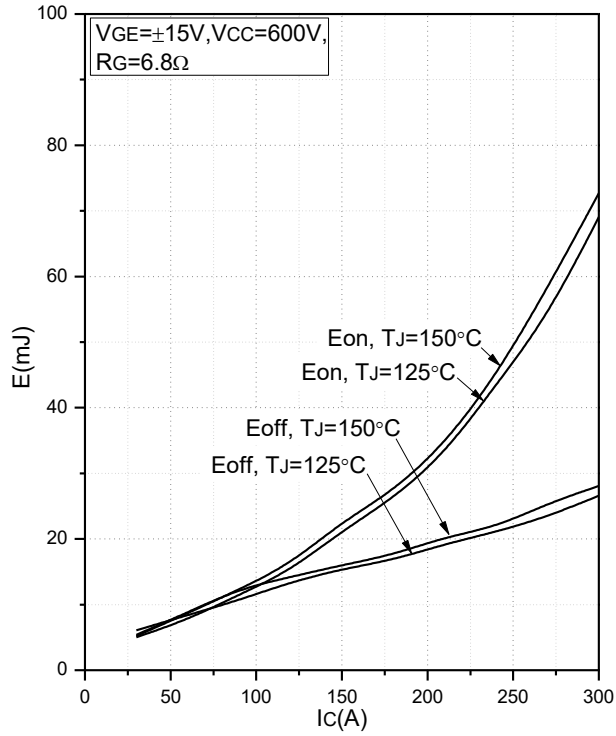


Fig.5 Typical Switching Loss vs. Collector Current

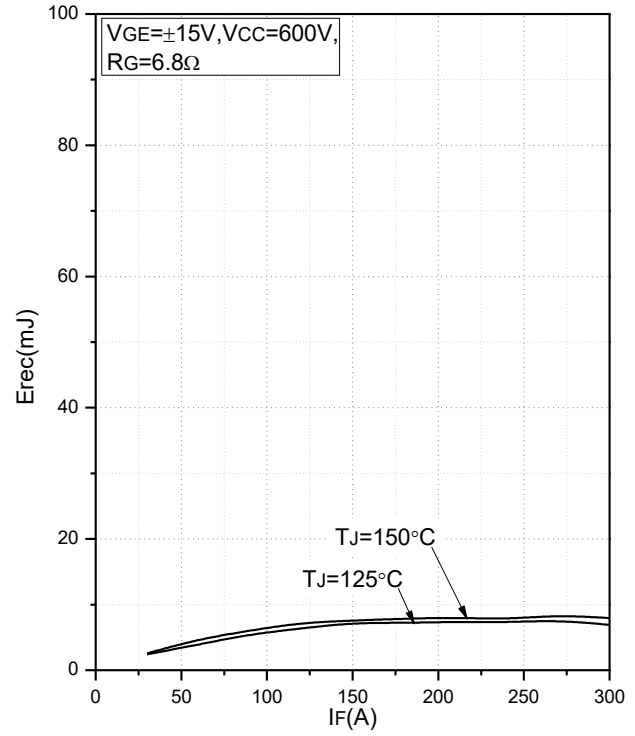


Fig.6 Typical Switching Loss vs. Forward Current(Chopper)

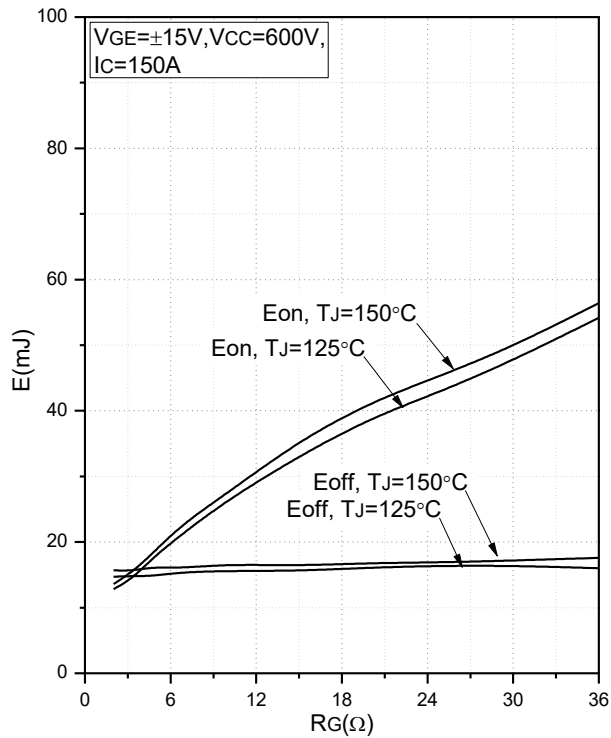


Fig.7 Typical Switching Loss vs. Gate Resistance

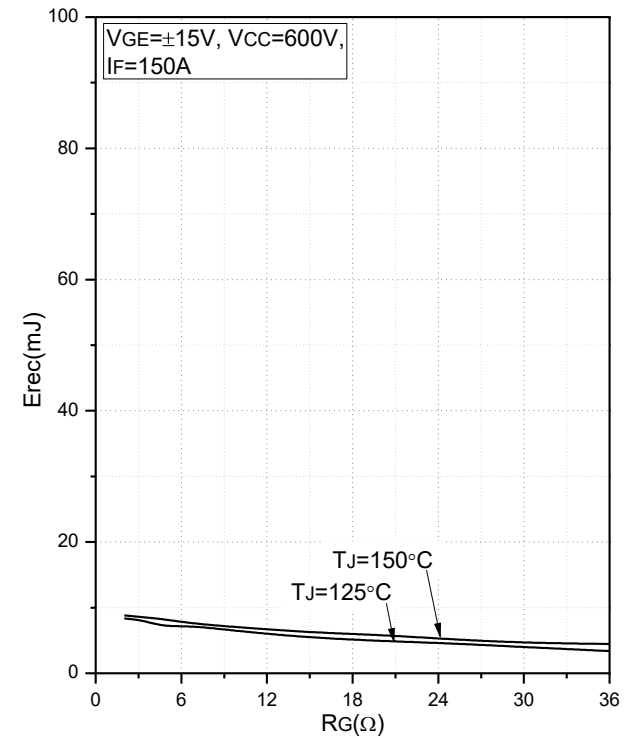


Fig.8 Typical Switching Loss vs. Gate Resistance(Chopper)

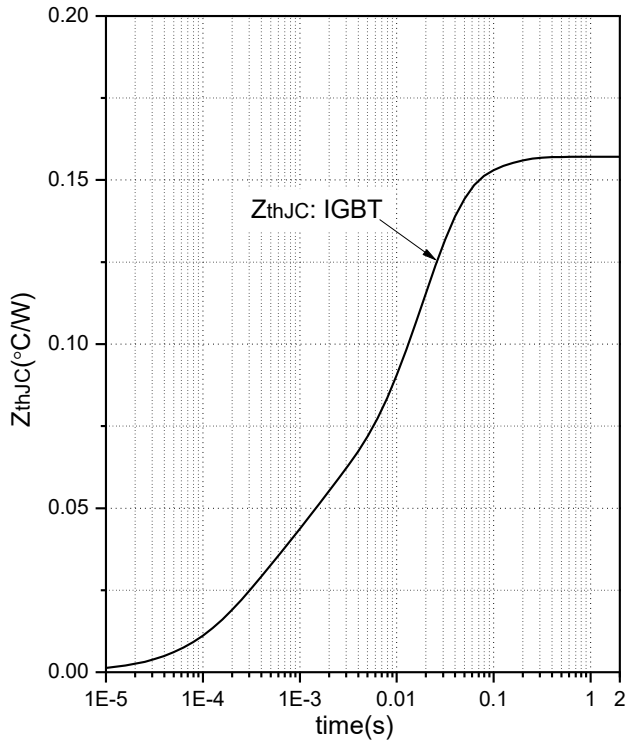


Fig.9 Transient Thermal Impedance (IGBT)

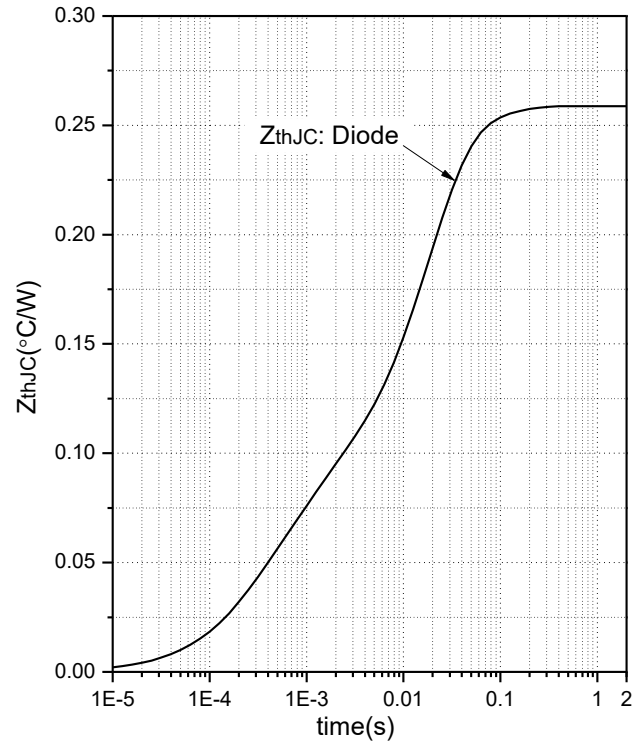


Fig.10 Transient Thermal Impedance (Chopper Diode)

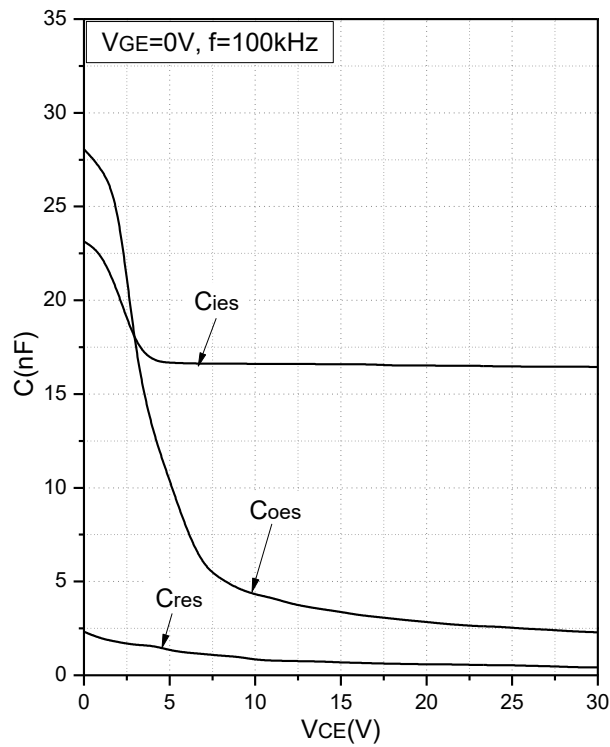


Fig.11 Capacitance Characteristics

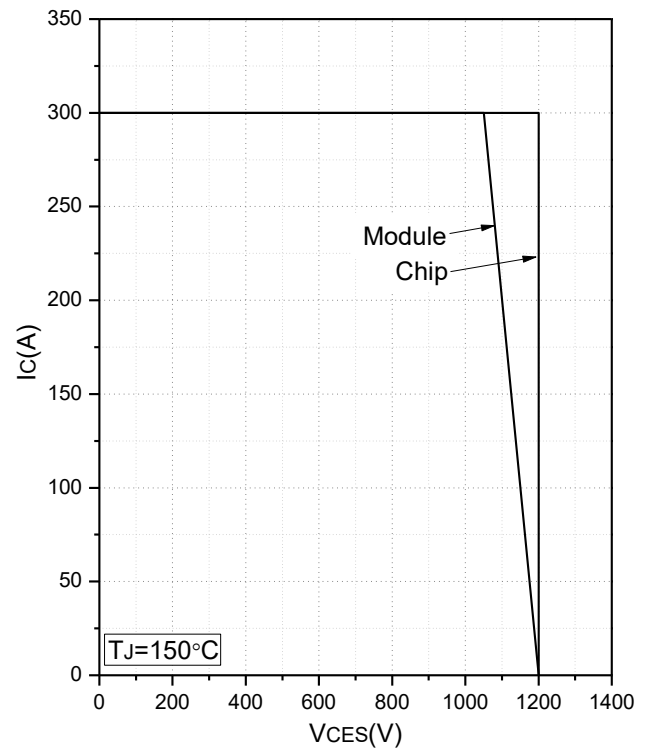


Fig.12 Reverse Bias Safe Operation Area (RBSOA)

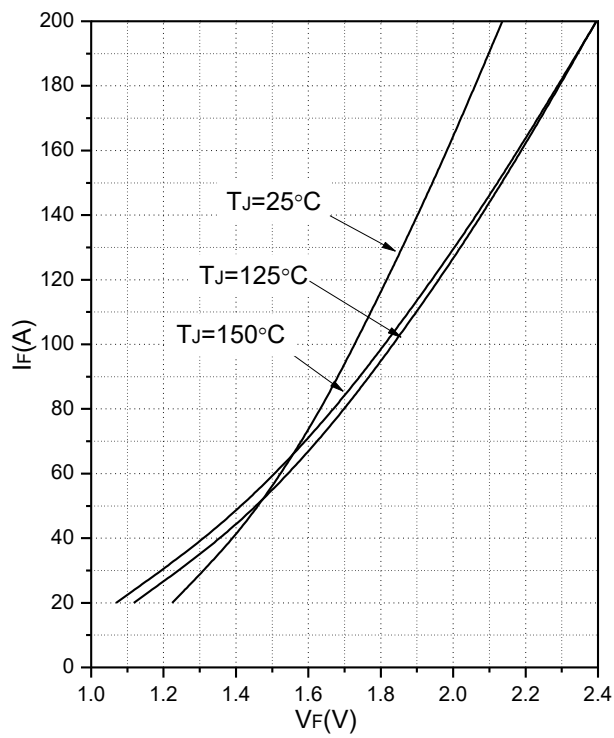


Fig.13 Forward Characteristics of Diode (Reverse)

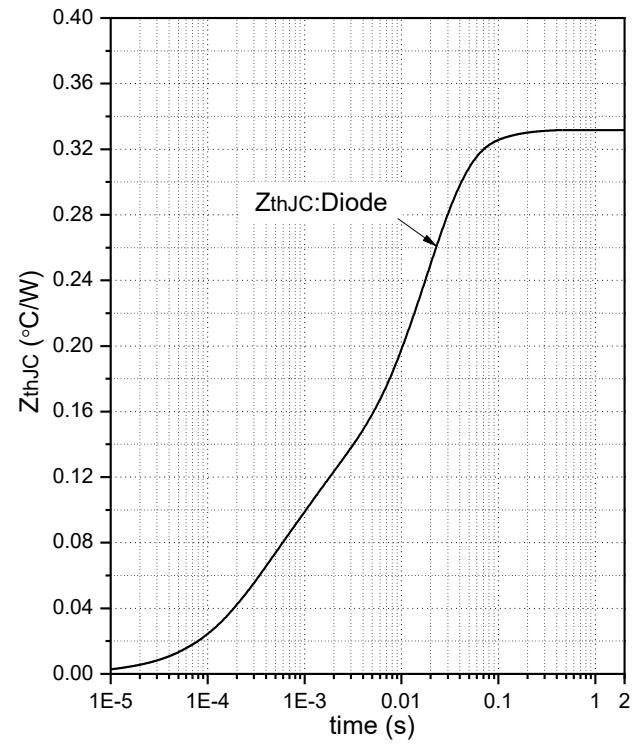
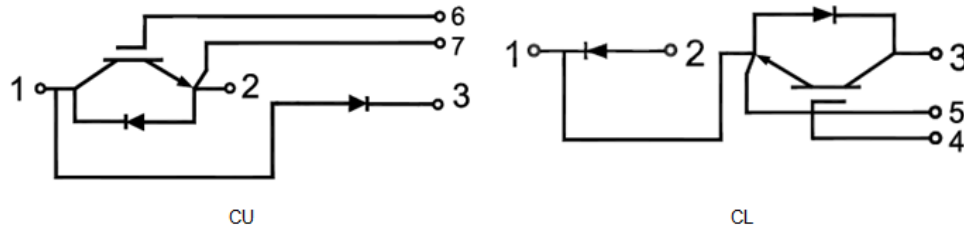


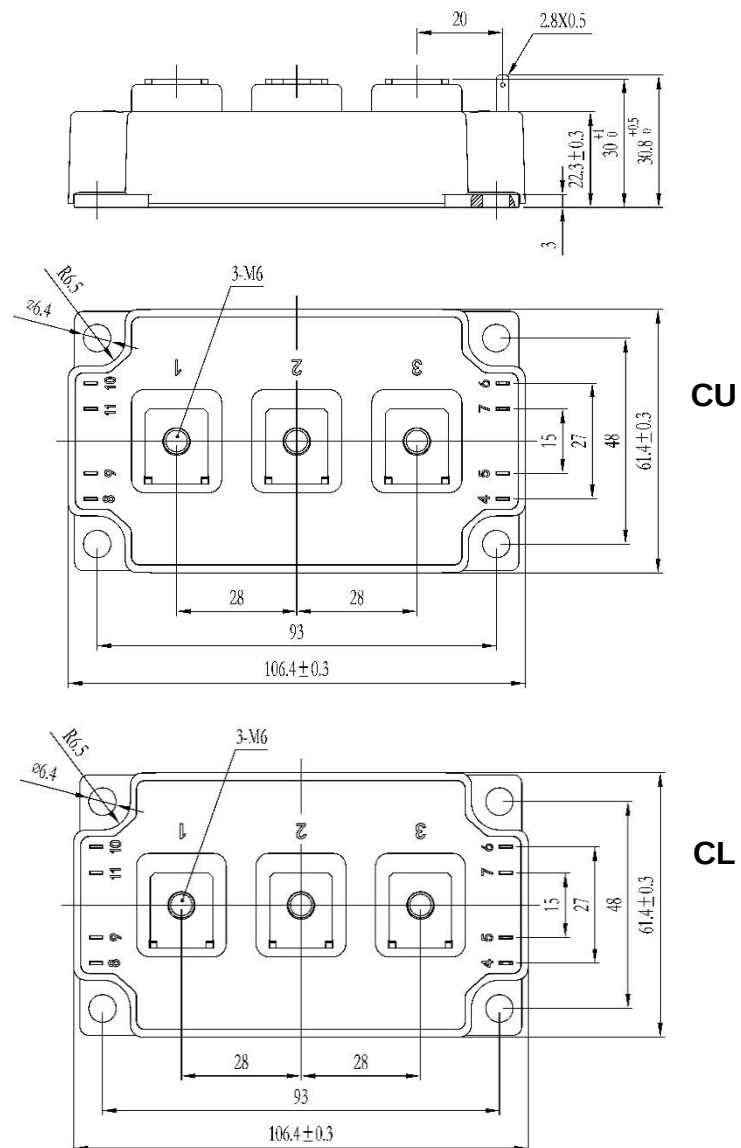
Fig.14 Transient Thermal Impedance (Reverse Diode)



Internal Circuit



Package Outline (Unit: mm):





Date	Revision	Notes
06/19/2024	01	Initial Release

Announcements

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