

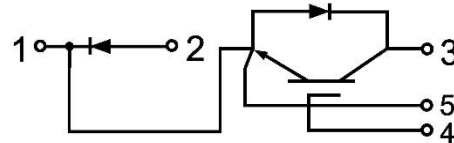
GT150CL120T1VH

IGBT Module

Circuit Diagram

Features:

- $V_{CES}=1200V$ $I_C=150A$ Trench & Field Stop IGBT Module
- Short Circuit Capability
- Low Switching Loss
- 100% RBSOA Tested($2 \times I_C$)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement



Applications:

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



Type	Package	Marking
GT150CL120T1VH	T1V	GT150CL120T1VH

IGBT, Brake-Chopper

Maximum Rated Values of IGBT ($T_C=25^\circ C$ unless otherwise specified)

V_{CES}	Collector-Emitter Blocking Voltage		1200	V
V_{GES}	Gate-Emitter Voltage		± 20	V
I_C	Continuous Collector Current Limited by T_{Jmax}	$T_C=90^\circ C$	150	A
		$T_C=25^\circ C$	300	A
I_{CM}	Peak Collector Current Repetitive	T_p Limited by T_{Jmax}	300	A
P_D	Maximum Power Dissipation (IGBT)	$T_C=25^\circ C, T_{Jmax}=150^\circ C$	796	W

GT150CL120T1VH

IGBT Module Datasheet



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	$I_C=5.7\text{mA}$, $V_{CE}=V_{GE}$	5.0	5.8	6.6	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=150\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^{\circ}\text{C}$	2.01	2.40	V
			$T_J=125^{\circ}\text{C}$	2.72		V
			$T_J=150^{\circ}\text{C}$	2.85		V
I_{CES}	Collector-Emitter Leakage Current	$V_{GE}=0\text{V}$, $V_{CE}=1200\text{V}$, $T_J=25^{\circ}\text{C}$			1	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=20\text{V}$, $V_{CE}=0\text{V}$, $T_J=25^{\circ}\text{C}$			200	nA
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$		17.03		nF
C_{oes}	Output Capacitance			0.80		nF
C_{res}	Reverse Transfer Capacitance			0.17		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V, I_C=150A,$ $R_{Gon}=1\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		67		ns
			$T_J=125^{\circ}C$		75		
			$T_J=150^{\circ}C$		76		
t_r	Rise Time		$T_J=25^{\circ}C$		18		ns
			$T_J=125^{\circ}C$		20		
			$T_J=150^{\circ}C$		21		
$t_{d(off)}$	Turn-off Delay Time		$T_J=25^{\circ}C$		92		ns
			$T_J=125^{\circ}C$		106		
			$T_J=150^{\circ}C$		109		
t_f	Fall Time	$T_J=25^{\circ}C$		25		ns	
		$T_J=125^{\circ}C$		34			
		$T_J=150^{\circ}C$		36			
E_{on}	Turn-on Switching Loss	$V_{CC}=600V, I_C=150A,$ $R_{Gon}=1\Omega, V_{GE}=\pm 15V,$ $di/dt=2800A/\mu s(T_J=150^{\circ}C)$ Inductive Load	$T_J=25^{\circ}C$		6.7		mJ
		$T_J=125^{\circ}C$		11.0			
		$T_J=150^{\circ}C$		12.0			



GT150CL120T1VH

IGBT Module Datasheet

E _{off}	Turn-off Switching Loss	V _{CC} =600V, I _C =150A, R _{Goff} =1Ω, V _{GE} =±15V, du/dt=4600V/μs(T _J =150°C) Inductive Load	T _J =25°C		5.4		mJ
			T _J =125°C		6.7		
			T _J =150°C		7.3		
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C		960		nC
R _{G (int)}	Internal Gate Resistance		T _J =25°C		3.0		Ω
T _{SC}	V _{CC} =600V, V _{GE} =±15V, T _J =150°C ^{note1}					10	us
R _{θJC}	IGBT Thermal Resistance: Junction-to-Case (per IGBT)					0.157	°C/W
R _{θCS}	IGBT Thermal Resistance: Case-to-Sink (per IGBT) (per IGBT, λ _{grease} = 1 W/(m · K))				0.055		°C/W

note1: Short circuit withstand time cannot exceed 10us under specified condition

Diode, Chopper

Maximum Rated Values of Diode-Chopper (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-Chopper (T_C=25°C unless otherwise specified)

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V _{FM}	Forward Voltage	I _F =150A	T _J =25°C		1.71	2.05	V
			T _J =125°C		1.84		
			T _J =150°C		1.79		
t _{rr}	Reverse Recovery Time	I _F =150A, -diF/dt=3650A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C		120		ns
			T _J =125°C		183		
			T _J =150°C		207		
I _{rr}	Peak Reverse Recovery Current		T _J =25°C		154		A
			T _J =125°C		158		
			T _J =150°C		160		
Q _{rr}	Reverse Recovery Charge		T _J =25°C		12.8		μC
			T _J =125°C		19.9		
			T _J =150°C		22.3		

GT150CL120T1VH

IGBT Module Datasheet



E _{rec}	Reverse Recovery Energy	I _F =150A, -diF/dt=3650A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C		5.2		mJ
			T _J =125°C		8.2		
			T _J =150°C		9.3		
R _{θJC}	Diode Thermal Resistance: Junction-to-Case (per Diode)					0.326	°C/W
R _{θCS}	Diode Thermal Resistance: Case-to-Sink (per Diode, λ _{grease} = 1 W/(m • K))				0.114		°C/W

Diode, Reverse

Maximum Rated Values of Diode-Reverse ($T_C=25^{\circ}C$ unless otherwise specified)

V_{RRM}	Repetitive Peak Reverse Voltage	$T_J=25^{\circ}C$	1200	V
I_F	Diode Continuous Forward Current		100	A
I_{FM}	Diode Maximum Forward Current	$t_p=1ms$	200	A

Electrical Characteristics of Diode- Reverse ($T_C=25^{\circ}C$ unless otherwise specified)

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V _{FM}	Forward Voltage	I _F =100A	T _J =25°C		1.67	2.05	V
			T _J =125°C		1.76		
			T _J =150°C		1.73		
R _{θJC}	Diode Thermal Resistance: Junction-to-Case (per Diode)					0.429	°C/W
R _{θCS}	Diode Thermal Resistance: Case-to-Sink (per Diode, λ _{grease} = 1 W/(m • K))				0.150		°C/W

GT150CL120T1VH

IGBT Module Datasheet



Module

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
V _{iso}	Isolation Voltage (All Terminals Shorted)	RMS f=50Hz, 60s	2500			V
T _J	Maximum Junction Temperature		-40		150	°C
T _{JOP}	Maximum Operating Junction Temperature Range		-40		150	°C
T _{stg}	Storage Temperature		-40		125	°C
CTI	Comparative Tracking Index		200			
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	CL	120	T1V	H
①	②	③	④	⑤	⑥	⑦

- ① - IGBT Module
- ② - Field Stop Trench Gate IGBT
- ③ - Rated Current (150=150A)
- ④ - Circuit Configuration: Chopper, CL(Diode on Low Side)
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

GT150CL120T1VH

IGBT Module Datasheet



Characteristic diagram

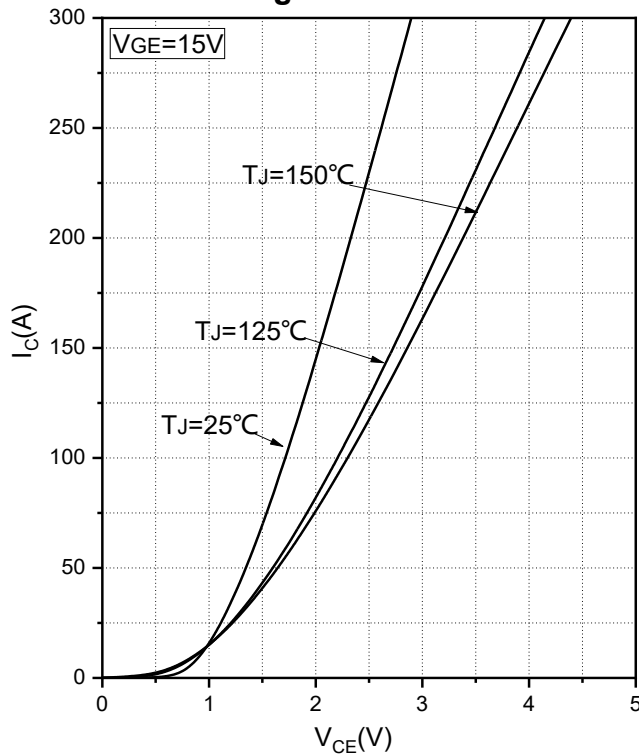


Fig.1 Typical Saturation Voltage Characteristics

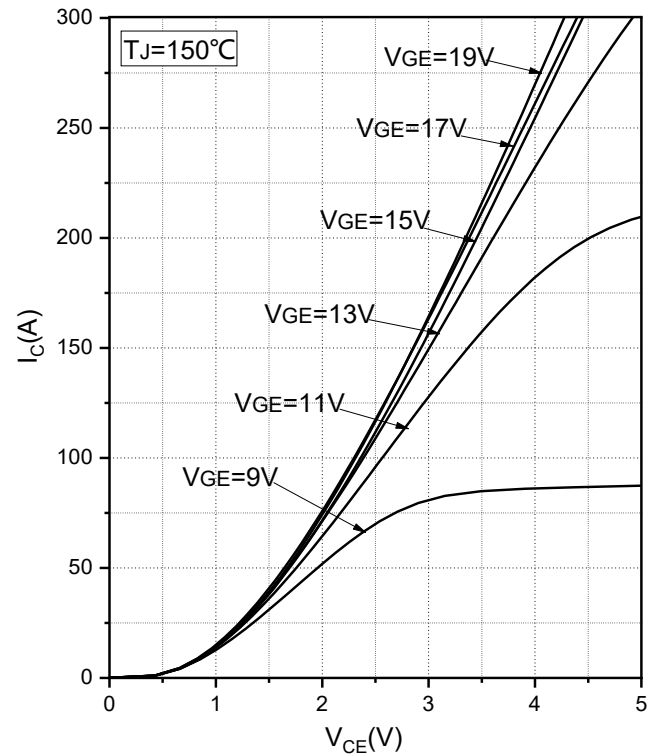


Fig.2 Typical Output Characteristics

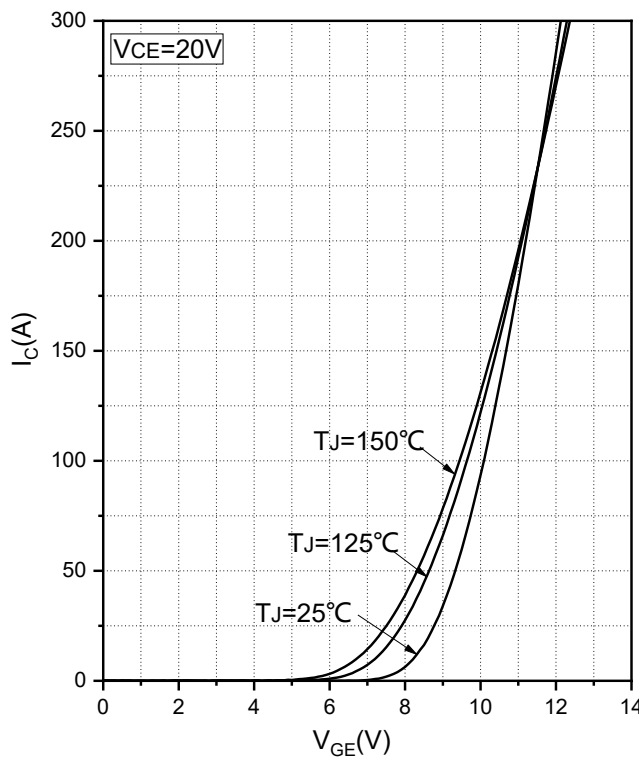


Fig.3 Transfer Characteristic

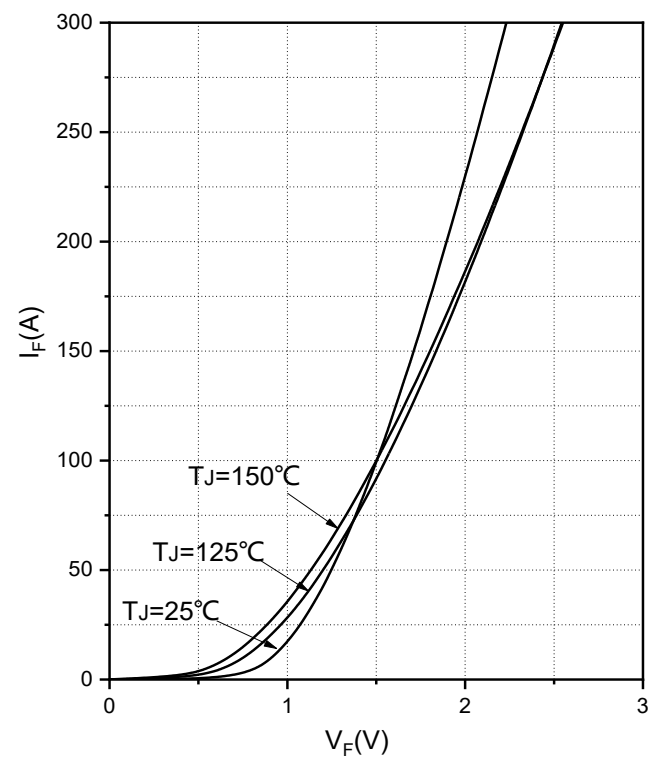


Fig.4 Forward Characteristics of Diode-Chopper

GT150CL120T1VH

IGBT Module Datasheet

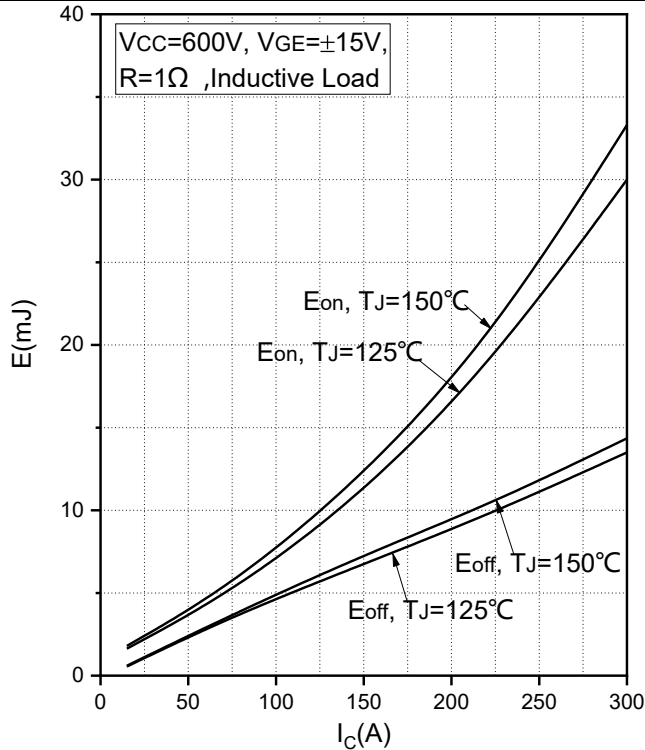


Fig.5 Typical Switching Loss vs. Collector Current

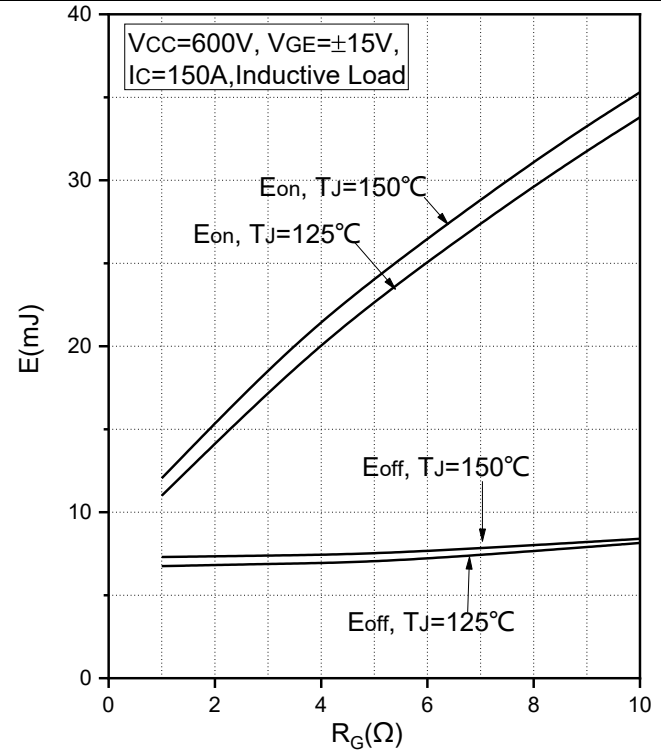


Fig.6 Typical Switching Loss vs. Gate Resistance

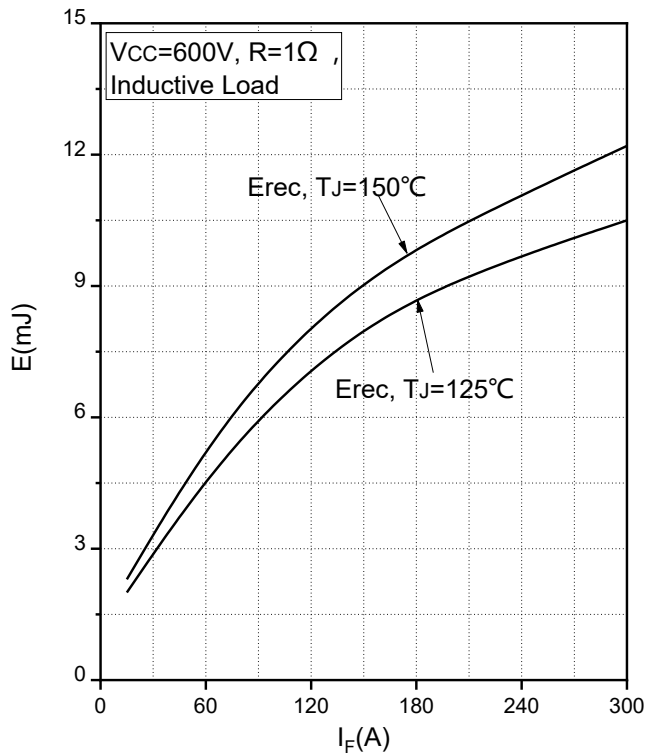


Fig.7 Typical Switching Loss vs. Forward Current of diode-chopper

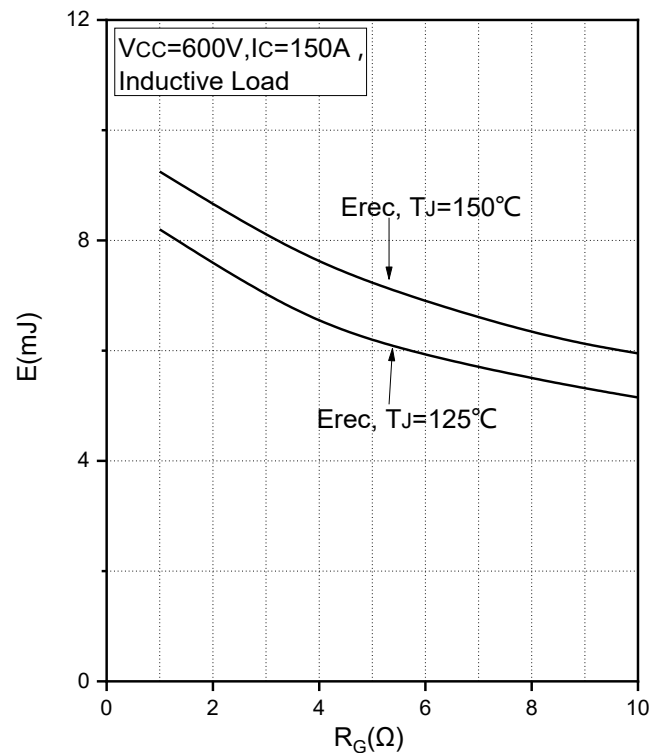


Fig.8 Typical Switching Loss vs. Gate Resistance of diode-chopper

GT150CL120T1VH

IGBT Module Datasheet

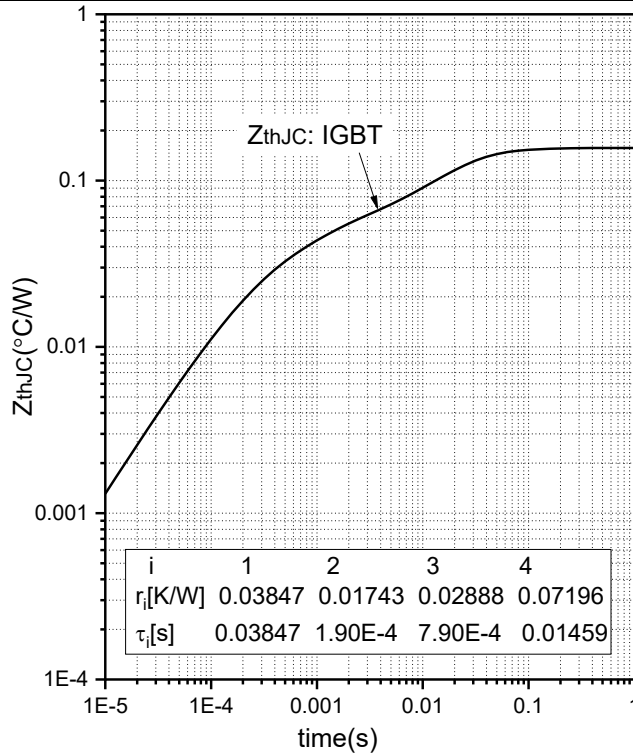


Fig.9 Transient Thermal Impedance (IGBT)

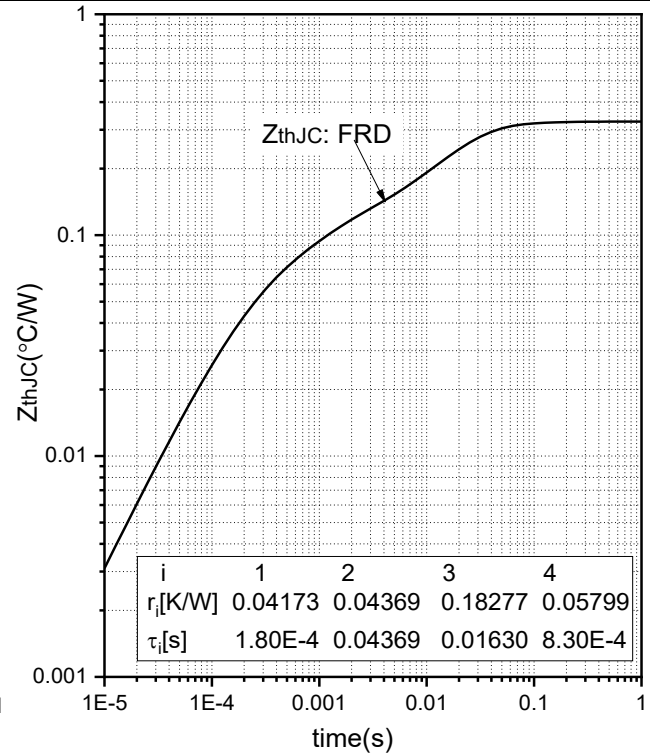


Fig.10 Transient Thermal Impedance (Diode-Chopper)

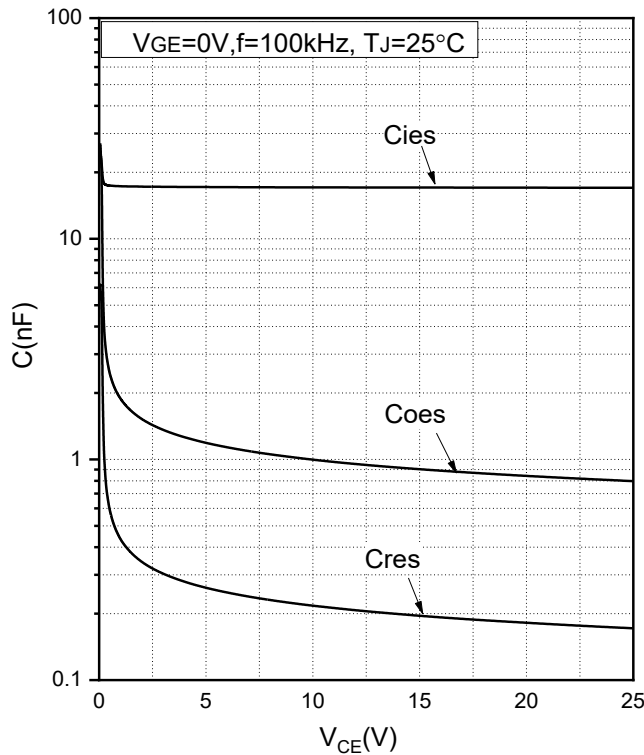


Fig.11 Capacitance Characteristics

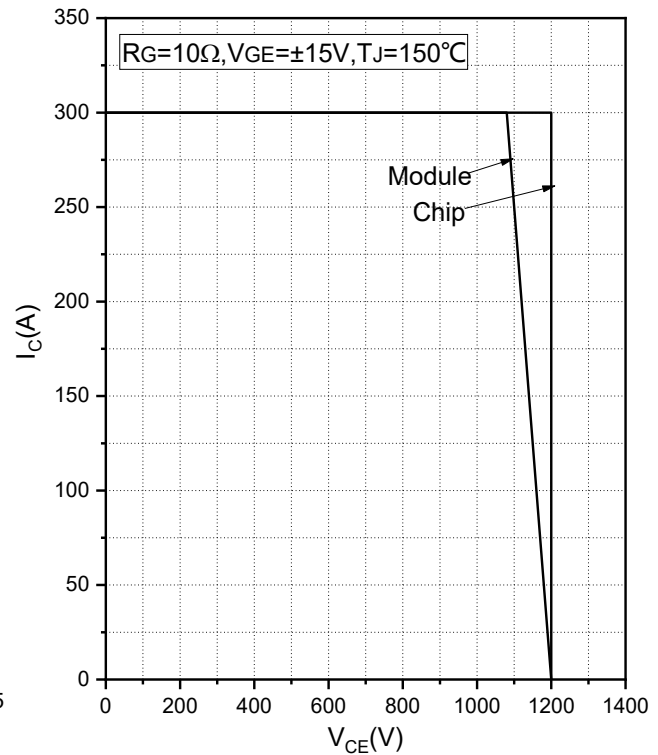
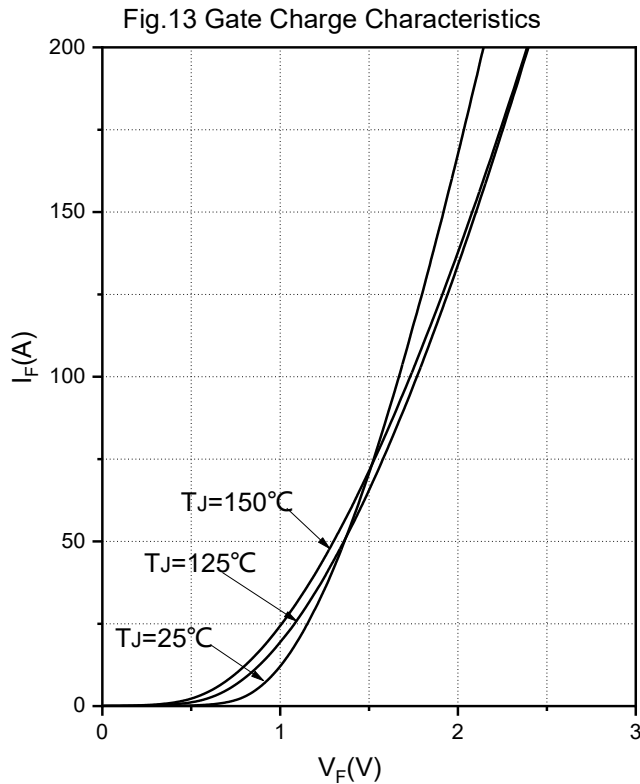
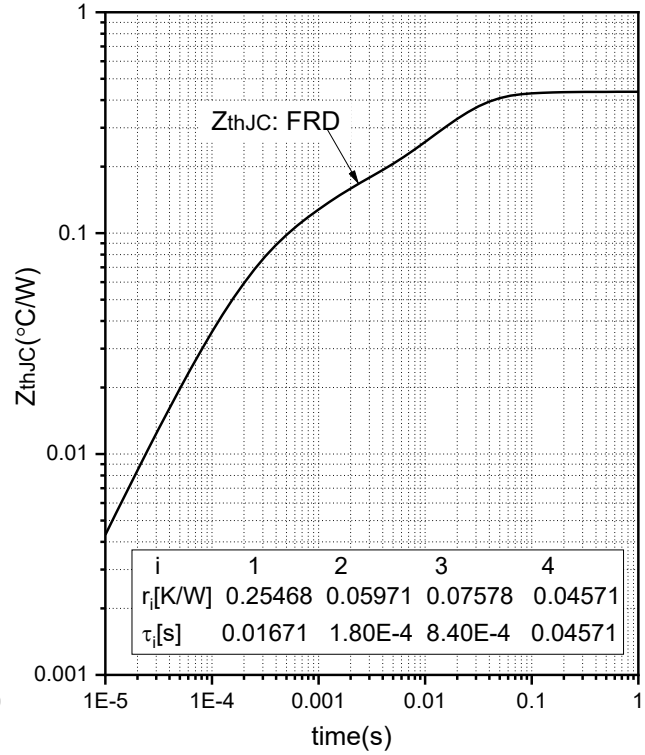
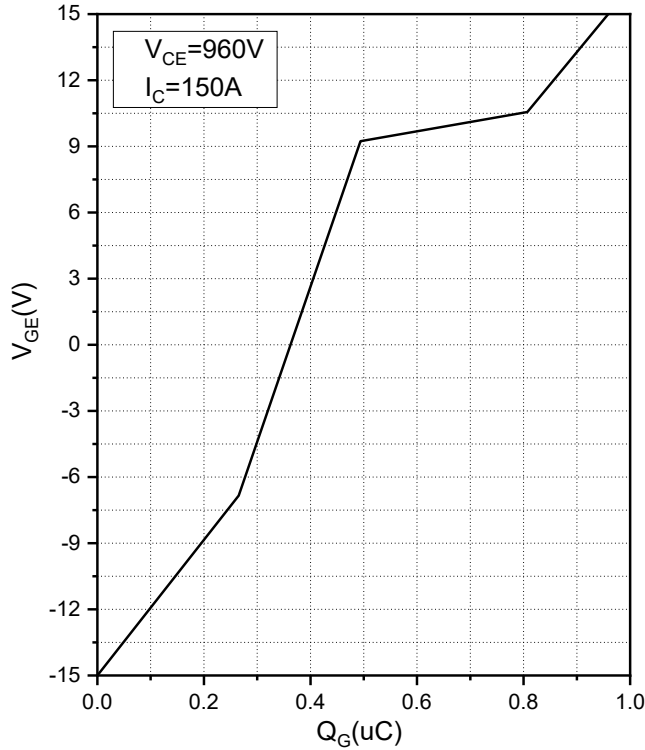


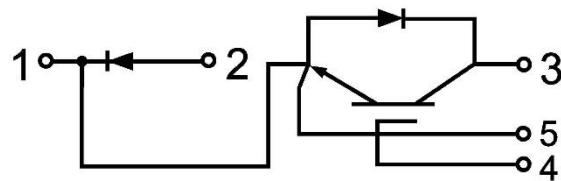
Fig.12 Reverse Bias Safe Operation Area (RBSOA)

GT150CL120T1VH

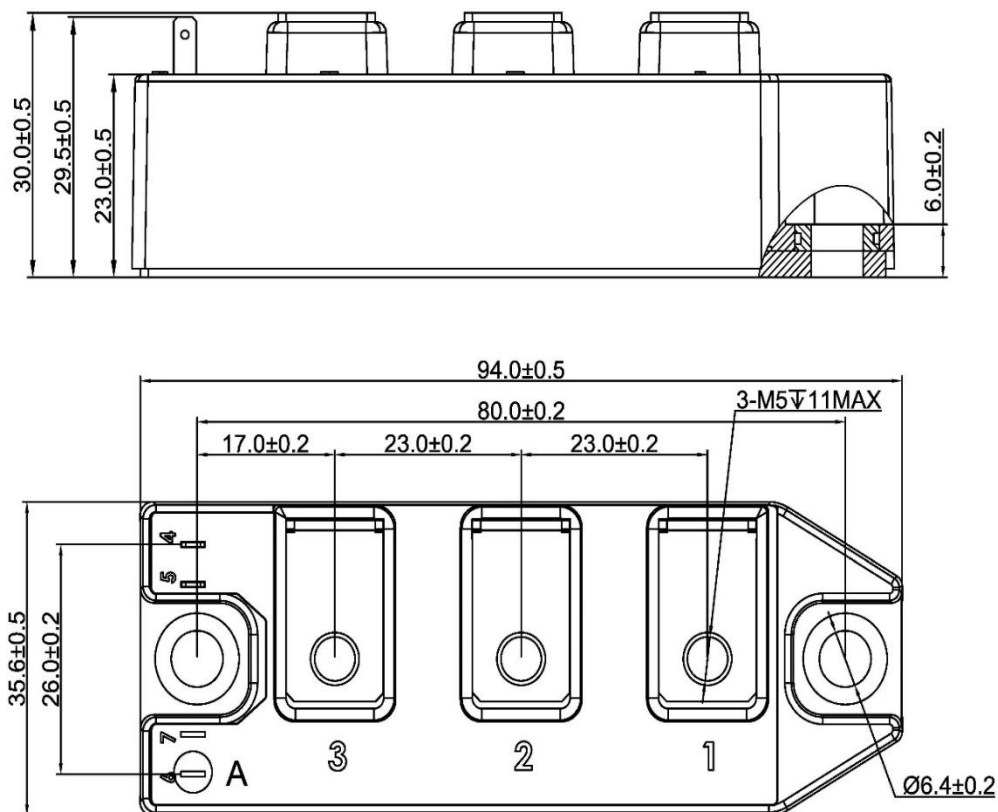
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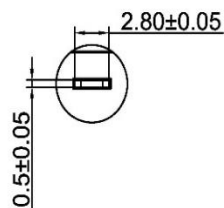
Internal Circuit:



Package Outline (Unit: mm):



View A
scale 3:1





Revision	Notes
02	Engineering Sample Datasheet

Announcement

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