

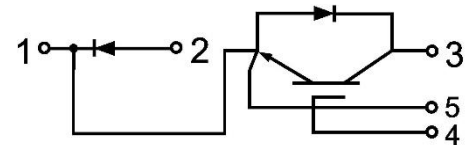
GF300CL120T2NH

Circuit Diagram

IGBT Module

Features:

- $V_{CES}=1200V$ $I_C=300A$ 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:

- High-power Converters
- UPS System
- Motor Drives
- Servo Drives
- Wind Turbines

Type	Package	Marking
GF300CL120T2NH	T2N	GF300CL120T2NH

IGBT, Inverter

Maximum Rated Values ($T_C=25^\circ C$ 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}	$T_C=90^\circ C$	300	A
		$T_C=25^\circ C$	600	A
I_{CM}	Peak Collector Current Repetitive	T_p Limited by T_{Jmax}	600	A
P_D	Maximum Power Dissipation (IGBT)	$T_C=25^\circ C, T_{Jmax}=150^\circ C$	2100	W

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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	$I_C=12\text{mA}$, $V_{CE}=V_{GE}$	5	5.6	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=300\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^{\circ}\text{C}$	3.00	3.60	V
			$T_J=125^{\circ}\text{C}$	3.68		V
			$T_J=150^{\circ}\text{C}$	3.83		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	$V_{GE}=20\text{V}$, $V_{CE}=0\text{V}$, $T_J=25^{\circ}\text{C}$			400	nA
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$		24.3		nF
C_{oes}	Output Capacitance			2.18		nF
C_{res}	Reverse Transfer Capacitance			1.03		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V, I_C=300A,$ $R_{Gon}=4.7\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		332		ns
			$T_J=125^{\circ}C$		336		
			$T_J=150^{\circ}C$		375		
t_r	Rise Time		$T_J=25^{\circ}C$		86		ns
			$T_J=125^{\circ}C$		83		
			$T_J=150^{\circ}C$		83		
$t_{d(off)}$	Turn-off Delay Time		$T_J=25^{\circ}C$		689		ns
			$T_J=125^{\circ}C$		738		
			$T_J=150^{\circ}C$		750		
t_f	Fall Time	$T_J=25^{\circ}C$		34		ns	
		$T_J=125^{\circ}C$		42			
		$T_J=150^{\circ}C$		48			
E_{on}	Turn-on Switching Loss	$V_{CC}=600V, I_C=300A,$ $R_{Gon}=4.7\Omega, V_{GE}=\pm 15V,$ $di/dt=2890A/\mu s(T_J=150^{\circ}C)$ Inductive Load	$T_J=25^{\circ}C$		34		mJ
		$T_J=125^{\circ}C$		41			
		$T_J=150^{\circ}C$		46			

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E _{off}	Turn-off Switching Loss	V _{CC} =600V, I _C =300A, R _{Goff} =4.7Ω, V _{GE} =±15V, du/dt=4400V/μs(T _J =150°C) Inductive Load	T _J =25°C		16		mJ
			T _J =125°C		21		
			T _J =150°C		23		
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C		3.6		uC
R _{G (int)}	Internal Gate Resistance		T _J =25°C		2.3		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)					0.048	°C/W
R _{θCS}	IGBT Thermal Resistance: Case-to-Sink (per IGBT) (per IGBT, λ _{grease} = 1 W/(m · K))				0.027		°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		300	A
I _{FM}	Diode Maximum Forward Current	tp=1ms	600	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 =300A	T _J =25°C		2.71	3.10	V
			T _J =125°C		2.85		
			T _J =150°C		2.76		
t _{rr}	Reverse Recovery Time	I _F =300A, -diF/dt=2800A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C		240		ns
			T _J =125°C		420		
			T _J =150°C		450		
I _{rr}	Peak Reverse Recovery Current		T _J =25°C		148		A
			T _J =125°C		200		
			T _J =150°C		208		
Q _{rr}	Reverse Recovery Charge		T _J =25°C		13		μC
			T _J =125°C		28		
			T _J =150°C		31		

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E _{rec}	Reverse Recovery Energy	I _F =300A, -diF/dt=2800A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C		3.5		mJ
			T _J =125°C		9.0		
			T _J =150°C		10.5		
R _{θJC}	Diode Thermal Resistance: Junction-to-Case (per Diode)				0.111		°C/W
R _{θCS}	Diode Thermal Resistance: Case-to-Sink (per Diode, λ _{grease} = 1 W/(m • K))				0.062		°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		300	A
I_{FM}	Diode Maximum Forward Current	$t_p=1ms$	600	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 =300A	T _J =25°C		2.45	2.85	V
			T _J =125°C		2.52		
			T _J =150°C		2.26		
R _{θJC}	Diode Thermal Resistance: Junction-to-Case (per Diode)					0.137	°C/W
R _{θCS}	Diode Thermal Resistance: Case-to-Sink (per Diode, λ _{grease} = 1 W/(m • K))				0.076		°C/W

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Module

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
V _{iso}	Isolation Voltage (All Terminals Shorted)	f=50Hz, 1minute	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: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	F	300	CL	120	T2N	H
	①	②	③	④	⑤	⑥	⑦

- ① - IGBT Module
- ② - Non Punch Through (NPT) Technology, Fast IGBT
- ③ - Rated Current (300=300A)
- 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)



Characteristic diagram

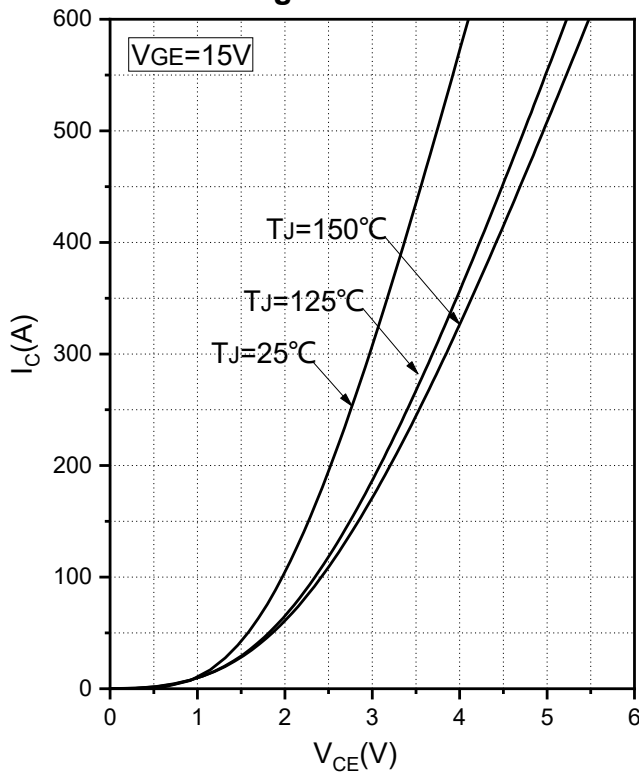


Fig.1 Typical Saturation Voltage Characteristics

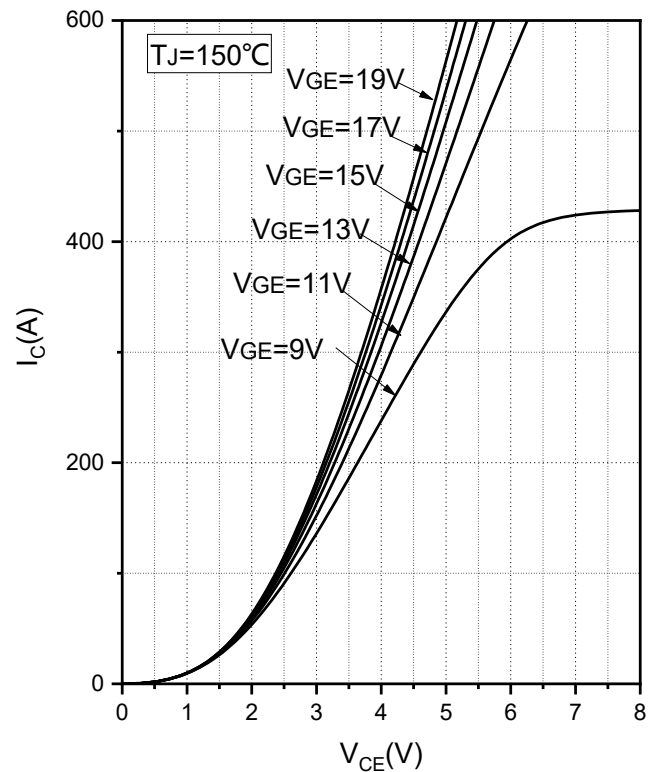


Fig.2 Typical Output Characteristics

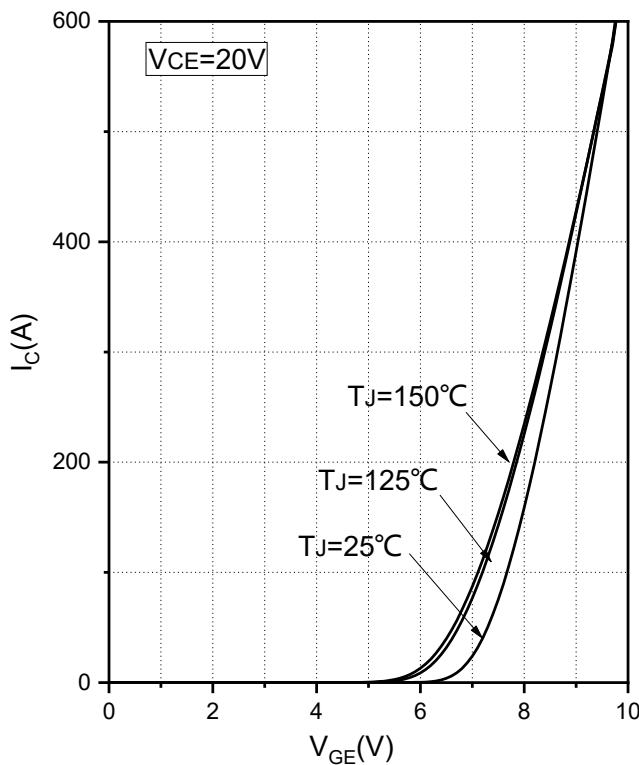


Fig.3 Transfer Characteristic

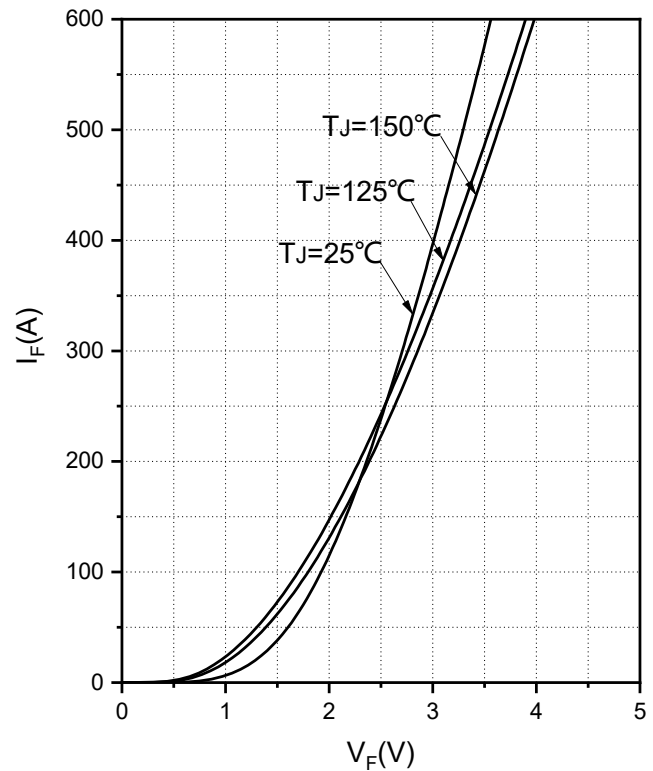


Fig.4 Forward Characteristics of Diode-Chopper

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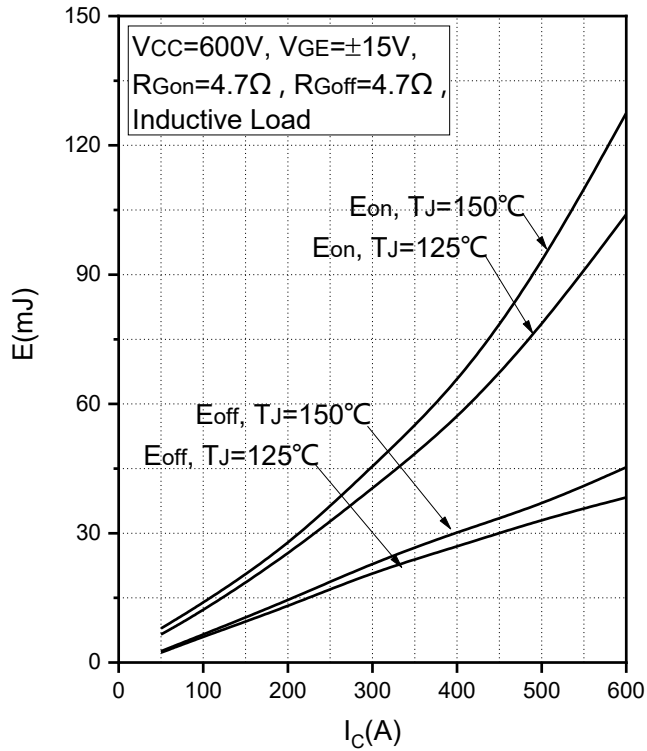


Fig.5 Typical Switching Loss vs. Collector Current

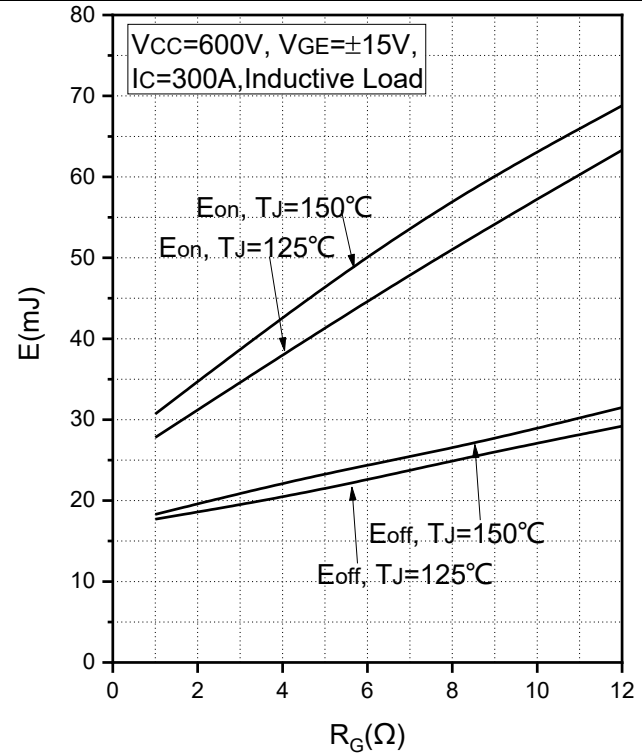


Fig.6 Typical Switching Loss vs. Gate Resistance

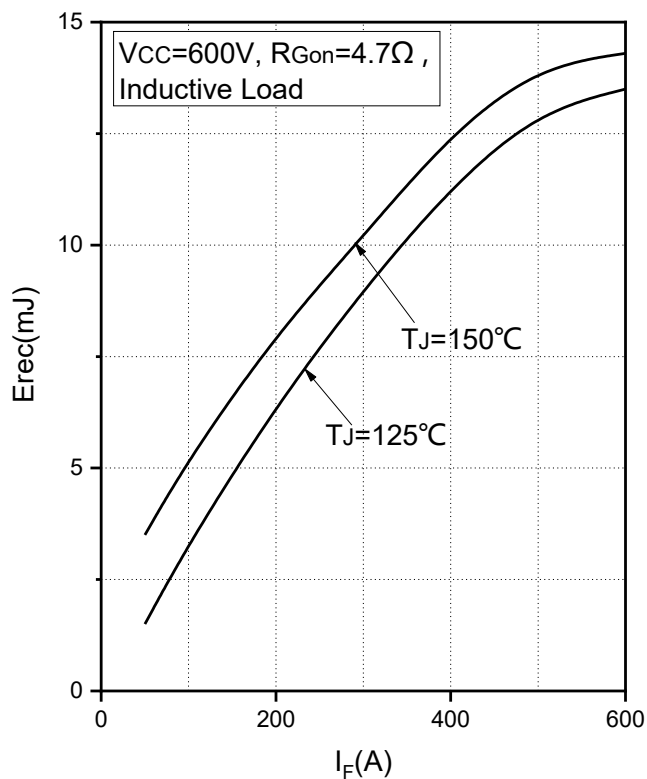


Fig.7 Typical Switching Loss vs. Forward Current of diode-chopper

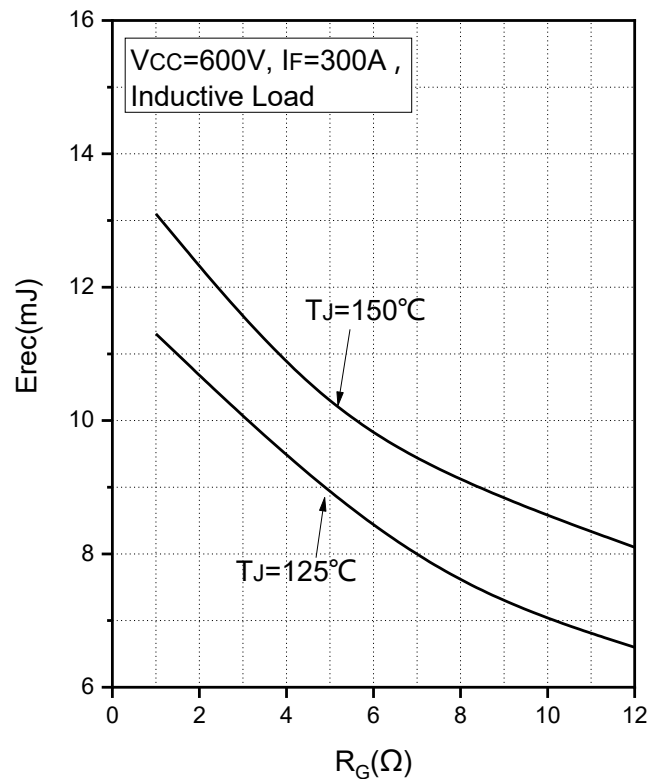


Fig.8 Typical Switching Loss vs. Gate Resistance of diode-chopper

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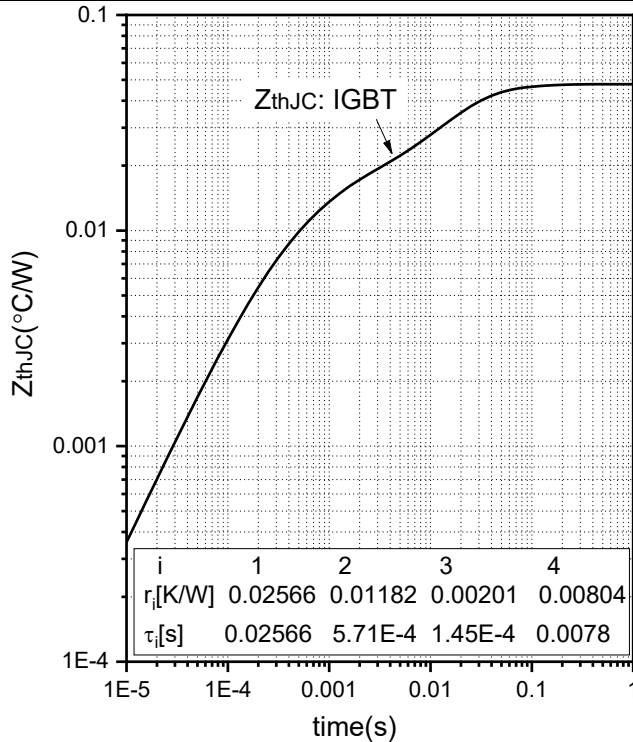


Fig.9 Transient Thermal Impedance (IGBT)

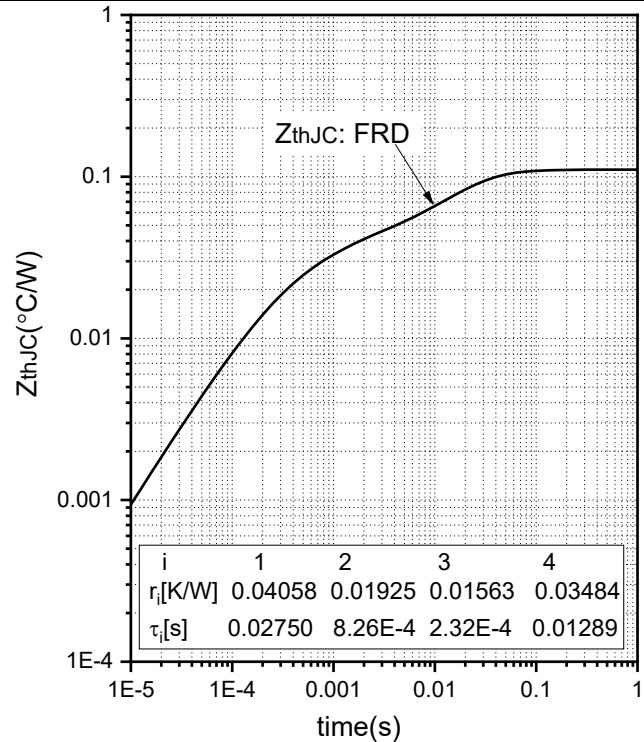


Fig.10 Transient Thermal Impedance (Diode-Chopper)

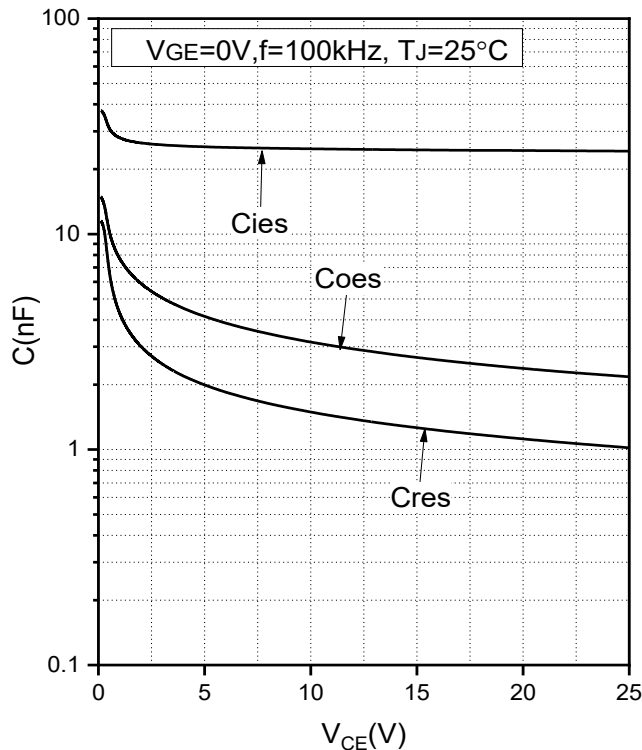


Fig.11 Capacitance Characteristics

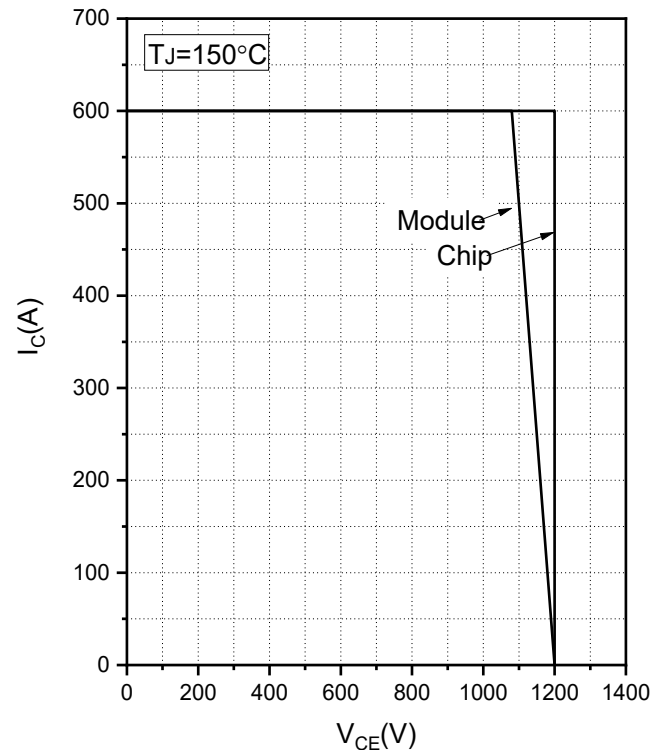


Fig.12 Reverse Bias Safe Operation Area (RBSOA)

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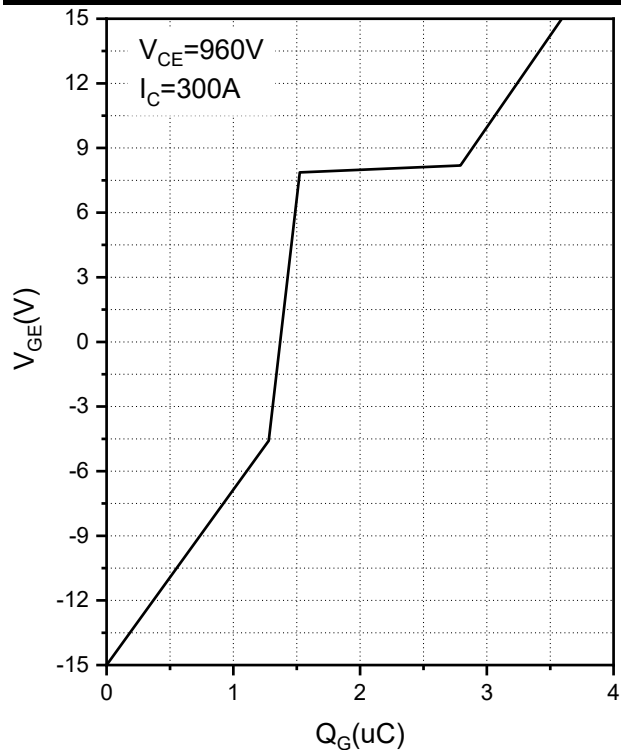


Fig.13 Gate Charge Characteristics

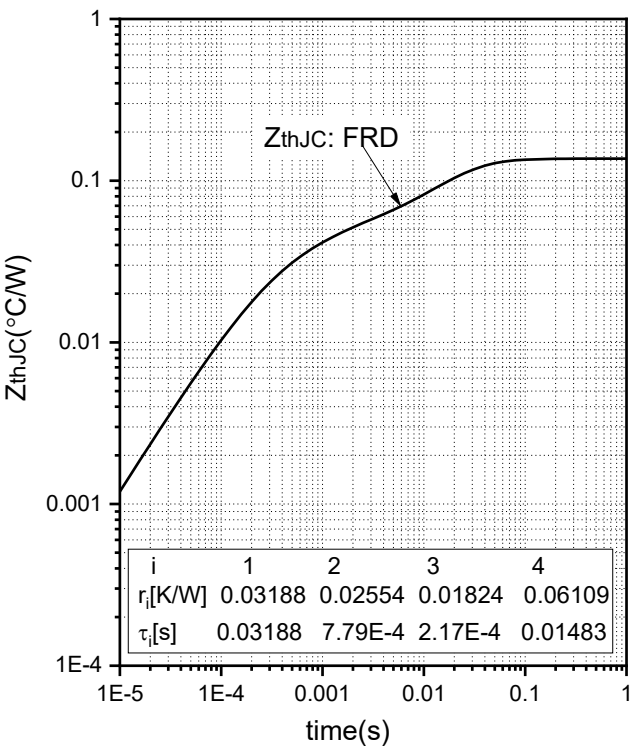
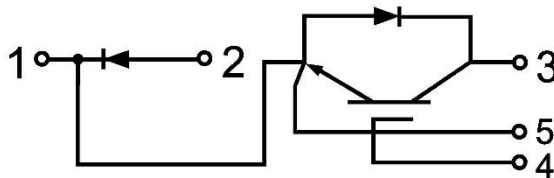


Fig.14 Transient Thermal Impedance (Diode- Reverse)

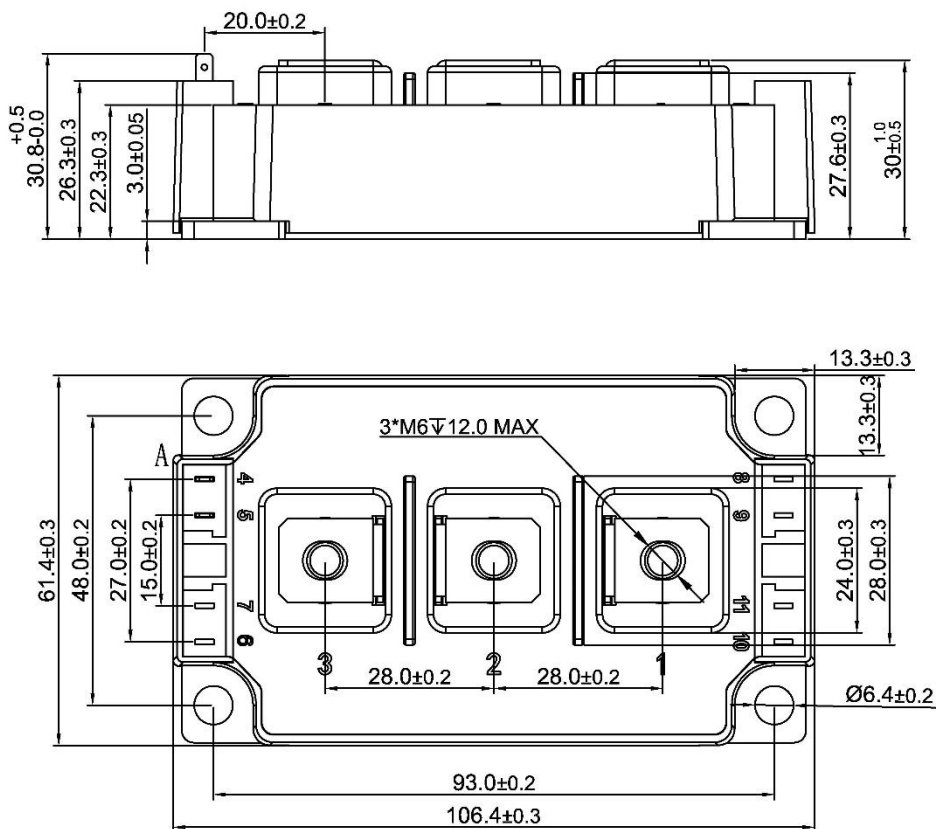
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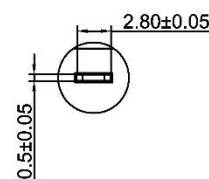
Internal Circuit:



Package Outline (Unit: mm):



View A
scale 3:1



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Revision	Notes
A	Final Datasheet Initial Release

Announcement

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