



GF300CU120T2NH

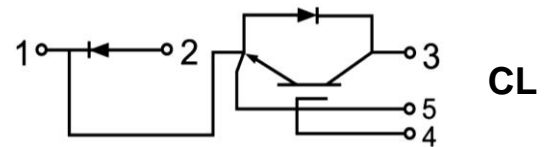
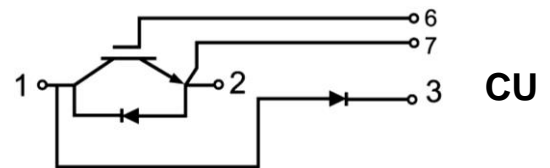
GF300CL120T2NH

IGBT Module

Features:

- Non Punch Through (NPT) Technology
- Short Circuit Rated >10 μ s
- Low Saturation Voltage
- Low Switching Loss
- 100% RBSOA Tested (2xI_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, Brake-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	$T_C=80^\circ\text{C}$	300	A
		$T_C=25^\circ\text{C}$	600	A
I_{CM}	Repetitive Peak Collector Current	$T_J=150^\circ\text{C}$	600	A
t_{SC}	Short Circuit Withstand Time		>10	μ s
P_D	Maximum Power Dissipation per leg	$T_C=25^\circ\text{C}$ $T_{Jmax}=150^\circ\text{C}$	2600	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	$I_C=12\text{mA}$, $V_{CE}=V_{GE}$	5.0	5.8	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=300\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^\circ\text{C}$	3.30	3.65	V
			$T_J=125^\circ\text{C}$	4.15		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	$V_{GE}=\pm 20\text{V}$, $V_{CE}=0\text{V}$, $T_J=25^\circ\text{C}$			300	nA
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$		23.50		nF
C_{oes}	Output Capacitance			1.96		nF
C_{res}	Reverse Transfer Capacitance			1.04		nF

Switching Characteristics

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600\text{V}$, $I_C=300\text{A}$, $R_{Gon}=4.7\Omega$, $V_{GE}=\pm 15\text{V}$, Inductive Load	$T_J=25^\circ\text{C}$		896	ns
			$T_J=125^\circ\text{C}$		910	
t_r	Rise Time		$T_J=25^\circ\text{C}$		182	ns
			$T_J=125^\circ\text{C}$		177	
$t_{d(off)}$	Turn-off Delay Time		$T_J=25^\circ\text{C}$		835	ns
			$T_J=125^\circ\text{C}$		871	
t_f	Fall Time	$T_J=25^\circ\text{C}$		92	ns	
		$T_J=125^\circ\text{C}$		118		
E_{on}	Turn-on Switching Loss	$T_J=25^\circ\text{C}$		23.4	mJ	
		$T_J=125^\circ\text{C}$		30.9		
E_{off}	Turn-off Switching Loss	$T_J=25^\circ\text{C}$		23.0	mJ	
		$T_J=125^\circ\text{C}$		26.8		
Q_g	Total Gate Charge	$V_{GE}=+15\text{V} \dots -15\text{V}$	$T_J=25^\circ\text{C}$	2.96		μC
R_g	Gate Resistance		$T_J=25^\circ\text{C}$	2.30		Ω
RBSOA	$I_C=600\text{A}$, $V_{CC}=1050\text{V}$, $V_p=1200\text{V}$, $R_G=4.7\Omega$, $V_{GE}=+15\text{V}$ to 0V , $T_J=125^\circ\text{C}$		Trapezoid			
I_{SC}	$V_{CC}=600\text{V}$, $t_p=10\mu\text{s}$, $V_{GE}=\pm 15\text{V}$, $R_G=6.8\Omega$, $T_J=125^\circ\text{C}$			2660		A
$R_{\theta JC}$	Thermal Resistance: Junction-to-Case (per IGBT)				0.048	$^\circ\text{C/W}$



Diode, Reverse

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

V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	Diode Continuous Forward Current	200	A
I_{FM}	Diode Maximum Forward Current	400	A

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

Symbol	Description	Conditions		Min.	Typ.	Max.	Units	
V_{FM}	Forward Voltage	$I_F=200\text{A}$	$T_J=25^\circ\text{C}$		2.50	2.75	V	
			$T_J=125^\circ\text{C}$		2.60			
t_{rr}	Reverse Recovery Time	$I_F=200\text{A}$, $-di_F/dt=1410\text{A}/\mu\text{s}(T_J=125^\circ\text{C})$, $V_{rr}=600\text{V}$, $V_{GE}=-15\text{V}$	$T_J=25^\circ\text{C}$		132		ns	
			$T_J=125^\circ\text{C}$		330			
I_{rr}	Peak Reverse Recovery Current		$T_J=25^\circ\text{C}$		66		A	
			$T_J=125^\circ\text{C}$		95			
Q_{rr}	Reverse Recovery Charge		$T_J=25^\circ\text{C}$		5.8		μC	
			$T_J=125^\circ\text{C}$		14.9			
E_{rec}	Reverse Recovery Energy		$T_J=25^\circ\text{C}$		2.0		mJ	
			$T_J=125^\circ\text{C}$		5.0			
$R_{\theta JC}$	Thermal Resistance: Junction-to-Case (per Diode)					0.166	$^\circ\text{C}/\text{W}$	

Diode, Brake-Chopper

Maximum Rated Values ($T_C=25^\circ\text{C}$ unless otherwise specified)

V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	Diode Continuous Forward Current	300	A
I_{FM}	Diode Maximum Forward Current	600	A



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

Symbol	Description	Conditions		Min.	Typ.	Max.	Units	
V_{FM}	Forward Voltage	$I_F=300\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^{\circ}\text{C}$		2.85	3.15	V	
			$T_J=125^{\circ}\text{C}$		3.05			
t_{rr}	Reverse Recovery Time	$I_F=300\text{A}$, $di/dt=1850\text{A}/\mu\text{s}$ ($T_J=125^{\circ}\text{C}$), $V_{rr}=600\text{V}$, $V_{GE}=-15\text{V}$	$T_J=25^{\circ}\text{C}$		156		ns	
			$T_J=125^{\circ}\text{C}$		288			
I_{rr}	Peak Reverse Recovery Current		$T_J=25^{\circ}\text{C}$		106		A	
			$T_J=125^{\circ}\text{C}$		150			
Q_{rr}	Reverse Recovery Charge		$T_J=25^{\circ}\text{C}$		10.0		μC	
			$T_J=125^{\circ}\text{C}$		21.7			
E_{rec}	Reverse Recovery Energy		$T_J=25^{\circ}\text{C}$		3.9		mJ	
			$T_J=125^{\circ}\text{C}$		8.0			
$R_{\theta JC}$	Thermal Resistance: Junction-to-Case (per Diode)					0.129	$^{\circ}\text{C}/\text{W}$	

Module

Symbol	Description	Min.	Typ.	Max.	Units
V_{iso}	Isolation Voltage (All Terminals Shorted)	$f=50\text{Hz}$, 30s		4500	V
L_{sCE}	Stray Inductance Module		20		nH
T_J	Maximum Junction Temperature			150	$^{\circ}\text{C}$
T_{JOP}	Maximum Operating Junction Temperature Range	-40		+125	$^{\circ}\text{C}$
T_{stg}	Storage Temperature	-40		+125	$^{\circ}\text{C}$
CTI	Comparative Tracking Index	200			
$R_{\theta CS}$	Case-to-Sink Thermally (Conductive Grease Applied)			0.03	$^{\circ}\text{C}/\text{W}$
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	CU	120	T2N	H
	①	②	③	④	⑤	⑥	⑦

- ① - IGBT Module
- ② - NPT, Fast 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)

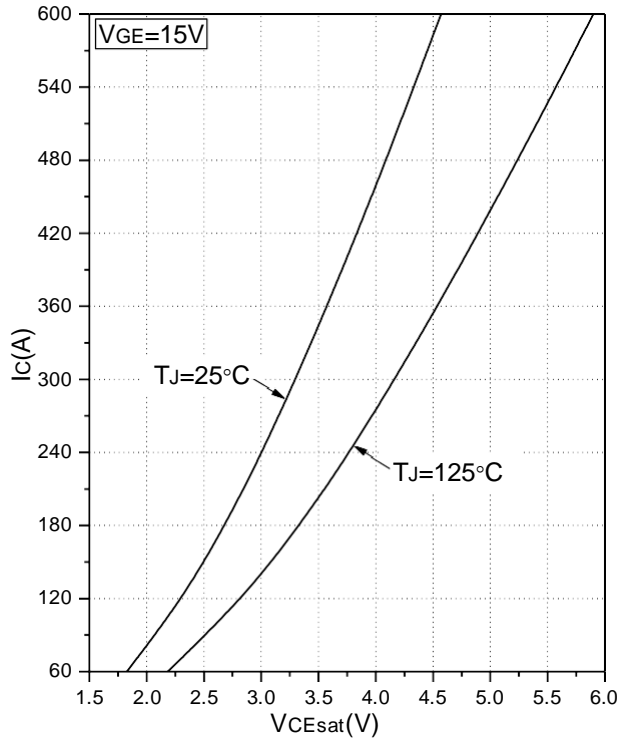


Fig.1 Typical Saturation Voltage Characteristics

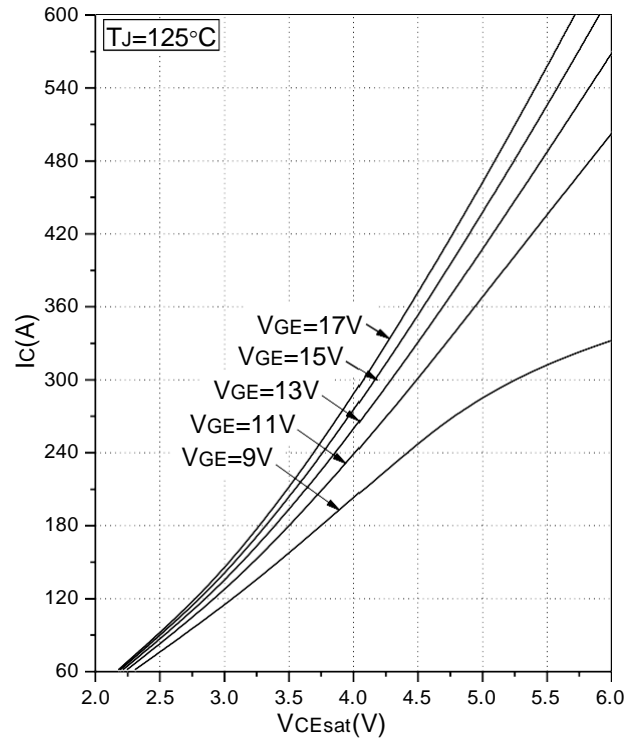


Fig.2 Typical Output Characteristics

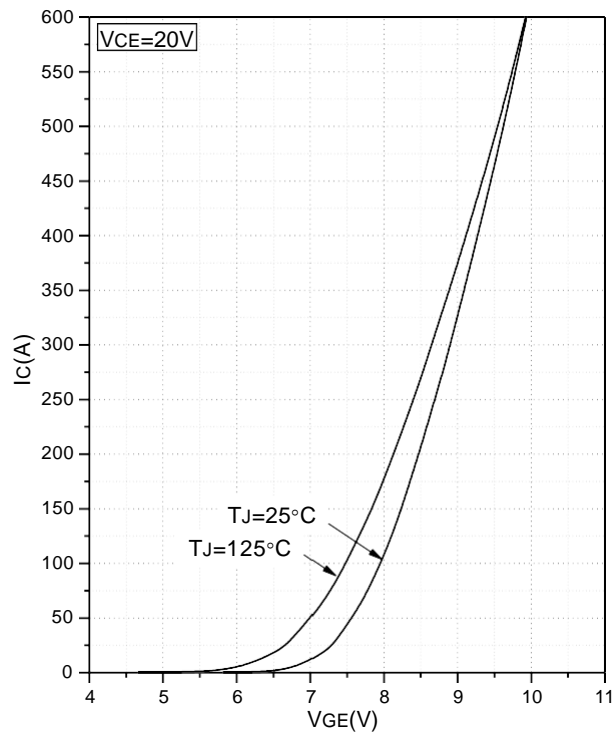


Fig.3 Transfer Characteristic

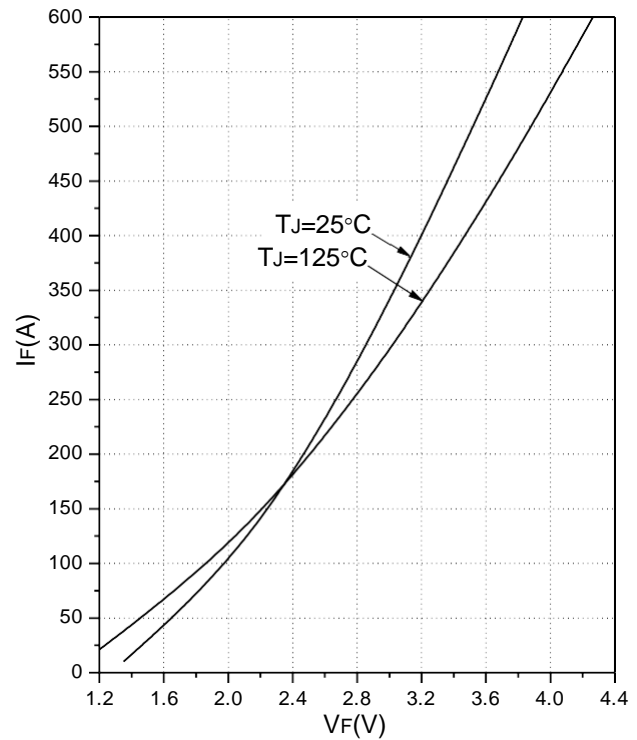


Fig.4 Forward Characteristics of Diode (Diode, Chopper)

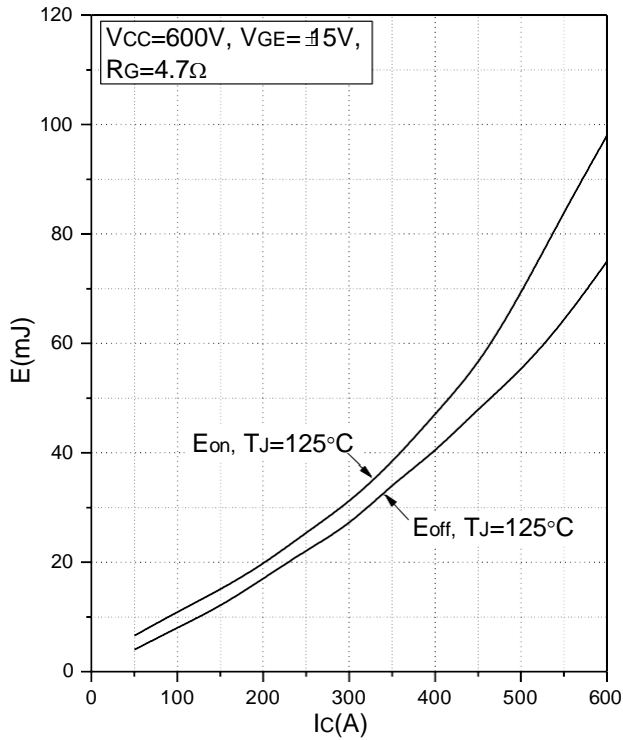


Fig.5 Typical Switching Loss vs. Collector Current

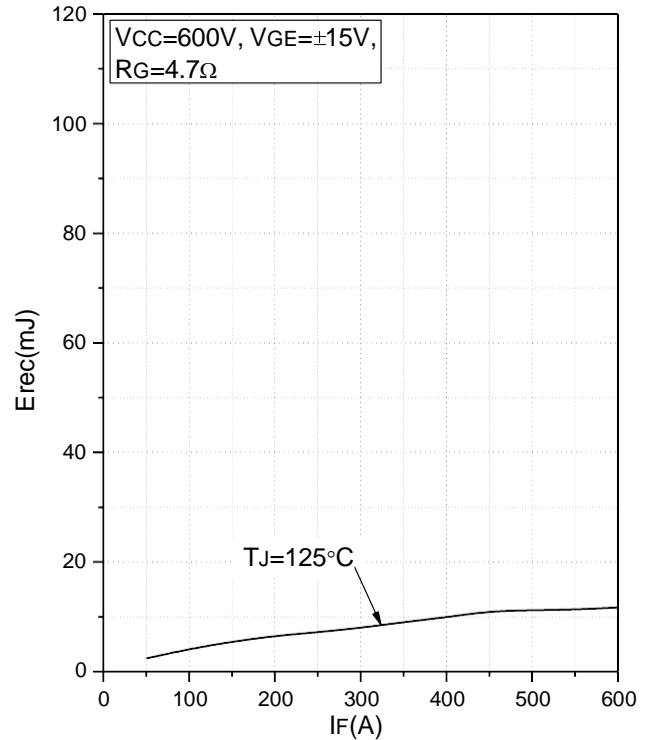


Fig.6 Typical Switching Loss vs. Forward Current (Diode, Chopper)

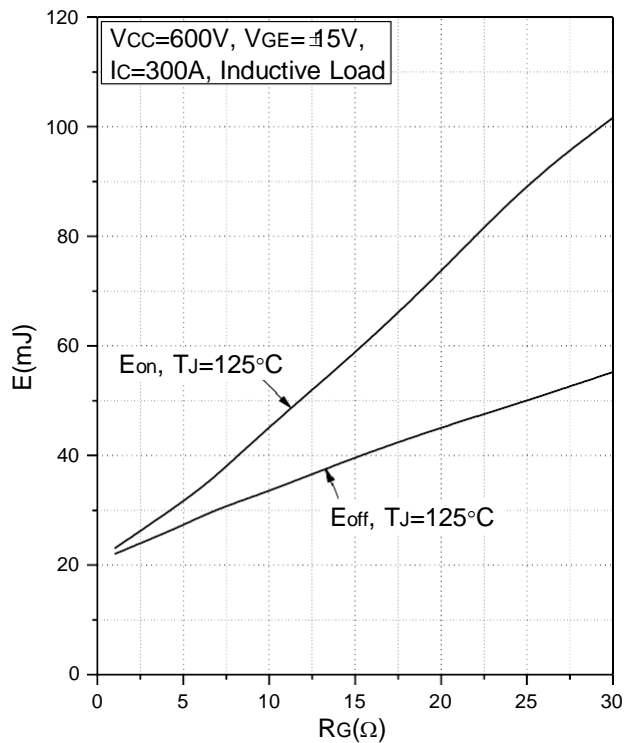


Fig.7 Typical Switching Loss vs. Gate Resistance

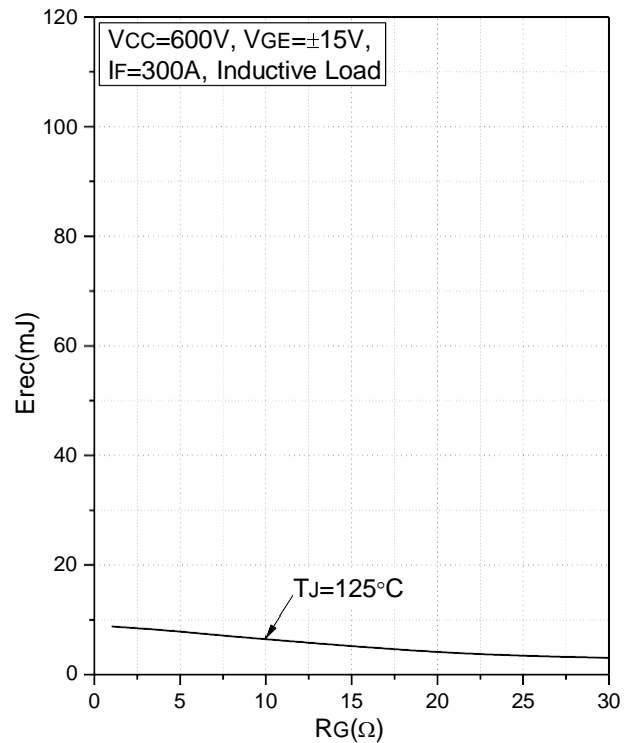


Fig.8 Typical Switching Loss vs. Gate Resistance (Diode, Chopper)

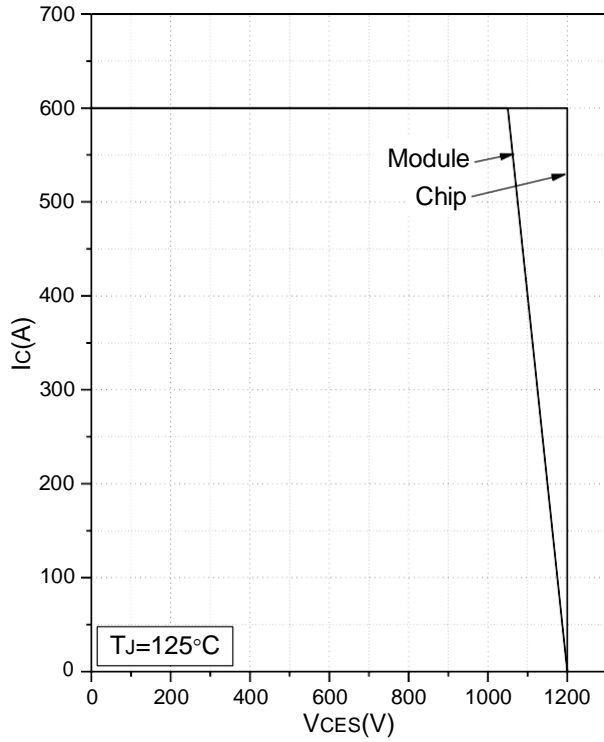


Fig.9 Reverse Bias Safe Operation Area (RBSOA)

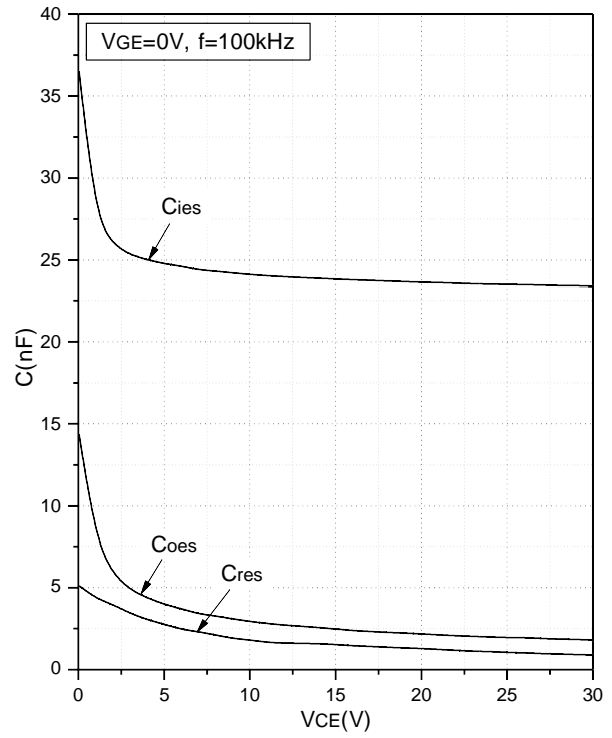


Fig.10 Capacitance Characteristics

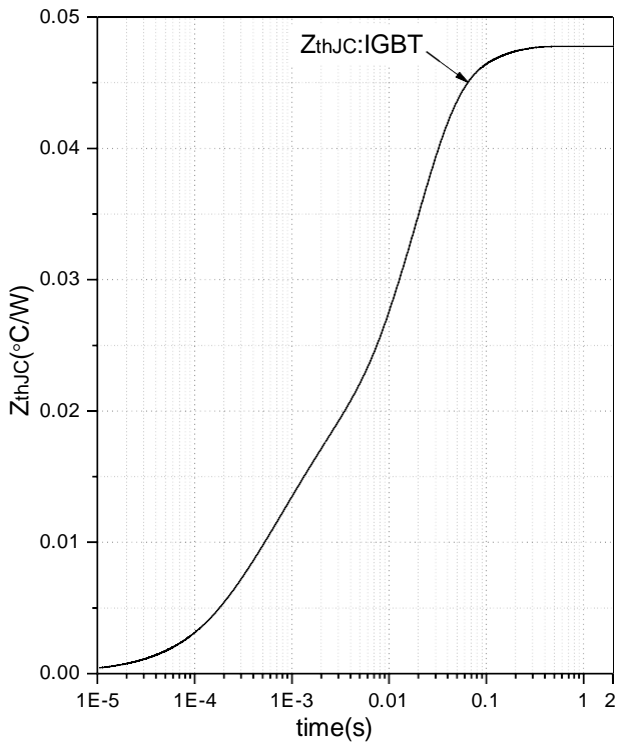


Fig.11 Transient Thermal Impedance (IGBT)

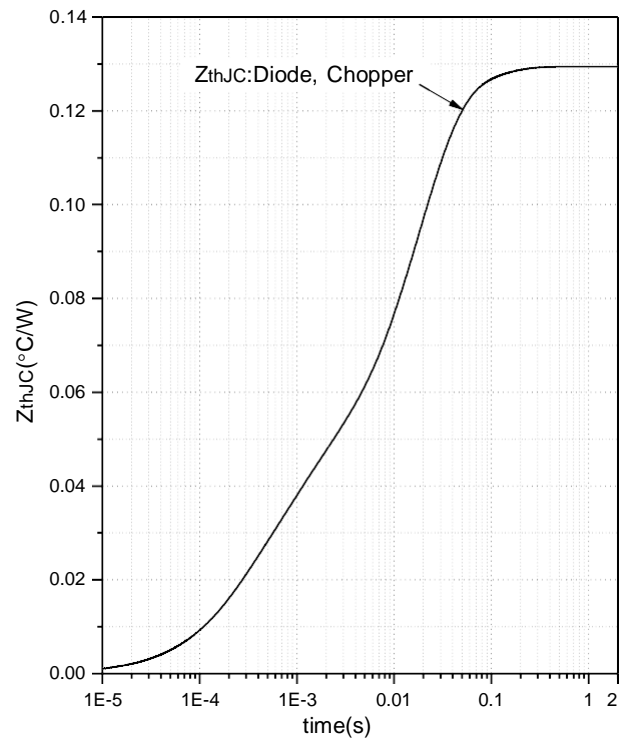


Fig.12 Transient Thermal Impedance (Diode, Chopper)

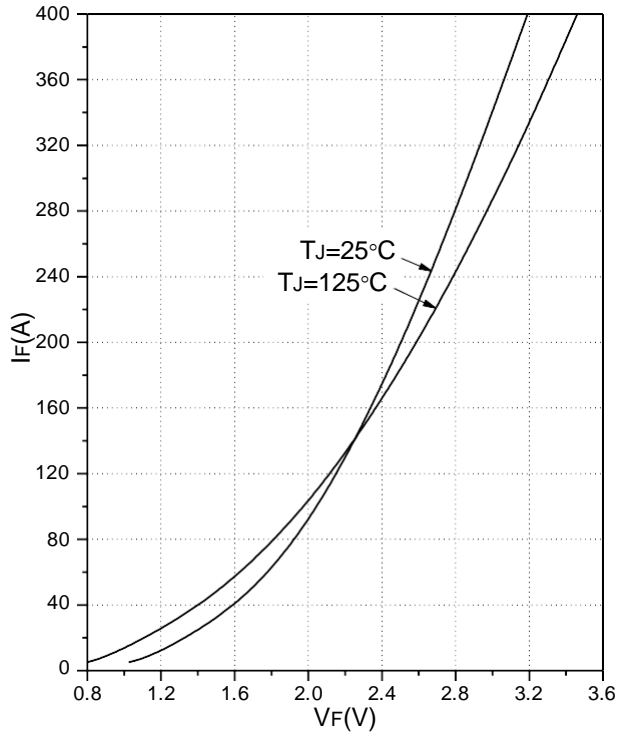


Fig.13 Forward Characteristics of Diode (Diode, Reverse)

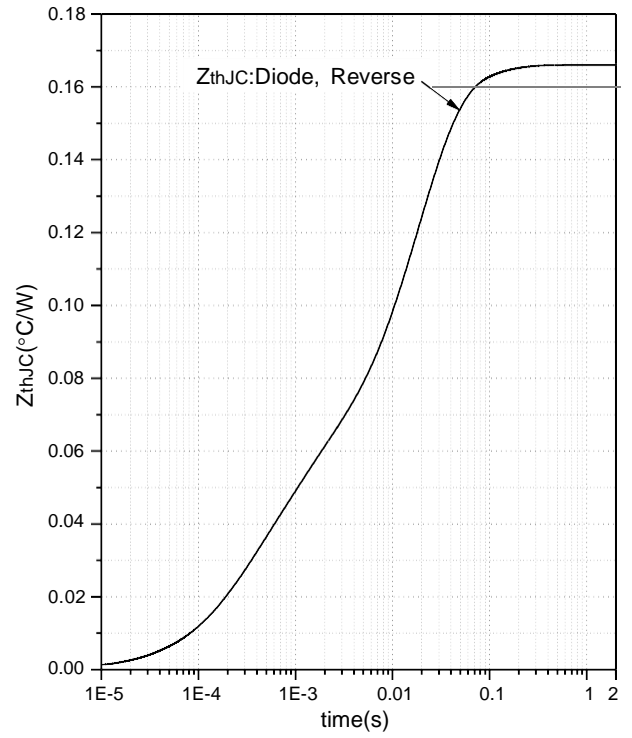
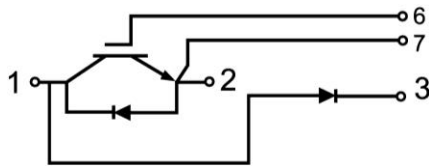


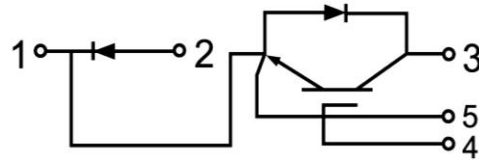
Fig.14 Transient Thermal Impedance (Diode, Reverse)



Internal Circuit

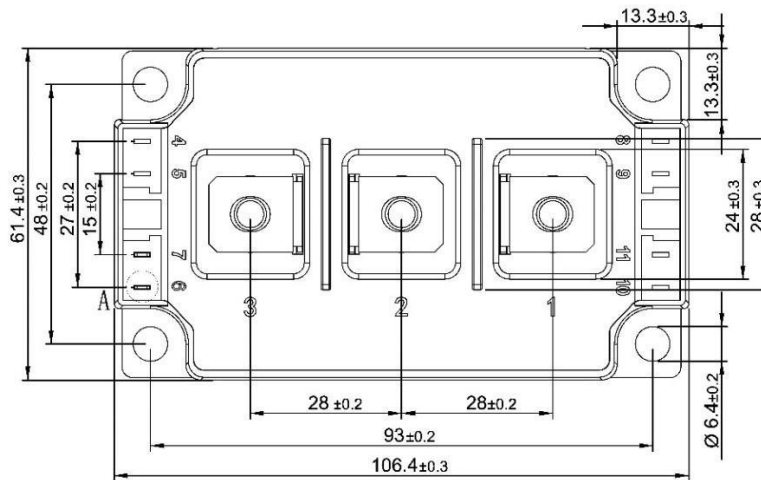
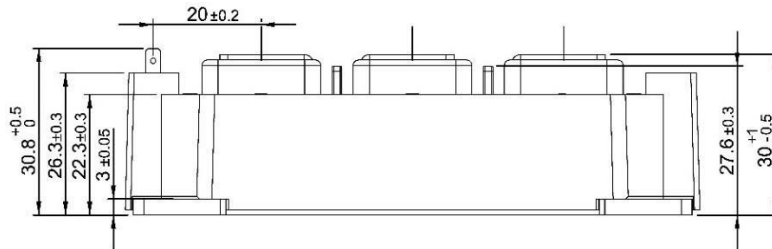


CU

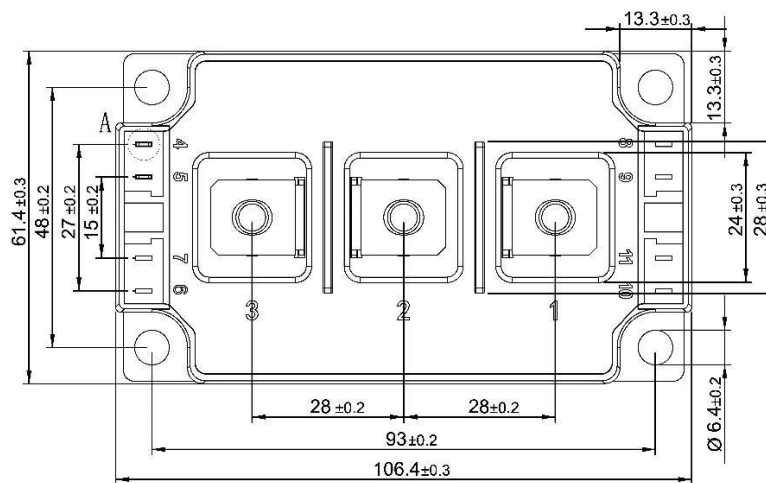


CL

Package Outline (Unit: mm):



CU



CL



Date	Revision	Notes
10/30/2023	A	Final Version

Announcements

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