



GF300HF120T2NH

GF300CC120T2NH

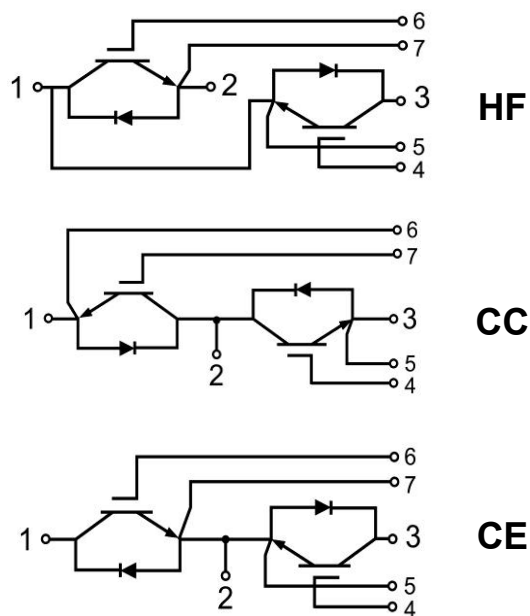
GF300CE120T2NH

IGBT Module

Features:

- NPT Technology
- Short Circuit Rated >10 μ 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:

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

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		$\pm$ 20	V
I _C	Continuous Collector Current	T _C =80 $^{\circ}$ C	300	A
		T _C =25 $^{\circ}$ C	600	A
I _{CM}	Repetitive Pulse Collector Current	T _J =150 $^{\circ}$ C	600	A
t _{sc}	Short Circuit Withstand Time		>10	μ s
P _D	Maximum Power Dissipation per leg	T _C =25 $^{\circ}$ C T _{Jmax} =150 $^{\circ}$ C	2625	W



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

Static Characteristics

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=12\text{mA}$, $V_{CE}=V_{GE}$	5.00	5.90	6.50	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=300\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^{\circ}\text{C}$	3.15	3.50	V
			$T_J=125^{\circ}\text{C}$	3.90		V
			$T_J=150^{\circ}\text{C}$	4.05		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	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$		22.89		nF
C_{oes}	Output Capacitance			2.13		nF
C_{res}	Reverse Transfer Capacitance			1.05		nF

Switching Characteristics

Switching Characteristics							
Symbol	Description	Conditions		Min.	Typ.	Max.	Units
$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V, I_C=300A,$ $R_{Gon}=2.7\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		563		ns
			$T_J=125^{\circ}C$		564		
			$T_J=150^{\circ}C$		573		
t_r	Rise Time		$T_J=25^{\circ}C$		110		ns
			$T_J=125^{\circ}C$		109		
			$T_J=150^{\circ}C$		109		
$t_{d(off)}$	Turn-off Delay Time		$T_J=25^{\circ}C$		544		ns
			$T_J=125^{\circ}C$		572		
			$T_J=150^{\circ}C$		585		
t_f	Fall Time	$T_J=25^{\circ}C$		144		ns	
		$T_J=125^{\circ}C$		159			
		$T_J=150^{\circ}C$		170			
E_{on}	Turn-on Switching Loss	$V_{CC}=600V, I_C=300A,$ $R_{Gon}=2.7\Omega, V_{GE}=\pm 15V,$ $di/dt=2430A/\mu s(T_J=150^{\circ}C)$ Inductive Load	$T_J=25^{\circ}C$		21.9		mJ
		$T_J=125^{\circ}C$		25.8			
		$T_J=150^{\circ}C$		28.2			



E _{off}	Turn-off Switching Loss	V _{CC} =600V, I _C =300A, R _{Goff} =2.7Ω, V _{GE} =±15V, du/dt=4320V/μs(T _J =150℃) Inductive Load	T _J =25℃		12.6		mJ
			T _J =125℃		16.8		
			T _J =150℃		17.7		
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25℃		3.3		μC
R _g	Gate Resistance		T _J =25℃		1.2		Ω
RBSOA	Reverse Bias Safe Operation Area	I _C =600A, V _{CC} =1050V, V _p =1200V, R _G =2.7Ω, V _{GE} =+15V to 0V, T _J =150℃		Trapezoid			
SC Data	V _{CC} =600V, t _p =10us, V _{GE} =+/-15V, R _{Gon} =2.7 Ω, R _{Goff} = 2.7Ω, T _J =150℃			10			μs
R _{θJC}	IGBT Thermal Resistance: Junction-to-Case					0.047	℃/W

Diode, Inverter

Maximum Rated Values(T_C=25°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°C unless otherwise specified)

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V _{FM}	Forward Voltage	I _F =300A	T _J =25℃		2.70		V
			T _J =125℃		2.80		
			T _J =150℃		2.70		
t _{rr}	Reverse Recovery Time	I _F =300A, -di/dt=3210A/μs(T _J =150℃), V _{rr} =600V, V _{GE} =-15V	T _J =25℃		132		ns
			T _J =125℃		265		
			T _J =150℃		314		
I _{rr}	Peak Reverse Recovery Current		T _J =25℃		117.3		A
			T _J =125℃		164.1		
			T _J =150℃		173.4		
Q _{rr}	Reverse Recovery Charge		T _J =25℃		8.4		μC
			T _J =125℃		18.3		
			T _J =150℃		22.2		



E _{rec}	Reverse Recovery Energy	I _F =300A, -di/dt=3210A/μs(T _J =150℃), V _{rr} =600V, V _{GE} =-15V	T _J =25℃		3.24		mJ
			T _J =125℃		7.14		
			T _J =150℃		8.73		
R _{θJC}	Diode Thermal Resistance: Junction-to-Case					0.138	℃/W

Module

Symbol	Description		Min.	Typ.	Max.	Units
V _{iso}	Isolation Voltage (All Terminals Shorted)	f=50Hz, 1minute	2500			V
T _J	Maximum Junction Temperature				150	℃
T _{JOP}	Maximum Operating Junction Temperature Range		-40		+125	℃
T _{stg}	Storage Temperature		-40		+125	℃
CTI	Comparative Tracking Index		200			
R _{θCS}	Case-to-Sink Thermally (Conductive Grease Applied)				0.03	℃/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	HF	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: HF(Half Bridge)
CC(Common Collector)
CE(Common Emitter)
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

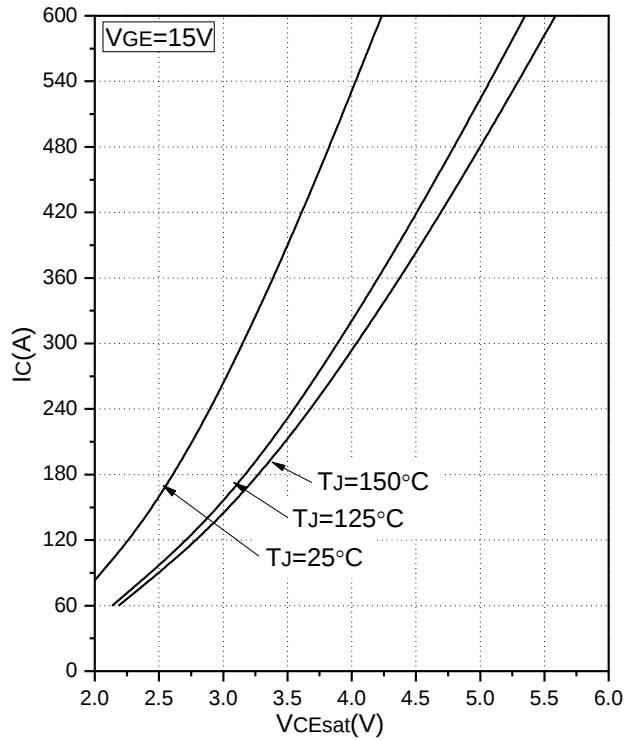


Fig.1 Typical Saturation Voltage Characteristics

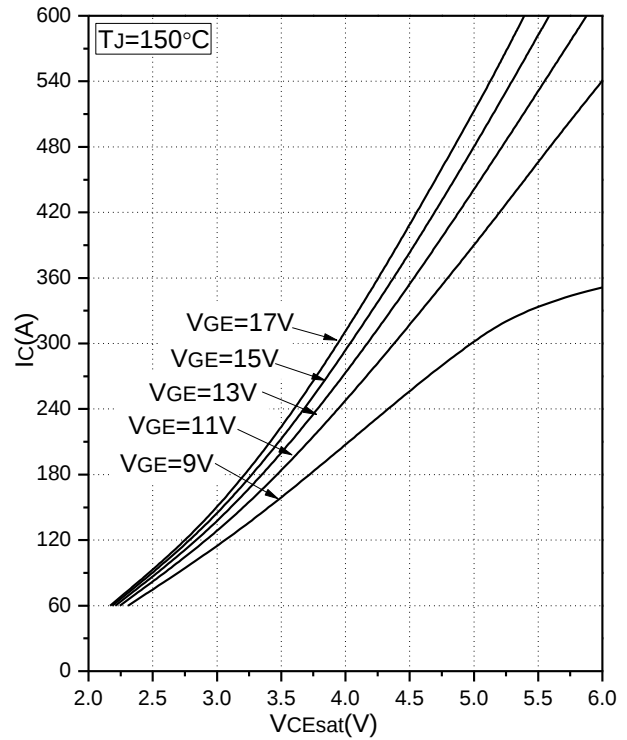


Fig.2 Typical Output Characteristics

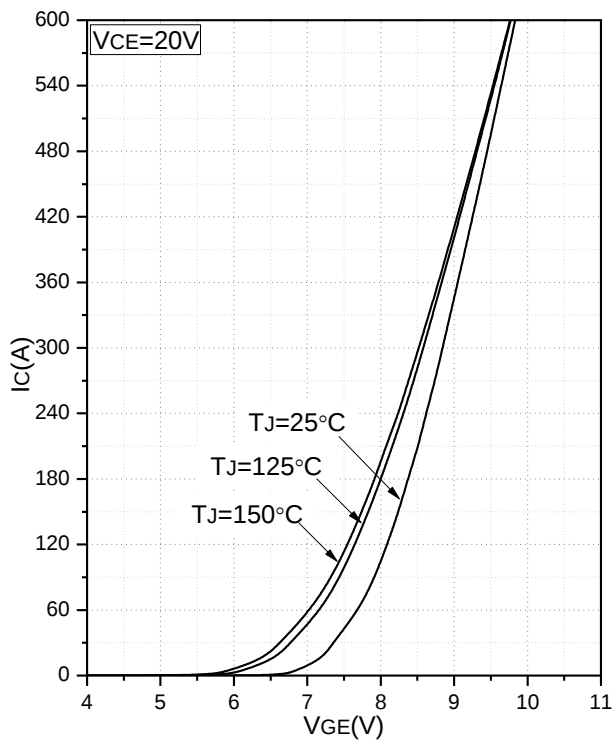


Fig.3 Transfer Characteristic

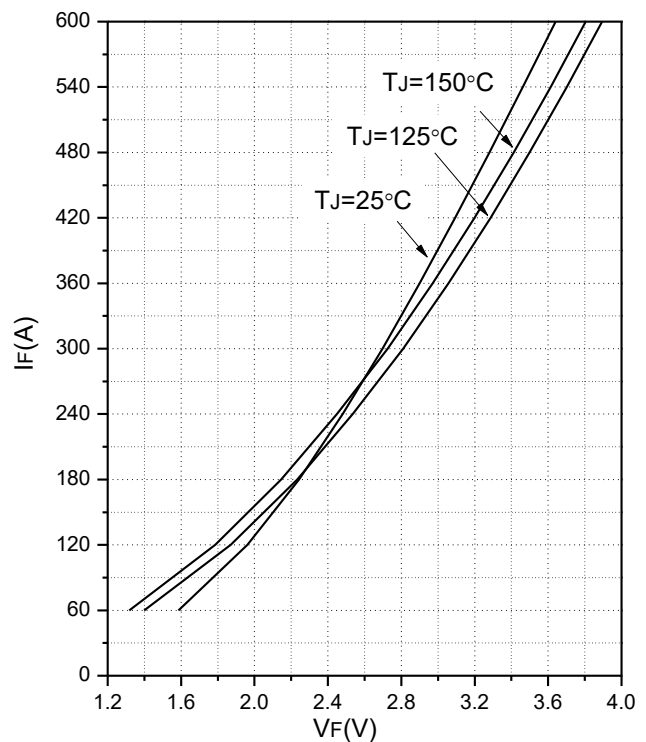


Fig.4 Forward Characteristics of Diode

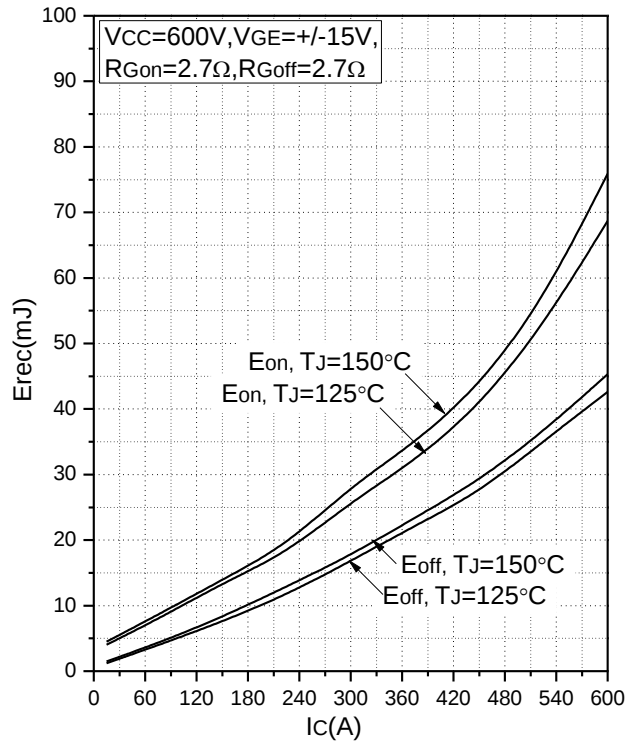


Fig.5 Typical Switching Loss vs. Collector Current

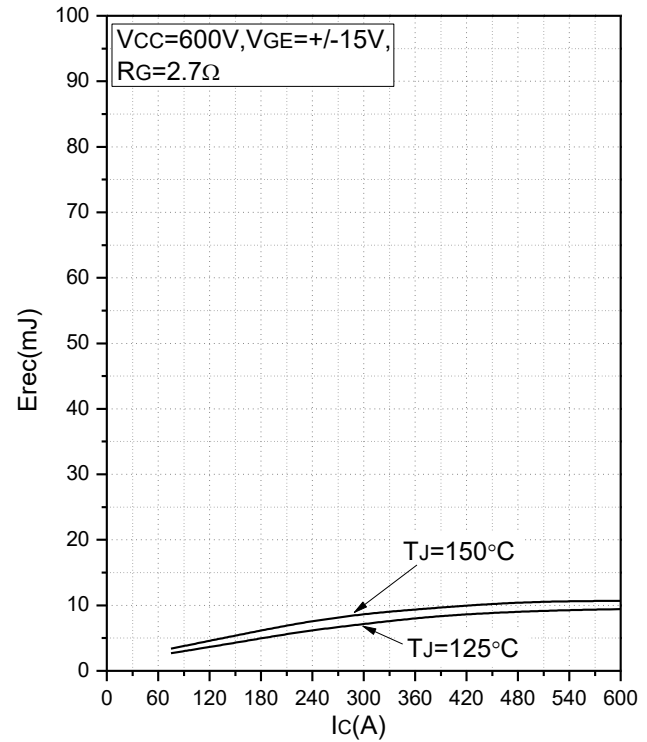


Fig.6 Typical Switching Loss vs. Forward Current

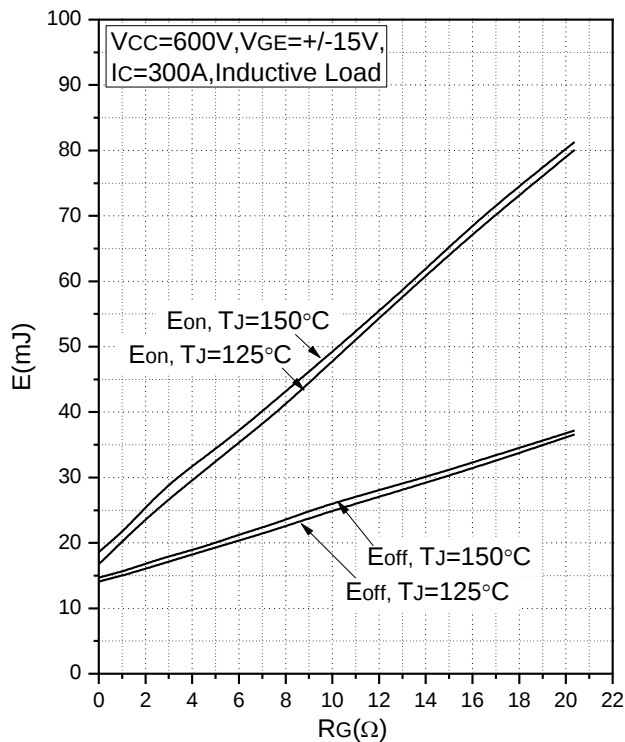


Fig.7 Typical Switching Loss vs. Gate Resistance

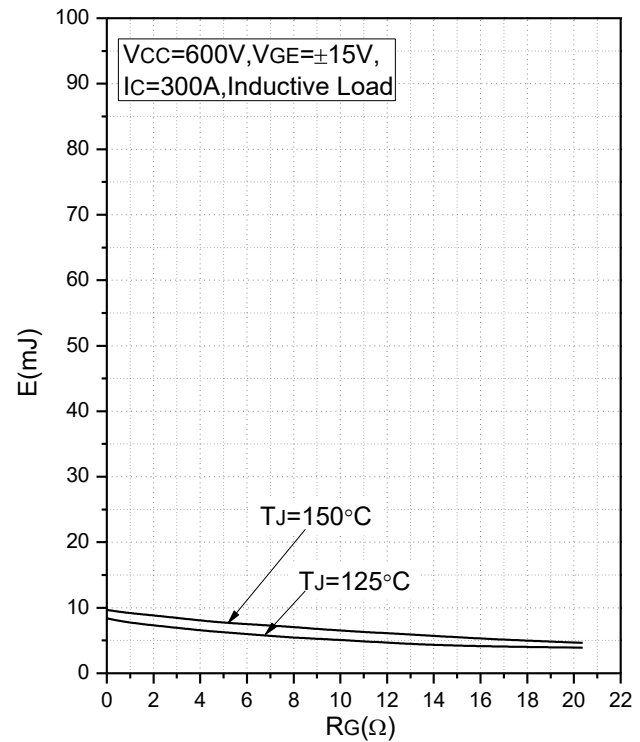


Fig.8 Typical Switching Loss vs. Gate Resistance

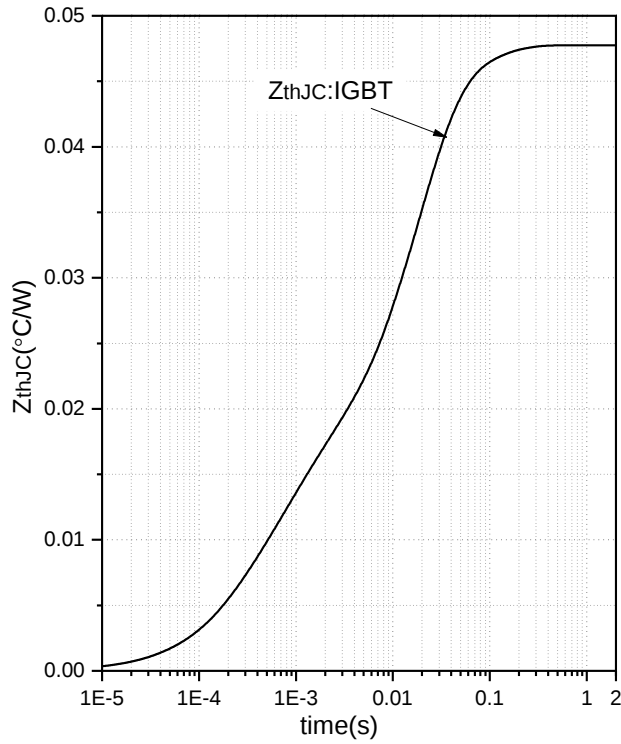


Fig.9 Transient Thermal Impedance (IGBT)

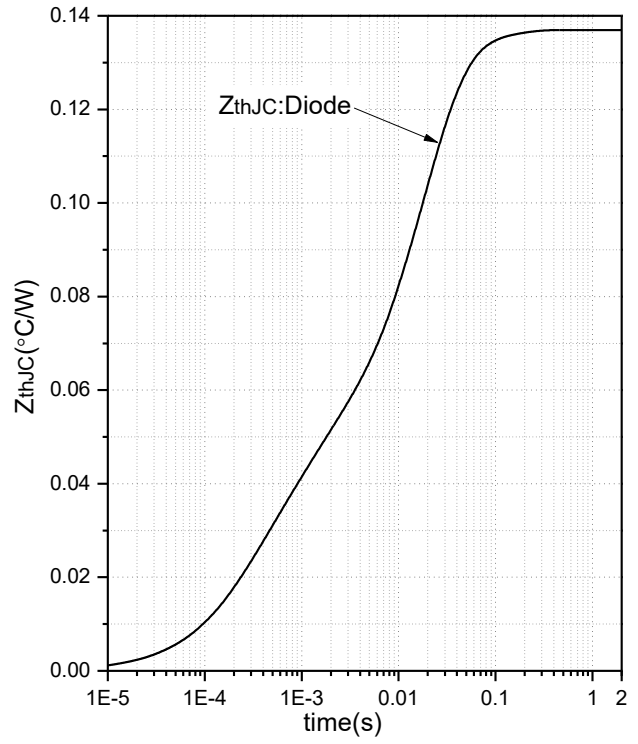


Fig.10 Transient Thermal Impedance (Diode)

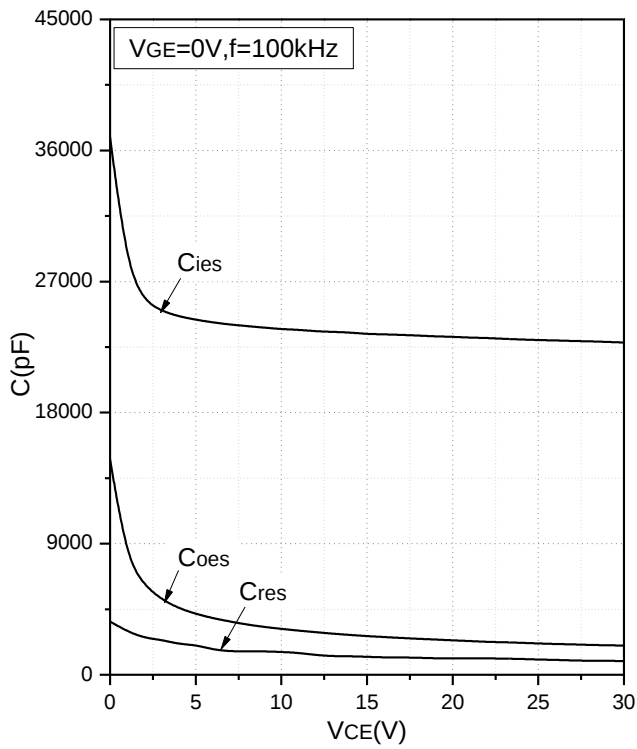


Fig.11 Capacitance Characteristics

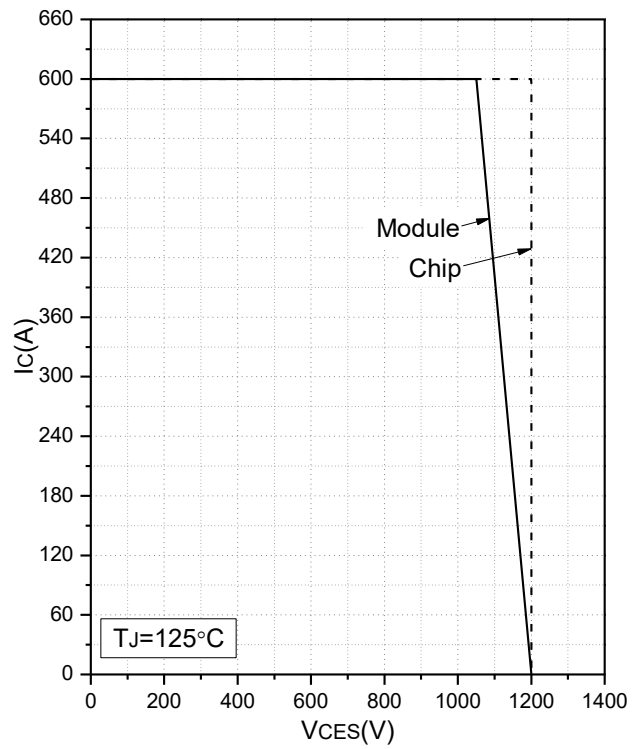
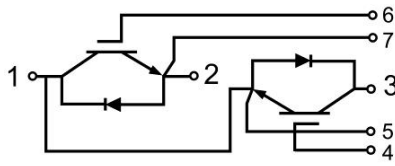


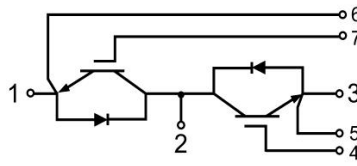
Fig.12 Reverse Bias Safe Operation Area (RBSOA)



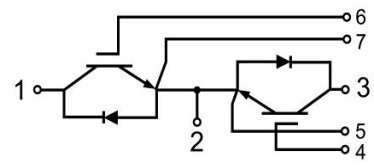
Internal Circuit



HF

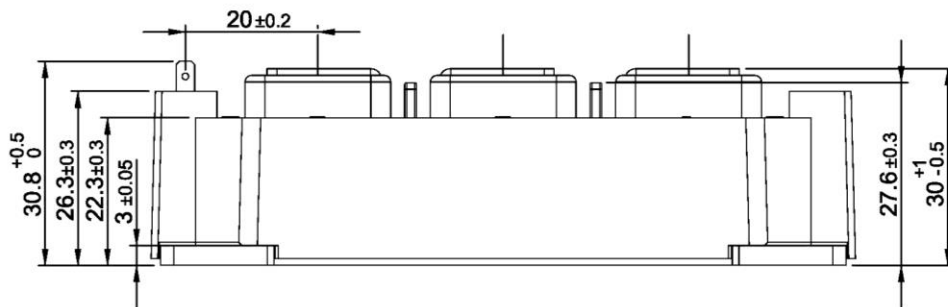


CC

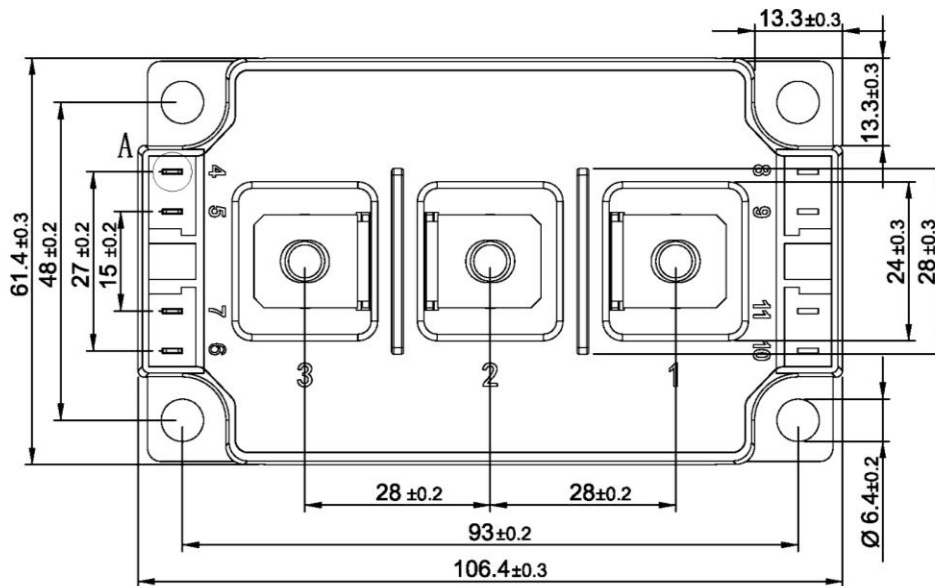
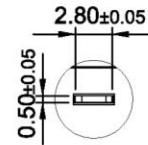


CE

Package Outline (Unit: mm):



View A
scale 3:1





Date	Revision	Notes
09/01/2021	A	Final Version

Announcement

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