

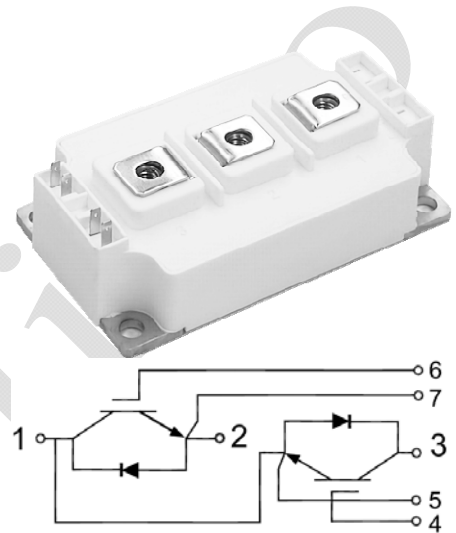
GF300HF120T2NHE

IGBT Module

Preliminary Data

Features:

- Non Punch Through(NPT) Technology
- Short Circuit Rated $> 10\mu\text{s}$
- Low Saturation Voltage
- 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

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	$T_C = 100^\circ\text{C}$	300	A
		$T_C = 25^\circ\text{C}$	500	A
I_{CM}	Repetitive Peak Collector Current	$T_J = 150^\circ\text{C}$	600	A
t_{SC}	Short Circuit Withstand Time		> 10	μs
P_D	Maximum Power Dissipation per IGBT	$T_C = 25^\circ\text{C}$ $T_{Jmax} = 150^\circ\text{C}$	2605	W

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

Static Characteristics

Symbol	Description	Conditions	Min	Typ	Max	Unit
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C = 4\text{mA}, V_{CE} = V_{GE}$	4.4	5.2	6.0	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	3.60	V
			$T_J=125^\circ\text{C}$	3.80		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	$V_{GE} = \pm 20\text{V}, V_{CE} = 0\text{V}, T_J = 25^\circ\text{C}$			400	nA
C_{ies}	Input Capacitance	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		33.6		nF
C_{oes}	Output Capacitance			2.56		nF

Switching Characteristics

$t_{d(on)}$	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	$T_J=25^\circ\text{C}$		260		ns
			$T_J=125^\circ\text{C}$		250		
t_r	Rise Time		$T_J=25^\circ\text{C}$		175		ns
			$T_J=125^\circ\text{C}$		175		
$t_{d(off)}$	Turn-off Delay Time	$V_{CC} = 600\text{V}, I_C = 300\text{A}, R_{Goff} = 4.7\Omega, V_{GE} = \pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		740		ns
			$T_J=125^\circ\text{C}$		775		
t_f	Fall Time		$T_J=25^\circ\text{C}$		125		ns
			$T_J=125^\circ\text{C}$		125		
E_{on}	Turn-on Switching Loss	$V_{CC} = 600\text{V}, I_C = 300\text{A}, R_{Gon} = 4.7\Omega, V_{GE} = \pm 15\text{V},$ $di/dt=1382\text{A}/\mu\text{s} (T_J=125^\circ\text{C})$ Inductive Load	$T_J=25^\circ\text{C}$		16.4		mJ
			$T_J=125^\circ\text{C}$		21.0		
E_{off}	Turn-off Switching Loss	$V_{CC} = 600\text{V}, I_C = 300\text{A}, R_{Goff} = 4.7\Omega, V_{GE} = \pm 15\text{V},$ $du/dt=3900\text{V}/\mu\text{s} (T_J=125^\circ\text{C})$ Inductive Load	$T_J=25^\circ\text{C}$		20.9		mJ
			$T_J=125^\circ\text{C}$		25.4		
Q_g	Total Gate Charge	$V_{GE} = +15\text{V} \dots -15\text{V}$	$T_J=25^\circ\text{C}$		3.6		μC
$R_{g\ internal}$	Internal gate resistance		$T_J=25^\circ\text{C}$		2.3		Ω
RBSOA	Reverse Bias Safe Operation Area	$I_C=600\text{A}, V_{CC}=1050\text{V}, V_p=1200\text{V}, R_{Goff} = 4.7\Omega, V_{GE} = +15\text{V to } 0\text{V}, T_J = 150^\circ\text{C}$	Trapezoid				
SCSOA	Short Circuit Safe Operation Area	$V_{CC} = 600\text{V}, V_{GE} = 15\text{V}, T_J = 150^\circ\text{C}$	10				μs
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case(per leg)			0.048			$^\circ\text{C}/\text{W}$

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	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	Unit	
V_{FM}	Forward Voltage	$I_F = 300\text{A}$	$T_J=25^\circ\text{C}$	2.20		V	
			$T_J=125^\circ\text{C}$		2.45		
t_{rr}	Reverse Recovery Time	$I_F = 300\text{A},$ $-di_F/dt = 2200\text{A}/\mu\text{s}(T_J=125^\circ\text{C}),$ $V_R = 600\text{V},$ $V_{GE} = -15\text{V}$	$T_J=25^\circ\text{C}$	226		ns	
			$T_J=125^\circ\text{C}$		339		
I_{rr}	Peak Reverse Recovery Current		$T_J=25^\circ\text{C}$		145	A	
			$T_J=125^\circ\text{C}$		200		
Q_{rr}	Reverse Recovery Charge		$T_J=25^\circ\text{C}$		19.5	μC	
			$T_J=125^\circ\text{C}$		43.6		
E_{rec}	Reverse Recovery Energy		$T_J=25^\circ\text{C}$		9.8	mJ	
			$T_J=125^\circ\text{C}$		22.0		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case (per leg)			0.134		$^\circ\text{C}/\text{W}$	

Module

Symbol	Description		Min	Typ	Max	Unit
V _{iso}	Isolation Voltage (All Terminals Shorted)	f = 50Hz, 1minute	2500			V
T _J	Maximum Junction Temperature				150	°C
T _{JOP}	Maximum Operating Junction Temperature Range		-40		+150	°C
T _{stg}	Storage Temperature		-40		+125	°C
CTI	Comparative Tracking Index		200			V
R _{eCS}	Case-To-Sink Thermally (Conductive Grease Applied)			0.03		°C/W
T	Power Terminals Screw:M6		4.0		6.0	N·m
T	Mounting Screw:M6		4.0		6.0	N·m
G	Weight			290		g

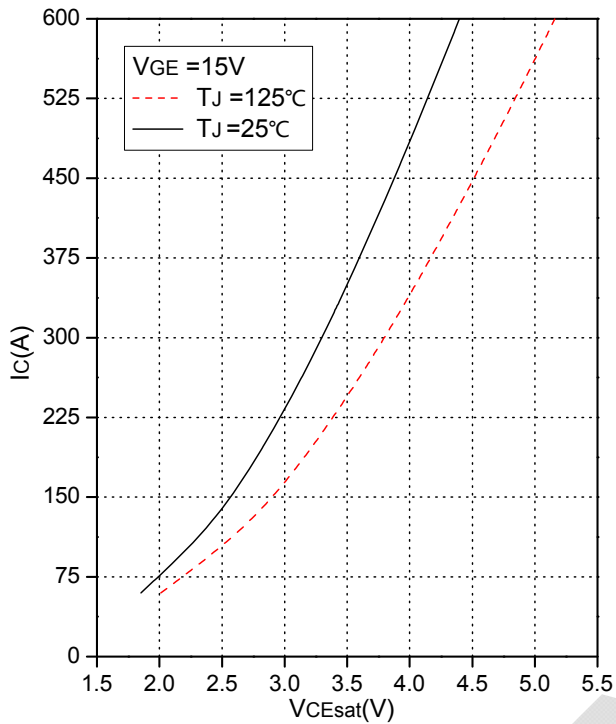


Fig.1 Typical Saturation Voltage Characteristics

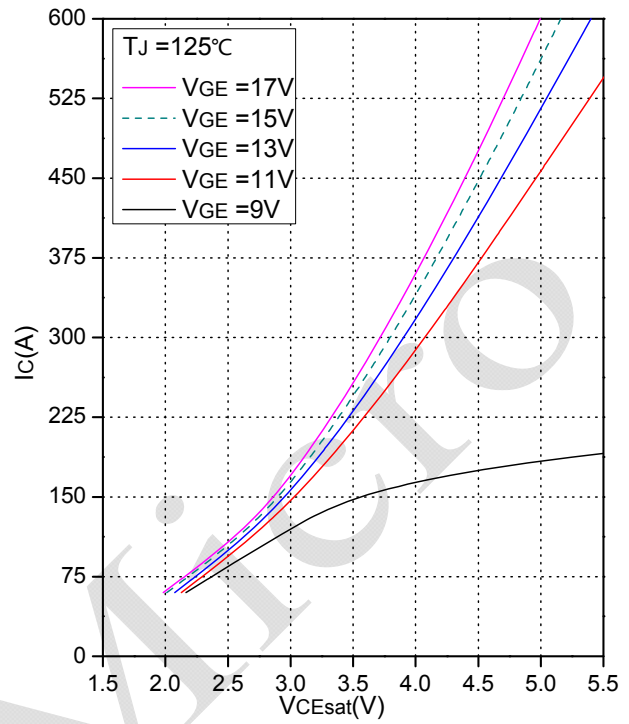


Fig.2 Typical Output Characteristics

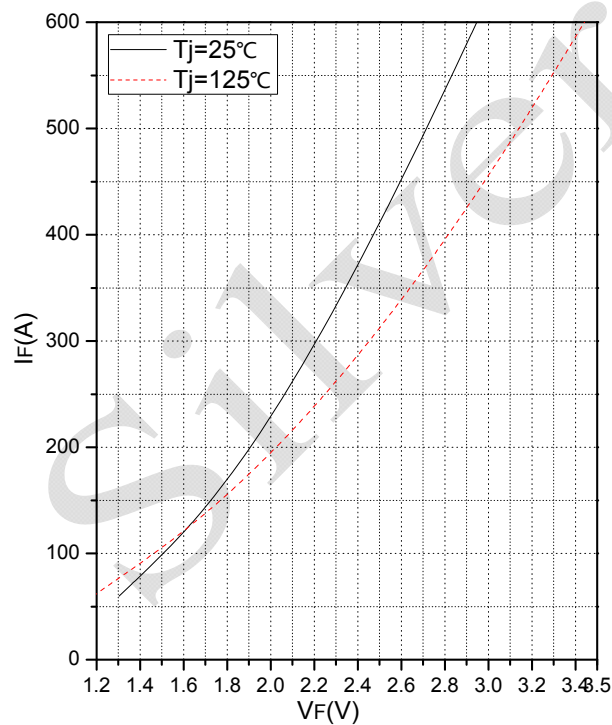


Fig.3 Forward Characteristics of Diode

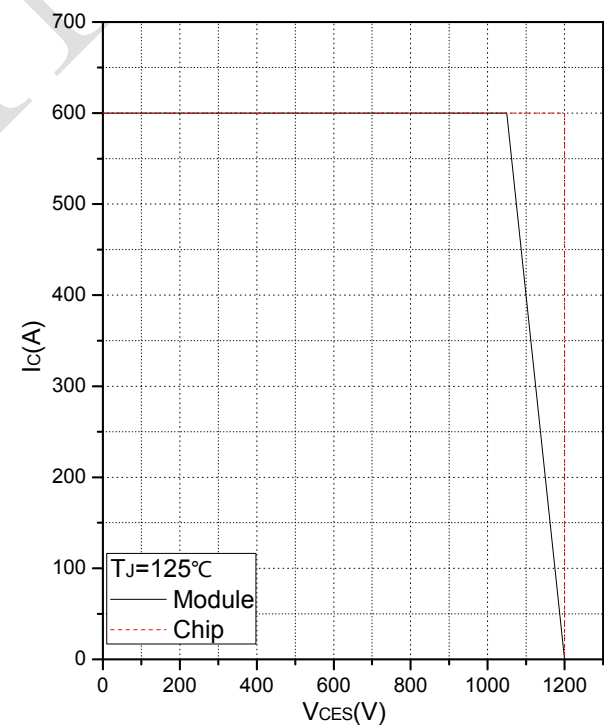


Fig.4 Reverse Bias Safe Operation Area (RBSOA)

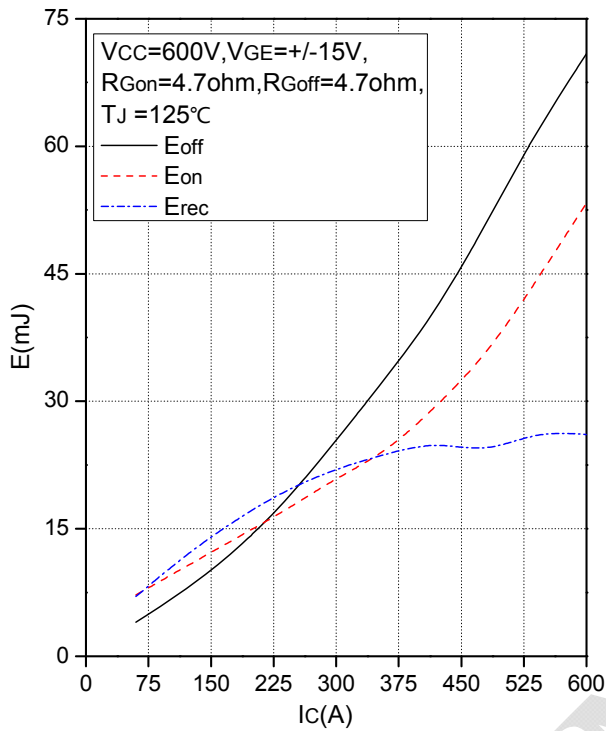


Fig.5 Typical Switching Loss vs. Collector Current

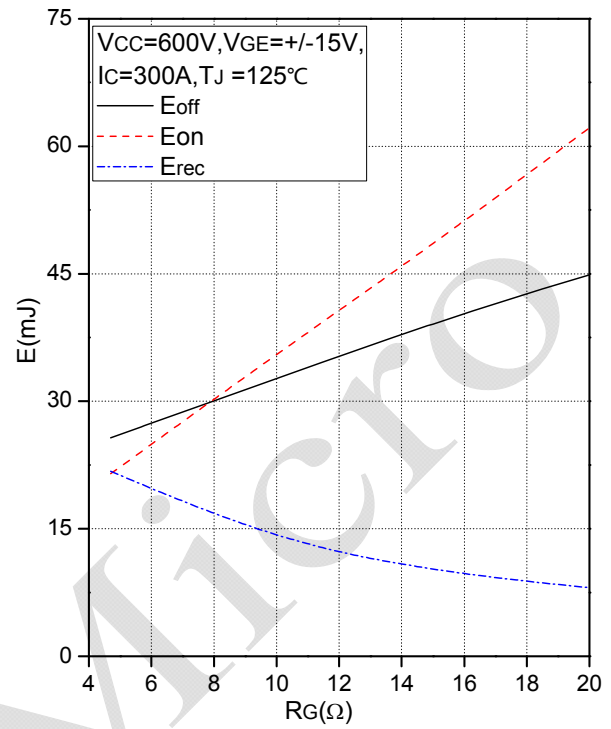


Fig.6 Typical Switching Loss vs. Gate Resistance

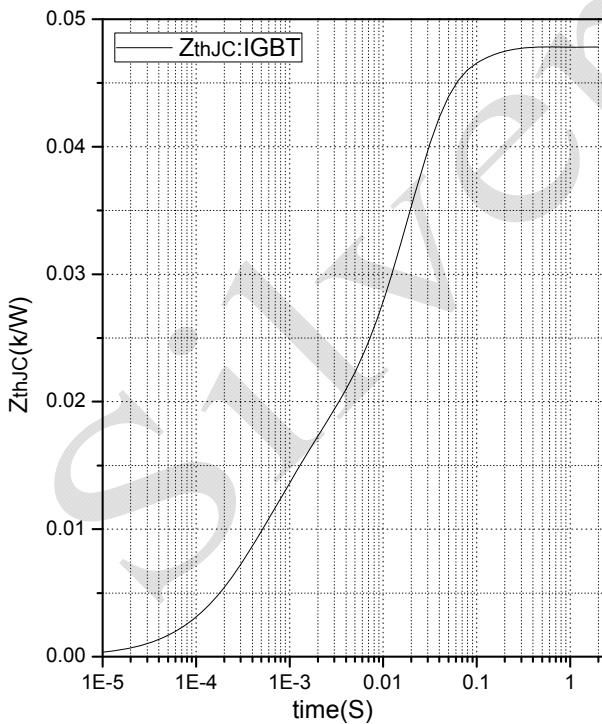


Fig.7 Transient Thermal Impedance (IGBT)

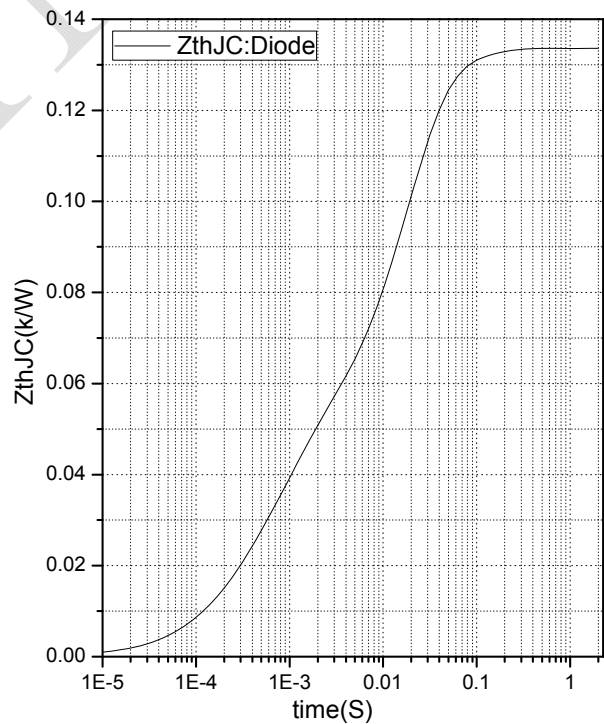
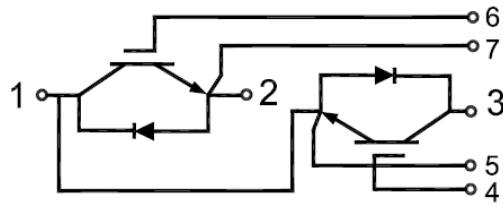
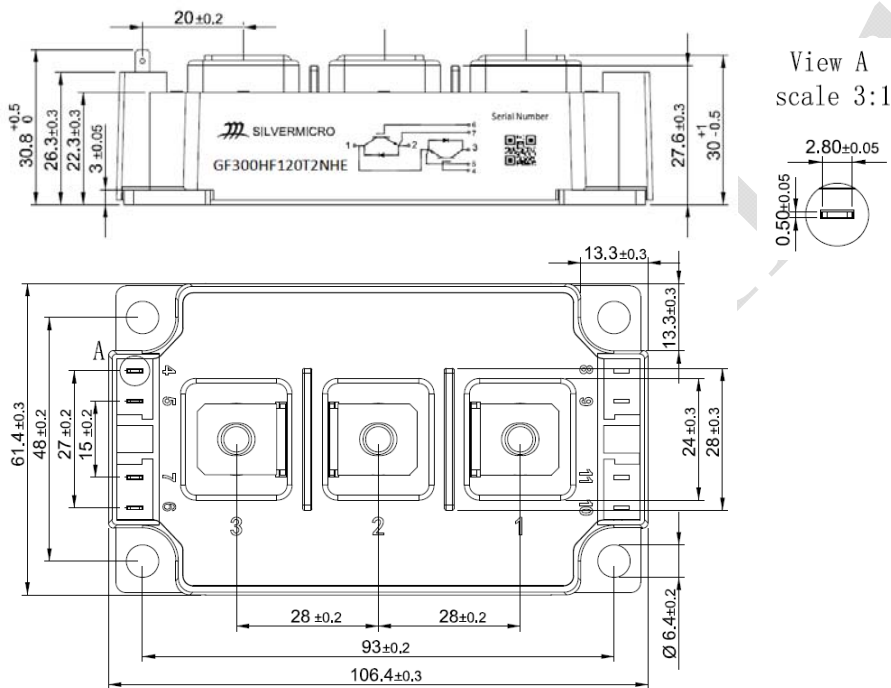


Fig.8 Transient Thermal Impedance (Diode)

Internal Circuit



Package Outline (Unit: mm):





Announcement

Information in this document is believed to be accurate and reliable. However, NJSME does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information.

Right to Make Changes

NJSME reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.