

GT100FF120T6H-M

IGBT Module

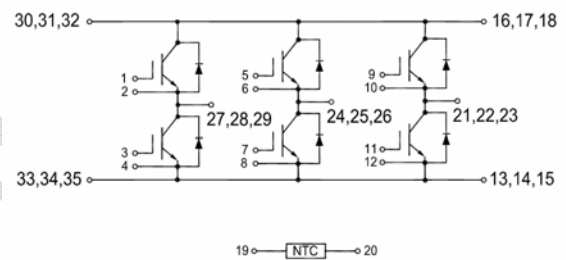
Features:

- Field Stop Trench Gate IGBT
- 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



Applications:

- Industrial Inverters
- Servo Applications



IGBT, Inverter

Maximum Rated Values (T_C=25°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°C	100	A
		T _C =25°C	200	A
I _{CM}	Peak Collector Current Repetitive	T _J =175°C	200	A
t _{SC}	Short Circuit Withstand Time		>10	μs
P _D	Maximum Power Dissipation (IGBT)	T _C =25°C T _{Jmax} =175°C	714	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	$I_C=1\text{mA}, V_{CE}=V_{GE}$	5.0	5.5	6.6	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=100\text{A}, V_{GE}=15\text{V}$	$T_J=25^\circ\text{C}$	1.70	2.00	V
			$T_J=125^\circ\text{C}$	1.90		V
			$T_J=150^\circ\text{C}$	1.90		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			8.03		nF
C_{oes}	Output Capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$		1.22		nF
C_{res}	Reveres Transfer Capacitance			0.59		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600\text{V}, I_C=100\text{A}, R_{Gon}=1\Omega, V_{GE}=\pm 15\text{V}, \text{Inductive Load}$	$T_J=25^\circ\text{C}$	228		ns	
			$T_J=125^\circ\text{C}$	250			
			$T_J=150^\circ\text{C}$	254			
t_r	Rise Time		$T_J=25^\circ\text{C}$	63		ns	
			$T_J=125^\circ\text{C}$	67			
			$T_J=150^\circ\text{C}$	69			
$t_{d(off)}$	Turn-off Delay Time		$V_{CC}=600\text{V}, I_C=100\text{A}, R_{Goff}=1\Omega, V_{GE}=\pm 15\text{V}, \text{Inductive Load}$	$T_J=25^\circ\text{C}$	269		ns
				$T_J=125^\circ\text{C}$	279		
				$T_J=150^\circ\text{C}$	284		
t_f	Fall Time	$T_J=25^\circ\text{C}$		184		ns	
		$T_J=125^\circ\text{C}$		291			
		$T_J=150^\circ\text{C}$		317			
E_{on}	Turn-on Switching Loss	$V_{CC}=600\text{V}, I_C=100\text{A}, R_{Gon}=1\Omega, V_{GE}=\pm 15\text{V}, di/dt=1387\text{A}/\mu\text{s}(T_J=150^\circ\text{C}), \text{Inductive Load}$		$T_J=25^\circ\text{C}$	3.1		mJ
				$T_J=125^\circ\text{C}$	4.3		
				$T_J=150^\circ\text{C}$	4.8		

E _{off}	Turn-off Switching Loss	V _{CC} =600V, I _C =100A, R _{Goff} =1Ω, V _{GE} =±15V, du/dt=4448V/μs(T _J =150°C), Inductive Load	T _J =25°C	5.28	mJ
			T _J =125°C	8.33	
			T _J =150°C	9.30	
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C	745	nC
R _{g internal}	Internal Gate Resistance		T _J =25°C	7.5	Ω
RBSOA	I _C =200A, V _{CC} =1050V, V _p =1200V, R _{Goff} =1Ω, V _{GE} =+15V to 0V, T _J =150°C			Trapezoid	
SC data	V _{CC} =600V, t _p =10us, V _{ge} =+/-15V, R _{Gon} =1ohm, R _{Goff} =1ohm, T _J =25°C			575	A
R _{θJC}	IGBT Thermal Resistance: Junction-To-Case			0.21	°C/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	100	A
I _{FM}	Peak FWD Current Repetitive	200	A

Electrical Characteristics of FWD (T_C=25°C unless otherwise specified)

Symbol	Description	Conditions	Min	Typ	Max	Unit
V _{FM}	Forward Voltage	I _F =100A	T _J =25°C	1.70		V
			T _J =125°C	1.80		
			T _J =150°C	1.80		
t _{rr}	Reverse Recovery Time	I _F =100A, -diF/dt =1911A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C	260		ns
			T _J =125°C	396		
			T _J =150°C	454		
I _{rr}	Peak Reverse Recovery Current	V _R =600V, V _{GE} =-15V	T _J =25°C	92		A
			T _J =125°C	104		
			T _J =150°C	105		

Q _{rr}	Reverse Recovery Charge		T _J =25°C	10.2	μC
			T _J =125°C	16.8	
			T _J =150°C	19.2	
E _{rec}	Reverse Recovery Energy	I _F =100A, -diF/dt =1911A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C	4.83	mJ
			T _J =125°C	7.92	
			T _J =150°C	9.13	
R _{θJC}	Diode Thermal Resistance: Junction-To-Case			0.34	°C/W

Internal NTC-Thermistor Characteristics

R ₂₅	T _C =25°C	5		kΩ
ΔR/R	T _C =100°C, R ₁₀₀ =481Ω		±5	%
P ₂₅	T _C =25°C	50		mW
B _{25/50}	R ₂ =R ₂₅ exp[B _{25/50} (1/T ₂ -1/(298.15K))]	3380		K
B _{25/80}	R ₂ =R ₂₅ exp[B _{25/80} (1/T ₂ -1/(298.15K))]	3440		K

Module

Symbol	Description	Conditions	Min	Typ	Max	Unit
V _{iso}	Isolation Voltage (All Terminals Shorted)	f = 50Hz, 1minute	2500			V
T _J	Maximum Junction Temperature				175	°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 _{θCS}	Case-To-Sink Thermally (Conductive Grease Applied)			0.1		°C/W
M	Power Terminals Screw:M5		3.0		5.0	N·m
G	Weight			300		g

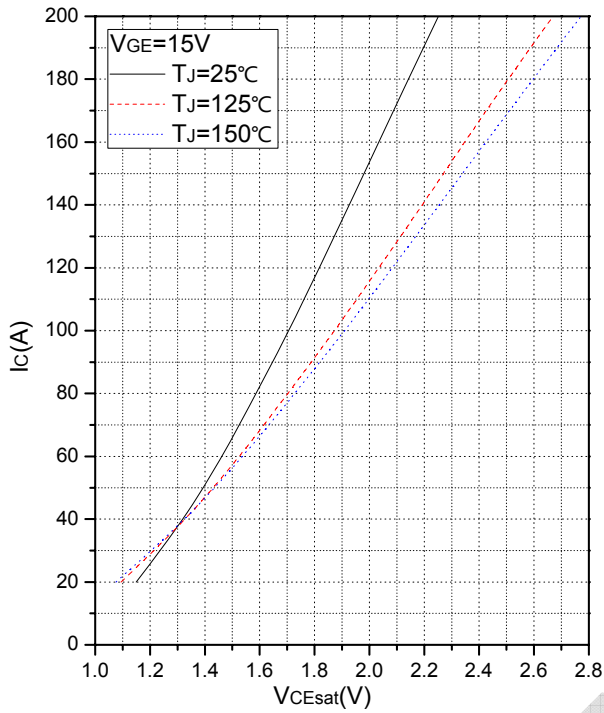


Fig.1 Typical Saturation Voltage Characteristics

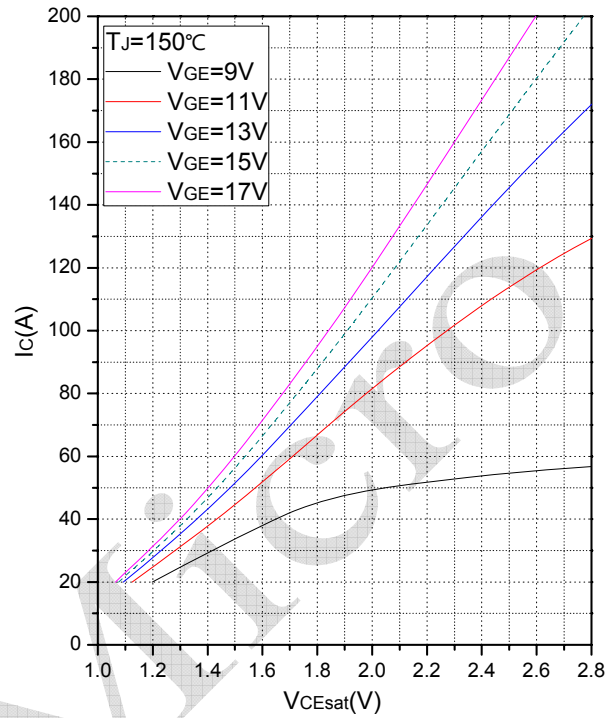


Fig.2 Typical Output Characteristics

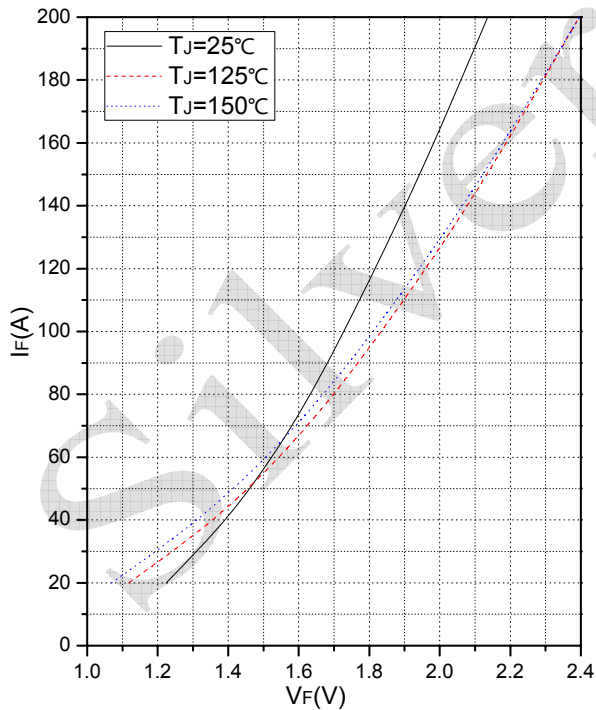


Fig.3 Forward Characteristics of FWD

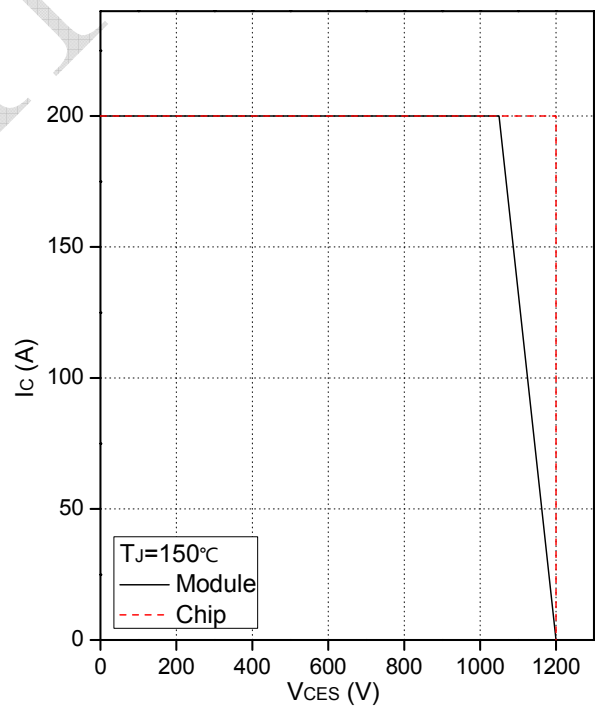


Fig.4 Reverse Bias Safe Operation Area (RBSOA)

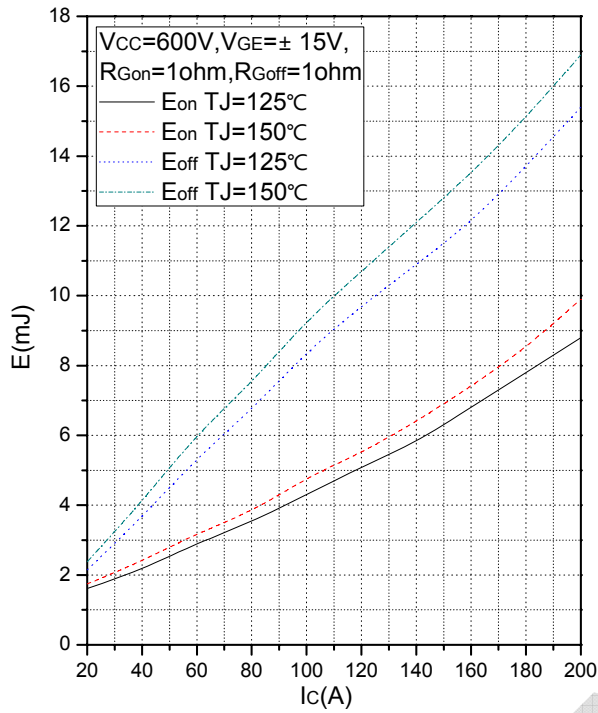


Fig.5 Typical Switching Loss vs. Collector Current

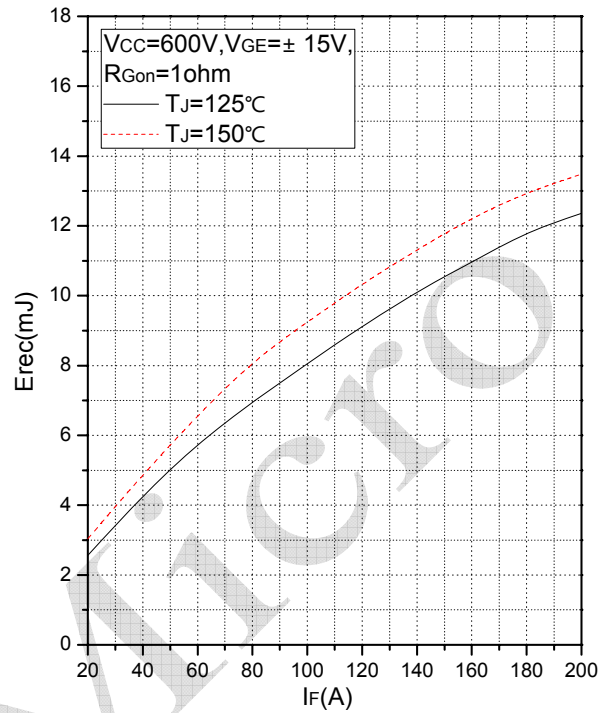


Fig.6 Typical Switching Loss vs. Forward Current

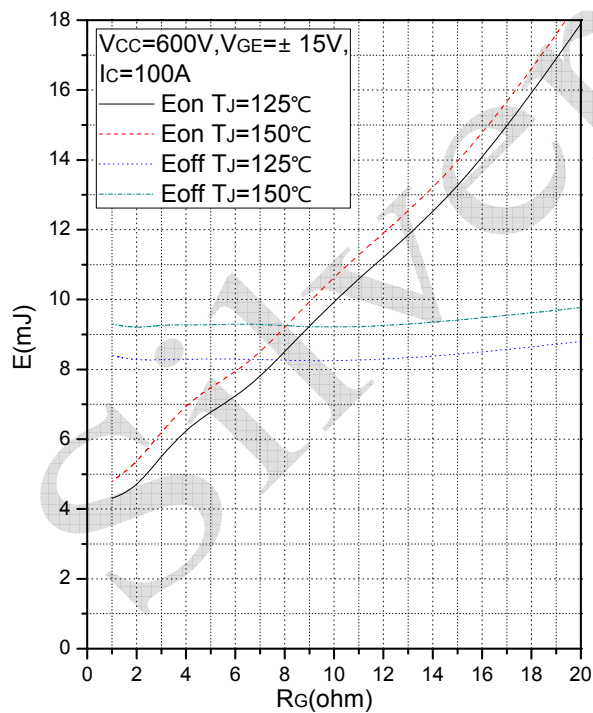


Fig.7 Typical Switching Loss vs. Gate Resistance

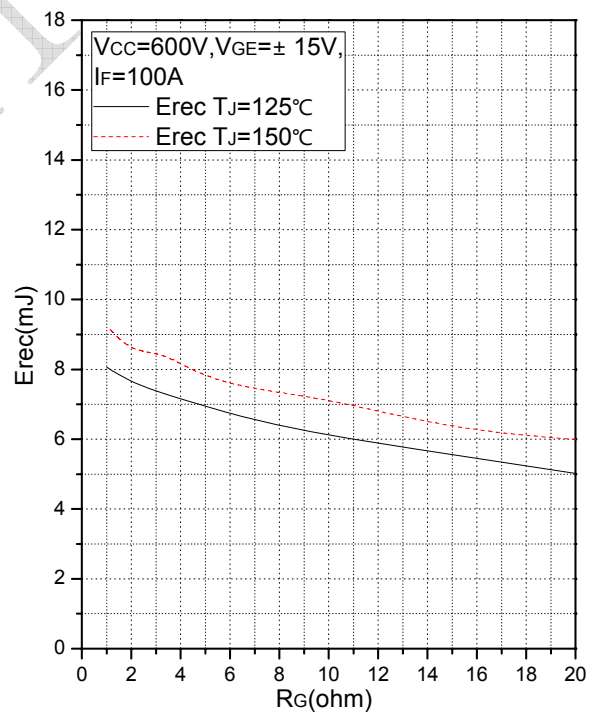


Fig.8 Typical Switching Loss vs. Gate Resistance

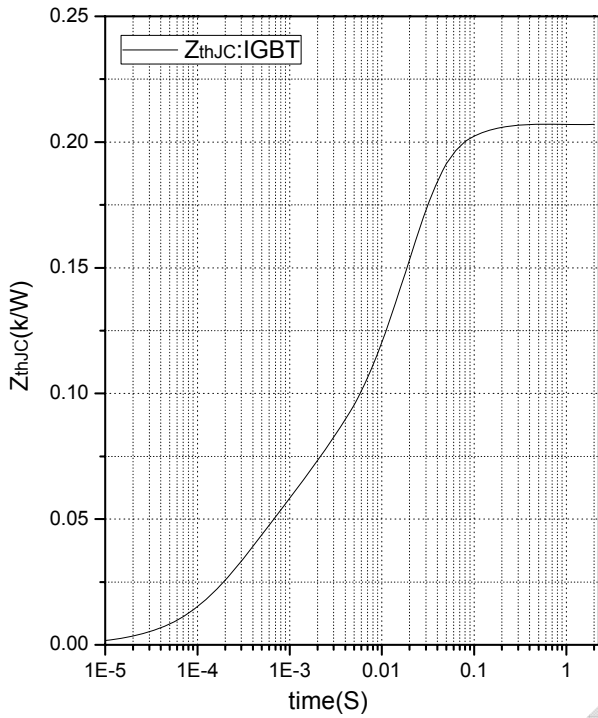


Fig.9 Transient Thermal Impedance (IGBT)

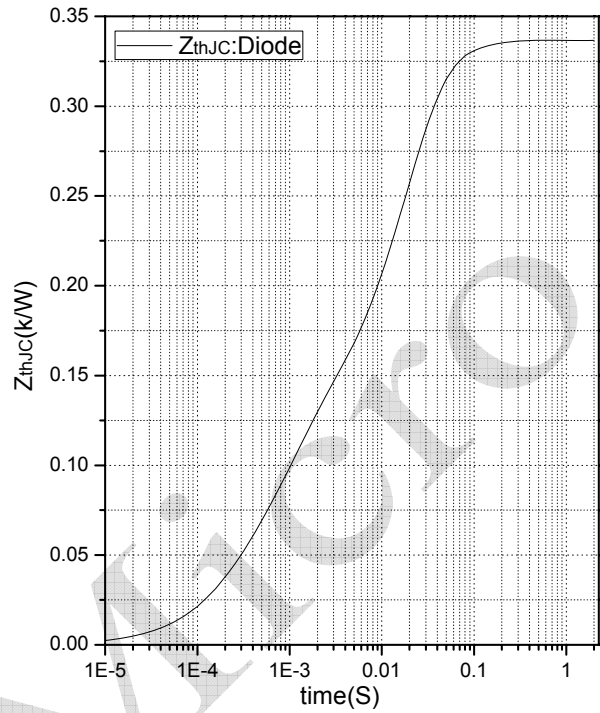


Fig.10 Transient Thermal Impedance (Diode)

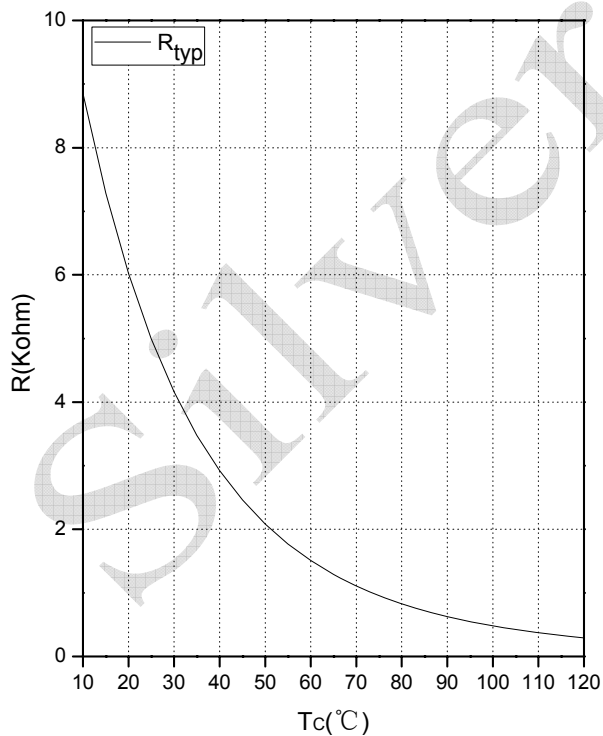


Fig.11 NTC Temperature Characteristics

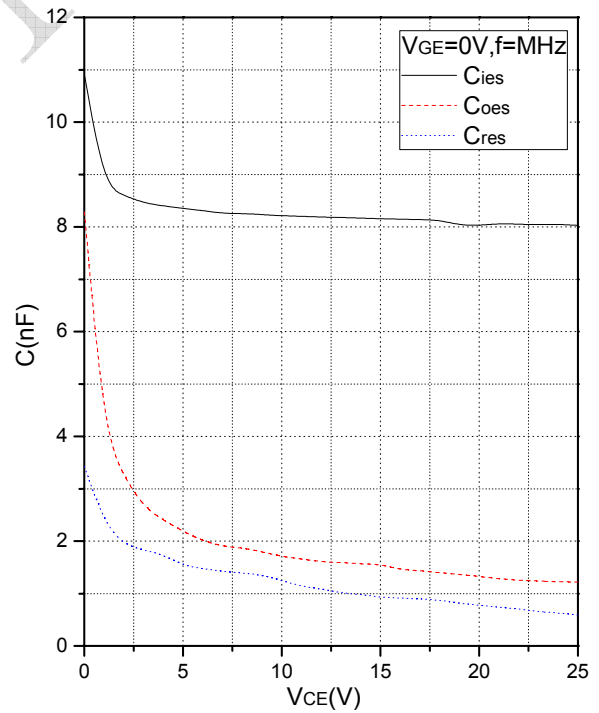
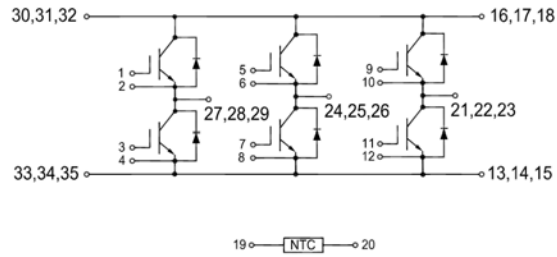
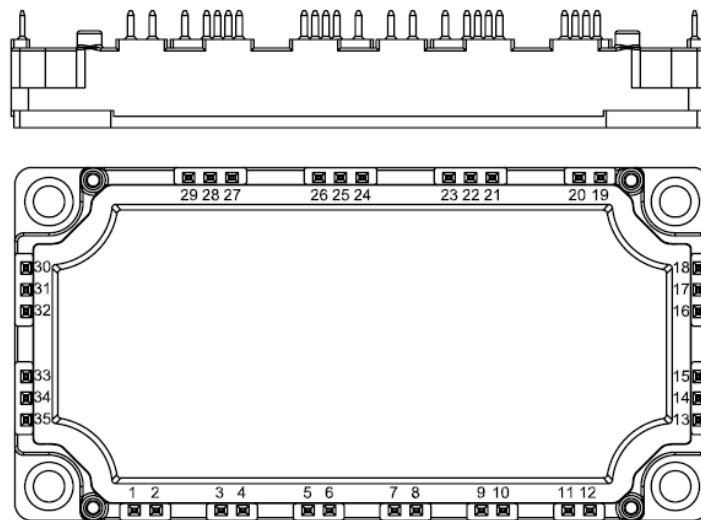


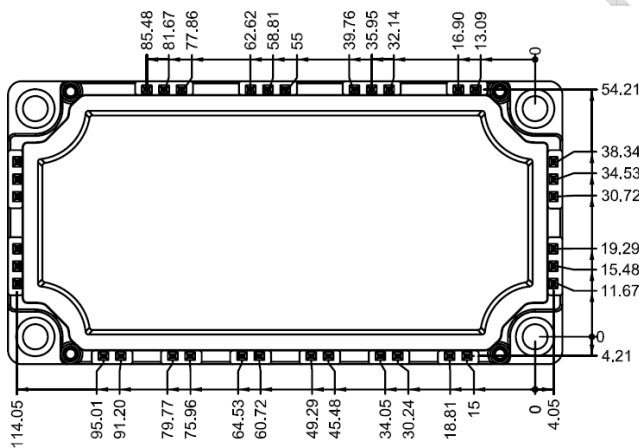
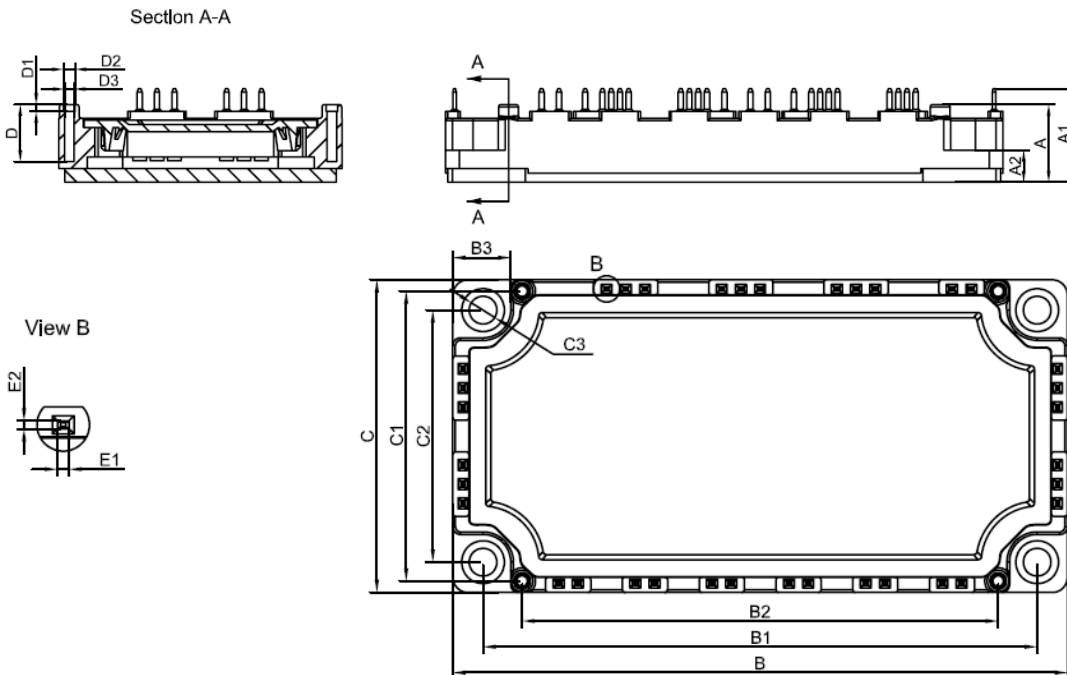
Fig.12 Capacitance Characteristics

Internal Circuit:



Package Outline (Unit: mm):





DIMENSIONS				
REF DIM	DATA BOOK(mm)			NOTES
	NOM	MIN	MAX	
A	17,00	16,50	17,50	
A1	20,50	19,50	21,50	
A2	7,00	6,50	7,50	
B	122,00	121,00	123,00	
B1	110,00	108,80	110,20	
B2	94,50	94,30	94,70	
B3	11,30	11,10	11,50	
C	62,00	61,00	63,00	
C1	57,50	57,30	57,70	
C2	50,00	49,80	50,20	
C3	5,50	5,30	5,70	
D	12,50	12,00	13,00	
D1	1,50	1,30	1,70	
D2	2,50	2,30	2,70	
D3	2,10	1,90	2,30	
E1	1,15	1,12	1,18	
E2	0,80	0,77	0,83	



Date	Revision	Notes
07/02/2018	01	Initial Release
09/12/2019	A	Final Version

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.

SilverMicro