SILVERMICRO

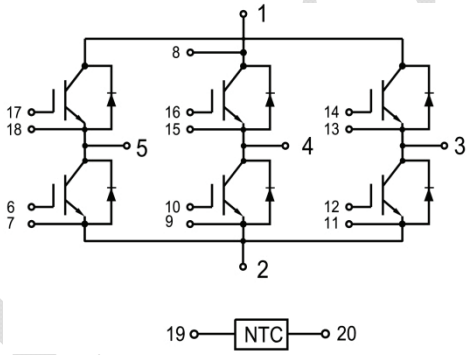
GT150FF120A8H

IGBT Module

Features：

- Field Stop Trench Gate IGBT
- Short Circuit Rated>10μs
- Low Saturation Voltage
- Low Switching Loss
- 100% RBSOA Tested(2×Ic)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement

Circuit Diagram



Applications：

- Industrial Inverters
- Servo Applications

Maximum Rated Values of IGBT (T_C=25℃ 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℃	150	A
		T_C=25℃	220	A
I_{CM}	Repetitive Peak Collector Current	T_J=175℃	300	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation per IGBT	T_C=25℃ T_{Jmax}=150℃	710	W

Electrical Characteristics of IGBT (T_C=25℃ unless otherwise specified)

Static Characteristics

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C=6mA, V_{CE}=V_{GE}		5.0	5.9	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=150A, V_{GE}=15V	T_J=25℃		1.65	1.95	V
			T_J=125℃		2.00		V
			T_J=150℃		2.10		V
I_{CES}	Collector-Emitter Leakage Current	V_{GE}=0V, V_{CE}=V_{CES}				1	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE}=±20V, V_{CE}=0V				500	nA
C_{ies}	Input Capacitance	V_{CE}=25V, V_{GE}=0V, f=100kHz			18.5		nF
C_{oes}	Output Capacitance				0.69		nF
C_{res}	Reverse Transfer Capacitance				0.23		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V, I_C=150A, R_{Gon}=10Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		703		ns
			T_J=125℃		700		
			T_J=150℃		666		
t_r	Rise Time		T_J=25℃		157		ns
			T_J=125℃		165		
			T_J=150℃		162		
$t_{d(off)}$	Turn-off Delay Time	V_{CC}=600V, I_C=150A, R_{Goff}=10Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		600		ns
			T_J=125℃		657		
			T_J=150℃		637		
t_f	Fall Time		T_J=25℃		217		ns
			T_J=125℃		346		
			T_J=150℃		360		
E_{on}	Turn-on Switching Loss	V_{CC}=600V, I_C=150A, R_{Gon}=10Ω, V_{GE}=±15V, di/dt=790A/μs (T_J=150℃) Inductive Load	T_J=25℃		14.1		mJ
			T_J=125℃		17.4		
			T_J=150℃		17.6		

E_{off}	Turn-off Switching Loss	V_{CC}=600V, I_C=150A, R_{Goff}=10Ω, V_{GE}=±15V, du/dt=4890V/μs (T_J=150℃) Inductive Load	T_J=25℃		12.0		mJ
			T_J=125℃		15.5		
			T_J=150℃		15.9		
Q_g	Total Gate Charge	V_{GE}=+15V…-15V	T_J=25℃		1.48		μC
$R_{g\ internal}$	Internal Gate Resistance		T_J=25℃		3		Ω
RBSOA	I_C=300A,V_{CC}=1050V, Vp=1200V, R_{Goff} = 10Ω, V_{GE}=+15V to 0V, T_J=125°C			Trapezoid			
I_{SC}	V_{GE}=±15V,V_{CC}=600V, R_{Gon}=10Ω, R_{Goff}=10Ω, tp=10us, T_J=125℃ Inductive Load				1140		A
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-to-Case(per IGBT)					0.175	℃/W

Maximum Rated Values of Diode (T_C=25℃ unless otherwise specified)

V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	Diode Continuous Forward Current	150	A
I_{FM}	Diode Maximum Forward Current	300	A

Electrical Characteristics of Diode (T_C=25℃ unless otherwise specified)

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V_{FM}	Forward Voltage	I_F=150A	T_J=25℃		1.90		V
			T_J=125℃		2.05		
			T_J=150℃		2.05		
I_{rr}	Peak Reverse Recovery Current	I_F=150A, di/dt=1020A/μs (T_J=150℃), V_{rr}=600V, V_{GE}=±15V	T_J=25℃		85.9		A
			T_J=125℃		109.4		
			T_J=150℃		118.8		
t_{rr}	Reverse Recovery Time		T_J=25℃		246		ns
			T_J=125℃		446		
			T_J=150℃		480		
Q_{rr}	Reverse Recovery Charge		T_J=25℃		12.1		μC
			T_J=125℃		22.8		
			T_J=150℃		26.2		

E_{rec}	Reverse Recovery Energy	I_F=150A, di/dt=1020A/μs (T_J=150℃), V_{rr}=600V, V_{GE}=±15V	T_J=25℃		5.3		mJ
			T_J=125℃		10.2		
			T_J=150℃		12.3		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-to-Case					0.259	℃/W

Internal NTC-Thermistor Characteristics

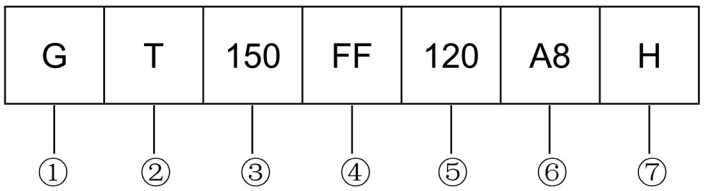
R_{25}	T_C=25℃	5		kΩ
△R/R	T_C=100℃, R_{100}=481Ω		±5	%
P_{25}	T_C=25℃	50		mW
$B_{25/50}$	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15K))]$	3380		K
$B_{25/80}$	$R_2=R_{25}\exp[B_{25/80}(1/T_2-1/(298.15K))]$	3440		K

Module

Symbol	Description		Min.	Typ.	Max.	Units
V_{ISO}	Isolation Voltage (All Terminals Shorted)	f=50Hz, 1minute	2500			V
Internal Isolation				Al_2O_3		
d_{creep}	Creepage Distance: Terminal to Baseplate				25	mm
	Creepage Distance: Terminal to Terminal				12.5	mm
d_{clear}	Clearance Distance: Terminal to Baseplate				11	mm
	Clearance Distance: Terminal to Terminal				7	mm
L_{SCE}	Stray Inductance Module	Measured between terminals 2 and 3			20	nH
T_J	Maximum Junction Temperature				150	℃
T_{JOP}	Maximum Operating Junction Temperature Range		-40		+150	℃
T_{stg}	Storage Temperature		-40		+125	℃
CTI	Comparative Tracking Index		200			
$R_{\theta CS}$	Case-to-Sink Thermally (Conductive Grease Applied)				0.03	℃/W
M	Power Terminals Screw:M5		3.0		6.0	N·m
M	Mounting Screw:M6		3.0		6.0	N·m
G	Weight			390		g

Ordering Information Table

Device code



① - IGBT Module
② - Trench, Low Switching Losses IGBT
③ - Rated Current (150=150A)
④ - Circuit Configuration (Full Bridge)
⑤ - Rated Voltage (120=1200V)
⑥ - Package Type
⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

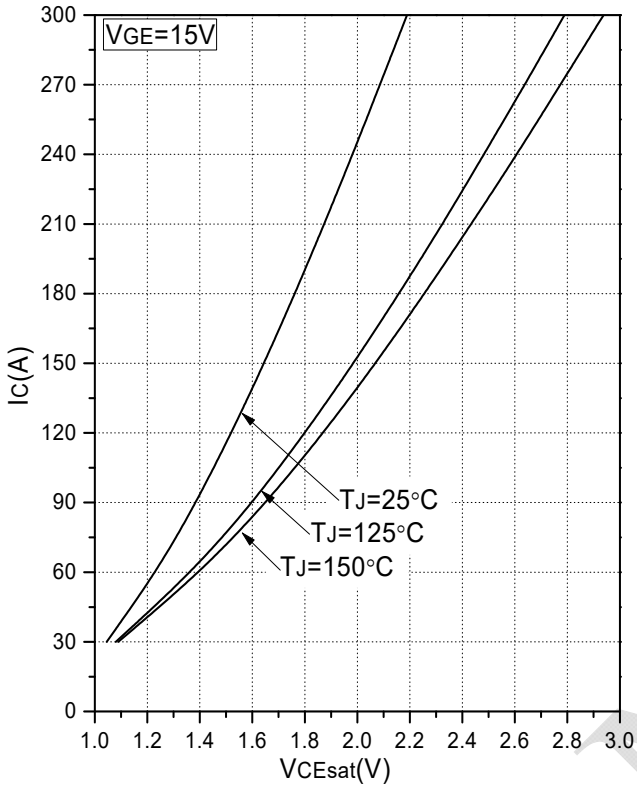


Fig.1 Typical Saturation Voltage Characteristics

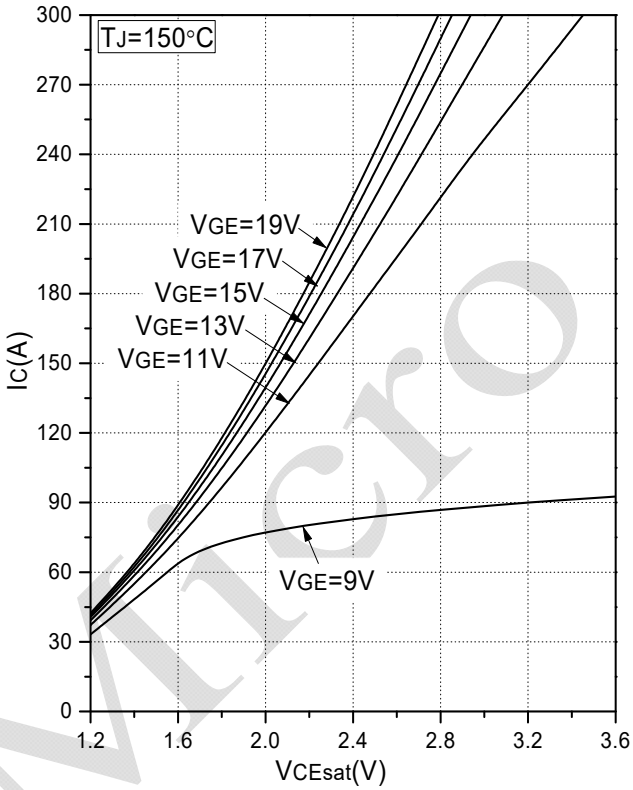


Fig.2 Typical Output Characteristics

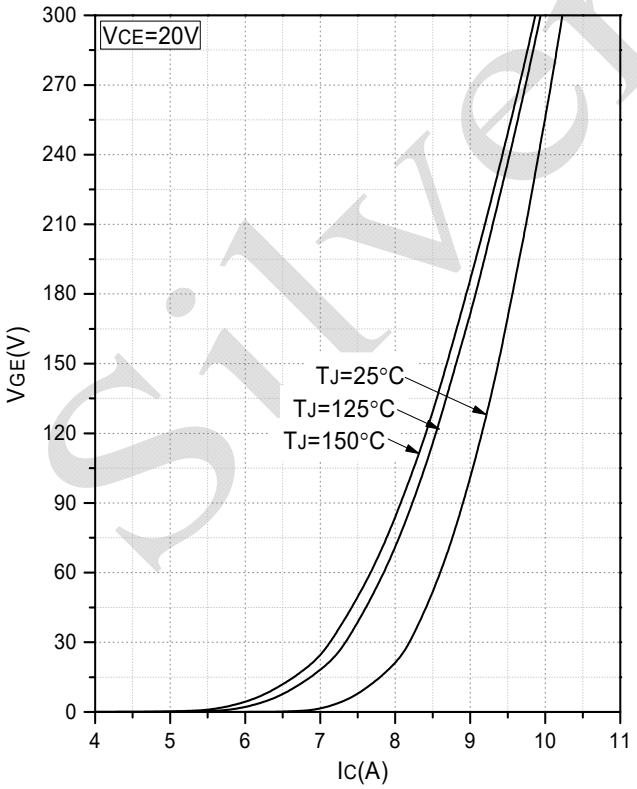


Fig.3 Transfer Characteristic

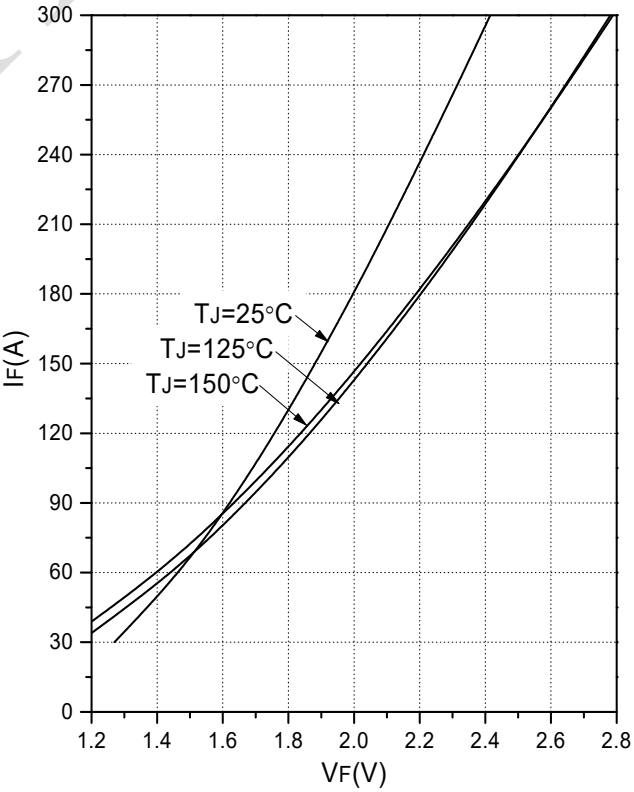


Fig.4 Forward Characteristics of Diode

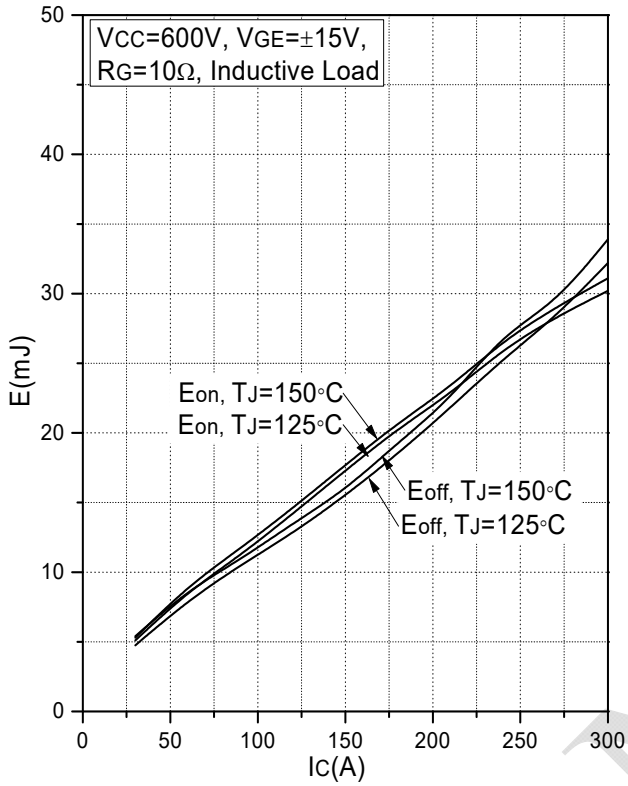


Fig.5 Typical Switching Loss vs. Collector Current

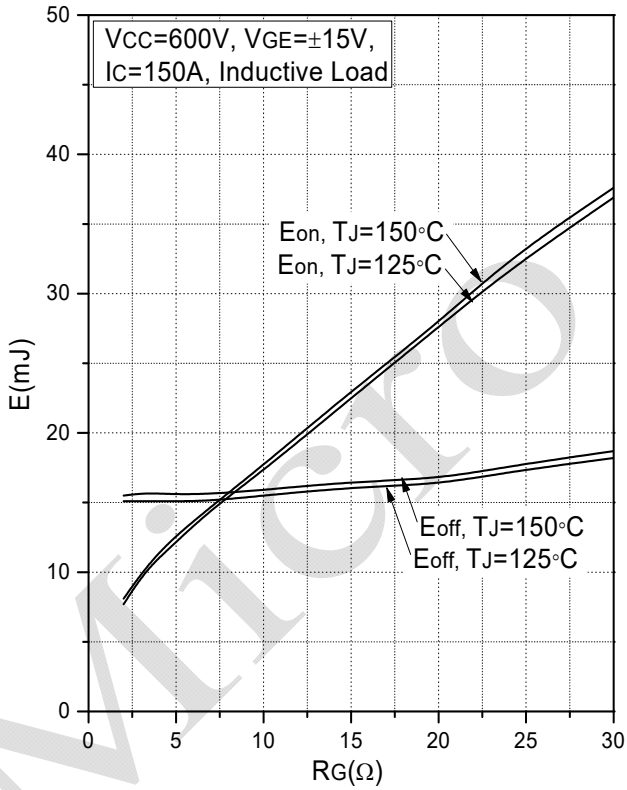


Fig.6 Typical Switching Loss vs. Gate Resistance

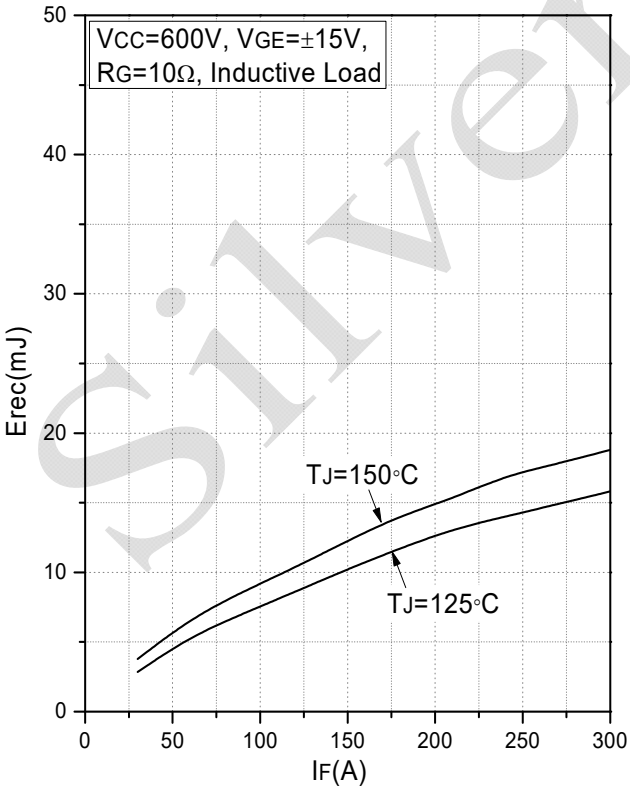


Fig.7 Typical Switching Loss vs. Forward Current

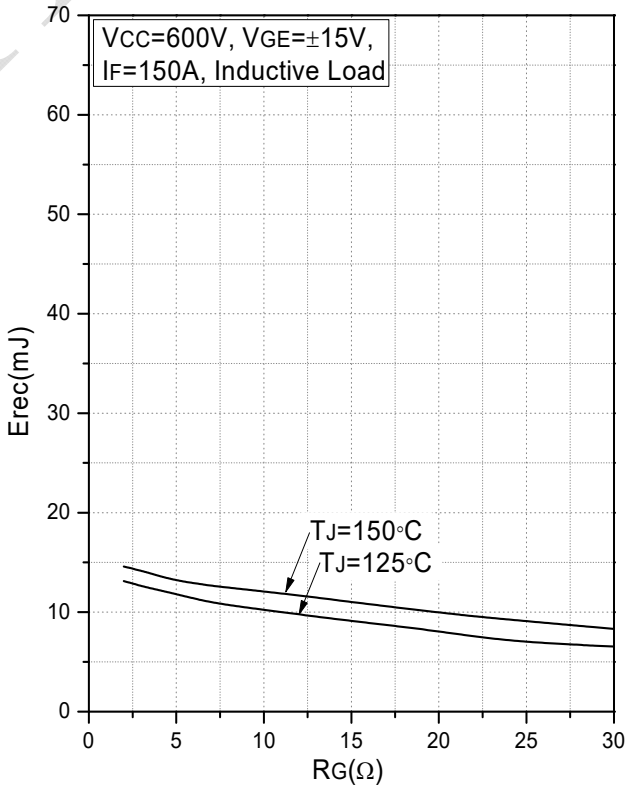


Fig.8 Typical Switching Loss vs. Gate Resistance

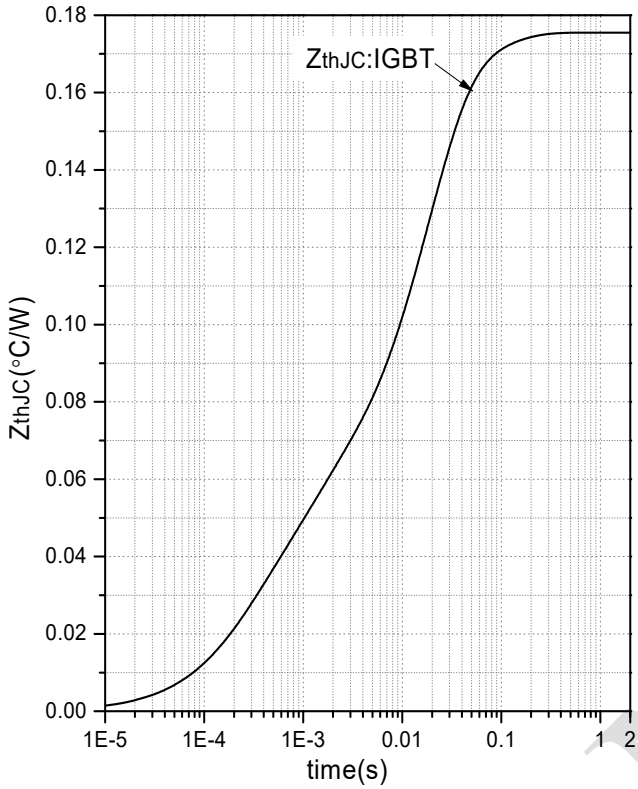


Fig.9 Transient Thermal Impedance of IGBT

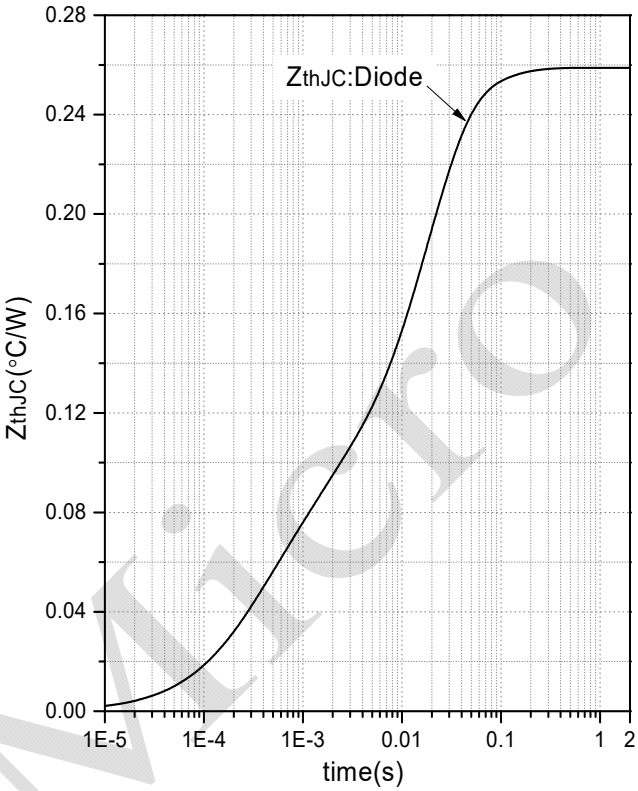


Fig.10 Transient Thermal Impedance of Diode

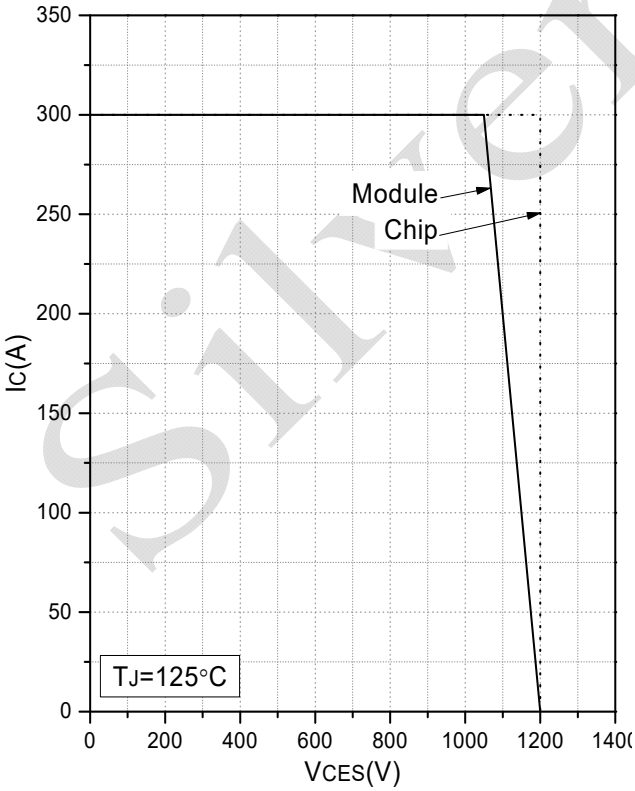


Fig.11 Reverse Bias Safe Operation Area

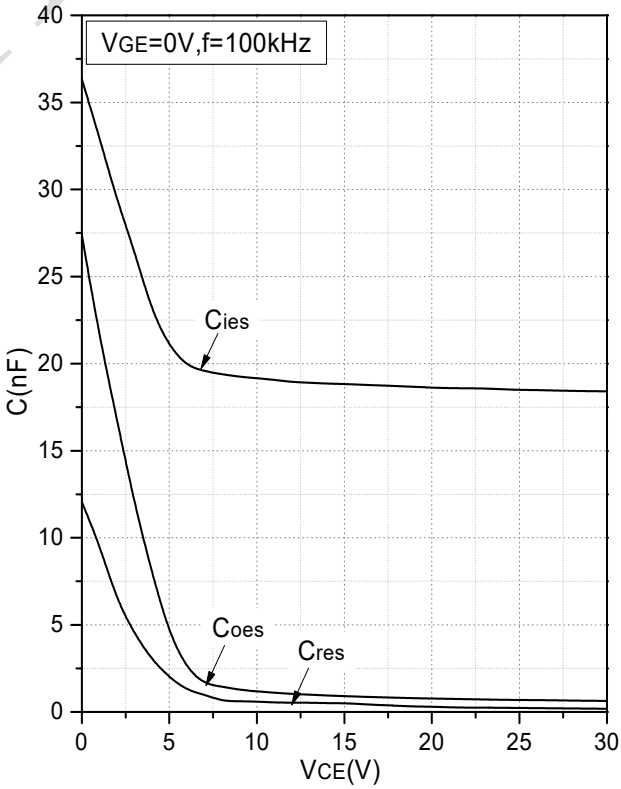


Fig.12 Capacitance Characteristics

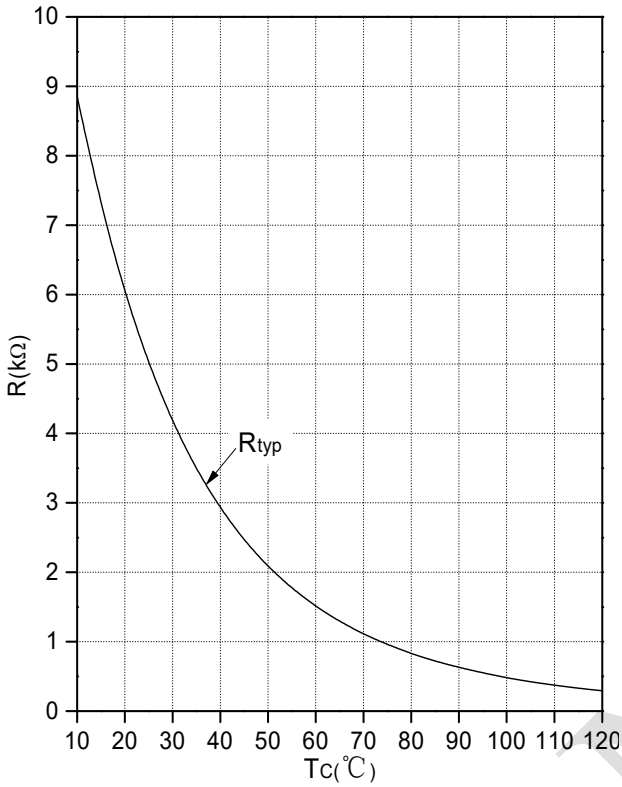
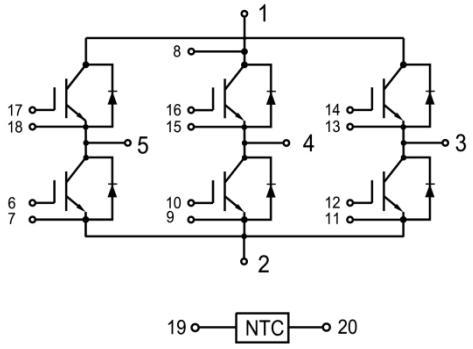
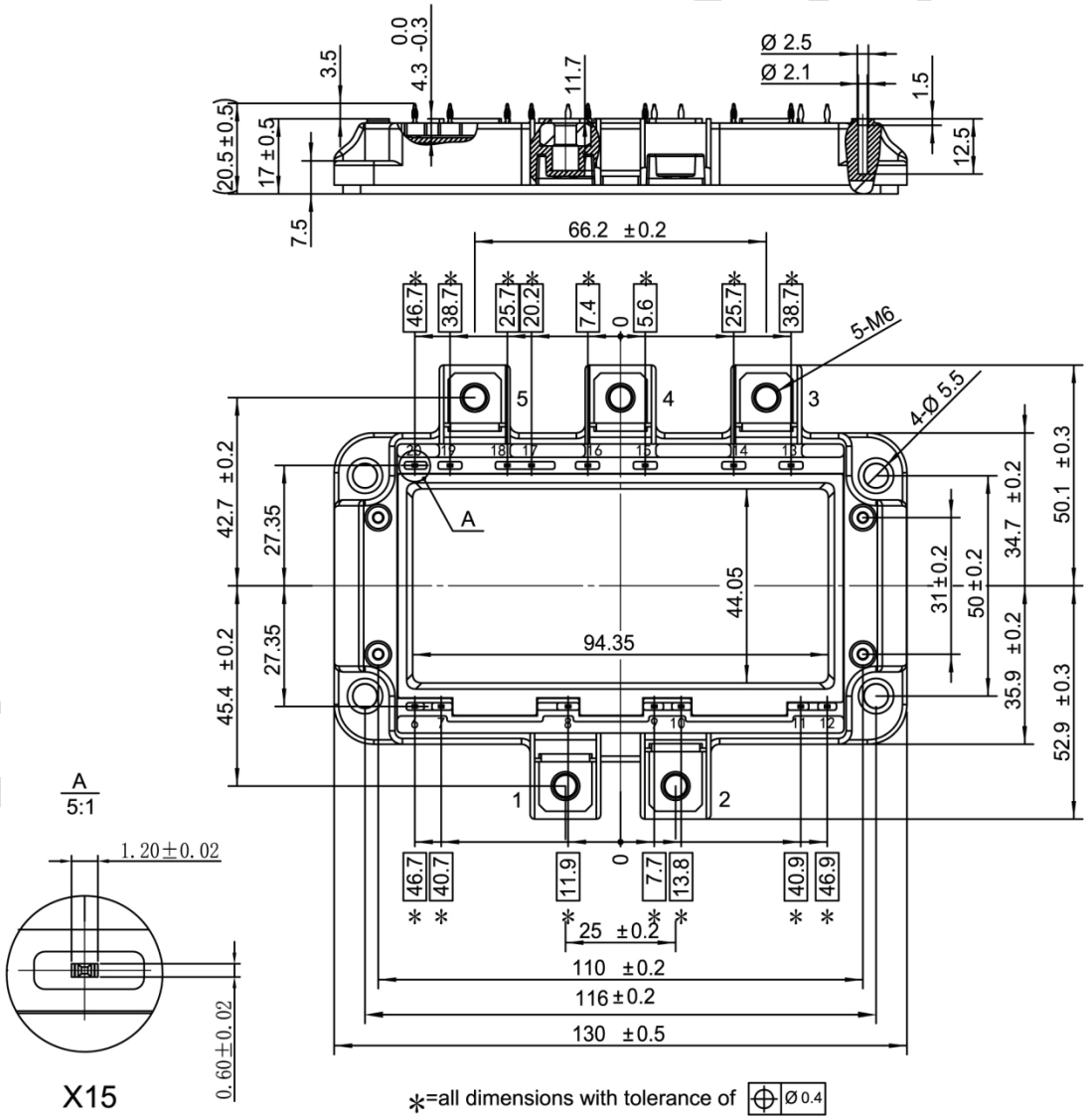


Fig.13 NTC Temperature Characteristics

Internal Circuit



Package Outline (Unit: mm):



Date	Revision	Notes
11/29/2022	A	Final Version

Announcement

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