

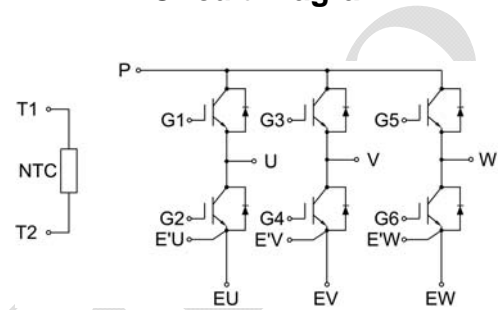
# GT25FF120B3H

## IGBT Module

### Features:

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

### Circuit Diagram



### Applications:

- Motor Drives
- Air Conditioning
- Servo Drives
- UPS

### IGBT, Inverter Maximum Rated Values

V <sub>CES</sub>	Collector-Emitter Blocking Voltage	T <sub>J</sub> =25°C	1200	V
V <sub>GES</sub>	Gate-Emitter Voltage		±20	V
I <sub>C</sub>	Continuous Collector Current	T <sub>C</sub> =100°C	25	A
		T <sub>C</sub> =25°C	50	A
I <sub>CM</sub>	Repetitive Peak Collector Current	t <sub>p</sub> =1ms	50	A
t <sub>SC</sub>	Short Circuit Withstand Time		>10	μs
P <sub>D</sub>	Maximum Power Dissipation per Leg	T <sub>C</sub> =25°C T <sub>Jmax</sub> =175°C	290	W

## Electrical Characteristics of IGBT

### Static Characteristics

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=1mA, V_{CE}=V_{GE}, T_J=25^{\circ}C$	5.0	5.6	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=25A, V_{GE}=15V$	$T_J=25^{\circ}C$	1.95	2.20	V
			$T_J=125^{\circ}C$	2.30		
			$T_J=150^{\circ}C$	2.40		
$I_{CES}$	Collector-Emitter Leakage Current	$V_{GE}=0V, V_{CE}=V_{CES}, T_J=25^{\circ}C$			1	mA
$I_{GES}$	Gate-Emitter Leakage Current	$V_{GE}=\pm 20V, V_{CE}=0V, T_J=25^{\circ}C$			200	nA
$C_{ies}$	Input Capacitance	$V_{CE}=25V, V_{GE}=0V, f=100kHz, T_J=25^{\circ}C$		1.69		nF
$C_{oes}$	Output Capacitance			0.17		
$C_{res}$	Reverse Transfer Capacitance			0.06		

### Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V, I_C=25A, R_{Gon}=20\Omega, V_{GE}=\pm 15V, \text{Inductive Load}$	$T_J=25^{\circ}C$		79		ns		
			$T_J=125^{\circ}C$		83				
			$T_J=150^{\circ}C$		83				
$t_r$	Rise Time		$V_{CC}=600V, I_C=25A, R_{Gon}=20\Omega, V_{GE}=\pm 15V, \text{Inductive Load}$	$T_J=25^{\circ}C$		46		ns	
				$T_J=125^{\circ}C$		48			
				$T_J=150^{\circ}C$		51			
$t_{d(off)}$	Turn-off Delay Time			$V_{CC}=600V, I_C=25A, R_{Goff}=20\Omega, V_{GE}=\pm 15V, \text{Inductive Load}$	$T_J=25^{\circ}C$		157		ns
					$T_J=125^{\circ}C$		167		
					$T_J=150^{\circ}C$		168		
$t_f$	Fall Time	$V_{CC}=600V, I_C=25A, R_{Goff}=20\Omega, V_{GE}=\pm 15V, \text{Inductive Load}$			$T_J=25^{\circ}C$		288		ns
					$T_J=125^{\circ}C$		327		
					$T_J=150^{\circ}C$		330		
$E_{on}$	Turn-on Switching Loss		$V_{CC}=600V, I_C=25A, R_{Gon}=20\Omega, V_{GE}=\pm 15V, di/dt=395A/\mu s (T_J=150^{\circ}C) \text{ Inductive Load}$		$T_J=25^{\circ}C$		2.36		mJ
					$T_J=125^{\circ}C$		2.79		
					$T_J=150^{\circ}C$		2.94		

E <sub>off</sub>	Turn-off Switching Loss	V <sub>CC</sub> =600V, I <sub>C</sub> =25A, R <sub>Goff</sub> =20Ω, V <sub>GE</sub> =±15V, du/dt=2600V/μs (T <sub>J</sub> =150°C) Inductive Load	T <sub>J</sub> =25°C	1.48	mJ
			T <sub>J</sub> =125°C	2.02	
			T <sub>J</sub> =150°C	2.18	
Q <sub>g</sub>	Total Gate Charge	V <sub>GE</sub> =+15V...-15V	T <sub>J</sub> =25°C	150	nC
RBSOA	I <sub>C</sub> =50A, V <sub>CC</sub> =1050V, V <sub>p</sub> =1200V, R <sub>Goff</sub> =20Ω, V <sub>GE</sub> =+15V to 0V, T <sub>J</sub> =150°C			Trapezoid	
SC Data	V <sub>CC</sub> =600V, t <sub>p</sub> =10us, V <sub>GE</sub> =+/-15V, R <sub>Gon</sub> =20Ω, R <sub>Goff</sub> =20Ω, T <sub>J</sub> =125°C			90	A
R <sub>θJC</sub>	IGBT Thermal Resistance: Junction-to-Case(per Leg)			0.517	°C/W

### Diode, Inverter Maximum Rated Values

V <sub>RRM</sub>	Repetitive Peak Reverse Voltage	T <sub>J</sub> =25°C	1200	V
I <sub>F</sub>	Diode Continuous Forward Current		25	A
I <sub>FM</sub>	Diode Maximum Forward Current	t <sub>p</sub> =1ms	50	A

### Electrical Characteristics of Diode

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
V <sub>FM</sub>	Forward Voltage	I <sub>F</sub> =25A	T <sub>J</sub> =25°C	1.85		V
			T <sub>J</sub> =125°C	1.95		
			T <sub>J</sub> =150°C	1.95		
t <sub>rr</sub>	Reverse Recovery Time		T <sub>J</sub> =25°C	59		ns
			T <sub>J</sub> =125°C	99		
			T <sub>J</sub> =150°C	119		
I <sub>rr</sub>	Peak Reverse Recovery Current	I <sub>F</sub> =25A, -diF/dt=520A/μs(T <sub>J</sub> =150°C), V <sub>rr</sub> =600V, V <sub>GE</sub> =-15V	T <sub>J</sub> =25°C	26.6		A
			T <sub>J</sub> =125°C	35.3		
			T <sub>J</sub> =150°C	36.0		
Q <sub>rr</sub>	Reverse Recovery Charge		T <sub>J</sub> =25°C	0.91		μC
			T <sub>J</sub> =125°C	1.80		
			T <sub>J</sub> =150°C	2.20		

E <sub>rec</sub>	Reverse Recovery Energy	I <sub>F</sub> =25A, -diF/dt=368A/μs(T <sub>J</sub> =150°C), V <sub>rr</sub> =600V, V <sub>GE</sub> =-15V	T <sub>J</sub> =25°C	0.72	mJ
			T <sub>J</sub> =125°C	1.36	
			T <sub>J</sub> =150°C	1.70	
R <sub>θJC</sub>	Diode Thermal Resistance: Junction-to-Case(per Leg)			0.693	°C/W

### Internal NTC-Thermistor Characteristics

R <sub>25</sub>	T <sub>C</sub> =25°C	5		kΩ
ΔR/R	T <sub>C</sub> =100°C, R <sub>100</sub> =481Ω		±5	%
P <sub>25</sub>	T <sub>C</sub> =25°C	50		mW
B <sub>25/50</sub>	$R_2=R_{25} \exp[B_{25/50}(1/T_2-1/(298.15K))]$	3380		K
B <sub>25/80</sub>	$R_2=R_{25} \exp[B_{25/80}(1/T_2-1/(298.15K))]$	3440		K

### Module

Symbol	Description	Min.	Typ.	Max.	Units
V <sub>iso</sub>	Isolation Voltage(All Terminals Shorted)   DC, 3s	3500			V
d <sub>creep</sub>	Creepage Distance: Terminal to Heatsink		11.5		mm
	Creepage Distance: Terminal to Terminal		6.3		mm
d <sub>clear</sub>	Clearance Distance: Terminal to Heatsink		10		mm
	Clearance Distance: Terminal to Terminal		5		mm
L <sub>SCE</sub>	Stray Inductance Module		25		nH
T <sub>J</sub>	Maximum Junction Temperature			175	°C
T <sub>JOP</sub>	Maximum Operating Junction Temperature Range	-40		+150	°C
T <sub>stg</sub>	Storage Temperature	-40		+125	°C
CTI	Comparative Tracking Index	200			
R <sub>θCS</sub>	Case-to-Sink Thermally (Conductive Grease Applied)			0.08	°C/W
M	Mounting Screw:M4	1.5		1.8	N·m
G	Weight		23		g

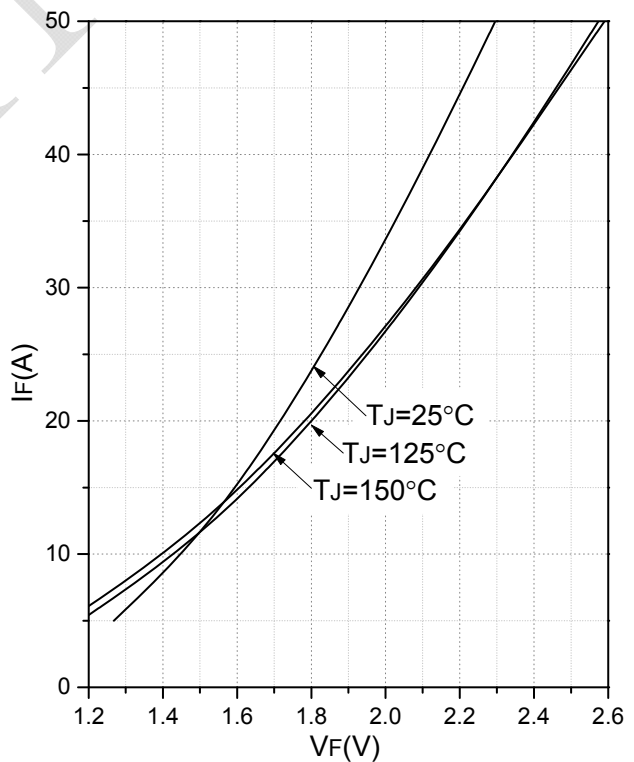
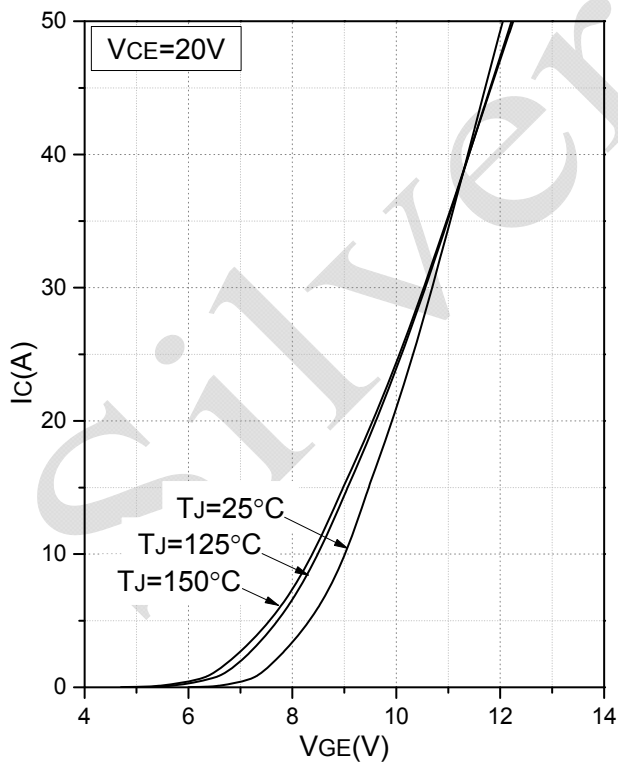
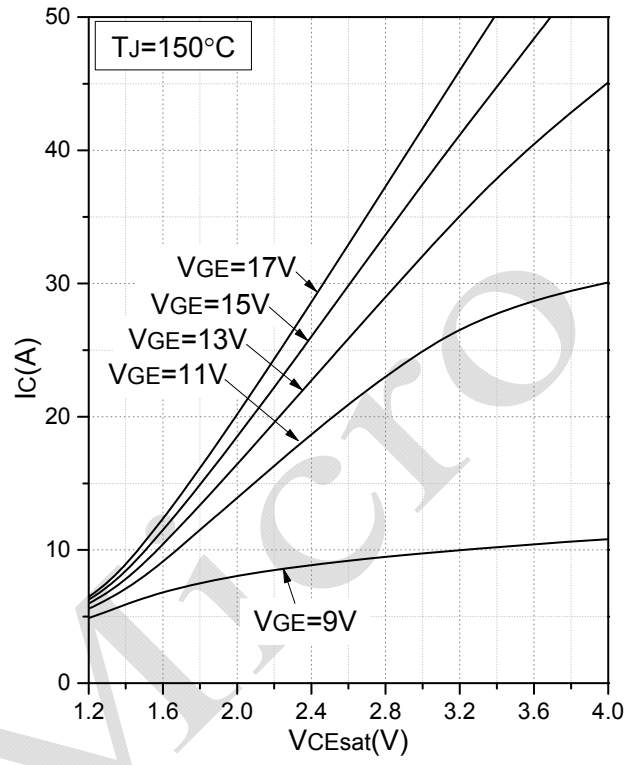
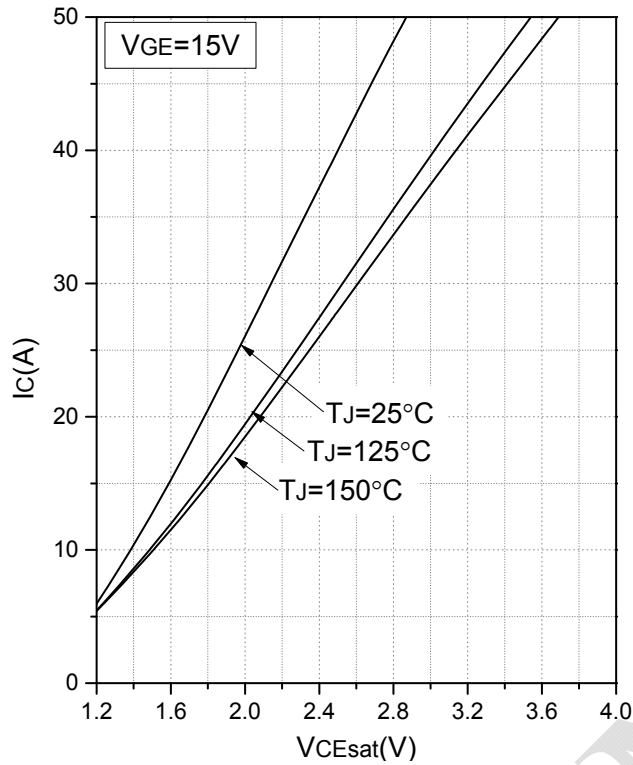
## Ordering Information Table

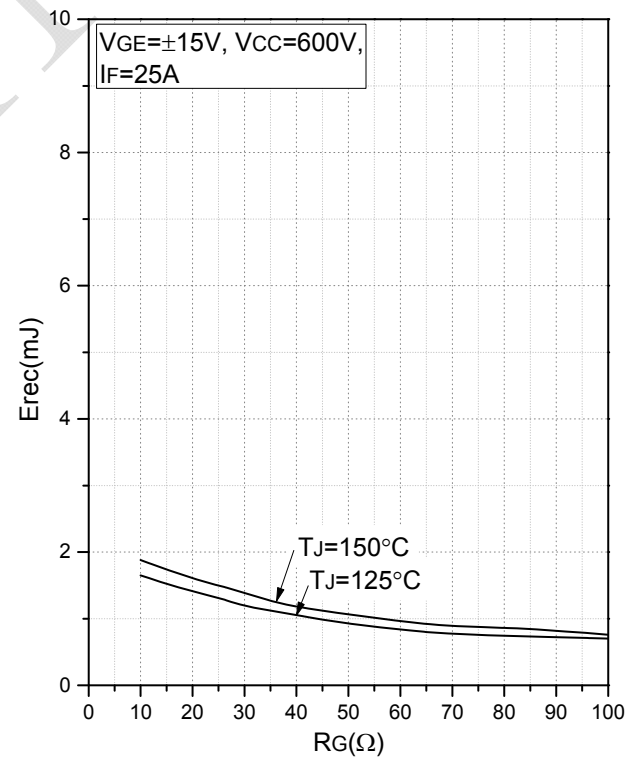
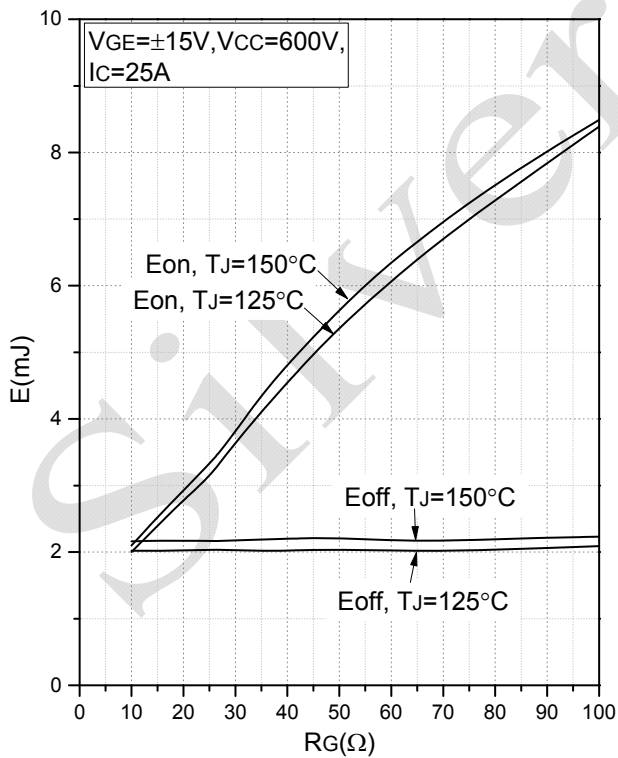
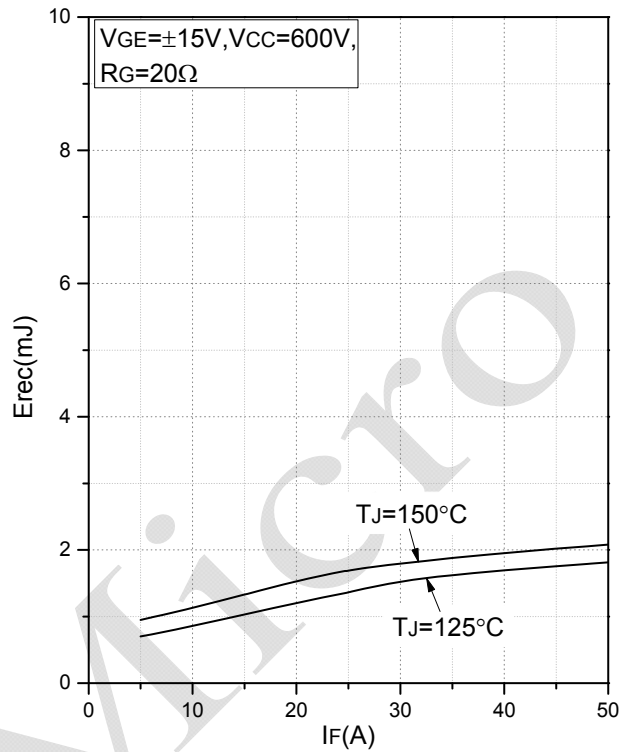
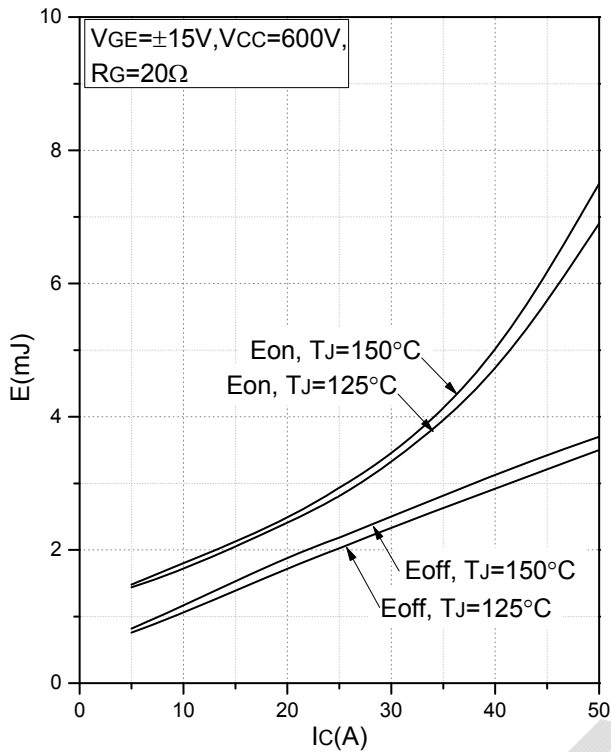
Device code

G	T	25	FF	120	B3	H
①	②	③	④	⑤	⑥	⑦

- ① - IGBT Module
- ② - Trench, Low Switching Losses IGBT
- ③ - Rated Current (25=25A)
- ④ - Circuit Configuration: Full Bridge
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

SilverMicro





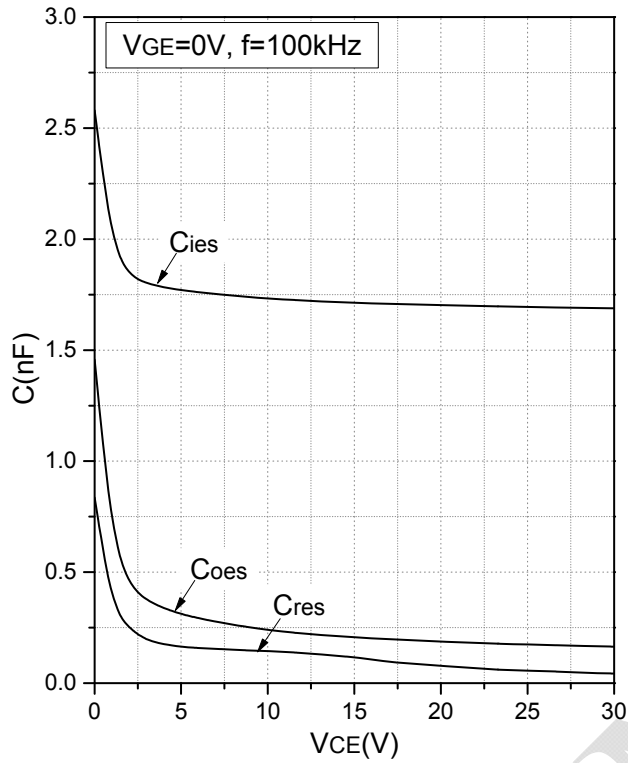


Fig.9 Capacitance Characteristics

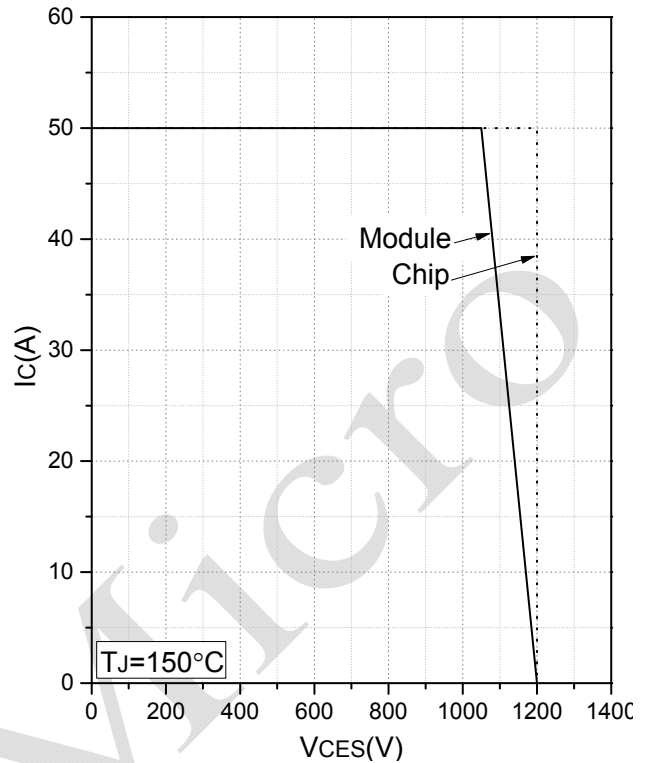


Fig.10 Reverse Bias Safe Operation Area

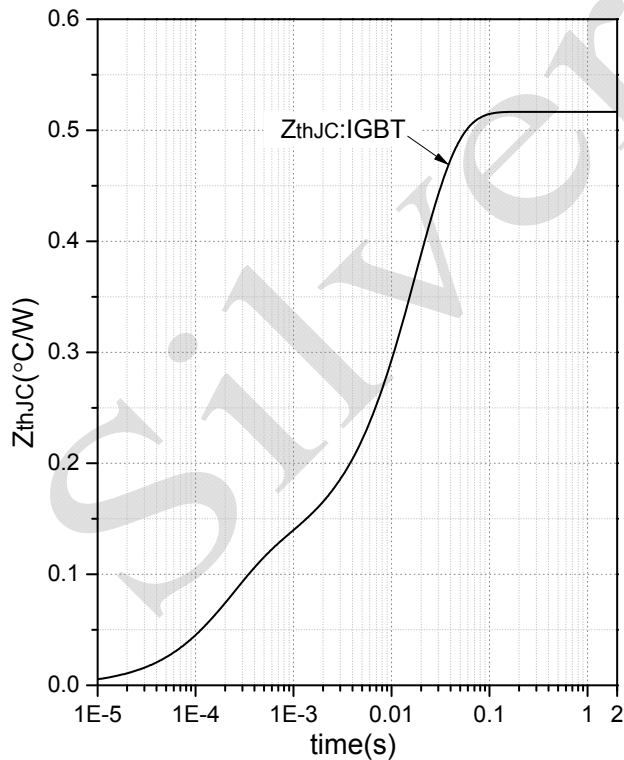


Fig.11 Transient Thermal Impedance (IGBT)

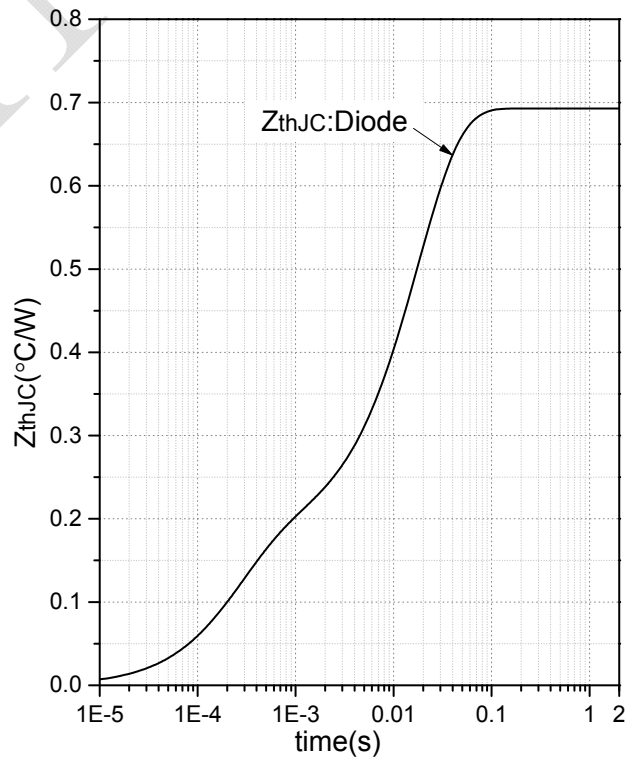


Fig.12 Transient Thermal Impedance (Diode)



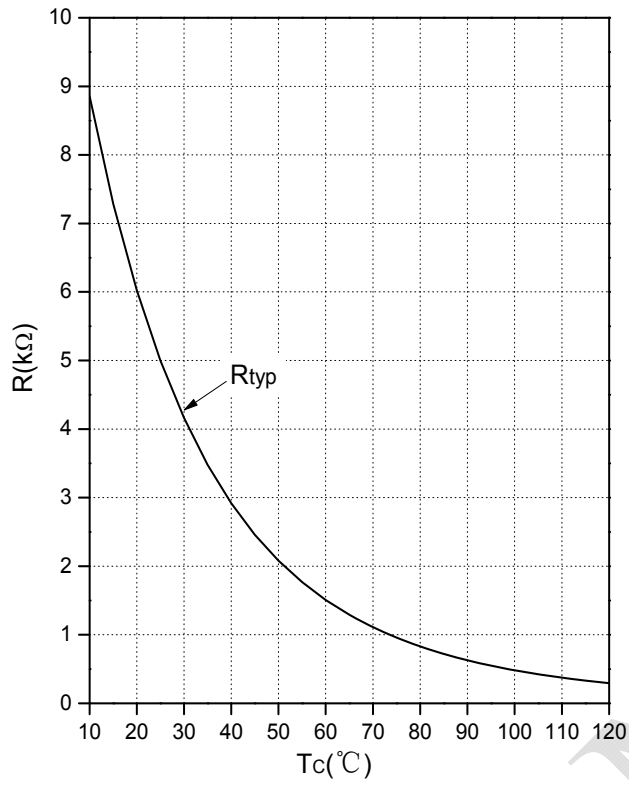


Fig.13 NTC Temperature Characteristics



Date	Revision	Notes
04/15/2022	A	Final Version

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