



GT300HF65T9H

IGBT Module

Preliminary Data

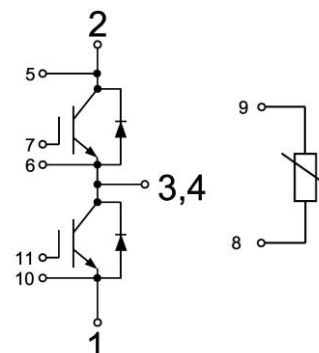
Features:

- Trench & Field Stop IGBT
- Short Circuit Rated $>10\mu\text{s}$
- Low Switching Loss
- 100% RBSOA Tested($2\times I_c$)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement

Applications:

- UPS System
- Motor Drives
- Servo Drives
- Wind Turbines

Circuit Diagram



IGBT, Inverter

Maximum Rated Values ($T_c=25^\circ\text{C}$ unless otherwise specified)

V_{CES}	Collector-Emitter Blocking Voltage		650	V
V_{GES}	Gate-Emitter Voltage		± 20	V
I_c	Continuous Collector Current	$T_c=100^\circ\text{C}$	300	A
		$T_c=25^\circ\text{C}$	371	A
I_{CM}	Peak Collector Current Repetitive	$t_p=1\text{ms}$	600	A
P_D	Maximum Power Dissipation (IGBT)	$T_c=25^\circ\text{C}$ $T_J=175^\circ\text{C}$	1113	W



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

Static Characteristics

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V _{GE(th)}	Gate-Emitter Threshold Voltage	I _C =4mA, V _{CE} =V _{GE}		4.0	4.7	6.0	V
V _{CE(sat)}	Collector-Emitter Saturation Voltage	I _C =300A, V _{GE} =15V	T _J =25℃		1.50	1.80	V
			T _J =125℃		1.70		V
			T _J =150℃		1.75		V
I _{CES}	Collector-Emitter Leakage Current	V _{GE} =0V, V _{CE} =V _{CES} , T _J =25℃				1	mA
I _{GES}	Gate-Emitter Leakage Current	V _{GE} =20V, V _{CE} =0V, T _J =25℃				400	nA
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f=100kHz			18.4		nF
C _{oes}	Output Capacitance				1.44		nF
C _{res}	Reverse Transfer Capacitance				0.55		nF

Switching Characteristics

t _{d(on)}	Turn-on Delay Time	V _{CC} =300V, I _C =300A, R _{Gon} =4.7Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		412		ns
			T _J =125℃		417		
			T _J =150℃		421		
t _r	Rise Time		T _J =25℃		217		ns
			T _J =125℃		220		
			T _J =150℃		226		
t _{d(off)}	Turn-off Delay Time		T _J =25℃		432		ns
			T _J =125℃		436		
			T _J =150℃		438		
t _f	Fall Time	T _J =25℃		118		ns	
		T _J =125℃		129			
		T _J =150℃		130			
E _{on}	Turn-on Switching Loss	V _{CC} =300V, I _C =300A, R _{Gon} =4.7Ω, V _{GE} =±15V, di/dt=1134A/μs (T _J =150℃) Inductive Load	T _J =25℃		8.2		mJ
		T _J =125℃		10.4			
		T _J =150℃		10.8			



E _{off}	Turn-off Switching Loss	V _{CC} =300V, I _C =300A, R _{Goff} =4.7Ω, V _{GE} =±15V, du/dt=2160V/μs (T _J =150°C) Inductive Load	T _J =25°C		12.5		mJ
			T _J =125°C		15.8		
			T _J =150°C		17.2		
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C		1.47		μC
R _{g internal}	Internal Gate Resistance		T _J =25°C		1		Ω
SCSOA	V _{CC} =300V, V _{GE} =±15V, T _J =150°C			6			μs
R _{θJC}	IGBT Thermal Resistance: Junction-to-Case (per IGBT)					0.13	°C/W

FWD, Inverter

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

V _{RRM}	Repetitive Peak Reverse Voltage	T _J =25°C	650	V
I _F	Diode Continuous Forward Current		300	A
I _{FM}	Peak Diode Current Repetitive	t _p =1ms	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°C		1.58		V
			T _J =125°C		1.65		
			T _J =150°C		1.60		
t _{rr}	Reverse Recovery Time	I _F =300A, -diF/dt=1449A/μs(T _J =150°C), V _R =300V, V _{GE} =-15V	T _J =25°C		125		ns
			T _J =125°C		169		
			T _J =150°C		174		
I _{rr}	Peak Reverse Recovery Current		T _J =25°C		80		A
			T _J =125°C		113		
			T _J =150°C		122		
Q _{rr}	Reverse Recovery Charge		T _J =25°C		6.0		μC
			T _J =125°C		11.6		
			T _J =150°C		12.8		



E _{rec}	Reverse Recovery Energy	I _F =300A, -diF/dt=1449/μs(T _J =150℃), V _R =300V, V _{GE} =-15V	T _J =25℃		0.6		mJ
			T _J =125℃		2.0		
			T _J =150℃		2.4		
R _{θJC}	Diode Thermal Resistance: Junction-to-Case (per Diode)					0.18	℃/W

Internal NTC-Thermistor Characteristics

Symbol	Description	Min.	Typ.	Max.	Units
R ₂₅	T _C =25°C		5		kΩ
△R/R	T _C =100°C, R ₁₀₀ =465Ω	-5		5	%
P ₂₅	T _C =25°C			10	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
B _{25/100}	$R_2=R_{25} \exp[B_{25/100}(1/T_2-1/(298.15K))]$		3545		K

Module

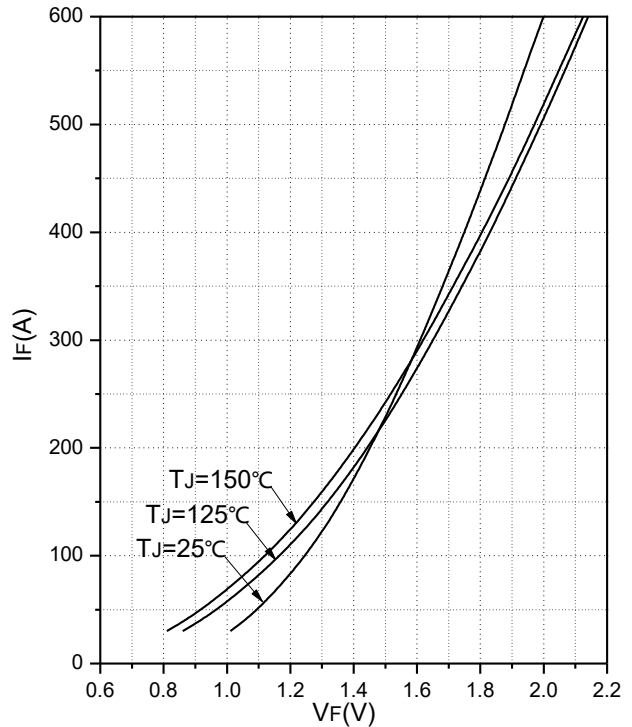
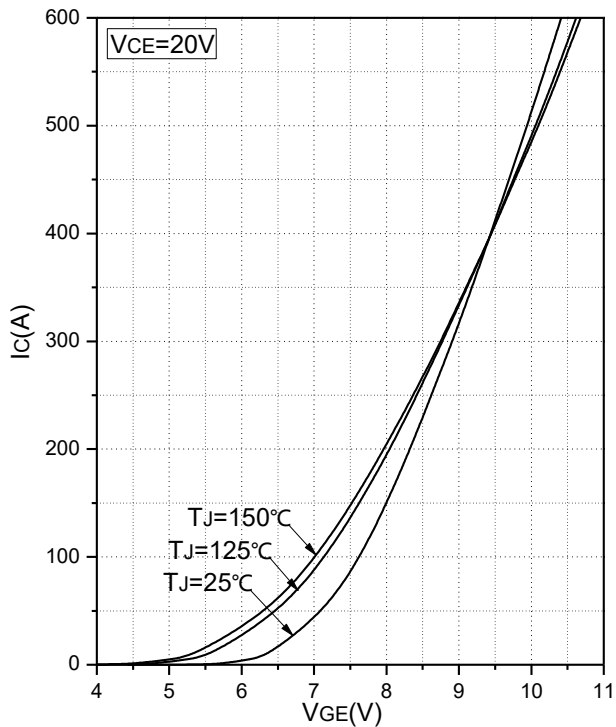
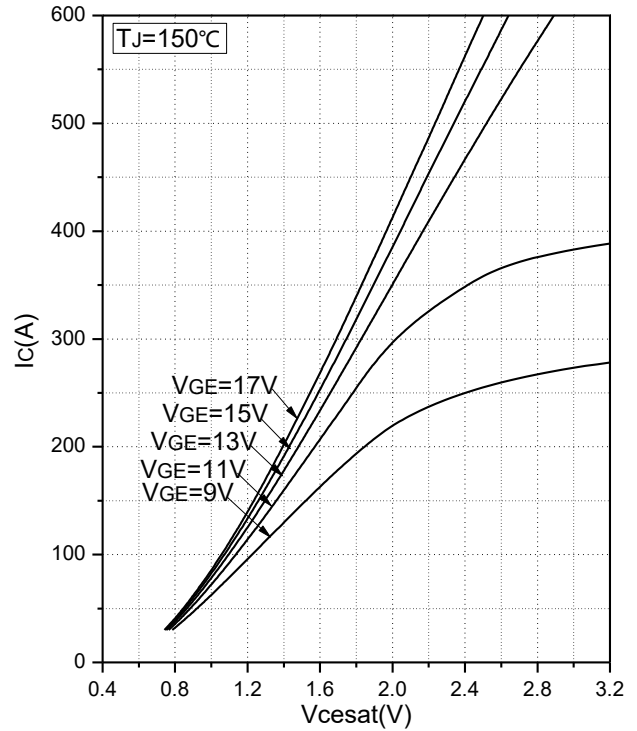
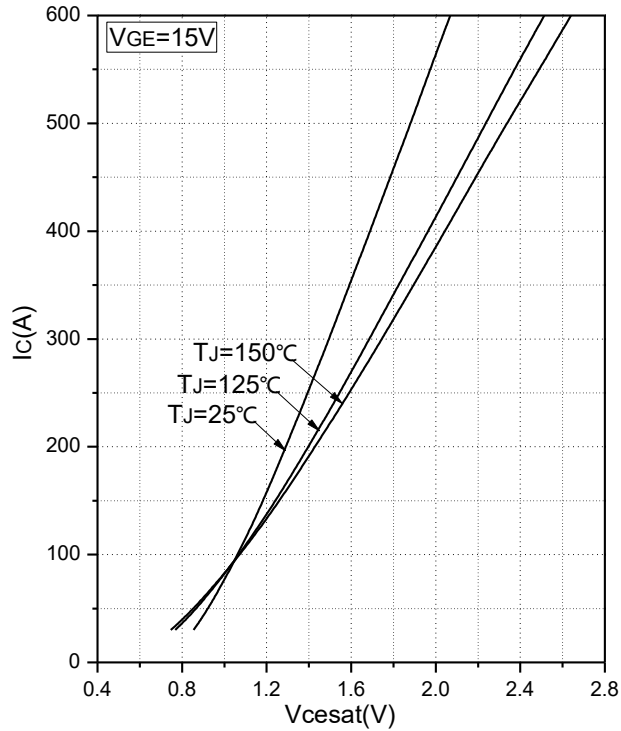
Symbol	Description		Min.	Typ.	Max.	Units
V _{iso}	Isolation Voltage (All Terminals Shorted)	RMS, f=50Hz, 1minute	2500			V
T _J	Maximum Junction Temperature				175	°C
T _{JOP}	Maximum Operating Junction Temperature Range		-40		+150	°C
T _{stg}	Storage Temperature		-40		+125	°C
CTI	Comparative Tracking Index		200			
R _{θCS}	Case-to-Sink Thermally (Conductive Grease Applied)				0.03	°C/W
M	Power Terminals Screw:M6		4.0		5.0	N·m
M	Mounting Screw:M5		3.0		6.0	N·m
G	Weight			330		g



Ordering Information Table

Device code	G	T	300	HF	65	T9	H
	①	②	③	④	⑤	⑥	⑦

- ①- IGBT Module
- ②- Field Stop Trench Gate IGBT
- ③- Rated Current (300=300A)
- ④- Circuit Configuration (Half Bridge)
- ⑤- Rated Voltage (65=650V)
- ⑥- Package Type
- ⑦- Test Level (Pass the Important Reliability Test-Industrial Grade)



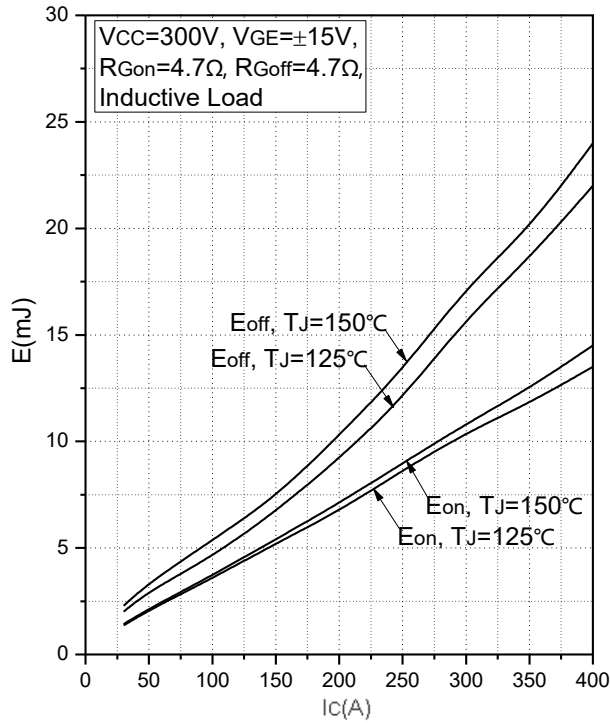


Fig.5 Typical Switching Loss vs. Collector Current

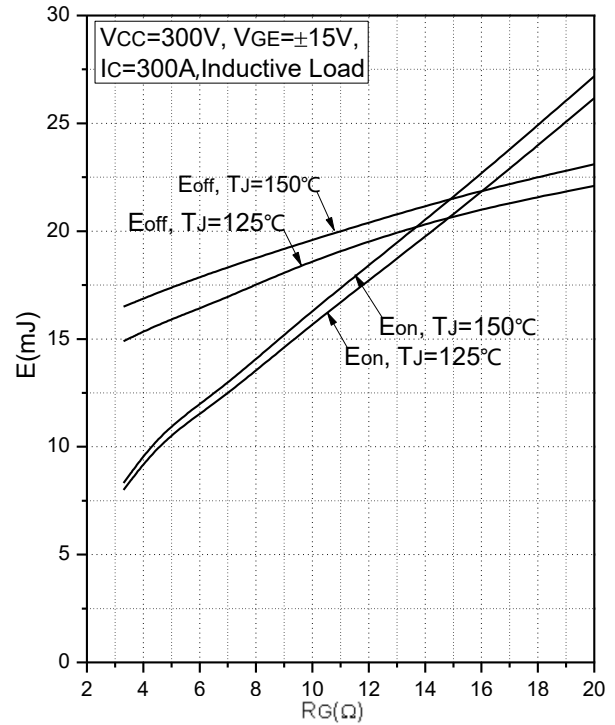


Fig.6 Typical Switching Loss vs. Gate Resistance

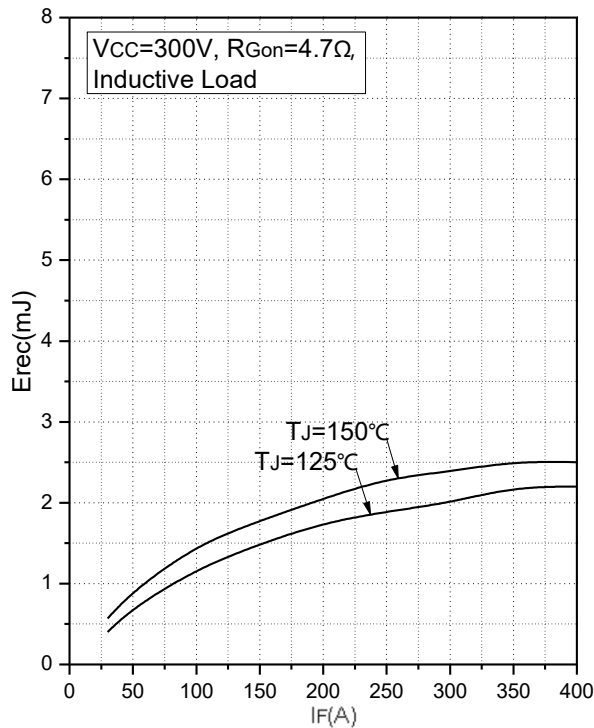


Fig.7 Typical Switching Loss vs. Forward Current

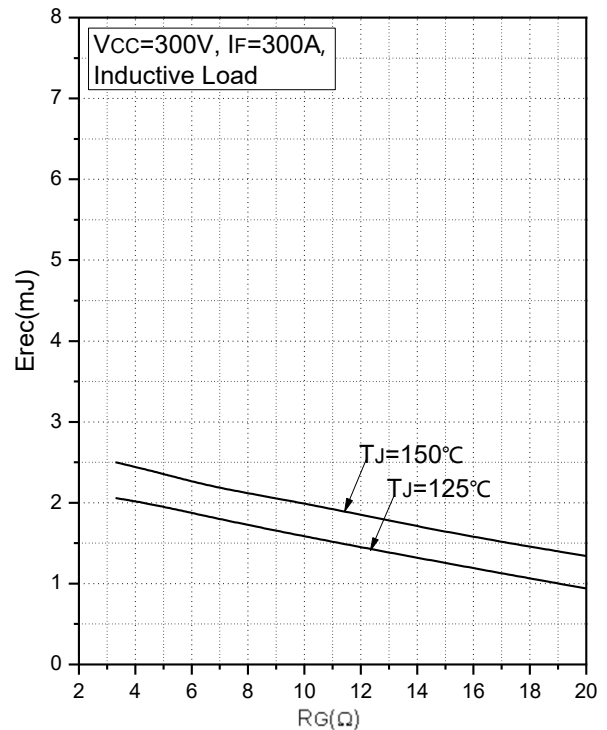


Fig.8 Typical Switching Loss vs. Gate Resistance

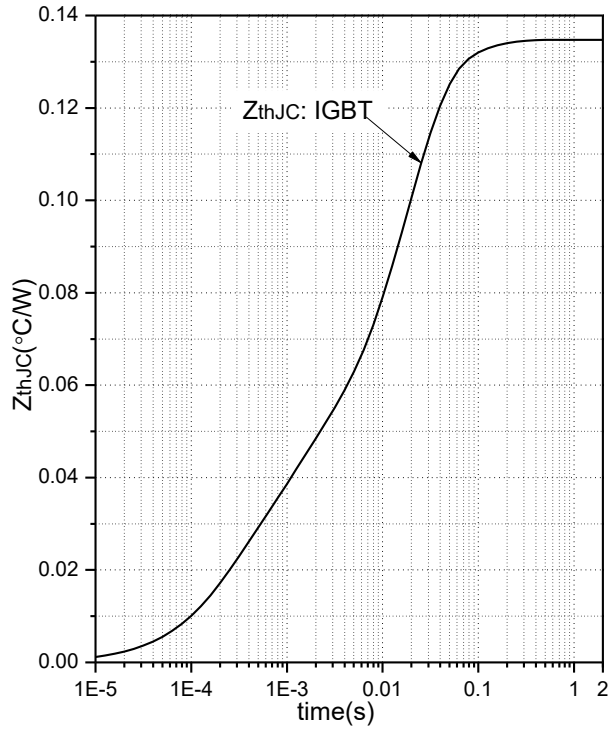


Fig.9 Transient Thermal Impedance (IGBT)

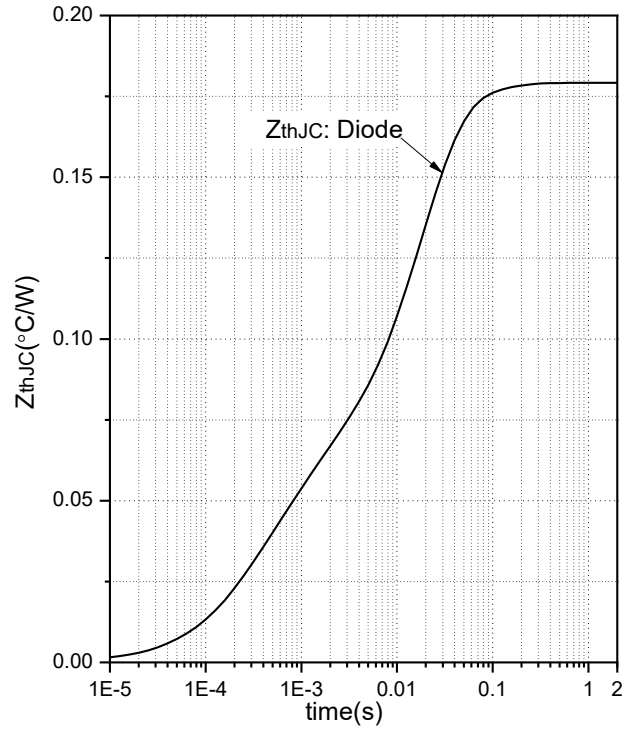


Fig.10 Transient Thermal Impedance (Diode)

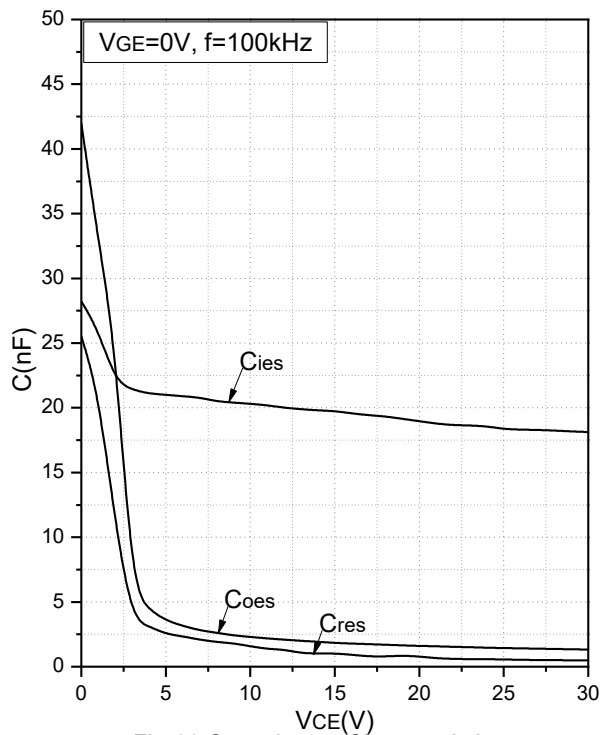


Fig.11 Capacitance Characteristics

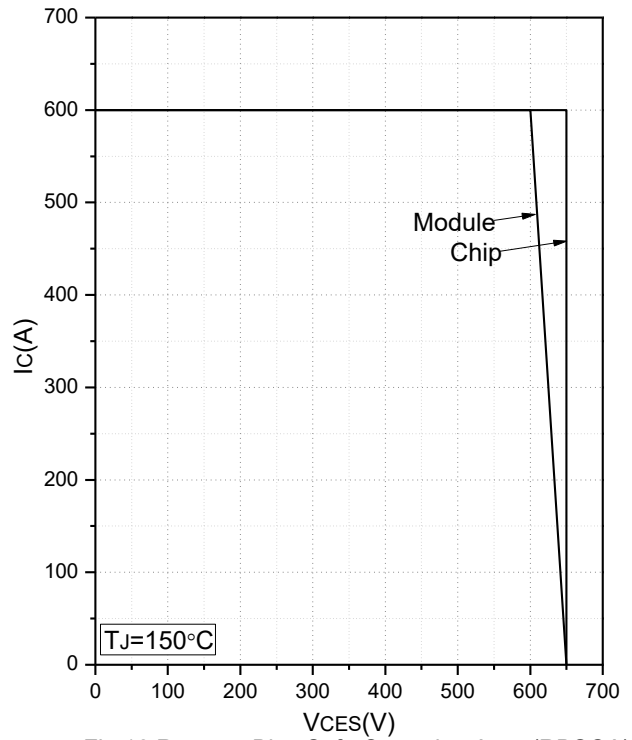


Fig.12 Reverse Bias Safe Operation Area (RBSOA)

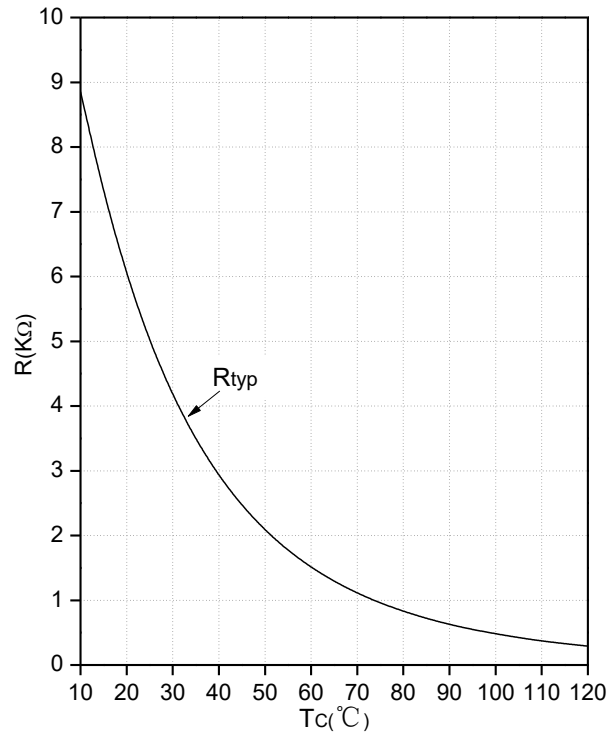


Fig.13 NTC Temperature Characteristics



Revision	Notes
01	Initial Release

Announcement

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