

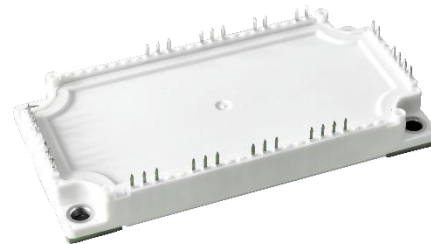
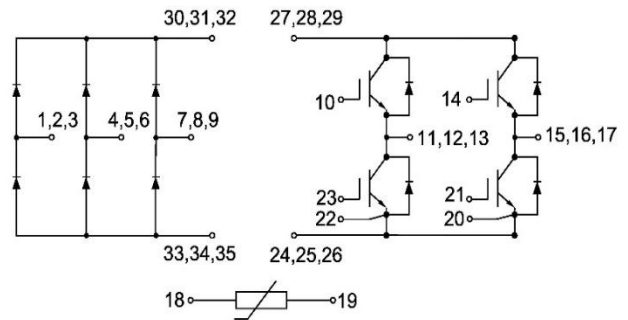
GT75RHH170T6H

IGBT Module

Circuit Diagram

Features:

- $V_{CES}=1700V$ $I_C=75A$ Trench & Field Stop IGBT Module
- Short Circuit Capability
- Low Saturation Voltage
- Low Switching Loss
- 100% RBSOA Tested($2 \times I_C$)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement



Applications:

- High Power Converters
- Medium Voltage Converters

Type	Package	Marking
GT75RHH170T6H	T6	GT75RHH170T6H

IGBT, Inverter

Maximum Rated Values ($T_C=25^\circ C$ unless otherwise specified)

V_{CES}	Collector-Emitter Blocking Voltage		1700	V
V_{GES}	Gate-Emitter Voltage		± 20	V
I_C	Continuous Collector Current, Limited by T_{Jmax}	$T_C=90^\circ C$	75	A
		$T_C=25^\circ C$	150	A
I_{CM}	Peak Collector Current Repetitive	t_p limited by T_{Jmax}	150	A
P_D	Maximum Power Dissipation (IGBT)	$T_C=25^\circ C, T_{Jmax}=150^\circ C$	570	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 =3mA, V _{CE} =V _{GE}		5.3	6.0	6.7	V
V _{CE(sat)}	Collector-Emitter Saturation Voltage	I _C =75A, V _{GE} =15V	T _J =25°C		1.70	2.10	V
			T _J =125°C		2.12		V
			T _J =150°C		2.20		V
I _{CES}	Collector-Emitter Leakage Current	V _{GE} =0V, V _{CE} =1700V, T _J =25°C				1	mA
I _{GES}	Gate-Emitter Leakage Current	V _{GE} =20V, V _{CE} =0V, T _J =25°C				400	nA
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f=100kHz			7220		pF
C _{oes}	Output Capacitance				690		pF
C _{res}	Reverse Transfer Capacitance				95		pF

Switching Characteristics

$t_{d(ON)}$	Turn-on Delay Time	$V_{CC}=900V, I_C=75A,$ $R_{Gon}=4.7\Omega, V_{GE}=+15V/-15V,$ Inductive Load	$T_J=25^{\circ}C$		118		ns
			$T_J=125^{\circ}C$		133		
			$T_J=150^{\circ}C$		134		
t_r	Rise Time		$T_J=25^{\circ}C$		35		ns
			$T_J=125^{\circ}C$		42		
			$T_J=150^{\circ}C$		45		
$t_{d(OFF)}$	Turn-off Delay Time	$V_{CC}=900V, I_C=75A,$ $R_{Goff}=4.7\Omega, V_{GE}=+15V/-15V,$ Inductive Load	$T_J=25^{\circ}C$		366		ns
			$T_J=125^{\circ}C$		399		
			$T_J=150^{\circ}C$		416		
t_f	Fall Time		$T_J=25^{\circ}C$		252		ns
			$T_J=125^{\circ}C$		337		
			$T_J=150^{\circ}C$		468		
E_{on}	Turn-on Switching Loss	$V_{CC}=900V, I_C=75A,$ $R_{Gon}=4.7\Omega, V_{GE}=+15V/-15V,$ $di/dt=1700A/\mu s(T_J=150^{\circ}C)$ Inductive Load	$T_J=25^{\circ}C$		15		mJ
			$T_J=125^{\circ}C$		22		
			$T_J=150^{\circ}C$		24		

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E _{off}	Turn-off Switching Loss	V _{CC} =900V, I _C =75A, R _{Goff} =4.7Ω, V _{GE} =+15V/-15V, du/dt=5000V/μs(T _J =150°C) Inductive Load	T _J =25°C		17		mJ
			T _J =125°C		22		
			T _J =150°C		23		
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C		594		nC
R _{G (int)}	Internal Gate Resistance		T _J =25°C		6.0		Ω
T _{SC}	V _{CC} =900V, V _{GE} =±15V, T _J =150°C ^{note1}					10	us
R _{θJC}	IGBT Thermal Resistance: Junction-to-Case (per IGBT)					0.216	°C/W
R _{θCS}	IGBT Thermal Resistance: Case-to-Sink (per IGBT) (per IGBT, λ _{grease} = 1 W/(m · K))				0.184	;	°C/W

note1: Short circuit withstand time cannot exceed 10us under specified condition.

Diode, Inverter

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

V _{RRM}	Repetitive Peak Reverse Voltage	T _J =25°C	1700	V
I _F	Diode Continuous Forward Current		75	A
I _{FM}	Diode Maximum Forward Current	t _p =1ms	150	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 =75A	T _J =25°C		1.93	2.05	V
			T _J =125°C		2.21		
			T _J =150°C		2.21		
t _{rr}	Reverse Recovery Time	I _F =75A, -diF/dt=1600A/μs(T _J =150°C), V _R =900V, V _{GE} =-15V	T _J =25°C		510		ns
			T _J =125°C		531		
			T _J =150°C		592		
I _{rr}	Peak Reverse Recovery Current		T _J =25°C		68		A
			T _J =125°C		63		
			T _J =150°C		66		
Q _{rr}	Reverse Recovery Charge		T _J =25°C		14		μC
			T _J =125°C		21		
			T _J =150°C		26		

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E _{rec}	Reverse Recovery Energy	I _F =75A, -diF/dt=1600A/μs(T _J =150°C), V _R =900V, V _{GE} =-15V	T _J =25°C		10		mJ
			T _J =125°C		15		
			T _J =150°C		20		
R _{θJC}	Diode Thermal Resistance: Junction-to-Case (per Diode)					0.553	°C/W
R _{θCS}	Diode Thermal Resistance: Case-to-Sink (per Diode, λ _{grease} = 1 W/(m • K))				0.471		°C/W

Diode, Rectifier

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

V_{RRM}	Repetitive Peak Reverse Voltage	$T_J=25^{\circ}C$	1800	V
I_{FRMSM}	Maximum RMS Forward Current per Chip	$T_J=80^{\circ}C$	180	A
I_{RMSM}	Maximum RMS Forward Current at Rectifier Output	$T_J=80^{\circ}C$	240	A
I_{FSM}	Surge Current @ $t_p=10ms$	$T_J=25^{\circ}C$	2400	A
		$T_J=150^{\circ}C$	1920	
I^2t	I^2t - value	$T_J=25^{\circ}C$	28800	A^2s
		$T_J=150^{\circ}C$	18432	

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

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V_F	Forward Voltage	$I_F=75A$	$T_J=25^{\circ}C$		1.02		V
			$T_J=125^{\circ}C$		0.95		
			$T_J=150^{\circ}C$		0.93		
I_R	Reverse Current	$V_R=1800V$	$T_J=25^{\circ}C$			1	mA
$R_{\theta JC}$	Thermal Resistance: Junction-to-Case (per Diode)					0.151	$^{\circ}C/W$
$R_{\theta CS}$	Diode Thermal Resistance: Case-to-Sink (per Diode, $\lambda_{grease} = 1 W/(m \cdot K)$)				0.129		$^{\circ}C/W$

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Module

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
V _{iso}	Isolation Voltage (All Terminals Shorted)	RMS, f=50Hz, 60s	3400			V
T _J	Maximum Junction Temperature		-40		150	°C
T _{JOP}	Maximum Operating Junction Temperature Range		-40		150	°C
T _{stg}	Storage Temperature		-40		125	°C
CTI	Comparative Tracking Index		200			
M	Mounting Screw:M5		3.0		6.0	N·m
G	Weight			300		g

Ordering Information Table

Device code

G	T	75	RHH	170	T6	H
①	②	③	④	⑤	⑥	⑦

- ① - IGBT Module
- ② - Trench, Low Switching Losses IGBT
- ③ - Rated Current (75=75A)
- ④ - Circuit Configuration (Rectifier + H Bridge)
- ⑤ - Rated Voltage (170=1700V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)



Characteristic diagram

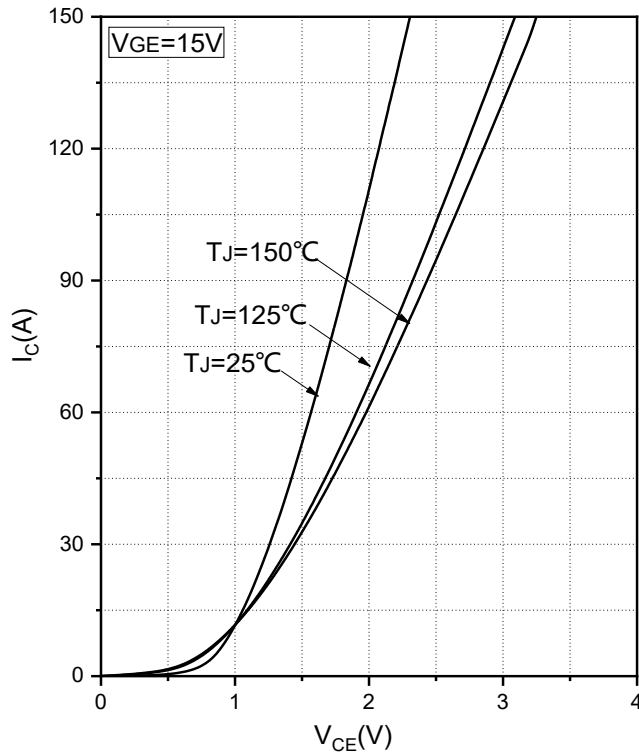


Fig.1 Typical Saturation Voltage Characteristics

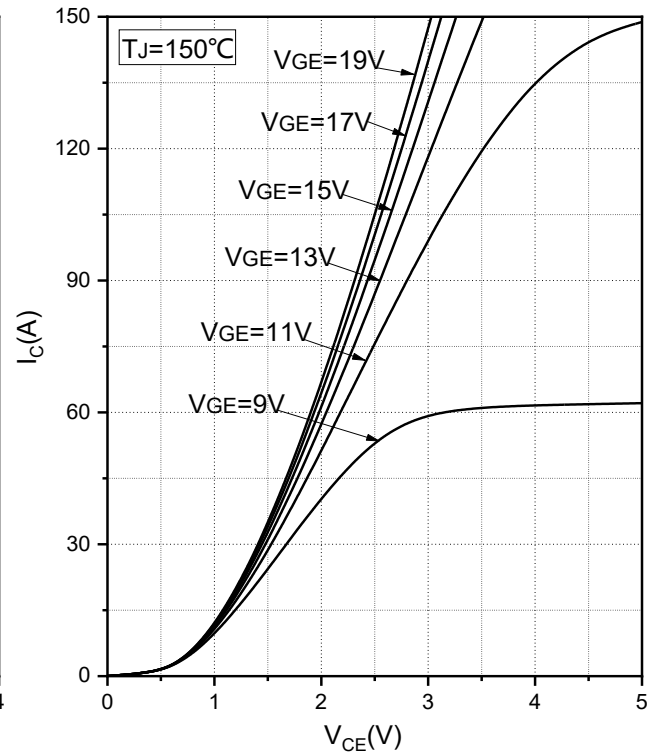


Fig.2 Typical Output Characteristics

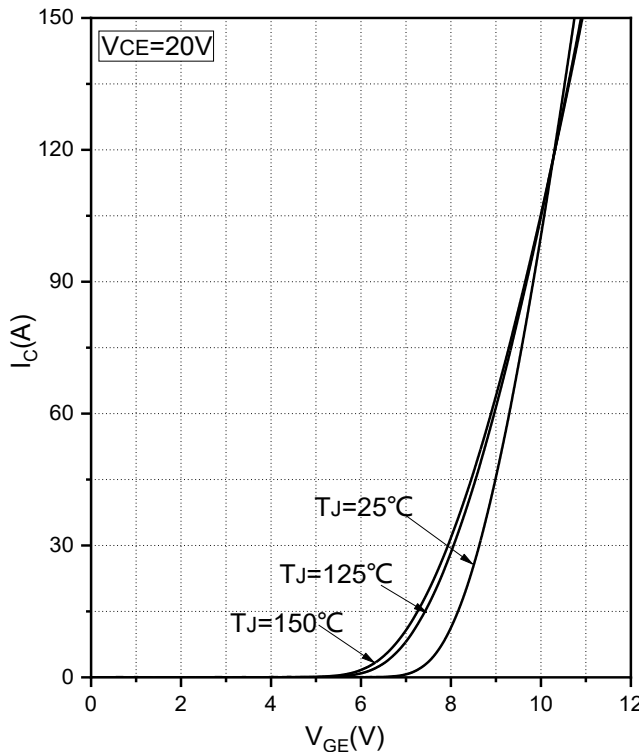


Fig.3 Transfer Characteristic

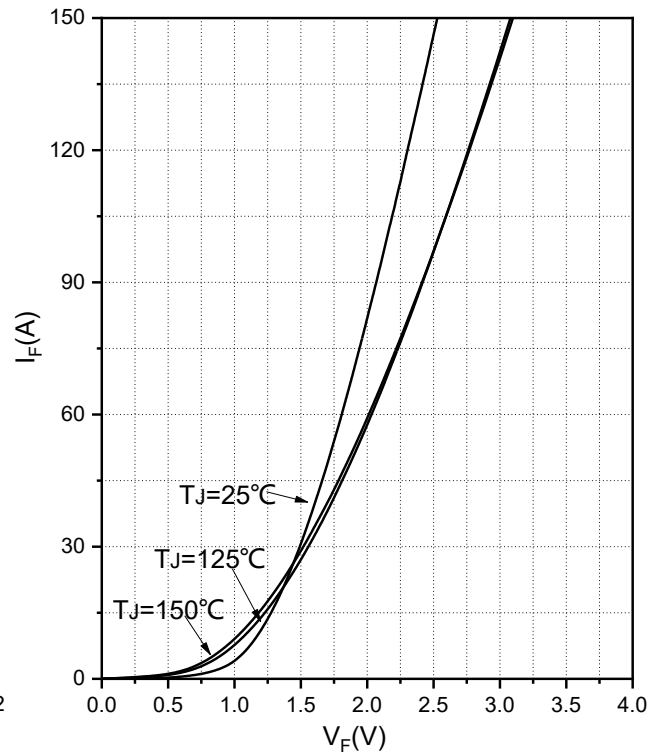


Fig.4 Forward Characteristics of Diode

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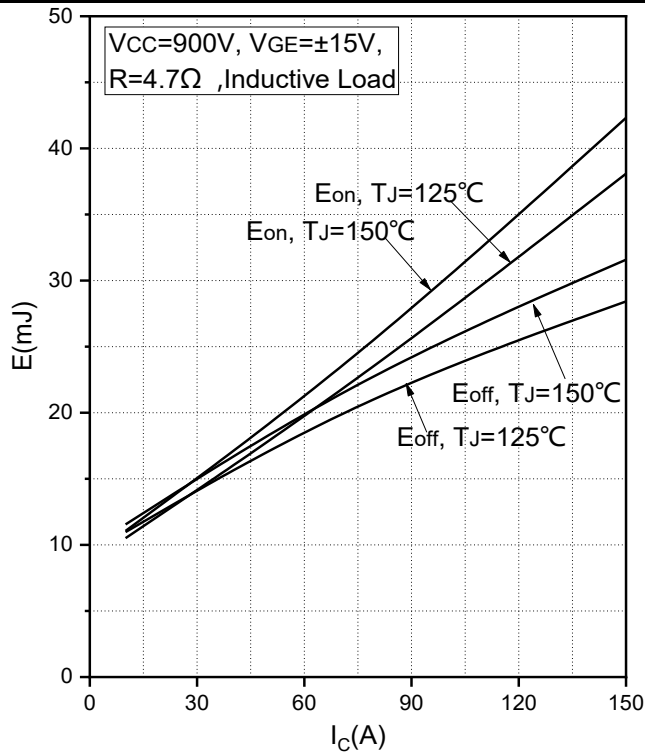


Fig.5 Typical Switching Loss vs. Collector Current

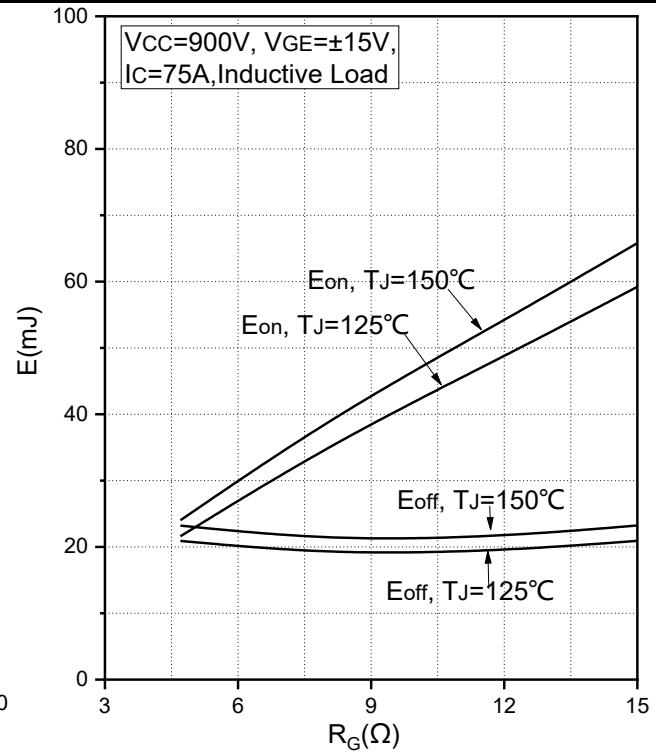


Fig.6 Typical Switching Loss vs. Gate Resistance

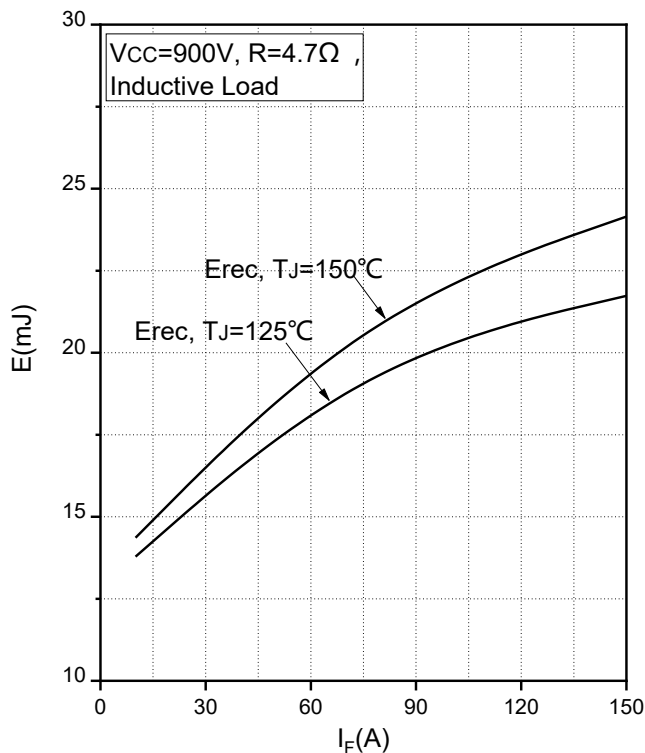


Fig.7 Typical Switching Loss vs. Forward Current

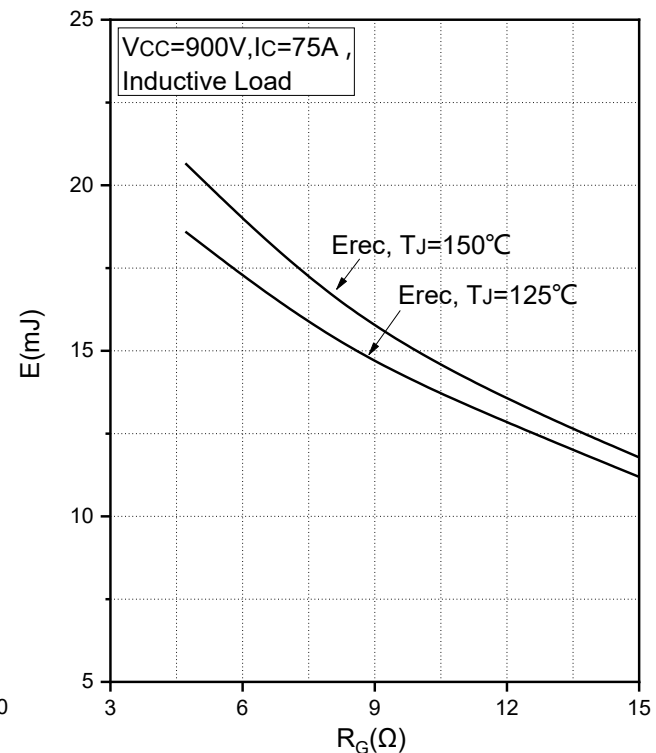


Fig.8 Typical Switching Loss vs. Gate Resistance

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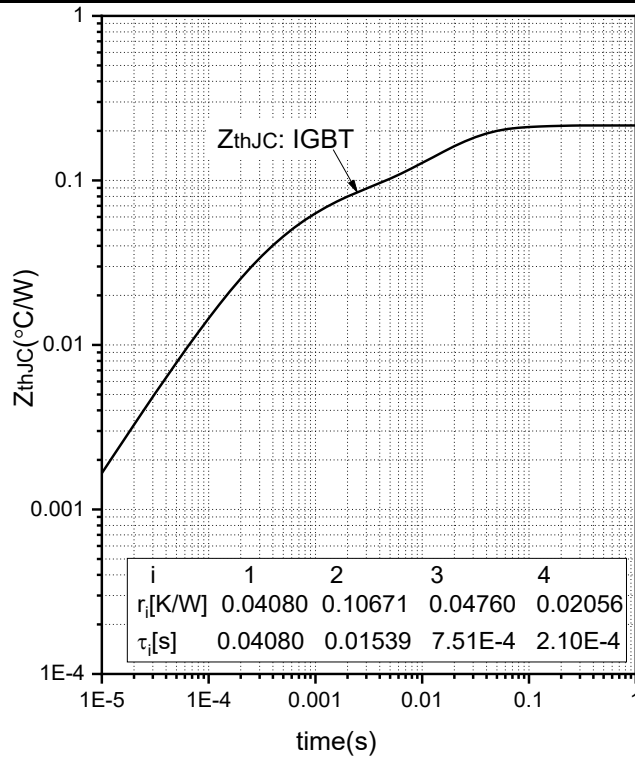


Fig.9 Transient Thermal Impedance (IGBT)

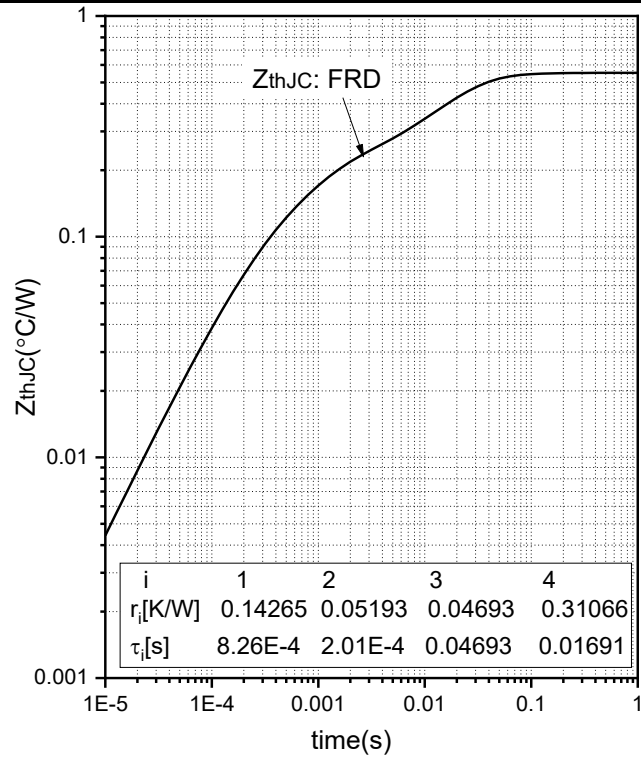


Fig.10 Transient Thermal Impedance (Diode)

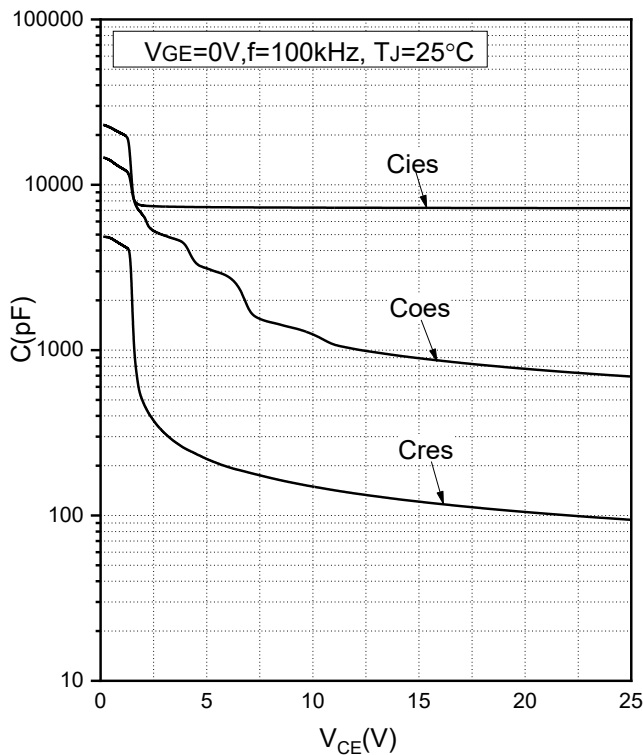


Fig.11 Capacitance Characteristics

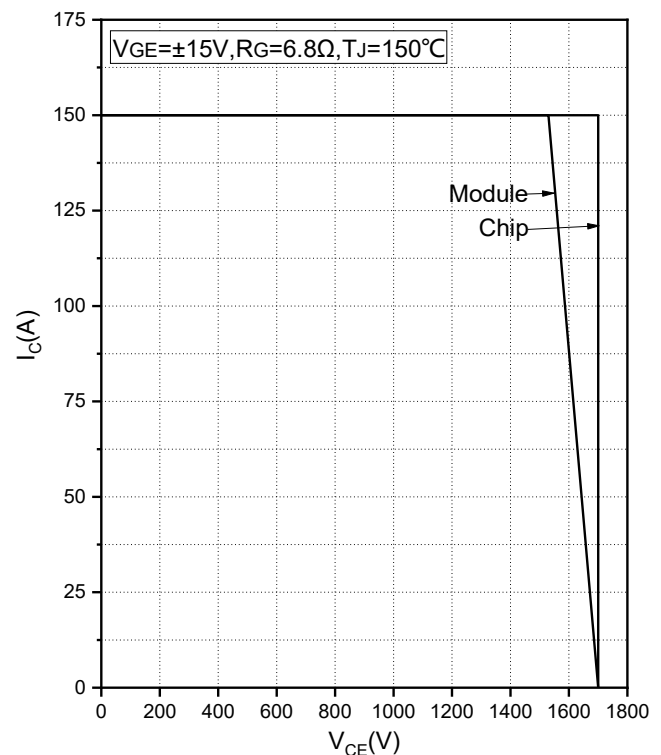


Fig.12 Reverse Bias Safe Operation Area (RBSOA)

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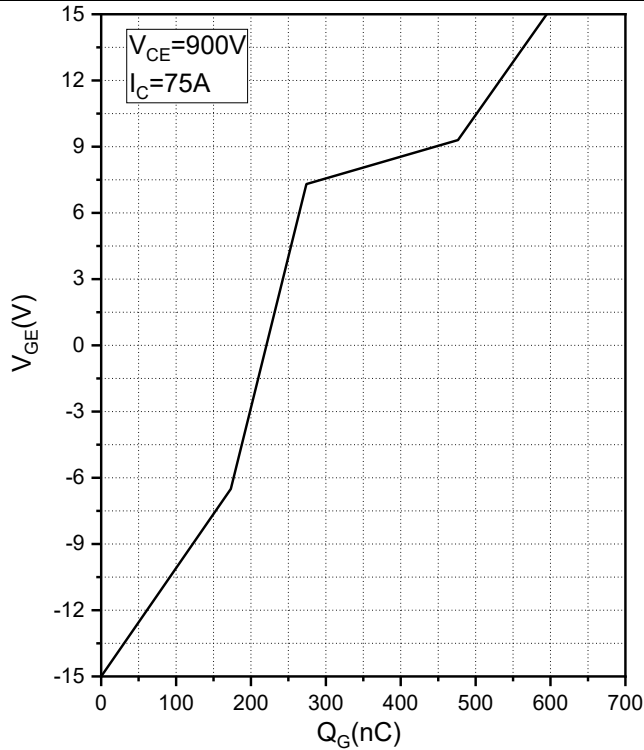


Fig.13 Gate Charge Characteristics

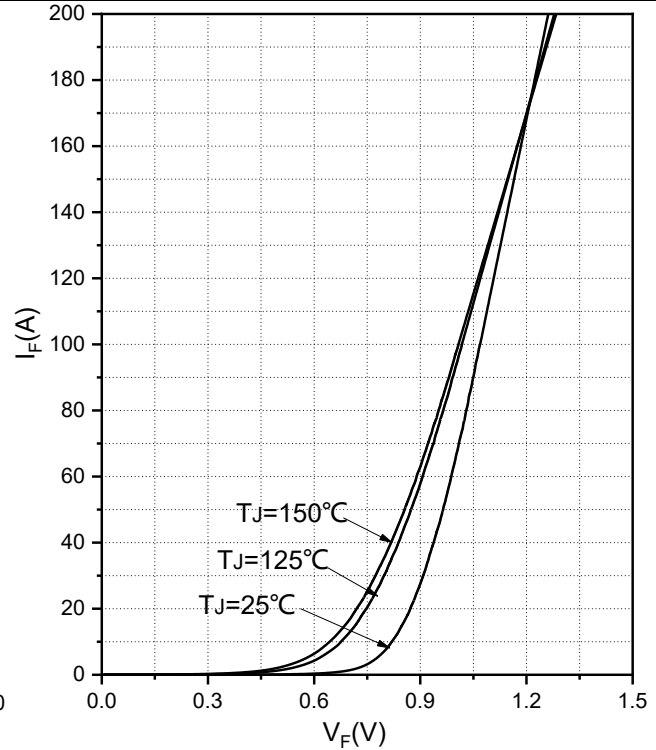


Fig.14 Forward Characteristics of Diode(Rectifier)

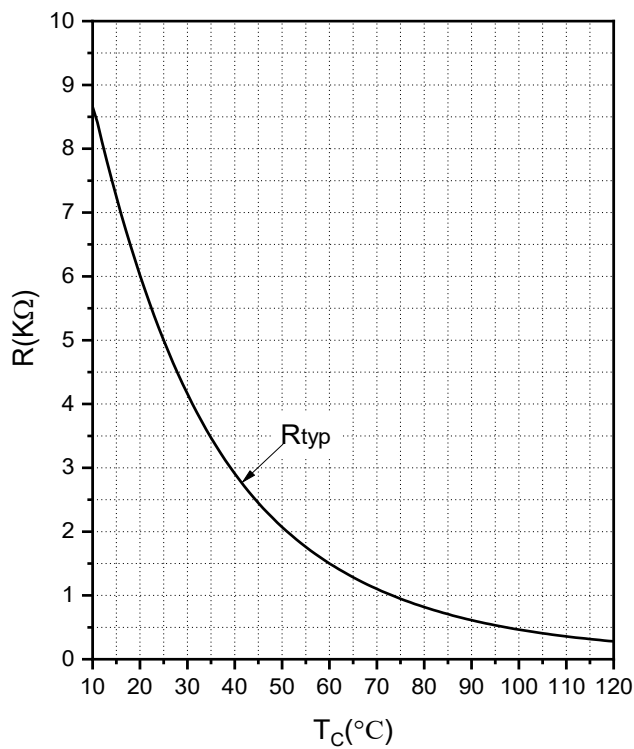


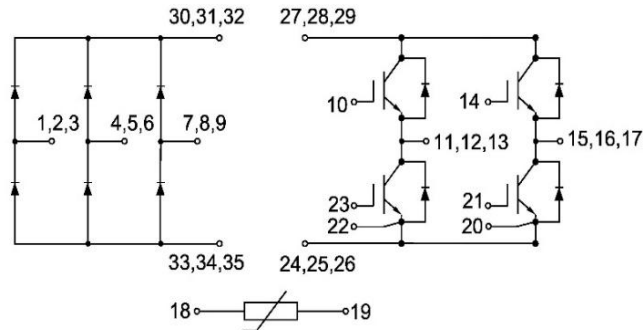
Fig.15 NTC Temperature Characteristics

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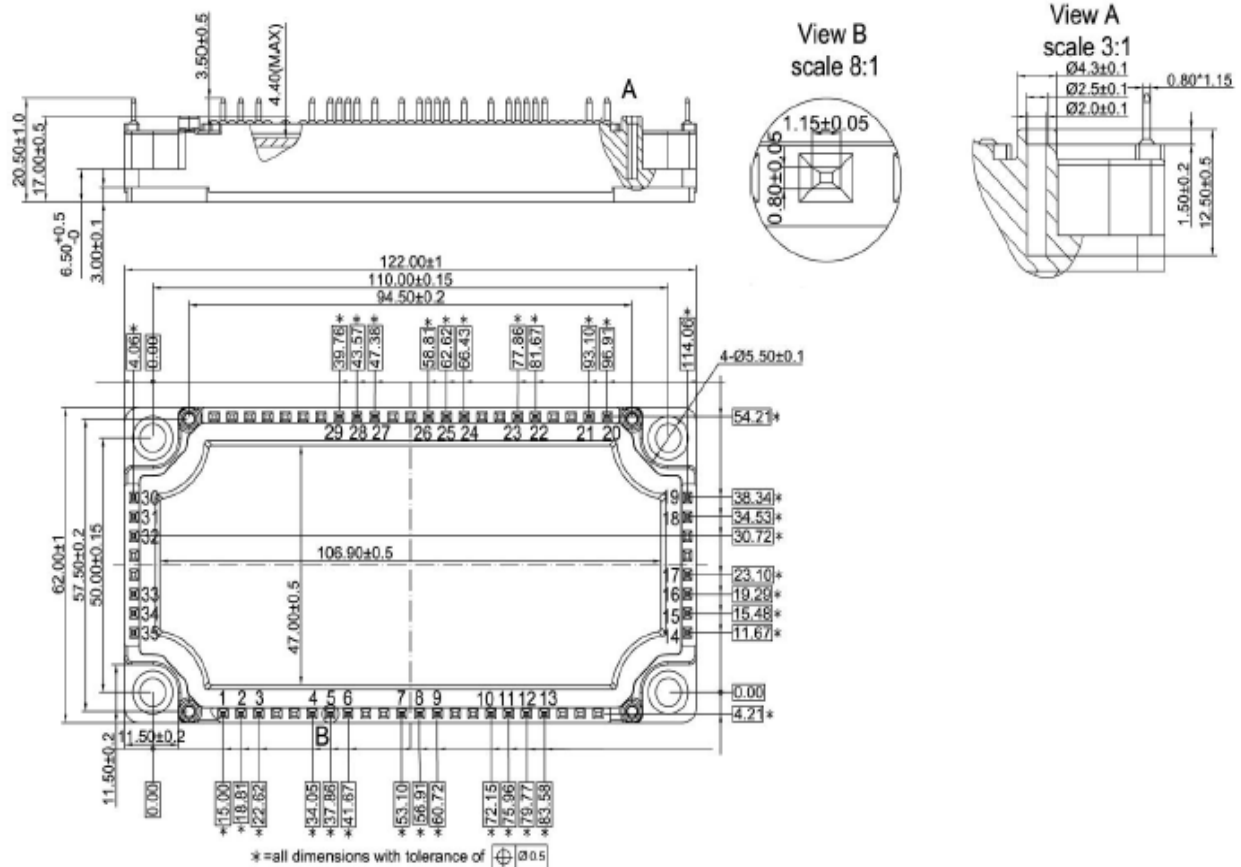
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Internal Circuit:



Package Outline (Unit: mm):



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Revision	Notes
02	Engineering Sample Datasheet

Announcement

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