



GT35FF120C6H

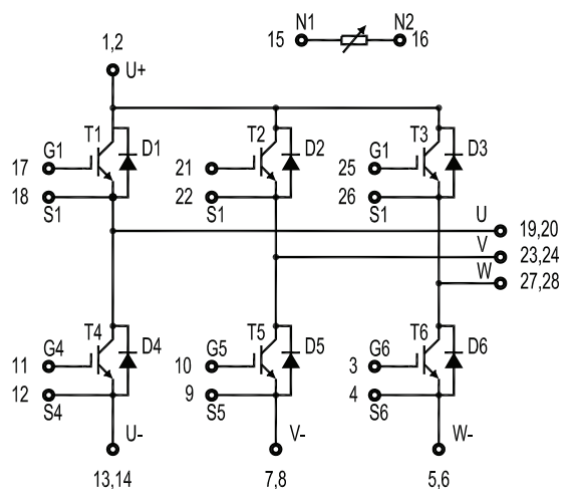
IGBT Module

Preliminary Data

Features:

- Trench & Field Stop 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

Circuit Diagram



Applications:

- Motor Drives
- Air Conditioning
- Servo Drives
- UPS

IGBT, Inverter Maximum Rated Values

V _{CES}	Collector-Emitter Blocking Voltage	T _J =25°C	1200	V
V _{GES}	Gate-Emitter Voltage		±20	V
I _C	Continuous Collector Current	T _C =80°C	35	A
		T _C =25°C	70	A
I _{CM}	Peak Collector Current Repetitive	t _p =1ms	70	A
t _{SC}	Short Circuit Withstand Time		>10	μs
P _D	Maximum Power Dissipation (IGBT)	T _C =25°C T _{Jmax} =150°C	243	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	5.8	6.5	V	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=35A, V_{GE}=15V$	$T_J=25^\circ C$		1.70	2.10	V
			$T_J=125^\circ C$		1.90		
			$T_J=150^\circ C$		2.00		
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	$V_{CE}=25V, V_{GE}=0V, f=100kHz, T_J=25^\circ C$		3.44		nF	
C_{oes}	Output Capacitance			0.51			
C_{res}	Reverse Transfer Capacitance			0.32			

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V, I_C=35A, R_{Gon}=15\Omega, V_{GE}=\pm 15V, \text{Inductive Load}$	$T_J=25^\circ C$		88		ns
			$T_J=125^\circ C$		89		
			$T_J=150^\circ C$		90		
t_r	Rise Time	$V_{CC}=600V, I_C=35A, R_{Gon}=15\Omega, V_{GE}=\pm 15V, \text{Inductive Load}$	$T_J=25^\circ C$		36		ns
			$T_J=125^\circ C$		40		
			$T_J=150^\circ C$		40		
$t_{d(off)}$	Turn-off Delay Time	$V_{CC}=600V, I_C=35A, R_{Goff}=15\Omega, V_{GE}=\pm 15V, \text{Inductive Load}$	$T_J=25^\circ C$		193		ns
			$T_J=125^\circ C$		195		
			$T_J=150^\circ C$		199		
t_f	Fall Time	$V_{CC}=600V, I_C=35A, R_{Goff}=15\Omega, V_{GE}=\pm 15V, \text{Inductive Load}$	$T_J=25^\circ C$		268		ns
			$T_J=125^\circ C$		320		
			$T_J=150^\circ C$		325		
E_{on}	Turn-on Switching Loss	$V_{CC}=600V, I_C=35A, R_{Gon}=15\Omega, V_{GE}=\pm 15V, di/dt=750A/\mu s(T_J=150^\circ C), \text{Inductive Load}$	$T_J=25^\circ C$		2.25		mJ
			$T_J=125^\circ C$		2.45		
			$T_J=150^\circ C$		2.74		



E _{off}	Turn-off Switching Loss	V _{CC} =600V, I _C =35A, R _{Goff} =15Ω, V _{GE} =±15V, du/dt=2450V/μs(T _J =150°C), Inductive Load	T _J =25°C		3.05		mJ
			T _J =125°C		3.61		
			T _J =150°C		3.85		
Q _g	Total Gate Charge	V _{GE} =-15V...+15V	T _J =25°C		430		nC
RBSOA	I _C =70A, V _{CC} =1050V, V _P =1200V, R _G =15Ω, V _{GE} =+15V to 0V, T _J =150°C			Trapezoid			
I _{SC}	V _{CC} =600V, V _{GE} = ±15V, tp=10us, R _{Gon} =56Ω, R _{Goff} =56Ω, T _J =25°C				175		A
R _{θJC}	IGBT Thermal Resistance: Junction-to-Case (per IGBT)				0.513	0.570	°C/W

Diode, Inverter

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

V _{RRM}	Repetitive Peak Reverse Voltage	T _J =25°C	1200	V
I _F	Diode Continuous Forward Current		35	A
I _{FM}	Peak FWD Current Repetitive	tp=1ms	70	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 =35A	T _J =25°C		1.70	2.10	V
			T _J =125°C		1.80		
			T _J =150°C		1.80		
I _{rr}	Peak Reverse Recovery Current		T _J =25°C		47.5		A
			T _J =125°C		56.2		
			T _J =150°C		57.5		
t _{rr}	Reverse Recovery Time	I _F =35A, di/dt=800A/μs(T _J =150°C), V _{rr} =600V, V _{GE} =-15V	T _J =25°C		155		ns
			T _J =125°C		175		
			T _J =150°C		175		
Q _{rr}	Reverse Recovery Charge		T _J =25°C		3.43		μC
			T _J =125°C		5.46		
			T _J =150°C		5.58		



E _{rec}	Reverse Recovery Energy	I _F =35A, di/dt=800A/μs(T _J =150°C), V _{rr} =600V, V _{GE} =-15V	T _J =25°C	1.42	mJ	
			T _J =125°C	2.00		
			T _J =150°C	2.30		
R _{θJC}	Diode Thermal Resistance: Junction-to-Case (per Diode)			0.714	0.805	°C/W

Internal NTC-Thermistor Characteristics

Symbol	Description	Min.	Typ.	Max.	Units
R ₂₅	T _C =25°C		22.7		kΩ
ΔR/R	T _C =100°C, R ₁₀₀ =1481Ω	-3		+3	%
P ₂₅	T _C =25°C			5	mW
B _{25/50}	$R_2=R_{25} \exp[B_{25/50}(1/T_2-1/(298.15K))]$		3950		K
B _{25/80}	$R_2=R_{25} \exp[B_{25/80}(1/T_2-1/(298.15K))]$		4000		K

Module

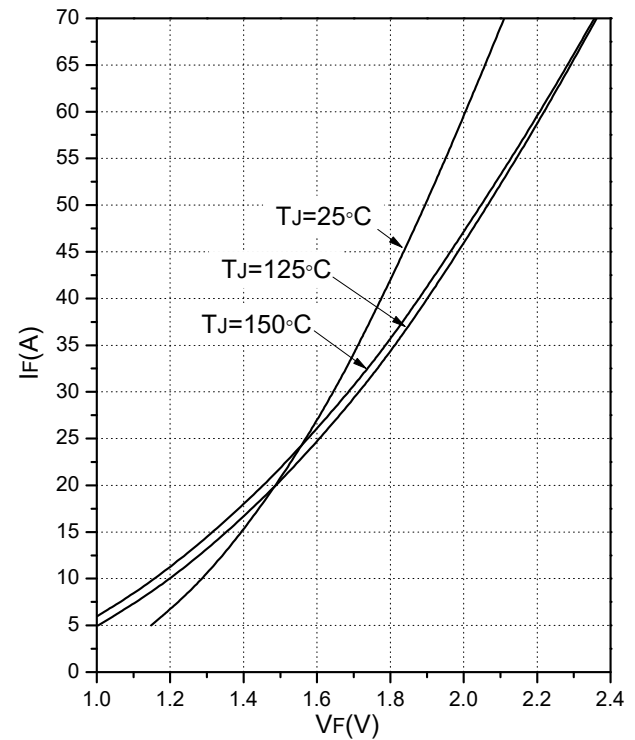
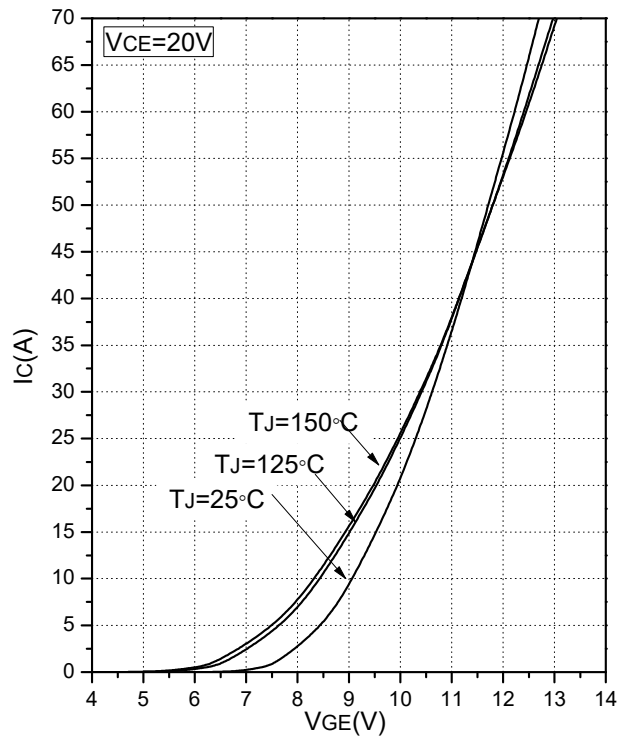
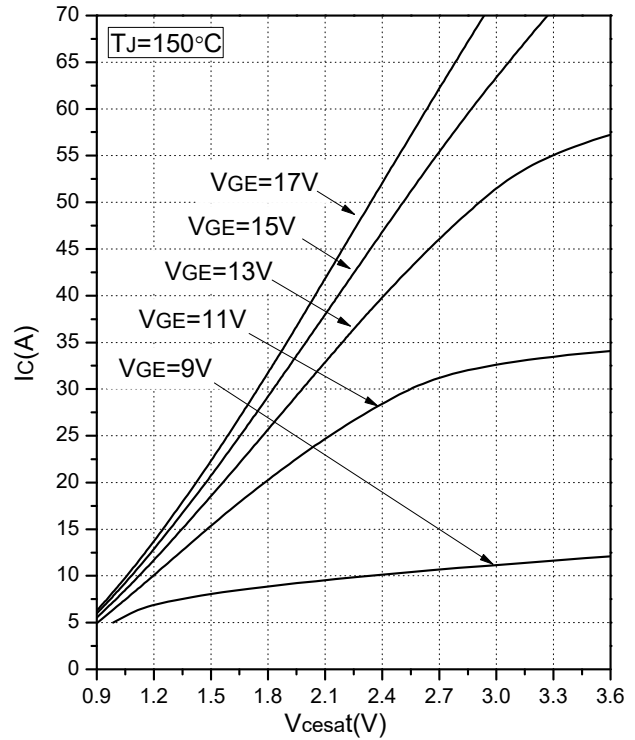
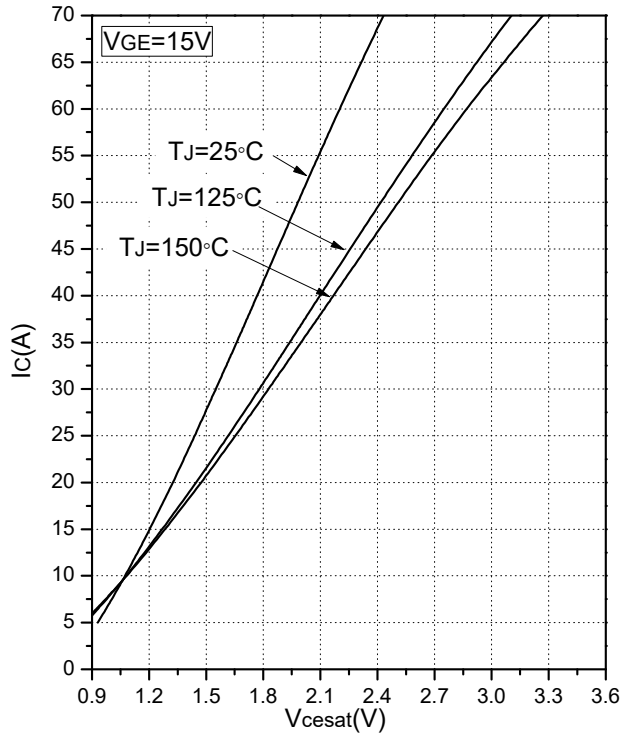
Symbol	Description	Min.	Typ.	Max.	Units	
V _{IOS}	Isolation Voltage(All Terminals Shorted)	RMS, f=50Hz, 30s		4500	V	
Internal Isolation			Al ₂ O ₃			
d _{creep}	Creepage Distance	12.7			mm	
d _{clear}	Clearance	12.7			mm	
T _J	Maximum Junction Temperature			150	°C	
T _{JOP}	Maximum Operating Junction 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)			0.13	°C/W	
M	Mounting Torque for Module Mounting	Screw M4--Mounting according to valid application note		1.0	1.5	N·m
G	Weight		39		g	



Ordering Information Table

Device code	G	T	35	FF	120	C6	H
	①	②	③	④	⑤	⑥	⑦

- ① - IGBT Module
- ② - Trench, Low Switching Losses IGBT
- ③ - Rated Current (35=35A)
- ④ - Circuit Configuration(FF=Full Bridge)
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)



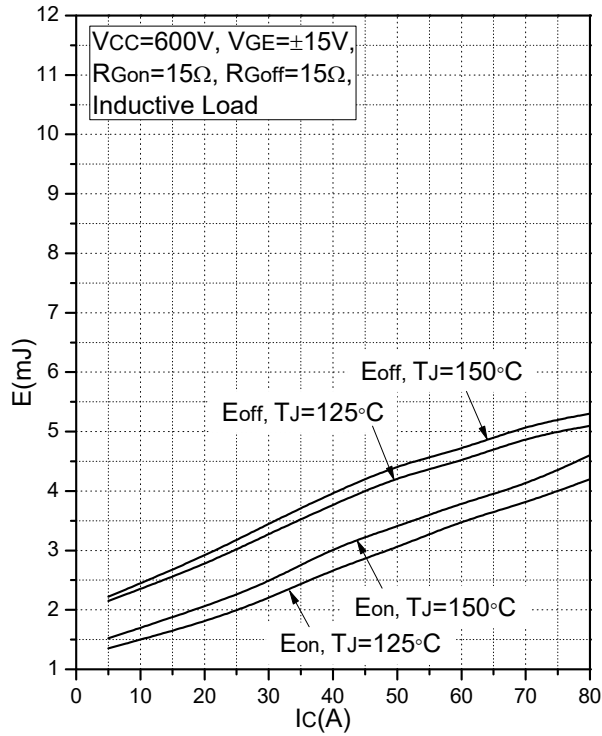


Fig.5 Typical Switching Loss vs. Collector Current

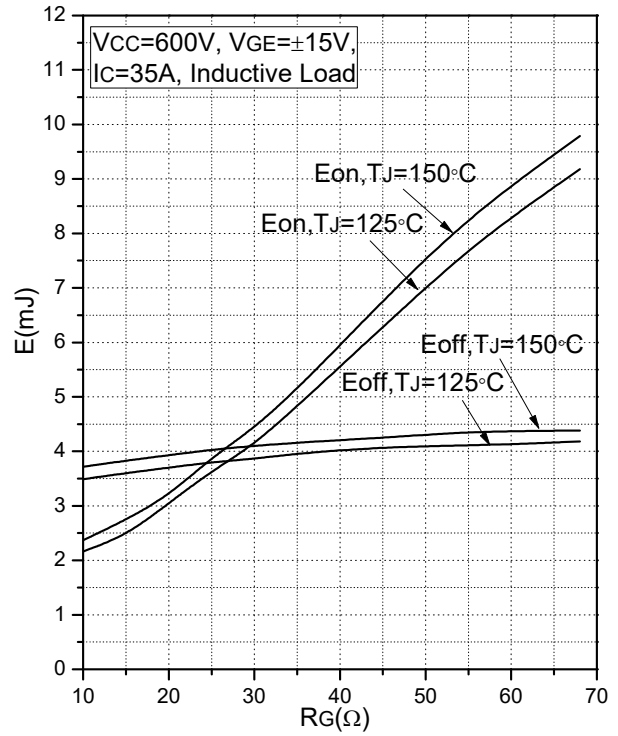


Fig.6 Typical Switching Loss vs. Gate Resistance

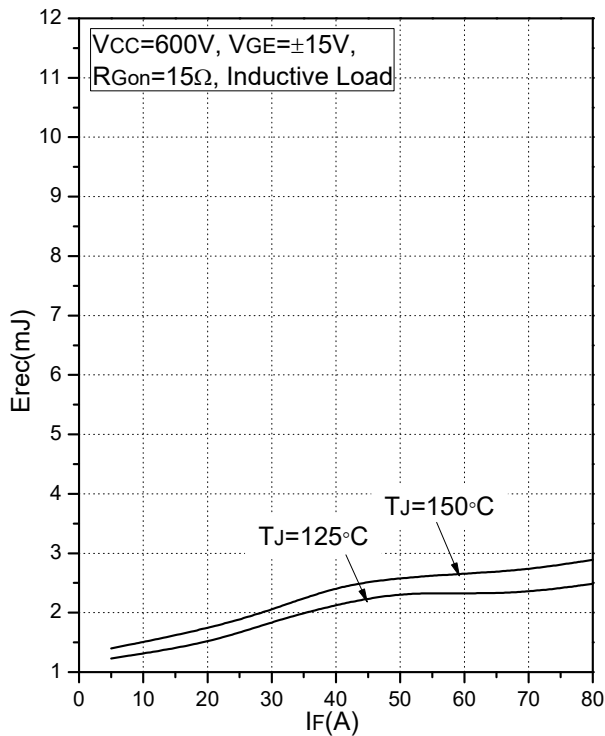


Fig.7 Typical Switching Loss vs. Forward Current

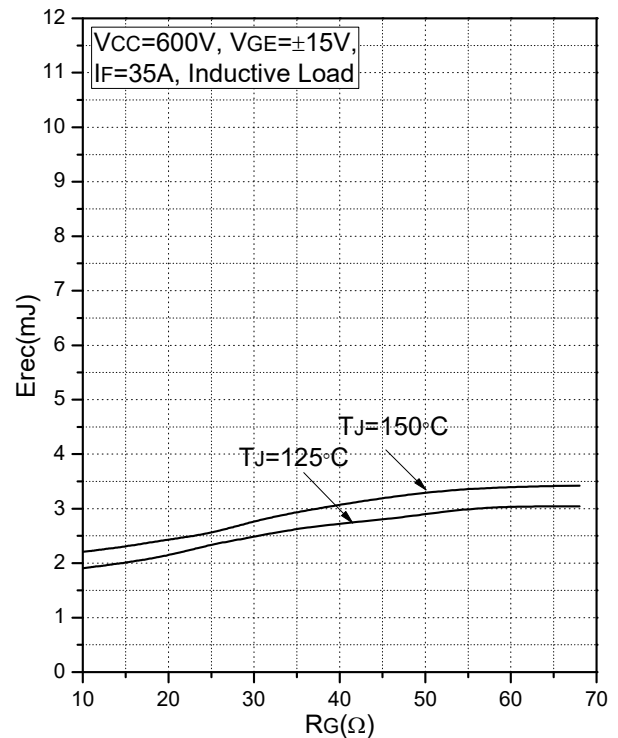


Fig.8 Typical Switching Loss vs. Gate Resistance

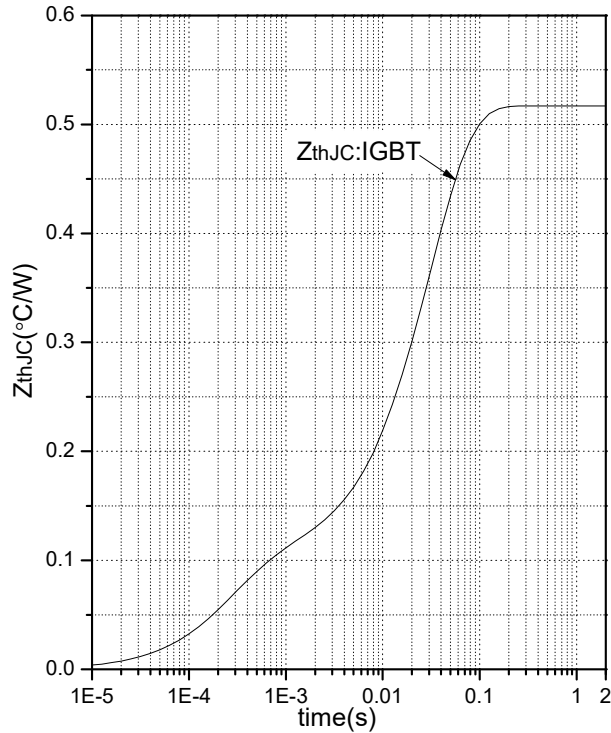


Fig.9 Transient Thermal Impedance

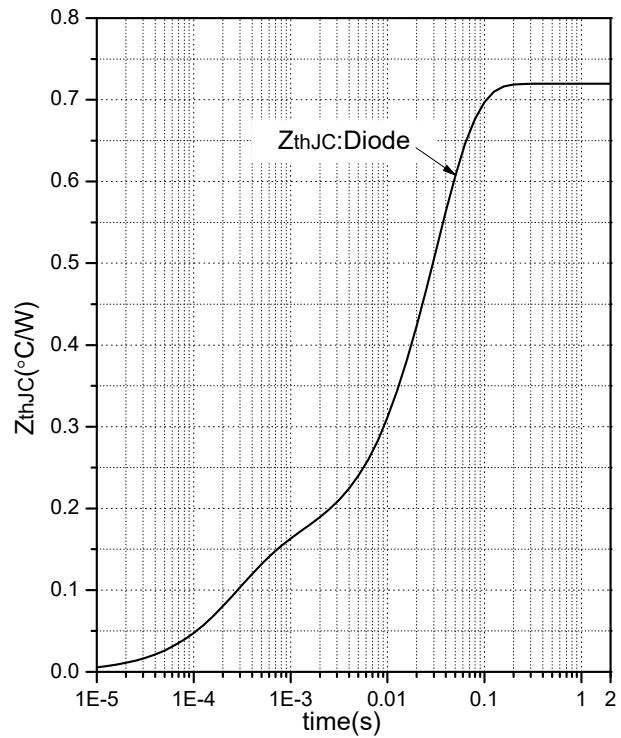


Fig.10 Transient Thermal Impedance

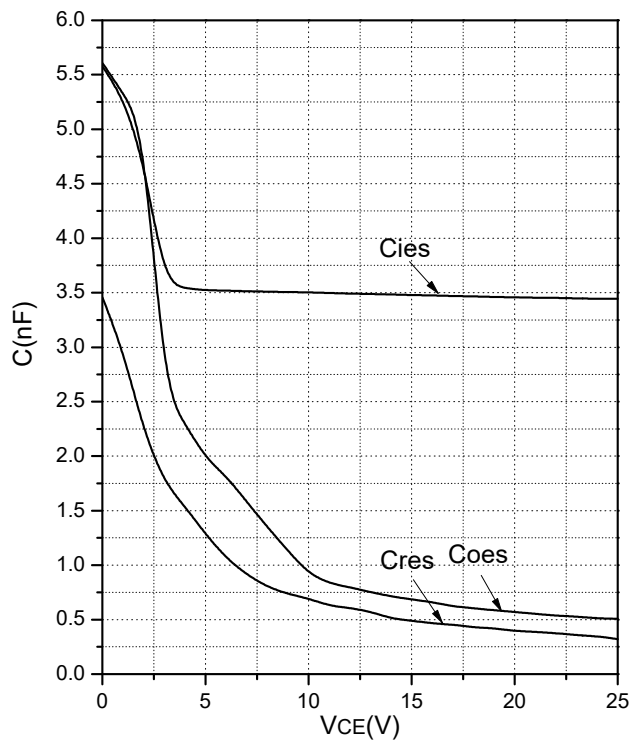


Fig.11 Capacitance Characteristics

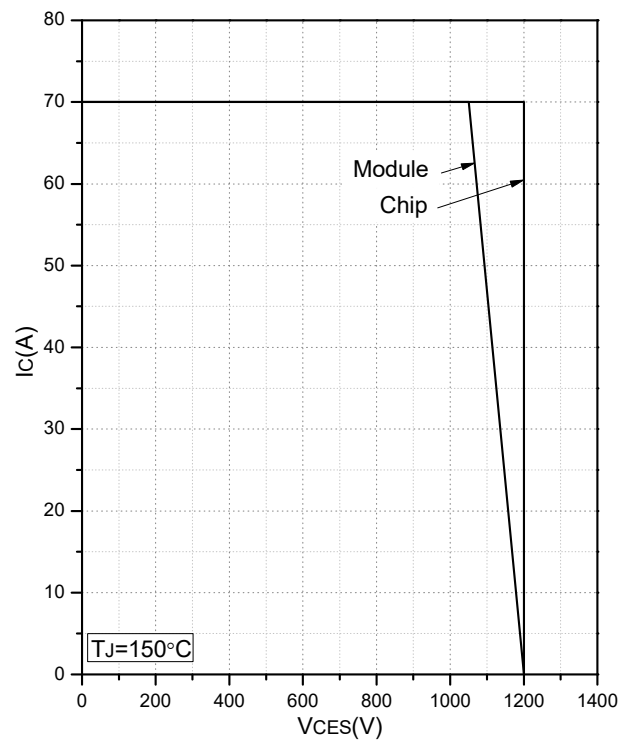


Fig.12 Reverse Bias Safe Operation Area (RBSOA)

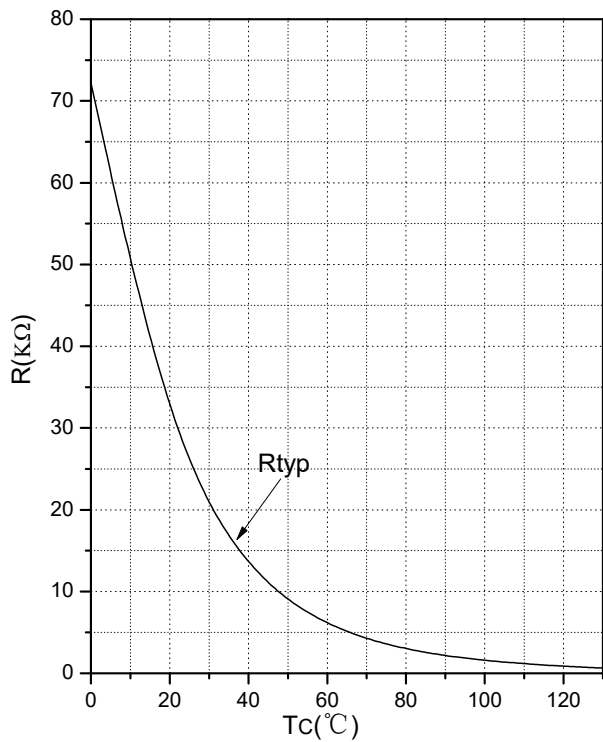
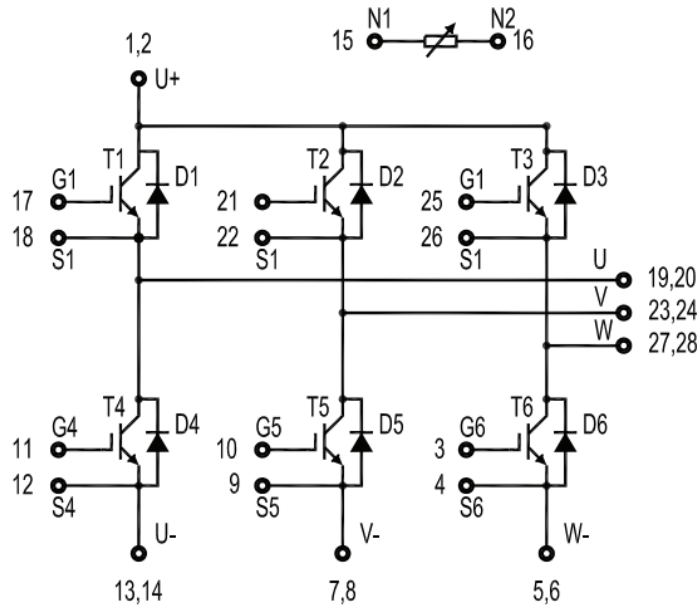


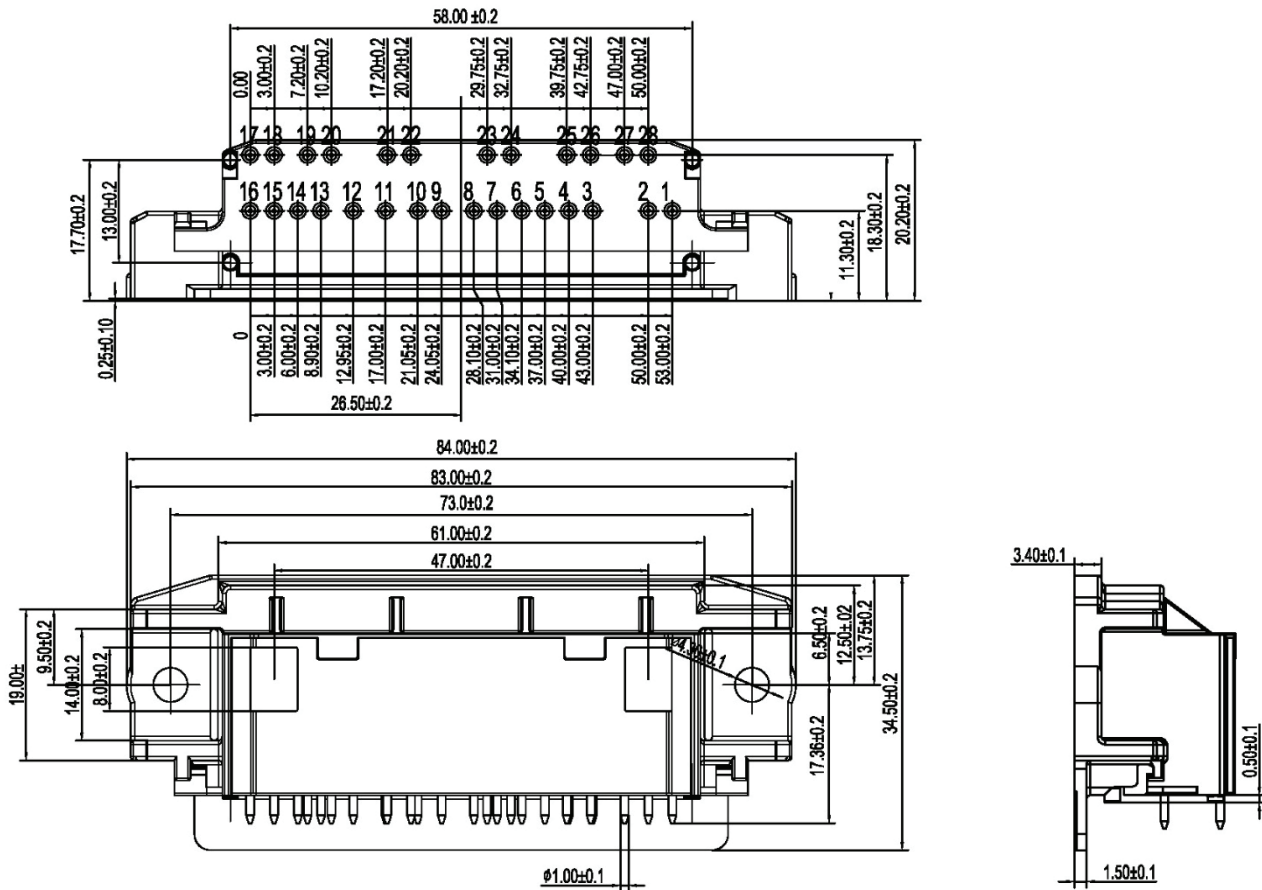
Fig.13 NTC Temperature Characteristics



Internal Circuit:



Package Outline (Unit: mm):





Date	Revision	Notes
05/31/2023	01	Initial Release
09/13/2023	02	Update Switching Characteristic Curves
10/13/2023	03	Update the typical and maximum values of Thermal Resistance

Announcements

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