



GT100CU120T1VH

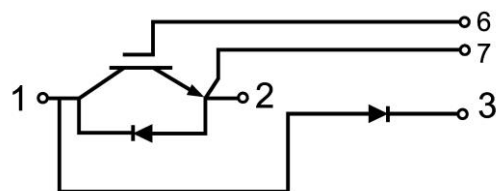
IGBT Module

Preliminary Data

Features:

- Field Stop Trench Gate IGBT
- Short Circuit Rated $>10\mu\text{s}$
- 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:

- High Power Converters
- Motor Drives
- UPS Systems

IGBT, Chopper

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

V_{CES}	Collector-Emitter Blocking Voltage	$T_J=25^\circ\text{C}$	1200	V
V_{GES}	Gate-Emitter Voltage		± 20	V
I_c	Continuous Collector Current	$T_c=100^\circ\text{C}$	100	A
		$T_c=25^\circ\text{C}$	200	A
I_{CM}	Repetitive Peak Collector Current	$t_p=1\text{ms}$	200	A
P_D	Maximum Power Dissipation per IGBT	$T_c=25^\circ\text{C}$ $T_{Jmax}=175^\circ\text{C}$	700	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	$I_C=4\text{mA}$, $V_{CE}=V_{GE}$	5.0	5.7	6.6	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=100\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^{\circ}\text{C}$	1.65	2.10	V
			$T_J=125^{\circ}\text{C}$	2.00		V
			$T_J=150^{\circ}\text{C}$	2.10		V
I_{CES}	Collector-Emitter Leakage Current	$V_{GE}=0\text{V}$, $V_{CE}=V_{CES}$, $T_J=25^{\circ}\text{C}$			1	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=20\text{V}$, $V_{CE}=0\text{V}$, $T_J=25^{\circ}\text{C}$			200	nA
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$		11.46		nF
C_{oes}	Output Capacitance			1.52		nF
C_{res}	Reveres Transfer Capacitance			0.74		nF

Switching Characteristics

Switching Characteristics							
$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V, I_C=100A,$ $R_{Gon}=15\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		206		ns
			$T_J=125^{\circ}C$		212		
			$T_J=150^{\circ}C$		216		
t_r	Rise Time		$T_J=25^{\circ}C$		78		ns
			$T_J=125^{\circ}C$		91		
			$T_J=150^{\circ}C$		92		
$t_{d(off)}$	Turn-off Delay Time	$V_{CC}=600V, I_C=100A,$ $R_{Goff}=15\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		400		ns
			$T_J=125^{\circ}C$		434		
			$T_J=150^{\circ}C$		444		
t_f	Fall Time		$T_J=25^{\circ}C$		154		ns
			$T_J=125^{\circ}C$		232		
			$T_J=150^{\circ}C$		242		
E_{on}	Turn-on Switching Loss	$V_{CC}=600V, I_C=100A,$ $R_{Gon}=15\Omega, V_{GE}=\pm 15V,$ $di/dt=964A/\mu s(T_J=150^{\circ}C),$ Inductive Load	$T_J=25^{\circ}C$		10.9		mJ
			$T_J=125^{\circ}C$		15.7		
			$T_J=150^{\circ}C$		16.8		



E _{off}	Turn-off Switching Loss	V _{CC} =600V, I _C =100A, R _{Goff} =15Ω, V _{GE} =±15V, du/dt=5363V/μs(T _J =150°C), Inductive Load	T _J =25°C		7.9		mJ
			T _J =125°C		10.6		
			T _J =150°C		11.2		
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C		2856		nC
R _{G(int)}	Internal Gate Resistor		T _J =25°C		5.0		Ω
I _{SC}	V _{CC} =600V, V _{GE} =±15V, t _p =10μs, T _J =150°C				440		A
R _{θJC}	Thermal Resistance: Junction-to-Case (per IGBT)					0.21	°C/W

Diode, Chopper

Maximum Rated Values of Diode (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		100	A
I _{FM}	Peak Diode Current Repetitive	t _p =1ms	200	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 =100A	T _J =25°C		1.70		V
			T _J =125°C		1.80		
			T _J =150°C		1.80		
t _{rr}	Reverse Recovery Time	I _F =100A, -diF/dt=1153A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C		232		ns
			T _J =125°C		443		
			T _J =150°C		456		
I _{rr}	Peak Reverse Recovery Current		T _J =25°C		76		A
			T _J =125°C		82		
			T _J =150°C		82		
Q _{rr}	Reverse Recovery Charge		T _J =25°C		8.4		μC
			T _J =125°C		15.4		
			T _J =150°C		16.4		



E _{rec}	Reverse Recovery Energy	I _F =100A, -diF/dt=1153A/μs(T _J =150℃), V _R =600V, V _{GE} =-15V	T _J =25℃		2.4		mJ
			T _J =125℃		5.1		
			T _J =150℃		5.4		
R _{θJC}	Thermal Resistance: Junction-to-Case (per Diode)					0.43	℃/W

FWD, Reverse

Maximum Rated Values of Diode (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		75	A
I _{FM}	Diode Maximum Forward Current	tp=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		1.65		V
			T _J =125°C		1.75		
			T _J =150°C		1.75		
t _{rr}	Reverse Recovery Time	I _F =75A, -diF/dt=1196A/μs(T _J =150°C), V _{rr} =600V, V _{GE} =-15V	T _J =25°C		218		ns
			T _J =125°C		386		
			T _J =150°C		424		
I _{rr}	Peak Reverse Recovery Current		T _J =25°C		71.6		A
			T _J =125°C		73.1		
			T _J =150°C		73.8		
Q _{rr}	Reverse Recovery Charge		T _J =25°C		6.94		μC
			T _J =125°C		12.11		
			T _J =150°C		13.44		
E _{rec}	Reverse Recovery Energy		T _J =25°C		2.17		mJ
			T _J =125°C		4.09		
			T _J =150°C		4.60		
R _{θJC}	Thermal Resistance: Junction-to-Case (per Diode)					0.50	°C/W



Module

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
V _{iso}	Isolation Voltage (All Terminals Shorted)	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)				0.07	°C/W
T	Power Terminals Screw:M5		3.0		5.0	N·m
T	Mounting Screw:M6		4.0		6.0	N·m
G	Weight			165		g

Ordering Information Table

Device code	G	T	100	CU	120	T1V	H
	①	②	③	④	⑤	⑥	⑦

- ① - IGBT Module
- ② - Field Stop Trench Gate IGBT
- ③ - Rated Current (100=100A)
- ④ - Circuit Configuration: Chopper, CU(Diode on High Side)
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

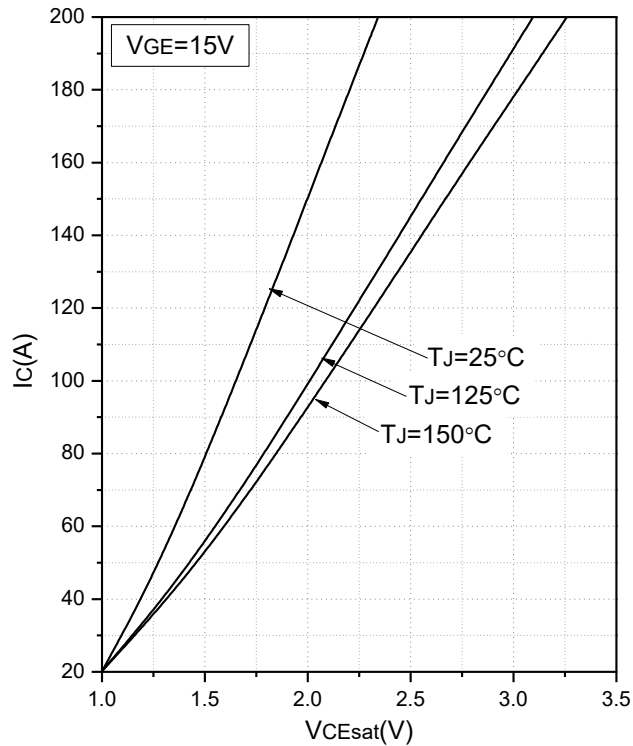


Fig.1 Typical Saturation Voltage Characteristics

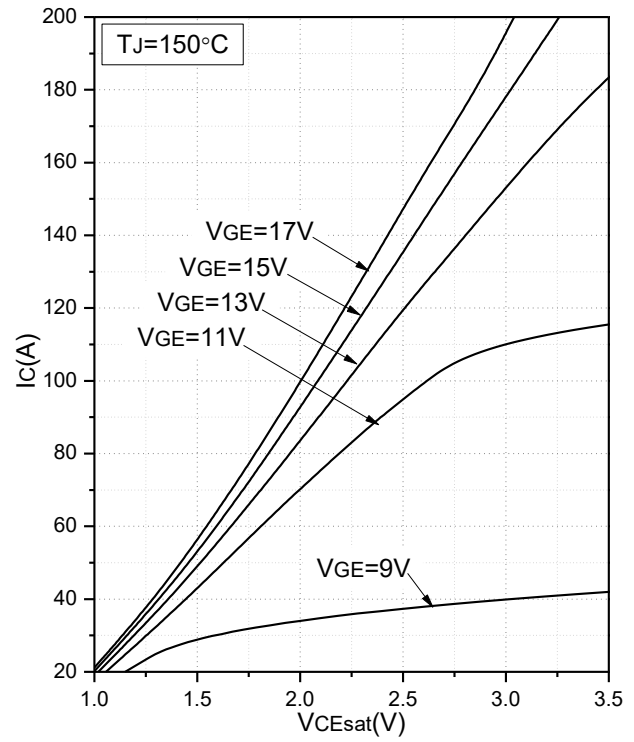


Fig.2 Typical Output Characteristics

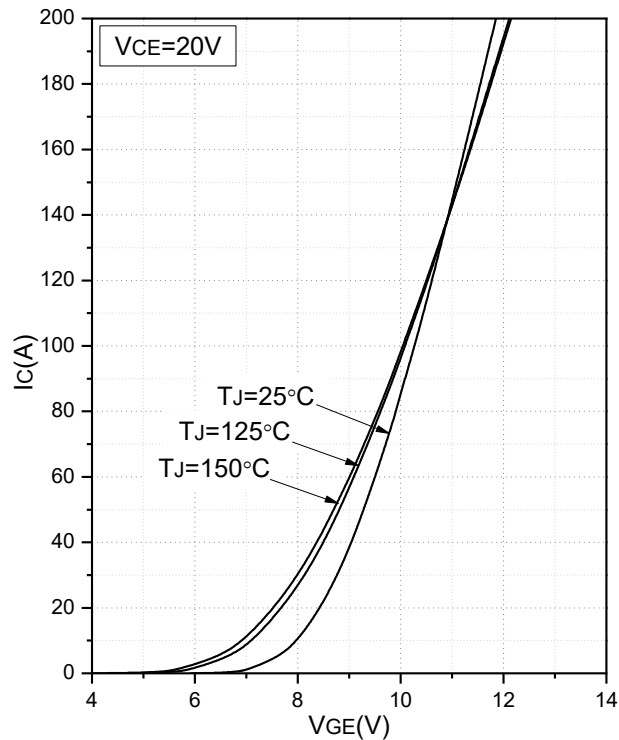


Fig.3 Transfer Characteristics

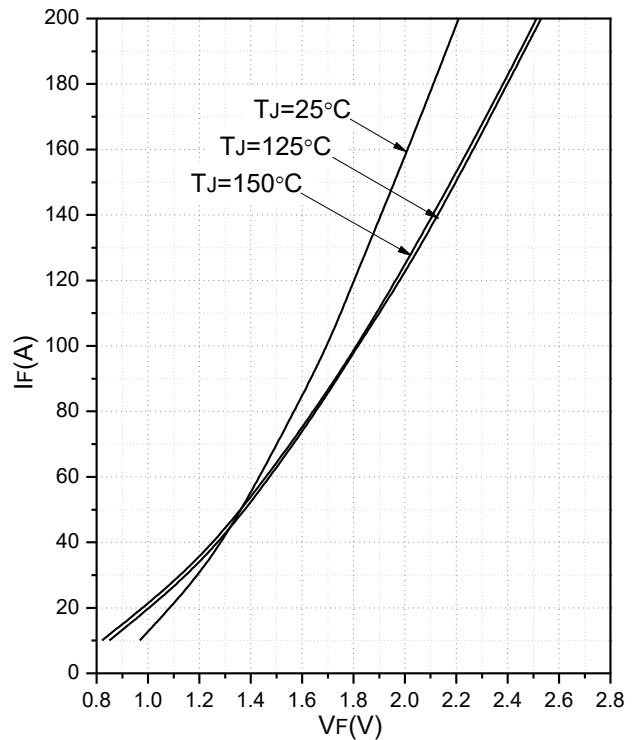


Fig.4 Forward Characteristics of Diode (Chopper)

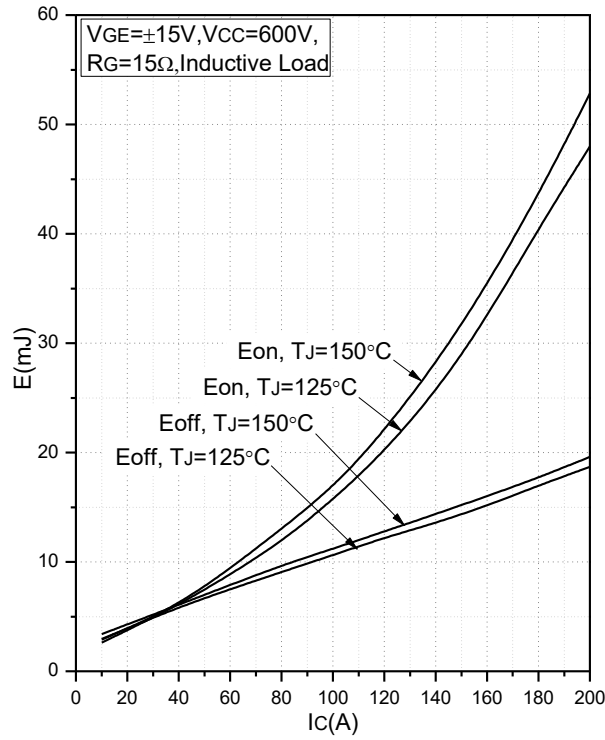


Fig.5 Typical Switching Loss vs. Collector Current

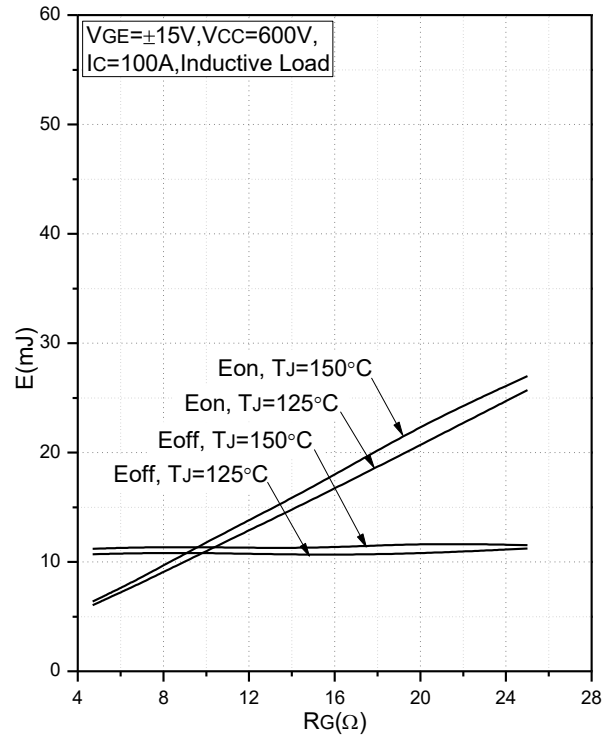


Fig.6 Typical Switching Loss vs. Gate Resistance

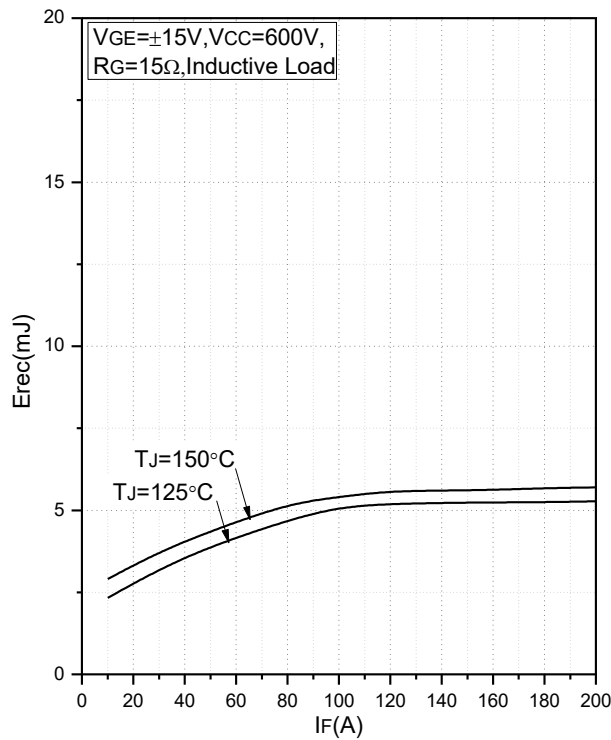


Fig.7 Typical Switching Loss vs. Forward Current (Chopper)

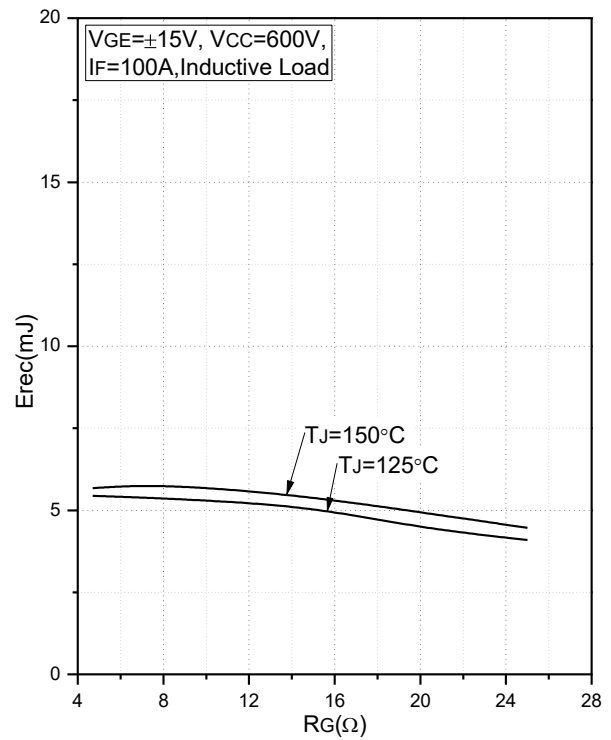


Fig.8 Typical Switching Loss vs. Gate Resistance (Chopper)

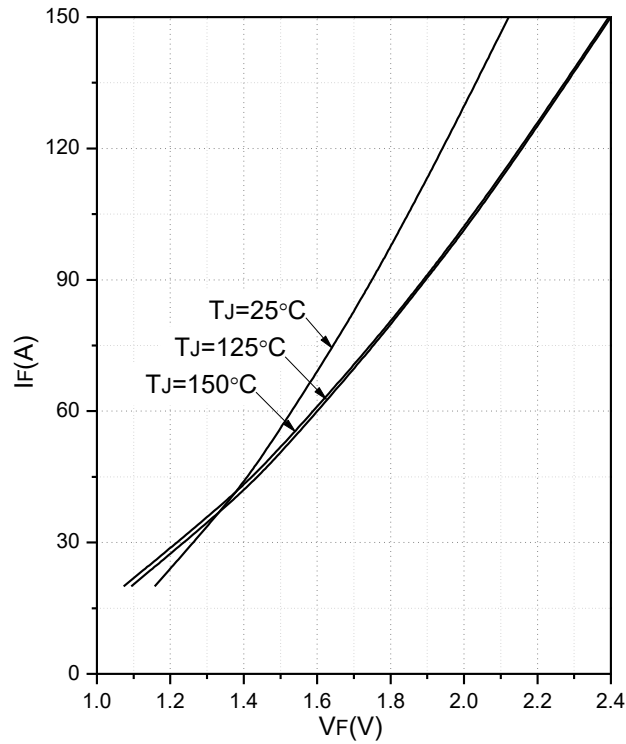


Fig.9 Forward Characteristics of Diode (Reverse)

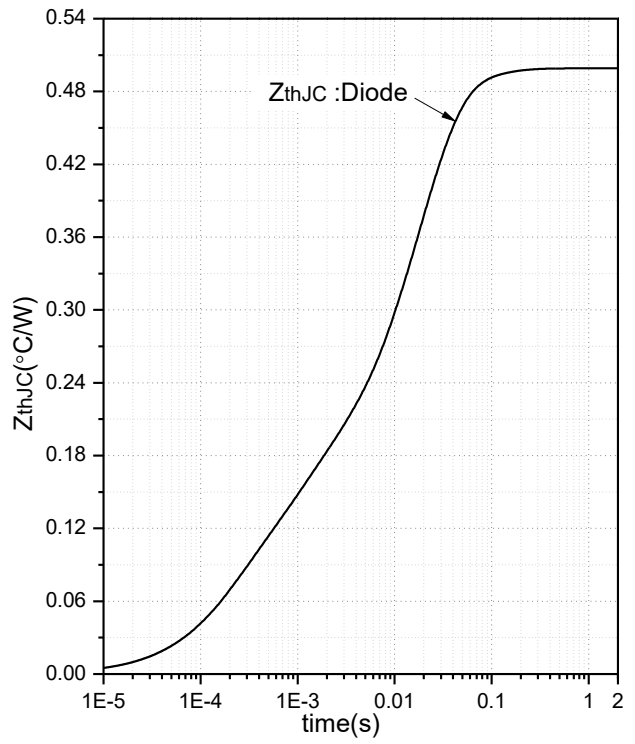


Fig.10 Transient Thermal Impedance (Reverse-Diode)

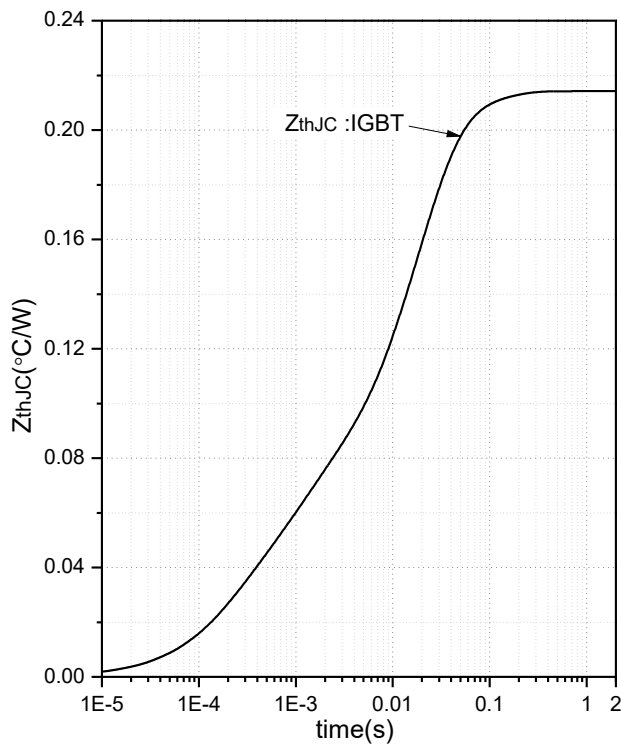


Fig.11 Transient Thermal Impedance (IGBT)

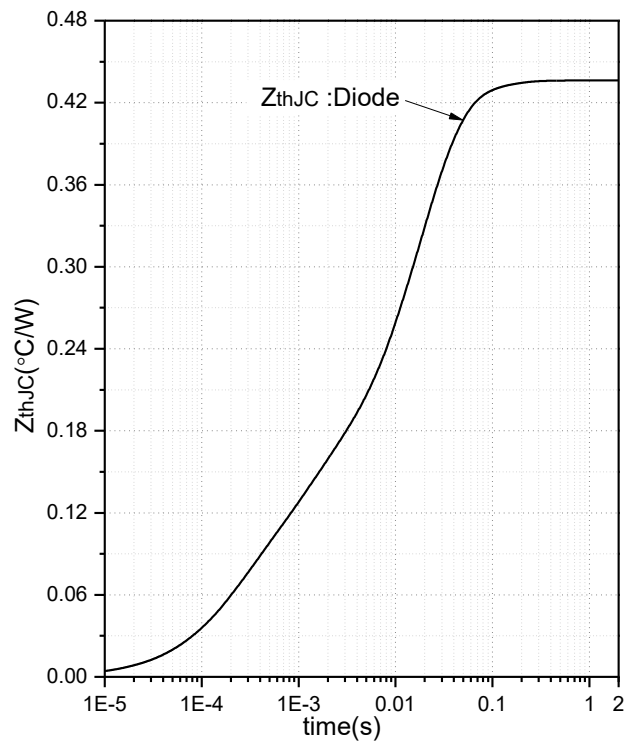


Fig.12 Transient Thermal Impedance (Chopper-Diode)

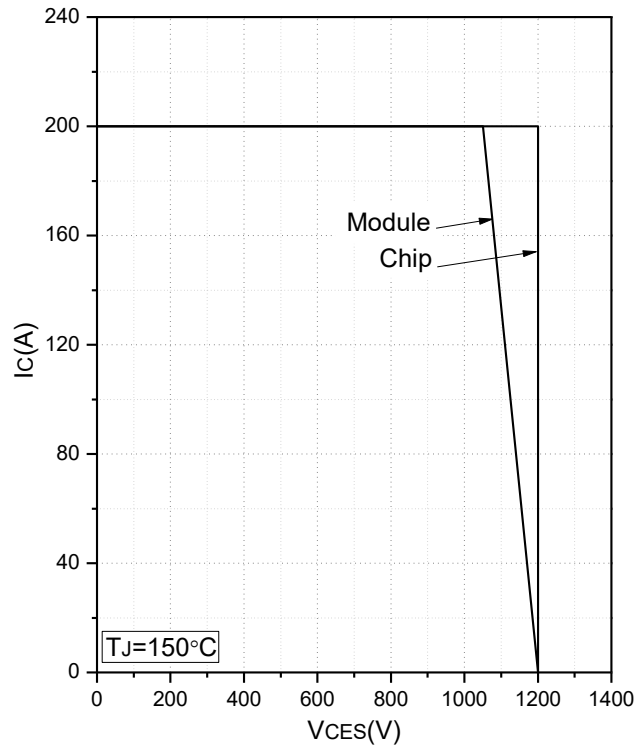


Fig.13 Reverse Bias Safe Operation Area (RBSOA)

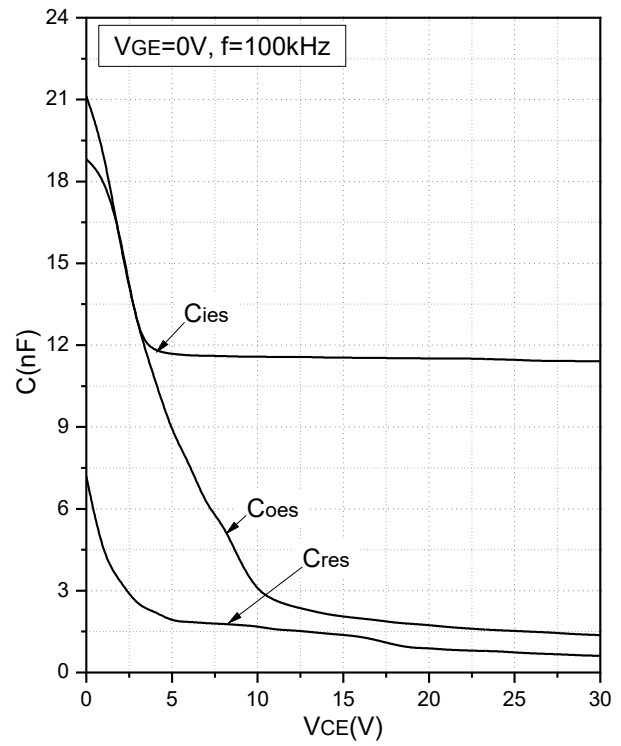
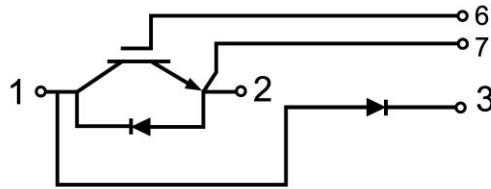


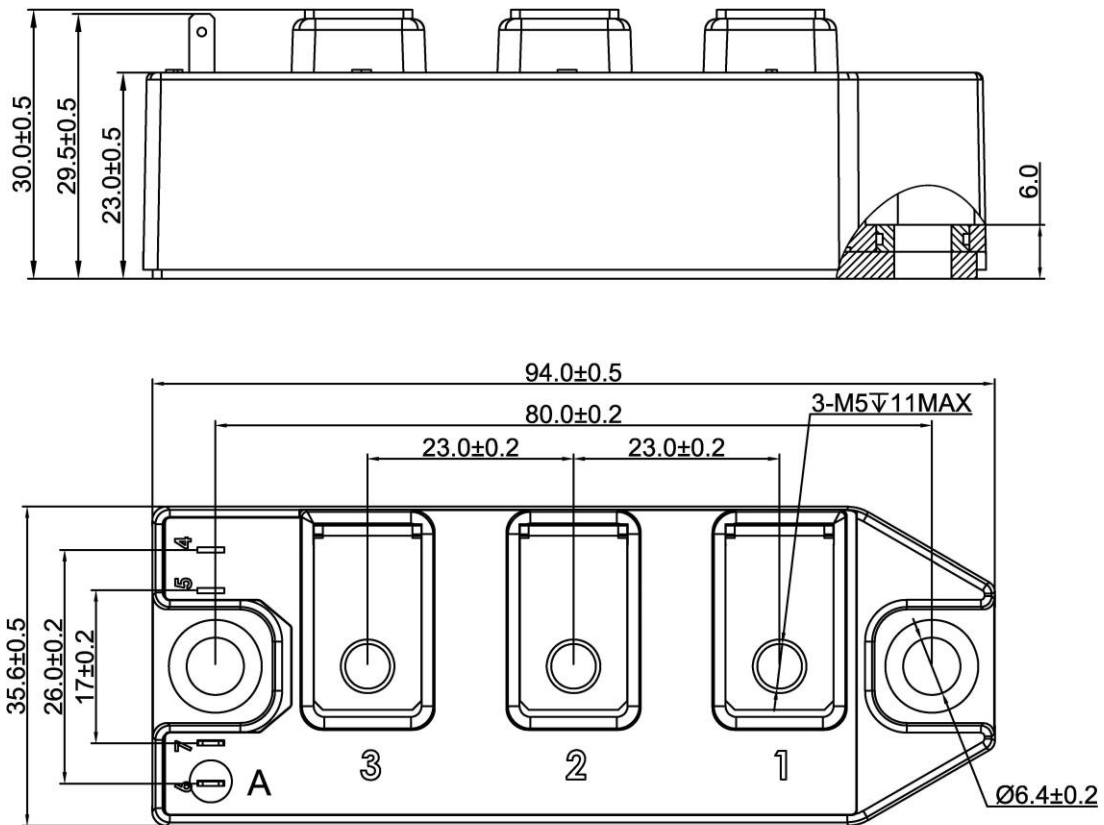
Fig.14 Capacitance Characteristics



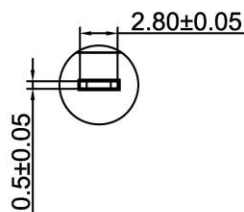
Internal Circuit



Package Outline (Unit: mm):



View A
scale 3:1





Revision	Notes
01	Initial release

Announcement

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