



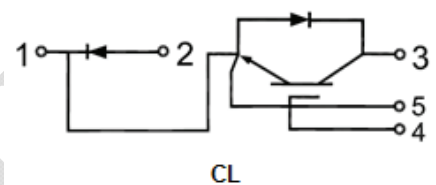
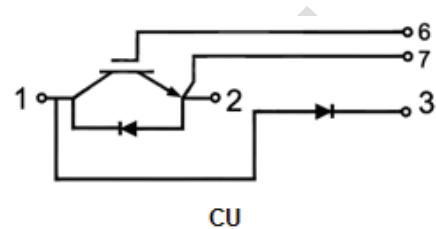
GT150CU120T2VH

GT150CL120T2VH

IGBT Module

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



Applications:

- Welding
- HEV Inverter
- Industrial Motor Drives
- UPS



IGBT, Brake-Chopper

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

V_{CES}	Collector-Emitter Blocking Voltage		1200	V
V_{GES}	Gate-Emitter Voltage		± 20	V
I_C	Continuous Collector Current	$T_C = 100^\circ\text{C}$	150	A
		$T_C = 25^\circ\text{C}$	300	A
I_{CM}	Repetitive Peak Collector Current	$T_J = 175^\circ\text{C}$	300	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation per IGBT	$T_C = 25^\circ\text{C}$ $T_{Jmax} = 175^\circ\text{C}$	1085	W

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

Static Characteristics

Symbol	Description	Conditions	Min	Typ	Max	Unit
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=4\text{mA}$, $V_{CE}=V_{GE}$	5.0	5.9	6.6	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=150\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^\circ\text{C}$	1.70	2.00	V
			$T_J=125^\circ\text{C}$	1.90		V
			$T_J=150^\circ\text{C}$	2.00		
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	$V_{GE}=\pm 20\text{V}$, $V_{CE}=0\text{V}$, $T_J=25^\circ\text{C}$			400	nA
C_{ies}	Input Capacitance	$V_{CE} = 25\text{V}$, $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$		10.13		nF
C_{oes}	Out Capacitance			1.01		nF
C_{res}	Reverse Transfer Capacitance			0.77		nF



Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V, I_C=150A,$ $R_{Gon}=4.7\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^\circ C$	258	ns
			$T_J=125^\circ C$	258	
			$T_J=150^\circ C$	260	
t_r	Rise Time	$V_{CC}=600V, I_C=150A,$ $R_{Gon}=4.7\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^\circ C$	85	ns
			$T_J=125^\circ C$	89	
			$T_J=150^\circ C$	89	
$t_{d(off)}$	Turn-off Delay Time	$V_{CC}=600V, I_C=150A,$ $R_{Goff}=4.7\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^\circ C$	265	ns
			$T_J=125^\circ C$	277	
			$T_J=150^\circ C$	284	
t_f	Fall Time	$V_{CC}=600V, I_C=150A,$ $R_{Goff}=4.7\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^\circ C$	205	ns
			$T_J=125^\circ C$	376	
			$T_J=150^\circ C$	428	
E_{on}	Turn-on Switching Loss	$V_{CC}=600V, I_C=150A,$ $R_{Gon}=4.7\Omega, V_{GE}=\pm 15V,$ $di/dt=1550A/\mu s (T_J=150^\circ C)$ Inductive Load	$T_J=25^\circ C$	12.5	mJ
			$T_J=125^\circ C$	15.7	
			$T_J=150^\circ C$	17.5	
E_{off}	Turn-off Switching Loss	$V_{CC}=600V, I_C=150A,$ $R_{Goff}=4.7\Omega, V_{GE}=\pm 15V,$ $du/dt=4106V/\mu s (T_J=150^\circ C)$ Inductive Load	$T_J=25^\circ C$	10.3	mJ
			$T_J=125^\circ C$	15.8	
			$T_J=150^\circ C$	17.4	
Q_g	Total Gate Charge	$V_{GE}=+15V \dots -15V$	$T_J=25^\circ C$	0.71	μC
$R_{g\ internal}$	Internal Gate Resistance		$T_J=25^\circ C$	5	Ω
RBSOA	$I_C=300A, V_{CC}=1050V, V_p=1200V, R_{Goff}=4.7\Omega, V_{GE}=+15V \text{ to } 0V, T_J=150^\circ C$			Trapezoid	
SC Data	$V_{CC}=600V, R_{Gon}=4.7\ \Omega, R_{Goff}=4.7\ \Omega, t_p=10\mu s, V_{GE}=\pm 15V, T_J=125^\circ C$			680	A
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case(per leg)			0.14	$^\circ C/W$



Diode, Chopper

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

V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	Diode Continuous Forward Current	150	A
I_{FM}	Diode Maximum Forward Current	300	A

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

Symbol	Description	Conditions	Min	Typ	Max	Unit
V_{FM}	Forward Voltage	$I_F=150\text{A}$	$T_J=25^\circ\text{C}$	1.50		V
			$T_J=125^\circ\text{C}$	1.50		
			$T_J=150^\circ\text{C}$	1.50		
t_{rr}	Reverse Recovery Time		$T_J=25^\circ\text{C}$	371		ns
			$T_J=125^\circ\text{C}$	562		
			$T_J=150^\circ\text{C}$	625		
I_{rr}	Peak Reverse Recovery Current	$I_F=150\text{A}$, $-diF/dt=1670\text{A}/\mu\text{s}(T_J=150^\circ\text{C})$, $V_R=600\text{V}$, $V_{GE}=-15\text{V}$	$T_J=25^\circ\text{C}$	127		A
			$T_J=125^\circ\text{C}$	142		
			$T_J=150^\circ\text{C}$	145		
Q_{rr}	Reverse Recovery Charge		$T_J=25^\circ\text{C}$	22.6		μC
			$T_J=125^\circ\text{C}$	34.6		
			$T_J=150^\circ\text{C}$	39.4		
E_{rec}	Reverse Recovery Energy		$T_J=25^\circ\text{C}$	9.7		mJ
			$T_J=125^\circ\text{C}$	15.2		
			$T_J=150^\circ\text{C}$	17.6		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case (per leg)				0.21	$^\circ\text{C}/\text{W}$



Diode, Reverse

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

V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	Diode Continuous Forward Current	100	A
I_{FM}	Peak FWD Current Repetitive	200	A

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

Symbol	Description	Conditions	Min	Typ	Max	Unit
V_{FM}	Forward Voltage	$I_F=100\text{A}$	$T_J=25^\circ\text{C}$	1.70		V
			$T_J=125^\circ\text{C}$	1.80		
			$T_J=150^\circ\text{C}$	1.80		
t_{rr}	Reverse Recovery Time		$T_J=25^\circ\text{C}$	260		ns
			$T_J=125^\circ\text{C}$	396		
			$T_J=150^\circ\text{C}$	454		
I_{rr}	Peak Reverse Recovery Current	$I_F=100\text{A}$, $-diF/dt = 1911\text{A}/\mu\text{s}(T_J=150^\circ\text{C})$, $V_R=600\text{V}$, $V_{GE}=-15\text{V}$	$T_J=25^\circ\text{C}$	92		A
			$T_J=125^\circ\text{C}$	104		
			$T_J=150^\circ\text{C}$	105		
Q_{rr}	Reverse Recovery Charge		$T_J=25^\circ\text{C}$	10.2		μC
			$T_J=125^\circ\text{C}$	16.8		
			$T_J=150^\circ\text{C}$	19.2		
E_{rec}	Reverse Recovery Energy		$T_J=25^\circ\text{C}$	4.83		mJ
			$T_J=125^\circ\text{C}$	7.92		
			$T_J=150^\circ\text{C}$	9.13		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case				0.34	$^\circ\text{C}/\text{W}$



Module

Symbol	Description	Min	Typ	Max	Unit
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
T	Power Terminals Screw:M6	3.0		5.0	N·m
T	Mounting Screw:M6	4.0		6.0	N·m
G	Weight		300		g

Ordering Information Table

Device code	G	T	150	CU	120	T2V	H
	①	②	③	④	⑤	⑥	⑦

- ① - IGBT Module
- ② - Trench & Field Stop IGBT
- ③ - Rated Current (150=150A)
- ④ - Circuit Configuration: Chopper, CU(Diode on High Side) / CL(Diode on Low Side)
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

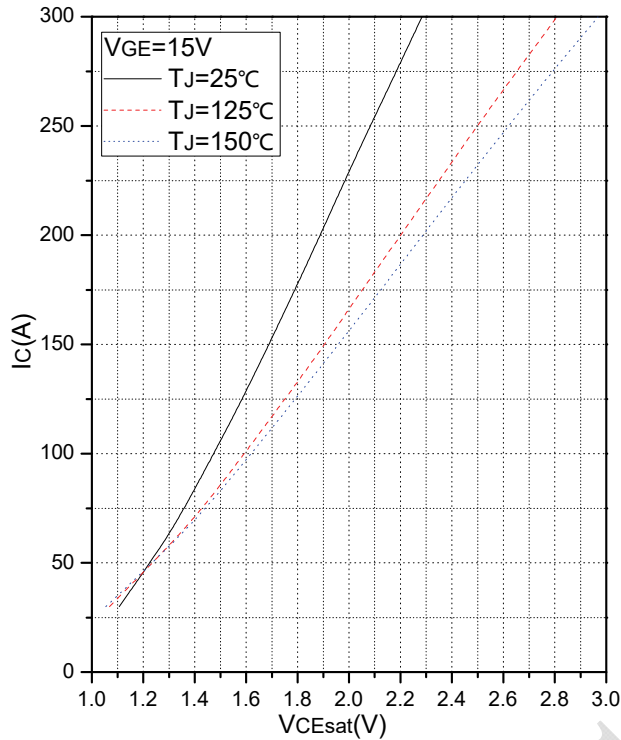


Fig.1 Typical Saturation Voltage Characteristics

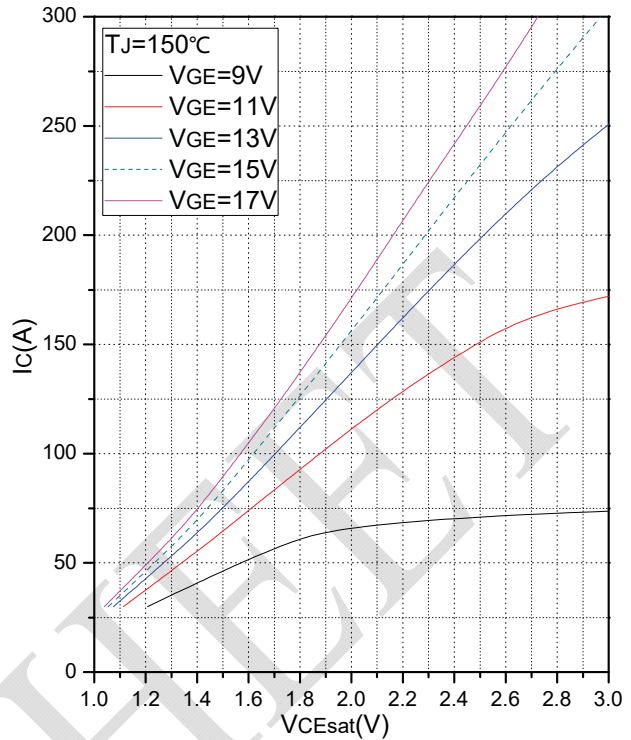


Fig.2 Typical Output Characteristics

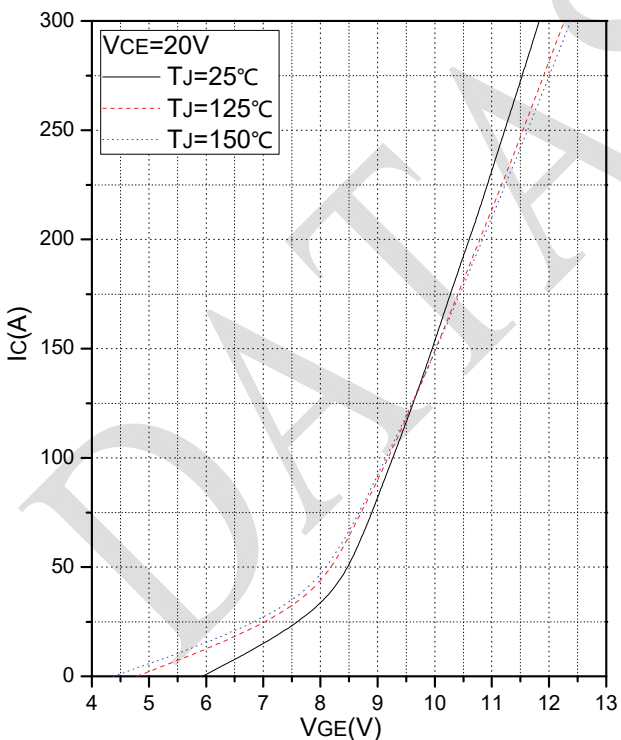


Fig.3 Transfer Characteristic

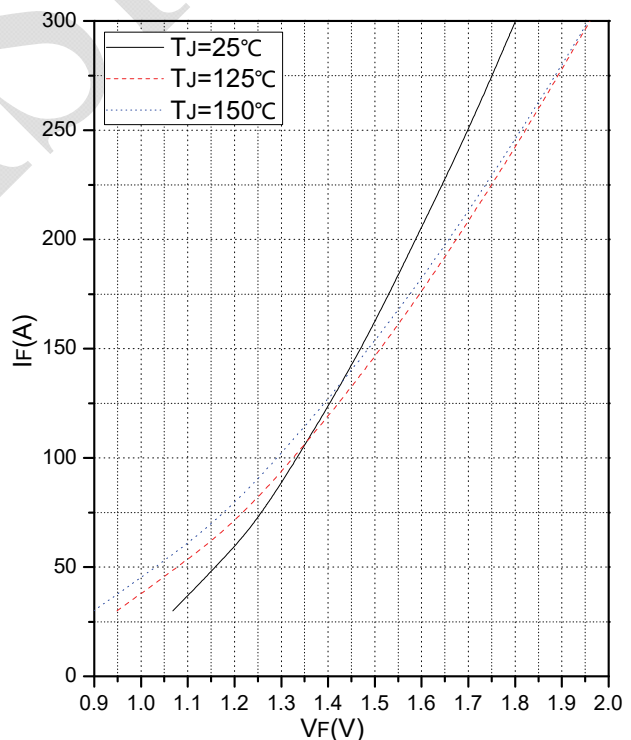


Fig.4 Forward Characteristics of Chopper Diode

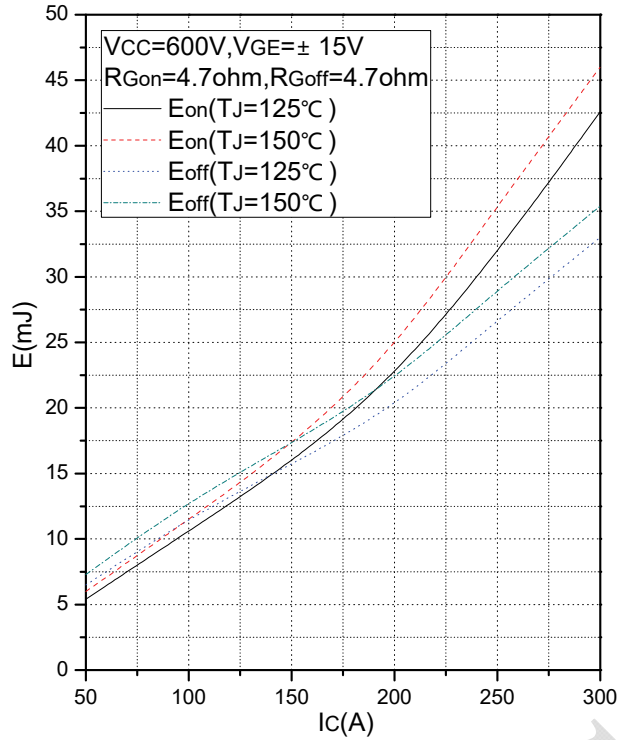


Fig.5 Typical Switching Loss vs. Collector Current

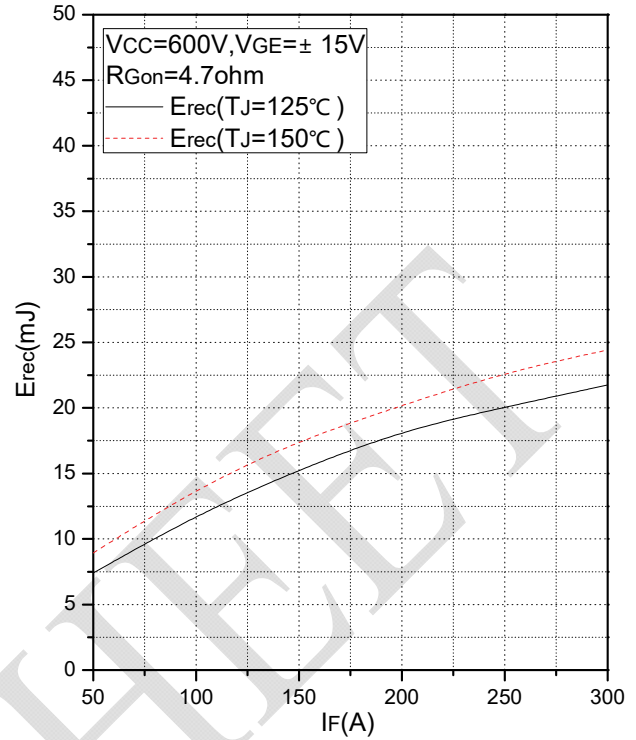


Fig.6 Typical Switching Loss vs. Forward Current

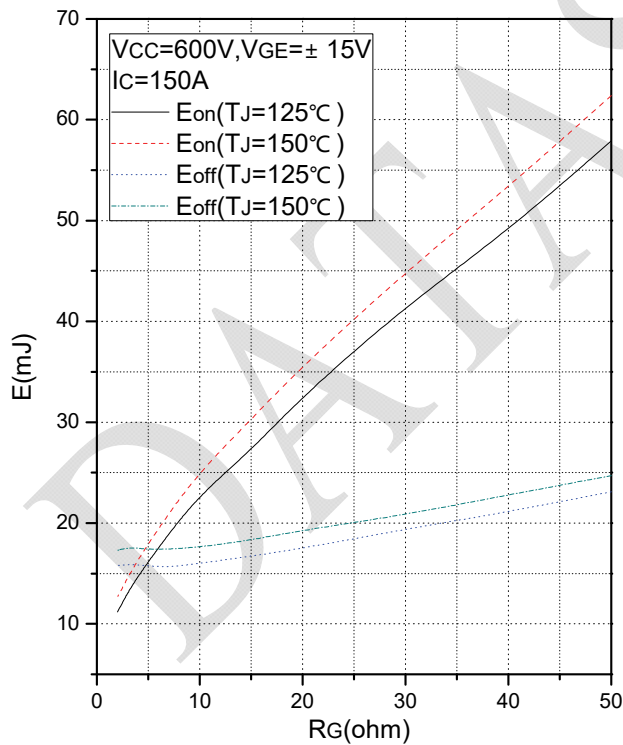


Fig.7 Typical Switching Loss vs. Gate Resistance

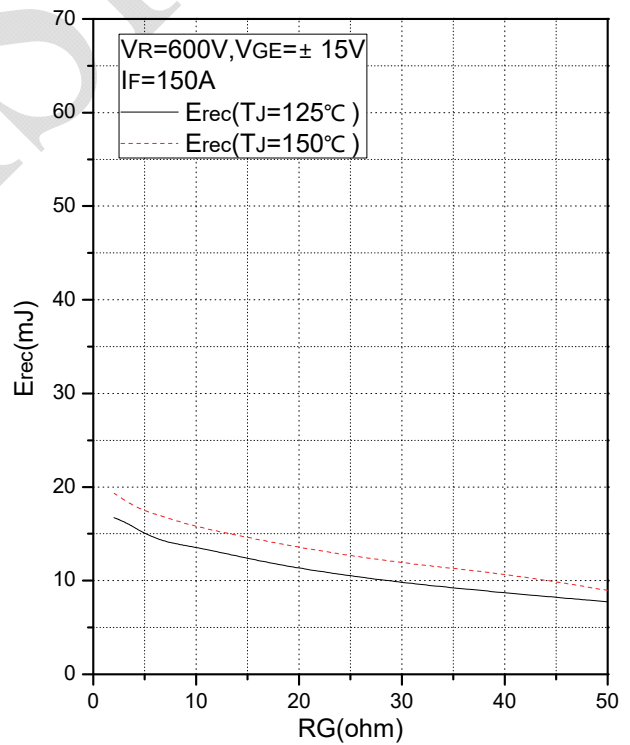


Fig.8 Typical Switching Loss vs. Gate Resistance

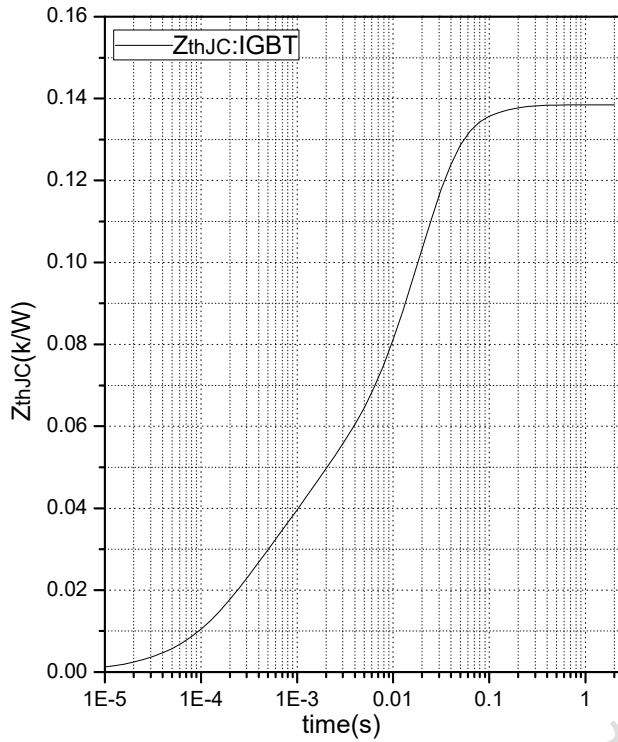


Fig.9 Transient Thermal Impedance (IGBT)

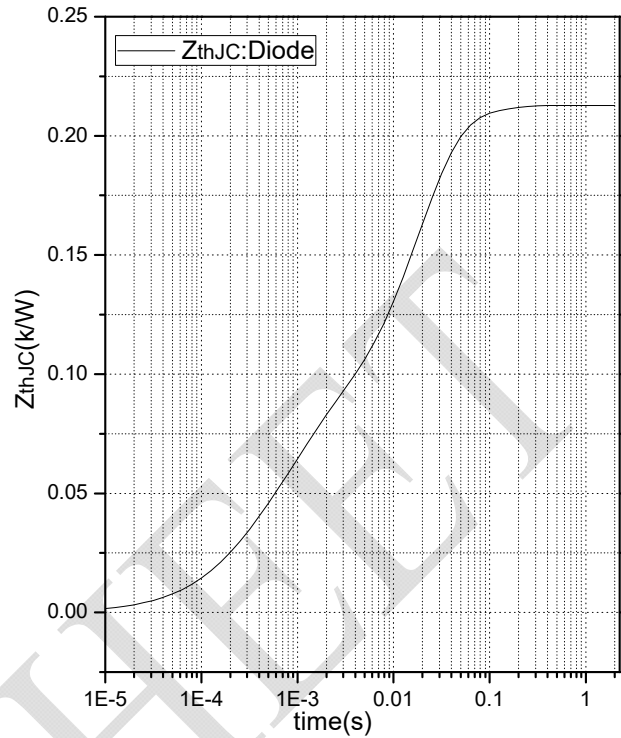


Fig.10 Transient Thermal Impedance (FWD)

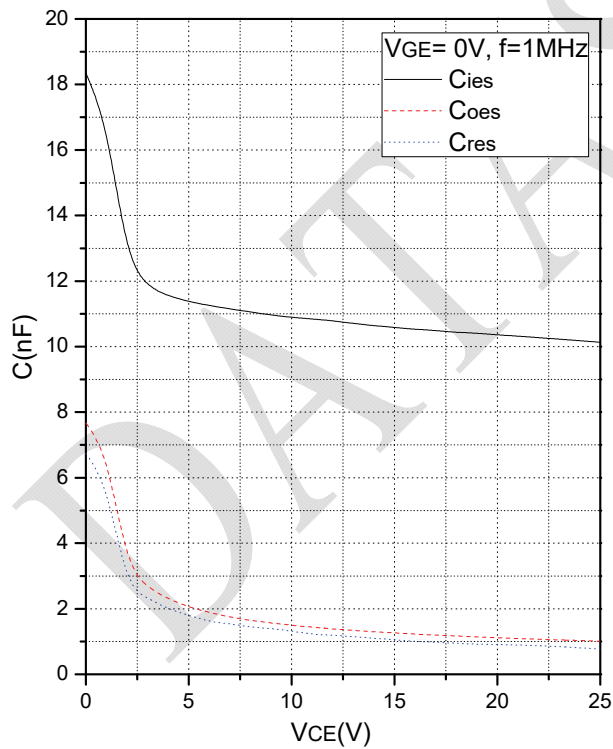


Fig.11 Capacitance Characteristics

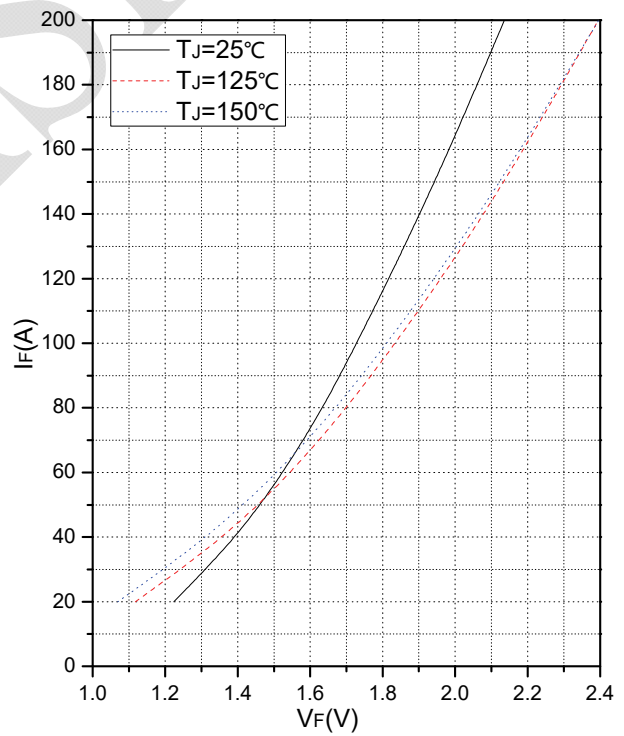


Fig.12 Forward Characteristics of Reverse Diode

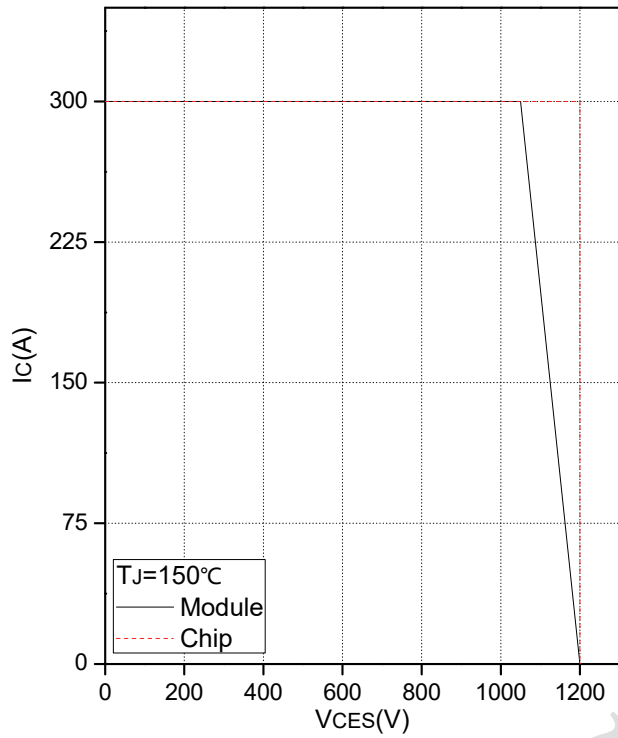
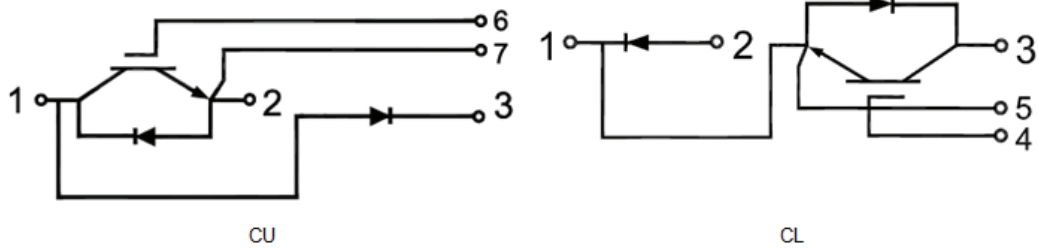


Fig.13 Reverse Bias Safe Operation Area (RBSOA)

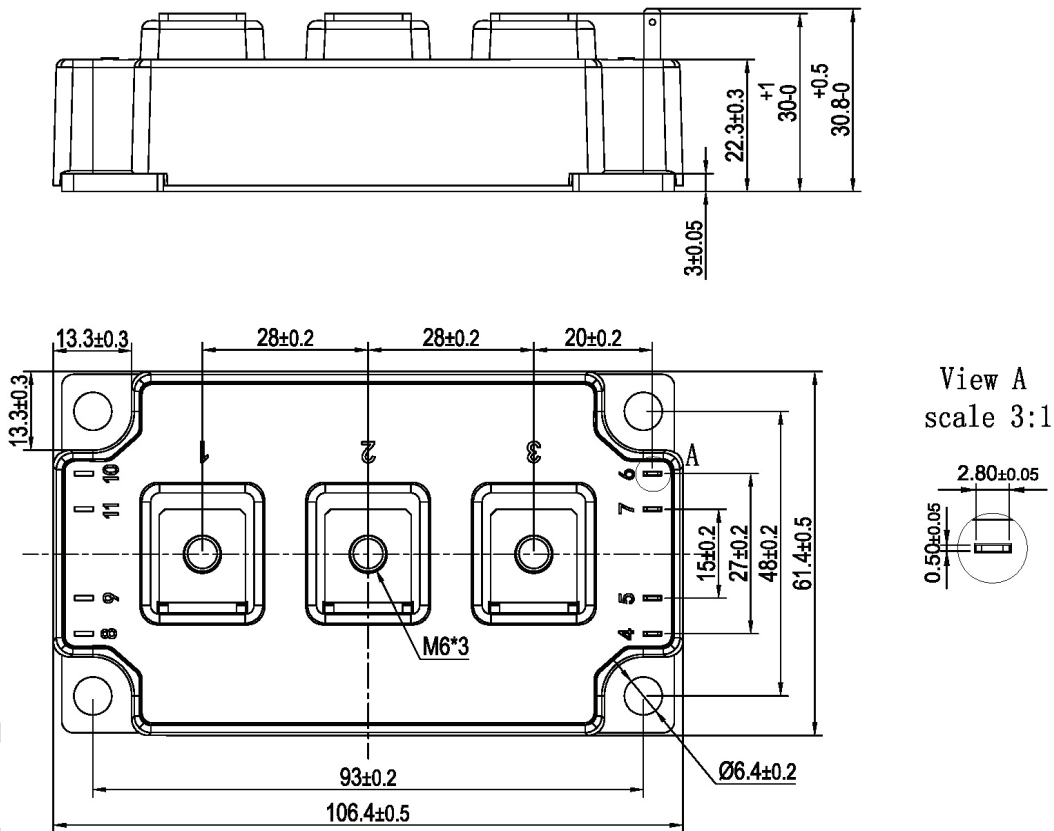
DATA SHEET



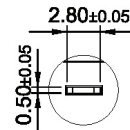
Internal Circuit



Package Outline (Unit: mm):



View A
scale 3:1





Date	Revision	Notes
12/04/2018	01	Initial Release.
09/10/2019	A	Final Version.

Announcement

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