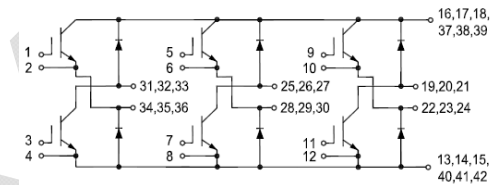
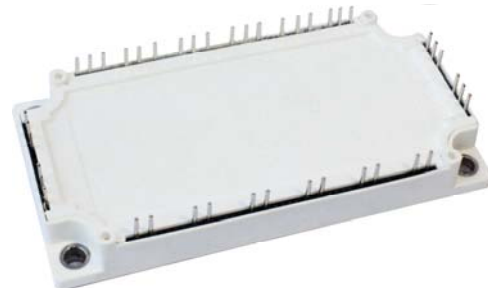


GT150CZ120T6H-M

IGBT Module

Features:

- Field Stop Trench Gate 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



Applications:

- Switched Reluctance Drive
- Servo Applications

IGBT, Brake-Chopper

Maximum Rated Values (T_C=25°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°C	150	A
		T _C = 25°C	300	A
I _{CM}	Repetitive Peak Collector Current	T _J = 175°C	300	A
t _{SC}	Short Circuit Withstand Time		>10	μs
P _D	Maximum Power Dissipation per IGBT	T _C = 25°C T _{Jmax} = 175°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		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	$V_{GE}=\pm 20\text{V}$, $V_{CE}=0\text{V}$, $T_J=25^\circ\text{C}$			400	nA
C_{ies}	Input Capacitance			10.13		nF
C_{oes}	Out Capacitance	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=1\text{MHz}$		1.01		nF
C_{res}	Reverse Transfer Capacitance			0.77		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600\text{V}$, $I_C=150\text{A}$, $R_{Gon}=4.7\Omega$, $V_{GE}=\pm 15\text{V}$, Inductive Load	$T_J=25^\circ\text{C}$	258		ns
			$T_J=125^\circ\text{C}$	258		
			$T_J=150^\circ\text{C}$	260		
t_r	Rise Time	$V_{CC}=600\text{V}$, $I_C=150\text{A}$, $R_{Gon}=4.7\Omega$, $V_{GE}=\pm 15\text{V}$, Inductive Load	$T_J=25^\circ\text{C}$	85		ns
			$T_J=125^\circ\text{C}$	89		
			$T_J=150^\circ\text{C}$	89		
$t_{d(off)}$	Turn-off Delay Time	$V_{CC}=600\text{V}$, $I_C=150\text{A}$, $R_{Goff}=4.7\Omega$, $V_{GE}=\pm 15\text{V}$, Inductive Load	$T_J=25^\circ\text{C}$	265		ns
			$T_J=125^\circ\text{C}$	277		
			$T_J=150^\circ\text{C}$	284		
t_f	Fall Time	$V_{CC}=600\text{V}$, $I_C=150\text{A}$, $R_{Goff}=4.7\Omega$, $V_{GE}=\pm 15\text{V}$, Inductive Load	$T_J=25^\circ\text{C}$	205		ns
			$T_J=125^\circ\text{C}$	376		
			$T_J=150^\circ\text{C}$	428		
E_{on}	Turn-on Switching Loss	$V_{CC}=600\text{V}$, $I_C=150\text{A}$, $R_{Gon}=4.7\Omega$, $V_{GE}=\pm 15\text{V}$, $di/dt=1550\text{A}/\mu\text{s}$ ($T_J=150^\circ\text{C}$) Inductive Load	$T_J=25^\circ\text{C}$	12.5		mJ
			$T_J=125^\circ\text{C}$	15.7		
			$T_J=150^\circ\text{C}$	17.5		

E _{off}	Turn-off Switching Loss	V _{CC} =600V, I _C =150A, R _{Goff} =4.7Ω, V _{GE} = ±15V, du/dt=4106V/μs (T _J =150°C) Inductive Load	T _J =25°C	10.3	mJ
			T _J =125°C	15.8	
			T _J =150°C	17.4	
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J = 25°C	0.71	μC
R _{g internal}	Internal Gate Resistance		T _J =25°C	5	Ω
RBSOA	I _C =300A, V _{CC} =1050V, V _p =1200V, R _{Goff} =4.7Ω, V _{GE} =+15V to 0V, T _J =150°C			Trapezoid	
SC Data	V _{CC} =600V, R _{Gon} =4.7 Ω, R _{Goff} =4.7 Ω, t _p =10us, V _{GE} =+/-15V, T _J =125°C			680	A
R _{θJC}	IGBT Thermal Resistance: Junction-To-Case (per leg)			0.138	°C/W

Diode, Brake-Chopper Maximum Rated Values (T_C=25°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°C unless otherwise specified)

Symbol	Description	Conditions	Min	Typ	Max	Unit
V _{FM}	Forward Voltage	I _F =150A	T _J =25°C	1.50		V
			T _J =125°C	1.50		
			T _J =150°C	1.50		
t _{rr}	Reverse Recovery Time		T _J =25°C	371		ns
			T _J =125°C	562		
			T _J =150°C	625		
I _{rr}	Peak Reverse Recovery Current	I _F =150A, -diF/dt=1670A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C	127		A
			T _J =125°C	142		
			T _J =150°C	145		
Q _{rr}	Reverse Recovery Charge		T _J =25°C	22.6		μC
			T _J =125°C	34.6		
			T _J =150°C	39.4		

E _{rec}	Reverse Recovery Energy	I _F =150A, -diF/dt=1670A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C	9.7	mJ
			T _J =125°C	15.2	
			T _J =150°C	17.6	
R _{θJC}	Diode Thermal Resistance: Junction-To-Case (per leg)			0.213	°C/W

Module

Symbol	Description	Min	Typ	Max	Unit
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)		0.02		°C/W
M	Mounting Screw:M5	4.0		6.0	N·m
G	Weight		300		g

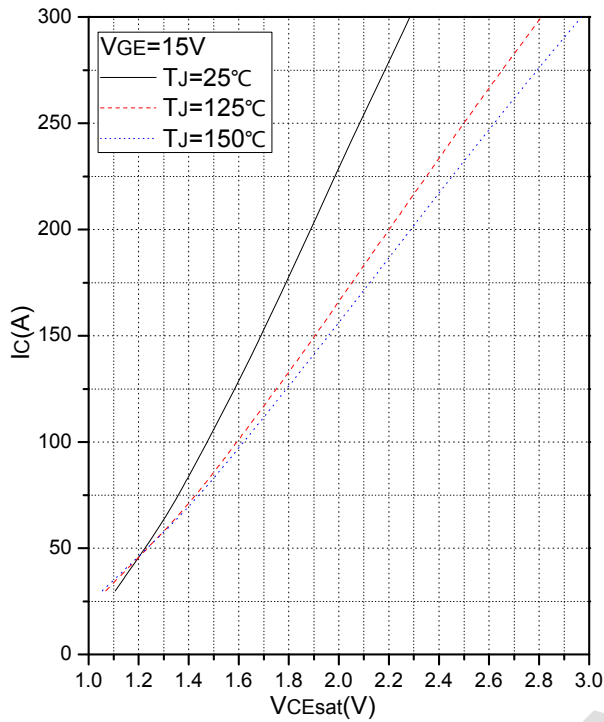


Fig.1 Typical Saturation Voltage Characteristics

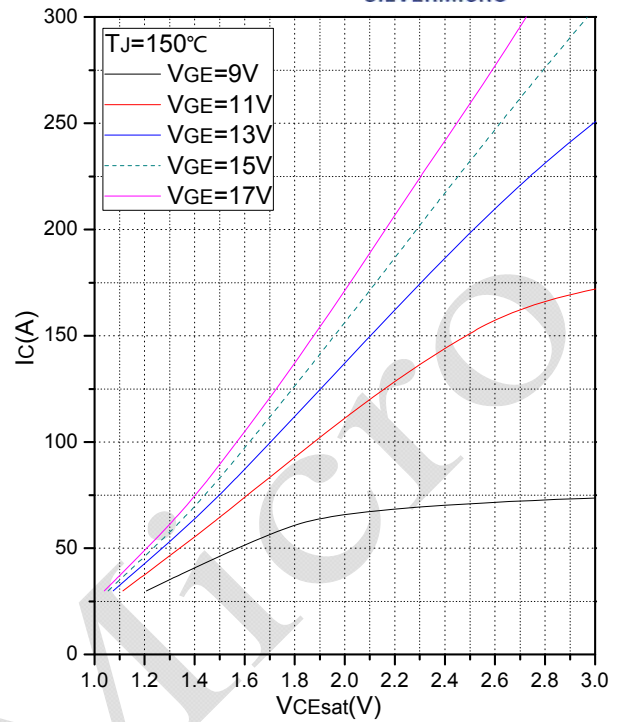


Fig.2 Typical Output Characteristics

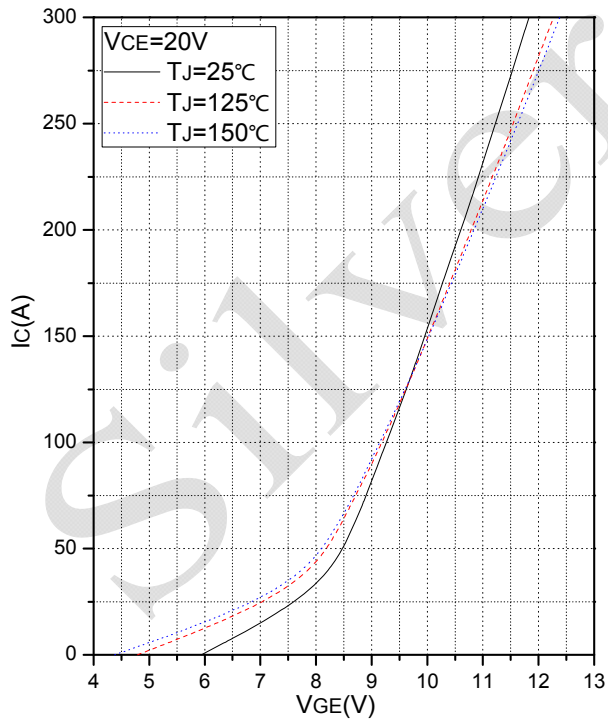


Fig.3 Transfer Characteristic

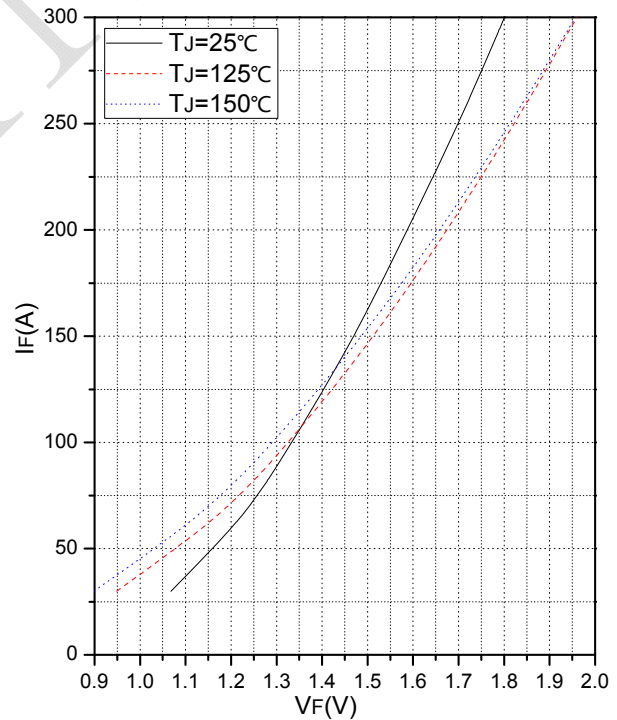


Fig.4 Forward Characteristics of Brake-Chopper Diode

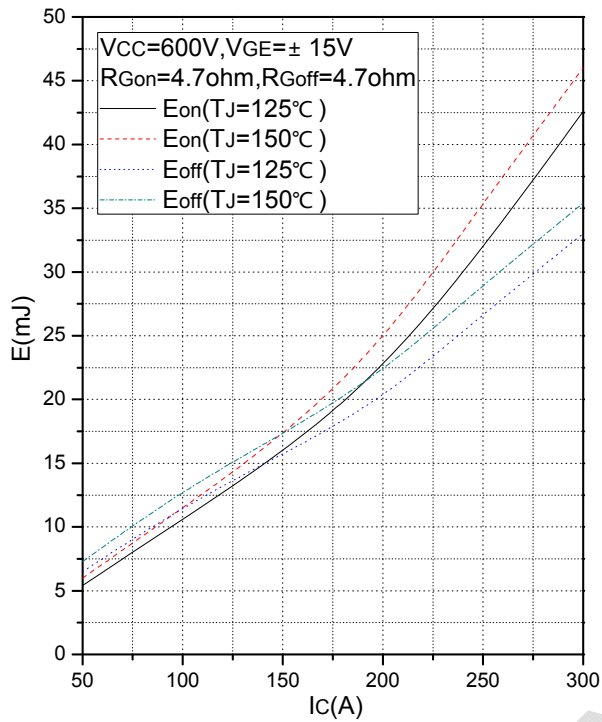


Fig.5 Typical Switching Loss vs. Collector Current

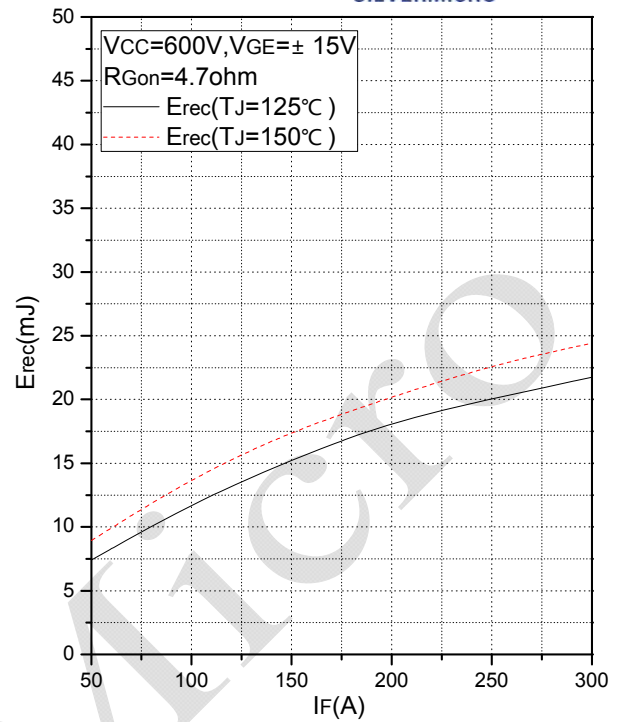


Fig.6 Typical Switching Loss vs. Forward Current

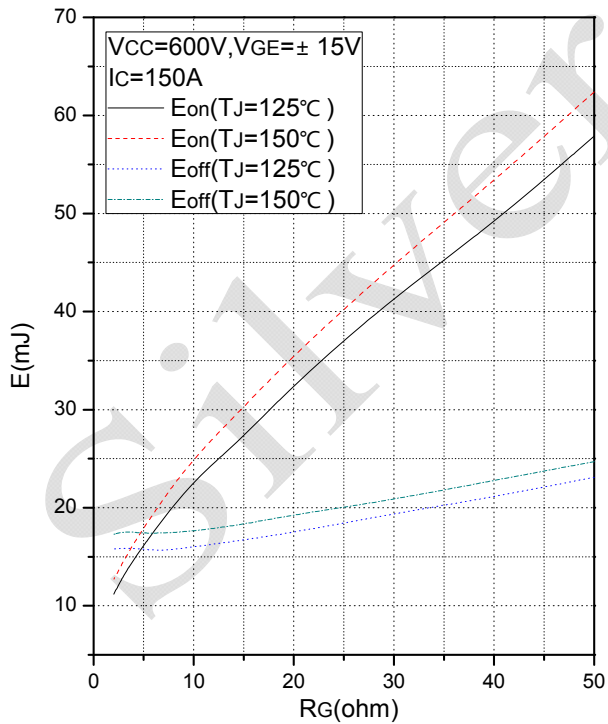


Fig.7 Typical Switching Loss vs. Gate Resistance

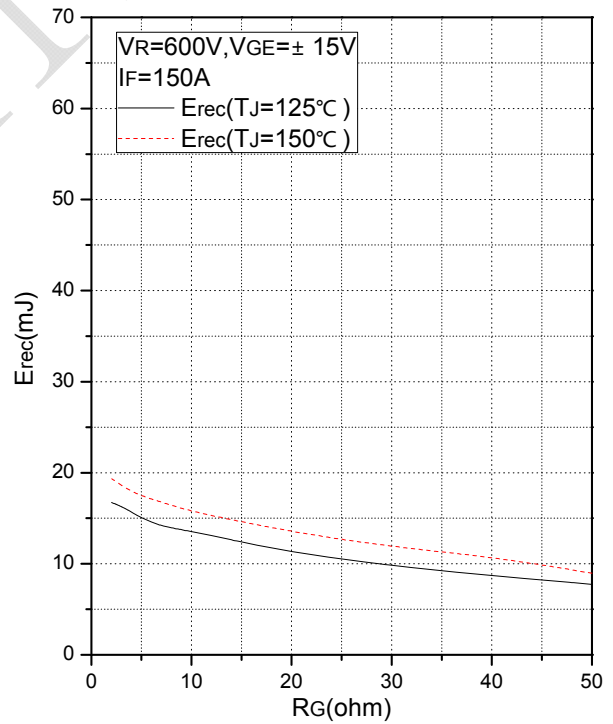


Fig.8 Typical Switching Loss vs. Gate Resistance

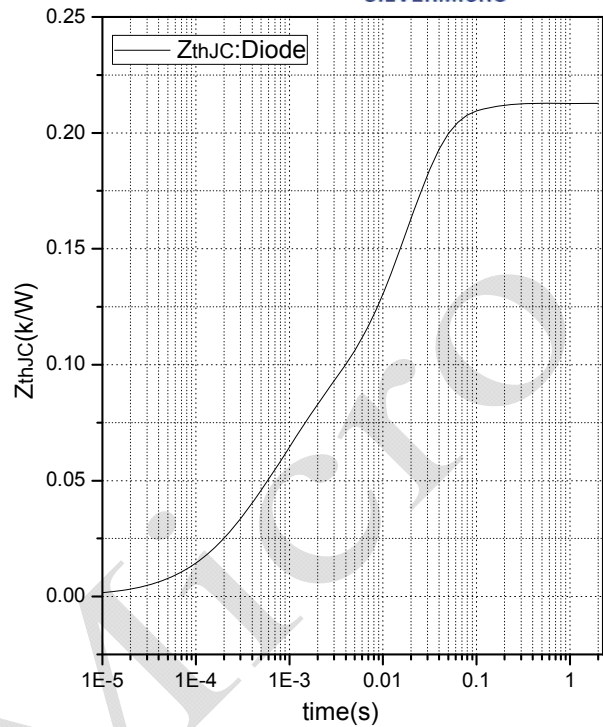
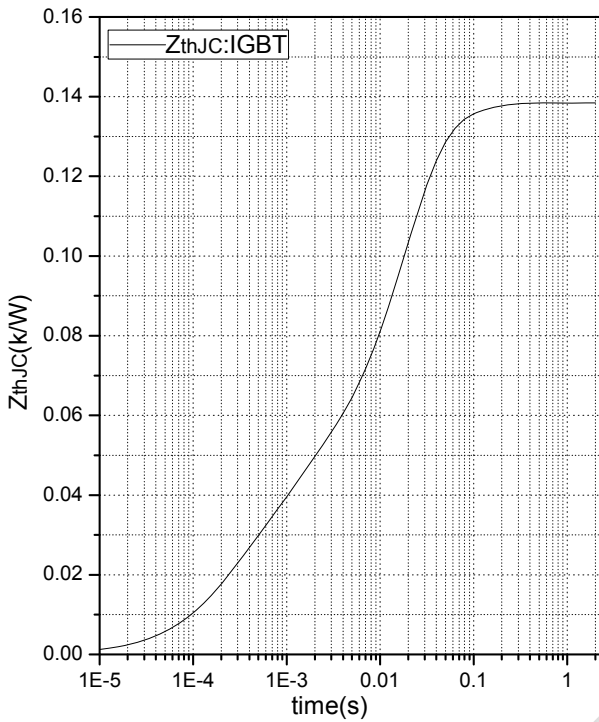


Fig.9 Transient Thermal Impedance (Brake-Chopper IGBT)

Fig.10 Transient Thermal Impedance (Brake-Chopper Diode)

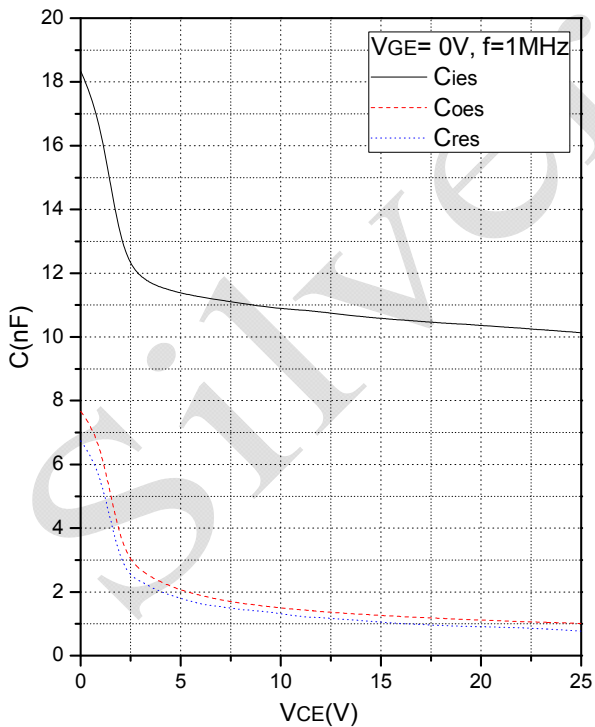


Fig.11 Capacitance Characteristics

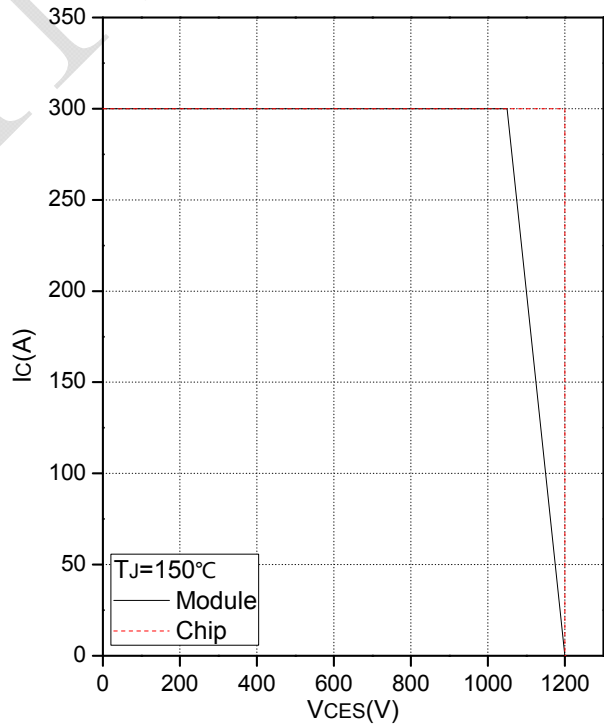
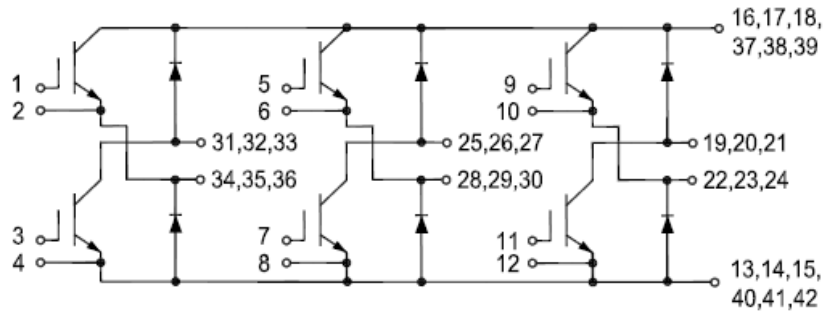
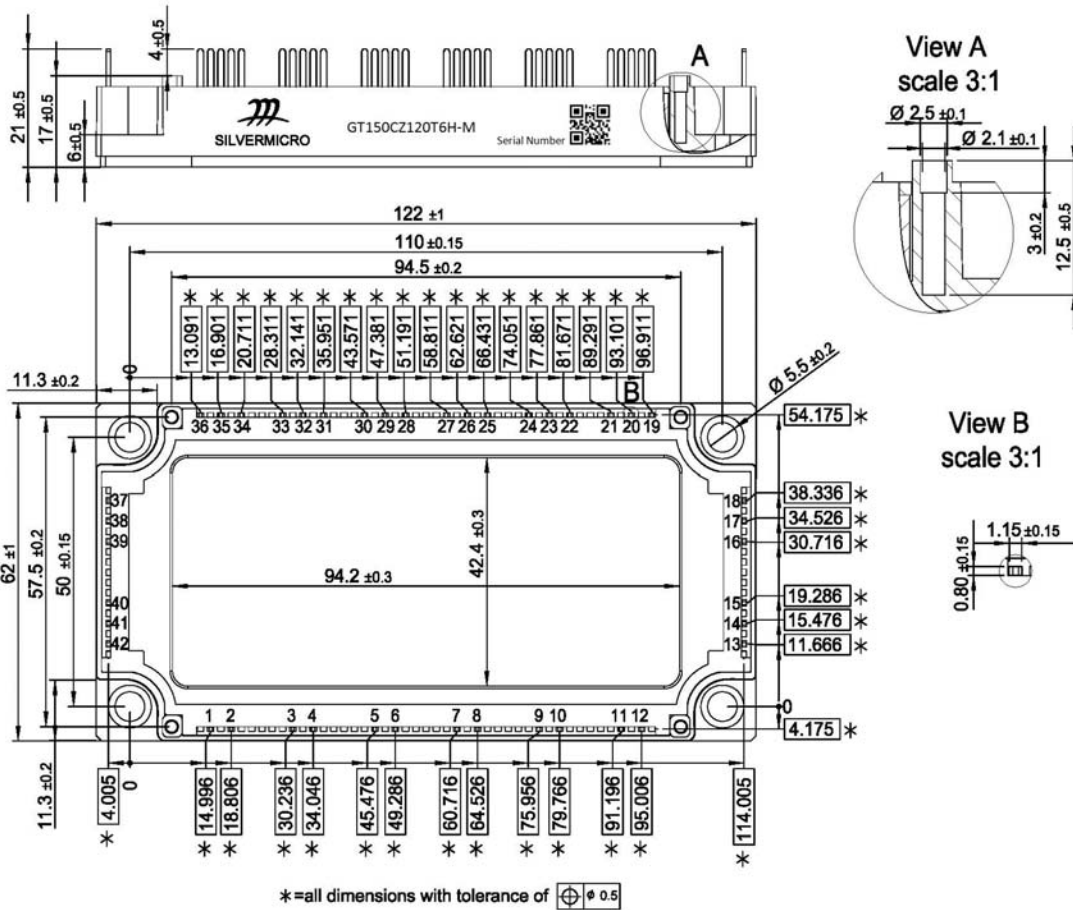


Fig.12 Reverse Bias Safe Operation Area (RBSOA)

Internal Circuit:



Package Outline (Unit: mm):





Date	Revision	Notes
07/17/2019	A	Final Version.
09/11/2019	B	Add R _g internal.

Announcement

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