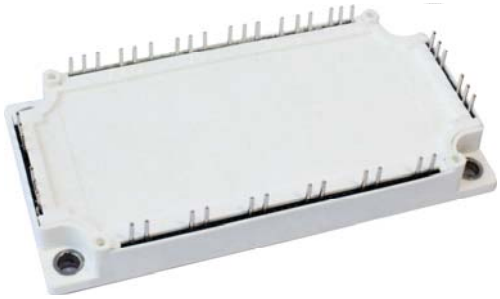
GT50CZ120T6H-M

IGBT Module

Features：

- Field Stop Trench Gate IGBT
- Short Circuit Rated>10μs
- Low Saturation Voltage
- Low Switching Loss
- 100% RBSOA Tested(2×Ic)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement



Applications：

- Switched Reluctance Drive
- Servo Applications

IGBT, Brake-Chopper

Maximum Rated Values (T_C=25℃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℃	50	A
		T_C = 25℃	100	A
I_{CM}	Peak Collector Current Repetitive	T_J = 175℃	100	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation (IGBT)	T_C = 25℃ T_{Jmax}=175℃	398	W

Electrical Characteristics of IGBT (T_C=25℃unless otherwise specified)

Static Characteristics

Symbol	Description	Conditions		Min	Typ	Max	Unit
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C=1mA, V_{CE}=V_{GE}		5.0	5.6	6.6	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=50A, V_{GE} =15V	T_J=25℃		1.70	2.00	V
			T_J=125℃		1.90		V
			T_J=150℃		1.90		V
I_{CES}	Collector-Emitter Leakage Current	V_{GE}=0V, V_{CE}=V_{CES}, T_J=25℃				1	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE}= ±20V, V_{CE}=0V, T_J=25℃				200	nA
C_{ies}	Input Capacitance	V_{CE}=25V, V_{GE}=0V , f=1MHz			3.65		nF
C_{oes}	Output Capacitance				0.50		nF
C_{res}	Reveres Transfer Capacitance				0.31		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V,I_C=50A, R_{Gon}=15Ω,V_{GE}=±15V, Inductive Load	T_J=25℃		154		ns
			T_J=125℃		169		
			T_J=150℃		174		
t_r	Rise Time		T_J=25℃		51		ns
			T_J=125℃		54		
			T_J=150℃		56		
$t_{d(off)}$	Turn-off Delay Time	V_{CC}=600V,I_C=50A, R_{Goff}=15Ω,V_{GE}=±15V, Inductive Load	T_J=25℃		202		ns
			T_J=125℃		216		
			T_J=150℃		225		
t_f	Fall Time		T_J=25℃		220		ns
			T_J=125℃		379		
			T_J=150℃		407		
E_{on}	Turn-on Switching Loss	V_{CC}=600V,I_C=50A, R_{Gon}=15Ω,V_{GE}=±15V, di/dt=791A/μs(T_J=150℃), Inductive Load	T_J=25℃		3.37		mJ
			T_J=125℃		5.10		
			T_J=150℃		5.53		

E_{off}	Turn-off Switching Loss	V_{CC}=600V,I_C=50A, R_{Goff}=15Ω,V_{GE}=±15V, du/dt=3488V/μs(T_J=150℃), Inductive Load	T_J=25℃		2.42		mJ
			T_J=125℃		4.09		
			T_J=150℃		4.52		
Q_g	Total Gate Charge	V_{GE}=+15V…-15V	T_J=25℃		504		nC
$R_{g\ internal}$	Internal Gate Resistance		T_J=25℃		4		Ω
RBSOA	I_C=100A,V_{CC}=1050V,Vp=1200V, R_{Goff}=15Ω, V_{GE}=+15V to 0V, T_J=150°C			Trapezoid			
SC data	Vcc=600V, tp=10us, Vge=+/-15V, R_{Gon}=15ohm, R_{Goff}=15ohm, Tj=25℃				256		A
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case				0.38		℃/W

Diode, Brake-Chopper

Maximum Rated Values (T_C=25℃unless otherwise specified)

V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	Diode Continuous Forward Current	50	A
I_{FM}	Diode Maximum Forward Current	100	A

Electrical Characteristics of Diode (T_C=25℃unless otherwise specified)

Symbol	Description	Conditions		Min	Typ	Max	Unit
V_{FM}	Forward Voltage	I_F=50A	T_J=25℃		1.40		V
			T_J=125℃		1.50		
			T_J=150℃		1.45		
t_{rr}	Reverse Recovery Time	I_F=50A, -diF/dt =1197A/μs(T_J=150℃), V_R=600V, V_{GE}=-15V	T_J=25℃		318		ns
			T_J=125℃		539		
			T_J=150℃		554		
I_{rr}	Peak Reverse Recovery Current		T_J=25℃		57		A
			T_J=125℃		60		
			T_J=150℃		65		
Q_{rr}	Reverse Recovery Charge		T_J=25℃		7.95		μC
			T_J=125℃		12.78		
			T_J=150℃		14.17		

E_{rec}	Reverse Recovery Energy	I_F=50A, -diF/dt =1197A/μs(T_J=150℃), V_R=600V, V_{GE}=-15V	T_J=25℃		3.15		mJ
			T_J=125℃		5.21		
			T_J=150℃		6.05		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case				0.51		℃/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	℃
T_{JOP}	Maximum Operating Junction Temperature Range		-40		+150	℃
T_{stg}	Storage Temperature		-40		+125	℃
CTI	Comparative Tracking Index		200			
$R_{\theta CS}$	Case-To-Sink Thermally (Conductive Grease Applied)			0.02		℃/W
M	Mounting Screw:M5		4.0		6.0	N·m
G	Weight			300		g

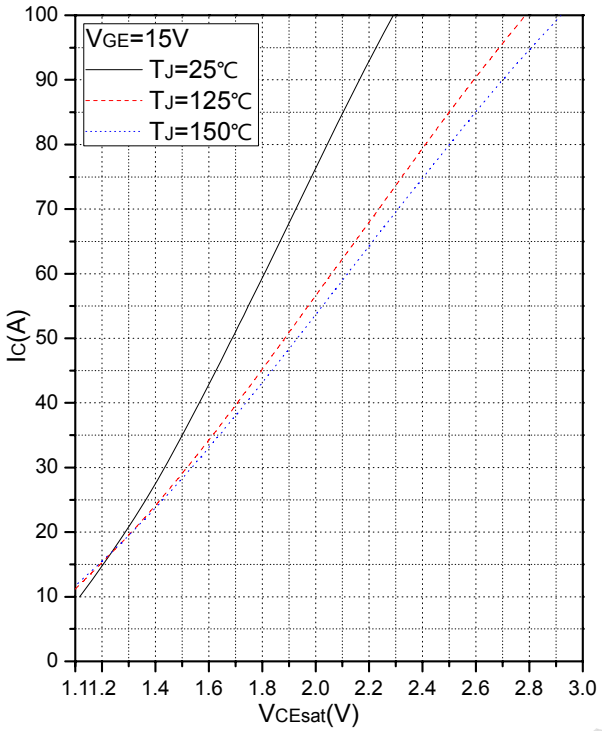


Fig.1 Typical Saturation Voltage Characteristics

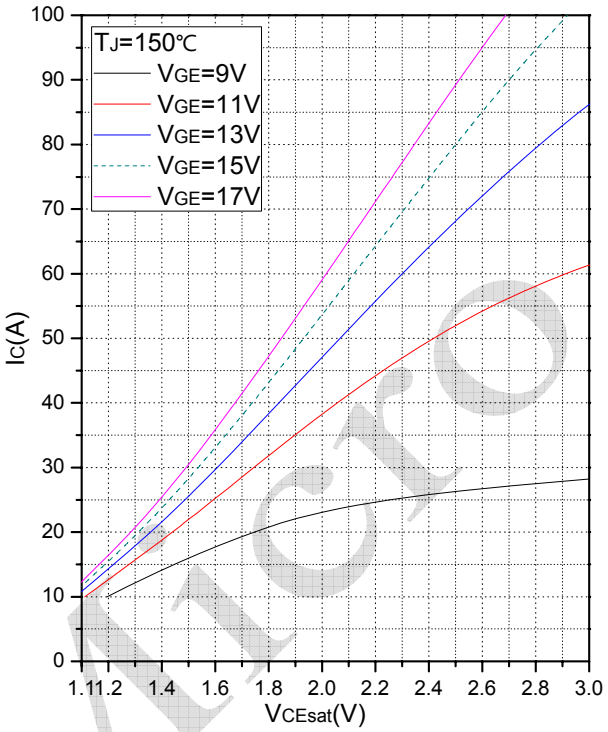


Fig.2 Typical Output Characteristics

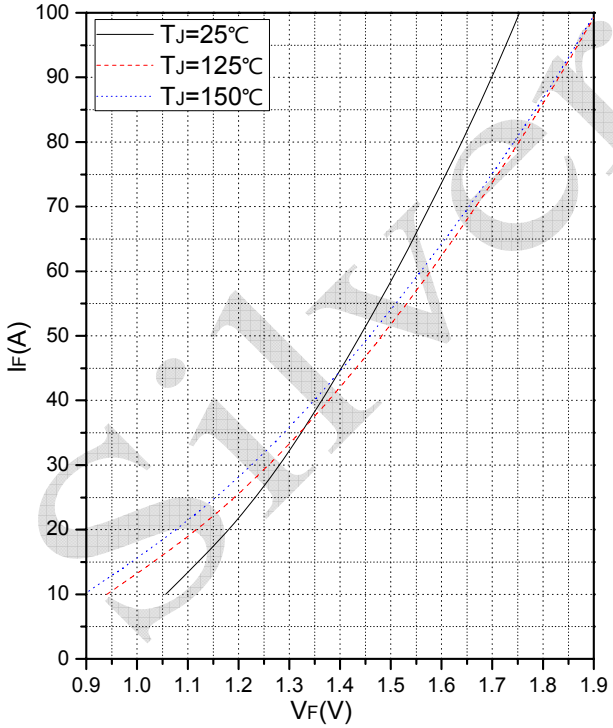


Fig.3 Forward Characteristics of Brake-Chopper Diode

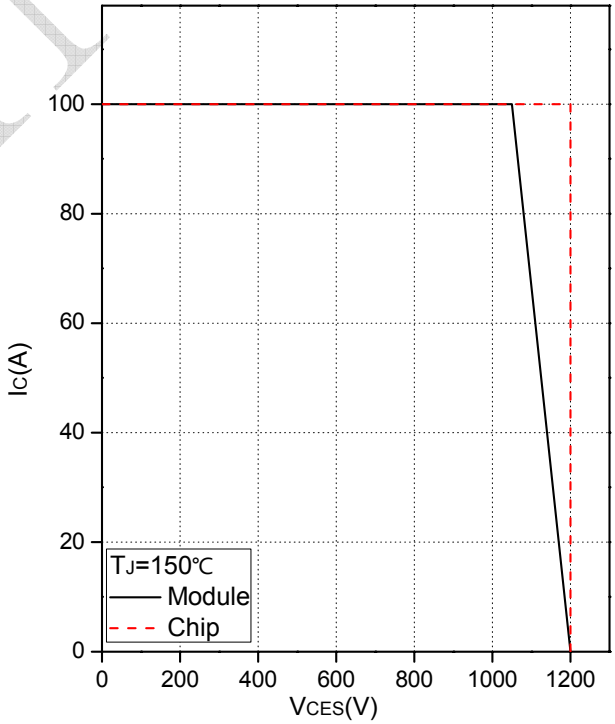


Fig.4 Reverse Bias Safe Operation Area (RBSOA)

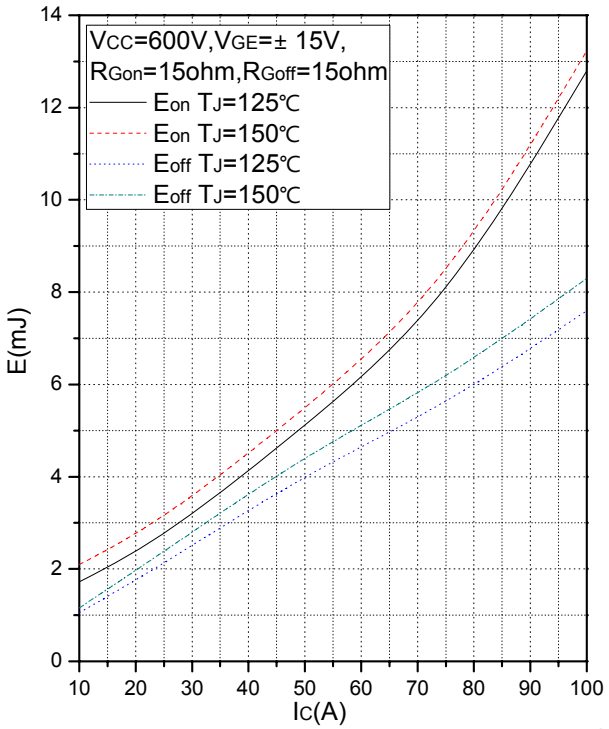


Fig.5 Typical Switching Loss vs. Collector Current

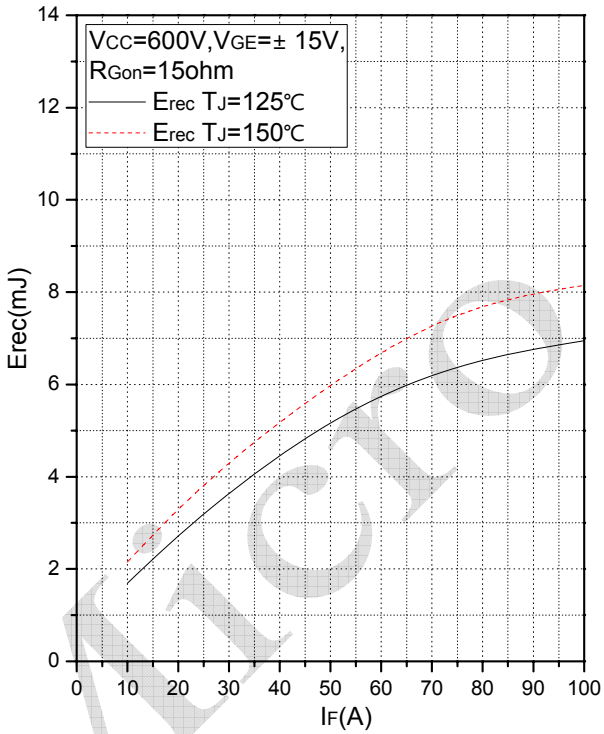


Fig.6 Typical Switching Loss vs. Forward Current

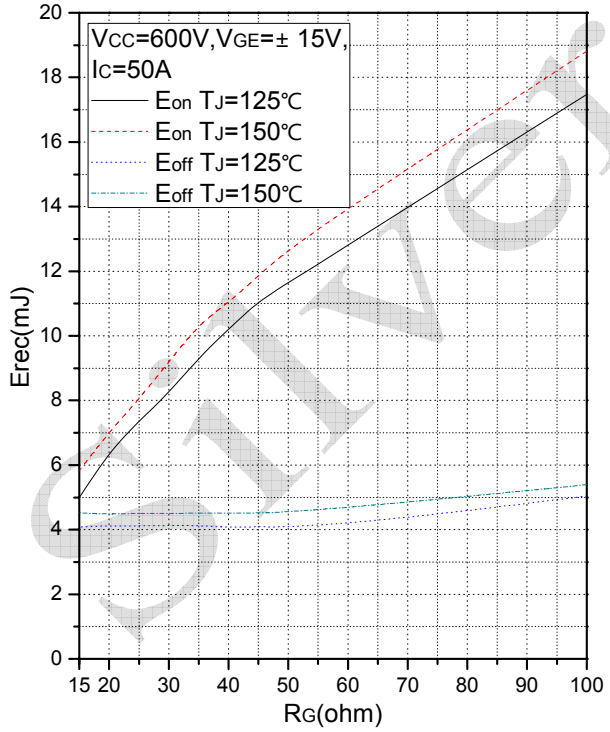


Fig.7 Typical Switching Loss vs. Gate Resistance

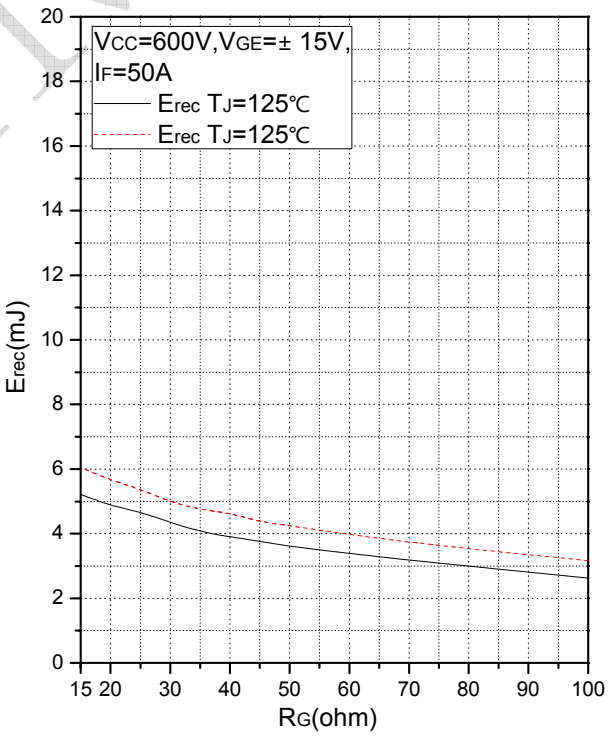


Fig.8 Typical Switching Loss vs. Gate Resistance

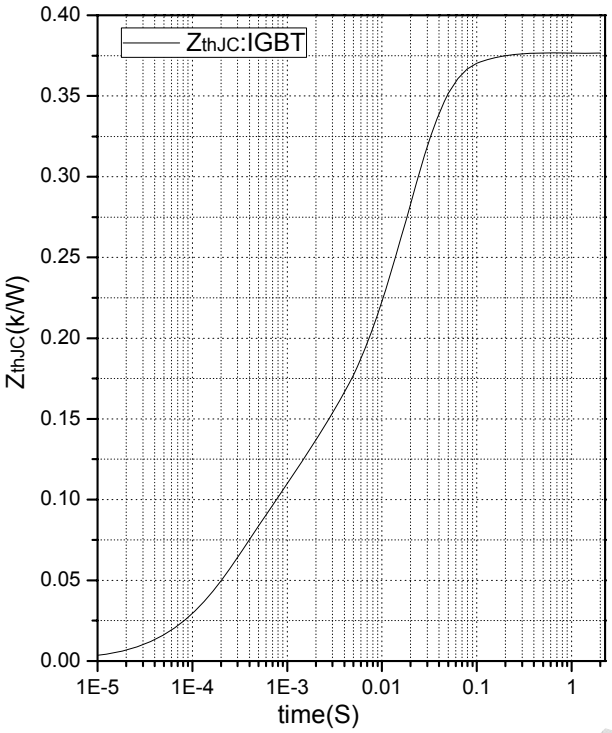


Fig.9 Transient Thermal Impedance

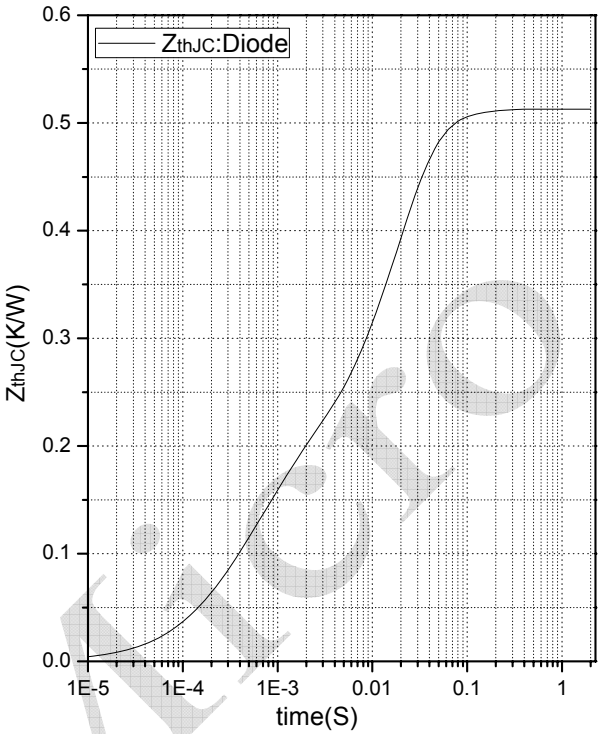


Fig.10 Transient Thermal Impedance

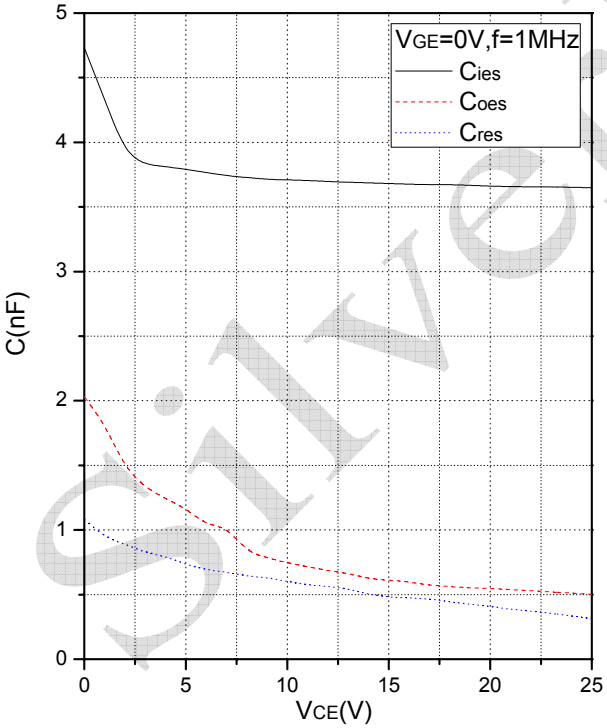
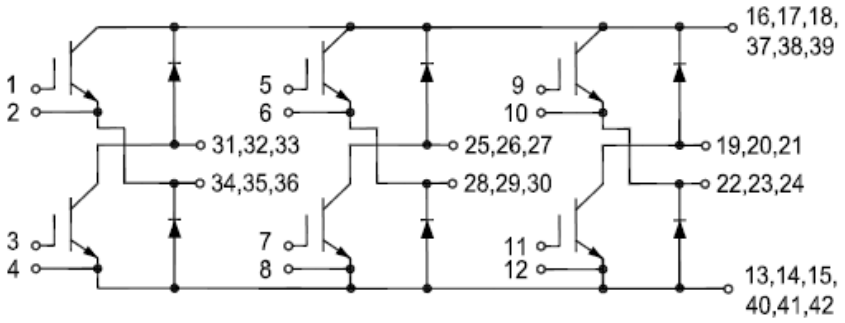
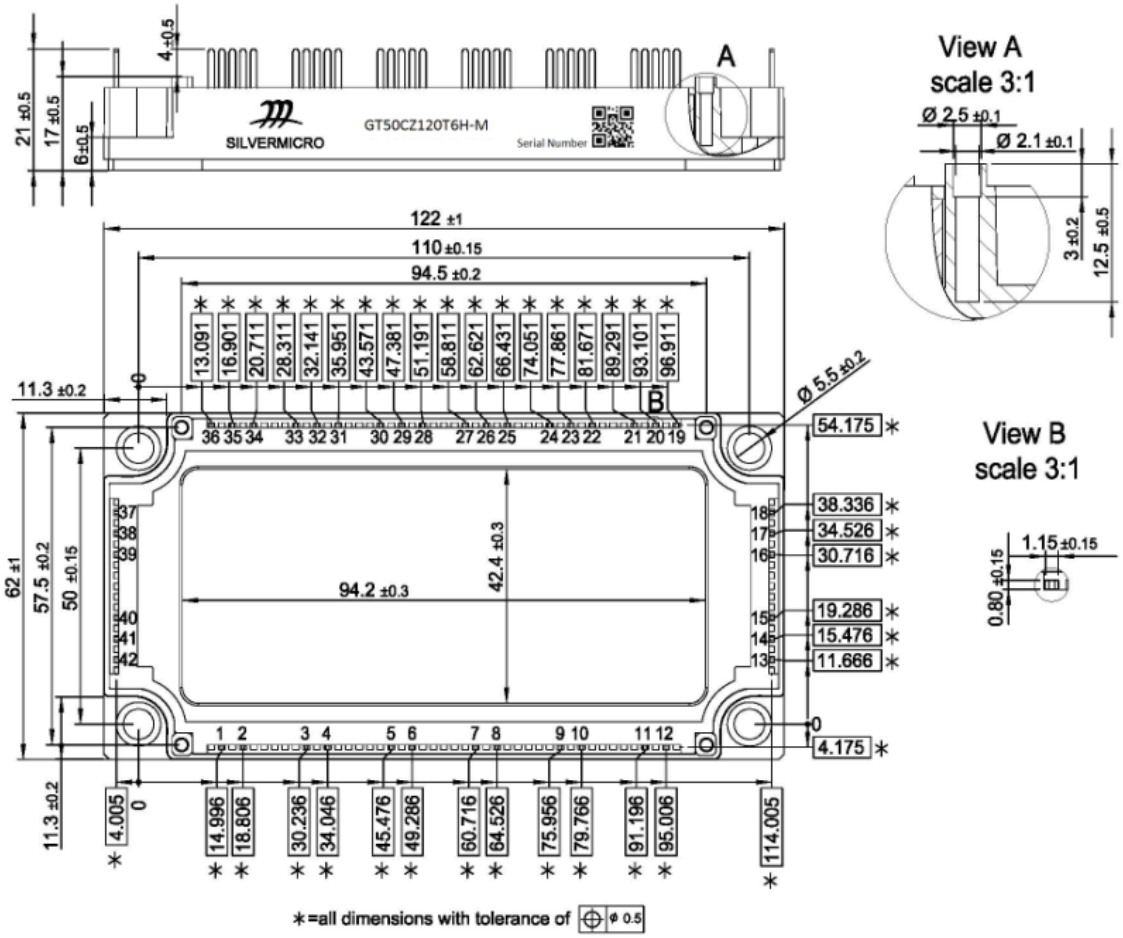


Fig.11 Capacitance Characteristics

Internal Circuit:



Package Outline (Unit: mm):



Date	Revision	Notes
07/22/2019	A	Final Version
09/12/2019	B	Add $R_{g\ internal}$

Announcement

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