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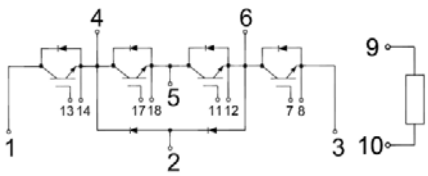
GTR150TL65T2SH

Preliminary Data

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:

- UPS and SMPS
- Industrial Inverters
- Servo Applications
- 3 Level Inverter

IGBT, Inverter

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

V_{CES}	Collector-Emitter Blocking Voltage		650	V
V_{GES}	Gate-Emitter Voltage		±20	V
I_C	Continuous Collector Current	T_C = 100℃	150	A
		T_C = 25℃	235	A
I_{CM}	Peak Collector Current Repetitive	T_J = 175℃	300	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation (IGBT)	T_C = 25℃ T_{Jmax}=175℃	655	W

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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	5.8	6.8	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 150A, V_{GE} = 15V	T_J=25℃		1.40	1.70	V
			T_J=125℃		1.60		V
			T_J=150℃		1.60		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			12.5		nF
C_{oes}	Output Capacitance				0.5		nF
C_{res}	Reveres Transfer Capacitance				0.4		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC} = 300V,I_C = 150A, R_{Gon} =4.7 Ω,V_{GE} = ±15V Inductive Load	T_J=25℃		247		ns
			T_J=125℃		253		
			T_J=150℃		254		
t_r	Rise Time		T_J=25℃		103		ns
			T_J=125℃		109		
			T_J=150℃		112		
$t_{d(off)}$	Turn-off Delay Time	V_{CC} = 300V,I_C = 150A, R_{Goff} =4.7 Ω,V_{GE} = ±15V Inductive Load	T_J=25℃		312		ns
			T_J=125℃		328		
			T_J=150℃		335		
t_f	Fall Time		T_J=25℃		107		ns
			T_J=125℃		127		
			T_J=150℃		128		
E_{on}	Turn-on Switching Loss	V_{CC} = 300V,I_C = 150A, R_{Gon} =4.7 Ω,V_{GE} = ±15V di/dt=1120A/μs(T_J=125℃), Inductive Load	T_J=25℃		1.09		mJ
			T_J=125℃		1.65		
			T_J=150℃		2.28		

E_{off}	Turn-off Switching Loss	V_{CC} = 300V,I_C = 150A, R_{Goff} =4.7 Ω,V_{GE} = ±15V du/dt=4180V/μs(T_J=125℃), Inductive Load	T_J=25℃		2.80		mJ
			T_J=125℃		3.77		
			T_J=150℃		4.02		
Q_g	Total Gate Charge	V_{GE}=+15V…-15V	T_J = 25℃		1202		nC
Rg	Internal Gate Resistor		T_J = 25℃		4.7		Ω
RBSOA	I_C=300A,V_{CC}=600V,Vp=650V, R_{Goff} = 4.7Ω, V_{GE}=+15V to 0V, T_J =150°C				Trapezoid		
SCSOA	V_{CC}=300V, V_{GE}=15V, T_J=150℃			10			μs
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case(per leg)				0.229		℃/W

Diode, Inverse

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

V_{RRM}	Repetitive Peak Reverse Voltage	650	V
I_F	Diode Continuous Forward Current	150	A
I_{FM}	Peak FWD Current Repetitive	300	A

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

V_{FM}	Forward Voltage	I_F=150A	T_J=25℃		1.50		V
			T_J=125℃		1.50		
			T_J=150℃		1.50		
t_{rr}	Reverse Recovery Time	I_F=150A, $-di_F/dt$ =1300A/μs(T_J=150℃), V_R=300V, V_{GE}=-15V	T_J=25℃		114		ns
			T_J=125℃		162		
			T_J=150℃		165		
I_{rr}	Peak Reverse Recovery Current		T_J=25℃		71.9		A
			T_J=125℃		81.5		
			T_J=150℃		87.5		
Q_{rr}	Reverse Recovery Charge		T_J=25℃		5.38		μC
			T_J=125℃		8.73		
			T_J=150℃		9.44		

E_{rec}	Reverse Recovery Energy	I_F=150A, -di_F/dt=1300A/μs(T_J=150℃), V_R=300V, V_{GE}=-15V	T_J=25℃		0.55		mJ
			T_J=125℃		1.71		
			T_J=150℃		1.77		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case(per leg)				0.449		℃/W

Diode, Freewheeling (Neutral Clamp Diode)
Maximum Rated Values (T_C=25℃ unless otherwise specified)

V_{RRM}	Repetitive Peak Reverse Voltage	650	V
I_F	Diode Continuous Forward Current	150	A
I_{FM}	Peak FWD Current Repetitive	300	A

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

V_{FM}	Forward Voltage	I_F = 150A	T_J=25℃		1.50		V
			T_J=125℃		1.50		
			T_J=150℃		1.50		
t_{rr}	Reverse Recovery Time	I_F=150A, -di_F/dt=1300A/μs(T_J=150℃), V_R=300V, V_{GE}=-15V	T_J=25℃		114		ns
			T_J=125℃		162		
			T_J=150℃		165		
I_{rr}	Peak Reverse Recovery Current		T_J=25℃		71.9		A
			T_J=125℃		81.5		
			T_J=150℃		87.5		
Q_{rr}	Reverse Recovery Charge		T_J=25℃		5.38		μC
			T_J=125℃		8.73		
			T_J=150℃		9.44		
E_{rec}	Reverse Recovery Energy		T_J=25℃		0.55		mJ
			T_J=125℃		1.71		
			T_J=150℃		1.77		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case(per leg)				0.449		℃/W

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Internal NTC- Thermistor Characteristic

R_{25}	T_C =25℃	5		kΩ
△R/R	T_C =100℃，R_{100} =481Ω		±5	%
P_{25}	T_C =25℃	50		mW
$B_{25/50}$	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15K))]$	3380		K
$B_{25/80}$	$R_2=R_{25}\exp[B_{25/80}(1/T_2-1/(298.15K))]$	3440		K

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)			0.10		℃/W
M	Power Terminals Screw:M6		3.0		5.0	N·m
M	Mounting Screw:M6		4.0		6.0	N·m
G	Weight			230		g

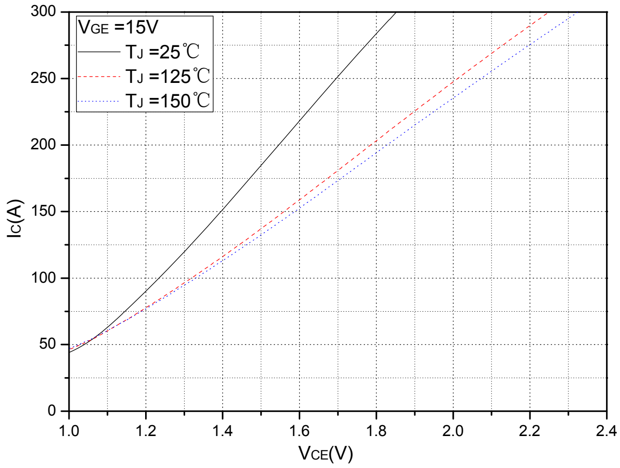


Fig.1 Typical Saturation Voltage Characteristics

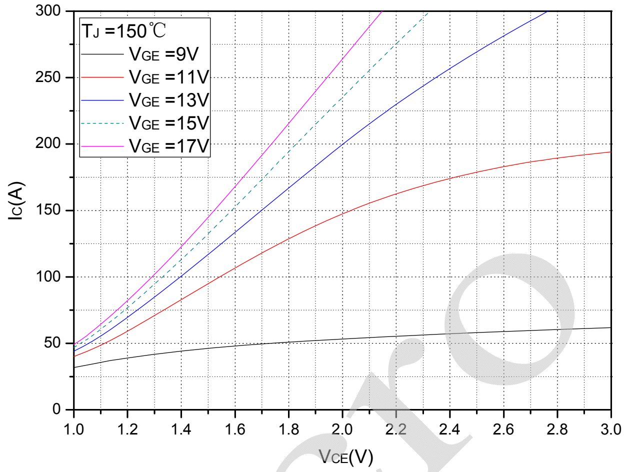


Fig.2 Typical Output Characteristics

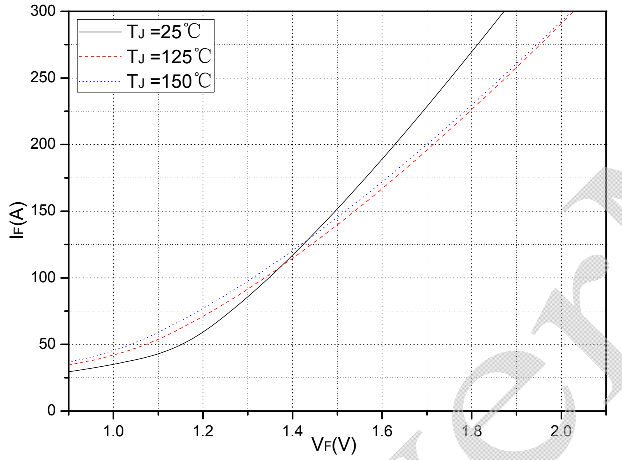


Fig.3 Forward Characteristics of Diode (Reverse)

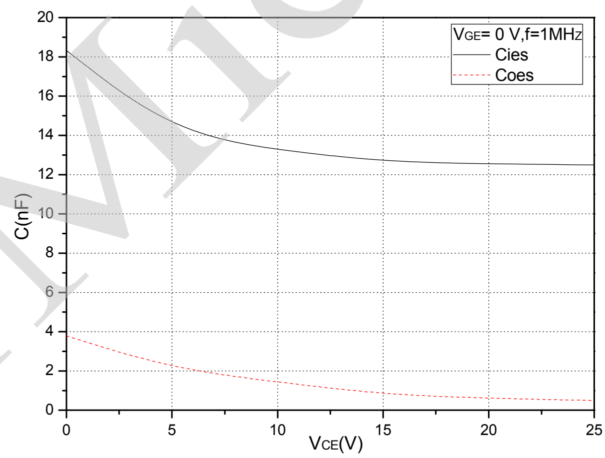


Fig.4 Capacitance Characteristics

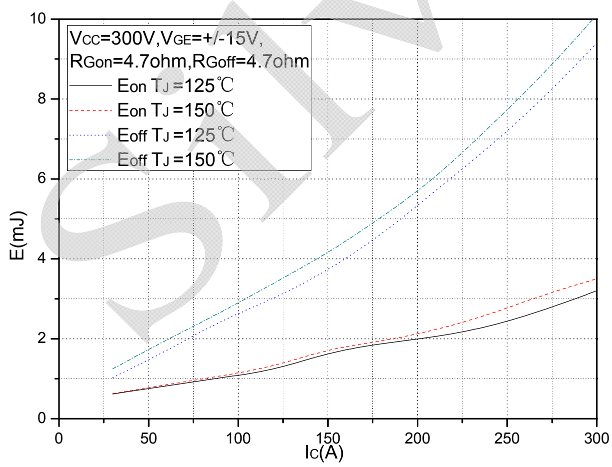


Fig.5 Typical Switching Loss vs. Collector Current

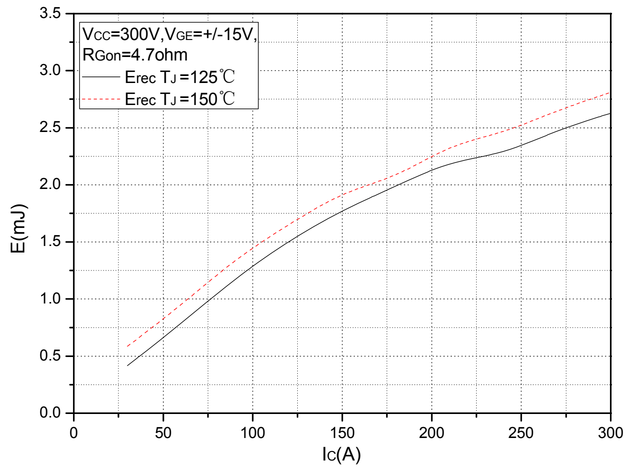


Fig.6 Typical Switching Loss vs. Gate Resistance

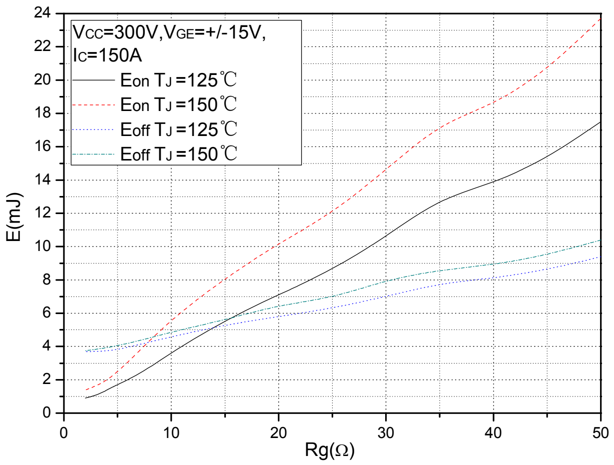


Fig.7 Typical Switching Loss vs. Collector Current

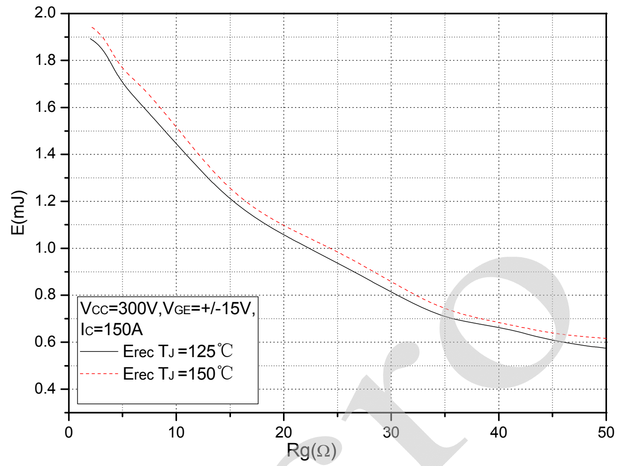


Fig.8 Typical Switching Loss vs. Gate Resistance

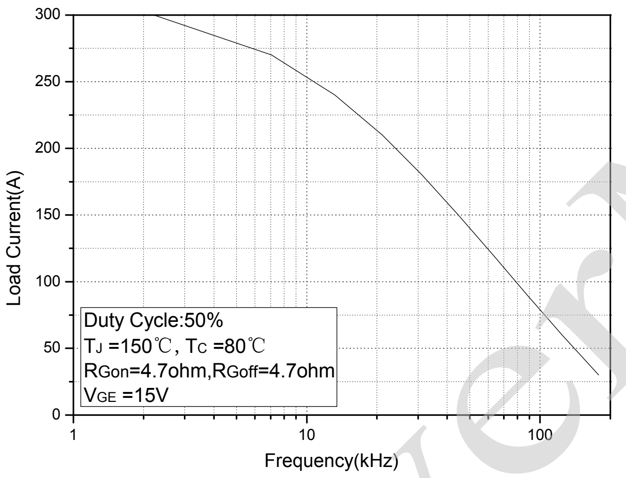


Fig.9 Typical Load Current vs. Frequency

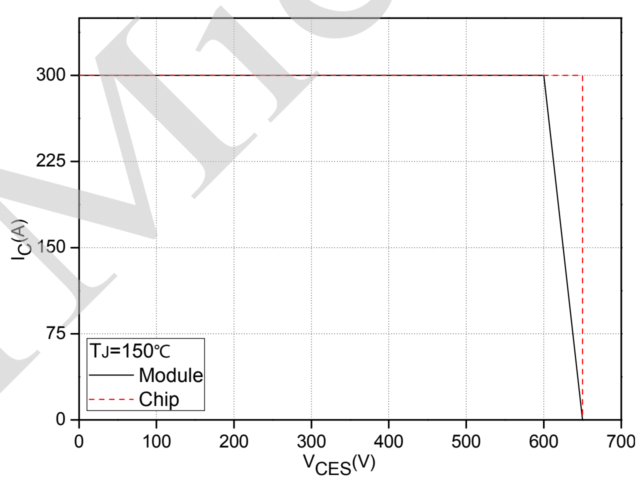


Fig.10 Reverse Bias Safe Operation Area (RBSOA)

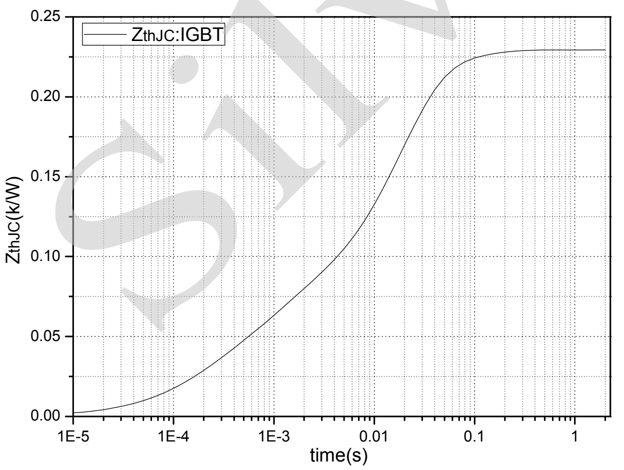


Fig.11 Transient Thermal Impedance (IGBT)

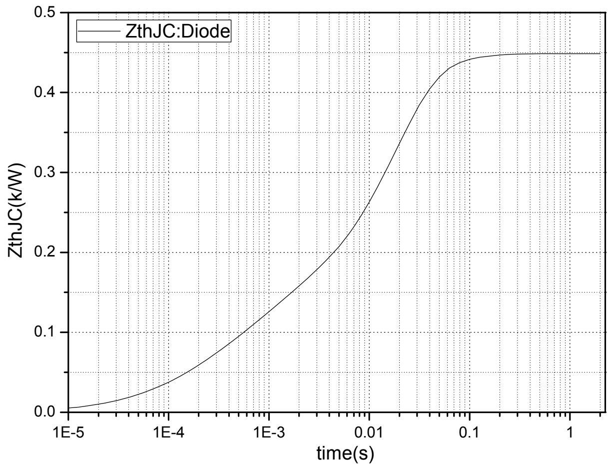


Fig.12 Transient Thermal Impedance (Diode)

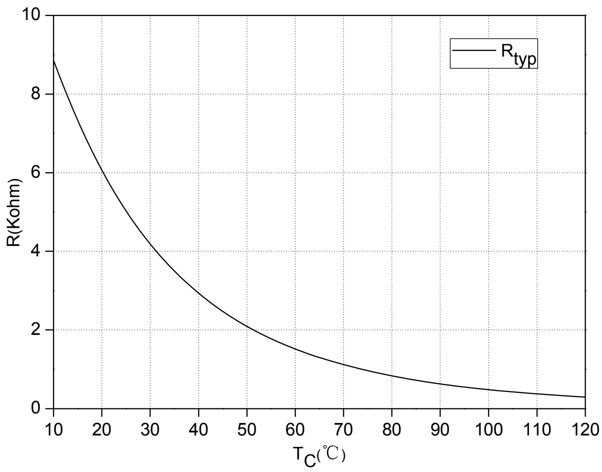


Fig.13 NTC Temperature Characteristics

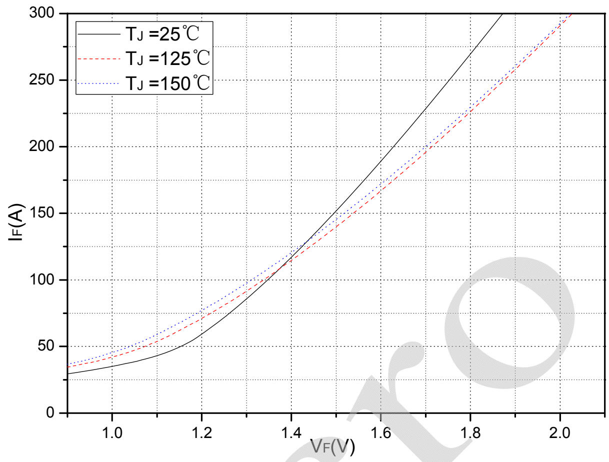
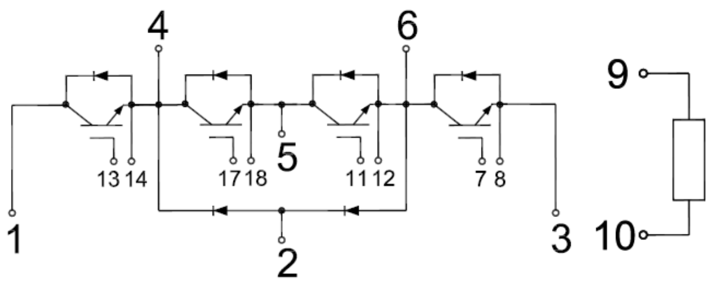
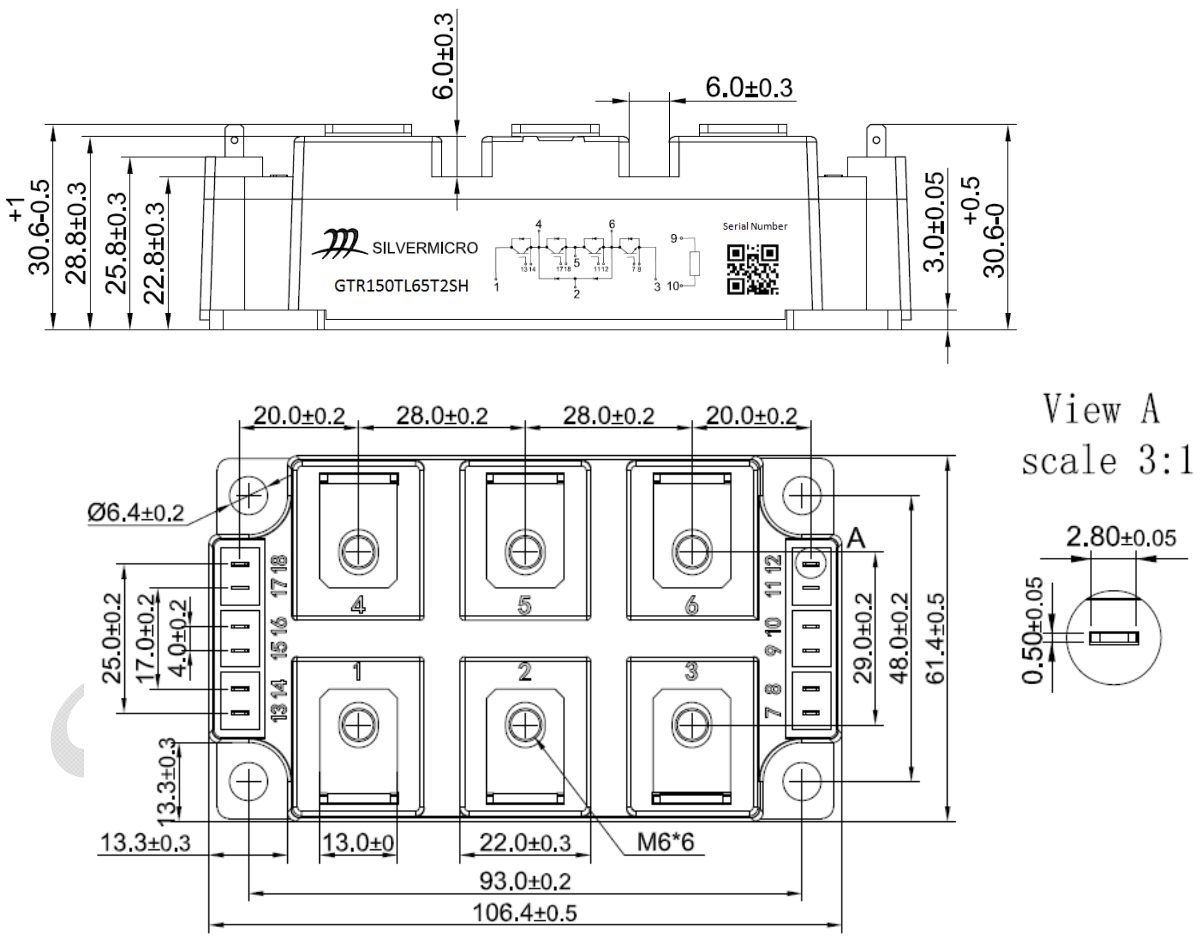


Fig.14 Forward Characteristics of Diode (3-Level)

Internal Circuit



Package Outline (Unit: mm):



Date	Revision	Notes
03/25/2019	01	Initial Release

Announcement

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