

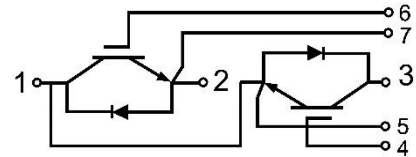


GT50HF170T1VH

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:

- Motor Drive
- Servo Drive
- Plating Power Supply、Induction Heating
- SMPS、UPS

IGBT, Inverter

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

V_{CES}	Collector-Emitter Blocking Voltage	$T_J=25^\circ\text{C}$	1700	V
V_{GES}	Gate-Emitter Voltage		± 20	V
I_c	Continuous Collector Current	$T_c=100^\circ\text{C}$	50	A
		$T_c=25^\circ\text{C}$	100	A
I_{CM}	Repetitive Peak Collector Current	$t_p=1\text{ms}$	100	A
P_D	Maximum Power Dissipation per IGBT	$T_c=25^\circ\text{C}$ $T_{Jmax}=175^\circ\text{C}$	346	W



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

Static Characteristics

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V _{GE(th)}	Gate-Emitter Threshold Voltage	I _C =2mA, V _{CE} =V _{GE} , T _J =25°C		5.0	5.9	6.8	V
V _{CE(sat)}	Collector-Emitter Saturation Voltage	I _C =50A, V _{GE} =15V	T _J =25°C		2.00	2.30	V
			T _J =125°C		2.35		V
			T _J =150°C		2.45		V
I _{CES}	Collector-Emitter Leakage Current	V _{GE} =0V, V _{CE} =V _{CES} , T _J =25°C				1	mA
I _{GES}	Gate-Emitter Leakage Current	V _{GE} =±20V, V _{CE} =0V, T _J =25°C				±200	nA
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} =0V , f=100kHz			7.21		nF
C _{oes}	Output Capacitance				0.19		nF
C _{res}	Reverse Transfer Capacitance				0.07		nF

Switching Characteristics

t _{d(on)}	Turn-on Delay Time	V _{CC} =900V, I _C =50A, R _{Gon} =15Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		62		ns
			T _J =125℃		64		
			T _J =150℃		66		
t _r	Rise Time		T _J =25℃		50		ns
			T _J =125℃		50		
			T _J =150℃		52		
t _{d(off)}	Turn-off Delay Time	V _{CC} =900V, I _C =50A, R _{Goff} =15Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		292		ns
			T _J =125℃		416		
			T _J =150℃		426		
t _f	Fall Time		T _J =25℃		266		ns
			T _J =125℃		412		
			T _J =150℃		414		
E _{on}	Turn-on Switching Loss	V _{CC} =900V, I _C =50A, R _{Gon} =15Ω, V _{GE} =±15V, di/dt=859A/μs(T _J =150℃), Inductive Load	T _J =25℃		7.9		mJ
			T _J =125℃		12.5		
			T _J =150℃		13.9		



E _{off}	Turn-off Switching Loss	V _{CC} =900V, I _C =50A, R _{Goff} =15Ω, V _{GE} =±15V, du/dt=4735A/μs(T _J =150°C), Inductive Load	T _J =25°C		7.6		mJ
			T _J =125°C		12.4		
			T _J =150°C		12.8		
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C		4273		nC
R _{G(int)}	Internal Gate Resistor		T _J =25°C		1		Ω
I _{SC}	V _{CC} =900V, t _p =10us, V _{ge} =+/-15V, R _{Gon} =15Ω, R _{Goff} =15Ω, T _J =150°C				207		A
R _{θJC}	Thermal Resistance: Junction-to-Case (per IGBT)					0.43	°C/W

Diode, Inverter

Maximum Rated Values (T_C=25°C unless otherwise specified)

V _{RRM}	Repetitive Peak Reverse Voltage	T _J =25°C	1700	V
I _F	Diode Continuous Forward Current	T _C =100°C	50	A
I _{FM}	Diode Maximum Forward Current	t _p =1ms	100	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 =50A	T _J =25°C		1.90		V
			T _J =125°C		2.05		
			T _J =150°C		2.00		
t _{rr}	Reverse Recovery Time	I _F =50A, -di _F /dt=1141A/μs(T _J =150°C), V _R =900V, V _{GE} =-15V	T _J =25°C		244		ns
			T _J =125°C		568		
			T _J =150°C		618		
I _{rr}	Peak Reverse Recovery Current		T _J =25°C		47		A
			T _J =125°C		56		
			T _J =150°C		58		
Q _{rr}	Reverse Recovery Charge		T _J =25°C		5.4		μC
			T _J =125°C		13.3		
			T _J =150°C		15.3		



E _{rec}	Reverse Recovery Energy	I _F =50A, -di _F /dt=1141A/μs(T _J =150°C), V _R =900V, V _{GE} =-15V	T _J =25°C		2.4		mJ
			T _J =125°C		7.5		
			T _J =150°C		8.6		
R _{θJC}	Thermal Resistance: Junction-to-Case (per Diode)					0.38	°C/W

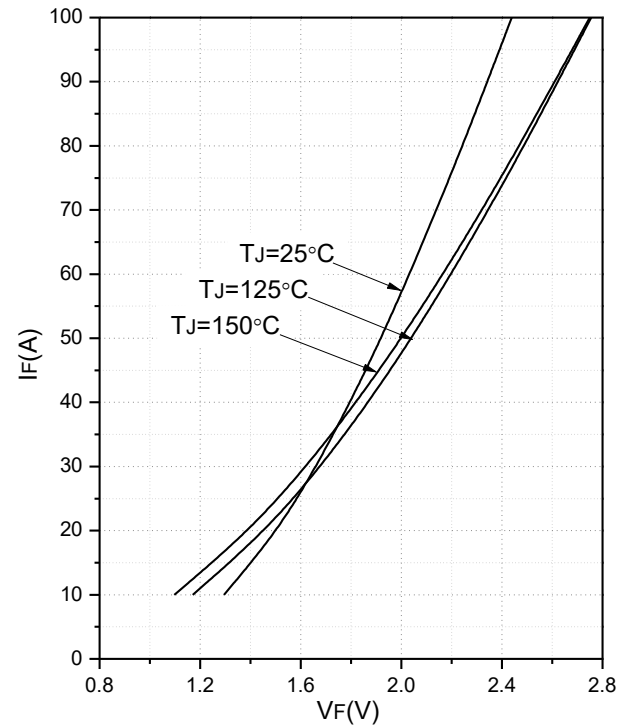
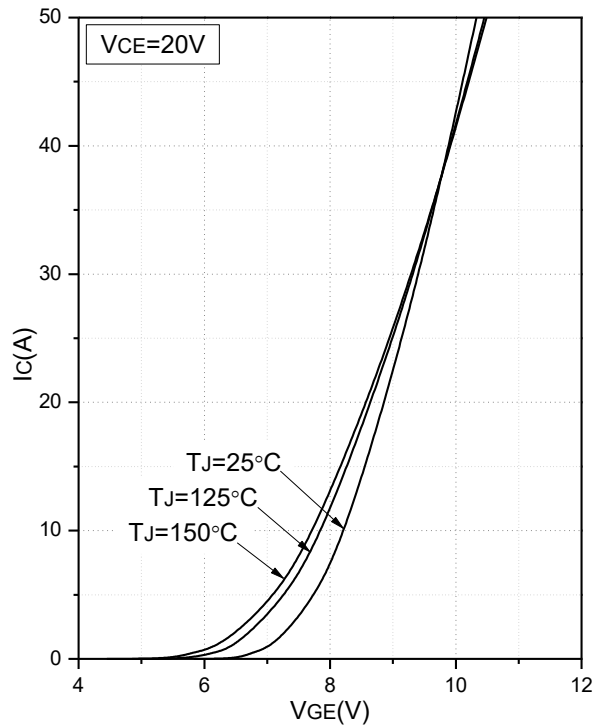
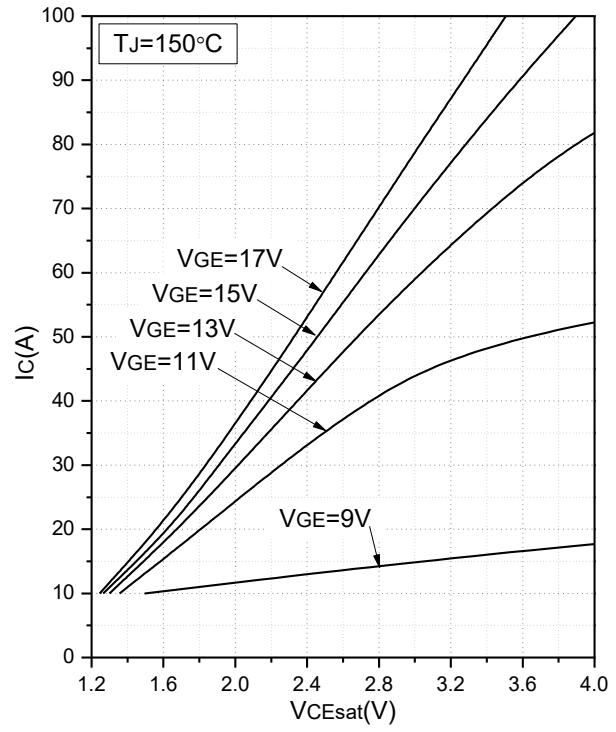
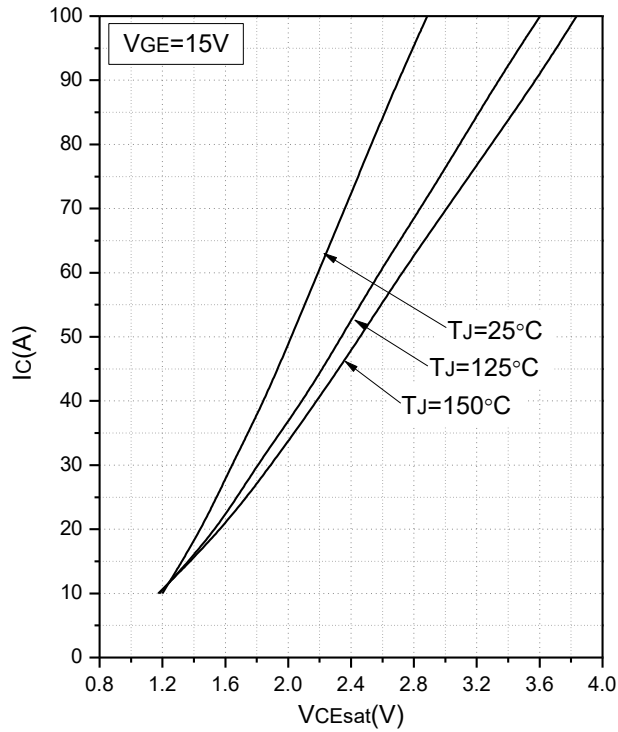
Module

Symbol	Description		Min.	Typ.	Max.	Units
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)				0.07	°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	50	HF	170	T1V	H
	①	②	③	④	⑤	⑥	⑦

- ① - IGBT Module
- ② - Field Stop Trench Gate IGBT
- ③ - Rated Current (50=50A)
- ④ - Circuit Configuration (HF=Half Bridge)
- ⑤ - Rated Voltage (170=1700V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)



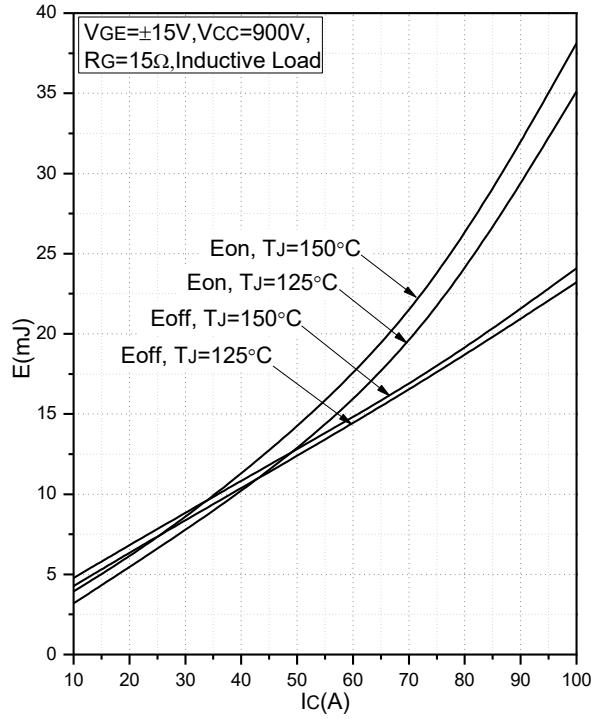


Fig.5 Typical Switching Loss vs. Collector Current

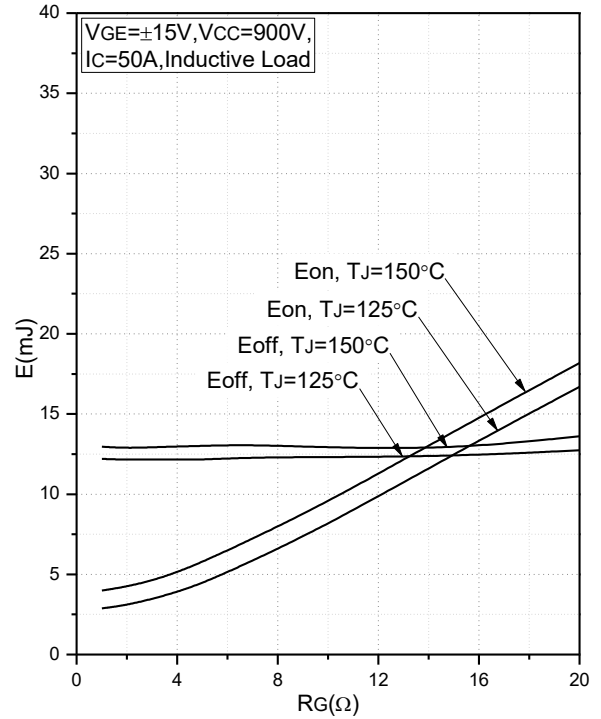


Fig.6 Typical Switching Loss vs. Gate Resistance

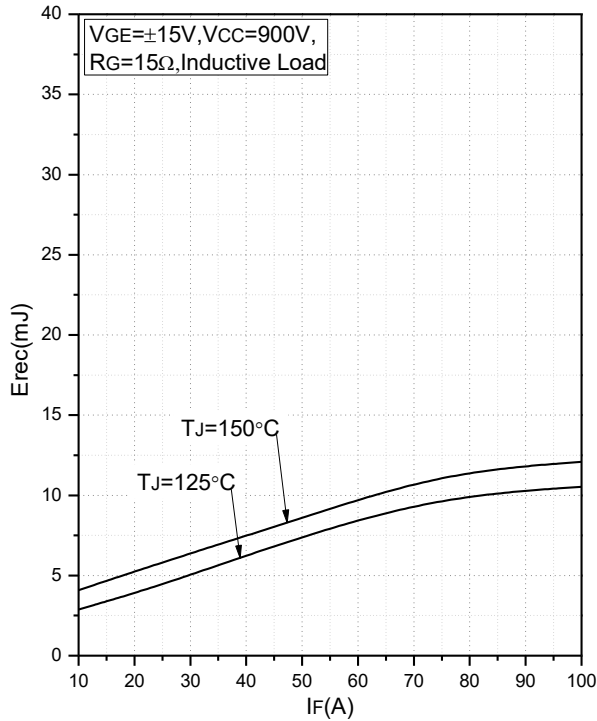


Fig.7 Typical Switching Loss vs. Forward Current

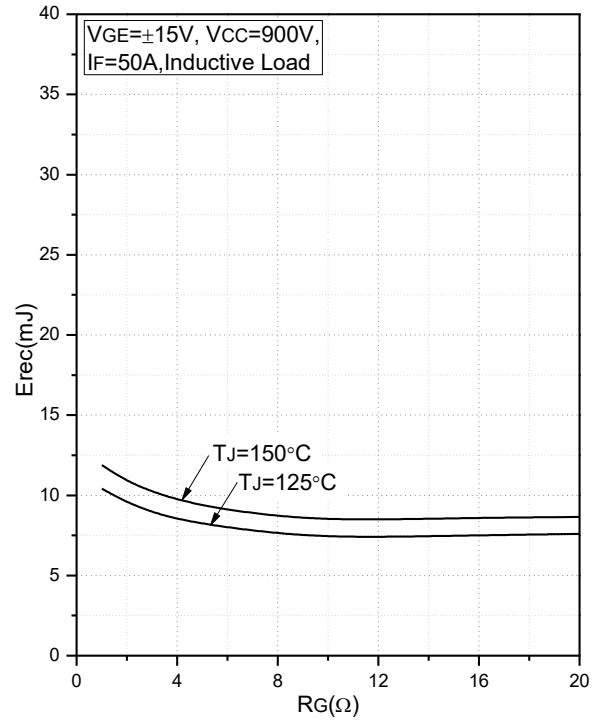


Fig.8 Typical Switching Loss vs. Gate Resistance

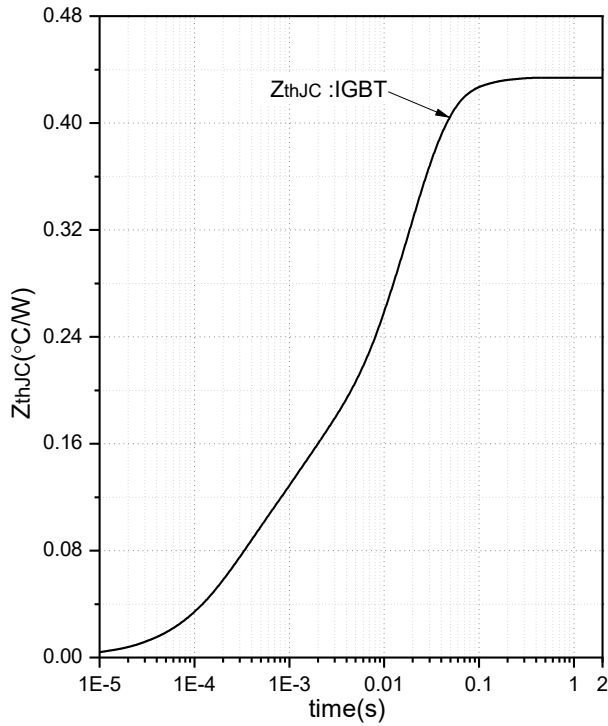


Fig.9 Transient Thermal Impedance (IGBT)

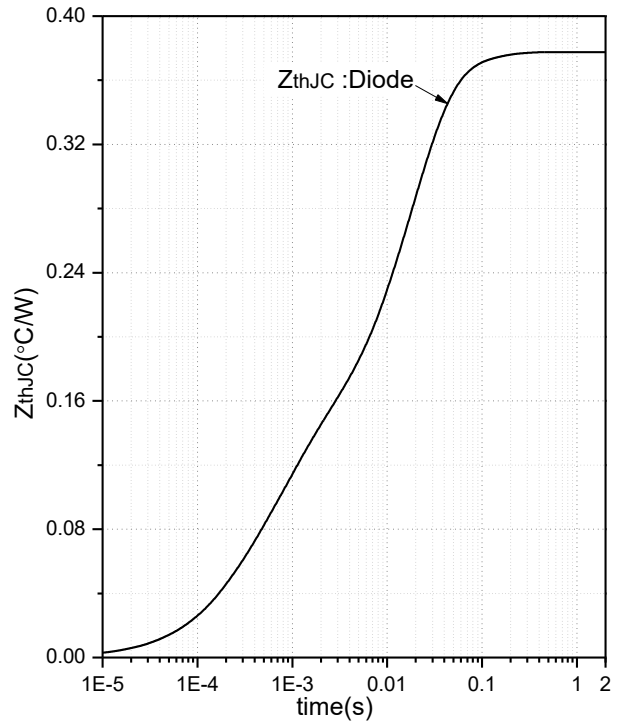


Fig.10 Transient Thermal Impedance (Diode)

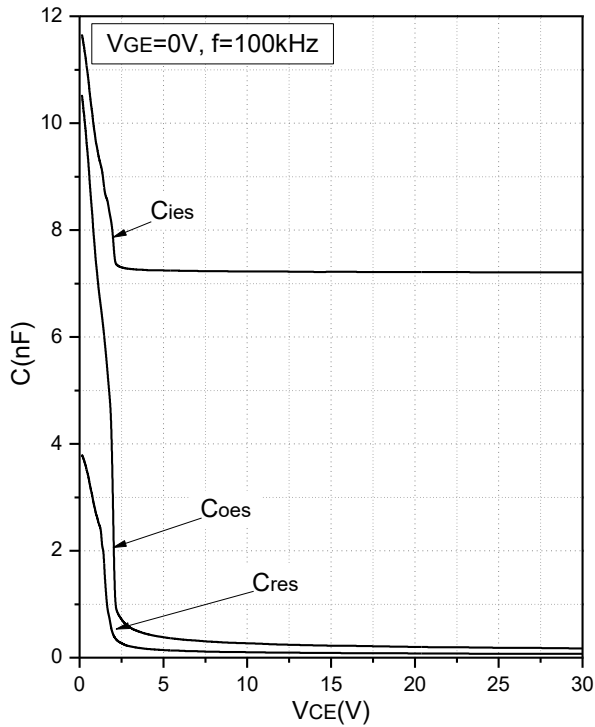


Fig.11 Capacitance Characteristics

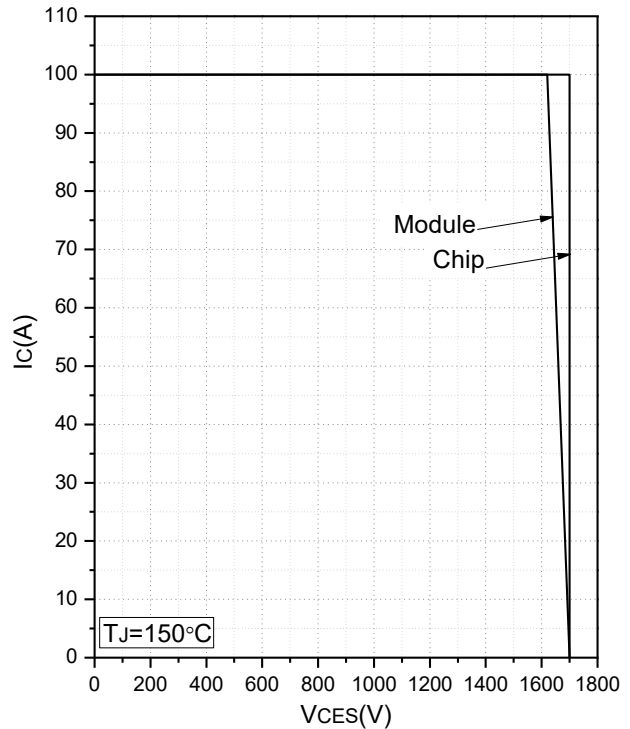
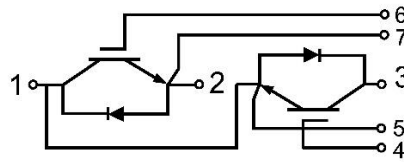


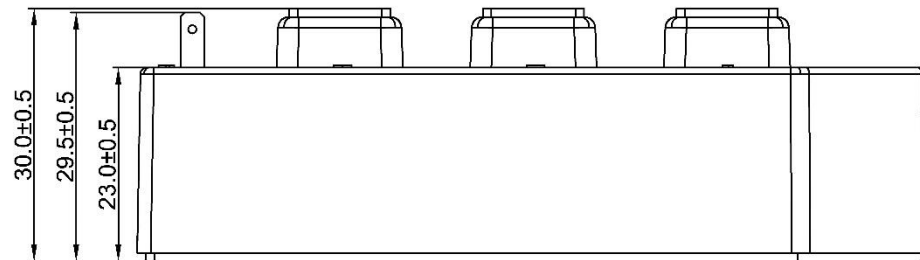
Fig.12 Reverse Bias Safe Operation Area (RBSOA)



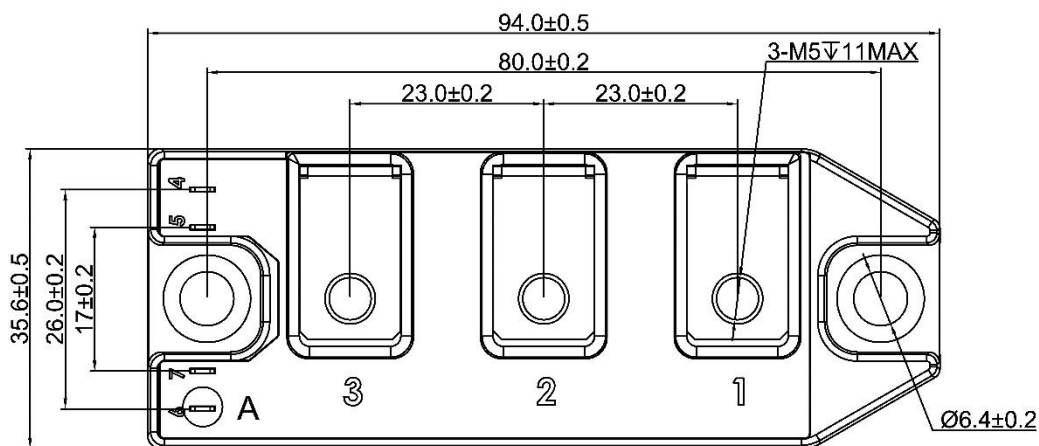
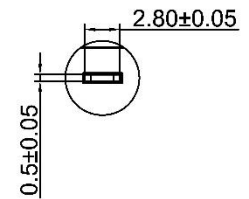
Internal Circuit:



Package Outline (Unit: mm):



View A
scale 3:1





Revision	Notes
A	Final Version

Announcements

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