

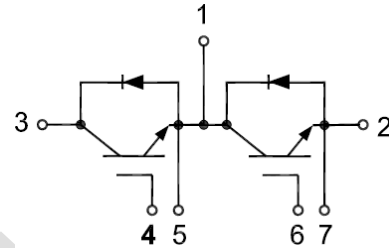


GK75HF60T1VH

IGBT Module

Features:

- Non Punch Through (NPT) Technology
- 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:

- Welding Machine、Cutting Machine
- Plating Power Supply、Induction Heating
- SMPS、UPS

Maximum Rated Values of IGBT

V _{CES}	Collector-Emitter Blocking Voltage	T _J =25 $^{\circ}$ C	600	V
V _{GES}	Gate-Emitter Voltage		\pm 20	V
I _c	Continuous Collector Current	T _C =80 $^{\circ}$ C	75	A
		T _C =25 $^{\circ}$ C	100	A
I _{CM}	Repetitive Peak Collector Current	t _p =1ms	150	A
t _{sc}	Short Circuit Withstand Time		>10	μ s
P _D	Maximum Power Dissipation per IGBT	T _C =25 $^{\circ}$ C T _{Jmax} =150 $^{\circ}$ C	365	W



Electrical Characteristics of IGBT

Static characteristics

Symbol	Description	Conditions	Min	Typ	Max	Unit
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=1mA, V_{CE}=V_{GE}, T_J=25^{\circ}C$	4.5	5.0	5.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=75A, V_{GE}=15V$	$T_J=25^{\circ}C$	1.90	2.20	V
			$T_J=125^{\circ}C$	2.20		V
I_{CES}	Collector-Emitter Leakage Current	$V_{GE}=0V, V_{CE}=V_{CES}, T_J=25^{\circ}C$			1	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=\pm 20V, V_{CE}=0V, T_J=25^{\circ}C$			200	nA
C_{ies}	Input Capacitance	$V_{CE}=25V, V_{GE}=0V, f=100kHz$		2.77		nF
C_{oes}	Output Capacitance			0.44		nF
C_{res}	Reverse Transfer Capacitance			0.23		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=300V, I_C=75A, R_{Gon}=20\Omega, V_{GE}=\pm 15V, \text{Inductive Load}$	$T_J=25^{\circ}C$	194		ns
			$T_J=125^{\circ}C$	205		
t_r	Rise Time	$V_{CC}=300V, I_C=75A, R_{Gon}=20\Omega, V_{GE}=\pm 15V, \text{Inductive Load}$	$T_J=25^{\circ}C$	74		ns
			$T_J=125^{\circ}C$	75		
$t_{d(off)}$	Turn-off Delay Time	$V_{CC}=300V, I_C=75A, R_{Goff}=20\Omega, V_{GE}=\pm 15V, \text{Inductive Load}$	$T_J=25^{\circ}C$	276		ns
			$T_J=125^{\circ}C$	290		
t_f	Fall Time	$V_{CC}=300V, I_C=75A, R_{Goff}=20\Omega, V_{GE}=\pm 15V, \text{Inductive Load}$	$T_J=25^{\circ}C$	112		ns
			$T_J=125^{\circ}C$	131		
E_{on}	Turn-on Switching Loss	$V_{CC}=300V, I_C=75A, R_{Gon}=20\Omega, V_{GE}=\pm 15V, di/dt=850A/\mu s (T_J=125^{\circ}C) \text{ Inductive Load}$	$T_J=25^{\circ}C$	1.0		mJ
			$T_J=125^{\circ}C$	1.1		
E_{off}	Turn-off Switching Loss	$V_{CC}=300V, I_C=75A, R_{Goff}=20\Omega, V_{GE}=\pm 15V, du/dt=6550V/\mu s (T_J=125^{\circ}C) \text{ Inductive Load}$	$T_J=25^{\circ}C$	1.4		mJ
			$T_J=125^{\circ}C$	1.9		
Q_g	Total Gate Charge		$T_J=25^{\circ}C$	396		nC
R_g	Internal Gate Resistant		$T_J=25^{\circ}C$	0		Ω
RBSOA	$I_C=150A, V_{CC}=480V, V_p=600V, R_G=20\Omega, V_{GE}=\pm 15V \text{ to } 0V, T_J=150^{\circ}C$			Trapezoid		
SCSOA	$V_{CC}=300V, V_{GE}=15V, T_J=150^{\circ}C$			10		μs
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case				0.342	$^{\circ}C/W$



Maximum Rated Values of Diode

V_{RRM}	Repetitive Peak Reverse Voltage	$T_J=25^{\circ}\text{C}$	600	V
I_F	Diode Continuous Forward Current		75	A
I_{FM}	Diode Maximum Forward Current	$t_p=1\text{ms}$	150	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	$I_F=75\text{A}$	$T_J=25^{\circ}\text{C}$	1.60		V	
			$T_J=125^{\circ}\text{C}$	1.70			
t_{rr}	Reverse Recovery Time	$I_F=75\text{A},$ $di/dt=1175\text{A}/\mu\text{s}(T_J=125^{\circ}\text{C}),$ $V_{rr}=300\text{V},$ $V_{GE}=-15\text{V}$	$T_J=25^{\circ}\text{C}$	121		ns	
			$T_J=125^{\circ}\text{C}$	176			
I_{rr}	Peak Reverse Recovery Current		$T_J=25^{\circ}\text{C}$	34.4		A	
			$T_J=125^{\circ}\text{C}$	40.6			
Q_{rr}	Reverse Recovery Charge		$T_J=25^{\circ}\text{C}$	2.5		μC	
			$T_J=125^{\circ}\text{C}$	4.1			
E_{rec}	Reverse Recovery Energy		$T_J=25^{\circ}\text{C}$	0.44		mJ	
			$T_J=125^{\circ}\text{C}$	0.88			
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case				0.831	$^{\circ}\text{C}/\text{W}$	



Module

Symbol	Description	Min	Typ	Max	Unit
V _{iso}	Isolation Voltage (All Terminals Shorted)	f = 50Hz, 1minute	2500		V
T _J	Maximum Junction Temperature			150	°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)			0.1	°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	K	75	HF	60	T1V	H
	①	②	③	④	⑤	⑥	⑦

- ① - IGBT Module
- ② - Non Punch Through (NPT) Technology
- ③ - Rated Current (75=75A)
- ④ - Circuit Configuration (HF=Half Bridge)
- ⑤ - Rated Voltage (60=600V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

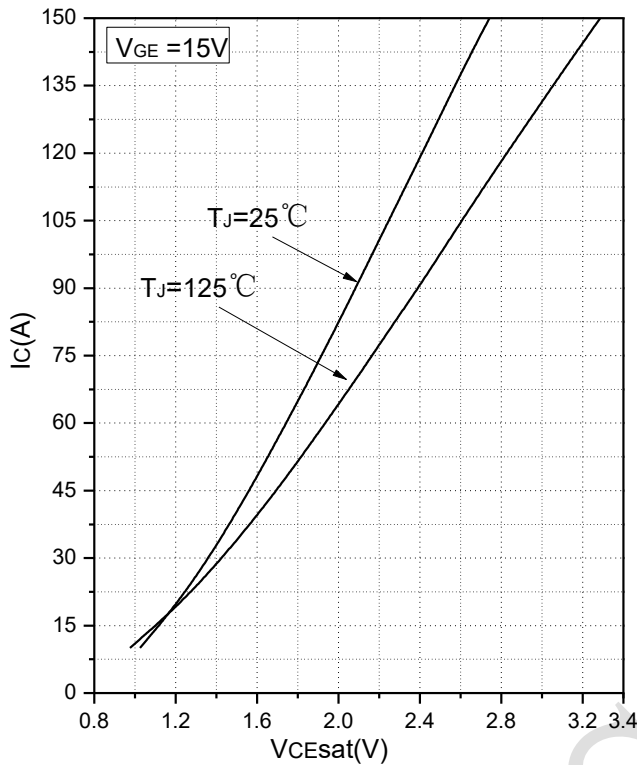


Fig.1 Typical Saturation Voltage Characteristics

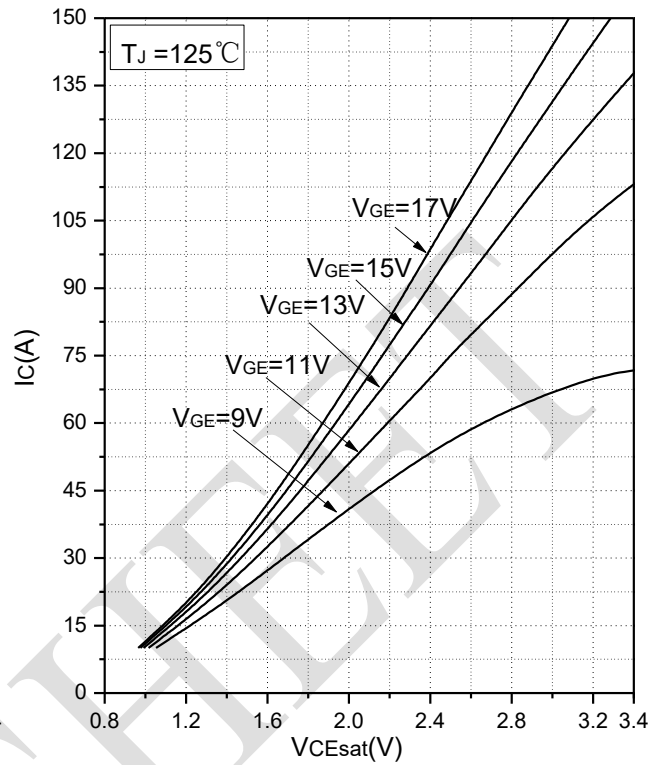


Fig.2 Typical Output Characteristics

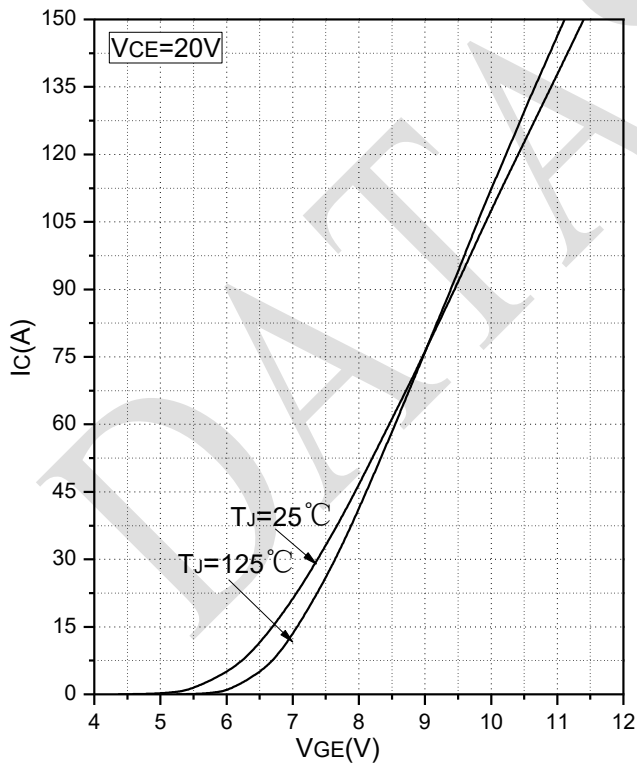


Fig.3 Transfer Characteristic

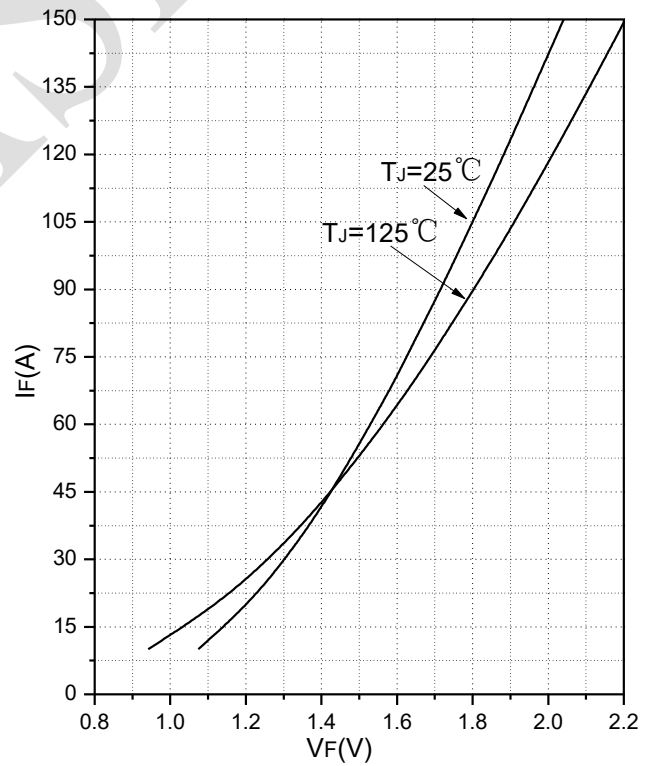


Fig.4 Forward Characteristics of Diode

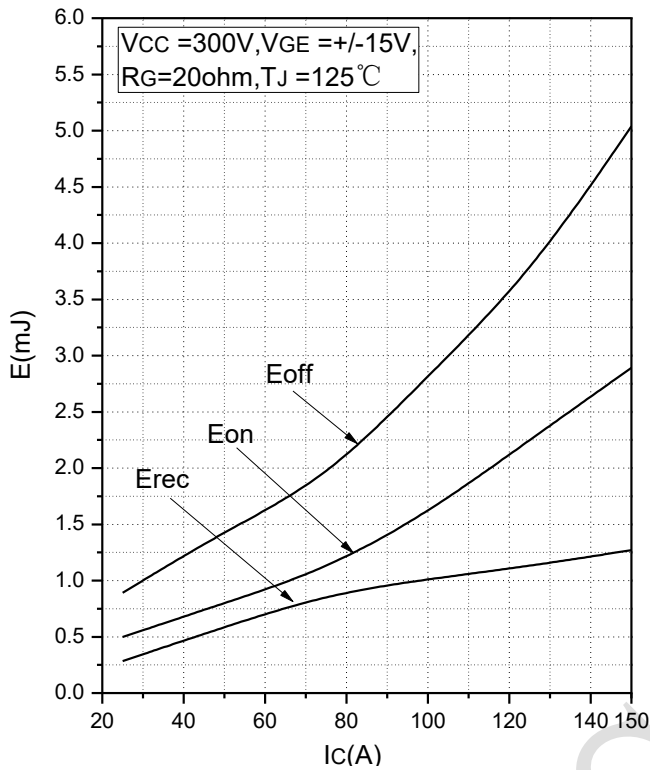


Fig.5 Typical Switching Loss vs. Collector Current

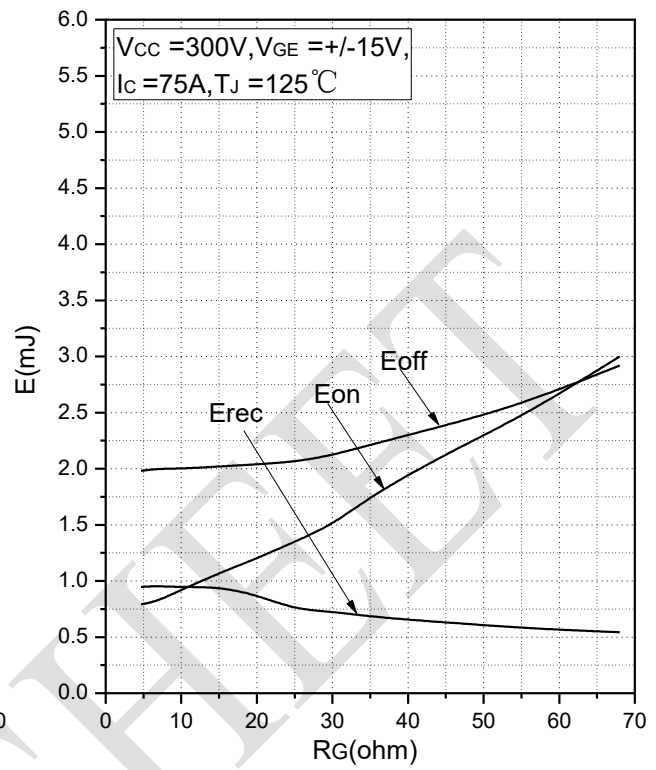


Fig.6 Typical Switching Loss vs. Gate Resistance

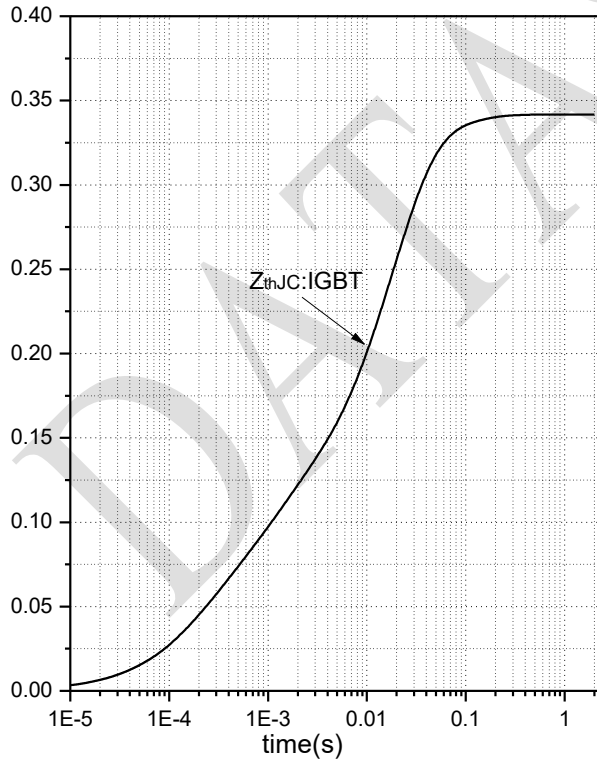


Fig.7 Transient Thermal Impedance (IGBT)

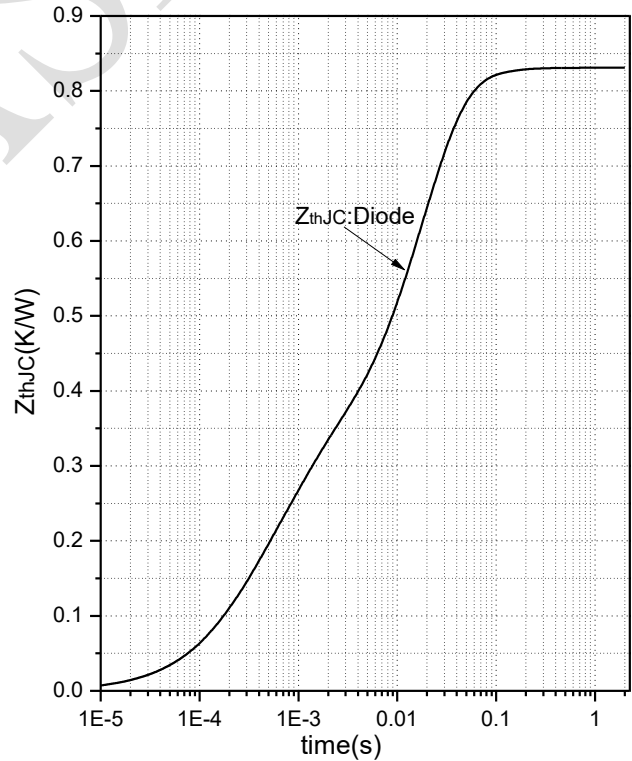


Fig.8 Transient Thermal Impedance (Diode)

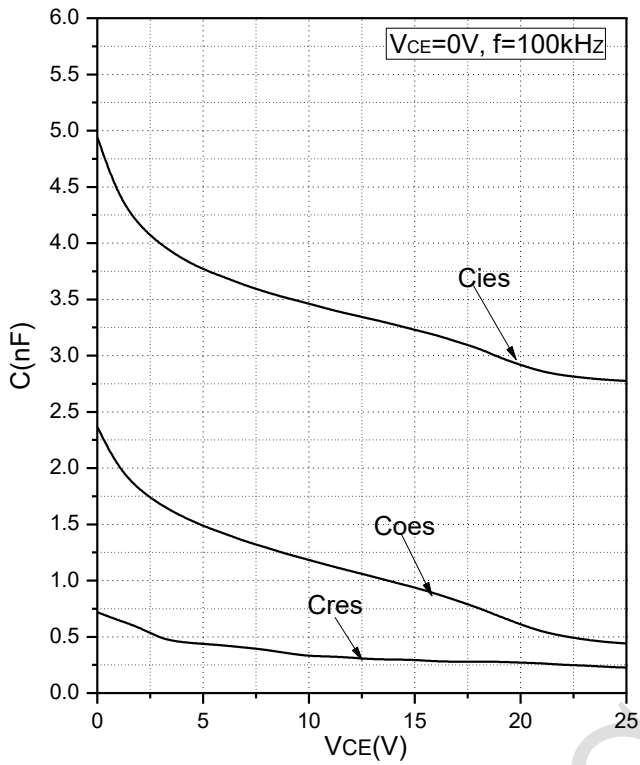


Fig.9 Capacitance Characteristics

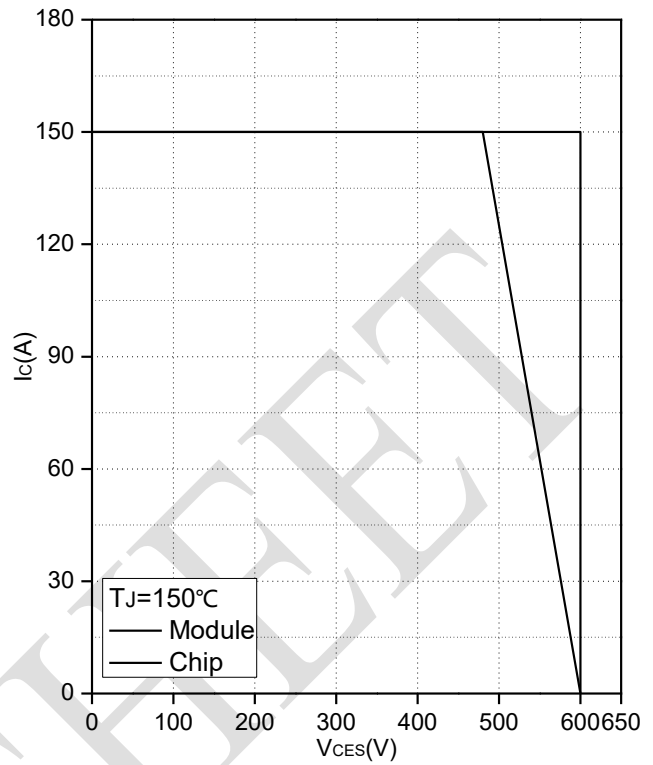
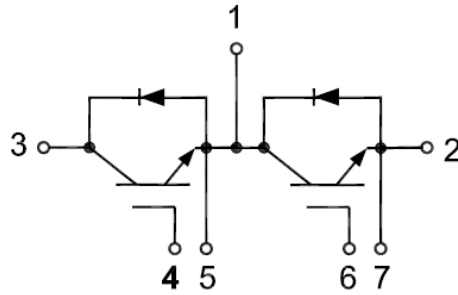


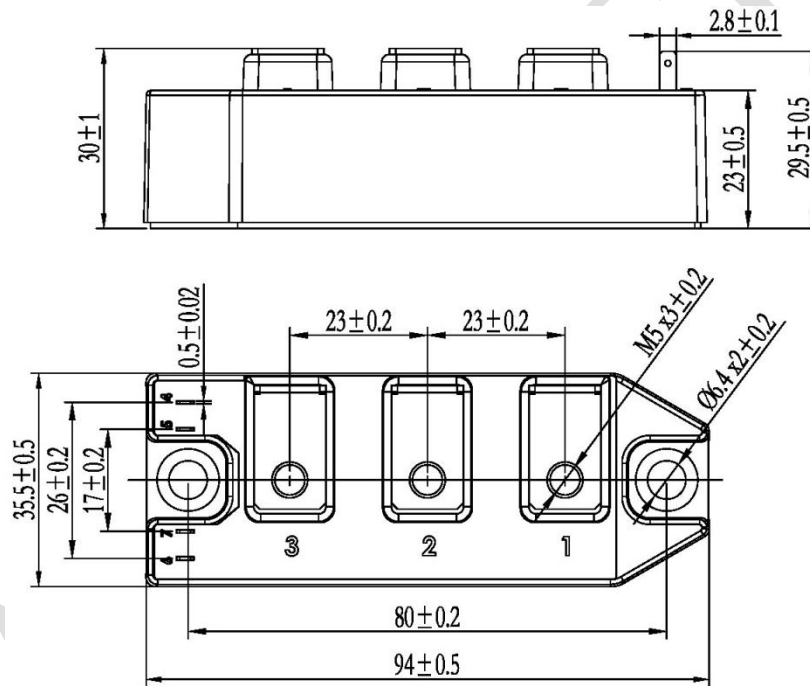
Fig.10 Reverse Bias Safe Operation Area (RBSOA)



Internal Circuit



Package Outline (Unit: mm):





Date	Revision	Notes
08/04/2021	A	Final Version

Announcement

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