GT150HF120T1NH

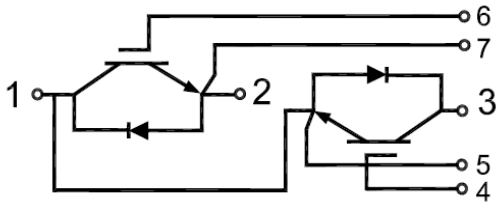
IGBT Module

Preliminary Data

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

Circuit Diagram



Applications：

- Welding
- HEV Inverter
- Industrial Motor Drives
- UPS

IGBT, Brake-Chopper
Maximum Rated Values of IGBT

V_{CES}	Collector-Emitter Blocking Voltage	T_J=25℃	1200	V
V_{GES}	Gate-Emitter Voltage		±20	V
I_C	Continuous Collector Current	T_C=100℃	150	A
		T_C=25℃	300	A
I_{CM}	Repetitive Peak Collector Current	tp=1ms	300	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation per IGBT	T_C=25℃ T_{Jmax}=175℃	987	W

Electrical Characteristics of IGBT

Static Characteristics

Symbol	Description	Conditions		Min.	Typ.	Max.	Units.
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C=6mA, V_{CE}=V_{GE}, T_J=25℃		5.0	6.2	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=150A, V_{GE}=15V	T_J=25℃		2.30	2.60	V
			T_J=125℃		3.30		V
			T_J=150℃		3.60		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=100kHz, T_J=25℃			12.96		nF
C_{oes}	Out Capacitance				0.87		nF
C_{res}	Reverse Transfer Capacitance				0.39		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V, I_C=150A, R_{Gon}=10Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		334		ns
			T_J=125℃		336		
			T_J=150℃		334		
t_r	Rise Time		T_J=25℃		107		ns
			T_J=125℃		117		
			T_J=150℃		118		
$t_{d(off)}$	Turn-off Delay Time	V_{CC}=600V, I_C=150A, R_{Goff}=10Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		175		ns
			T_J=125℃		176		
			T_J=150℃		176		
t_f	Fall Time		T_J=25℃		133		ns
			T_J=125℃		147		
			T_J=150℃		145		
E_{on}	Turn-on Switching Loss	V_{CC}=600V, I_C=150A, R_{Gon}=10Ω, V_{GE}=±15V, di/dt=1085A/μs (T_J=150℃) Inductive Load	T_J=25℃		12.3		mJ
			T_J=125℃		19.8		
			T_J=150℃		21.5		

E_{off}	Turn-off Switching Loss	V_{CC}=600V, I_C=150A, R_{Goff}=10Ω, V_{GE}=±15V, du/dt=8304V/μs (T_J=150℃) Inductive Load	T_J=25℃		6.2		mJ
			T_J=125℃		8.2		
			T_J=150℃		8.4		
Q_g	Total Gate Charge	V_{GE}=+15V…-15V	T_J=25℃		0.59		uC
$R_{g\ internal}$	Internal Gate Resistance		T_J=25℃		1		Ω
RBSOA	I_C=300A, V_{CC}=1050V, Vp=1200V, R_G=10Ω, V_{GE}=+15V to 0V, T_J=150°C			Trapezoid			
SCSOA	Vcc=600V, R_{Gon}=10Ω, R_{Goff}=10Ω, V_{GE}=+/-15V, T_J=125℃			450			A
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case (per IGBT)					0.152	℃/W

Maximum Rated Values of Diode

V_{RRM}	Repetitive Peak Reverse Voltage	T_J=25℃	1200	V
I_F	Diode Continuous Forward Current		150	A
I_{FM}	Peak FWD Current Repetitive	tp=1ms	300	A

Electrical Characteristics of Diode

Symbol	Description	Conditions		Min.	Typ.	Max.	Units.
V_{FM}	Forward Voltage	I_F=150A	T_J=25℃		2.60		V
			T_J=125℃		2.70		
			T_J=150℃		2.70		
t_{rr}	Reverse Recovery Time	I_F=150A, -diF/dt=980A/μs(T_J=150℃), V_R=600V, V_{GE}=-15V	T_J=25℃		130		ns
			T_J=125℃		260		
			T_J=150℃		385		
I_{rr}	Peak Reverse Recovery Current		T_J=25℃		53		A
			T_J=125℃		75		
			T_J=150℃		85		
Q_{rr}	Reverse Recovery Charge		T_J=25℃		5.02		μC
			T_J=125℃		10.84		
			T_J=150℃		11.58		

E_{rec}	Reverse Recovery Energy	I_F=150A, -diF/dt=980A/μs(T_J=150℃), V_R=600V, V_{GE}=-15V	T_J=25℃		2.21		mJ
			T_J=125℃		4.75		
			T_J=150℃		5.81		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case (per Diode)					0.332	℃/W

Module

Symbol	Description		Min.	Typ.	Max.	Units.
V_{iso}	Isolation Voltage (All Terminals Shorted)	RMS, f=50Hz, 30s		4500		V
T_J	Maximum Junction Temperature				175	℃
T_{JOP}	Maximum Operating Junction Temperature Range		-55		+150	℃
T_{stg}	Storage Temperature		-55		+150	℃
CTI	Comparative Tracking Index			200		
$R_{\theta CS}$	Case-To-Sink Thermally (Conductive Grease Applied)				0.07	℃/W
T	Power Terminals Screw:M5		3.0		5.0	N·m
T	Mounting Screw:M6		4.0		6.0	N·m
G	Weight			150		g

Ordering Information Table

Device code

G	T	150	HF	120	T1N	H
①	②	③	④	⑤	⑥	⑦

① - IGBT Module
② - Field Stop Trench Gate IGBT
③ - Rated Current (150=150A)
④ - Circuit Configuration: HF (Half Bridge)
⑤ - Rated Voltage (120=1200V)
⑥ - Package Type
⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

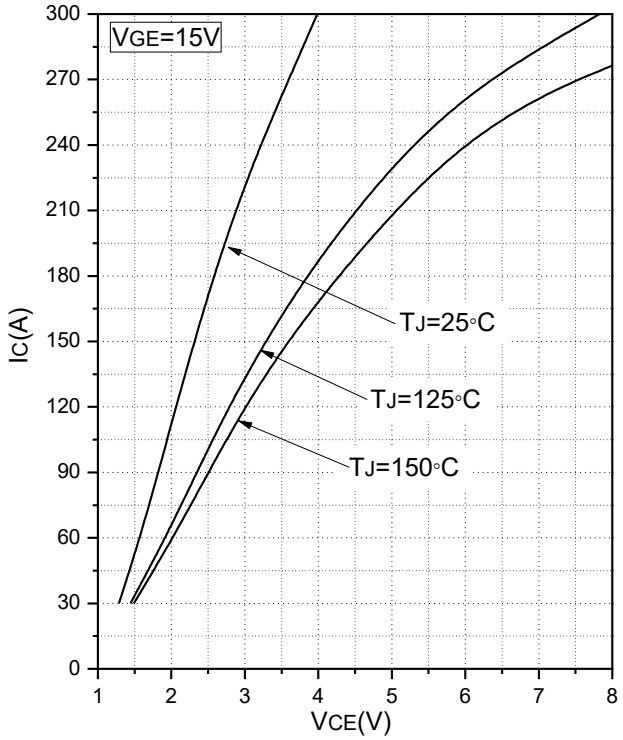


Fig.1 Typical Saturation Voltage Characteristics

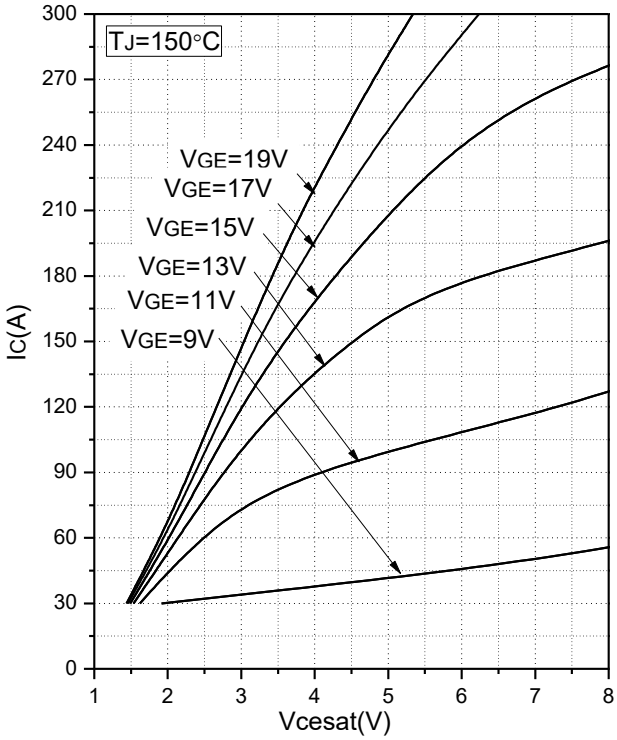


Fig.2 Typical Output Characteristics

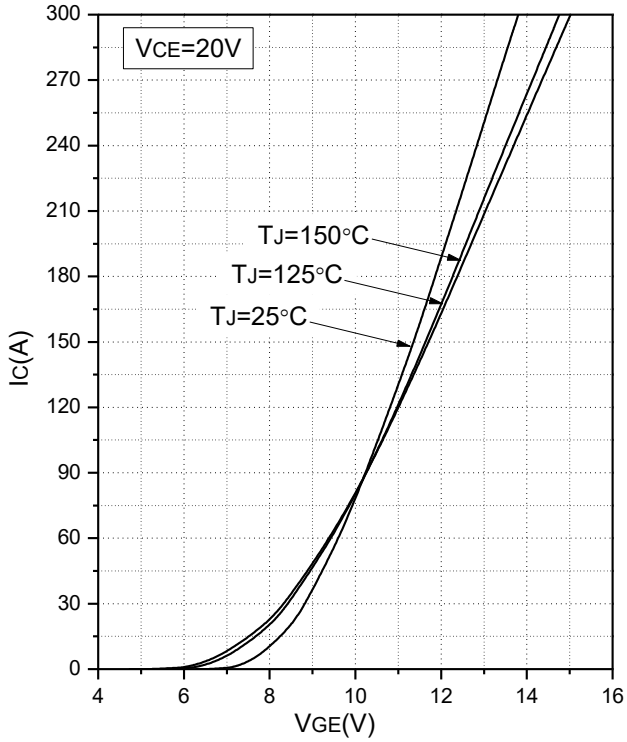


Fig.3 Transfer Characteristic

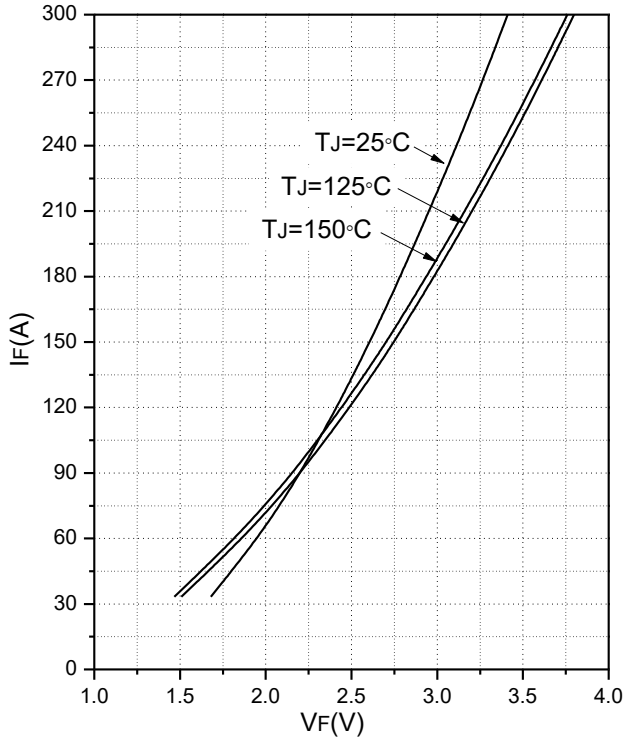


Fig.4 Forward Characteristics of Diode

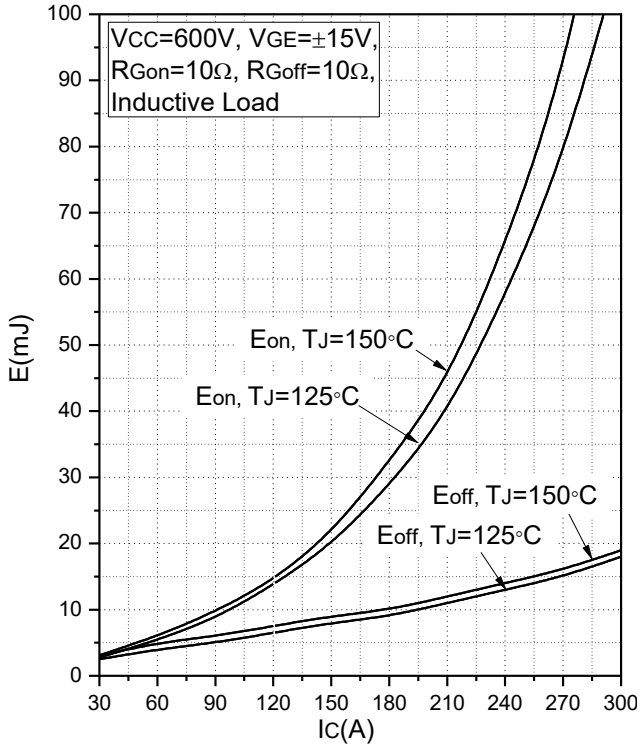


Fig.5 Typical Switching Loss vs. Collector Current

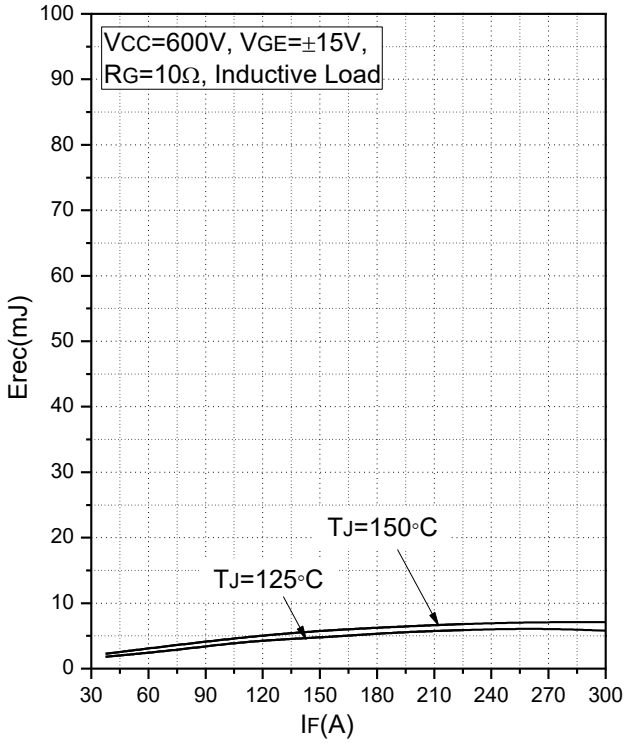


Fig.6 Typical Switching Loss vs. Forward Current

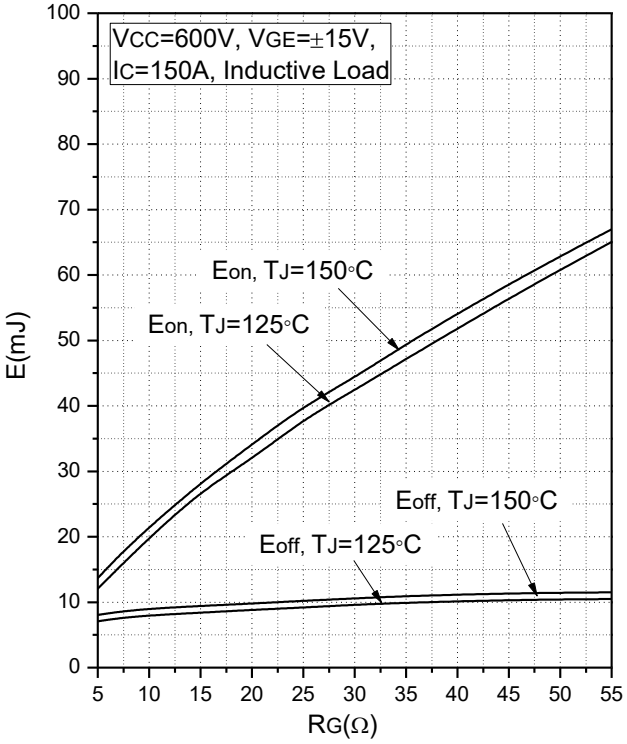


Fig.7 Typical Switching Loss vs. Gate Resistance

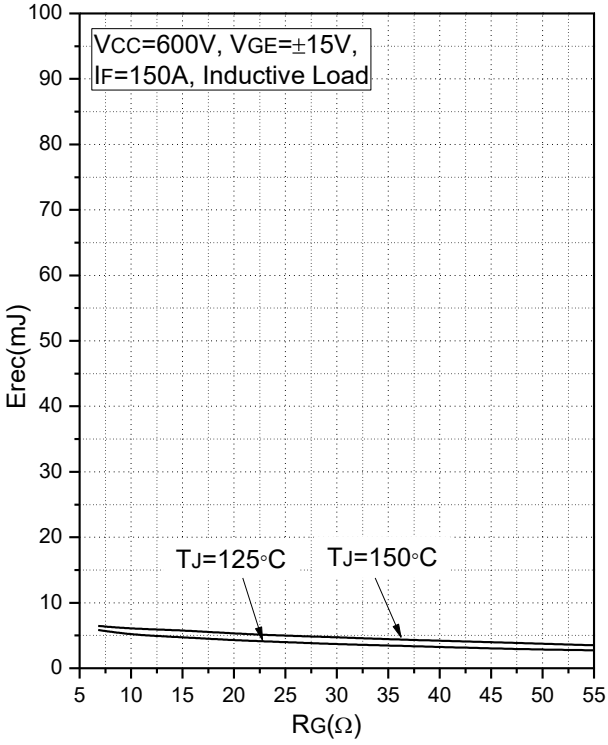


Fig.8 Typical Switching Loss vs. Gate Resistance

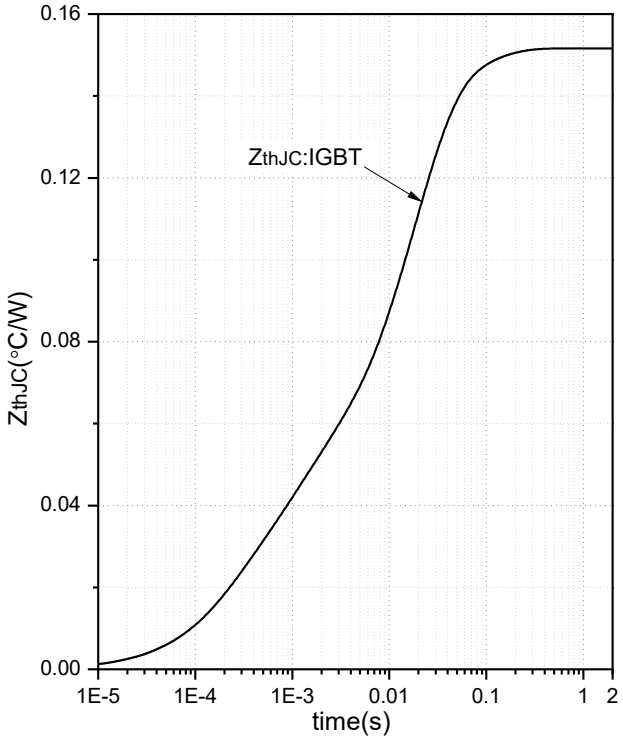


Fig.9 Transient Thermal Impedance (IGBT)

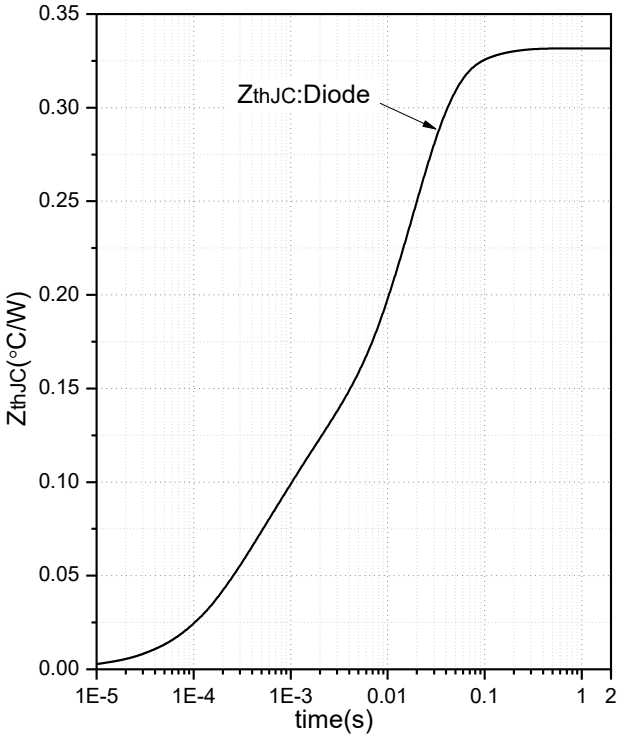


Fig.10 Transient Thermal Impedance (Diode)

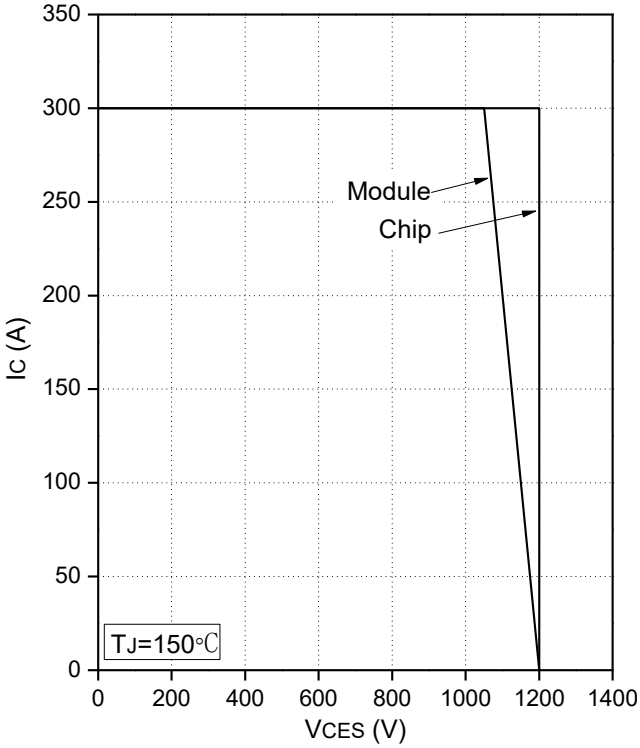
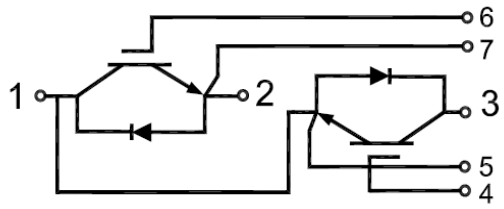
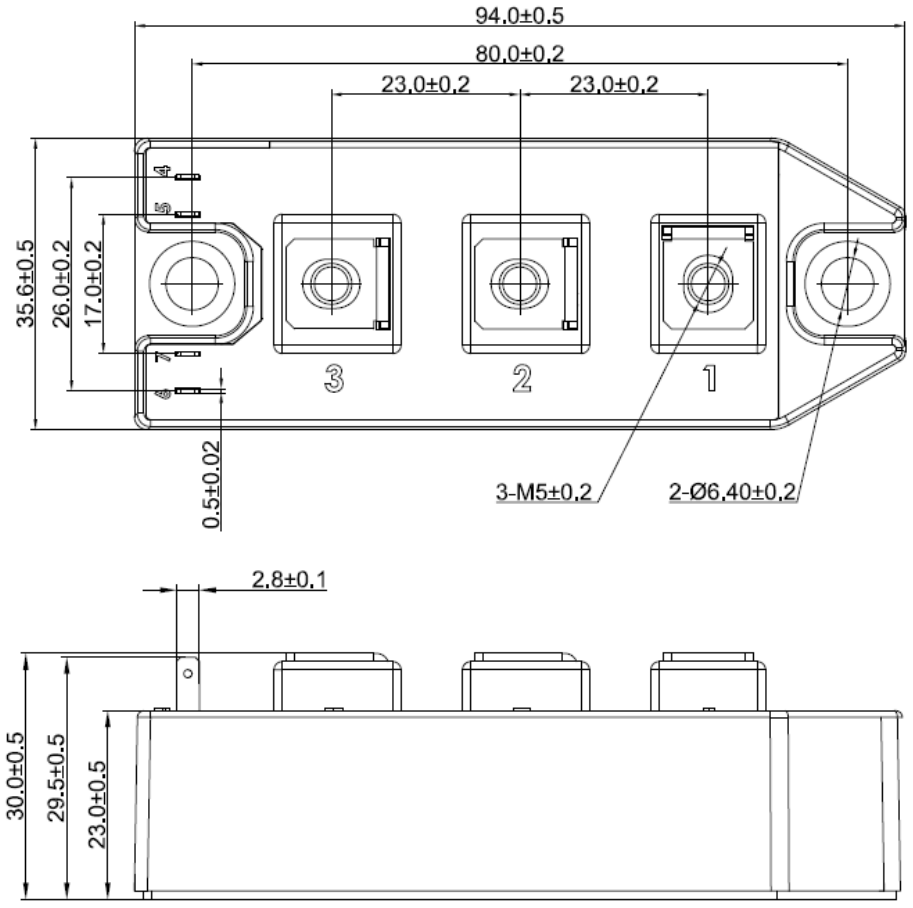


Fig.11 Reverse Bias Safe Operation Area (RBSOA)

Internal Circuit



Package Outline (Unit: mm):



Date	Revision	Notes
08/30/2023	01	Initial release

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