

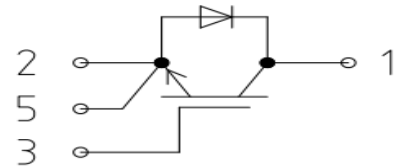
IGBT Module

Features

- 1200V 600A, $V_{CE(sat)(typ.)} = 2.1\text{ V}$
- Lower losses and higher energy
- Excellent short circuit ruggedness
- 62mm Single tube module

Mechanical Data

- **Case:** D2(62mm)(plastic package).
Lead free; RoHS compliant
- **Molding Compound Flammability Rating:**
UL 94 V-0



Equivalent Circuit Schematic

Benefits

- Inverter for motor drive
- AC and DC servo drive amplifier
- Excellent Current Sharing in Parallel Operation

Applications

CREATEK's IGBTs offer lower losses and higher energy for application such as motor drive, inverter and other soft switching applications.

Absolute Maximum Ratings of IGBT

Symbol	Parameter	Value	Units
V_{CES}	Collector to Emitter Voltage	1200	V
V_{GES}	Continuous Gate to Emitter Voltage	± 30	V
I_C	Continuous Collector Current	$T_C = 25^\circ\text{C}$	1200
		$T_C = 100^\circ\text{C}$	600
I_{CM}	Pulse Collector Current	$T_J = 150^\circ\text{C}$	1200
P_D	Maximum Power Dissipation (IGBT)	$T_C = 25^\circ\text{C}, T_J = 150^\circ\text{C}$	2660
t_{sc}	Short Circuit Withstand Time	> 10	μs
T_J	Maximum IGBT Junction Temperature	150	$^\circ\text{C}$
T_{JOP}	Maximum Operating Junction Temperature Range	-40 to +150	$^\circ\text{C}$
T_{stg}	Storage Temperature Range	-40 to +125	$^\circ\text{C}$

Absolute Maximum Ratings of Freewheeling Diode

Symbol	Parameter	Value	Units
V_{RRM}	Repetitive Peak Reverse Voltage Preliminary Data	1200	V
I_F	Diode Continuous Forward Current	$T_C = 25^\circ\text{C}$	1200
	Diode Continuous Forward Current	$T_C = 100^\circ\text{C}$	600
I_{FM}	Diode Maximum Forward Current	1200	A

Electrical Characteristics of IGBT($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	TestConditions	Min.	Typ.	Max.	Units
BV_{CES}	Collector to Emitter Breakdown Voltage	$V_{GE} = 0V, I_C = 1mA$	1200			V
I_{CES}	Collector to Emitter Leakage Current	$V_{GE} = 0V, V_{CE} = V_{CES}$			5	mA
I_{GES}	Gate to Emitter Leakage Current	$V_{GE} = \pm 30V, V_{CE} = 0V$			400	nA
$V_{GE(th)}$	Gate Threshold Voltage	$I_C = 1mA, V_{CE} = V_{GE}$	4.5		5.7	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage (Module Level)	$I_C = 600A, V_{GE} = 15V$		2.10	2.30	V
				2.50		

Electrical Characteristics of IGBT($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	TestConditions	Min.	Typ.	Max.	Units
$t_{d(on)}$	Turn-on Delay Time	$T_J = 25^{\circ}\text{C}$		150		ns
		$T_J = 125^{\circ}\text{C}$		160		
t_r	Turn-on Rise Time	$T_J = 25^{\circ}\text{C}$		135		ns
		$T_J = 125^{\circ}\text{C}$		140		
$t_{d(off)}$	Turn-off Delay Time	$T_J = 25^{\circ}\text{C}$		890		ns
		$T_J = 125^{\circ}\text{C}$		980		
t_f	Turn-off Fall Time	$T_J = 25^{\circ}\text{C}$		160		ns
		$T_J = 125^{\circ}\text{C}$		200		
E_{on}	Turn-on Switching Loss	$T_J = 25^{\circ}\text{C}$		18.0		mJ
		$T_J = 125^{\circ}\text{C}$		28.5		
E_{off}	Turn-off Switching Loss	$T_J = 25^{\circ}\text{C}$		51.5		mJ
		$T_J = 125^{\circ}\text{C}$		78.0		
Q_g	Total Gate Charge	$T_J = 25^{\circ}\text{C}$		5000		nC
R_{gint}	Integrated gate resistor	$f = 1M; V_{pp} = 1V$	$T_J = 25^{\circ}\text{C}$	1.3		Ω
C_{ies}	Input Capacitance	$V_{CE} = 25V$ $V_{GE} = 0V$ $f = 1MHz$	$T_J = 25^{\circ}\text{C}$	50		nF
C_{oes}	Output Capacitance		$T_J = 25^{\circ}\text{C}$	7.0		
C_{res}	Reverse Transfer Capacitance		$T_J = 25^{\circ}\text{C}$	4.0		
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (IGBT)				0.047	$^{\circ}\text{C/W}$

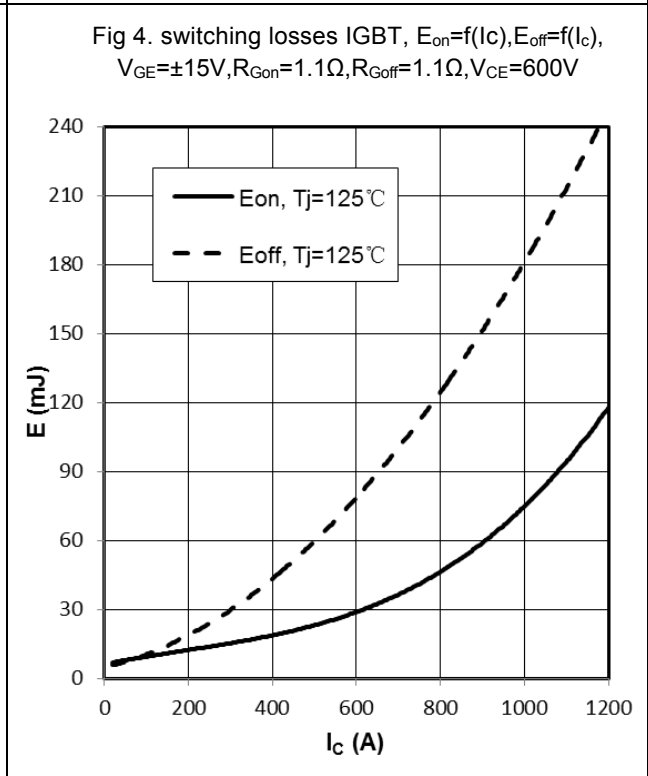
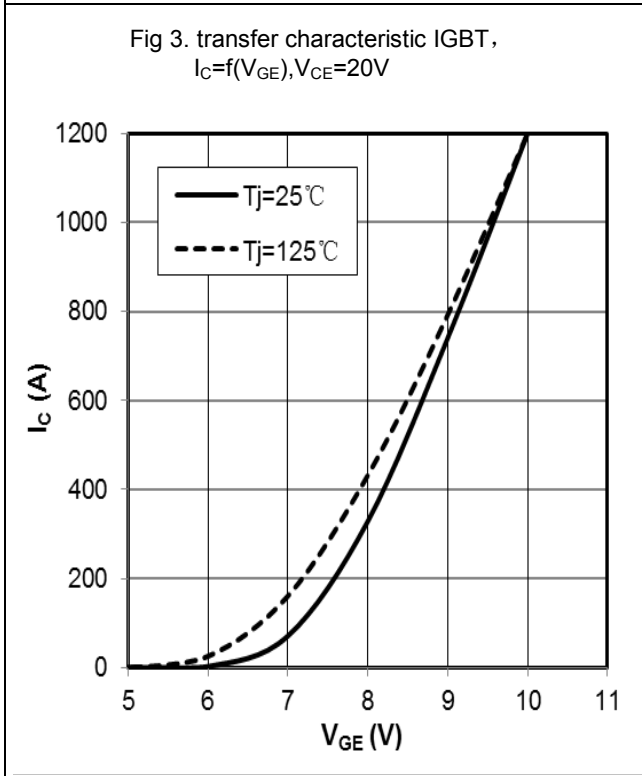
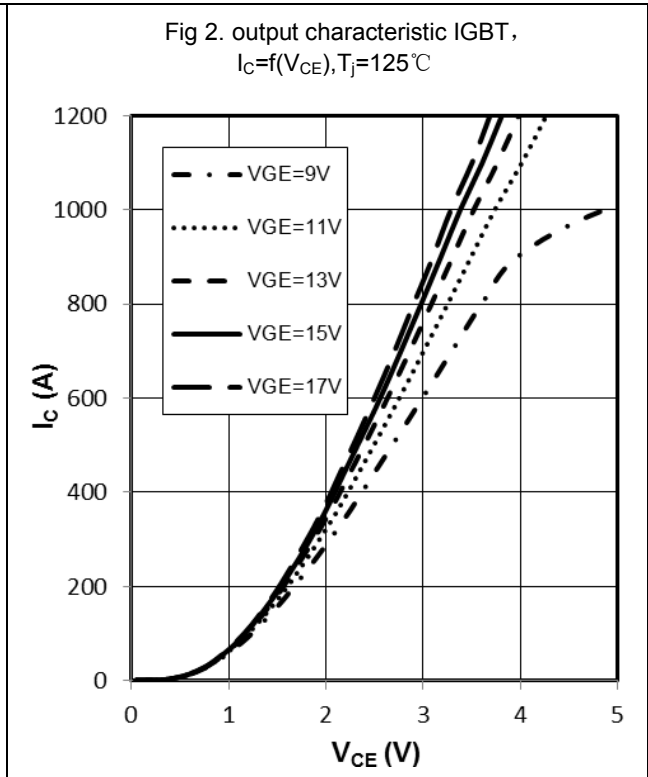
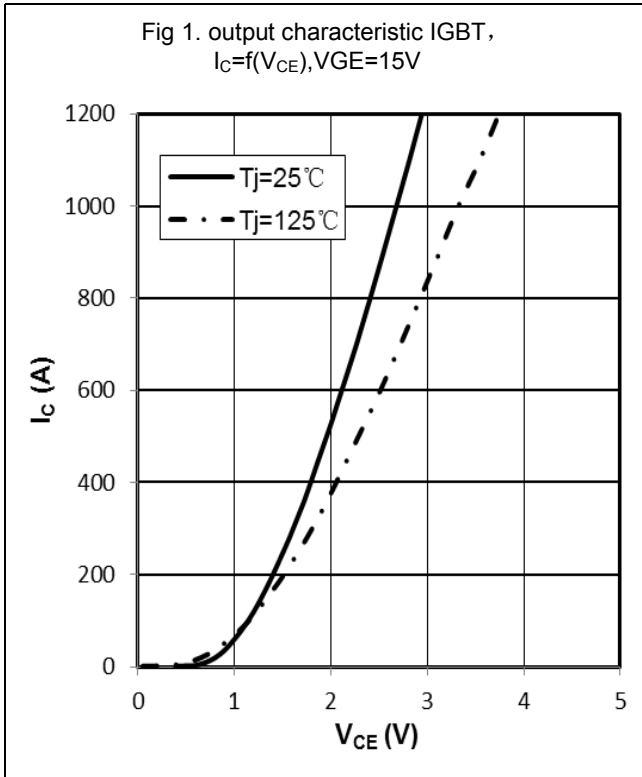
Electrical and Switching Characteristics of Freewheeling Diode

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	$I_F = 600A$,	$T_J = 25^\circ C$		1.90	2.20	V
		$V_{GE} = 0V$	$T_J = 125^\circ C$		1.90		
t_{rr}	Diode Reverse Recovery Time	$I_F = 600A$, $di/dt=6500A/\mu s$, $V_{rr} = 600V$,	$T_J = 25^\circ C$		230		ns
			$T_J = 125^\circ C$		320		
I_{rr}	Diode Peak Reverse Recovery Current		$T_J = 25^\circ C$		450		A
			$T_J = 125^\circ C$		590		
Q_{rr}	Diode Reverse Recovery Charge		$T_J = 25^\circ C$		56.5		nC
			$T_J = 125^\circ C$		98.0		
E_{rr}	Diode Reverse Recovery Energy		$T_J = 25^\circ C$		25.0		mJ
			$T_J = 125^\circ C$		37.5		
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (Diode)					0.057	$^\circ C/W$

Absolute Maximum Ratings of Freewheeling Diode

Symbol	Parameter	Min.	Typ.	Max.	Units
V_{iso}	Isolation Voltage (All Terminals Shorted), $f = 50Hz$, 1minute	2500			V
$R_{\theta CS}$	Case-To-Sink(Conductive Grease Applied)		0.1		$^\circ C/W$
M	Power Terminals Screw: M4	1.0		2.0	N·m
	Power Terminals Screw: M6	3.0		5.0	N·m
M	Mounting Screw: M6	4.0		6.0	N·m
G	Weight		320		g

Typical Characteristics ($T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)



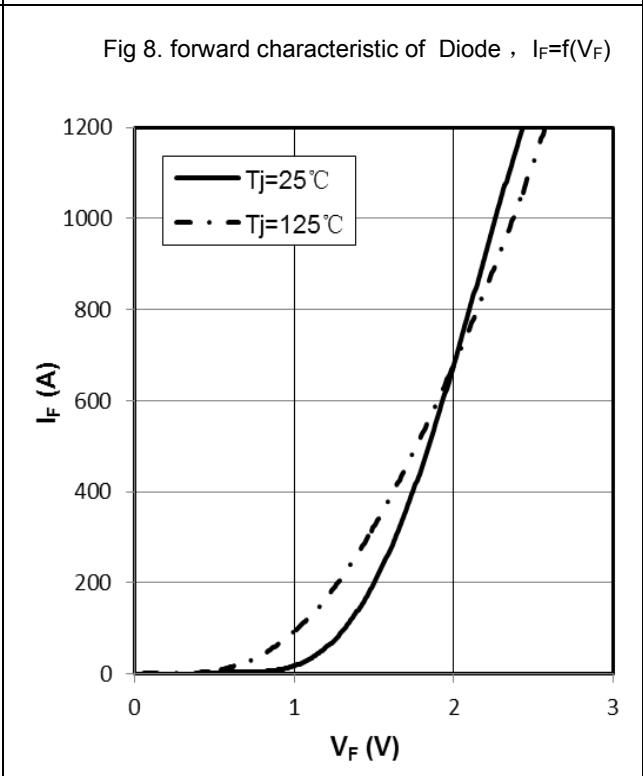
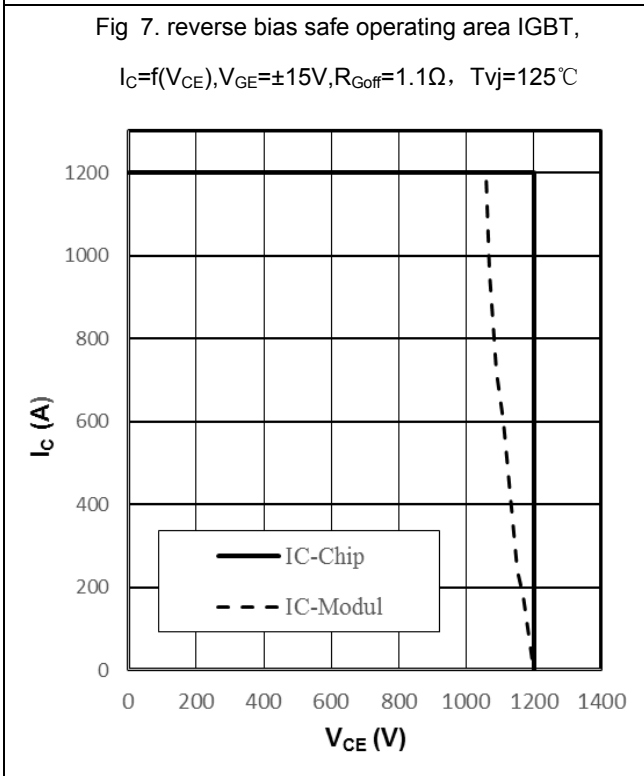
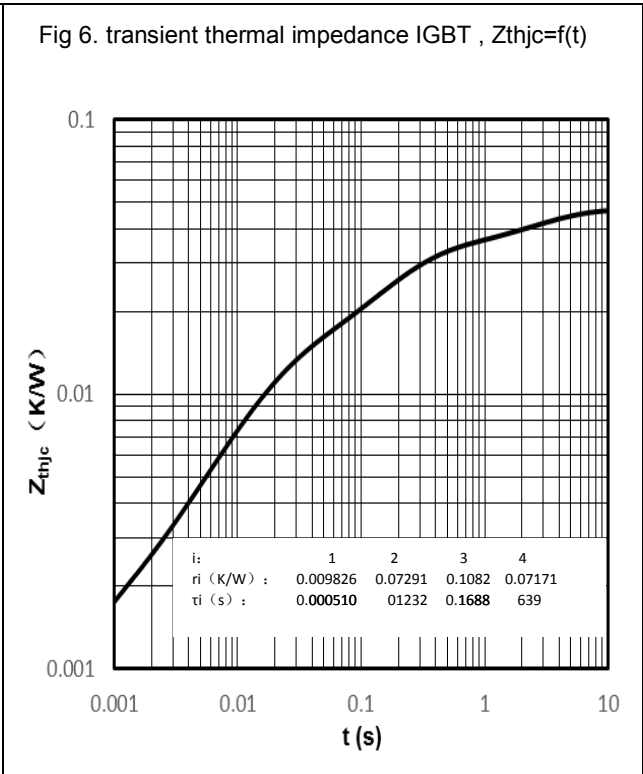
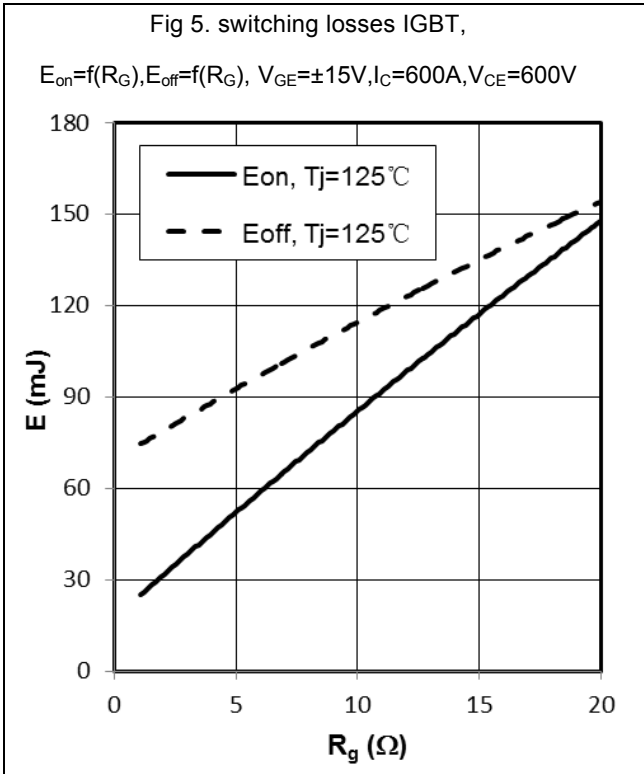


Fig 9. switching losses Diode,
 $E_{rr}=f(I_F), R_{Gon}=1.1 \Omega, V_{CE}=600V$

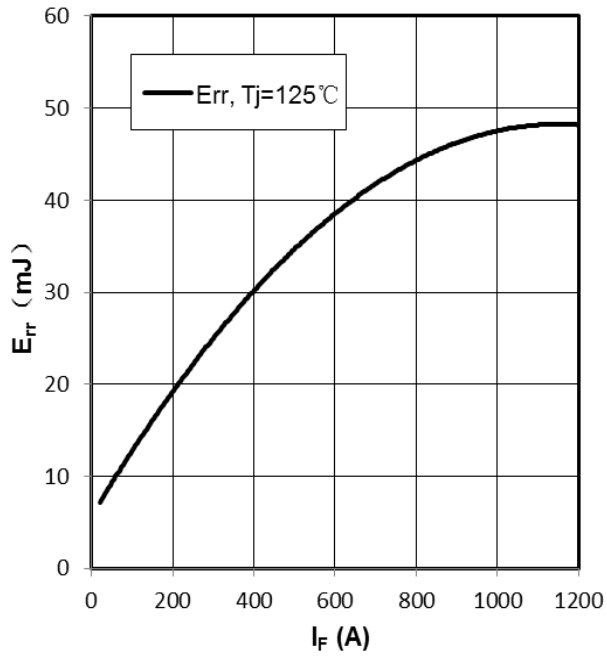
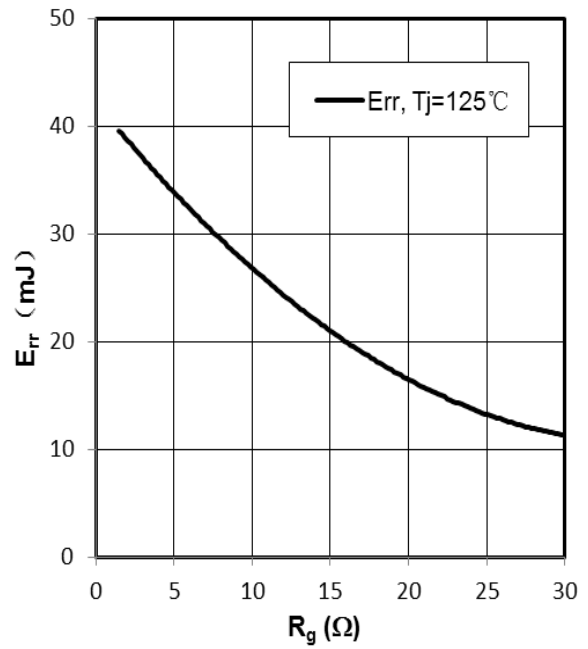
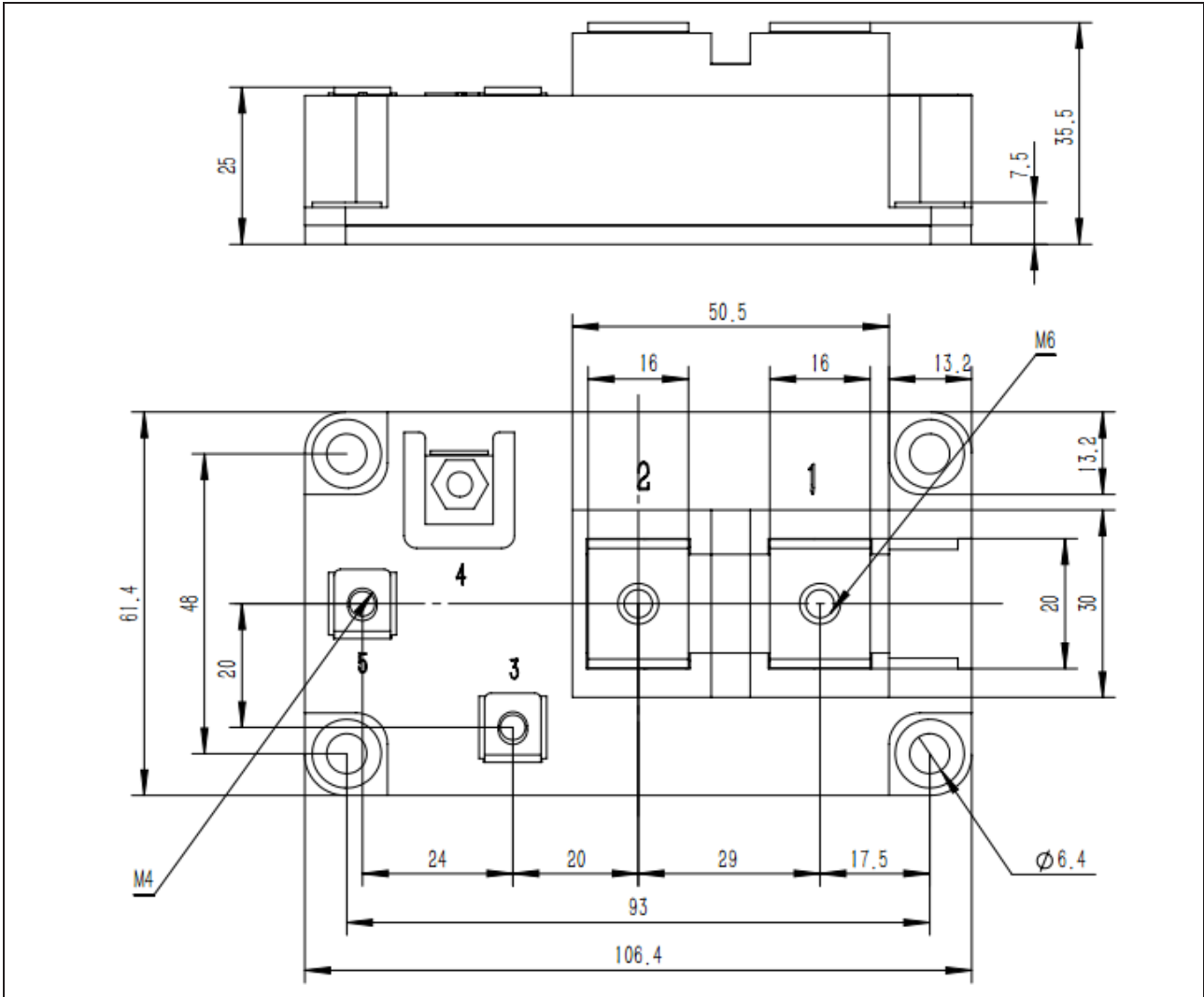


Fig 10. switching losses Diode,
 $E_{rr}=f(R_g), I_F=600A, V_{CE}=600V$



Package Dimensions(mm)



Ordering information

Order code	Package	Packaging option	Base quantity	Packaging specification
GPK600SG120D2	D2(62mm)	BOX	10pcs /BOX	

Revision history

Date	Revision	Changes
23-May-2016	1.0	Initial release
30-July-2018	2.0	Update

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