

## IGBT Modules



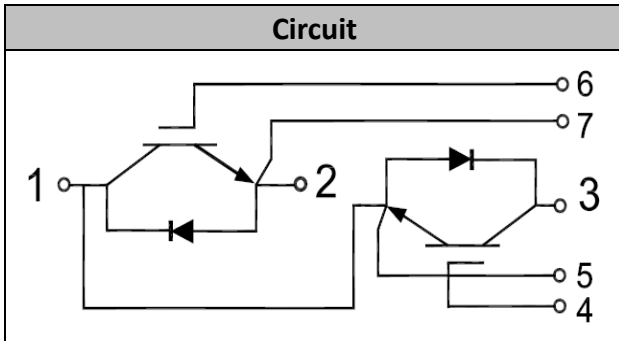
$V_{CES}$             1200V  
 $I_c$                  450A

## Applications

- Motion/sevo control
- High frequency switching application
- UPS (Uninterruptible Power Supplies)
- Welding machine

## Features

- Low  $V_{CE(sat)}$  with Trench technology
- Low switching losses especially Eoff
- $V_{CE(sat)}$  with positive temperature coefficient
- High short circuit capability(10us)
- Including ultra fast & soft recovery anti-parallel FWD
- Low inductance package
- Maximum junction temperature 175°C



## ● IGBT

### Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Collector-Emitter Voltage	$V_{CES}$	$V_{GE}=0V, I_c=1mA, T_{vj}=25^{\circ}C$	1200	V
Continuous Collector Current	$I_c$	$T_c=100^{\circ}C$	450	A
Repetitive Peak Collector Current	$I_{CRM}$	$t_p=1ms$	900	A
Gate-Emitter Voltage	$V_{GES}$	$T_{vj}=25^{\circ}C$	$\pm 20$	V
Total Power Dissipation	$P_{tot}$	$T_c=25^{\circ}C$ $T_{vjmax}=175^{\circ}C$	2307	W

**Characteristic values**

Parameter	Symbol	Conditions	Value			Unit	
			Min.	Typ.	Max.		
Gate-emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=12mA, T_{vj}=25^{\circ}C$	5.2	5.8	6.4	V	
Collector-Emitter Cut-off Current	$I_{CES}$	$V_{CE}=1200V, V_{GE}=0V, T_{vj}=25^{\circ}C$			1.0	mA	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=450A, V_{GE}=15V, T_{vj}=25^{\circ}C$		1.85	2.20	V	
		$I_C=450A, V_{GE}=15V, T_{vj}=125^{\circ}C$		2.15			
		$I_C=450A, V_{GE}=15V, T_{vj}=150^{\circ}C$		2.25			
Gate Charge	$Q_G$			3.50		$\mu C$	
Internal Gate Resistance	$R_{Gint}$			1.67		$\Omega$	
Input Capacitance	$C_{ies}$	$V_{CE}=25V, V_{GE}=0V,$		45.9		nF	
Reverse Transfer Capacitance	$C_{res}$	$f=1MHz, T_{vj}=25^{\circ}C$		1.1		nF	
Gate-Emitter leakage current	$I_{GES}$	$V_{CE}=0V, V_{GE}=20V, T_{vj}=25^{\circ}C$			400	nA	
Turn-on Delay Time	$t_{d(on)}$	$I_C=450A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=1.3\Omega$ $T_{vj}=25^{\circ}C$		145		ns	
Rise Time	$t_r$				78		ns
Turn-off Delay Time	$t_{d(off)}$				289		ns
Fall Time	$t_f$				169		ns
Energy Dissipation During Turn-on Time	$E_{on}$				46.1		mJ
Energy Dissipation During Turn-off Time	$E_{off}$				32.8		mJ
Turn-on Delay Time	$t_{d(on)}$	$I_C=450A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=1.3\Omega$ $T_{vj}=150^{\circ}C$		165		ns	
Rise Time	$t_r$				92		ns
Turn-off Delay Time	$t_{d(off)}$				343		ns
Fall Time	$t_f$				231		ns
Energy Dissipation During Turn-on Time	$E_{on}$				64.2		mJ
Energy Dissipation During Turn-off Time	$E_{off}$				40.1		mJ
SC Data	$I_{sc}$	$t_p \leq 10\mu s, V_{GE}=15V,$ $T_{vj}=150^{\circ}C, V_{CC}=900V,$ $V_{CEM} \leq 1200V$		2250		A	



## ● Diode

### Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Repetitive Peak Reverse Voltage	$V_{RRM}$	$T_{vj}=25^{\circ}C$	1200	V
Continuous DC Forward Current	$I_F$		450	A
Repetitive Peak Forward Current	$I_{FRM}$	$t_p=1ms$	900	A
$I^2t$ -value	$I^2t$	$V_R=0V, t_p=10ms, T_{vj}=125^{\circ}C$	32000	A <sup>2</sup> s
		$V_R=0V, t_p=10ms, T_{vj}=150^{\circ}C$	30000	

### Characteristic values

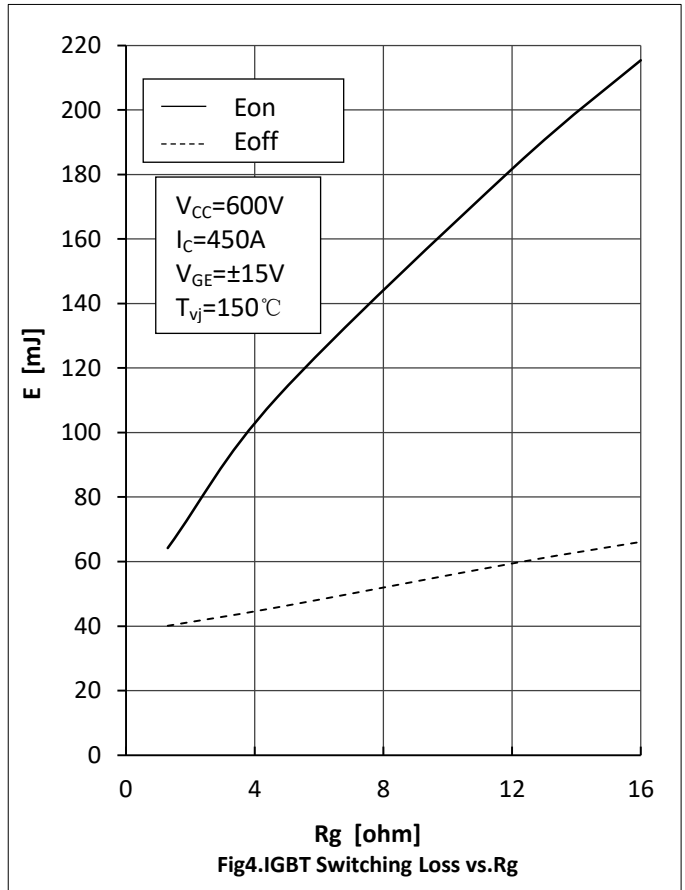
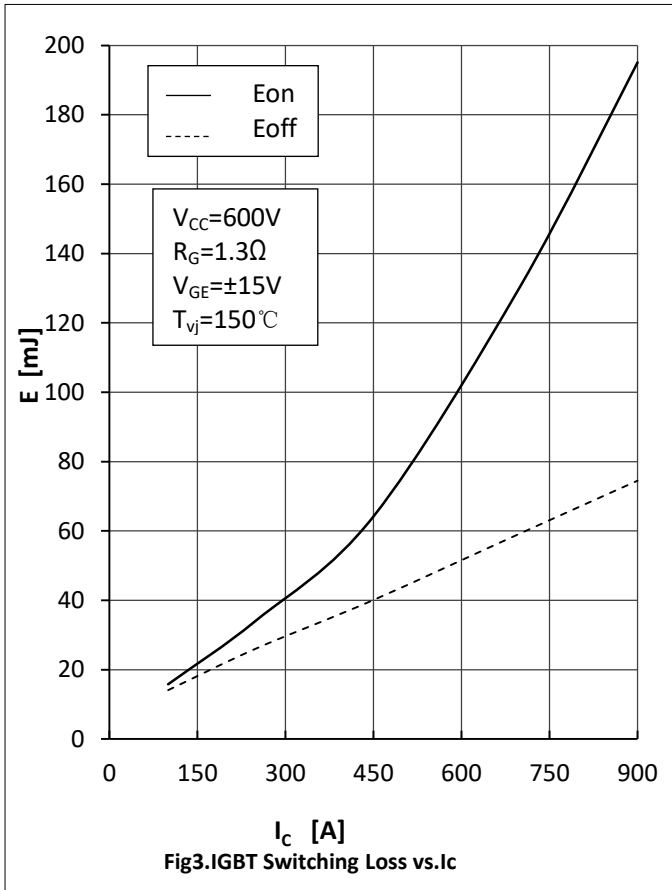
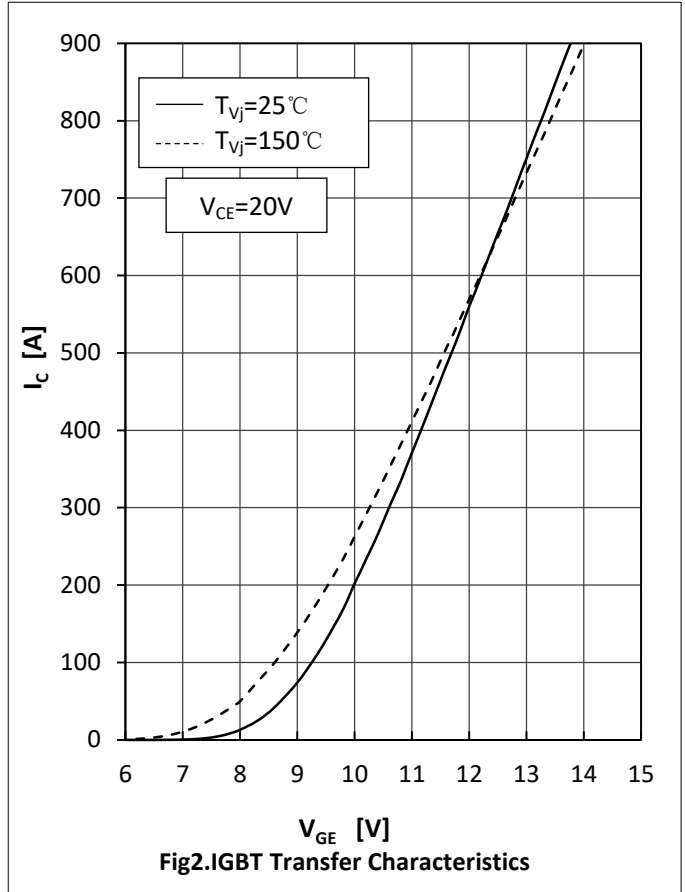
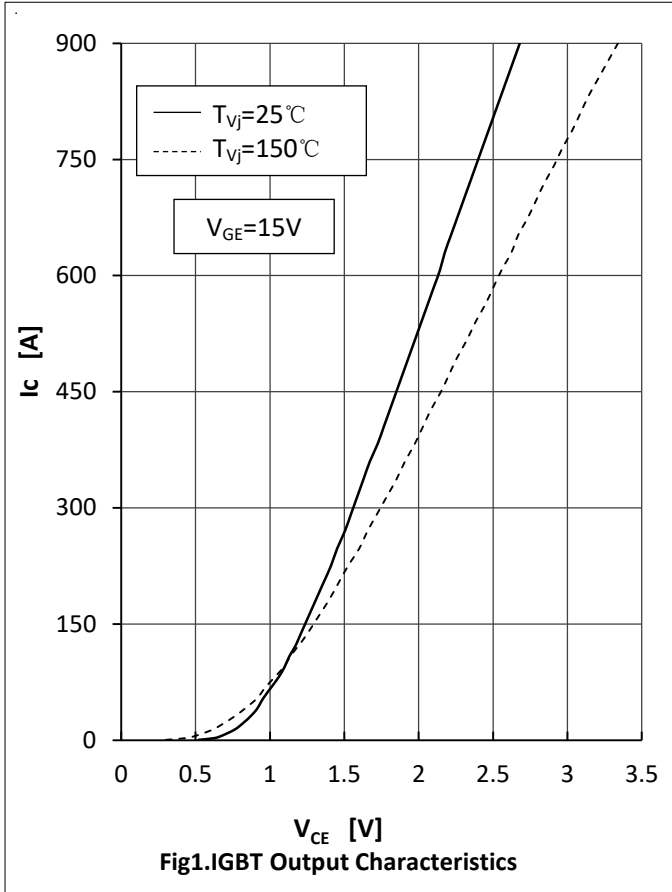
Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	$V_F$	$I_F=450A, T_{vj}=25^{\circ}C$		1.95		V
		$I_F=450A, T_{vj}=125^{\circ}C$		1.80		
		$I_F=450A, T_{vj}=150^{\circ}C$		1.75		
Recovered Charge	$Q_{rr}$	$I_F=450A$		20.5		$\mu C$
Peak Reverse Recovery Current	$I_{rr}$	$V_R=600V$		155		A
Reverse Recovery Energy	$E_{rec}$	$-di_F/dt=3800A/\mu s$ $T_{vj}=25^{\circ}C$		6.48		mJ
Recovered Charge	$Q_{rr}$	$I_F=450A$		59.8		$\mu C$
Peak Reverse Recovery Current	$I_{rr}$	$V_R=600V$		245		A
Reverse Recovery Energy	$E_{rec}$	$-di_F/dt=3800A/\mu s$ $T_{vj}=150^{\circ}C$		20.8		mJ

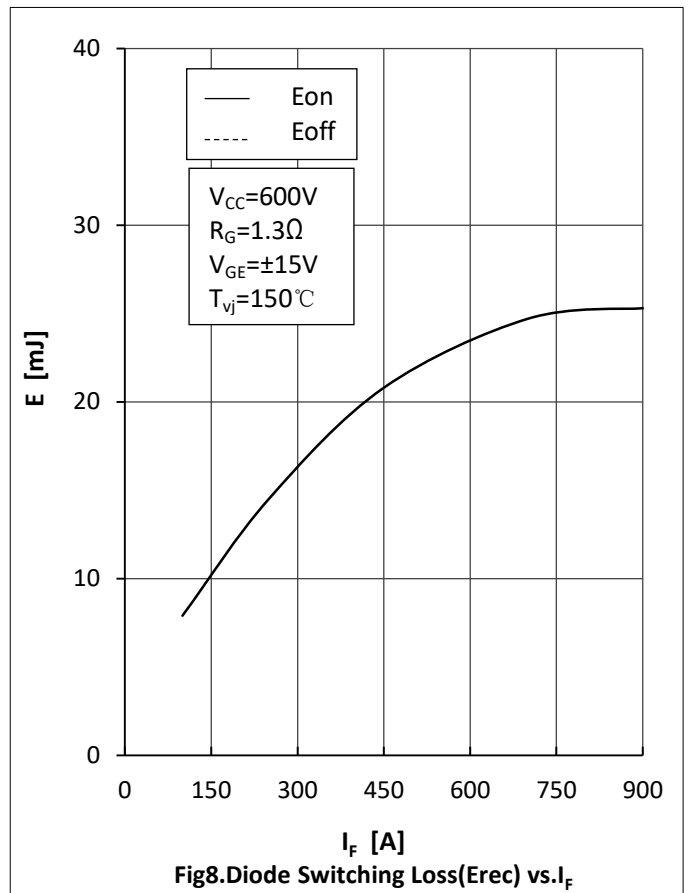
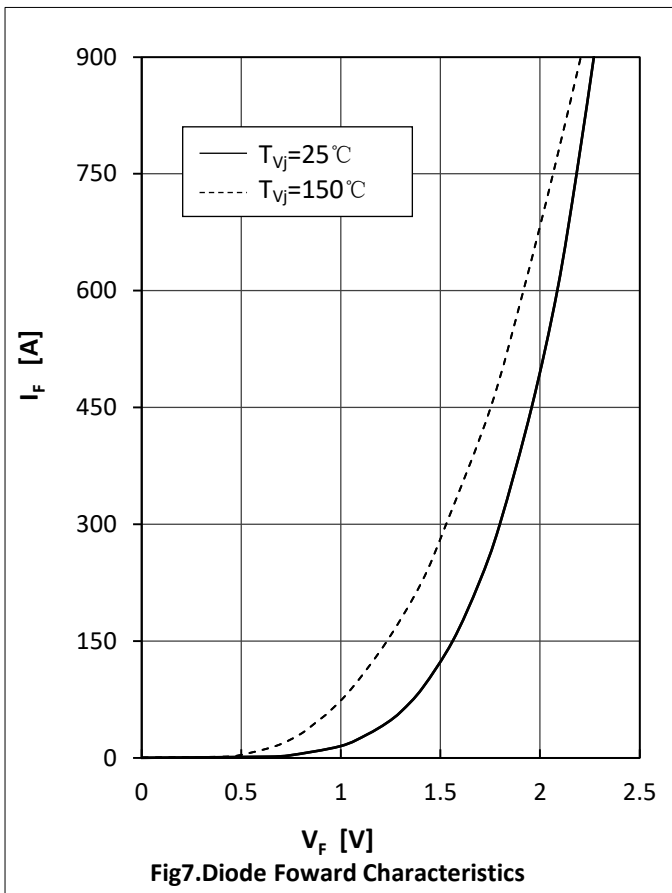
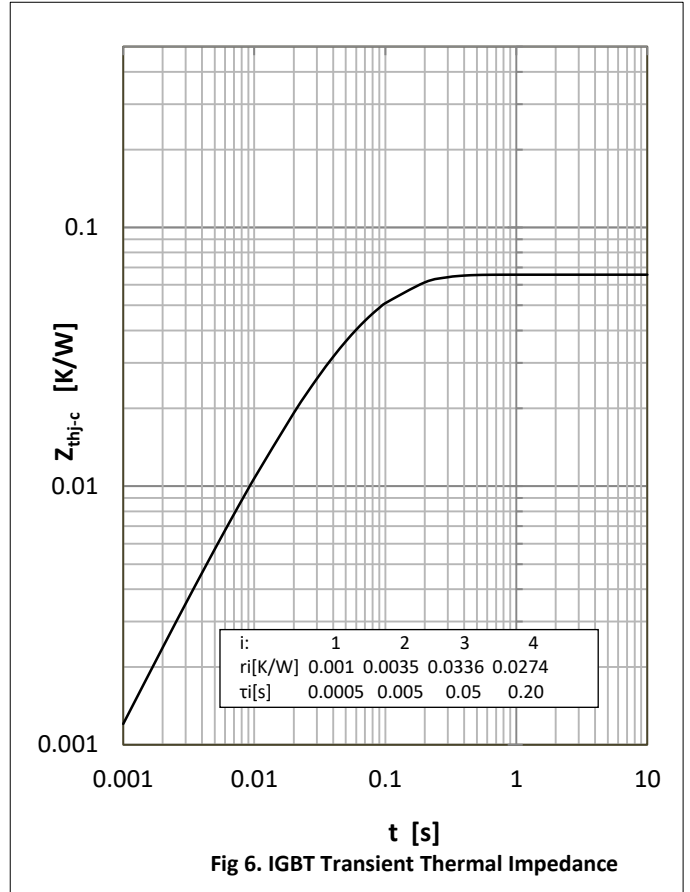
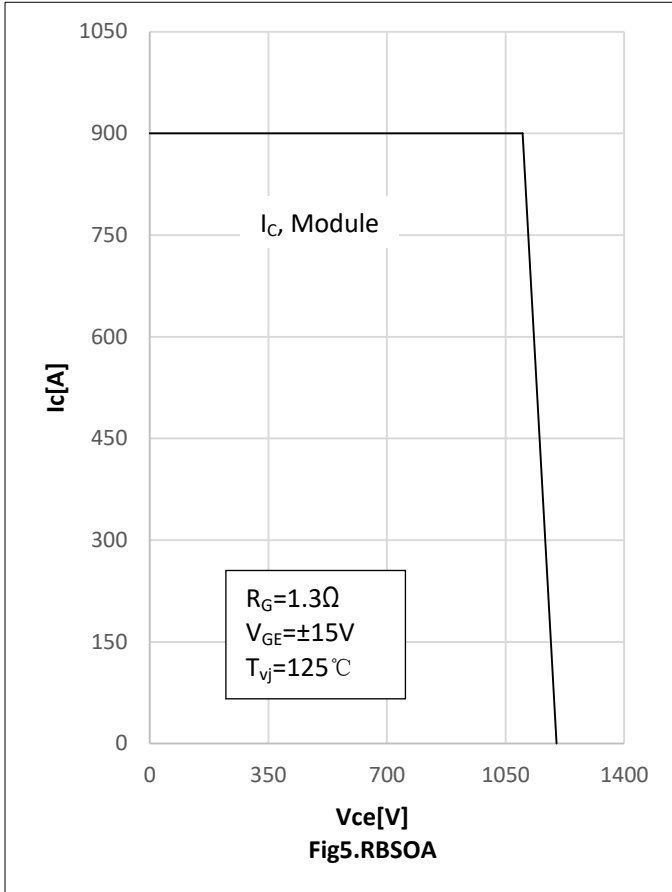


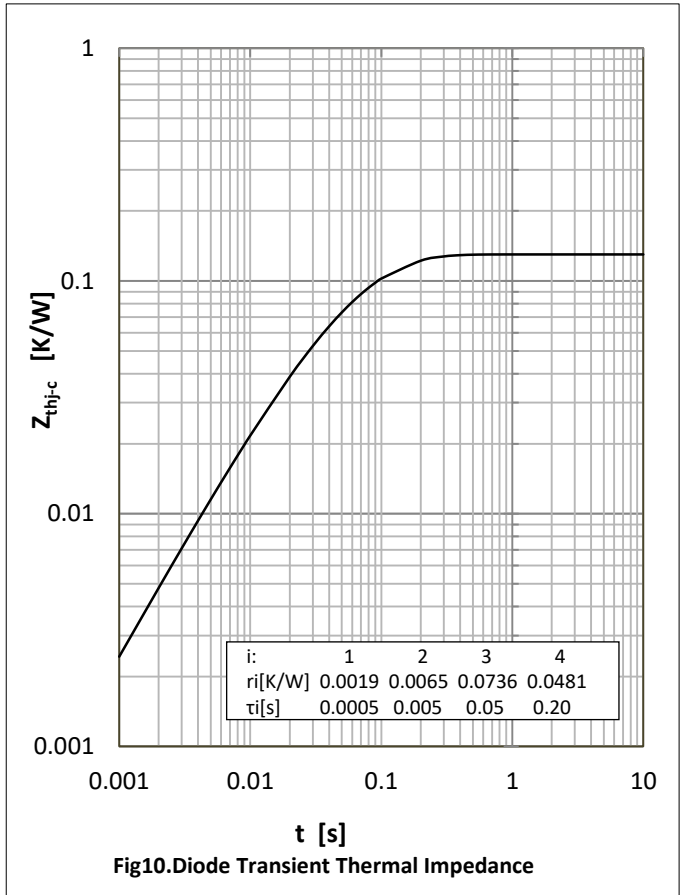
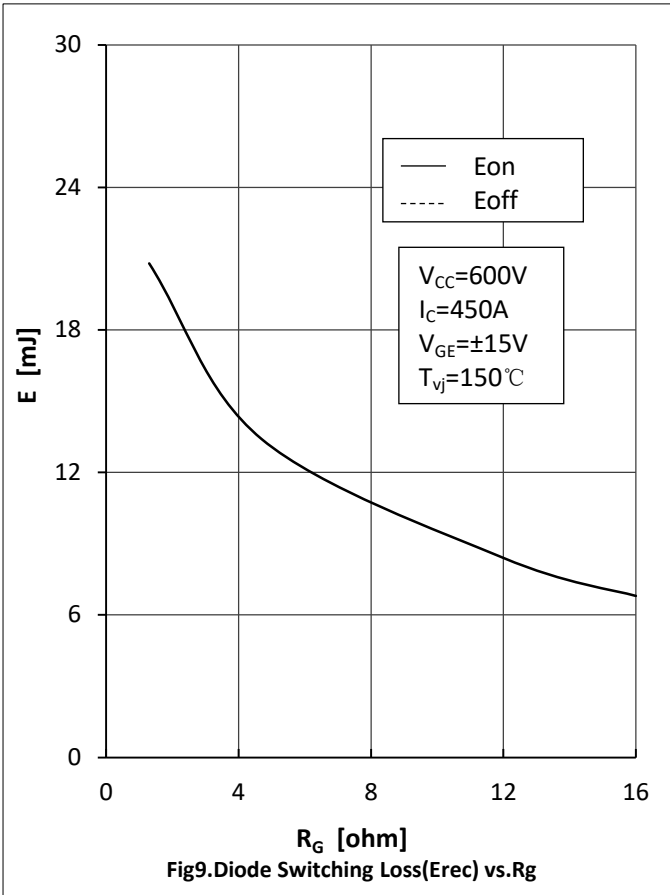
## ● Module Characteristics

T<sub>c</sub>=25°C unless otherwise specified

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Isolation voltage	V <sub>isol</sub>	t=1min,f=50Hz	2500			V
Maximum Junction Temperature	T <sub>jmax</sub>				175	°C
Operating Junction Temperature	T <sub>vj op</sub>		-40		150	°C
Storage Temperature	T <sub>stg</sub>		-40		125	°C
Thermal Resistance Junction-to Case	R <sub>θJC</sub>	per IGBT			0.065	K/W
		per Diode			0.13	
Thermal Resistance Case-to Sink	R <sub>θCS</sub>	Conductive grease applied		0.012	0.035	K/W
Comparative Tracking Index	CTI		400			
Module Electrodes Torque	M <sub>t</sub>	Recommended(M6)	3.0		5.0	N·m
Module-to-Sink Torque	M <sub>s</sub>	Recommended(M6)	3.0		5.0	N·m
Weight of Module	G			315		g

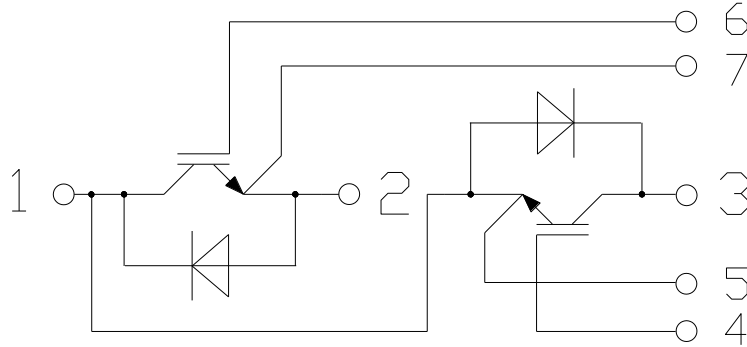






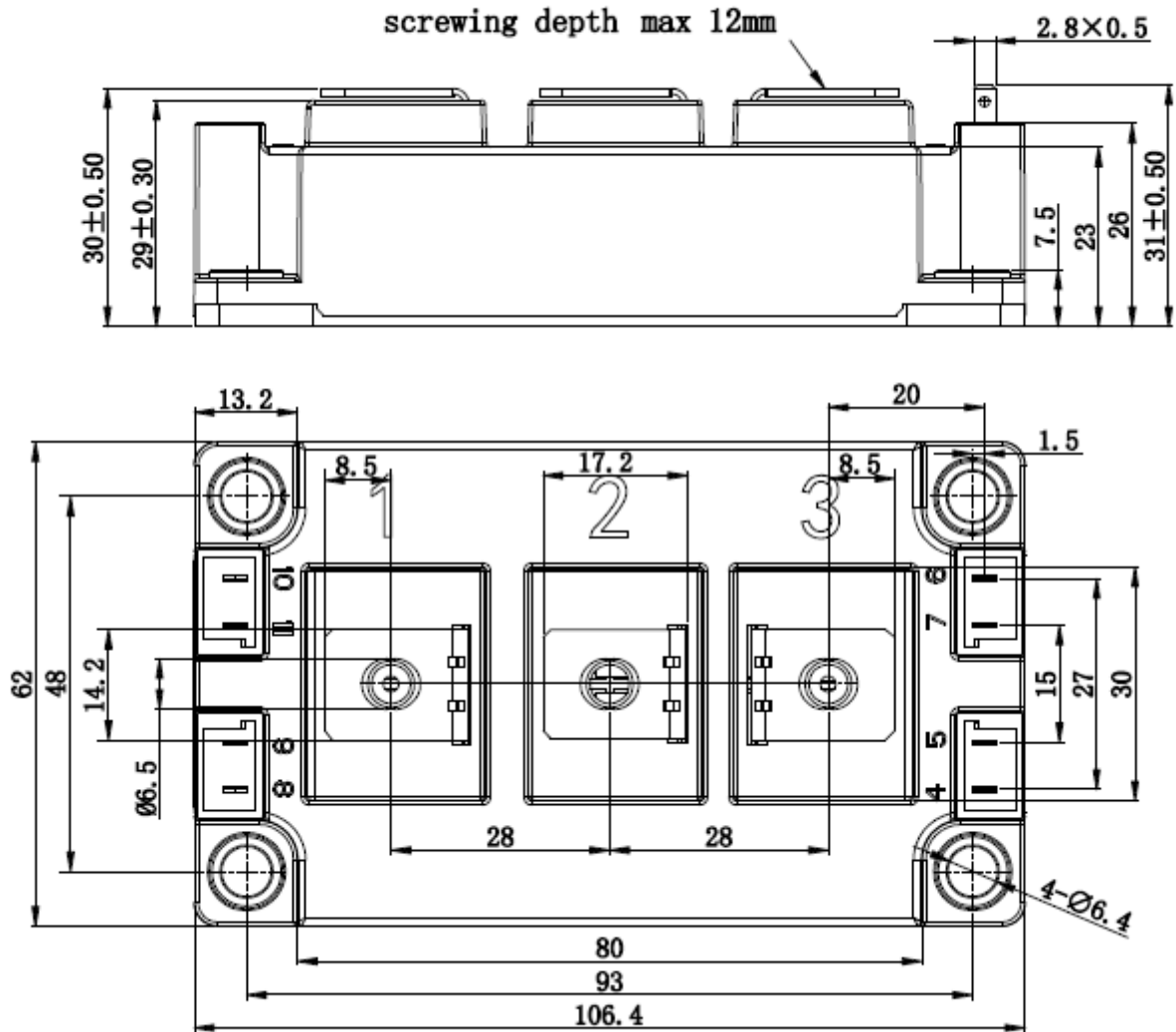


## ● Circuit Diagram



## ● Package Outline Information

### Dimensions in Millimeters







## Disclaimer

The information presented in this document is for reference only. Yangzhou Yangjie Electronic Technology Co., Ltd. reserves the right to make changes without notice for the specification of the products displayed herein to improve reliability, function or design or otherwise.

The product listed herein is designed to be used with ordinary electronic equipment or devices, and not designed to be used with equipment or devices which require high level of reliability and the malfunction of which would directly endanger human life (such as aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), Yangjie or anyone on its behalf, assumes no responsibility or liability for any damages resulting from such improper use of sale.

This publication supersedes & replaces all information previously supplied. For additional information, please visit our website [http:// www.21yangjie.com](http://www.21yangjie.com) , or consult your nearest Yangjie's sales office for further assistance.