

IGBT Modules

V_{CES} 1200V
I_C 200A

Applications

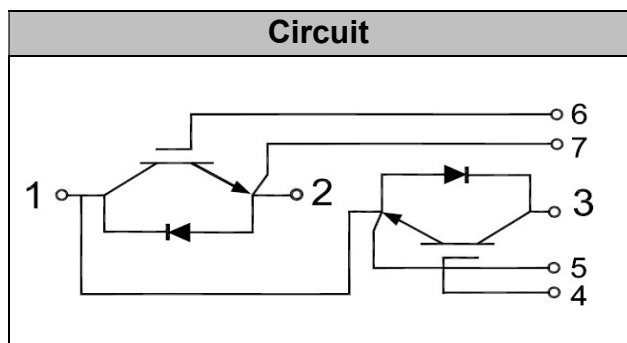
- Inverter for motor drive
- AC and DC servo drive amplifier
- UPS (Uninterruptible Power Supplies)
- Soft switching welding machine

Features

- Low V_{ce(sat)} with SPT+ technology
- V_{ce(sat)} with positive temperature coefficient
- Including fast & soft recovery anti-parallel FWD
- High short circuit capability(10us)
- Low inductance module structure



Circuit



● Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Collector-Emitter Voltage	V _{CES}	V _{GE} =0V, I _C =1mA, T _{vj} =25°C	1200	V
Continuous Collector Current	I _C	T _c =80°C	200	A
Peak Collector Current	I _{CRM}	tp=1ms	400	A
Gate-Emitter Voltage	V _{GES}	T _{vj} =25°C	±20	V
Total Power Dissipation (IGBT-inverter)	P _{tot}	T _c =25°C T _{vjmax} =150°C	1358	W



● IGBT Characteristics

Parameter	Symbol	Conditions	Value			Unit	
			Min.	Typ.	Max.		
Gate-emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=8mA, T_{vj}=25^{\circ}C$	5.0	5.8	6.5	V	
Collector-Emitter Cut-off Current	I_{CES}	$V_{CE}=1200V, V_{GE}=0V, T_{vj}=25^{\circ}C$			1.0	mA	
		$V_{CE}=1200V, V_{GE}=0V, T_{vj}=125^{\circ}C$			5.0	mA	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=200A, V_{GE}=15V, T_{vj}=25^{\circ}C$		1.95	2.25	V	
		$I_C=200A, V_{GE}=15V, T_{vj}=125^{\circ}C$		2.15		V	
Gate Charge	Q_G			2.00		uC	
Input Capacitance	C_{ies}	$V_{CE}=25V, V_{GE}=0V,$ $f=1MHz, T_{vj}=25^{\circ}C$		13.2		nF	
Output Capacitance	C_{oes}			0.9		nF	
Reverse Transfer Capacitance	C_{res}			0.8		nF	
Internal Gate Resistance	R_{gint}			1.25		Ω	
Gate-Emitter leakage current	I_{GES}	$V_{CE}=0V, V_{GE}=20V, T_{vj}=25^{\circ}C$			400	nA	
Turn-on Delay Time	$t_{d(on)}$	$I_C=200A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=3.3\Omega$ $T_{vj}=25^{\circ}C$		328		ns	
Rise Time	t_r			82		ns	
Turn-off Delay Time	$t_{d(off)}$			445		ns	
Fall Time	t_f			180		ns	
Energy Dissipation During Turn-on Time	E_{on}				7.0		mJ
Energy Dissipation During Turn-off Time	E_{off}				15.5		mJ
Turn-on Delay Time	$t_{d(on)}$		$I_C=200A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=3.3\Omega$ $T_{vj}=125^{\circ}C$		350		ns
Rise Time	t_r				84		ns
Turn-off Delay Time	$t_{d(off)}$				480		ns
Fall Time	t_f				305		ns
Energy Dissipation During Turn-on Time	E_{on}				9.8		mJ
Energy Dissipation During Turn-off Time	E_{off}				26.4		mJ
SC Data	I_{sc}	$T_p \leq 10\mu s, V_{GE}=15V,$ $T_{vj}=125^{\circ}C, V_{cc}=600V,$ $V_{CEM} \leq 1200V$			1500		A



● Diode Characteristics

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Diode DC Forward Current	I_F	$T_c=80^\circ\text{C}$		200		A
Diode Peak Forward Current	I_{FRM}	$t_p=1\text{ms}$		400		A
Forward Voltage	V_F	$I_F=200\text{A}, T_{vj}=25^\circ\text{C}$		1.70	2.0	V
		$I_F=200\text{A}, T_{vj}=125^\circ\text{C}$		1.75		V

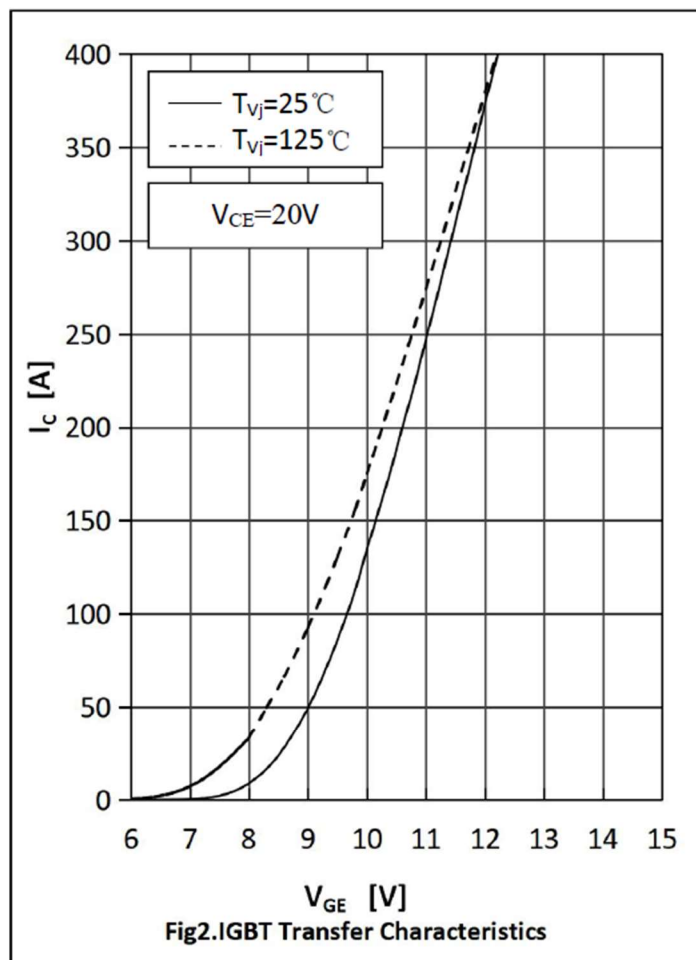
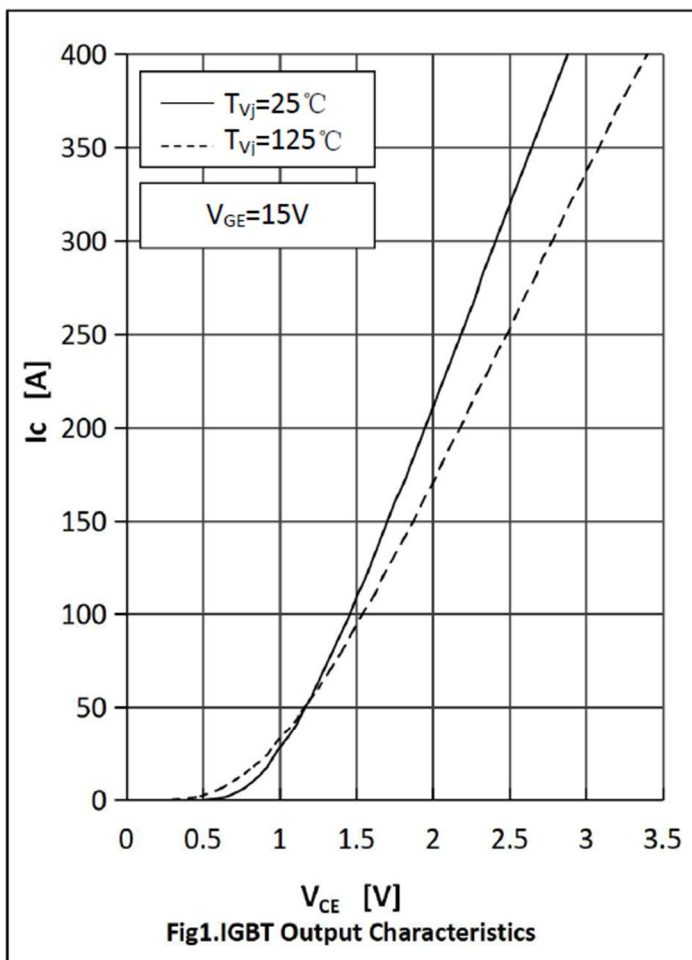
Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Recovered Charge	Q_{rr}	$I_F=200\text{A}$ $V_R=600\text{V}$ $-di_F/dt = 2500\text{A}/\mu\text{s}$ $T_{vj}=25^\circ\text{C}$		15.4		μC
Peak Reverse Recovery Current	I_{rr}			150		A
Reverse Recovery Energy	t_{rr}			8.8		ns
Recovered Charge	E_{rec}	$I_F=200\text{ A}$ $V_R=600\text{V}$ $-di_F/dt = 2500\text{A}/\mu\text{s}$ $T_{vj}=125^\circ\text{C}$		30.6		mJ
Peak Reverse Recovery Current	Q_{rr}			180		μC
Reverse Recovery Energy	I_{rr}			16.9		A

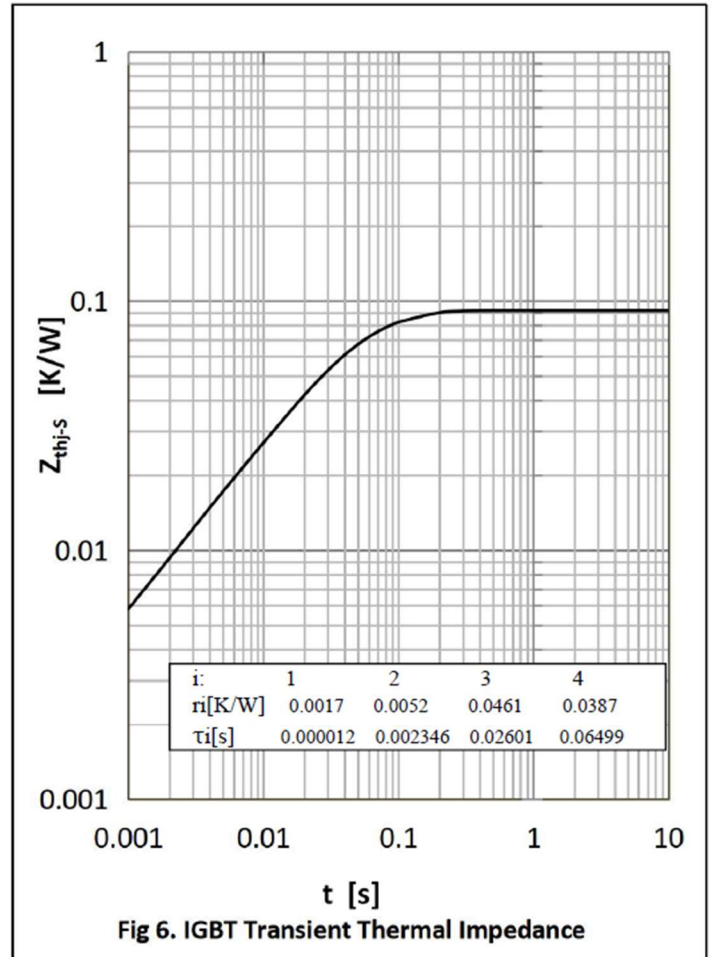
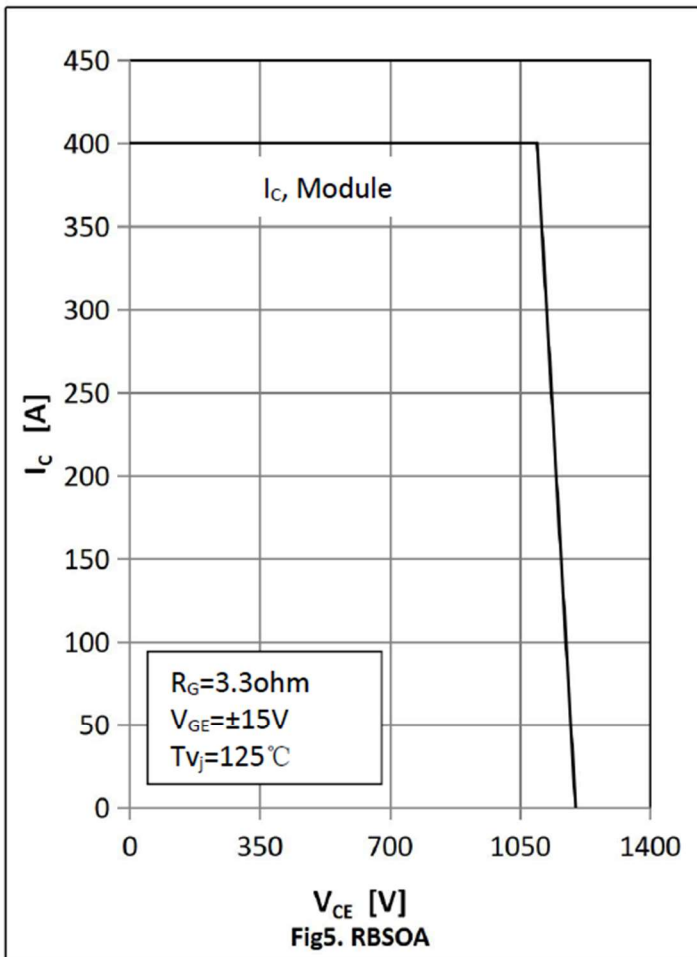
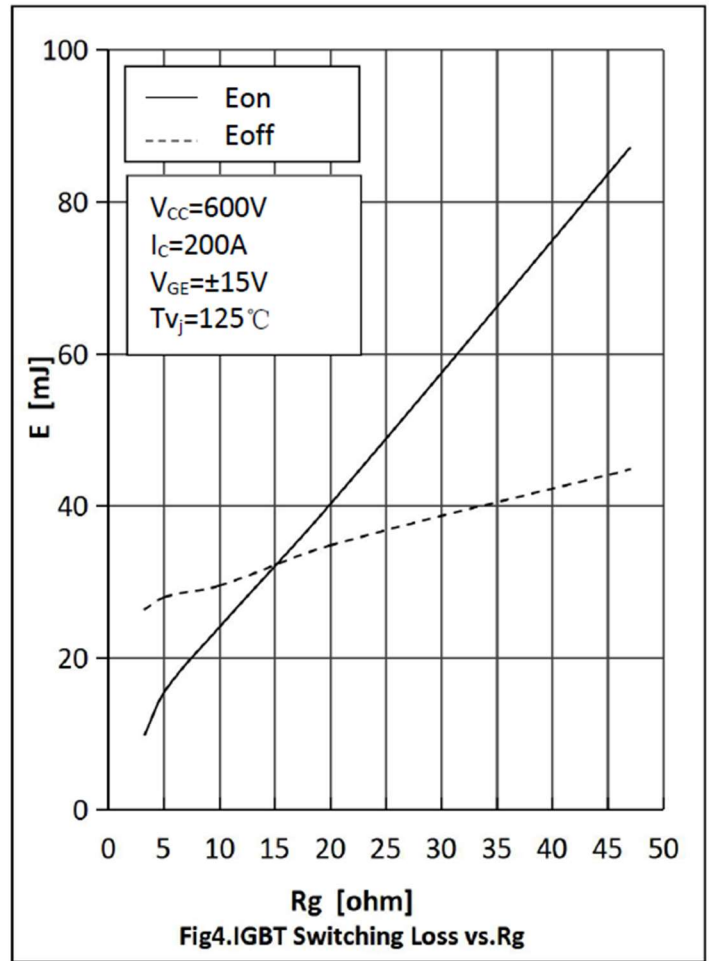
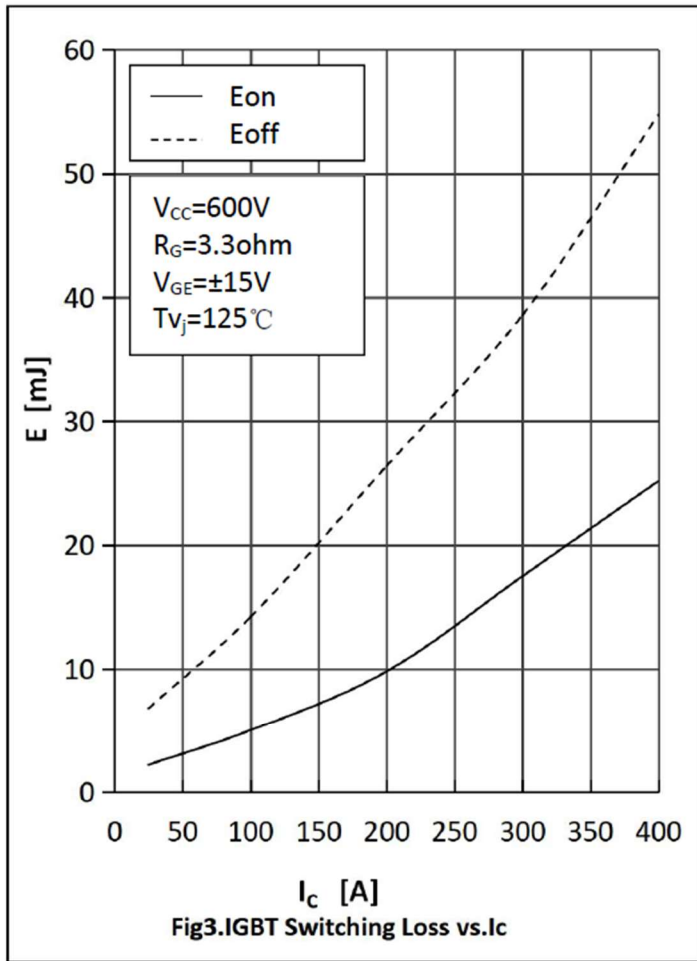


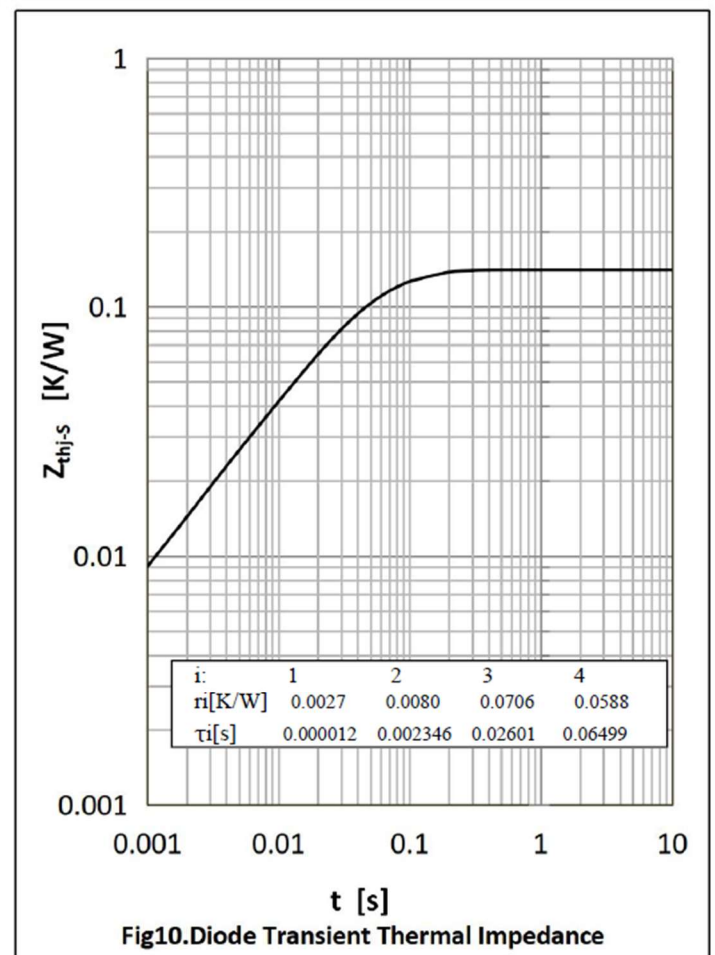
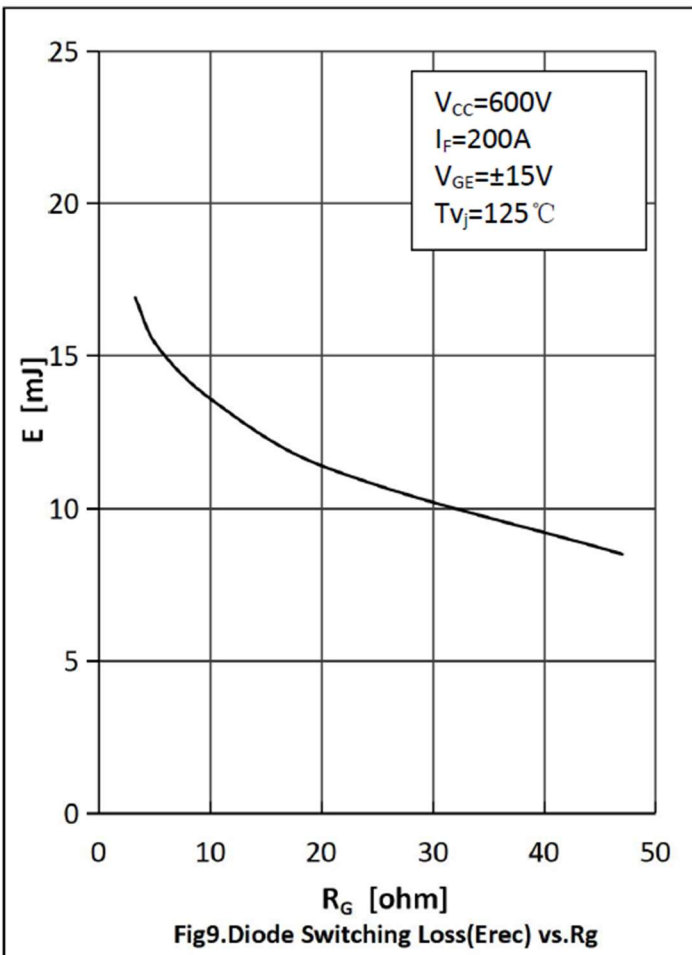
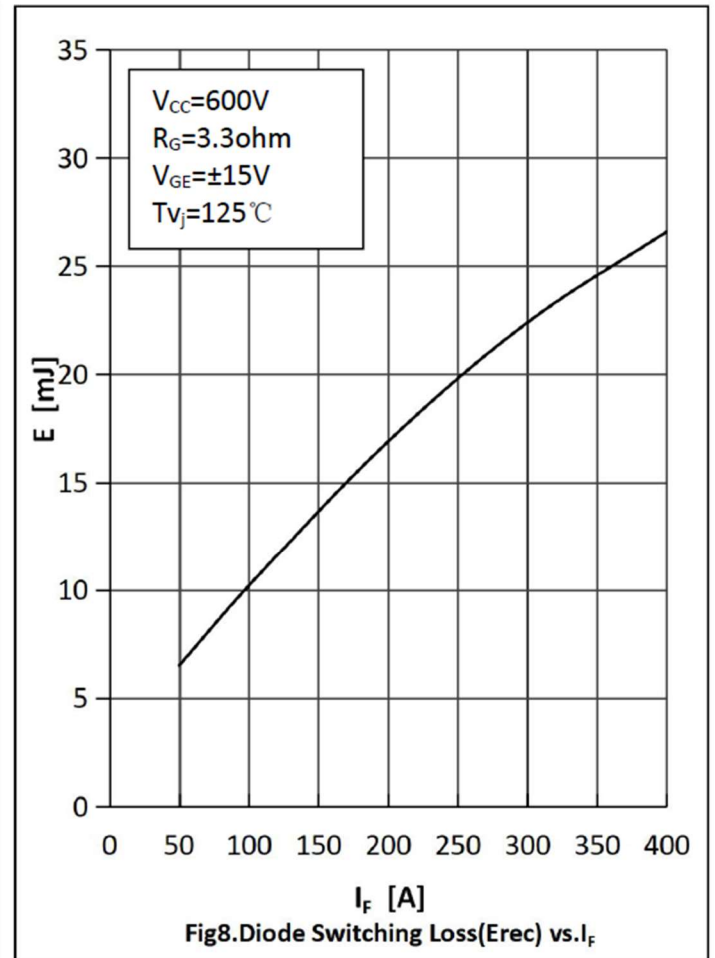
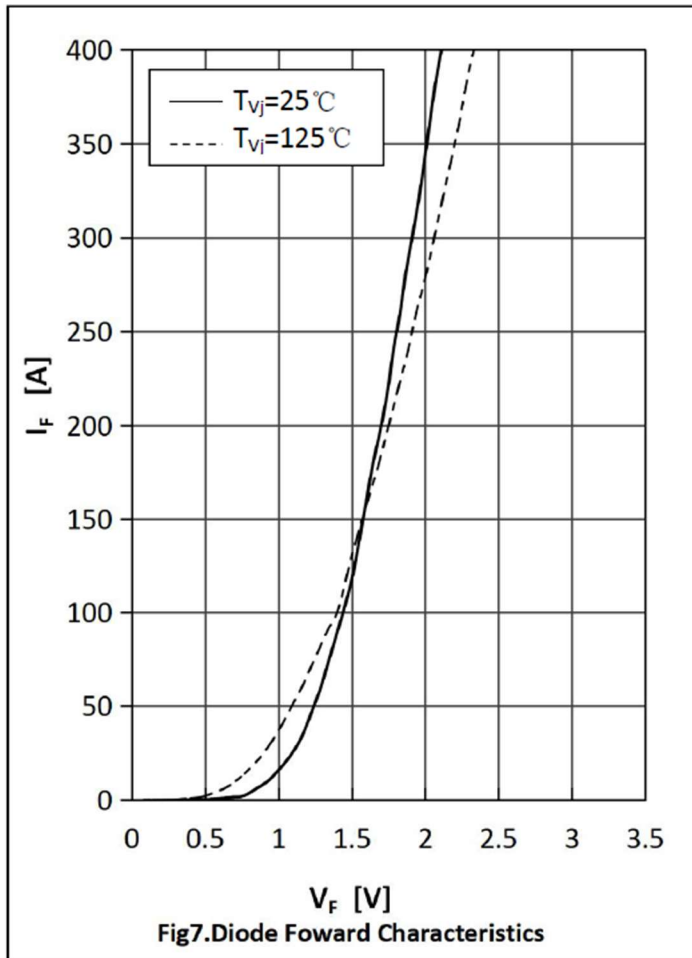
● **Module Characteristics** $T_C=25^{\circ}\text{C}$ unless otherwise specified

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Isolation voltage	V_{isol}	$t=1\text{min}, f=50\text{Hz}$	2500			V
Maximum Junction Temperature	T_{jmax}				150	$^{\circ}\text{C}$
Operating Junction Temperature	T_{vjop}		-40		125	$^{\circ}\text{C}$
Storage Temperature	T_{stg}		-40		125	$^{\circ}\text{C}$
Junction-to Case	$R_{\theta jc}$	per IGBT-inverter			0.092	K/W
		per Diode-inverter			0.140	K/W
Case to Sink	$R_{\theta cs}$	Conductive grease applied		0.046		K/W
Module Electrodes Torque	M_t	Recommended(M5)	2.5		5.0	N·m
Module-to-Sink Torque	M_s	Recommended(M6)	3.0		5.0	N·m
Weight of Module	G			300		g

Performance Curves

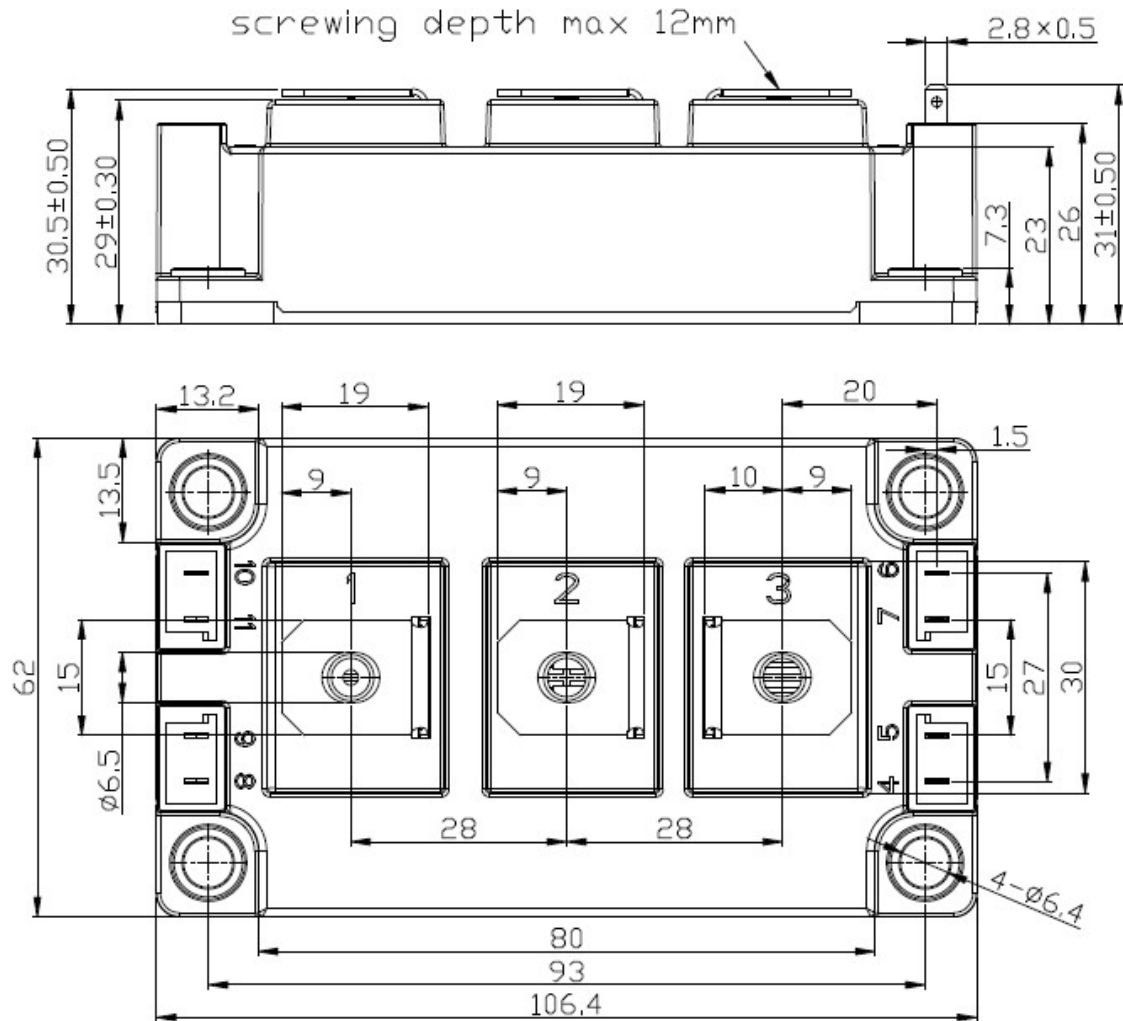






Package Outline Information

CASE: C2



Dimensions in mm