



Key Parameters

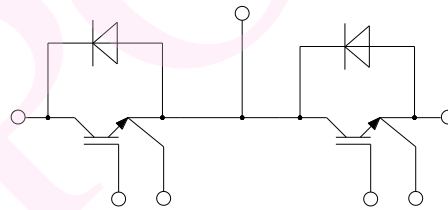
V_{CE} = 1200V
 I_c = 300A

Features

- Low $V_{ce(sat)}$
- Fast switching
- High short circuit capability (10 μ s)
- Low inductance module structure

Applications

- Inverter for motor drive
- AC and DC servo drive amplifier
- UPS
- Soft switching welding machine



Equivalent Circuit Schematic

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Absolute Maximum Ratings							
Symbol	Characteristic	Value	Unit				
V_{CES}	Collector-Emitter Voltage	1200	V				
I_{CDC}	Continuous DC Collector Current ($T_c=100^\circ\text{C}$, $T_j=175^\circ\text{C}$)	300	A				
I_{CRM}	Peak Collector Current ($t_p=1\text{ms}$)	600	A				
V_{GES}	Gate-Emitter Voltage	± 20	V				
P_{tot}	Total Power Dissipation ($T_c=25^\circ\text{C}$, $T_j=175^\circ\text{C}$)	1560	W				
IGBT Characteristics							
Symbol	Characteristic	Conditions	Value			Unit	
			Min.	Typ.	Max.		
BV_{CES}	Collector-Emitter breakdown Voltage	$V_{GE}=0\text{V}$, $I_C=250\mu\text{A}$, $T_{vj}=25^\circ\text{C}$	1200			V	
I_{CES}	Collector-Emitter leakage Current	$V_{CE}=1200\text{V}$, $V_{GE}=0\text{V}$, $T_{vj}=25^\circ\text{C}$			5.0	mA	
I_{GES}	Gate-Emitter leakage Current	$V_{CE}=0\text{V}$, $V_{GE}=\pm 20\text{V}$, $T_{vj}=25^\circ\text{C}$			400	ηA	
$V_{GE(th)}$	Gate-emitter Threshold Voltage	$V_{GE}=V_{CE}$, $I_C=1.5\text{mA}$, $T_{vj}=25^\circ\text{C}$	5.5	6.5	7.5	V	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=300\text{A}$, $V_{GE}=15\text{V}$, $T_{vj}=25^\circ\text{C}$		1.65	2.0	V	
		$I_C=300\text{A}$, $V_{GE}=15\text{V}$, $T_{vj}=125^\circ\text{C}$		2.05		V	
		$I_C=300\text{A}$, $V_{GE}=15\text{V}$, $T_{vj}=150^\circ\text{C}$		2.2			
Q_G	Gate Charge	$V_{CC}=600\text{V}$, $V_{GE}=0/15\text{V}$, $I_C=300\text{A}$, $T_{vj}=25^\circ\text{C}$		1.43		μC	
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=1\text{MHz}$, $T_{vj}=25^\circ\text{C}$		29		ηF	
C_{oes}	Output Capacitance			1.2		ηF	
C_{res}	Reverse Transfer Capacitance			0.3		ηF	
R_{gint}	Internal Gate Resistance			1.3		Ω	
$t_{d(on)}$	Turn-on Delay Time	$I_C=300\text{A}$ $V_{CE}=600\text{V}$ $V_{GE}=\pm 15\text{V}$ $R_G=2.0\Omega$ $T_{vj}=25^\circ\text{C}$, $L_{load}=0.82\text{mH}$ Energy loss include tail and diode reverse recovery		178		ηs	
t_r	Rise Time			90		ηs	
$t_{d(off)}$	Turn-off Delay Time			450		ηs	
t_f	Fall Time			87		ηs	
E_{on}	Energy Dissipation During Turn-on Time			10.22		mJ	
E_{off}	Energy Dissipation During Turn-off Time			14.18		mJ	
$t_{d(on)}$	Turn-on Delay Time		$I_C=300\text{A}$ $V_{CE}=600\text{V}$ $V_{GE}=\pm 15\text{V}$ $R_G=2.0\Omega$ $T_{vj}=150^\circ\text{C}$, $L_{load}=0.82\text{mH}$ Energy loss include tail and diode reverse recovery		215		ηs
t_r	Rise Time				102		ηs
$t_{d(off)}$	Turn-off Delay Time			520		ηs	
t_f	Fall Time			155		ηs	
E_{on}	Energy Dissipation During Turn-on Time			17.0		mJ	
E_{off}	Energy Dissipation During Turn-off Time			21.2		mJ	
I_{sc}	SC Data	$t_{sc}\leq 10\mu\text{s}$, $V_{GE}=15\text{V}$, $T_{vj}=25^\circ\text{C}$, $V_{CC}\leq 600\text{V}$,			1000		A

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Diode Characteristics						
Symbol	Characteristic	Conditions	Value			Unit
			Min.	Typ.	Max.	
I_F	Diode DC Forward Current			300		A
I_{FRM}	Diode Peak Forward Current			600		A
V_F	Forward Voltage	$I_F=300A, T_{vj}=25^{\circ}C$		1.95	2.35	V
		$I_F=300A, T_{vj}=125^{\circ}C$		1.8		
		$I_F=300A, T_{vj}=150^{\circ}C$		1.75		V
Q_{rr}	Recovered Charge	$I_F=300 A$		14		μC
I_{rr}	Peak Reverse Recovery Current	$V_R=600V$		275		A
E_{rec}	Reverse Recovery Energy	$-di_F/dt = 2630A/\mu s$ $T_{vj}=25^{\circ}C$		5.4		mJ

Module Characteristics						
Symbol	Characteristic	Conditions	Value			Unit
			Min.	Typ.	Max.	
V_{isol}	Isolation voltage	$t=1min, f=50Hz$	2500			V
T_{jmax}	Maximum Junction Temperature				175	$^{\circ}C$
$T_{vj op}$	Operating Junction Temperature		-40		150	$^{\circ}C$
T_{stg}	Storage Temperature		-40		125	$^{\circ}C$
$R_{CC+EE'}$	Module lead resistance terminal to chip			0.70		$m\Omega$
L_{SCE}	Stray Inductance, Module			20		nH
$R_{\theta jc}$	Junction-to Case	per IGBT-inverter		0.12		$^{\circ}C/W$
		per Diode-inverter		0.15		$^{\circ}C/W$
$R_{\theta cs}$	Case to Sink	per IGBT-inverter		0.032		$^{\circ}C/W$
		per Diode-inverter		0.05		$^{\circ}C/W$
		Conductive grease applied		0.01		K/W
M_t	Module Electrodes Torque	Recommended(M6)	2.5		5.0	N·m
M_s	Module-to-Sink Torque	Recommended(M6)	3.0		6.0	N·m
G	Weight of Module			320		g

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• Typical Electrical Characteristics

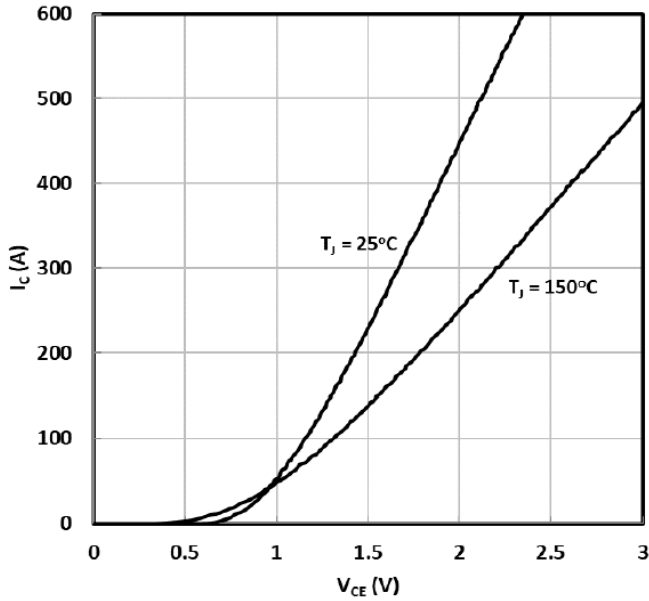


Fig. 1 IGBT (Inverter) Output Characteristics

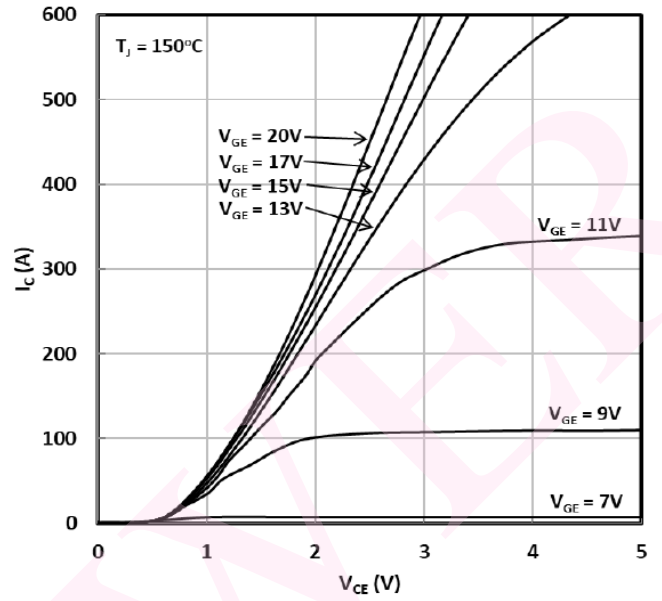


Fig. 2 IGBT (Inverter) Output Characteristics

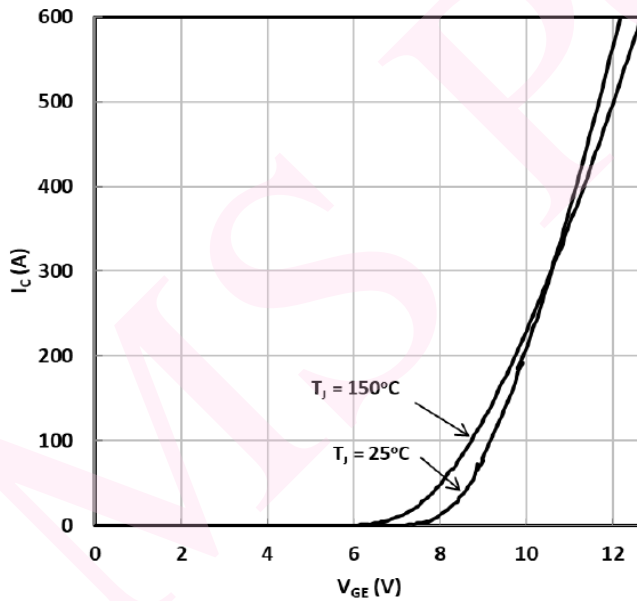


Fig. 3 IGBT (Inverter) Transfer Characteristics

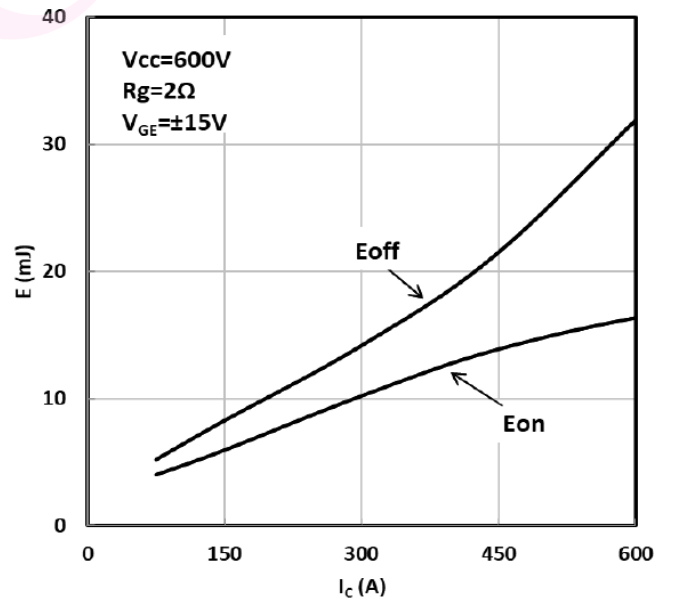


Fig. 4 IGBT (Inverter) Switching Loss vs. Ic

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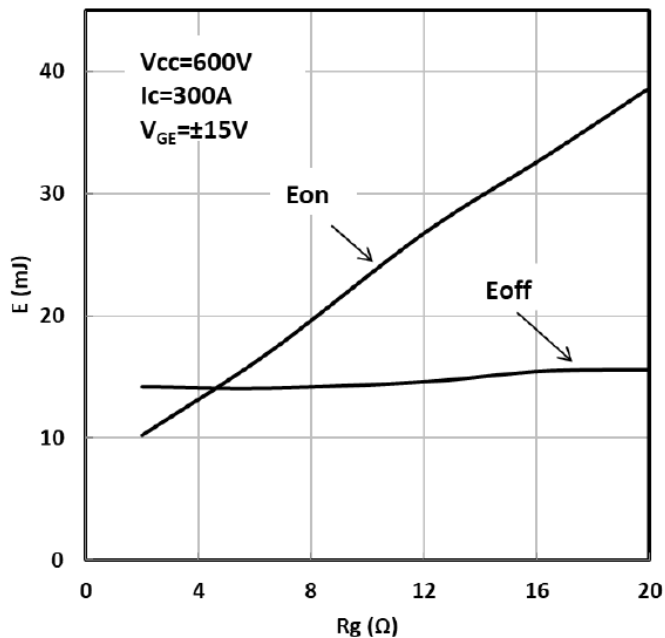


Fig. 5 IGBT (Inverter) Switching Loss vs. Rg

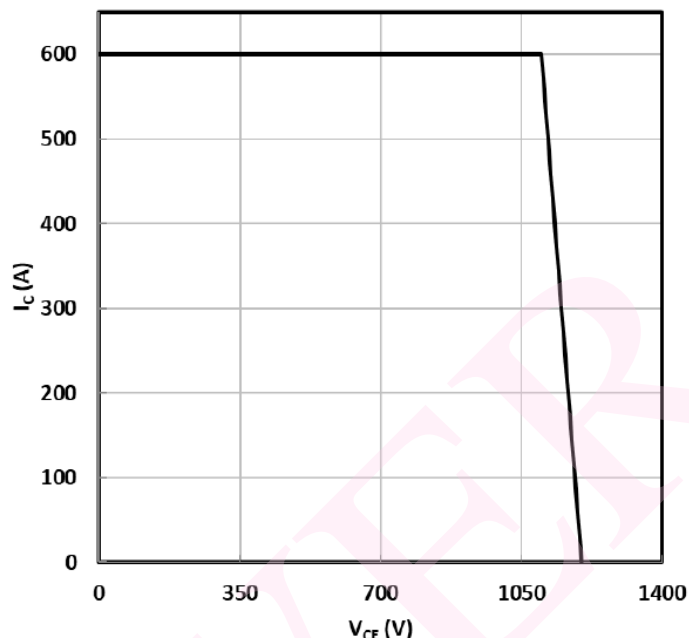


Fig. 6 RBSOA

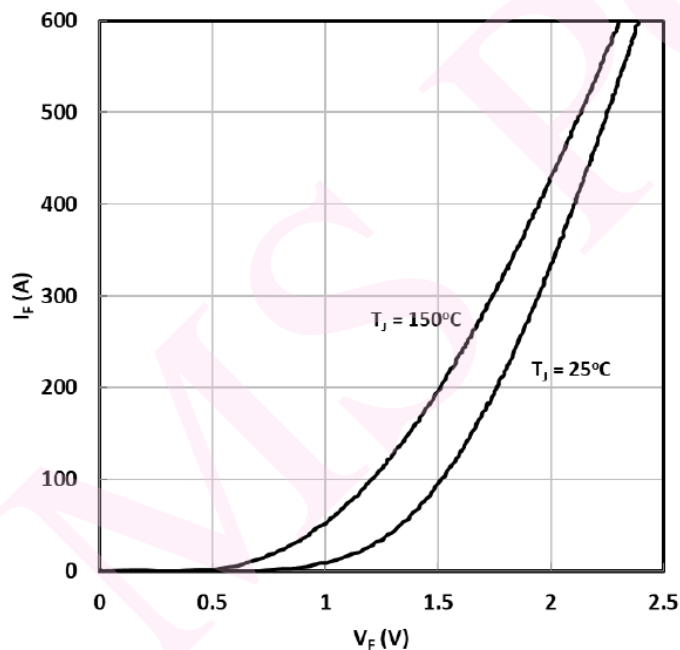
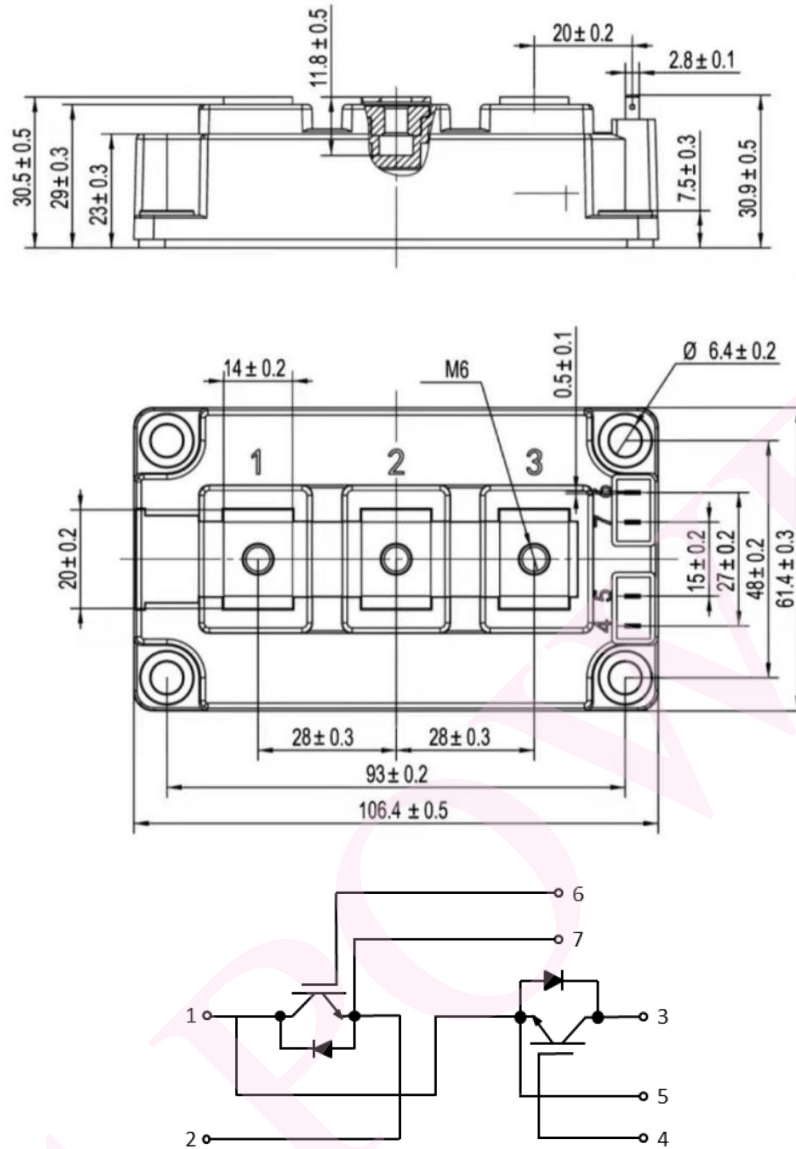


Fig. 7 Diode (Inverter) Forward Characteristics

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