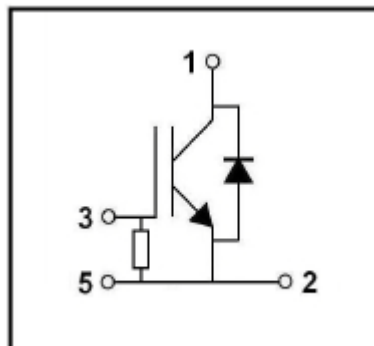


FEATURES

- High short circuit capability, self limiting short circuit current
- IGBT CHIP (T4 Fast Trench+Field Stop technology)
- $V_{CE(sat)}$ with positive temperature coefficient
- Free wheeling diodes with fast and soft reverse recovery
- Low switching losses
- 5K Ω Gate Protected Resistance Inside



APPLICATIONS

- Inverter
- Converter
- Welder
- SMPS and UPS
- Induction Heating

ABSOLUTE MAXIMUM RATINGS

$T_c=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Test Conditions	Values	Unit
IGBT				
V_{CES}	Collector - Emitter Voltage		1200	V
V_{GES}	Gate - Emitter Voltage		± 20	V
I_c	DC Collector Current	$T_c=25^\circ\text{C}$	600	A
		$T_c=80^\circ\text{C}$	400	A
I_{Cpuls}	Pulsed Collector Current	$T_c=25^\circ\text{C}$, $t_p=1\text{ms}$	1200	A
		$T_c=80^\circ\text{C}$, $t_p=1\text{ms}$	800	A
P_{tot}	Power Dissipation Per IGBT		2000	W
T_J	Junction Temperature Range		-40 to +175	$^\circ\text{C}$
T_{STG}	Storage Temperature Range		-40 to +125	$^\circ\text{C}$
V_{isol}	Insulation Test Voltage	AC, $t=1\text{min}$	3000	V
Free-Wheeling Diode				
V_{RRM}	Repetitive Reverse Voltage		1200	V
$I_{F(AV)}$	Average Forward Current	$T_c=25^\circ\text{C}$	600	A
		$T_c=80^\circ\text{C}$	400	A
I_{FRM}	Repetitive Peak Forward Current	$t_p=1\text{ms}$	800	A
I_{FSM}	Non-Repetitive Surge Forward Current	$T_vj=45^\circ\text{C}$, $t=10\text{ms}$, Sine	2500	A
		$T_vj=45^\circ\text{C}$, $t=8.3\text{ms}$, Sine	2800	A

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ELECTRICAL CHARACTERISTICS

T_c=25°C unless otherwise specified

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
IGBT						
V _{GE(th)}	Gate - Emitter Threshold Voltage	V _{CE} =V _{GE} , I _C =16mA	5.4	6	6.5	V
V _{CE(sat)}	Collector - Emitter Saturation Voltage	I _C =400A, V _{GE} =15V, T _{vj} =125°C		2.1	2.5	V
		I _C =400A, V _{GE} =15V, T _{vj} =125°C		2.5		V
I _{CES}	Collector Leakage Current	V _{CE} =1200V, V _{GE} =0V, T _{vj} =25°C			5	mA
I _{GES}	Gate Leakage Current	V _{CE} =0V, V _{GE} =± 20V	-400		400	nA
R _{Gint}	Integrated Gate Resistor			1.9		Ω
Q _g	Gate Charge	V _{CC} =600V, I _C =400A, V _{GE} =15V		1.9		μC
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f =1MHz		25		nF
C _{res}	Reverse Transfer Capacitance				1.4	
t _{d(on)}	Turn - on Delay Time	V _{CC} =600V, I _C =400A R _G =1.8 Ω, V _{GE} =± 15V T _{vj} =25°C Inductive Load		170		ns
t _r	Rise Time			75		ns
t _{d(off)}	Turn - off Delay Time			450		ns
t _f	Fall Time			45		ns
t _{d(on)}	Turn - on Delay Time	V _{CC} =600V, I _C =400A R _G =1.8 Ω, V _{GE} =± 15V T _{vj} =125°C Inductive Load		180		ns
t _r	Rise Time			85		ns
t _{d(off)}	Turn - off Delay Time			500		ns
t _f	Fall Time			65		ns
E _{on}	Turn - on Switching Energy	V _{CC} =600V, I _C =400A T _{vj} =25°C		36		mJ
		R _G =1.8 Ω T _{vj} =125°C		52		mJ
E _{off}	Turn - off Switching Energy	V _{GE} =± 15V T _{vj} =25°C		17		mJ
		Inductive Load T _{vj} =125°C		22		mJ
Free-Wheeling Diode						
V _F	Forward Voltage	I _F =400A, V _{GE} =0V, T _{vj} =25°C		1.65		V
		I _F =400A, V _{GE} =0V, T _{vj} =125°C		1.65		V
t _{rr}	Reverse Recovery Time	I _F =400A, V _R =600V		500		ns
I _{RRM}	Max. Reverse Recovery Current	di _F /dt=-4000A/μs		290		A
E _{rec}	Reverse Recovery Energy	T _{vj} =125°C		31		mJ

THERMAL AND MECHANICAL CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
R _{thJC}	Junction-to-Case Thermal Resistance	Per IGBT			0.075	K /W
R _{thJD}	Junction-to-Case Thermal Resistance	Per Inverse Diode			0.12	K /W
Torque	Module-to-Sink	Recommended (M6)	3		5	N · m
Torque	Module Electrodes	Recommended (M6)	2.5		5	N · m
Torque	Module Electrodes	Recommended (M4)	0.7		1.1	N · m
Weight				325		g

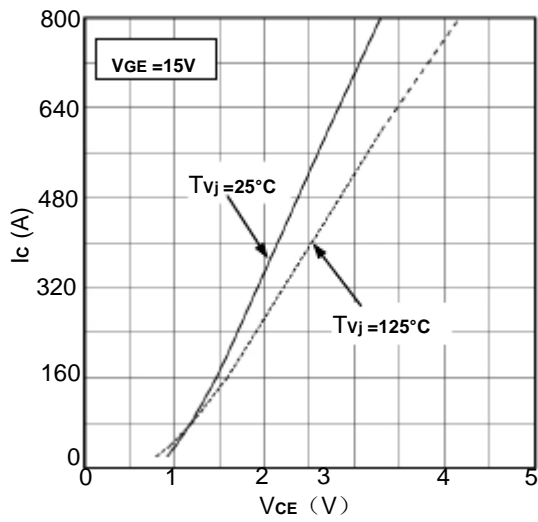


Figure1. Typical Output Characteristics

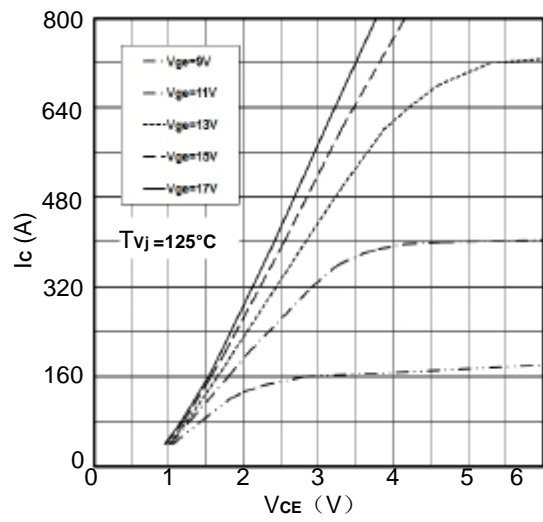


Figure2. Typical Output Characteristics

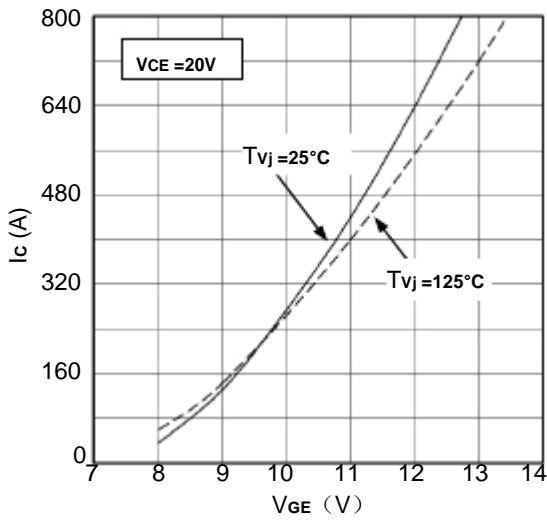


Figure3. Typical Transfer characteristics

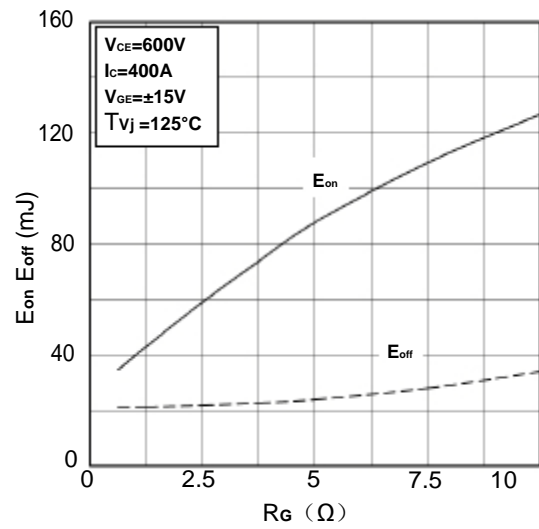


Figure4. Switching Energy vs. Gate Resistor

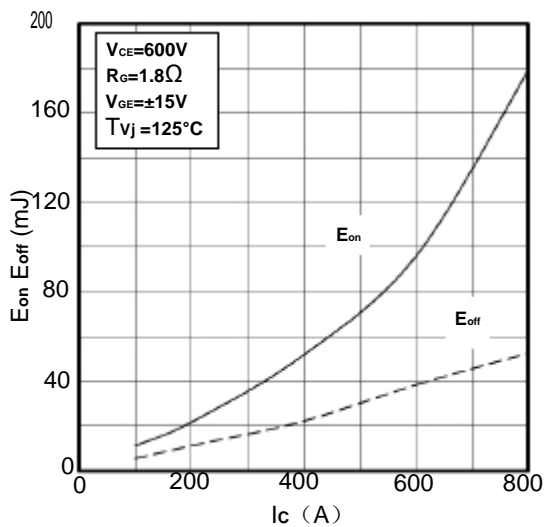


Figure5. Switching Energy vs. Collector Current

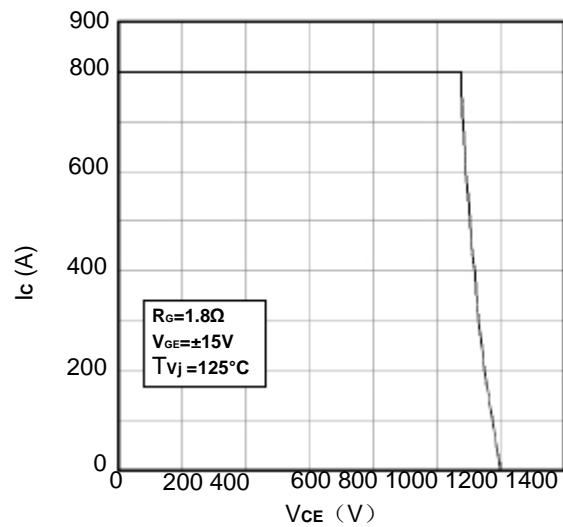


Figure6. Reverse Biased Safe Operating Area

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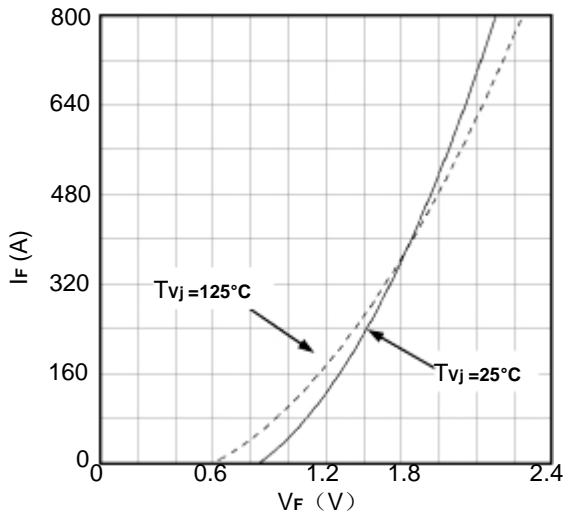


Figure7. Diode Forward Characteristics

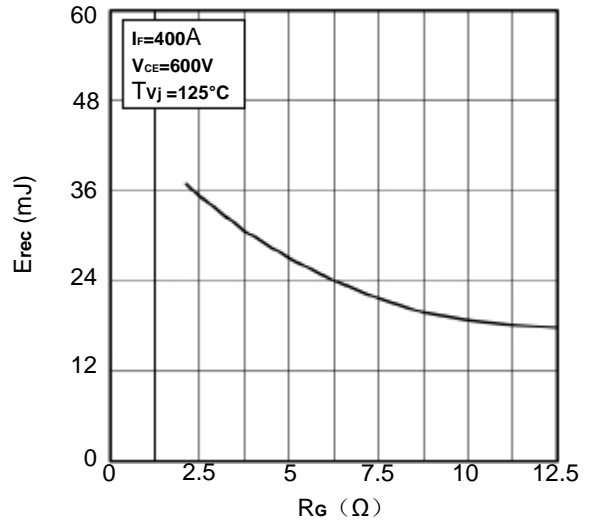


Figure8. Switching Energy vs. Gate Resistor

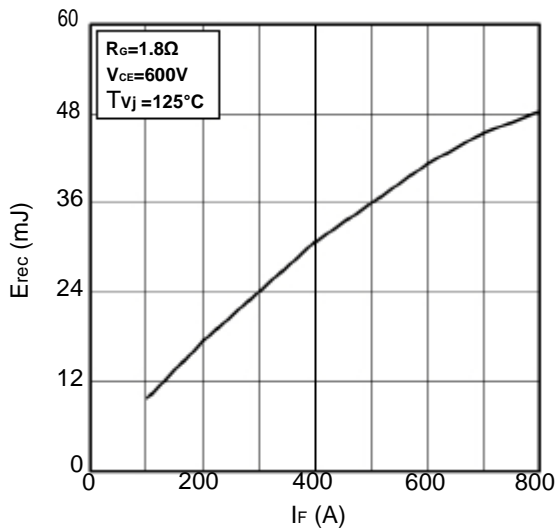


Figure9. Switching Energy vs. Forward Current

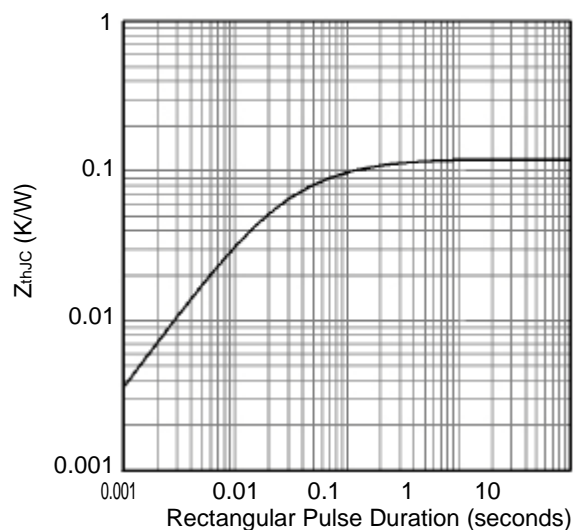


Figure10. Transient Thermal Impedance of Diode

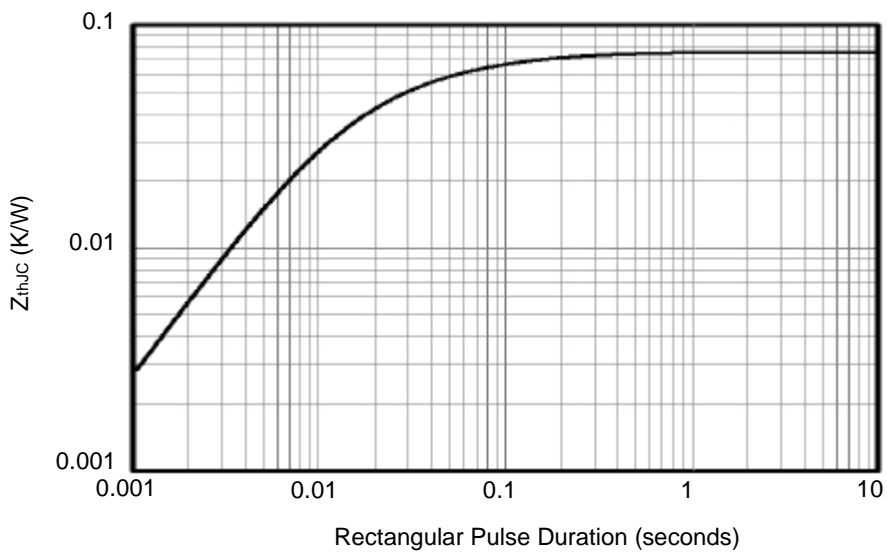


Figure11. Transient Thermal Impedance of IGBT

