

FEATURES

- Ultra Low Loss
- High Ruggedness
- High Short Circuit Capability
- Positive Temperature Coefficient
- With Fast Free-Wheeling Diodes

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	$T_C=25^{\circ}\text{C}$	105	A
		$T_C=80^{\circ}\text{C}$	75	A
I_{Cpuls}	Pulsed Collector Current	$T_C=25^{\circ}\text{C}$, $t_p=1\text{ms}$	210	A
		$T_C=80^{\circ}\text{C}$, $t_p=1\text{ms}$	150	A
P_{tot}	Power Dissipation Per IGBT		630	W
T_J	Junction Temperature Range		-40 to +150	$^{\circ}\text{C}$
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	$T_C=25^{\circ}\text{C}$	90	A
		$T_C=80^{\circ}\text{C}$	60	A
$I_{F(RMS)}$	RMS Forward Current		90	A
I_{FSM}	Non-Repetitive Surge	$T_J=45^{\circ}\text{C}$, $t=10\text{ms}$, Sine	430	A
	Forward Current	$T_J=45^{\circ}\text{C}$, $t=8.3\text{ms}$, Sine	450	A

ELECTRICAL CHARACTERISTICS

 $T_C=25^{\circ}\text{C}$ 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 =3mA	5	6.2	7	V
V _{CE(sat)}	Collector - Emitter Saturation Voltage	I _C =75A, V _{GE} =15V, T _J =25°C		1.8		V
		I _C =75A, V _{GE} =15V, T _J =125°C		2.0		V
I _{CES}	Collector Leakage Current	V _{CE} =1200V, V _{GE} =0V, T _J =25°C		0.2	0.5	mA
		V _{CE} =1200V, V _{GE} =0V, T _J =125°C		2		mA
I _{GES}	Gate Leakage Current	V _{CE} =0V, V _{GE} =± 20V	-100		100	nA
Q _{ge}	Gate Charge	V _{CC} =600V, I _C =75A, V _{GE} =± 15V		780		nC
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f =1MHz		5.52		nF
C _{oes}	Output Capacitance			0.4		nF
C _{res}	Reverse Transfer Capacitance			0.26		nF
t _{d(on)}	Turn - on Delay Time	V _{CC} =600V, I _C =75A R _G =15 Ω , V _{GE} =± 15V T _J =25°C Inductive Load		150		ns
t _r	Rise Time			65		ns
t _{d(off)}	Turn - off Delay Time			440		ns
t _f	Fall Time			55		ns
t _{d(on)}	Turn - on Delay Time	V _{CC} =600V, I _C =75A R _G =15 Ω , V _{GE} =± 15V T _J =125°C Inductive Load		160		ns
t _r	Rise Time			65		ns
t _{d(off)}	Turn - off Delay Time			500		ns
t _f	Fall Time			70		ns
E _{on}	Turn - on Switching Energy	V _{CC} =600V, I _C =75A T _J =25°C		7.45		mJ
		R _G =15 Ω T _J =125°C		10.3		mJ
E _{off}	Turn - off Switching Energy	V _{GE} =± 15V T _J =25°C		4.9		mJ
		Inductive Load T _J =125°C		7.8		mJ
Free-Wheeling Diode						
V _F	Forward Voltage	I _F =75A, V _{GE} =0V, T _J =25°C		2.0	2.48	V
		I _F =75A, V _{GE} =0V, T _J =125°C		1.7	2.20	V
t _{rr}	Reverse Recovery Time	I _F =75A, V _R =800V di _F /dt=-1000A/μs T _J =125°C		200		ns
I _{RRM}	Max. Reverse Recovery Current			70		A
Q _{rr}	Reverse Recovery Charge			8.2		μC

THERMAL AND MECHANICAL CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
R_{thJC}	Junction-to-Case Thermal Resistance	Per IGBT			0.2	K / W
R_{thJCD}	Junction-to-Case Thermal Resistance	Per Inverse Diode			0.5	K / W
Torque	Module-to-Sink	Recommended (M6)	3		5	N · m
Torque	Module Electrodes	Recommended (M5)	2.5		5	N · m
Weight				150		g

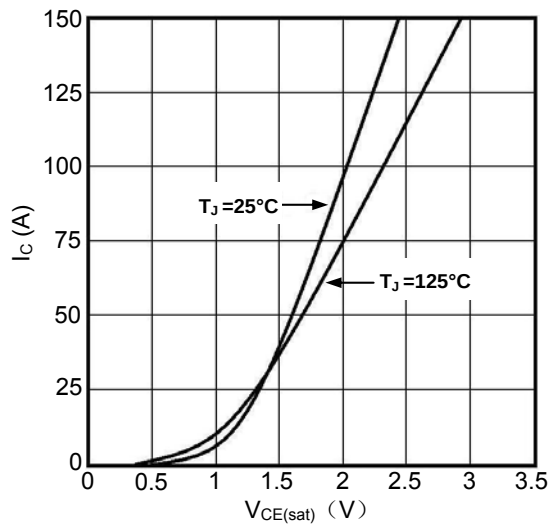


Figure1. Typical Output characteristics

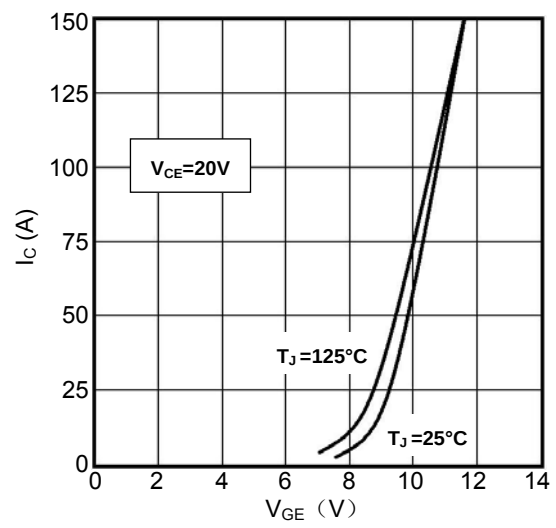


Figure2. Typical Transfer characteristics

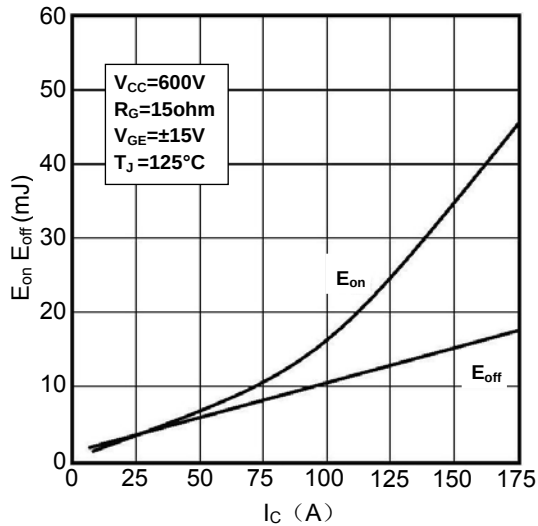


Figure3. Switching Energy vs. Collector Current

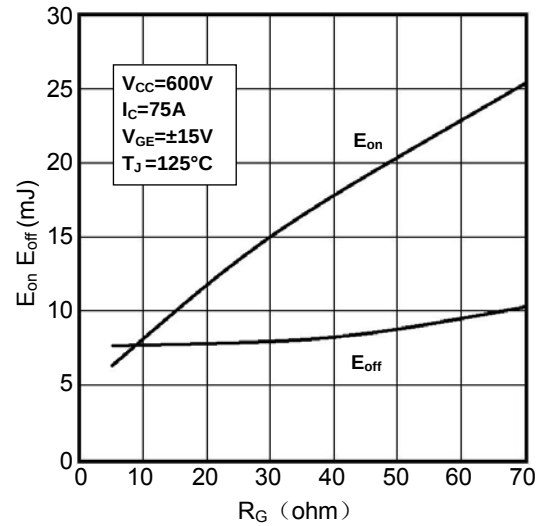


Figure4. Switching Energy vs. Gate Resistor

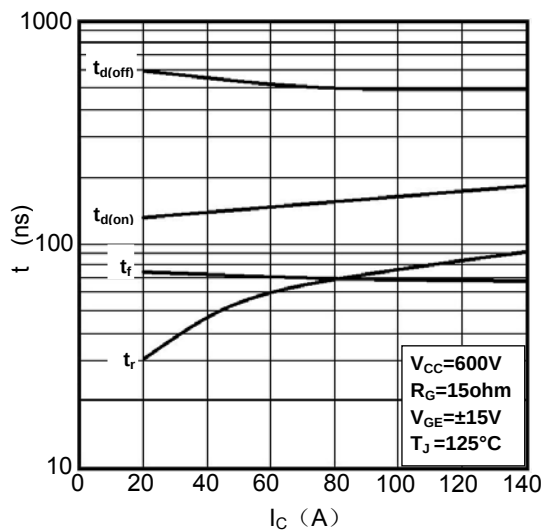


Figure5. Switching Times vs. Collector Current

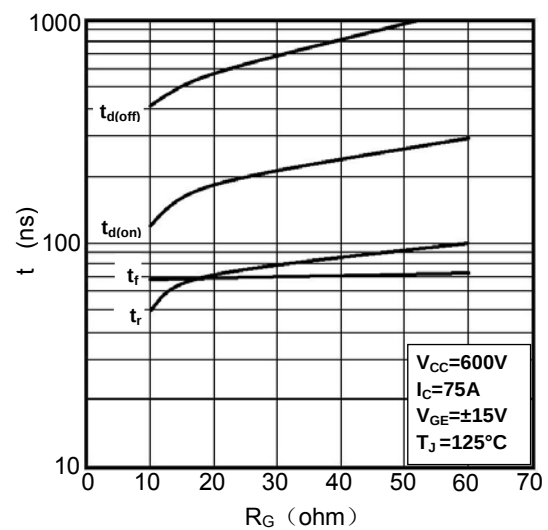


Figure6. Switching Times vs. Gate Resistor

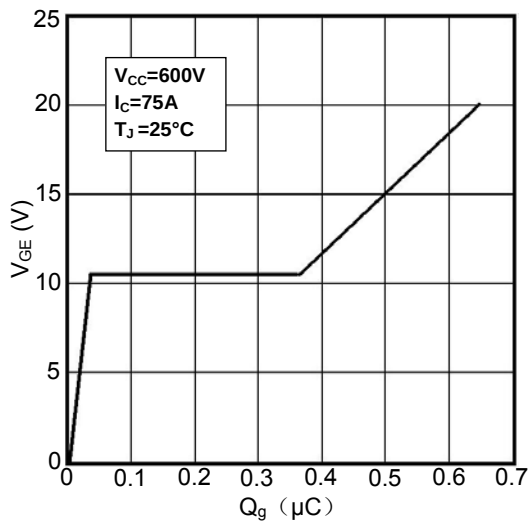


Figure7. Gate Charge characteristics

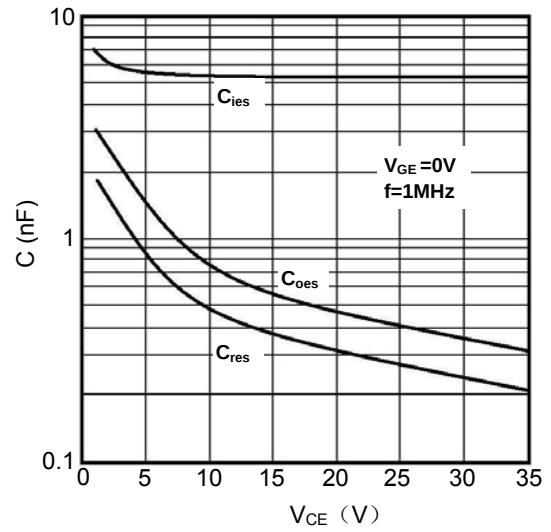


Figure8. Typical Capacitances vs. V_{CE}

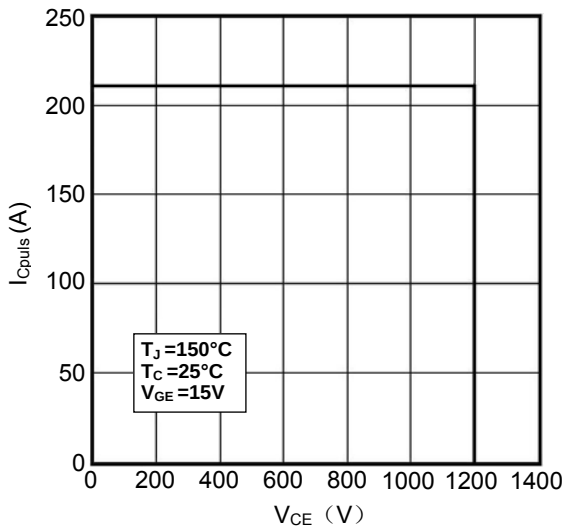


Figure9. Reverse Biased Safe Operating Area

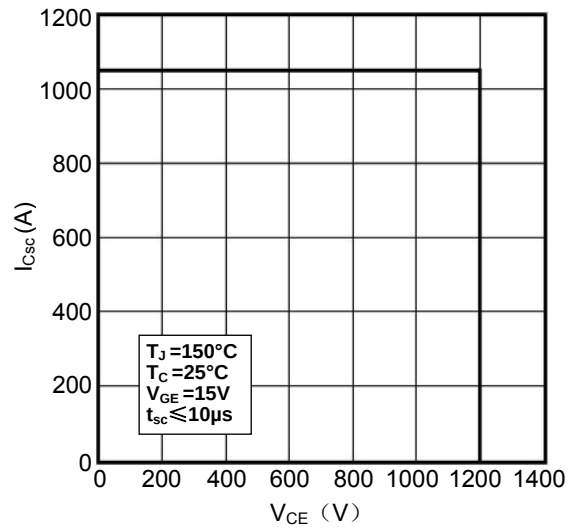


Figure10. Short Circuit Safe Operating Area

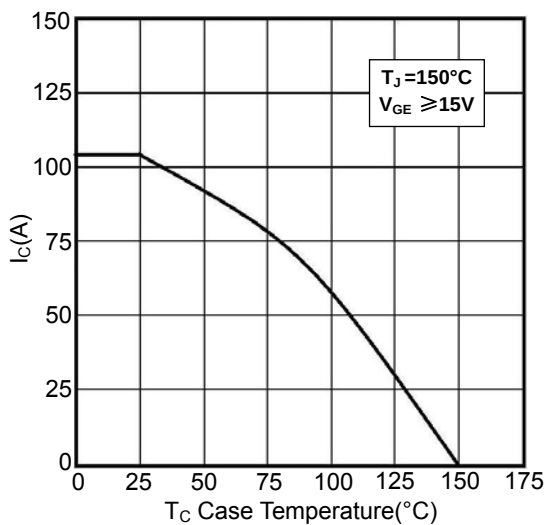


Figure11. Rated Current vs. T_C

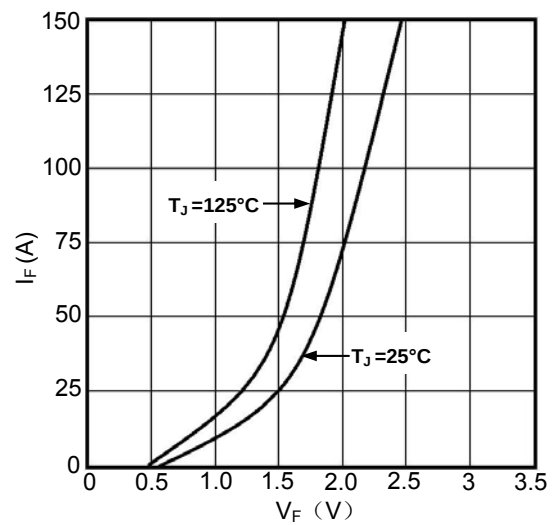
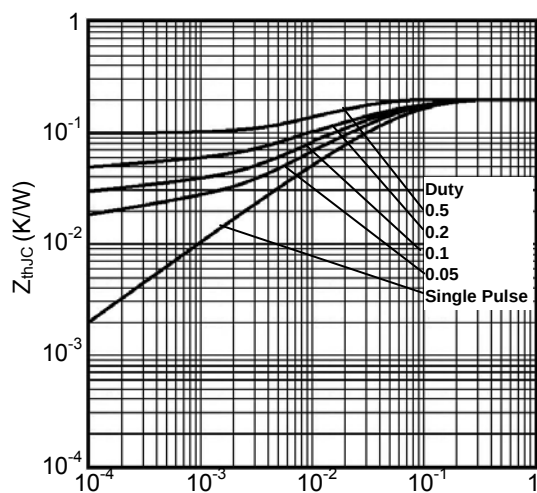
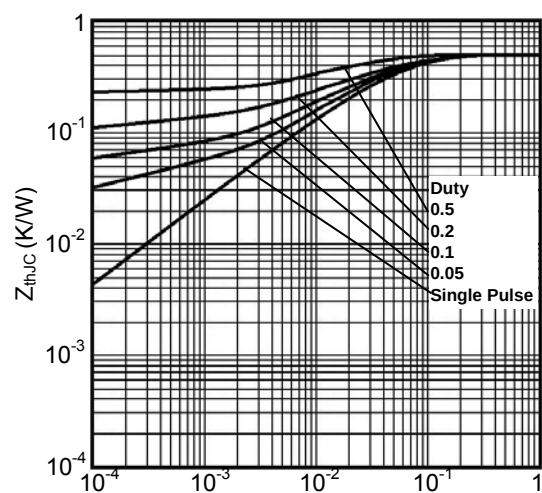


Figure12. Diode Forward Characteristics



Rectangular Pulse Duration (seconds)

Figure13. Transient Thermal Impedance of IGBT



Rectangular Pulse Duration (seconds)

Figure14. Transient Thermal Impedance of Diode

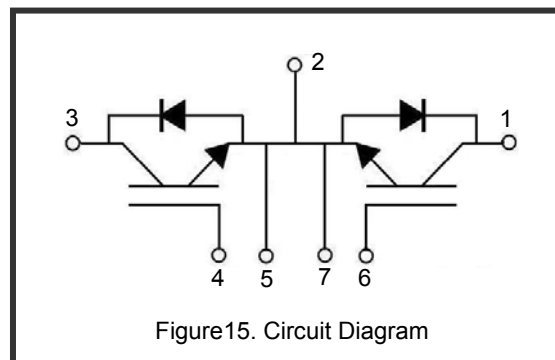
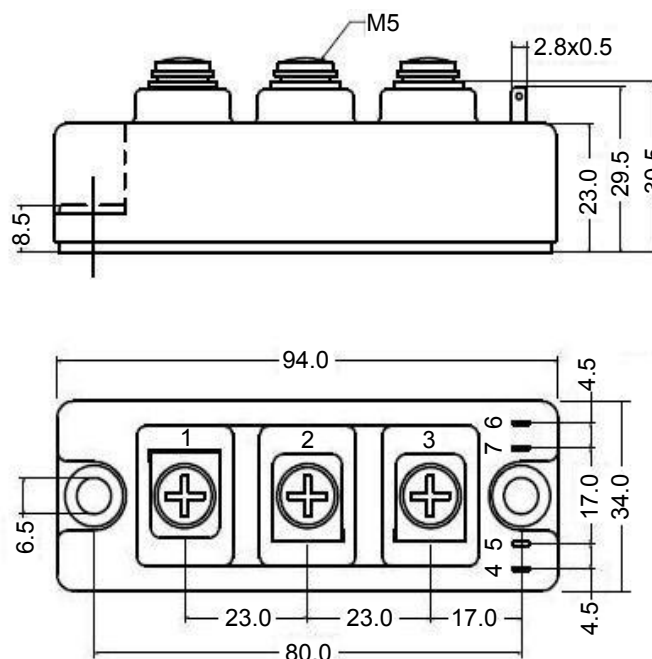


Figure15. Circuit Diagram



Dimensions in mm
Figure16. Package Outlines