

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		600	V
V_{GES}	Gate - Emitter Voltage		± 20	V
I_C	DC Collector Current	$T_C=25^{\circ}\text{C}$	300	A
		$T_C=80^{\circ}\text{C}$	210	A
I_{Cpuls}	Pulsed Collector Current	$T_C=25^{\circ}\text{C}$, $t_p=1\text{ms}$	600	A
		$T_C=80^{\circ}\text{C}$, $t_p=1\text{ms}$	420	A
P_{tot}	Power Dissipation Per IGBT		1100	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		600	V
$I_{F(AV)}$	Average Forward Current	$T_C=25^{\circ}\text{C}$	250	A
		$T_C=80^{\circ}\text{C}$	170	A
$I_{F(RMS)}$	RMS Forward Current		250	A
I_{FSM}	Non-Repetitive Surge	$T_J=45^{\circ}\text{C}$, $t=10\text{ms}$, Sine	1000	A
	Forward Current	$T_J=45^{\circ}\text{C}$, $t=8.3\text{ms}$, Sine	1090	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 =500μA	3.5		5.5	V
V _{CE(sat)}	Collector - Emitter Saturation Voltage	I _C =200A, V _{GE} =15V, T _J =25°C		1.9		V
		I _C =200A, V _{GE} =15V, T _J =125°C		2.1		V
I _{CES}	Collector Leakage Current	V _{CE} =600V, V _{GE} =0V, T _J =25°C			1	mA
		V _{CE} =600V, V _{GE} =0V, T _J =125°C		6		mA
I _{GES}	Gate Leakage Current	V _{CE} =0V, V _{GE} =± 20V	-2		2	μA
Q _{ge}	Gate Charge	V _{CC} =300V, I _C =200A , V _{GE} = ± 15V		460		nC
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f =1MHz		10.6		nF
C _{oes}	Output Capacitance			1.04		nF
C _{res}	Reverse Transfer Capacitance			0.68		nF
t _{d(on)}	Turn - on Delay Time	V _{CC} =300V, I _C =200A R _G =5 Ω , V _{GE} = ± 15V T _J =25°C Inductive Load		45		ns
t _r	Rise Time			45		ns
t _{d(off)}	Turn - off Delay Time			320		ns
t _f	Fall Time			35		ns
t _{d(on)}	Turn - on Delay Time	V _{CC} =300V, I _C =200A R _G =5 Ω , V _{GE} = ± 15V T _J =125°C Inductive Load		50		ns
t _r	Rise Time			45		ns
t _{d(off)}	Turn - off Delay Time			350		ns
t _f	Fall Time			40		ns
E _{on}	Turn - on Switching Energy	V _{CC} =300V, I _C =200A T _J =25°C		7		mJ
		R _G =5 Ω T _J =125°C		9		mJ
E _{off}	Turn - off Switching Energy	V _{GE} = ± 15V T _J =25°C		5		mJ
		Inductive Load T _J =125°C		7		mJ
Free-Wheeling Diode						
V _F	Forward Voltage	I _F =200A , V _{GE} =0V, T _J =25°C		1.9	2.2	V
		I _F =200A , V _{GE} =0V, T _J =125°C		1.7	2.0	V
t _{rr}	Reverse Recovery Time	I _F =200A , V _R =400V di _F /dt=-1000A/μs T _J =125°C		70		ns
I _{RRM}	Max. Reverse Recovery Current			55		A
Q _{rr}	Reverse Recovery Charge			3		μC

THERMAL AND MECHANICAL CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
R_{thJC}	Junction-to-Case Thermal Resistance	Per IGBT			0.1	K /W
R_{thJCD}	Junction-to-Case Thermal Resistance	Per Inverse Diode			0.25	K /W
Torque	Module-to-Sink	Recommended (M6)	3		5	N· m
Torque	Module Electrodes	Recommended (M5)	2.5		5	N· m
Weight				285		g

MIMMG200DR060UZK

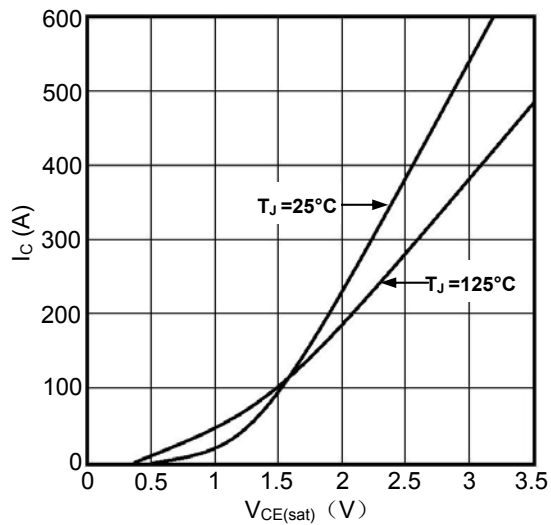


Figure1. Typical Output characteristics

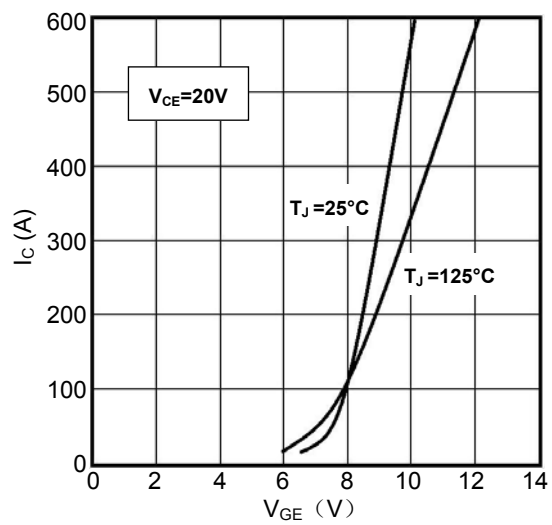


Figure2. Typical Transfer characteristics

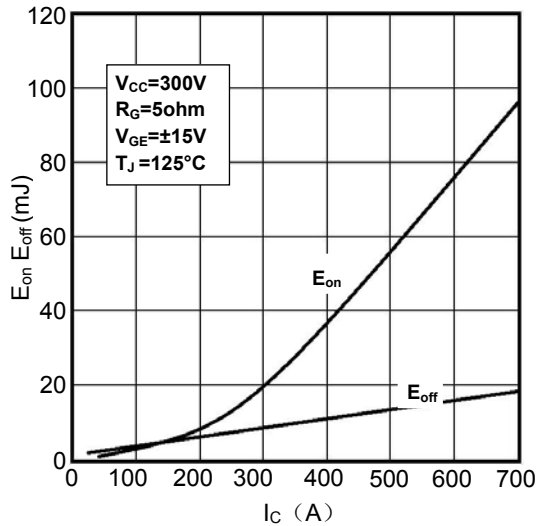


Figure3. Switching Energy vs. Collector Current

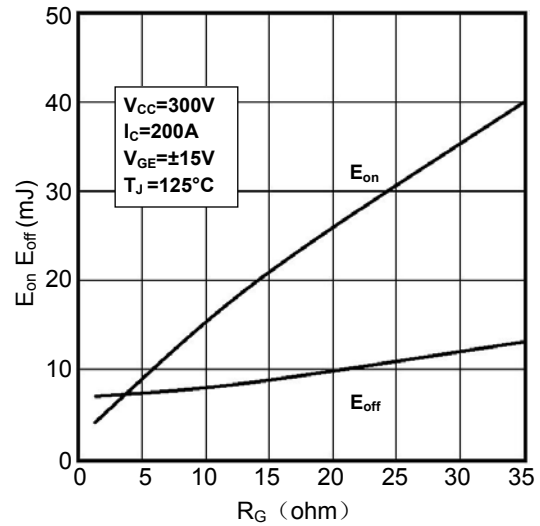


Figure4. Switching Energy vs. Gate Resistor

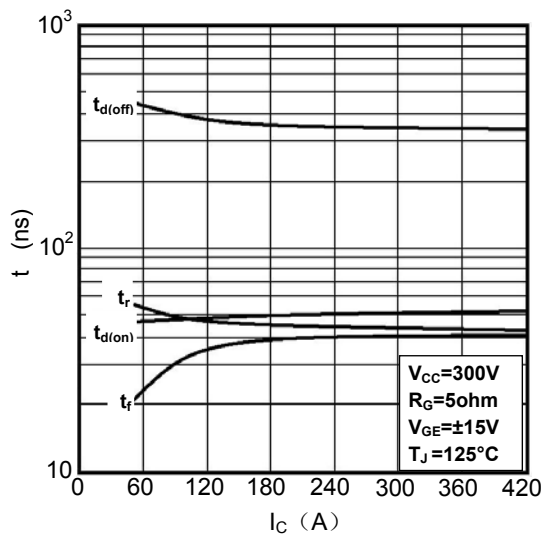


Figure5. Switching Times vs. Collector Current

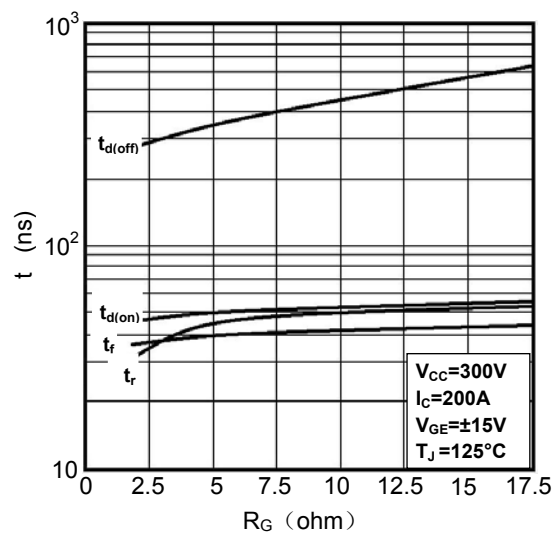


Figure6. Switching Times vs. Gate Resistor

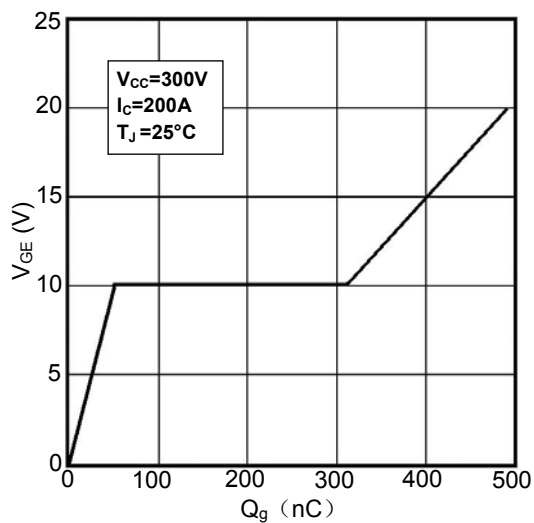


Figure7. Gate Charge characteristics

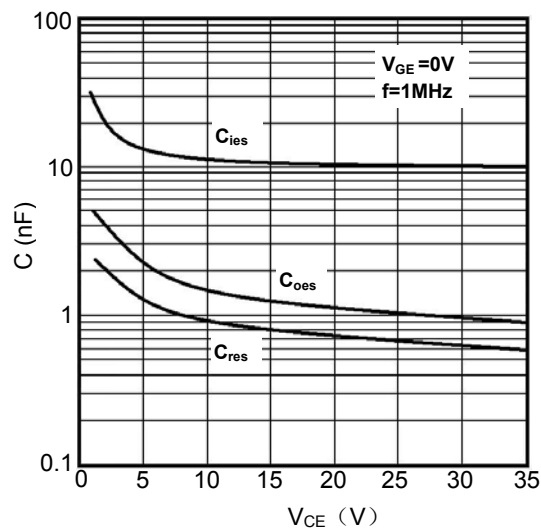


Figure8. Typical Capacitances vs. V_{CE}

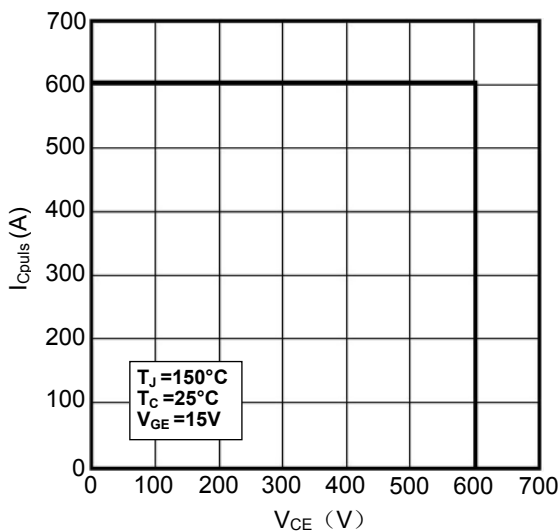


Figure9. Reverse Biased Safe Operating Area

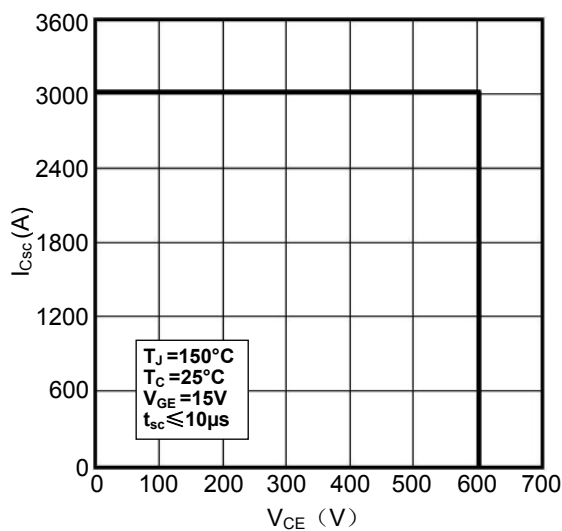


Figure10. Short Circuit Safe Operating Area

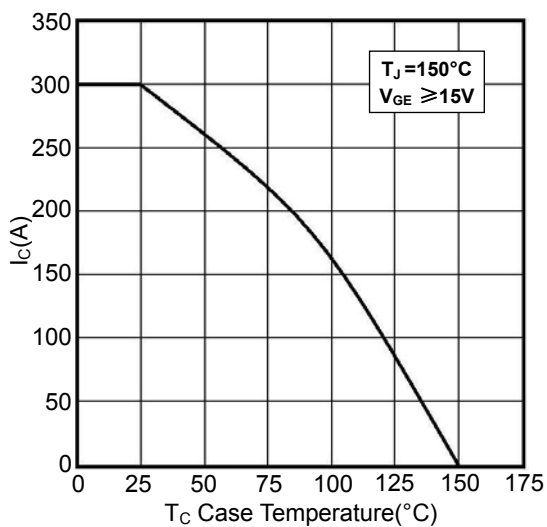


Figure11. Rated Current vs. T_C

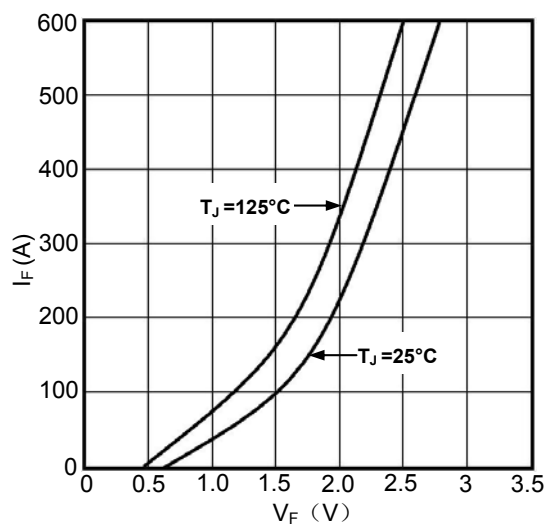
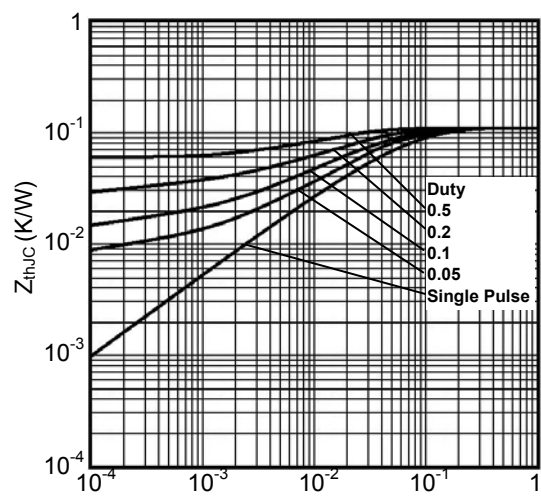
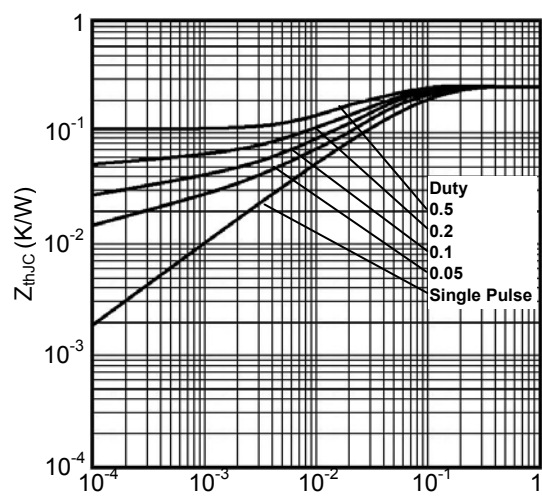


Figure12. Diode Forward Characteristics



Rectangular Pulse Duration (seconds)
Figure13. Transient Thermal Impedance of IGBT



Rectangular Pulse Duration (seconds)
Figure14. Transient Thermal Impedance of Diode

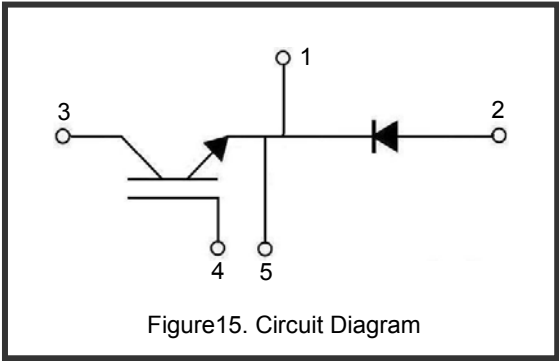


Figure15. Circuit Diagram

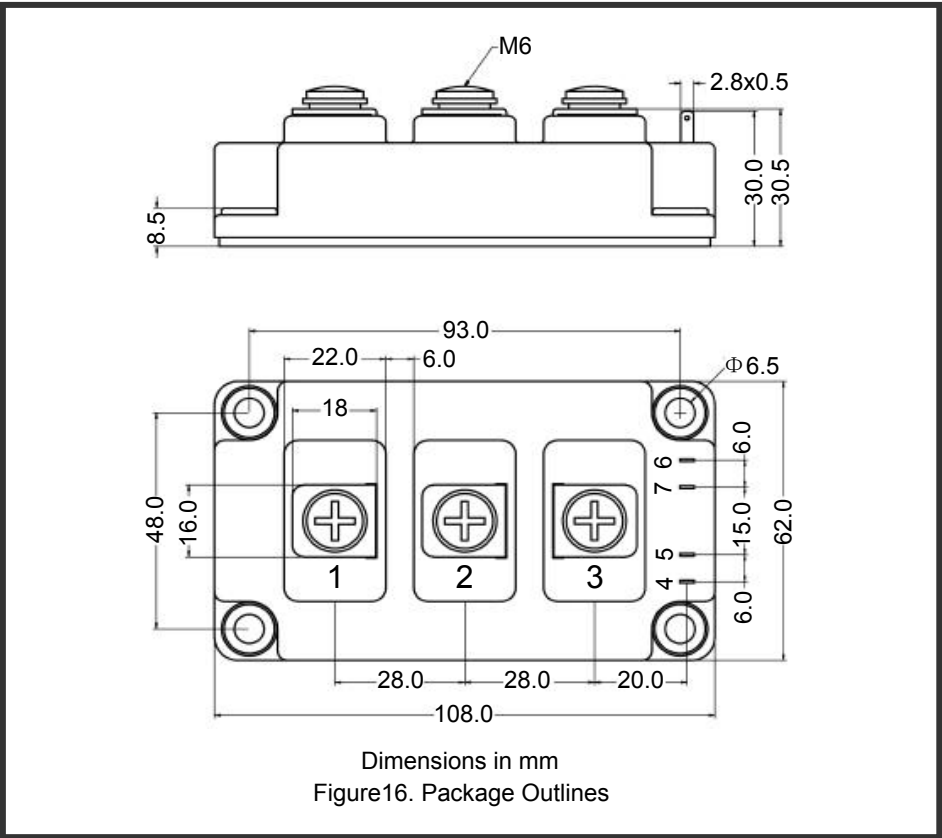


Figure16. Package Outlines