

PRODUCT FEATURES

- IGBT CHIP(Trench+Field Stop technology)
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability
- Fast switching and short tail current
- Free wheeling diodes with fast and soft reverse recovery
- Low switching losses



APPLICATIONS

- High frequency switching application
- Medical applications
- Motion/servo control
- UPS systems

IGBT

ABSOLUTE MAXIMUM RATINGS($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Values	Unit
V_{CES}	Collector Emitter Voltage	$T_J=25^{\circ}\text{C}$	1200	V
V_{GES}	Gate Emitter Voltage		± 20	
I_C	DC Collector Current	$T_C=25^{\circ}\text{C}, T_{Jmax}=175^{\circ}\text{C}$	300	A
		$T_C=100^{\circ}\text{C}, T_{Jmax}=175^{\circ}\text{C}$	200	
I_{CM}	Repetitive Peak Collector Current	$tp=1\text{ms}$	400	
P_{tot}	Power Dissipation Per IGBT	$T_C=25^{\circ}\text{C}, T_{Jmax}=175^{\circ}\text{C}$	1071	W

Diode

ABSOLUTE MAXIMUM RATINGS ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Values	Unit
V_{RRM}	Repetitive Reverse Voltage	$T_J=25^{\circ}\text{C}$	1200	V
$I_{F(AV)}$	Average Forward Current		200	A
I_{FRM}	Repetitive Peak Forward Current	$tp=1\text{ms}$	400	
I^2t		$T_J=125^{\circ}\text{C}, t=10\text{ms}, V_R=0\text{V}$	11.25	KA^2S

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MMG200Q120UA6TC

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ELECTRICAL CHARACTERISTICS ($T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit	
$V_{GE(th)}$	Gate Emitter Threshold Voltage	$V_{CE}=V_{GE}, I_C=8\text{mA}$	5.0	5.8	6.5	V	
$V_{CE(sat)}$	Collector - Emitter Saturation Voltage	$I_C=200\text{A}, V_{GE}=15\text{V}, T_J=25^\circ\text{C}$		1.8	2.25		
		$I_C=200\text{A}, V_{GE}=15\text{V}, T_J=125^\circ\text{C}$		2.1			
		$I_C=200\text{A}, V_{GE}=15\text{V}, T_J=150^\circ\text{C}$		2.15			
I_{CES}	Collector Leakage Current	$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$			1	mA	
		$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_J=150^\circ\text{C}$			10		
I_{GES}	Gate Leakage Current	$V_{CE}=0\text{V}, V_{GE}=\pm 20\text{V}, T_J=25^\circ\text{C}$	-400		400	nA	
R_{gint}	Integrated Gate Resistor			3.5		Ω	
Q_g	Gate Charge	$V_{CE}=600\text{V}, I_C=200\text{A}, V_{GE}=15\text{V}$		1.06		μC	
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$		14.2		nF	
C_{res}	Reverse Transfer Capacitance				600		pF
$t_{d(on)}$	Turn on Delay Time	$V_{CC}=600\text{V}, I_C=200\text{A}$ $R_G=2.7\Omega,$ $V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$	160		ns	
			$T_J=125^\circ\text{C}$	180		ns	
			$T_J=150^\circ\text{C}$	190		ns	
t_r	Rise Time		$T_J=25^\circ\text{C}$	60		ns	
			$T_J=125^\circ\text{C}$	64		ns	
			$T_J=150^\circ\text{C}$	66		ns	
$t_{d(off)}$	Turn off Delay Time	$T_J=25^\circ\text{C}$	390		ns		
		$T_J=125^\circ\text{C}$	440		ns		
		$T_J=150^\circ\text{C}$	460		ns		
t_f	Fall Time	$T_J=25^\circ\text{C}$	100		ns		
		$T_J=125^\circ\text{C}$	180		ns		
		$T_J=150^\circ\text{C}$	200		ns		
E_{on}	Turn on Energy	$V_{CC}=600\text{V}, I_C=200\text{A}$ $R_G=2.7\Omega,$ $V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=125^\circ\text{C}$	23.6		mJ	
			$T_J=150^\circ\text{C}$	26.1		mJ	
E_{off}	Turn off Energy		$T_J=125^\circ\text{C}$	16.9		mJ	
			$T_J=150^\circ\text{C}$	18.4		mJ	
I_{SC}	Short Circuit Current		$tp_{sc} \leq 10\mu\text{S}, V_{GE}=15\text{V}$ $T_J=125^\circ\text{C}, V_{CC}=800\text{V}$		840		A
R_{thJC}	Junction to Case Thermal Resistance (Per IGBT)				0.14	K/W	

Diode

ELECTRICAL CHARACTERISTICS ($T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F=200\text{A}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$		1.75	2.3	V
		$I_F=200\text{A}, V_{GE}=0\text{V}, T_J=125^\circ\text{C}$		1.5		
		$I_F=200\text{A}, V_{GE}=0\text{V}, T_J=150^\circ\text{C}$		1.45		
t_{rr}	Reverse Recovery Time	$I_F=200\text{A}, V_R=600\text{V}$ $dI_F/dt=-3600\text{A}/\mu\text{s}$ $T_J=150^\circ\text{C}$		330		ns
I_{RRM}	Max. Reverse Recovery Current			273		A
Q_{RR}	Reverse Recovery Charge			44		μC
E_{rec}	Reverse Recovery Energy			18.5		mJ
R_{thJCD}	Junction to Case Thermal Resistance (Per Diode)				0.2	K/W

MODULE CHARACTERISTICS ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Values	Unit
T_{Jmax}	Max. Junction Temperature		175	°C
T_{Jop}	Operating Temperature		-40~150	
T_{stg}	Storage Temperature		-40~125	
V_{isol}	Isolation Breakdown Voltage	AC, 50Hz(R.M.S), t=1minute	3000	V
CTI	Comparative Tracking Index		> 200	
Torque	to heatsink	Recommended (M6)	3~5	Nm
	to terminal	Recommended (M5)	2.5~5	Nm
Weight			200	g

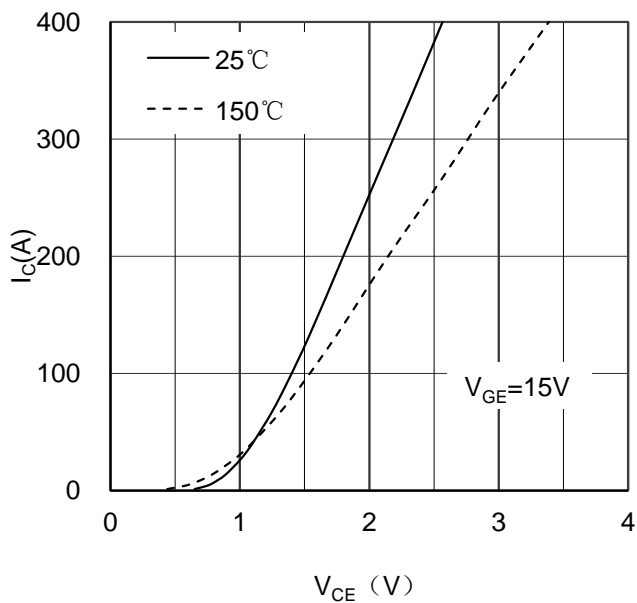


Figure 1. Typical Output Characteristics IGBT

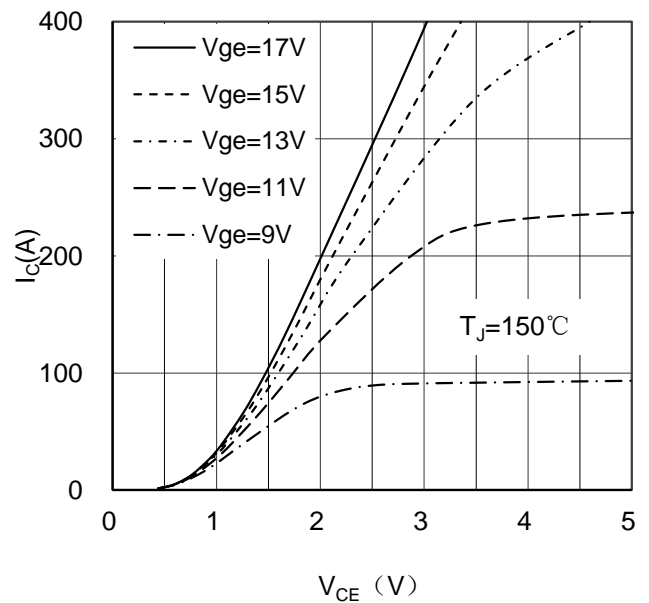


Figure 2. Typical Output Characteristics IGBT

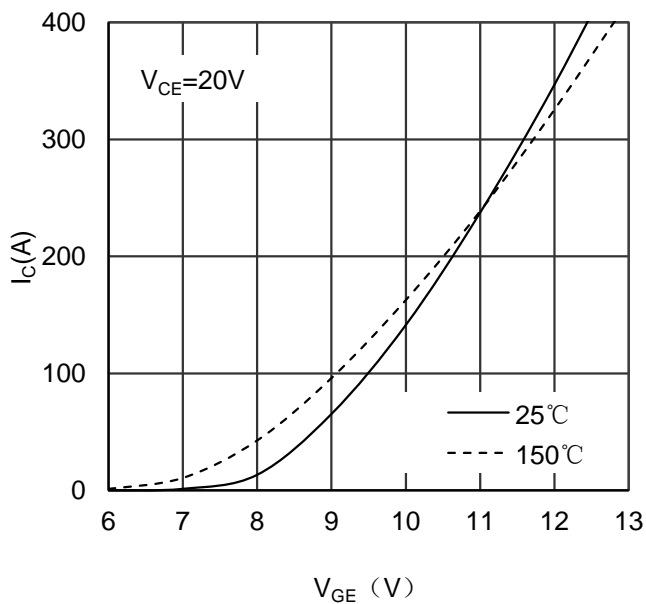


Figure 3. Typical Transfer characteristics IGBT

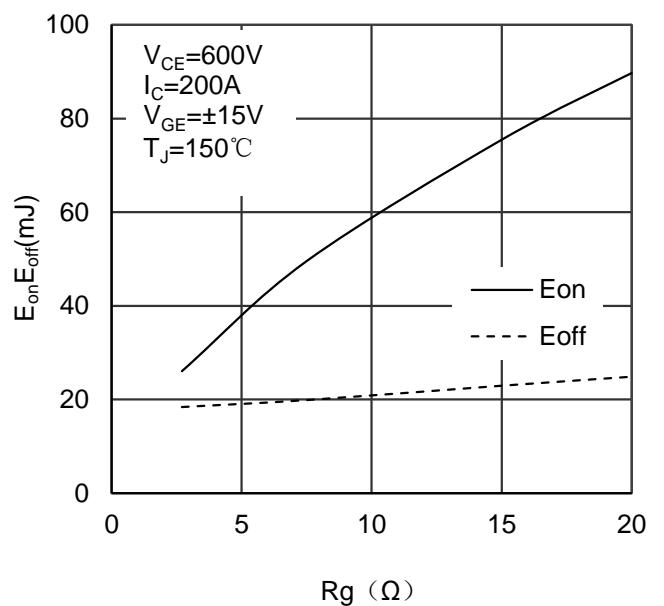


Figure 4. Switching Energy vs Gate Resistor IGBT

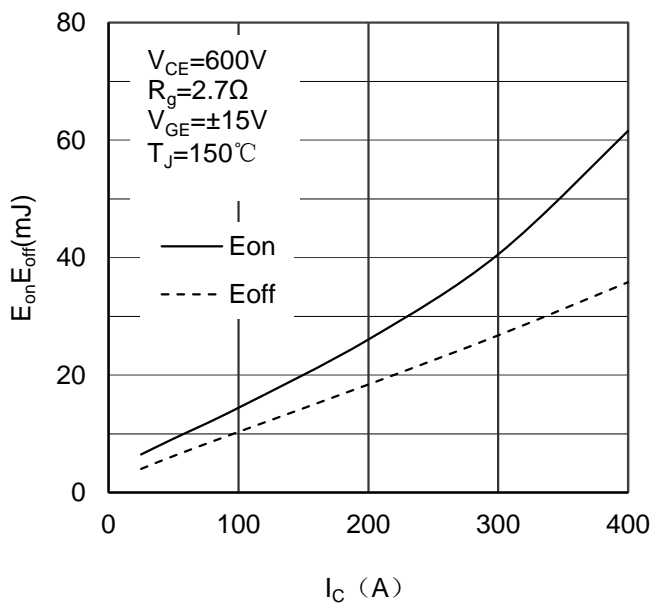


Figure 5. Switching Energy vs Collector Current IGBT

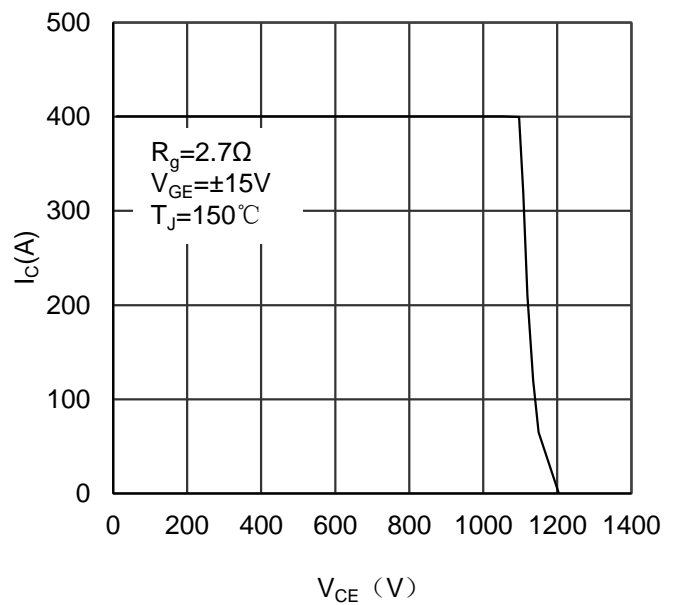


Figure 6. Reverse Biased Safe Operating Area IGBT

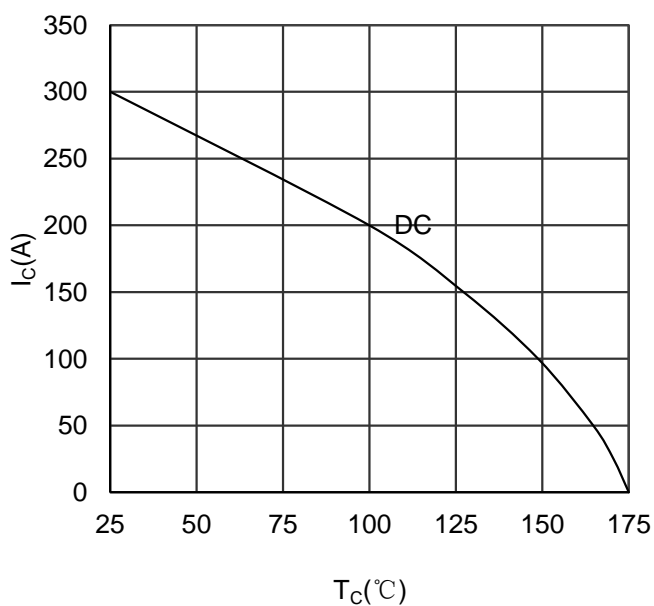


Figure 7. Collector Current vs Case temperature IGBT

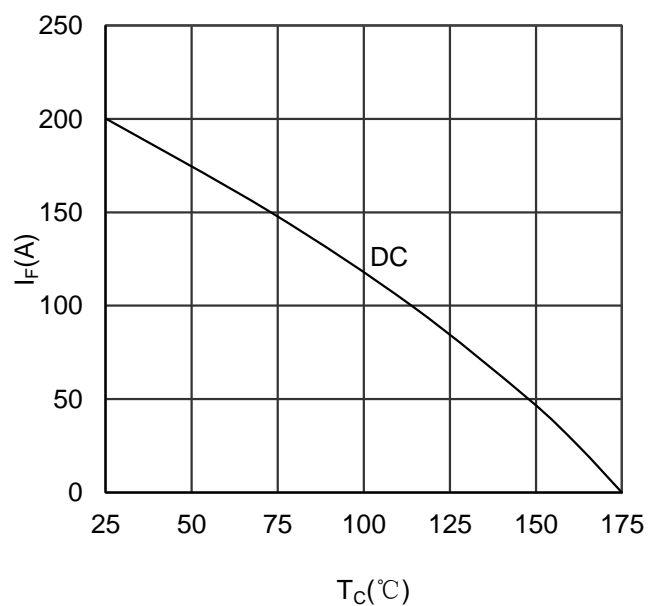


Figure 8. Forward current vs Case temperature Diode

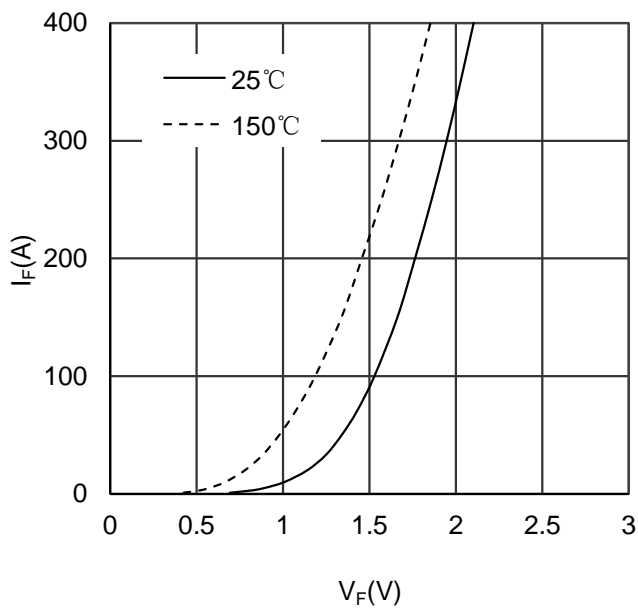


Figure 9. Diode Forward Characteristics Diode

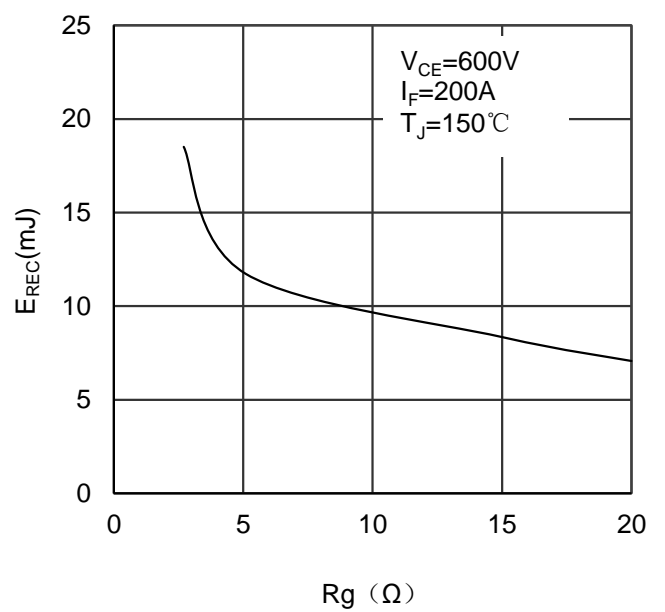


Figure 10. Switching Energy vs Gate Resistor Diode

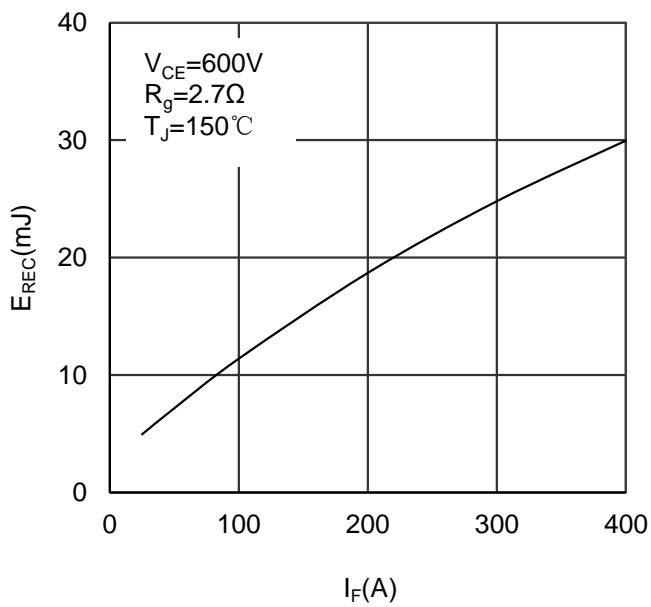


Figure 11. Switching Energy vs Forward Current Diode

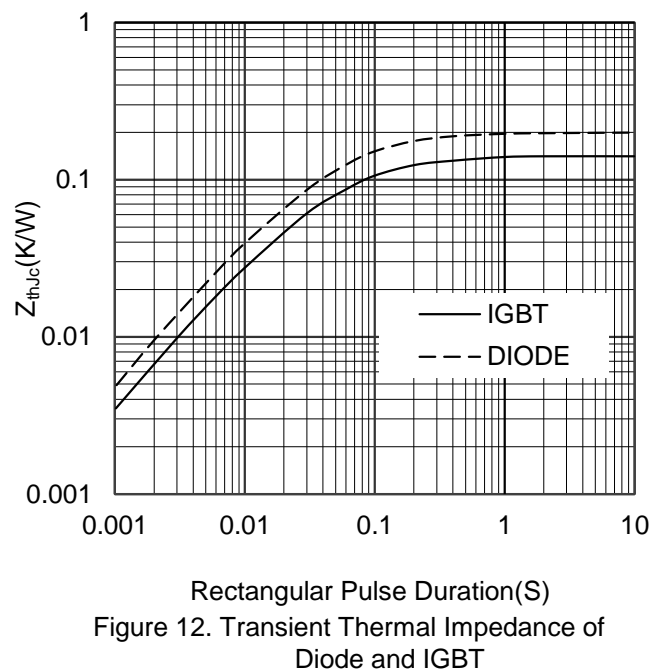


Figure 12. Transient Thermal Impedance of Diode and IGBT

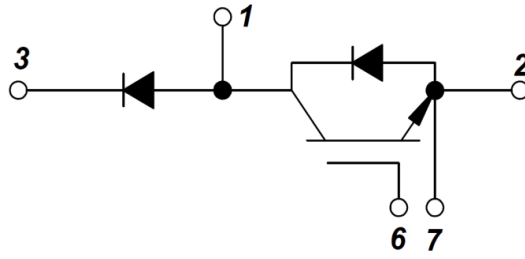
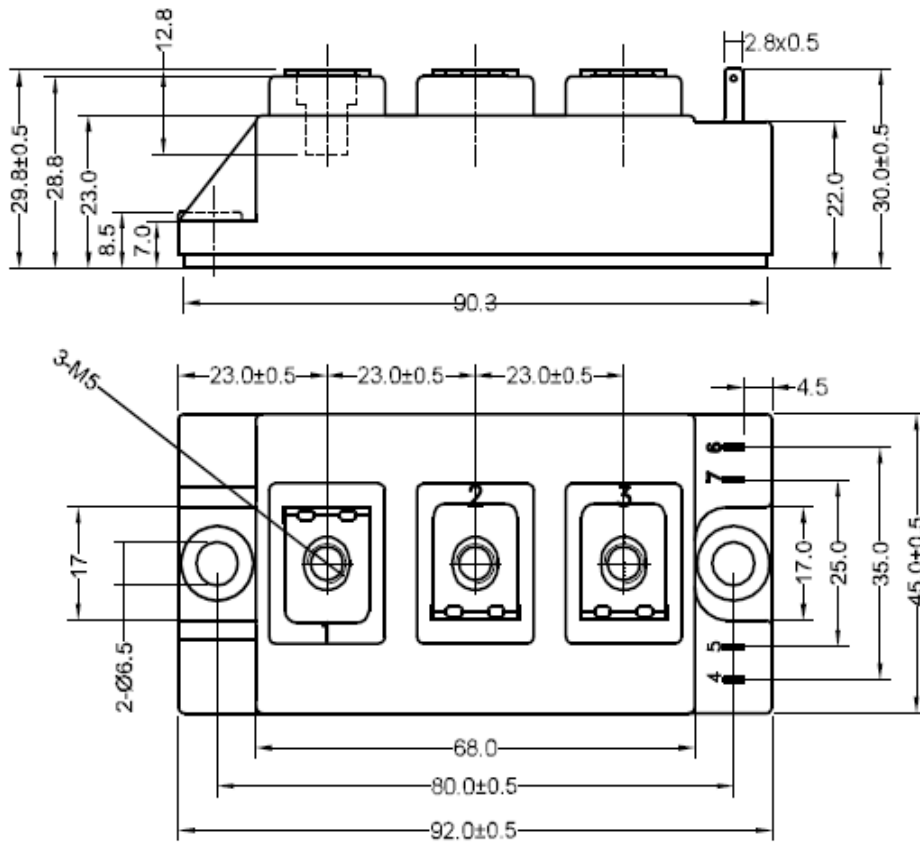


Figure 13. Circuit Diagram



Dimensions in (mm)
Figure 14. Package Outline