

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(T1 T2)-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	$T_C=25^{\circ}\text{C}, T_{Jmax}=175^{\circ}\text{C}$	422	A
		$T_C=90^{\circ}\text{C}, T_{Jmax}=175^{\circ}\text{C}$	300	
I_{CM}	Repetitive Peak Collector Current	$t_p=1\text{ms}$	600	
P_{tot}	Power Dissipation Per IGBT	$T_C=25^{\circ}\text{C}, T_{Jmax}=175^{\circ}\text{C}$	1428	W

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

Symbol	Parameter/Test Conditions		Values	Unit
Diode-Serial(D3 D4)				
V _{RRM}	Repetitive Reverse Voltage	T _J =25°C	1200	V
I _{F(AV)}	Average Forward Current		300	A
I _{FRM}	Repetitive Peak Forward Current	tp=1ms	600	
I ² t		T _J =125°C, t=10ms, V _R =0V	18000	A ² S
Reverse-Diode(D1 D2)				
V _{RRM}	Repetitive Reverse Voltage	T _J =25°C	1200	V
I _{F(AV)}	Average Forward Current		35	A
I _{FRM}	Repetitive Peak Forward Current	tp=1ms	70	
I ² t		T _J =125°C, t=10ms, V _R =0V	250	A ² S

MacMic Science & Technology Co., Ltd.

Add: #18, Hua Shan Zhong Lu, New District, Changzhou City, Jiangsu Province, P. R .of China

MMG300B120DKA6TC

IGBT(T1 T2)

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 =12mA	5.0	5.8	6.5	V
V _{CE(sat)}	Collector - Emitter Saturation Voltage	I _C =300A, V _{GE} =15V, T _J =25℃		1.85	2.25	
		I _C =300A, V _{GE} =15V, T _J =150℃		2.2		
I _{CES}	Collector Leakage Current	V _{CE} =1200V, V _{GE} =0V, T _J =25℃			1	mA
I _{GES}	Gate Leakage Current	V _{CE} =0V, V _{GE} =±20V, T _J =25℃	-400		400	nA
R _{gint}	Integrated Gate Resistor			1.8		Ω
Q _g	Gate Charge	V _{CE} =600V, I _C =300A , V _{GE} =15V		1.5		μC
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f =1MHz		21		nF
C _{res}	Reverse Transfer Capacitance			1		nF
t _{d(on)}	Turn on Delay Time	V _{CC} =600V, I _C =300A R _G =2.7Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		90	ns
			T _J =150℃		110	ns
t _r	Rise Time		T _J =25℃		72	ns
			T _J =150℃		76	ns
t _{d(off)}	Turn off Delay Time	V _{CC} =600V, I _C =300A R _G =2.7Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		450	ns
			T _J =150℃		500	ns
t _f	Fall Time		T _J =25℃		80	ns
			T _J =150℃		220	ns
E _{on}	Turn on Energy	V _{CC} =600V, I _C =300A R _G =2.7Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		17.5	mJ
			T _J =150℃		29.2	mJ
E _{off}	Turn off Energy		T _J =25℃		18.5	mJ
			T _J =150℃		29	mJ
I _{SC}	Short Circuit Current	tpsc≤10μS , V _{GE} =15V T _J =125℃, V _{CC} =800V		1200		A
R _{thJC}	Junction to Case Thermal Resistance (Per IGBT)				0.105	K /W

Diode

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

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
Diode-Serial(D3 D4)						
V _F	Forward Voltage	I _F =300A , V _{GE} =0V, T _J =25℃		1.8	2.3	V
		I _F =300A , V _{GE} =0V, T _J =150℃		1.5		
I _{RRM}	Max. Reverse Recovery Current	I _F =300A , V _R =600V dI _F /dt=-5600A/μs T _J =150℃		290		A
Q _{RR}	Reverse Recovery Charge			56.3		μC
E _{rec}	Reverse Recovery Energy			21.5		mJ
R _{thJCD}	Junction to Case Thermal Resistance （ Per Diode）				0.18	K /W
Reverse-Diode(D1 D2)						
V _F	Forward Voltage	I _F =35A , V _{GE} =0V, T _J =25℃		1.85	2.4	V
		I _F =35A , V _{GE} =0V, T _J =150℃		1.55		
I _{RRM}	Max. Reverse Recovery Current	I _F =35A , V _R =600V dI _F /dt=-1000A/μs T _J =150℃		38		A
Q _{RR}	Reverse Recovery Charge			9.2		μC
E _{rec}	Reverse Recovery Energy			3.3		mJ
R _{thJCD}	Junction to Case Thermal Resistance （ Per Diode）				1.1	K /W

MMG300B120DKA6TC

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

Symbol	Parameter/Test Conditions		Values	Unit
T_{Jmax}	Max. Junction Temperature		175	$^{\circ}\text{C}$
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
Torque	to heatsink	Recommended (M6)	3~5	Nm
	to terminal	Recommended (M6)	3~5	Nm
Weight			300	g

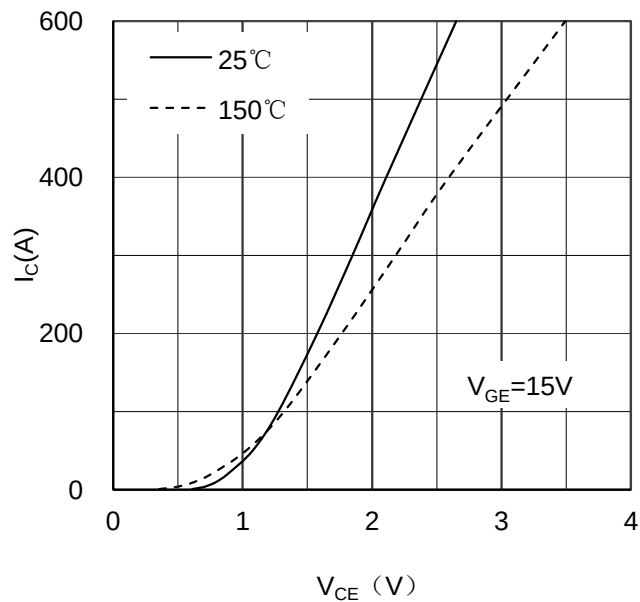


Figure 1. Typical Output Characteristics IGBT

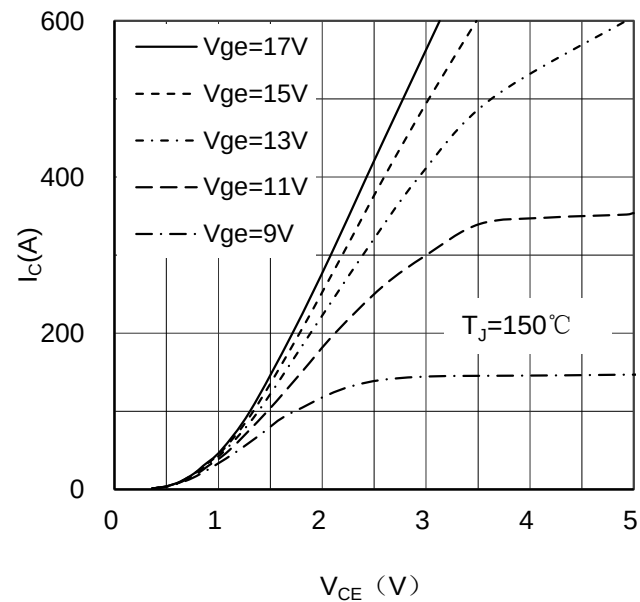


Figure 2. Typical Output Characteristics IGBT

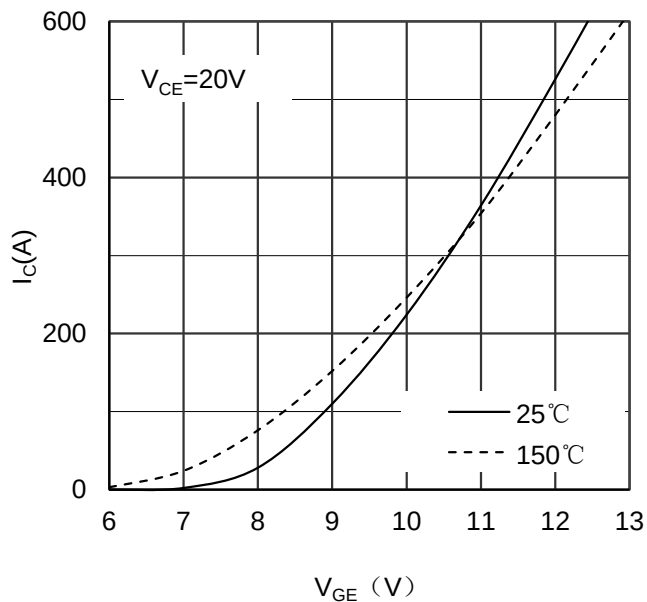


Figure 3. Typical Transfer characteristics IGBT

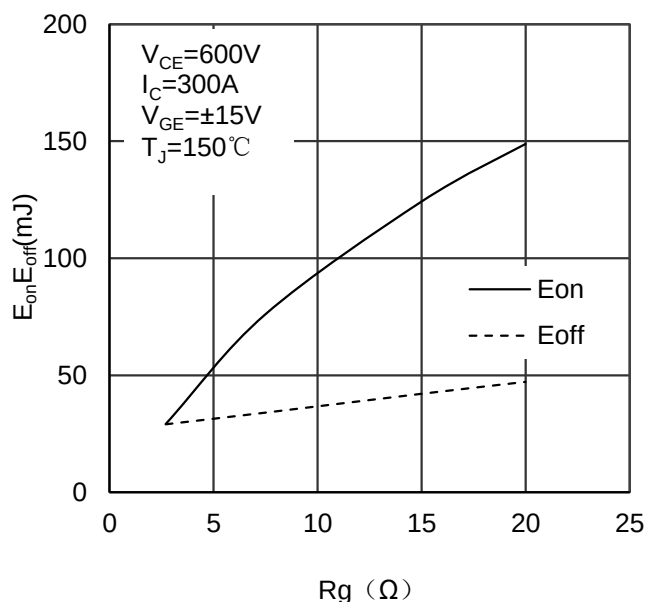


Figure 4. Switching Energy vs Gate Resistor IGBT

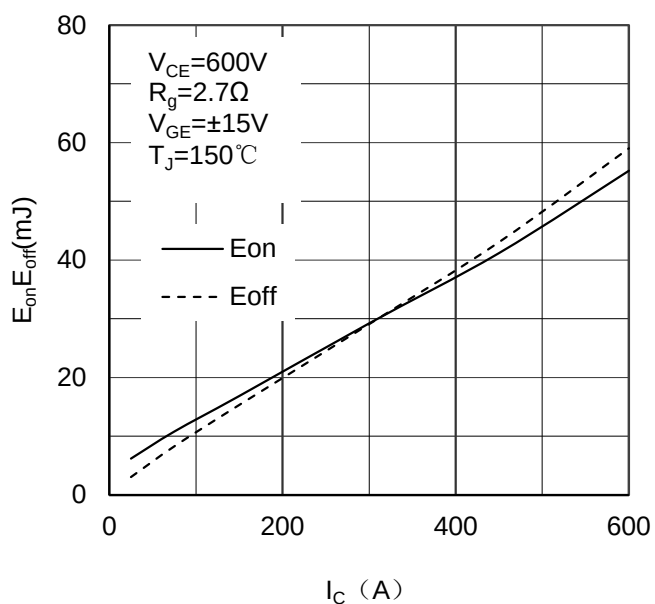


Figure 5. Switching Energy vs Collector Current IGBT

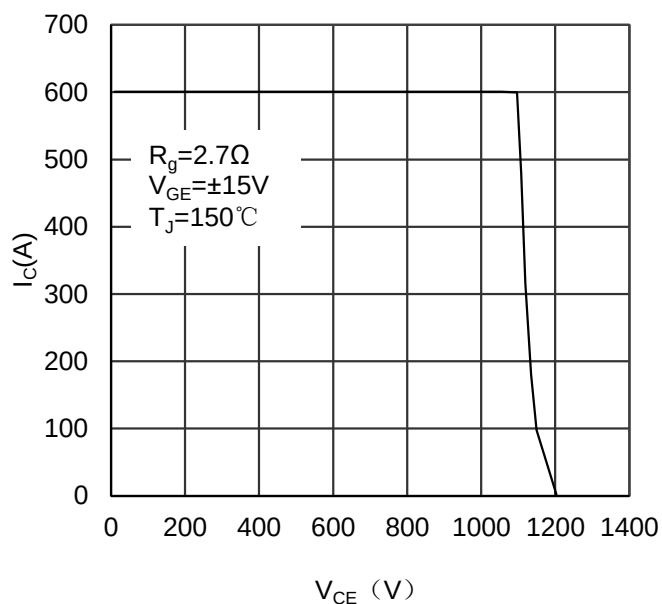


Figure 6. Reverse Biased Safe Operating Area IGBT

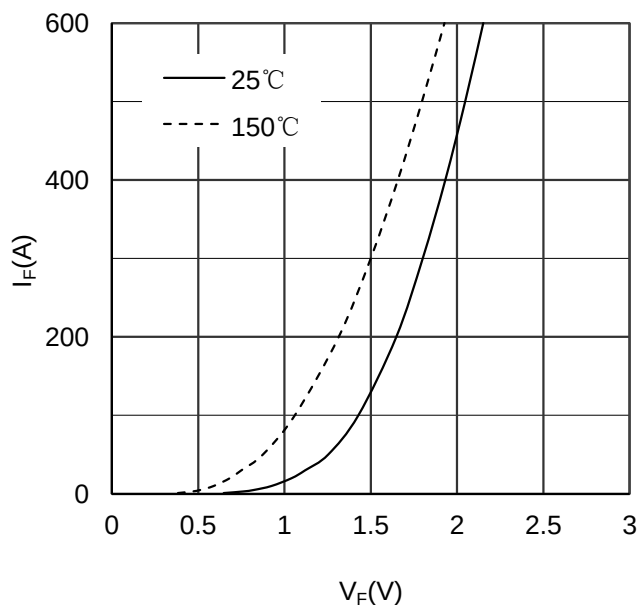


Figure 7. Diode Forward Characteristics Diode-Serial

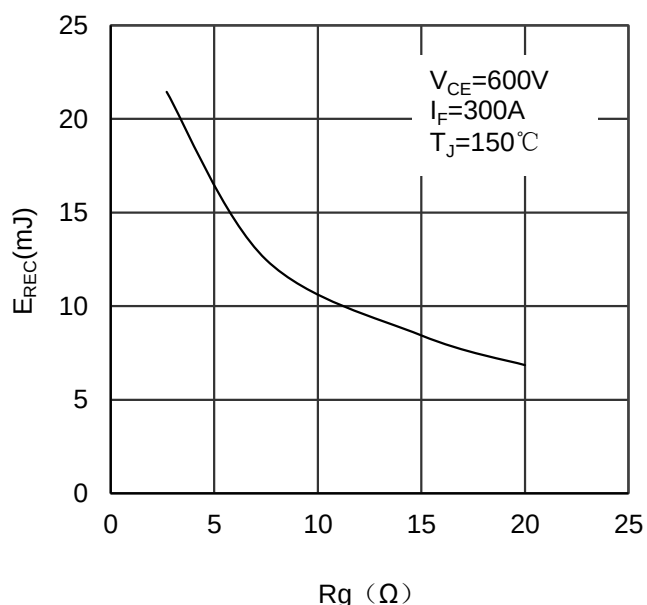


Figure 8. Switching Energy vs Gate Resistor Diode-Serial

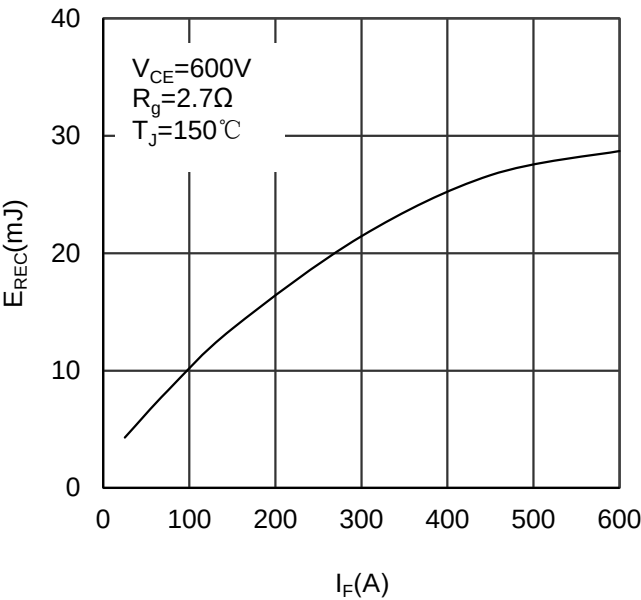


Figure 9. Switching Energy vs Forward Current Diode-Serial

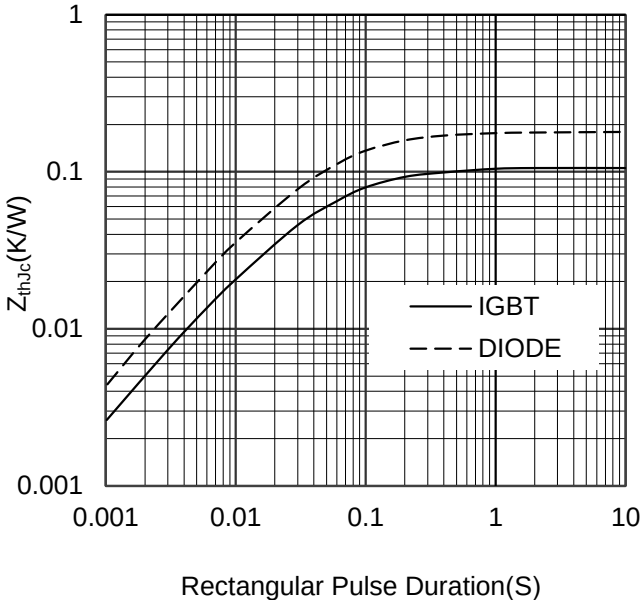


Figure 10. Transient Thermal Impedance of Diode-Serial and IGBT

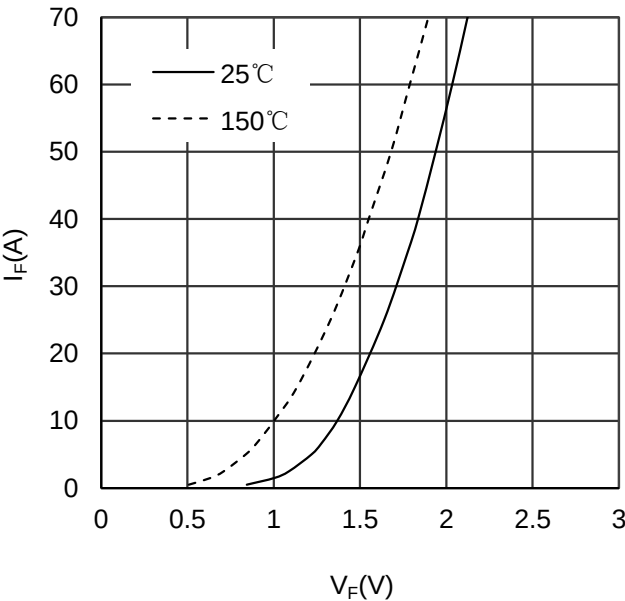


Figure 11. Diode Forward Characteristics Reverse-Diode

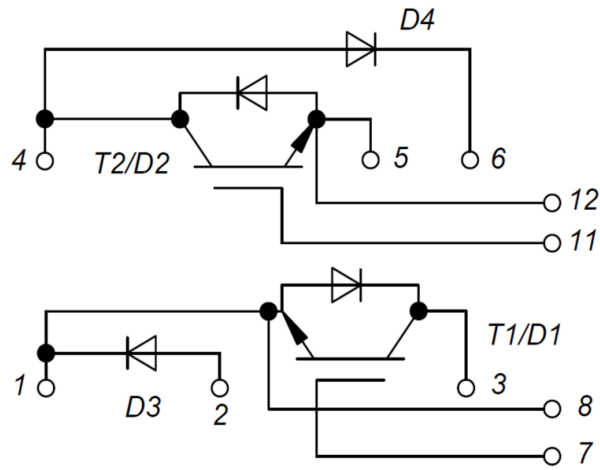
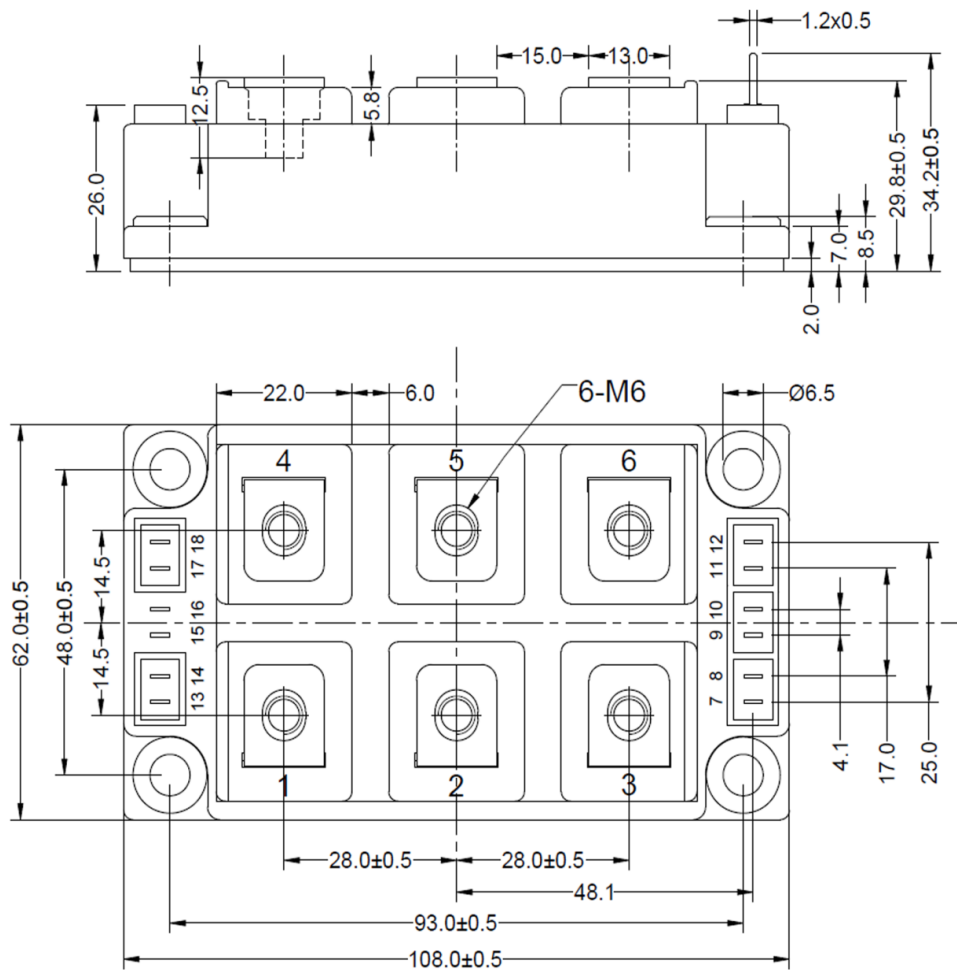


Figure 12. Circuit Diagram



Dimensions in (mm)

Figure 13. Package Outline