MMG200W120X6T6

1200V 200A Six-Pack Module

June 2023 | Preliminary | RoHS Compliant

PRODUCT FEATURES

☐ High level of integration

☐ IGBT CHIP(Trench+Field Stop technology)

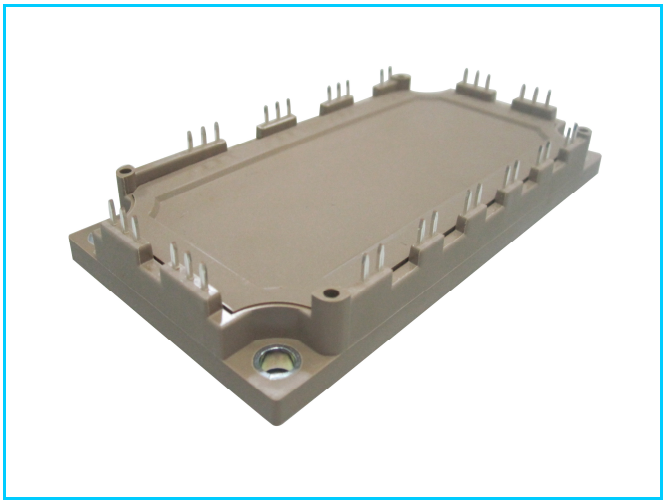
☐ Low saturation voltage and positive temperature coefficient

☐ Fast switching and short tail current

☐ Free wheeling diodes with fast and soft reverse recovery

☐ Industry standard package with insulated copper base plate and soldering pins for PCB mounting

☐ Temperature sense included



APPLICATIONS

☐ AC motor control

☐ Motion/servo control

☐ Inverter and power supplies

IGBT-inverter

ABSOLUTE MAXIMUM RATINGS(T_C =25°C *unless otherwise specified*)

Symbol	Parameter/Test Conditions		Values	Unit
V_{CES}	Collector Emitter Voltage	T_J=25℃	1200	V
V_{GES}	Gate Emitter Voltage		±20	
I_C	DC Collector Current	T_C=75℃,T_{Jmax}=175℃	200	A
I_{CM}	Repetitive Peak Collector Current	tp=1ms	400	
P_{tot}	Power Dissipation Per IGBT	T_C=25℃,T_{Jmax}=175℃	625	W

Diode-inverter

ABSOLUTE MAXIMUM RATINGS (T_C =25°C *unless otherwise specified*)

Symbol	Parameter/Test Conditions		Values	Unit
V_{RRM}	Repetitive Reverse Voltage	T_J=25℃	1200	V
$I_{F(AV)}$	Average Forward Current		200	A
I_{FRM}	Repetitive Peak Forward Current	tp=1ms	400	
I^2t		T_J =125℃, t=10ms, V_R=0V	5000	A^2s

MacMic Science & Technology Co., Ltd.

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

Tel.：+86-519-85163708 Fax：+86-519-85162291 Post Code：213022 Website：www.macmicst.com

IGBT-inverter

ELECTRICAL CHARACTERISTICS *(T_C =25°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=4.6mA		5.6	6.1	6.6	V
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	I_C=200A, V_{GE}=15V, T_J=25℃			1.55	1.85	
		I_C=200A, V_{GE}=15V, T_J=125℃			1.7		
		I_C=200A, V_{GE}=15V, T_J=175℃			1.75		
I_{CES}	Collector Leakage Current	V_{CE}=1200V, V_{GE}=0V, T_J=25℃				100	μA
I_{GES}	Gate Leakage Current	V_{CE}=0V,V_{GE}=±20V, T_J=25℃		-400		400	nA
R_{Gint}	Integrated Gate Resistor				1.2		Ω
Q_G	Gate Charge	V_{CE}=600V, I_C=200A , V_{GE}=15V			0.83		μC
C_{ies}	Input Capacitance	V_{CE}=25V, V_{GE}=0V, f =1MHz			26		nF
C_{res}	Reverse Transfer Capacitance				0.7		nF
$t_{d(on)}$	Turn on Delay Time	V_{CC}=600V,I_C=200A R_G =3Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		140		ns
			T_J=125℃		152		ns
			T_J=175℃		160		ns
t_r	Rise Time		T_J=25℃		50		ns
			T_J=125℃		60		ns
			T_J=175℃		62		ns
$t_{d(off)}$	Turn off Delay Time	V_{CC}=600V,I_C=200A R_G =3Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		338		ns
			T_J=125℃		384		ns
			T_J=175℃		404		ns
t_f	Fall Time		T_J=25℃		182		ns
			T_J=125℃		284		ns
			T_J=175℃		345		ns
E_{on}	Turn on Energy	V_{CC}=600V,I_C=200A R_G =3Ω, V_{GE}=±15V, Inductive Load	T_J=125℃		16.6		mJ
			T_J=175℃		21.4		mJ
E_{off}	Turn off Energy		T_J=125℃		27.1		mJ
			T_J=175℃		30.3		mJ
I_{SC}	Short Circuit Current	tpsc≤8μs , V_{GE}=15V T_J=150℃,V_{CC}=800V			850		A
		tpsc≤7μs , V_{GE}=15V T_J=175℃,V_{CC}=800V			820		A
R_{thJC}	Junction to Case Thermal Resistance （Per IGBT）					0.24	K /W

Diode-inverter

ELECTRICAL CHARACTERISTICS *(T_C =25°C unless otherwise specified)*

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
V_F	Forward Voltage	I_F=200A , V_{GE}=0V, T_J=25℃		2	2.4	V
		I_F=200A , V_{GE}=0V, T_J=125℃		1.8		
		I_F=200A , V_{GE}=0V, T_J=175℃		1.65		
t_{rr}	Reverse Recovery Time	I_F=200A , V_R=600V dI_F/dt=-4300A/μs T_J =175℃		330		ns
I_{RRM}	Max. Reverse Recovery Current			310		A
Q_{RR}	Reverse Recovery Charge			42		μC
E_{rec}	Reverse Recovery Energy			22.9		mJ
R_{thJCD}	Junction to Case Thermal Resistance （ Per Diode）				0.31	K /W

MODULE CHARACTERISTICS *(T_C =25°C unless otherwise specified)*

Symbol	Parameter/Test Conditions		Values	Unit
T_{Jmax}	Max. Junction Temperature		175	℃
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		> 225	
Torque	Mounting Torque	Recommended（M5）	2.5~5	Nm
Weight			300	g

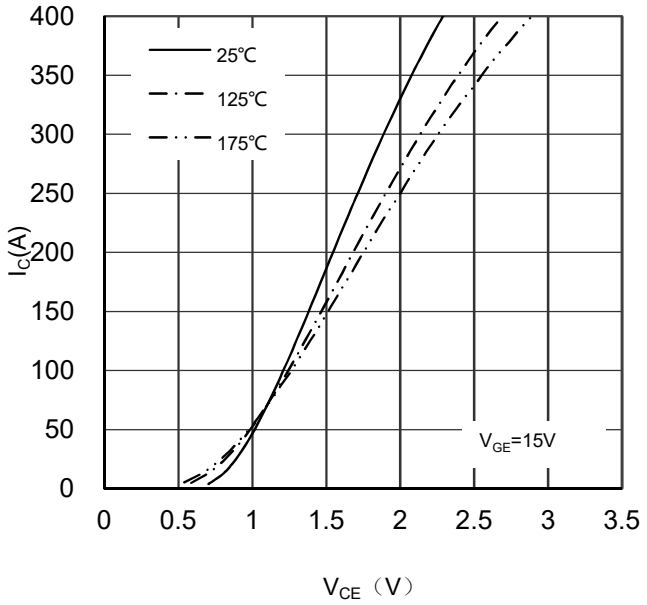


Figure 1. Typical Output Characteristics IGBT-inverter

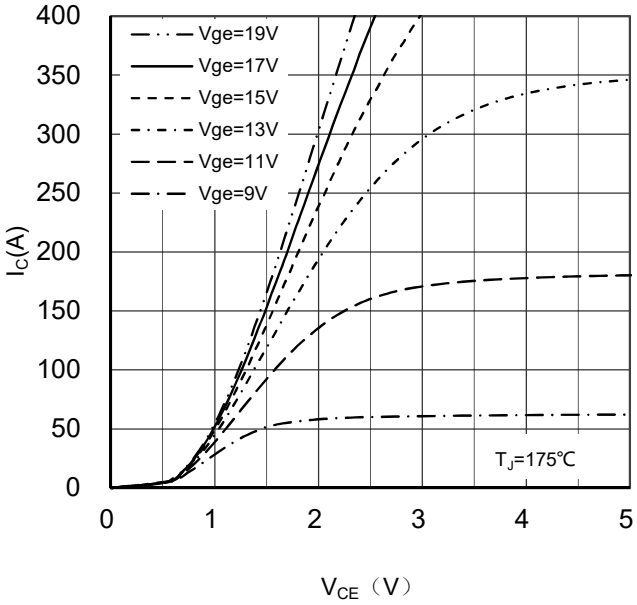


Figure 2. Typical Output Characteristics IGBT-inverter

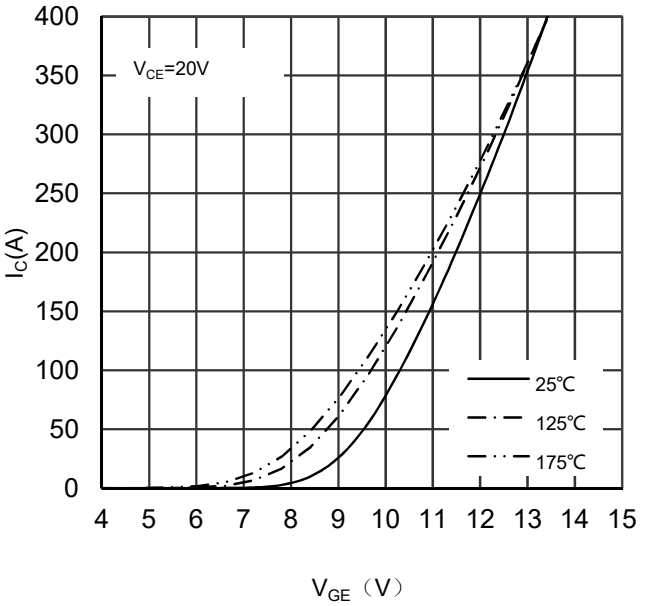


Figure 3. Typical Transfer characteristics IGBT-inverter

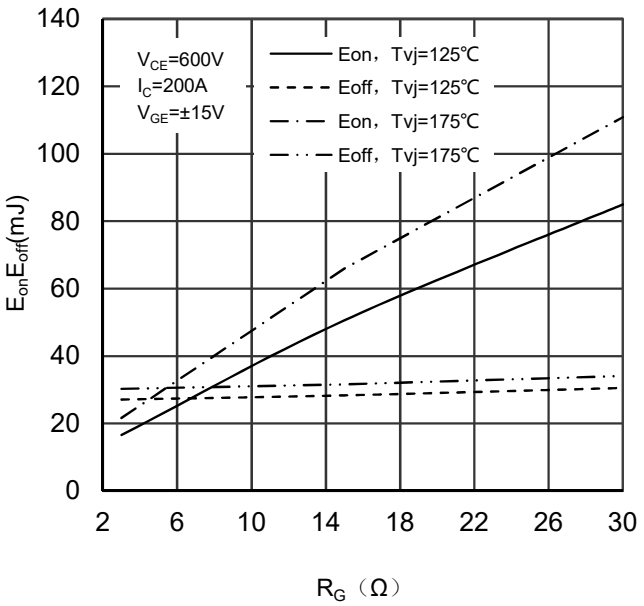


Figure 4. Switching Energy vs Gate Resistor IGBT-inverter

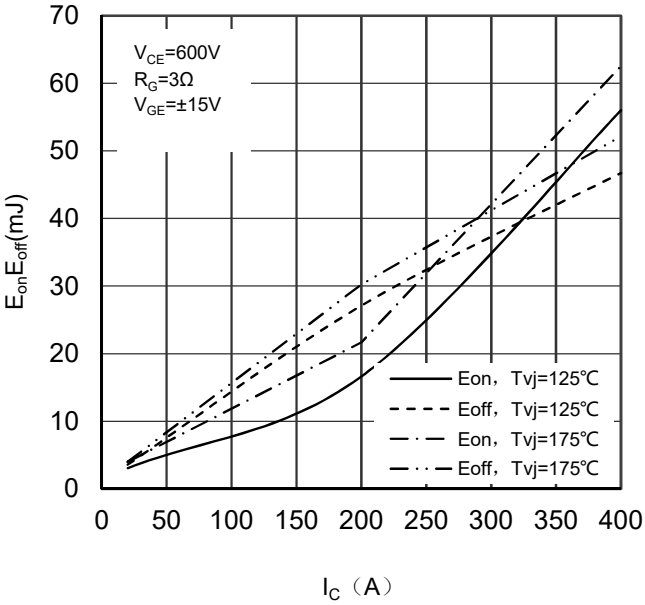


Figure 5. Switching Energy vs Collector Current IGBT-inverter

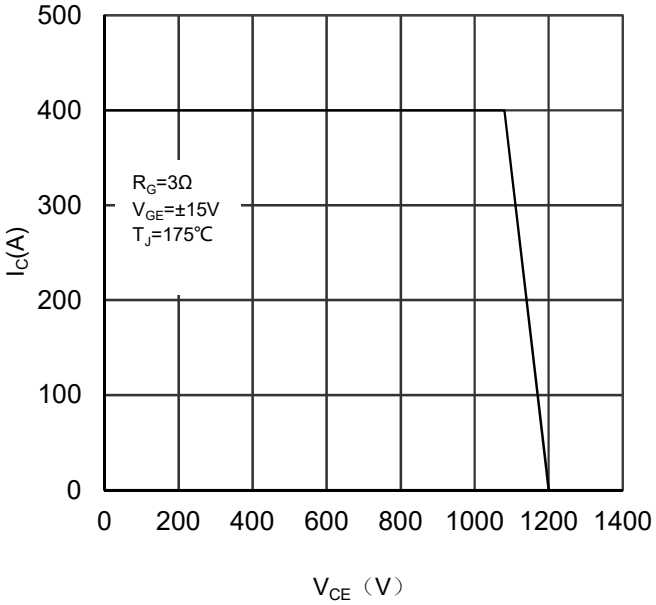


Figure 6. Reverse Biased Safe Operating Area IGBT-inverter

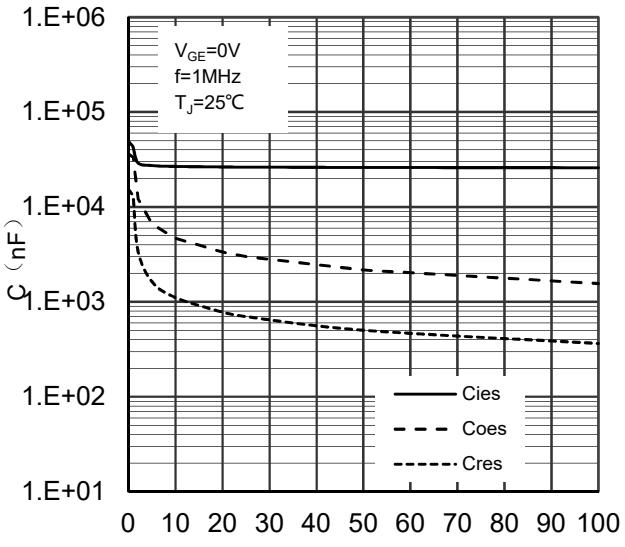


Figure 7. Typical capacitance

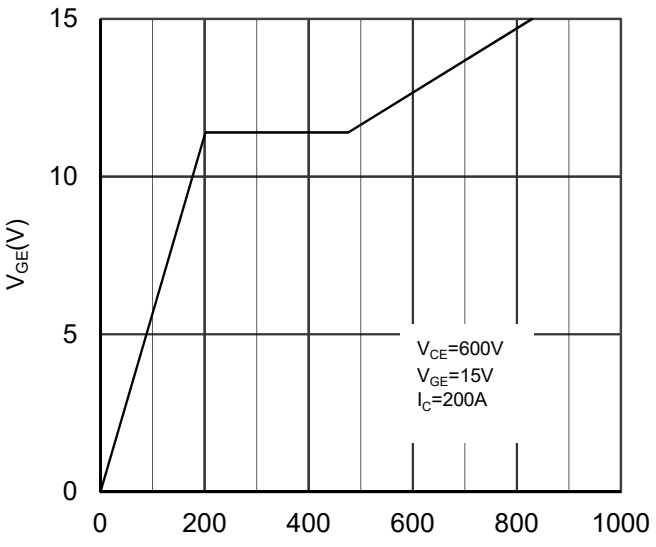


Figure 8. Typical Gate Charge

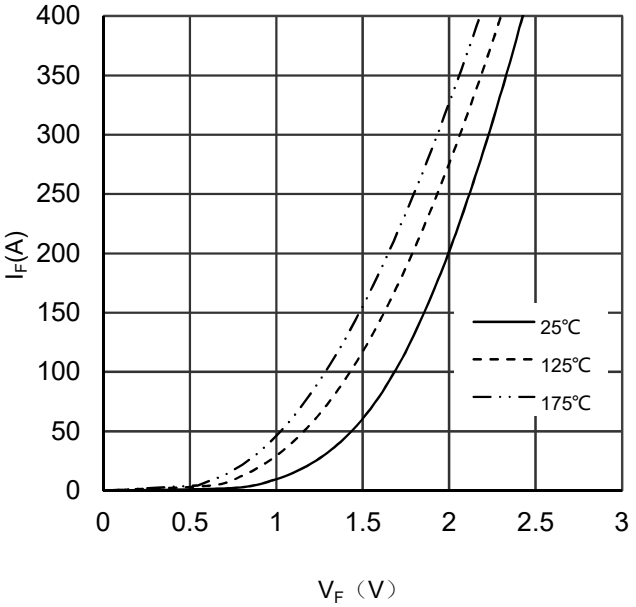


Figure 9. Diode Forward Characteristics Diode -inverter

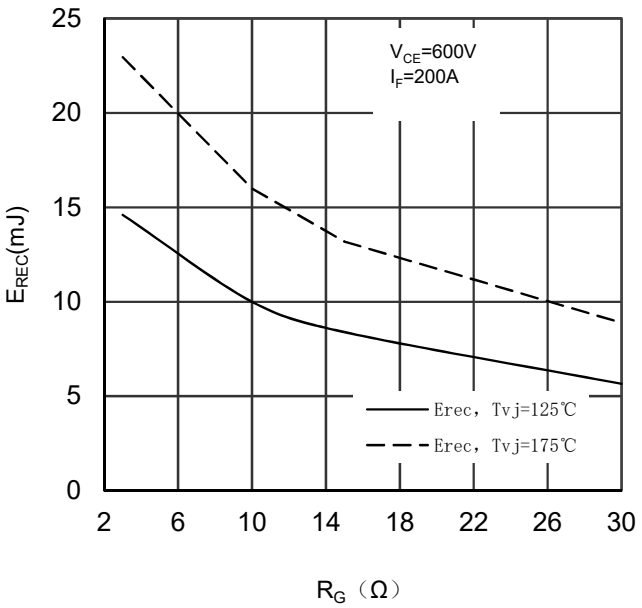


Figure 10. Switching Energy vs Gate Resistor Diode -inverter

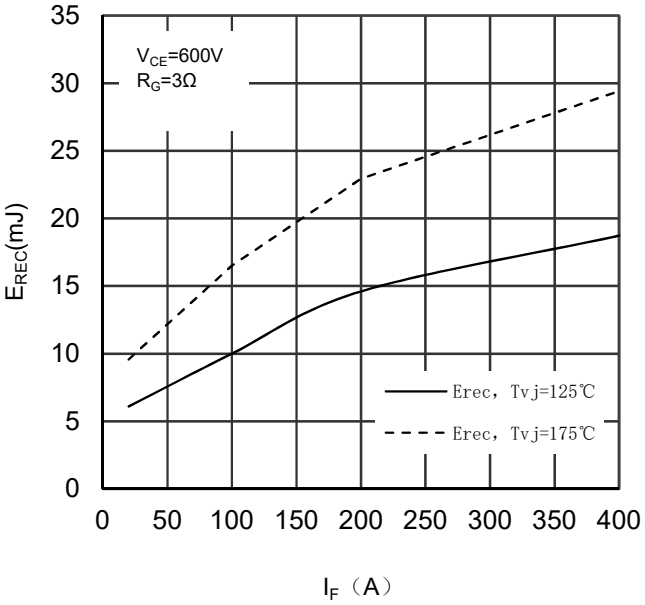


Figure 11. Switching Energy vs Forward Current Diode-inverter

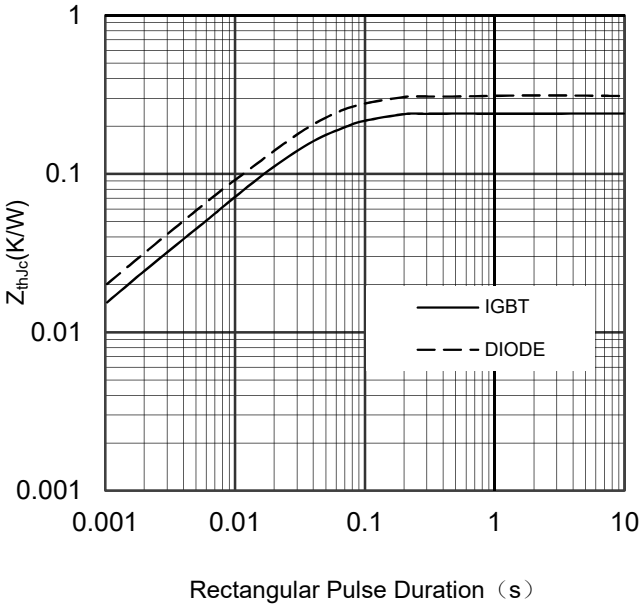


Figure 12. Transient Thermal Impedance of Diode and IGBT-inverter

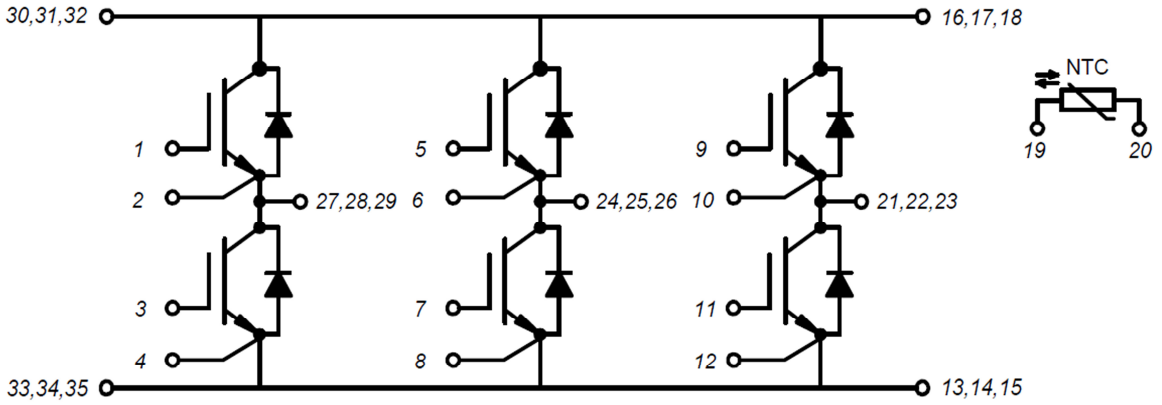
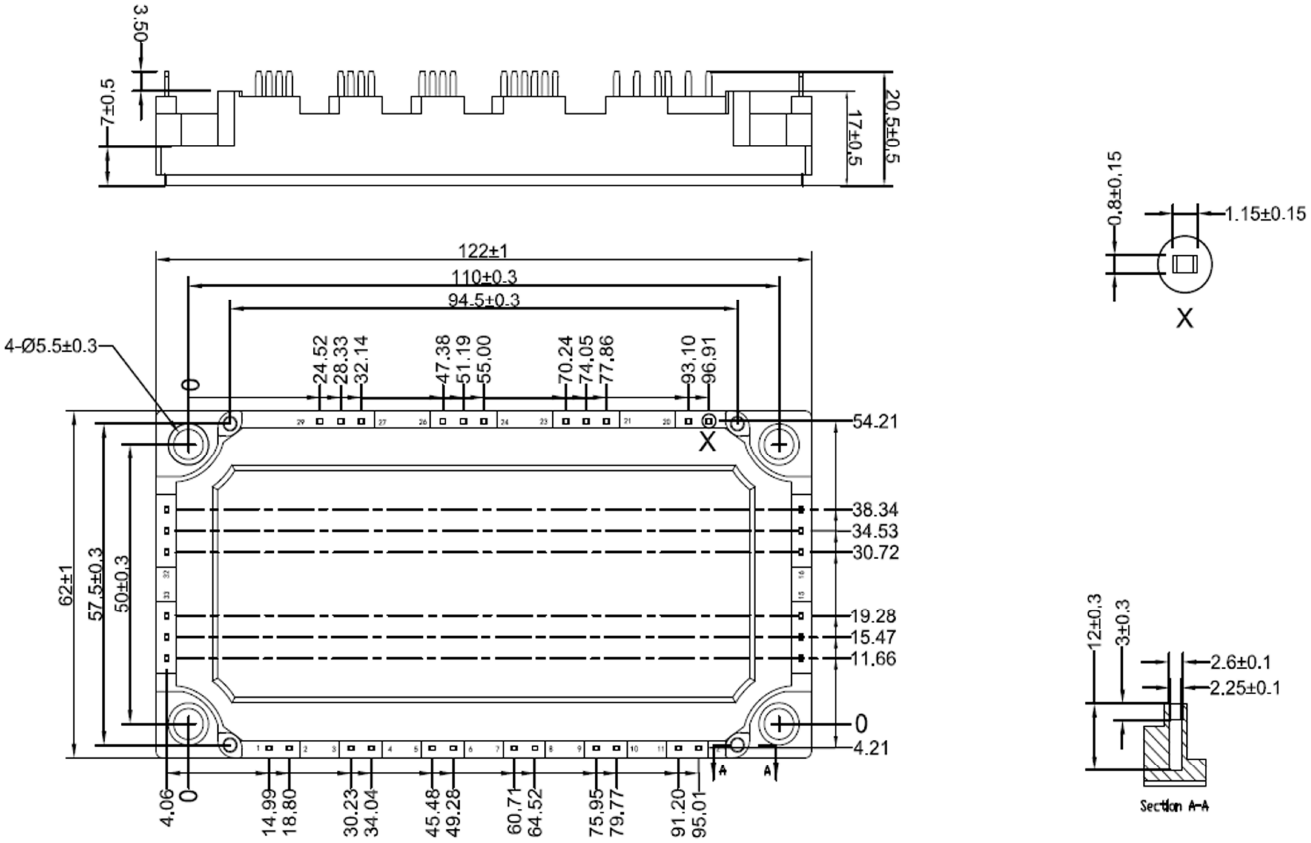


Figure 13. Circuit Diagram



Dimensions in (mm)

Figure 14. Package Outline