

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	$T_C=25^{\circ}\text{C}, T_{Jmax}=175^{\circ}\text{C}$	110	A
		$T_C=95^{\circ}\text{C}, T_{Jmax}=175^{\circ}\text{C}$	75	
I_{CM}	Repetitive Peak Collector Current	$t_p=1\text{ms}$	150	
P_{tot}	Power Dissipation Per IGBT	$T_C=25^{\circ}\text{C}, T_{Jmax}=175^{\circ}\text{C}$	385	W

Diode(D1)

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		15	A
I_{FRM}	Repetitive Peak Forward Current	$t_p=1\text{ms}$	30	
I^2t		$T_J=125^{\circ}\text{C}, t=10\text{ms}, V_R=0\text{V}$	60	A^2s

Diode(D2)

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		50	A
I_{FRM}	Repetitive Peak Forward Current	$t_p=1\text{ms}$	100	
I^2t		$T_J=125^{\circ}\text{C}, t=10\text{ms}, V_R=0\text{V}$	612	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

MMG75S120UA6TC

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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 =3mA	5.0	5.8	6.5	V	
V _{CE(sat)}	Collector - Emitter Saturation Voltage	I _C =75A, V _{GE} =15V, T _J =25℃		1.8	2.25		
		I _C =75A, V _{GE} =15V, T _J =125℃		2.1			
		I _C =75A, V _{GE} =15V, T _J =150℃		2.15			
I _{CES}	Collector Leakage Current	V _{CE} =1200V, V _{GE} =0V, T _J =25℃			1	mA	
		V _{CE} =1200V, V _{GE} =0V, T _J =150℃			10		
I _{GES}	Gate Leakage Current	V _{CE} =0V,V _{GE} =±20V, T _J =25℃	-400		400	nA	
R _{Gint}	Integrated Gate Resistor			5		Ω	
Q _G	Gate Charge	V _{CE} =600V, I _C =75A , V _{GE} =15V		0.4		μC	
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f =1MHz		8		nF	
C _{res}	Reverse Transfer Capacitance				220		pF
t _{d(on)}	Turn on Delay Time	V _{CC} =600V,I _C =75A R _G =7.5Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		46		ns
			T _J =125℃		48		ns
			T _J =150℃		50		ns
t _r	Rise Time		T _J =25℃		28		ns
			T _J =125℃		30		ns
			T _J =150℃		32		ns
t _{d(off)}	Turn off Delay Time	V _{CC} =600V,I _C =75A R _G =7.5Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		275		ns
			T _J =125℃		310		ns
			T _J =150℃		320		ns
t _f	Fall Time		T _J =25℃		150		ns
			T _J =125℃		235		ns
			T _J =150℃		245		ns
E _{on}	Turn on Energy	V _{CC} =600V,I _C =75A R _G =7.5Ω, V _{GE} =±15V, Inductive Load	T _J =125℃		8.5		mJ
			T _J =150℃		9.3		mJ
E _{off}	Turn off Energy		T _J =125℃		6.0		mJ
			T _J =150℃		6.4		mJ
I _{SC}	Short Circuit Current	tpsc≤10μs , V _{GE} =15V T _J =150℃,V _{CC} =800V			320		A
R _{thJC}	Junction to Case Thermal Resistance (Per IGBT)				0.38	K /W	

Diode(D1)

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 =15A , V _{GE} =0V, T _J =25℃		1.95	2.45	V
		I _F =15A , V _{GE} =0V, T _J =125℃		1.55		
		I _F =15A , V _{GE} =0V, T _J =150℃		1.5		
t _{rr}	Reverse Recovery Time	I _F =15A , V _R =600V di _F /dt=-800A/μs T _J =150℃		226		ns
I _{RRM}	Max. Reverse Recovery Current			25		A
Q _{RR}	Reverse Recovery Charge			2.68		μC
E _{rec}	Reverse Recovery Energy			0.75		mJ
R _{thJCD}	Junction to Case Thermal Resistance (Per Diode)				1.8	K /W

Diode(D2)

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

Symbol	Parameter/Test Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F=50\text{A}$, $V_{GE}=0\text{V}$, $T_J=25^\circ\text{C}$		1.95	2.45
		$I_F=50\text{A}$, $V_{GE}=0\text{V}$, $T_J=125^\circ\text{C}$		1.7	
		$I_F=50\text{A}$, $V_{GE}=0\text{V}$, $T_J=150^\circ\text{C}$		1.65	
t_{rr}	Reverse Recovery Time		290		ns
I_{RRM}	Max. Reverse Recovery Current	$I_F=75\text{A}$, $V_R=600\text{V}$ $di_F/dt=-2300\text{A}/\mu\text{s}$		85	A
Q_{RR}	Reverse Recovery Charge	$T_J=150^\circ\text{C}$		8.8	μC
E_{rec}	Reverse Recovery Energy		4.6		mJ
R_{thJCD}	Junction to Case Thermal Resistance (Per Diode)			0.78	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	℃
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			160	g

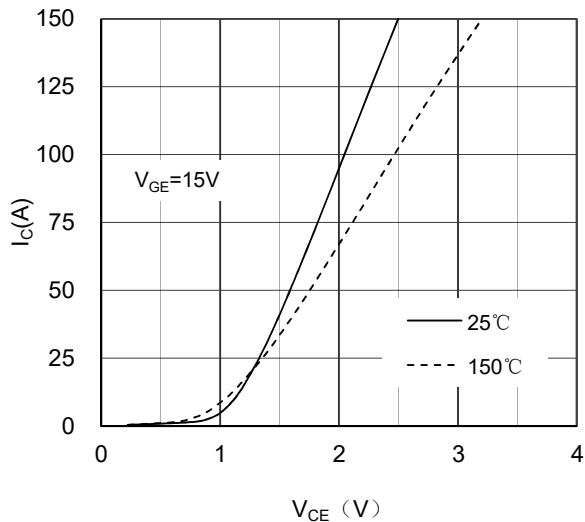


Figure 1. Typical Output Characteristics IGBT

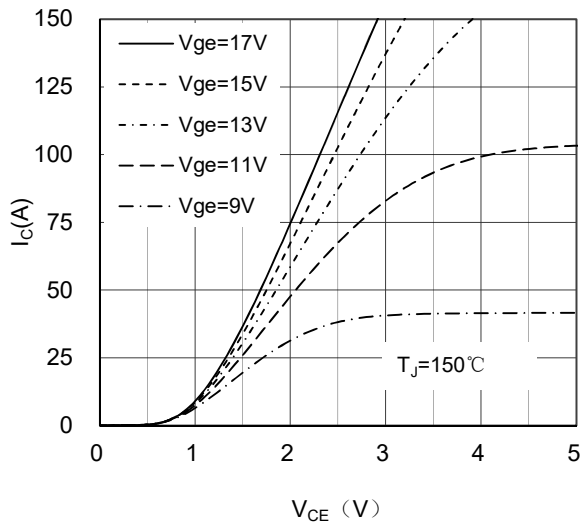


Figure 2. Typical Output Characteristics IGBT

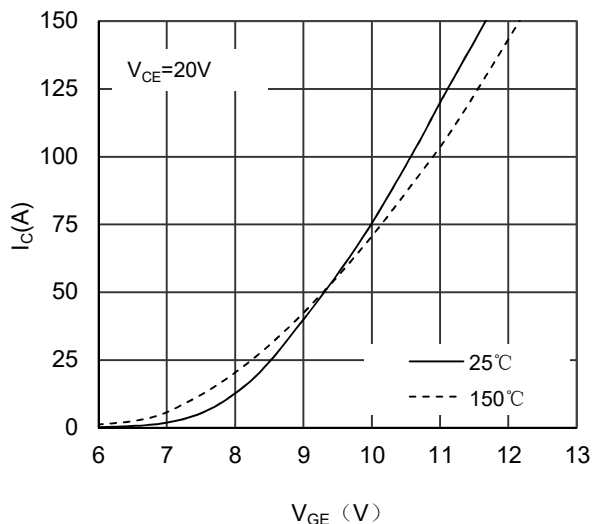


Figure 3. Typical Transfer characteristics IGBT

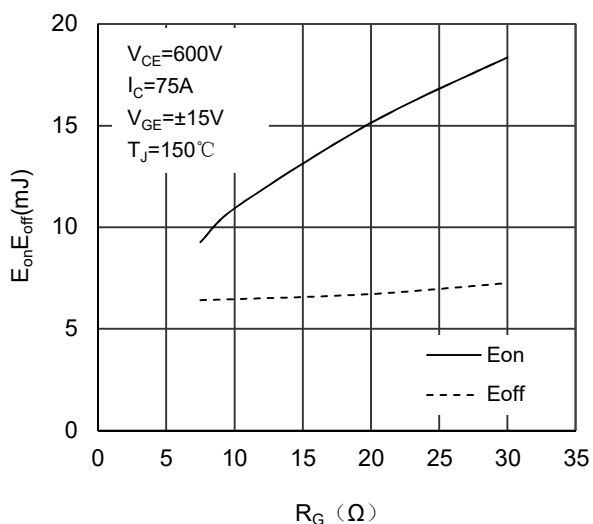


Figure 4. Switching Energy vs Gate Resistor IGBT

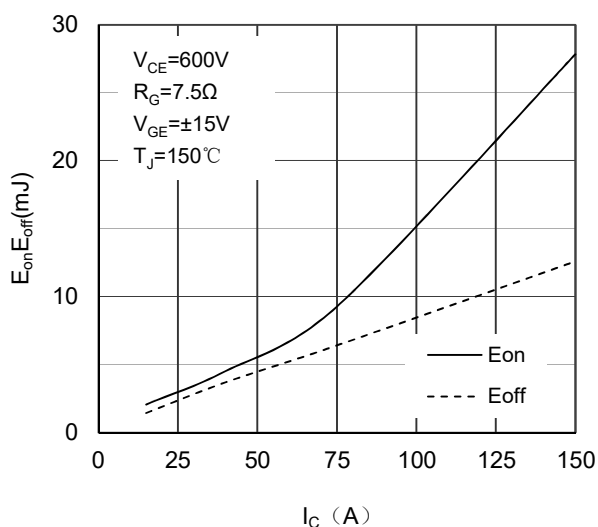


Figure 5. Switching Energy vs Collector Current IGBT

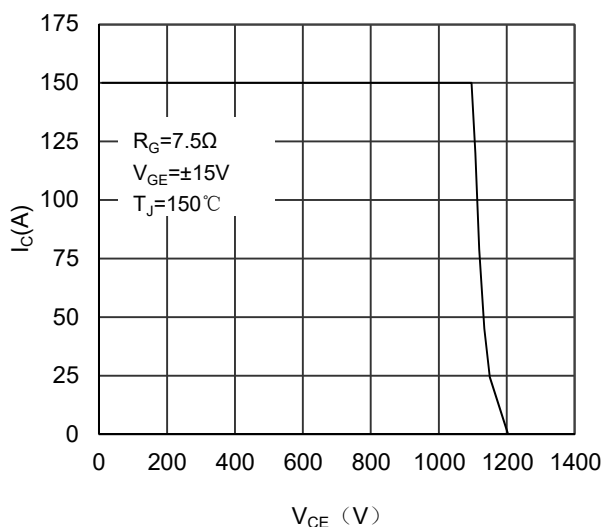


Figure 6. Reverse Biased Safe Operating Area IGBT

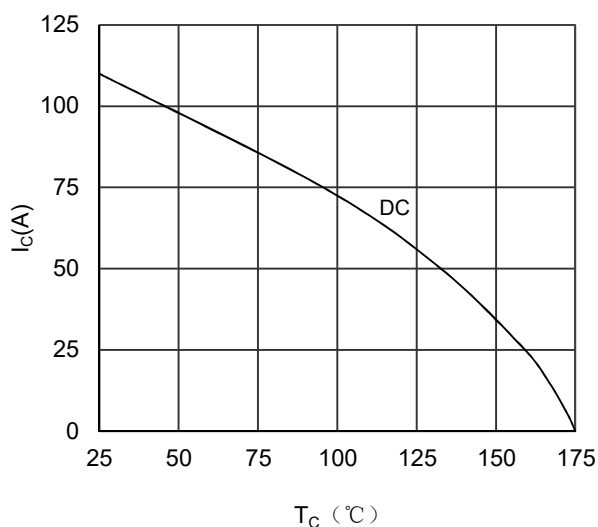


Figure 7. Collector Current vs Case temperature IGBT

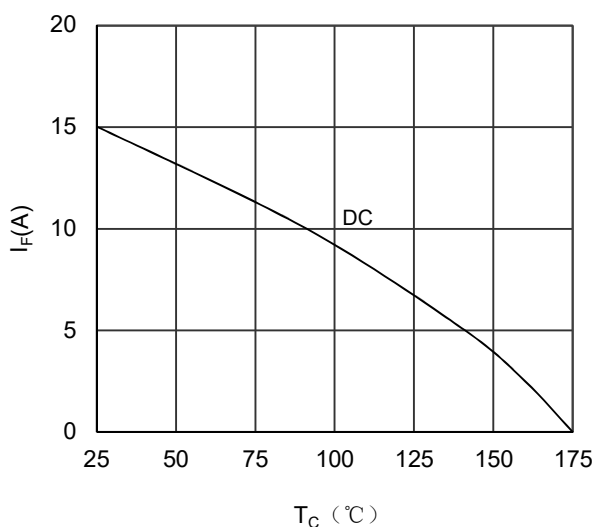


Figure 8. Forward current vs Case temperature Diode(D1)

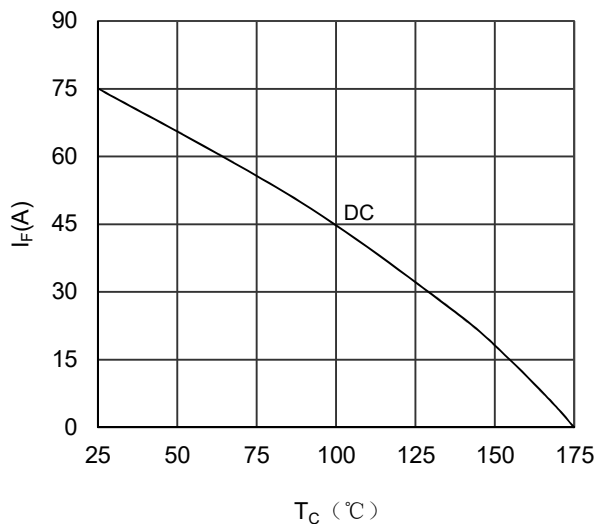


Figure 9. Forward current vs Case temperature Diode(D2)

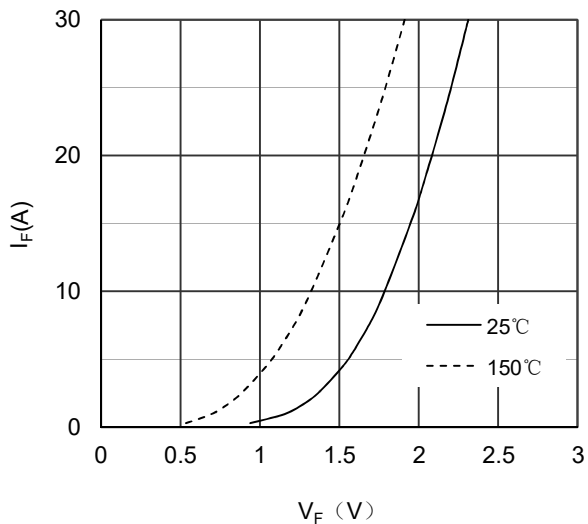


Figure 10. Diode Forward Characteristics Diode(D1)

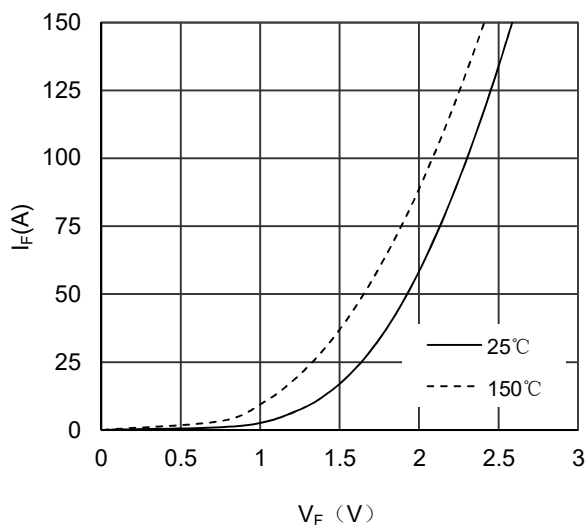


Figure 11. Diode Forward Characteristics Diode(D2)

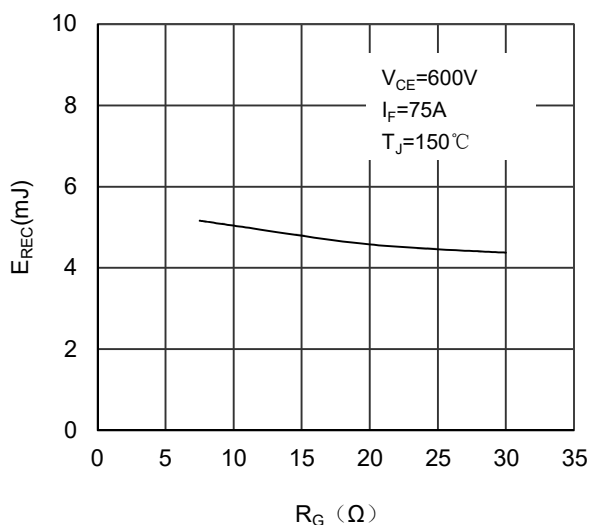


Figure 12. Switching Energy vs Gate Resistor Diode(D2)

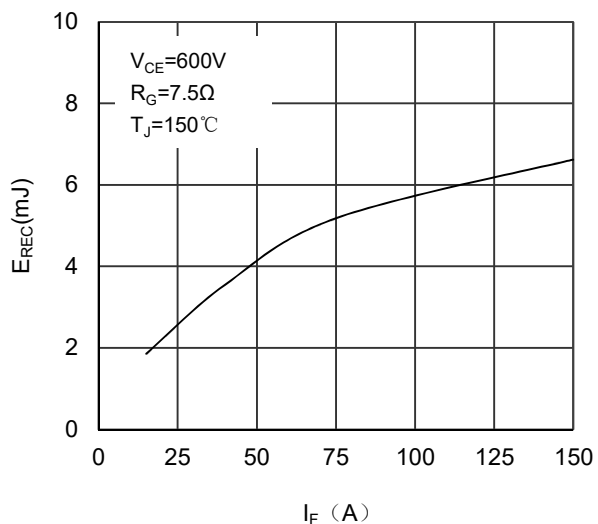


Figure 13. Switching Energy vs Forward Current Diode(D2)

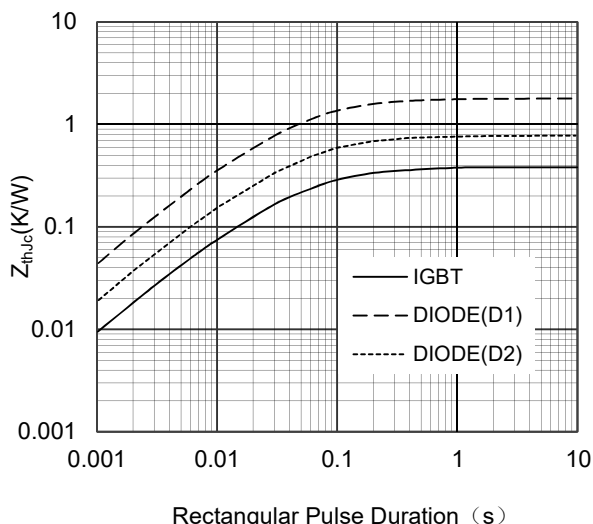


Figure 14. Transient Thermal Impedance of Diode and IGBT

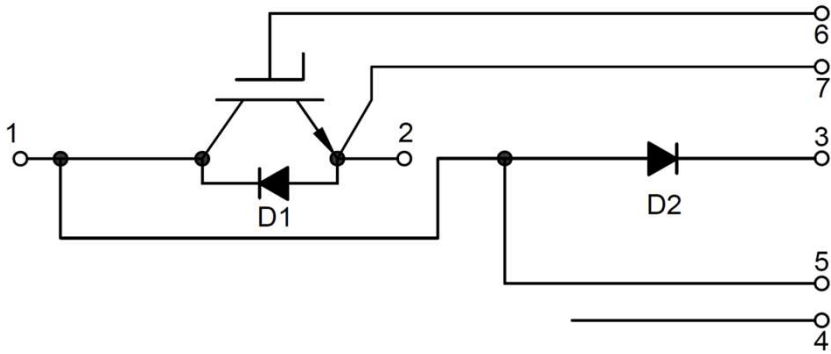
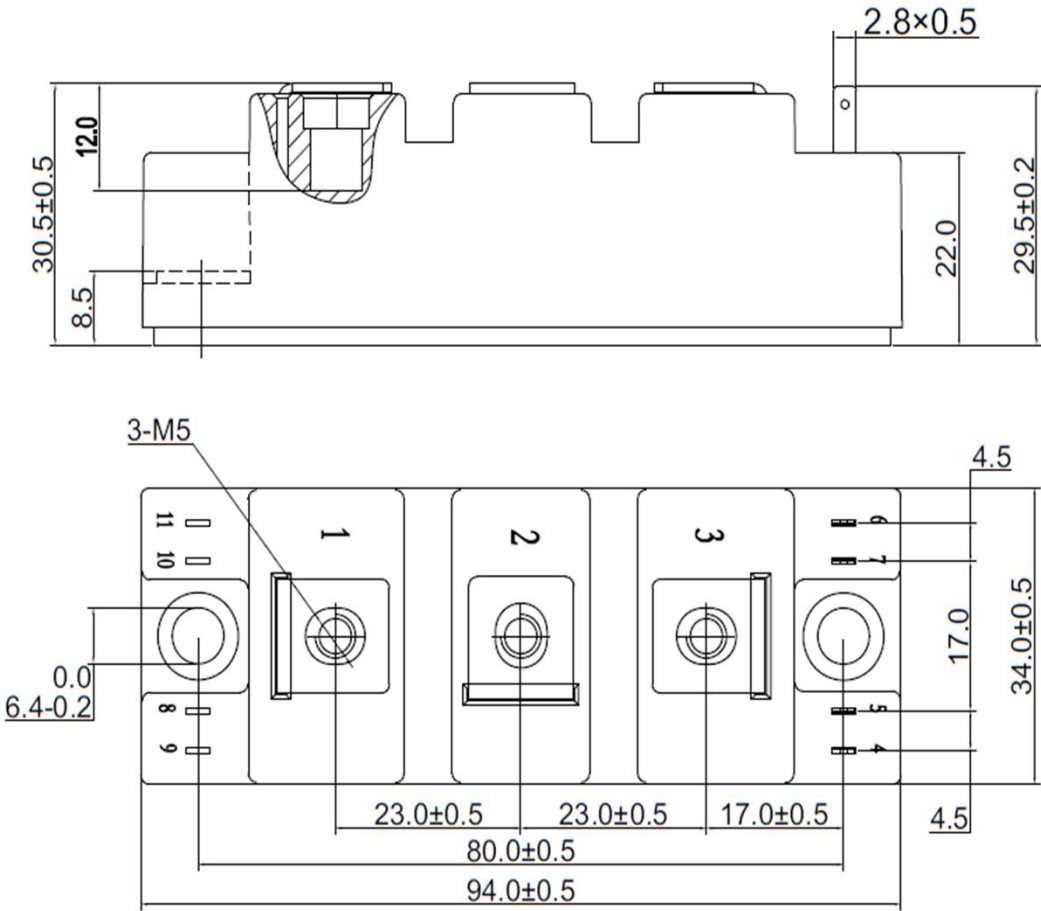


Figure 13. Circuit Diagram



Dimensions in (mm)
Figure 14. Package Outline