MMG100D120B6UC

PRODUCT FEATURES

☐ IGBT chip in trench FS-technology

☐ Low switching losses

☐ $V_{CE(sat)}$ with positive temperature coefficient

☐ Fast switching and short tail current

☐ Free wheeling diodes with fast and soft reverse recovery

APPLICATIONS

☐ Welding Machine

☐ Power Supplies

☐ Others

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=25℃,T_{Jmax}=175℃	154	A
		T_C=100℃,T_{Jmax}=175℃	100	
I_{CM}	Repetitive Peak Collector Current	tp=1ms	200	
P_{tot}	Power Dissipation Per IGBT	T_C=25℃,T_{Jmax}=175℃	789	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		100	A
I_{FRM}	Repetitive Peak Forward Current	tp=1ms	200	
I^2t		T_J =125℃, t=10ms, V_R=0V	2750	A^2S

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	$V_{CE}=V_{GE}$, $I_C=4mA$	5.0	5.8	6.5	
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$I_C=100A$, $V_{GE}=15V$, $T_J=25℃$		1.7	2.15	V
		$I_C=100A$, $V_{GE}=15V$, $T_J=125℃$		1.85		
		$I_C=100A$, $V_{GE}=15V$, $T_J=150℃$		1.95		
I_{CES}	Collector Leakage Current	$V_{CE}=1200V$, $V_{GE}=0V$, $T_J=25℃$			100	µA
		$V_{CE}=1200V$, $V_{GE}=0V$, $T_J=150℃$			1	mA
I_{GES}	Gate Leakage Current	$V_{CE}=0V$,$V_{GE}=±20V$, $T_J=25℃$	-400		400	nA
R_{gint}	Integrated Gate Resistor			3.8		Ω
Q_g	Gate Charge	$V_{CE}=600V$, $I_C=100A$, $V_{GE}=15V$		0.7		µC
C_{ies}	Input Capacitance	$V_{CE}=25V$, $V_{GE}=0V$, f =1MHz		9.8		nF
C_{res}	Reverse Transfer Capacitance			420		pF
$t_{d(on)}$	Turn on Delay Time	$V_{CC}=600V$,$I_C=100A$ R_G =5.1Ω, $V_{GE}=±15V$, Inductive Load	$T_J=25℃$		90		ns
			$T_J=125℃$		100		ns
			$T_J=150℃$		100		ns
t_r	Rise Time		$T_J=25℃$		50		ns
			$T_J=125℃$		56		ns
			$T_J=150℃$		60		ns
$t_{d(off)}$	Turn off Delay Time	$V_{CC}=600V$,$I_C=100A$ R_G =5.1Ω, $V_{GE}=±15V$, Inductive Load	$T_J=25℃$		400		ns
			$T_J=125℃$		440		ns
			$T_J=150℃$		450		ns
t_f	Fall Time		$T_J=25℃$		60		ns
			$T_J=125℃$		90		ns
			$T_J=150℃$		100		ns
E_{on}	Turn on Energy	$V_{CC}=600V$,$I_C=100A$ R_G =5.1Ω, $V_{GE}=±15V$, Inductive Load	$T_J=125℃$		14.2		mJ
			$T_J=150℃$		15		mJ
E_{off}	Turn off Energy		$T_J=125℃$		6.7		mJ
			$T_J=150℃$		7.0		mJ
I_{SC}	Short Circuit Current	tpsc≤10µS , $V_{GE}=15V$ $T_J=150℃$,$V_{CC}=600V$			750		A
R_{thJC}	Junction to Case Thermal Resistance （ Per IGBT）				0.19	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	$I_F=100A$, $V_{GE}=0V$, $T_J=25℃$		1.7	2.15	V
		$I_F=100A$, $V_{GE}=0V$, $T_J=125℃$		1.65		
		$I_F=100A$, $V_{GE}=0V$, $T_J=150℃$		1.65		
t_{rr}	Reverse Recovery Time	$I_F=100A$, $V_R=600V$ $dI_F/dt=-2050A/µs$ $T_J =150℃$		460		ns
I_{RRM}	Max. Reverse Recovery Current			106		A
Q_{RR}	Reverse Recovery Charge			20		µC
E_{rec}	Reverse Recovery Energy			6.9		mJ
R_{thJCD}	Junction to Case Thermal Resistance （ Per Diode）				0.42	K /W

MMG100D120B6UC

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	to heatsink	Recommended（M6）	3~5	Nm
	to terminal	Recommended（M6）	2.5~5	Nm
Weight			300	g
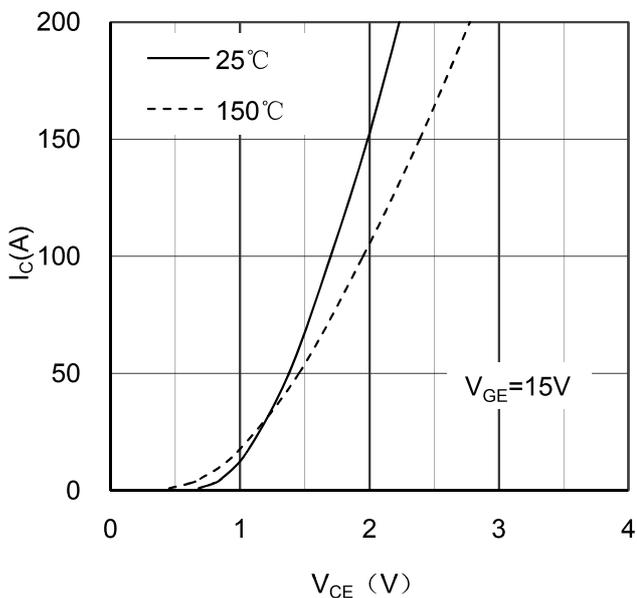
Figure 1. Typical Output Characteristics IGBT-inverter
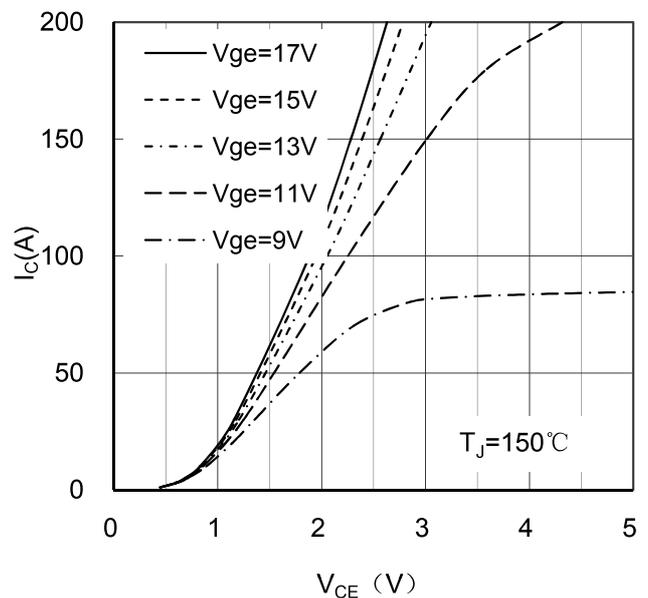
Figure 2. Typical Output Characteristics IGBT-inverter

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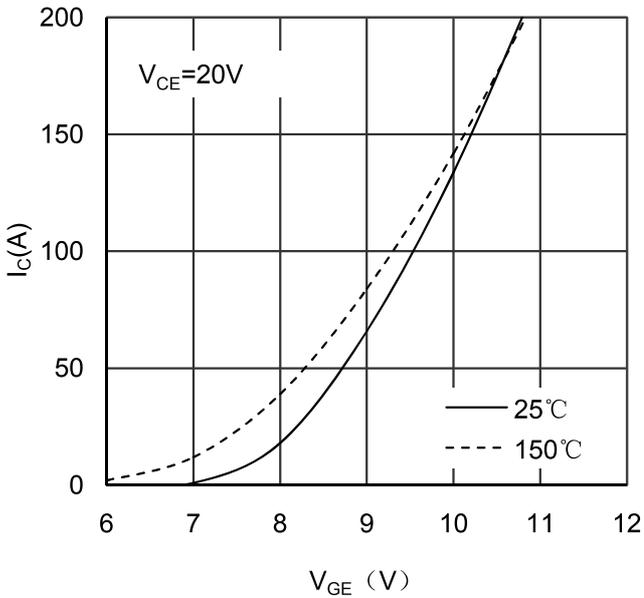
Figure 3. Typical Transfer characteristics IGBT-inverter
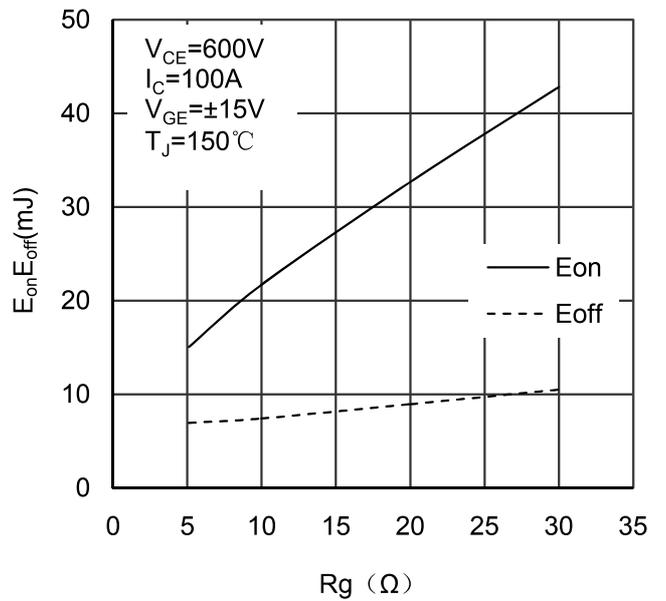
Figure 4. Switching Energy vs Gate Resistor IGBT-inverter
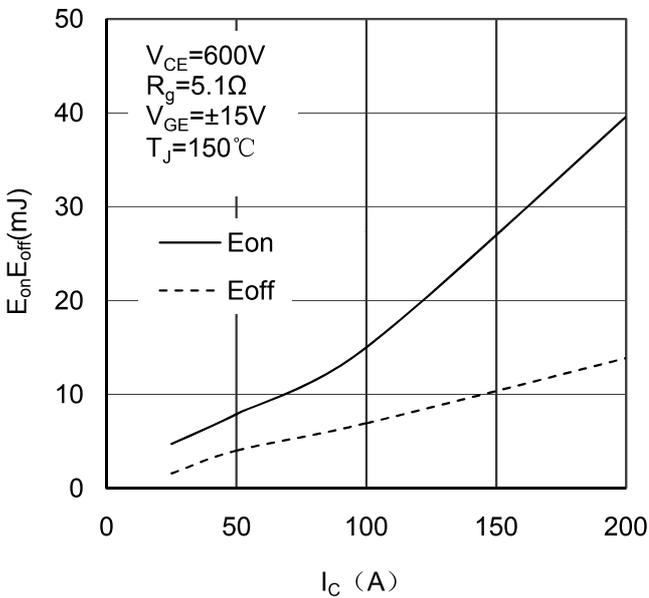
Figure 5. Switching Energy vs Collector Current IGBT-inverter
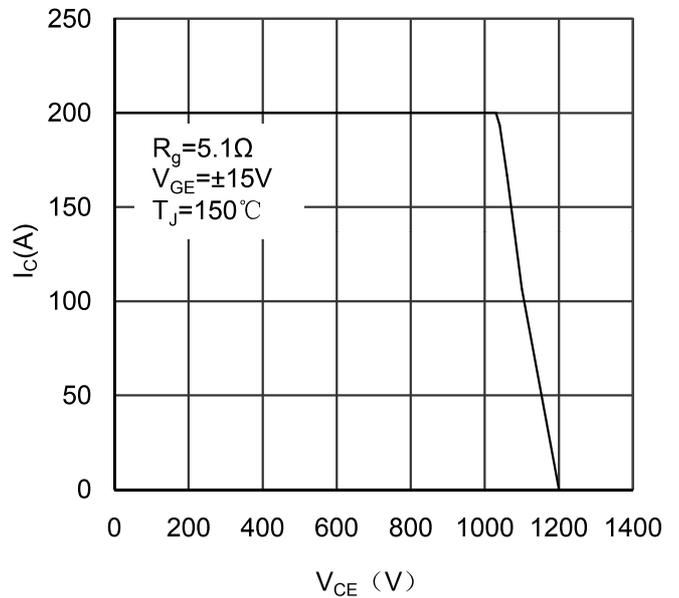
Figure 6. Reverse Biased Safe Operating Area IGBT-inverter
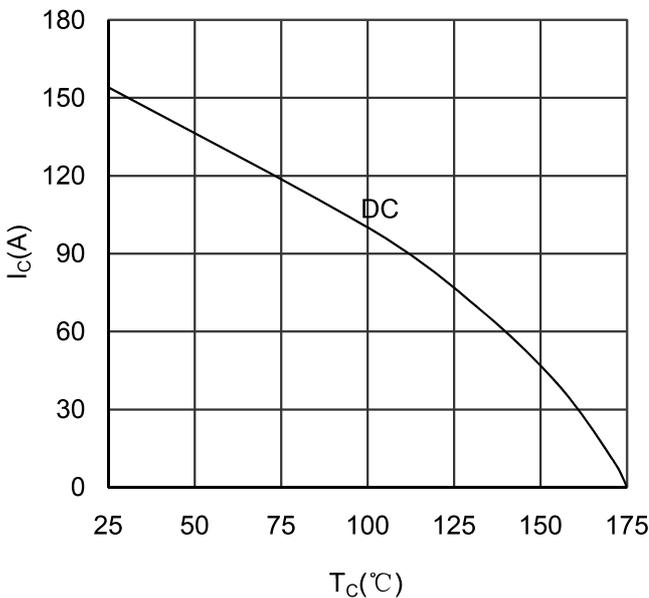
Figure 7. Collector Current vs Case temperature IGBT -inverter
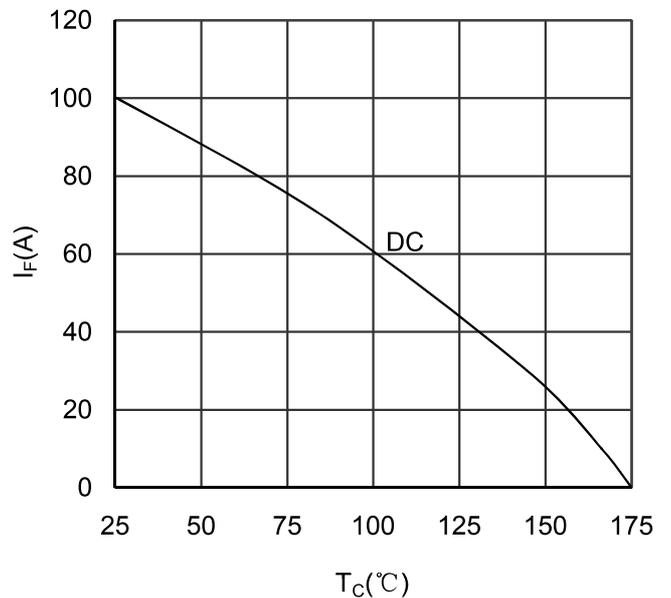
Figure 8. Forward current vs Case temperature Diode -inverter
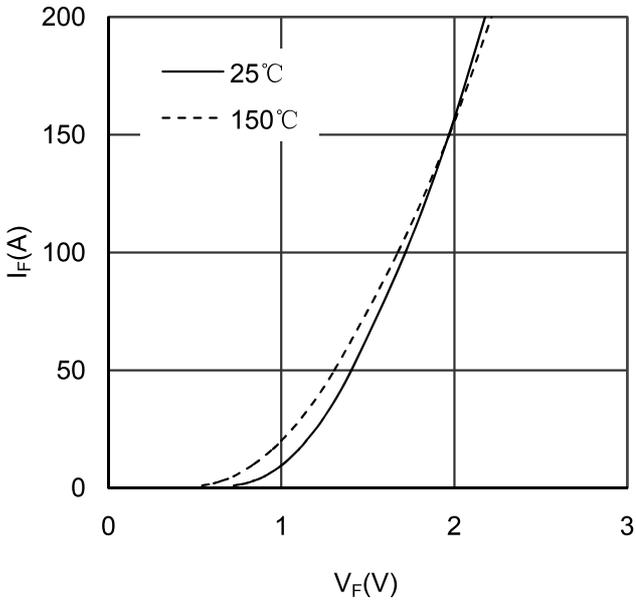
Figure 9. Diode Forward Characteristics Diode -inverter
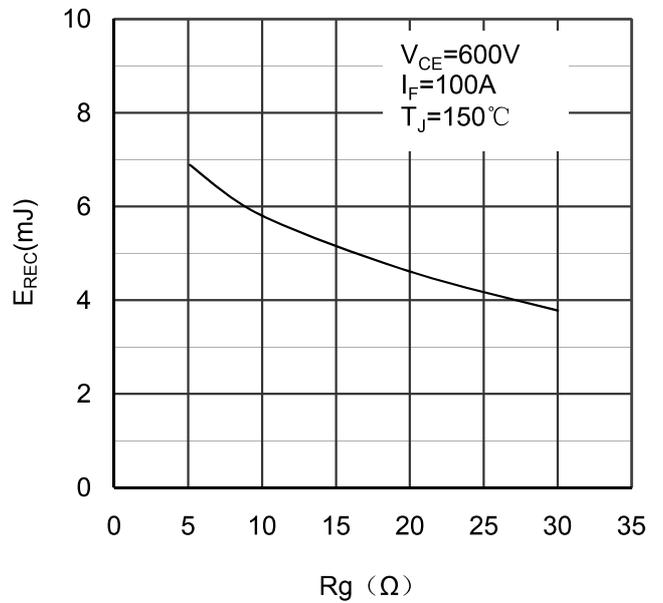
Figure 10. Switching Energy vs Gate Resistor Diode - inverter
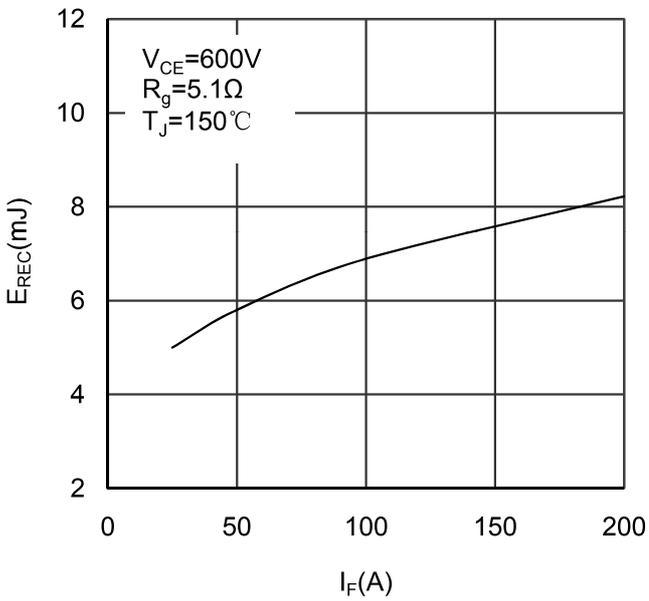
Figure 11. Switching Energy vs Forward Current Diode-inverter
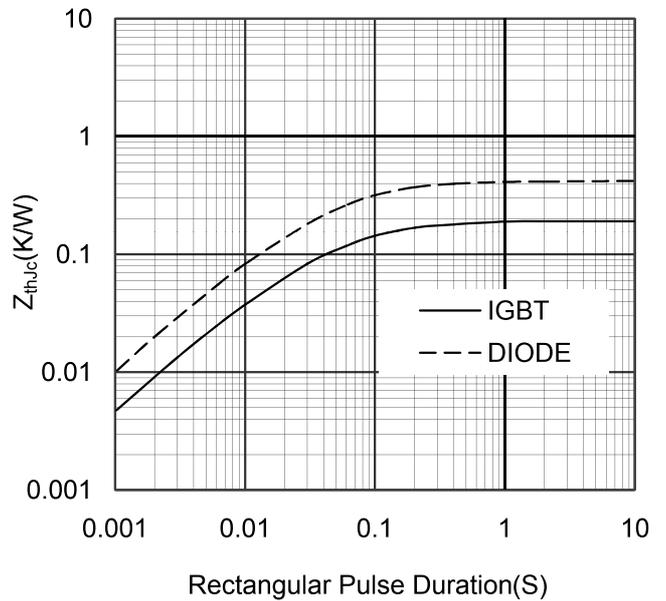
Figure 12. Transient Thermal Impedance of Diode and IGBT-inverter
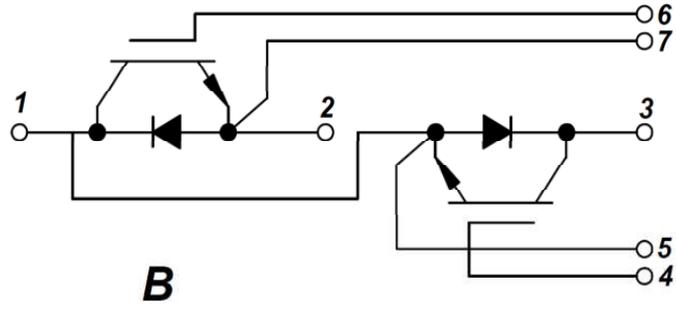
Figure 13. Circuit Diagram
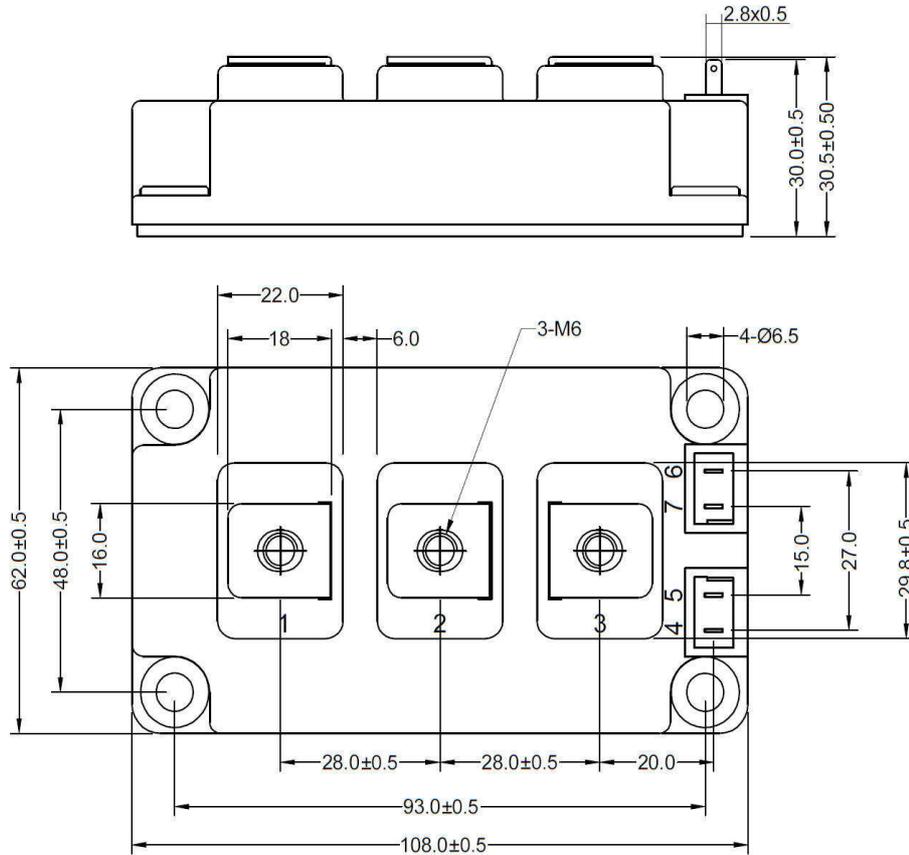
Dimensions in (mm)
Figure 14. Package Outline