

PRODUCT FEATURES

- ☐ IGBT CHIP(1700V Trench+Field Stop technology)
- ☐ Low turn-off losses, short tail current
- ☐ $V_{CE(sat)}$ with positive temperature coefficient
- ☐ Ultra Low Loss,High Ruggedness
- ☐ Free wheeling diodes with fast and soft reverse recovery

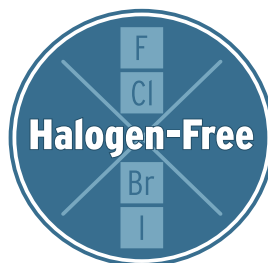
APPLICATIONS

- ☐ AC motor control
- ☐ Motion/servo control
- ☐ Inverter and power supplies
- ☐ Photovoltaic/Fuel cell

Product Summary

V_{CE}	$V_{CE(sat)}$	ID
1700V	2.15V	400A

IGBT Module



IGBT-inverter

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

Symbol	Parameter/Test Conditions		Values	Unit
V_{CES}	Collector Emitter Voltage	$T_J=25^{\circ}C$	1700	V
V_{GES}	Gate Emitter Voltage		± 20	
I_C	DC Collector Current	$T_C=25^{\circ}C, T_{Jmax}=175^{\circ}C$	446	A
		$T_C=95^{\circ}C, T_{Jmax}=175^{\circ}C$	400	
I_{CM}	Repetitive Peak Collector Current	$tp=1ms$	800	
P_{tot}	Power Dissipation Per IGBT	$T_C=25^{\circ}C, T_{Jmax}=175^{\circ}C$	1760	W

Diode-inverter

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

Symbol	Parameter/Test Conditions		Values	Unit
V_{RRM}	Repetitive Reverse Voltage	$T_J=25^{\circ}C$	1700	V
$I_{F(AV)}$	Average Forward Current		400	A
I_{FRM}	Repetitive Peak Forward Current	$tp=1ms$	600	
I^2t		$T_J=125^{\circ}C, t=10ms, V_R=0V$	14500	A^2S

IGBT-inverter

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	$V_{CE}=V_{GE}, I_C=12\text{mA}$	5.0	6.0	6.5	V
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$I_C=400\text{A}, V_{GE}=15\text{V}, T_J=25^\circ\text{C}$		2.15	2.6	
		$I_C=400\text{A}, V_{GE}=15\text{V}, T_J=125^\circ\text{C}$		2.35		
		$I_C=400\text{A}, V_{GE}=15\text{V}, T_J=150^\circ\text{C}$		2.45		
I_{CES}	Collector Leakage Current	$V_{CE}=1700\text{V}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$			2	mA
		$V_{CE}=1700\text{V}, V_{GE}=0\text{V}, T_J=150^\circ\text{C}$			20	mA
I_{GES}	Gate Leakage Current	$V_{CE}=0\text{V}, V_{GE}=\pm 20\text{V}, T_J=25^\circ\text{C}$	-500		500	nA
R_{gint}	Integrated Gate Resistor			1.8		Ω
Q_g	Gate Charge	$V_{CE}=900\text{V}, I_C=400\text{A}, V_{GE}=15\text{V}$		2.1		μC
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$		29.4		nF
C_{res}	Reverse Transfer Capacitance			900		pF
$t_{d(on)}$	Turn on Delay Time	$V_{CC}=900\text{V}, I_C=400\text{A}$ $R_G=4.7\Omega,$	$T_J=25^\circ\text{C}$	170		ns
			$T_J=150^\circ\text{C}$	190		ns
t_r	Rise Time	$V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$	150		ns
			$T_J=150^\circ\text{C}$	165		ns
$t_{d(off)}$	Turn off Delay Time	$V_{CC}=900\text{V}, I_C=400\text{A}$ $R_G=4.7\Omega,$	$T_J=25^\circ\text{C}$	690		ns
			$T_J=150^\circ\text{C}$	770		ns
t_f	Fall Time	$V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$	240		ns
			$T_J=150^\circ\text{C}$	360		ns
E_{on}	Turn on Energy	$V_{CC}=900\text{V}, I_C=400\text{A}$ $R_G=4.7\Omega,$	$T_J=25^\circ\text{C}$	173		mJ
			$T_J=125^\circ\text{C}$	223		mJ
			$T_J=150^\circ\text{C}$	232		mJ
E_{off}	Turn off Energy	$V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$	58		mJ
			$T_J=125^\circ\text{C}$	90		mJ
			$T_J=150^\circ\text{C}$	96		mJ
I_{SC}	Short Circuit Current	$t_{psc} \leq 10\mu\text{s}, V_{GE}=15\text{V}$ $T_J=150^\circ\text{C}, V_{CC}=1000\text{V}$		1000		A
R_{thJC}	Junction to Case Thermal Resistance (Per IGBT)				0.085	K /W

Diode-inverter

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 =400A , V _{GE} =0V, T _J =25℃		1.8	2.2	V
		I _F =400A , V _{GE} =0V, T _J =125℃		1.9		
		I _F =400A , V _{GE} =0V, T _J =150℃		1.9		
t _{rr}	Reverse Recovery Time	I _F =300A , V _R =900V dI _F /dt=-1500A/μs T _J =150℃		1380		ns
I _{RRM}	Max. Reverse Recovery Current			212		A
Q _{RR}	Reverse Recovery Charge			143		μC
E _{rec}	Reverse Recovery Energy			63		mJ
R _{thJCD}	Junction to Case Thermal Resistance （Per Diode）				0.13	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	$^{\circ}\text{C}$
T_{Jop}	Operating Temperature		-40~150	
T_{stg}	Storage Temperature		-40~125	
V_{isol}	Isolation Breakdown Voltage	AC, 50Hz(R.M.S), t=1minute	4000	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

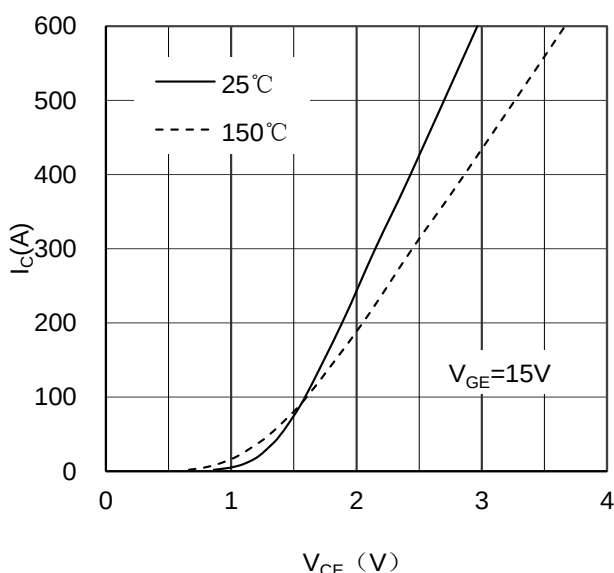


Figure 1. Typical Output Characteristics IGBT-inverter

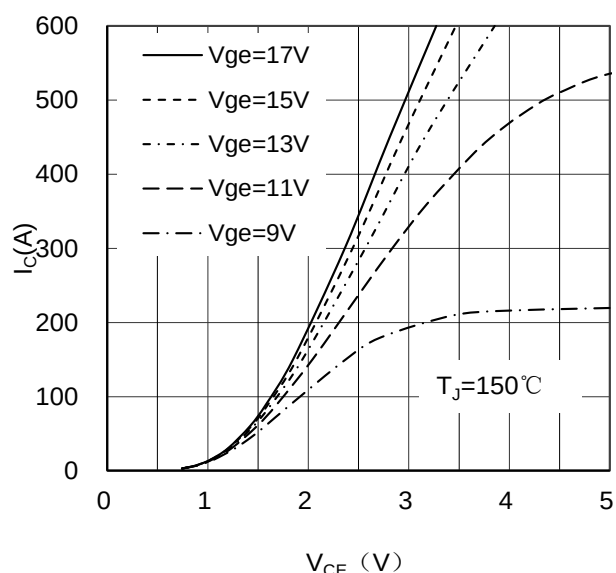


Figure 2. Typical Output Characteristics IGBT-inverter

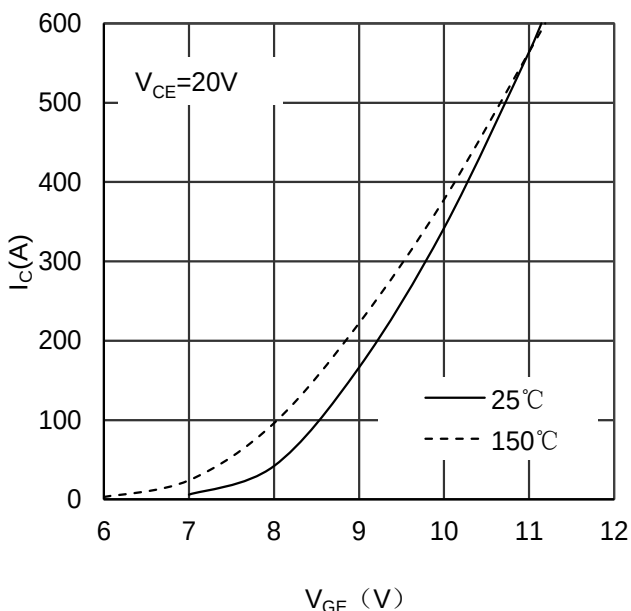


Figure 3. Typical Transfer characteristics IGBT-inverter

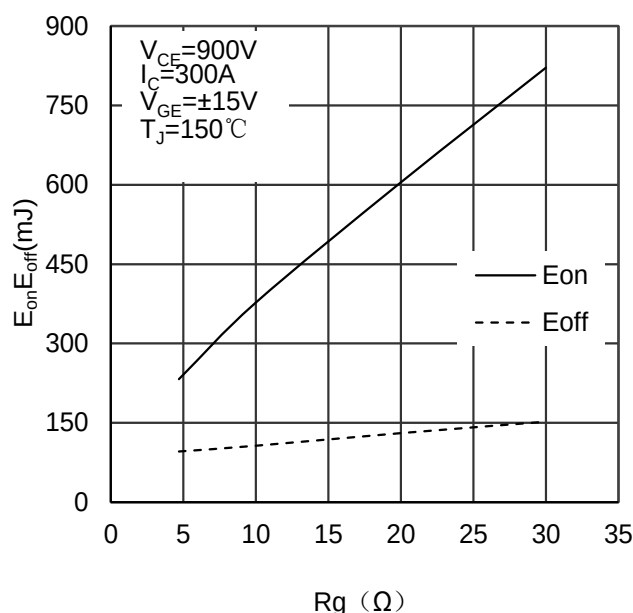


Figure 4. Switching Energy vs Gate Resistor IGBT-inverter

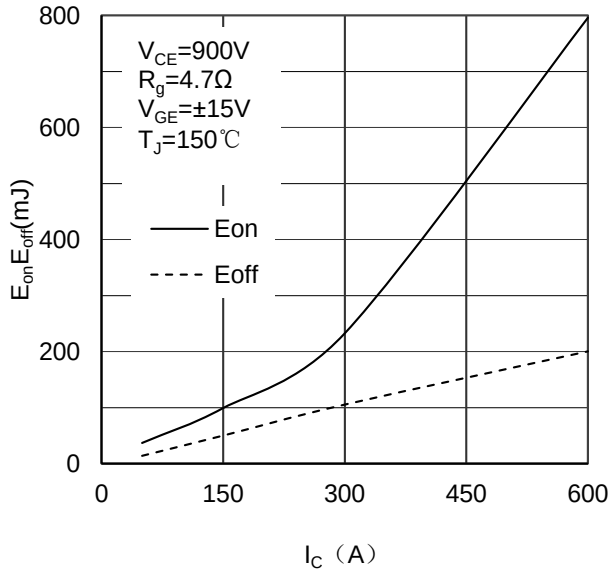


Figure 5. Switching Energy vs Collector Current IGBT-inverter

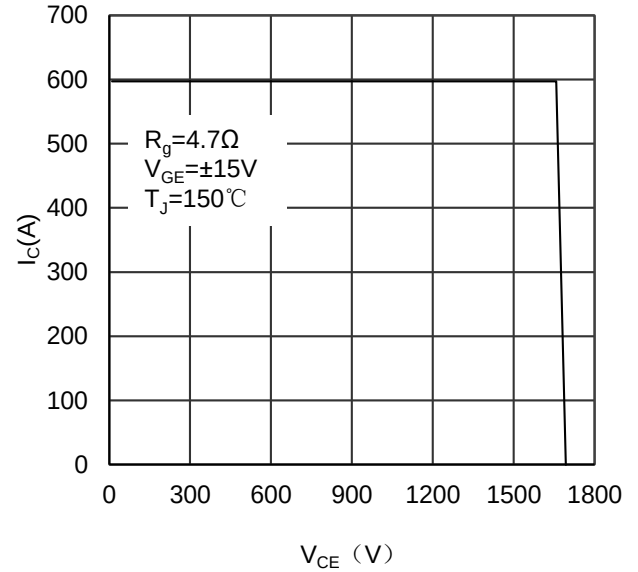


Figure 6. Reverse Biased Safe Operating Area IGBT-inverter

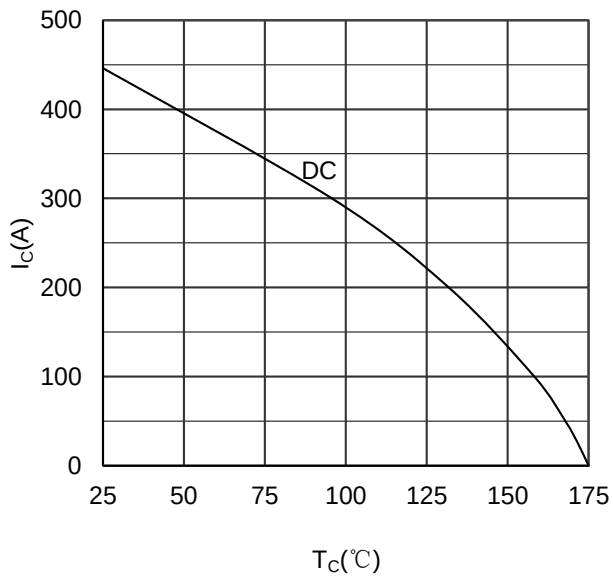


Figure 7. Collector Current vs Case temperature IGBT-inverter

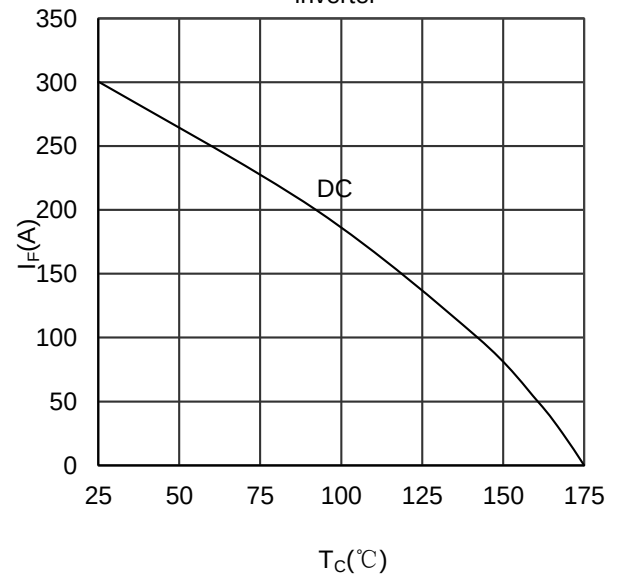


Figure 8. Forward current vs Case temperature Diode-inverter

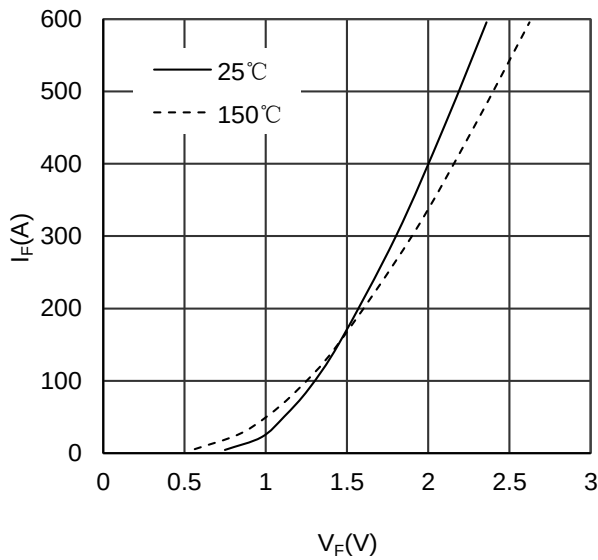


Figure 9. Diode Forward Characteristics Diode -inverter

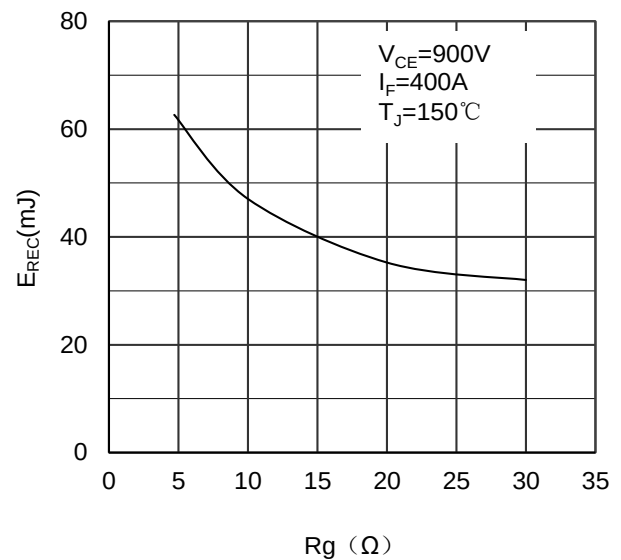


Figure 10. Switching Energy vs Gate Resistor Diode - inverter

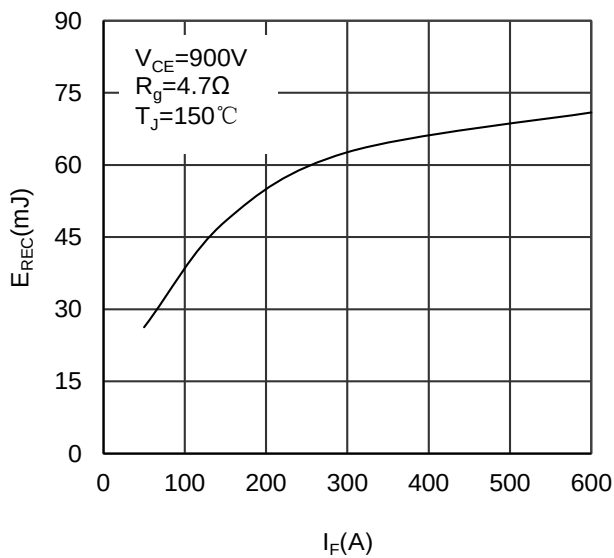


Figure 11. Switching Energy vs Forward Current Diode-inverter

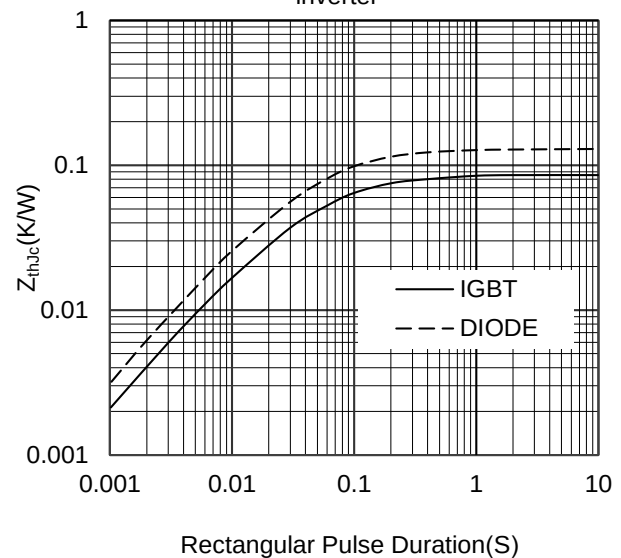


Figure 12. Transient Thermal Impedance of Diode and IGBT-inverter

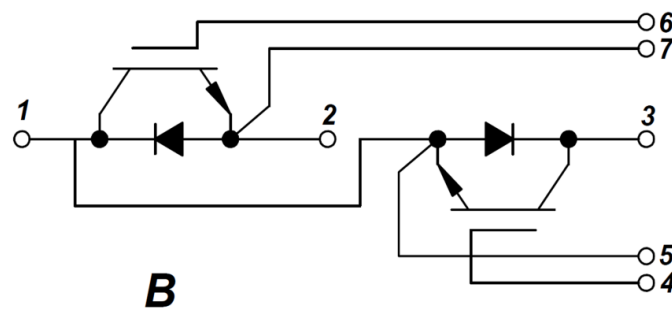
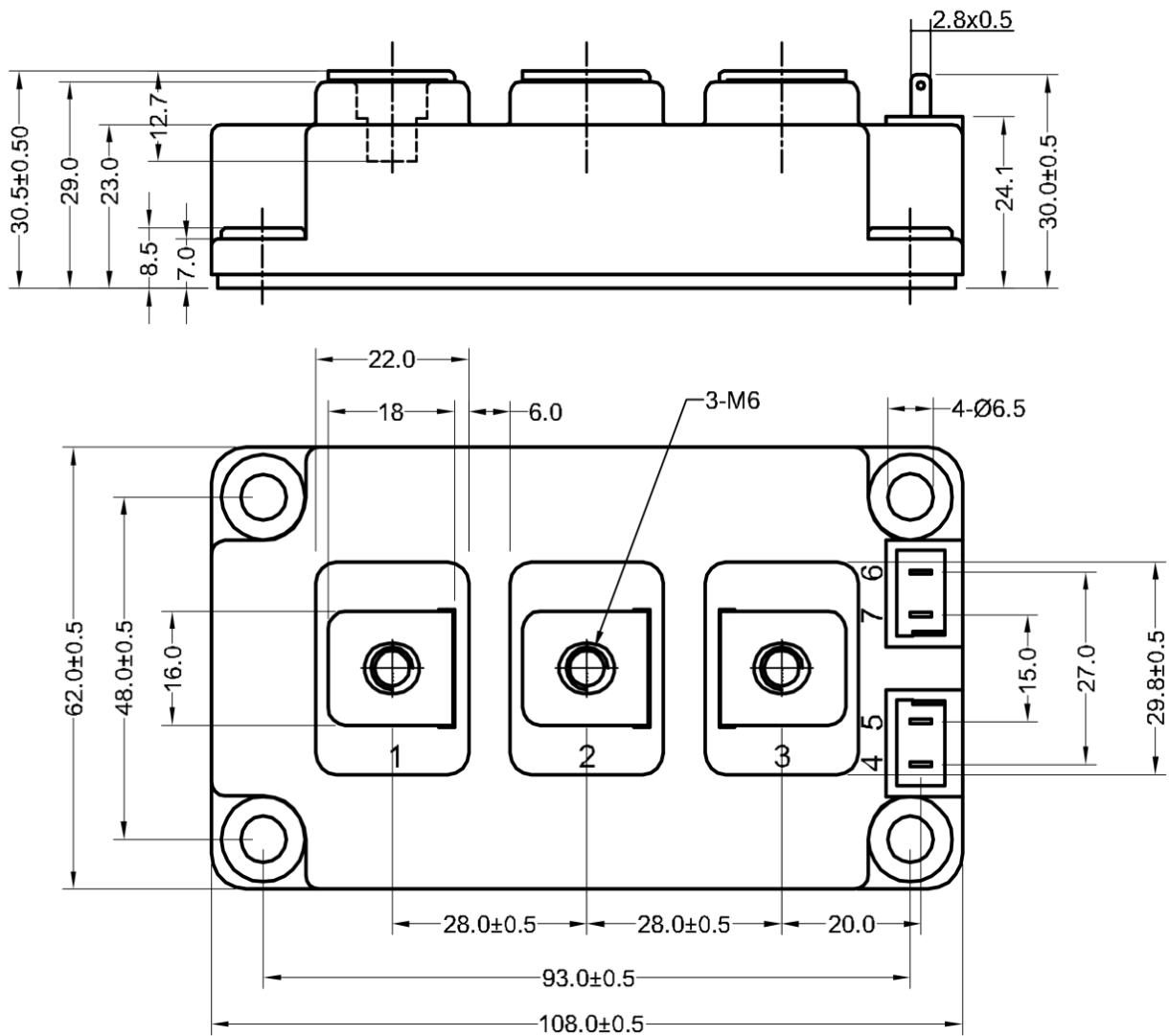


Figure 13. Circuit Diagram



Dimensions in (mm)
Figure 14. Package Outline