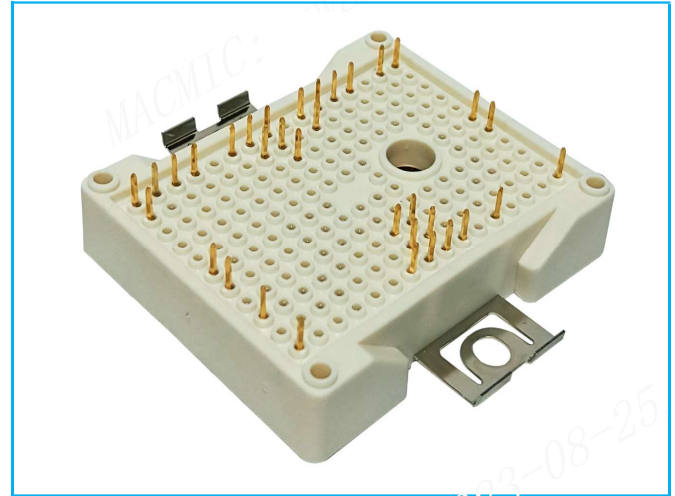


PRODUCT FEATURES

- 650V IGBT CHIP(Trench+Field Stop technology)
- Low saturation voltage and positive temperature coefficient
- Low switching losses and short tail current
- Free wheeling diodes with fast and soft reverse recovery
- Temperature sense included

APPLICATIONS

- 3-Level-Applications
- Solar Applications
- UPS Systems



IGBT(T1、 T2、 T3、 T4)

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

Symbol	Parameter/Test Conditions		Values	Unit
V_{CES}	Collector Emitter Voltage	$T_J=25^{\circ}\text{C}$	650	V
V_{GES}	Gate Emitter Voltage		± 20	
I_C	DC Collector Current	$T_C=25^{\circ}\text{C}, T_{Jmax}=175^{\circ}\text{C}$	116	A
		$T_C=58^{\circ}\text{C}, T_{Jmax}=175^{\circ}\text{C}$	100	
I_{CM}	Repetitive Peak Collector Current	$t_p=1\text{ms}$	200	
P_{tot}	Power Dissipation Per IGBT	$T_C=25^{\circ}\text{C}, T_{Jmax}=175^{\circ}\text{C}$	300	W

Diode(D1、 D2、 D3、 D4、 D5、 D6)

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

Symbol	Parameter/Test Conditions		Values	Unit
V_{RRM}	Repetitive Reverse Voltage	$T_J=25^{\circ}\text{C}$	650	V
$I_{F(AV)}$	Average Forward Current		100	A
I_{FRM}	Repetitive Peak Forward Current	$t_p=1\text{ms}$	200	
I^2t		$T_J=125^{\circ}\text{C}, t=10\text{ms}, V_R=0\text{V}$	1800	A^2s

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MMG100CE065PD6TC

IGBT(T1、T2、T3、T4)

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	$V_{CE}=V_{GE}, I_C=1.6\text{mA}$	4.9	5.8	6.5	V
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$I_C=100\text{A}, V_{GE}=15\text{V}, T_J=25^\circ\text{C}$		1.55	2	
		$I_C=100\text{A}, V_{GE}=15\text{V}, T_J=150^\circ\text{C}$		1.8		
I_{CES}	Collector Leakage Current	$V_{CE}=650\text{V}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$			1	mA
		$V_{CE}=650\text{V}, V_{GE}=0\text{V}, T_J=150^\circ\text{C}$			5	
I_{GES}	Gate Leakage Current	$V_{CE}=0\text{V}, V_{GE}=\pm 20\text{V}, T_J=25^\circ\text{C}$	-400		400	nA
R_{gint}	Integrated Gate Resistor			2		Ω
Q_G	Gate Charge	$V_{CE}=300\text{V}, I_C=100\text{A}, V_{GE}=15\text{V}$		0.58		μC
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$		6.6		nF
C_{res}	Reverse Transfer Capacitance				290	
$t_{d(on)}$	Turn on Delay Time	$V_{CC}=300\text{V}, I_C=100\text{A}$ $R_G=5.1\Omega,$ $V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		30	ns
			$T_J=150^\circ\text{C}$		40	ns
t_r	Rise Time	$V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		38	ns
			$T_J=150^\circ\text{C}$		42	ns
$t_{d(off)}$	Turn off Delay Time	$V_{CC}=300\text{V}, I_C=100\text{A}$ $R_G=5.1\Omega,$ $V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		220	ns
			$T_J=150^\circ\text{C}$		270	ns
t_f	Fall Time	$V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		60	ns
			$T_J=150^\circ\text{C}$		80	ns
E_{on}	Turn on Energy	$V_{CC}=300\text{V}, I_C=100\text{A}$ $R_G=5.1\Omega,$ $V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		1.95	mJ
			$T_J=150^\circ\text{C}$		3.05	mJ
E_{off}	Turn off Energy	$V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		1.75	mJ
			$T_J=150^\circ\text{C}$		2.4	mJ
I_{SC}	Short Circuit Current	$tp_{sc}\leq 6\mu\text{S}, V_{GE}=15\text{V}$ $T_J=125^\circ\text{C}, V_{CC}=360\text{V}$		500		A
R_{thJC}	Junction to Case Thermal Resistance (Per IGBT)			0.45	0.5	K/W

Diode(D1、D2、D3、D4、D5、D6)

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

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F=100\text{A}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$		1.7	2.15	V
		$I_F=100\text{A}, V_{GE}=0\text{V}, T_J=150^\circ\text{C}$		1.45		
t_{rr}	Reverse Recovery Time	$I_F=100\text{A}, V_R=300\text{V}$ $di_F/dt=-3000\text{A}/\mu\text{s}$ $T_J=150^\circ\text{C}$		110		ns
I_{RRM}	Max. Reverse Recovery Current			115		A
Q_{RR}	Reverse Recovery Charge			8.1		μC
E_{rec}	Reverse Recovery Energy			2.15		mJ
R_{thJCD}	Junction to Case Thermal Resistance (Per Diode)				0.6	K/W

MMG100CE065PD6TC

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

Symbol	Parameter/Test Conditions	Min.	Typ.	Max.	Unit
R_{25}	Resistance $T_C=25^\circ\text{C}$		5		K Ω
$B_{25/50}$	$R_2 = R_{25} \exp [B_{25/50}(1/T_2 - 1/(298.15 \text{ K}))]$		3375		K

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

Symbol	Parameter/Test Conditions	Values	Unit	
T_{Jmax}	Max. Junction Temperature	175	°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
CTI	Comparative Tracking Index		> 200	
F	Mounting Force Per Clamp		40~80	N
Weight			50	g

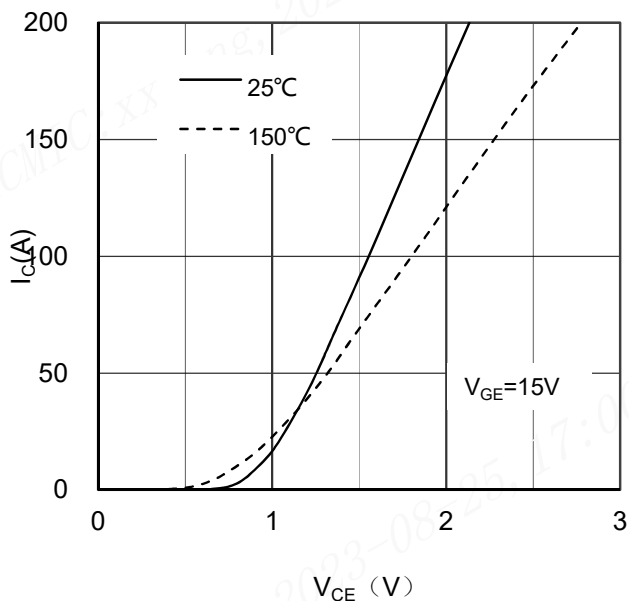


Figure 1. Typical Output Characteristics IGBT

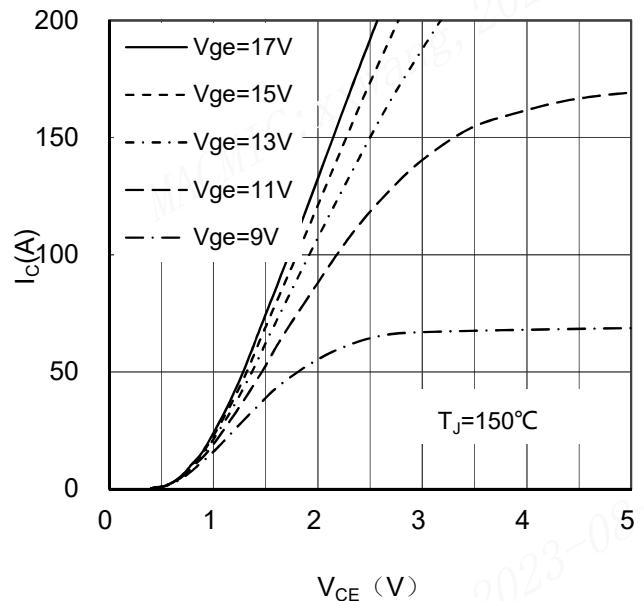


Figure 2. Typical Output Characteristics IGBT

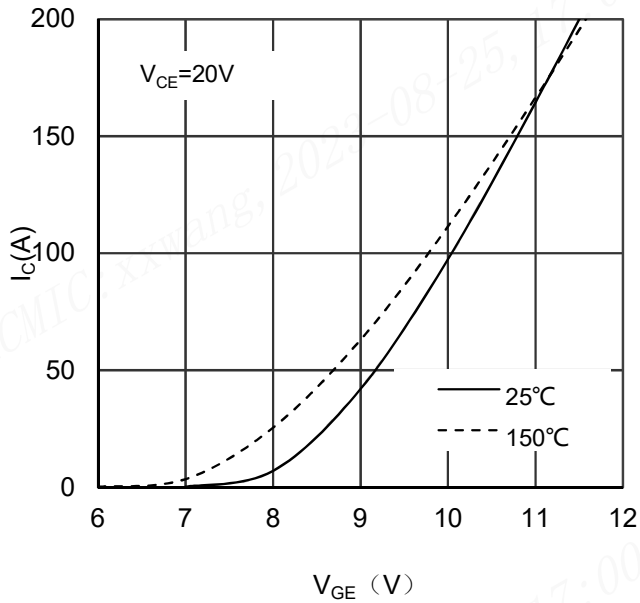


Figure 3. Typical Transfer characteristics IGBT

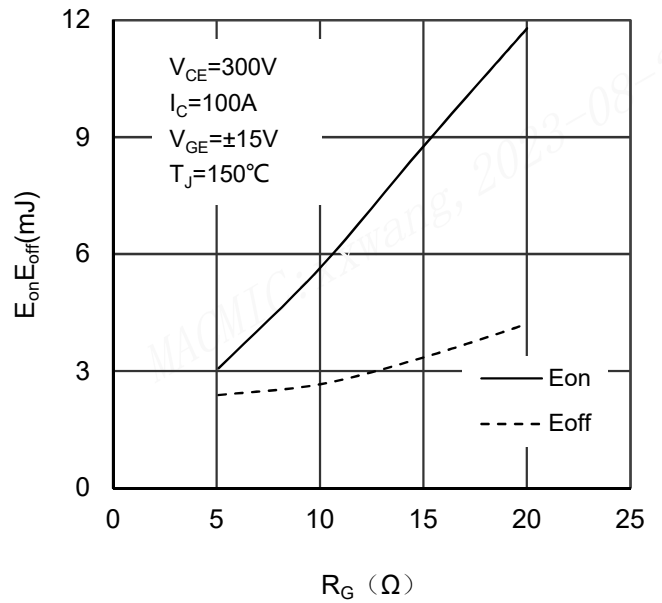


Figure 4. Switching Energy vs Gate Resistor IGBT

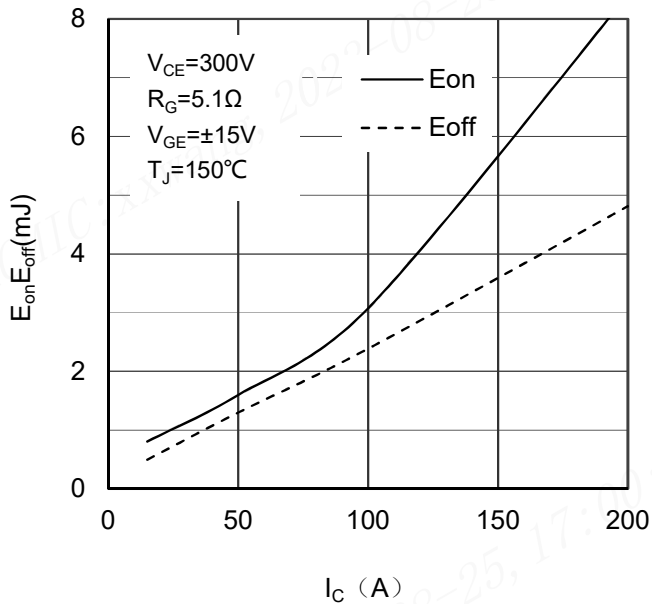


Figure 5. Switching Energy vs Collector Current IGBT

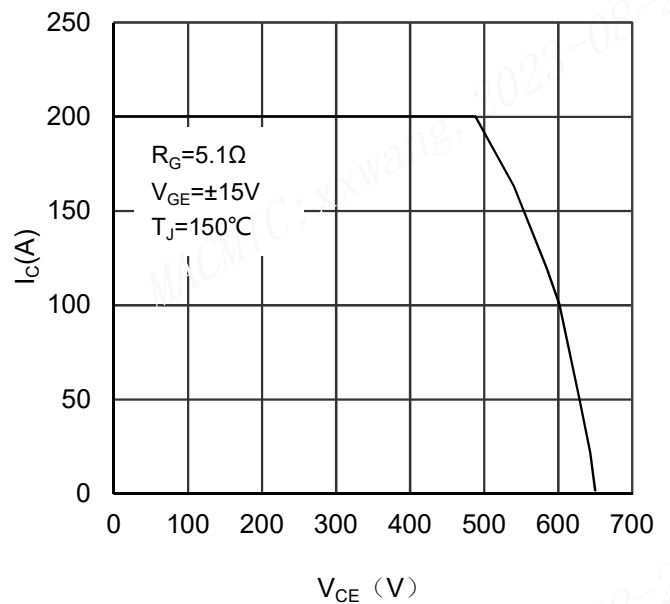


Figure 6. Reverse Biased Safe Operating Area IGBT

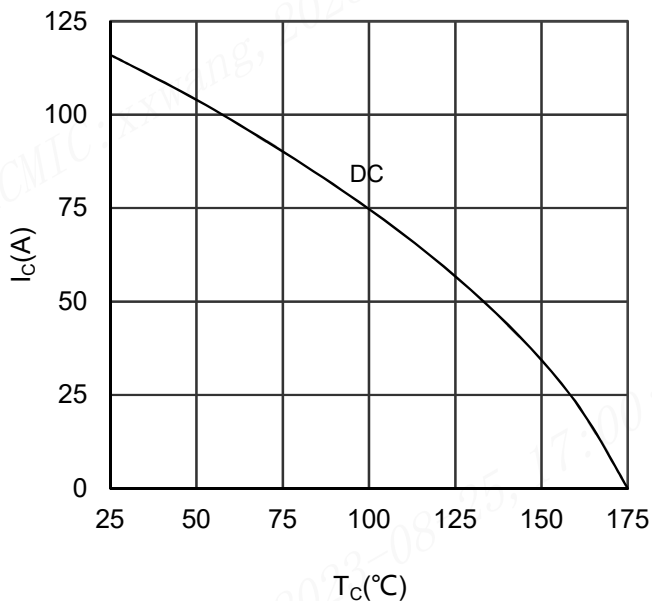


Figure 7. Collector Current vs Case temperature IGBT

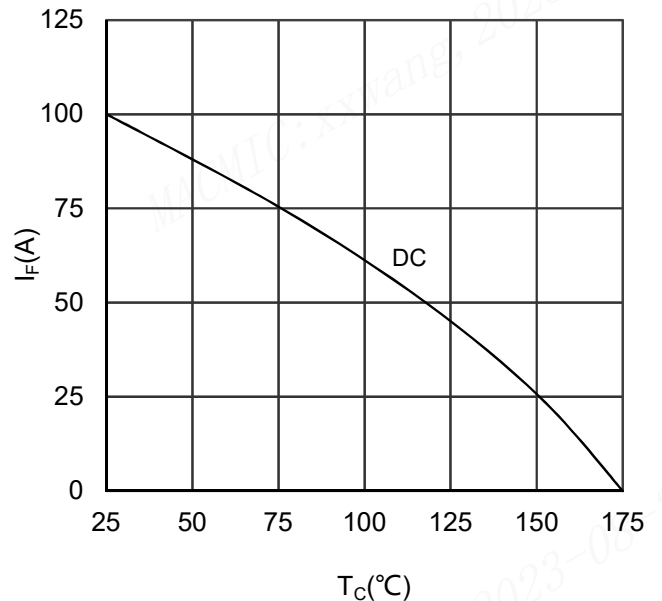


Figure 8. Forward current vs Case temperature Diode

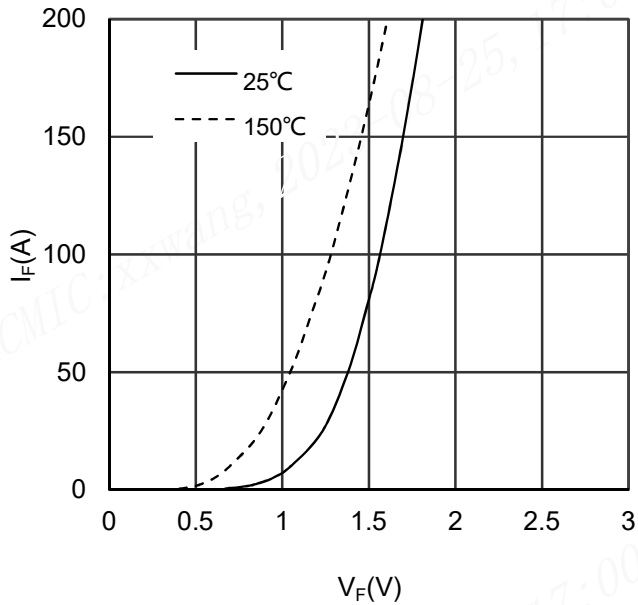


Figure 9. Diode Forward Characteristics Diode

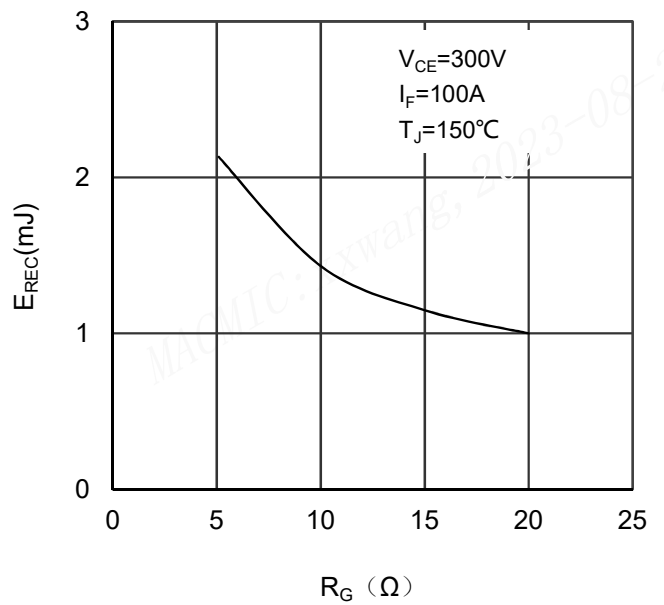


Figure 10. Switching Energy vs Gate Resistor Diode

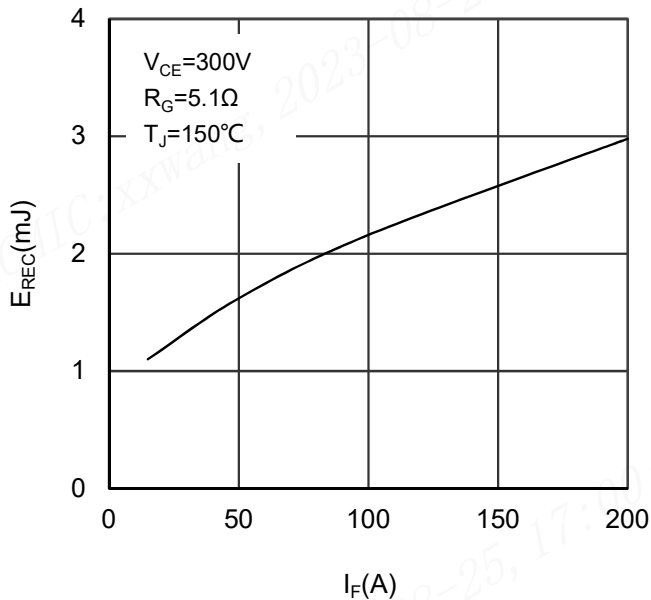
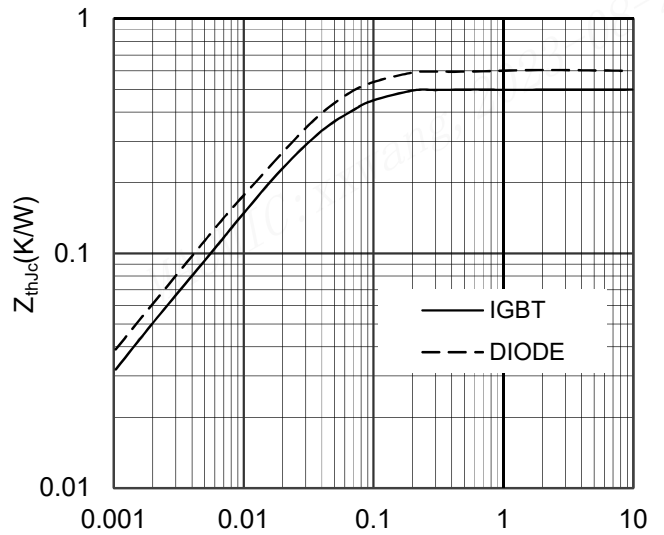


Figure 11. Switching Energy vs Forward Current Diode



(s)Rectangular Pulse Duration
Figure 12. Transient Thermal Impedance of Diode and IGBT

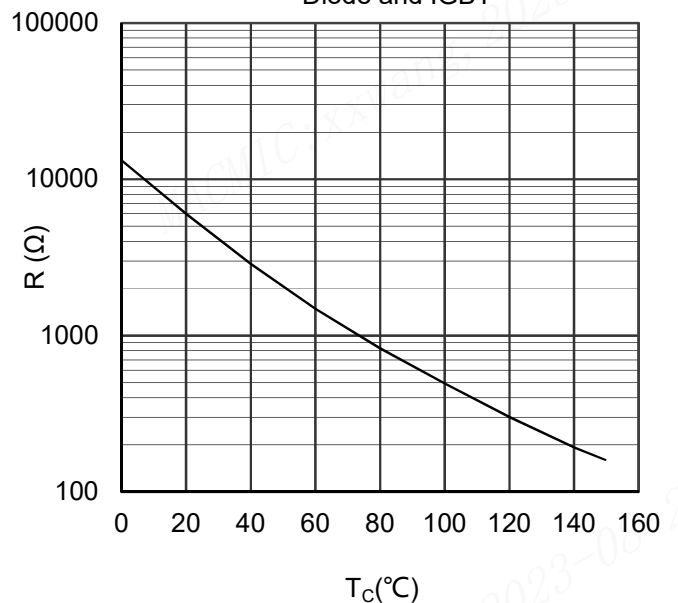


Figure 13. NTC Characteristics

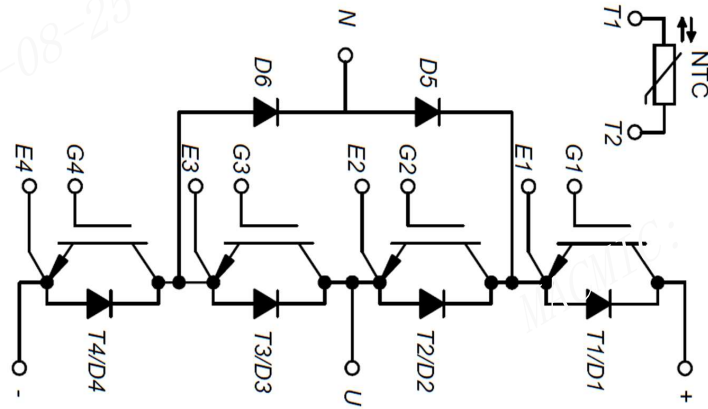
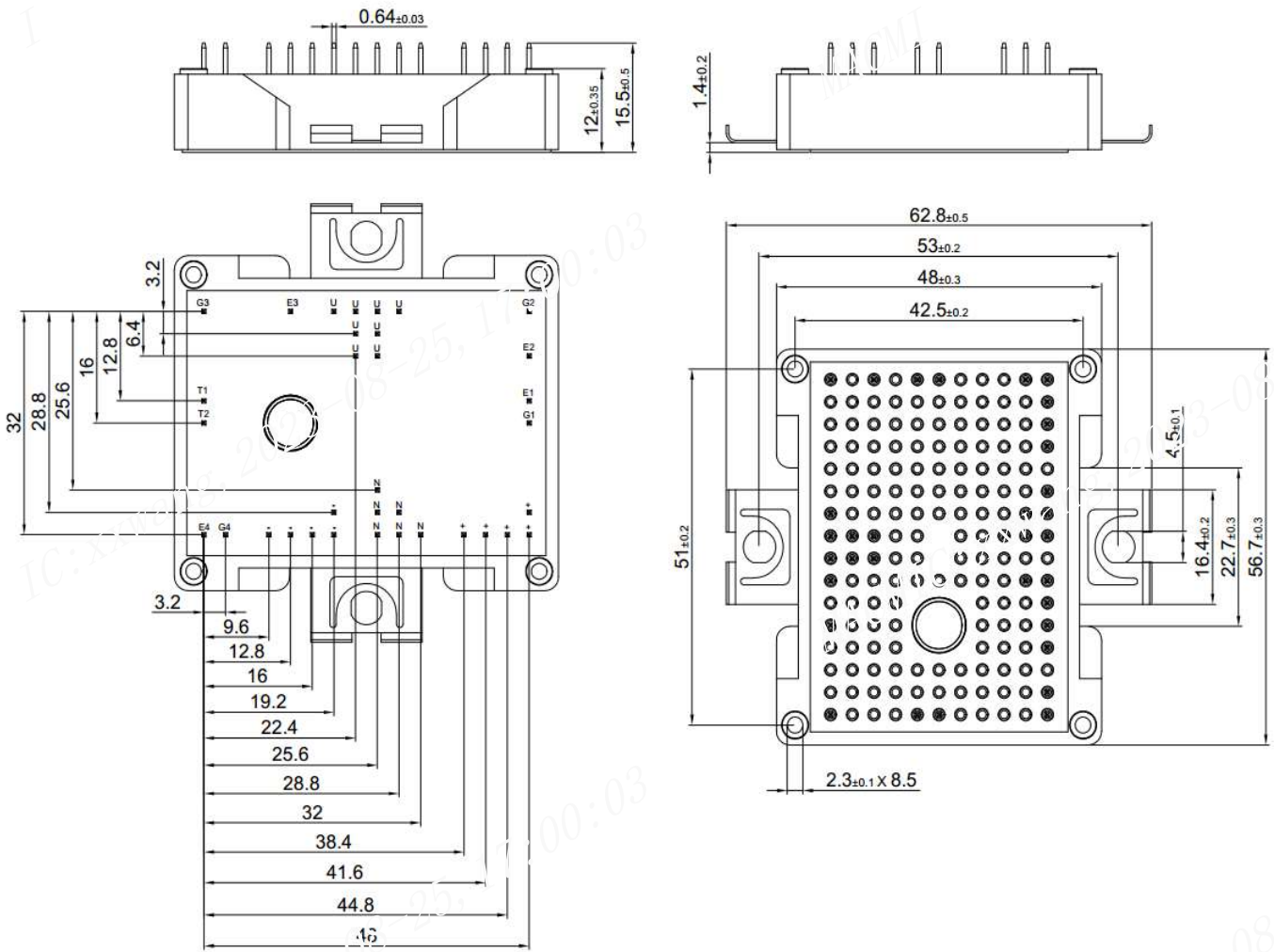


Figure 14. Circuit Diagram



Dimensions in (mm)
Figure 15. Package Outline