

PRODUCT FEATURES

- ☐ 650V IGBT³ 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	$T_C=25^{\circ}\text{C}, T_{Jmax}=175^{\circ}\text{C}$	235	A
		$T_C=60^{\circ}\text{C}, T_{Jmax}=175^{\circ}\text{C}$	200	
I_{CM}	Repetitive Peak Collector Current	$t_p=1\text{ms}$	400	
P_{tot}	Power Dissipation Per IGBT	$T_C=25^{\circ}\text{C}, T_{Jmax}=175^{\circ}\text{C}$	600	W

Diode(D1~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(D1~D4)		150	A
I_{FRM}	Repetitive Peak Forward Current(D1~D4)	$t_p=1\text{ms}$	300	
I^2t	(D1~D4)	$T_J=125^{\circ}\text{C}, t=10\text{ms}, V_R=0\text{V}$	1450	A^2S
$I_{F(AV)}$	Average Forward Current(D5、D6)		200	A
I_{FRM}	Repetitive Peak Forward Current(D5、D6)	$t_p=1\text{ms}$	400	
I^2t	(D5、D6)	$T_J=125^{\circ}\text{C}, t=10\text{ms}, V_R=0\text{V}$	2650	A^2S

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MMG200B065PD6EN

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 =3.2mA	4.9	5.8	6.5	V	
V _{CE(sat)}	Collector Emitter Saturation Voltage	I _C =200A, V _{GE} =15V, T _J =25℃		1.45	1.9		
		I _C =200A, V _{GE} =15V, T _J =150℃		1.7			
I _{CES}	Collector Leakage Current	V _{CE} =650V, V _{GE} =0V, T _J =25℃			1	mA	
		V _{CE} =650V, V _{GE} =0V, T _J =150℃			5		
I _{GES}	Gate Leakage Current	V _{CE} =0V,V _{GE} =±15V, T _J =25℃	-400		400	nA	
R _{gint}	Integrated Gate Resistor			2		Ω	
Q _g	Gate Charge	V _{CE} =300V, I _C =200A , V _{GE} =±15V		2.15		μC	
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f =1MHz		12.4		nF	
C _{res}	Reverse Transfer Capacitance			0.37		nF	
t _{d(on)}	Turn on Delay Time	V _{CC} =300V,I _C =200A R _G =2.7Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		90		ns
			T _J =150℃		110		ns
t _r	Rise Time		T _J =25℃		60		ns
			T _J =150℃		60		ns
t _{d(off)}	Turn off Delay Time		T _J =25℃		390		ns
			T _J =150℃		420		ns
t _f	Fall Time		T _J =25℃		60		ns
			T _J =150℃		80		ns
E _{on}	Turn on Energy	V _{CC} =300V,I _C =200A R _G =2.7Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		2.5		mJ
			T _J =150℃		3.1		mJ
E _{off}	Turn off Energy		T _J =25℃		5.5		mJ
			T _J =150℃		7.1		mJ
I _{SC}	Short Circuit Current		tpsc≤6μS , V _{GE} =15V T _J =125℃,V _{CC} =360V		1000		A
R _{thJC}	Junction to Case Thermal Resistance （ Per IGBT ）				0.25	K /W	

Diode(D1~D6) ELECTRICAL CHARACTERISTICS ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
V _F	Forward Voltage(D1~D4)	I _F =150A , V _{GE} =0V, T _J =25℃		1.55	1.95	V
		I _F =150A , V _{GE} =0V, T _J =150℃		1.45		
t _{rr}	Reverse Recovery Time(D1~D4)	I _F =150A , V _R =300V dI _F /dt=-1700A/μs T _J =150℃		130		ns
I _{RRM}	Max. Reverse Recovery Current(D1~D4)			80		A
Q _{RR}	Reverse Recovery Charge(D1~D4)			13		μC
E _{rec}	Reverse Recovery Energy(D1~D4)			3.5		mJ
R _{thJCD}	Junction to Case Thermal Resistance （ Per Diode ） (D1~D4)				0.6	K /W
V _F	Forward Voltage(D5、 D6)	I _F =200A , V _{GE} =0V, T _J =25℃		1.55	1.95	V
		I _F =200A , V _{GE} =0V, T _J =150℃		1.45		
t _{rr}	Reverse Recovery Time(D5、 D6)	I _F =200A , V _R =300V dI _F /dt=-2300A/μs T _J =150℃		135		ns
I _{RRM}	Max. Reverse Recovery Current(D5、 D6)			148		A
Q _{RR}	Reverse Recovery Charge(D5、 D6)			20		μC
E _{rec}	Reverse Recovery Energy(D5、 D6)			5		mJ
R _{thJCD}	Junction to Case Thermal Resistance （ Per Diode ） (D5、 D6)				0.45	K /W

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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	$^{\circ}\text{C}$
T_{Jop}	Operating Temperature		-40~150	
T_{stg}	Storage Temperature		-40~125	
V_{isol}	Isolation Breakdown Voltage	AC, 50Hz(R.M.S), t=1minute	3000	V
CTI	Comparative Tracking Index		> 200	
Torque	to heatsink	Recommended (M6)	3~5	Nm
	to terminal	Recommended (M6)	3~5	Nm
Weight			300	g

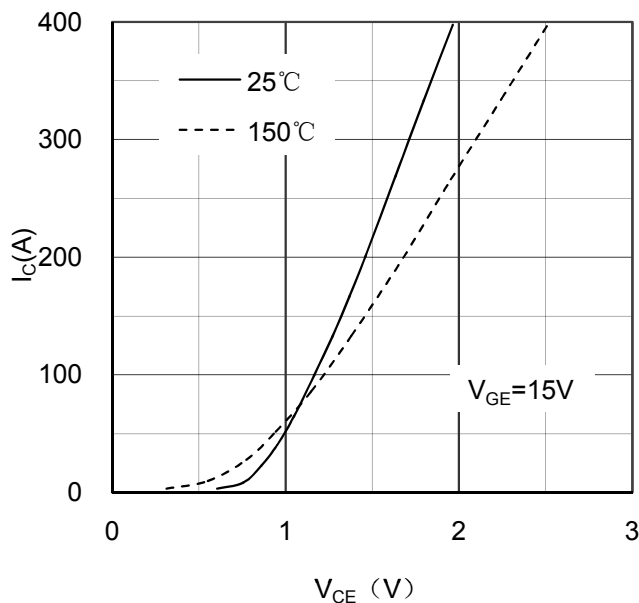


Figure 1. Typical Output Characteristics IGBT

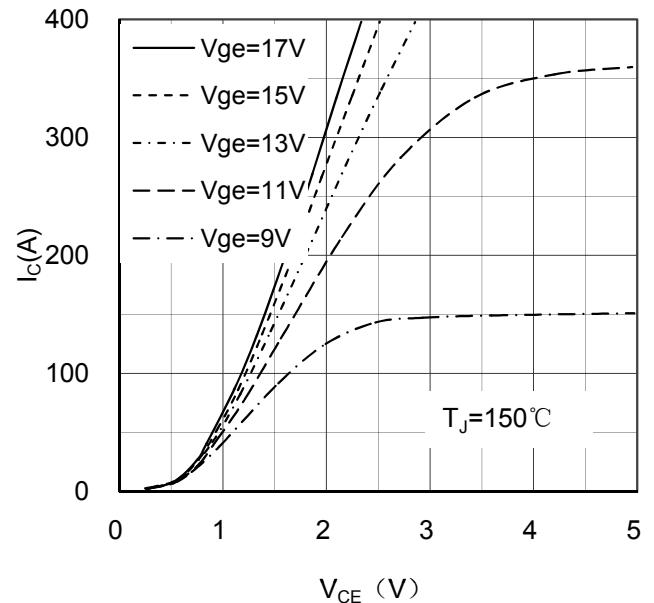


Figure 2. Typical Output Characteristics IGBT

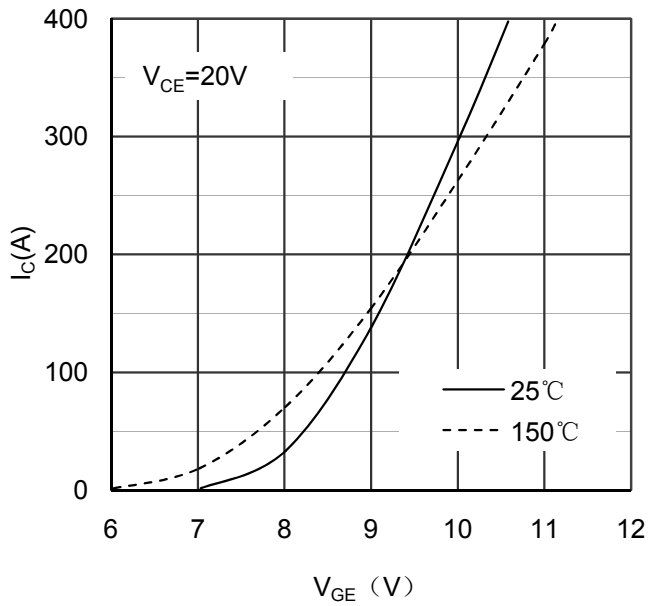


Figure 3. Typical Transfer characteristics IGBT

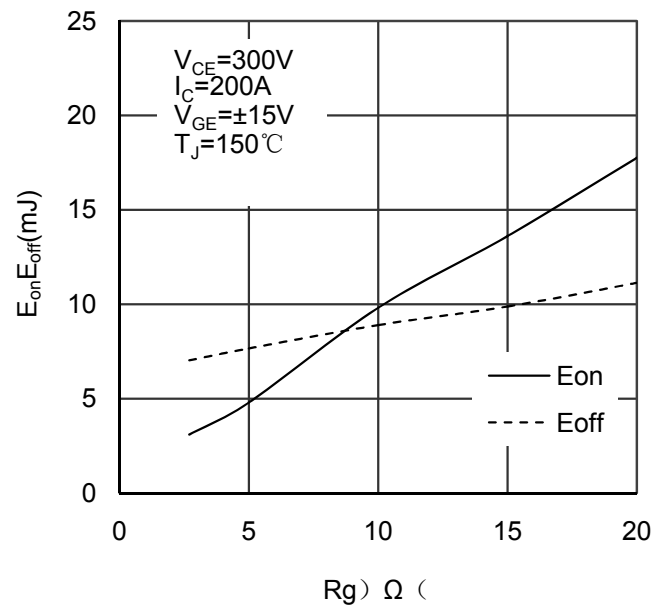


Figure 4. Switching Energy vs Gate Resistor IGBT

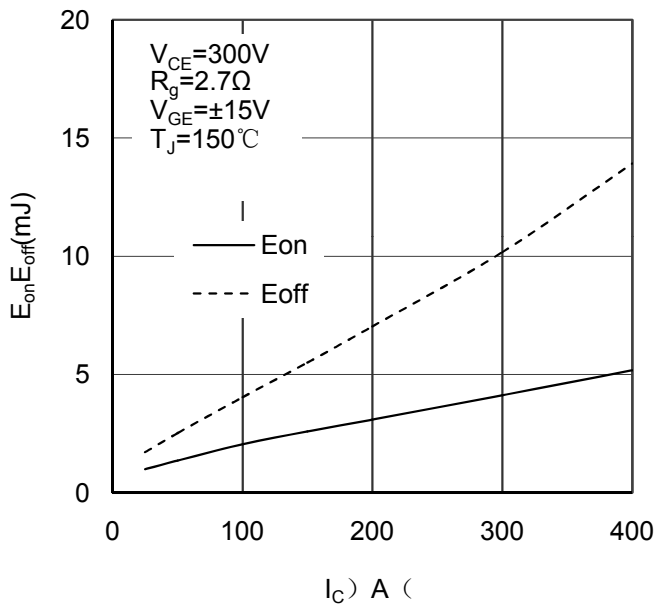


Figure 5. Switching Energy vs Collector Current IGBT

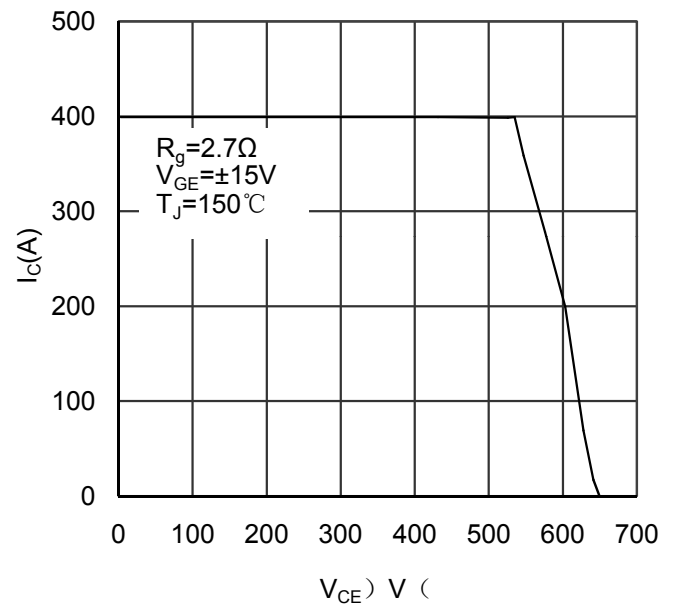


Figure 6. Reverse Biased Safe Operating Area IGBT

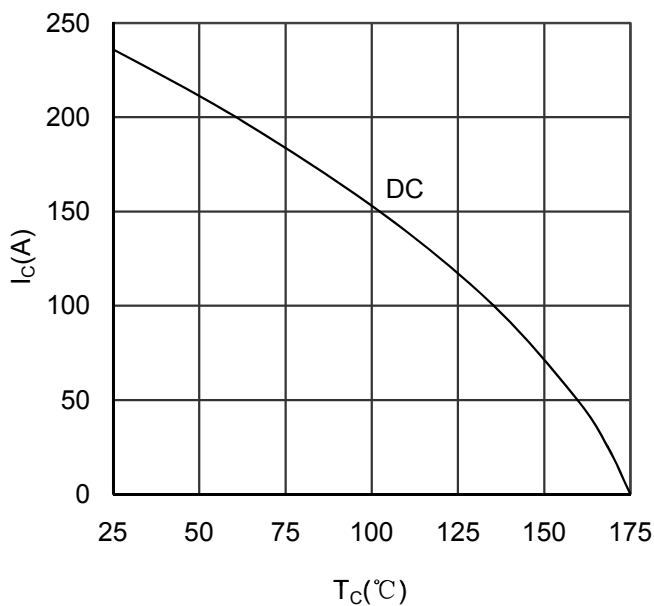


Figure 7. Collector Current vs Case temperature IGBT

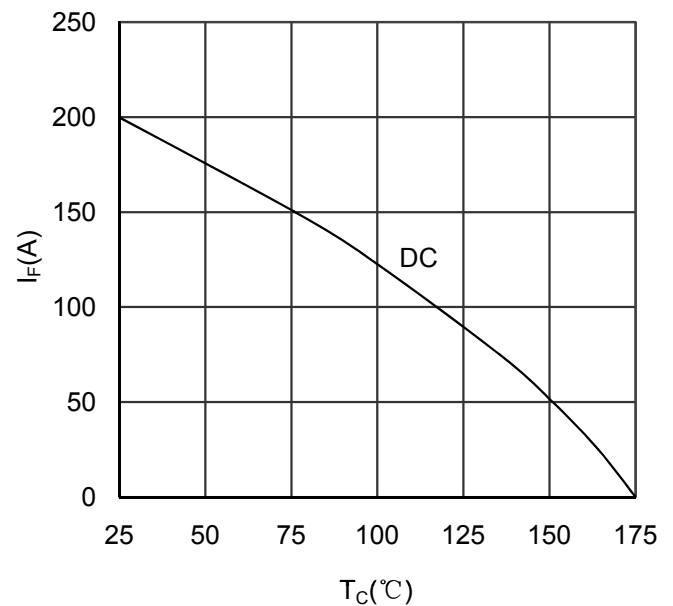


Figure 8. Forward current vs Case temperature Diode(D5, D6)

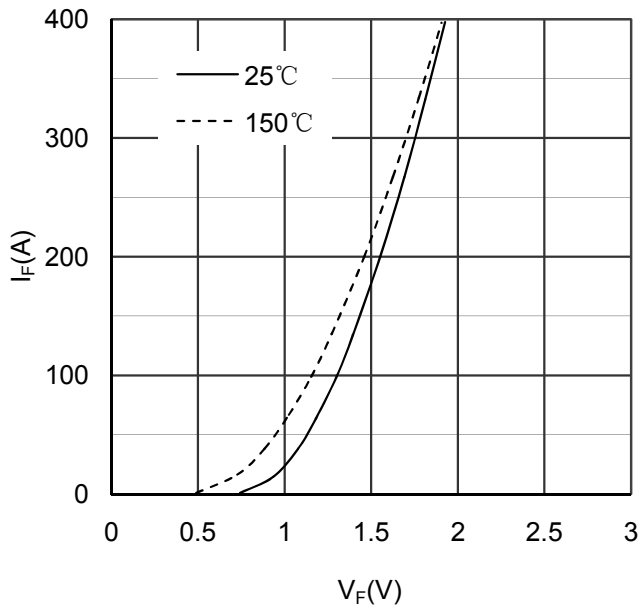


Figure 9. Diode Forward Characteristics Diode(D5、D6)

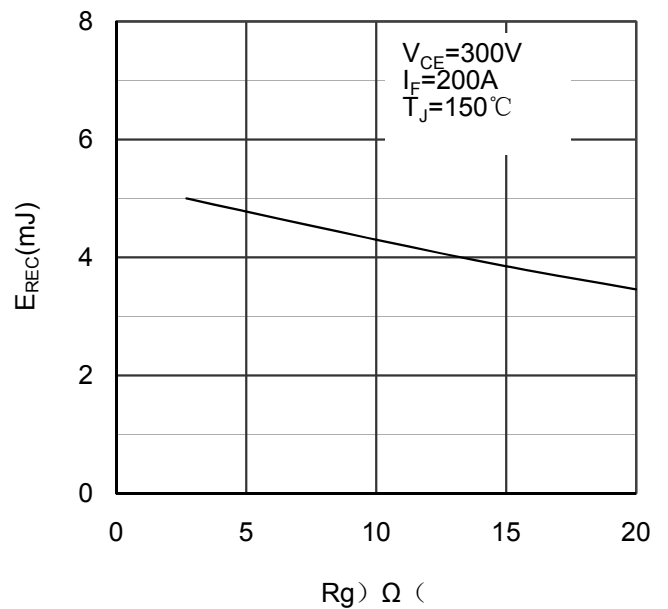


Figure 10. Switching Energy vs Gate Resistor Diode(D5、D6)

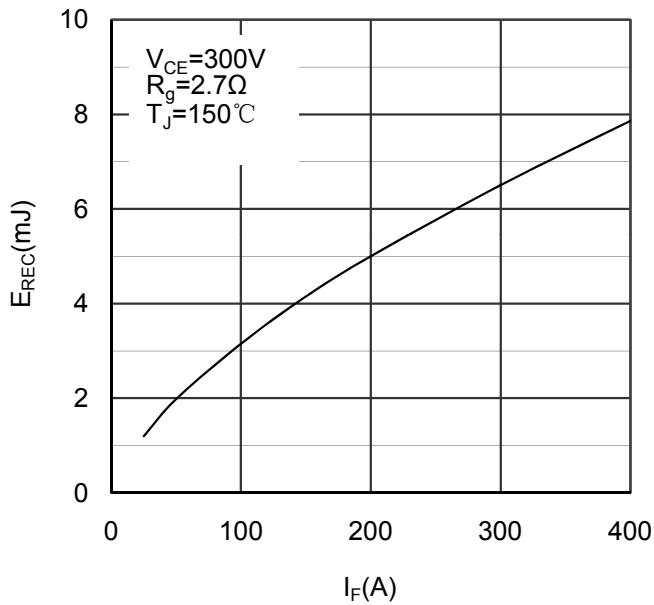


Figure 11. Switching Energy vs Forward Current Diode(D5、D6)

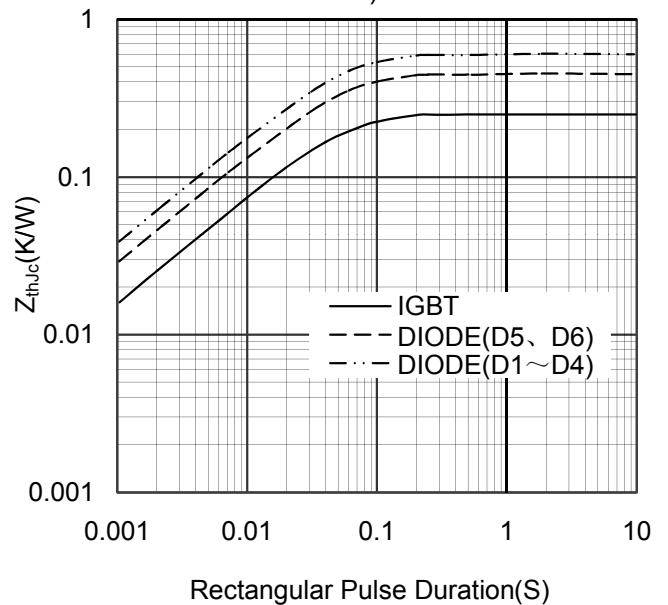


Figure 12. Transient Thermal Impedance of Diode and IGBT

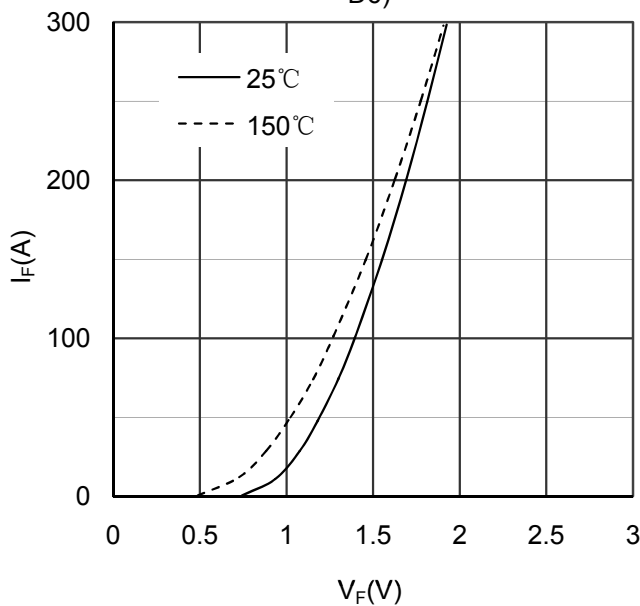


Figure 13. Diode Forward Characteristics Diode(D1~D4)

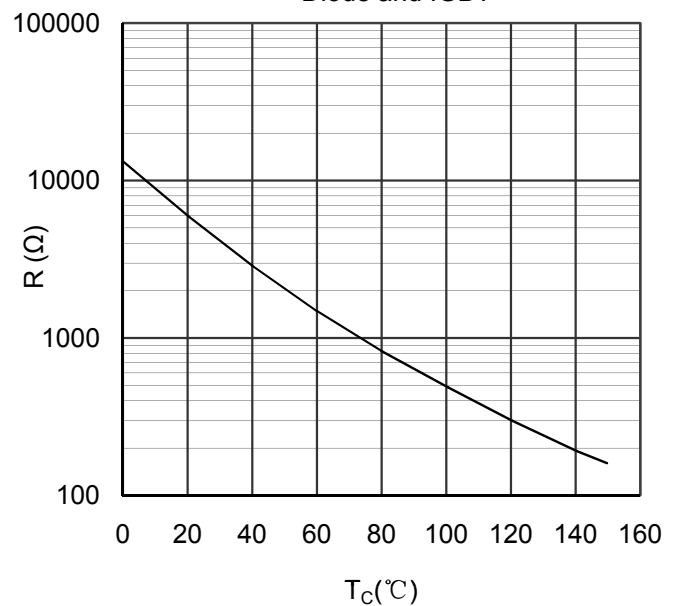


Figure 14. NTC Characteristics

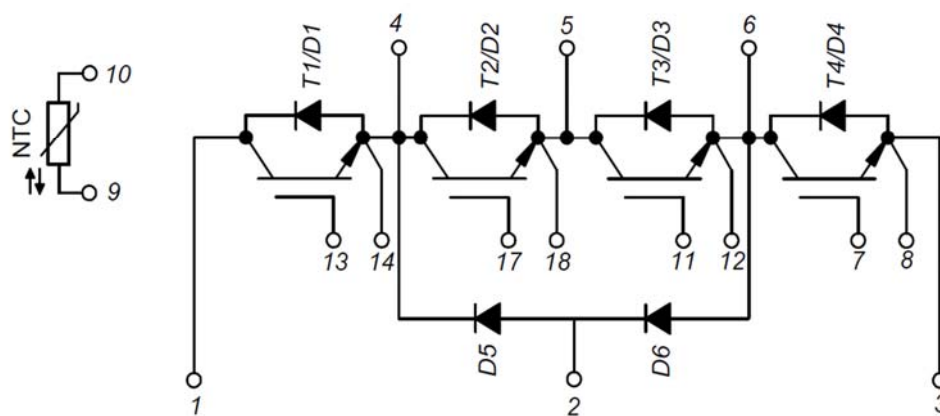
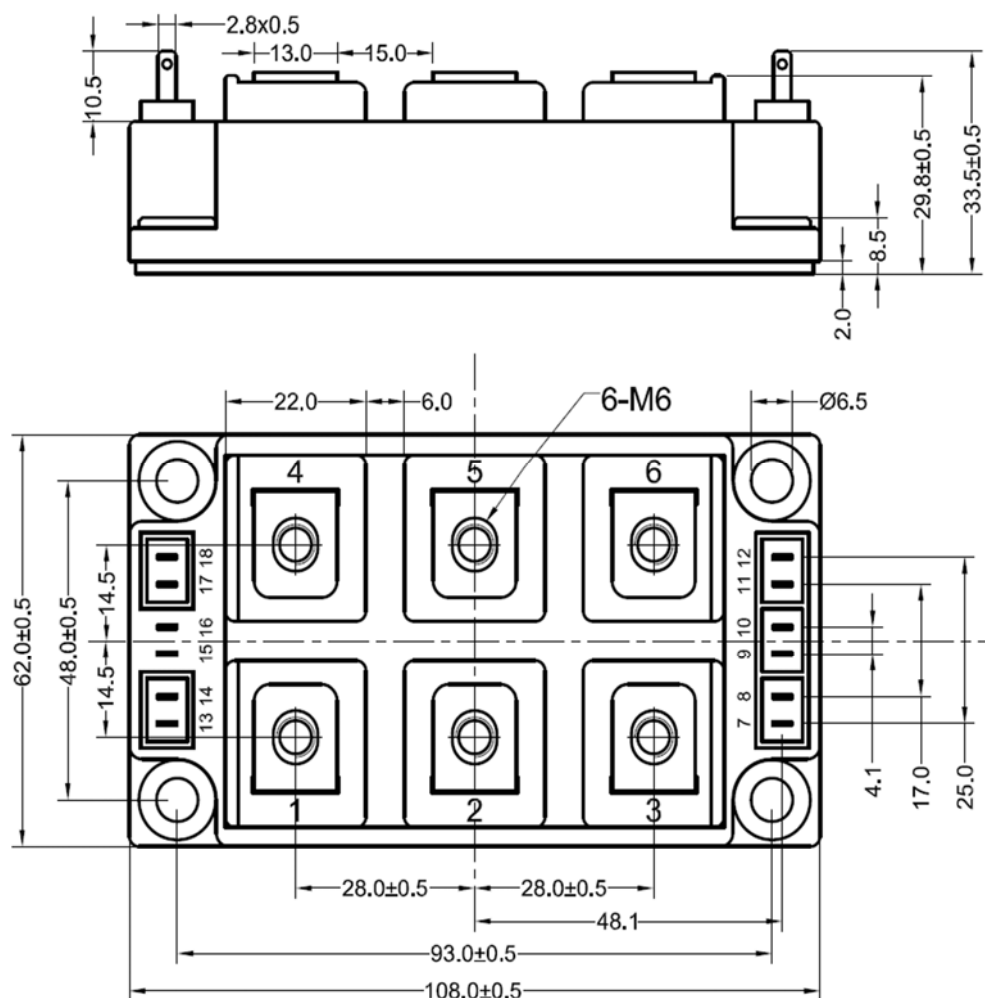


Figure 15. Circuit Diagram



Dimensions in (mm)

Figure 16. Package Outline