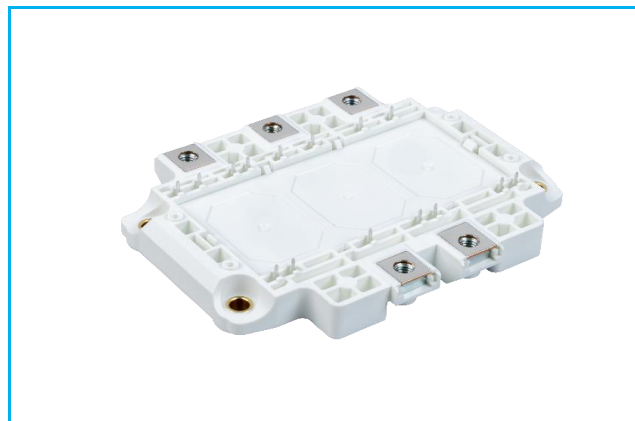


PRODUCT FEATURES

- ☐ IGBT CHIP(Trench+FS)
- ☐ Low saturation voltage and positive temperature coefficient
- ☐ Fast switching and short tail current
- ☐ Free wheeling diodes with fast and soft reverse recovery
- ☐ Temperature sense included



APPLICATIONS

- ☐ Automotive application
- ☐ Hybrid and electric vehicle
- ☐ Inverter for motor drive

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

Symbol	Parameter/Test Conditions		Values	Unit
V_{CES}	Collector Emitter Voltage	$T_J=25^{\circ}\text{C}$	750	V
V_{GES}	Gate Emitter Voltage		± 20	
I_C	DC Collector Current	$T_C=25^{\circ}\text{C}, T_{Jmax}=175^{\circ}\text{C}$	553	A
		$T_C=85^{\circ}\text{C}, T_{Jmax}=175^{\circ}\text{C}$	395	
I_{CM}	Repetitive Peak Collector Current	$tp=1\text{ms}$	800	
P_{tot}	Power Dissipation Per IGBT	$T_C=25^{\circ}\text{C}, T_{Jmax}=175^{\circ}\text{C}$	1027	W

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

Symbol	Parameter/Test Conditions		Values	Unit
V_{RRM}	Repetitive Reverse Voltage	$T_J=25^{\circ}\text{C}$	750	V
$I_{F(AV)}$	Average Forward Current		400	A
I_{FRM}	Repetitive Peak Forward Current	$tp=1\text{ms}$	800	
I^2t		$T_J=125^{\circ}\text{C}, t=10\text{ms}, V_R=0\text{V}$	19.6	kA^2s

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MMG400VD075X6TC-12

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 =5.72mA		5.55		V
V _{CE(sat)}	Collector Emitter Saturation Voltage	I _C =400A, V _{GE} =15V, T _J =25℃		1.40		
		I _C =400A, V _{GE} =15V, T _J =125℃		1.50		
		I _C =400A, V _{GE} =15V, T _J =175℃		1.60		
I _{CES}	Collector Leakage Current	V _{CE} =750V, V _{GE} =0V, T _J =25℃			1	mA
		V _{CE} =750V, V _{GE} =0V, T _J =175℃			10	
I _{GES}	Gate Leakage Current	V _{CE} =0V,V _{GE} =±20V, T _J =25℃	-400		400	nA
R _{Gint}	Integrated Gate Resistor			1.17		Ω
Q _g	Gate Charge	V _{CE} =400V, I _C =400A , V _{GE} =15V		1.3		μC
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f =1MHz		55		nF
C _{res}	Reverse Transfer Capacitance			0.60		nF
t _{d(on)}	Turn on Delay Time	V _{CC} =400V, I _C =400A, R _{Gon} =2.5Ω, V _{GE} =±15V, Inductive Load	T _J =25℃	180		ns
			T _J =175℃	195		ns
t _r	Rise Time		T _J =25℃	90		ns
			T _J =175℃	105		ns
E _{on}	Turn on Energy		T _J =25℃	9.5		mJ
			T _J =125℃	16.5		mJ
			T _J =175℃	20.3		mJ
t _{d(off)}	Turn off Delay Time	T _J =25℃	790		ns	
		T _J =175℃	840		ns	
t _f	Fall Time	T _J =25℃	160		ns	
		T _J =175℃	200		ns	
E _{off}	Turn off Energy	T _J =25℃	30.9		mJ	
		T _J =125℃	34.9		mJ	
		T _J =175℃	36.8		mJ	
I _{SC}	Short Circuit Current	tpsc≤5μs , V _{GE} =15V T _J =150℃,V _{CC} =400V		3000		A
R _{thJC}	Junction to Case Thermal Resistance （ Per IGBT ）				0.146	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℃		1.60		V
		I _F =400A , V _{GE} =0V, T _J =125℃		1.49		
		I _F =400A , V _{GE} =0V, T _J =175℃		1.42		
t _{rr}	Reverse Recovery Time	I _F =400A , V _R =400V dI _F /dt=-4000A/μs T _J =175℃		380		ns
I _{RRM}	Max. Reverse Recovery Current			310		A
Q _{RR}	Reverse Recovery Charge			55		μC
E _{rec}	Reverse Recovery Energy			20		mJ
R _{thJCD}	Junction to Case Thermal Resistance （ Per Diode ）					0.164

MMG400VD075X6TC-12

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		$\text{k}\Omega$
$B_{25/50}$	$R_2 = R_{25} \exp [B_{25/50}(1/T_2 - 1/(298.15 \text{ K}))]$		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	-40~175	
T_{stg}	Storage Temperature	-40~125	
V_{isol}	Isolation Breakdown Voltage AC, 50Hz(R.M.S), t=1minute	3300	V
CTI	Comparative Tracking Index	> 100	
Torque	to heatsink	Recommended (M5)	3~5 Nm
	to terminal	Recommended (M6)	3~5 Nm
Weight		450	g

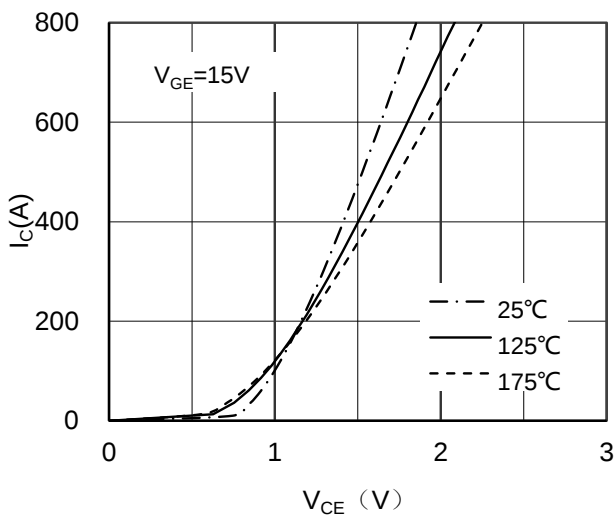


Figure 1. Typical Output Characteristics IGBT

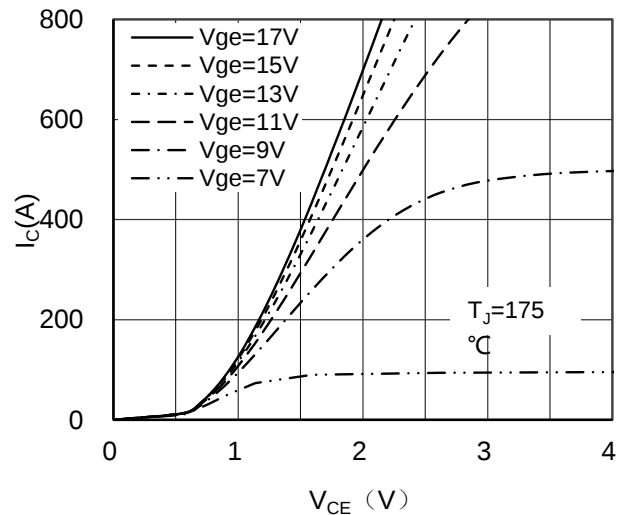


Figure 2. Typical Output Characteristics IGBT

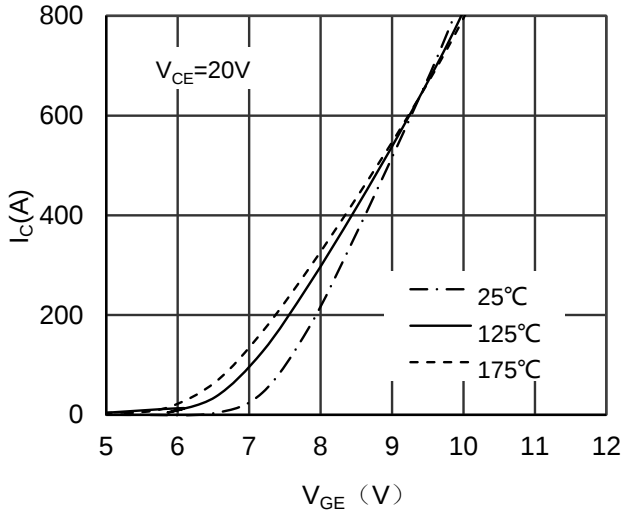


Figure 3. Typical Transfer characteristics IGBT

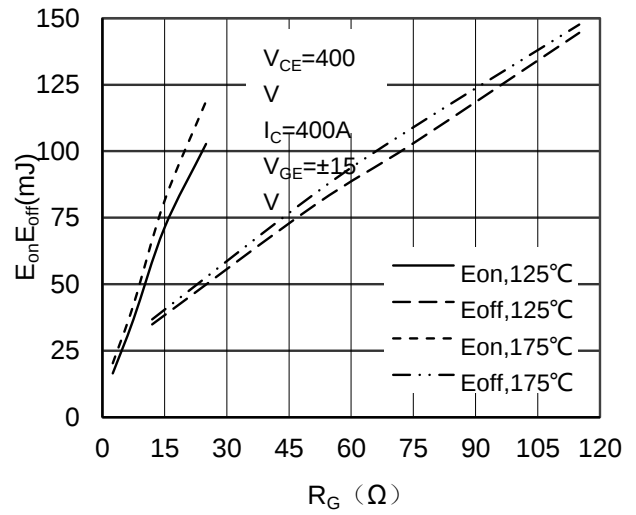


Figure 4. Switching Energy vs Gate Resistor IGBT

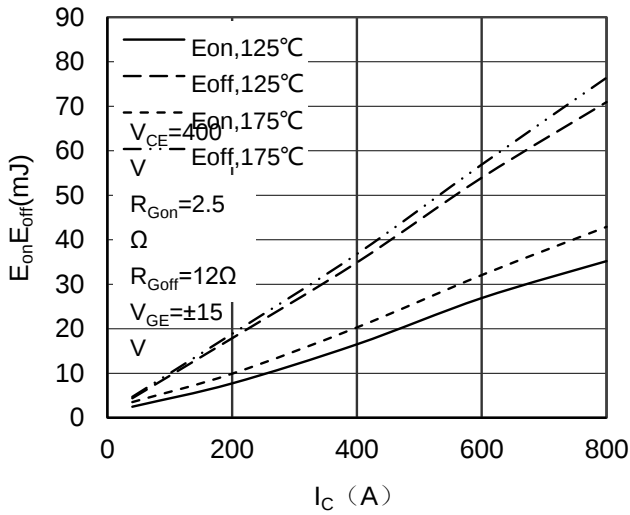


Figure 5. Switching Energy vs Collector Current IGBT

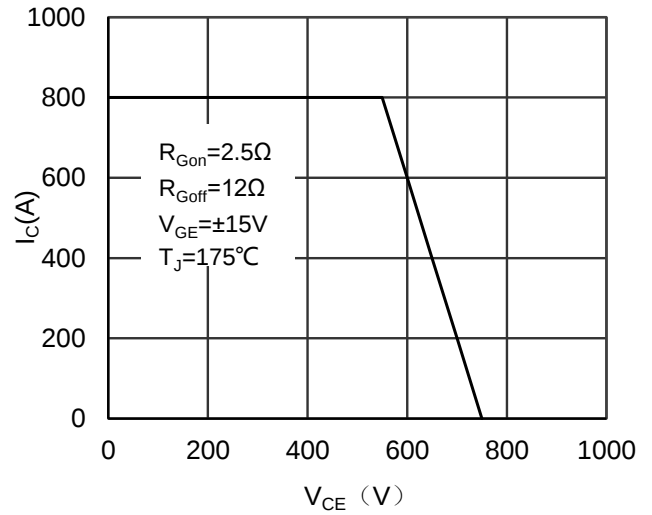


Figure 6. Reverse Biased Safe Operating Area IGBT

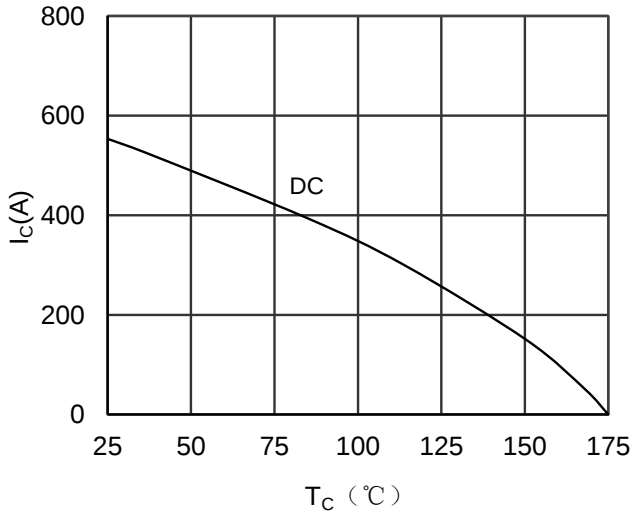


Figure 7. Collector Current vs Case temperature IGBT

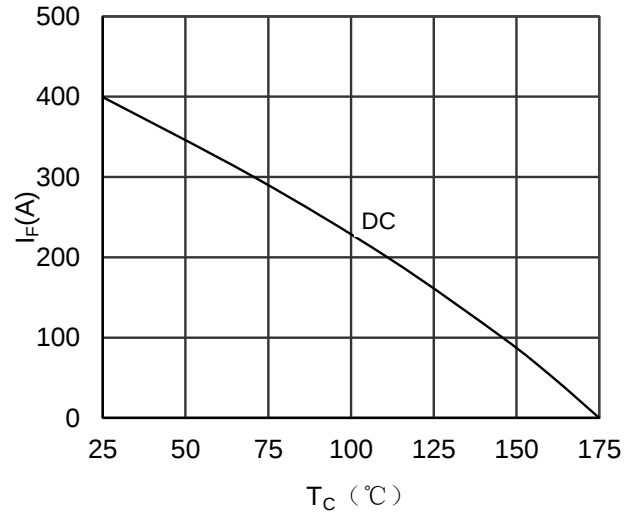


Figure 8. Forward current vs Case temperature Diode

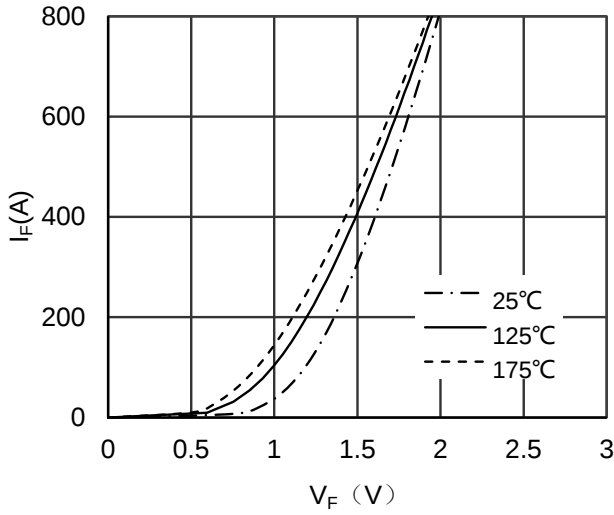


Figure 9. Diode Forward Characteristics Diode

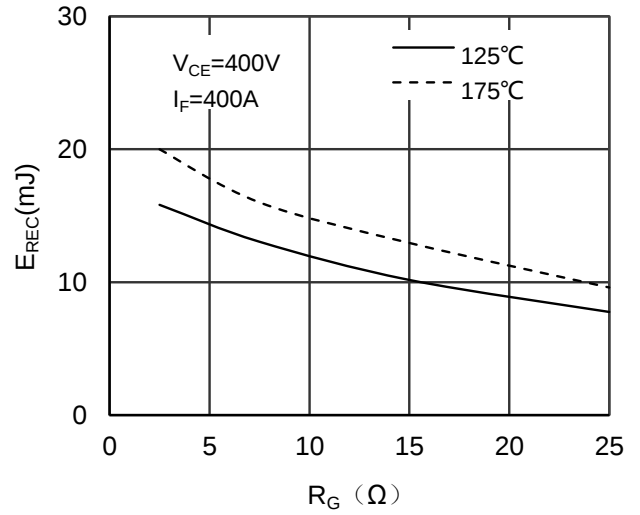


Figure 10. Switching Energy vs Gate Resistor Diode

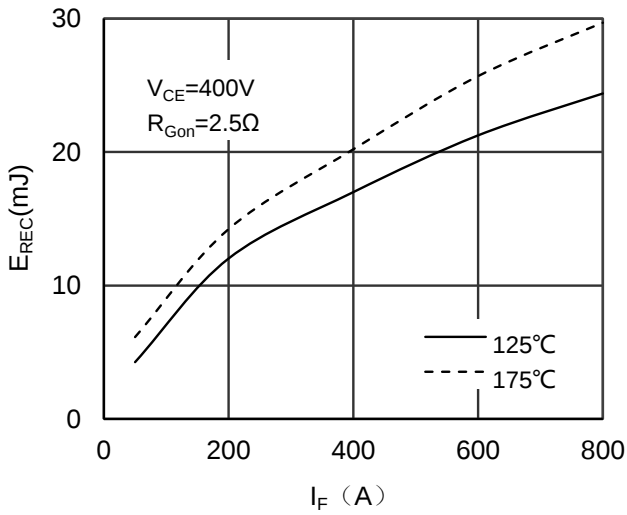


Figure 11. Switching Energy vs Forward Current Diode

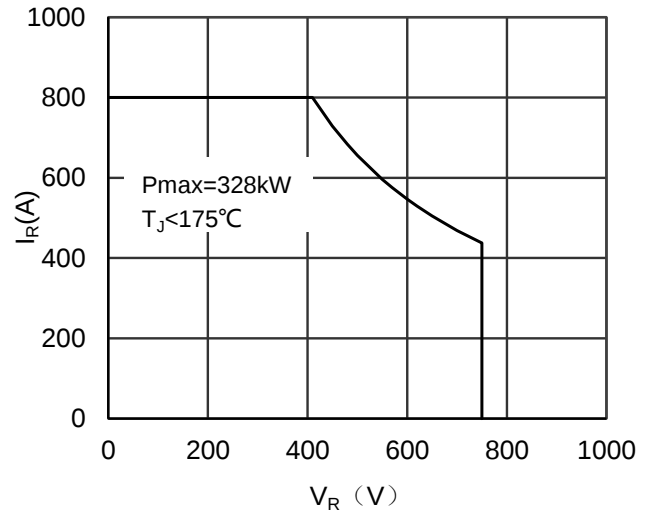


Figure 12. Safe Operating Area Diode

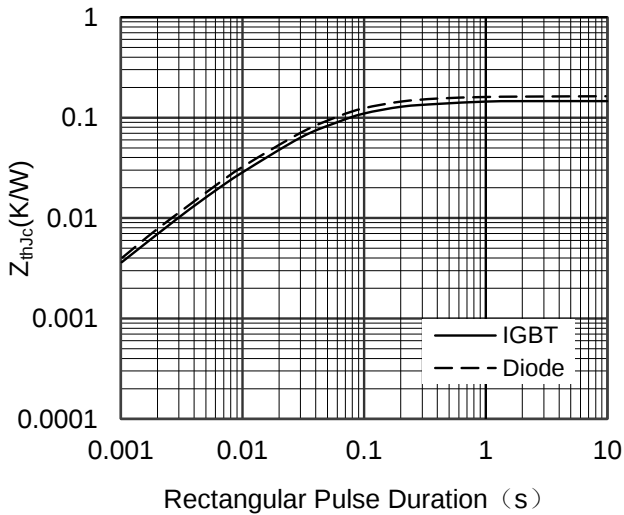


Figure 13. Transient Thermal Impedance of Diode and IGBT

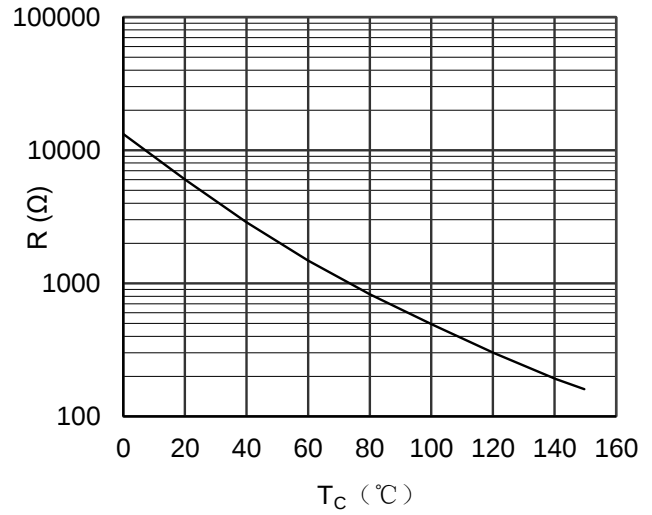


Figure 14. NTC Characteristics

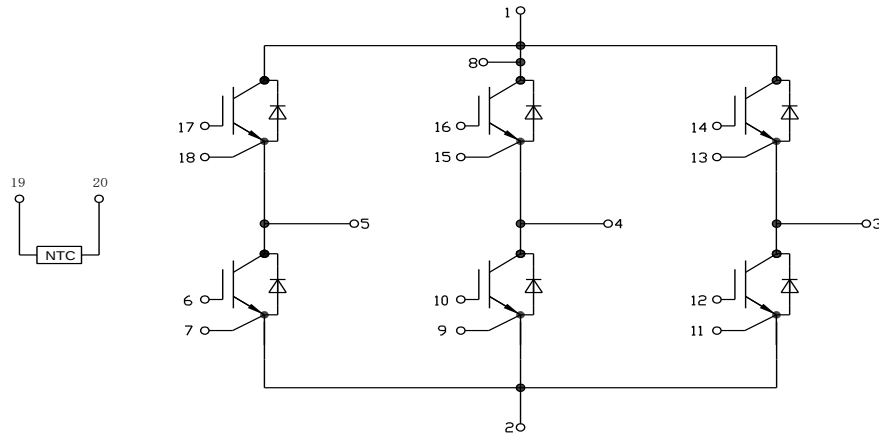
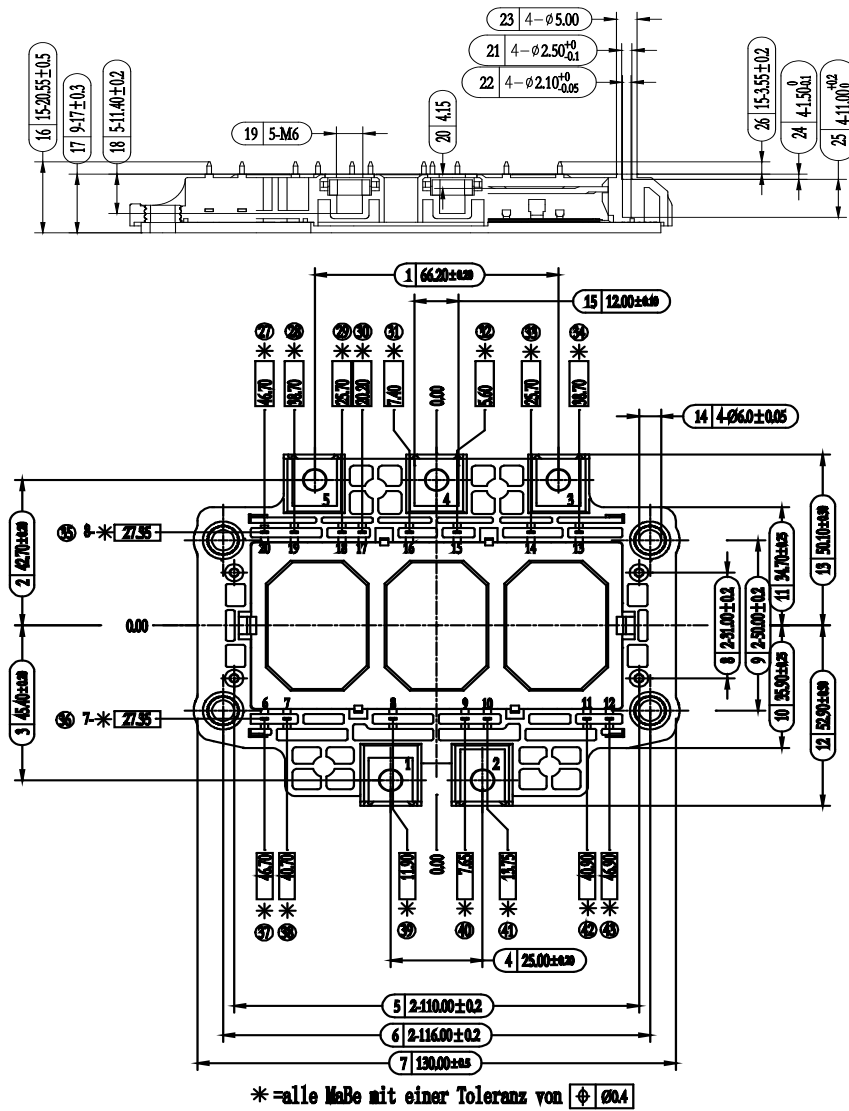


Figure 15. Circuit Diagram



Dimensions in (mm)

Figure 16. Package Outline