MG300ZD12MLC2

RoHS COMPLIANT

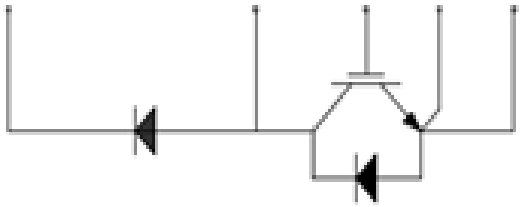
IGBT Modules

V_{CES} 1200V
I_C 300A

Applications

- Motor drive
- UPS (Uninterruptible Power Supplies)
- Soft switching welding machine

Circuit



Features

- Low $V_{CE(sat)}$ with Trench technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability(7us)
- Including ultra fast & soft recovery anti-parallel FWD
- Low inductance
- Maximum junction temperature 175℃

IGBT

Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Collector-Emitter Voltage	V_{CES}	V_{GE}=0V, I_C=1mA, T_{vj}=25℃	1200	V
Continuous Collector Current	I_C	T_C=100℃	300	A
Repetitive Peak Collector Current	I_{CRM}	t_p=1ms	600	A
Gate-Emitter Voltage	V_{GES}	T_{vj}=25℃	±20	V
Total Power Dissipation	P_{tot}	T_C=25℃ T_{vjmax}=175℃	1071	W

Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}$, I_C=11.5mA,T_{vj}=25℃	5.2	5.8	6.4	V
Collector-Emitter Cut-off Current	I_{CES}	V_{CE}=1200V,V_{GE}=0V,T_{vj}=25℃			1.0	mA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=300A,V_{GE}=15V, T_{vj}=25℃		1.65		V
		I_C=300A,V_{GE}=15V, T_{vj}=150℃		1.95		
		I_C=300A,V_{GE}=15V, T_{vj}=175℃		2.00		
Gate Charge	Q_G			4.6		uC
Internal Gate Resistor	R_{Gint}			1		Ω
Input Capacitance	C_{ies}	V_{CE}=25V,V_{GE}=0V, f=1MHz,T_{vj}=25℃		55.2		nF
Reverse Transfer Capacitance	C_{res}			0.2		nF
Gate-Emitter leakage current	I_{GES}	V_{CE}=0V, V_{GE}=20V,T_{vj}=25℃			400	nA
Turn-on Delay Time	$t_{d(on)}$	I_C=300A V_{CE}=600V V_{GE}=±15V R_G=2Ω T_{vj}=25℃		115		ns
Rise Time	t_r			47		ns
Turn-off Delay Time	$t_{d(off)}$			343		ns
Fall Time	t_f			186		ns
Energy Dissipation During Turn-on Time	E_{on}			24.8		mJ
Energy Dissipation During Turn-off Time	E_{off}			23.0		mJ
Turn-on Delay Time	$t_{d(on)}$	I_C=300A V_{CE}=600V V_{GE}=±15V R_G=2Ω T_{vj}=150℃		121		ns
Rise Time	t_r			54		ns
Turn-off Delay Time	$t_{d(off)}$			400		ns
Fall Time	t_f			285		ns
Energy Dissipation During Turn-on Time	E_{on}			39.3		mJ
Energy Dissipation During Turn-off Time	E_{off}			31.7		mJ
Turn-on Delay Time	$t_{d(on)}$	I_C=300A V_{CE}=600V V_{GE}=±15V R_G=2Ω T_{vj}=175℃		135		ns
Rise Time	t_r			59		ns
Turn-off Delay Time	$t_{d(off)}$			419		ns
Fall Time	t_f			310		ns
Energy Dissipation During Turn-on Time	E_{on}			43.8		mJ
Energy Dissipation During Turn-off Time	E_{off}			33.7		mJ
SC Data	I_{sc}	t_p≤7us, V_{GE}=15V, T_{vj}=175℃, V_{CC}=600V, V_{CEM}≤1200V		1250		A

Diode

Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Repetitive Peak Reverse Voltage	V_{RRM}	T_{vj}=25℃	1200	V
Continuous DC Forward Current	I_F		300	A
Repetitive Peak Forward Current	I_{FRM}	t_p=1ms	600	A

Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	I_F=300A,T_{vj}=25℃		2.05		V
		I_F=300A,T_{vj}=150℃		1.75		
		I_F=300A,T_{vj}=175℃		1.70		
Recovered Charge	Q_{rr}	I_F=300A V_R=600V -di_F/dt=3100A/us T_{vj}=25℃		17.8		uC
Peak Reverse Recovery Current	I_{rr}			148		A
Reverse Recovery Energy	E_{rec}			6.0		mJ
Recovered Charge	Q_{rr}	I_F=300A V_R=600V -di_F/dt=3100A/us T_{vj}=150℃		33.1		uC
Peak Reverse Recovery Current	I_{rr}			152		A
Reverse Recovery Energy	E_{rec}			11.2		mJ
Recovered Charge	Q_{rr}	I_F=300A V_R=600V -di_F/dt=3100A/us T_{vj}=175℃		38.6		uC
Peak Reverse Recovery Current	I_{rr}			153		A
Reverse Recovery Energy	E_{rec}			13.3		mJ

Module Characteristics

T_C=25°C unless otherwise specified

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Isolation Voltage	V_{isol}	t=1min,f=50Hz	2500			V
Maximum Junction Temperature	T_{jmax}				175	℃
Operating Junction Temperature	$T_{vj\ op}$		-40		150	℃
Storage Temperature	T_{stg}		-40		125	℃
Thermal Resistance Junction to Case	$R_{\theta JC}$	per IGBT			0.14	K/W
		per Diode			0.19	
Thermal Resistance Case to Sink	$R_{\theta CS}$	Conductive grease applied		0.012	0.035	K/W
Comparative Tracking Index	CTI		400			
Module Electrodes Torque	M_t	Recommended(M6)	3.0		5.0	N·m
Module-to-Sink Torque	M_s	Recommended(M6)	3.0		5.0	N·m
Weight of Module	G			315		g

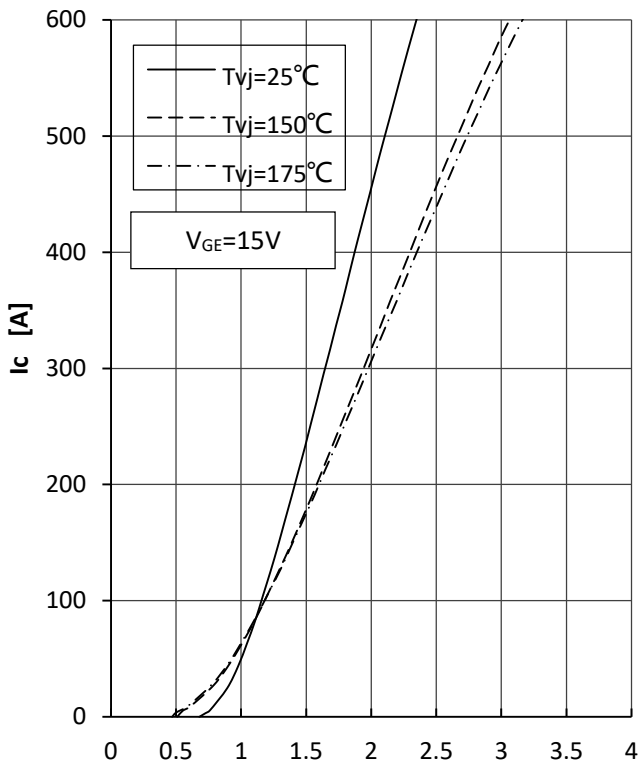


Fig1.IGBT Output Characteristics

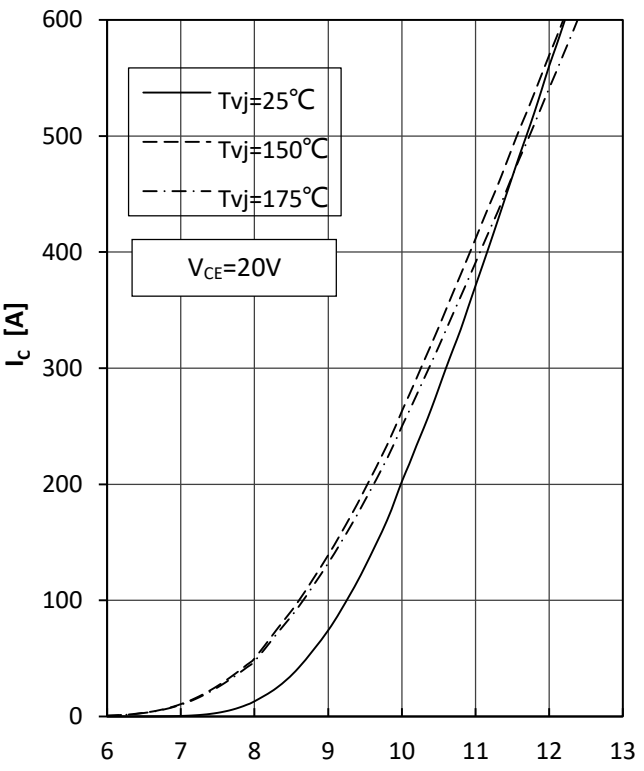


Fig2.IGBT Transfer Characteristics

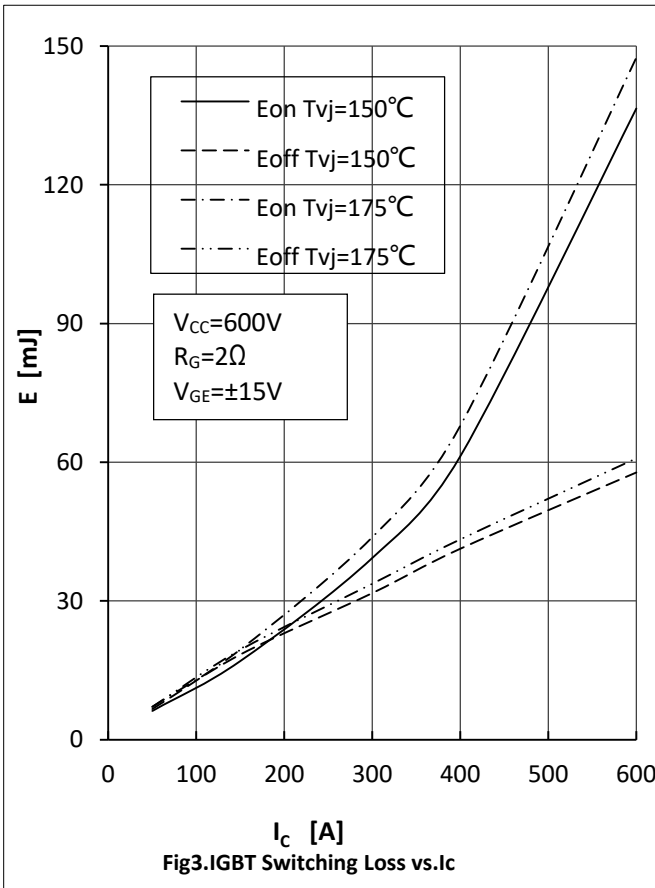


Fig3.IGBT Switching Loss vs.Ic

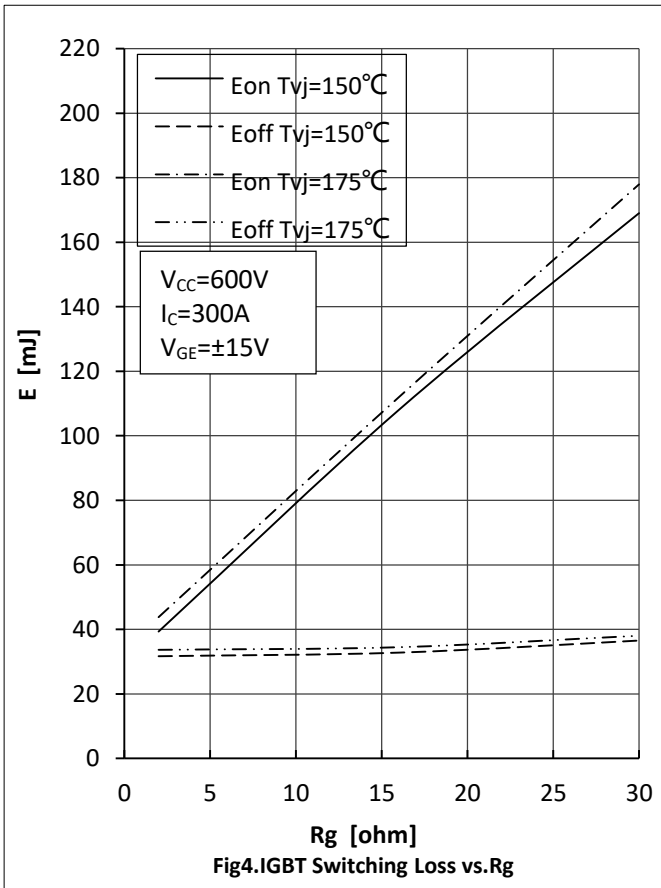


Fig4.IGBT Switching Loss vs.Rg

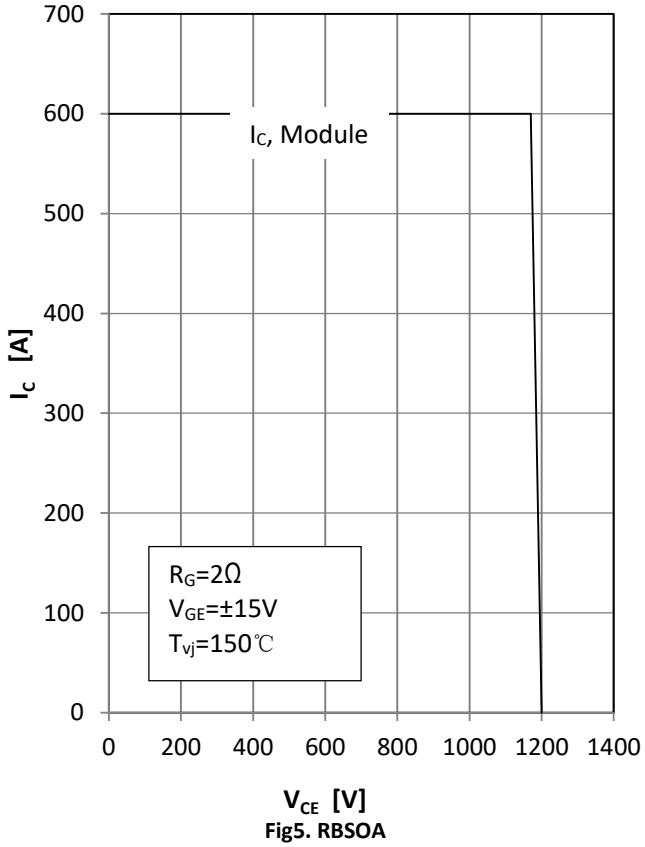


Fig5. RBSOA

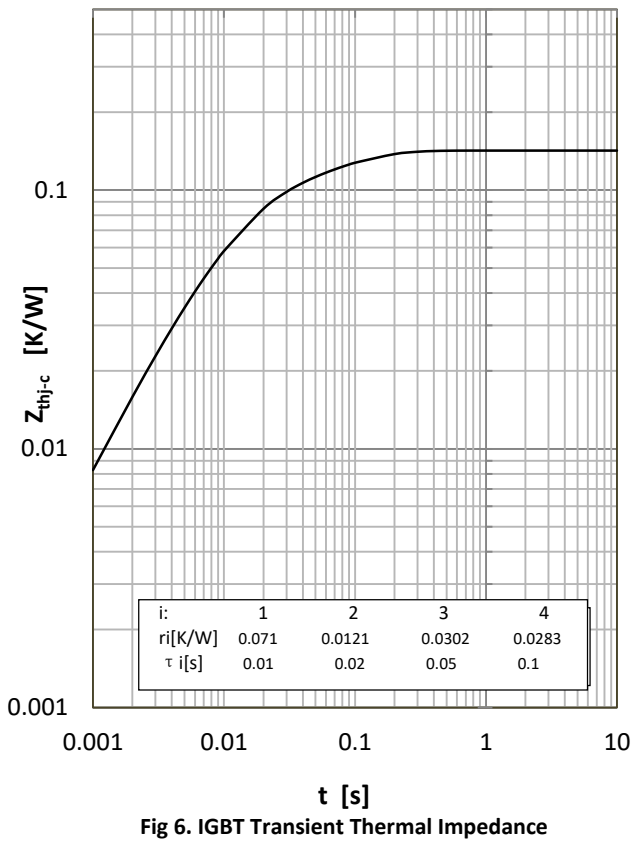


Fig 6. IGBT Transient Thermal Impedance

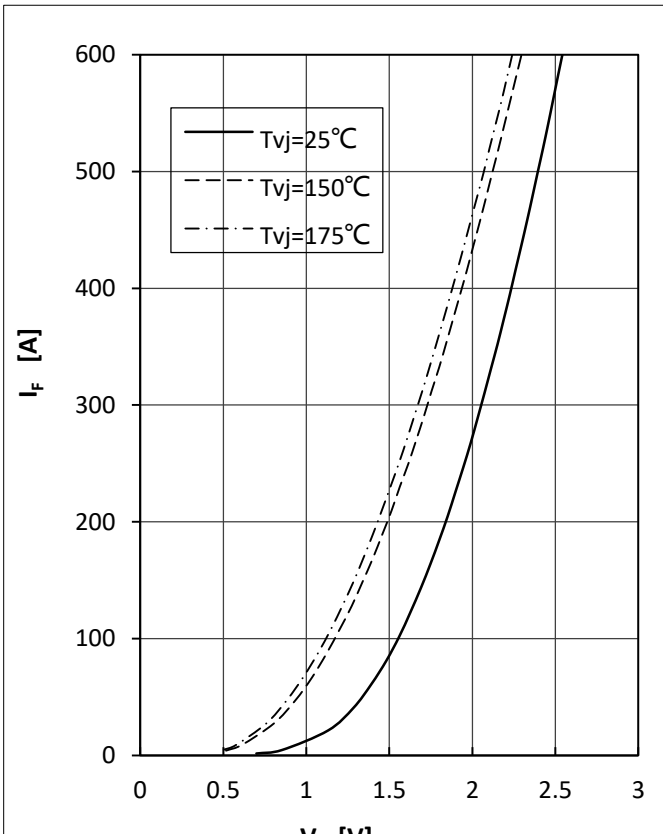


Fig7.Diode Foward Characteristics

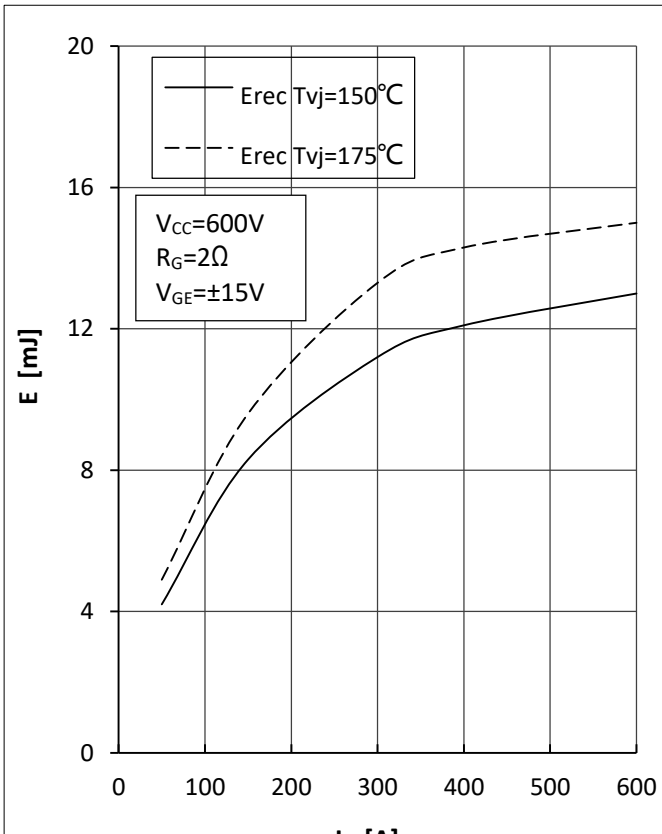


Fig8.Diode Switching Loss(Erec) vs.I_F

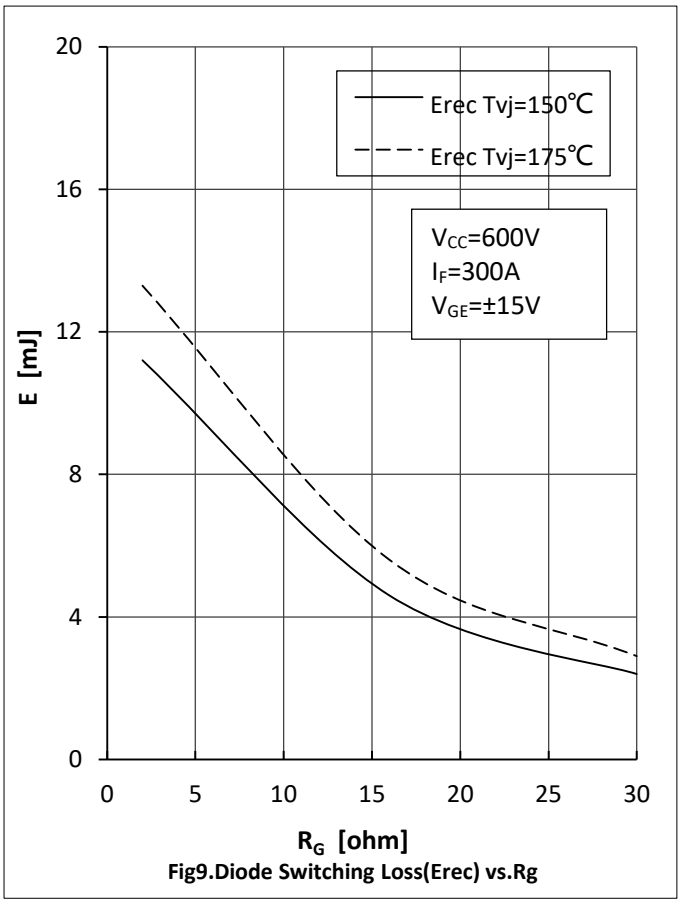


Fig9.Diode Switching Loss(Erec) vs.Rg

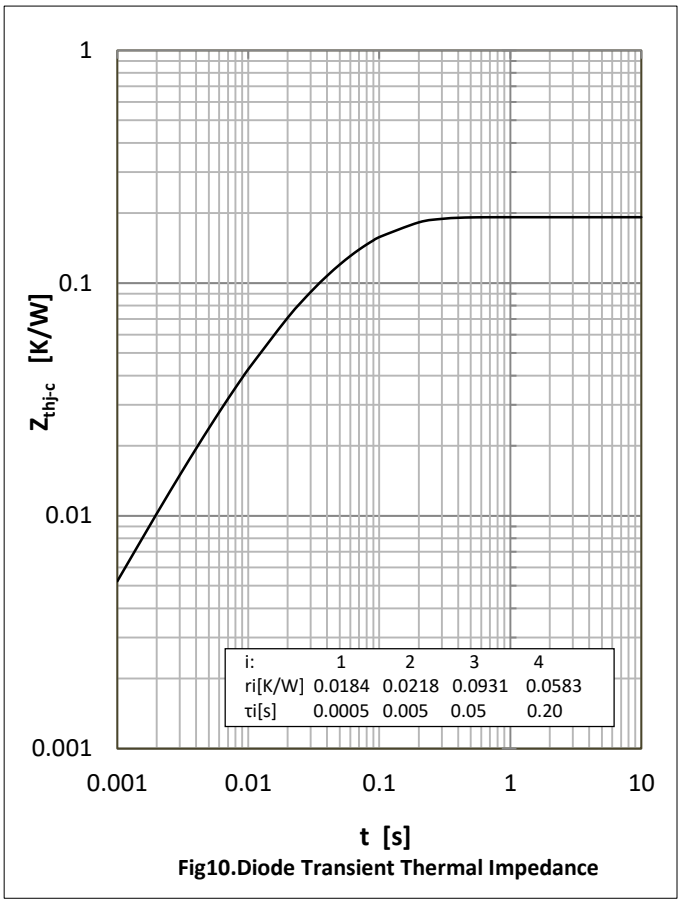
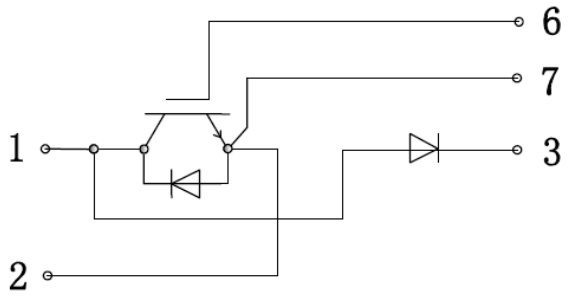


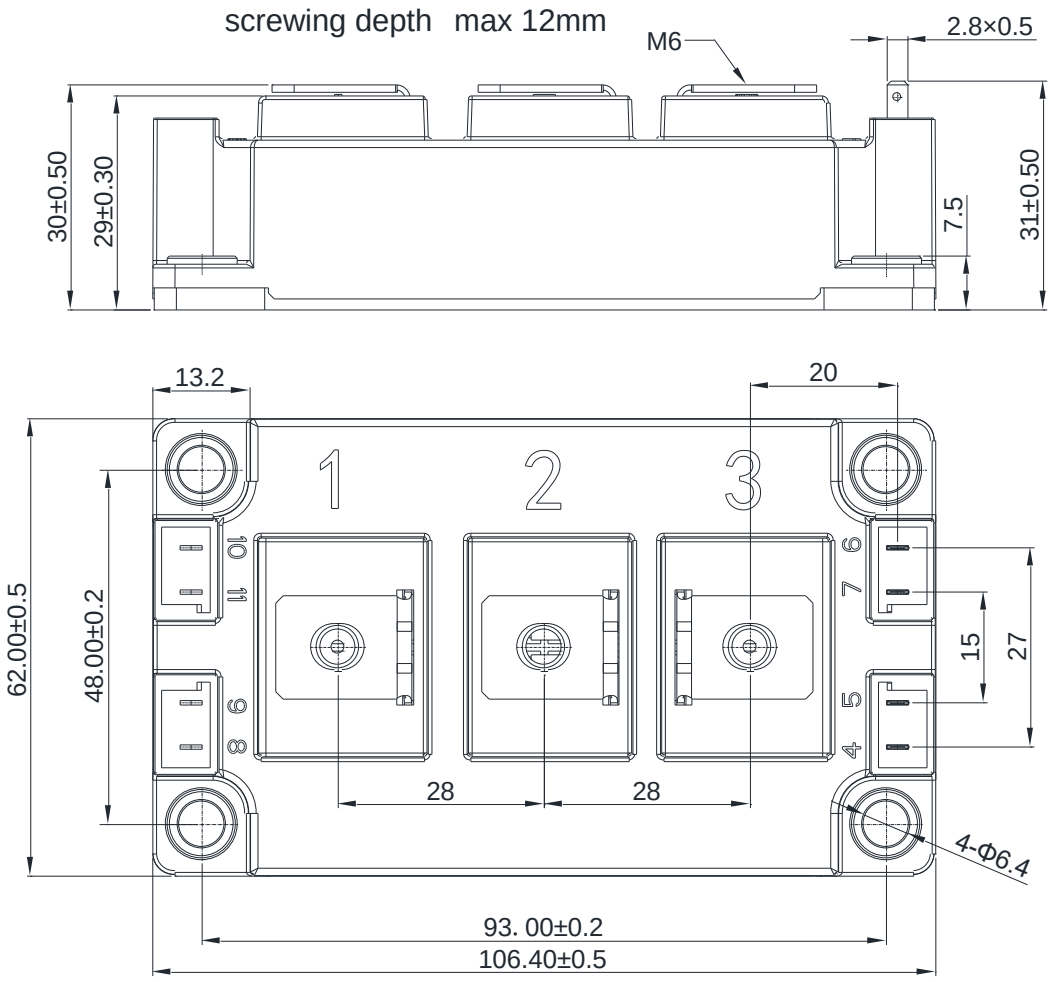
Fig10.Diode Transient Thermal Impedance

Circuit Diagram



Package Outline Information

Dimensions in Millimeters



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