MG450HF12TLC2

RoHS COMPLIANT



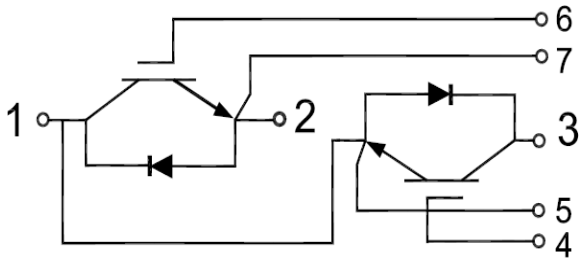
IGBT Modules

V_{CES}	1200V
I_C	450A

Applications

- Motion/servo control
- High frequency switching application
- UPS (Uninterruptible Power Supplies)
- Welding machine

Circuit



Features

- Low $V_{CE(sat)}$ with Trench technology
- Low switching losses especially Eoff
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability(10us)
- Including ultra fast & soft recovery anti-parallel FWD
- Low inductance package
- 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℃	450	A
Repetitive Peak Collector Current	I_{CRM}	t_p=1ms	900	A
Gate-Emitter Voltage	V_{GES}	T_{vj}=25℃	±20	V
Total Power Dissipation	P_{tot}	T_C=25℃ T_{vjmax}=175℃	2307	W

Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Gate-emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}$, I_C=12mA,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=450A,V_{GE}=15V, T_{vj}=25℃		2.36	2.8	V
		I_C=450A,V_{GE}=15V, T_{vj}=150℃		3.05		
		I_C=450A,V_{GE}=15V, T_{vj}=175℃		3.17		
Gate Charge	Q_G			3.50		uC
Internal Gate Resistance	R_{Gint}			1.67		Ω
Input Capacitance	C_{ies}	V_{CE}=25V,V_{GE}=0V, f=1MHz,T_{vj}=25℃		45.9		nF
Reverse Transfer Capacitance	C_{res}			1.1		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=450A V_{CE}=600V V_{GE}=±15V R_G=1.1Ω T_{vj}=25℃		141		ns
Rise Time	t_r			82		ns
Turn-off Delay Time	$t_{d(off)}$			332		ns
Fall Time	t_f			192		ns
Energy Dissipation During Turn-on Time	E_{on}			48.9		mJ
Energy Dissipation During Turn-off Time	E_{off}			34.2		mJ
Turn-on Delay Time	$t_{d(on)}$	I_C=450A V_{CE}=600V V_{GE}=±15V R_G=1.1Ω T_{vj}=150℃		147		ns
Rise Time	t_r			92		ns
Turn-off Delay Time	$t_{d(off)}$			376		ns
Fall Time	t_f			276		ns
Energy Dissipation During Turn-on Time	E_{on}			69.2		mJ
Energy Dissipation During Turn-off Time	E_{off}			44.2		mJ
Turn-on Delay Time	$t_{d(on)}$	I_C=450A V_{CE}=600V V_{GE}=±15V R_G=1.1Ω T_{vj}=175℃		148		ns
Rise Time	t_r			94		ns
Turn-off Delay Time	$t_{d(off)}$			385		ns
Fall Time	t_f			295		ns
Energy Dissipation During Turn-on Time	E_{on}			73.4		mJ
Energy Dissipation During Turn-off Time	E_{off}			46.6		mJ
SC Data	I_{sc}	t_p≤10us, V_{GE}=15V, T_{vj}=150℃, V_{CC}=900V, V_{CEM}≤1200V		2000		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		450	A
Repetitive Peak Forward Current	I_{FRM}	t_p=1ms	900	A

Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	I_F=450A,T_{vj}=25℃		2.01	2.80	V
		I_F=450A,T_{vj}=150℃		1.67		
		I_F=450A,T_{vj}=175℃		1.60		
Recovered Charge	Q_{rr}	I_F=450A V_R=600V -di_F/dt=3800A/us T_{vj}=25℃		25.2		uC
Peak Reverse Recovery Current	I_{rr}			171		A
Reverse Recovery Energy	E_{rec}			7.98		mJ
Recovered Charge	Q_{rr}	I_F=450A V_R=600V -di_F/dt=3800A/us T_{vj}=150℃		63		uC
Peak Reverse Recovery Current	I_{rr}			237		A
Reverse Recovery Energy	E_{rec}			20.6		mJ
Recovered Charge	Q_{rr}	I_F=450A V_R=600V -di_F/dt=3800A/us T_{vj}=175℃		73.6		uC
Peak Reverse Recovery Current	I_{rr}			254		A
Reverse Recovery Energy	E_{rec}			24.7		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			0.065	K/W
		per Diode			0.13	
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

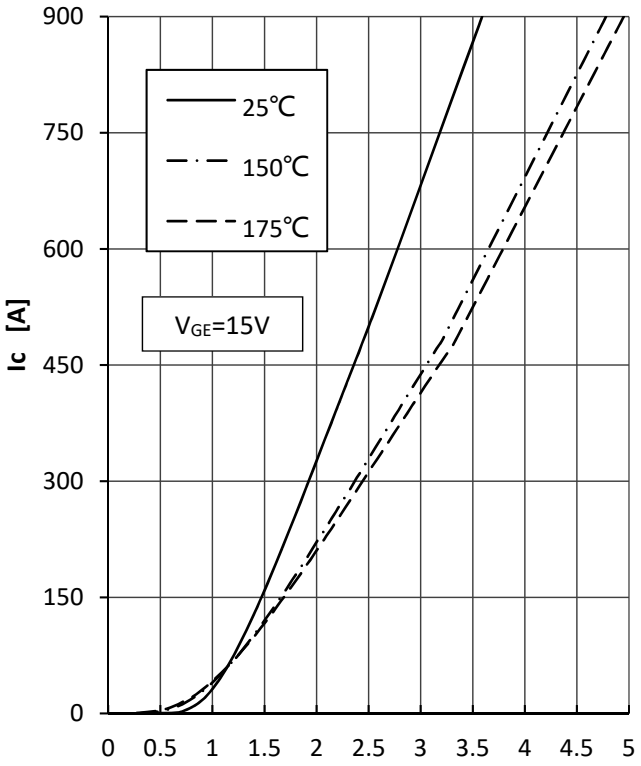


Fig1.IGBT Output Characteristics

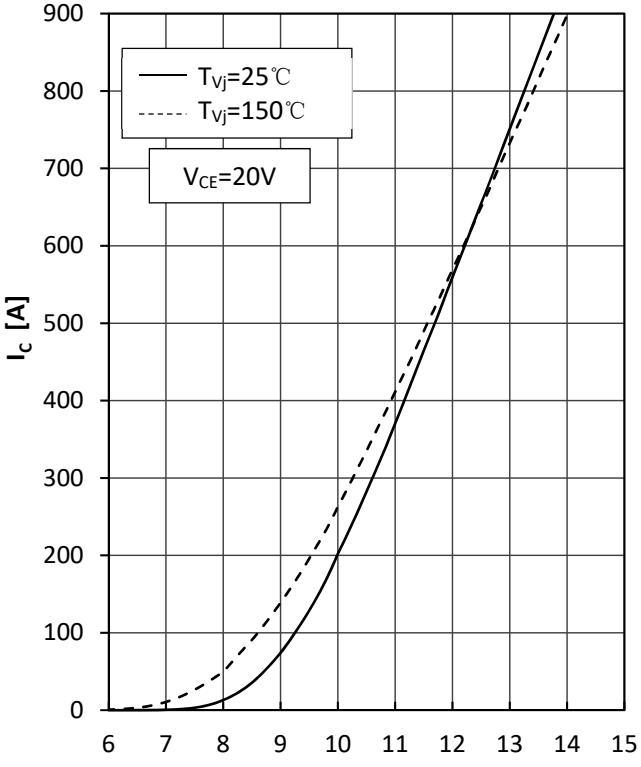


Fig2.IGBT Transfer Characteristics

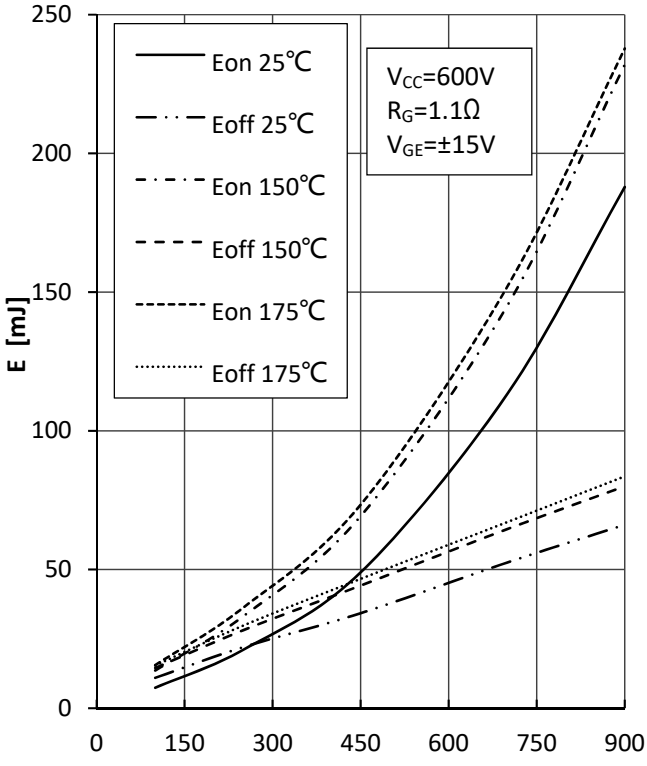


Fig3.IGBT Switching Loss vs.Ic

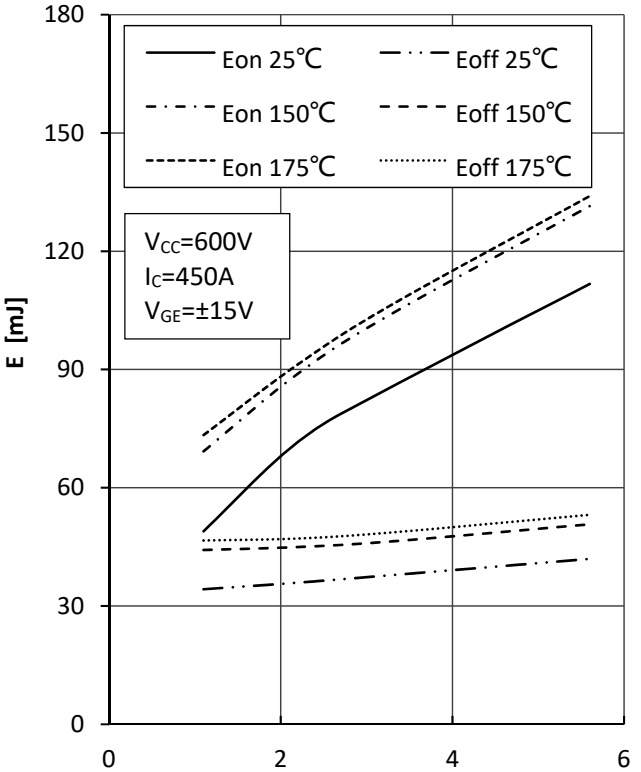


Fig4.IGBT Switching Loss vs.Rg

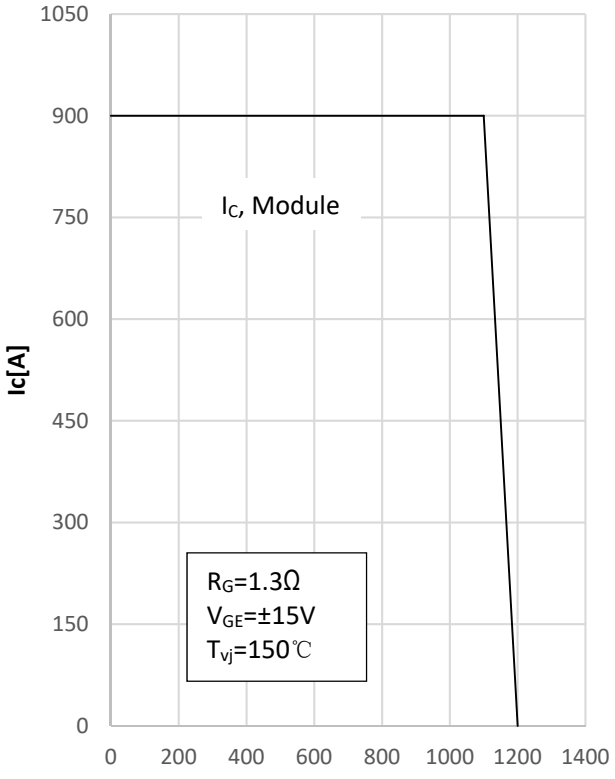


Fig5.RBSOA

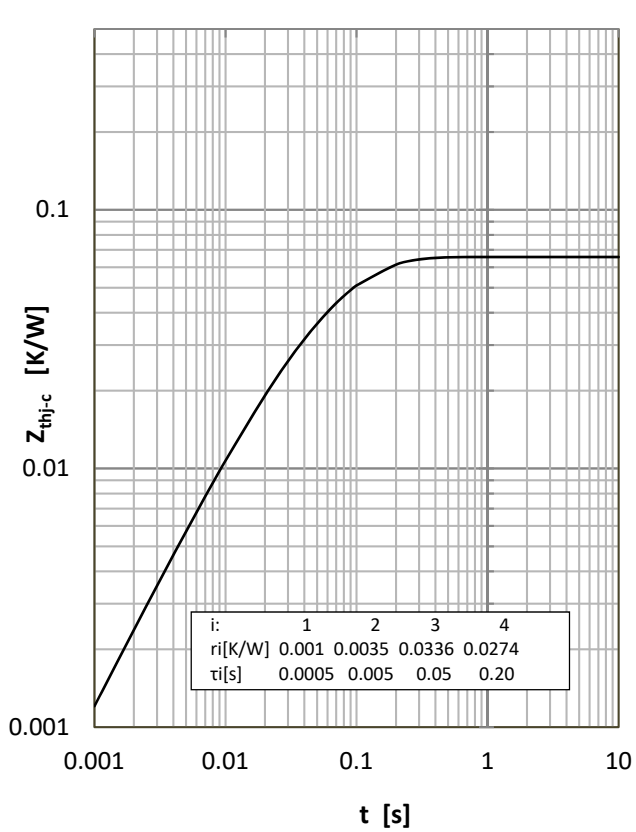


Fig 6. IGBT Transient Thermal Impedance

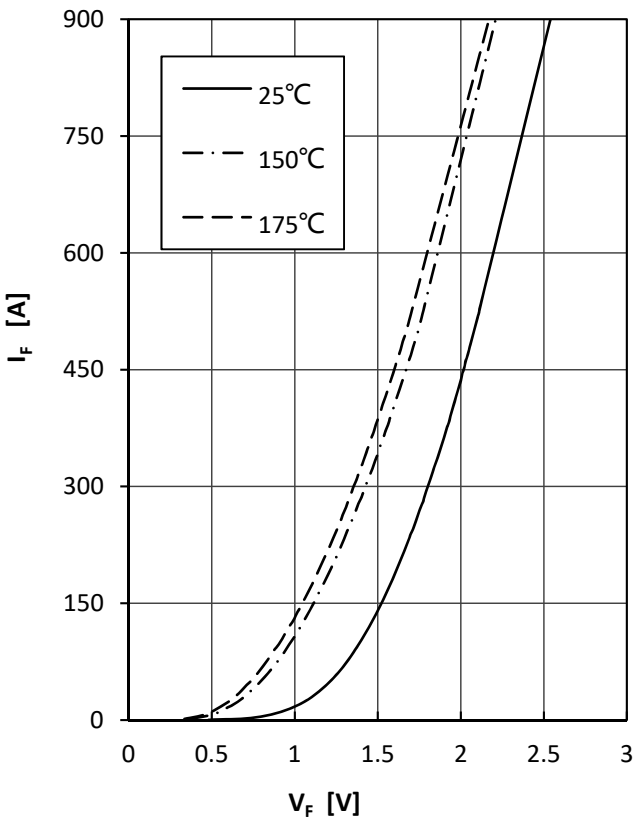


Fig7.Diode Foward Characteristics

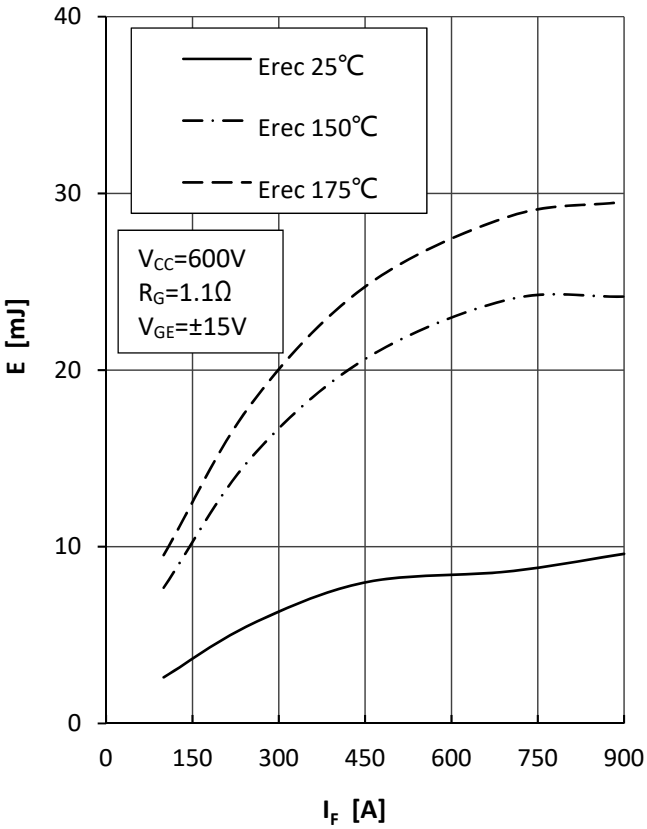


Fig8.Diode Switching Loss(Erec) vs.I_F

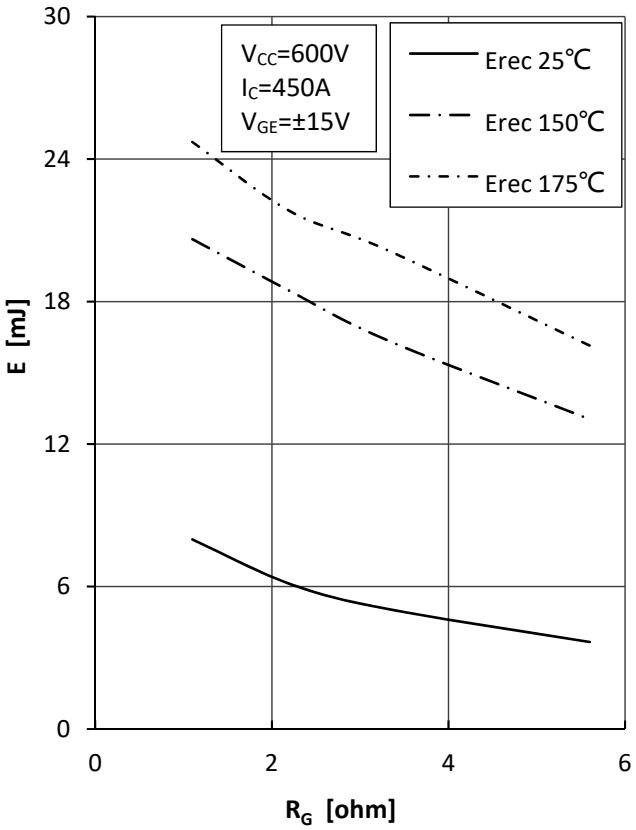


Fig9.Diode Switching Loss(Erec) vs.Rg

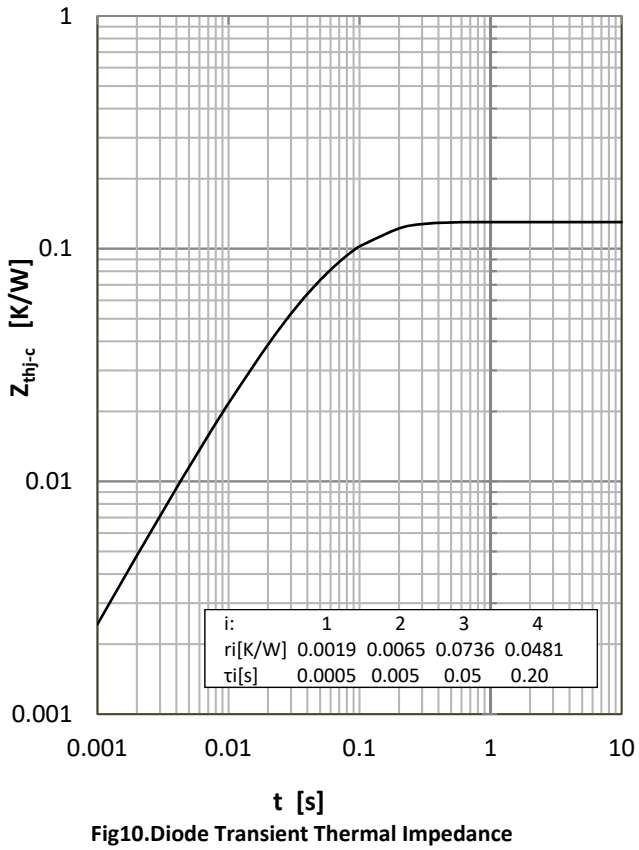
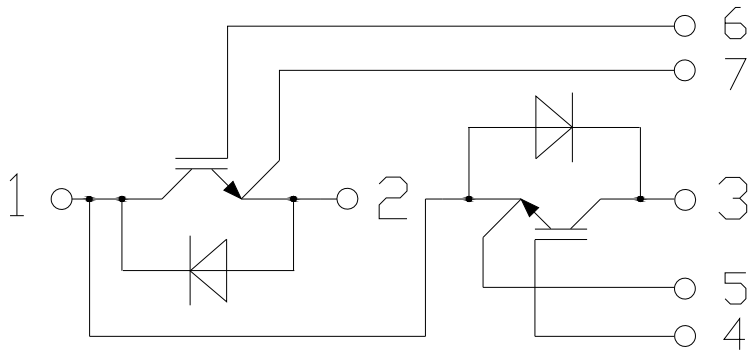


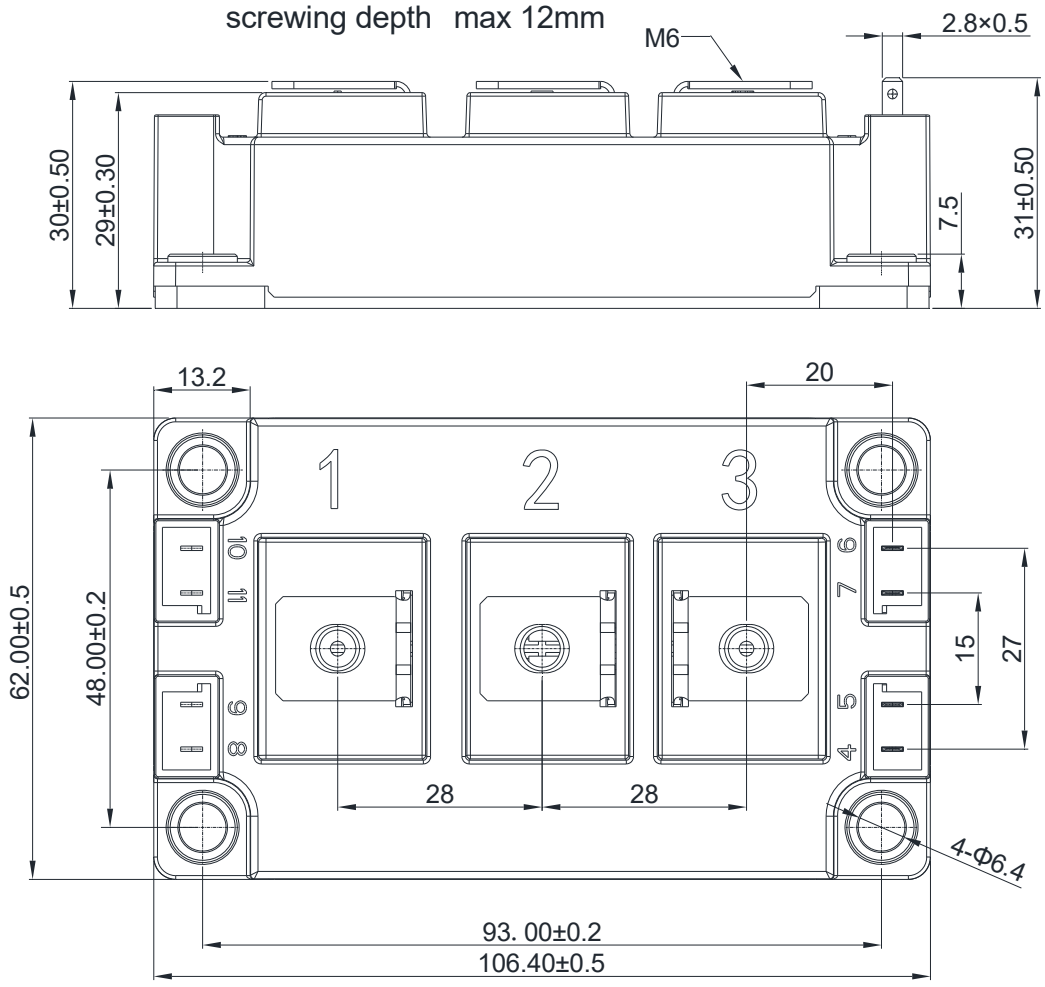
Fig10.Diode Transient Thermal Impedance

- Circuit Diagram



- **Package Outline Information**

Dimensions in Millimeters



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