MG150HF12MLC2

RoHS COMPLIANT



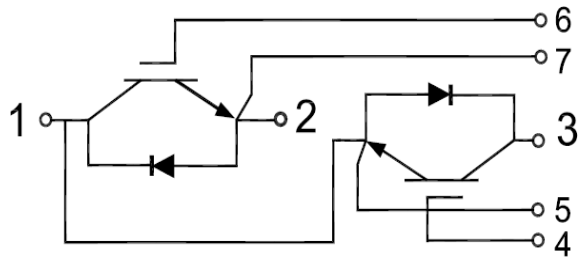
IGBT Modules

V_{CES} 1200V
I_C 150A

Applications

- Inverter for motor drive
- AC and DC servo drive amplifier
- UPS (Uninterruptible Power Supplies)
- Soft switching welding machine

Circuit



Features

- Low $V_{CE(sat)}$ with Trench technology
- Vce(sat) with positive temperature coefficient
- High short circuit capability(10us)
- 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℃	150	A
Repetitive Peak Collector Current	I_{CRM}	t_p=1ms	300	A
Gate-Emitter Voltage	V_{GES}	T_{vj}=25℃	±20	V
Total Power Dissipation	P_{tot}	T_c=25℃ T_{vjmax}=175℃	714	W

Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}$, I_C=4mA,T_{vj}=25℃	5.2	5.85	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=150A,V_{GE}=15V, T_{vj}=25℃		1.60	2.30	V
		I_C=150A,V_{GE}=15V, T_{vj}=150℃		1.95		
		I_C=150A,V_{GE}=15V, T_{vj}=175℃		2.00		
Gate Charge	Q_G			1.6		uC
Internal Gate Resistance	R_{gint}			1.37		Ω
Input Capacitance	C_{ies}	V_{CE}=25V,V_{GE}=0V, f=1MHz,T_{vj}=25℃		19.8		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=150A V_{CE}=600V V_{GE}=±15V R_G=4.7Ω T_{vj}=25℃		201		ns
Rise Time	t_r			119		ns
Turn-off Delay Time	$t_{d(off)}$			347		ns
Fall Time	t_f			240		ns
Energy Dissipation During Turn-on Time	E_{on}			18.5		mJ
Energy Dissipation During Turn-off Time	E_{off}			12.6		mJ
Turn-on Delay Time	$t_{d(on)}$	I_C=150A V_{CE}=600V V_{GE}=±15V R_G=4.7Ω T_{vj}=150℃		214		ns
Rise Time	t_r			128		ns
Turn-off Delay Time	$t_{d(off)}$			388		ns
Fall Time	t_f			380		ns
Energy Dissipation During Turn-on Time	E_{on}			26.9		mJ
Energy Dissipation During Turn-off Time	E_{off}			17.0		mJ
Turn-on Delay Time	$t_{d(on)}$	I_C=150A V_{CE}=600V V_{GE}=±15V R_G=4.7Ω T_{vj}=175℃		215		ns
Rise Time	t_r			131		ns
Turn-off Delay Time	$t_{d(off)}$			396		ns
Fall Time	t_f			402		ns
Energy Dissipation During Turn-on Time	E_{on}			28.7		mJ
Energy Dissipation During Turn-off Time	E_{off}			17.9		mJ
SC Data	I_{sc}	t_p≤8us,V_{GE}=15V,T_{vj}=150℃, V_{CC}=600V,V_{CEM}≤1200V		600		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		150	A
Repetitive Peak Forward Current	I_{FRM}	t_p=1ms	300	A

Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	I_F=150A,T_{vj}=25℃		2.00	2.80	V
		I_F=150A,T_{vj}=150℃		1.72		
		I_F=150A,T_{vj}=175℃		1.65		
Recovered Charge	Q_{rr}	I_F=150A V_R=600V -di_F/dt =2000A/us T_{vj}=25℃		8		uC
Peak Reverse Recovery Current	I_{rr}			40		A
Reverse Recovery Energy	E_{rec}			2.9		mJ
Recovered Charge	Q_{rr}	I_F=150A V_R=600V -di_F/dt =2000A/us T_{vj}=150℃		21		uC
Peak Reverse Recovery Current	I_{rr}			66		A
Reverse Recovery Energy	E_{rec}			7.8		mJ
Recovered Charge	Q_{rr}	I_F=150A V_R=600V -di_F/dt =2000A/us T_{vj}=175℃		25		uC
Peak Reverse Recovery Current	I_{rr}			72		A
Reverse Recovery Energy	E_{rec}			9.2		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			0.21	K/W
		per Diode			0.30	
Thermal Resistance Case to Sink	$R_{\theta CS}$	Conductive grease applied		0.012	0.035	K/W
Module ElectrodesTorque	M_t	Recommended(M6)	3.0		5.0	N·m
Module to SinkTorque	M_s	Recommended(M6)	3.0		5.0	N·m
Weight of Module	G			315		g

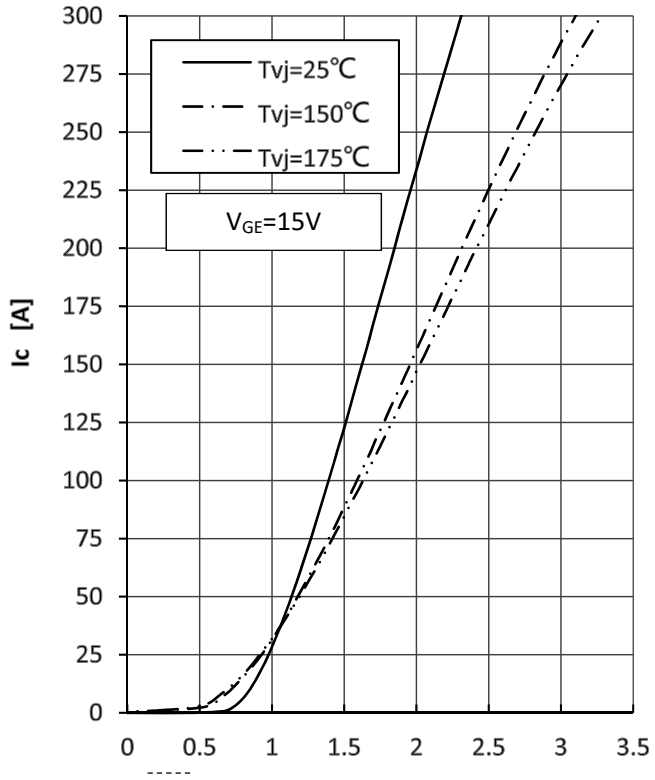


Fig1.IGBT Output Characteristics

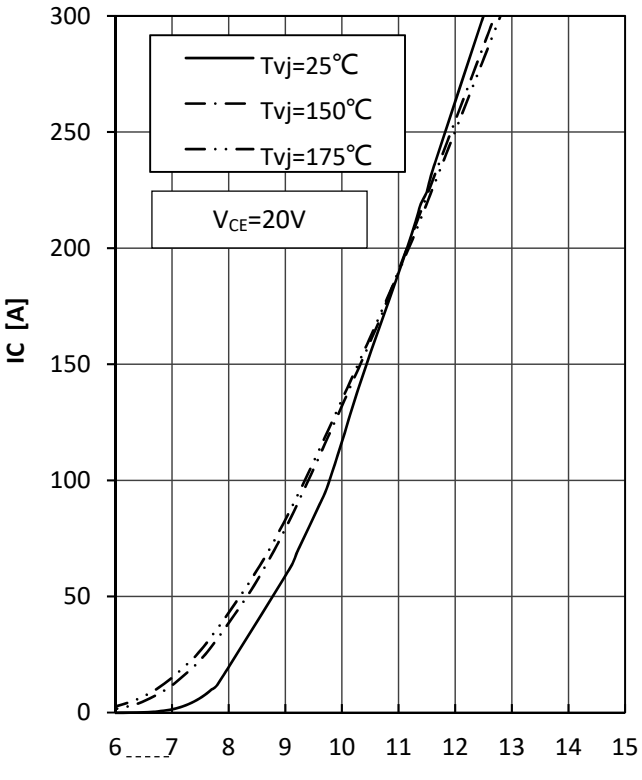


Fig2.IGBT Transfer Characteristics

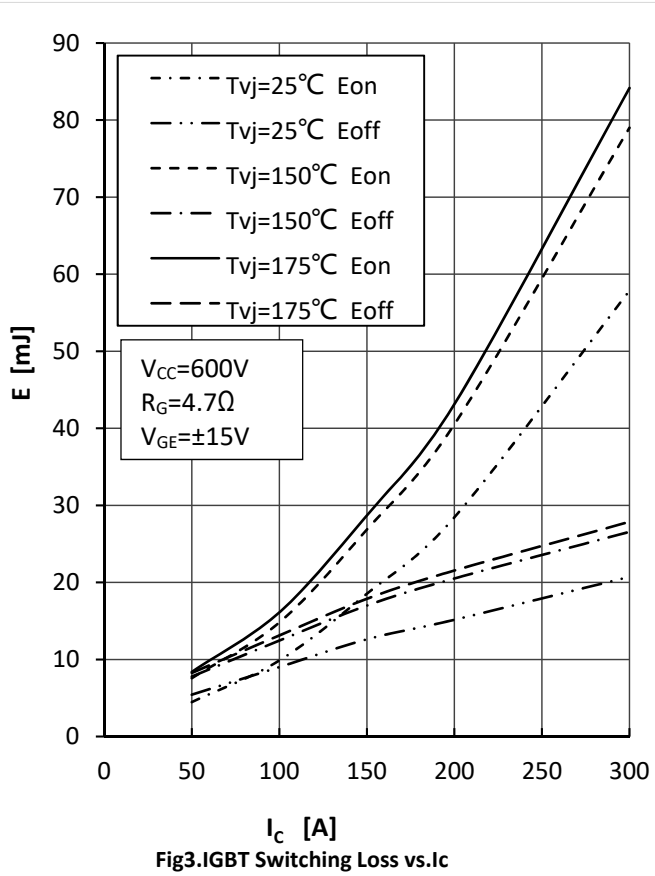


Fig3.IGBT Switching Loss vs.Ic

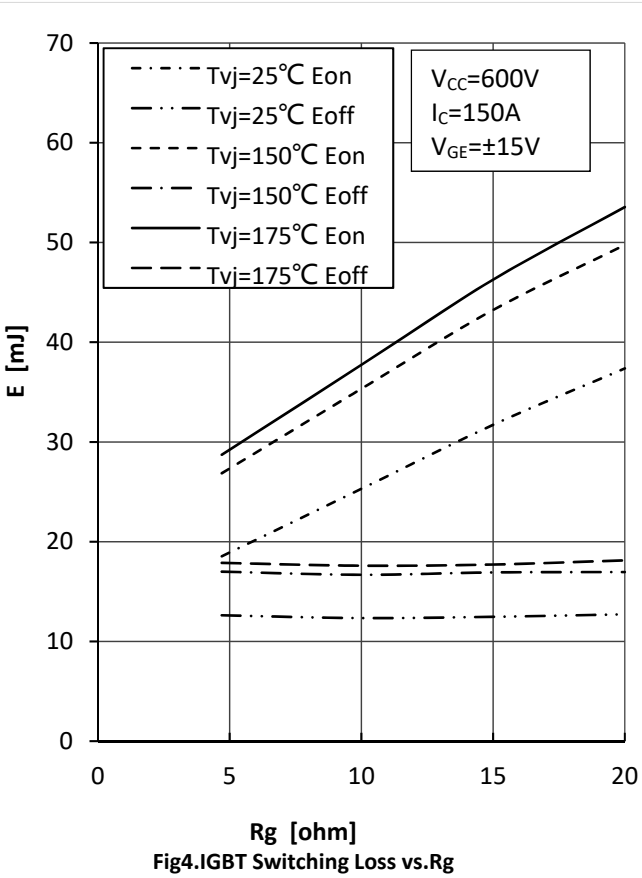


Fig4.IGBT Switching Loss vs.Rg

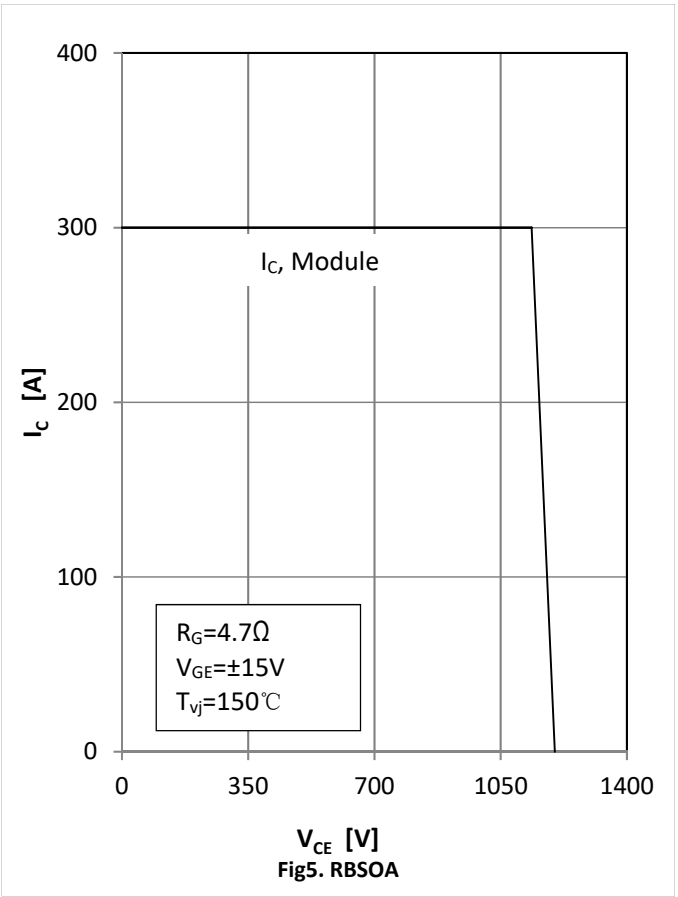


Fig5. RBSOA

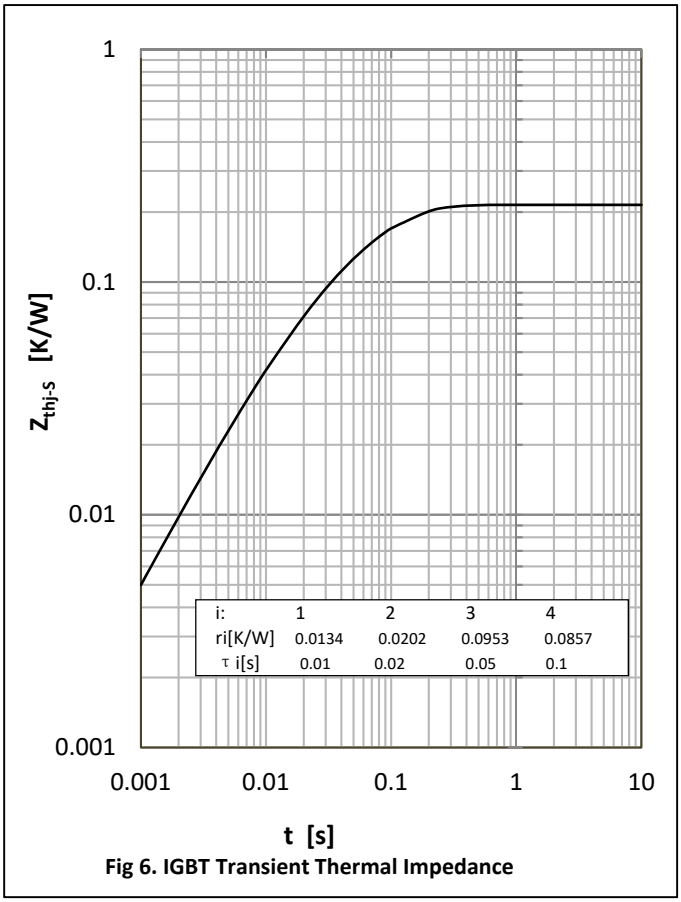


Fig 6. IGBT Transient Thermal Impedance

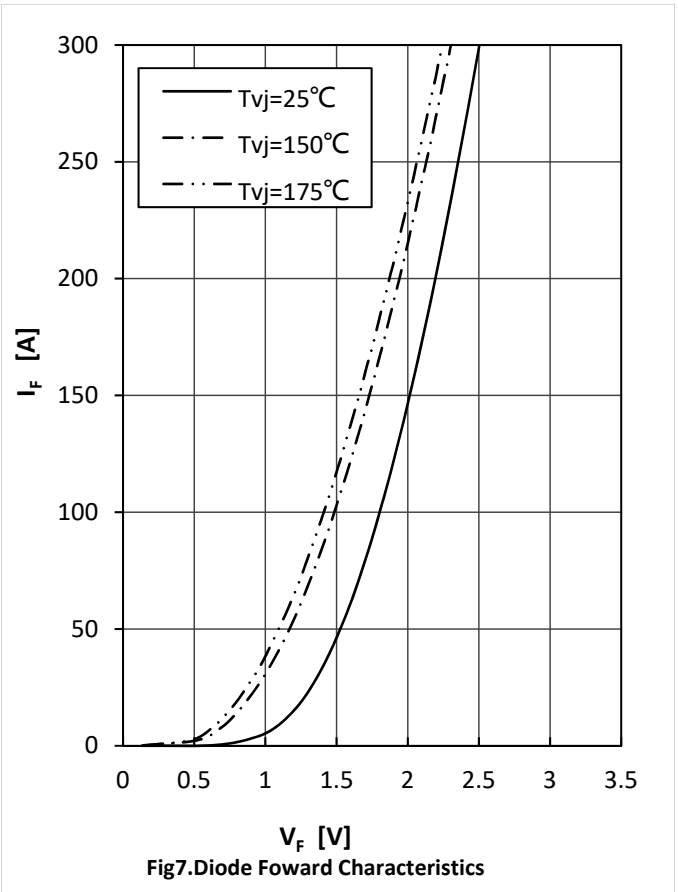


Fig7.Diode Foward Characteristics

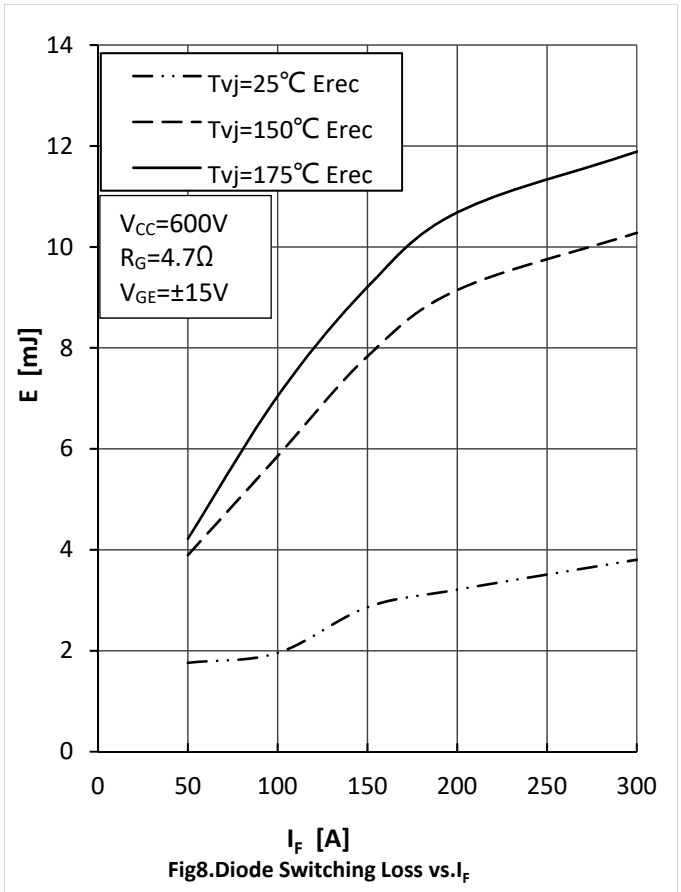


Fig8.Diode Switching Loss vs.I_F

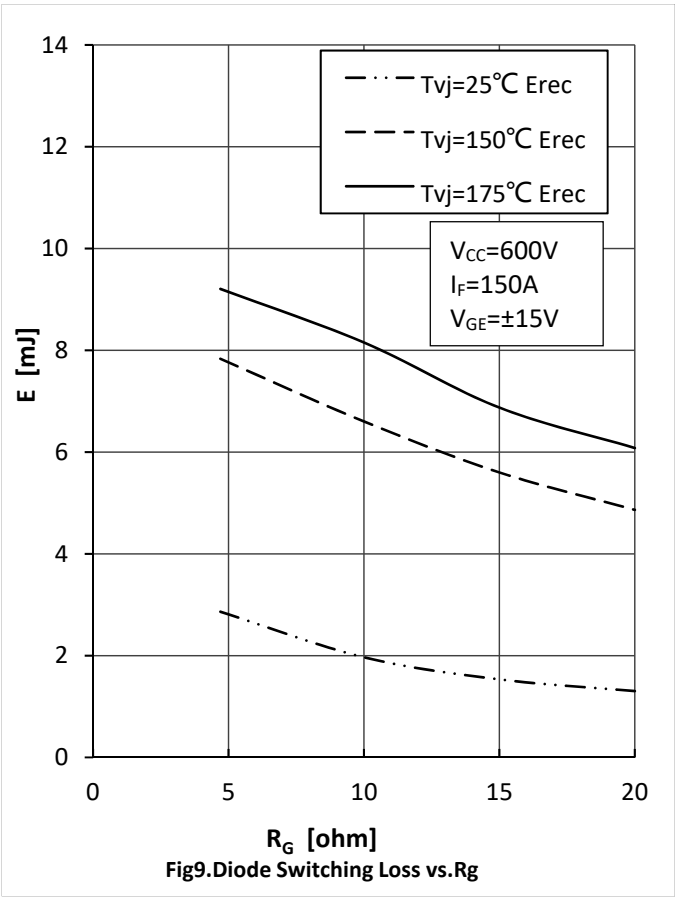


Fig9.Diode Switching Loss vs.Rg

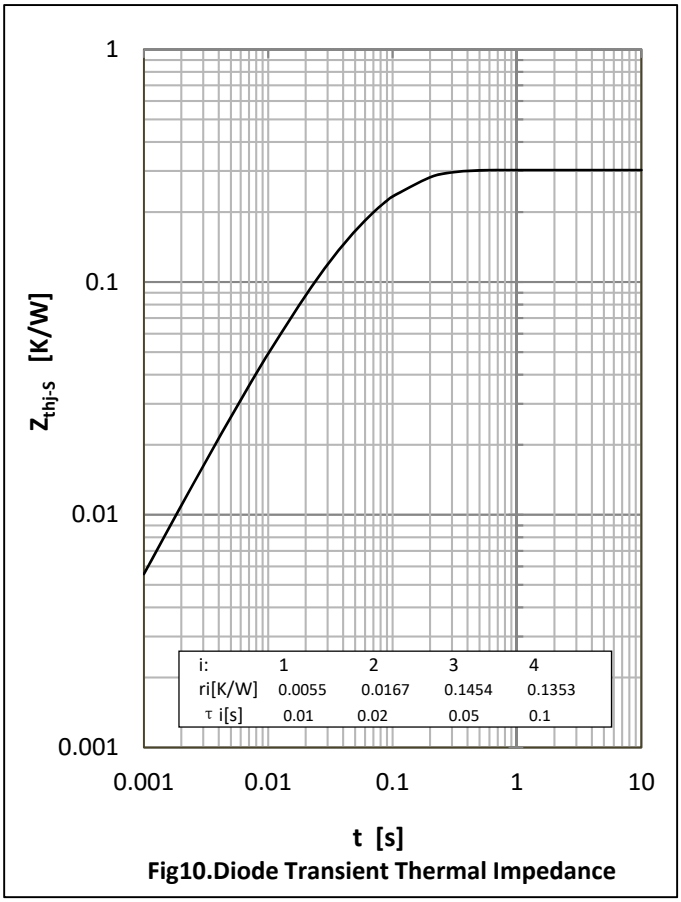
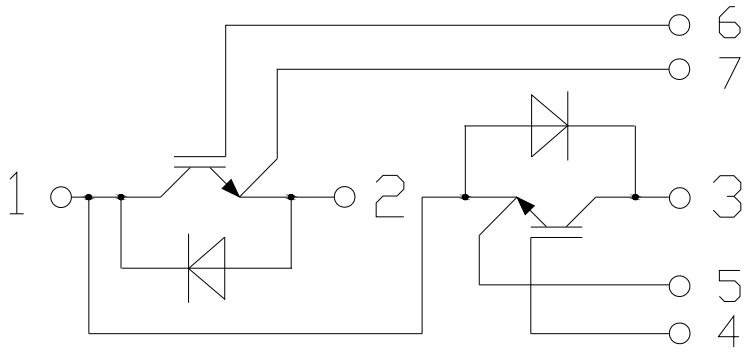


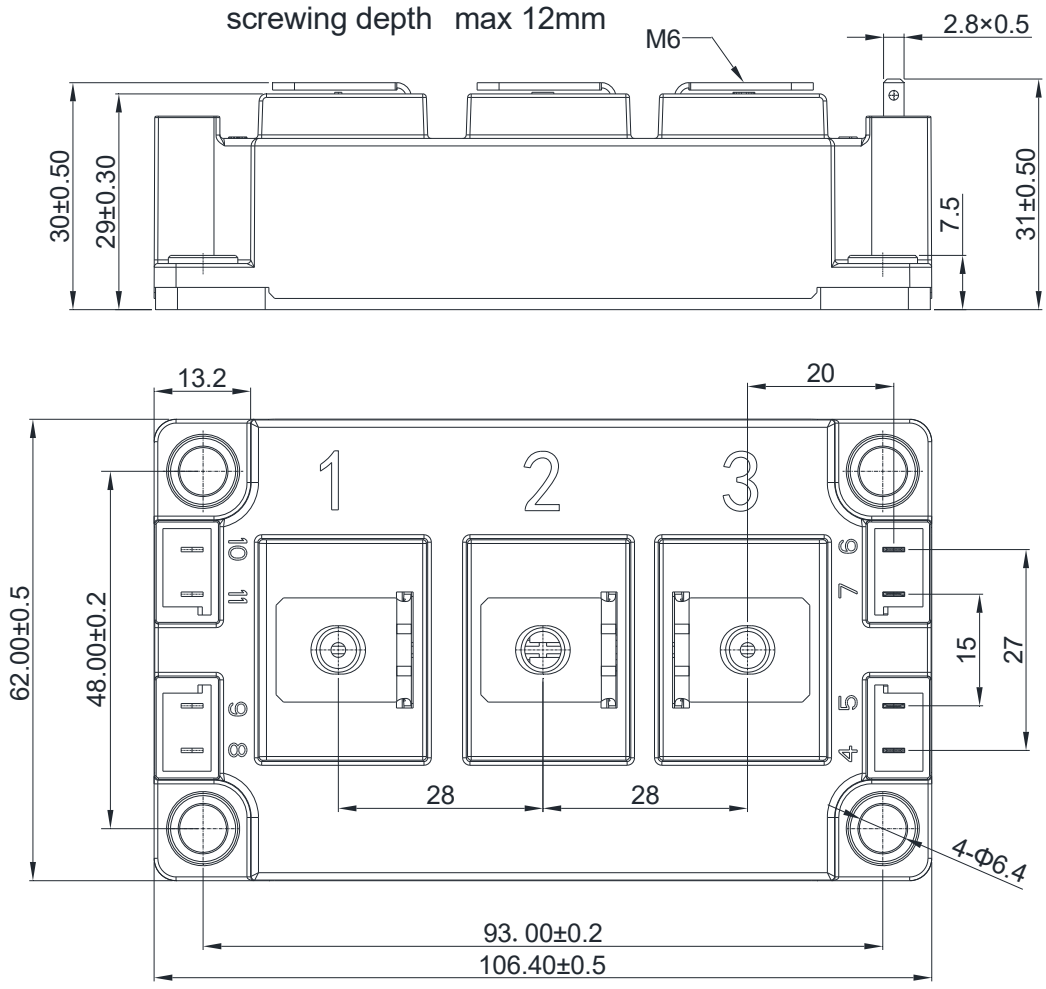
Fig10.Diode Transient Thermal Impedance

- Circuit Diagram



- **Package Outline Information**

Dimensions in Millimeters



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