STARSEA

MG150TF12E2A

RoHS COMPLIANT

IGBT Modules



V_{CES}	1200V
I_C	150A

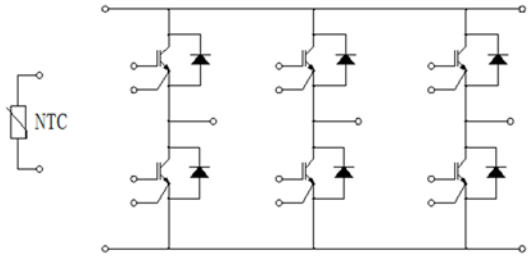
Applications

- Motor Drivers
- AC and DC servo drive amplifier
- UPS (Uninterruptible Power Supplies)

Features

- Low switching losses
- Low $v_{ce(sat)}$ with positive temperature coefficient
- Including fast & soft recovery anti-parallel FWD
- Low inductance case
- High short circuit capability(10us)
- Maximum junction temperature 175℃

Circuit



● IGBT- inverter

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℃, T_{vjmax}=175℃	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

IGBT

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℃	5.0	5.8	6.5	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℃		1.90		V
		I_C=150A,V_{GE}=15V, T_{vj}=125℃		2.25		
		I_C=150A,V_{GE}=15V, T_{vj}=150℃		2.45		
		I_C=150A,V_{GE}=15V, T_{vj}=175℃		2.50		
Gate Charge	Q_G			1.42		uC
Input Capacitance	C_{ies}	V_{CE}=25V,V_{GE}=0V, f=1MHz,T_{vj}=25℃		9.82		nF
Reverse Transfer Capacitance	C_{res}			0.49		nF
Internal Gate Resistance	R_{gint}			5.0		Ω
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 =3.3Ω T_{vj}=25℃		138		ns
Rise Time	t_r			65		ns
Turn-off Delay Time	$t_{d(off)}$			280		ns
Fall Time	t_f			237		ns
Energy Dissipation During Turn-on Time	E_{on}			13.3		mJ
Energy Dissipation During Turn-off Time	E_{off}			11.2		mJ
Turn-on Delay Time	$t_{d(on)}$	I_C=150A V_{CE}=600V V_{GE} = ±15V R_G =3.3Ω T_{vj}=125℃		174		ns
Rise Time	t_r			74		ns
Turn-off Delay Time	$t_{d(off)}$			313		ns
Fall Time	t_f			322		ns
Energy Dissipation During Turn-on Time	E_{on}			18.4		mJ
Energy Dissipation During Turn-off Time	E_{off}			14.6		mJ

Turn-on Delay Time		I_C=150A V_{CE}=600V V_{GE} = ±15V R_G =3.3Ω T_{vj}=150℃		175		ns
Rise Time				77		ns
Turn-off Delay Time				327		ns
Fall Time				370		ns
Energy Dissipation During Turn-on Time				20.2		mJ
Energy Dissipation During Turn-off Time				15.9		mJ
Turn-on Delay Time		I_C=150A V_{CE}=600V V_{GE} = ±15V R_G =3.3Ω T_{vj}=175℃		177		ns
Rise Time				78		ns
Turn-off Delay Time				338		ns
Fall Time				398		ns
Energy Dissipation During Turn-on Time				21.8		mJ
Energy Dissipation During Turn-off Time				17		mJ
SC Data	I_{sc}	t_p≤10us,V_{GE}=15V,T_{vj}=150℃, V_{cc}=900V,V_{CEM}≤1200V		675		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
I^2t-value	I^2t	V_R=0V,t_p=10ms,T_{vj}=125℃	4550	A^2s

Characteristic values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	I_F=150A,T_{vj}=25℃		2.45		V
		I_F=150A,T_{vj}=125℃		2.10		
		I_F=150A,T_{vj}=150℃		1.90		
		I_F=150A,T_{vj}=175℃		1.85		
Recovered Charge	Q_{rr}	I_F =150 A V_R=600V -di_F/dt =900A/us T_{vj}=25℃		1.6		uC
Peak Reverse Recovery Current	I_{rr}			49		A
Reverse Recovery Energy	E_{rec}			0.6		mJ
Recovered Charge	Q_{rr}	I_F =150 A V_R=600V -di_F/dt =900A/us T_{vj}=125℃		8.5		uC
Peak Reverse Recovery Current	I_{rr}			69		A
Reverse Recovery Energy	E_{rec}			2.3		mJ
Recovered Charge	Q_{rr}	I_F =150 A V_R=600V -di_F/dt =900A/us T_{vj}=150℃		11.4		uC
Peak Reverse Recovery Current	I_{rr}			77		A
Reverse Recovery Energy	E_{rec}			3.2		mJ
Recovered Charge	Q_{rr}	I_F =150 A V_R=600V -di_F/dt =900A/us T_{vj}=175℃		14.3		uC
Peak Reverse Recovery Current	I_{rr}			84		A
Reverse Recovery Energy	E_{rec}			4.2		mJ

NTC-Thermistor

Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Rated Resistance	R_{25}			5.0		kΩ
Deviation of R100	ΔR/R	T_C=100,R_{100}=493.3 Ω	-5		5	%
Power Dissipation	P_{25}				20.0	mW
B-value	$B_{25/50}$	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15\ K))]$		3375		K

● 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	℃
Stray-inductance-module	L_{SCE}			21		nH
Module lead resistance, terminals-chip	$R_{cc'+EE'}$	T_C=25℃, per switch		1.9		mΩ
	$R_{AA'+CC'}$			1.5		
Thermal Resistance Junction to Case	$R_{\theta JC}$	per IGBT-inverter			0.21	K/W
		per Diode-inverter			0.32	
Thermal Resistance Case to Sink	$R_{\theta CS}$	per IGBT-inverter		0.09		K/W
		per Diode-inverter		0.15		
Mounting Force Per Clamp	F		3.0		6.0	N
Weight of Module	G			300		g

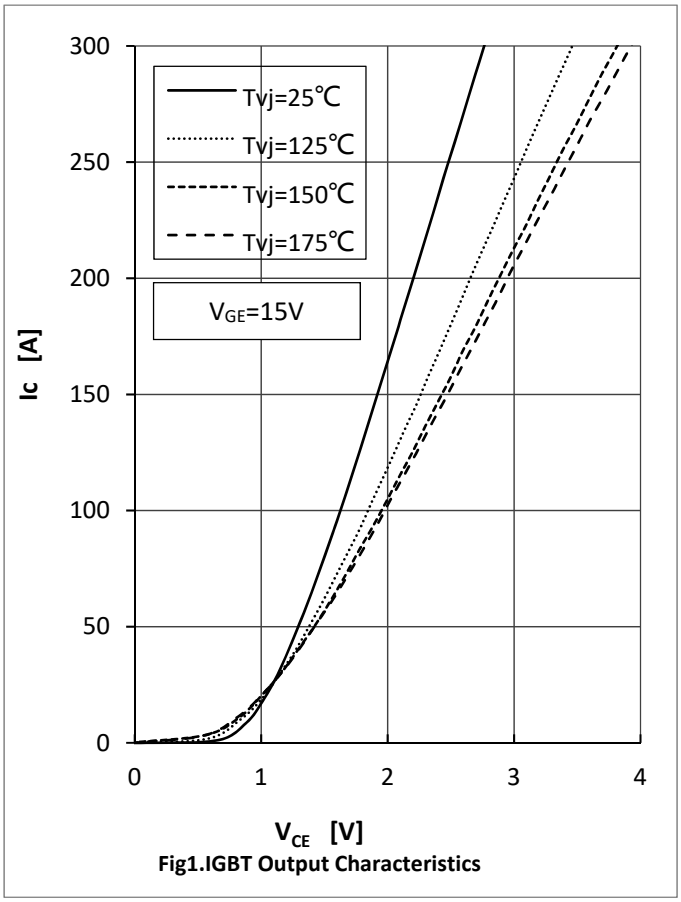


Fig1.IGBT Output Characteristics

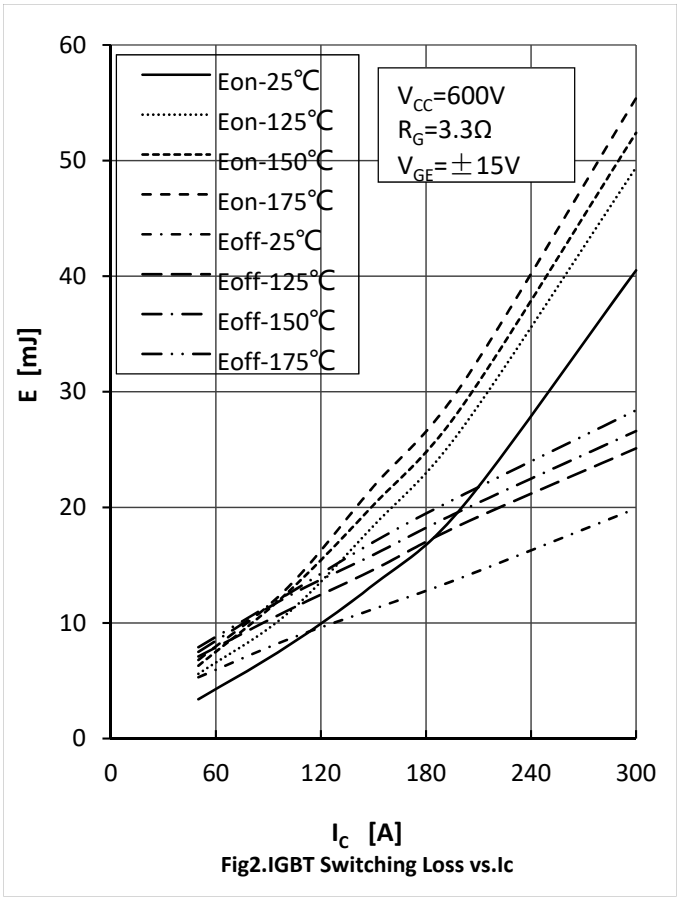


Fig2.IGBT Switching Loss vs.Ic

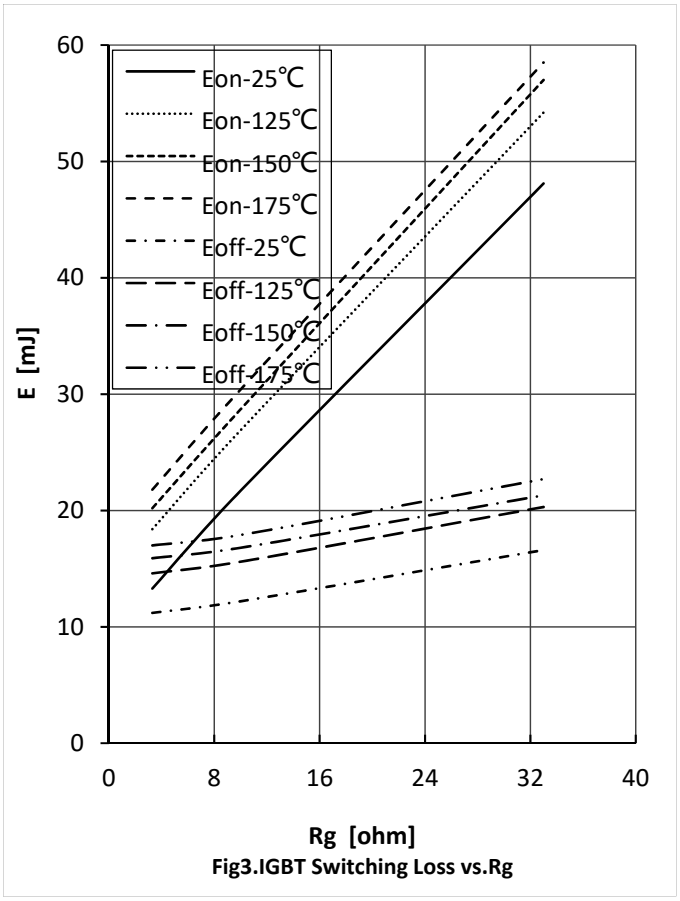


Fig3.IGBT Switching Loss vs.Rg

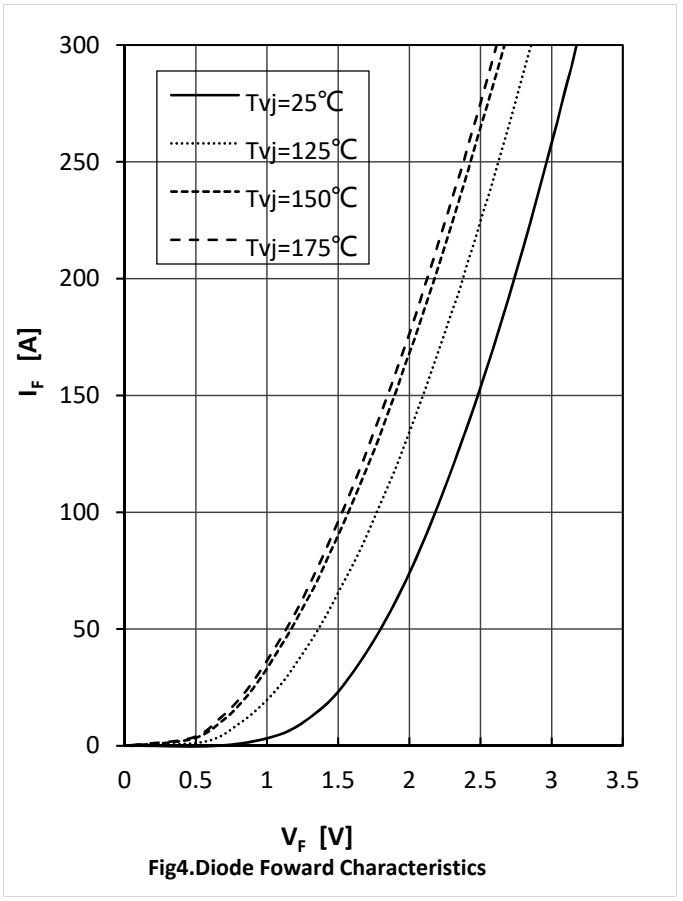


Fig4.Diode Foward Characteristics

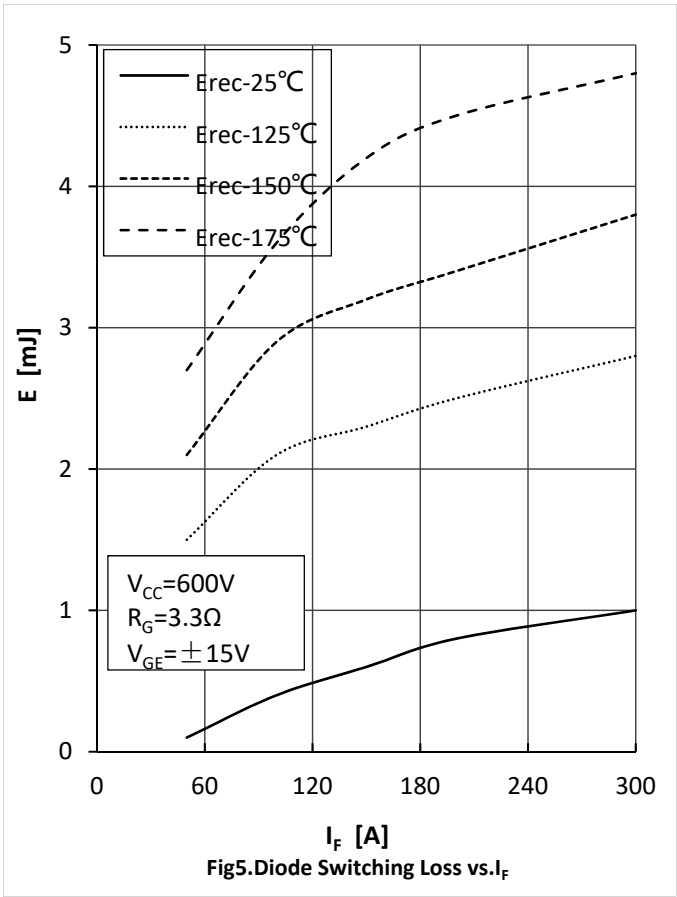


Fig5.Diode Switching Loss vs.I_F

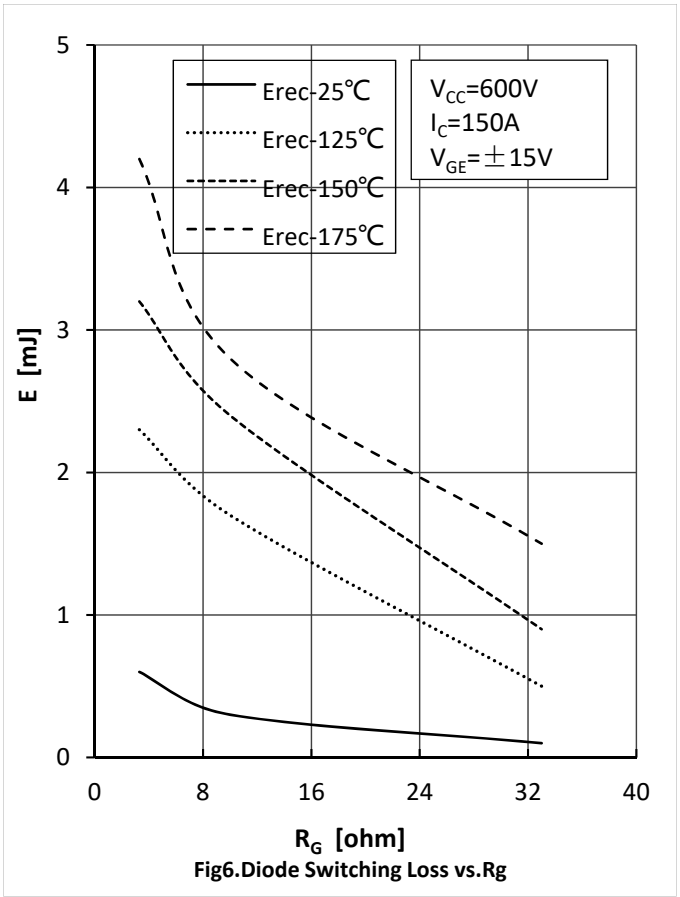


Fig6.Diode Switching Loss vs.Rg

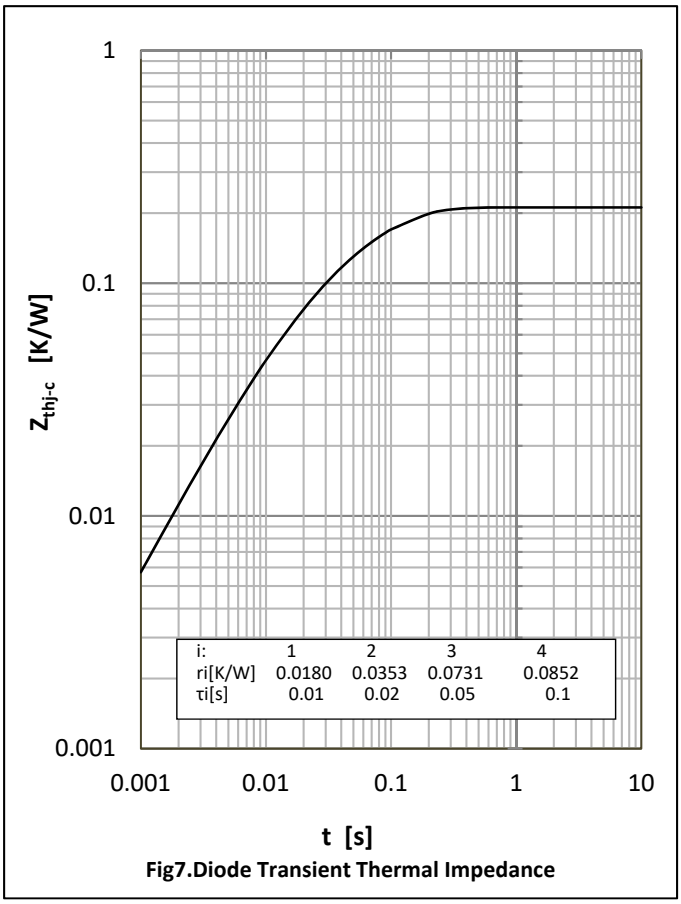


Fig7.Diode Transient Thermal Impedance

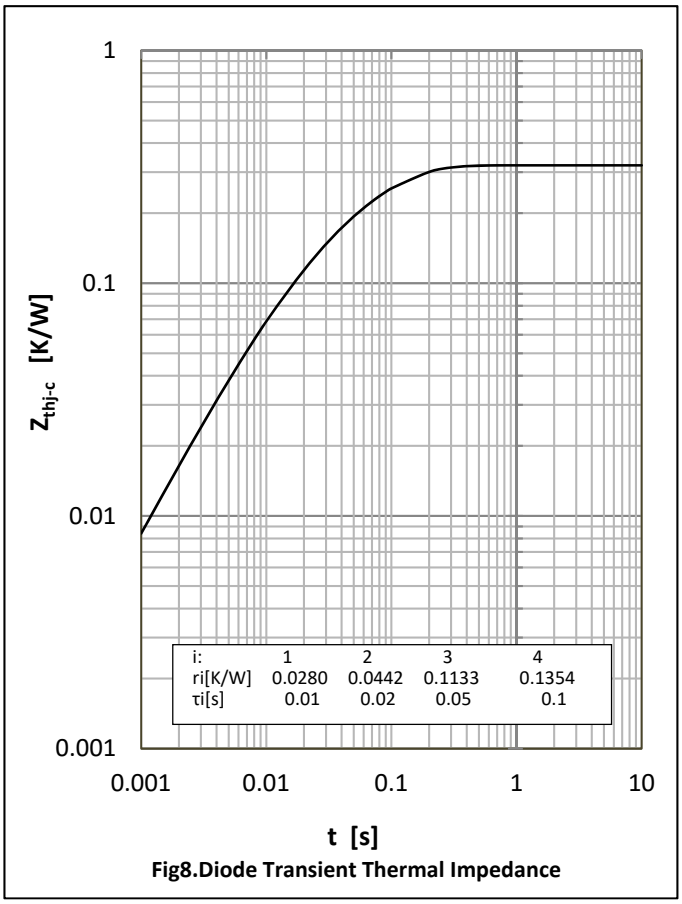
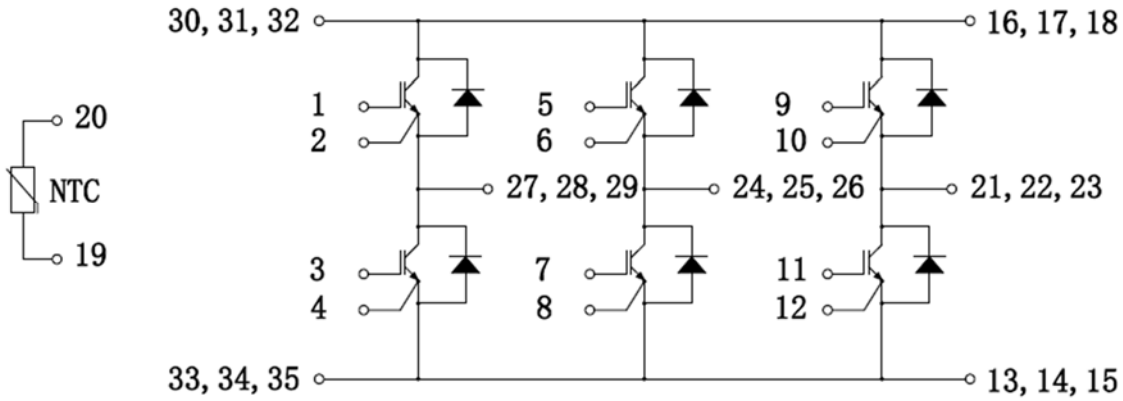
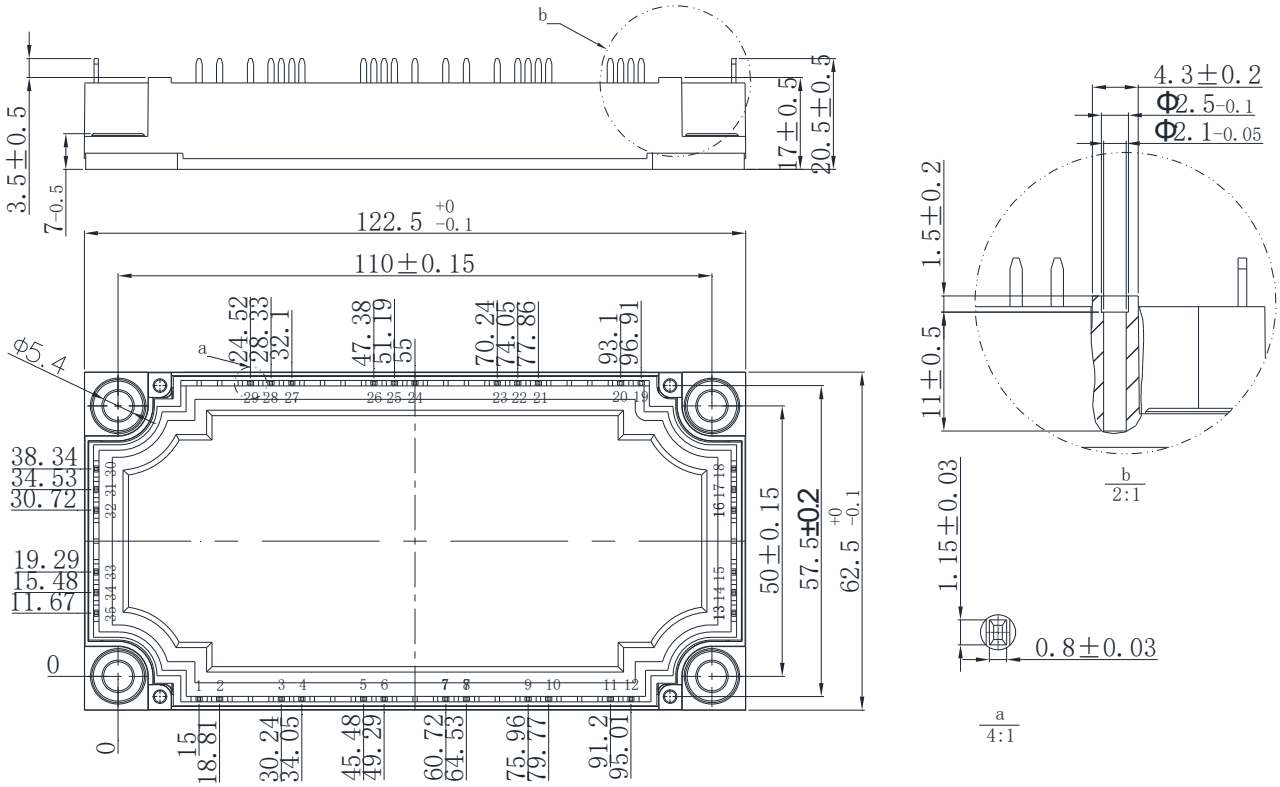


Fig8.Diode Transient Thermal Impedance

- Circuit Diagram



- **Package Outline Information**



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