MG150TF12E2A

RoHS COMPLIANT

IGBT Modules

V_{CES} 1200V
I_C 150A

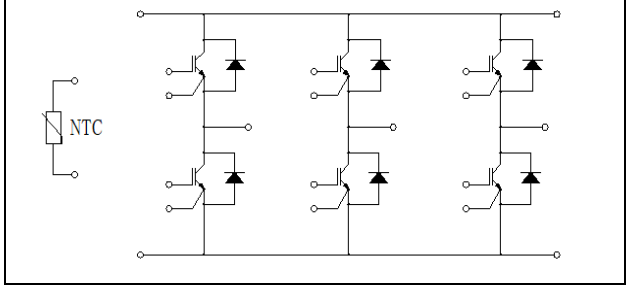
Applications

- 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

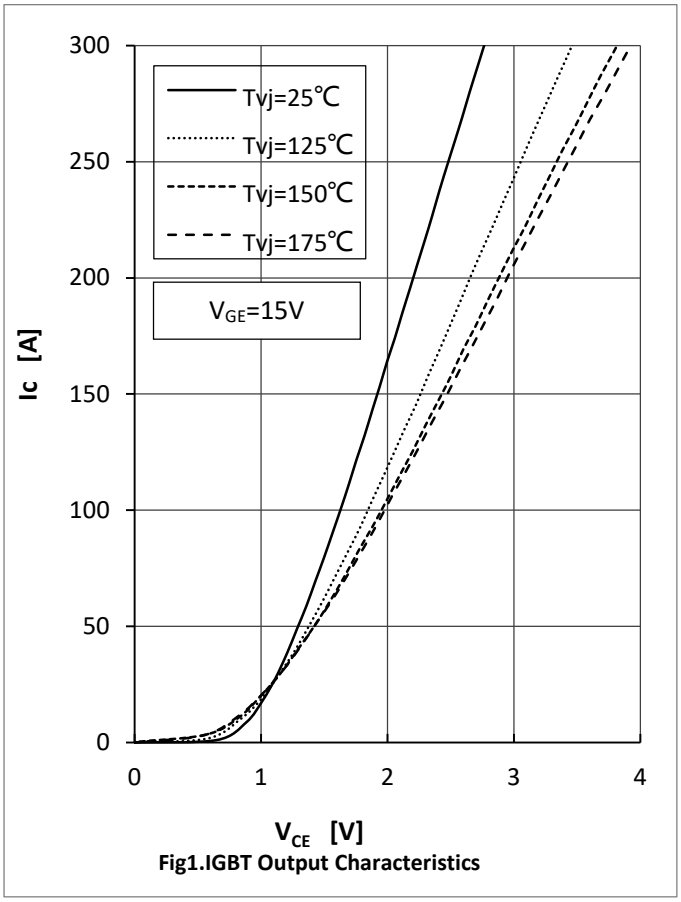


Fig1.IGBT Output Characteristics

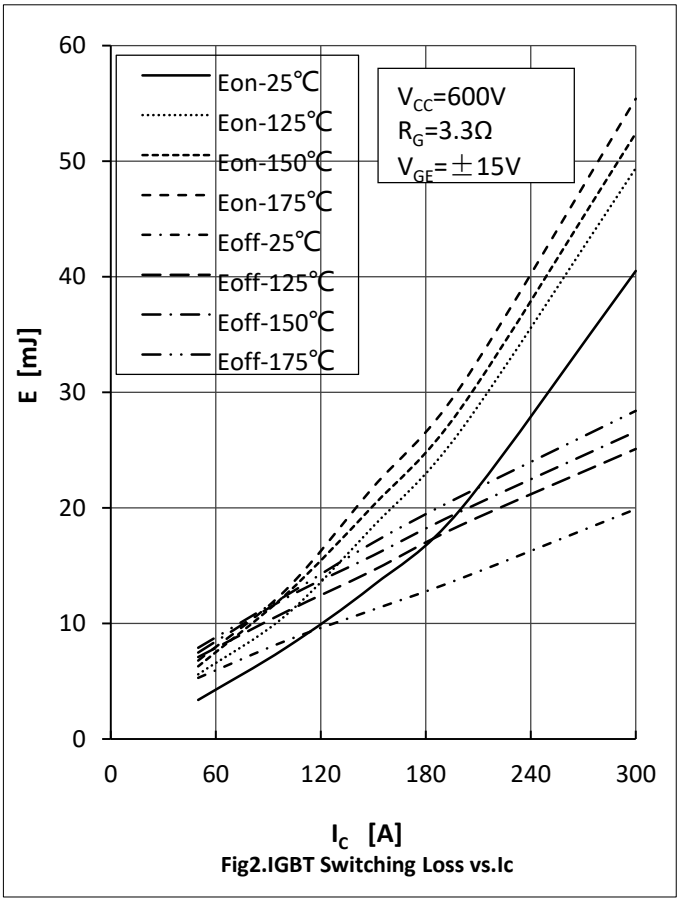


Fig2.IGBT Switching Loss vs.Ic

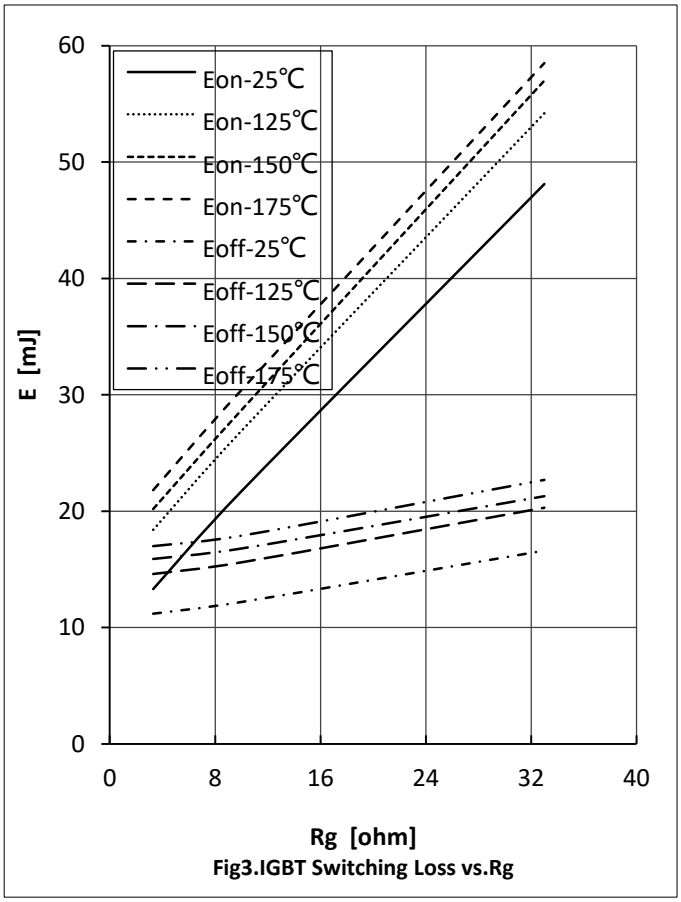


Fig3.IGBT Switching Loss vs.Rg

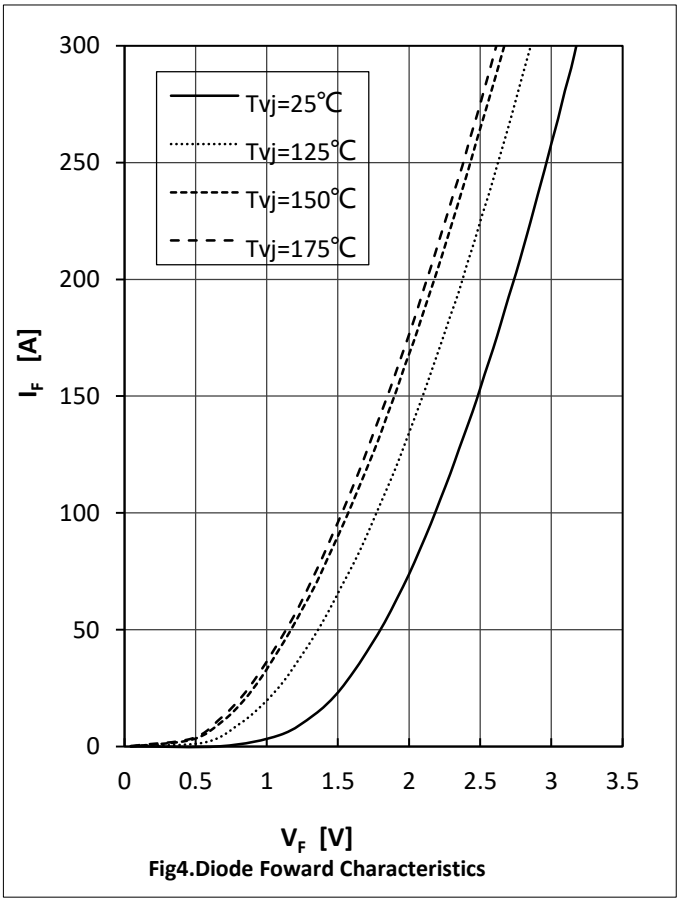


Fig4.Diode Foward Characteristics

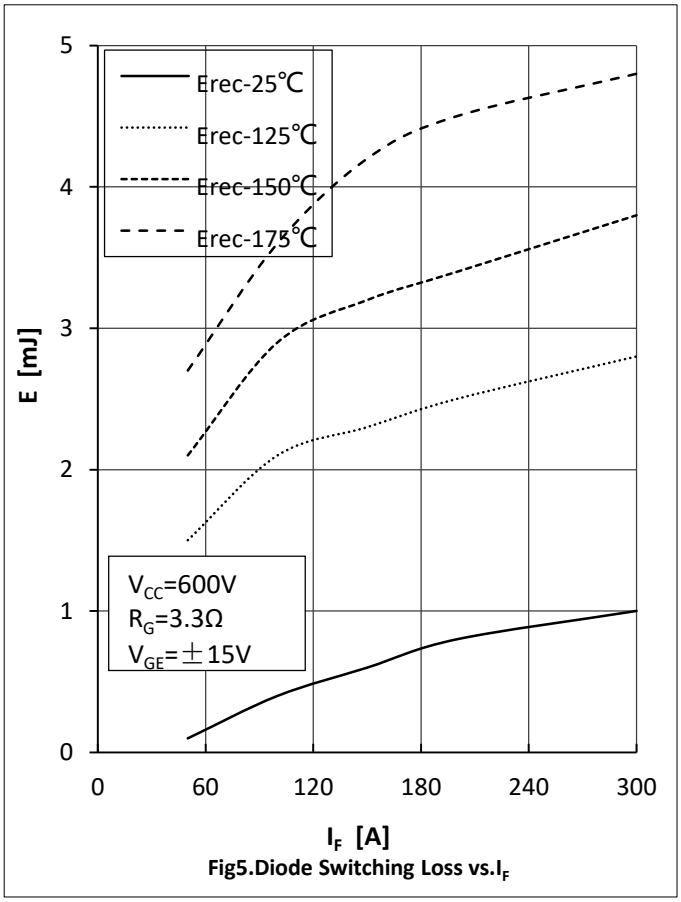


Fig5.Diode Switching Loss vs.I_F

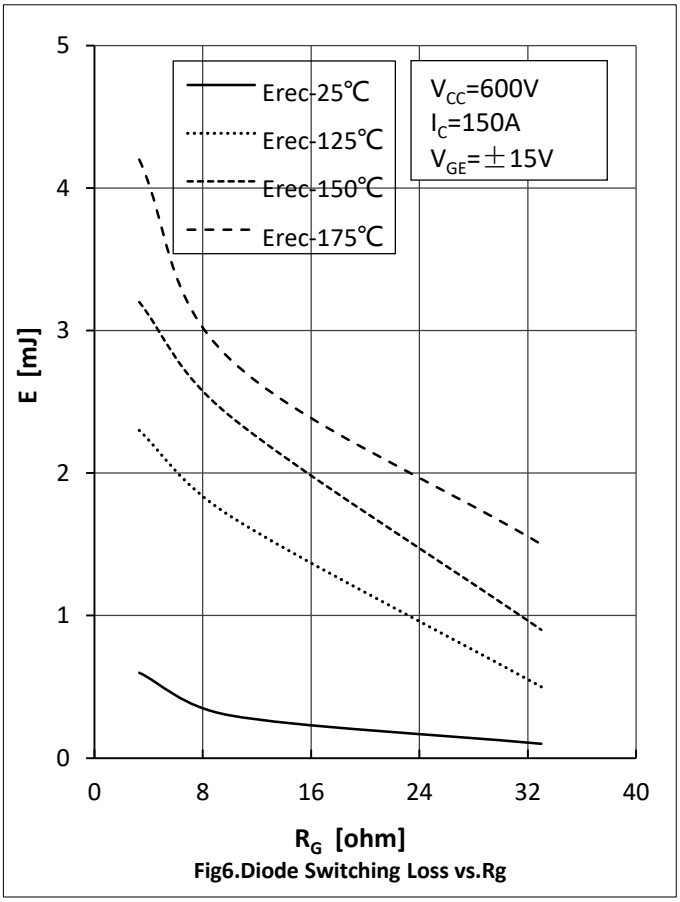


Fig6.Diode Switching Loss vs.Rg

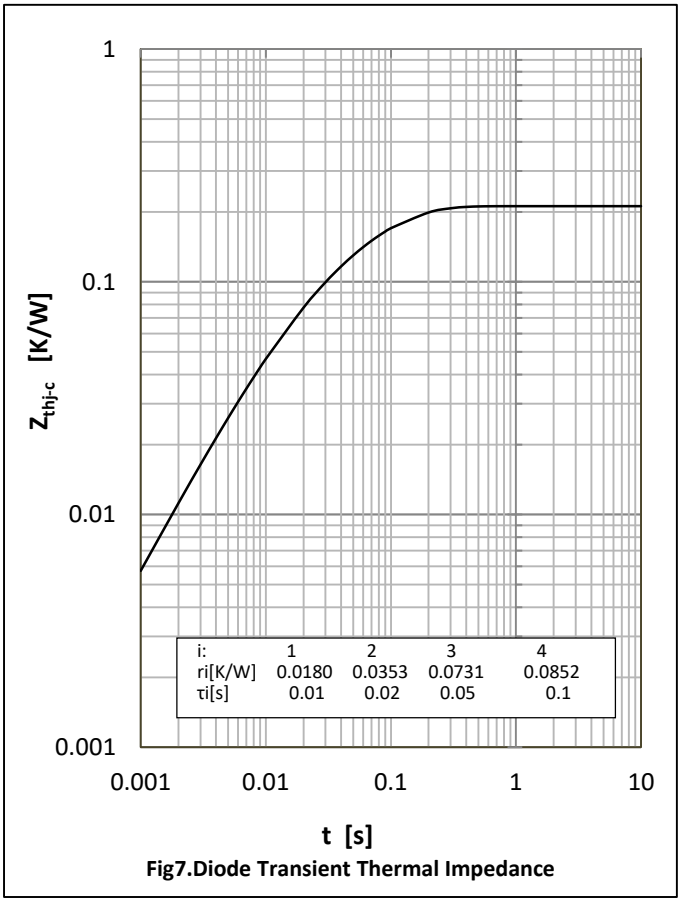


Fig7.Diode Transient Thermal Impedance

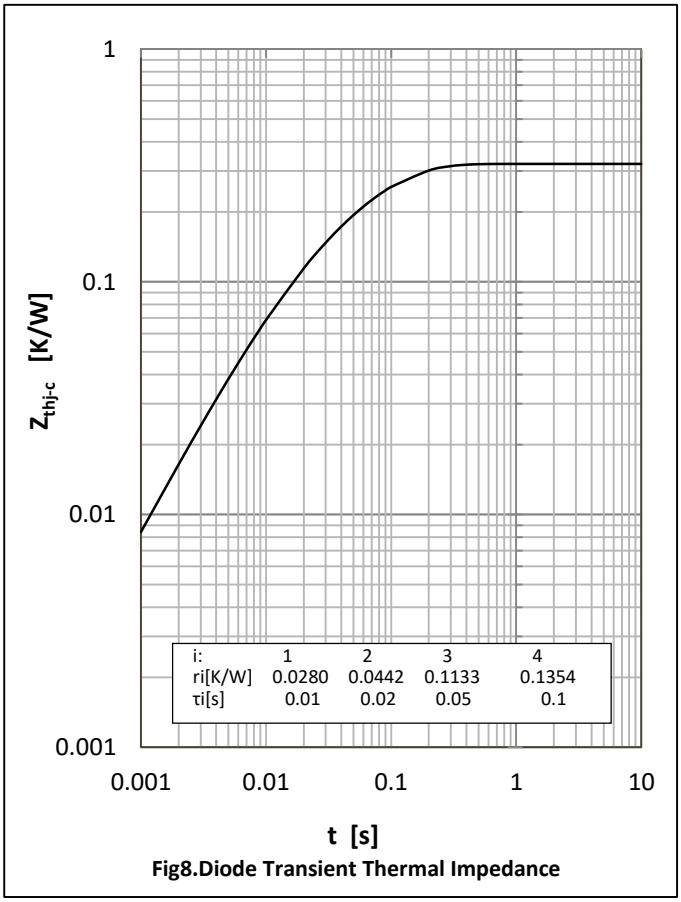
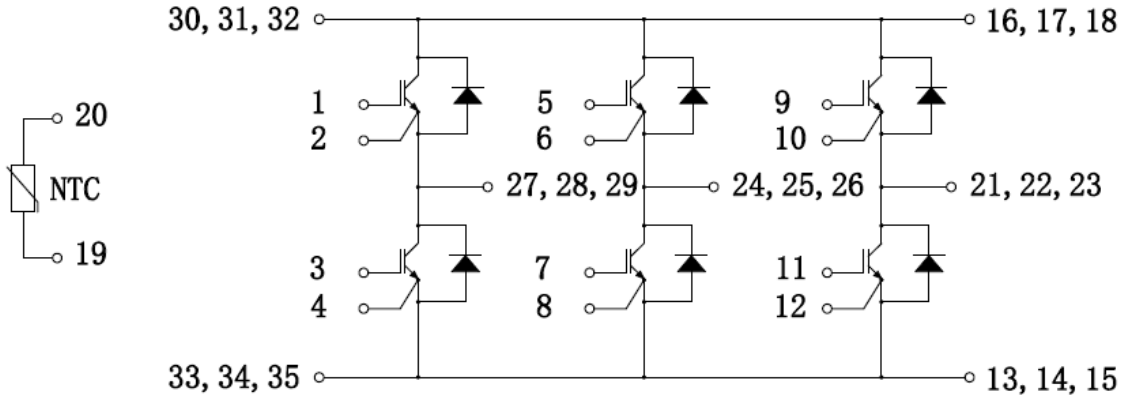
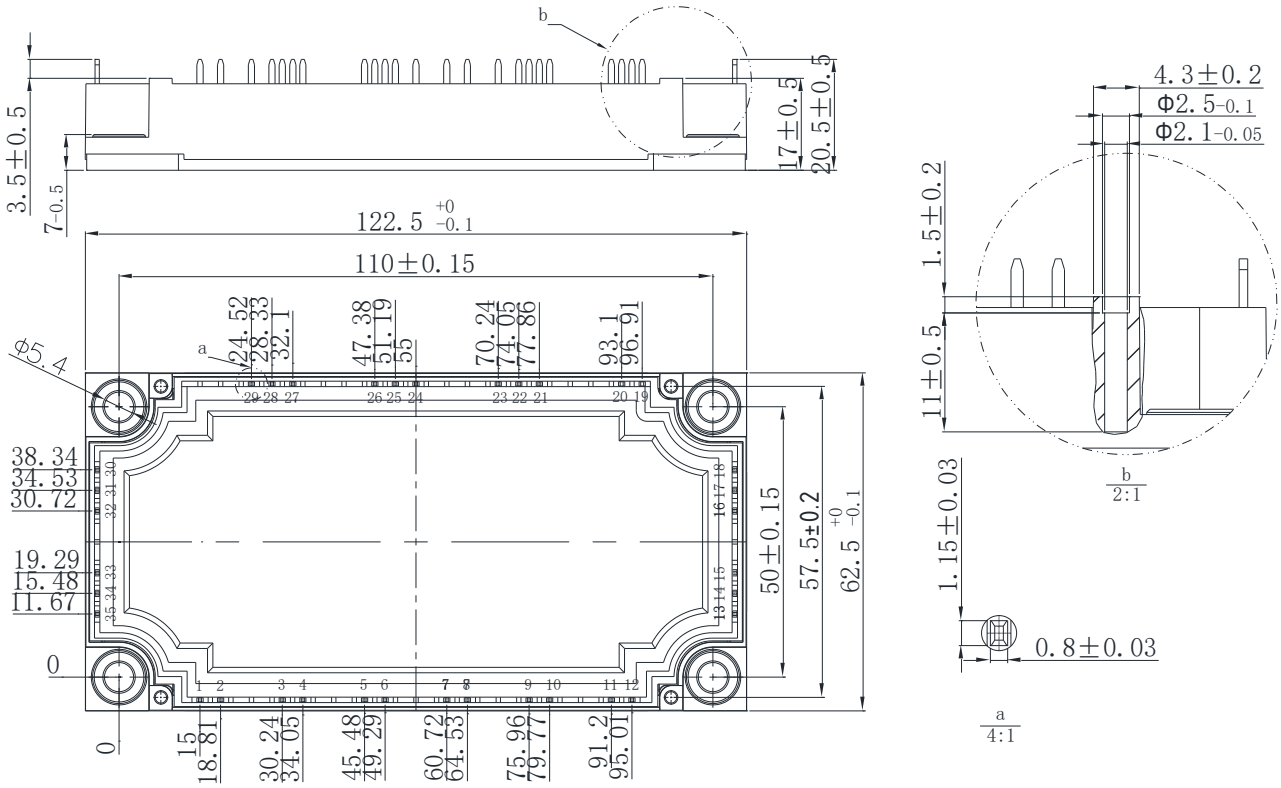


Fig8.Diode Transient Thermal Impedance

Circuit Diagram



Package Outline Information



Disclaimer

The information presented in this document is for reference only. Yangzhou Yangjie Electronic Technology Co., Ltd. reserves the right to make changes without notice for the specification of the products displayed herein to improve reliability, function or design or otherwise.

The data provided in this specification comes from professional testing equipment of Yangjie Electronic Laboratory, not general testing equipment. All the data is exclusively intended for technically trained staff. You and your technical departments will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to such application.

The product listed herein is designed to be used with ordinary electronic equipment or devices, and not designed to be used with equipment or devices which require high level of reliability and the malfunction of with would directly endanger human life (such as aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), Yangjie or anyone on its behalf, assumes no responsibility or liability for any damages resulting from such improper use of sale.

IGBTs is the device which is sensitive to the static electricity, it is necessary to protect the device from being damaged by the static electricity when using it.

This publication supersedes & replaces all information previously supplied. For additional information, please visit our website http:// www.21yangjie.com , or consult your nearest Yangjie's sales office for further assistance.