

IGBT Modules

V_{CES} 1200V
I_C 100A

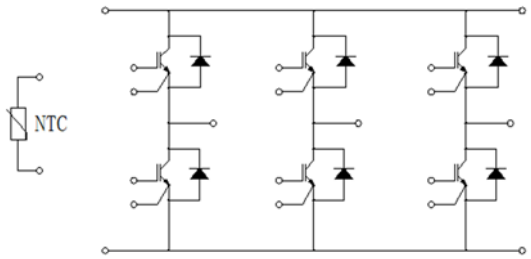
Applications

- 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℃	100	A
Repetitive Peak Collector Current	I_{CRM}	t_p=1ms	200	A
Gate-Emitter Voltage	V_{GES}	T_{vj}=25℃	±20	V
Total Power Dissipation	P_{tot}	T_C=25℃ T_{vjmax}=175℃	515	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=100A,V_{GE}=15V, T_{vj}=25℃		1.85	2.30	V
		I_C=100A,V_{GE}=15V, T_{vj}=125℃		2.15		
		I_C=100A,V_{GE}=15V, T_{vj}=150℃		2.25		
Gate Charge	Q_G			0.78		uC
Input Capacitance	C_{ies}	V_{CE}=25V,V_{GE}=0V, f=1MHz,T_{vj}=25℃		6.8		nF
Reverse Transfer Capacitance	C_{res}			0.32		nF
Internal Gate Resistance	R_{gint}			7.5		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=100A V_{CE}=600V V_{GE}=±15V R_G=2Ω T_{vj}=25℃		96		ns
Rise Time	t_r			42		ns
Turn-off Delay Time	$t_{d(off)}$			205		ns
Fall Time	t_f			230		ns
Energy Dissipation During Turn-on Time	E_{on}			8.5		mJ
Energy Dissipation During Turn-off Time	E_{off}			7.5		mJ
Turn-on Delay Time	$t_{d(on)}$	I_C=100A V_{CE}=600V V_{GE}=±15V R_G=2Ω T_{vj}=150℃		102		ns
Rise Time	t_r			49		ns
Turn-off Delay Time	$t_{d(off)}$			264		ns
Fall Time	t_f			323		ns
Energy Dissipation During Turn-on Time	E_{on}			12.7		mJ
Energy Dissipation During Turn-off Time	E_{off}			10.1		mJ
SC Data	I_{sc}	t_p≤10us,V_{GE}=15V,T_{vj}=150℃, V_{CC}=900V,V_{CEM}≤1200V		400		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		100	A
Repetitive Peak Forward Current	I_{FRM}	t_p=1ms	200	A

Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	I_F=100A,T_{vj}=25℃		1.85	2.80	V
		I_F=100A,T_{vj}=125℃		1.70		
		I_F=100A,T_{vj}=150℃		1.65		
Recovered Charge	Q_{rr}	I_F=100A V_R=600V -di_F/dt =1800A/us T_{vj}=25℃		8.9		uC
Peak Reverse Recovery Current	I_{rr}			66		A
Reverse Recovery Energy	E_{rec}			3.26		mJ
Recovered Charge	Q_{rr}	I_F=100A V_R=600V -di_F/dt =1800A/us T_{vj}=150℃		21.27		uC
Peak Reverse Recovery Current	I_{rr}			91		A
Reverse Recovery Energy	E_{rec}			8.0		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}=493.3Ω	-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			0.29	K/W
		per Diode-inverter			0.50	
Thermal Resistance Case to Sink	$R_{\theta CS}$	per module		0.009		K/W
Mounting Force Per Clamp	F		3.0		6.0	N
Weight of Module	G			300		g

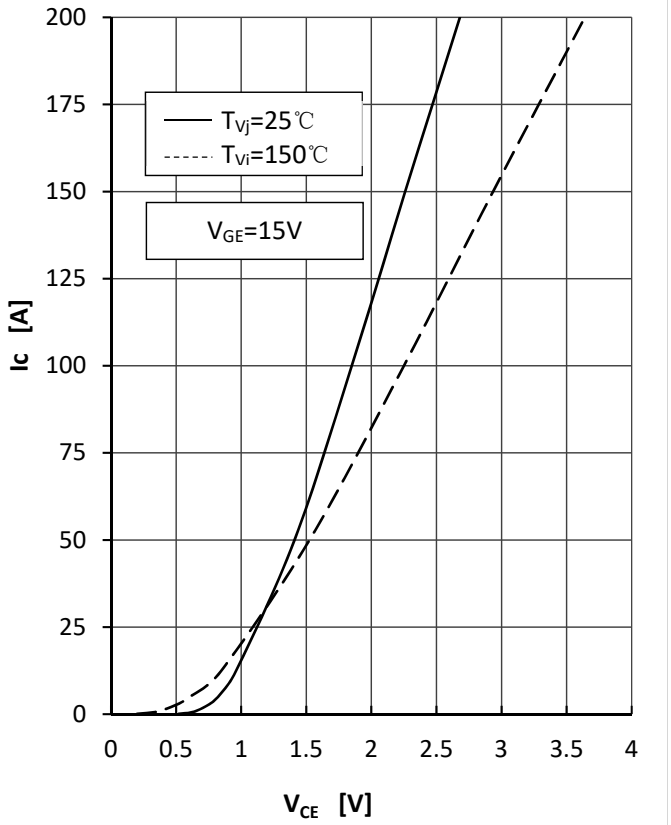


Fig1.IGBT Output Characteristics

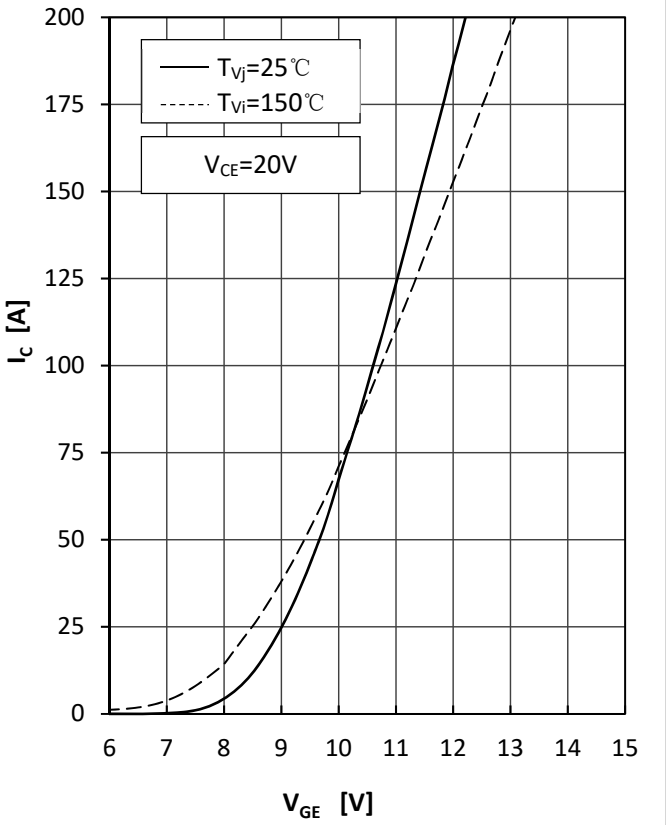


Fig2.IGBT Transfer Characteristics

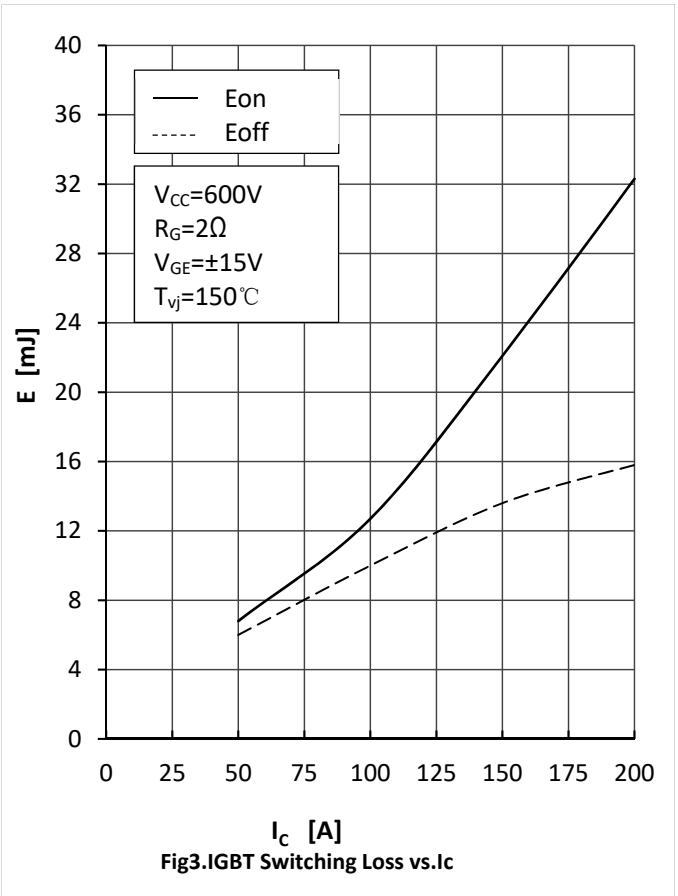


Fig3.IGBT Switching Loss vs.Ic

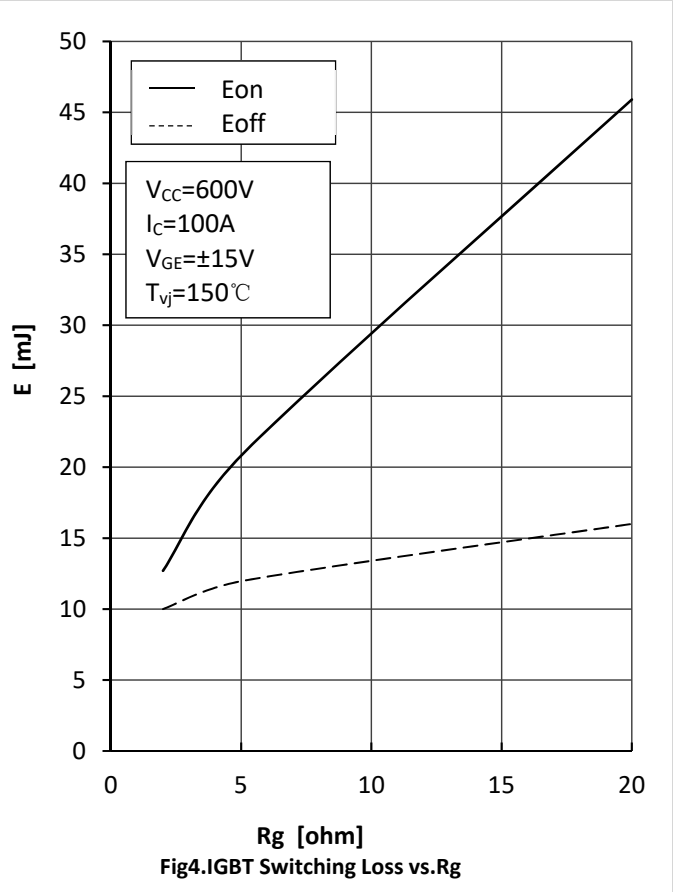


Fig4.IGBT Switching Loss vs.Rg

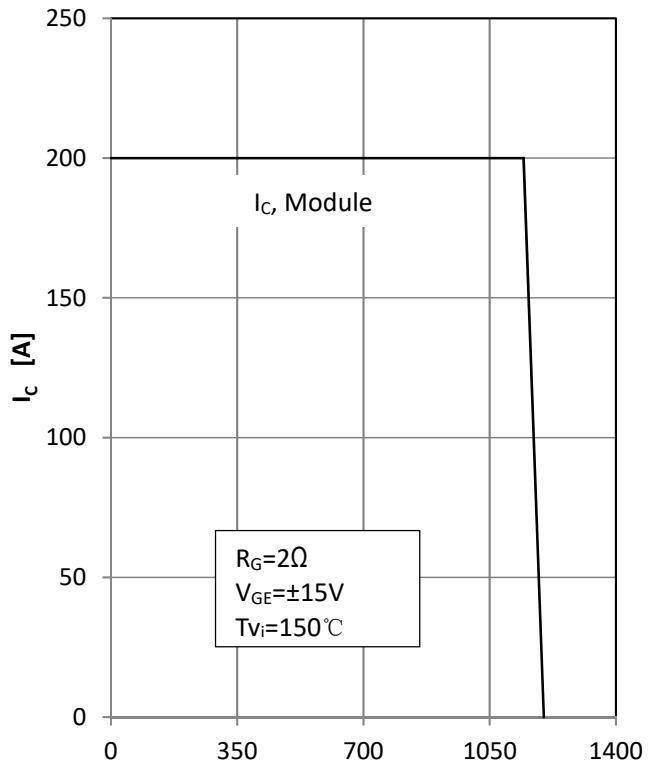


Fig5. RBSOA

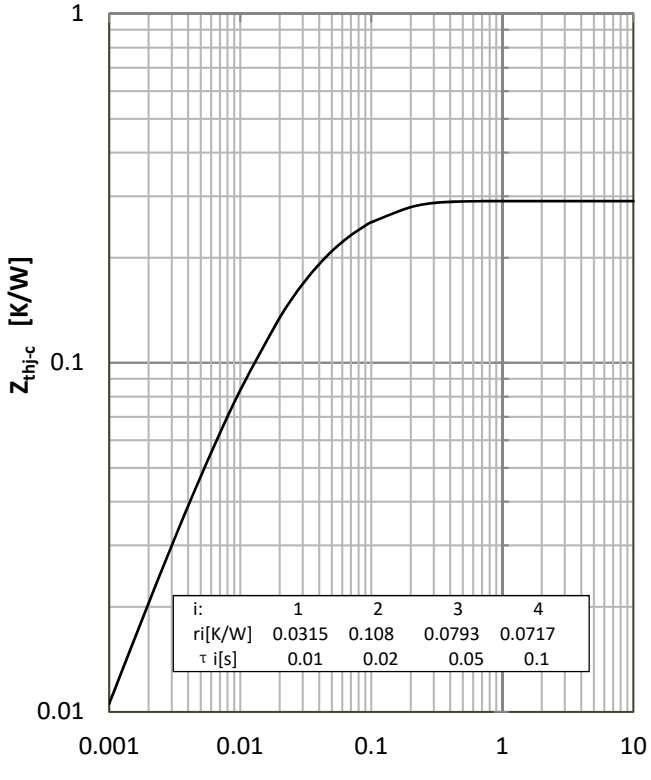


Fig 6. IGBT Transient Thermal Impedance

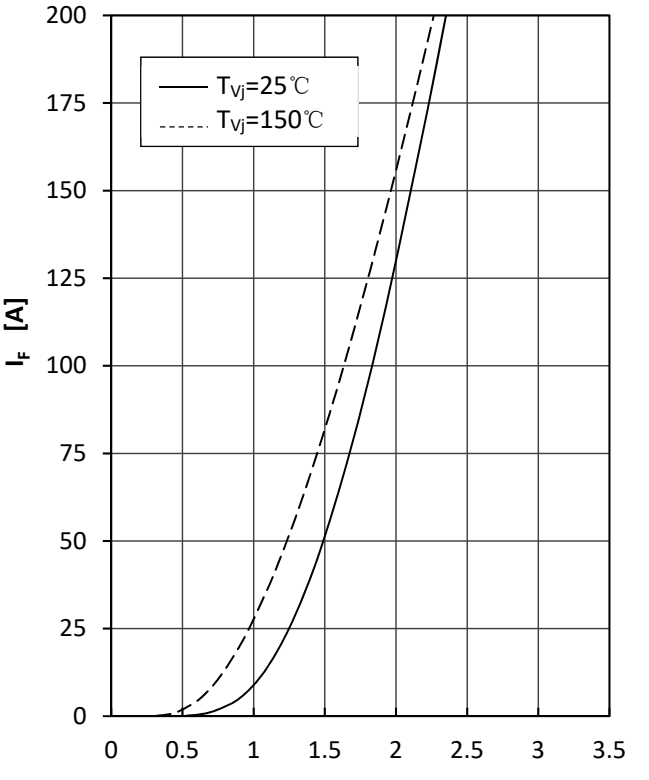


Fig7.Diode Foward Characteristics

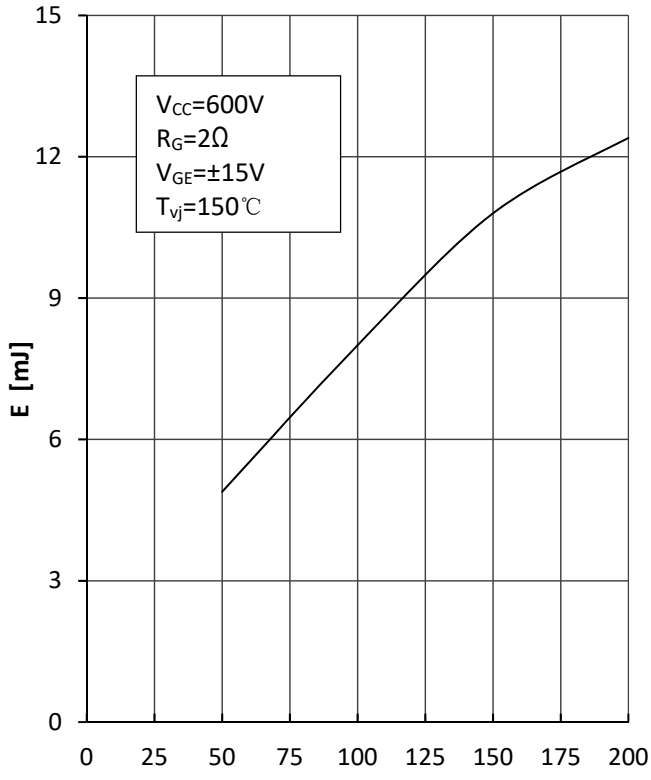


Fig8.Diode Switching Loss(Erec) vs.I_F

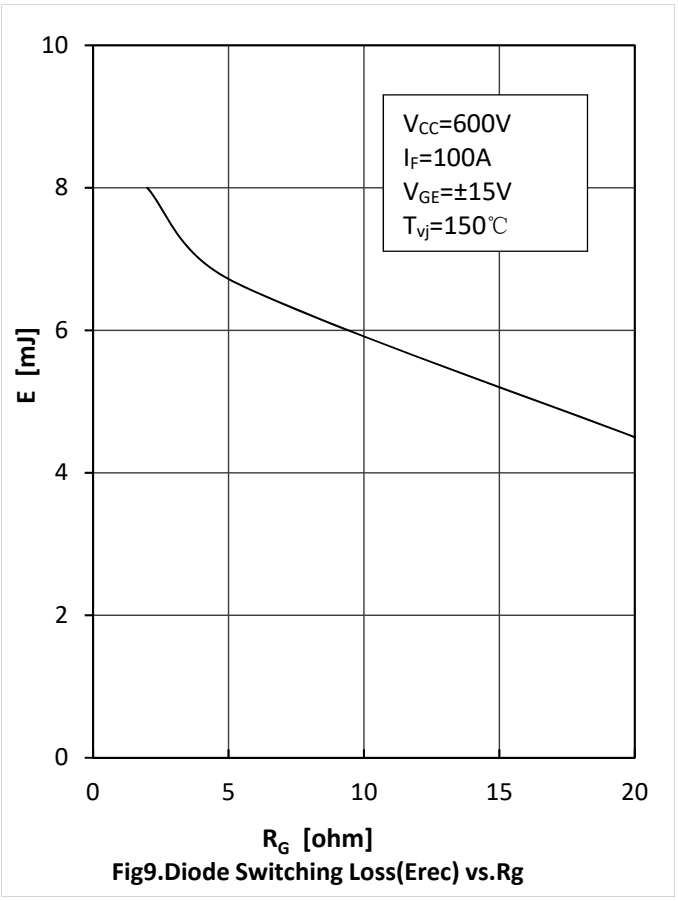


Fig9.Diode Switching Loss(Erec) vs.Rg

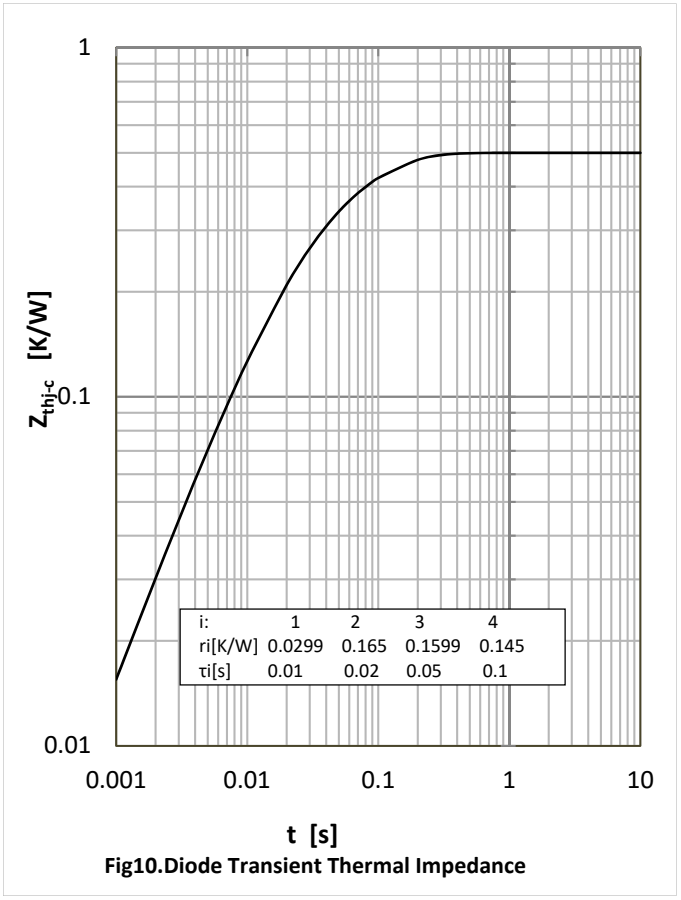


Fig10.Diode Transient Thermal Impedance

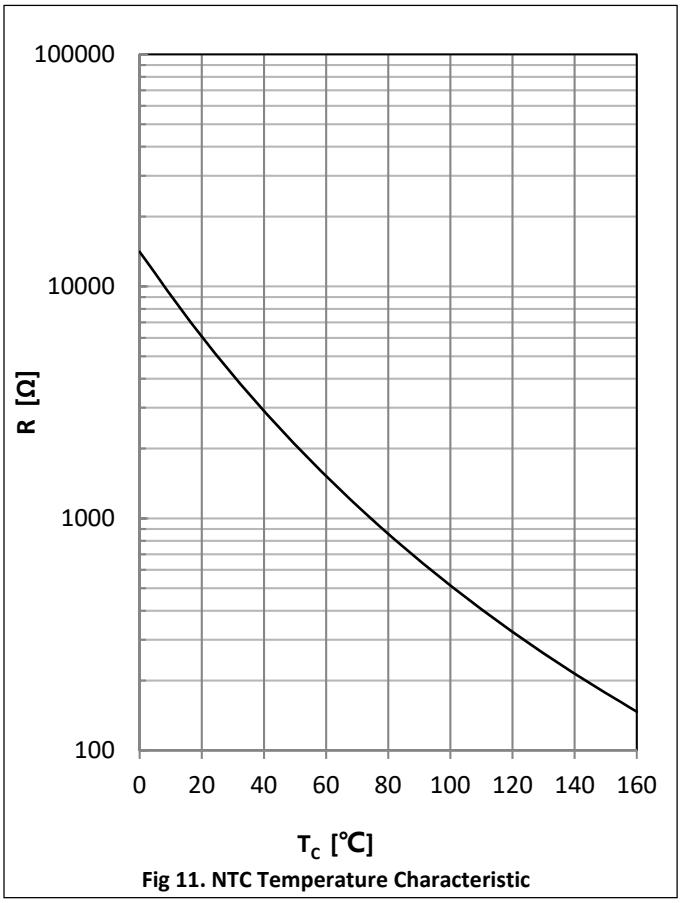
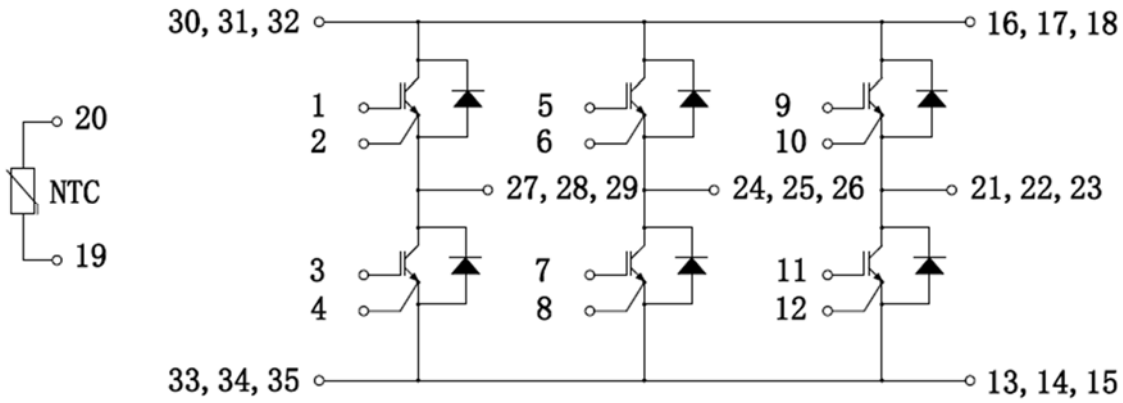
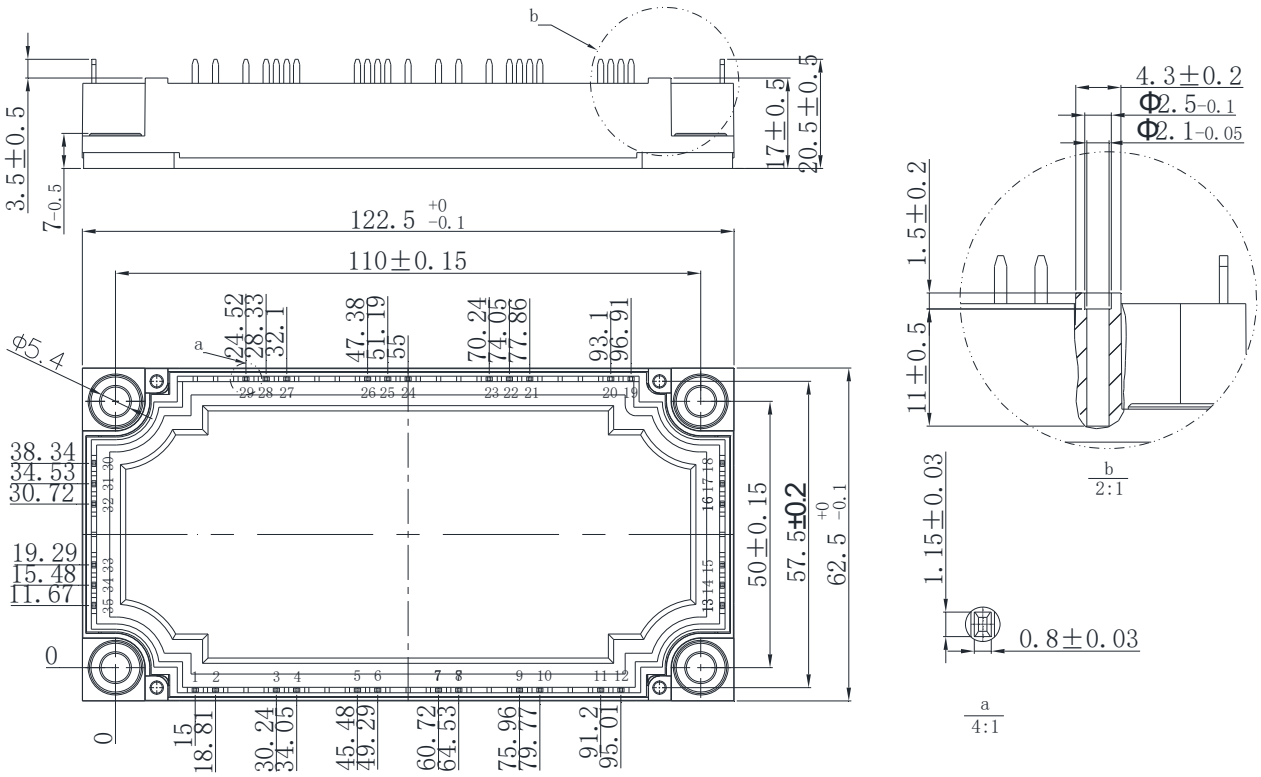


Fig 11. NTC Temperature Characteristic

- Circuit Diagram



- **Package Outline Information**



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