SEMICONDUCTOR

JFF300R17MHT6
HALF BRIDGE IGBT Module

Features

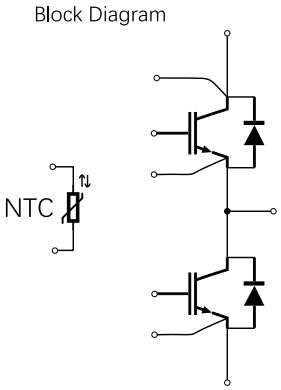
- Trench+ Field Stop Technology
- VCEsat with positive Temperature Coefficient
- Low VCEsat

Product Summary		
V_{CES}(V)	V_{CESAT}(V)Typ	I_C(A)
1700	1.71 @ 15V,300A	300

Application

- Inverter for motor drive
- AC and DC servo drive amplifier
- Uninterruptible power supply

Block Diagram



IGBT,Inverter

Table1 Absolute Maximum Ratings (T_C=25℃, unless otherwise specified)

Parameters	Symbol	Value	Unit
Collector-Emmiter Voltage	V_{CES}	1700	V
Gate-Emmiter Voltage	V_{GES}	±20	V
Collector DC Current-continuous T_C=90°C, T_J max=150℃	I_C	300	A
Repetitive peak collector current tp=1ms	I_{CRM}	600	A
Total power dissipation	P_D	910	W

Table 2. Electrical Chatacteristics (T_J=25℃,unless otherwise specified)

Parameters	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-Emmiter saturation Voltage	V_{CESAT}	V_{GE}=15V,I_C=300A,T_j=25°C		1.71		V
		V_{GE}=15V,I_C=300A,T_j=125°C		2.08		
		V_{GE}=15V,I_C=300A,T_j=150°C		2.14		
Gate Threshold Voltage	$V_{GE(TH)}$	V_{CE}=V_{GE},I_C=12mA		5.69		V
Internal gate resistor	R_{gint}	T_j=25°C		3.8		Ω
Gate charge	Q_G	V_{GE}=-8V~+15V,V_{CE}=900V		1.84		μC
Zero Gate Voltage Collector Current	I_{CES}	V_{CE}=1700V,V_{GE}=0V			4	mA
Gate-body Leakage Current	I_{GES}	V_{CE}=0V,V_{GE}=20V			450	nA

Input Capacitance	C_{IES}	V_{CE}=25V,V_{GE}=0V,f=1MHz		33.01		nF
Reverse Transfer Capacitance	C_{RES}			0.09		nF
Turn-On Delay Time	td(on)	V_{CE}=900V,I_C=300A, V_{GE}=-8V/+15V,R_G=3.3Ω, di/dton =2700A/μs, dv/dtoff =4700V/μs T_j=25°C		271.6		ns
Turn-On Rise Time	tr			89.6		ns
Turn-Off Delay Time	td(off)			604		ns
Turn-Off Fall Time	tf			488		ns
Turn-On energy	E_{on}			87		mJ
Turn-Off energy	E_{off}			70		mJ
Turn-On Delay Time	td(on)	V_{CE}=900V,I_C=300A, V_{GE}=-8V/+15V,R_G=3.3Ω, di/dton =2100A/μs, dv/dtoff =3600V/μs T_j=125°C		252		ns
Turn-On Rise Time	tr			116		ns
Turn-Off Delay Time	td(off)			752		ns
Turn-Off Fall Time	tf			738		ns
Turn-On energy	E_{on}			125		mJ
Turn-Off energy	E_{off}			99		mJ
Turn-On Delay Time	td(on)	V_{CE}=900V,I_C=300A, V_{GE}=-8V/+15V,R_G=3.3Ω, di/dton =2000A/μs, dv/dtoff =3400V/μs T_j=150°C		274		ns
Turn-On Rise Time	tr			116		ns
Turn-Off Delay Time	td(off)			782		ns
Turn-Off Fall Time	tf			928		ns
Turn-On energy	E_{on}			145		mJ
Turn-Off energy	E_{off}			105		mJ
Temperature under switching conditions	T_{vjop}		-40		150	℃
SC data	I_{SC}	tp≤8us, V_{GE}=15V, Vcc=1000V, V_{CEM}≤1700V, T_j=25°C		1500		A
		tp≤6us, V_{GE}=15V, Vcc=1000V, V_{CEM}≤1700V, T_j=150°C		1320		A

Diode, Inverter

Table1 Absolute Maximum Ratings (T_C=25℃, unless otherwise specified)

Parameters	Symbol	Value	Unit
Repetitive peak reverse voltage	V_{RRM}	1700	V
Continuous DC forward current	I_F	300	A
Repetitive peak forward current tp=1ms	I_{FRM}	600	A
Implemented forward current	I_{FN}	300	A

Table 2. Electrical Chatacteristics (T_J=25℃,unless otherwise specified)

Parameters	Symbol	Test Conditions	Min	Typ	Max	Unit
Diode Forward Voltage	V_F	I_F=300A,T_j=25°C		1.99		V
		I_F=300A,T_j=125°C		2.17		
		I_F=300A,T_j=150°C		2.09		
Diode Peak Reverse Recovery Current	Irrm	I_F=300A V_R=900V -diF/dt =3400A/μs T_j=25°C		293		A
Reverse Recovery Charge	Qrr			54.54		μC
Reverse recovery energy	Erec			22.52		mJ
Diode Peak Reverse Recovery Current	Irrm	I_F=300A V_R=900V -diF/dt =2700A/μs T_j=125°C		294		A
Reverse Recovery Charge	Qrr			96.59		μC
Reverse recovery energy	Erec			49.35		mJ
Diode Peak Reverse Recovery Current	Irrm	I_F=300A V_R=900V -diF/dt =2600A/μs T_j=150°C		318		A
Reverse Recovery Charge	Qrr			128		μC
Reverse recovery energy	Erec			62.81		mJ
Temperature under switching conditions	T_{vjop}		-40		150	℃

NTC-Thermistor

Table 1. Electrical Chatacteristics

Parameters	Symbol	Test Conditions	Min	Typ	Max	Unit
Rated resistances	R_{25}	T_C=25℃, ±5%		5		KΩ
B-value	$R_{25/50}$	±1%		3380		K
Deviation of R100	ΔR/R	Tc=100℃, R100=493.3Ω	-5		5	%
Power dissipation	P_{25}				20	mW

Module

Table 1. Electrical Chatacteristics (T_J=25℃,unless otherwise specified)

Parameters	Symbol	Test Conditions	Min	Typ	Max	Unit
Isolation test voltage	V_{ISOL}	RMS, f=50Hz, t=60s	2500			V
Maximum junction temperature	T_{jmax}				150	℃
Storage temperature	T_{stg}		-40		125	℃
Operating junction temperature	$T_{j\,op}$		-40		150	℃
Stray inductance	L_{CE}			20		nH
Module lead resistance,terminals-chip	$R_{CC'+EE'}$			1.00		mΩ
Mounting torque for modul mounting	M		3.0		6.0	Nm
Weight	W			340		g

Electrical Characteristics (curves)

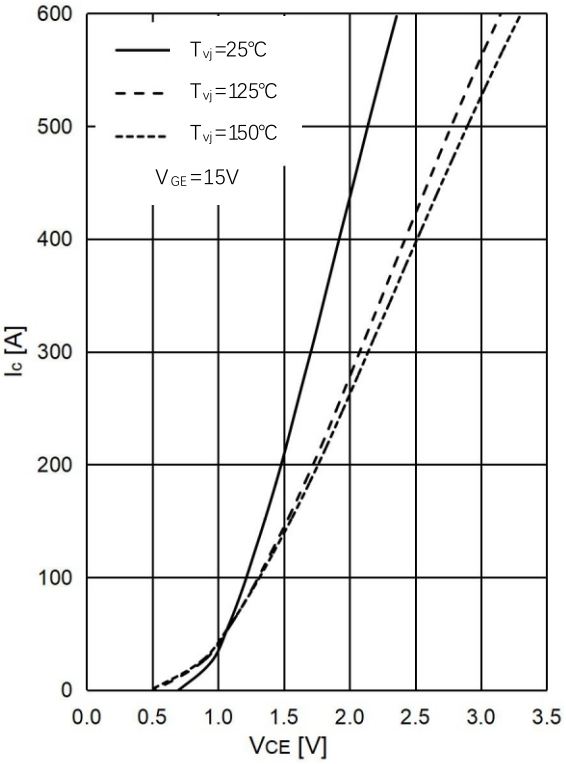


Fig 1. IGBT Output Charac teristic,Inverter

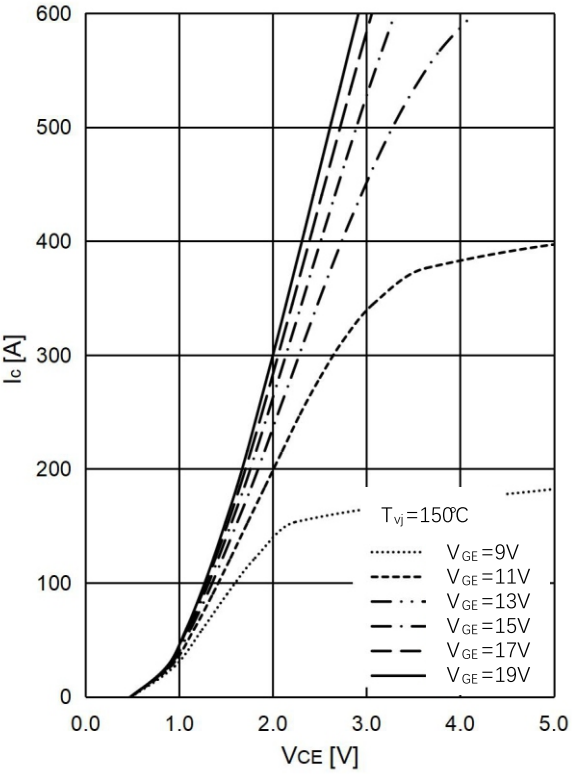


Fig 2. IGBT Output Characteristic ,Inverter

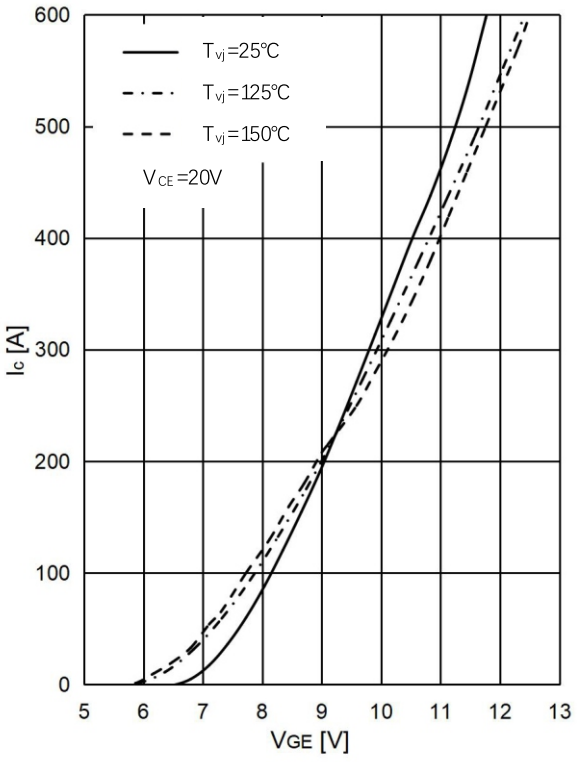


Fig 3. IGBT Transfer Characteristic ,Inverter

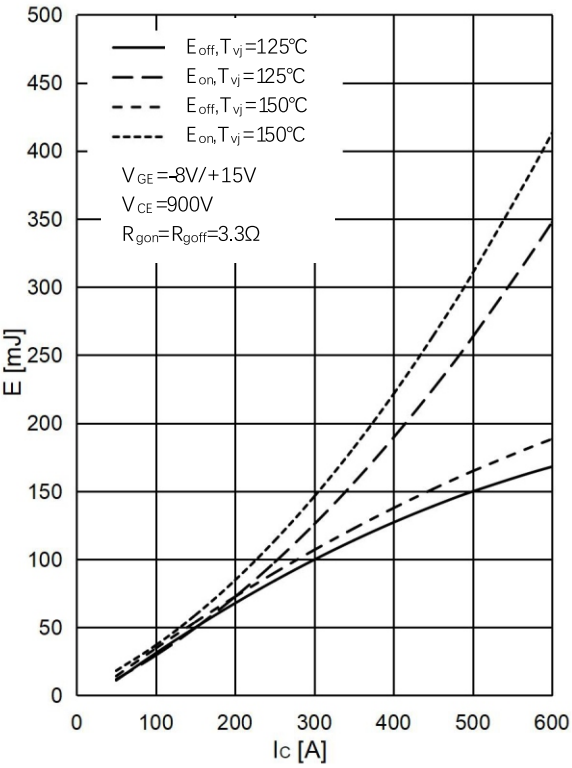


Fig 4. IGBT Switching Loss E_{on} & E_{off} vs. I_C,Inverter

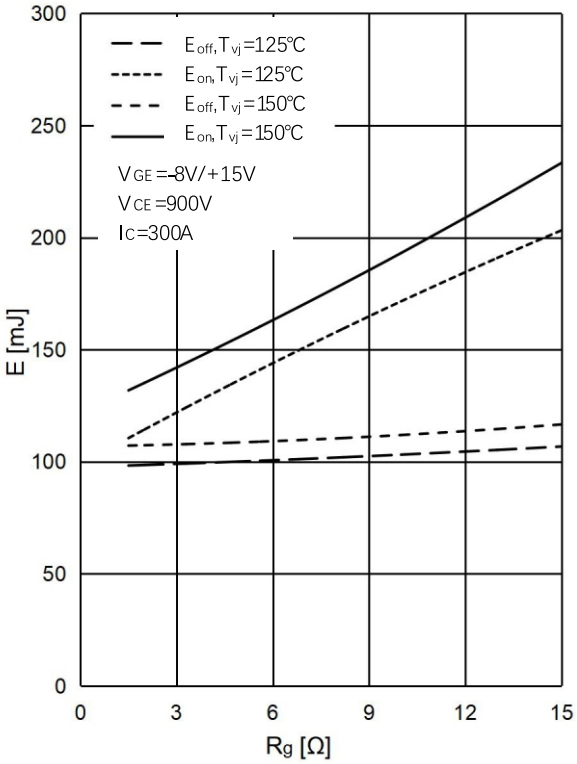


Fig 5. IGBT Switching Loss E_{on} & E_{off} vs. R_G,Inverter

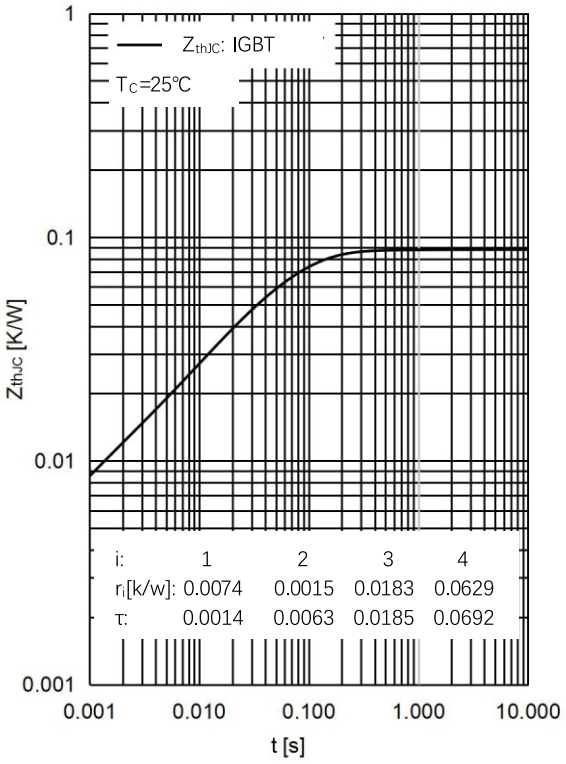


Fig 6. IGBT Transient thermal impedance, Inverter

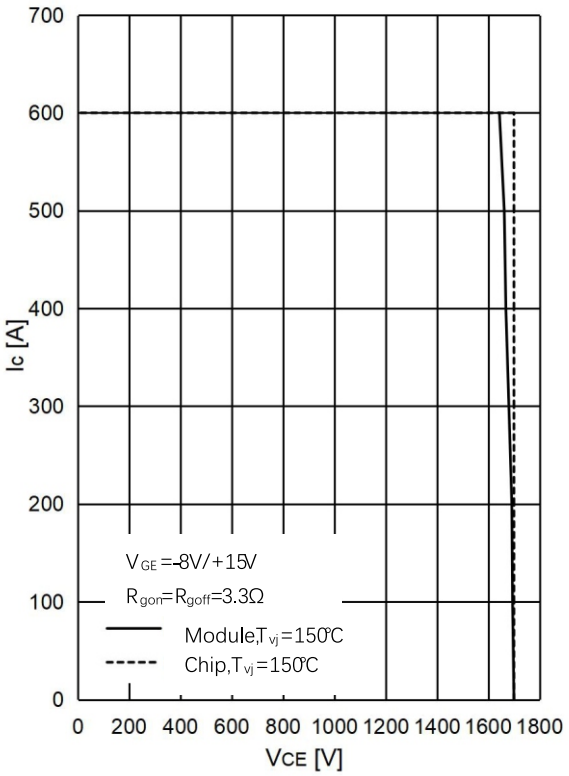


Fig 7. IGBT RBSOA ,Inverter

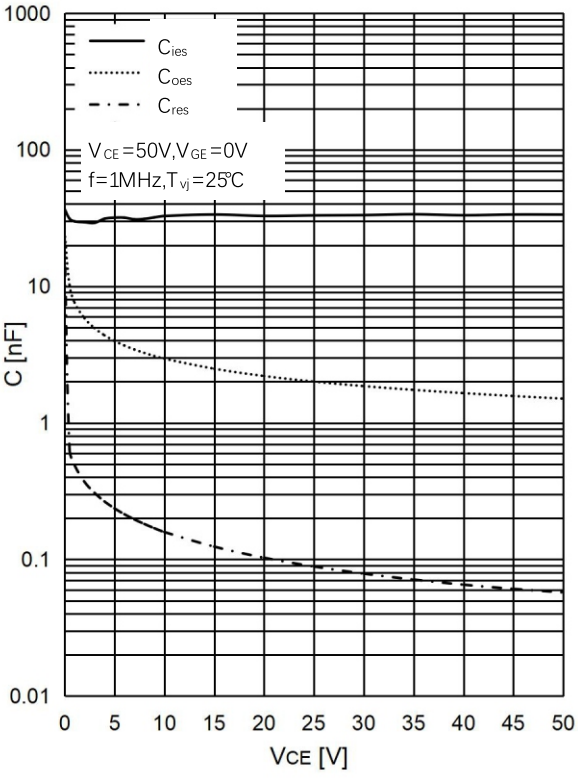


Fig 8. IGBT Capacity Characteristic, Inverter

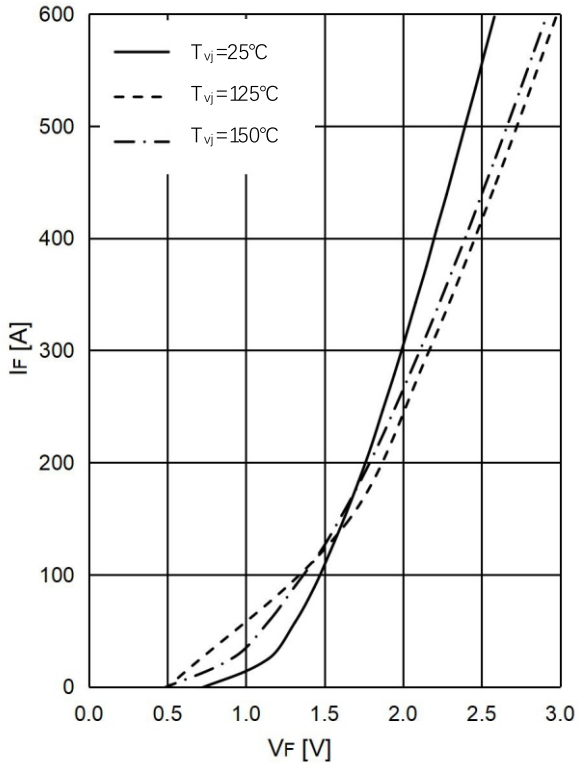


Fig 9. Diode Forward characteristic,Inverter

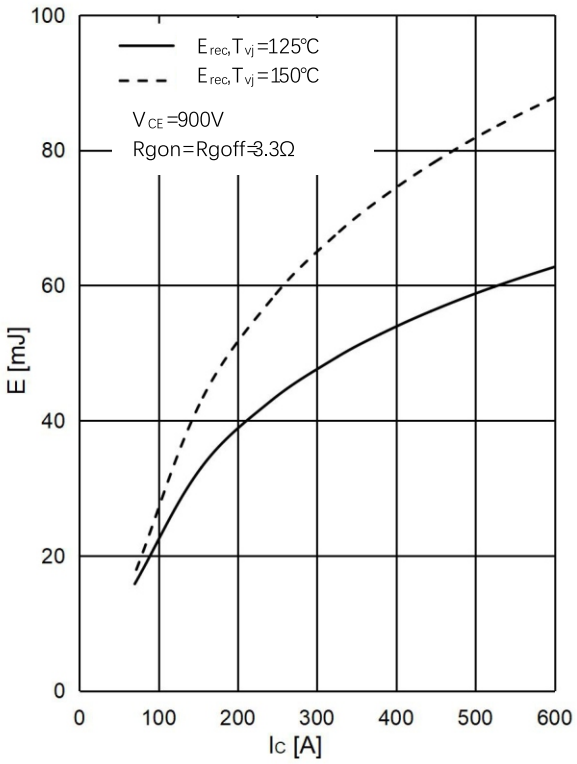


Fig 10. Diode Switching Loss E_{rec} vs. I_F,Inverter

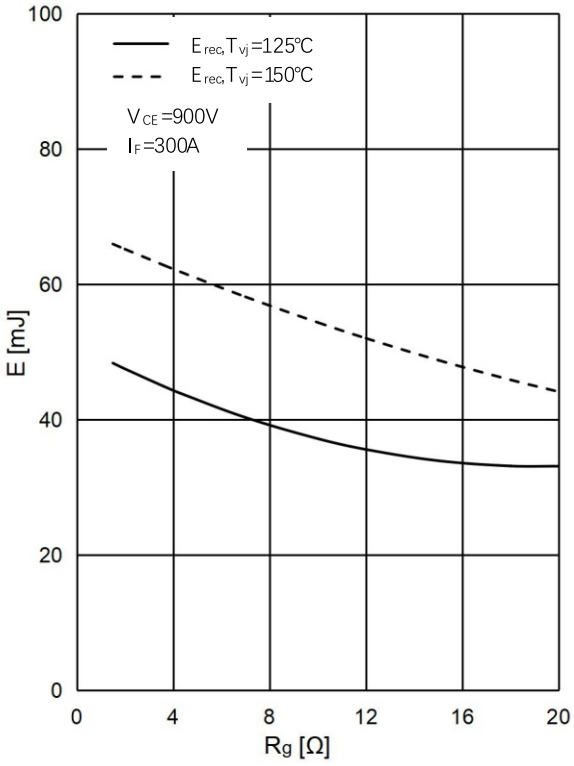


Fig 11. Diode Switching Loss E_{rec} vs. R_G,Inverter

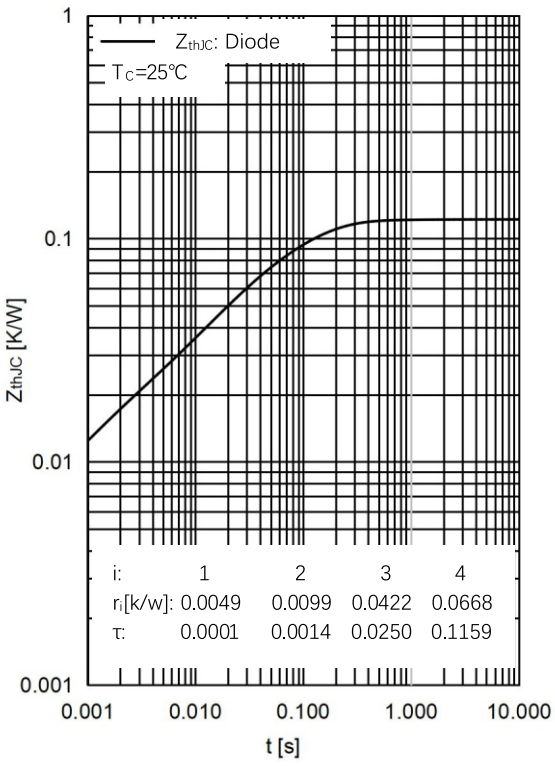


Fig 12. Diode Transient thermal impedance , Inverter

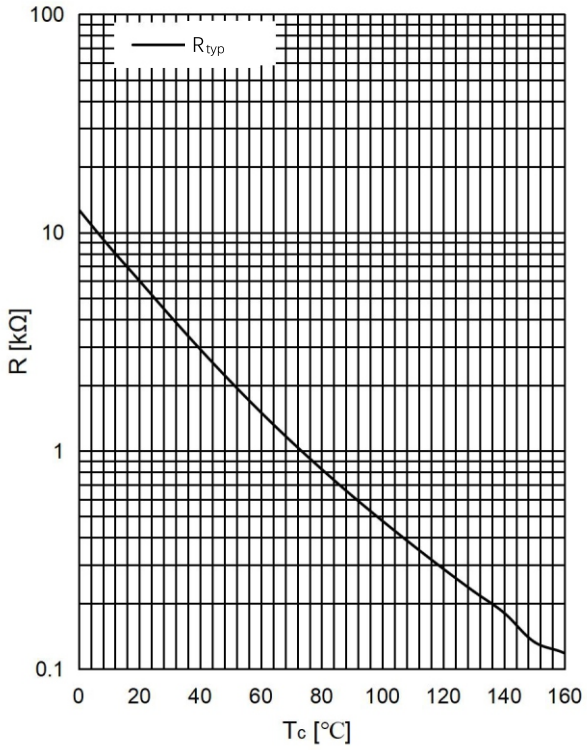
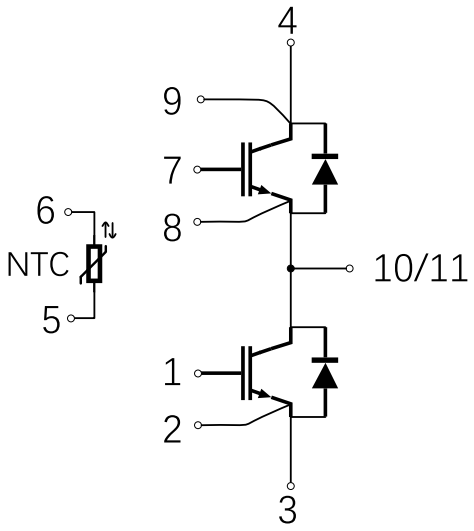
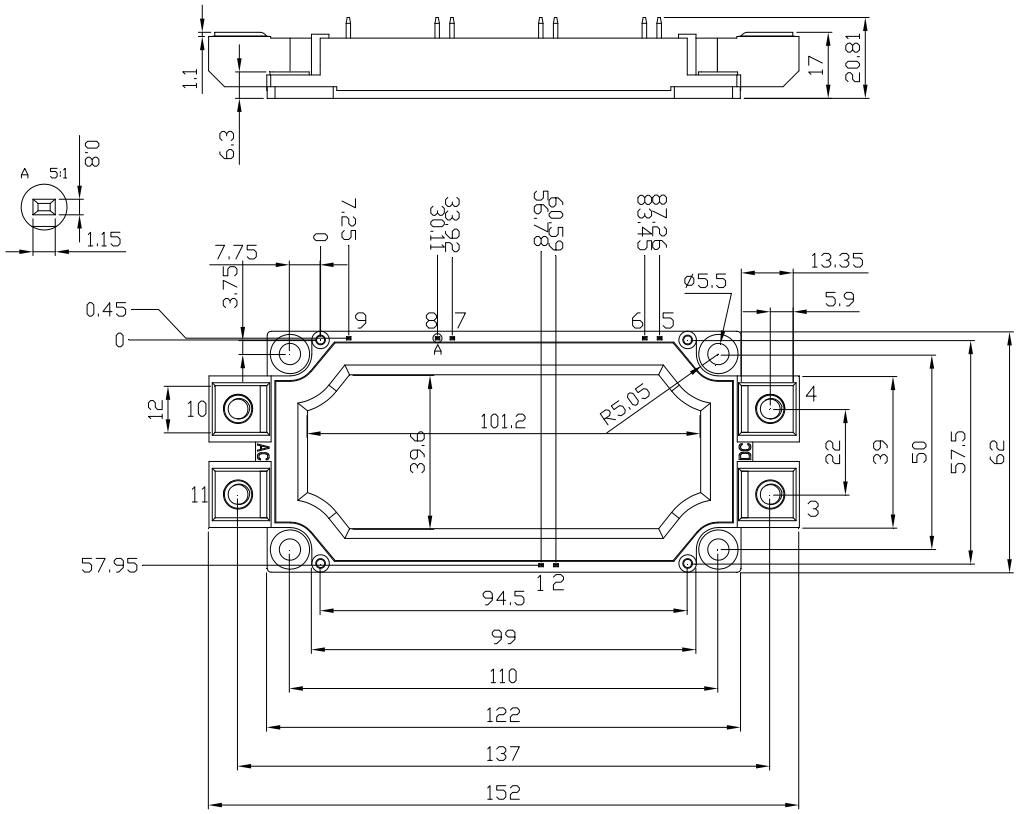


Fig 13. NTC-Thermistor-temperature characteristic

Circuit Diagram



PackageDimensions



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