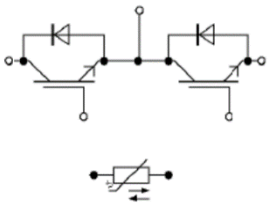
1200V/600A 2 in one-package

Features：

- 1200V600A,VCE(sat)(typ.)=2.20V
- Lower losses and higher energy
- Excellent short circuit ruggedness
- Standard Housing



Equivalent Circuit Schematic

General Applications：

H&M Semi's IGBTs offer lower losses and higher energy for application such as motor drive ,inverter and other soft switching applications.soft switching applications.

Absolute Maximum Ratings of IGBT

Parameter			Values	Unit
V_{CES}	Collector to Emitter Voltage		1200	V
V_{GES}	Continuous Gate to Emitter Voltage		±30	V
I_C	Continuous Collector Current	T_C = 25°C	1200	A
		T_C = 80°C	600	
I_{CM}	Pulse Collector Current	T_J = 150°C	600	A
P_D	Maximum Power Dissipation (IGBT)	T_C = 25°C,	1470	W
		T_J = 150°C		
t_{sc}	Short Circuit Withstand Time		> 10	μs
T_J	Maximum IGBT Junction Temperature		150	℃
T_{JOP}	Maximum Operating Junction Temperature Range		-40 to +150	℃
T_{stg}	Storage Temperature Range		-40 to +125	℃

Absolute Maximum Ratings of Freewheeling Diode

V_{RRM}	Repetitive Peak Reverse Voltage	T_{vj} = 25°C	1200	V
I_F	Diode Continuous Forward Current	T_{vimax} = 150°C	600	A
I_{FM}	Diode Maximum Forward Current	t_P = 1ms	1200	A
I^2t	I^2t Value	Vr=0V,tp=10ms,Tvj=125°C	45000	A^2S
		Vr=0V,tp=10ms,Tvj=150°C	42000	

Electrical Characteristics of IGBT at TJ = 25°C (Unless Otherwise Specified)

Parameter		Test Conditions		Min	Typ	Max	Unit
BV_{CES}	Collector to Emitter Breakdown Voltage	V_{GE}=0V, T_J=25℃		1200			V
I_{CES}	Collector-emitter cut-off current t	V_{GE}=0V,V_{CE}=1200V,T_J=25℃				3	mA
I_{GES}	Gate to Emitter Leakage Current	V_{GE}=±30V,V_{CE}=0V,T_J=25℃				400	nA
$V_{GE(th)}$	Gate Threshold Voltage	I_C=20mA,V_{CE}=V_{GE},T_J=25℃		5.0		6.0	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage (Module Level)	I_C=600A, V_{GE}=15V	T_J=25℃ T_J=125℃		2.20 2.40	2.40	V

Switching Characteristics of IGBT

Parameter		Test Conditions		Min	Typ	Max	Unit
$t_{d(on)}$	Turn-on Delay Time	V_{CC} = 600V I_C = 600A R_G = 1.5Ω V_{GE} = ±15V Inductive Load	T_J=25℃ T_J=125℃		330 340		ns
t_r	Turn-on Rise Time		T_J=25℃ T_J=125℃		135 125		ns
$t_{d(off)}$	Turn-off Delay Time		T_J=25℃ T_J=125℃		550 610		ns
t_f	Turn-off Fall Time		T_J=25℃ T_J=125℃		90 115		ns
E_{on}	Turn-on Switching Loss		T_J=25℃ T_J=125℃		40 55		mJ
E_{off}	Turn-off Switching Loss		T_J=25℃ T_J=125℃		65 85		mJ
Q_g	Total Gate Charge	V_{GE}= -15V →+15V	T_J=25℃		4.8		uC
R_{gint}	Integrated gate resistor		T_J=25℃		2.37		Ω
C_{ies}	Input Capacitance	V_{CE}=25V V_{GE}=0V f=1MHz	T_J=25℃		82		nF
C_{oes}	Output Capacitance		T_J=25℃		4.1		
C_{res}	Reverse Transfer Capacitance		T_J=25℃		1.8		
I_{SC}	SC data	V_{GE}≤15V,V_{CC}=600V V_{CEmax}=V_{CES}-L_{sCE}·di/dt	T_J=125℃		3600		A
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (IGBT)					0.085	°C/W

Electrical and Switching Characteristics of Freewheeling Diode

Parameter		Test Conditions		Min	Typ	Max	Unit
V_F	Diode Forward Voltage	I_F=600A , V_{GE}=0V	T_J=25℃ T_J=125℃		2.20 2.40	2.40	V
I_{rr}	Diode Peak Reverse Recovery Current	I_F=600A, di/dt= 4200A/μs, V_R=600V, V_{GE}-15V	T_J=25℃ T_J=125℃		255 310		A
Q_{rr}	Diode Reverse Recovery Charge		T_J=25℃ T_J=125℃		27 55		uC
E_{rec}	Diode Reverse Recovery Energy		T_J=25℃ T_J=125℃		14 25		mJ
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (Diode)					0.141	°C/W

Characteristic Values of NTC-Thermistor

Parameter	Test Conditions	Min	Typ	Max	Unit
R_{25}	T_{NTC} =25℃		5		kΩ
△R/R	T_{NTC} =100℃，R_{100} =481Ω	-5		5	%
P_{25}	T_{NTC} =25℃			20	mW
$B_{25/50}$	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15K))]$		3380		K
$B_{25/80}$	$R_2=R_{25}\exp[B_{25/80}(1/T_2-1/(298.15K))]$		3440		K

Module Characteristics

Parameter		Min.	Typ.	Max.	Unit
V_{iso}	Isolation Voltage(All Terminals Shorted) Terminals to base plate,RMS,f=50Hz,AC 1min	2500			V
$R_{\theta CS}$	Case-To-Sink,per 1 module,Thermal grease applied		0.02		°C/W
L_{sCE}	Stray inductance module		20		nH
$R_{CC'+EE'}$	Internal lead resistance,Main terminals-chip,per switch,Tc=25℃		1		mΩ
M_t	Main terminals M6 Screw	3.0	4.0	5.0	N·m
M_S	Mounting to heat sink M5 Screw	3.0	4.0	5.0	N·m
G	Weight		345		g

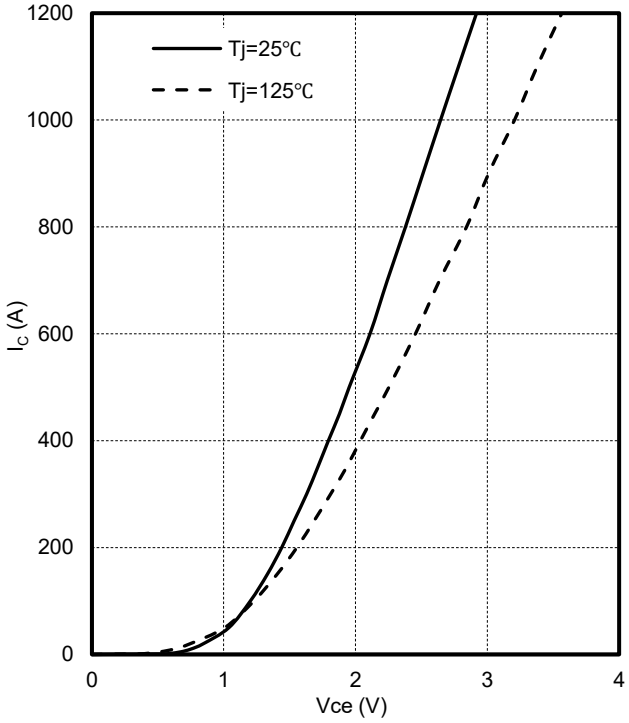


Fig.1 Output characteristic IGBT,
IC=f(Vce),Vge=15V

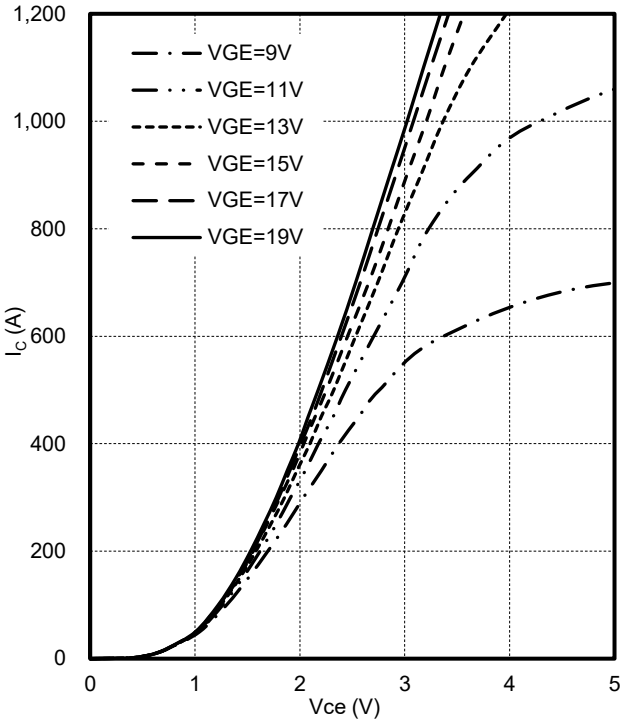


Fig.2 Output characteristic IGBT,
IC=f(Vce),Tj=125℃

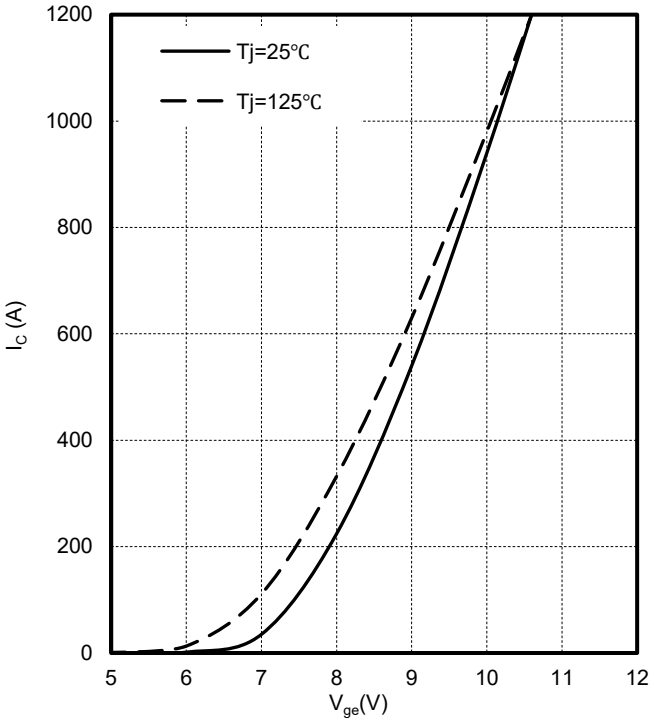


Fig.3 Transfer characteristic IGBT,
Ic=f(Vge),Vce=20V

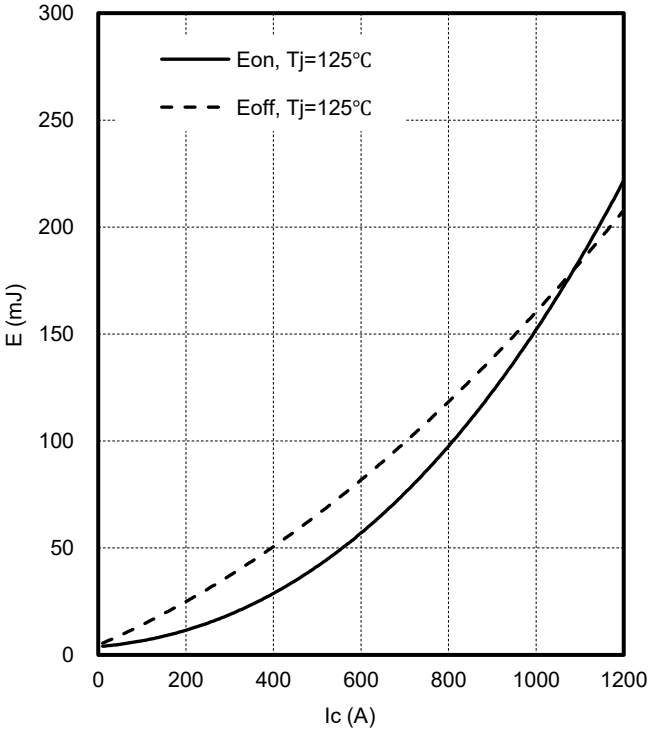


Fig.4 Switching losses IGBT, Eon=f(Ic),Eoff=f(Ic),
Vge=±15V,Rgon=1.5Ω,Rgoff=1.5Ω,Vce=600V

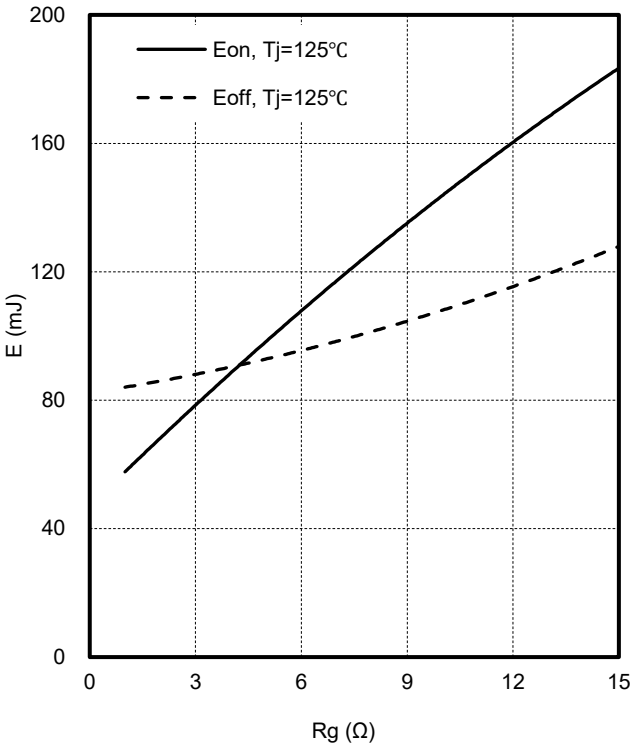


Fig.5 Switching losses IGBT, Eon=f(Rg),Eoff=f(Rg), Vge=±15V,Ic=600A,Vce=600V

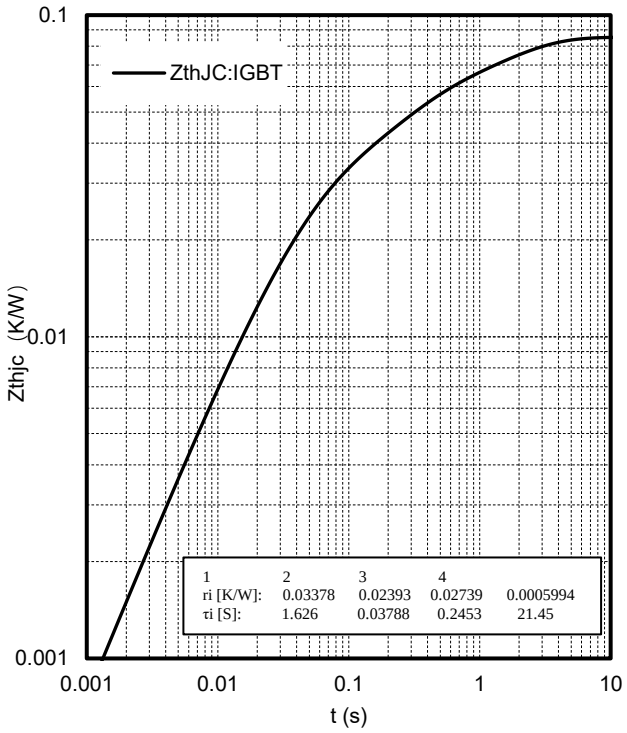


Fig.6 Transient thermal impedance IGBT , Zthjc=f(t)

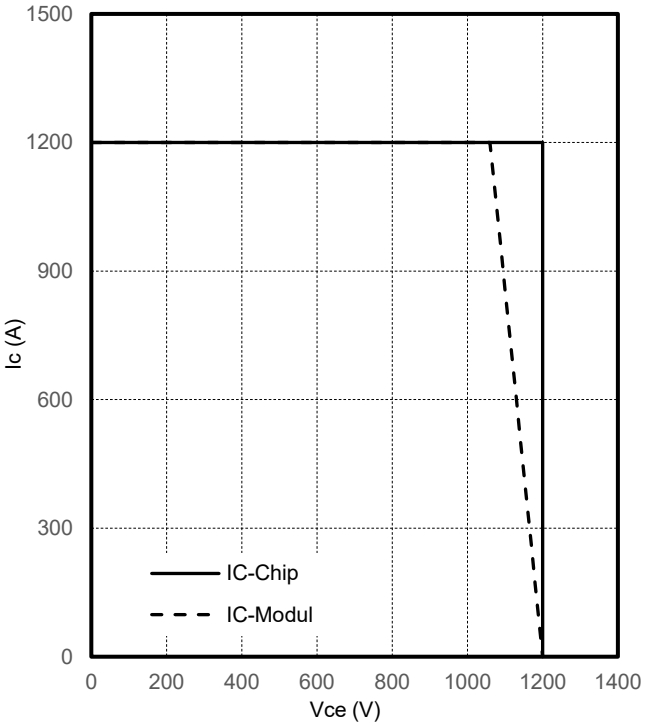


Fig.7 Reverse bias safe operating area IGBT, IC=f(Vce),Vge=±15V,Rgoff=1.5Ω,Tvj=125℃

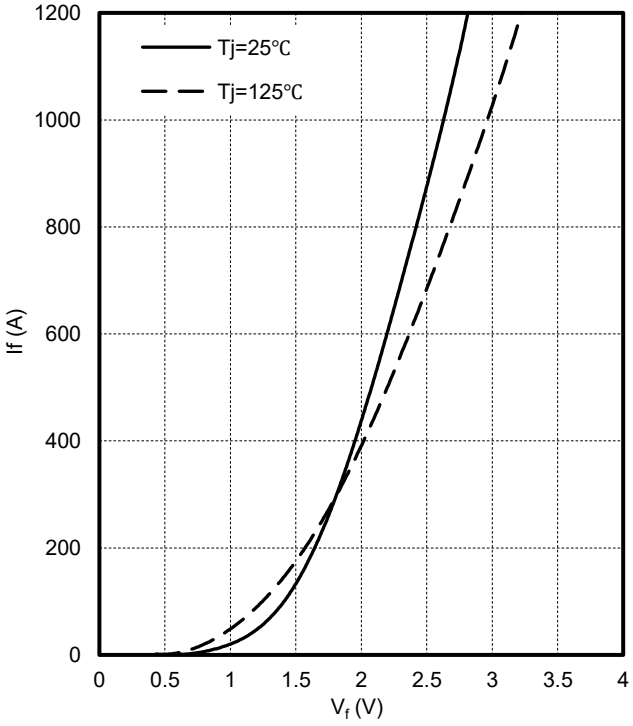


Fig.8 Forward characteristic of Diode, If=f(Vf)

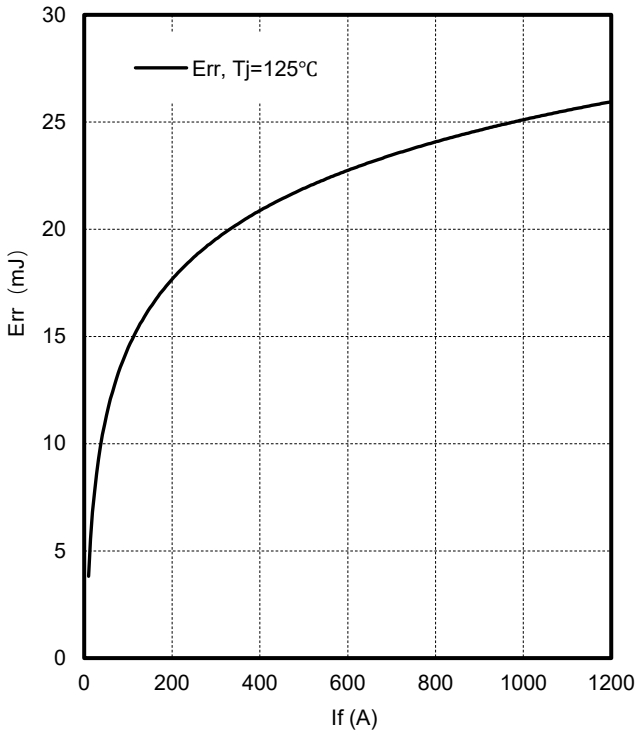


Fig.9 Switching losses Diode,
Err=f(if),Rgon=1.5Ω,Vce=600V

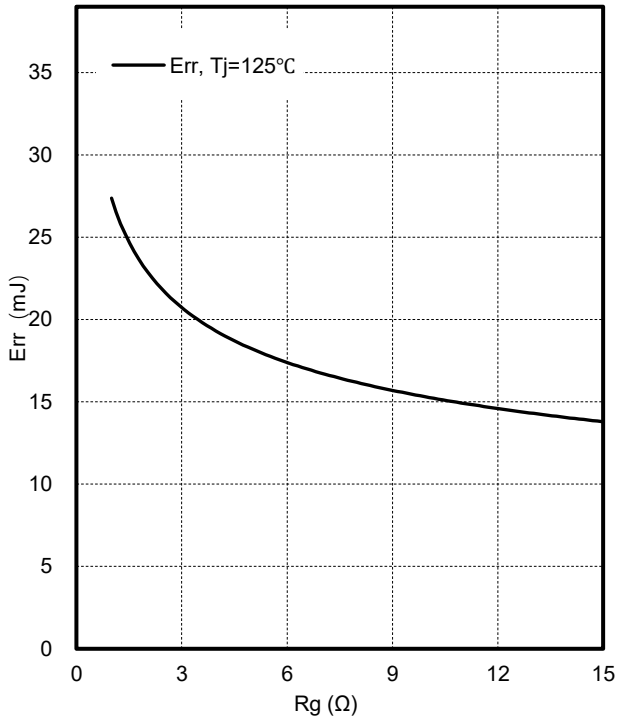


Fig.10 Switching losses Diode,
Err=f(Rg),If=600A,Vce=600V

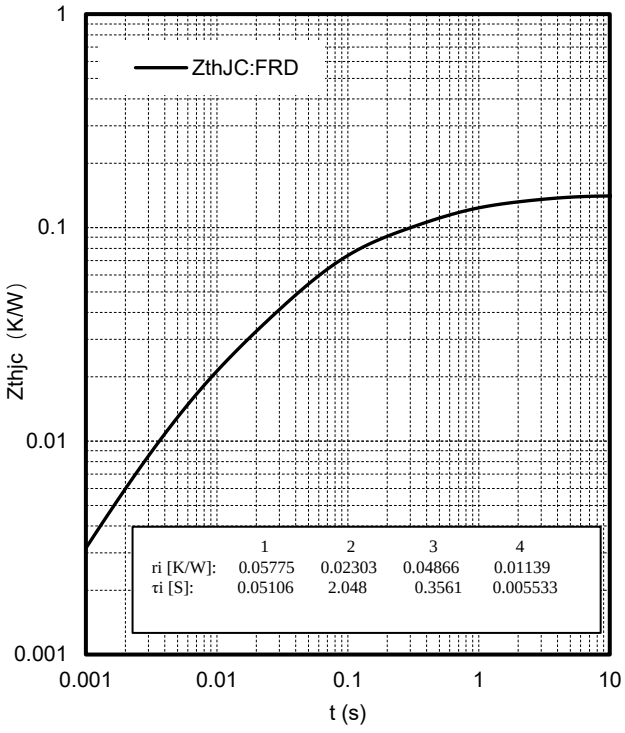


Fig.11 Transient thermal impedance Diode,
Zthjc=f(t)

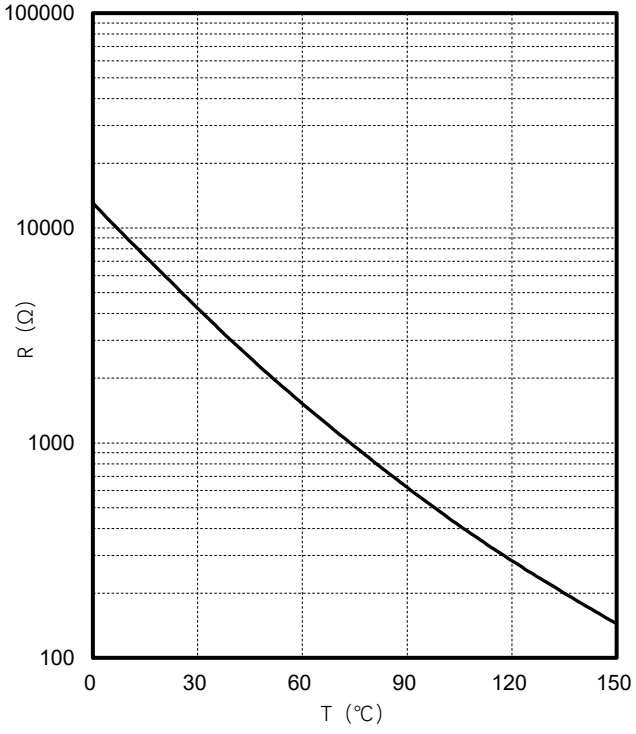
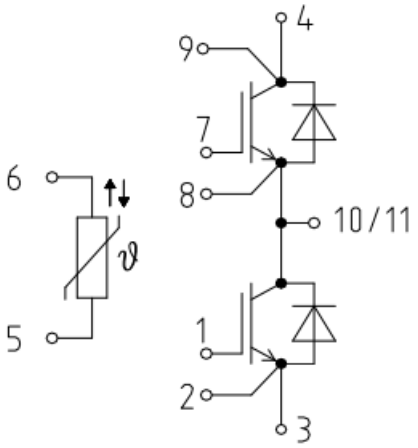


Fig.12 NTC-Thermistor-temperature
characteristic(typical)

Internal Circuit:



Package Dimension
Dimensions in Millimeters