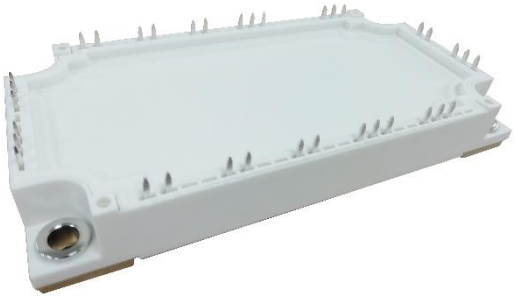
1200V/75A PIM

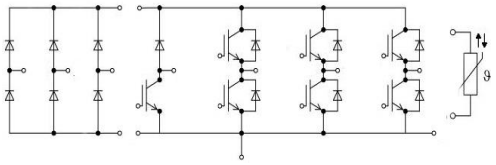


Features：

- 1200V75A,VCE(sat)(typ.)=2.10V
- Lower losses and higher energy
- Excellent short circuit ruggedness
- 62mm PIM module

General Applications：

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



Equivalent Circuit Schematic

IGBT,Inverter

Maximum Ratings of IGBT

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	150	A
		T_C = 100°C	75	
I_{CM}	Pulse Collector Current	T_J = 150°C	150	A
P_D	Maximum Power Dissipation (IGBT)	T_C = 25°C, T_J = 150°C	510	W
t_{sc}	Short Circuit Withstand Time		> 10	μs
T_J	Maximum IGBT Junction Temperature		150	°C
T_{JOP}	Maximum Operating Junction Temperature Range		-40 to +150	°C
T_{stg}	Storage Temperature Range		-40 to +125	°C

Absolute Maximum Ratings of Freewheeling Diode

V_{RRM}	Repetitive Peak Reverse Voltage Preliminary Data		1200	V
I_F	Diode Continuous Forward Current	T_C = 25°C	150	A
	Diode Continuous Forward Current	T_C = 100°C	75	
I_{FM}	Diode Maximum Forward Current		150	A

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

Parameter		Test Conditions		Min	Typ	Max	Unit
BV_{CES}	Collector to Emitter Breakdown Voltage	V_{GE} = 0V, I_C = 1mA		1200			V
I_{CES}	Collector to Emitter Leakage Current	V_{GE} = 0V,V_{CE} = V_{CES}				1	mA
I_{GES}	Gate to Emitter Leakage Current	V_{GE} = ±30V, V_{CE} = 0V				200	nA
$V_{GE(th)}$	Gate Threshold Voltage	I_C = 1mA, V_{CE} = V_{GE}		4.5		5.7	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage (Module Level)	I_C = 75A, V_{GE} = 15V	T_J = 25°C		2.10	2.30	V
			T_J = 125°C		2.50		

Switching Characteristics of IGBT

$t_{d(on)}$	Turn-on Delay Time	V_{CC} = 600V I_C = 75A R_G = 10Ω V_{GE} = ±15V Inductive Load	T_J = 25°C		25		ns
			T_J = 125°C		30		
t_r	Turn-on Rise Time		T_J = 25°C		40		ns
			T_J = 125°C		45		
$t_{d(off)}$	Turn-off Delay Time		T_J = 25°C		320		ns
			T_J = 125°C		350		
t_f	Turn-off Fall Time		T_J = 25°C		160		ns
			T_J = 125°C		180		
E_{on}	Turn-on Switching Loss		T_J = 25°C		5.5		mJ
			T_J = 125°C		7.5		
E_{off}	Turn-off Switching Loss		T_J = 25°C		5.1		mJ
			T_J = 125°C		8.5		
Q_g	Total Gate Charge		T_J = 25°C		680		nC
R_{gint}	Integrated gate resistor	f = 1M; Vpp = 1V	T_J = 25°C		2.5		Ω
C_{ies}	Input Capacitance	V_{CE} = 25V V_{GE} = 0V f = 1MHz	T_J = 25°C		5.9		nF
C_{oes}	Output Capacitance		T_J = 25°C		0.92		
C_{res}	Reverse Transfer Capacitance		T_J = 25°C		0.53		
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (IGBT)					0.245	°C/W

Electrical and Switching Characteristics of Freewheeling Diode

V_F	Diode Forward Voltage	I_F = 75A , V_{GE} = 0V	T_J = 25°C		1.90	2.20	V
			T_J = 125°C		1.90		
t_{rr}	Diode Reverse Recovery Time	I_F = 75A, di/dt = 1200A/μs, V_{rr} = 600V,	T_J = 25°C		150		ns
			T_J = 125°C		270		
I_{rr}	Diode Peak Reverse Recovery Current		T_J = 25°C		90		A
			T_J = 125°C		100		
Q_{rr}	Diode Reverse Recovery Charge		T_J = 25°C		7.00		uC
			T_J = 125°C		11.50		
E_{rr}	Diode Reverse Recovery Energy		T_J = 25°C		2.30		mJ
			T_J = 125°C		4.30		
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (Diode)					0.63	°C/W

Diode, Rectifier
Maximum Rated Values

V_{RRM}	Repetitive Peak Reverse Voltage	T_J = 25°C	1800	V
I_{FRMSM}	Maximum RMS forward current per chip	T_C =80℃	75	A
I_{RMSM}	Maximum RMS current at rectifier output	T_C =80℃	150	
I_{FSM}	Surge Current @t_p=10 ms	T_J =25℃	840	A
I^2t	I^2t - value	T_J =25℃	3528	A^2s

Electrical Characteristics of Diode

V_F	Diode Forward Voltage	I_F = 75A	T_J = 25°C		1.05		V
			T_J = 125°C		0.85		
I_R	Reverse current		T_J = 125°C		1.0		mA
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (Diode)					0.65	°C/W

IGBT,Brake-Chopper
Maximum Ratings of IGBT

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	100	A
		T_C = 100°C	50	
I_{CM}	Pulse Collector Current	T_J = 150°C	100	A
P_D	Maximum Power Dissipation (IGBT)	T_C = 25°C, T_J = 150°C	365	W
t_{sc}	Short Circuit Withstand Time		> 10	μs
T_J	Maximum IGBT Junction Temperature		150	°C
T_{JOP}	Maximum Operating Junction Temperature Range		-40 to +150	°C
T_{stg}	Storage Temperature Range		-40 to +125	°C

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

Parameter		Test Conditions		Min	Typ	Max	Unit
BV_{CES}	Collector to Emitter Breakdown Voltage	V_{GE} = 0V, I_C = 1mA		1200			V
I_{CES}	Collector to Emitter Leakage Current	V_{GE} = 0V, V_{CE} = V_{CES}				1	mA
I_{GES}	Gate to Emitter Leakage Current	V_{GE} = ±30V, V_{CE} = 0V				200	nA
$V_{GE(th)}$	Gate Threshold Voltage	I_C = 1mA, V_{CE} = V_{GE}		4.5		5.7	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage (Module Level)	I_C = 50A, V_{GE} = 15V	T_J = 25°C		2.10	2.30	V
			T_J = 125°C		2.50		

Switching Characteristics of IGBT

$t_{d(on)}$	Turn-on Delay Time	V_{CC} = 600V I_C = 50A R_G = 13Ω V_{GE} = ±15V Inductive Load	T_J = 25°C		20		ns
			T_J = 125°C		25		
t_r	Turn-on Rise Time		T_J = 25°C		40		ns
			T_J = 125°C		45		
$t_{d(off)}$	Turn-off Delay Time		T_J = 25°C		300		ns
			T_J = 125°C		330		
t_f	Turn-off Fall Time		T_J = 25°C		160		ns
			T_J = 125°C		180		

E_{on}	Turn-on Switching Loss	V_{CC} = 600V I_C = 50A R_G = 13Ω V_{GE} = ±15V Inductive Load	T_J = 25°C		4.50		mJ
			T_J = 125°C		6.50		
E_{off}	Turn-off Switching Loss		T_J = 25°C		4.20		mJ
			T_J = 125°C		6.10		
Q_g	Total Gate Charge		T_J = 25°C		430		nC
R_{gint}	Integrated gate resistor	f = 1M; Vpp = 1V	T_J = 25°C		2.2		Ω
C_{ies}	Input Capacitance	V_{CE} = 25V V_{GE} = 0V f = 1MHz	T_J = 25°C		3.80		nF
C_{oes}	Output Capacitance		T_J = 25°C		0.51		
C_{res}	Reverse Transfer Capacitance		T_J = 25°C		0.33		
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (IGBT)					0.343	°C/W

Diode,Brake-Chopper

Maximum Rated Values

V_{RRM}	Repetitive Peak Reverse Voltage Preliminary Data		1200	V
I_F	Diode Continuous Forward Current	T_C = 25°C	100	A
		T_C = 100°C	50	
I_{FM}	Diode Maximum Forward Current		100	A

Electrical and Switching Characteristics of Freewheeling Diode

V_F	Diode Forward Voltage	I_F = 50A , V_{GE} = 0V	T_J = 25°C		1.90	2.20	V
			T_J = 125°C		1.90		
t_{rr}	Diode Reverse Recovery Time	I_F = 50A, di/dt = 1200A/μs, V_{rr} = 600V,	T_J = 25°C		110		ns
			T_J = 125°C		250		
I_{rr}	Diode Peak Reverse Recovery Current		T_J = 25°C		85		A
			T_J = 125°C		100		
Q_{rr}	Diode Reverse Recovery Charge		T_J = 25°C		5.5		uC
			T_J = 125°C		9.50		
E_{rr}	Diode Reverse Recovery Energy		T_J = 25°C		1.80		mJ
			T_J = 125°C		3.70		
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (Diode)					0.652	°C/W

NTC - Thermistor
Characteristic Values

R_{25}	T_C = 25°C	5		KΩ
△R/R	T_C = 100°C,R_{100}=493Ω		±5	%
P_{25}	T_C = 25°C	50		mW
$B_{25/50}$	$R_2 = R_{25}\exp[B_{25/50}(1/T_2-1/(298.15K)]$	3375		K
$B_{25/80}$	$R_2 = R_{25}\exp[B_{25/80}(1/T_2-1/(298.15K)]$	3410		K

Module Characteristics

Parameter		Min.	Typ.	Max.	Unit
V_{iso}	Isolation Voltage (All Terminals Shorted),f = 50Hz, 1minute			2500	V
$R_{\theta CS}$	Case-To-Sink(Conductive Grease Applied)		0.1		°C/W
M	Mounting Screw: M5	3.0		6.0	N·m
G	Weight		300		g

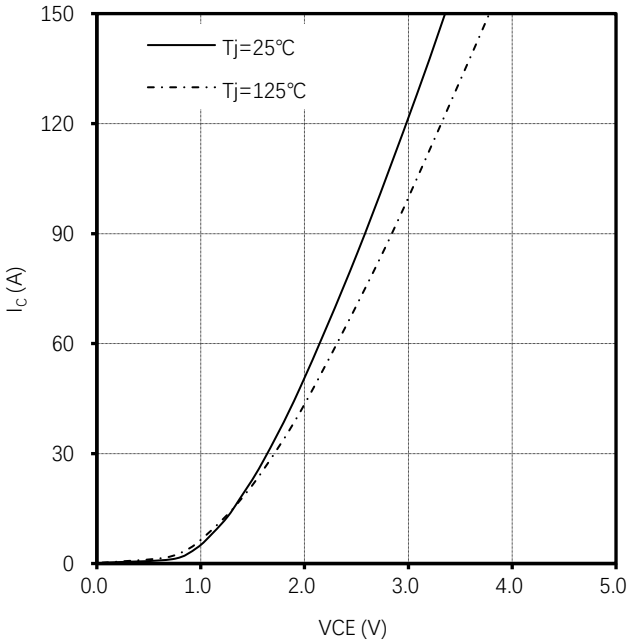


Fig 1. Output characteristic IGBT，
$I_C=f(V_{CE})$,VGE=15V

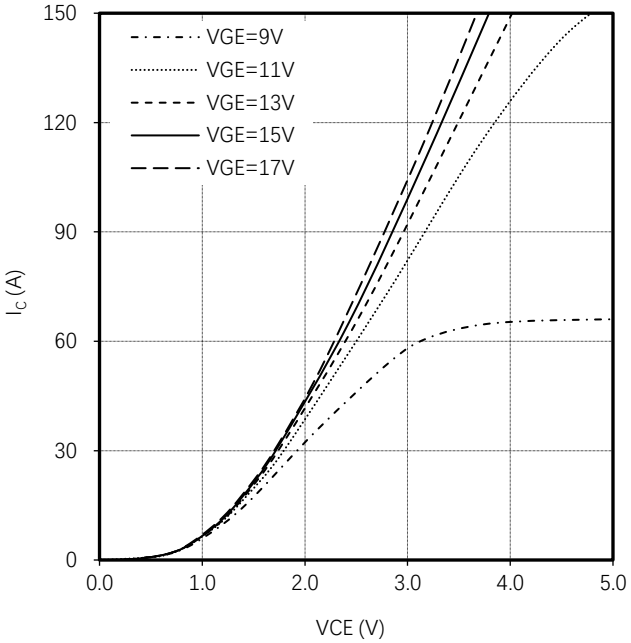


Fig 2. Output characteristic IGBT，
$I_C=f(V_{CE})$,T_j=125℃

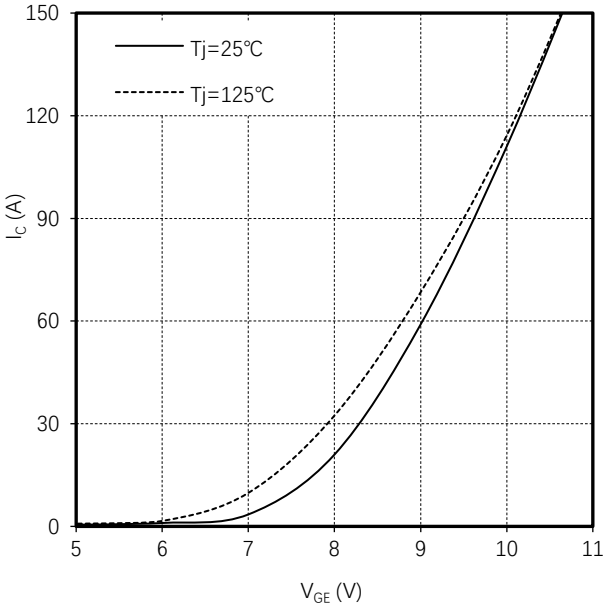


Fig 3. Transfer characteristic IGBT
$I_C=f(V_{GE})$,V_{CE}=20V

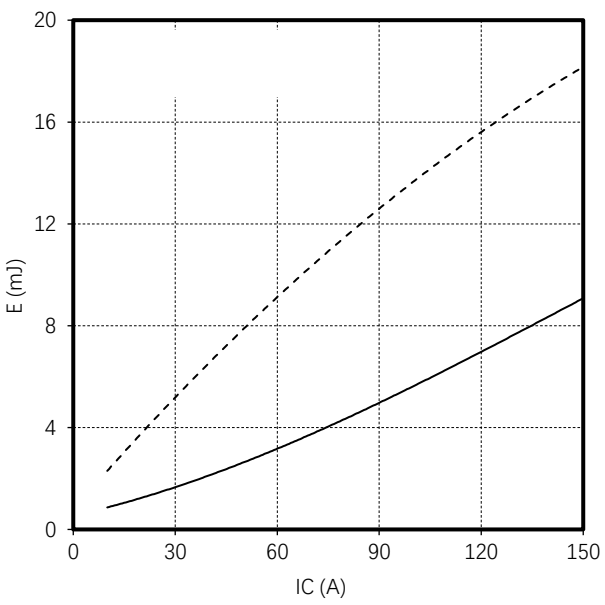


Fig 4. Switching losses IGBT, $E_{on}=f(I_C)$,$E_{off}=f(I_C)$,
V_{GE}=±15V,R_{Gon}=4.7Ω,R_{Goff}=4.7Ω,V_{CE}=600V

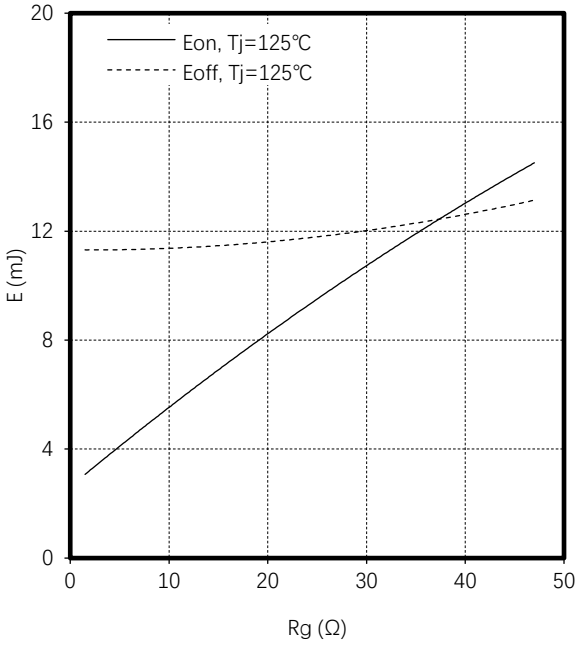


Fig 5. Switching losses IGBT, $E_{on}=f(R_G)$,$E_{off}=f(R_G)$, $V_{GE}=\pm15V$,$I_C=75A$,$V_{CE}=600V$

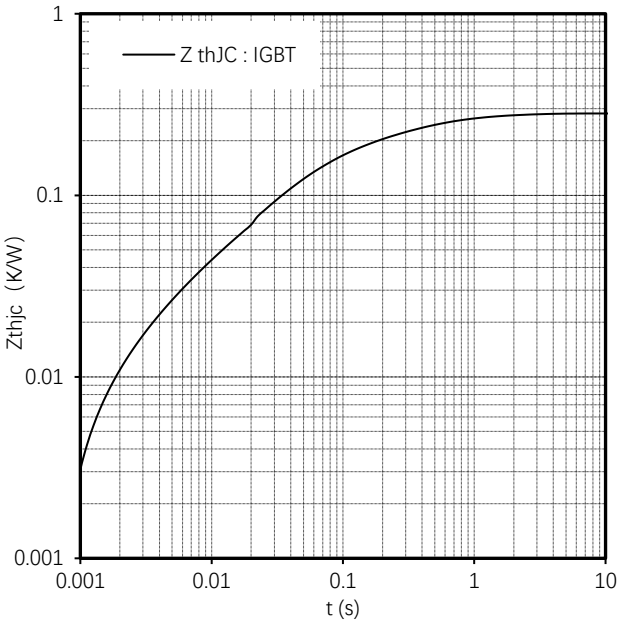


Fig 6. Transient thermal impedance IGBT , Zthjc=f(t)

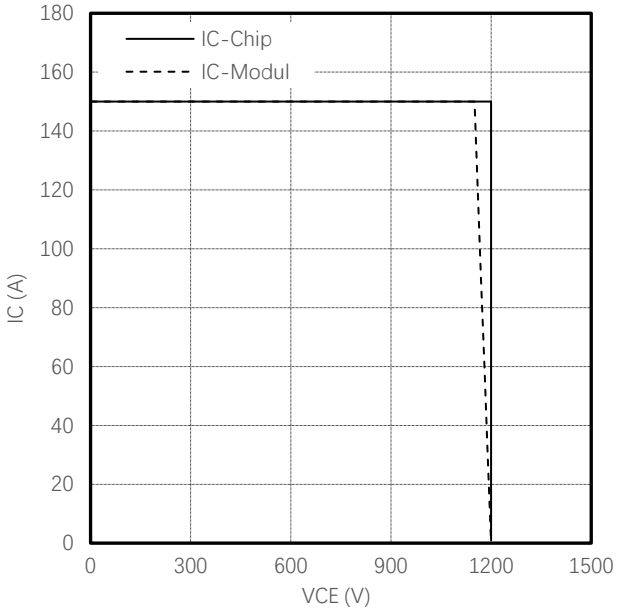


Fig 7.Rreverse bias safe operating area IGBT, $I_C=f(V_{CE})$,$V_{GE}=\pm15V$,$R_{Goff}=4.7\Omega$，Tvj=125℃

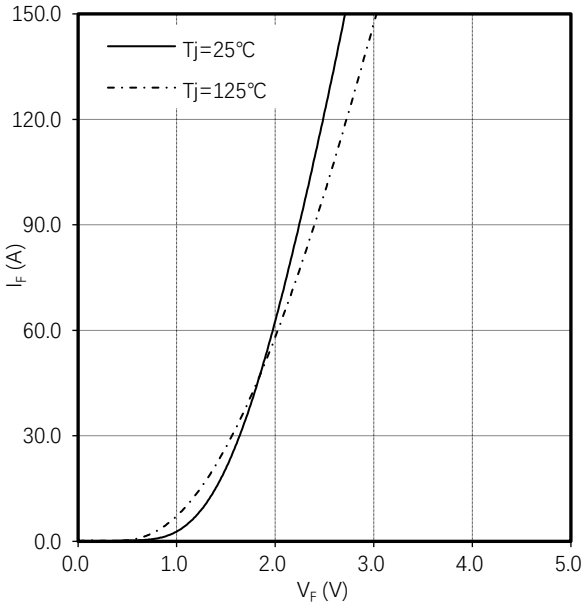


Fig 8. Forward characteristic of Diode， $I_F=f(V_F)$

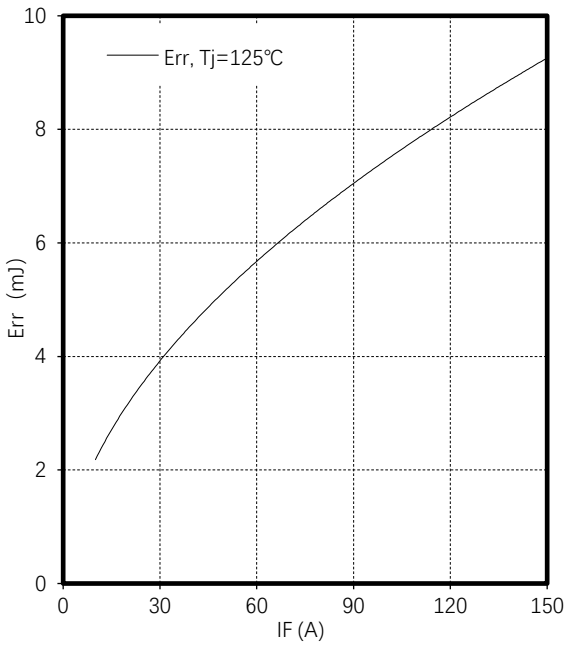


Fig 9. Switching losses Diode,
$E_{rr}=f(I_F)$,,$R_{Gon}=4.7\Omega$,$V_{CE}=600V$

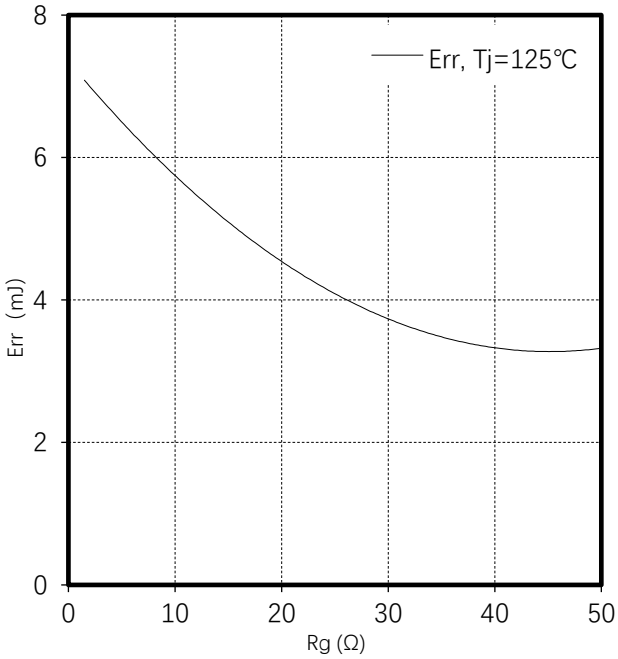


Fig 10. Switching losses Diode,
$E_{rr}=f(R_G)$,$I_F=75A$,$V_{CE}=600V$

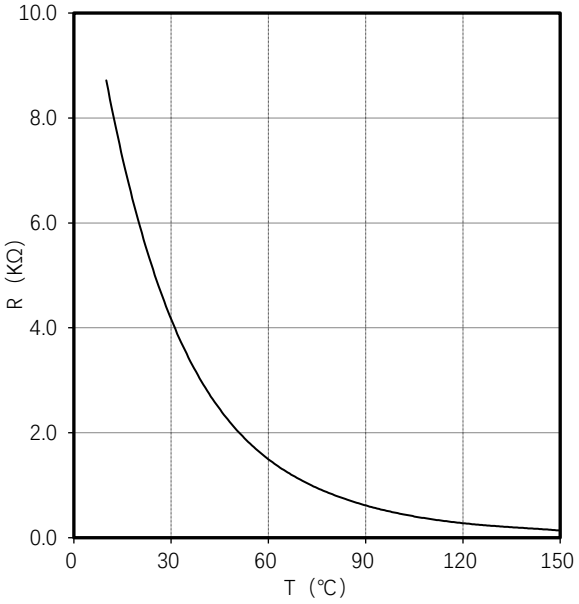
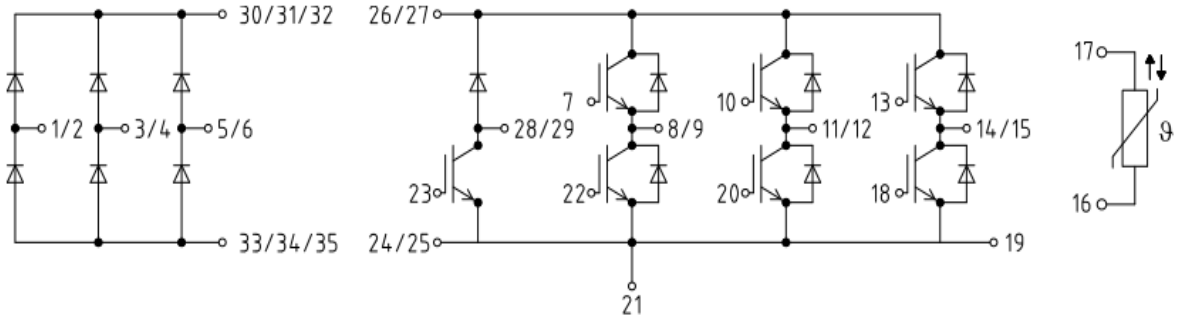


Fig 11.NTC-Thermistor-temperature characteristic(typical)

Internal Circuit:



Package Dimension
Dimensions in Millimeters