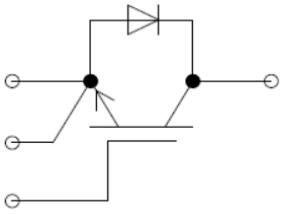
1200V/400A Single Switches

Features：

- 1200V400A,VCE(sat)(typ.)=3.0V
- Ultrafast switching speed
- Excellent short circuit ruggedness
- 62mm single module

General Applications：

Daxin's IGBTs offer ultrafast switching speed for application such as welding, inductive heating, UPS and other high frequency applications



Equivalent Circuit Schematic

Absolute 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	800	A
		T_C = 100°C	400	
I_{CM}	Pulse Collector Current	T_J = 150°C	800	A
P_D	Maximum Power Dissipation (IGBT)	T_C = 25°C, T_J = 150°C	1735	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	800	A
		T_C = 100°C	400	
I_{FM}	Diode Maximum Forward Current		800	A

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, I_C = 1mA		1200			V
I_{CES}	Collector to Emitter Leakage Current	V_{GE} = 0V,V_{CE} = V_{CES}				5	mA
I_{GES}	Gate to Emitter Leakage Current	V_{GE} = ±30V, V_{CE} = 0V				400	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 = 400A, V_{GE} = 15V	T_J = 25°C		3.00	3.20	V
			T_J = 125°C		3.60		

Switching Characteristics of IGBT

$t_{d(on)}$	Turn-on Delay Time	V_{CC} = 600V I_C = 400A R_G = 2.2Ω V_{GE} = ±15V Inductive Load	T_J = 25°C		140		ns
			T_J = 125°C		145		
t_r	Turn-on Rise Time		T_J = 25°C		130		ns
			T_J = 125°C		135		
$t_{d(off)}$	Turn-off Delay Time		T_J = 25°C		850		ns
			T_J = 125°C		960		
t_f	Turn-off Fall Time		T_J = 25°C		120		ns
			T_J = 125°C		140		
E_{on}	Turn-on Switching Loss		T_J = 25°C		13.0		mJ
			T_J = 125°C		16.5		
E_{off}	Turn-off Switching Loss		T_J = 25°C		24.0		mJ
			T_J = 125°C		29.5		
Q_g	Total Gate Charge		T_J = 25°C		3480		nC
R_{gint}	Integrated gate resistor	f = 1M; Vpp = 1V	T_J = 25°C		1.3		Ω
C_{ies}	Input Capacitance	V_{CE} = 25V V_{GE} = 0V f = 1MHz	T_J = 25°C		35		nF
C_{oes}	Output Capacitance		T_J = 25°C		4.8		
C_{res}	Reverse Transfer Capacitance		T_J = 25°C		2.8		
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (IGBT)					0.072	°C/W

Electrical and Switching Characteristics of Freewheeling Diode

V_F	Diode Forward Voltage	I_F = 400A , 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 = 400A, di/dt=3100A/μs, V_{rr} = 600V,	T_J = 25°C		180		ns
			T_J = 125°C		230		
I_{rr}	Diode Peak Reverse Recovery Current		T_J = 25°C		320		A
			T_J = 125°C		400		
Q_{rr}	Diode Reverse Recovery Charge		T_J = 25°C		32.5		nC
			T_J = 125°C		52.0		
E_{rr}	Diode Reverse Recovery Energy		T_J = 25°C		12.0		mJ
			T_J = 125°C		20.5		
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (Diode)					0.078	°C/W

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	Power Terminals Screw: M4	1.0		2.0	N·m
	Power Terminals Screw: M6	3.0		5.0	N·m
M	Mounting Screw: M6	4.0		6.0	N·m
G	Weight		320		g

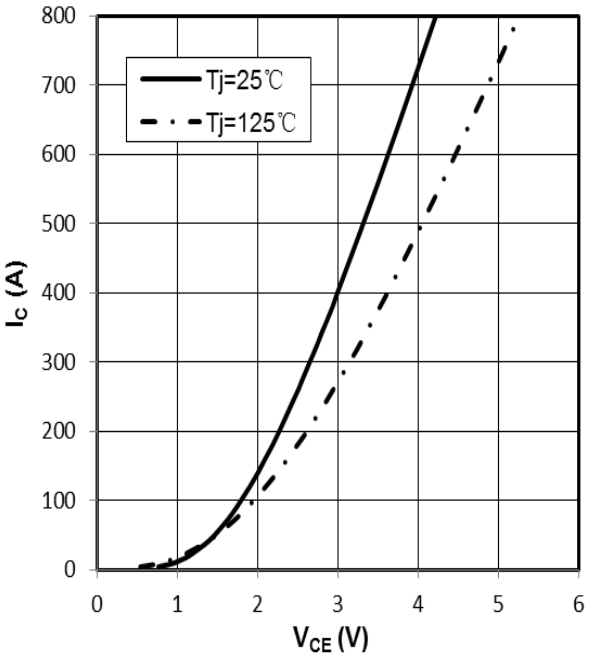


Fig 1. output characteristic IGBT，
$I_C=f(V_{CE})$,VGE=15V

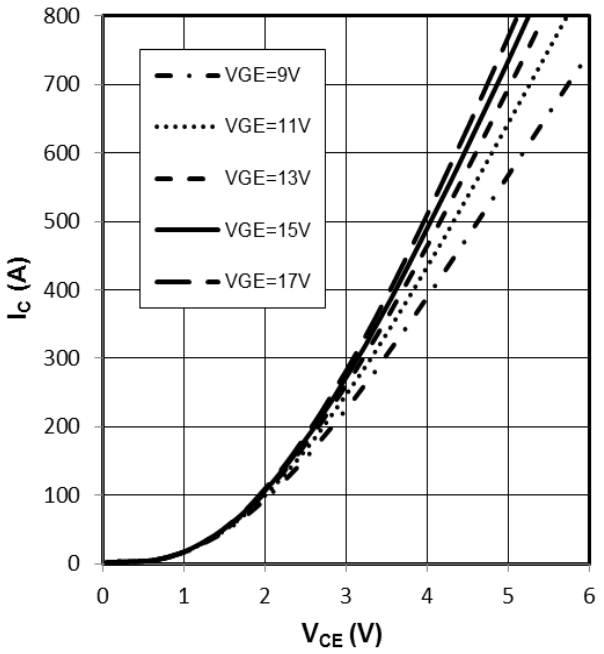


Fig 2. output characteristic IGBT，
$I_C=f(V_{CE})$,T_j=125℃

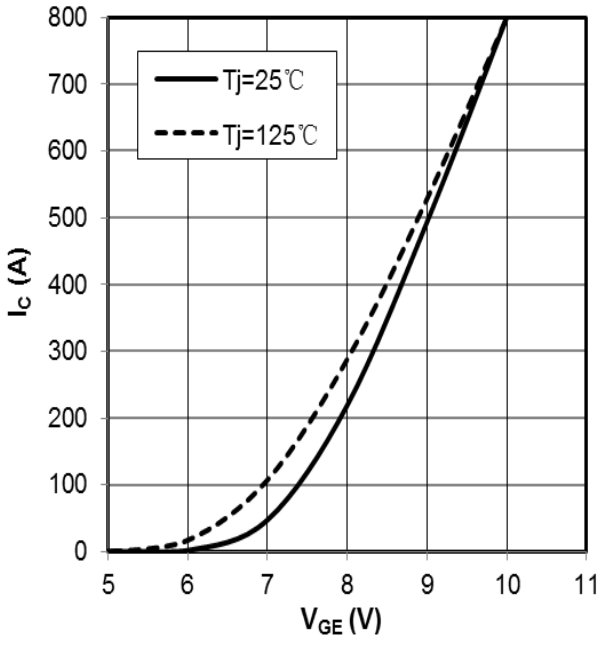


Fig 3. transfer characteristic IGBT，
$I_C=f(V_{GE})$,V_{CE}=20V

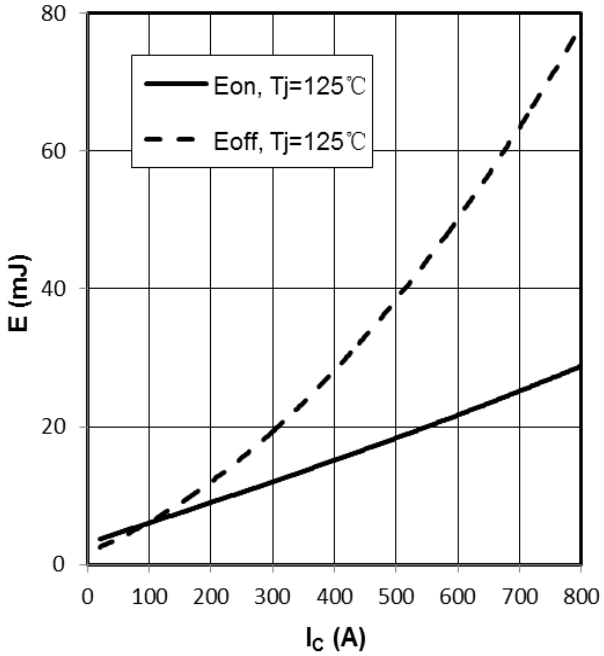


Fig 4. switching losses IGBT, $E_{on}=f(Ic)$,$E_{off}=f(I_C)$,
V_{GE}=±15V,R_{Gon}=2.2Ω,R_{Goff}=2.2Ω,V_{CE}=600V

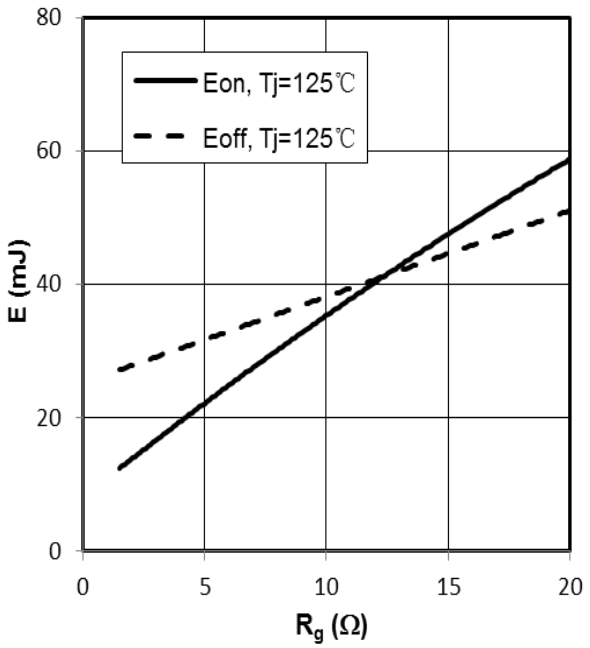


Fig 5. switching losses IGBT, $E_{on}=f(R_G)$,$E_{off}=f(R_G)$, $V_{GE}=\pm15V$,$I_C=400A$,$V_{CE}=600V$

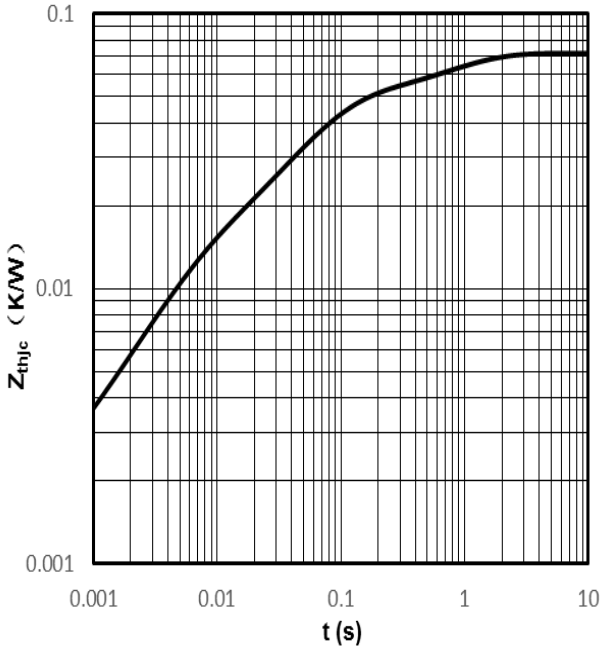


Fig 6. transient thermal impedance IGBT , Zthjc=f(t)

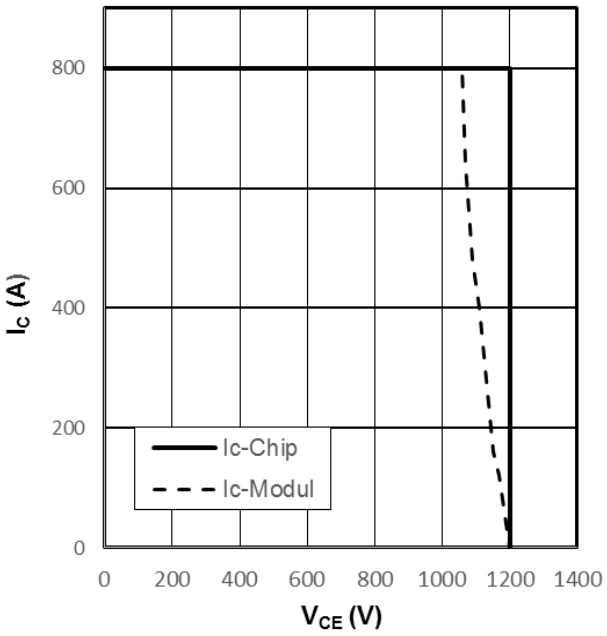


Fig 7. reverse bias safe operating area IGBT, $I_C=f(V_{CE})$,$V_{GE}=\pm15V$,$R_{Goff}=2.2\Omega$， Tj=125℃

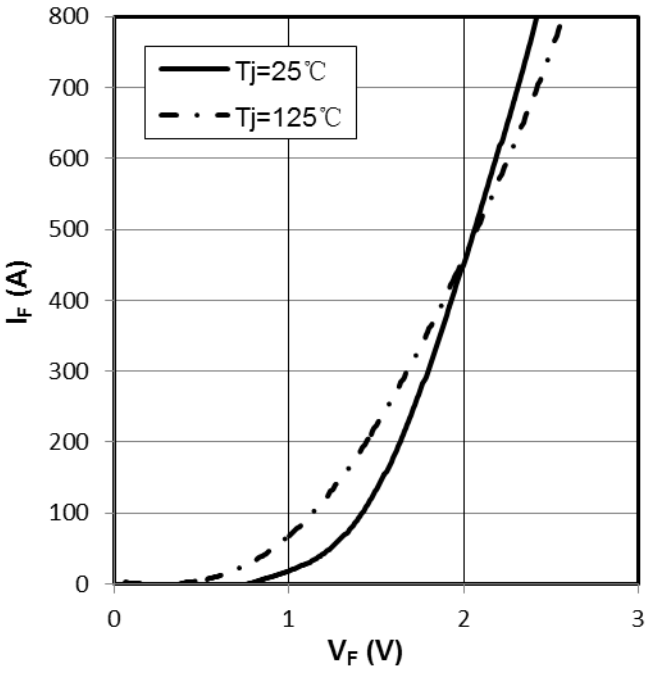


Fig 8. forward characteristic of Diode， $I_F=f(V_F)$

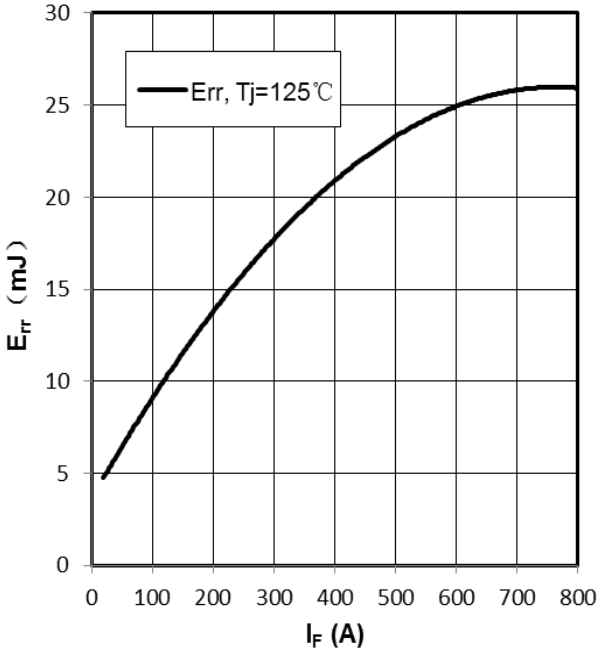


Fig 9. switching losses Diode,
E_{rr}=f(I_F),,R_{Gon}=2.2Ω,V_{CE}=600V

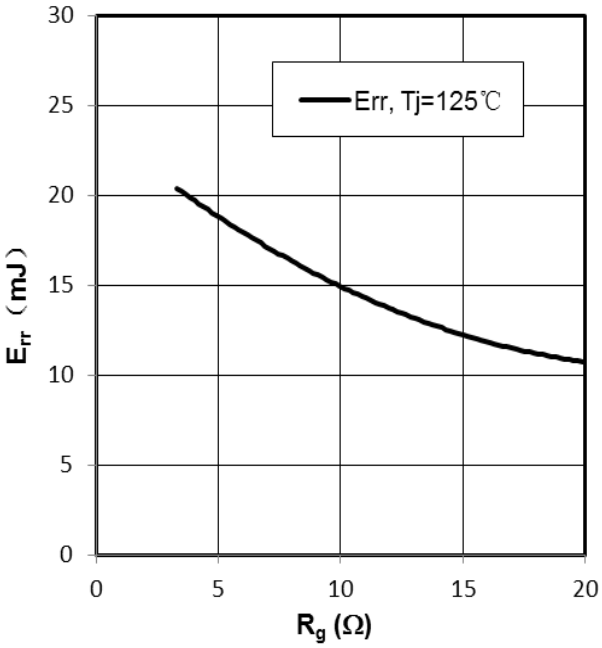
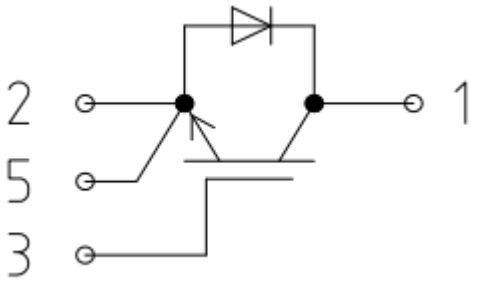


Fig 10. switching losses Diode,
E_{rr}=f(R_G),I_F=400A,V_{CE}=600V

Internal Circuit:



Package Dimension
Dimensions in Millimeters