

1700V/600A Single Switches

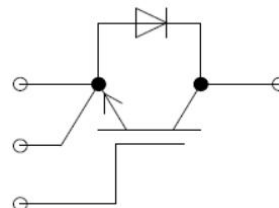
Features:

- 1700V600A, $V_{CE(sat)}(typ.)=3.0V$
- 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		1700	V
V_{GES}	Continuous Gate to Emitter Voltage		± 30	V
I_C	Continuous Collector Current	$T_C = 25^\circ C$	1200	A
		$T_C = 100^\circ C$	600	
I_{CM}	Pulse Collector Current	$T_J = 150^\circ C$	1200	A
P_D	Maximum Power Dissipation (IGBT)	$T_C = 25^\circ C, T_J = 150^\circ C$	2660	W
t_{sc}	Short Circuit Withstand Time		> 10	μs
T_J	Maximum IGBT Junction Temperature		150	$^\circ C$
T_{JOP}	Maximum Operating Junction Temperature Range		-40 to +150	$^\circ C$
T_{stg}	Storage Temperature Range		-40 to +125	$^\circ C$

Absolute Maximum Ratings of Freewheeling Diode

V_{RRM}	Repetitive Peak Reverse Voltage Preliminary Data		1700	V
I_F	Diode Continuous Forward Current	$T_C = 25^\circ C$	1200	A
		$T_C = 100^\circ C$	600	
I_{FM}	Diode Maximum Forward Current		1200	A

Electrical Characteristics of IGBT at $T_J = 25^{\circ}\text{C}$ (Unless Otherwise Specified)

Parameter		Test Conditions		Min	Typ	Max	Unit
BV _{CES}	Collector to Emitter Breakdown Voltage	V _{GE} = 0V, I _C = 1mA		1700			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 = 600A, 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} = 960V I _C = 600A R _G = 1.1Ω V _{GE} = ±15V Inductive Load	T _J = 25°C		140		ns
			T _J = 125°C		150		
t _r	Turn-on Rise Time		T _J = 25°C		120		ns
			T _J = 125°C		125		
t _{d(off)}	Turn-off Delay Time		T _J = 25°C		870		ns
			T _J = 125°C		920		
t _f	Turn-off Fall Time		T _J = 25°C		120		ns
			T _J = 125°C		135		
E _{on}	Turn-on Switching Loss		T _J = 25°C		15.5		mJ
			T _J = 125°C		25.0		
E _{off}	Turn-off Switching Loss		T _J = 25°C		43.0		mJ
			T _J = 125°C		52.5		
Q _g	Total Gate Charge		T _J = 25°C		5000		nC
R _{gint}	Integrated gate resistor	f = 1M; V _{pp} = 1V	T _J = 25°C		1.3		Ω
C _{ies}	Input Capacitance	V _{CE} = 25V V _{GE} = 0V f = 1MHz	T _J = 25°C		50		nF
C _{oes}	Output Capacitance		T _J = 25°C		7.0		
C _{res}	Reverse Transfer Capacitance		T _J = 25°C		4.0		
R _{θJC}	Thermal Resistance, Junction-to-Case (IGBT)					0.047	°C/W

Electrical and Switching Characteristics of Freewheeling Diode

V _F	Diode Forward Voltage	I _F = 600A , 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 = 600A, di/dt=6500A/μs, V _{rr} = 600V,	T _J = 25°C		230		ns	
			T _J = 125°C		320			
I _{rr}	Diode Peak Reverse Recovery Current		T _J = 25°C		450		A	
			T _J = 125°C		590			
Q _{rr}	Diode Reverse Recovery Charge		T _J = 25°C		56.5		nC	
			T _J = 125°C		98.0			
E _{rr}	Diode Reverse Recovery Energy		T _J = 25°C		25.0		mJ	
			T _J = 125°C		37.5			
R _{θJC}	Thermal Resistance, Junction-to-Case (Diode)					0.057	°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		$^\circ C/W$
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

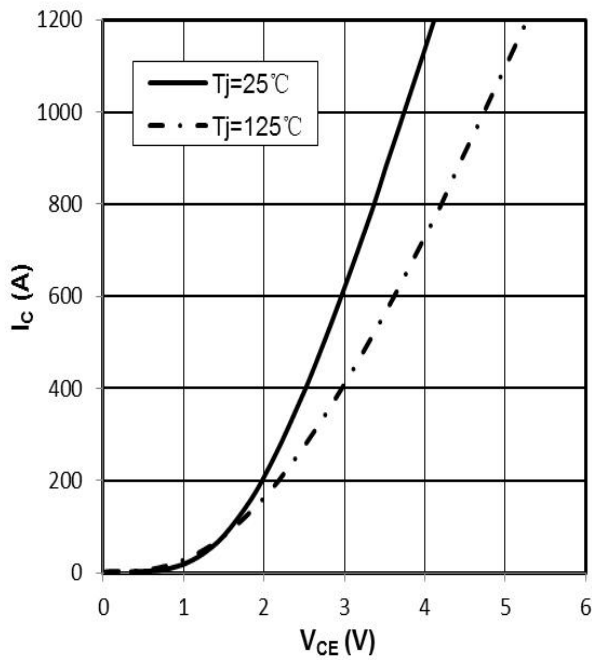


Fig 1. output characteristic IGBT,
 $I_c=f(V_{CE}), V_{GE}=15V$

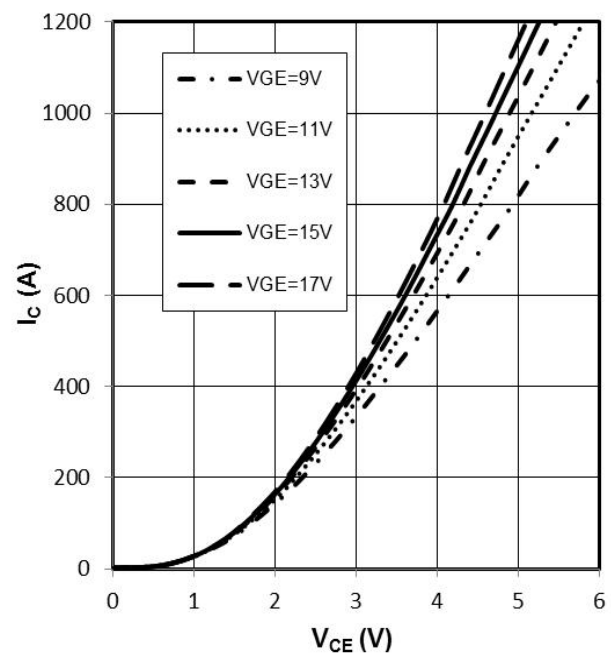


Fig 2. output characteristic IGBT,
 $I_c=f(V_{CE}), T_j=125^\circ C$

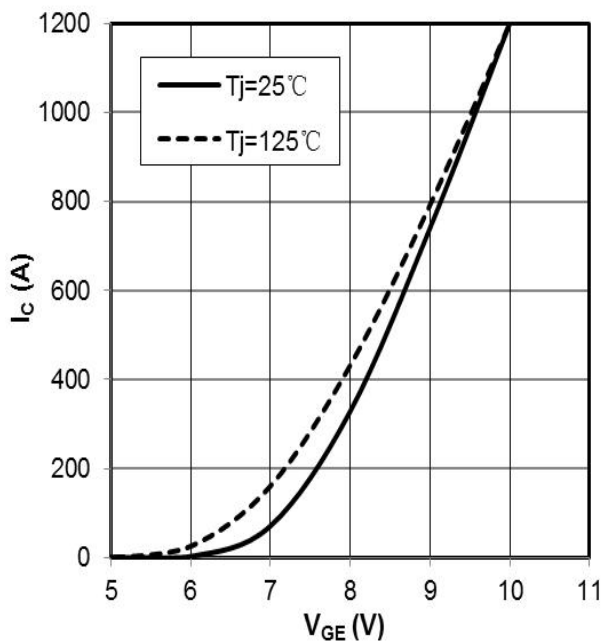


Fig 3. transfer characteristic IGBT,
 $I_c=f(V_{GE}), V_{CE}=20V$

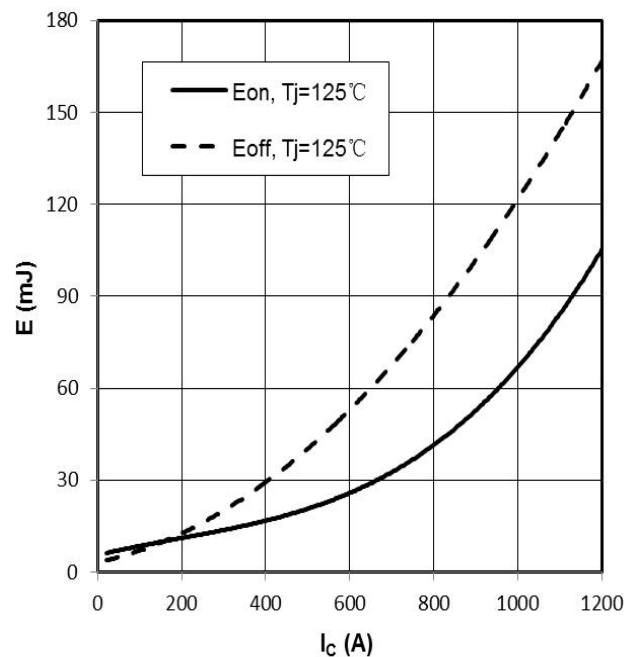


Fig 4. switching losses IGBT, $E_{on}=f(I_c), E_{off}=f(I_c)$,
 $V_{GE}=\pm 15V, R_{Gon}=1.1\Omega, R_{Goff}=1.1\Omega, V_{CE}=600V$

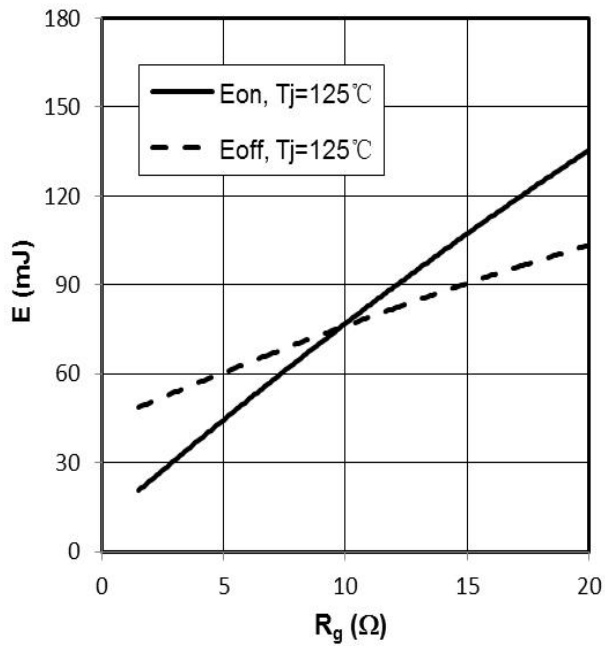


Fig 5. switching losses IGBT, $E_{on}=f(R_g)$, $E_{off}=f(R_g)$, $V_{GE}=\pm 15V$, $I_C=600A$, $V_{CE}=600V$

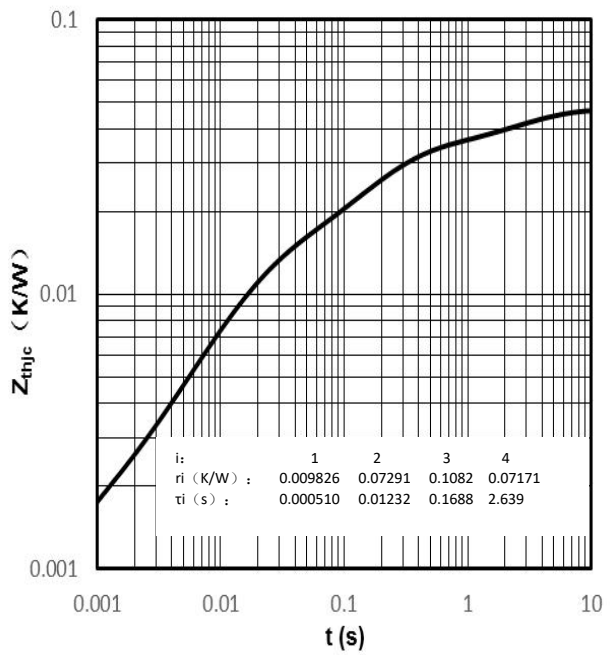


Fig 6. transient thermal impedance IGBT, $Z_{thjc}=f(t)$

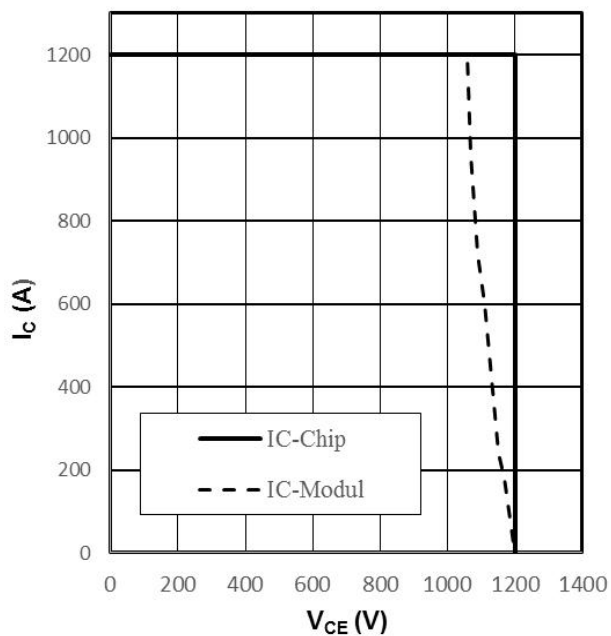


Fig 7. reverse bias safe operating area IGBT, $I_C=f(V_{CE})$, $V_{GE}=\pm 15V$, $R_{Goff}=1.1\Omega$, $T_{vj}=125^\circ C$

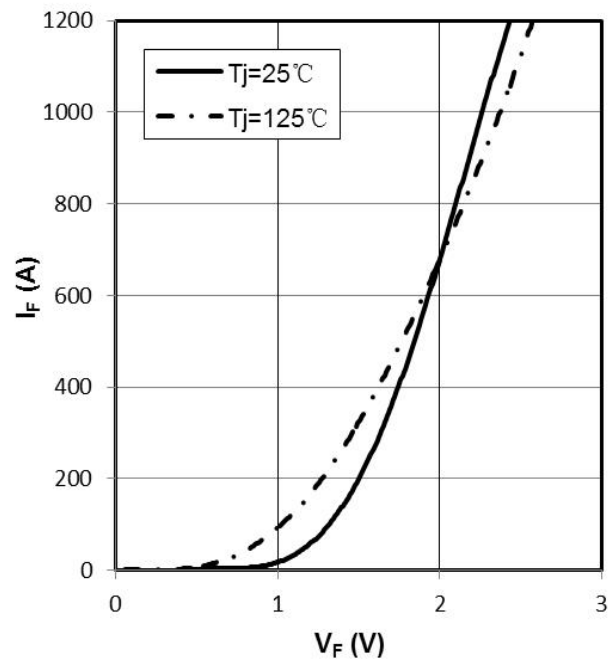


Fig 8. forward characteristic of Diode, $I_F=f(V_F)$

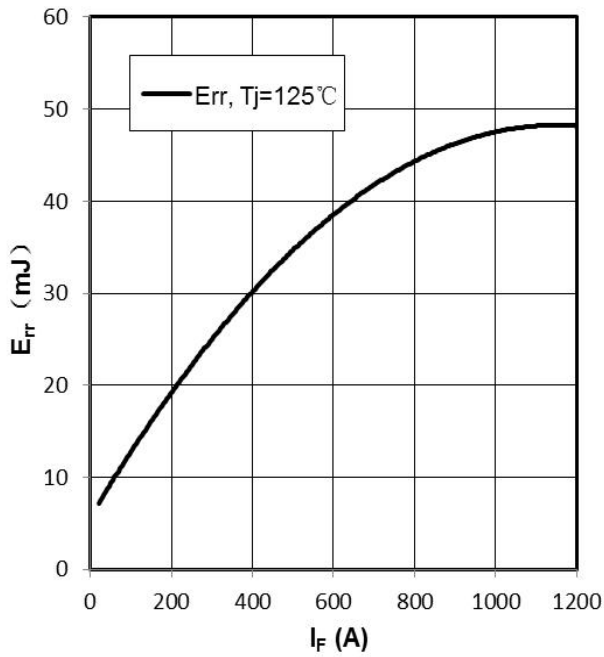


Fig 9. switching losses Diode,
 $E_{rr}=f(I_F)$, $R_{Gon}=1.1\Omega$, $V_{CE}=600V$

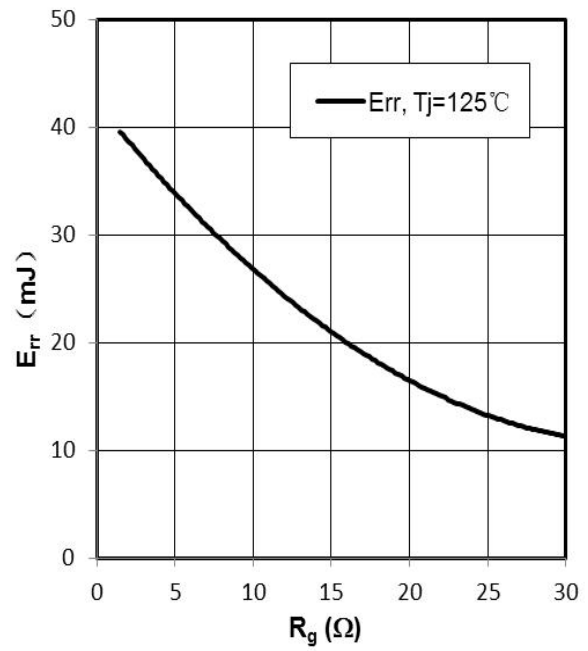
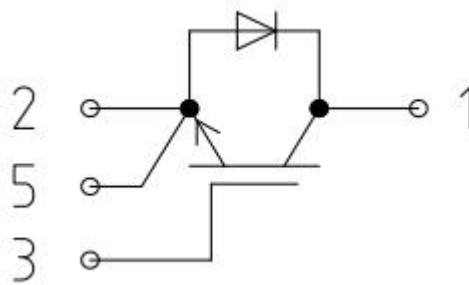


Fig 10. switching losses Diode,
 $E_{rr}=f(R_g)$, $I_F=600A$, $V_{CE}=600V$

Internal Circuit:



Package Dimension

Dimensions in Millimeters

