

1200V/400A Single Switches

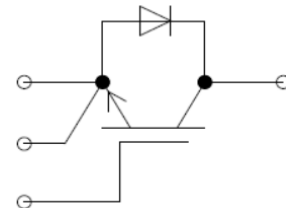
Features:

- 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 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}		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; 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	35	nF
C _{oes}	Output Capacitance		T _J = 25°C	4.8	
C _{res}	Reverse Transfer Capacitance		T _J = 25°C	2.8	
R _{θJC}	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	I _F = 400A, di/dt=3100A/μs, V _{rr} = 600V,	T _J = 25°C	320		A
			T _J = 125°C	400		
Q _{rr}	Diode Reverse Recovery Charge	I _F = 400A, di/dt=3100A/μs, V _{rr} = 600V,	T _J = 25°C	32.5		nC
			T _J = 125°C	52.0		
E _{rr}	Diode Reverse Recovery Energy	I _F = 400A, di/dt=3100A/μs, V _{rr} = 600V,	T _J = 25°C	12.0		mJ
			T _J = 125°C	20.5		
R _{θJC}	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 _{ecs}	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

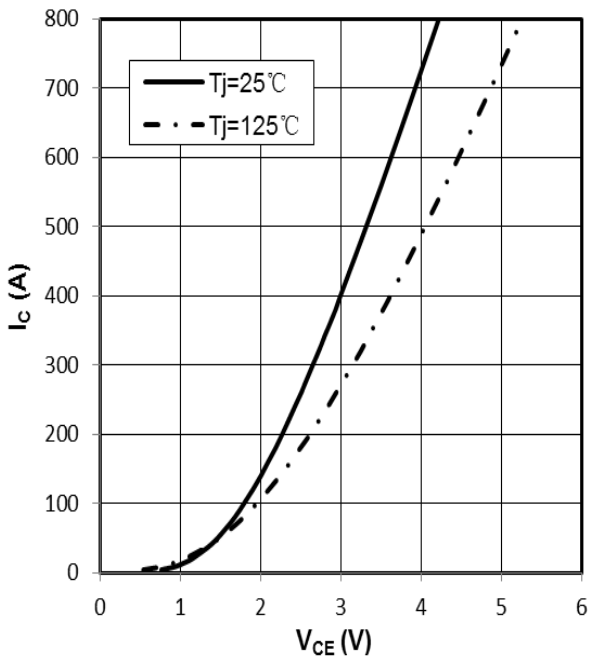


Fig 1. output characteristic IGBT,
 $I_c=f(V_{CE}), V_{GE}=15V$

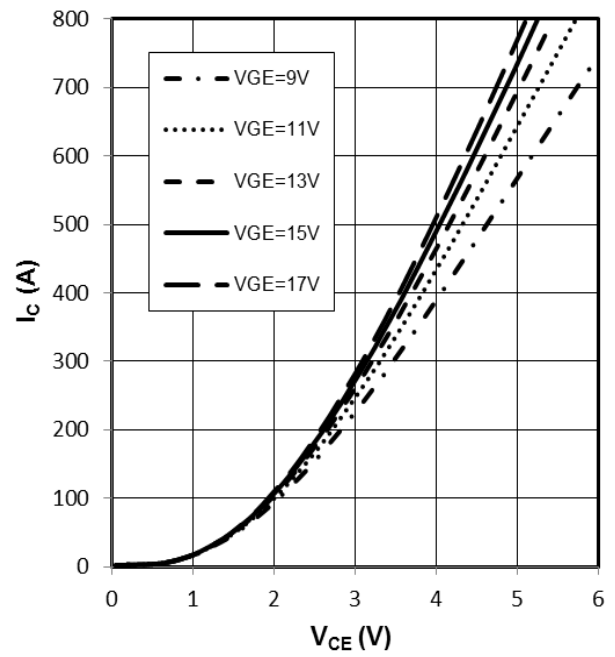


Fig 2. output characteristic IGBT,
 $I_c=f(V_{CE}), T_j=125^\circ C$

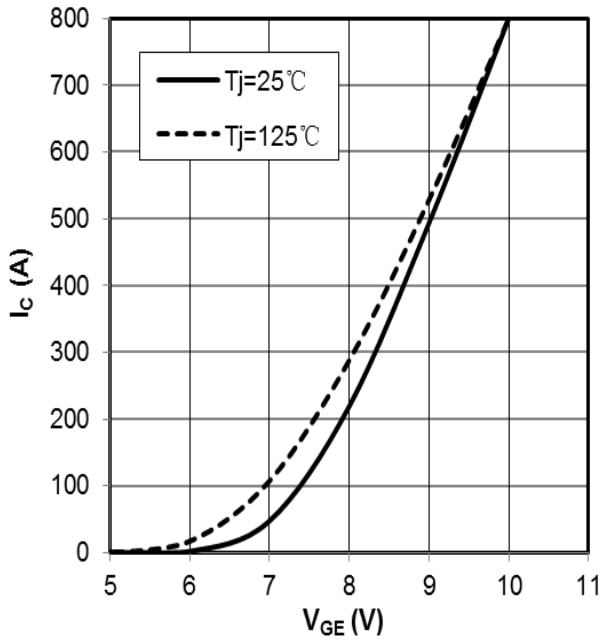


Fig 3. transfer characteristic IGBT,
 $I_c=f(V_{GE}), V_{CE}=20V$

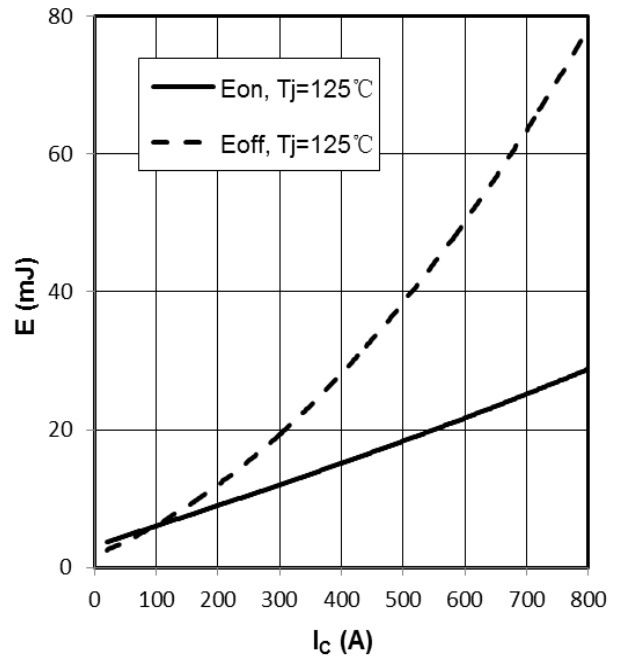


Fig 4. switching losses IGBT, $E_{on}=f(I_c), E_{off}=f(I_c)$,
 $V_{GE}=\pm 15V, R_{Gon}=2.2\Omega, R_{Goff}=2.2\Omega, V_{CE}=600V$

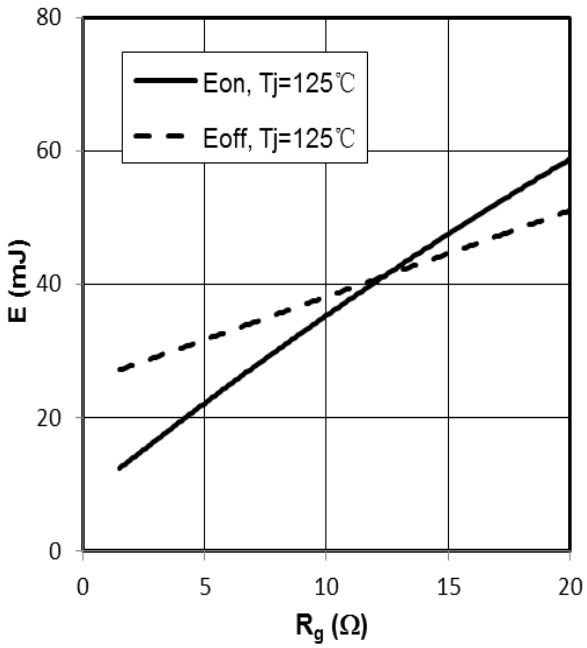


Fig 5. switching losses IGBT, $E_{on}=f(R_g), E_{off}=f(R_g)$, $V_{GE}=\pm 15V, I_c=400A, V_{CE}=600V$

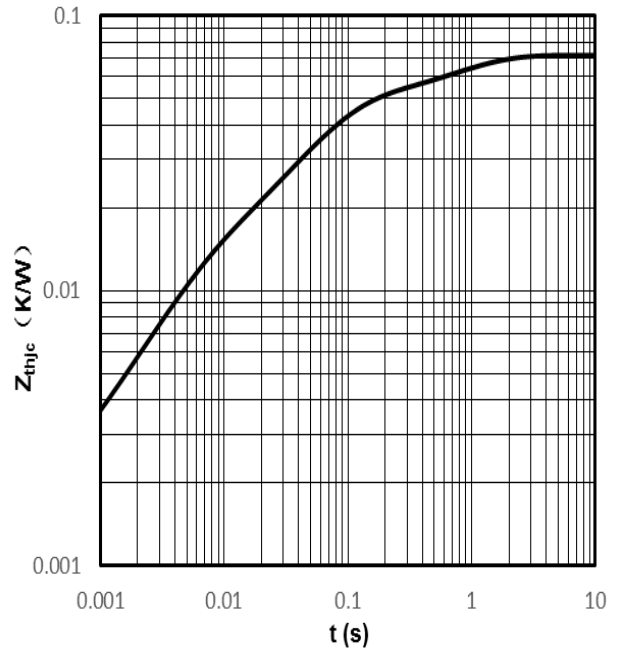


Fig 6. transient thermal impedance IGBT, $Z_{thjc}=f(t)$

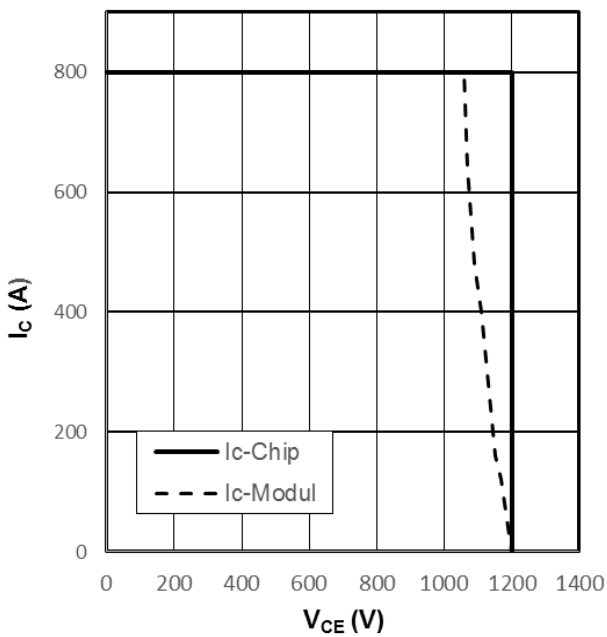


Fig 7. reverse bias safe operating area IGBT, $I_c=f(V_{CE}), V_{GE}=\pm 15V, R_{Goff}=2.2\Omega, T_j=125^\circ C$

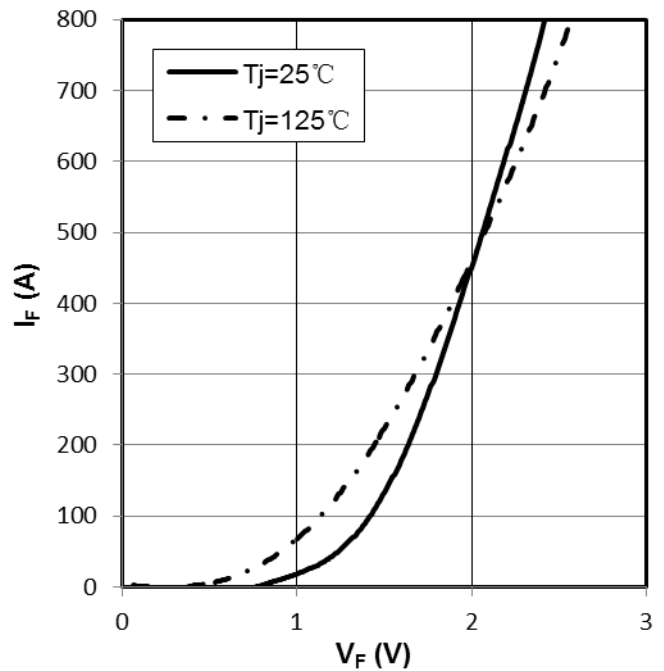


Fig 8. forward characteristic of Diode, $I_F=f(V_F)$

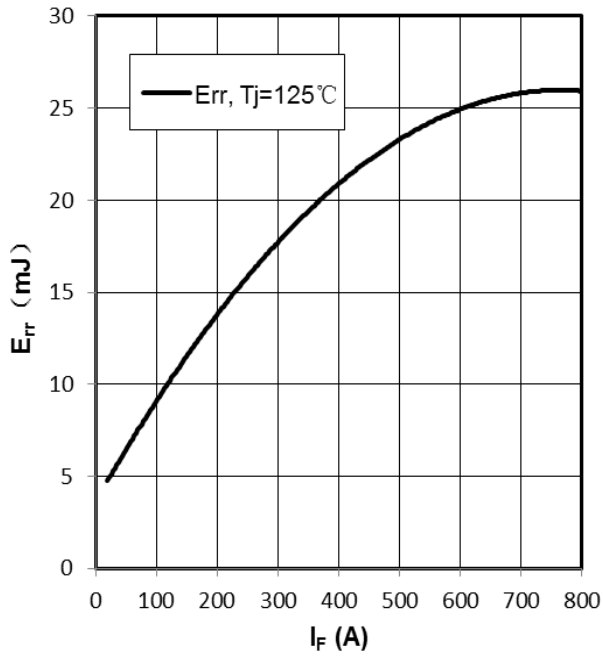


Fig 9. switching losses Diode,
 $E_{rr}=f(I_F)$, $R_{Gon}=2.2\Omega$, $V_{CE}=600V$

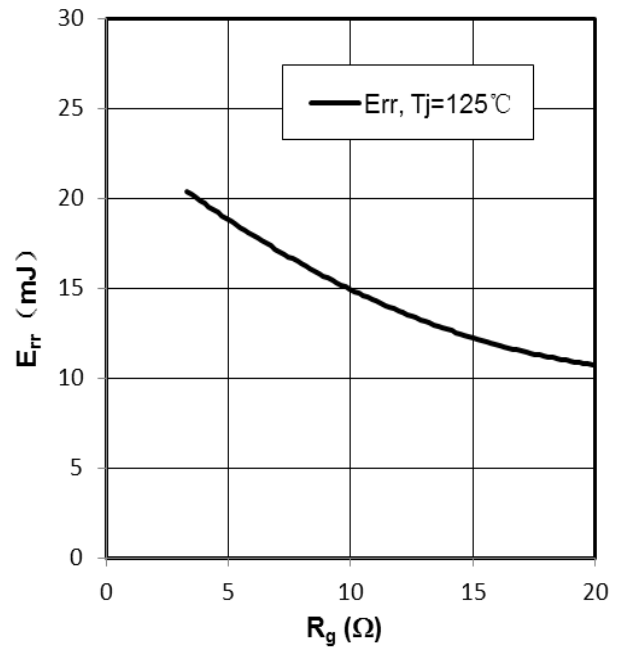
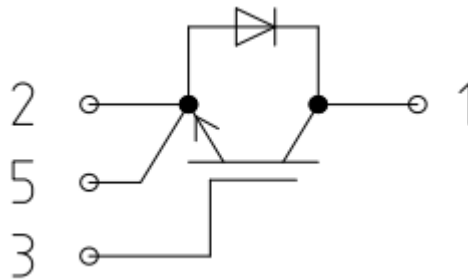
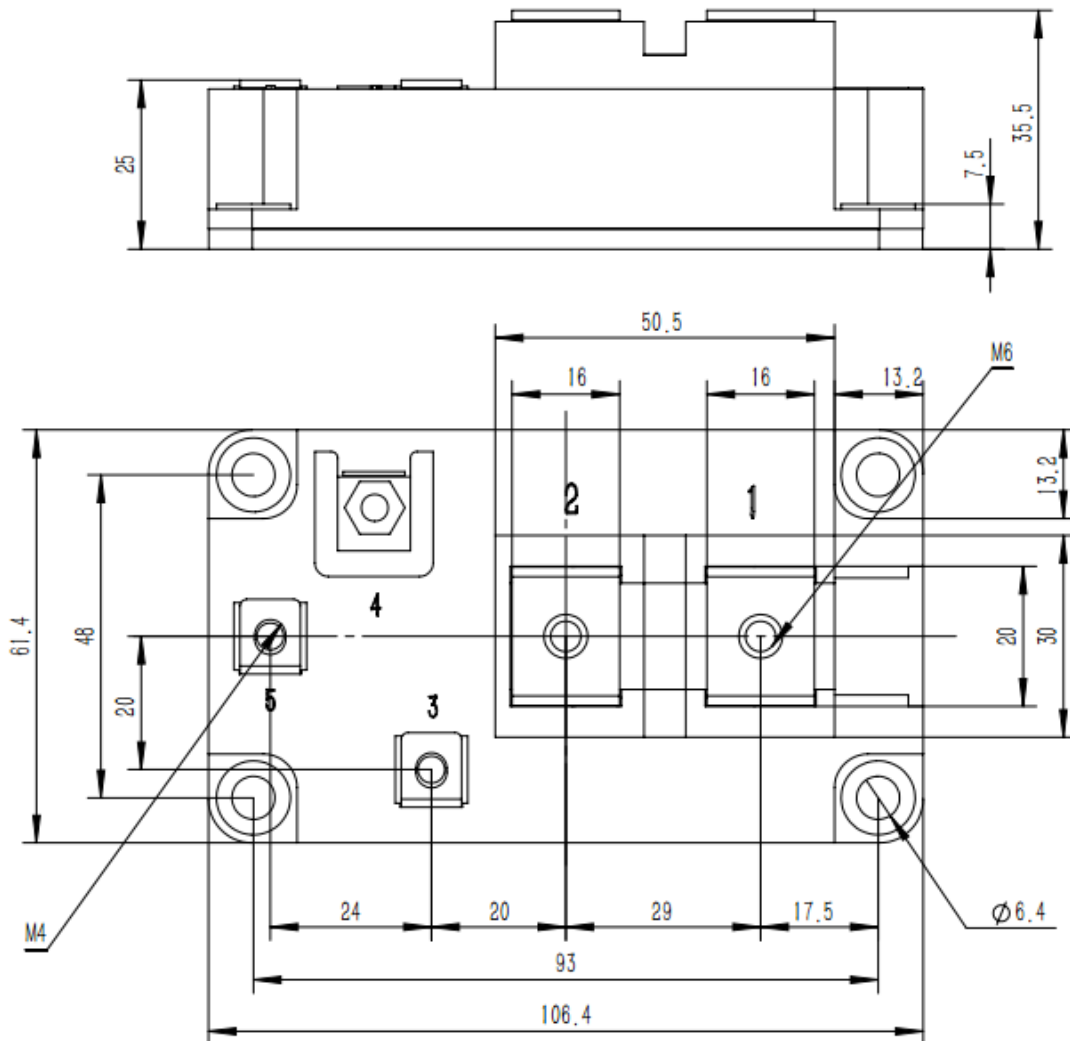


Fig 10. switching losses Diode,
 $E_{rr}=f(R_g)$, $I_F=400A$, $V_{CE}=600V$

Internal Circuit:



Package Dimension
Dimensions in Millimeters



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[RJH60D7BDPQ-E0#T2](#) [APT40GR120B](#)