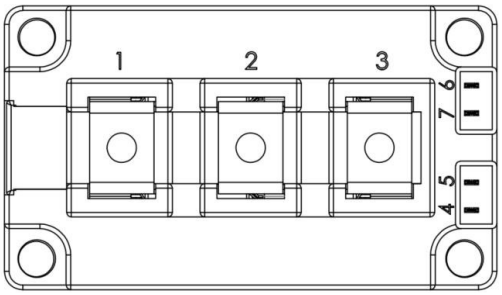
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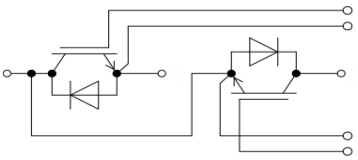
IGBT 1200V/300A

62mm-package



Features:

- 1200V300A,VCE(sat)(typ.)=3.0V
- Ultrafast switching speed
- Excellent short circuit ruggedness
- 62mm half bridge module



Equivalent Circuit Schematic

General Applications:

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

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	600	A
		T_C = 100°C	300	
I_{CM}	Pulse Collector Current	T_J = 150°C	600	A
P_D	Maximum Power Dissipation (IGBT)	T_C = 25°C, T_J = 150°C	1315	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	600	A
		T_C = 100°C	300	
I_{FM}	Diode Maximum Forward Current		600	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 = 300A, 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 = 300A R_G = 3.3Ω V_{GE} = ±15V Inductive Load	T_J = 25°C		130		ns
			T_J = 125°C		140		
t_r	Turn-on Rise Time		T_J = 25°C		105		ns
			T_J = 125°C		110		
$t_{d(off)}$	Turn-off Delay Time		T_J = 25°C		820		ns
			T_J = 125°C		890		
t_f	Turn-off Fall Time		T_J = 25°C		110		ns
			T_J = 125°C		130		
E_{on}	Turn-on Switching Loss		T_J = 25°C		11.5		mJ
			T_J = 125°C		15.5		
E_{off}	Turn-off Switching Loss		T_J = 25°C		22.5		mJ
			T_J = 125°C		26.0		
Q_g	Total Gate Charge		T_J = 25°C		2550		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		25		nF
C_{oes}	Output Capacitance		T_J = 25°C		3.5		
C_{res}	Reverse Transfer Capacitance		T_J = 25°C		2.0		
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (IGBT)					0.095	°C/W

Electrical and Switching Characteristics of Freewheeling Diode

V_F	Diode Forward Voltage	I_F = 300A , 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 = 300A, di/dt=2780A/μs, V_{rr} = 600V,	T_J = 25°C		200		ns
			T_J = 125°C		300		
I_{rr}	Diode Peak Reverse Recovery Current		T_J = 25°C		230		A
			T_J = 125°C		290		
Q_{rr}	Diode Reverse Recovery Charge		T_J = 25°C		27.50		nC
			T_J = 125°C		46.50		
E_{rr}	Diode Reverse Recovery Energy		T_J = 25°C		10.00		mJ
			T_J = 125°C		17.50		
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (Diode)					0.115	°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: M6	3.0		5.0	N·m
M	Mounting Screw: M6	4.0		6.0	N·m
G	Weight		315		g

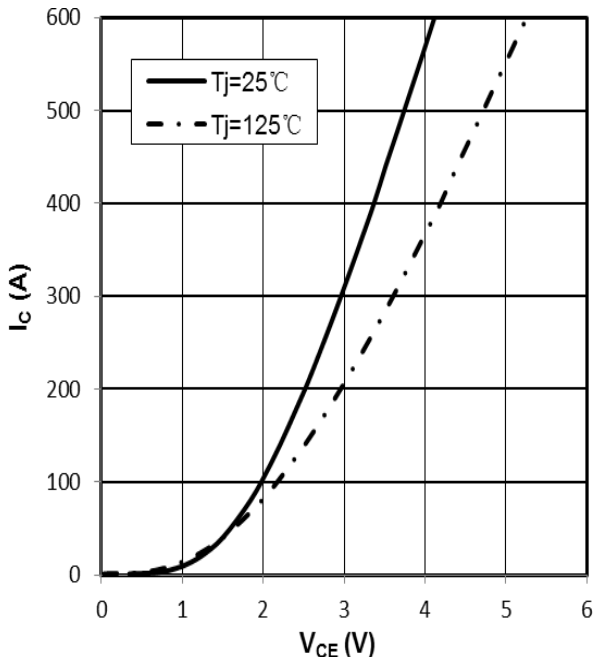


Fig 1. output characteristic IGBT，
$I_C=f(V_{CE})$,VGE=15V

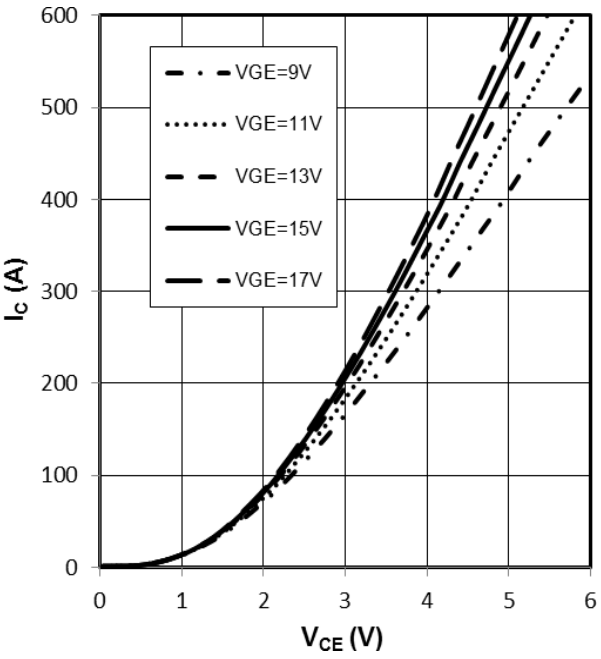


Fig 2. output characteristic IGBT，
$I_C=f(V_{CE})$,T_j=125℃

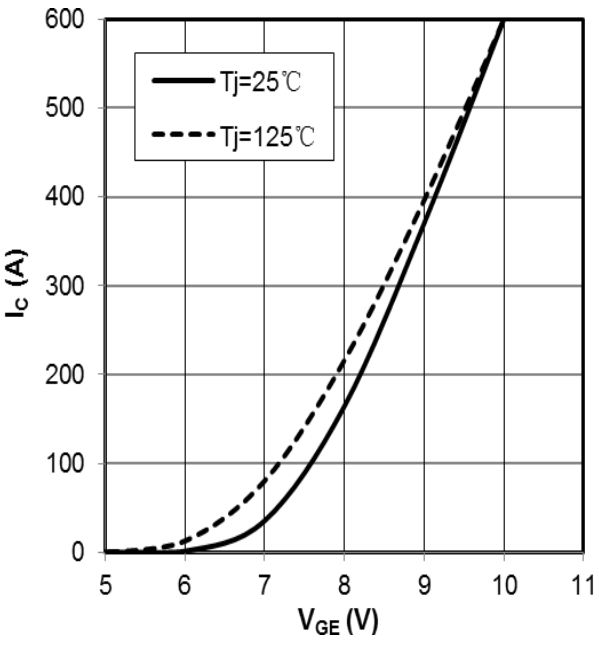


Fig 3. transfer characteristic IGBT，
$I_C=f(V_{GE})$,V_{CE}=20V

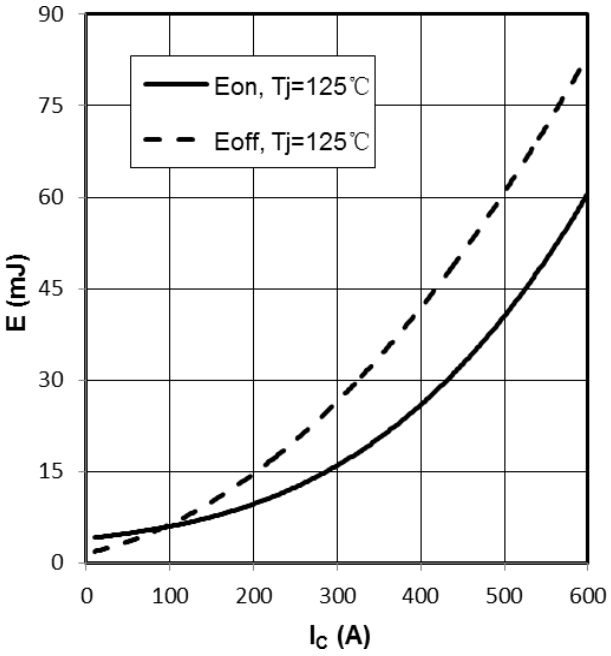


Fig 4. switching losses IGBT, $E_{on}=f(Ic)$,$E_{off}=f(I_C)$,
V_{GE}=±15V,R_{Gon}=3.3Ω,R_{Goff}=3.3Ω,V_{CE}=600V

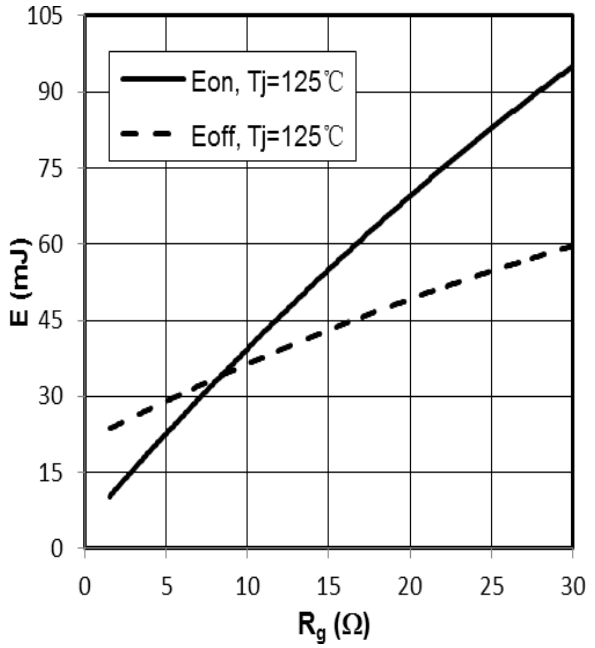


Fig 5. switching losses IGBT, $E_{on}=f(R_G)$,$E_{off}=f(R_G)$, $V_{GE}=\pm15V$,$I_C=300A$,$V_{CE}=600V$

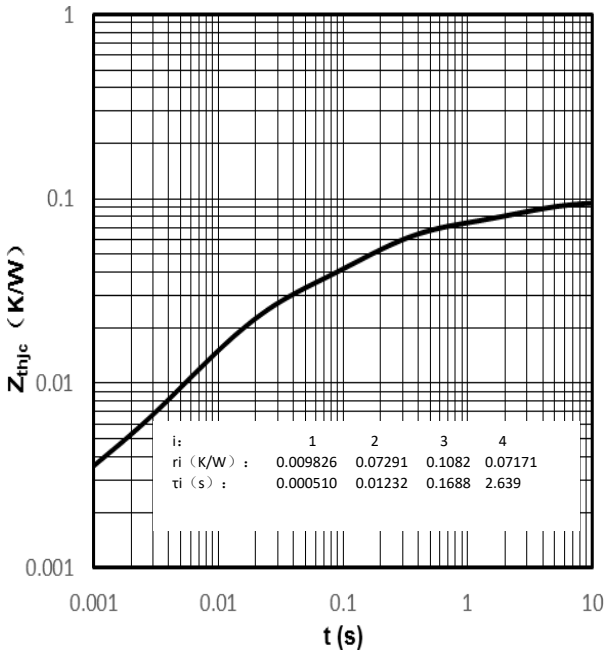


Fig 6. transient thermal impedance IGBT , Zthjc=f(t)

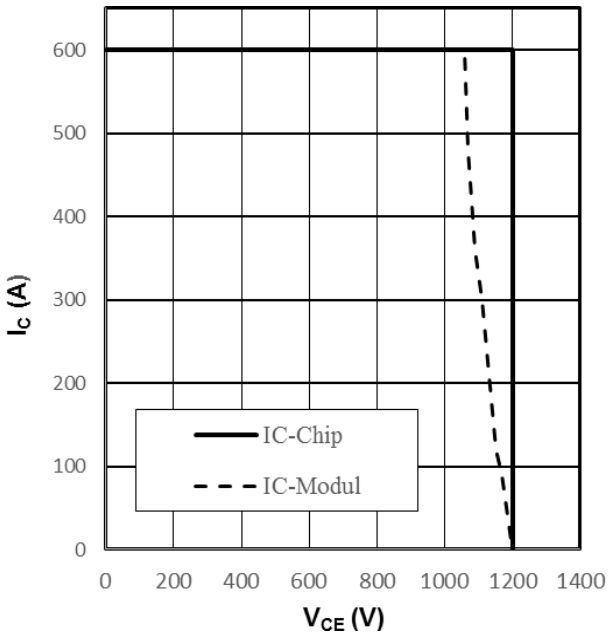


Fig 7. reverse bias safe operating area IGBT, $I_C=f(V_{CE})$,$V_{GE}=\pm15V$,$R_{Goff}=3.3\Omega$，Tvj=125℃

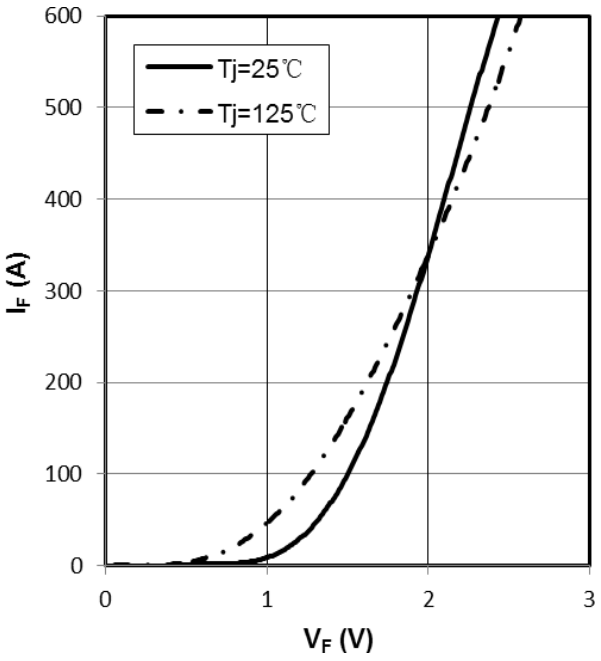


Fig 8. forward characteristic of Diode， $I_F=f(V_F)$

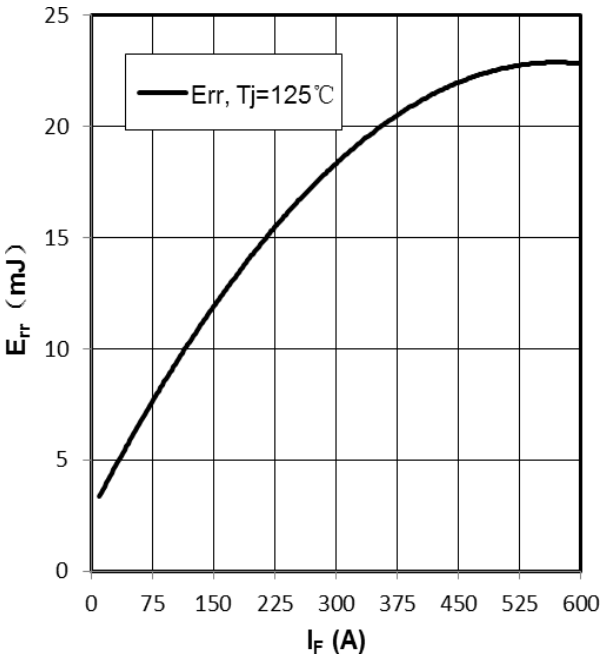


Fig 9. switching losses Diode,
$E_{rr}=f(I_F),,R_{Gon}=3.3\Omega,V_{CE}=600V$

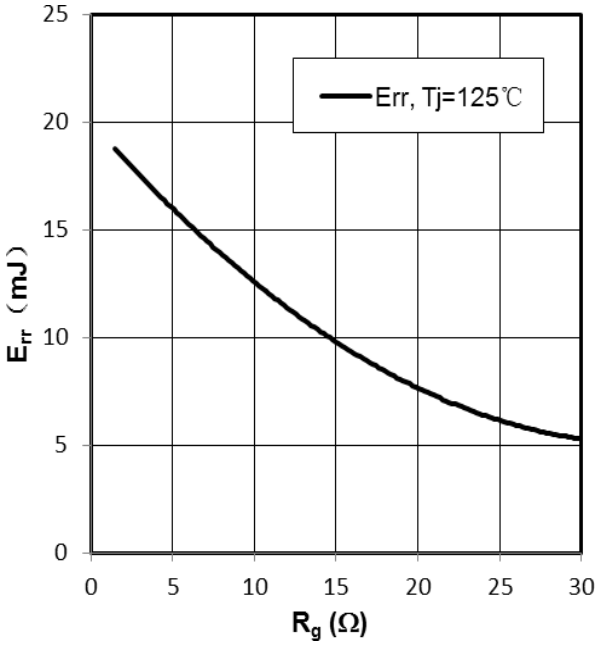
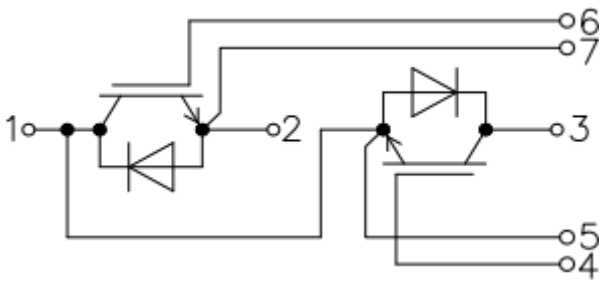


Fig 10. switching losses Diode,
$E_{rr}=f(R_G),I_F=300A,V_{CE}=600V$

Internal Circuit:



Package Dimension
Dimensions in Millimeters

