

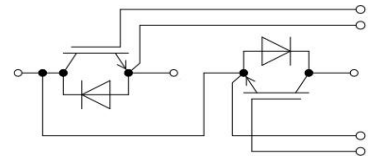
1200V/300A 2 in one-package

Features:

- 1200V/300A, $V_{CE(sat)(typ)}=2.30V$
- SPT (Soft Punch Through) technology
- Lower losses
- Higher system efficiency
- Excellent short-circuit capability
- Square RBSOA

General Applications:

Huajing 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	$T_C = 25^\circ C$	600	A
		$T_C = 100^\circ C$	300	
I_{CM}	Pulse Collector Current	$T_J = 150^\circ C$	600	A
P_D	Maximum Power Dissipation (IGBT)	$T_C = 25^\circ C,$ $T_J = 150^\circ C$	1140	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		1200	V
I_F	Diode Continuous Forward Current	$T_C = 25^\circ C$	600	A
		$T_C = 100^\circ C$	300	
I_{FM}	Diode Maximum Forward Current		600	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	$V_{GE} = 0V, I_C = 1mA$	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	$V_{GE} = \pm 30V, V_{CE} = 0V$		400	nA	
$V_{GE(th)}$	Gate Threshold Voltage	$I_C = 2mA, V_{CE} = V_{GE}$	4.5		V	
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage (Module Level)	$I_C = 300A, V_{GE} = 15V$	$T_J = 25^\circ\text{C}$	2.30	2.50	V
			$T_J = 125^\circ\text{C}$	2.70		

Switching Characteristics of IGBT

$t_{d(on)}$	Turn-on Delay Time	$V_{CC} = 600V$ $I_C = 300A$ $R_G = 3.3\Omega$ $V_{GE} = \pm 15V$ Inductive Load	$T_J = 25^\circ\text{C}$	120		ns
			$T_J = 125^\circ\text{C}$	130		
t_r	Turn-on Rise Time		$T_J = 25^\circ\text{C}$	90		ns
			$T_J = 125^\circ\text{C}$	100		
$t_{d(off)}$	Turn-off Delay Time		$T_J = 25^\circ\text{C}$	720		ns
			$T_J = 125^\circ\text{C}$	780		
t_f	Turn-off Fall Time		$T_J = 25^\circ\text{C}$	90		ns
			$T_J = 125^\circ\text{C}$	120		
E_{on}	Turn-on Switching Loss		$T_J = 25^\circ\text{C}$	10.5		mJ
			$T_J = 125^\circ\text{C}$	13.5		
E_{off}	Turn-off Switching Loss	$T_J = 25^\circ\text{C}$	19.5		mJ	
		$T_J = 125^\circ\text{C}$	23.0			
Q_g	Total Gate Charge	$T_J = 25^\circ\text{C}$	2200		nC	
R_{gint}	Integrated gate resistor	$f = 1M;$ $V_{pp} = 1V$	$T_J = 25^\circ\text{C}$	2.5		Ω
C_{ies}	Input Capacitance	$V_{CE} = 25V$ $V_{GE} = 0V$ $f = 1MHz$	$T_J = 25^\circ\text{C}$	22.0		nF
C_{oes}	Output Capacitance		$T_J = 25^\circ\text{C}$	3.10		
C_{res}	Reverse Transfer Capacitance		$T_J = 25^\circ\text{C}$	1.80		
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (IGBT)			0.110		$^\circ\text{C/W}$

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		T _J = 25°C	230		ns
			T _J = 125°C	300		
I _{rr}	Diode Peak Reverse Recovery Current	I _F = 300A, di/dt=3000A/μs, V _{rr} = 600V,	T _J = 25°C	220		A
			T _J = 125°C	280		
Q _{rr}	Diode Reverse Recovery Charge		T _J = 25°C	24.5		nC
			T _J = 125°C	42.5		
E _{rr}	Diode Reverse Recovery Energy		T _J = 25°C	7.8		mJ
			T _J = 125°C	15.5		
R _{θJC}	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 _{θCS}	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

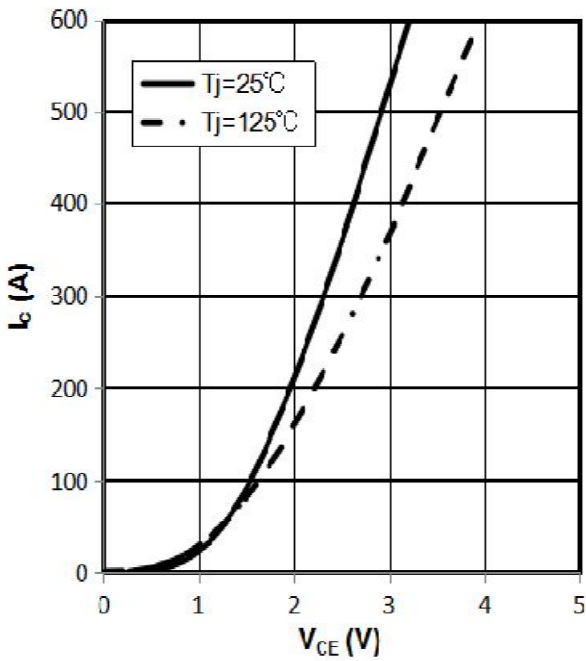


Fig 1. output characteristic IGBT,
 $I_c=f(V_{CE}), V_{GE}=15V$

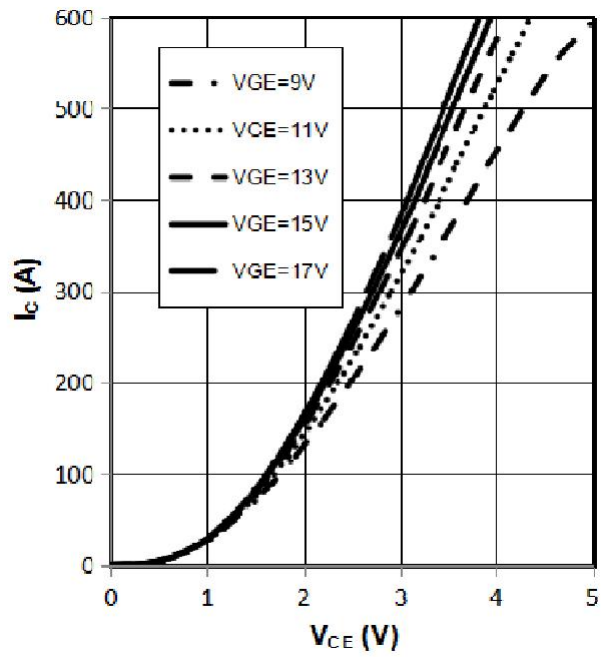


Fig 2. output characteristic IGBT,
 $I_c=f(V_{CE}), T_j=125^\circ C$

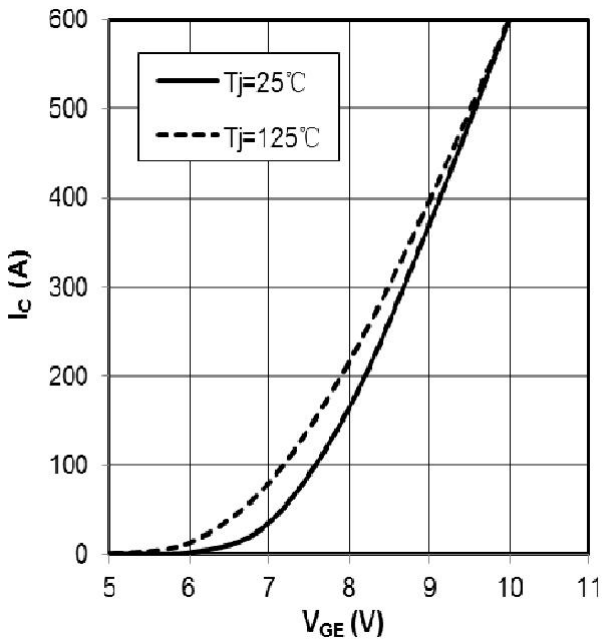


Fig 3. transfer characteristic IGBT,
 $I_c=f(V_{GE}), V_{CE}=20V$

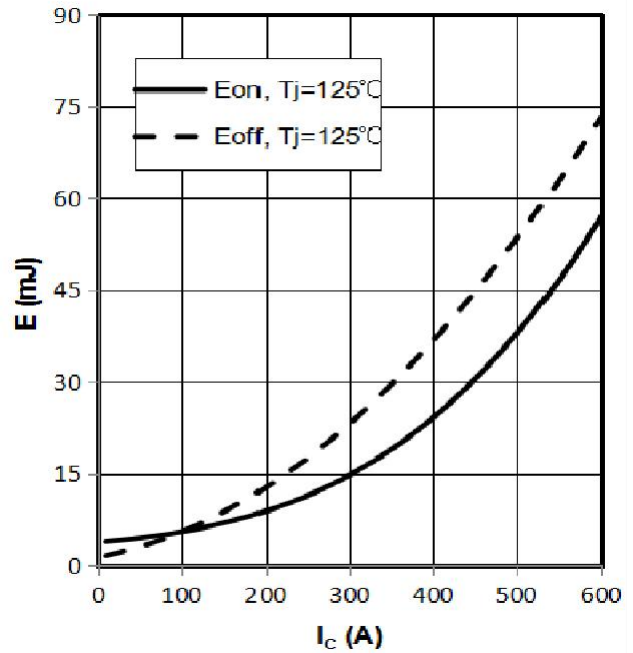


Fig 4. switching losses IGBT, $E_{on}=f(I_c), E_{off}=f(I_c)$,
 $V_{GE}=\pm 15V, R_{Gon}=3.3\Omega, R_{Goff}=3.3\Omega, V_{CE}=600V$

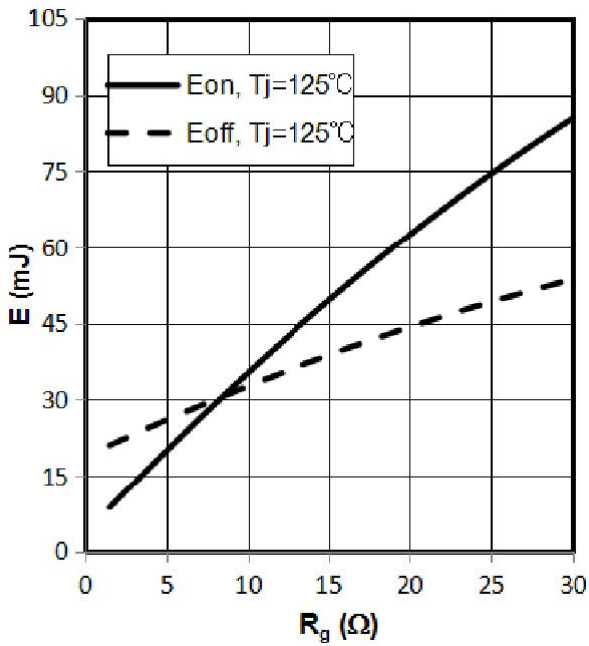


Fig 5. switching losses IGBT, $E_{on}=f(R_g), E_{off}=f(R_g)$, $V_{GE}=\pm 15\text{V}, I_c=300\text{A}, V_{CE}=600\text{V}$

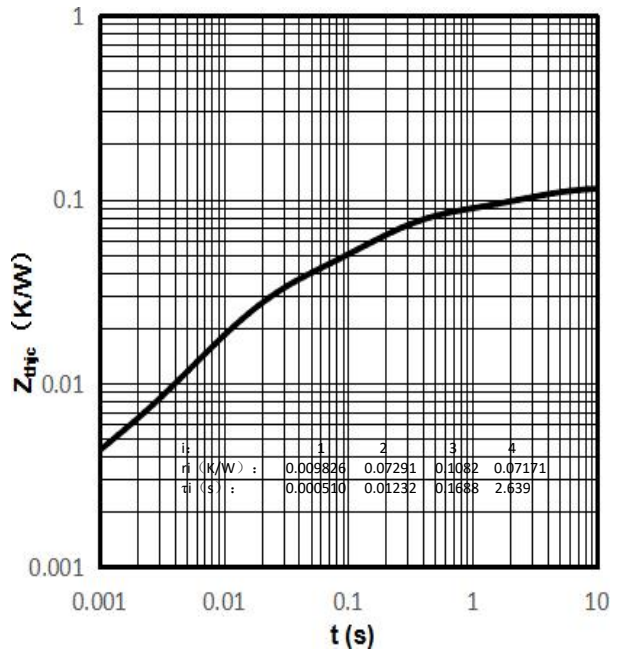


Fig 6. transient thermal impedance IGBT, $Z_{thjc}=f(t)$

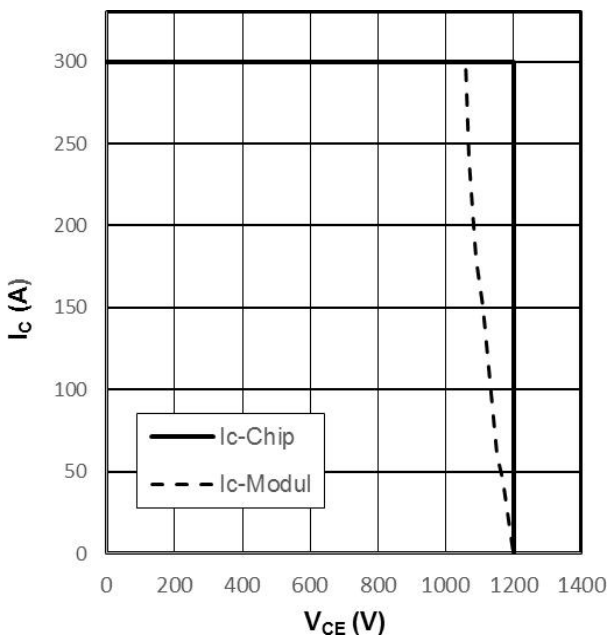


Fig 7. reverse bias safe operating area IGBT, $I_c=f(V_{CE}), V_{GE}=\pm 15\text{V}, R_{Goff}=3.3\Omega, T_j=125^\circ\text{C}$

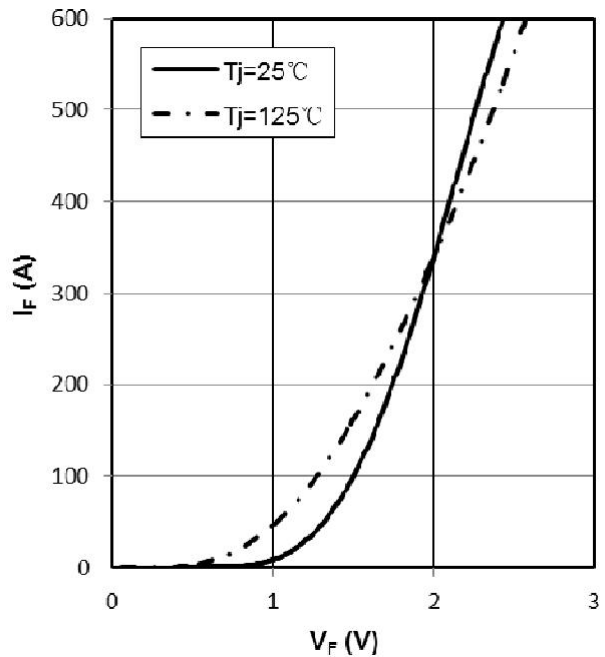


Fig 8. forward characteristic of Diode, $I_F=f(V_F)$

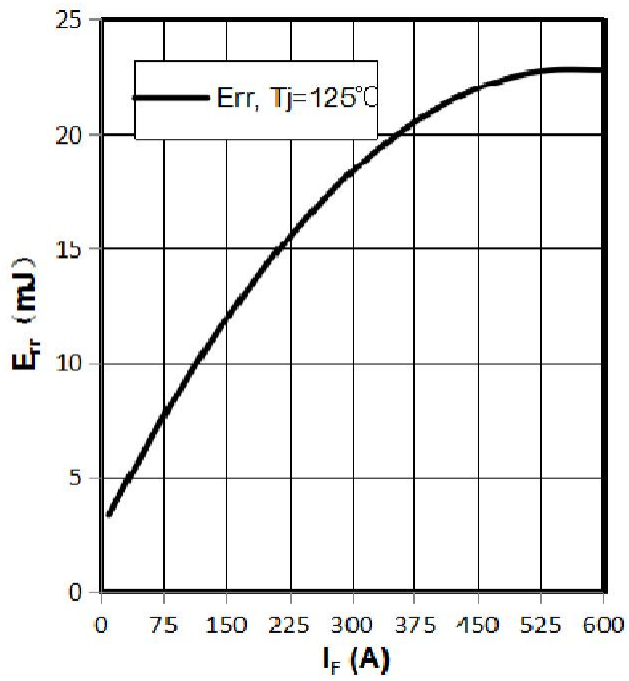


Fig 9. switching losses Diode,
 $E_{rr}=f(I_F), R_{Gon}=3.3\Omega, V_{CE}=600V$

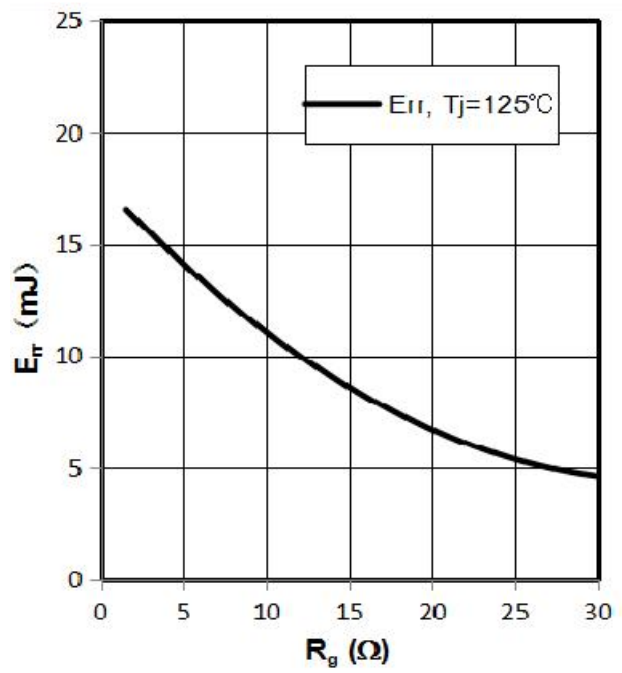
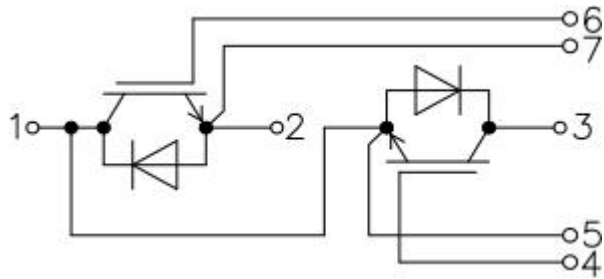


Fig 10. switching losses Diode,
 $E_{rr}=f(R_g), I_F=300A, V_{CE}=600V$

Internal Circuit:



Package Dimension Dimensions in Millimeters

