

1200V/450A 2 in one-package

Preliminary Data

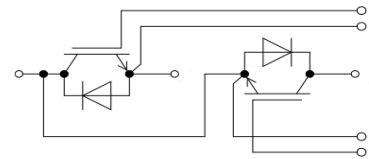
Features:

- 1200V/450A, $V_{CE(sat)(typ)}=2.60V$
- SPT (Soft Punch Through) technology
- Lower losses
- Higher system efficiency
- Excellent short-circuit capability
- Square RBSOA



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	$T_C = 25^\circ C$	900	A
		$T_C = 100^\circ C$	450	
I_{CM}	Pulse Collector Current	$T_J = 150^\circ C$	900	A
P_D	Maximum Power Dissipation (IGBT)	$T_C = 25^\circ C, T_J = 150^\circ C$	1360	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	$T_C = 25^\circ C$	900	A
		$T_C = 100^\circ C$	450	
I_{FM}	Diode Maximum Forward Current		900	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} = ±30V, V _{CE} = 0V				400	nA
V _{GE(th)}	Gate Threshold Voltage	I _C = 2mA, V _{CE} = V _{GE}		4.5		5.7	V
V _{CE(sat)}	Collector to Emitter Saturation Voltage (Module Level)	I _C = 450A, V _{GE} = 15V	T _J = 25°C		2.60	2.80	V
			T _J = 125°C		3.00		

Switching Characteristics of IGBT

$t_{d(on)}$	Turn-on Delay Time	$V_{CC} = 900V$ $I_C = 450A$ $R_G = 1.1\Omega$ $V_{GE} = \pm 15V$ Inductive Load	$T_J = 25^{\circ}C$		65		ns
			$T_J = 125^{\circ}C$		70		
t_r	Turn-on Rise Time		$T_J = 25^{\circ}C$		110		ns
			$T_J = 125^{\circ}C$		120		
$t_{d(off)}$	Turn-off Delay Time		$T_J = 25^{\circ}C$		520		ns
			$T_J = 125^{\circ}C$		580		
t_f	Turn-off Fall Time		$T_J = 25^{\circ}C$		100		ns
			$T_J = 125^{\circ}C$		130		
E_{on}	Turn-on Switching Loss		$T_J = 25^{\circ}C$		20.5		mJ
			$T_J = 125^{\circ}C$		31.0		
E_{off}	Turn-off Switching Loss		$T_J = 25^{\circ}C$		35.0		mJ
			$T_J = 125^{\circ}C$		52.0		
Q_g	Total Gate Charge		$T_J = 25^{\circ}C$		4560		nC
R_{gint}	Integrated gate resistor	$f = 1M;$ $V_{pp} = 1V$	$T_J = 25^{\circ}C$		2.5		Ω
C_{ies}	Input Capacitance	$V_{CE} = 25V$ $V_{GE} = 0V$ $f = 1MHz$	$T_J = 25^{\circ}C$		21.5		nF
C_{oes}	Output Capacitance		$T_J = 25^{\circ}C$		3.30		
C_{res}	Reverse Transfer Capacitance		$T_J = 25^{\circ}C$		1.90		
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (IGBT)					0.092	$^{\circ}C/W$

Electrical and Switching Characteristics of Freewheeling Diode

V _F	Diode Forward Voltage	I _F = 450A , 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 = 450A, di/dt=8500A/μs, V _{rr} = 600V,	T _J = 25°C		230		ns
			T _J = 125°C		400		
I _{rr}	Diode Peak Reverse Recovery Current		T _J = 25°C		450		A
			T _J = 125°C		760		
Q _{rr}	Diode Reverse Recovery Charge		T _J = 25°C		58.0		nC
			T _J = 125°C		85.0		
E _{rr}	Diode Reverse Recovery Energy		T _J = 25°C		18.0		mJ
			T _J = 125°C		29.5		
R _{θJC}	Thermal Resistance, Junction-to-Case (Diode)					0.095	°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: M6	3.0		5.0	N·m
M	Mounting Screw: M6	4.0		6.0	N·m
G	Weight		315		g

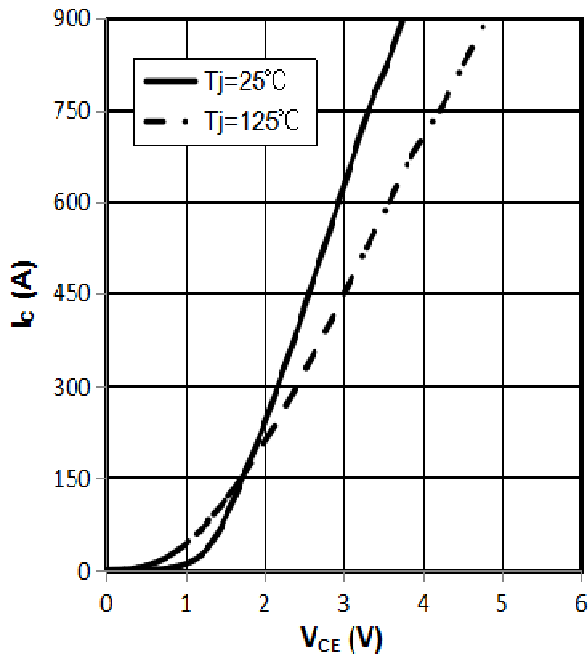


Fig 1. output characteristic IGBT,
 $I_C = f(V_{CE}), V_{GE} = 15V$

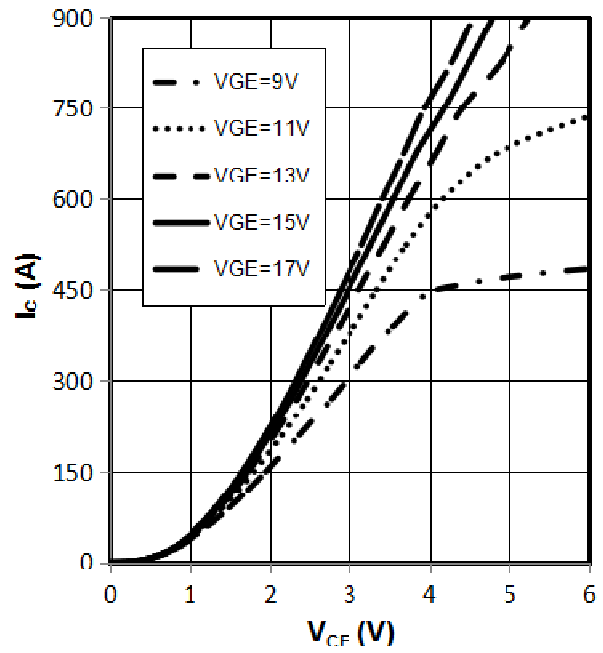


Fig 2. output characteristic IGBT,
 $I_C = f(V_{CE}), T_J = 125°C$

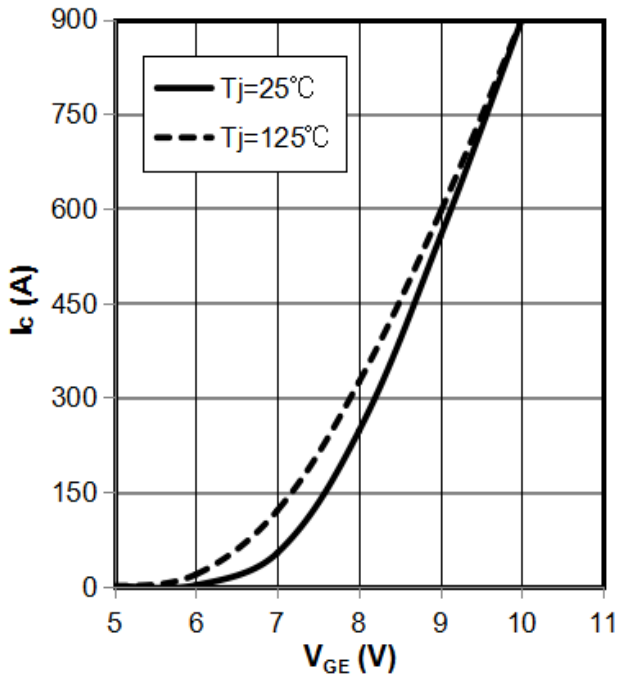


Fig 3. transfer characteristic IGBT,
 $I_C = f(V_{GE}), V_{CE} = 20V$

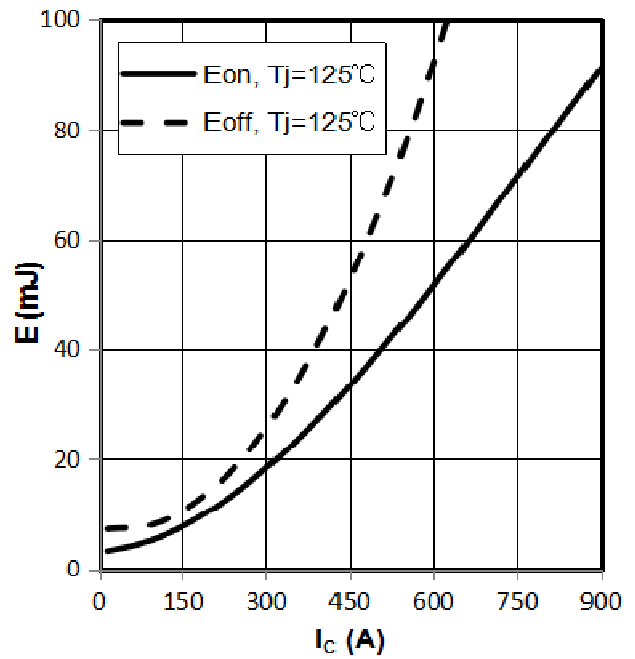


Fig 4. switching losses IGBT, $E_{on} = f(I_C), E_{off} = f(I_C)$,
 $V_{GE} = \pm 15V, R_{Gon} = 1.1\Omega, R_{Goff} = 1.1\Omega, V_{CE} = 600V$

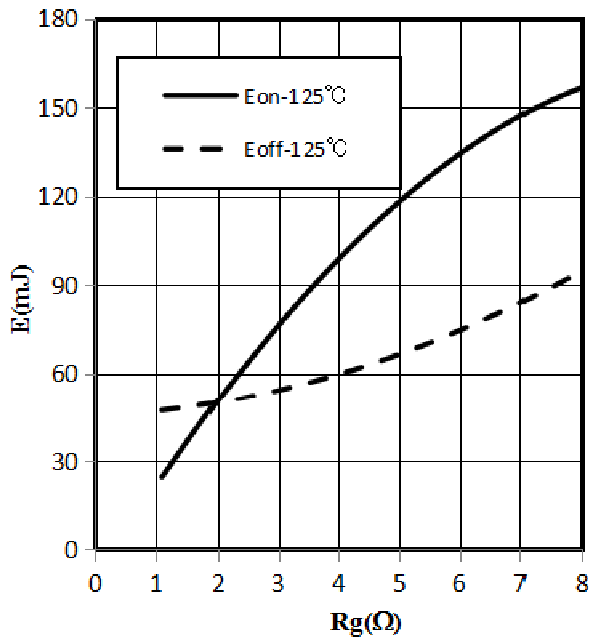


Fig 5. switching losses IGBT, $E_{on}=f(R_G)$, $E_{off}=f(R_G)$,
 $V_{GE}=\pm 15V$, $I_C=300A$, $V_{CE}=600V$

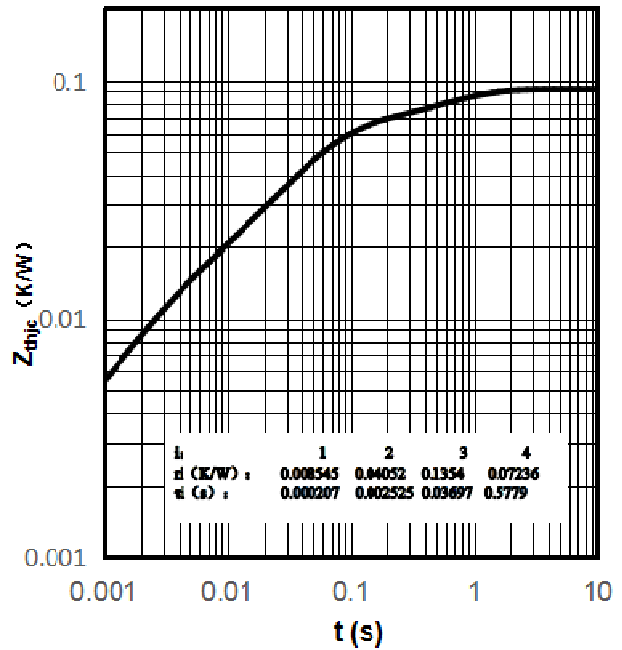


Fig 6. transient thermal impedance IGBT, $Z_{thjc}=f(t)$

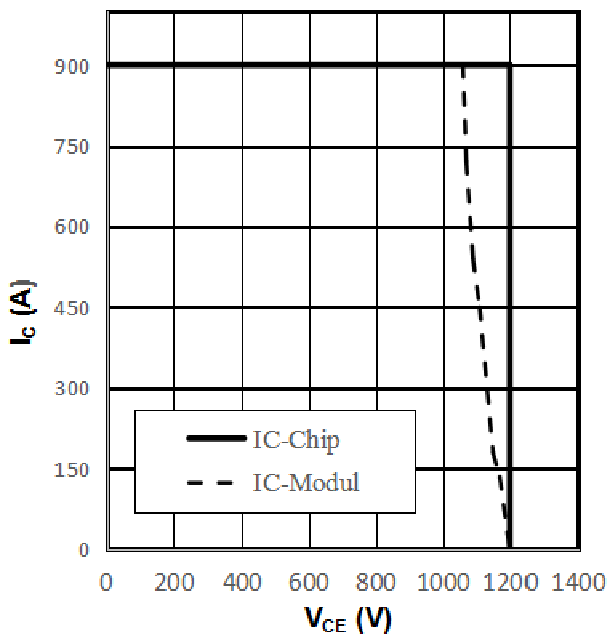


Fig 7. reverse bias safe operating area IGBT,
 $I_C=f(V_{CE})$, $V_{GE}=\pm 15V$, $R_{Goff}=3.3\Omega$, $T_{vj}=125^\circ C$

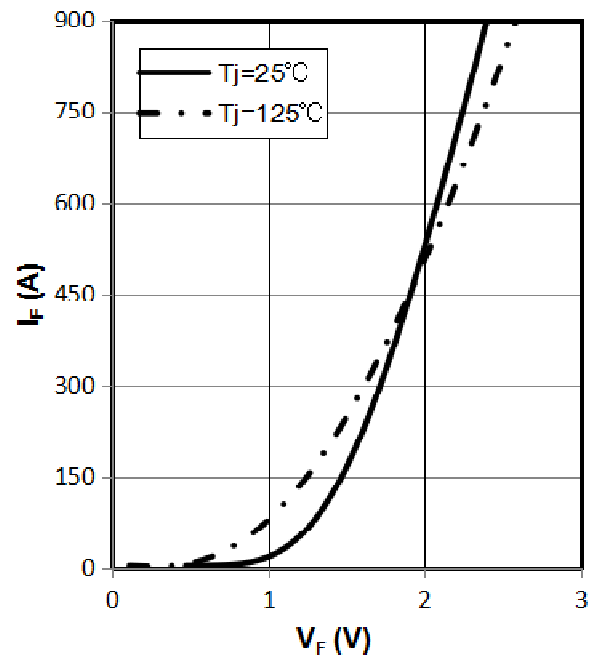
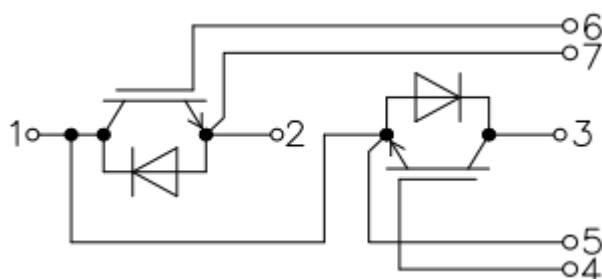


Fig 8. forward characteristic of Diode ,
 $I_F=f(V_F)$

Internal Circuit:



Package Dimension
Dimensions in Millimeters

