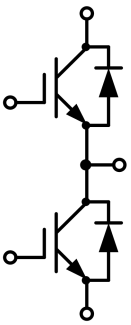
34mm Half Bridge IGBT Module

V_{CES}=1200V， $I_{C\,nom}$=150A / I_{CRM}=300A

D6



Equivalent Circuit

Features：

- 1200V Trench / Field Stop process
- Low switching losses
- Vcesat has a positive temperature coefficient

Applications:

- Inverter welding machine
- induction heating
- high-frequency switch power supply
- inverter

IGBT, Inverter

Maximum Ratings

Parameter	Conditions	Symbol	Value	Unit
Collector-Emitter voltage	T_{vj}=25°C	V_{CES}	1200	V
Continuous DC collector current	T_C=100°C, $T_{vj\,max}$=175°C	$I_{C\,nom}$	150	A
Repetitive peak collector current	t_P=1 ms	I_{CRM}	300	A
Gate emitter voltage		V_{GE}	±20	V

Characteristic Values

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
Collector-Emitter saturation voltage	V_{GE}=15V, I_C=150A T_{vj}=25°C V_{GE}=15V, I_C=150A T_{vj}=125°C V_{GE}=15V, I_C=150A T_{vj}=150°C	V_{CEsat}		1.97 2.28 2.34	2.50	V
Gate-Emitter threshold voltage	I_C = 3.8mA, V_{GE}= V_{CE} T_{vj}=25°C	$V_{GE(th)}$	5.20	5.80	6.40	
Internal gate resistor		R_{Gint}		8.41		Ω
Input capacitance	f=1MHz, V_{CE}=25 V, V_{GE}=0 V T_{vj}=25°C	C_{ies}		13.86		nF
Reverse transfer capacitance		C_{res}		0.1		
Collector-emitter cut-off current	V_{CE}=1200V , V_{GE}= 0 V T_{vj}=25°C	I_{CES}			1	mA
Gate-emitter leakage current	V_{CE}=0 V, V_{GE}= 20 V T_{vj}=25°C	I_{GES}			150	nA
Turn-on delay time	I_C=150A, V_{CE}=600 V T_{vj}=25°C V_{GE}=±15 V, R_G=6.8Ω T_{vj}=125°C (inductive load) T_{vj}=150°C	$t_{d\,on}$		396.7 401.6 415.1		ns
Rise time	I_C=150A, V_{CE}=600 V T_{vj}=25°C V_{GE}=±15 V, R_G=6.8Ω T_{vj}=125°C (inductive load) T_{vj}=150°C	t_r		71.3 73.1 75.9		
Turn-off delay time	I_C=150A, V_{CE}=600 V T_{vj}=25°C V_{GE}=±15 V, R_G=6.8Ω T_{vj}=125°C (inductive load) T_{vj}=150°C	$t_{d\,off}$		239.5 286.2 297.1		
Fall time	I_C=150A, V_{CE}=600 V T_{vj}=25°C V_{GE}=±15 V, R_G=6.8Ω T_{vj}=125°C (inductive load) T_{vj}=150°C	t_f		86.2 131.2 141.4		
Turn-on energy loss per pulse	I_C=150A, V_{CE}=600 V V_{GE}=±15 V, R_G=6.8Ω T_{vj}=25°C di/dt =1602A/μs (Tvj = T_{vj}=125°C 150°C) T_{vj}=150°C (inductive load)	E_{on}		10.30 15.12 16.55		mJ
Turn-off energy loss per pulse	I_C=150A, V_{CE}=600 V V_{GE}= ± 15V,R_G=6.8 Ω T_{vj}=25°C dv/dt=8236V/μs (Tvj = T_{vj}=125°C 150°C) T_{vj}=150°C (inductive load)	E_{off}		5.04 7.27 7.90		
Temperature under switching conditions		$T_{vj\,op}$	-40		150	°C

Diode, Inverter

Maximum Ratings

Parameter	Conditions	Symbol	Value	Unit
Repetitive peak reverse voltage	T_{vj}=25°C	V_{RRM}	1200	V
Continuous DC forward current		I_F	150	A
Repetitive peak forward current	t_p=1ms	I_{FRM}	300	A
I^2t value	t_p=10ms，sin180°，T_{vj}=125°C	I^2t	4090	A^2s

Characteristic Values

Parameter	Conditions		Symbol	Value			Unit
				Min.	Typ.	Max.	
Forward voltage	I_F=150A, V_{GE}=0V I_F=150A, V_{GE}=0V I_F=150A, V_{GE}=0V	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	V_F		2.49 2.01 1.91	3.00	V
Peak reverse recovery current	I_F=150A, -di$_F$/dt=1776A/μs(T_{vj}=150°C) V_R=600V, V_{GE}=-15V	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	I_{RM}		67.2 105.6 118.4		A
Recovered charge	I_F=150A, -di$_F$/dt=1776A/μs(T_{vj}=150°C) V_R=600V, V_{GE}=-15V	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	Q_r		6.81 15.16 18.34		μC
Reverse recovered energy	I_F=150A, -di$_F$/dt=1776A/μs(T_{vj}=150°C) V_R=600V, V_{GE}=-15V	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	E_{rec}		2.39 5.14 6.26		mJ
Temperature under switching conditions			$T_{vj\ op}$	-40		150	°C

Module

Parameter	Conditions	Symbol	Value			Unit
Isolation test voltage	RMS, f=50Hz, t=1min	V_{ISOL}	4000			V
Internal isolation			Al_2O_3			
Storage temperature		T_{stg}	-40		125	°C
Mounting torque for modul mounting		M	3.0		5.0	Nm
Terminal Connection Torque		M	2.5		5.0	Nm
Weight		W		158		g

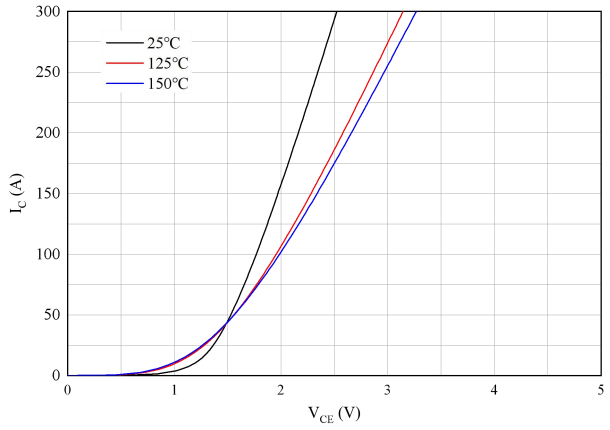


Fig 1. Typical output characteristics (V_{GE}=15V)

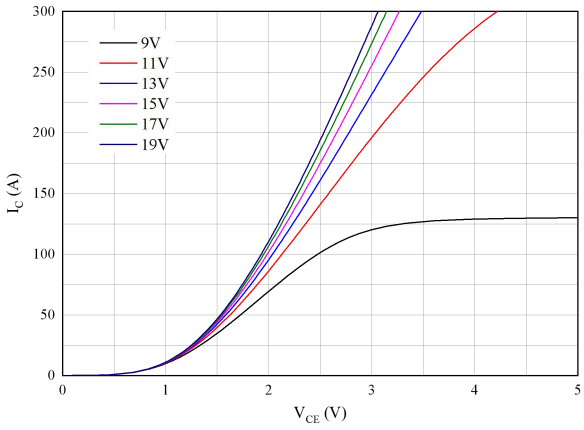


Fig 2. Typical output characteristics (T_{vj}=150℃)

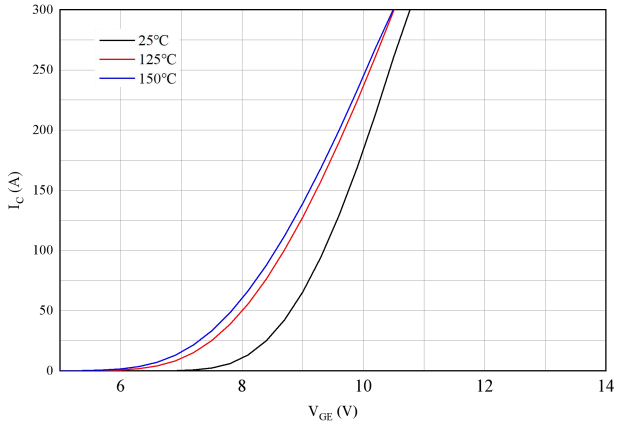


Fig 3. Typical transfer characteristic(V_{CE}=20V)

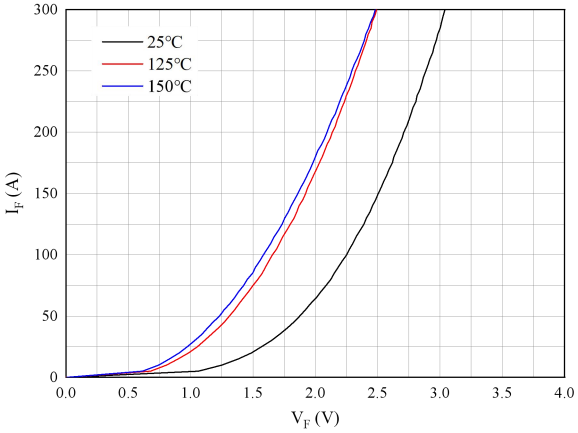


Fig 4. Forward characteristic of Diode

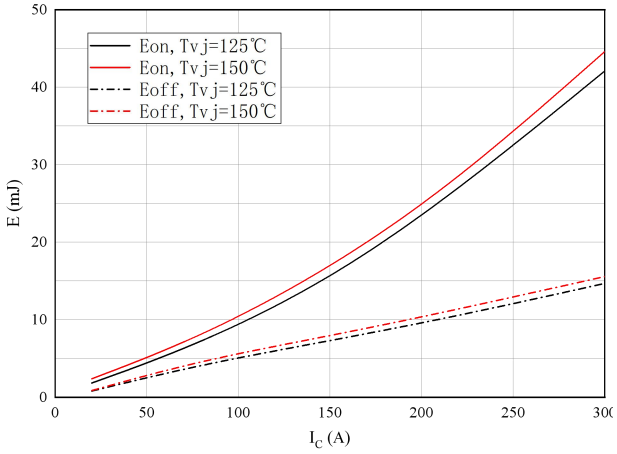


Fig5. Switching losses of IGBT

VGE=±15V, RGon=6.8Ω, RGoff=6.8Ω, VCE=600V

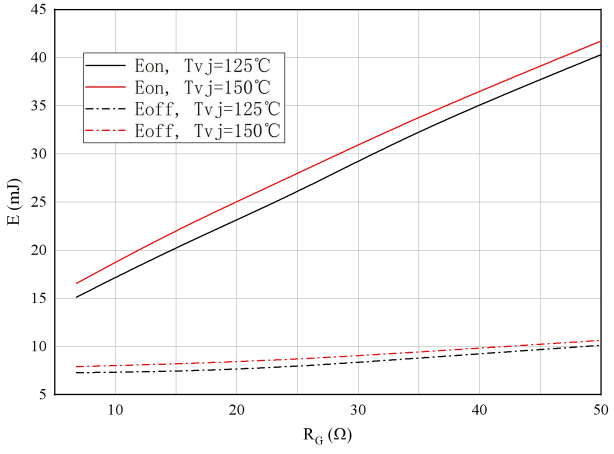


Fig6. Switching losses of IGBT

VGE=±15V, IC=150A, VCE=600V

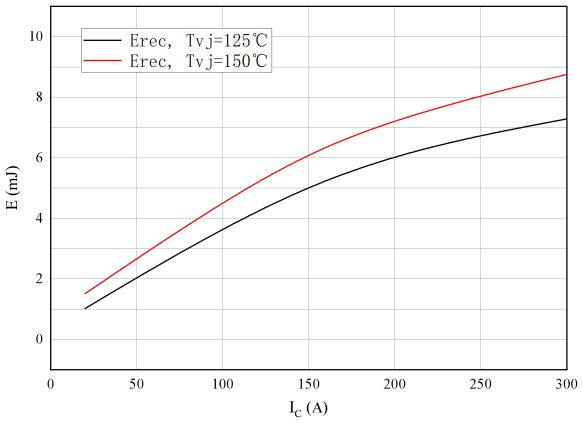


Fig 7. Switching losses of Diode

RGon=6.8 Ω , VCE=600V

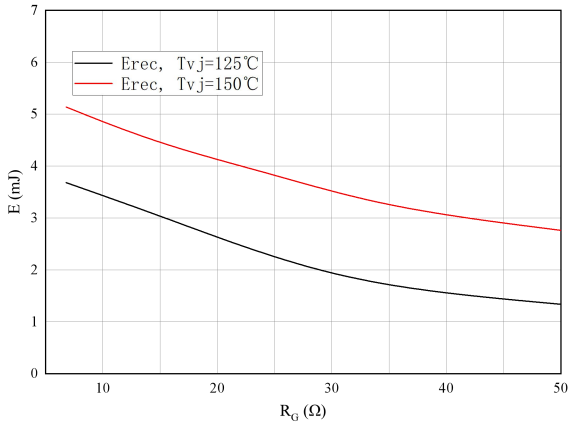


Fig8. Switching losses of Diode

IF=150A, VCE=600V

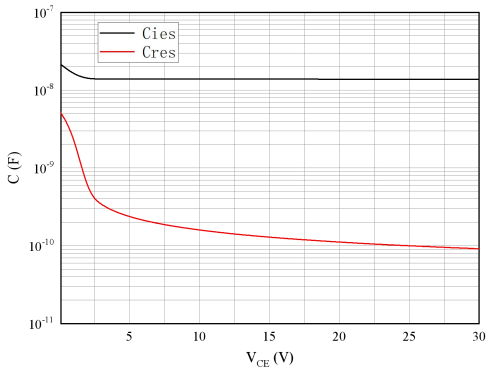
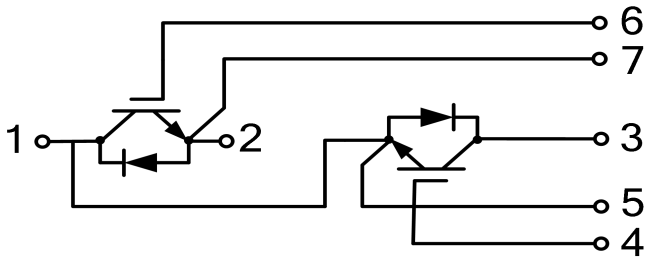


Fig 9. Capacitance characteristic

Circuit diagram



Package outlines