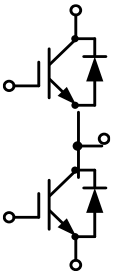
34mm Half Bridge IGBT Module

V_{CES}=1200V，$I_{C\ nom}$=50A / I_{CRM}=100A

D6



Equivalent Circuit

Features：

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

Applications:

- Inverter welding machine

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	$I_{C\ nom}$	50	A
Repetitive peak collector current	t_P=1 ms	I_{CRM}	100	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=50A T_{vj}=25°C V_{GE}=15V, I_C=50A T_{vj}=125°C V_{GE}=15V, I_C=50A T_{vj}=150°C	V_{CEsat}		2.07 2.49 2.61	2.55	V
Gate-Emitter threshold voltage	I_C = 1.7mA, V_{GE}= V_{CE} T_{vj}=25°C	$V_{GE(th)}$	5.20	5.70	6.30	
Gate charge	V_{GE}=-15V…+15V	Q_G		0.25		µC
Internal gate resistor	T_{vj}=25°C	R_{Gint}		2.75		Ω
Input capacitance	f=100KHz, V_{CE}=25 V, V_{GE}=0 V T_{vj}=25°C	C_{ies}		2.98		nF
Reverse transfer capacitance		C_{res}		0.12		
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}			100	nA
Turn-on delay time	I_C=30A, V_{CE}=600 V T_{vj}=25°C V_{GE}=±15 V, R_G=15Ω T_{vj}=125°C (inductive load) T_{vj}=150°C	$t_{d\ on}$		51 47 47		ns
Rise time	I_C=30A, V_{CE}=600 V T_{vj}=25°C V_{GE}=±15 V, R_G=15Ω T_{vj}=125°C (inductive load) T_{vj}=150°C	t_r		23 24 28		
Turn-off delay time	I_C=30A, V_{CE}=600 V T_{vj}=25°C V_{GE}=±15 V, R_G=15Ω T_{vj}=125°C (inductive load) T_{vj}=150°C	$t_{d\ off}$		215 263 308		
Fall time	I_C=30A, V_{CE}=600 V T_{vj}=25°C V_{GE}=±15 V, R_G=15Ω T_{vj}=125°C (inductive load) T_{vj}=150°C	t_f		165 210 212		
Turn-on energy loss per pulse	I_C=30A, V_{CE}=600 V V_{GE}=±15 V, R_G=15Ω T_{vj}=25°C di/dt =800A/µs (Tvj = 150°C) T_{vj}=125°C (inductive load) T_{vj}=150°C	E_{on}		1.74 2.78 3.61		mJ
Turn-off energy loss per pulse	I_C=30A, V_{CE}=600 V V_{GE}=±15V,R_G=15Ω T_{vj}=25°C dv/dt=4300V/µs (Tvj = 150°C) T_{vj}=125°C (inductive load) T_{vj}=150°C	E_{off}		1.62 2.20 2.33		
SC data	V_{GE}≤15V, Vcc=800V V_{CEmax}=V_{CES}-L_{sCE}·di/dt t_P≤10us, T_{vj}=150°C	I_{SC}		262		A
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}=25ºC	V_{RRM}	1200	V
Continuous DC forward current		I_F	30	A
Repetitive peak forward current	t_p=1ms	I_{FRM}	60	A
I^2t-value	t_p=10ms，sin180°，T_{vj}=125ºC	I^2t	490	A^2s

Characteristic Values

Parameter	Conditions		Symbol	Value			Unit
				Min.	Typ.	Max.	
Forward voltage	I_F=30A, V_{GE}=0V I_F=30A, V_{GE}=0V I_F=30A, V_{GE}=0V	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	V_F		1.87 1.60 1.50	2.60	V
Peak reverse recovery current	I_F=30A, -di_F/dt=800A/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}		48 69 73		A
Recovered charge	I_F=30A, -di_F/dt=800A/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		1.43 5.64 7.22		µC
Reverse recovered energy	I_F=30A, -di_F/dt=800A/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}		0.26 1.87 2.61		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}	2500			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		150		g

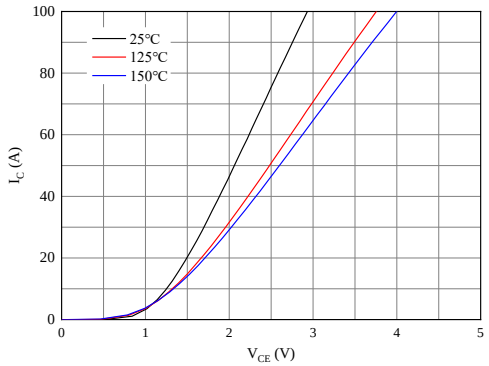


Fig 1. Typical output characteristics (V_{GE}=15V)

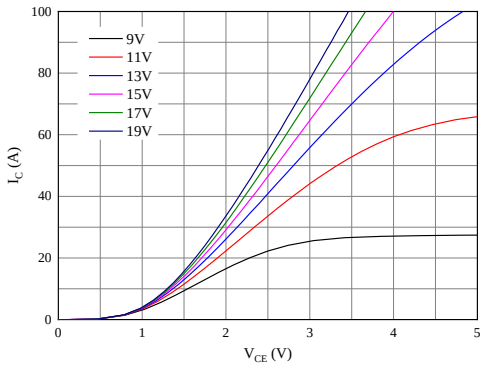


Fig 2. Typical output characteristics (T_{vj}=150℃)

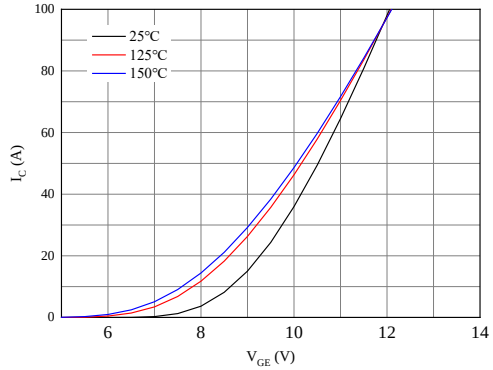


Fig 3. Typical transfer characteristic(V_{CE}=20V)

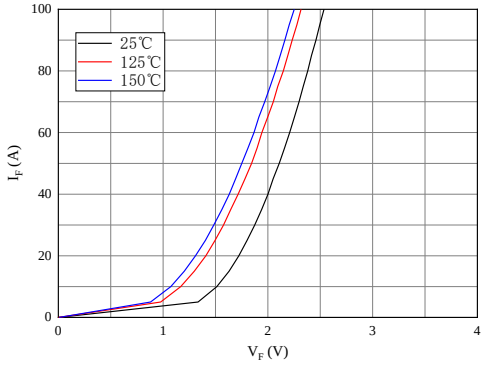


Fig 4. Forward characteristic of Diode

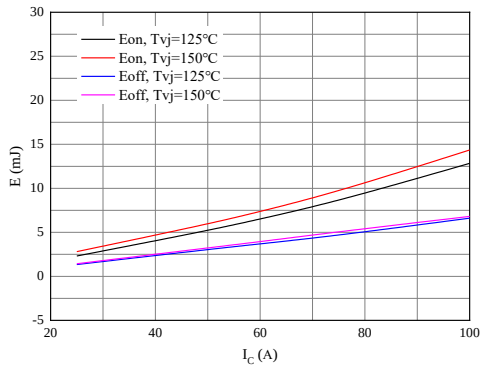


Fig 5. Switching losses of IGBT

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

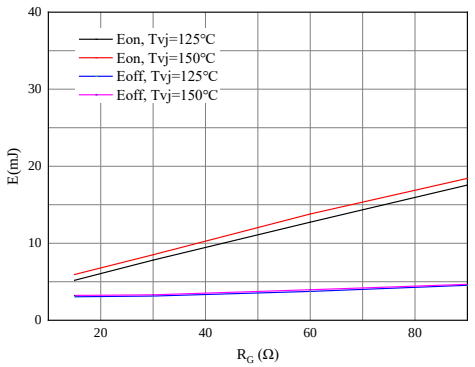


Fig 6. Switching losses of IGBT

VGE=±15V, IC=50A, VCE=600V

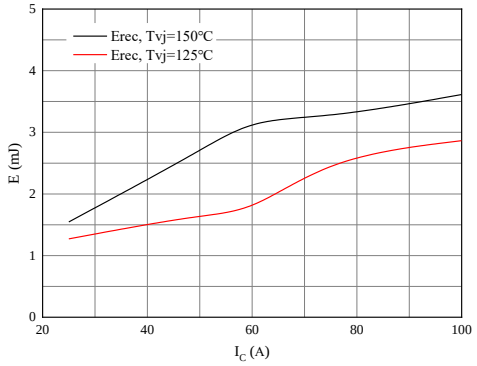


Fig 7. Switching losses of Diode
RGon=15Ω, VCE=600V

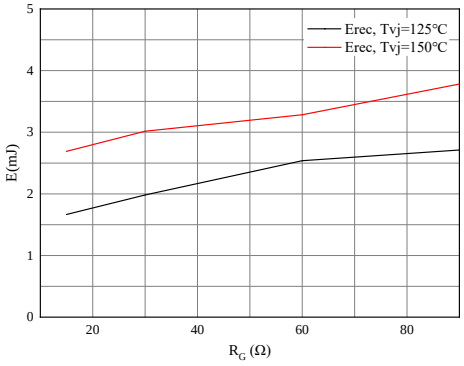


Fig 8. Switching losses of Diode
IF=50A, VCE=600V

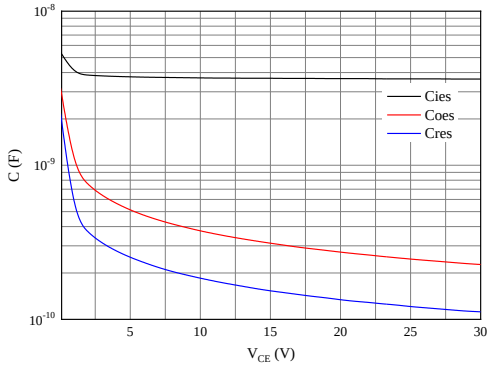
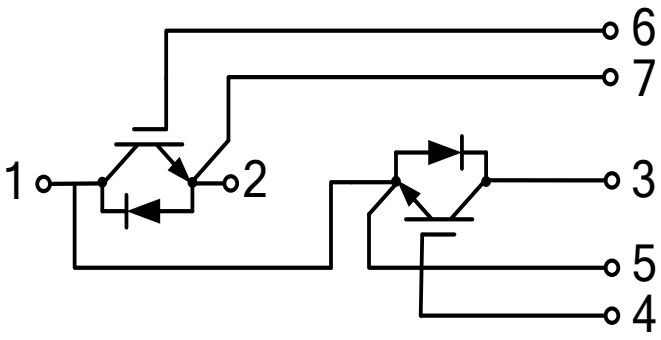


Fig 9. Capacitance characteristic

Circuit diagram



Package outlines