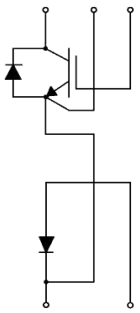
62mm Half Bridge IGBT Module

V_{CES} =1200V， $I_{C\,nom}$ =450A / I_{CRM} =900A

D5



Electrical characteristics：

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

Applications:

- UPS
- Motor control and drive
- 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	$I_{C\,nom}$	450	A
Repetitive peak collector current	t_P=1 ms	I_{CRM}	900	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=450A T_{vj}=25°C V_{GE}=15V, I_C=450A T_{vj}=125°C V_{GE}=15V, I_C=450A T_{vj}=150°C	V_{CEsat}		1.85 2.13 2.19	2.20	V
Gate-Emitter threshold voltage	I_C=17mA, V_{GE}= V_{CE} T_{vj}=25°C	$V_{GE(th)}$	5.3	5.9	6.5	
Gate charge	V_{GE}=-15V…+15V	Q_G		3.10		µC
Internal gate resistor	T_{vj}=25°C	R_{Gint}		1.84		Ω
Input capacitance	f=1MHz, V_{CE}=25 V, V_{GE}=0 V T_{vj}=25°C	C_{ies}		34.62		nF
Reverse transfer capacitance		C_{res}		1.37		nF
Collector-emitter cut-off current	V_{CE}=1200V , V_{GE}= 0 V T_{vj}=25°C	I_{CES}			2	mA
Gate-emitter leakage current	V_{CE}=0 V, V_{GE}= 20 V T_{vj}=25°C	I_{GES}			200	nA
Turn-on delay time	I_C=450A, V_{CE}=600 V T_{vj}=25°C V_{GE}=±15 V, R_G=1Ω T_{vj}=125°C (inductive load) T_{vj}=150°C	$t_{d\,on}$		217 228 230		ns
Rise time	I_C=450A, V_{CE}=600 V T_{vj}=25°C V_{GE}=±15 V, R_G=1Ω T_{vj}=125°C (inductive load) T_{vj}=150°C	t_r		83 89 92		
Turn-off delay time	I_C=450A, V_{CE}=600 V T_{vj}=25°C V_{GE}=±15 V, R_G=1Ω T_{vj}=125°C (inductive load) T_{vj}=150°C	$t_{d\,off}$		380 425 439		
Fall time	I_C=450A, V_{CE}=600 V T_{vj}=25°C V_{GE}=±15 V, R_G=1Ω T_{vj}=125°C (inductive load) T_{vj}=150°C	t_f		102 109 109		
Turn-on energy loss per pulse	I_C=450A, V_{CE}=600 V V_{GE}=±15 V, R_G=1Ω T_{vj}=25°C di/dt =3900 A/µs (Tvj = 150°C) T_{vj}=125°C (inductive load) T_{vj}=150°C	E_{on}		26.38 36.60 41.24		mJ
Turn-off energy loss per pulse	I_C=450A, V_{CE}=600 V V_{GE}=±15 V, R_G=1Ω T_{vj}=25°C dv/dt = 4900V/µs (Tvj = 150°C) T_{vj}=125°C (inductive load) T_{vj}=150°C	E_{off}		35.87 40.24 41.81		
SC data	V_{GE}≤15V, Vce=800V V_{CEmax}=V_{CES}-L_{sCE}·di/dt t_P≤10us, T_{vj}=150°C	I_{SC}		2512		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}=25°C	V_{RRM}	1200	V
Continuous DC forward current		I_F	450	A
Repetitive peak forward current	t_p=1ms	I_{FRM}	900	A
I^2t-value	t_p=10ms，sin180°，T_j=125°C	I^2t	40000	A^2S

Characteristic Values

Parameter	Conditions		Symbol	Value			Unit
				Min.	Typ.	Max.	
Forward voltage	I_F=450A, V_{GE}=0V I_F=450A, V_{GE}=0V I_F=450A, V_{GE}=0V	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	V_F		2.30 2.46 2.38	2.80	V
Peak reverse recovery current	I_F=450A, -di$_F$/dt=3900A/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}		250 288 307		A
Recovered charge	I_F=450A, -di$_F$/dt=3900A/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		34 51 61		μC
Reverse recovered energy	I_F=450A, -di$_F$/dt=3900A/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}		14.53 21.06 25.04		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		6.0	Nm
Terminal Connection Torque		M	2.5		5.0	Nm
Weight		W		312		g

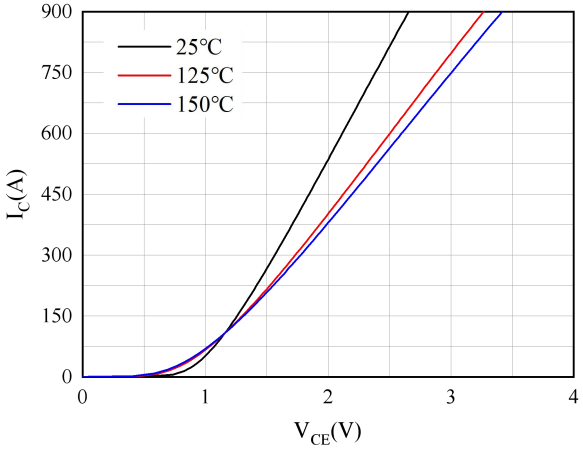


Fig 1. Typical output characteristics (V_{GE}=15V)

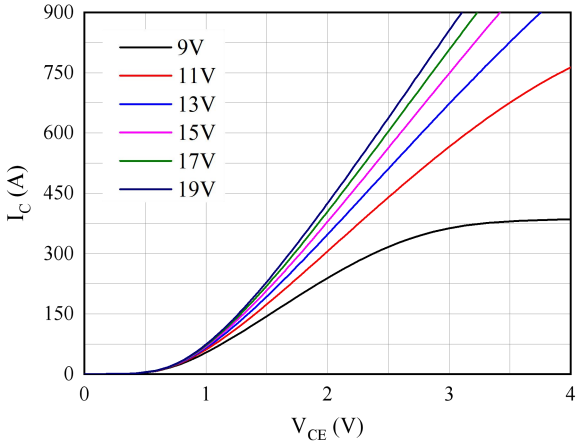


Fig 2. Typical output characteristics (T_{vj}=150℃)

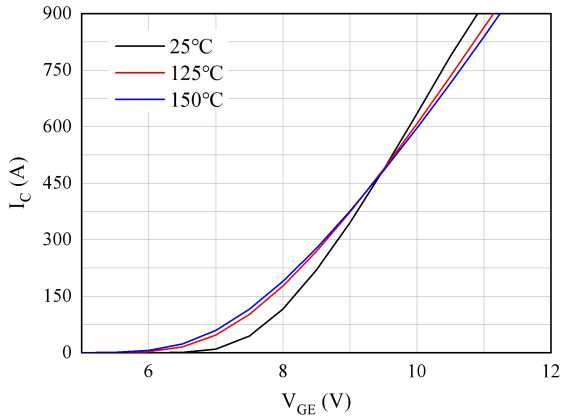


Fig 3. Typical transfer characteristic(V_{CE}=20V)

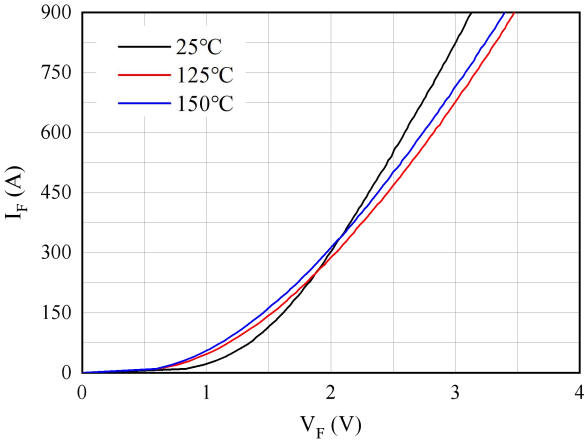


Fig 4. Forward characteristic of Diode

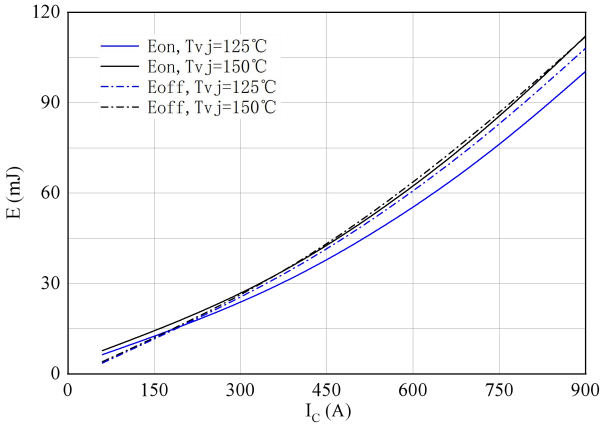


Fig 5. Switching losses of IGBT

VGE=±15V, RGon=1Ω, RGoff=1Ω, VCE=600V

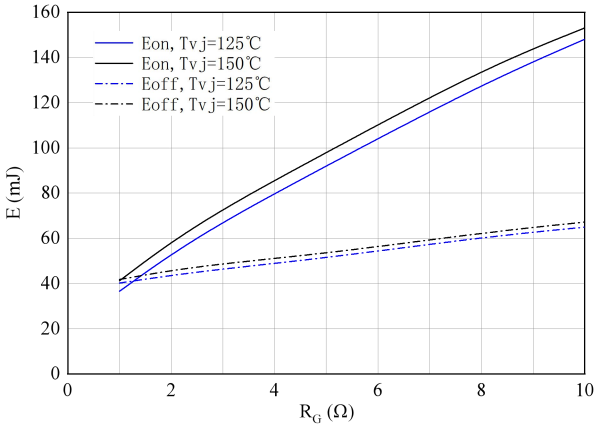


Fig 6. Switching losses of IGBT

VGE=±15V, IC=450A, VCE=600V

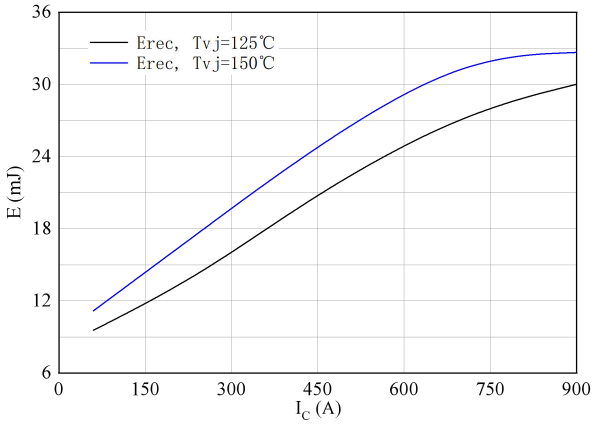


Fig 7. Switching losses of Diode

RGon=1Ω, VCE=600V

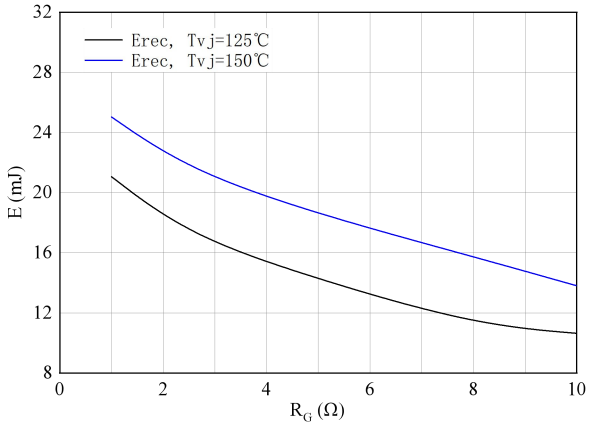


Fig 8. Switching losses of Diode

IF=450A, VCE=600V

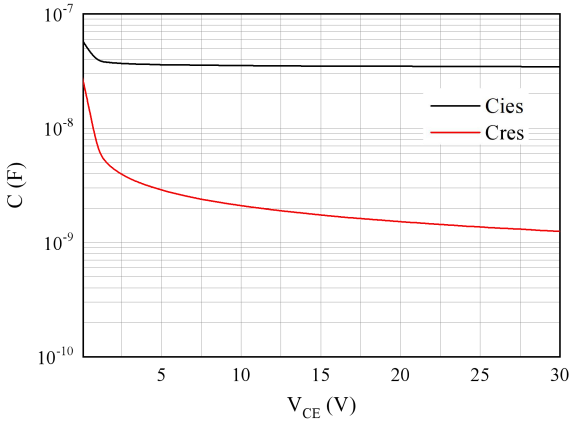
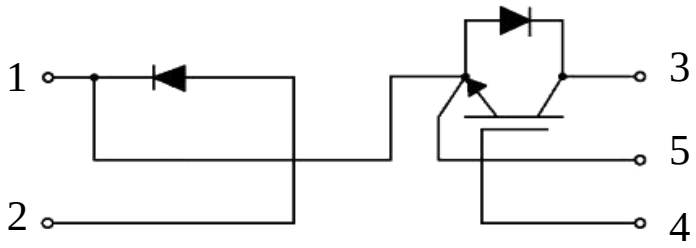


Fig 9. Capacitance characteristic

Circuit diagram



Package outlines