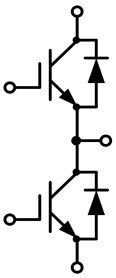
62mm Half Bridge IGBT Module

V_{CES}=1200V， $I_{C\,nom}$=300A / I_{CRM}=600A

D5



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	$I_{C\,nom}$	300	A
Repetitive peak collector current	t_P=1 ms	I_{CRM}	600	A
Total power dissipation	T_C = 25°C, $T_{vj\,max}$ = 175°C	P_{tot}	1250	W
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=300A T_{vj}=25°C V_{GE}=15V, I_C=300A T_{vj}=125°C V_{GE}=15V, I_C=300A T_{vj}=150°C	V_{CEsat}		2.10 2.50 2.58	2.65	V
Gate-Emitter threshold voltage	I_C = 8mA, V_{GE}= V_{CE} T_{vj}=25°C	$V_{GE(th)}$	5.50	6.10	6.70	
Gate charge	V_{GE}=-15V…+15V	Q_G		1.52		µC
Internal gate resistor	T_{vj}=25°C	R_{Gint}		3.48		Ω
Input capacitance	f=1 MHz, V_{CE}=25 V, V_{GE}=0 V T_{vj}=25°C	C_{ies}		27.38		nF
Reverse transfer capacitance		C_{res}		0.21		
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=300A, V_{CE}=600 V T_{vj}=25°C V_{GE}=±15 V, R_G=3.3Ω T_{vj}=125°C (inductive load) T_{vj}=150°C	$t_{d\,on}$		350 362 363		ns
Rise time	I_C=300A, V_{CE}=600 V T_{vj}=25°C V_{GE}=±15 V, R_G=3.3Ω T_{vj}=125°C (inductive load) T_{vj}=150°C	t_r		87 99 96		
Turn-off delay time	I_C=300A, V_{CE}=600 V T_{vj}=25°C V_{GE}=±15 V, R_G=3.3Ω T_{vj}=125°C (inductive load) T_{vj}=150°C	$t_{d\,off}$		227 272 281		
Fall time	I_C=300A, V_{CE}=600 V T_{vj}=25°C V_{GE}=±15 V, R_G=3.3Ω T_{vj}=125°C (inductive load) T_{vj}=150°C	t_f		60 94 96		
Turn-on energy loss per pulse	I_C=300A, V_{CE}=600 V V_{GE}=±15 V, R_G=3.3Ω T_{vj}=25°C di/dt =2477A/µs (Tvj = T_{vj}=125°C 150°C) T_{vj}=150°C (inductive load)	E_{on}		25.31 40.84 45.26		mJ
Turn-off energy loss per pulse	I_C=300A, V_{CE}=600 V V_{GE}=±15 V, R_G=3.3Ω T_{vj}=25°C dv/dt=8706V/µs (Tvj = T_{vj}=125°C 150°C) T_{vj}=150°C (inductive load)	E_{off}		9.88 14.3 15,87		
Thermal resistance, junction to case	per IGBT	R_{thJC}			0.12	K/W
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	300	A
Repetitive peak forward current	t_p=1ms	I_{FRM}	600	A
I^2t-value	t_p=10ms，sin180°，T_j=125°C	I^2t	34000	A^2S

Characteristic Values

Parameter	Conditions		Symbol	Value			Unit
				Min.	Typ.	Max.	
Forward voltage	I_F=300A I_F=300A I_F=300A	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	V_F		2.08 1.74 1.66	2.55	V
Peak reverse recovery current	I_F=300A, -di_F/dt=2477A/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}		122 224 243		A
Recovered charge	I_F=300A, -di_F/dt=2477A/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		18.96 50.12 60.12		μC
Reverse recovered energy	I_F=300A, -di_F/dt=2477A/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}		7.05 17. 9121.		mJ
Thermal resistance, junction to case	per diode		R_{thJC}		72	0.23	K/W
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		313		g

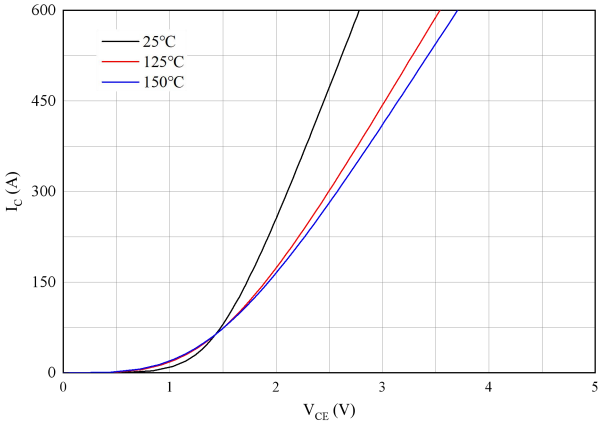


Fig 1. Typical output characteristics (V_{GE}=15V)

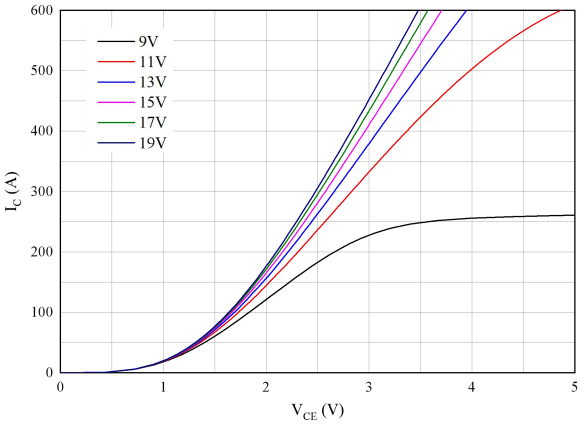


Fig 2. Typical output characteristics (T_{vj}=150℃)

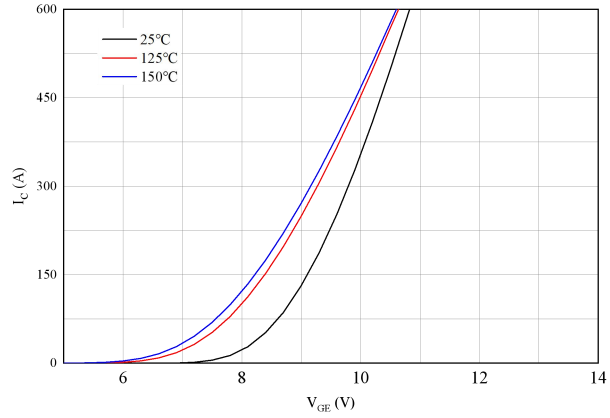


Fig3. Typical transfer characteristic(V_{CE}=20V)

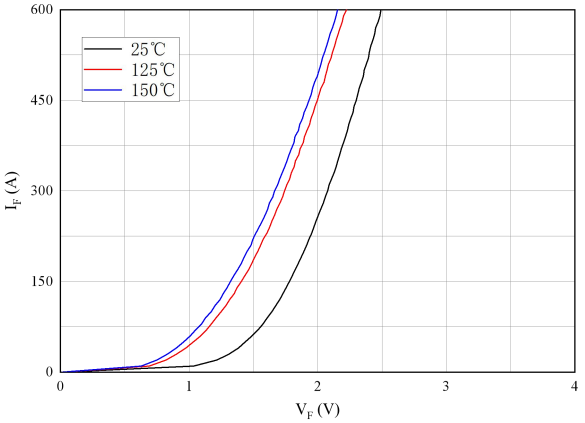


Fig 4. Forward characteristic of Diode

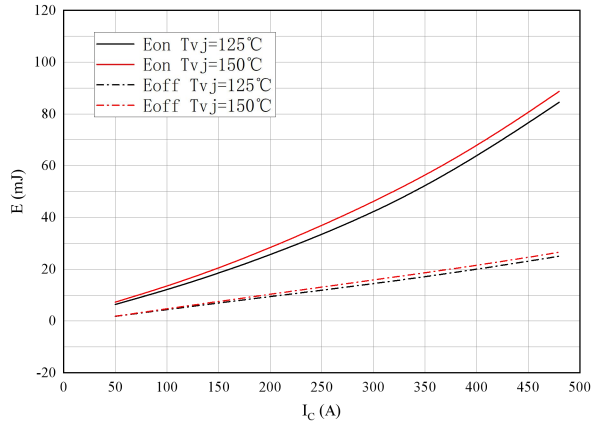


Fig5. Switching losses of IGBT

VGE=±15V, RGon=3.3Ω, RGoff=3.3Ω, VCE=600V

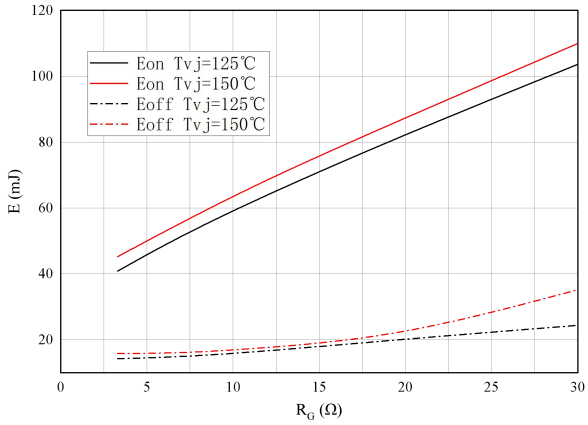


Fig 6. Switching losses of IGBT

VGE=±15V, IC=300A, VCE=600V

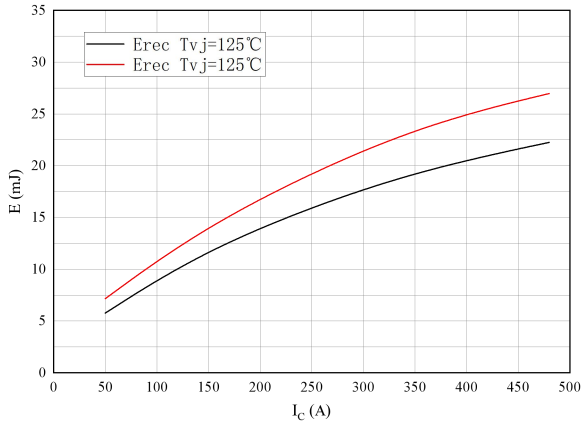


Fig7. Switching losses of Diode

RGon=3.3Ω, VCE=600V

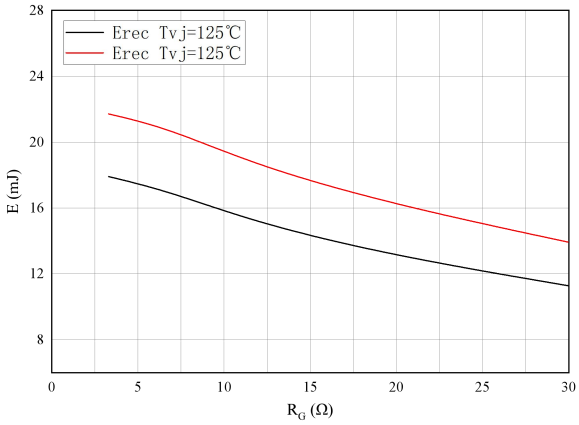


Fig 8. Switching losses of Diode

IF=300A, VCE=600V

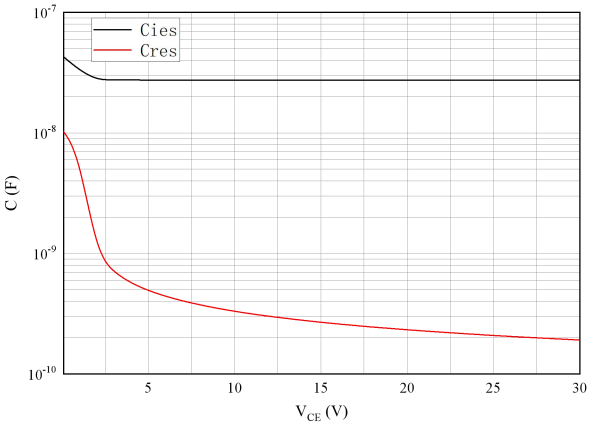


Fig 9.Capacitance characteristic

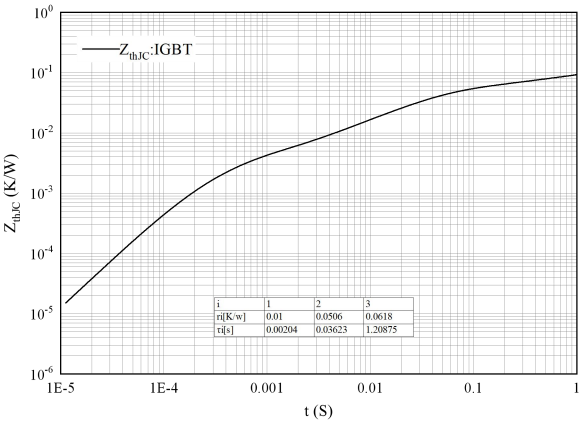


Fig 10. Transient thermal impedance IGBT,Inverter

Z_{thJC}=f(t)

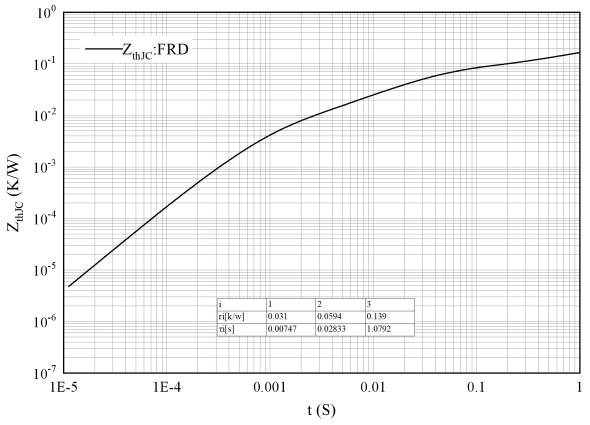
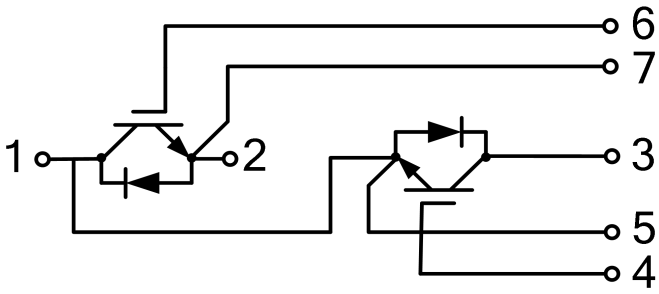


Fig 11. Transient thermal impedance FRD ,Inverter

Z_{thJC}=f(t)

Circuit diagram



Package outlines