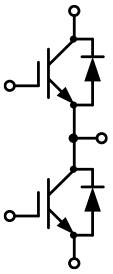
34mm Half Bridge IGBT Module

V_{CES}=650V， $I_{C\ nom}$=100A / I_{CRM}=200A

D6



Equivalent Circuit

Features：

- 650V Trench / Field Stop process
- Low switching losses
- Vcesat has a positive temperature coefficient

Applications:

- Inverter welding machine
- Induction heating

IGBT, Inverter

Maximum Ratings

Parameter	Conditions	Symbol	Value	Unit
Collector-Emitter voltage	T_{vj}=25°C	V_{CES}	650	V
Continuous DC collector current	T_C=100°C, $T_{vj\ max}$=175°C	$I_{C\ nom}$	100	A
Repetitive peak collector current	t_P=1 ms	I_{CRM}	200	A
Total power dissipation	T_C = 25°C, $T_{vj\ max}$ = 175°C	P_{tot}	395	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=100A T_{vj}=25°C V_{GE}=15V, I_C=100A T_{vj}=150°C	V_{CEsat}		1.75 2.23	2.4	V
Gate-Emitter threshold voltage	I_C = 2.6mA, V_{GE}= V_{CE} T_{vj}=25°C	$V_{GE(th)}$	4.8	5.4	6.0	
Gate charge	V_{GE}=-15V…+15V	Q_G		0.76		µC
Internal gate resistor		R_{Gint}		none		Ω
Input capacitance	f=1MHz, V_{CE}=25 V, V_{GE}=0 V T_{vj}=25°C	C_{ies}		8.28		nF
Reverse transfer capacitance		C_{res}		0.15		
Collector-emitter cut-off current	V_{CE}=650V , 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=100A, V_{CE}=400 V V_{GE}=±15 V, R_G=1.8Ω (inductive load) T_{vj}=25°C T_{vj}=150°C	$t_{d\ on}$		109 103		ns
Rise time	I_C=100A, V_{CE}=400 V V_{GE}=±15 V, R_G=1.8Ω (inductive load) T_{vj}=25°C T_{vj}=150°C	t_r		39 40		
Turn-off delay time	I_C=100A, V_{CE}=400 V V_{GE}=±15 V, R_G=1.8Ω (inductive load) T_{vj}=25°C T_{vj}=150°C	$t_{d\ off}$		287 310		
Fall time	I_C=100A, V_{CE}=400 V V_{GE}=±15 V, R_G=1.8Ω (inductive load) T_{vj}=25°C T_{vj}=150°C	t_f		46 64		
Turn-on energy loss per pulse	I_C=100A, V_{CE}=400 V V_{GE}=±15 V, R_G=1.8Ω (inductive load) T_{vj}=25°C T_{vj}=150°C	E_{on}		1.02 1.19		mJ
Turn-off energy loss per pulse	I_C=100A, V_{CE}=400 V V_{GE}=±15 V, R_G=1.8Ω ((inductive load) T_{vj}=25°C T_{vj}=150°C	E_{off}		1.03 1.34		
Thermal resistance, junction to case	per IGBT	R_{thJC}			0.38	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}	650	V
Continuous DC forward current		I_F	60	A
Repetitive peak forward current	t_p=1ms	I_{FRM}	120	A

Characteristic Values

Parameter	Conditions		Symbol	Value			Unit
				Min.	Typ.	Max.	
Forward voltage	I_F=60A, V_{GE}=0V I_F=60A, V_{GE}=0V	T_{vj}=25°C T_{vj}=150°C	V_F		1.45 1.51	2.1	V
Peak reverse recovery current	I_F=60A, -di$_F$/dt=1557A/µs(T_{vj}=150°C) V_R=400V, V_{GE}=-15V	T_{vj}=25°C T_{vj}=150°C	I_{RM}		48 64		A
Recovered charge	I_F=60A, -di$_F$/dt=1557A/µs(T_{vj}=150°C) V_R=400V, V_{GE}=-15V	T_{vj}=25°C T_{vj}=150°C	Q_r		1.6 3.1		µC
Reverse recovered energy	I_F=60A, -di$_F$/dt=1557A/µs(T_{vj}=150°C) V_R=400V, V_{GE}=-15V	T_{vj}=25°C T_{vj}=150°C	E_{rec}		0.44 0.90		mJ
Thermal resistance, junction to case	per diode		R_{thJC}			0.58	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
Weight		W		155		g

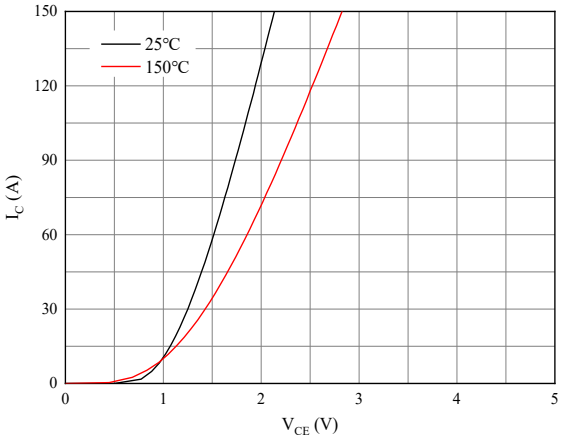


Fig 1. Typical output characteristics (V_{GE}=15V)

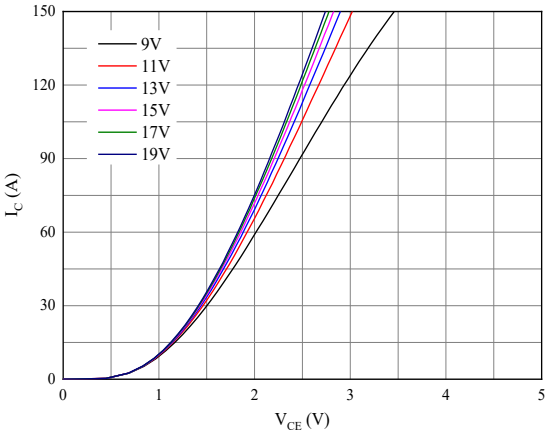


Fig 2. Typical output characteristics (T_{vj}=150℃)

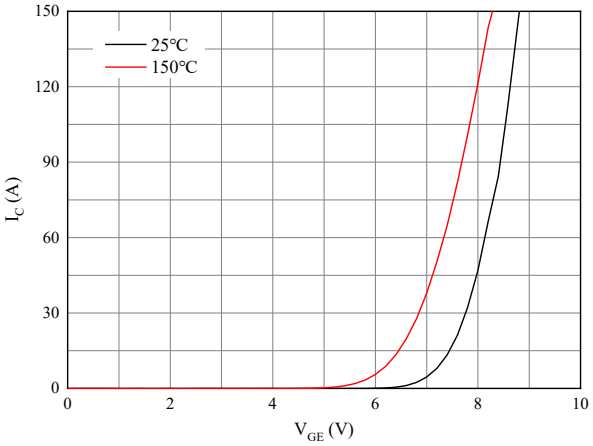


Fig 3. Typical transfer characteristic(V_{CE}=20V)

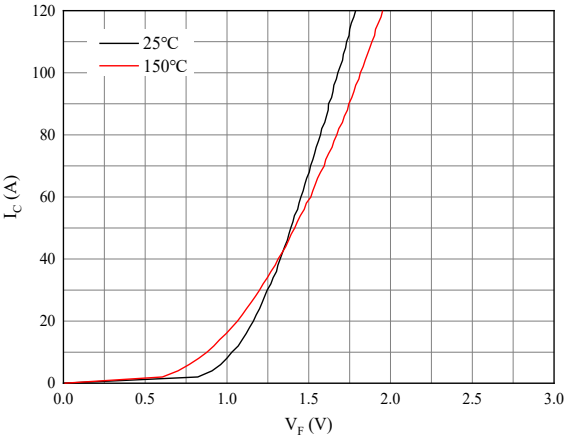


Fig 4. Forward characteristic of Diode

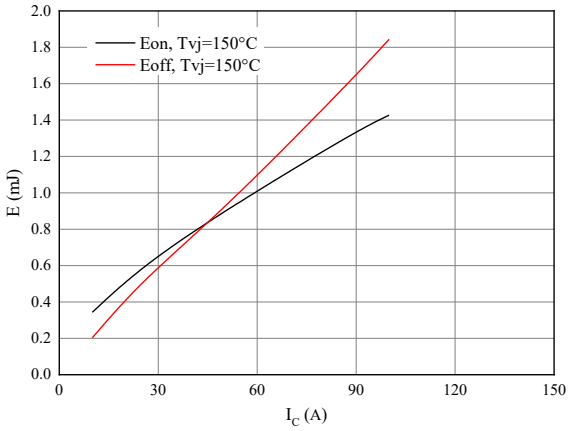


Fig 5. Switching losses of IGBT

VGE=±15V, RGon=1.8Ω, RGoff=1.8Ω, VCE=400V

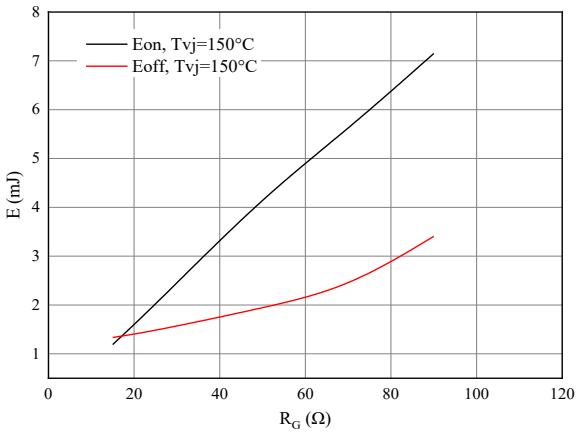


Fig 6. Switching losses of IGBT

VGE=±15V, IC=100A, VCE=400V

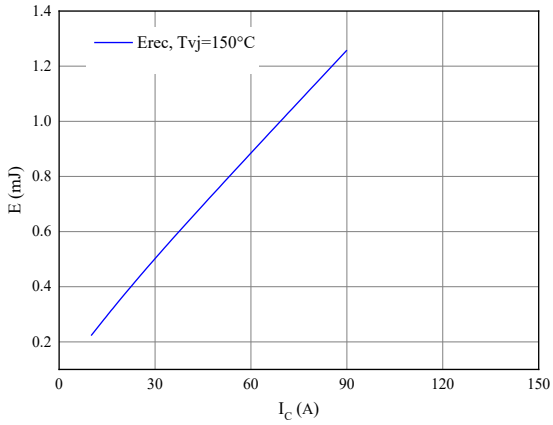


Fig 7. Switching losses of Diode

RGon=1.8Ω, VCE=400V

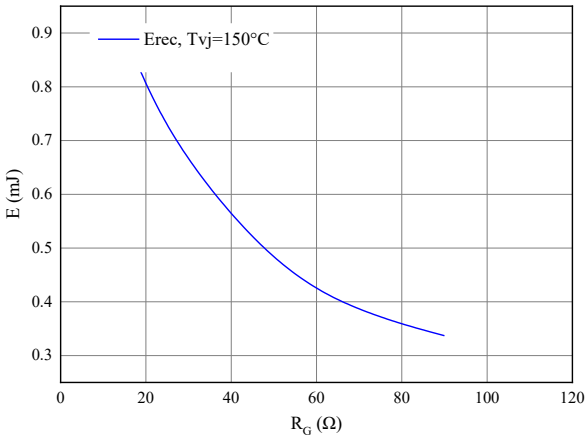


Fig 8. Switching losses of Diode

IF=60A, VCE=400V

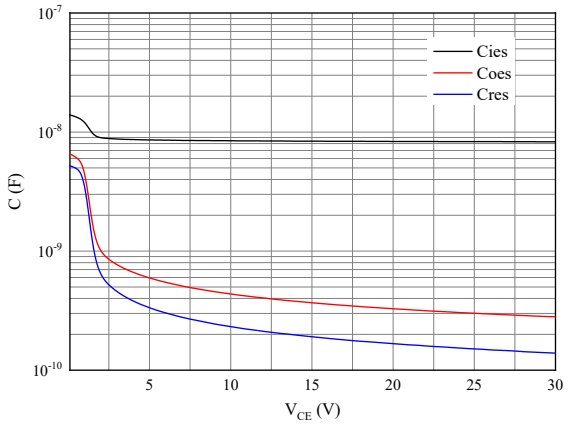
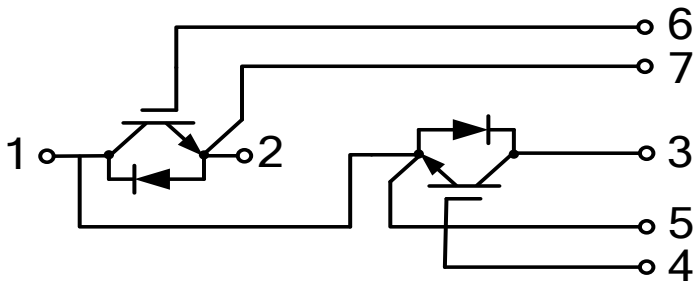


Fig 9. Capacitance characteristic

Circuit diagram



Package outlines