SF150R12A6

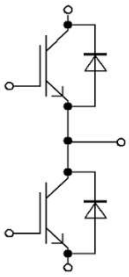
34mm module with IGBT and Diode

Features:

- 1200V Trench & Field stop technology
- Low switching losses
- Positive temperature coefficient

Applications:

- Motor Drives
- UPS



IGBT, Inverter

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

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
Total power dissipation	T_C = 25°C, Tvj max = 175°C	Ptot	789	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=150A V_{GE}=15V, I_C=150A V_{GE}=15V, I_C=150A	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	V_{CEsat}		1.97 2.36 2.44		V
Gate-Emitter threshold voltage	I_C=3.2mA, V_{GE}= V_{CE}	T_{vj}=25°C	$V_{GE(th)}$		5.7		
Gate charge	V_{GE}=-15V…+15V		Q_G		1.09		µC
Internal gate resistor			R_{Gint}		3.6		Ω
Input capacitance	f=1 MHz, V_{CE}=25 V, V_{GE}=0 V	T_{vj}=25°C	C_{ies}		11.7		nF
Output capacitance			C_{oes}		0.925		
Reverse transfer capacitance			C_{res}		0.410		nF
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=150A, V_{CE}=600 V V_{GE}=±15 V, R_G=3.6Ω (inductive load)	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	$t_{d\ on}$		140 150 160		ns
Rise time	I_C=150A, V_{CE}=600 V V_{GE}=±15 V, R_G=3.6Ω (inductive load)	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	t_r		40 45 45		
Turn-off delay time	I_C=150A, V_{CE}=600 V V_{GE}=±15 V, R_G=3.6Ω (inductive load)	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	$t_{d\ off}$		220 310 320		
Fall time	I_C=150A, V_{CE}=600 V V_{GE}=±15 V, R_G=3.6Ω (inductive load)	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	t_f		200 280 280		
Turn-on energy loss per pulse	I_C=150A, V_{CE}=600 V V_{GE}=±15 V, R_G=3.6Ω (inductive load)	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	E_{on}		8.63 12.7 14.8		mJ
Turn-off energy loss per pulse	I_C=150A, V_{CE}=600 V V_{GE}=±15 V, R_G=3.6Ω (inductive load)	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	E_{off}		8.77 16.1 16.8		
SC data	V_{GE}≤15V, Vcc=800V V_{CEmax}=V_{CES}-L_{sCE}·di/dt	t_P≤10us, T_{vj}=150°C	I_{SC}		480		A
Thermal resistance, junction to case	per IGBT		R_{thJC}			0.19	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}=25ºC	V_{RRM}	1200	V
Continuous DC forward current		I_F	150	A
Repetitive peak forward current	t_p=1ms	I_{FRM}	300	A

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		2.2 2.26 2.17		V
Peak reverse recovery current	I_F=150A, -di_F/dt=2700A/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}		80 95 100		A
Recovered charge	I_F=150A, -di_F/dt=2700A/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		6.5 17.0 21.5		μC

Reverse recovered energy	I_F=150A, -di$_F$/dt=2700A/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}		2.4 7.0 8.7		mJ
Thermal resistance, junction to case	Per diode		R_{thjc}			0.32	K/W

Module

Isolation test voltage	RMS，f = 50Hz，t = 1min	V_{ISOL}	4	kV
Material module baseplate			Cu	
Mounting torque for modul mounting	to heat sink M6	M	3~5	Nm
Terminal connection torque	to terminals M5	M	2.5~5	Nm

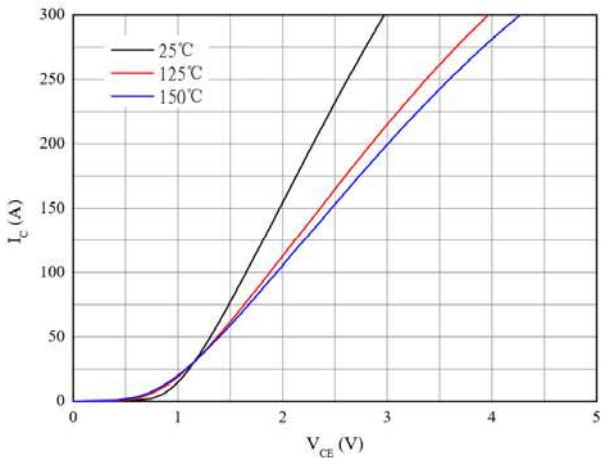


Figure 1. Typical output characteristics (V_{GE}=15V)

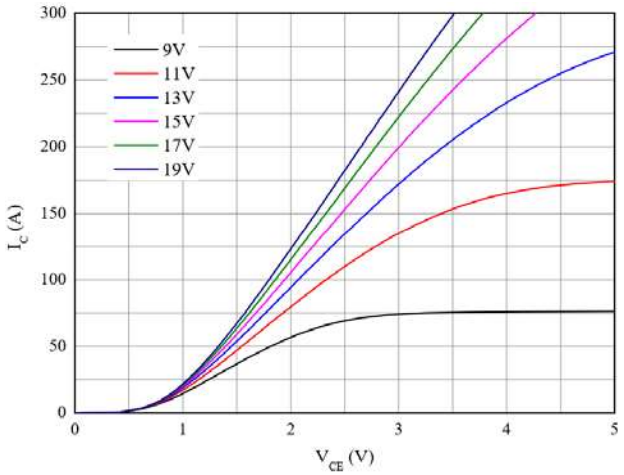


Figure 2. Typical output characteristics (T_{vj}=150℃)

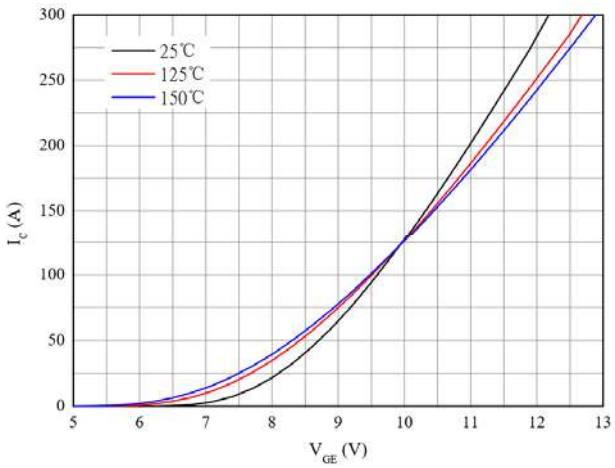


Figure 3. Typical transfer characteristic(V =20V)

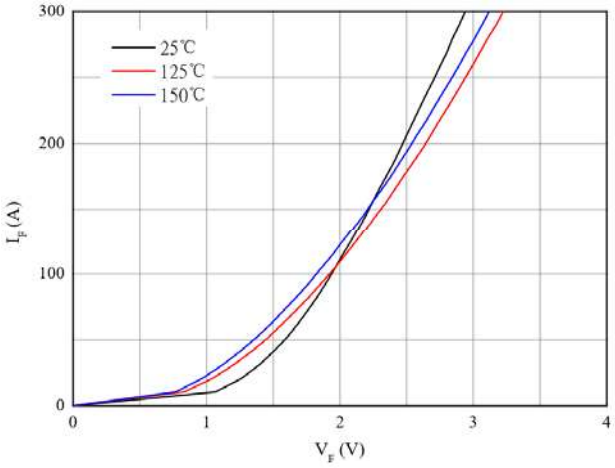


Figure 4. Forward characteristic of Diode

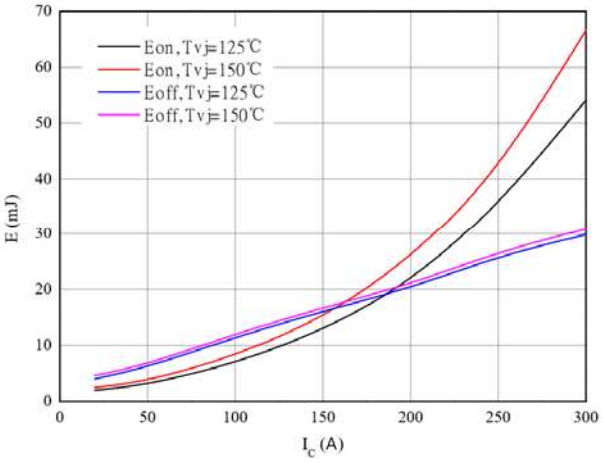


Figure 5. Switching losses of IGBT
V_{GE}=±15V, R_{Gon}=3.6Ω, R_{Goff}=3.6Ω, V_{CE}=600V

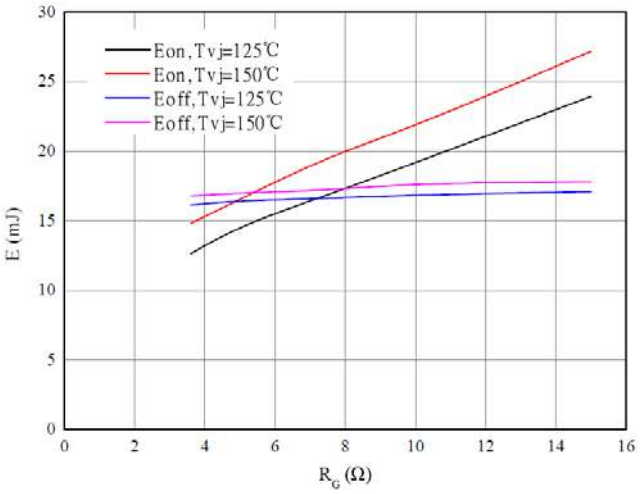


Figure 6. Switching losses of IGBT
V_{GE}=±15V, I_C=150A, V_{CE}=600V

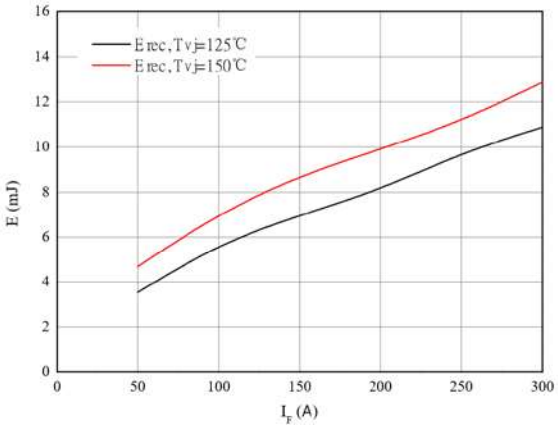


Figure 7. Switching losses of Diode
R_{Gon}=3.6Ω, V_{CE}=600V

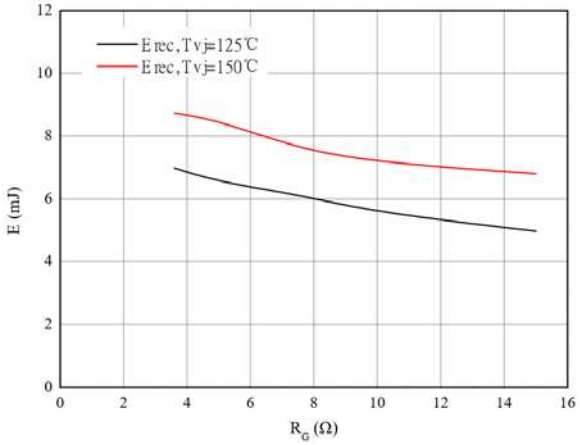


Figure 8. Switching losses of Diode
I_F=150A, V_{CE}=600V

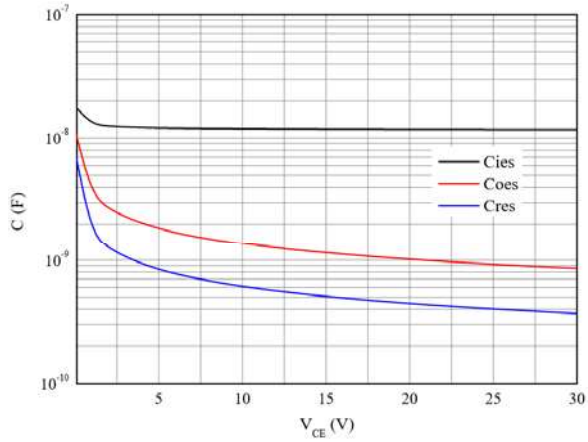
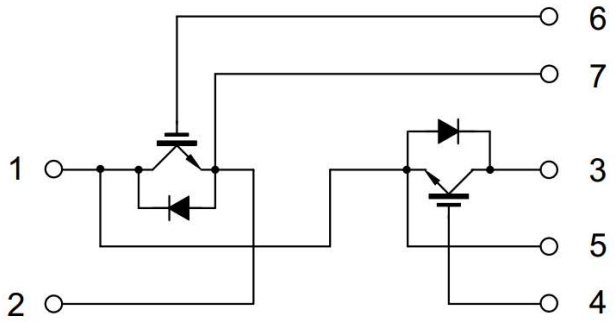


Figure 9. Capacitance characteristic

Circuit diagram



Package outlines