

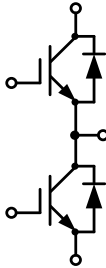
34mm Half Bridge IGBT Module

电气特性:

- 1200V 沟槽栅/场终止工艺
- 低开关损耗
- 正温度系数

典型应用:

- 逆变焊机
- 感应加热
- 高频开关应用
- 逆变器



$V_{CES}=1200V$, $I_{C\ nom}=75A$ / $I_{CRM}=150A$

IGBT, 逆变器 / IGBT, Inverter

最大额定值 / Maximum Ratings

Parameter	Conditions	Symbol	Value	Unit
集电极-发射极电压 Collector-Emitter voltage	$T_{vj}=25^{\circ}C$	V_{CES}	1200	V
连续集电极直流电流 Continuous DC collector current	$T_C=100^{\circ}C$, $T_{vj\ max}=175^{\circ}C$	$I_{C\ nom}$	75	A
集电极重复峰值电流 Repetitive peak collector current	$t_p=1\ ms$	I_{CRM}	150	A
栅极-发射极电压 Gate emitter voltage		V_{GE}	± 20	V

特征值 / Characteristic Values

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
集电极-发射极饱和电压 Collector-Emitter saturation voltage	$V_{GE}=15V$, $I_C=75A$ $V_{GE}=15V$, $I_C=75A$ $V_{GE}=15V$, $I_C=75A$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$ V_{CESat}		2.05 2.45 2.56	2.50	V
栅极-发射极阈值电压 Gate-Emitter threshold voltage	$I_C=2.6mA$, $V_{GE}=V_{CE}$	$T_{vj}=25^{\circ}C$ $V_{GE(th)}$	5.00	5.70	6.30	
栅电荷 Gate charge	$V_{GE}=-15V\dots+15V$	Q_G		0.63		μC
内部栅极电阻 Internal gate resistor		R_{Gint}		None		Ω

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输入电容 Input capacitance	$f=100\text{ kHz}$, $V_{CE}=25\text{ V}$, $V_{GE}=0\text{ V}$ $T_{vj}=25^{\circ}\text{C}$	C_{ies}	8.37	nF
输出电容 Output capacitance		C_{oes}	0.35	
反向传输电容 Reverse transfer capacitance		C_{res}	0.13	
集电极-发射极截止电流 Collector-emitter cut-off current	$V_{CE}=1200\text{ V}$, $V_{GE}=0\text{ V}$ $T_{vj}=25^{\circ}\text{C}$	I_{CES}	1	mA
栅极-发射极漏电流 Gate-emitter leakage current	$V_{CE}=0\text{ V}$, $V_{GE}=20\text{ V}$ $T_{vj}=25^{\circ}\text{C}$	I_{GES}	100	nA
开通延迟时间 Turn-on delay time	$I_c=60\text{ A}$, $V_{CE}=600\text{ V}$ $T_{vj}=25^{\circ}\text{C}$ $V_{GE}=\pm 15\text{ V}$, $R_G=15\Omega$ $T_{vj}=125^{\circ}\text{C}$ (电感负载) / (inductive load) $T_{vj}=150^{\circ}\text{C}$	t_{don}	77 75 70	ns
上升时间 Rise time	$I_c=60\text{ A}$, $V_{CE}=600\text{ V}$ $T_{vj}=25^{\circ}\text{C}$ $V_{GE}=\pm 15\text{ V}$, $R_G=15\Omega$ $T_{vj}=125^{\circ}\text{C}$ (电感负载) / (inductive load) $T_{vj}=150^{\circ}\text{C}$	t_r	65 59 57	
关断延迟时间 Turn-off delay time	$I_c=60\text{ A}$, $V_{CE}=600\text{ V}$ $T_{vj}=25^{\circ}\text{C}$ $V_{GE}=\pm 15\text{ V}$, $R_G=15\Omega$ $T_{vj}=125^{\circ}\text{C}$ (电感负载) / (inductive load) $T_{vj}=150^{\circ}\text{C}$	t_{doff}	228 237 244	
下降时间 Fall time	$I_c=60\text{ A}$, $V_{CE}=600\text{ V}$ $T_{vj}=25^{\circ}\text{C}$ $V_{GE}=\pm 15\text{ V}$, $R_G=15\Omega$ $T_{vj}=125^{\circ}\text{C}$ (电感负载) / (inductive load) $T_{vj}=150^{\circ}\text{C}$	t_f	68 155 157	
开通损耗能量（每脉冲） Turn-on energy loss per pulse	$I_c=60\text{ A}$, $V_{CE}=600\text{ V}$ $T_{vj}=25^{\circ}\text{C}$ $V_{GE}=\pm 15\text{ V}$, $R_G=15\Omega$ $T_{vj}=125^{\circ}\text{C}$ (电感负载) / (inductive load) $T_{vj}=150^{\circ}\text{C}$	E_{on}	3.68 5.18 5.85	mJ
关断损耗能量（每脉冲） Turn-off energy loss per pulse	$I_c=60\text{ A}$, $V_{CE}=600\text{ V}$ $T_{vj}=25^{\circ}\text{C}$ $V_{GE}=\pm 15\text{ V}$, $R_G=15\Omega$ $T_{vj}=125^{\circ}\text{C}$ (电感负载) / (inductive load) $T_{vj}=150^{\circ}\text{C}$	E_{off}	2.19 2.69 2.84	
在开关状态下温度 Temperature under switching conditions		$T_{vj\text{ op}}$	-40	150 °C

二极管，逆变器 / Diode, Inverter

最大额定值 / Maximum Ratings

Parameter	Conditions	Symbol	Value	Unit
反向重复峰值电压 Repetitive peak reverse voltage	$T_{vj}=25^{\circ}\text{C}$	V_{RRM}	1200	V
连续正向直流电流 Continuous DC forward current		I_F	60	A
正向重复峰值电流 Repetitive peak forward current	$t_p=1\text{ ms}$	I_{FRM}	120	A
I^2t 值 I^2t -value	$t_p=10\text{ ms}$, $\sin 180^{\circ}$, $T_j=25^{\circ}\text{C}$	I^2t	1200	A ² S

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特征值 / Characteristic Values

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
正向电压 Forward voltage	$I_F=75A, V_{GE}=0V$ $I_F=75A, V_{GE}=0V$ $I_F=75A, V_{GE}=0V$ $T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	V_F		2.05 1.70 1.60		V
反向恢复峰值电流 Peak reverse recovery current	$I_F=60A,$ $-di_F/dt=800A/\mu s(T_{vj}=150^{\circ}C)$ $V_R=600V, V_{GE}=-15V$ $T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	I_{RM}		31 60 70		A
恢复电荷 Recovered charge	$I_F=60A,$ $-di_F/dt=800A/\mu s(T_{vj}=150^{\circ}C)$ $V_R=600V, V_{GE}=-15V$ $T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	Q_r		5.1 11.8 14.1		μC
反向恢复损耗（每脉冲） Reverse recovered energy	$I_F=60A,$ $-di_F/dt=800A/\mu s(T_{vj}=150^{\circ}C)$ $V_R=600V, V_{GE}=-15V$ $T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	E_{rec}		2.19 5.00 5.84		mJ
在开关状态下温度 Temperature under switching conditions		$T_{vj\ op}$	-40		150	$^{\circ}C$

模块 / Module

Parameter	Conditions	Symbol	Value			Unit
绝缘测试电压 Isolation test voltage	RMS, $f=50Hz, t=1min$	V_{ISOL}	4000			V
内部绝缘 Internal isolation			Al_2O_3			
储存温度 Storage temperature		T_{stg}	-40		125	$^{\circ}C$
模块安装的扭矩 Mounting torque for modul mounting		M	3.0		5.0	Nm
重量 Weight		W		163		g

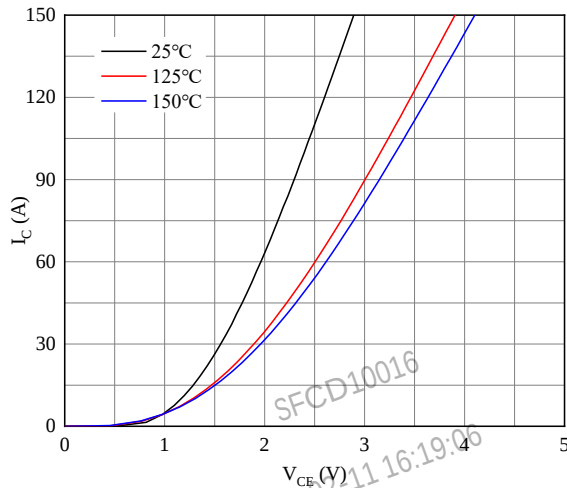
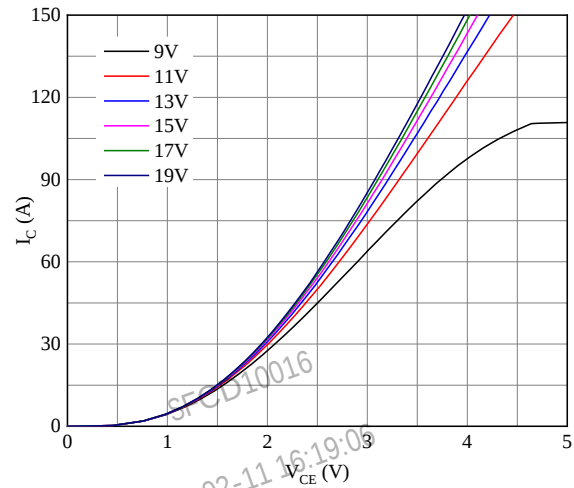
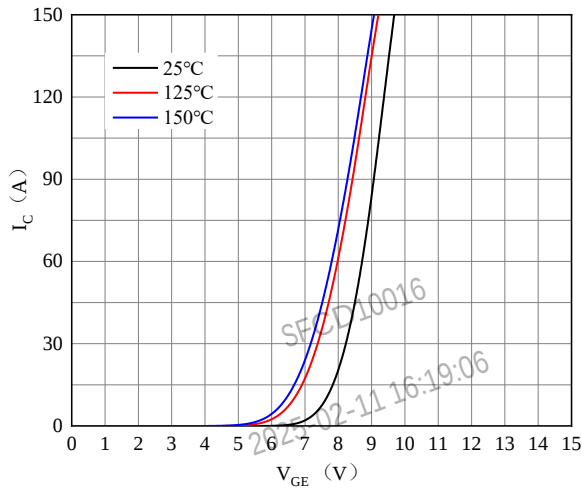
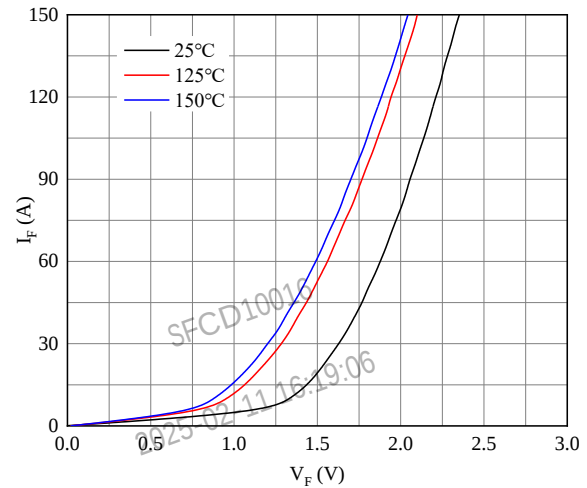
图 1. 典型输出特性 ($V_{GE}=15V$)Figure 1. Typical output characteristics ($V_{GE}=15V$)图 2. 典型输出特性 ($T_{vj}=150^{\circ}C$)Figure 2. Typical output characteristics ($T_{vj}=150^{\circ}C$)图 3. 典型传输特性 ($V_{CE}=20V$)Figure 3. Typical transfer characteristic ($V_{CE}=20V$)

图 4. 正向偏压特性 二极管

Figure 4. Forward characteristic of Diode

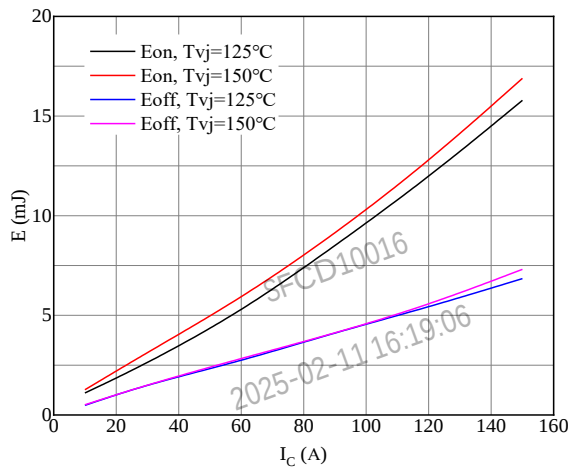


图 5. 开关损耗 逆变器

Figure 5. Switching losses of IGBT

$V_{GE}=\pm 15V$, $R_{Gon}=15\Omega$, $R_{Goff}=15\Omega$, $V_{CE}=600V$

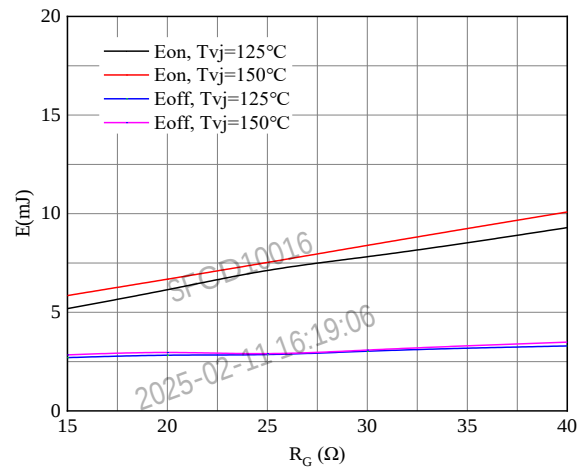


图 6. 开关损耗 逆变器

Figure 6. Switching losses of IGBT

$V_{GE}=\pm 15V$, $I_C=60A$, $V_{CE}=600V$

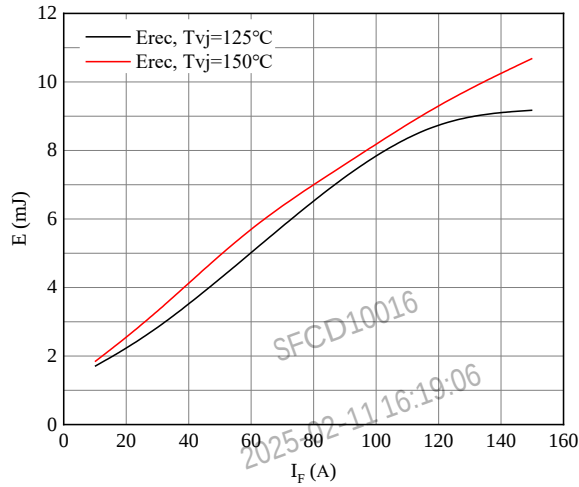


图 7. 开关损耗 二极管

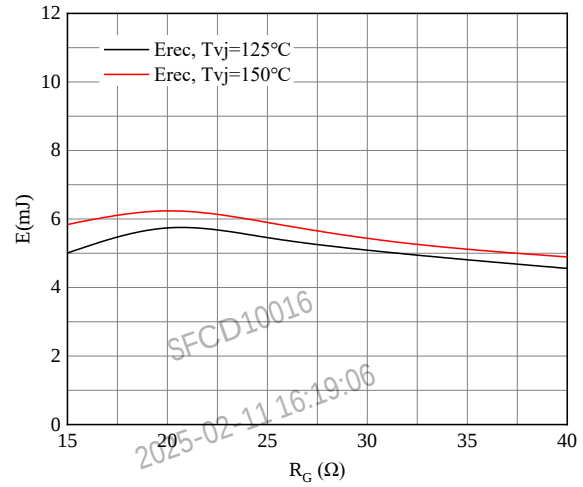
Figure 7. Switching losses of Diode
 $R_{Gon}=15\Omega$, $V_{CE}=600V$ 

图 8. 开关损耗 二极管

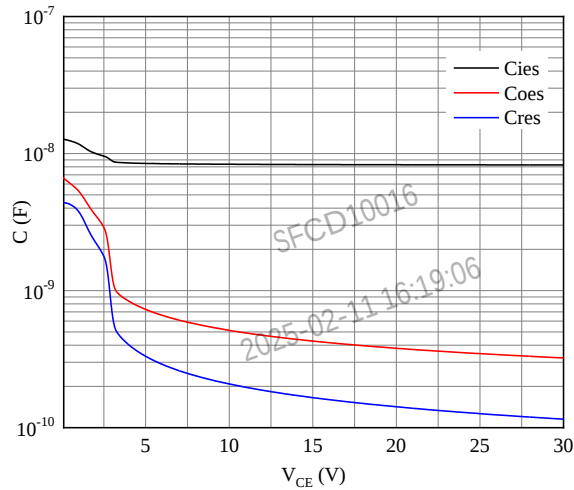
Figure 8. Switching losses of Diode
 $I_F=60A$, $V_{CE}=600V$ 

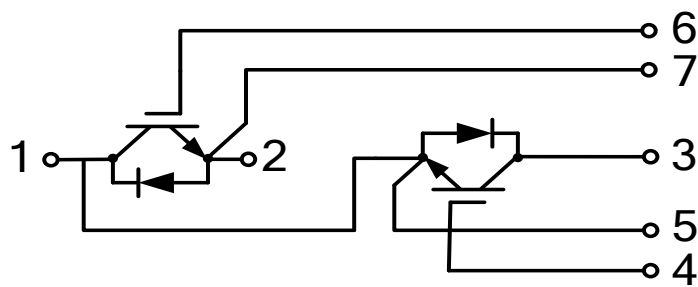
图 9. 电容特性

Figure 9. Capacitance characteristic

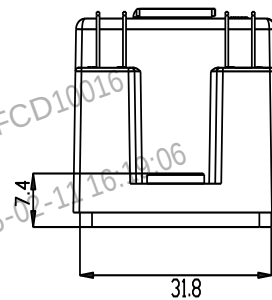
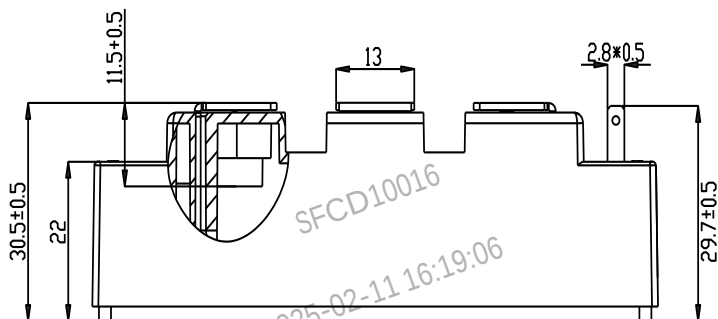
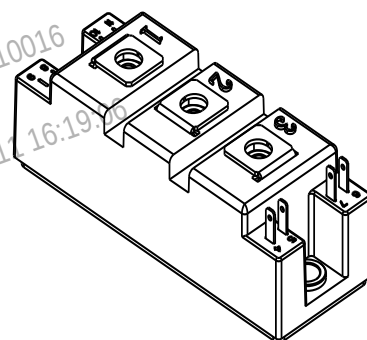
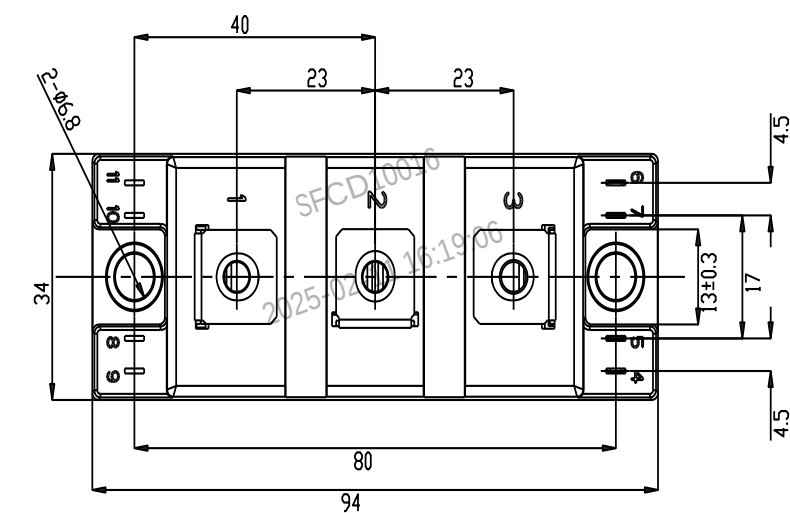
SEMI-FUTURE

SF75R12A6U

接线图 / Circuit diagram



封装尺寸 / Package outlines



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