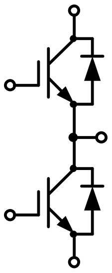
SF75R12A6H 34mm Half Bridge IGBT Module

电气特性 / Features and Benefits:

- 1200V 沟槽栅/场终止工艺
1200V Trench Gate / Field Termination Process
- 低开关损耗
  Low Switching Losses
- 正温度系数
  Positive Temperature Coefficient

典型应用 / Application:

- 逆变焊机
  Inverter Welding Machine
- 感应加热
  Induction Heating
- 高频开关应用
  High Frequency Switch Applications
- 逆变器
  Inverter



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°C	V_{CES}	1200	V
连续集电极直流电流 Continuous DC collector current	T_C=100°C, $T_{vj\ max}$=175°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
总功率损耗 Total power dissipation	T_C = 25°C, $T_{vj\ max}$ = 175°C	P_{tot}	395	W
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°C T_{vj}=125°C T_{vj}=150°C	V_{CEsat}		1.98 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°C	$V_{GE(th)}$	5.10	5.70	6.30	
栅电荷 Gate charge	V_{GE}=-15V…+15V		Q_G		0.36		μC
内部栅极电阻			R_{Gint}		6.00		Ω

Internal gate resistor						
输入电容 Input capacitance	f=1MHz, V_{CE}=25 V, V_{GE}=0 V T_{vj}=25°C	C_{ies}		4.49		nF
反向传输电容 Reverse transfer capacitance		C_{res}		0.20		
集电极-发射极截止电流 Collector-emitter cut-off current	V_{CE}=1200V , V_{GE}= 0 V T_{vj}=25°C	I_{CES}			1	mA
栅极-发射极漏电流 Gate-emitter leakage current	V_{CE}=0 V, V_{GE}= 20 V T_{vj}=25°C	I_{GES}			100	nA
开通延迟时间 Turn-on delay time	I_C=75A, V_{CE}=600 V T_{vj}=25°C V_{GE}=±15 V, R_G=10Ω T_{vj}=125°C (电感负载) / (inductive load) T_{vj}=150°C	$t_{d\ on}$		97 107 111		ns
上升时间 Rise time	I_C=75A, V_{CE}=600 V T_{vj}=25°C V_{GE}=±15 V, R_G=10Ω T_{vj}=125°C (电感负载) / (inductive load) T_{vj}=150°C	t_r		47 58 63		
关断延迟时间 Turn-off delay time	I_C=75A, V_{CE}=600 V T_{vj}=25°C V_{GE}=±15 V, R_G=10Ω T_{vj}=125°C (电感负载) / (inductive load) T_{vj}=150°C	$t_{d\ off}$		242 280 289		
下降时间 Fall time	I_C=75A, V_{CE}=600 V T_{vj}=25°C V_{GE}=±15 V, R_G=10Ω T_{vj}=125°C (电感负载) / (inductive load) T_{vj}=150°C	t_f		119 142 135		
开通损耗能量（每脉冲） Turn-on energy loss per pulse	I_C=75A, V_{CE}=600 V T_{vj}=25°C V_{GE}=±15 V, R_G=10Ω T_{vj}=125°C (电感负载) / (inductive load) T_{vj}=150°C	E_{on}		6.72 10.62 11.89		mJ
关断损耗能量（每脉冲） Turn-off energy loss per pulse	I_C=75A, V_{CE}=600 V T_{vj}=25°C V_{GE}=±15 V, R_G=10Ω T_{vj}=125°C (电感负载) / (inductive load) T_{vj}=150°C	E_{off}		3.16 4.09 4.41		
结-外壳热阻 Thermal resistance, junction to case	每个 IGBT / per IGBT	R_{thJC}			0.38	K/W
在开关状态下温度 Temperature under switching conditions		$T_{vj\ op}$	-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°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=1ms	I_{FRM}	120	A
I^2t 值 I^2t-value	t_p=10ms，sin180°，T_j=125°C	I^2t	1200	A^2s

特征值 / Characteristic Values

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
正向电压 Forward voltage	I_F=60A, V_{GE}=0V T_{vj}=25°C I_F=60A, V_{GE}=0V T_{vj}=125°C I_F=60A, V_{GE}=0V T_{vj}=150°C	V_F		1.90 1.62 1.54	2.40	V
反向恢复峰值电流 Peak reverse recovery current	I_F=60A, T_{vj}=25°C -di_F/dt=900A/µs(T_{vj}=150°C) T_{vj}=125°C V_R=600V, V_{GE}=-15V T_{vj}=150°C	I_{RM}		29 43 48		A
恢复电荷 Recovered charge	I_F=60A, T_{vj}=25°C -di_F/dt=900A/µs(T_{vj}=150°C) T_{vj}=125°C V_R=600V, V_{GE}=-15V T_{vj}=150°C	Q_r		5.46 11.68 13.88		µC
反向恢复损耗（每脉冲） Reverse recovered energy	I_F=60A, T_{vj}=25°C -di_F/dt=900A/µs(T_{vj}=150°C) T_{vj}=125°C V_R=600V, V_{GE}=-15V T_{vj}=150°C	E_{rec}		2.07 4.26 5.06		mJ
结-外壳热阻 Thermal resistance, junction to case	每个二极管 / per diode	R_{thJC}			0.58	K/W
在开关状态下温度 Temperature under switching conditions		$T_{vj\ op}$	-40		150	°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	°C
模块安装的扭矩 Mounting torque for modul mounting		M	3.0		6.0	Nm
重量 Weight		W		155		g

Typical Characteristics

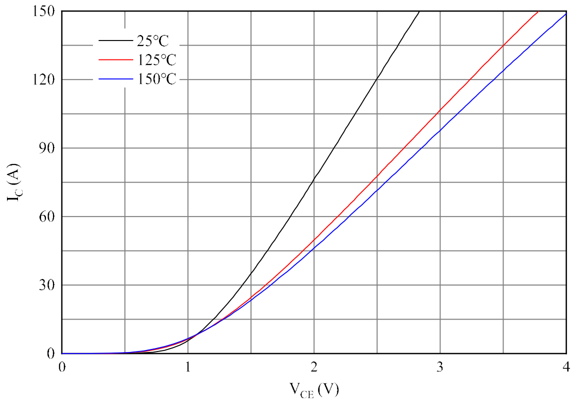


图 1. 典型输出特性 (V_{GE}=15V)

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

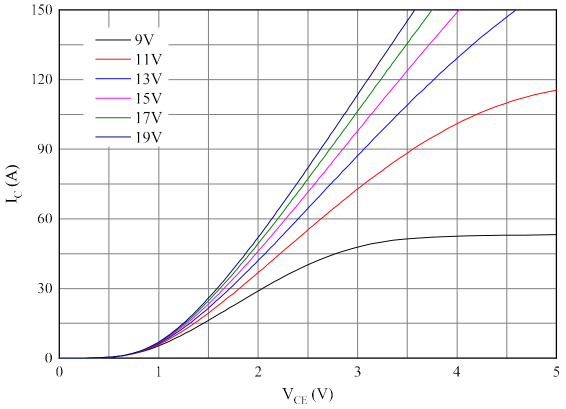


图 2. 典型输出特性 (T_{vj}=150℃)

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

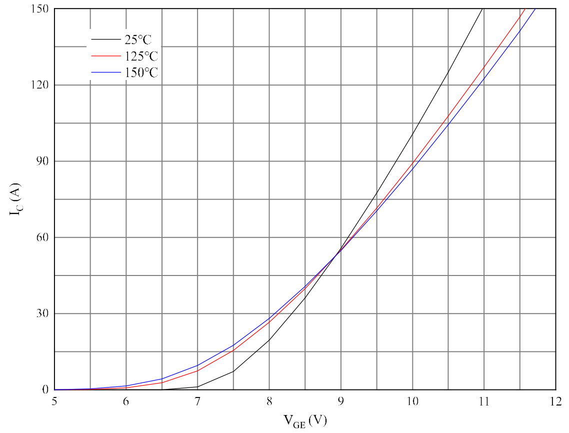


图 3. 典型传输特性(V_{CE}=20V)

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

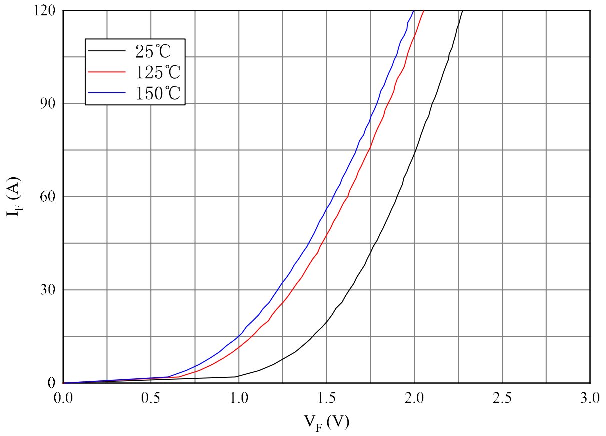


图 4. 正向偏压特性 二极管

Figure 4. Forward characteristic of Diode

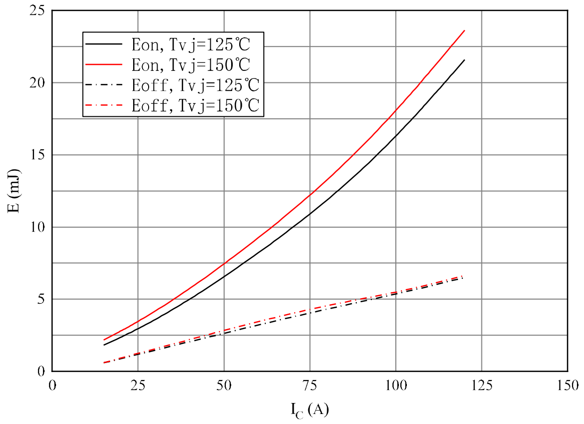


图 5. 开关损耗 逆变器

Figure 5. Switching losses of IGBT

VGE=±15V, RGon=10Ω, RGoff=10Ω, VCE=600V

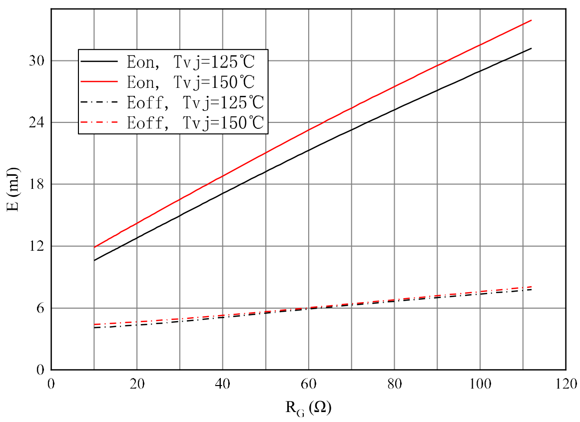


图 6. 开关损耗 逆变器

Figure 6. Switching losses of IGBT

VGE=±15V, IC=75A, VCE=600V

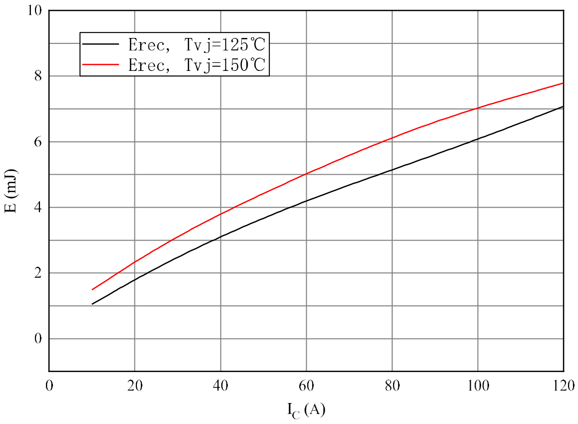


图 7. 开关损耗 二极管

Figure 7. Switching losses of Diode

RGon=10Ω, VCE=600V

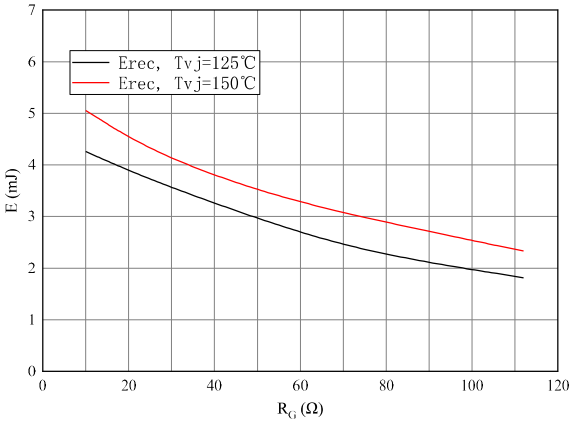


图 8. 开关损耗 二极管

Figure 8. Switching losses of Diode

IF=60A, VCE=600V

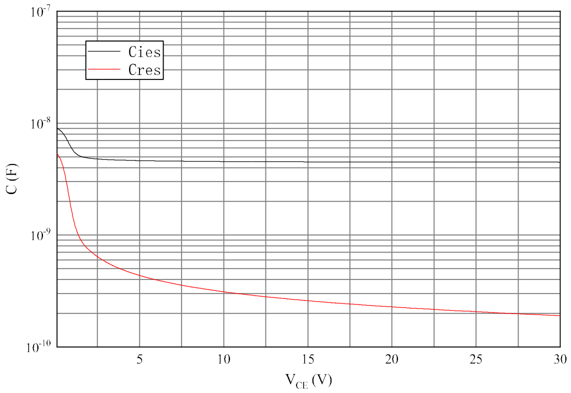
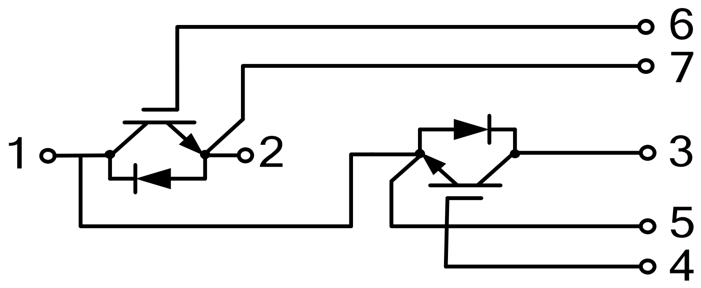


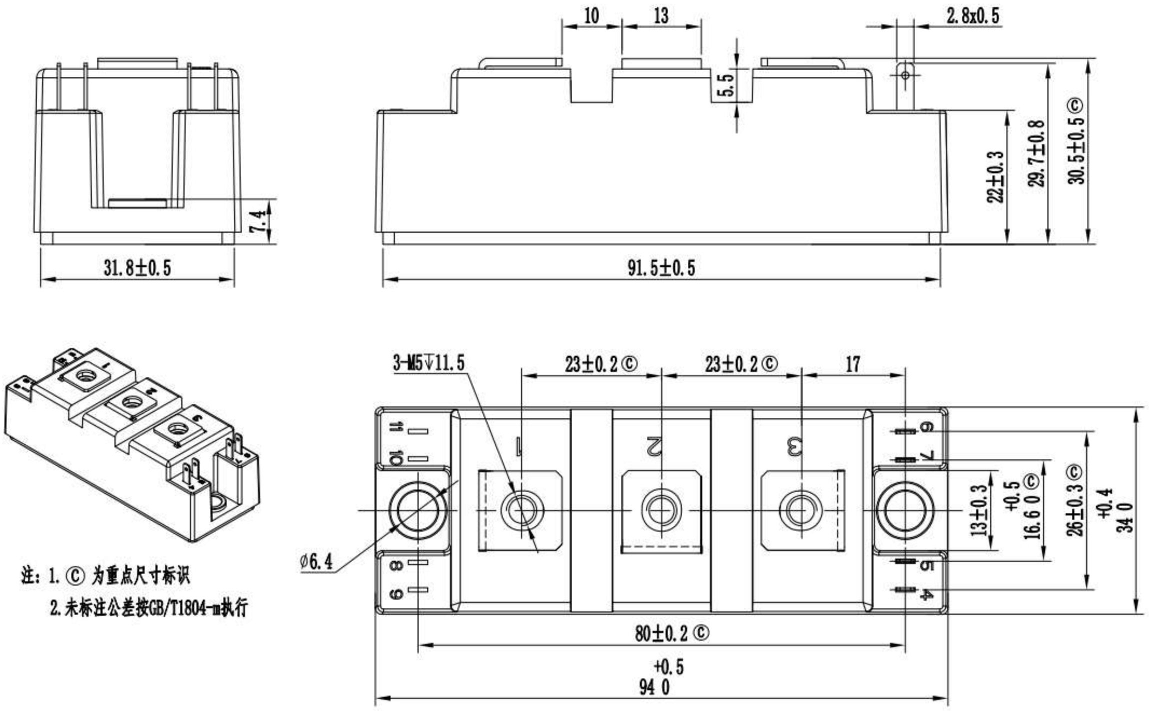
图 9. 电容特性

Figure 9. Capacitance characteristic

接线图 / Circuit diagram



封装尺寸 / Package outlines



注：1. © 为重点尺寸标识
2. 未标注公差按GB/T1804-m执行

Dimensions in (mm)