

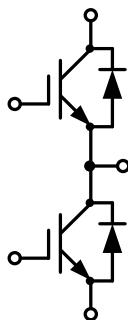
## 34mm Half Bridge IGBT Module

## 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


 $V_{CES} = 1200V, I_{C\text{ nom}} = 150A / I_{CRM} = 300A$ 
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	$T_C = 100^{\circ}C, T_{vj\text{ max}} = 175^{\circ}C$	$I_{C\text{ nom}}$	150	A
集电极重复峰值电流 Repetitive peak collector current	$t_p = 1\text{ ms}$	$I_{CRM}$	300	A
总功率损耗 Total power dissipation	$T_C = 25^{\circ}C, T_{vj\text{ max}} = 175^{\circ}C$	$P_{tot}$	790	W
栅极-发射极电压 Gate emitter voltage		$V_{GE}$	$\pm 20$	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	$V_{GE} = 15V, I_C = 150A$ $V_{GE} = 15V, I_C = 150A$ $V_{GE} = 15V, I_C = 150A$	$T_{vj} = 25^{\circ}C$ $T_{vj} = 125^{\circ}C$ $T_{vj} = 150^{\circ}C$	$V_{CESat}$	2.18 2.51 2.66	2.65	V	
栅极-发射极阈值电压 Gate-Emitter threshold voltage	$I_C = 3.8mA, V_{GE} = V_{CE}$	$T_{vj} = 25^{\circ}C$	$V_{GE(th)}$	5.20	5.80	6.40	
内部栅极电阻 Internal gate resistor			$R_{Gint}$	3.80		$\Omega$	
输入电容 Input capacitance	$f = 1MHz, V_{CE} = 25V, V_{GE} = 0V$	$T_{vj} = 25^{\circ}C$	$C_{ies}$	11.40		nF	

Input capacitance						
反向传输电容 Reverse transfer capacitance		$C_{res}$		0.40		
集电极-发射极截止电流 Collector-emitter cut-off current	$V_{CE}=1200V, V_{GE}=0V$	$T_{vj}=25^{\circ}C$	$I_{CES}$		1	mA
栅极-发射极漏电流 Gate-emitter leakage current	$V_{CE}=0V, V_{GE}=20V$	$T_{vj}=25^{\circ}C$	$I_{GES}$		150	nA
开通延迟时间 Turn-on delay time	$I_C=150A, V_{CE}=600V$ $V_{GE}=\pm 15V, R_G=2.0\Omega$ (电感负载) / (inductive load)	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	$t_{don}$		139 142 143	ns
上升时间 Rise time	$I_C=150A, V_{CE}=600V$ $V_{GE}=\pm 15V, R_G=2.0\Omega$ (电感负载) / (inductive load)	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	$t_r$		37 40 40	
关断延迟时间 Turn-off delay time	$I_C=150A, V_{CE}=600V$ $V_{GE}=\pm 15V, R_G=2.0\Omega$ (电感负载) / (inductive load)	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	$t_{doff}$		192 236 237	
下降时间 Fall time	$I_C=150A, V_{CE}=600V$ $V_{GE}=\pm 15V, R_G=2.0\Omega$ (电感负载) / (inductive load)	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	$t_f$		128 126 143	
开通损耗能量 (每脉冲) Turn-on energy loss per pulse	$I_C=150A, V_{CE}=600V$ $V_{GE}=\pm 15V, R_G=2.0\Omega$ (电感负载) / (inductive load)	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	$E_{on}$		7.90 13.43 15.07	
关断损耗能量 (每脉冲) Turn-off energy loss per pulse	$I_C=150A, V_{CE}=600V$ $V_{GE}=\pm 15V, R_G=2.0\Omega$ (电感负载) / (inductive load)	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	$E_{off}$		8.40 10.59 10.97	mJ
短路数据 SC data	$V_{GE}\leq 15V, V_{CC}=800V$ $V_{CEmax}=V_{CES}-L_{sCE}\cdot di/dt \quad t_p\leq 10\mu s, T_{vj}=150^{\circ}C$		$I_{SC}$		518	A
结-外壳热阻 Thermal resistance, junction to case	每个 IGBT / per IGBT		$R_{thJC}$		0.19	K/W
在开关状态下温度 Temperature under switching conditions			$T_{vjop}$	-40	150	$^{\circ}C$

## 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	$T_{vj}=25^{\circ}C$	$V_{RRM}$	1200	V
连续正向直流电流 Continuous DC forward current		$I_F$	150	A
正向重复峰值电流 Repetitive peak forward current	$t_p=1ms$	$I_{FRM}$	300	A
$I^2t$ 值 $I^2t$ value	$t_p=10ms, \sin 180^{\circ}, T_{vj}=125^{\circ}C$	$I^2t$	4090	$A^2s$

## 特征值 / Characteristic Values

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
正向电压 Forward voltage	$I_F=150A, V_{GE}=0V$ $I_F=150A, V_{GE}=0V$ $I_F=150A, V_{GE}=0V$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	$V_F$	2.51 1.92 1.81	3.00	V
反向恢复峰值电流 Peak reverse recovery current	$I_F=150A,$ $-di_F/dt=2150A/\mu s(T_{vj}=150^{\circ}C)$ $V_R=600V, V_{GE}=-15V$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	$I_{RM}$	42 89 100		A
恢复电荷 Recovered charge	$I_F=150A,$ $-di_F/dt=3900A/\mu s(T_{vj}=150^{\circ}C)$ $V_R=600V, V_{GE}=-15V$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	$Q_r$	3.10 9.50 12.60		$\mu C$
反向恢复损耗（每脉冲） Reverse recovered energy	$I_F=150A,$ $-di_F/dt=3900A/\mu s(T_{vj}=150^{\circ}C)$ $V_R=600V, V_{GE}=-15V$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	$E_{rec}$	1.10 3.30 3.95		mJ
结-外壳热阻 Thermal resistance, junction to case	每个二极管 / per diode		$R_{thJC}$		0.31	K/W
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 <sub>2</sub> O <sub>3</sub>			
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		6.0	Nm
重量 Weight		W		158		g

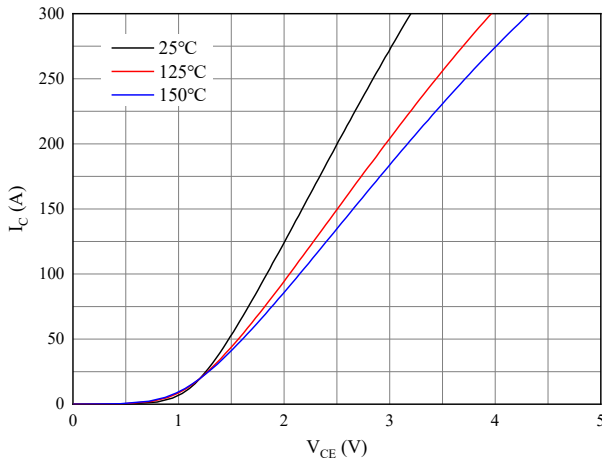


图 1. 典型输出特性 ( $V_{GE}=15V$ )

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

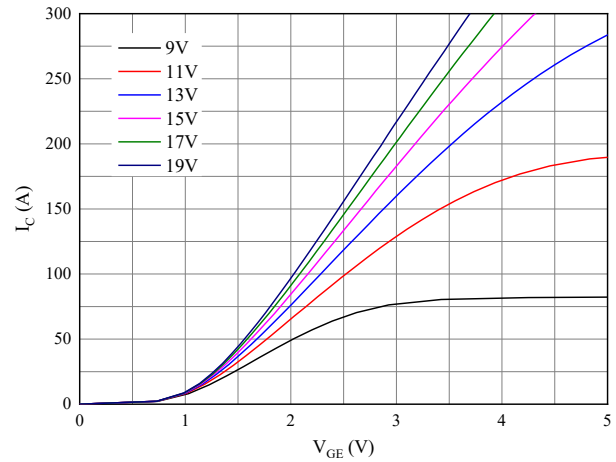


图 2. 典型输出特性 ( $T_{vj}=150^{\circ}C$ )

Figure 2. Typical output characteristics ( $T_{vj}=150^{\circ}C$ )

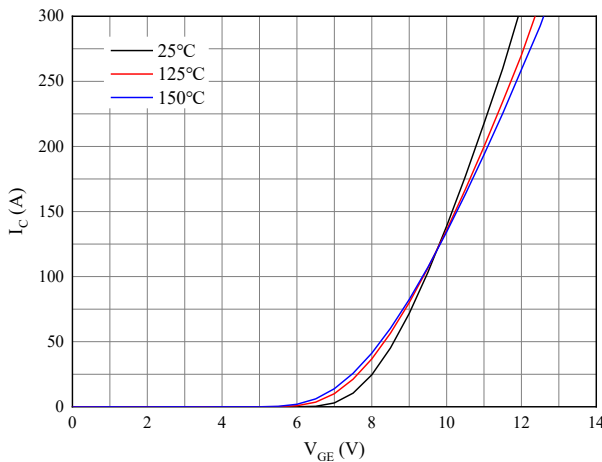


图 3. 典型传输特性( $V_{CE}=20V$ )

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

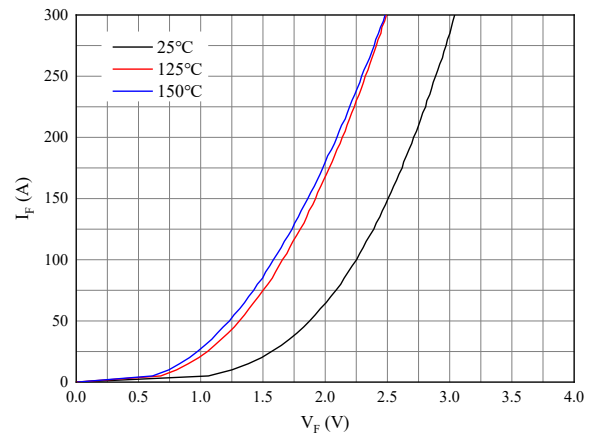


图 4. 正向偏压特性 二极管

Figure 4. Forward characteristic of Diode

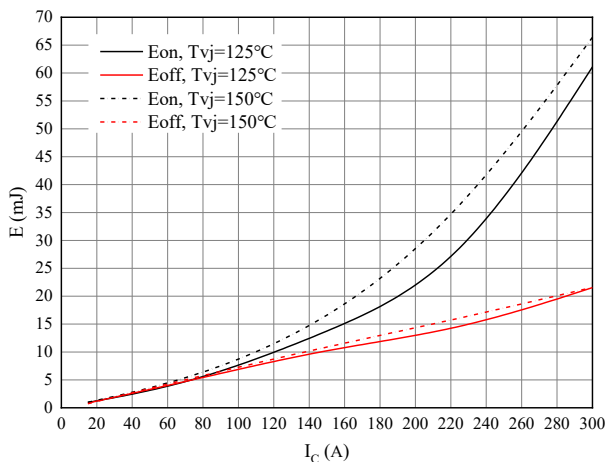


图 5. 开关损耗 逆变器

Figure 5. Switching losses of IGBT

$V_{GE}=\pm 15V, R_{Gon}=2\Omega, R_{Goff}=2\Omega, V_{CE}=600V$

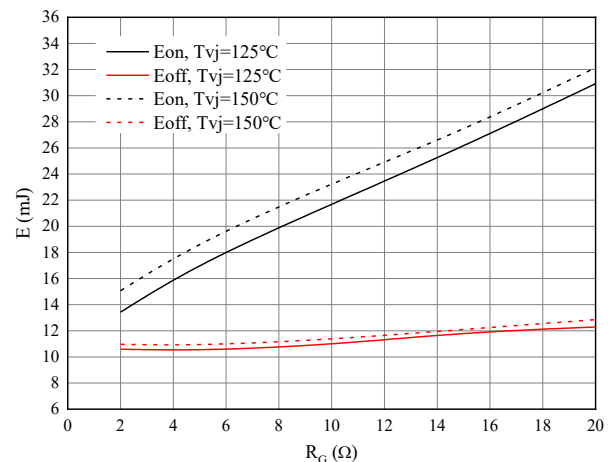


图 6. 开关损耗 逆变器

Figure 6. Switching losses of IGBT

$V_{GE}=\pm 15V, I_C=150A, V_{CE}=600V$

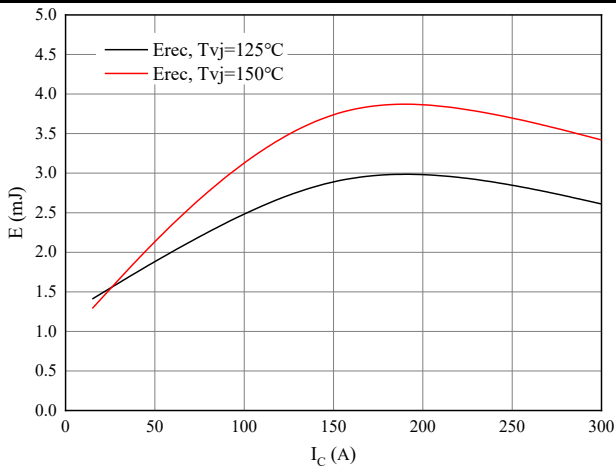


图 7. 开关损耗 二极管

Figure 7. Switching losses of Diode

$R_{Gon}=2\ \Omega, V_{CE}=600\text{V}$

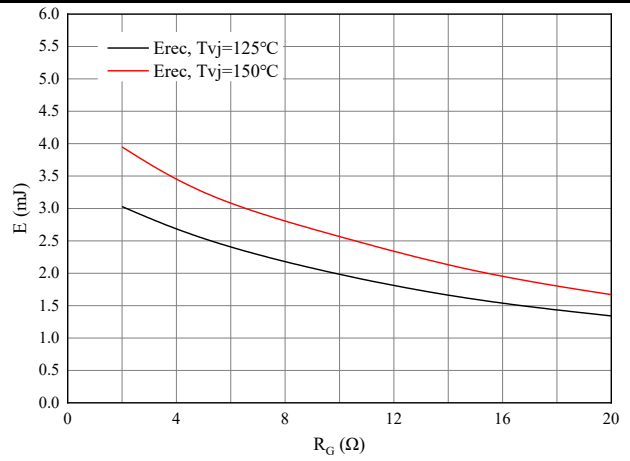


图 8. 开关损耗 二极管

Figure 8. Switching losses of Diode

$I_F=150\text{A}, V_{CE}=600\text{V}$

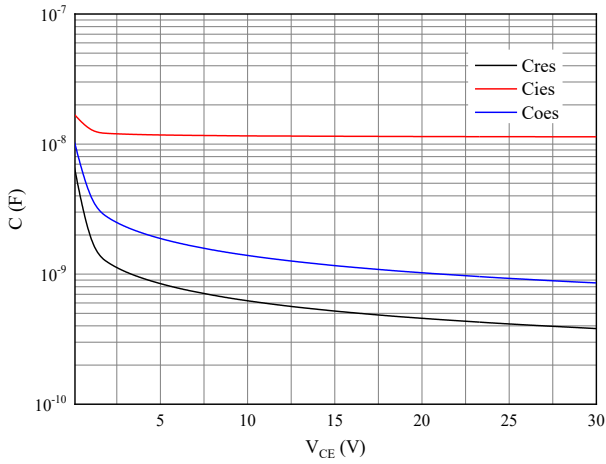
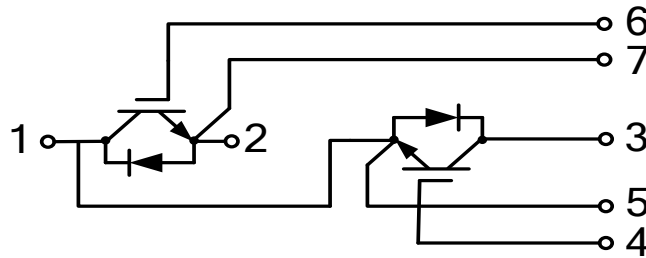


图 9. 电容特性

Figure 9. Capacitance characteristic

接线图 / Circuit diagram



封装尺寸 / Package outlines

