

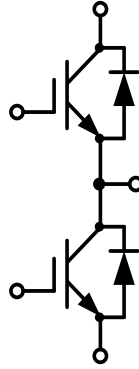
62mm Half Bridge IGBT Module

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:

- UPS 系统
- 电机传动
- 三电平应用
- 伺服驱动器



$V_{CES} = 1200V$, $I_{C\ nom} = 600A$ / $I_{CRM} = 1200A$

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	$T_C = 100^{\circ}C$, $T_{vj\ max} = 175^{\circ}C$	$I_{C\ nom}$	600	A
集电极重复峰值电流 Repetitive peak collector current	$t_p = 1\ ms$	I_{CRM}	1200	A
总功率损耗 Total power dissipation	$T_C = 25^{\circ}C$, $T_{vj\ max} = 175^{\circ}C$	P_{tot}	2050	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	$V_{GE} = 15V$, $I_C = 600A$ $V_{GE} = 15V$, $I_C = 600A$ $V_{GE} = 15V$, $I_C = 600A$	$T_{vj} = 25^{\circ}C$ $T_{vj} = 125^{\circ}C$ $T_{vj} = 150^{\circ}C$	V_{CESat}	1.82 2.18 2.29	2.6	V
栅极-发射极阈值电压 Gate-Emitter threshold voltage	$I_C = 12mA$, $V_{GE} = V_{CE}$	$T_{vj} = 25^{\circ}C$	$V_{GE(th)}$	5.2	5.8	6.4
栅电荷 Gate charge	$V_{GE} = -15V \dots +15V$		Q_G	7.52		μC
内部栅极电阻 Internal gate resistor	$T_{vj} = 25^{\circ}C$		R_{Gint}	0.9		Ω

Changes of this product data sheet are reserved.
Edited by Semi-Future Technologies, Edition 0.3

preliminary

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}	94.9	nF
反向传输电容 Reverse transfer capacitance		C_{res}	0.39	nF
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}	2	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}	200	nA
开通延迟时间 Turn-on delay time	$I_C=600\text{A}, V_{CE}=600\text{ V}$ $V_{GE}=\pm 15\text{ V}, R_G=0.5\Omega$ (电感负载) / (inductive load)	$T_{vj}=25^\circ\text{C}$ $T_{vj}=125^\circ\text{C}$ $T_{vj}=150^\circ\text{C}$	t_{don}	366 393 396
上升时间 Rise time			t_r	86 98 101
关断延迟时间 Turn-off delay time				t_{doff}
下降时间 Fall time	t_f	124 215 243		
开通损耗能量 (每脉冲) Turn-on energy loss per pulse		E_{on}	28.54 49.61 59.54	
关断损耗能量 (每脉冲) Turn-off energy loss per pulse			E_{off}	55.75 71.68 77.16
短路数据 SC data	I_{sc}			2000
结-外壳热阻 Thermal resistance, junction to case		R_{thJC}		0.065
在开关状态下温度 Temperature under switching conditions			$T_{vj op}$	-40
	150			
	$^\circ\text{C}$			

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	600	A
正向重复峰值电流 Repetitive peak forward current	$t_p=1\text{ms}$	I_{FRM}	1200	A
I^2t 值 I^2t -value	$t_p=10\text{ms}, \sin 180^\circ, T_j=125^\circ\text{C}$	I^2t	45000	A^2S

特征值 / Characteristic Values

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
正向电压 Forward voltage	$I_F=600A, V_{GE}=0V$ $I_F=600A, V_{GE}=0V$ $I_F=600A, V_{GE}=0V$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	V_F		2.24 2.17 2.10	2.80 V
反向恢复峰值电流 Peak reverse recovery current	$I_F=600A,$ $-di_F/dt=4700A/\mu s(T_{vj}=150^{\circ}C)$ $V_R=600V, V_{GE}=-15V$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	I_{RM}		320 448 464	A
恢复电荷 Recovered charge	$I_F=600A,$ $-di_F/dt=4700A/\mu s(T_{vj}=150^{\circ}C)$ $V_R=600V, V_{GE}=-15V$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	Q_r		29.00 70.94 87.43	μC
反向恢复损耗（每脉冲） Reverse recovered energy	$I_F=600A,$ $-di_F/dt=4700A/\mu s(T_{vj}=150^{\circ}C)$ $V_R=600V, V_{GE}=-15V$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	E_{rec}		12.25 27.93 34.12	mJ
结-外壳热阻 Thermal resistance, junction to case	每个二极管 / per diode		R_{thJC}			0.078 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_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		6.0	Nm
重量 Weight		W		325		g

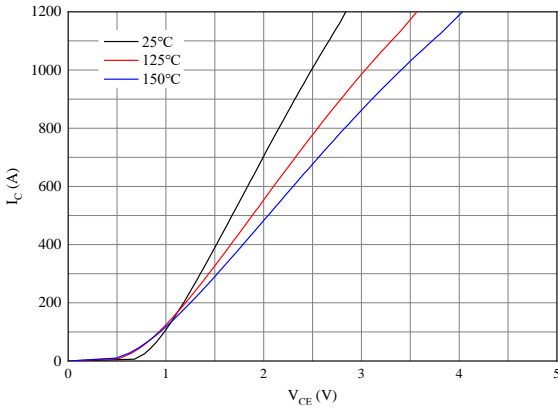


图 1. 典型输出特性 ($V_{GE}=15V$)

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

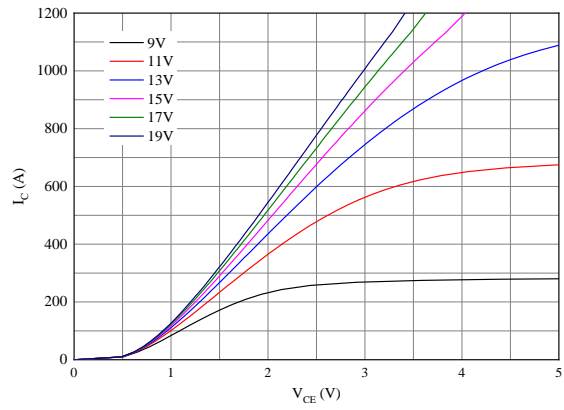


图 2. 典型输出特性 ($T_{vj}=150^{\circ}C$)

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

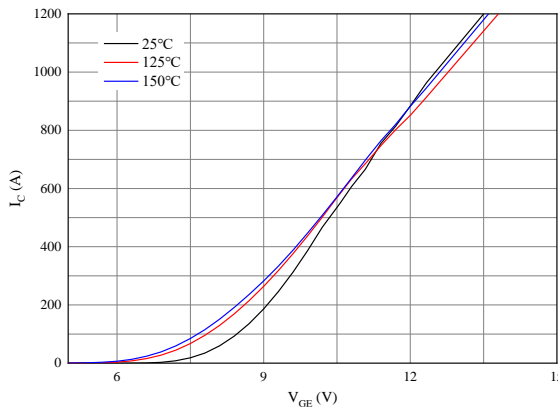


图 3. 典型传输特性 ($V_{CE}=20V$)

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

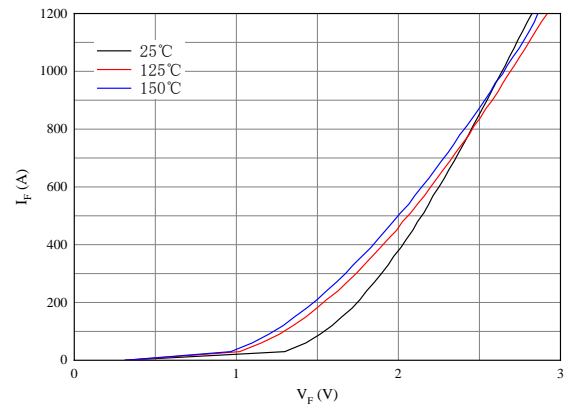


图 4. 正向偏压特性 二极管

Figure 4. Forward characteristic of Diode

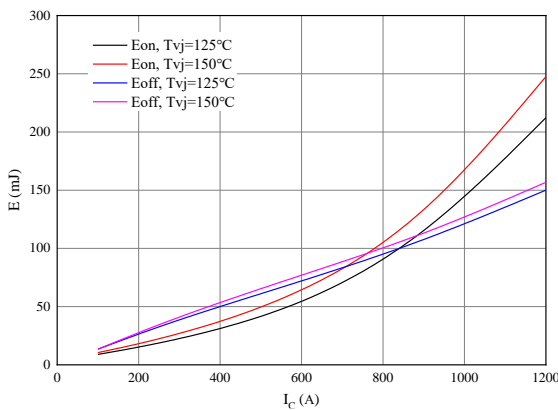


图 5. 开关损耗 逆变器

Figure 5. Switching losses of IGBT

$V_{GE}=\pm 15V, R_{Gon}=0.5\Omega, R_{Goff}=0.5\Omega, V_{CE}=600V$

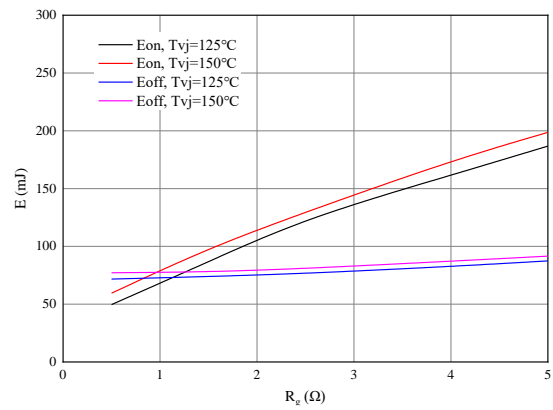


图 6. 开关损耗 逆变器

Figure 6. Switching losses of IGBT

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

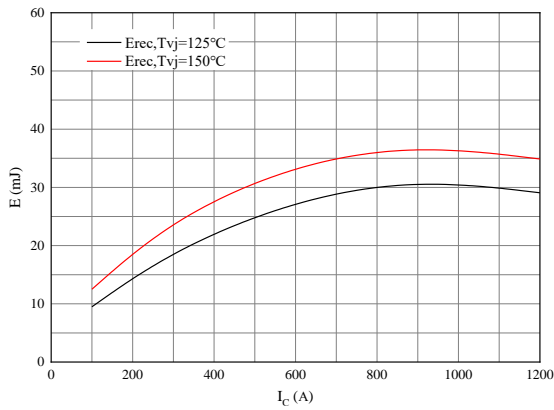


图 7. 开关损耗 二极管
Figure 7. Switching losses of Diode
RGon=0.5Ω, VCE=600V

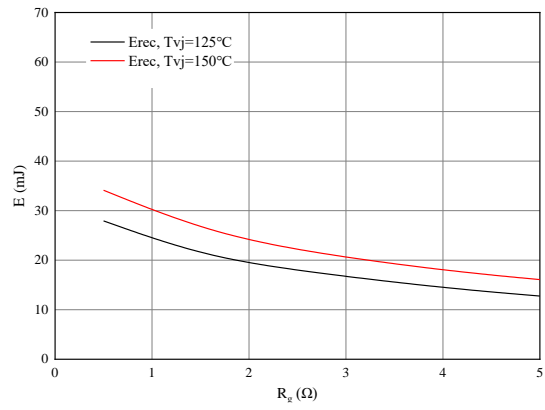


图 8. 开关损耗 二极管
Figure 8. Switching losses of Diode
IF=600A, VCE=600V

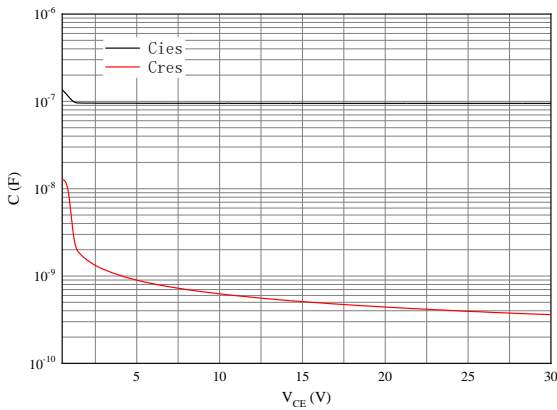


图 9. 电容特性
Figure 9. Capacitance characteristic

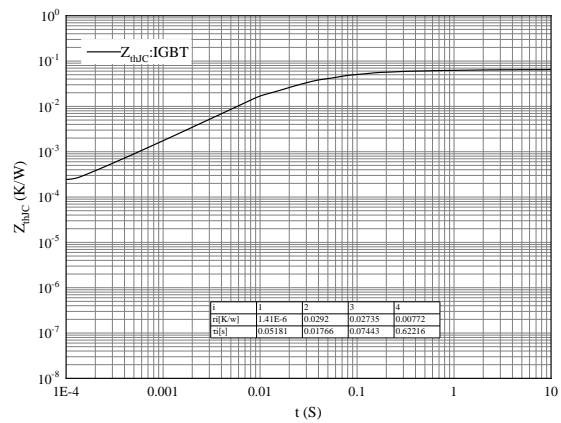


图 10. 瞬态热阻抗 IGBT 逆变器
Figure10. Transient thermal impedance IGBT,Inverter
 $Z_{thJC}=f(t)$

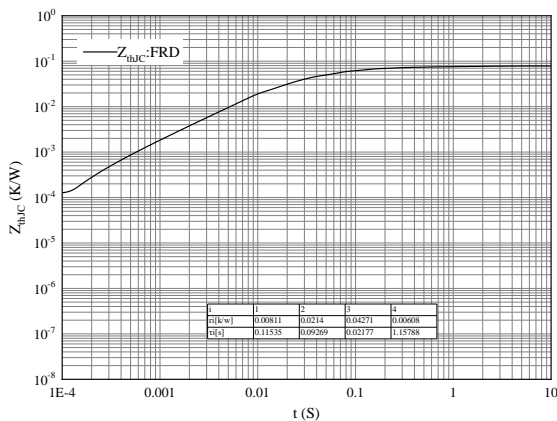
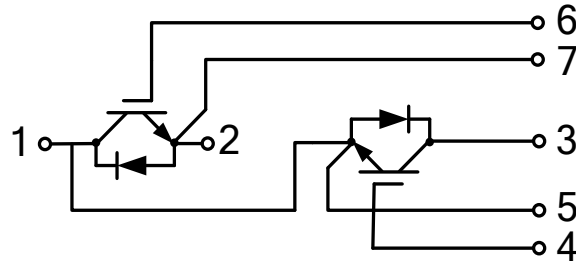
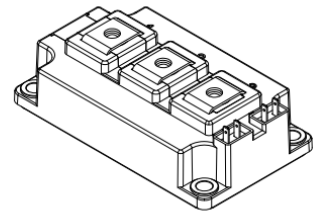
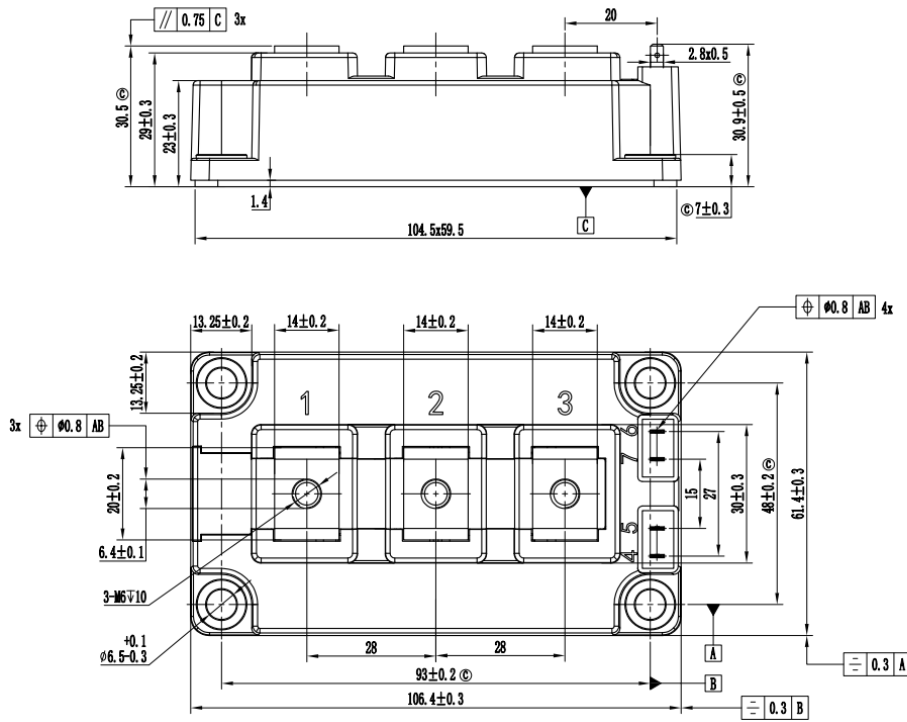


图 11. 瞬态热阻抗 FRD 逆变器
Figure11. Transient thermal impedance FRD ,Inverter
 $Z_{thJC}=f(t)$

接线图 / Circuit diagram



封装尺寸 / Package outlines



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2. 未标注公差按GB/T1804-m执行