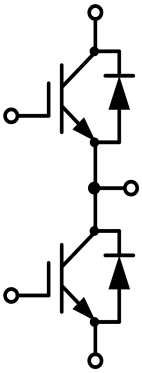
62mm Half Bridge IGBT Module

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°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	$I_{C\ nom}$	600	A
集电极重复峰值电流 Repetitive peak collector current	t_P=1ms	I_{CRM}	1200	A
总功率损耗 Total power dissipation	T_C=25°C, $T_{vj\ max}$=175°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°C T_{vj}=125°C T_{vj}=150°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°C	$V_{GE(th)}$	5.2	5.8	6.4	
栅电荷 Gate charge	V_{GE}=-15V…+15V		Q_G		7.52		µC
内部栅极电阻 Internal gate resistor	T_{vj}=25°C		R_{Gint}		0.9		Ω

输入电容 Input capacitance	f=100KHz, V_{CE}=25V, V_{GE}=0V	T_{vj}=25°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}=1200V , V_{GE}=0V	T_{vj}=25°C	I_{CES}		2	mA
栅极-发射极漏电流 Gate-emitter leakage current	V_{CE}=0V, V_{GE}=20V	T_{vj}=25°C	I_{GES}		200	nA
开通延迟时间 Turn-on delay time	I_C=600A, V_{CE}=600V V_{GE}=±15 V, R_G=0.5Ω (电感负载) / (inductive load)	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	$t_{d\,on}$		366 393 396	ns
上升时间 Rise time	I_C=600A, V_{CE}=600V V_{GE}=±15 V, R_G=0.5Ω (电感负载) / (inductive load)	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	t_r		86 98 101	
关断延迟时间 Turn-off delay time	I_C=600A, V_{CE}=600V V_{GE}=±15 V, R_G=0.5Ω (电感负载) / (inductive load)	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	$t_{d\,off}$		397 444 461	
下降时间 Fall time	I_C=600A, V_{CE}=600V V_{GE}=±15 V, R_G=0.5Ω (电感负载) / (inductive load)	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	t_f		124 215 243	
开通损耗能量（每脉冲） Turn-on energy loss per pulse	I_C=600A, V_{CE}=600V V_{GE}=±15 V, R_G=0.5Ω di/dt = 4700A/μs (Tvj = 150°C) (电感负载) / (inductive load)	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	E_{on}		28.54 49.61 59.54	mJ
关断损耗能量（每脉冲） Turn-off energy loss per pulse	I_C=600A, V_{CE}=600V V_{GE}=±15 V, R_G=0.5Ω dv/dt = 4200V/μs (Tvj = 150°C) (电感负载) / (inductive load)	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	E_{off}		55.75 71.68 77.16	
短路数据 SC data	V_{GE}≤15V, Vce=800V V_{CEmax}=V_{CES}-L_{sCE}·di/dt	t_P≤8us, T_{vj}=150°C	I_{SC}		2000	A
结-外壳热阻 Thermal resistance, junction to case	每个 IGBT / per IGBT		R_{thJC}		0.065	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	600	A
正向重复峰值电流 Repetitive peak forward current	t_p=1ms	I_{FRM}	1200	A
I^2t 值 I^2t-value	t_p=10ms，sin180°，T_j=125°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°C T_{vj}=125°C T_{vj}=150°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/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}		320 448 464		A
恢复电荷 Recovered charge	I_F=600A, -di$_F$/dt=4700A/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		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/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}		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	°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		325		g

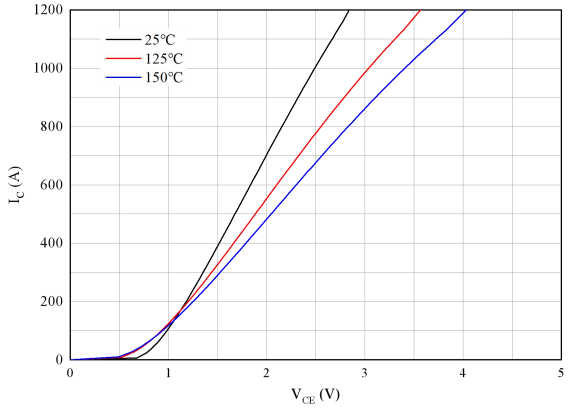


图 1. 典型输出特性 (V_{GE}=15V)
Figure 1. Typical output characteristics (V_{GE}=15V)

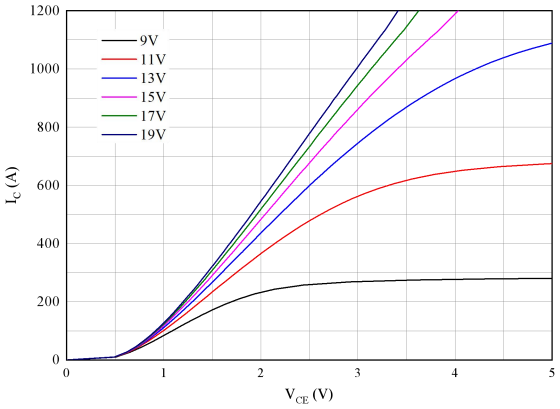


图 2. 典型输出特性 (T_{vj}=150℃)
Figure 2. Typical output characteristics (T_{vj}=150℃)

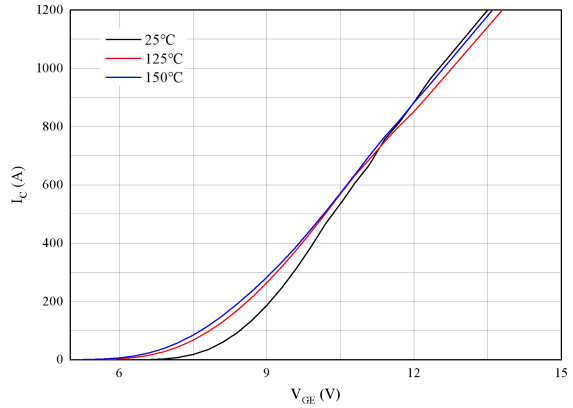


图 3. 典型传输特性(V_{CE}=20V)
Figure 3. Typical transfer characteristic(V_{CE}=20V)

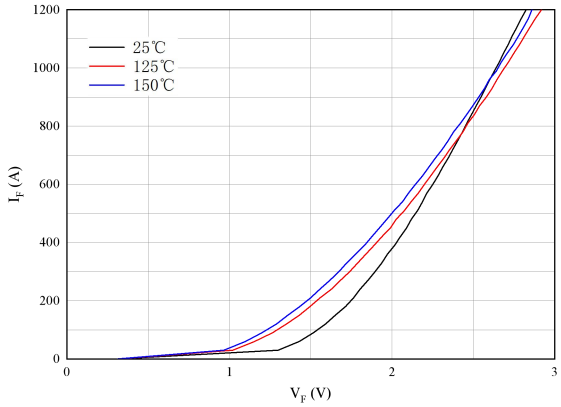


图 4. 正向偏压特性 二极管
Figure 4. Forward characteristic of Diode

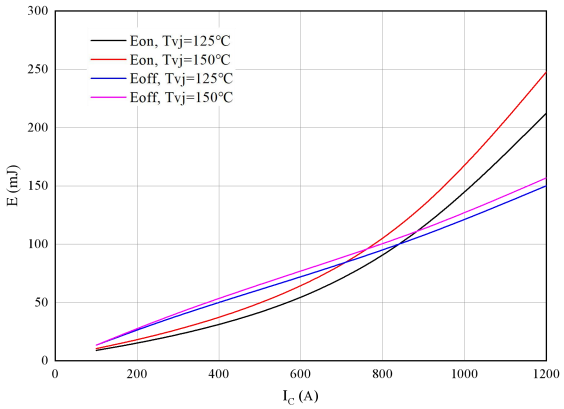


图 5. 开关损耗 逆变器
Figure 5. Switching losses of IGBT
VGE=±15V, RGon=0.5Ω, RGoff=0.5Ω, VCE=600V

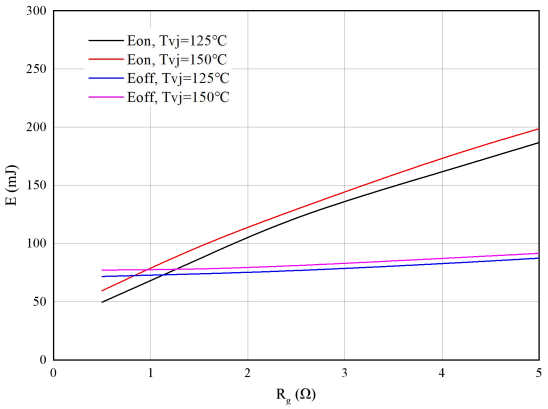


图 6. 开关损耗 逆变器
Figure 6. Switching losses of IGBT
VGE=±15V, IC=600A, VCE=600V

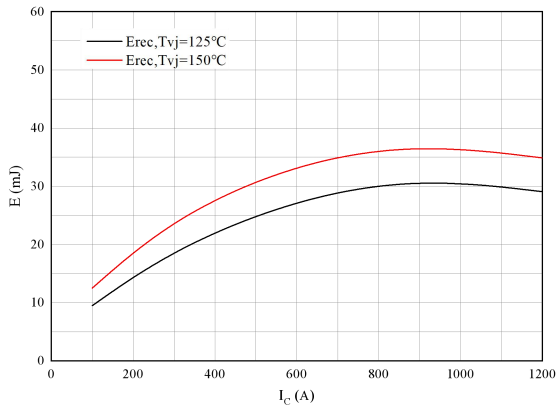


图 7. 开关损耗 二极管

Figure 7. Switching losses of Diode

RGon=0.5Ω, VCE=600V

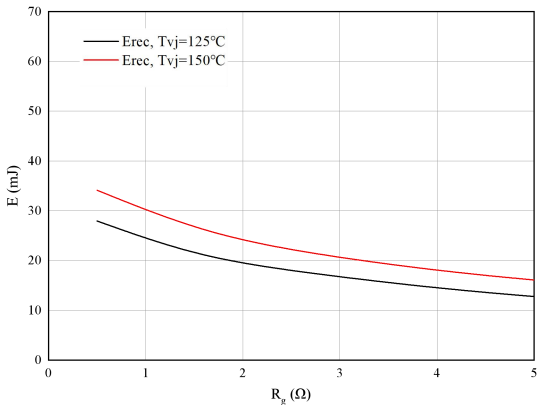


图 8. 开关损耗 二极管

Figure 8. Switching losses of Diode

IF=600A, VCE=600V

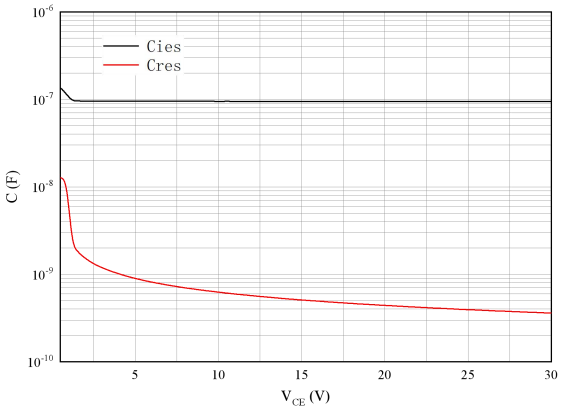


图 9. 电容特性

Figure 9. Capacitance characteristic

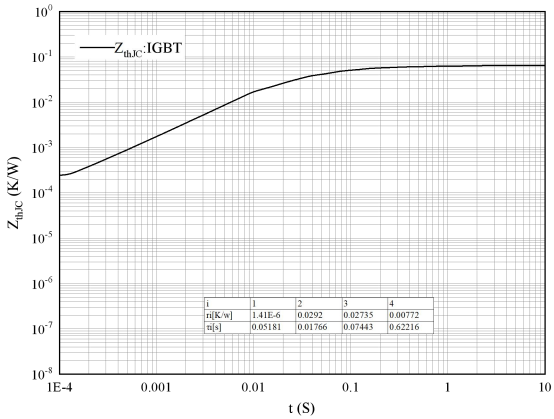


图 10. 瞬态热阻抗 IGBT 逆变器

Figure10. Transient thermal impedance IGBT,Inverter

$Z_{thJC}=f(t)$

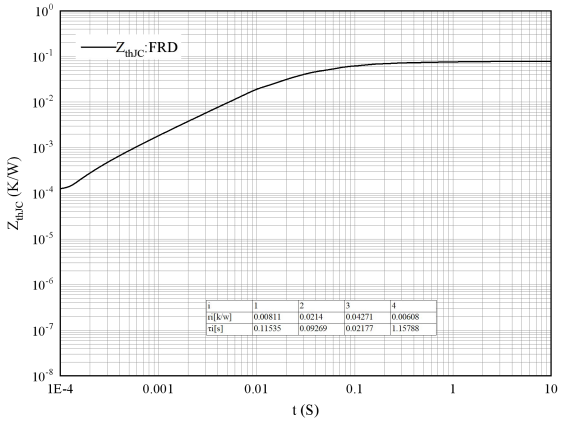
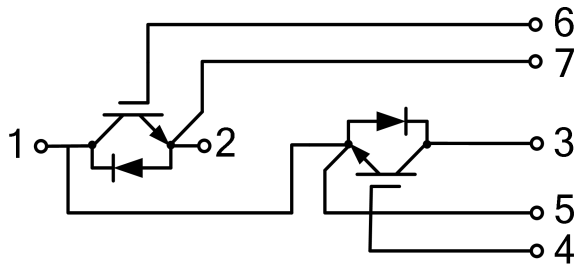


图 11. 瞬态热阻抗 FRD 逆变器

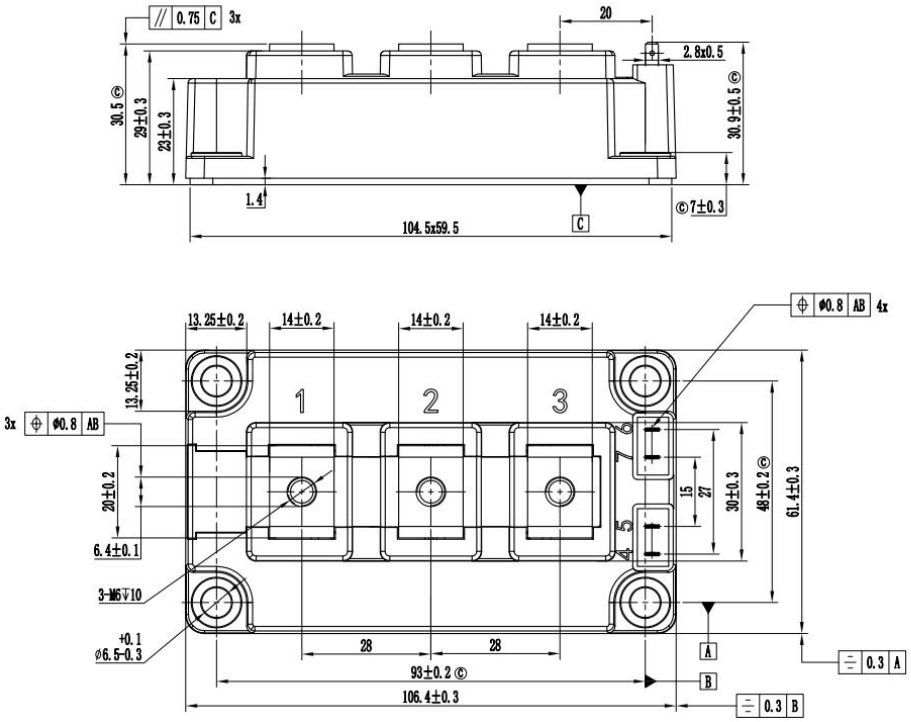
Figure11. Transient thermal impedance FRD ,Inverter

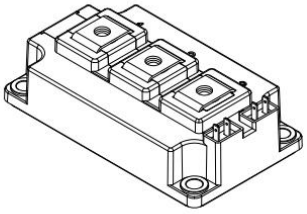
$Z_{thJC}=f(t)$

接线图 / Circuit diagram



封装尺寸 / Package outlines





注：1. ©尺寸为关键管控尺寸
2. 未标注公差按GB/T1804-m执行