

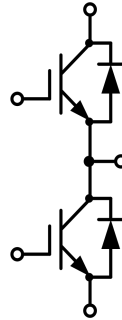
62mm Half Bridge IGBT Module

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:

- 变频器
- UPS
- 伺服
- 逆变器


 $V_{CES} = 1200V, I_{C\ nom} = 450A / I_{CRM} = 900A$
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	$T_C=100^{\circ}C, T_{vj\ max}=175^{\circ}C$	$I_{C\ nom}$	450	A
集电极重复峰值电流 Repetitive peak collector current	$t_p=1\ ms$	I_{CRM}	900	A
总功率损耗 Total power dissipation	$T_C = 25^{\circ}C, T_{vj\ max} = 175^{\circ}C$	P_{tot}	2500	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	$V_{GE}=15V, I_C=450A$ $V_{GE}=15V, I_C=450A$ $V_{GE}=15V, I_C=450A$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$		1.85 2.13 2.19	2.20	V
栅极-发射极阈值电压 Gate-Emitter threshold voltage	$I_C=17mA, V_{GE}=V_{CE}$	$T_{vj}=25^{\circ}C$				
栅电荷 Gate charge	$V_{GE}=-15V \dots +15V$	Q_G		3.10		μC
内部栅极电阻	$T_{vj}=25^{\circ}C$	R_{Gint}		1.84		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}		34.62		nF
反向传输电容 Reverse transfer capacitance		C _{res}		1.37		nF
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}			200	nA
开通延迟时间 Turn-on delay time	I _C =450A, V _{CE} =600 V T _{vj} =25°C V _{GE} =±15 V, R _G =1Ω T _{vj} =125°C (电感负载) / (inductive load) T _{vj} =150°C	t _{d on}		217 228 230		ns
上升时间 Rise time	I _C =450A, V _{CE} =600 V T _{vj} =25°C V _{GE} =±15 V, R _G =1Ω T _{vj} =125°C (电感负载) / (inductive load) T _{vj} =150°C	t _r		83 89 92		
关断延迟时间 Turn-off delay time	I _C =450A, V _{CE} =600 V T _{vj} =25°C V _{GE} =±15 V, R _G =1Ω T _{vj} =125°C (电感负载) / (inductive load) T _{vj} =150°C	t _{d off}		380 425 439		
下降时间 Fall time	I _C =450A, V _{CE} =600 V T _{vj} =25°C V _{GE} =±15 V, R _G =1Ω T _{vj} =125°C (电感负载) / (inductive load) T _{vj} =150°C	t _f		102 109 109		
开通损耗能量（每脉冲） Turn-on energy loss per pulse	I _C =450A, V _{CE} =600 V T _{vj} =25°C V _{GE} =±15 V, R _G =1Ω T _{vj} =125°C di/dt =4000 A/μs (T _{vj} = 150°C)\ (电感负载) / (inductive load) T _{vj} =150°C	E _{on}		26.38 36.60 41.24		mJ
关断损耗能量（每脉冲） Turn-off energy loss per pulse	I _C =450A, V _{CE} =600 V T _{vj} =25°C V _{GE} =±15 V, R _G =1Ω T _{vj} =125°C dv/dt = 4900V/μs (T _{vj} = 150°C) (电感负载) / (inductive load) T _{vj} =150°C	E _{off}		35.87 40.24 41.81		
短路数据 SC data	V _{GE} ≤15V, V _{ce} =800V V _{CEmax} =V _{CES} -L _{sCE} ·di/dt t _p ≤10us, T _{vj} =150°C	I _{sc}		3074		A
结-外壳热阻 Thermal resistance, junction to case	每个 IGBT / per IGBT	R _{thJC}			0.06	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	$T_{vj}=25^{\circ}\text{C}$	V_{RRM}	1200	V
连续正向直流电流 Continuous DC forward current		I_F	450	A
正向重复峰值电流 Repetitive peak forward current	$t_p=1\text{ms}$	I_{FRM}	900	A
I^2t 值 I^2t -value	$t_p=10\text{ms}$, $\sin 180^{\circ}$, $T_j=125^{\circ}\text{C}$	I^2t	40271	A^2S

特征值 / Characteristic Values

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
正向电压 Forward voltage	$I_F=450\text{A}$, $V_{GE}=0\text{V}$, $T_{vj}=25^{\circ}\text{C}$ $I_F=450\text{A}$, $V_{GE}=0\text{V}$, $T_{vj}=125^{\circ}\text{C}$ $I_F=450\text{A}$, $V_{GE}=0\text{V}$, $T_{vj}=150^{\circ}\text{C}$	V_F		2.30 2.46 2.38	2.80	V
反向恢复峰值电流 Peak reverse recovery current	$I_F=450\text{A}$, $T_{vj}=25^{\circ}\text{C}$ $-di_F/dt=4000\text{A}/\mu\text{s}$ ($T_{vj}=150^{\circ}\text{C}$), $T_{vj}=125^{\circ}\text{C}$ $V_R=600\text{V}$, $V_{GE}=-15\text{V}$, $T_{vj}=150^{\circ}\text{C}$	I_{RM}		250 288 307		A
恢复电荷 Recovered charge	$I_F=450\text{A}$, $T_{vj}=25^{\circ}\text{C}$ $-di_F/dt=4000\text{A}/\mu\text{s}$ ($T_{vj}=150^{\circ}\text{C}$), $T_{vj}=125^{\circ}\text{C}$ $V_R=600\text{V}$, $V_{GE}=-15\text{V}$, $T_{vj}=150^{\circ}\text{C}$	Q_r		34 51 61		μC
反向恢复损耗（每脉冲） Reverse recovered energy	$I_F=450\text{A}$, $T_{vj}=25^{\circ}\text{C}$ $-di_F/dt=4000\text{A}/\mu\text{s}$ ($T_{vj}=150^{\circ}\text{C}$), $T_{vj}=125^{\circ}\text{C}$ $V_R=600\text{V}$, $V_{GE}=-15\text{V}$, $T_{vj}=150^{\circ}\text{C}$	E_{rec}		14.53 21.06 25.04		mJ
结-外壳热阻 Thermal resistance, junction to case	每个 Diode / per diode	R_{thJC}			0.16	K/W
在开关状态下温度 Temperature under switching conditions		$T_{vj\text{ op}}$	-40		150	$^{\circ}\text{C}$

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 ₂ O 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
端子连接扭矩 Terminal Connection Torque		M	2.5		5.0	Nm
重量 Weight		W		324		g

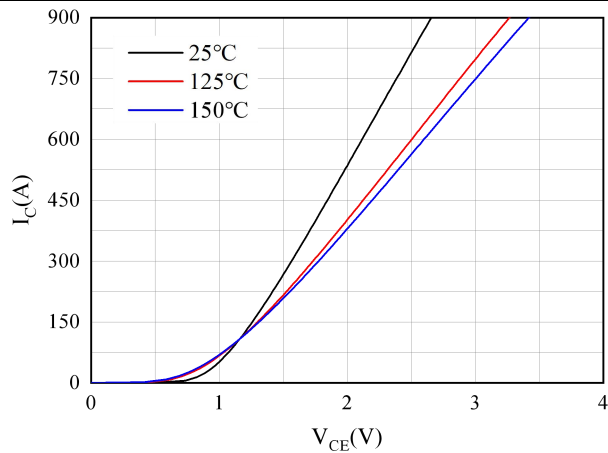
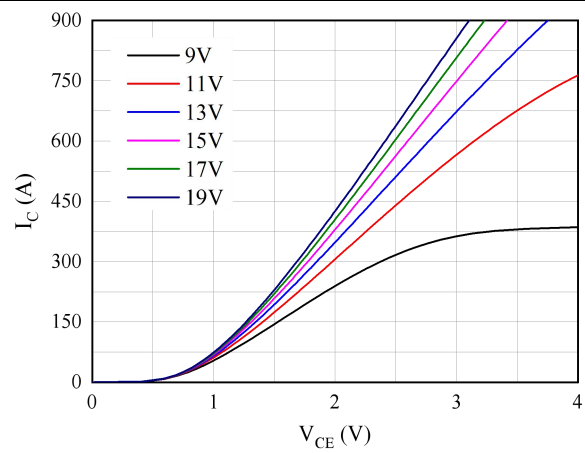
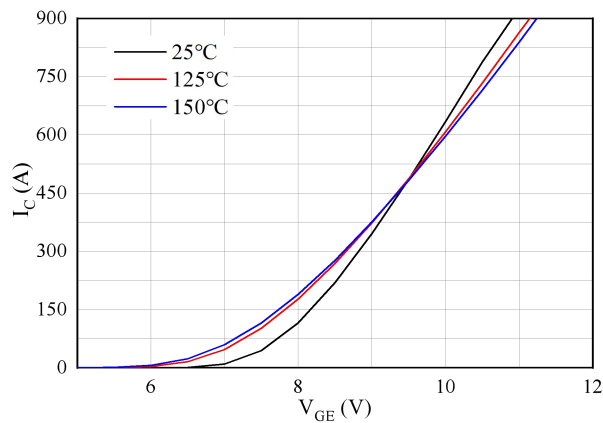
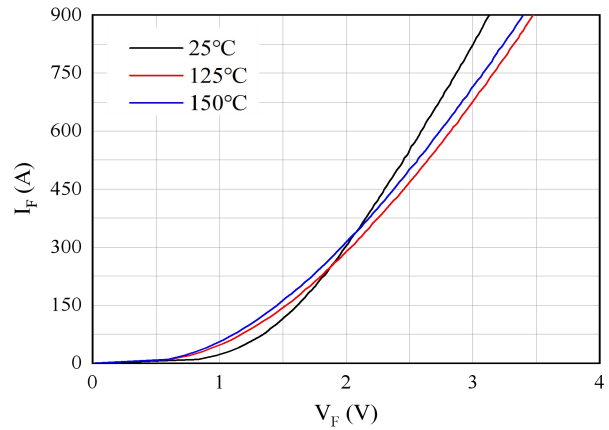
图 1. 典型输出特性 ($V_{GE}=15V$)Figure 1. Typical output characteristics ($V_{GE}=15V$)图 2. 典型输出特性 ($T_{vj}=150^{\circ}C$)Figure 2. Typical output characteristics ($T_{vj}=150^{\circ}C$)图 3. 典型传输特性 ($V_{CE}=20V$)Figure 3. Typical transfer characteristic ($V_{CE}=20V$)

图 4. 正向偏压特性 二极管

Figure 4. Forward characteristic of Diode

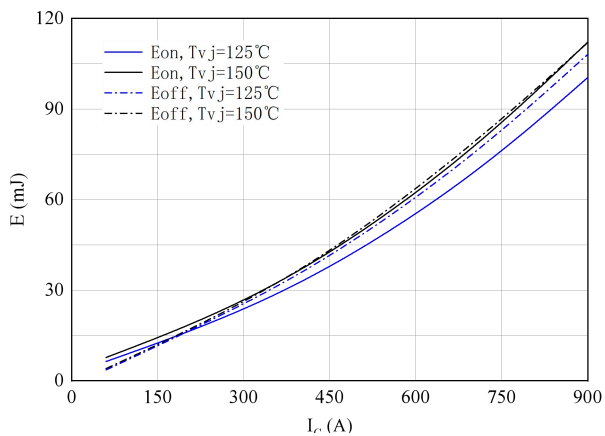


图 5. 开关损耗 逆变器

Figure 5. Switching losses of IGBT

$V_{GE}=\pm 15V$, $R_{Gon}=1\Omega$, $R_{Goff}=1\Omega$, $V_{CE}=600V$

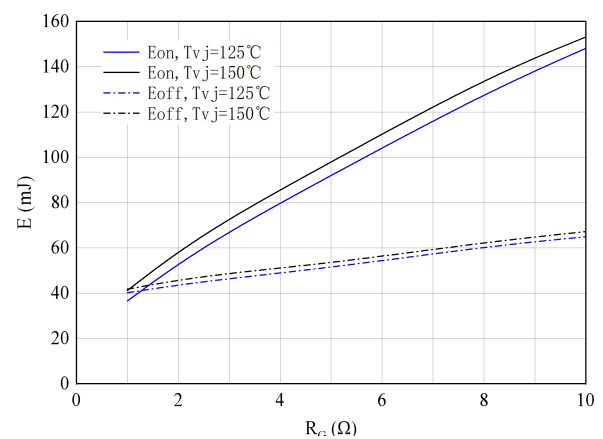


图 6. 开关损耗 逆变器

Figure 6. Switching losses of IGBT

$V_{GE}=\pm 15V$, $I_C=450A$, $V_{CE}=600V$

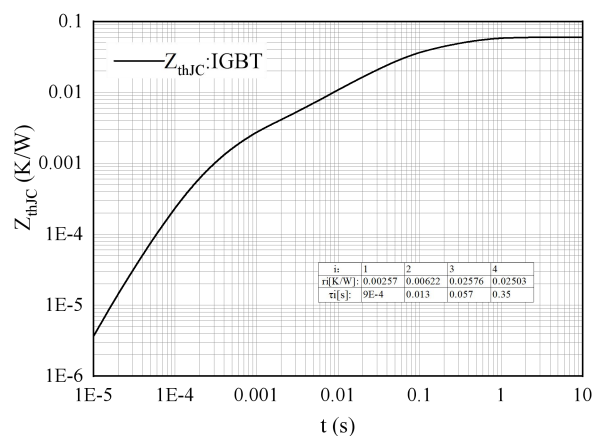


图 7. 瞬态热阻抗 IGBT 逆变器
Figure 7. Transient thermal impedance IGBT,Inverter

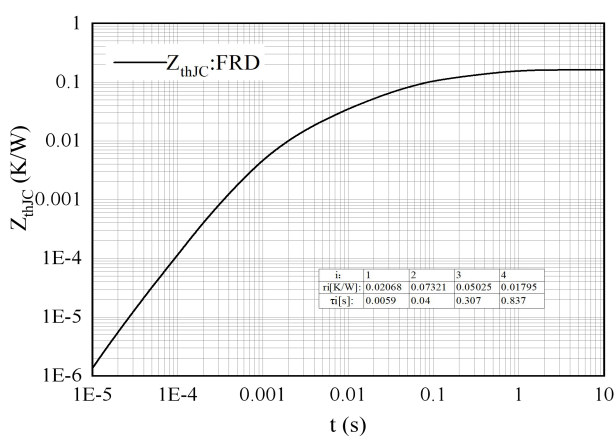


图 8. 瞬态热阻抗 FRD 逆变器
Figure 8. Transient thermal impedance FRD,Inverter

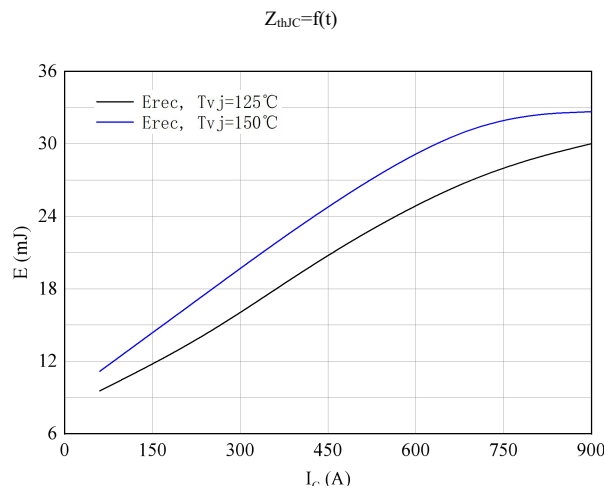


图 9. 开关损耗 二极管
Figure 9. Switching losses of Diode
RGon=1Ω, VCE=600V

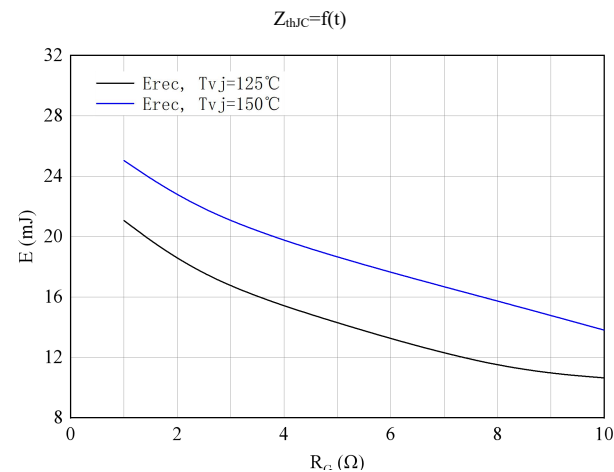


图 10. 开关损耗 二极管
Figure 10. Switching losses of Diode
IF=450A, VCE=600V

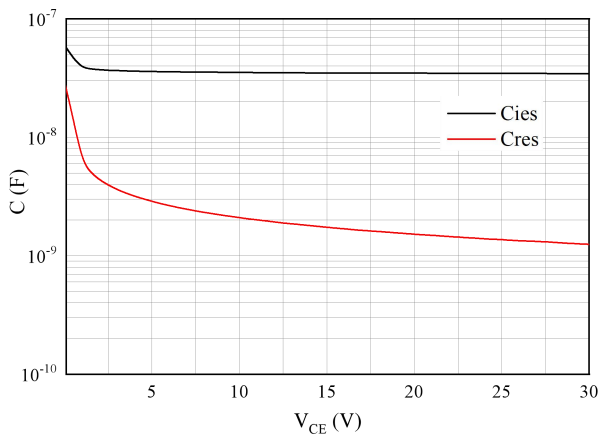
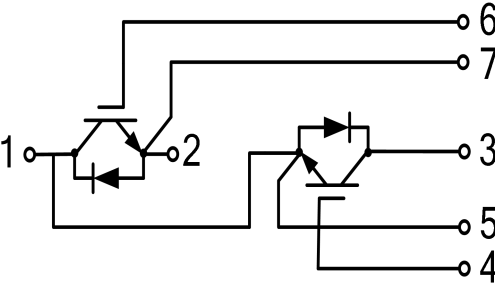
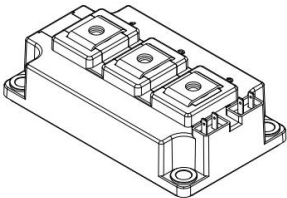
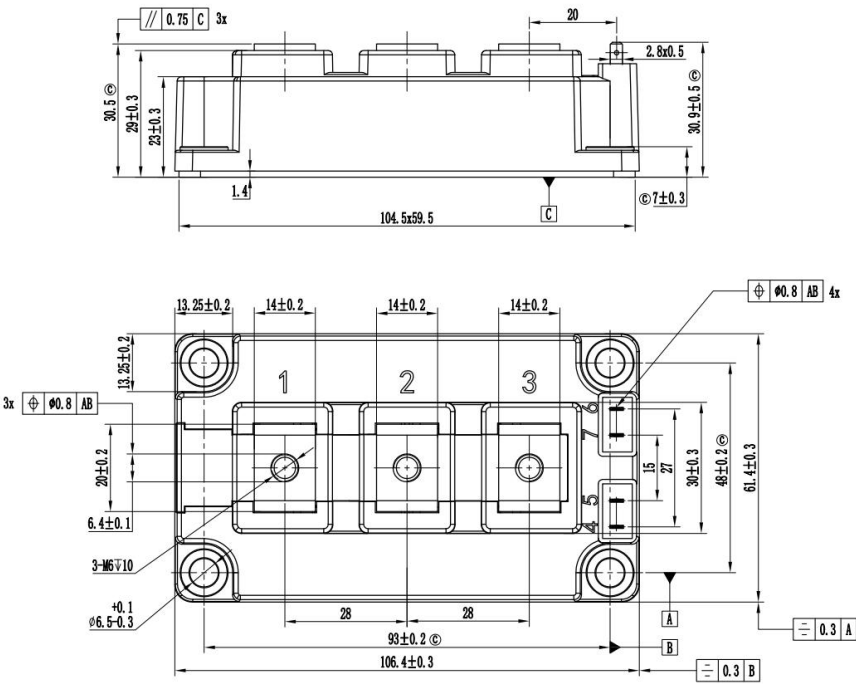


图 11. 电容特性
Figure 11. Capacitance characteristic

接线图 / Circuit diagram



封装尺寸 / Package outlines



注：1. ① 尺寸为关键管控尺寸
2. 未标注公差按GB/T1804-m执行