

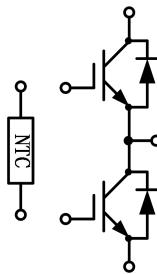
Half Bridge IGBT Module

电气特性:

- 1700V 沟槽栅/场终止工艺
1700V trench gate/field termination process
- 低开关损耗
Low switching losses
- V_{CESAT} 正温度系数
V_{CESAT} has a positive temperature coefficient

典型应用:

- 变频器
Power Converters
- UPS 系统
UPS Systems
- 伺服电机
Servo Drives
- 风力发电机
Wind Turbines



V_{CES} = 1700V, 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°C	V _{CES}	1700	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}	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°C, T _{vj max} = 175°C	P _{tot}	2140	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	$V_{GE}=15V, I_c=450A$ $V_{GE}=15V, I_c=450A$ $V_{GE}=15V, I_c=450A$	$T_{vj}=25^\circ C$ $T_{vj}=125^\circ C$ $T_{vj}=150^\circ C$	V_{CESat}	2.14	2.55	V
栅极-发射极阈值电压 Gate-Emitter threshold voltage	$I_c=18mA, V_{GE}= V_{CE}$	$T_{vj}=25^\circ C$		2.54	2.65	
栅电荷 Gate charge	$V_{GE}=-15V...+15V$	Q_G		4.90	5.50	6.10
内部栅极电阻 Internal gate resistor	$T_{vj}=25^\circ C$	R_{Gint}		3.22		μC
输入电容 Input capacitance	$f=100KHz, V_{CE}=25 V, V_{GE}=0 V$	$T_{vj}=25^\circ C$	C_{ies}	44.00		nF
反向传输电容 Reverse transfer capacitance			C_{res}	1.30		
集电极-发射极截止电流 Collector-emitter cut-off current	$V_{CE}=1700V, V_{GE}= 0 V$	$T_{vj}=25^\circ C$	I_{CES}		2	mA
栅极-发射极漏电流 Gate-emitter leakage current	$V_{CE}=0 V, V_{GE}= 20 V$	$T_{vj}=25^\circ C$	I_{GES}		200	nA
开通延迟时间 Turn-on delay time	$I_c=450A, V_{CE}=900 V$ $V_{GE}=\pm 15 V, R_G=3.3\Omega$ (电感负载) / (inductive load)	$T_{vj}=25^\circ C$ $T_{vj}=125^\circ C$ $T_{vj}=150^\circ C$	$t_{d\ on}$	264		ns
上升时间 Rise time	$I_c=450A, V_{CE}=900 V$ $V_{GE}=\pm 15 V, R_G=3.3\Omega$ (电感负载) / (inductive load)	$T_{vj}=125^\circ C$ $T_{vj}=150^\circ C$		251		
关断延迟时间 Turn-off delay time	$I_c=450A, V_{CE}=900 V$ $V_{GE}=\pm 15 V, R_G=3.3\Omega$ (电感负载) / (inductive load)	$T_{vj}=150^\circ C$		158		
下降时间 Fall time	$I_c=450A, V_{CE}=900 V$ $V_{GE}=\pm 15 V, R_G=3.3\Omega$ (电感负载) / (inductive load)	$T_{vj}=25^\circ C$ $T_{vj}=125^\circ C$ $T_{vj}=150^\circ C$	t_f	109		ns
开通损耗能量 (每脉冲) Turn-on energy loss per pulse	$I_c=450A, V_{CE}=900 V$ $V_{GE}=\pm 15 V, R_G=3.3\Omega$ $di/dt=2500A/\mu s(T_{vj}=150^\circ C)$ (电感负载) / (inductive load)	$T_{vj}=25^\circ C$ $T_{vj}=125^\circ C$ $T_{vj}=150^\circ C$		109		
关断损耗能量 (每脉冲) Turn-off energy loss per pulse	$I_c=450A, V_{CE}=900 V$ $V_{GE}=\pm 15 V, R_G=3.3\Omega$ $du/dt=4900V/\mu s(T_{vj}=150^\circ C)$ (电感负载) / (inductive load)	$T_{vj}=25^\circ C$ $T_{vj}=125^\circ C$ $T_{vj}=150^\circ C$		117		
短路数据 SC data	$V_{GE}\leq 15V, V_{ce}=900V$ $V_{CEmax}=V_{CES}-L_{sCE}\cdot di/dt$ $tp\leq 10\mu s, T_{vj}=150^\circ C$	I_{sc}		295		A
结-外壳热阻 Thermal resistance, junction to case	每个 IGBT / per IGBT	R_{thJC}		536		K/W
在开关状态下温度 Temperature under switching conditions		$T_{vj\ op}$	-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°C	V _{RRM}	1700		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 =1ms	I _{FRM}	900		A
I ² t 值 I ² t-value	t _p =10ms, sin180°, T _j =125°C	I ² t	20000		A ² s

特征值 / Characteristic Values

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
正向电压 Forward voltage	I _F =450A, V _{GE} =0V	V _F		2.18	2.90	V
	I _F =450A, V _{GE} =0V			2.30		
	I _F =450A, V _{GE} =0V			2.34		
反向恢复峰值电流 Peak reverse recovery current	I _F =450A	I _{RM}		190		A
	-dI _F /dt=2500A/μs(T _{vj} =150°C)			223		
	V _R =900V, V _{GE} =-15V			214		
恢复电荷 Recovered charge	I _F =450A	Q _r		60.30		μC
	-dI _F /dt=2500A/μs(T _{vj} =150°C)			83.50		
	V _R =900V, V _{GE} =-15V			94.40		
反向恢复损耗 (每脉冲) Reverse recovered energy	I _F =450A	E _{rec}		33.20		mJ
	-dI _F /dt=2500A/μs(T _{vj} =150°C)			47.60		
	V _R =900V, V _{GE} =-15V			52.30		
结-外壳热阻 Thermal resistance, junction to case	每个二极管 / per diode	R _{thJC}			0.14	K/W
在开关状态下温度 Temperature under switching conditions		T _{vj op}	-40		150	°C

负温度系数热敏电阻 / NTC-Thermistor

特征值 / Characteristic Values

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
额定电阻值 Rated resistances	T _c =25°C, ±5%	R ₂₅		5.0		k Ω
B-值 B-value	±2%	B _{25/50}		3375		K

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
端子联接扭距 Terminal connection torque		M	3.0		6.0	Nm
重量 Weight		W		344		g

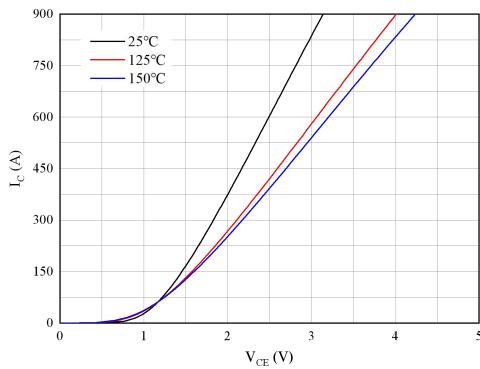
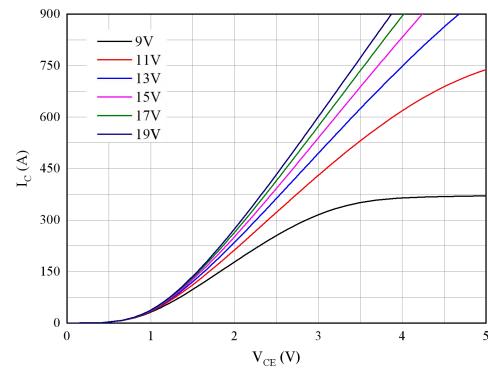
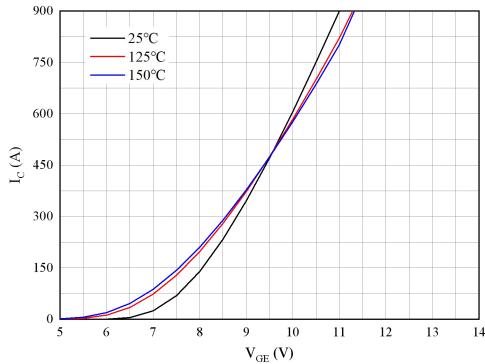
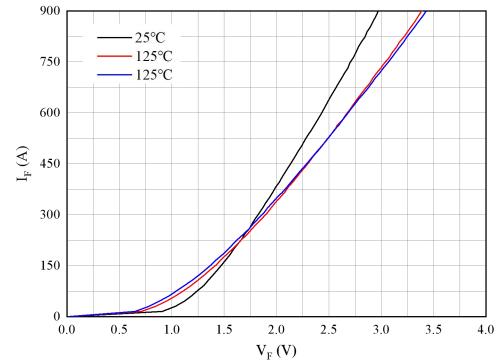
图 1. 典型输出特性 ($V_{GE}=15\text{V}$)Figure 1. Typical output characteristics ($V_{GE}=15\text{V}$)图 2. 典型输出特性 ($T_{vj}=150^\circ\text{C}$)Figure 2. Typical output characteristics ($T_{vj}=150^\circ\text{C}$)图 3. 典型传输特性($V_{CE}=20\text{V}$)Figure 3. Typical transfer characteristic($V_{CE}=20\text{V}$)

图 4. 正向偏压特性 二极管

Figure 4. Forward characteristic of Diode

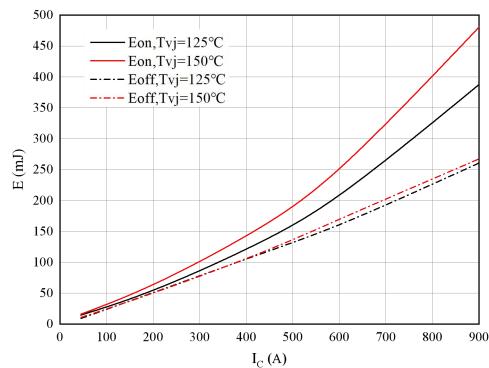


图 5. 开关损耗 逆变器

Figure 5. Switching losses of IGBT

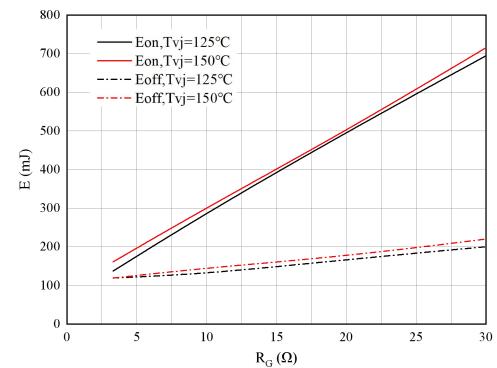
 $V_{GE}=\pm 15\text{V}$, $R_{Gon}=3.3\Omega$, $R_{Goff}=3.3\Omega$, $V_{CE}=900\text{V}$ 

图 6. 开关损耗 逆变器

Figure 6. Switching losses of IGBT

 $V_{GE}=\pm 15\text{V}$, $I_c=450\text{A}$, $V_{CE}=900\text{V}$

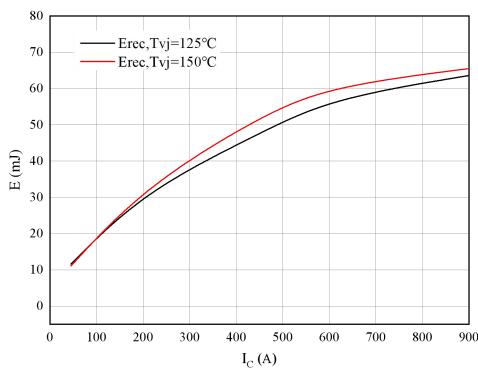


图 7. 开关损耗 二极管

Figure 7. Switching losses of Diode
 $R_{Gon}=3.3\Omega$, $V_{CE}=900V$

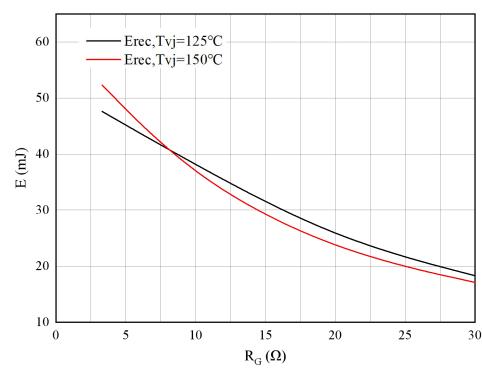


图 8. 开关损耗 二极管

Figure 8. Switching losses of Diode
 $I_F=450A$, $V_{CE}=900V$

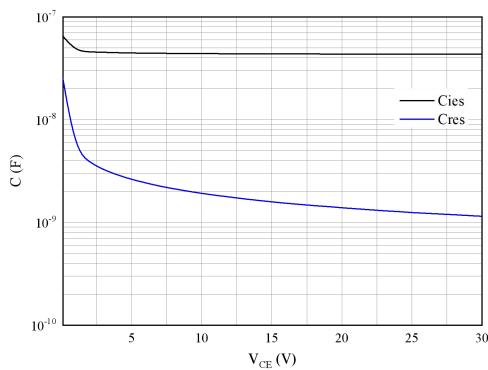


图 9. 电容特性
Figure 9. Capacitance characteristic

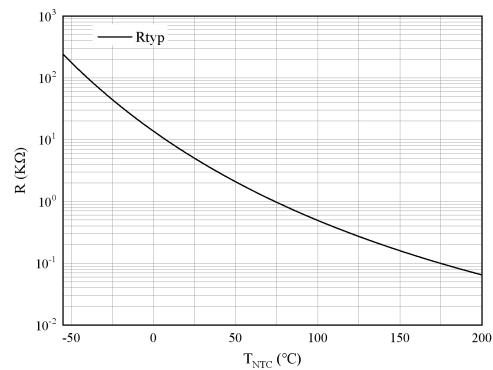


图 10. 负温系数热敏电阻 温度特性
Figure 10. NTC-Themistor-temperature characteristic

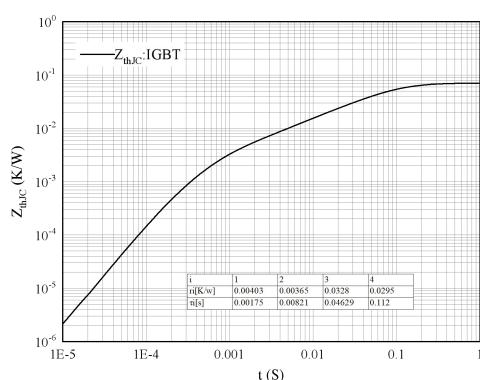


图 11. 瞬态热阻抗 IGBT 逆变器
Figure 11. Transient thermal impedance IGBT,Inverter
 $Z_{thJC}=f(t)$

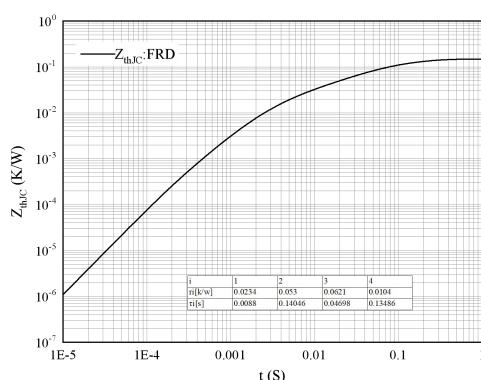
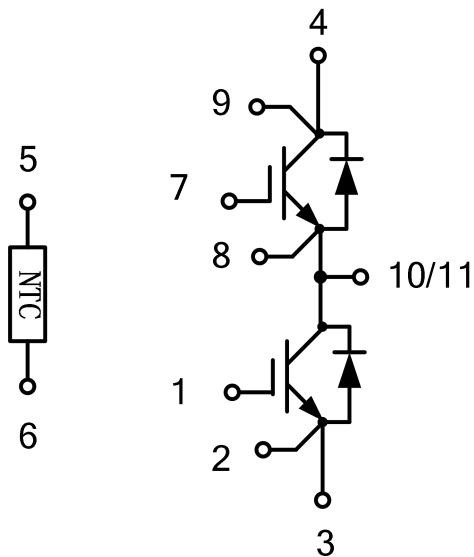


图 12. 瞬态热阻抗 FRD 逆变器
Figure 12. Transient thermal impedance FRD ,Inverter
 $Z_{thJC}=f(t)$

接线图 / Circuit diagram



封装尺寸 / Package outlines

