

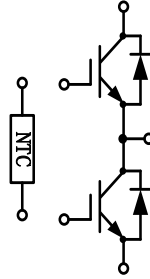
Half Bridge IGBT Module

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
总功率损耗 Total power dissipation	$T_C = 25^{\circ}C$, $T_{vj\ max} = 175^{\circ}C$	P_{tot}	2250	W
集电极重复峰值电流 Repetitive peak collector current	$t_p = 1\ ms$	I_{CRM}	900	A
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	$V_{GE} = 15V$, $I_C = 450A$ $T_{vj} = 25^{\circ}C$ $V_{GE} = 15V$, $I_C = 450A$ $T_{vj} = 125^{\circ}C$ $V_{GE} = 15V$, $I_C = 450A$ $T_{vj} = 150^{\circ}C$	$V_{CE\ sat}$		2.10 2.50 2.60	2.60	V
栅极-发射极阈值电压 Gate-Emitter threshold voltage	$I_C = 17mA$, $V_{GE} = V_{CE}$, $T_{vj} = 25^{\circ}C$	V_{GEth}	5.10	5.70	6.30	
栅电荷 Gate charge	$V_{GE} = -15V \dots +15V$	Q_G		2.19		μC
内部栅极电阻		R_{Gint}		1.60		Ω

Internal gate resistor						
输入电容 Input capacitance	f=1MHz, V _{CE} =25V, V _{GE} =0 V	T _{vj} =25°C	C _{ies}	34.80	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} =1200V, V _{GE} =0 V	T _{vj} =25°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°C	I _{GES}	200	nA	
开通延迟时间 Turn-on delay time	I _C =450 A, V _{CE} =600 V V _{GE} =±15 V, R _G =1.8Ω (电感负载) / (inductive load)	T _{vj} =25°C	t _{d on}	177		
		T _{vj} =125°C		199		
		T _{vj} =150°C		198		
上升时间 Rise time	I _C =450 A, V _{CE} =600 V V _{GE} =±15 V, R _G =1.8Ω (电感负载) / (inductive load)	T _{vj} =25°C	t _r	66		
		T _{vj} =125°C		65		
		T _{vj} =150°C		66		
关断延迟时间 Turn-off delay time	I _C =450 A, V _{CE} =600 V V _{GE} =±15 V, R _G =1.8Ω (电感负载) / (inductive load)	T _{vj} =25°C	t _{d off}	312	ns	
		T _{vj} =125°C		349		
		T _{vj} =150°C		351		
下降时间 Fall time	I _C =450 A, V _{CE} =600 V V _{GE} =±15 V, R _G =1.8Ω (电感负载) / (inductive load)	T _{vj} =25°C	t _f	167		
		T _{vj} =125°C		198		
		T _{vj} =150°C		209		
开通损耗能量（每脉冲） Turn-on energy loss per pulse	I _C =450 A, V _{CE} =600 V V _{GE} =±15 V, R _G =1.8Ω (电感负载) / (inductive load)	T _{vj} =25°C	E _{on}	11.17	mJ	
		T _{vj} =125°C		14.20		
		T _{vj} =150°C		16.67		
关断损耗能量（每脉冲） Turn-off energy loss per pulse	I _C =450 A, V _{CE} =600 V V _{GE} =±15 V, R _G =1.8Ω (电感负载) / (inductive load)	T _{vj} =25°C	E _{off}	39.35	mJ	
		T _{vj} =125°C		48.51		
		T _{vj} =150°C		51.47		
短路数据 SC data	V _{GE} ≤15V, V _{CC} =800V V _{CEmax} =V _{CES} -L _s CE·di/dt tp≤10us, T _{vj} =150°C		I _{SC}	1525	A	
结-外壳热阻 Thermal resistance, junction to case	每个 IGBT/per IGBT		R _{thJC}	0.066	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	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	12100	A ² s

特征值 / Characteristic Values

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
正向电压 Forward voltage	$I_F=450A, V_{GE}=0V$ $I_F=450A, V_{GE}=0V$ $I_F=450A, V_{GE}=0V$	$T_{vj}=25^\circ C$ $T_{vj}=125^\circ C$ $T_{vj}=150^\circ C$	V_F	2.40 2.60 2.50	2.90	V
反向恢复峰值电流 Peak reverse recovery current	$I_F=450A, -di_F/dt=6650A/\mu s$ $V_R=600V$ $V_{GE}=-15V$	$T_{vj}=25^\circ C$ $T_{vj}=125^\circ C$ $T_{vj}=150^\circ C$	I_{RM}	262 344 349		A
恢复电荷 Recovered charge	$I_F=450A, -di_F/dt=6650A/\mu s$ $V_R=600V$ $V_{GE}=-15V$	$T_{vj}=25^\circ C$ $T_{vj}=125^\circ C$ $T_{vj}=150^\circ C$	Q_r	18.90 41.20 41.50		μC
反向恢复损耗（每脉冲） Reverse recovered energy	$I_F=450A, -di_F/dt=6650A/\mu s$ $V_R=600V$ $V_{GE}=-15V$	$T_{vj}=25^\circ C$ $T_{vj}=125^\circ C$ $T_{vj}=150^\circ C$	E_{rec}	9.93 21.76 21.85		mJ
结-外壳热阻 Thermal resistance, junction to case	每个二极管 / per diode		R_{thJC}		0.10	K/W
在开关状态下温度 Temperature under switching conditions			$T_{vj op}$	-40	150	$^\circ C$

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	$T_c=25^\circ C, \pm 5\%$	R_{25}		5.0		K Ω
B-值 B-value	$\pm 2\%$	$B_{25/50}$		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}	2500			V
内部绝缘 Internal isolation			Al ₂ O 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		342		g

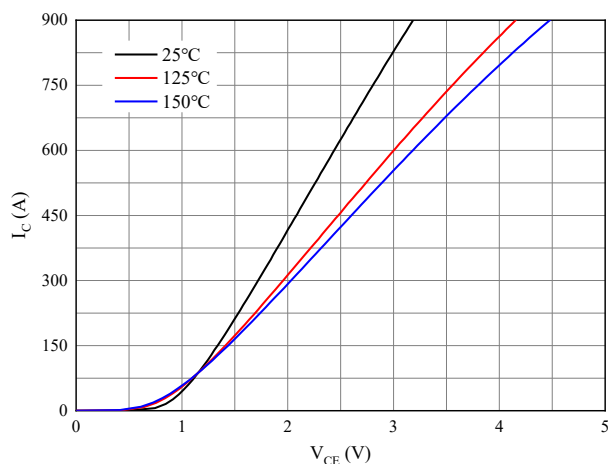


图 1. 典型输出特性 ($V_{GE}=15V$)
Figure 1. Typical output characteristics ($V_{GE}=15V$)

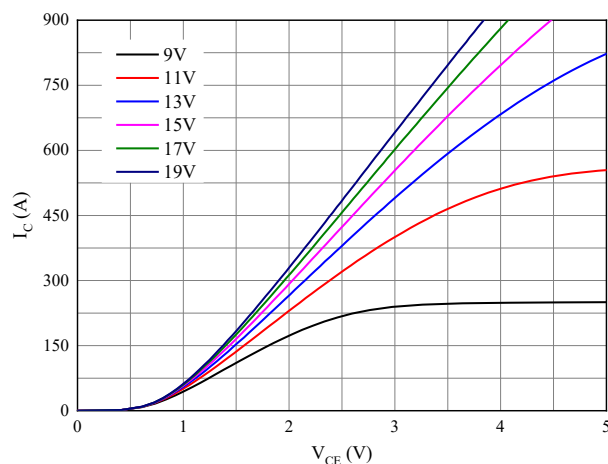


图 2. 典型输出特性 ($T_{vj}=150^{\circ}C$)
Figure 2. Typical output characteristics ($T_{vj}=150^{\circ}C$)

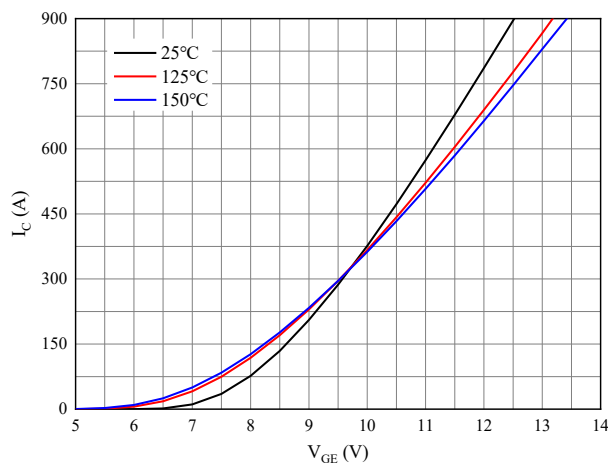


图 3. 典型传输特性 ($V_{CE}=20V$)
Figure 3. Typical transfer characteristic ($V_{CE}=20V$)

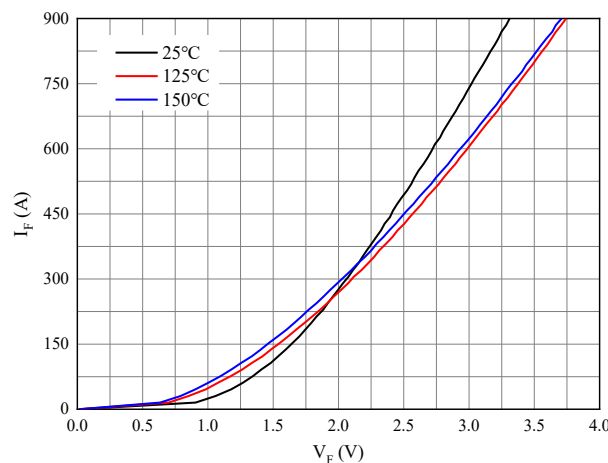


图 4. 正向偏压特性 二极管
Figure 4. Forward characteristic of Diode

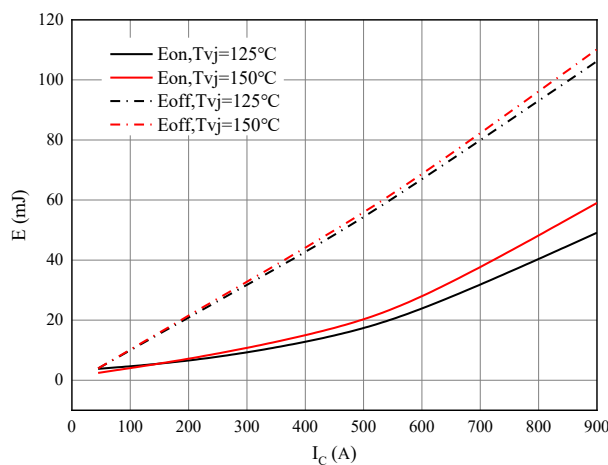


图 5. 开关损耗 逆变器
Figure 5. Switching losses of IGBT
 $V_{GE}=\pm 15V$, $R_{Gon}=1.8\Omega$, $R_{Goff}=1.8\Omega$, $V_{CE}=600V$

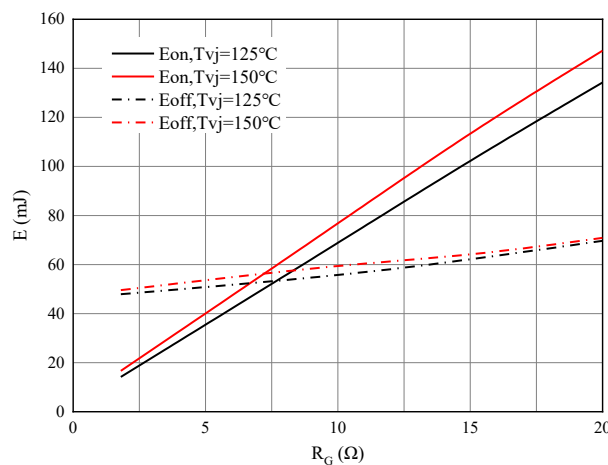


图 6. 开关损耗 逆变器
Figure 6. Switching losses of IGBT
 $V_{GE}=\pm 15V$, $I_C=450A$, $V_{CE}=600V$

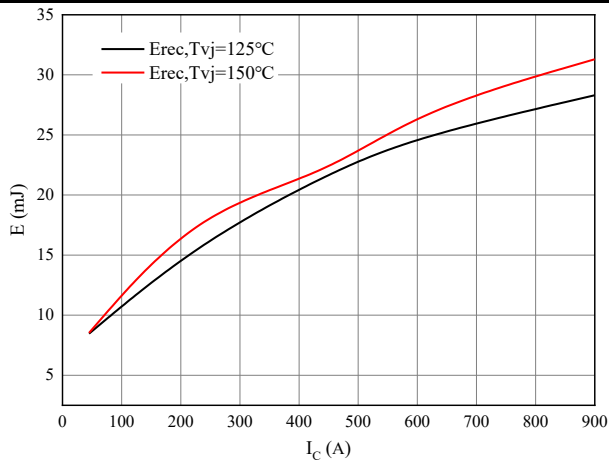


图 7. 开关损耗 二极管

Figure 7. Switching losses of Diode
R_{Gon}=1.8Ω, V_{CE}=600V

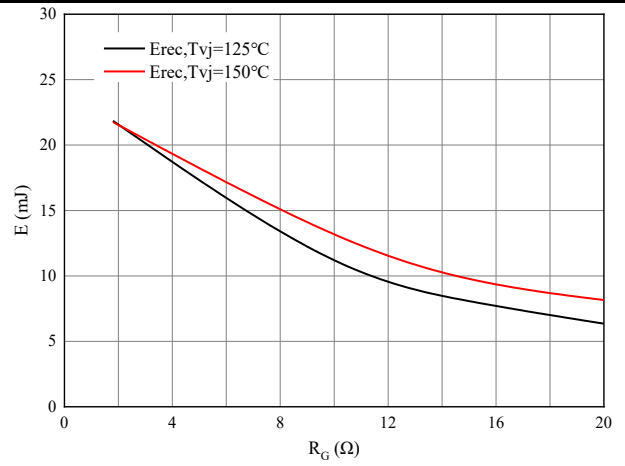


图 8. 开关损耗 二极管

Figure 8. Switching losses of Diode
I_F=450A, V_{CE}=600V

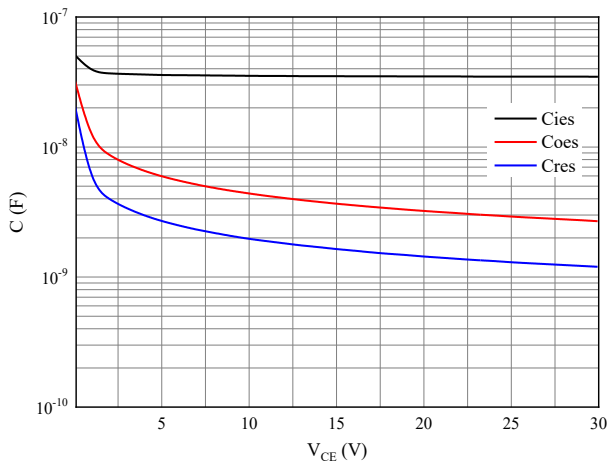


图 9. 电容特性

Figure 9. Capacitance characteristic

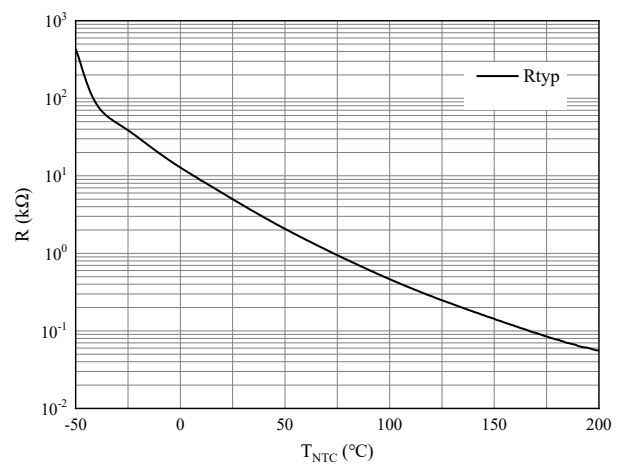
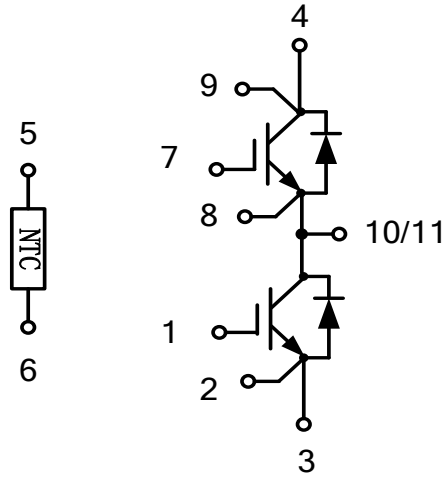


图 10. 负温系数热敏电阻 温度特性

Figure10. NTC-Thermistor-temperature characteristic

接线图 / Circuit diagram



封装尺寸 / Package outlines

