

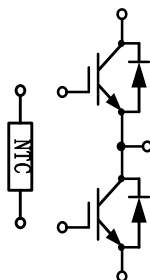
Half Bridge IGBT Module

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 T _{vj} =25°C V _{GE} =±15 V, R _G =1.8Ω T _{vj} =125°C (电感负载) / (inductive load) T _{vj} =150°C	t _{d on}		177 199 198		ns
上升时间 Rise time	I _C =450 A, V _{CE} =600 V T _{vj} =25°C V _{GE} =±15 V, R _G =1.8Ω T _{vj} =125°C (电感负载) / (inductive load) T _{vj} =150°C	t _r		66 65 66		
关断延迟时间 Turn-off delay time	I _C =450 A, V _{CE} =600 V T _{vj} =25°C V _{GE} =±15 V, R _G =1.8Ω T _{vj} =125°C (电感负载) / (inductive load) T _{vj} =150°C	t _{d off}		312 349 351		
下降时间 Fall time	I _C =450 A, V _{CE} =600 V T _{vj} =25°C V _{GE} =±15 V, R _G =1.8Ω T _{vj} =125°C (电感负载) / (inductive load) T _{vj} =150°C	t _f		167 198 209		
开通损耗能量（每脉冲） Turn-on energy loss per pulse	I _C =450 A, V _{CE} =600 V T _{vj} =25°C V _{GE} =±15 V, R _G =1.8Ω T _{vj} =125°C (电感负载) / (inductive load) T _{vj} =150°C	E _{on}		11.17 14.20 16.67		mJ
关断损耗能量（每脉冲） Turn-off energy loss per pulse	I _C =450 A, V _{CE} =600 V T _{vj} =25°C V _{GE} =±15 V, R _G =1.8Ω T _{vj} =125°C (电感负载) / (inductive load) T _{vj} =150°C	E _{off}		39.35 48.51 51.47		mJ
短路数据 SC data	V _{GE} ≤15V, V _{CC} =800V V _{CEmax} =V _{CES} -L _{sCE} ·di/dt t _p ≤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	$I_F=450A, -di_F/dt=665A/\mu s$ $V_R=600V$ $V_{GE}=-15V$ $T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	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

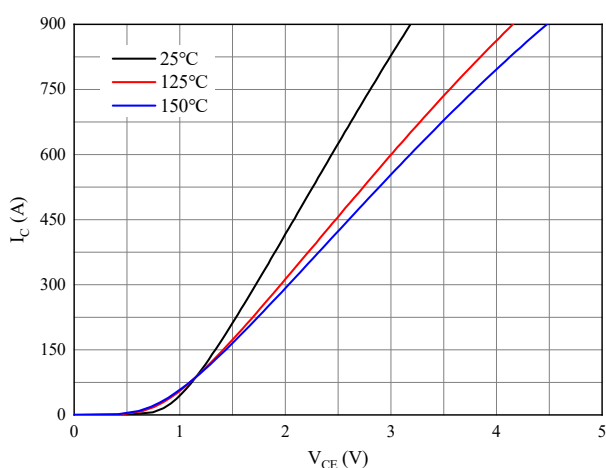
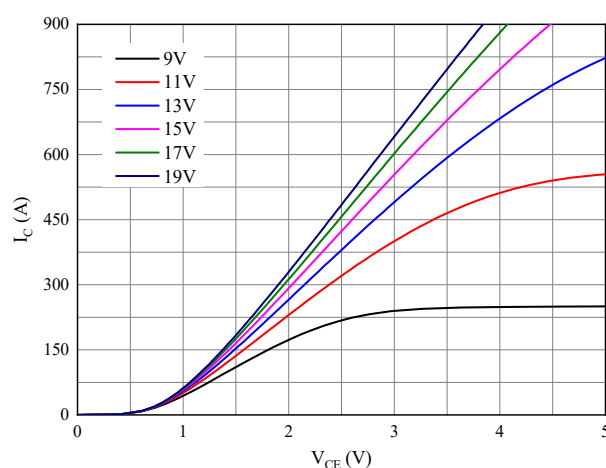
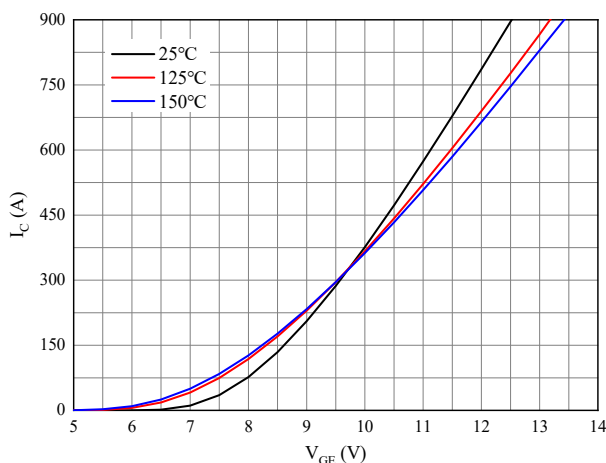
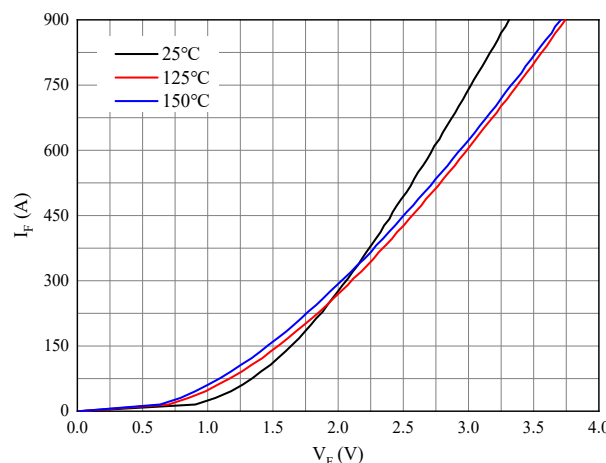
图 1. 典型输出特性 ($V_{GE}=15V$)Figure 1. Typical output characteristics ($V_{GE}=15V$)图 2. 典型输出特性 ($T_{vj}=150^{\circ}C$)Figure 2. Typical output characteristics ($T_{vj}=150^{\circ}C$)图 3. 典型传输特性 ($V_{CE}=20V$)Figure 3. Typical transfer characteristic ($V_{CE}=20V$)

图 4. 正向偏压特性 二极管

Figure 4. Forward characteristic of Diode

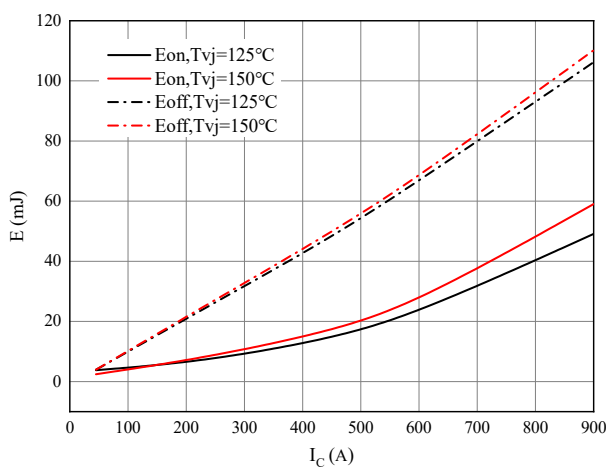


图 5. 开关损耗 逆变器

Figure 5. Switching losses of IGBT

$V_{GE}=\pm 15V$, $R_{Gon}=1.8\Omega$, $R_{Goff}=1.8\Omega$, $V_{CE}=600V$

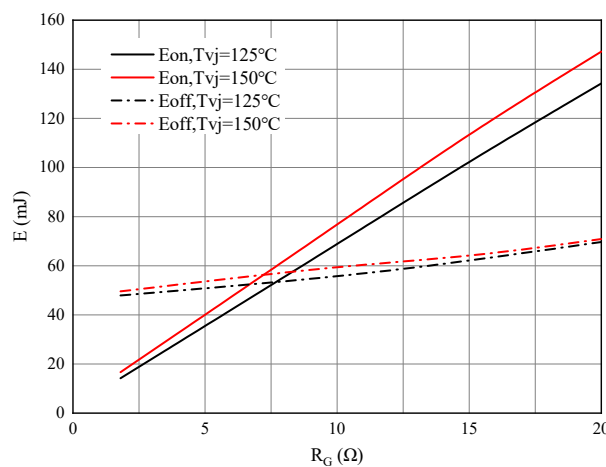


图 6. 开关损耗 逆变器

Figure 6. Switching losses of IGBT

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

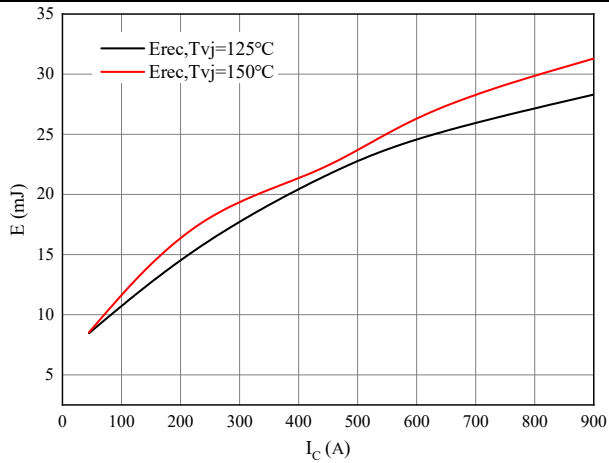


图 7. 开关损耗 二极管

Figure 7. Switching losses of Diode

RGon=1.8Ω, VCE=600V

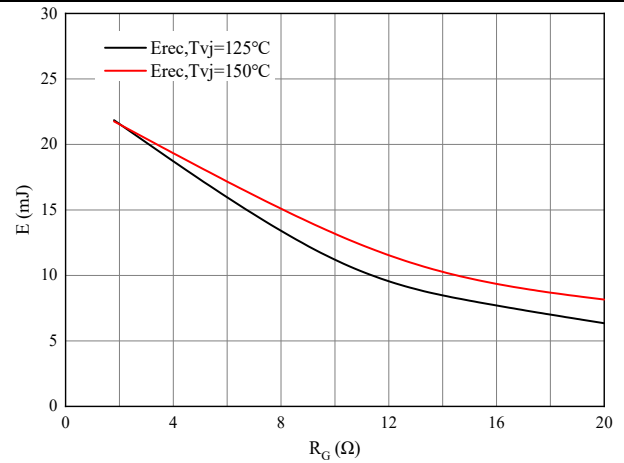


图 8. 开关损耗 二极管

Figure 8. Switching losses of Diode

IF=450A, VCE=600V

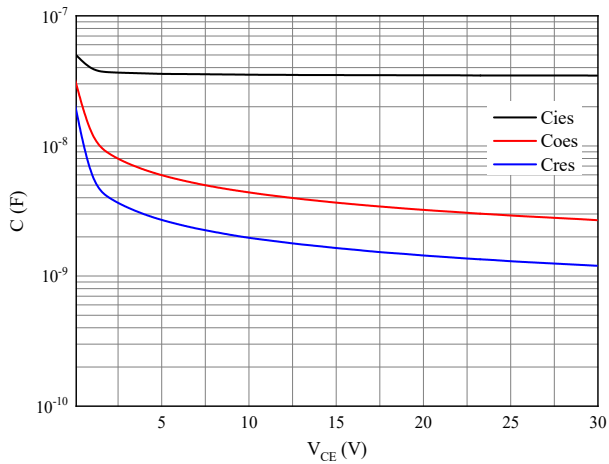


图 9. 电容特性

Figure 9. Capacitance characteristic

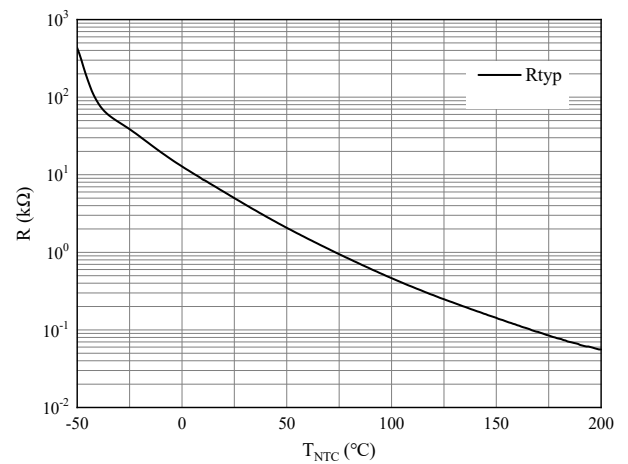
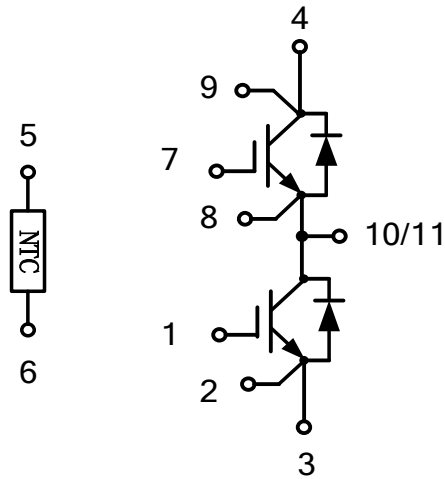


图 10. 负温系数热敏电阻 温度特性

Figure10. NTC-Thermistor-temperaturecharacteristic

接线图 / Circuit diagram



封装尺寸 / Package outlines

