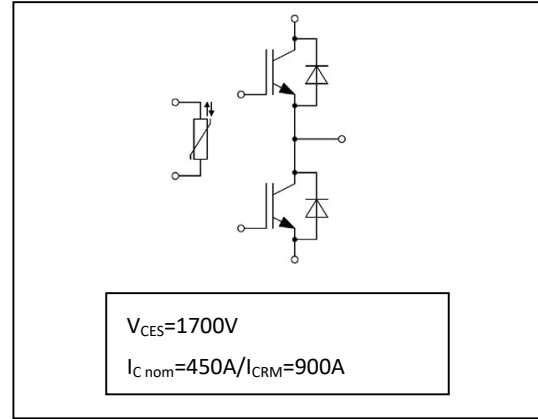


1700V 450A IGBT Half Bridge Module

1700V 450A IGBT 半桥模块



Features:

- 1700V Trench+ Field Stop technology
- Freewheeling diodes with fast and soft reverse recovery
- $V_{CE(sat)}$ with positive temperature coefficient
- Low switching losses
- Short circuit ruggedness

产品特性:

- 1700V 沟槽栅+场截止技术
- 快速的软恢复特性续流二极管
- 导通压降具有正温度系数
- 低开关损耗
- 良好的短路稳定性

Typical Applications:

- Motor drives
- Wind turbines

典型应用:

- 电机驱动
- 风力发电机

IGBT, Inverter / IGBT, 逆变器

Maximum Rated Values / 最大额定值

Item	Symbol	Conditions	Value	Units
集电极-发射极电压 Collector-emitter voltage	V_{CEs}	$T_{vj}=25^{\circ}C$	1700	V
连续集电极直流电流 Continuous DC collector current	$I_{c\ nom}$	$T_c=100^{\circ}C, T_{vj\ max}=175^{\circ}C$	450	A
集电极重复峰值电流 Peak repetitive collector current	I_{CRM}	$t_p=1ms$	900	A
栅极-发射极峰值电压 Maximum gate-emitter voltage	V_{GES}		± 20	V

Characteristic Values / 特征值

Item	Symbol	Conditions	Min.	Typ.	Max.	Units
集电极-发射极饱和电压 Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_c=450A, V_{GE}=15V$				
		$T_{vj}=25^{\circ}C$		1.70	2.00	V
		$T_{vj}=125^{\circ}C$		1.95		V
		$T_{vj}=150^{\circ}C$		2.00		V
栅极阈值电压 Gate threshold voltage	$V_{GE(th)}$	$I_c=17mA, V_{CE}=V_{GE}, T_{vj}=25^{\circ}C$	5.1	5.9	6.6	V
栅极电荷 Gate charge	Q_G	$V_{GE}=-15V...+15V$		2.42		μC
内部栅极电阻 Internal gate resistor	R_{Gint}	$T_{vj}=25^{\circ}C$		2.2		Ω
输入电容 Input capacitance	C_{ies}	$f=1MHz, T_{vj}=25^{\circ}C, V_{CE}=25V, V_{GE}=0V$		37.5		nF
反向传输电容 Reverse transfer capacitance	C_{res}	$f=1MHz, T_{vj}=25^{\circ}C, V_{CE}=10V, V_{GE}=0V$		0.63		nF
集电极-发射极截止电流 Collector-emitter cut-off current	I_{CES}	$V_{CE}=1700V, V_{GE}=0V, T_{vj}=25^{\circ}C$			3.00	mA
栅极-发射极漏电流 Gate-emitter leakage current	I_{GES}	$V_{CE}=0V, V_{GE}=20V, T_{vj}=25^{\circ}C$			400	nA
开通延迟时间(电感负载) Turn-on delay time, inductive load	$t_{d(on)}$					
		$T_{vj}=25^{\circ}C$		230		ns
		$T_{vj}=125^{\circ}C$		250		ns
		$T_{vj}=150^{\circ}C$		252		ns
上升时间(电感负载) Rise time, inductive load	t_r					
		$T_{vj}=25^{\circ}C$		110		ns
		$T_{vj}=125^{\circ}C$		130		ns
		$T_{vj}=150^{\circ}C$		135		ns
关断延迟时间(电感负载) Turn-off delay time, inductive load	$t_{d(off)}$	$I_c=450A, V_{CE}=900V$ $V_{GE}=\pm 15V$ $R_{Gon}=3.3\Omega$				
		$T_{vj}=25^{\circ}C$		605		ns
		$T_{vj}=125^{\circ}C$		735		ns
		$T_{vj}=150^{\circ}C$		740		ns
下降时间(电感负载) Fall time, inductive load	t_f	$R_{Goff}=3.3\Omega$ Inductive Load,				
		$T_{vj}=25^{\circ}C$		410		ns
		$T_{vj}=125^{\circ}C$		670		ns
		$T_{vj}=150^{\circ}C$		695		ns
开通损耗能量(每脉冲) Turn-on energy loss per pulse	E_{on}					
		$T_{vj}=25^{\circ}C$		129		mJ
		$T_{vj}=125^{\circ}C$		181		mJ
		$T_{vj}=150^{\circ}C$		190		mJ
关断损耗能量(每脉冲) Turn-off energy loss per pulse	E_{off}					
		$T_{vj}=25^{\circ}C$		111		mJ
		$T_{vj}=125^{\circ}C$		154		mJ
		$T_{vj}=150^{\circ}C$		159		mJ
短路数据 SC data	I_{sc}	$V_{GE}\leq 15V, V_{CC}=1000V$ $V_{CE\ max}=V_{CES}-I_{sc}\cdot dt, t_p=10\mu s, T_{vj}=150^{\circ}C$		1400		A
结-外壳热阻 Thermal resistance, junction to case	R_{thJC}	Per IGBT / 每个 IGBT			0.07	K/W
工作温度 Temperature under switching conditions	T_{vjop}		-40		150	$^{\circ}C$

Diode, Inverter / 二极管, 逆变器

Maximum Rated Values / 最大额定值

Item	Symbol	Conditions	Value	Units
反向重复峰值电压 Peak repetitive reverse voltage	V_{RRM}	$T_{vj}=25^{\circ}C$	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 Peak repetitive forward current	I_{FRM}	$t_p=1ms$	900	A

Characteristic Values / 特征值

Item	Symbol	Conditions	Min.	Typ.	Max.	Units
正向电压 Forward voltage	V_F	$I_F=450A$	$T_{vj}=25^{\circ}C$	2.00	2.30	V
			$T_{vj}=125^{\circ}C$	2.20		V
			$T_{vj}=150^{\circ}C$	2.25		V
反向恢复峰值电流 Peak reverse recovery current	I_{RM}	$I_F=450A$	$T_{vj}=25^{\circ}C$	370		A
			$T_{vj}=125^{\circ}C$	345		A
			$T_{vj}=150^{\circ}C$	345		A
恢复电荷 Recovery charge	Q_r	$-di_f/dt_{off}=3700A/\mu s$ $V_R=900V$ $V_{GE}=-15V$	$T_{vj}=25^{\circ}C$	80		μC
			$T_{vj}=125^{\circ}C$	125		μC
			$T_{vj}=150^{\circ}C$	125		μC
反向恢复损耗 (每脉冲) Reverse recovery energy (per pulse)	E_{rec}		$T_{vj}=25^{\circ}C$	43		mJ
			$T_{vj}=125^{\circ}C$	62		mJ
			$T_{vj}=150^{\circ}C$	65		mJ
结-外壳热阻 Thermal resistance, junction to case	R_{thJC}	Per diode / 每个二极管			0.10	K/W
工作温度 Temperature under switching conditions	T_{vjop}		-40		150	$^{\circ}C$

NTC-Thermistor / 负温度系数热敏电阻

Characteristic Values / 特征值

Item	Symbol	Conditions	Value	Units
额定电阻值 Rated resistance	R_{25}	$T_c=25^{\circ}C$	5.00	k Ω
B-值 B-value	$B_{25/50}$		3375	K

Module / 模块

Item	Symbol	Conditions	Value	Units
绝缘测试电压 Isolation test voltage	V_{ISOL}	RMS, f=50Hz, t=1min	3.4	kV
模块基板材料 Material of module baseplate			Cu	
内部绝缘 Internal isolation		基本绝缘 (class 1, IEC 61140) Basic insulation (class 1, IEC 61140)	Al_2O_3	
爬电距离 Creepage distance		端子-散热片 / terminal to heatsink 端子-端子/terminal to terminal	14.5 13.0	mm
电气间隙 Clearance		端子-散热片 / terminal to heatsink 端子-端子/terminal to terminal	12.5 10.0	mm
相对电痕指数 Comparative tracking index	CTI		> 200	

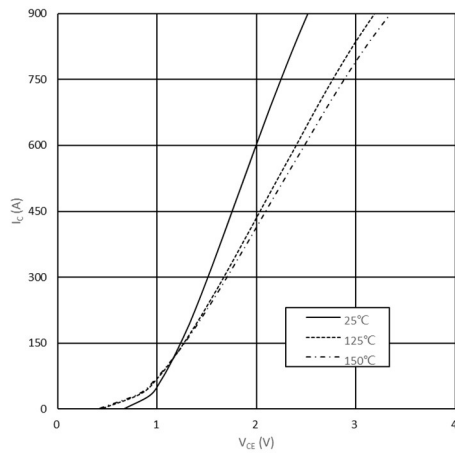
Item	Symbol	Conditions	Min.	Typ.	Max.	Units
杂散电感, 模块 Stray inductance module	L_{SCE}			20		nH
模块引线电阻, 端子-芯片 Module lead resistance, terminals - chip	$R_{CC+EE'}$	$T_c=25^{\circ}C$		1.10		m Ω
储存温度 Storage temperature	T_{stg}		-40		125	$^{\circ}C$
模块安装的安装扭矩 Mounting torque for module mounting	M5		3.00		6.00	Nm
端子联接扭矩 Terminal connection torque	M6		3.00		6.00	Nm
重量 Weight	G			345		g

输出特性 IGBT, 逆变器 (典型)

Output characteristic IGBT, Inverter (typical)

$$I_C = f(V_{CE})$$

$V_{GE} = 15V$

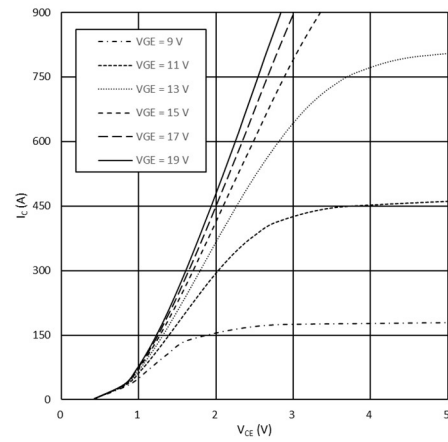


输出特性 IGBT, 逆变器 (典型)

Output characteristic IGBT, Inverter (typical)

$$I_C = f(V_{CE})$$

$T_{Vj} = 150^\circ C$

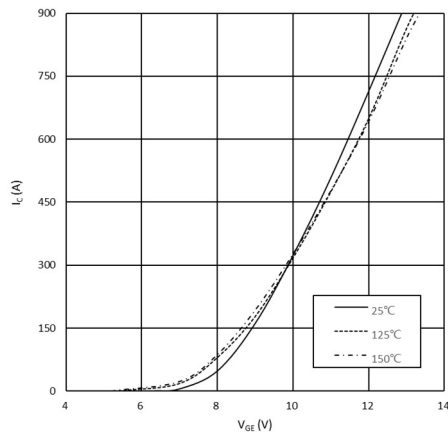


传输特性 IGBT, 逆变器 (典型)

Transfer characteristic IGBT, Inverter (typical)

$$I_C = f(V_{GE})$$

$V_{CE} = 20V$

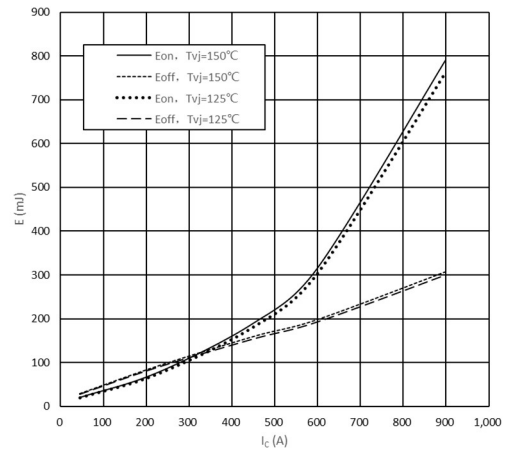


开关损耗 IGBT, 逆变器 (典型)

Switching losses IGBT, Inverter (typical)

$$E = f(I_C)$$

$V_{GE} = \pm 15V, R_G = 3.3 \Omega, V_{CE} = 900V$

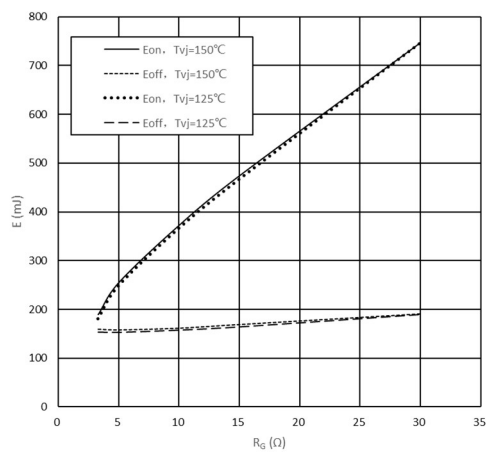


开关损耗 IGBT, 逆变器 (典型)

Switching losses IGBT, Inverter (typical)

$$E = f(R_G)$$

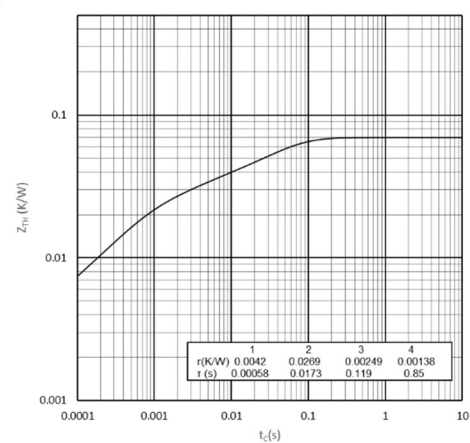
$V_{GE} = \pm 15V, I_C = 450A, V_{CE} = 900V$



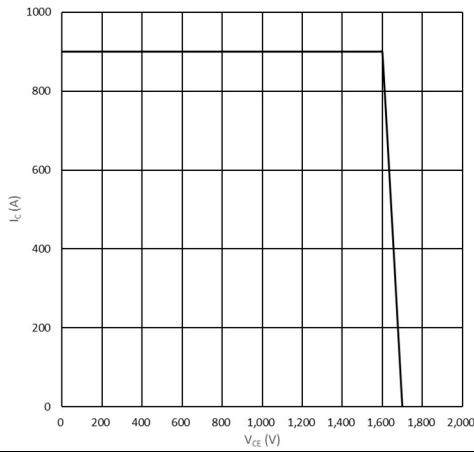
瞬态热阻抗 IGBT, 逆变器

Transient thermal impedance IGBT, Inverter

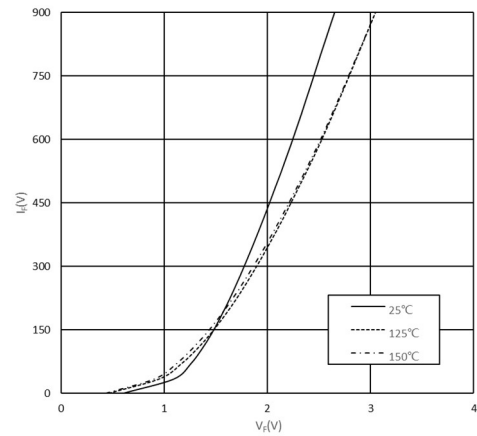
$$Z_{thjc} = f(t)$$



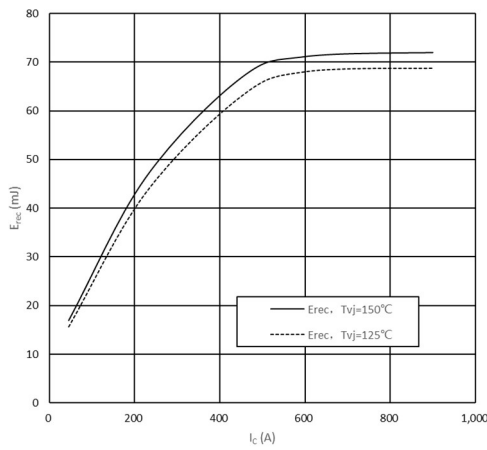
反偏安全工作区 IGBT, 逆变器 (RBSOA)
Reverse bias safe operating area IGBT, Inverter (RBSOA)
 $I_C=f(V_{CE})$
 $V_{GE}=\pm 15V, R_{Goff}=3.3\Omega, T_{vj}=150^\circ C$



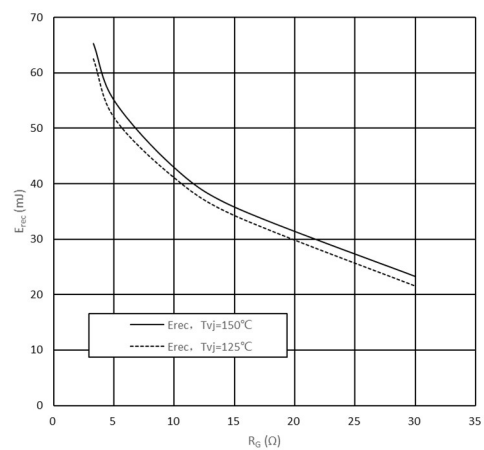
正向偏压特性 二极管, 逆变器 (典型)
Forward characteristic of Diode, Inverter (typical)
 $I_F=f(V_F)$



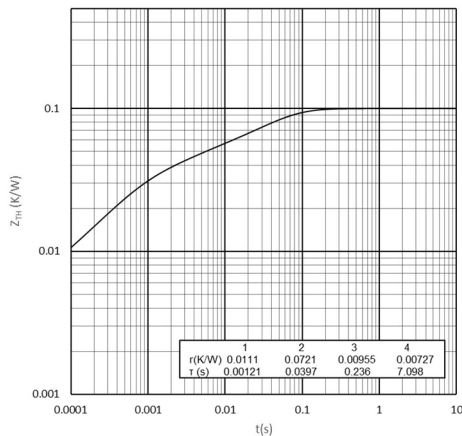
开关损耗 二极管, 逆变器 (典型)
Switching losses Diode, Inverter (typical)
 $E_{rec}=f(I_F)$
 $R_G=3.3\Omega, V_{CE}=900V$



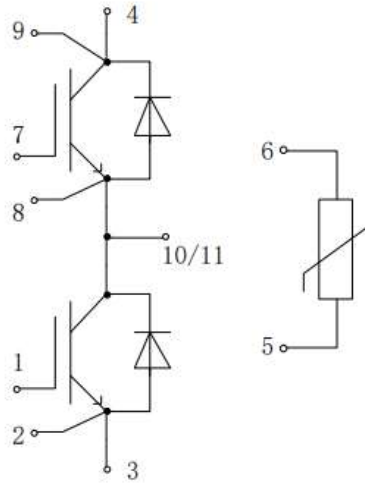
开关损耗 二极管, 逆变器 (典型)
Switching losses Diode, Inverter (typical)
 $E_{rec}=f(R_G)$
 $I_F=450A, V_{CE}=900V$



瞬态热阻抗二极管, 逆变器
Transient thermal impedance Diode, Inverter
 $Z_{thJC}=f(t)$



Circuit diagram headline / 接线图



Package outlines / 封装尺寸

