

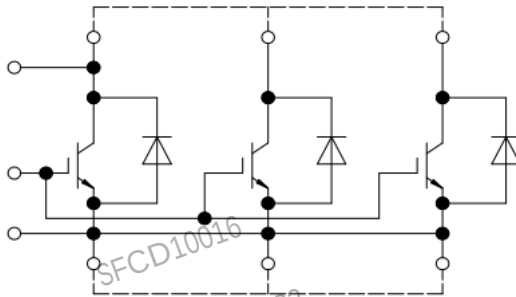
IGBT Discrete with Anti-Parallel Diode

电气特性/ Features and Benefits:

- AlSiC 基板
- AlN 衬板
- 高热循环能力
- 低 $V_{CE(sat)}$ 型器件
- 高电流密度

典型应用/ Applications:

- 牵引传动
- 电机控制
- 智能电网
- 高可靠性逆变器



$V_{CES} = 1700V$, $I_{C\ nom} = 3600A$

双极晶体管/IGBT

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}	1700	V
连续集电极直流电流 Continuous DC collector current	$T_C=100^{\circ}C$, $T_{vj\ max}=150^{\circ}C$	$I_{C\ nom}$	3600	A
集电极重复峰值电流 Repetitive peak collector current	$t_p=1ms$	I_{CRM}	7200	A
栅极-发射极电压 Gate emitter voltage		V_{GE}	± 20	V
总功率损耗 Power dissipation	$T_C=25^{\circ}C$	P_{tot}	16	kW
在开关状态下温度 Temperature under switching conditions		$T_{vj\ op}$	-40...+150	$^{\circ}C$
储存温度 Storage temperature		T_{stg}	-40...+150	$^{\circ}C$

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	$V_{GE}=15V, I_C=3600A$ $V_{GE}=15V, I_C=3600A$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$	V_{CEsat}	2.17 2.69	2.60	V	
栅极-发射极阈值电压 Gate-Emitter threshold voltage	$I_C=145mA, V_{GE}=V_{CE}$	$T_{vj}=25^{\circ}C$	$V_{GE(th)}$	5.2	5.48	6.4	V
输入电容 Input capacitance	$f=100kHz, V_{CE}=25V, V_{GE}=0V$	$T_{vj}=25^{\circ}C$	C_{ies}	326		nF	
反向传输电容 Reverse transfer capacitance			C_{res}	6.4			
门极电荷 Gate charge	$I_C=3600A, V_{GE}=-15V...+15V$	$T_{vj}=25^{\circ}C$	Q_G	25		μC	
集电极-发射极截止电流 Collector-emitter cut-off current	$V_{CE}=1700V, V_{GE}=0V$	$T_{vj}=25^{\circ}C$	I_{CES}		5	mA	
栅极-发射极漏电流 Gate-emitter leakage current	$V_{CE}=0V, V_{GE}=20V$	$T_{vj}=25^{\circ}C$	I_{GES}		1000	nA	
开通延迟时间 Turn-on delay time	$I_C=3600A, V_{CE}=900V$ $V_{GE}=\pm 15V, R_G=1.7\Omega$ (电感负载) / (inductive load)	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	$t_{d(on)}$	480 560 800		ns	
上升时间 Rise time	$I_C=3600A, V_{CE}=900V$ $V_{GE}=\pm 15V, R_G=1.7\Omega$ (电感负载) / (inductive load)	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	t_r	220 260 280		ns	
关断延迟时间 Turn-off delay time	$I_C=3600A, V_{CE}=900V$ $V_{GE}=\pm 15V, R_G=1.7\Omega$ (电感负载) / (inductive load)	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	$t_{d(off)}$	1060 1100 1200		ns	
下降时间 Fall time	$I_C=3600A, V_{CE}=900V$ $V_{GE}=\pm 15V, R_G=1.7\Omega$ (电感负载) / (inductive load)	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	t_f	219 560 580		ns	
开通损耗能量（每脉冲） Turn-on energy loss per pulse	$I_C=3600A, V_{CE}=900V$ $V_{GE}=\pm 15V, R_G=1.7\Omega$ (电感负载) / (inductive load)	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	E_{on}	983 1762 1786		mJ	
关断损耗能量（每脉冲） Turn-off energy loss per pulse	$I_C=3600A, V_{CE}=900V$ $V_{GE}=\pm 15V, R_G=1.7\Omega$ (电感负载) / (inductive load)	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	E_{off}	1170 1571 1624		mJ	
短路数据 SC data	$V_{GE}\leq 15V, V_{cc}=700V$ $V_{CEmax}=V_{CES}-L_{sCE}\cdot di/dt$ $t_p\leq 60us, T_{vj}=25^{\circ}C$	I_{sc}		25400		A	

二极管/Diode

最大额定值 / Maximum Ratings

Parameter	Conditions	Symbol	Value	Unit
反向重复峰值电压 Repetitive peak reverse voltage	$T_{vj}=25^{\circ}C$	V_{RRM}	1700	V

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连续正向直流电流 Continuous DC forward current	$T_C=100^{\circ}\text{C}$, $T_{vj\text{ max}}=150^{\circ}\text{C}$	I_F	3600	A
正向重复峰值电流 Repetitive peak forward current	$t_p=1\text{ms}$	I_{FRM}	7200	A

特征值 / Characteristic Values

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
正向电压 Forward voltage	$I_F=3600\text{A}$, $V_{GE}=0\text{V}$ $I_F=3600\text{A}$, $V_{GE}=0\text{V}$ $I_F=3600\text{A}$, $V_{GE}=0\text{V}$	$T_{vj}=25^{\circ}\text{C}$ $T_{vj}=125^{\circ}\text{C}$ $T_{vj}=150^{\circ}\text{C}$ V_F		1.65 1.75 1.75	2.10	V
反向恢复峰值电流 Peak reverse recovery current	$I_F=3600\text{A}$, $R_G=1.7\Omega$ $V_R=900\text{V}$, $V_{GE}=-15\text{V}$	$T_{vj}=25^{\circ}\text{C}$ $T_{vj}=125^{\circ}\text{C}$ $T_{vj}=150^{\circ}\text{C}$ I_{RM}		2800 3075 3220		A
反向恢复电荷 Reverse Recovered charge	$I_F=3600\text{A}$, $R_G=1.7\Omega$ $V_R=900\text{V}$, $V_{GE}=-15\text{V}$	$T_{vj}=25^{\circ}\text{C}$ $T_{vj}=125^{\circ}\text{C}$ $T_{vj}=150^{\circ}\text{C}$ Q_{rr}		820 1242 1402		μC
反向恢复损耗（每脉冲） Reverse recovered energy	$I_F=3600\text{A}$, $R_G=1.7\Omega$ $V_R=900\text{V}$, $V_{GE}=-15\text{V}$	$T_{vj}=25^{\circ}\text{C}$ $T_{vj}=125^{\circ}\text{C}$ $T_{vj}=150^{\circ}\text{C}$ E_{rec}		530 723 835		mJ

模块 / Module

Parameter	Conditions	Symbol	Value			Unit
绝缘测试电压 Isolation test voltage	RMS, $f=50\text{Hz}$, $t=1\text{min}$	V_{ISOL}		4000		V
内部绝缘 Internal isolation				AIN		
重量 Weight		W		1500		g

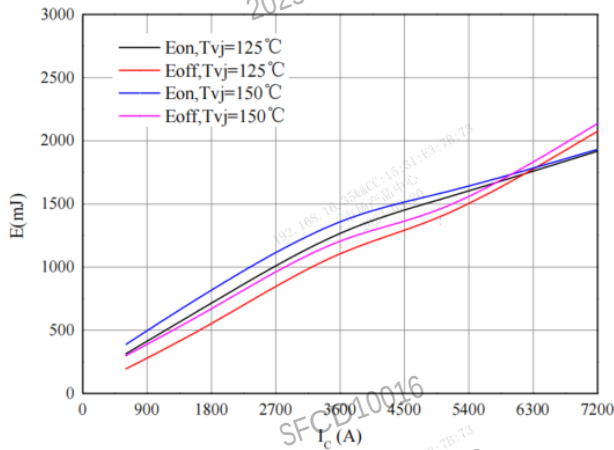


图 1. 开关损耗

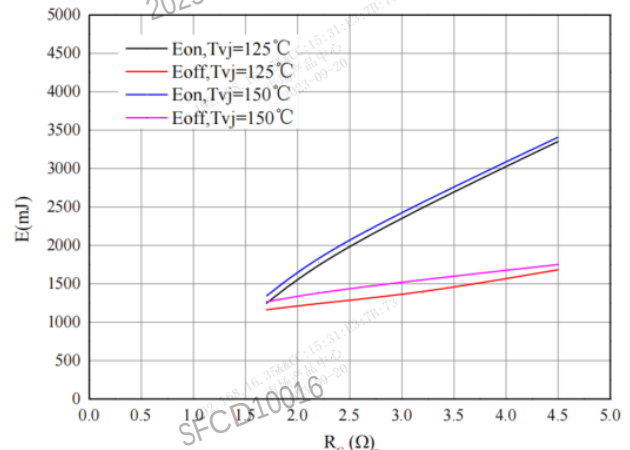
Figure 1. Switching losses of IGBT
 $V_{GE} = \pm 15V$, $R_{gon} = 1.7\Omega$, $R_{goff} = 1.7\Omega$, $V_{CE} = 900V$ 

图 2. 开关损耗

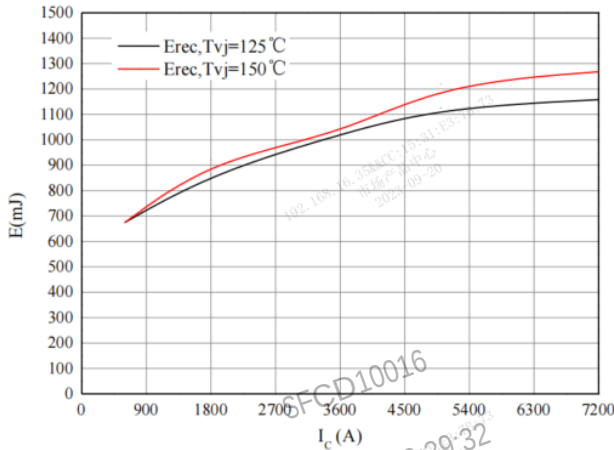
Figure 2. Switching losses of IGBT
 $V_{GE} = \pm 15V$, $I_c = 3600A$, $V_{CE} = 900V$ 

图 3. 开关损耗 二极管

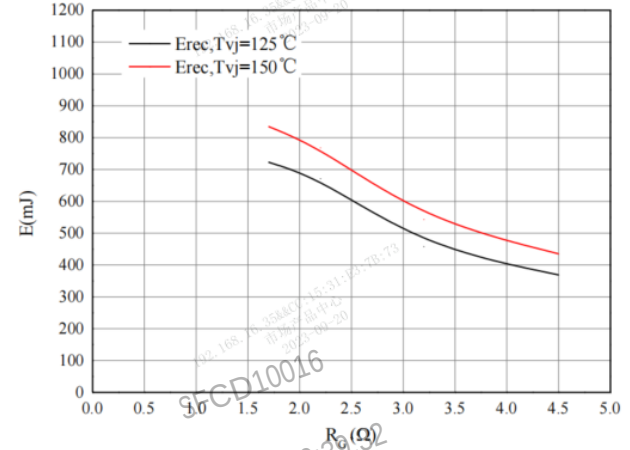
Figure 3. Switching losses of Diode
 $R_{gon} = 1.7\Omega$, $V_{CE} = 900V$ 

图 4. 开关损耗 二极管

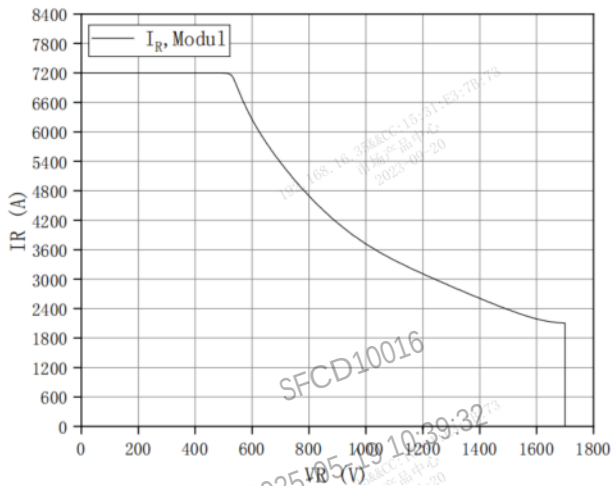
Figure 4. Switching losses of Diode
 $I_f = 3600A$, $V_{CE} = 900V$ 

图 5. 二极管安全工作区

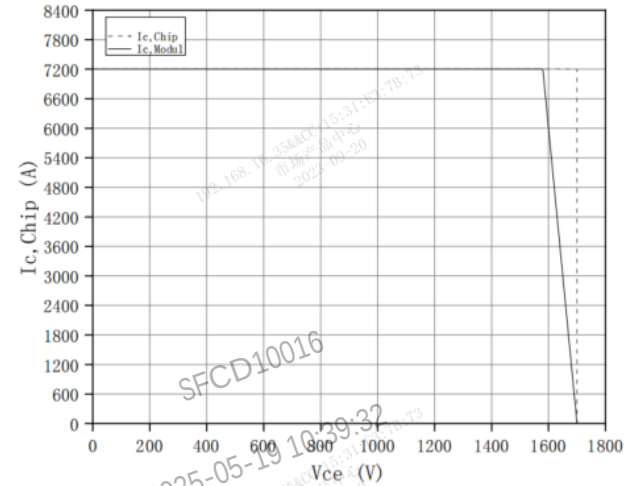
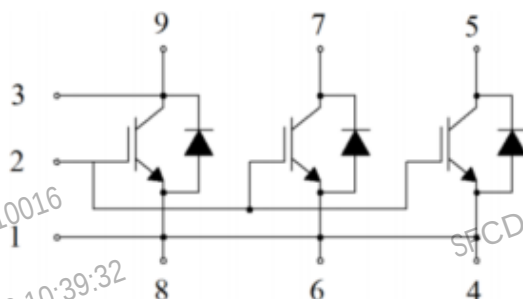
Figure 5. safe operation area (SOA), Diode, Inverter
 $V_{GE} = \pm 15V$, $R_{goff} = 1.7\Omega$, $T_j = 150^\circ C$ 

图 6. 开关损耗 二极管

Figure 6. reverse bias safe operating area (RBSOA),
IGBT, Inverter
 $V_{GE} = \pm 15V$, $R_{goff} = 1.7\Omega$, $T_j = 150^\circ C$

接线图 / Circuit diagram



封装尺寸 / Package outlines

