

Silicon FS Trench IGBT

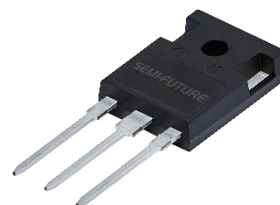
电气特性/ Features And Benefits:

- 650V 沟槽栅/场终止工艺
650V trench gate/field termination process
- 低开关损耗
Low switching losses
- Vcesat 正温度系数
Vcesat has a positive temperature coefficient



典型应用/Applications:

- 充电桩
Charging station
- 不间断电源
Uninterruptible power supplies
- 逆变器
Inverters



关键性能和程序参数 / Key Performance And Package Parameters

Type	V _{CE}	I _C	V _{CEsat} , T _{vj} =25°C	T _{vjmax}	Package
SD75N07A6	650V	75A	1.63V	175°C	TO-247-3L

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°C	V _{CEs}	650	V
连续集电极直流电流 Continuous DC collector current	T _C =25°C, T _{vj max} =175°C T _C =100°C, T _{vj max} =175°C	I _C	80 75	A
集电极脉冲电流 Pulsed collector current, tp limited by T _{vj max}		I _{Cpuls}	225	A
总功率损耗 Total power dissipation	T _C =25°C, T _{vj max} =175°C T _C =100°C, T _{vj max} =175°C	P _{tot}	441 220	W

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栅极-发射极电压 Gate emitter Voltage	$t_p \leq 10\mu s, D < 0.010$	V_{GE}	± 20 ± 30	V
在开关状态下温度 Temperature under switching conditions		$T_{vj\ op}$	-40...+175	°C
储存温度 Storage temperature		T_{stg}	-40...+150	°C

热特性 / Thermal Characteristics

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
热阻, 结-环境 Thermal resistance, junction-ambient		$R_{th(j-a)}$			65	K/W
IGBT 热阻, 结-壳 IGBT thermal resistance, junction - case		$R_{th(j-c)}$		0.34		K/W

特征值 / Characteristic Values

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
击穿电压 Collector-emitter breakdown voltage	$V_{GE}=0V, I_C=0.25mA$	$V_{(BR)CES}$	650			V
集电极-发射极饱和电压 Collector-Emitter saturation Voltage	$V_{GE}=15V, I_C=75A$ $V_{GE}=15V, I_C=75A$ $V_{GE}=15V, I_C=75A$	V_{CEsat}		1.63 2.03 2.13	2.10	
栅极-发射极阈值电压 Gate-Emitter threshold Voltage	$I_C=0.75mA, V_{GE}=V_{CE}$ $T_{vj}=25^\circ C$	$V_{GE(th)}$	4.2	5.1	6.0	
跨导 Transconductance	$V_{CE}=20V, I_C=75A$	G_{fs}		91		S
输入电容 Input capacitance	$f=1\ MHz, V_{CE}=25V, V_{GE}=0V$ $T_{vj}=25^\circ C$	C_{ies}		7.44		nF
输出电容 Output capacitance		C_{oes}		0.24		
反向传输电容 Reverse transfer capacitance		C_{res}		0.13		
门极电荷 Gate charge	$I_C=75A, V_{GE}=15V,$ $V_{CE}=520V$ $T_{vj}=25^\circ C$	Q_G		0.74		μC
集电极-发射极截止电流 Collector-emitter cut-off current	$V_{CE}=650V, V_{GE}=0V$ $T_{vj}=25^\circ C$ $T_{vj}=175^\circ C$	I_{CES}		2400	50	μA
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}			100	nA
开通延迟时间 Turn-on delay time	$I_C=75A, V_{CE}=400V$ $V_{GE}=\pm 15V, R_G=8\Omega$ (电感负载) / (inductive load) $T_{vj}=25^\circ C$ $T_{vj}=125^\circ C$ $T_{vj}=150^\circ C$	t_{don}		34 37 40		ns

上升时间 Rise time	$I_C=75A, V_{CE}=400V$	$T_{vj}=25^{\circ}C$	t_r		153	
	$V_{GE}=\pm 15V, R_G=8\Omega$	$T_{vj}=125^{\circ}C$			157	
	(电感负载) / (inductive load)	$T_{vj}=150^{\circ}C$			163	
关断延迟时间 Turn-off delay time	$I_C=75A, V_{CE}=400V$	$T_{vj}=25^{\circ}C$	$t_{d\ off}$		183	
	$V_{GE}=\pm 15V, R_G=8\Omega$	$T_{vj}=125^{\circ}C$			198	
	(电感负载) / (inductive load)	$T_{vj}=150^{\circ}C$			208	
下降时间 Fall time	$I_C=75A, V_{CE}=400V$	$T_{vj}=25^{\circ}C$	t_f		67	
	$V_{GE}=\pm 15V, R_G=8\Omega$	$T_{vj}=125^{\circ}C$			68	
	(电感负载) / (inductive load)	$T_{vj}=150^{\circ}C$			73	
开通损耗能量 (每脉冲) Turn-on energy loss per pulse	$I_C=75A, V_{CE}=400V$	$T_{vj}=25^{\circ}C$	E_{on}		4.28	mJ
	$V_{GE}=\pm 15V, R_G=8\Omega$	$T_{vj}=125^{\circ}C$			4.35	
	(电感负载) / (inductive load)	$T_{vj}=150^{\circ}C$			4.57	
关断损耗能量 (每脉冲) Turn-off energy loss per pulse	$I_C=75A, V_{CE}=400V$	$T_{vj}=25^{\circ}C$	E_{off}		1.08	mJ
	$V_{GE}=\pm 15V, R_G=8\Omega$	$T_{vj}=125^{\circ}C$			1.12	
	(电感负载) / (inductive load)	$T_{vj}=150^{\circ}C$			1.20	
开关损耗能量 (每脉冲) Total switching energy	$I_C=75A, V_{CE}=400V$	$T_{vj}=25^{\circ}C$	E_{ts}		5.36	
	$V_{GE}=\pm 15V, R_G=8\Omega$	$T_{vj}=125^{\circ}C$			5.47	
	(电感负载) / (inductive load)	$T_{vj}=150^{\circ}C$			5.77	

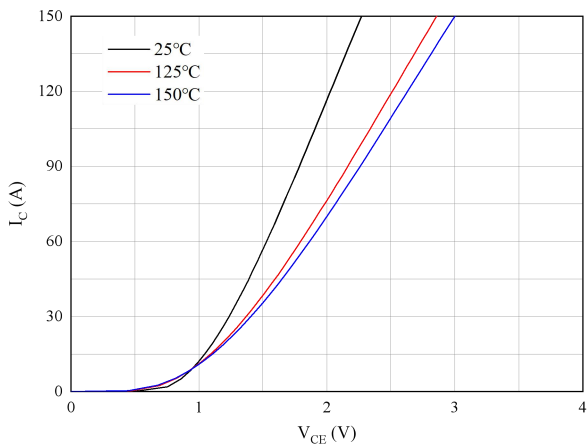


图 1. 典型输出特性 ($V_{GE}=15V$)

Figure 1. Typical output characteristics ($V_{GE}=15V$)

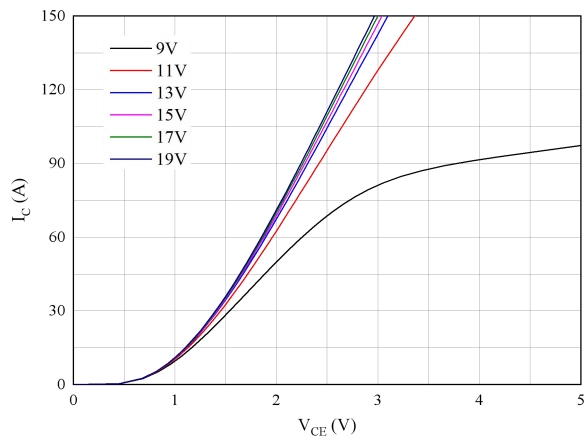


图 2. 典型输出特性 ($T_{vj}=150^{\circ}C$)

Figure 2. Typical output characteristics ($T_{vj}=150^{\circ}C$)

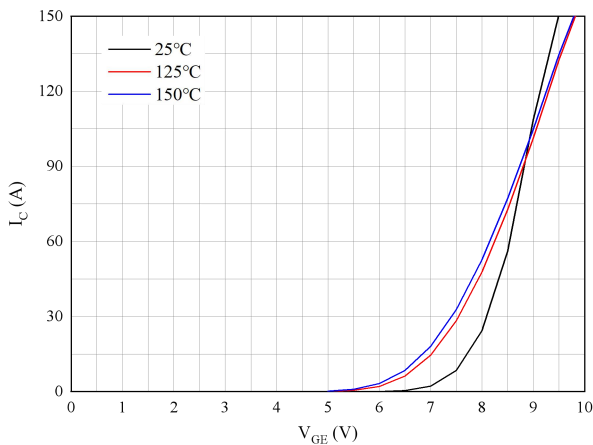


图 3. 典型传输特性($V_{CE}=20V$)

Figure 3. Typical transfer characteristic($V_{CE}=20V$)

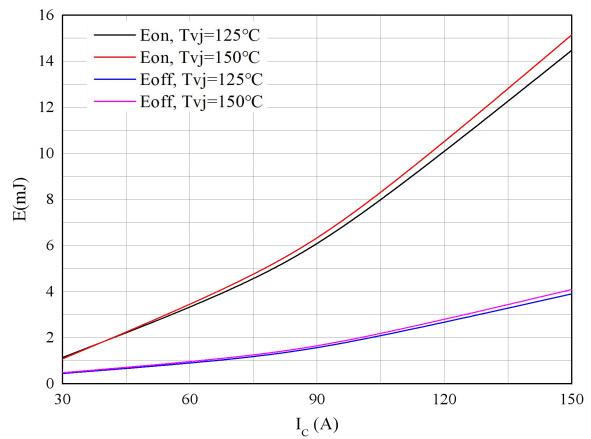


图 4. 开关损耗

Figure 4. Switching losses of IGBT

$V_{GE}=\pm 15V, R_{Gon}=8\Omega, R_{Goff}=8\Omega, V_{CE}=400V$

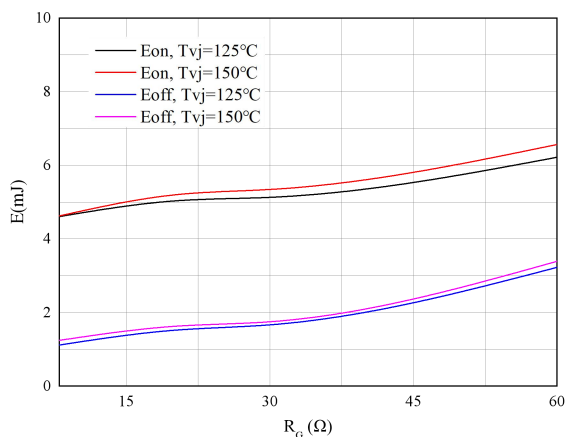


图 5. 开关损耗

Figure 5. Switching losses of IGBT

$V_{GE}=\pm 15V, I_C=75A, V_{CE}=400V$

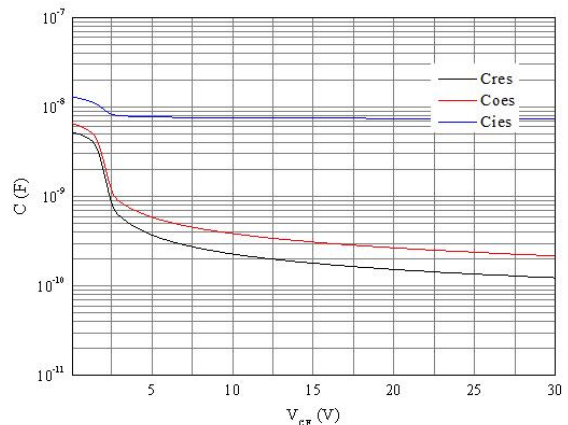


图 6. 电容特性

Figure 6. Capacitance characteristic

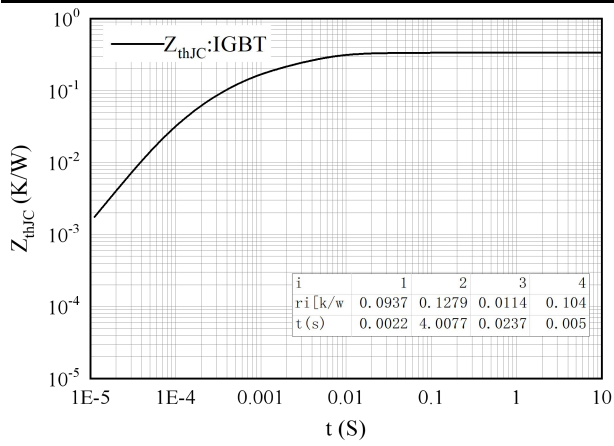
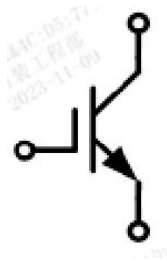


图 7. 瞬态热阻抗 IGBT

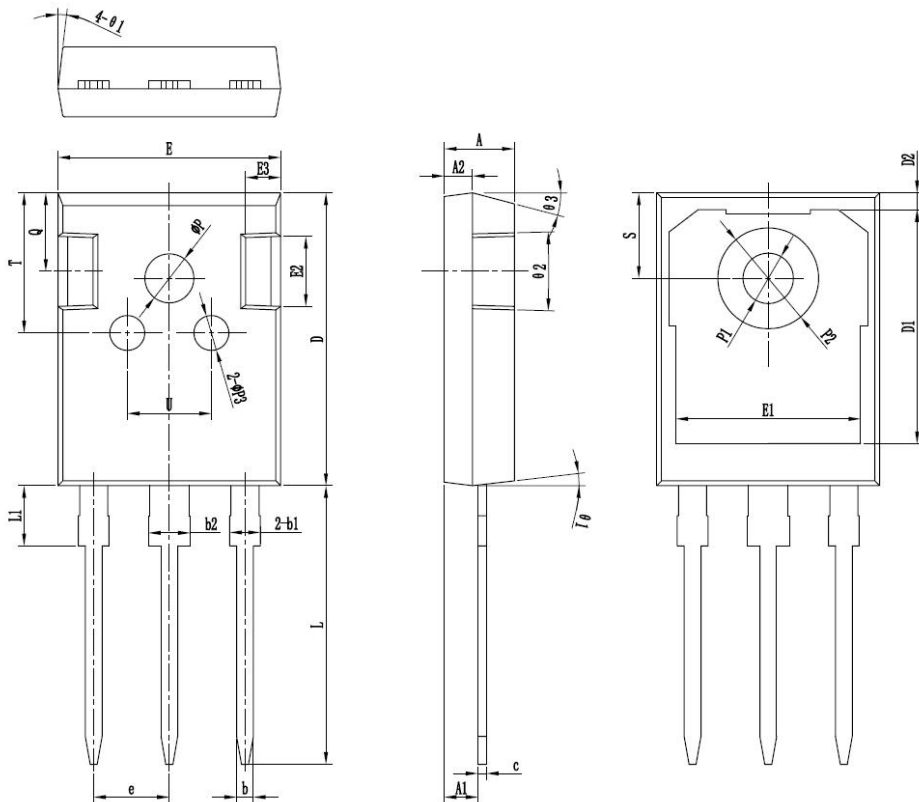
Figure 7. Transient thermal impedance IGBT,

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

接线图 / Circuit diagram



封装尺寸 / Package outlines



符号	单位:mm		
	MIN	NOM	MAX
*H	4.90	5.00	5.10
*H1	2.31	2.41	2.51
A2	1.90	2.00	2.10
*b	1.15	1.20	1.25
*b1	1.95	2.10	2.25
*b2	2.95	3.10	3.25
*c	0.65	0.60	0.65
*d	20.90	21.00	21.10
D1	16.35	16.55	16.75
D2	1.05	1.20	1.35
*e	15.70	15.80	15.90
E1	13.10	13.25	13.40
E2	4.90	5.00	5.10
E3	2.40	2.50	2.60
*e	5.40	5.44	5.48
*L	19.80	19.92	20.10
*L1	-	-	4.30
*PP	3.70	3.80	3.90
*PP1	3.50	3.60	3.70
PP2	7.00	7.20	7.40
PP3	2.40	2.50	2.60
Q	5.60	5.80	6.00
*S	6.05	6.15	6.25
T	9.80	10.00	10.20
U	6.00	6.20	6.40
θ1	5°	7°	9°
θ2	1°	3°	5°
θ3	13°	15°	17°

*为关键管控尺寸