

MOSFET

英飞凌高耐热60V OptiMOS™功率晶体管

特性

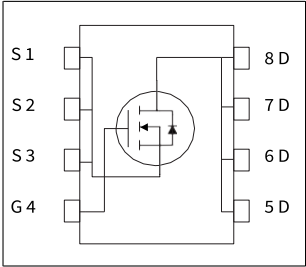
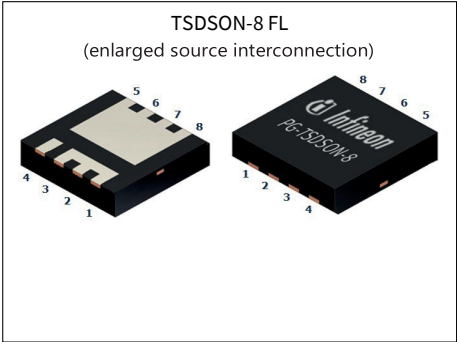
- 针对高性能 SMPS（例如同步整流）进行优化同步整流
- 100% 雪崩测试
- 卓越的耐热性
- N沟道
- 无铅镀层；符合RoHS标准
- 符合 IEC61249-2-21 标准的无卤素

产品验证

完全符合 JEDEC 工业应用标准

表 1 主要性能参数

Parameter	Value	Unit
V_{DS}	60	V
$R_{DS(on),max}$	3.7	mΩ
I_D	104	A
Q_{oss}	32	nC
$Q_G(0V..4.5V)$	18	nC



Type / Ordering Code	Package	Marking	Related Links
BSZ037N06LS5	PG-TSDSON-8 FL	037N06L	-

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1 最大额定值

除非另有规定， $T_A = 25\text{ °C}$

表 2 最大额定值

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Continuous drain current ¹⁾	I_D	-	-	104 65 87 55 18	A	$V_{GS}=10\text{ V}$, $T_C=25\text{ °C}$ $V_{GS}=10\text{ V}$, $T_C=100\text{ °C}$ $V_{GS}=4.5\text{ V}$, $T_C=25\text{ °C}$ $V_{GS}=4.5\text{ V}$, $T_C=100\text{ °C}$ $V_{GS}=10\text{ V}$, $T_A=25\text{ °C}$, $R_{THJA}=60\text{ °C/W}^{2)}$
Pulsed drain current ³⁾	$I_{D,pulse}$	-	-	416	A	$T_A=25\text{ °C}$
Avalanche energy, single pulse ⁴⁾	E_{AS}	-	-	117	mJ	$I_D=20\text{ A}$, $R_{GS}=25\text{ }\Omega$
Gate source voltage	V_{GS}	-20	-	20	V	-
Power dissipation	P_{tot}	-	-	69 2.1	W	$T_C=25\text{ °C}$ $T_A=25\text{ °C}$, $R_{THJA}=60\text{ °C/W}^{2)}$
Operating and storage temperature	T_j, T_{stg}	-55	-	150	°C	IEC climatic category; DIN IEC 68-1: 55/150/56

2 热特性

表3 热特性

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Thermal resistance, junction - case, bottom	R_{thJC}	-	-	1.8	°C/W	-
Thermal resistance, junction - case, top	R_{thJC}	-	-	20	°C/W	-
Device on PCB, 6 cm ² cooling area	R_{thJA}	-	-	60	°C/W	-

¹⁾额定值指产品仅具有数据表指定的绝对最大值，保持外壳温度符合规定要求。其他外壳温度请参见图 2。需要根据实际环境条件降低额定值。

²⁾器件安装在 40 mm x 40 mm x 1.5 mm 环氧树脂印刷电路板 FR4 上，漏极连接用铜面积为 6 cm²（一层，70 μm 厚）。印刷电路板垂直放置在静止空气中。

³⁾详细信息请参见图 3

⁴⁾详细信息请参见图 13

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3 电气特性

除非另有规定， $T_j = 25\text{ °C}$

表4 静态特性

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Drain-source breakdown voltage	$V_{(BR)DSS}$	60	-	-	V	$V_{GS}=0\text{ V}$, $I_D=1\text{ mA}$
Gate threshold voltage	$V_{GS(th)}$	1.1	1.7	2.3	V	$V_{DS}=V_{GS}$, $I_D=36\text{ }\mu\text{A}$
Zero gate voltage drain current	I_{DSS}	-	0.1 10	1 100	μA	$V_{DS}=60\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=25\text{ °C}$ $V_{DS}=60\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=125\text{ °C}$
Gate-source leakage current	I_{GSS}	-	10	100	nA	$V_{GS}=20\text{ V}$, $V_{DS}=0\text{ V}$
Drain-source on-state resistance	$R_{DS(on)}$	-	3.1 4.2	3.7 5.3	m Ω	$V_{GS}=10\text{ V}$, $I_D=20\text{ A}$ $V_{GS}=4.5\text{ V}$, $I_D=10\text{ A}$
Gate resistance	R_G	-	1.6	2.4	Ω	-
Transconductance	g_{fs}	33	66	-	S	$ V_{DS} \geq 2 I_D /R_{DS(on)max}$, $I_D=20\text{ A}$

表5 动态特性

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Input capacitance	C_{iss}	-	2400	3100	pF	$V_{GS}=0\text{ V}$, $V_{DS}=30\text{ V}$, $f=1\text{ MHz}$
Output capacitance ¹⁾	C_{oss}	-	500	650	pF	$V_{GS}=0\text{ V}$, $V_{DS}=30\text{ V}$, $f=1\text{ MHz}$
Reverse transfer capacitance ¹⁾	C_{rss}	-	25	44	pF	$V_{GS}=0\text{ V}$, $V_{DS}=30\text{ V}$, $f=1\text{ MHz}$
Turn-on delay time	$t_{d(on)}$	-	9	-	ns	$V_{DD}=30\text{ V}$, $V_{GS}=10\text{ V}$, $I_D=20\text{ A}$, $R_{G,ext}=1.6\text{ }\Omega$
Rise time	t_r	-	5	-	ns	$V_{DD}=30\text{ V}$, $V_{GS}=10\text{ V}$, $I_D=20\text{ A}$, $R_{G,ext}=1.6\text{ }\Omega$
Turn-off delay time	$t_{d(off)}$	-	26	-	ns	$V_{DD}=30\text{ V}$, $V_{GS}=10\text{ V}$, $I_D=20\text{ A}$, $R_{G,ext}=1.6\text{ }\Omega$
Fall time	t_f	-	5	-	ns	$V_{DD}=30\text{ V}$, $V_{GS}=10\text{ V}$, $I_D=20\text{ A}$, $R_{G,ext}=1.6\text{ }\Omega$

表6 栅极电荷特性²⁾

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Gate to source charge	Q_{gs}	-	6.6	-	nC	$V_{DD}=30\text{ V}$, $I_D=20\text{ A}$, $V_{GS}=0\text{ to }4.5\text{ V}$
Gate charge at threshold	$Q_{g(th)}$	-	4.2	-	nC	$V_{DD}=30\text{ V}$, $I_D=20\text{ A}$, $V_{GS}=0\text{ to }4.5\text{ V}$
Gate to drain charge ¹⁾	Q_{gd}	-	5.3	8	nC	$V_{DD}=30\text{ V}$, $I_D=20\text{ A}$, $V_{GS}=0\text{ to }4.5\text{ V}$
Switching charge	Q_{sw}	-	7.8	-	nC	$V_{DD}=30\text{ V}$, $I_D=20\text{ A}$, $V_{GS}=0\text{ to }4.5\text{ V}$
Gate charge total ¹⁾	Q_g	-	18	22	nC	$V_{DD}=30\text{ V}$, $I_D=20\text{ A}$, $V_{GS}=0\text{ to }4.5\text{ V}$
Gate plateau voltage	$V_{plateau}$	-	2.7	-	V	$V_{DD}=30\text{ V}$, $I_D=20\text{ A}$, $V_{GS}=0\text{ to }4.5\text{ V}$
Gate charge total ¹⁾	Q_g	-	35	47	nC	$V_{DD}=30\text{ V}$, $I_D=20\text{ A}$, $V_{GS}=0\text{ to }10\text{ V}$
Gate charge total, sync. FET ¹⁾	$Q_{g(sync)}$	-	32	42	nC	$V_{DS}=0.1\text{ V}$, $V_{GS}=0\text{ to }10\text{ V}$
Output charge ¹⁾	Q_{oss}	-	32	42	nC	$V_{DD}=30\text{ V}$, $V_{GS}=0\text{ V}$

¹⁾由设计标定，不受制于生产测试。

²⁾参数定义请参见“栅极充电波形”

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表 7 反向二极管

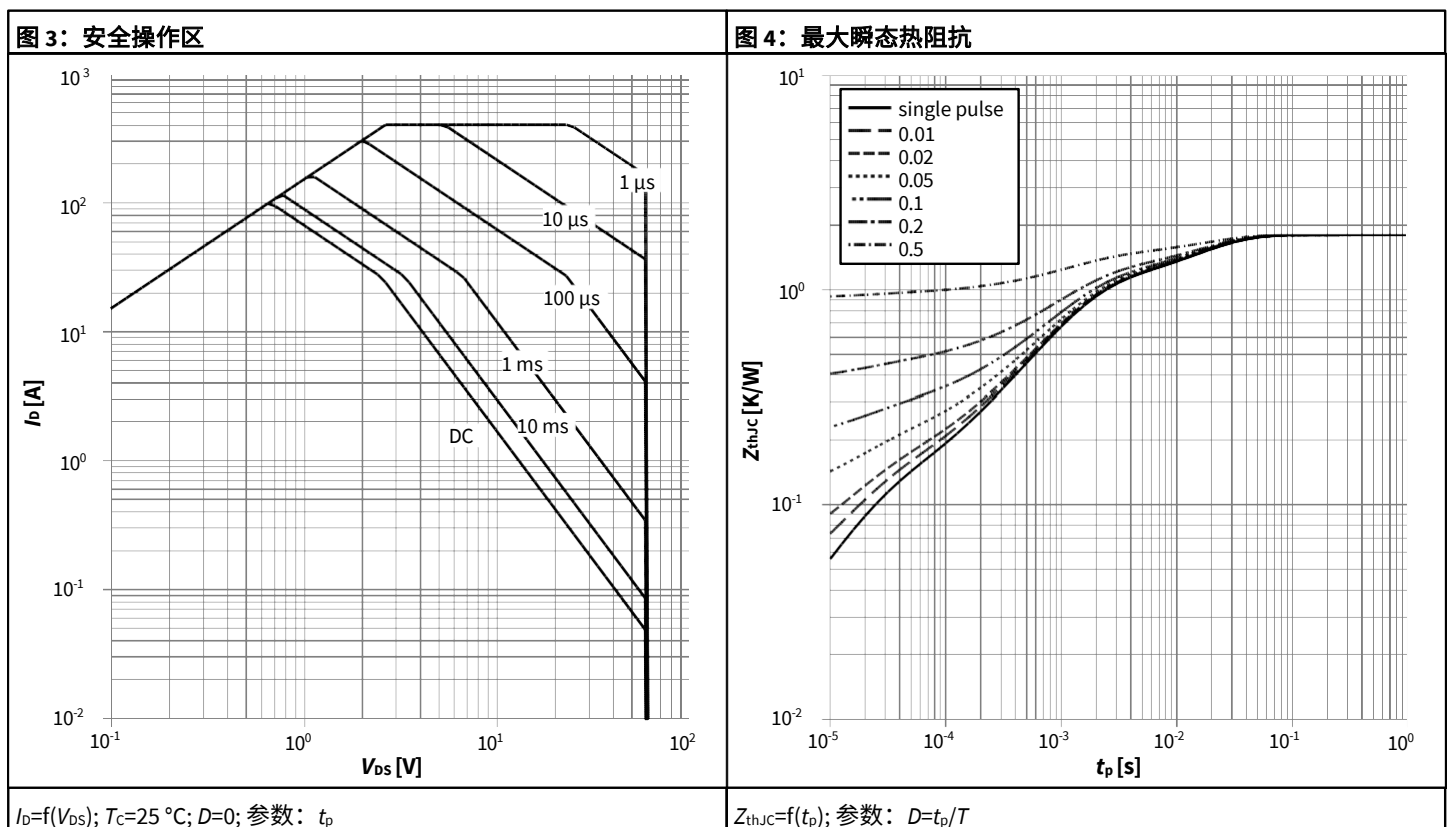
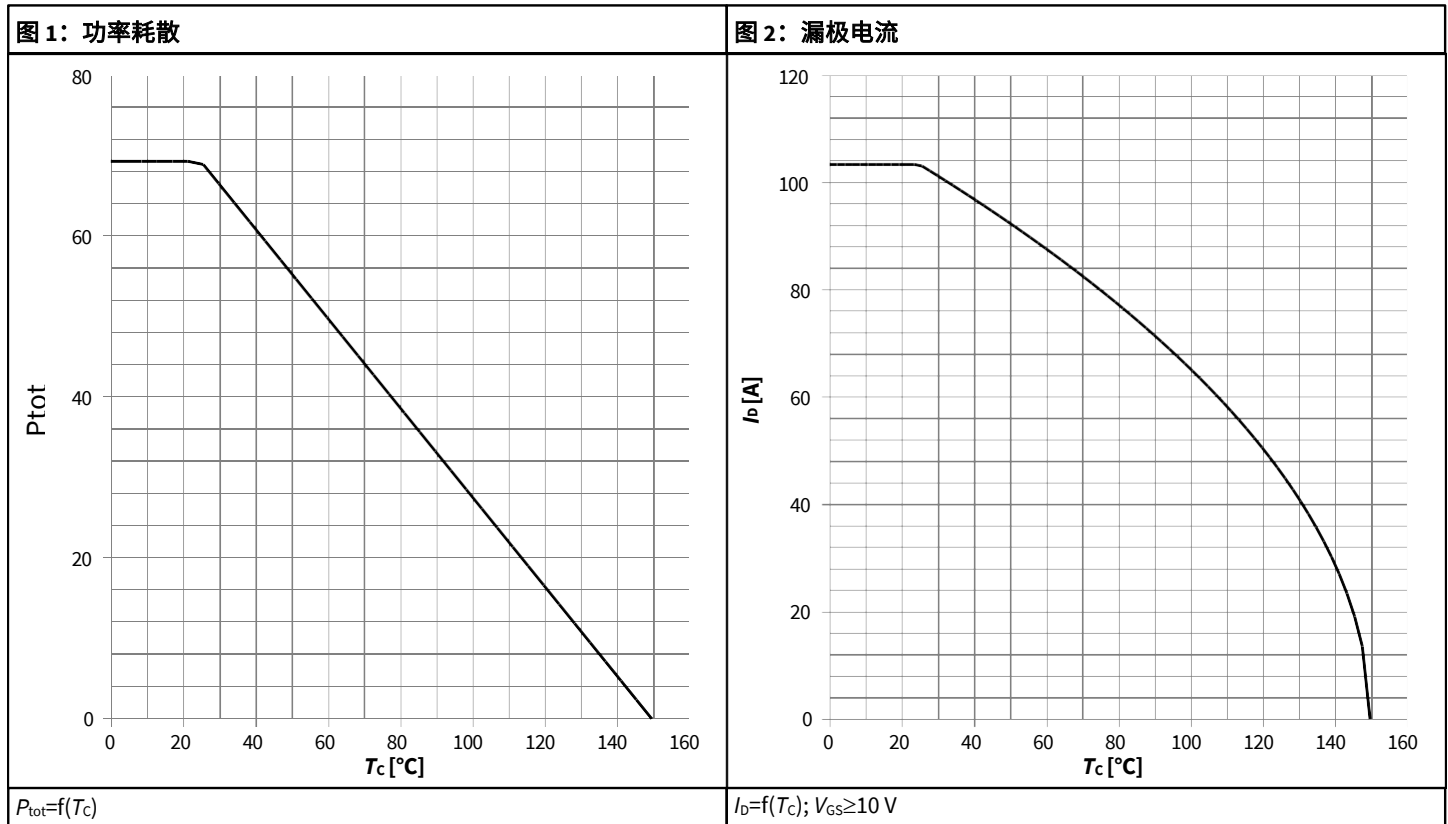
Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Diode continuous forward current	I_S	-	-	69	A	$T_C=25\text{ °C}$
Diode pulse current	$I_{S,pulse}$	-	-	416	A	$T_C=25\text{ °C}$
Diode forward voltage	V_{SD}	-	0.80	1	V	$V_{GS}=0\text{ V}$, $I_F=20\text{ A}$, $T_J=25\text{ °C}$
Reverse recovery time ¹⁾	t_{rr}	-	24	48	ns	$V_R=30\text{ V}$, $I_F=20\text{ A}$, $di_F/dt=100\text{ A}/\mu\text{s}$
Reverse recovery charge ¹⁾	Q_{rr}	-	11	22	nC	$V_R=30\text{ V}$, $I_F=20\text{ A}$, $di_F/dt=100\text{ A}/\mu\text{s}$

¹⁾由设计标定，不受制于生产测试。

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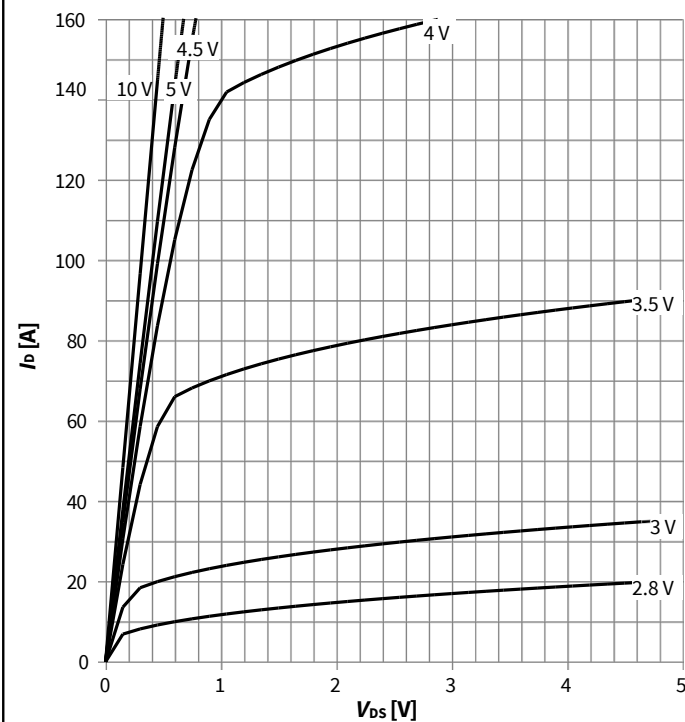
4 电气特性图



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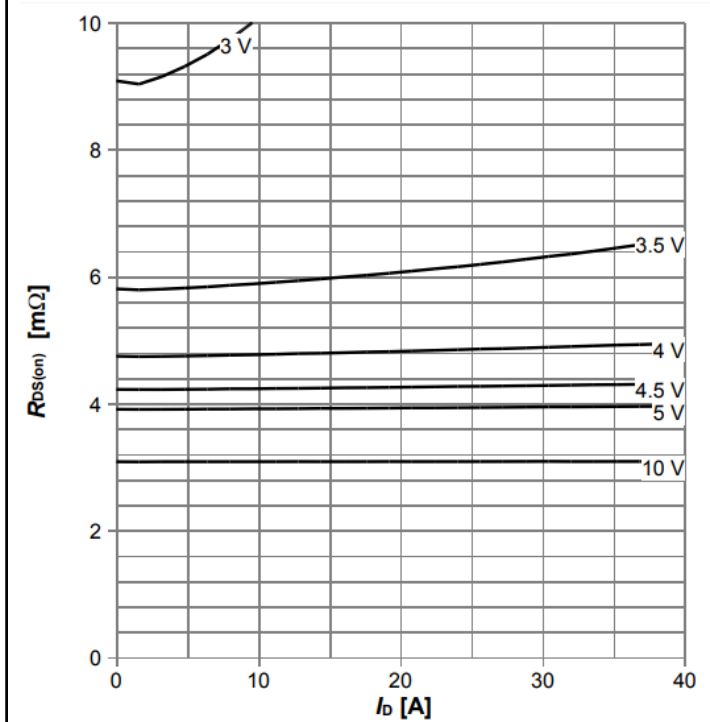
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图 5：典型输出特性



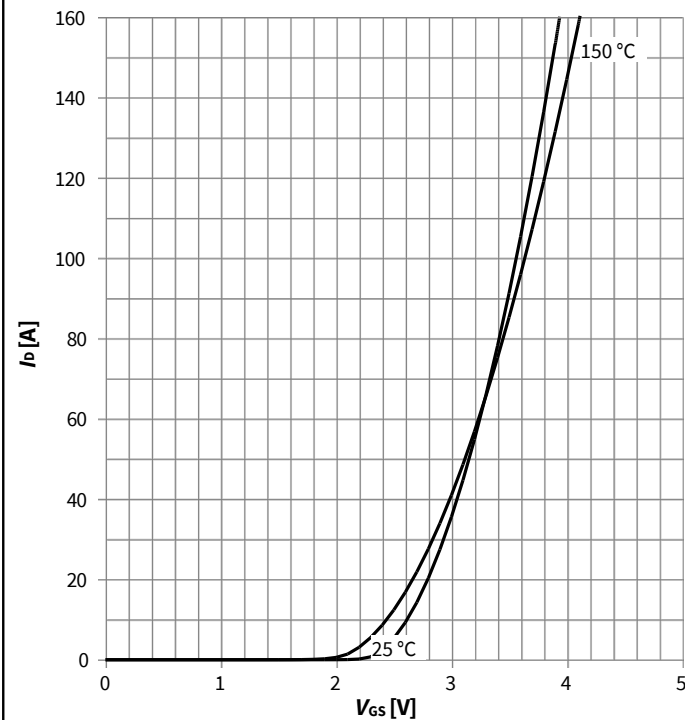
$I_D = f(V_{DS})$, $T_J = 25^\circ\text{C}$; 参数: V_{GS}

图 6：典型漏源导通电阻



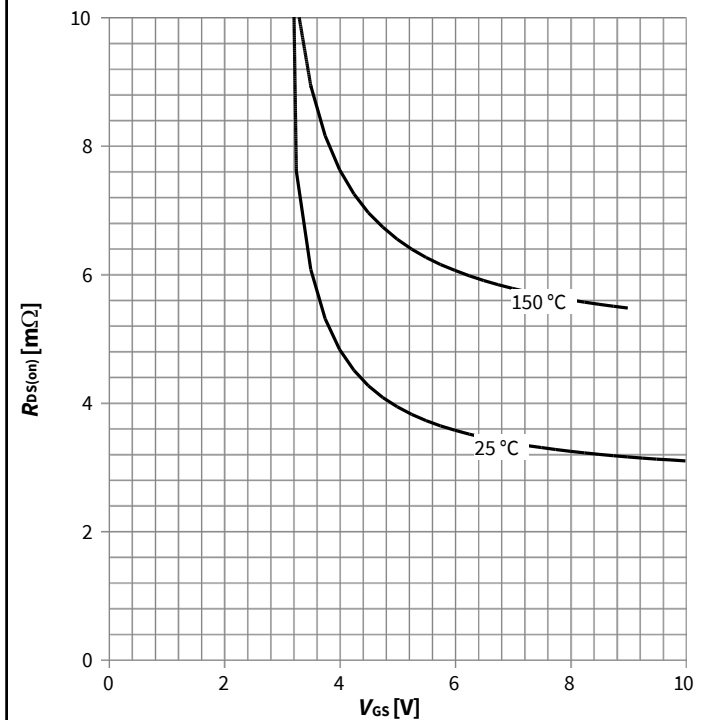
$R_{DS(on)} = f(I_D)$, $T_J = 25^\circ\text{C}$; 参数: V_{GS}

图 7：典型转移特性



$I_D = f(V_{GS})$, $|V_{DS}| > 2|I_D|R_{DS(on)max}$; 参数: T_J

图 8：典型漏源导通电阻

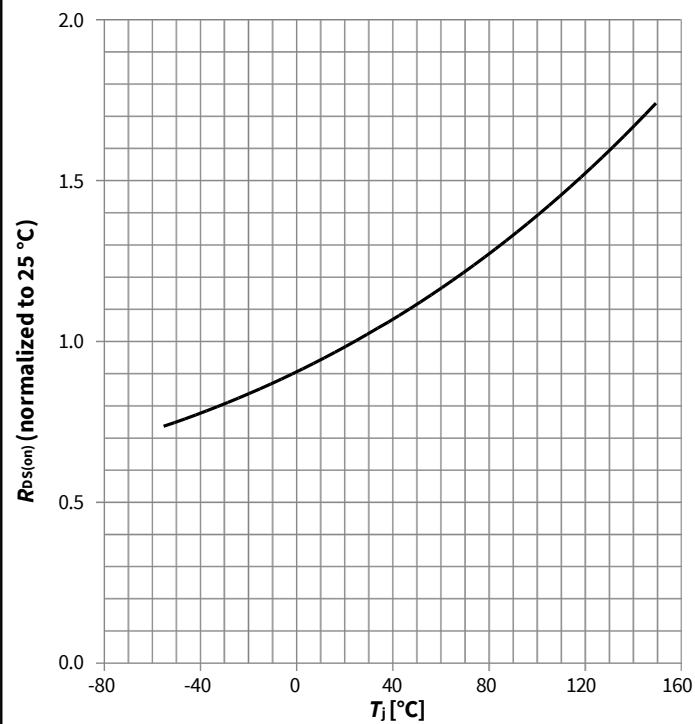


$R_{DS(on)} = f(V_{GS})$, $I_D = 20\text{ A}$; 参数: T_J

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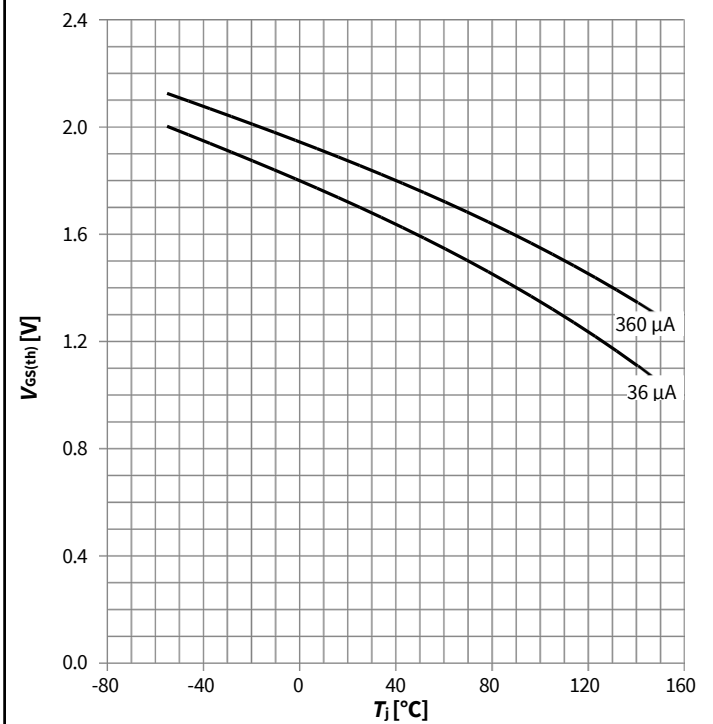
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图 9：典型漏源导通电阻



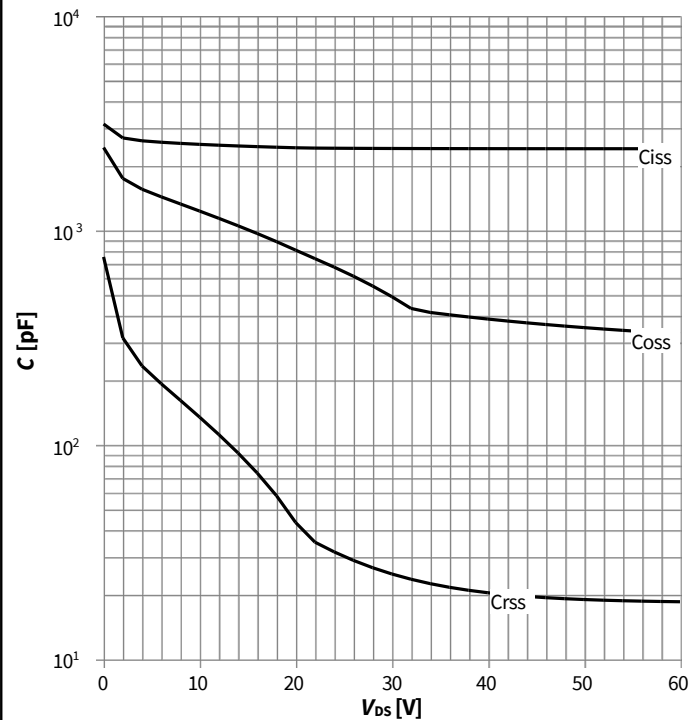
$$R_{DS(on)} = f(T_j), I_D = 20 \text{ A}, V_{GS} = 10 \text{ V}$$

图 10：典型栅极阈值电压



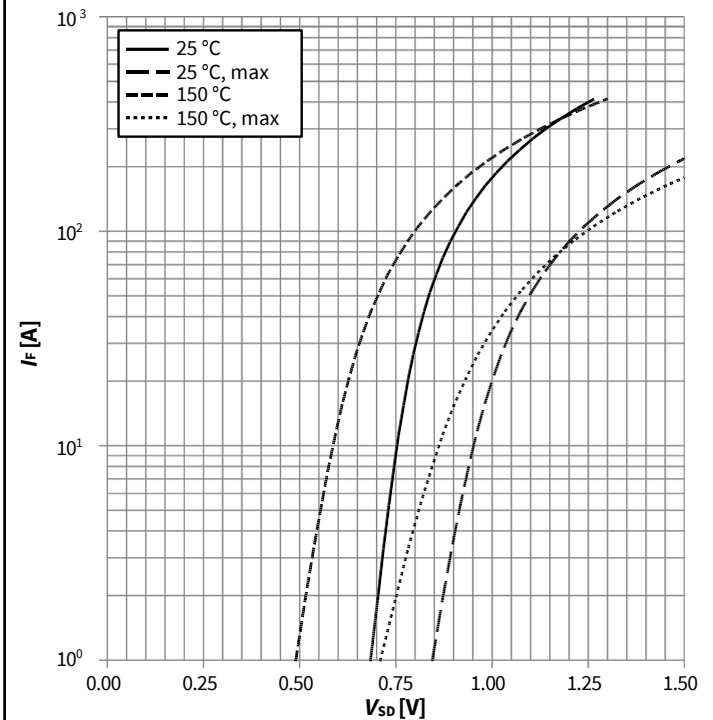
$$V_{GS(th)} = f(T_j), V_{GS} = V_{DS}; \text{参数: } I_D$$

图 11：典型电容值



$$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$$

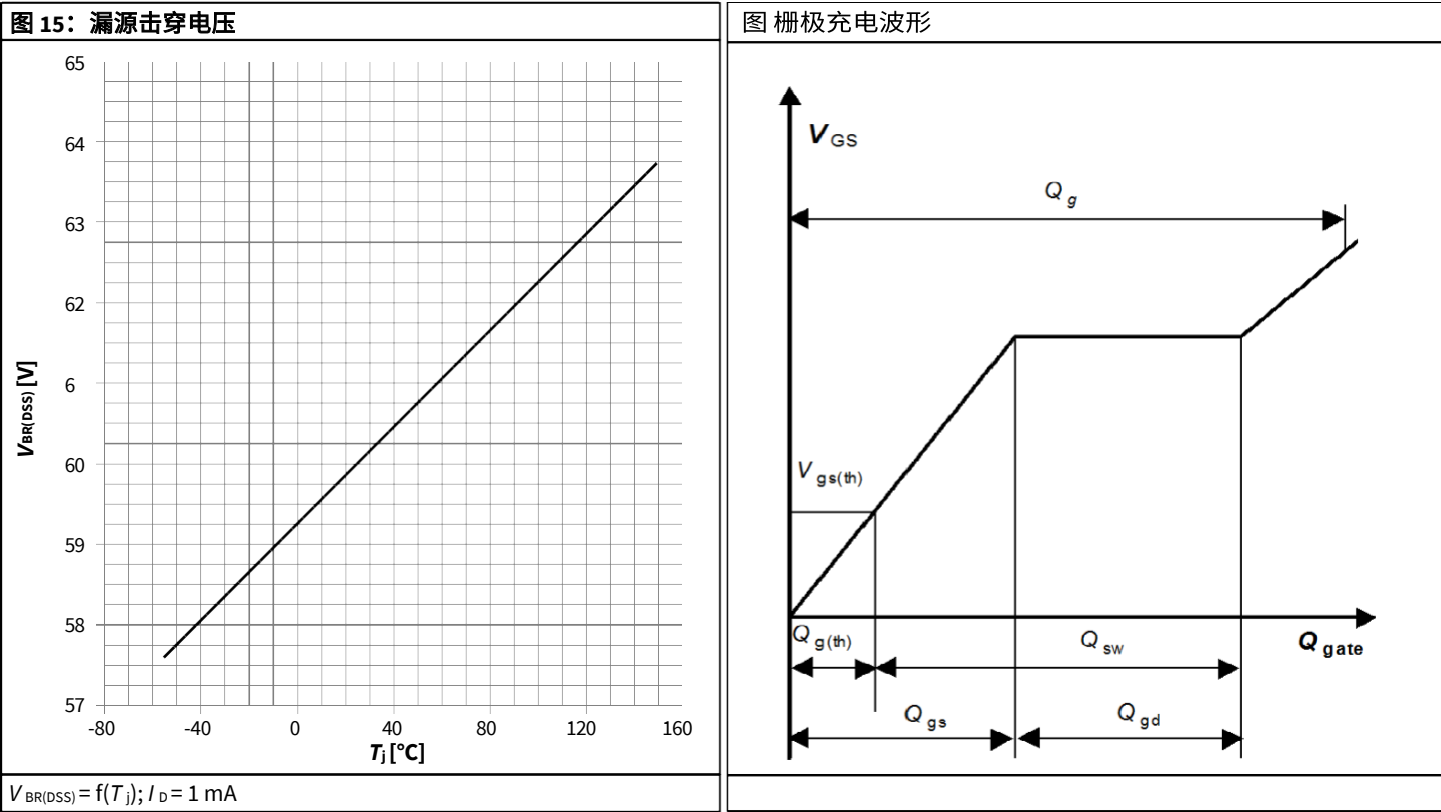
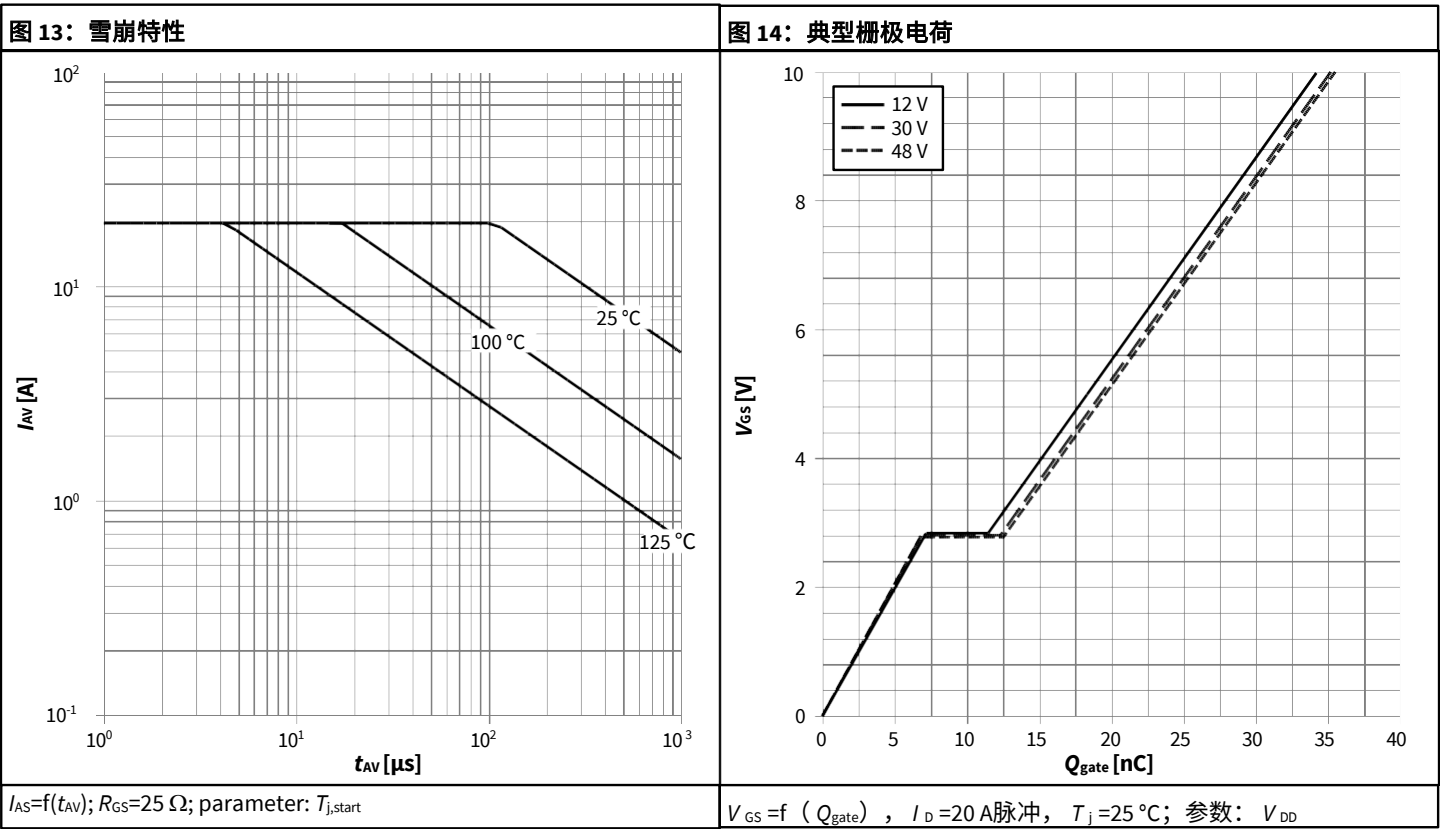
图 12：反向二极管的正向特性



$$I_F = f(V_{SD}); \text{参数: } T_j$$

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5 封装外形

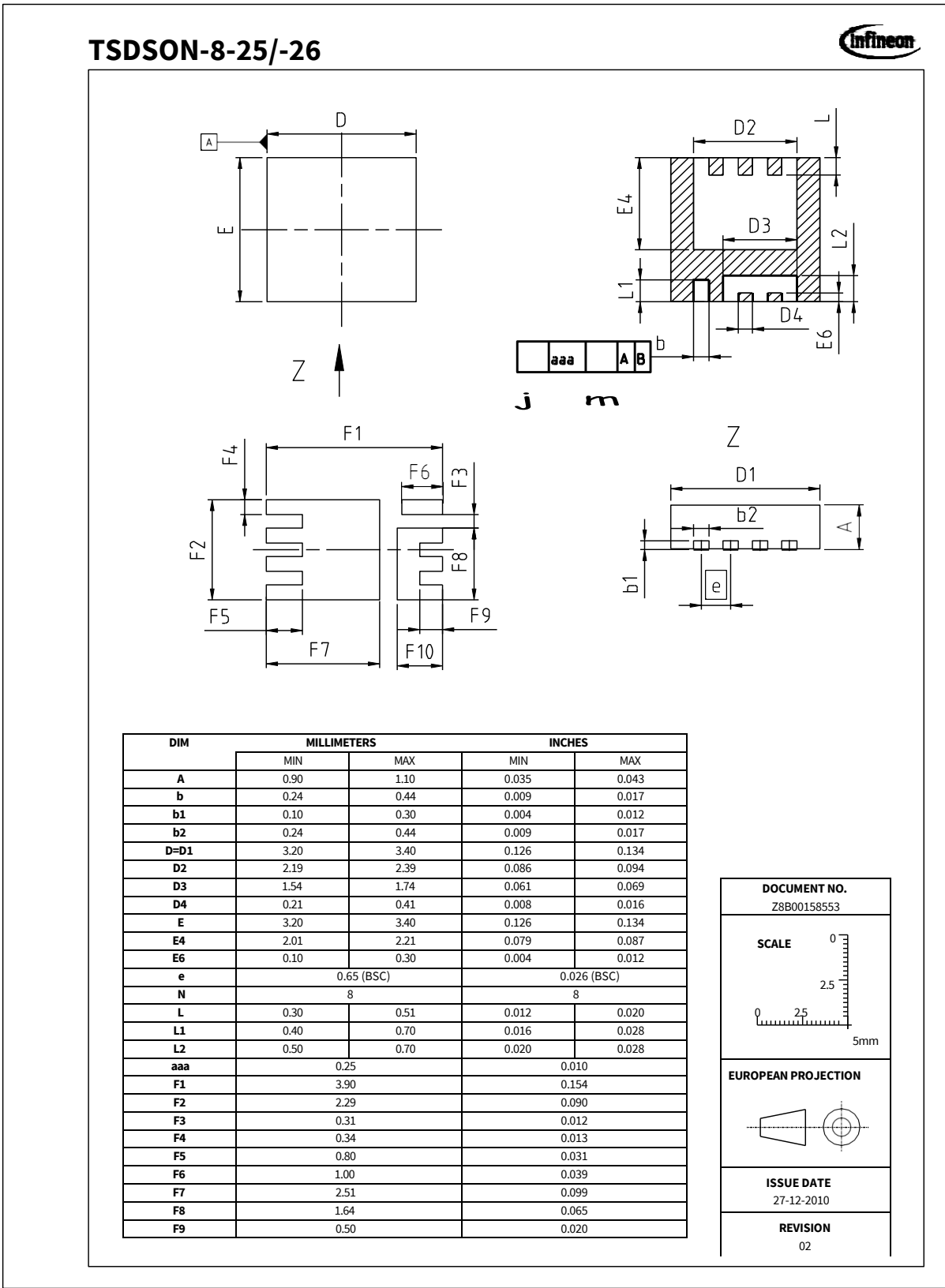


图 1 PG-TDSON-8 FL 外形图，尺寸单位为毫米/英寸

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修订记录

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历史修订版本

Revision	Date	Subjects (major changes since last revision)
2.0	2019-02-11	Release of final version
2.1	2020-04-17	Update Current Rating

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