

MOSFET

英飞凌高耐热80 V OptiMOS™ 5 功率晶体管

特性

- 针对高性能 SMPS（例如同步整流）进行优化
- 额定温度为 175°C
- 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

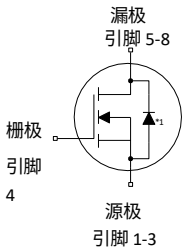
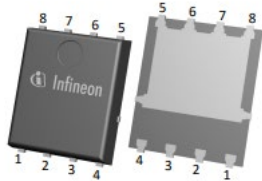
完全符合 JEDEC 工业应用标准

表 1 主要性能参数

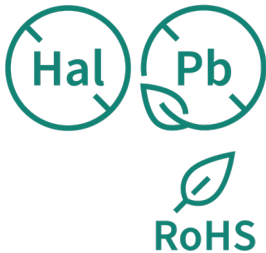
Parameter	Value	Unit
V_{DS}	80	V
$R_{DS(on),max}$	3.7	mΩ
I_D	136	A
Q_{oss}	56	nC
$Q_G(0V..10V)$	46	nC

Type/Ordering Code	Package	Marking	Related Links
BSC037N08NS5	PG-TDSON-8	037N08NS	-

PG-TDSON-8



*1: 内部二极管



本数据手册的原文使用英文撰写。为方便起见，英飞凌提供了译文；由于翻译过程中可能使用了自动化工具，英飞凌不保证译文的准确性。为确认准确性，请务必访问 infineon.com 参考最新的英文版本（控制文档）。

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1 最大额定值

除非另有规定

表 2 最大额定值

Parameter	Symbol	Values			Unit	Note/ Test Condition
		Min.	Typ.	Max.		
Continuous drain current ¹⁾	I_D	-	-	136 96 22	A	$V_{GS}=10\text{ V}, T_C=25\text{ °C}$ $V_{GS}=10\text{ V}, T_C=100\text{ °C}$ $V_{GS}=10\text{ V}, T_A=25\text{ °C}, R_{thJA}=50\text{ K/W}$ ²⁾
Pulsed drain current ³⁾	$I_{D,pulse}$	-	-	544	A	$T_C=25\text{ °C}$
Avalanche energy, single pulse ⁴⁾	E_{AS}	-	-	140	mJ	$I_D=50\text{ A}, R_{GS}=25\text{ }\Omega$
Gate source voltage	V_{GS}	-20	-	20	V	-
Power dissipation	P_{tot}	-	-	136 3.0	W	$T_C=25\text{ °C}$ $T_A=25\text{ °C}, R_{thJA}=50\text{ K/W}$ ²⁾
Operating and storage temperature	T_j, T_{stg}	-55	-	175	°C	-

1) 额定值的适用条件：产品在数据手册中规定的绝对最大值条件下运行、确保外壳温度为25°C

更高的外壳温度请参见图 2。需要根据实际环境条件降低额定值。

2) 器件置于40 mm × 40 mm × 1.5 mm 环氧树脂 PCB FR4基板上，配有6 cm²（单层，70微米厚）铜层，用于漏极连接。PCB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

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}	-	0.7	1.1	K/W	-
Thermal resistance, junction - case, top	R_{thJC}	-	-	20	K/W	-
Device on PCB, 6 cm ² cooling area ⁵⁾	R_{thJA}	-	-	50	K/W	-

⁵⁾ 器件置于40 mm × 40 mm × 1.5 mm 环氧树脂 PCB FR4基板上, 配有6 cm² (单层, 70微米厚) 铜层, 用于漏极连接。PCB 垂直放置在静止空气中。

3 电气特性

除非另有规定

表4 静态特性

Parameter	Symbol	Values			Unit	Note/ Test Condition
		Min.	Typ.	Max.		
Drain-source breakdown voltage	$V_{(BR)DSS}$	80	-	-	V	$V_{GS}=0\text{ V}, I_D=1\text{ mA}$
Gate threshold voltage	$V_{GS(th)}$	2.2	3	3.8	V	$V_{DS}=V_{GS}, I_D=72\text{ }\mu\text{A}$
Zero gate voltage drain current	I_{DSS}	-	0.1 10	1 100	μA	$V_{DS}=80\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ }^\circ\text{C}$ $V_{DS}=80\text{ V}, V_{GS}=0\text{ V}, T_j=125\text{ }^\circ\text{C}$
Gate-source leakage current	I_{GSS}	-	10	100	nA	$V_{GS}=20\text{ V}, V_{DS}=0\text{ V}$
Drain-source on-state resistance	$R_{DS(on)}$	-	3.2 4.4	3.7 5.3	m Ω	$V_{GS}=10\text{ V}, I_D=50\text{ A}$ $V_{GS}=6\text{ V}, I_D=25\text{ A}$
Gate resistance ⁶⁾	R_G	-	1.3	2.0	Ω	-
Transconductance	g_{fs}	47	94	-	S	$ V_{DS} >2 I_D R_{DS(on)max}, I_D=50\text{ A}$

⁶⁾ 由设计定义。未经过生产测试。

表5 动态特性⁷⁾

Parameter	Symbol	Values			Unit	Note/ Test Condition
		Min.	Typ.	Max.		
Input capacitance	C_{iss}	-	3200	4200	pF	$V_{GS}=0\text{ V}, V_{DS}=40\text{ V}, f=1\text{ MHz}$
Output capacitance	C_{oss}	-	530	690	pF	$V_{GS}=0\text{ V}, V_{DS}=40\text{ V}, f=1\text{ MHz}$
Reverse transfer capacitance	C_{rss}	-	25	44	pF	$V_{GS}=0\text{ V}, V_{DS}=40\text{ V}, f=1\text{ MHz}$
Turn-on delay time	$t_{d(on)}$	-	14	-	ns	$V_{DD}=40\text{ V}, V_{GS}=10\text{ V}, I_D=50\text{ A}, R_{G,ext}=3\text{ }\Omega$
Rise time	t_r	-	10	-	ns	$V_{DD}=40\text{ V}, V_{GS}=10\text{ V}, I_D=50\text{ A}, R_{G,ext}=3\text{ }\Omega$
Turn-off delay time	$t_{d(off)}$	-	26	-	ns	$V_{DD}=40\text{ V}, V_{GS}=10\text{ V}, I_D=50\text{ A}, R_{G,ext}=3\text{ }\Omega$
Fall time	t_f	-	7	-	ns	$V_{DD}=40\text{ V}, V_{GS}=10\text{ V}, I_D=50\text{ A}, R_{G,ext}=3\text{ }\Omega$

⁷⁾ 由设计定义。未经过生产测试。

表6 栅极电荷特性⁸⁾

Parameter	Symbol	Values			Unit	Note/ Test Condition
		Min.	Typ.	Max.		
Gate to source charge	Q_{gs}	-	15	-	nC	$V_{DD}=40\text{ V}, I_D=50\text{ A}, V_{GS}=0\text{ to }10\text{ V}$
Gate charge at threshold	$Q_{g(th)}$	-	9.0	-	nC	$V_{DD}=40\text{ V}, I_D=50\text{ A}, V_{GS}=0\text{ to }10\text{ V}$
Gate to drain charge	Q_{gd}	-	10	15	nC	$V_{DD}=40\text{ V}, I_D=50\text{ A}, V_{GS}=0\text{ to }10\text{ V}$
Switching charge	Q_{sw}	-	16	-	nC	$V_{DD}=40\text{ V}, I_D=50\text{ A}, V_{GS}=0\text{ to }10\text{ V}$
Gate charge total	Q_g	-	46	58	nC	$V_{DD}=40\text{ V}, I_D=50\text{ A}, V_{GS}=0\text{ to }10\text{ V}$
Gate plateau voltage	$V_{plateau}$	-	4.8	-	V	$V_{DD}=40\text{ V}, I_D=50\text{ A}, V_{GS}=0\text{ to }10\text{ V}$
Gate charge total, sync. FET	$Q_{g(sync)}$	-	40	-	nC	$V_{DS}=0.1\text{ V}, V_{GS}=0\text{ to }10\text{ V}$

表 6 栅极电荷特性⁸⁾

Parameter	Symbol	Values			Unit	Note/ Test Condition
		Min.	Typ.	Max.		
Output charge	Q_{oss}	-	56	74	nC	$V_{DD}=40\text{ V}, V_{GS}=0\text{ V}$

⁸⁾ 有关参数定义, 请参见“栅极充电波形”。由设计标定, 不受制于生产测试。

表 7 反向二极管

Parameter	Symbol	Values			Unit	Note/ Test Condition
		Min.	Typ.	Max.		
Diode continuous forward current	I_S	-	-	124	A	$T_C=25\text{ °C}$
Diode pulse current	$I_{S,pulse}$	-	-	544	A	$T_C=25\text{ °C}$
Diode forward voltage	V_{SD}	-	0.9	1.1	V	$V_{GS}=0\text{ V}, I_F=50\text{ A}, T_J=25\text{ °C}$
Reverse recovery time ⁹⁾	t_{rr}	-	41	83	ns	$V_R=40\text{ V}, I_F=50\text{ A}, di_F/dt=100\text{ A}/\mu\text{s}$
Reverse recovery charge ⁹⁾	Q_{rr}	-	36	72	nC	$V_R=40\text{ V}, I_F=50\text{ A}, di_F/dt=100\text{ A}/\mu\text{s}$

⁹⁾ 由设计标定, 不受制于生产测试。

4 电气特性图

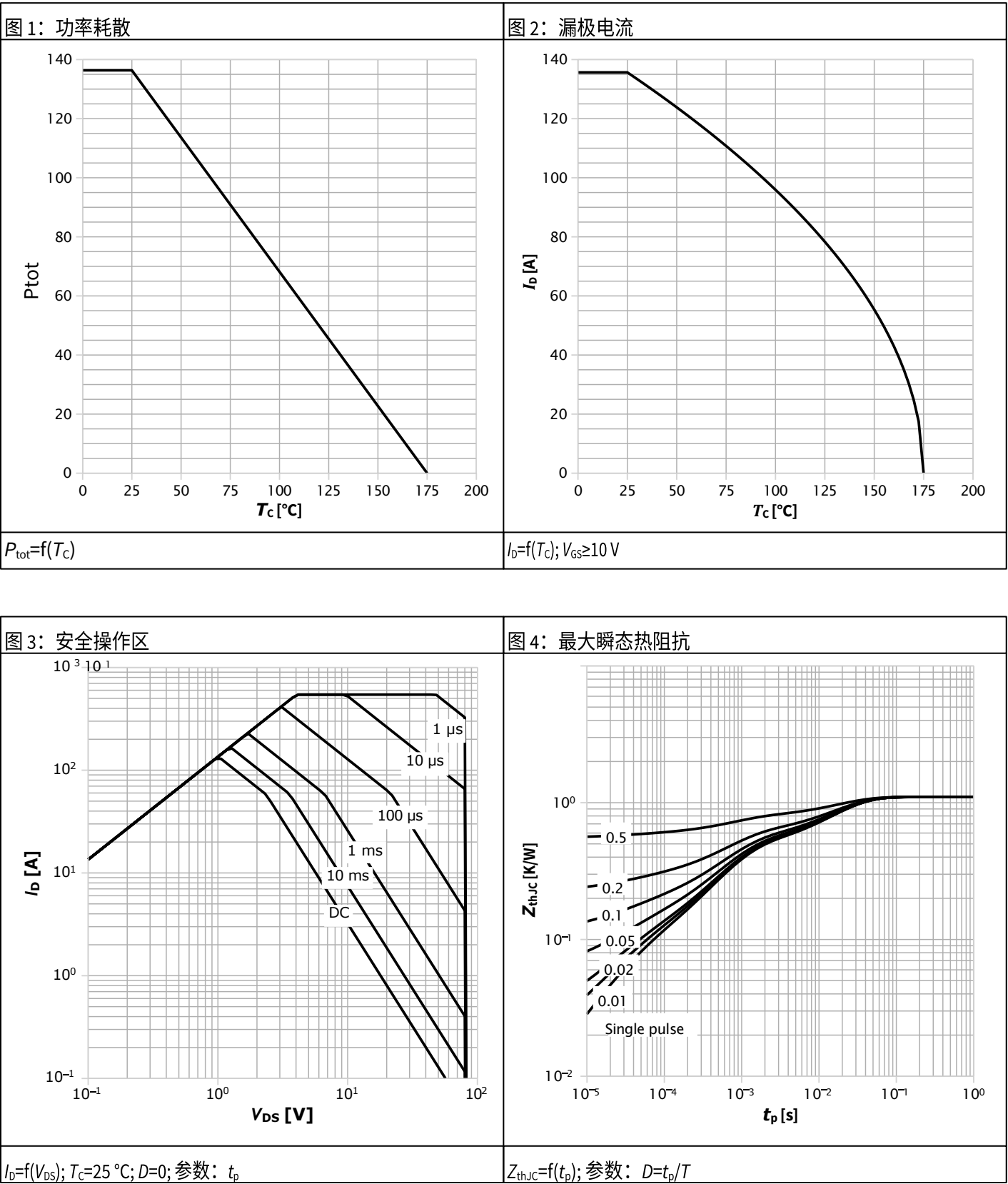


图 5：典型输出特性

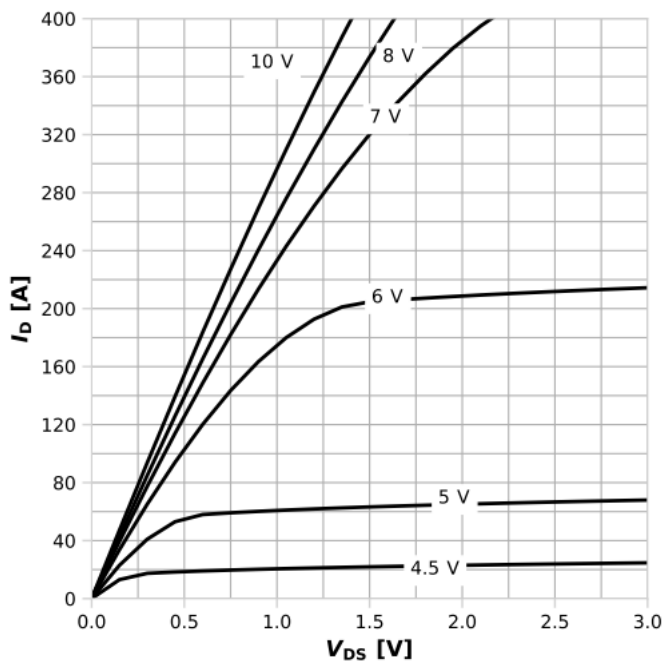

 $I_D = f(V_{DS}), T_j = 25^\circ\text{C}; \text{参数: } V_{GS}$

图 6：典型漏源导通电阻

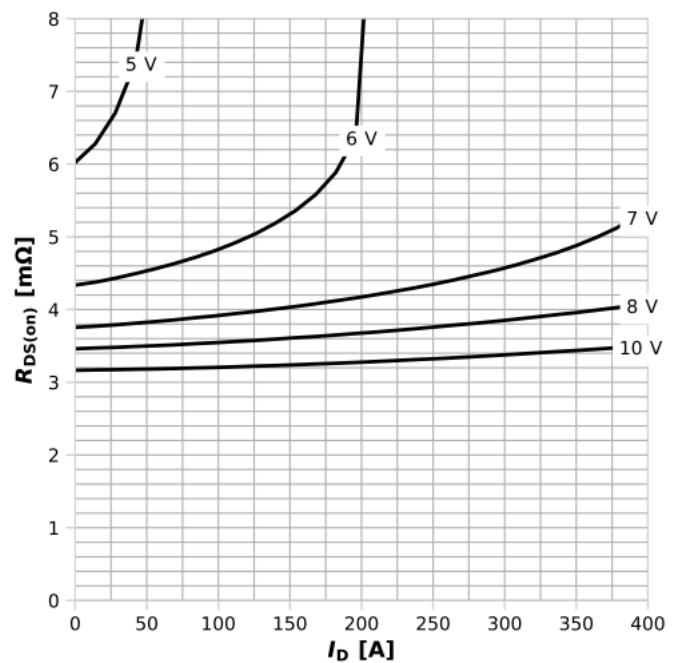

 $R_{DS(on)} = f(I_D), T_j = 25^\circ\text{C}; \text{参数: } V_{GS}$

图 7：典型转移特性

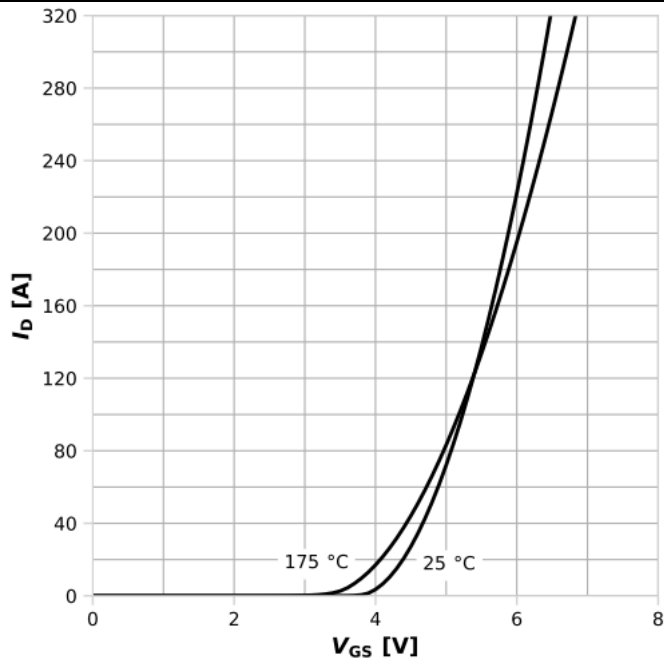

 $I_D = f(V_{GS}), |V_{DS}| > 2|I_D|R_{DS(on)max}; \text{参数: } T_j$

图 8：典型正向跨导

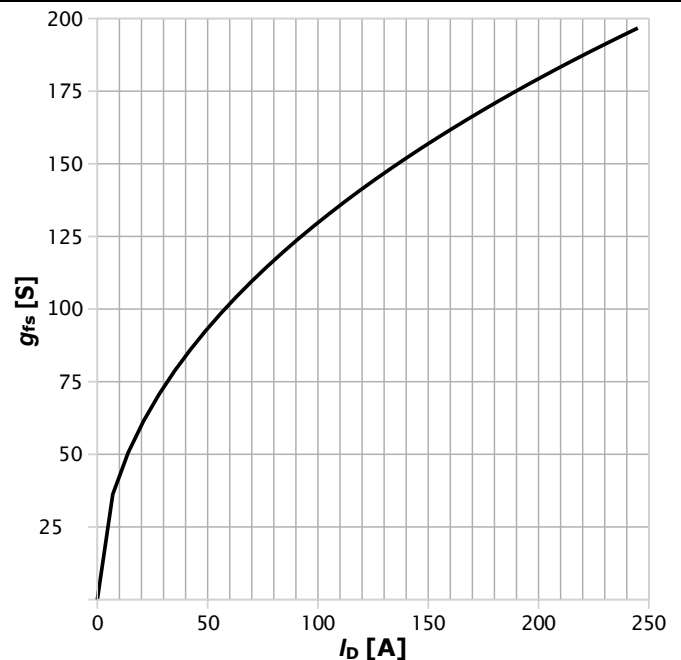
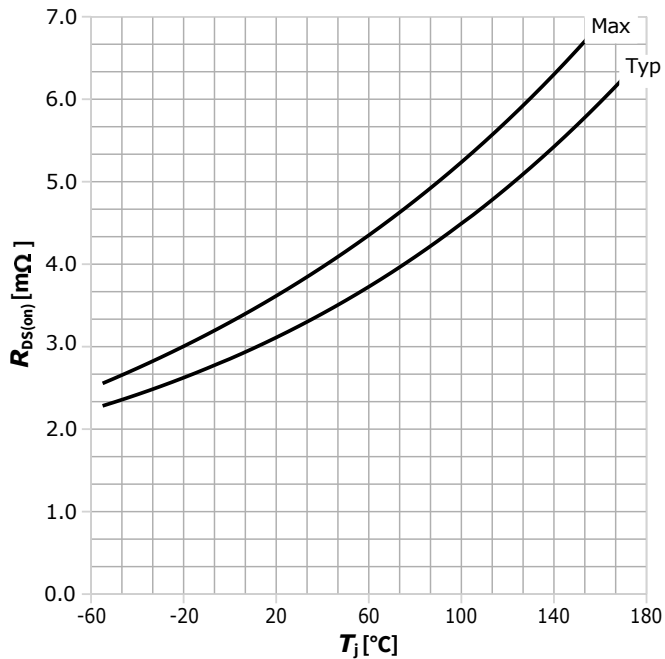
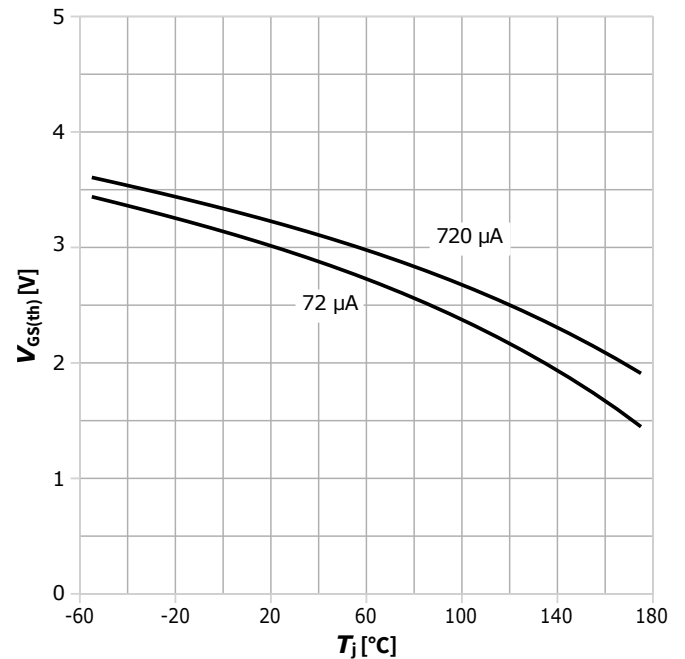

 $g_{fs} = f(I_D), V_{DS} = 3\text{ V}, T_j = 25^\circ\text{C}$

图 9：漏源导通电阻



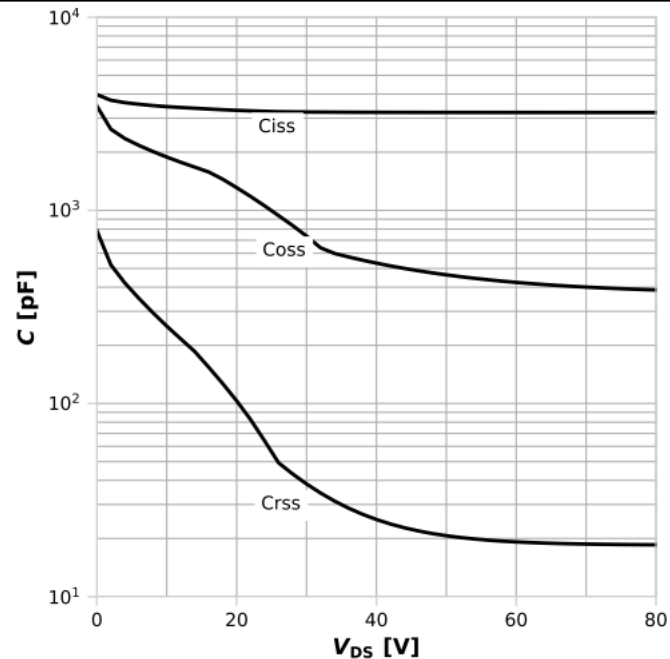
$$R_{DS(on)} = f(T_j), I_D = 50 \text{ A}, V_{GS} = 10 \text{ V}$$

图 10：典型栅极阈值电压



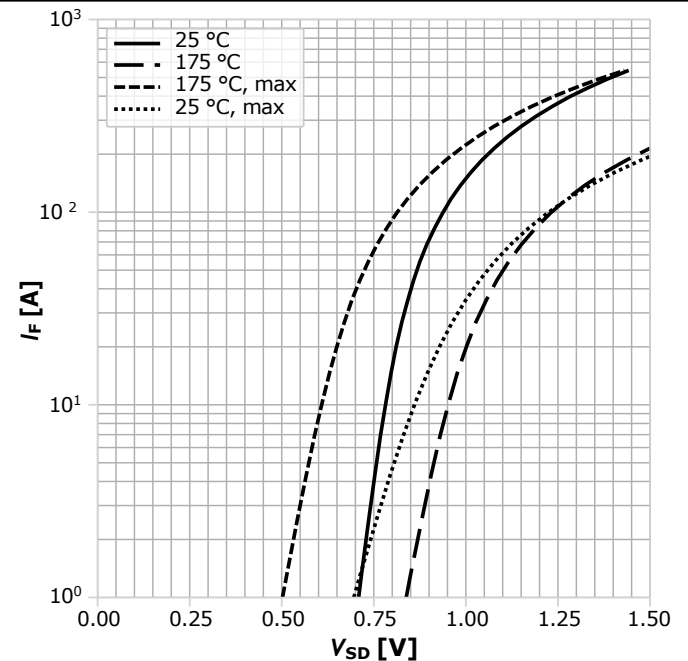
$$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}$$

图 11：典型电容值



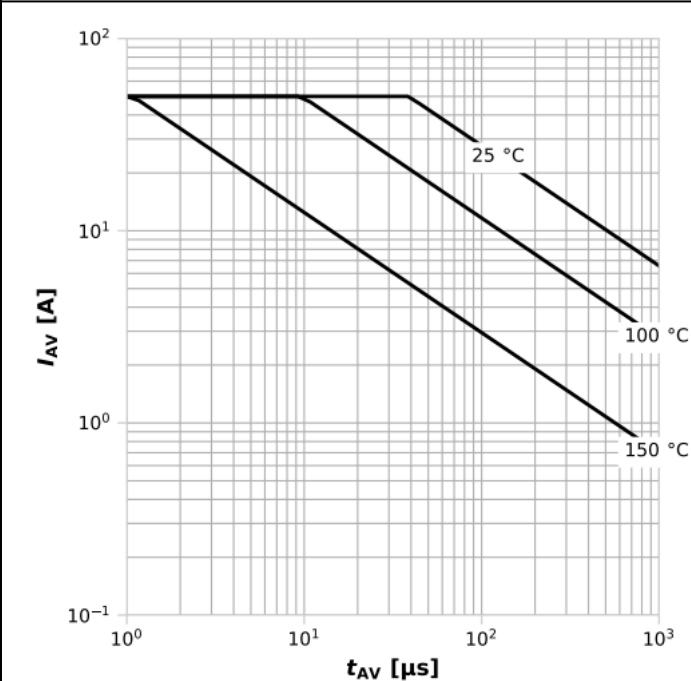
$$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$$

图 12：反向二极管的正向特性



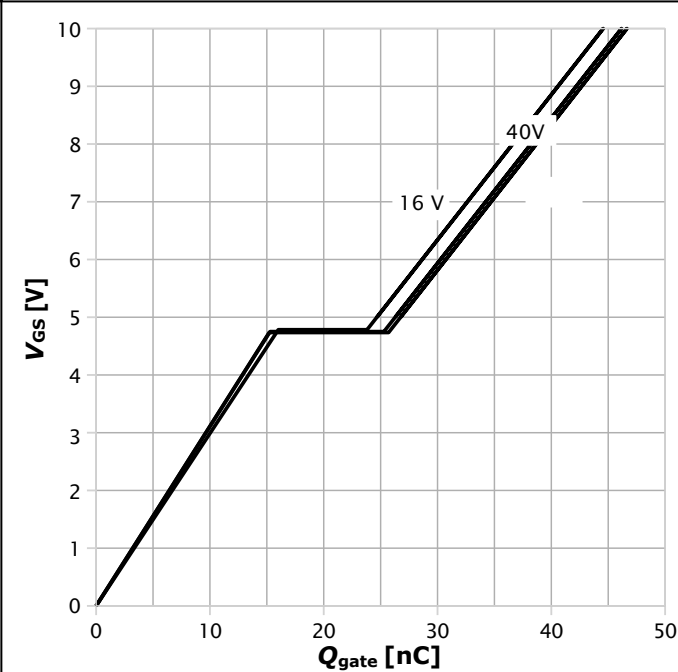
$$I_F = f(V_{DS}); \text{参数: } T_j$$

图 13: 雪崩特性



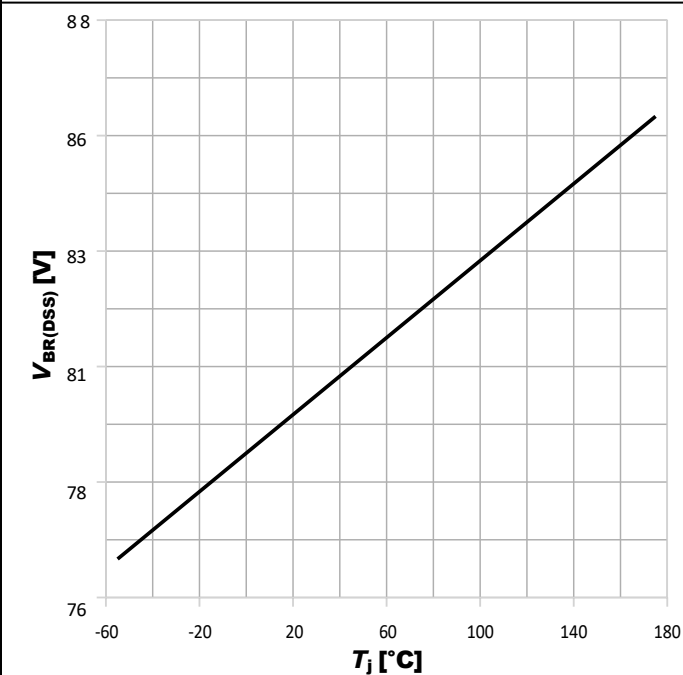
$$I_{AS}=f(t_{AV}); R_{GS}=25\ \Omega; \text{参数: } T_{j(\text{start})}$$

图 14: 典型栅极电荷



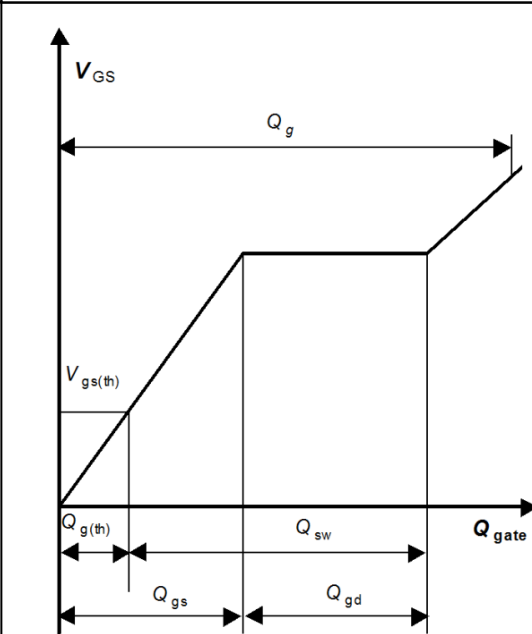
$$V_{GS}=f(Q_{gate}); I_D=50\ \text{A 脉冲}; \text{参数: } V_{DD}$$

图 15: 漏源击穿电压



$$V_{BR(DSS)}=f(T_j); I_D=1\ \text{mA}$$

栅极充电波形



-

5 封装外形尺寸

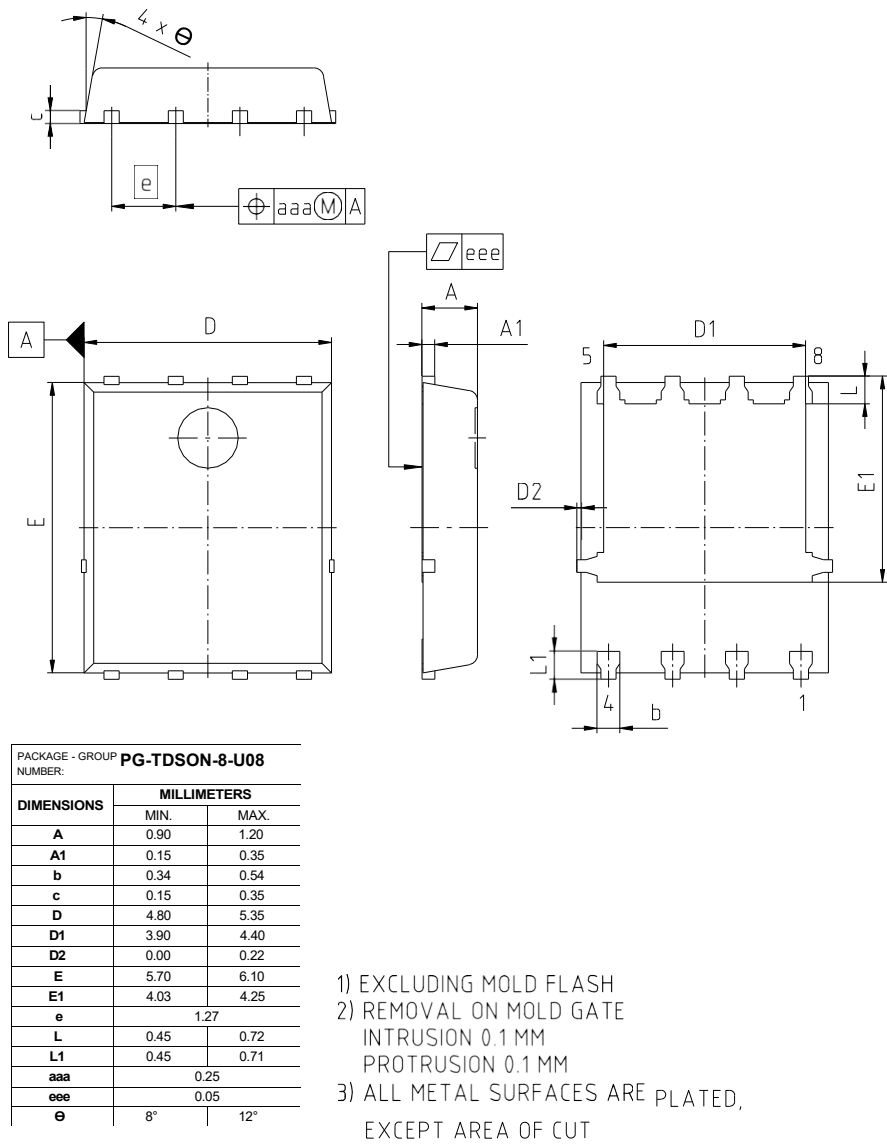


图 1 PG- TDSON- 8 外形图，尺寸单位为毫米

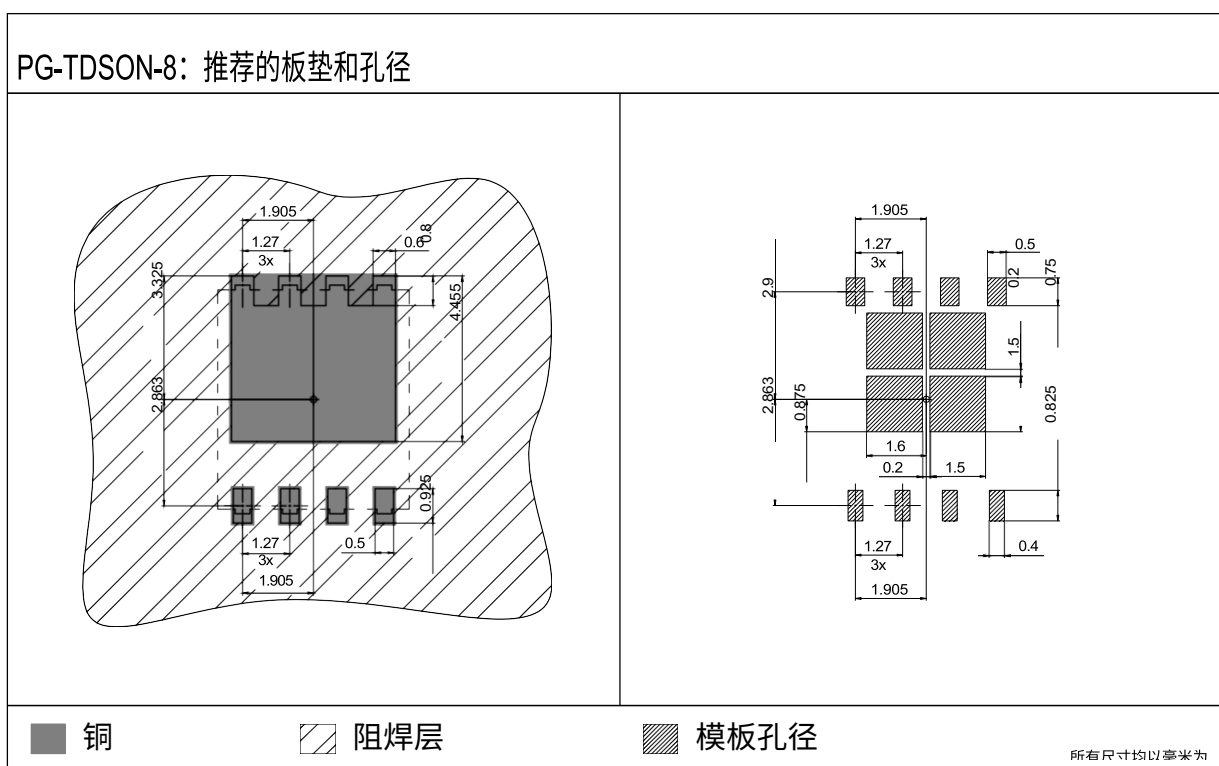
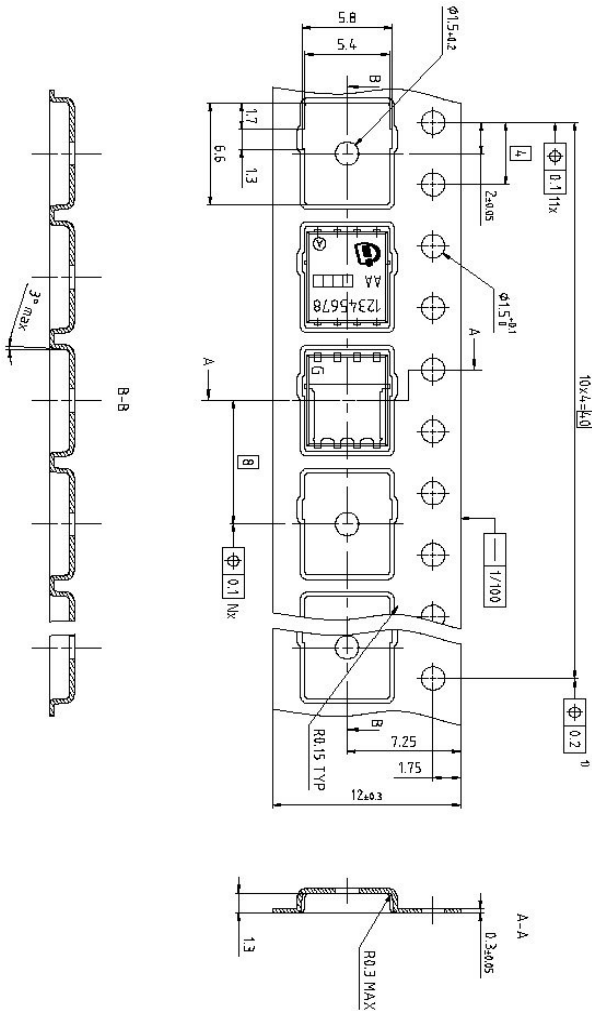


图 2 PG- TDSO N- 8 外形图, 尺寸单位为毫米



尺寸 (毫米)

图 3 PG-TDSON-8 外形图，尺寸单位为毫米

修订记录

BSC037N08NS5

Revision 2024 - 06 - 11 , Rev. 2 . 4

历史修订版本

Revision	Date	Subjects (major changes since last revision)
2.0	2014-12-17	Release of final version
2.1	2019-03-05	Update Rds(on) typ at Vgs=10V
2.2	2020-02-07	Update package drawings
2.3	2020-07-27	Update current rating
2.4	2024-06-11	Upgrade Operating and storage temperature max to 175°C . Update drawings in section 5 Package Outlines. Production validation added on page1

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