

MOSFET

英飞凌高耐热80V OptiMOS™5 功率晶体管

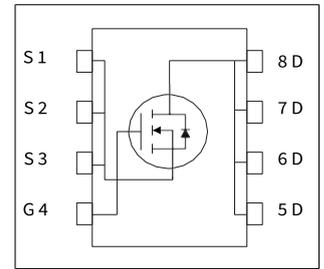
特性

- 针对高性能 SMPS（例如同步整流）进行优化
- 100% 雪崩测试
- 卓越的耐热性
- N沟道
- 符合 JEDEC¹⁾ 工业应用标准
- 无铅镀层；符合RoHS标准
- 符合 IEC61249-2-21 标准的无卤素



表 1 主要性能参数

Parameter	Value	Unit
V_{DS}	80	V
$R_{DS(on),max}$	6.1	mΩ
I_b	82	A
Q_{oss}	33	nC
$Q_G(0V..10V)$	27	nC



Type / Ordering Code	Package	Marking	Related Links
BSC061N08NS5	PG-TDSON-8	061N08NS	-

¹⁾ J-STD20 和 JESD22

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）。

目录

描述	1
最大额定值	3
热特性	3
电气特性	4
电气特性图	6
封装外形	10
修订历史	13
商标	13
免责声明	13

OptiMOS™5 功率晶体管, 80 V

1 最大额定值

除非另有规定, $T_j = 25\text{ °C}$

表 2 最大额定值

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Continuous drain current	I_D	-	-	82	A	$V_{GS}=10\text{ V}, T_C=25\text{ °C}$ $V_{GS}=10\text{ V}, T_C=100\text{ °C}$ $V_{GS}=10\text{ V}, T_C=25\text{ °C}, R_{thJA}=50\text{K/W}^1$
Pulsed drain current ²⁾	$I_{D,pulse}$	-	-	328	A	$T_C=25\text{ °C}$
Avalanche energy, single pulse ³⁾	E_{AS}	-	-	50	mJ	$I_D=50\text{ A}, R_{GS}=25\text{ }\Omega$
Gate source voltage	V_{GS}	-20	-	20	V	-
Power dissipation	P_{tot}	-	-	74	W	$T_C=25\text{ °C}$ $T_A=25\text{ °C}, R_{thJA}=50\text{ K/W}^1$
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}	-	1.0	1.7	K/W	-
Thermal resistance, junction - case, top	R_{thJC}	-	-	20	K/W	-
Device on PCB, 6 cm ² cooling area ¹⁾	R_{thJA}	-	-	50	K/W	-

¹⁾器件位于 40 mm x 40 mm x 1.5 mm 环氧树脂 PCB FR4 上, 具有 6 cm² (一层, 70 μm 厚) 的铜面积用于漏极连接。PCB 在静止空气中垂直放置。

²⁾详细信息请参见图 3

³⁾详细信息请参见图 13

3 电气特性

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	3.0	3.8	V	$V_{DS}=V_{GS}, I_D=41\text{ }\mu\text{A}$
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	$R_{DS(on)}$	-	5.2 7.4	6.1 9.0	$\text{m}\Omega$	$V_{GS}=10\text{ V}, I_D=41\text{ A}$ $V_{GS}=6\text{ V}, I_D=20.5\text{ A}$
Gate resistance ¹⁾	R_G	-	1.0	1.5	Ω	-
Transconductance	g_{fs}	32	65	-	S	$ V_{DS} >2 I_D R_{DS(on)max}, I_D=41\text{ A}$

表5 动态特性

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Input capacitance ¹⁾	C_{iss}	-	1900	2500	pF	$V_{GS}=0\text{ V}, V_{DS}=40\text{ V}, f=1\text{ MHz}$
Output capacitance ¹⁾	C_{oss}	-	310	400	pF	$V_{GS}=0\text{ V}, V_{DS}=40\text{ V}, f=1\text{ MHz}$
Reverse transfer capacitance ¹⁾	C_{riss}	-	16	28	pF	$V_{GS}=0\text{ V}, V_{DS}=40\text{ V}, f=1\text{ MHz}$
Turn-on delay time	$t_{d(on)}$	-	11	-	ns	$V_{DD}=40\text{ V}, V_{GS}=10\text{ V}, I_D=41\text{ A}, R_{G,ext}=3\text{ }\Omega$
Rise time	t_r	-	6	-	ns	$V_{DD}=40\text{ V}, V_{GS}=10\text{ V}, I_D=41\text{ A}, R_{G,ext}=3\text{ }\Omega$
Turn-off delay time	$t_{d(off)}$	-	19	-	ns	$V_{DD}=40\text{ V}, V_{GS}=10\text{ V}, I_D=41\text{ A}, R_{G,ext}=3\text{ }\Omega$
Fall time	t_f	-	5	-	ns	$V_{DD}=40\text{ V}, V_{GS}=10\text{ V}, I_D=41\text{ A}, R_{G,ext}=3\text{ }\Omega$

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}	-	9	-	nC	$V_{DD}=40\text{ V}, I_D=41\text{ A}, V_{GS}=0\text{ to }10\text{ V}$
Gate charge at threshold	$Q_{g(th)}$	-	5	-	nC	$V_{DD}=40\text{ V}, I_D=41\text{ A}, V_{GS}=0\text{ to }10\text{ V}$
Gate to drain charge ¹⁾	Q_{gd}	-	6	9	nC	$V_{DD}=40\text{ V}, I_D=41\text{ A}, V_{GS}=0\text{ to }10\text{ V}$
Switching charge	Q_{sw}	-	10	-	nC	$V_{DD}=40\text{ V}, I_D=41\text{ A}, V_{GS}=0\text{ to }10\text{ V}$
Gate charge total ¹⁾	Q_g	-	27	33	nC	$V_{DD}=40\text{ V}, I_D=41\text{ A}, V_{GS}=0\text{ to }10\text{ V}$
Gate plateau voltage	$V_{plateau}$	-	4.9	-	V	$V_{DD}=40\text{ V}, I_D=41\text{ A}, V_{GS}=0\text{ to }10\text{ V}$
Gate charge total, sync. FET	$Q_{g(sync)}$	-	23	-	nC	$V_{DS}=0.1\text{ V}, V_{GS}=0\text{ to }10\text{ V}$
Output charge ¹⁾	Q_{oss}	-	33	44	nC	$V_{DD}=40\text{ V}, V_{GS}=0\text{ V}$

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”

表 7 反向二极管

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Diode continuous forward current	I_S	-	-	67	A	$T_C=25\text{ °C}$
Diode pulse current	$I_{S,pulse}$	-	-	328	A	$T_C=25\text{ °C}$
Diode forward voltage	V_{SD}	-	0.89	1.1	V	$V_{GS}=0\text{ V}, I_F=41\text{ A}, T_J=25\text{ °C}$
Reverse recovery time ¹⁾	t_{rr}	-	37	74	ns	$V_R=40\text{ V}, I_F=41\text{ A}, di_F/dt=100\text{ A}/\mu\text{s}$
Reverse recovery charge ¹⁾	Q_{rr}	-	37	74	nC	$V_R=40\text{ V}, I_F=41\text{ A}, di_F/dt=100\text{ A}/\mu\text{s}$

¹⁾由设计标定，不受制于生产测试。

4 电气特性图

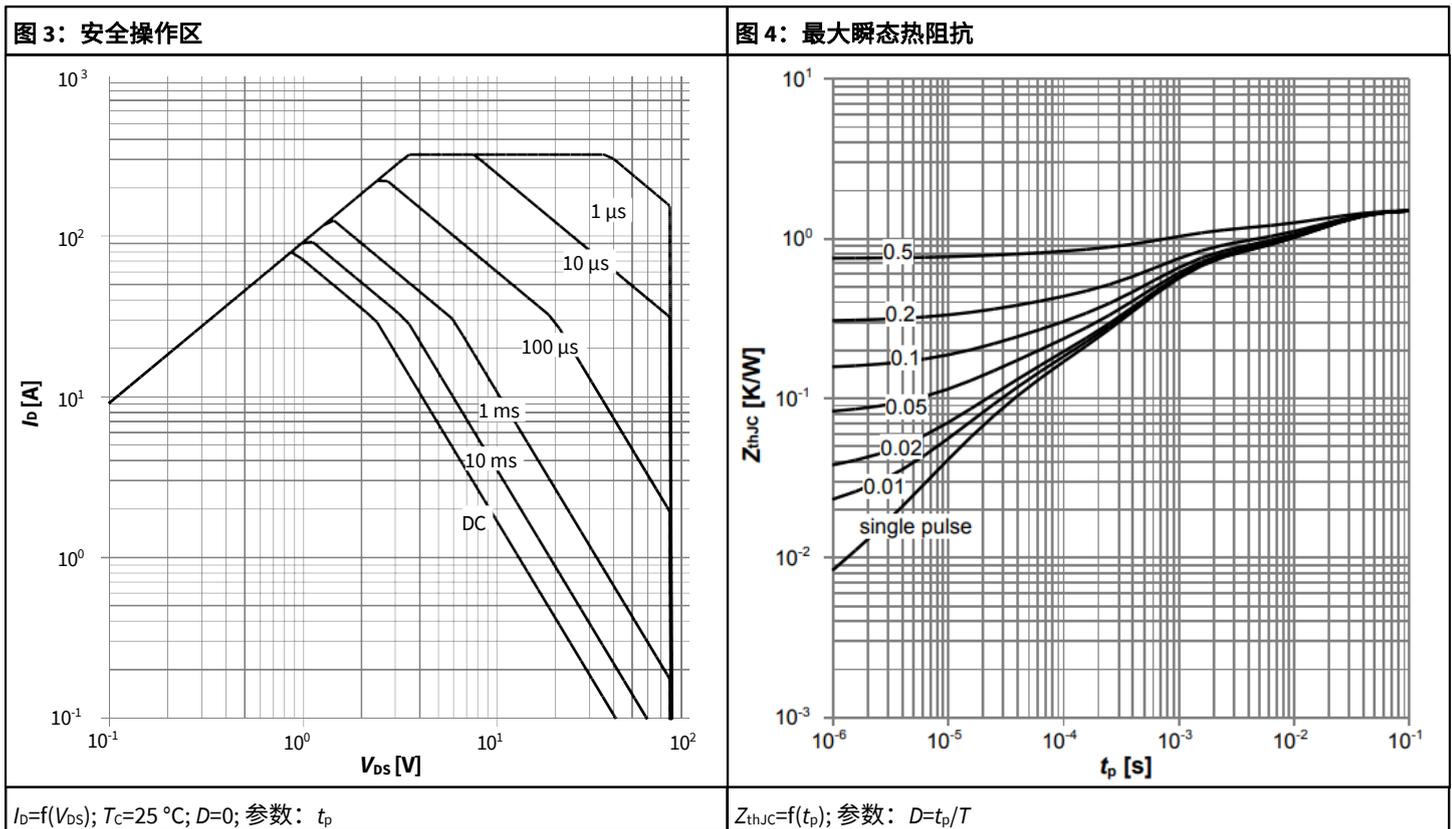
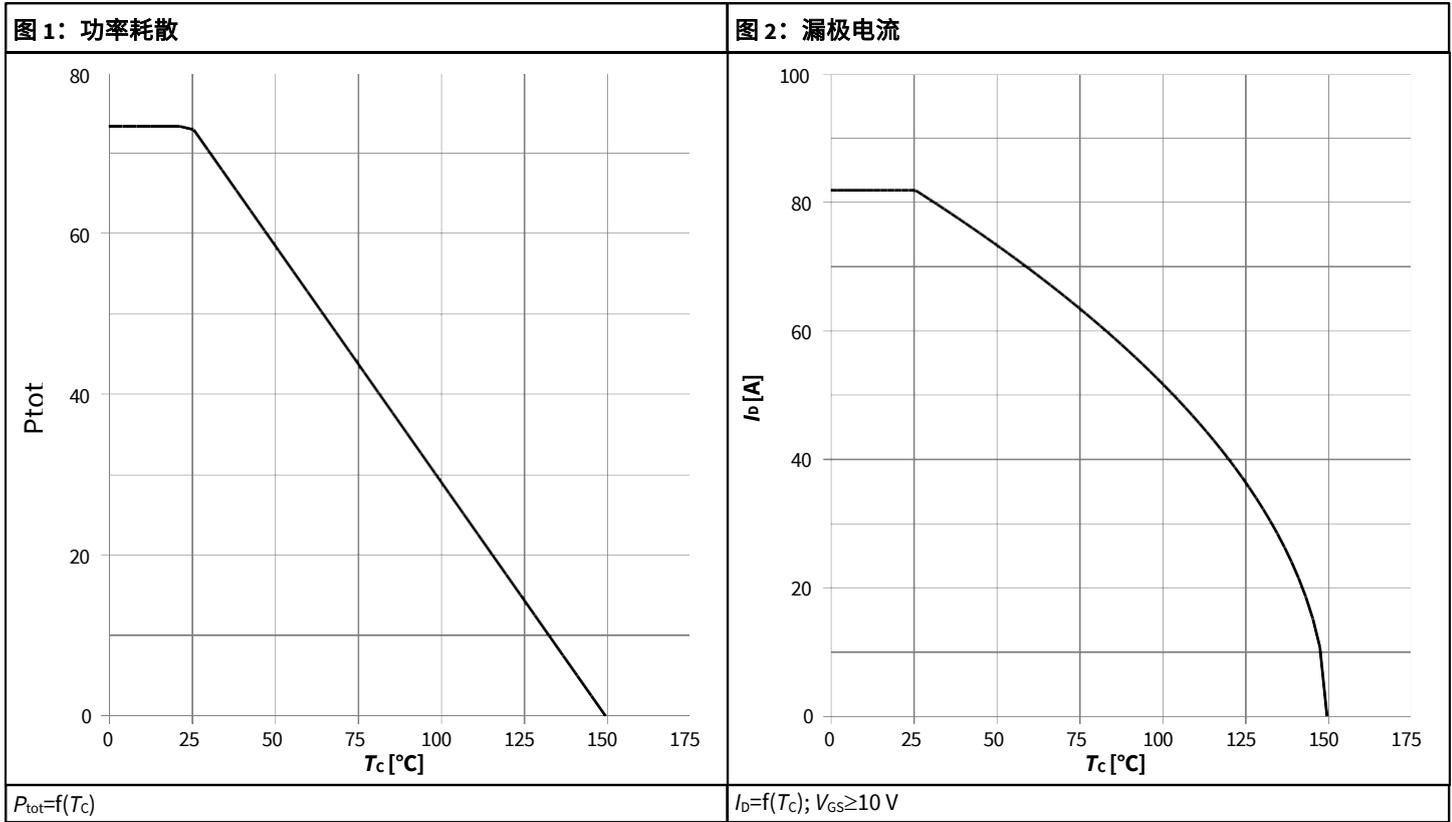
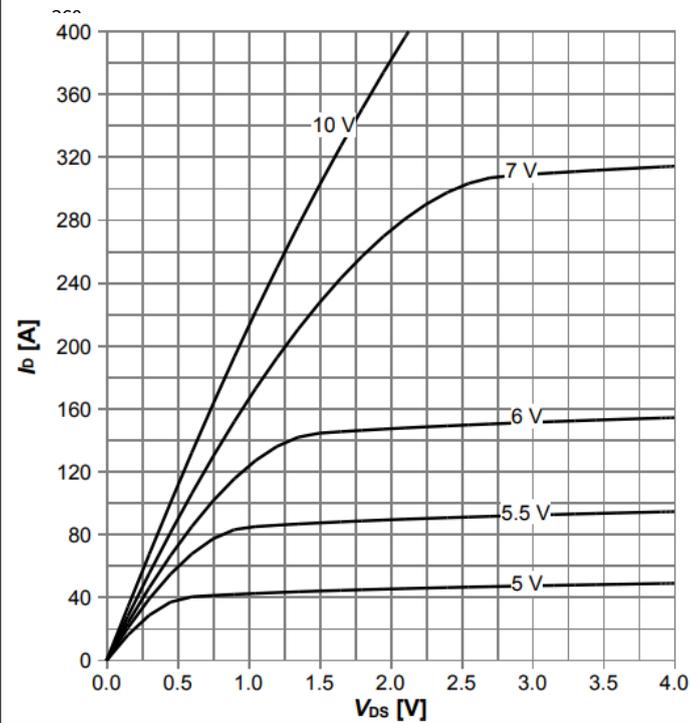
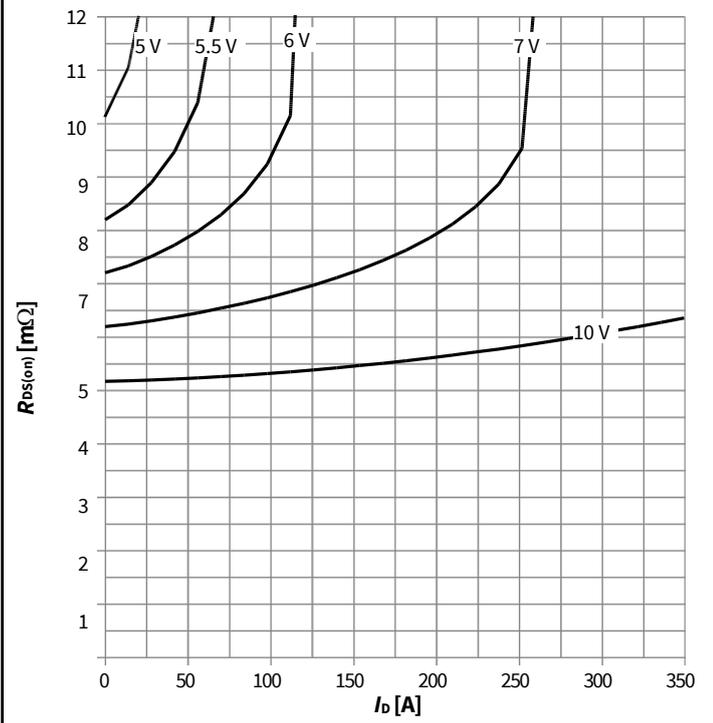


图 5: 典型输出特性



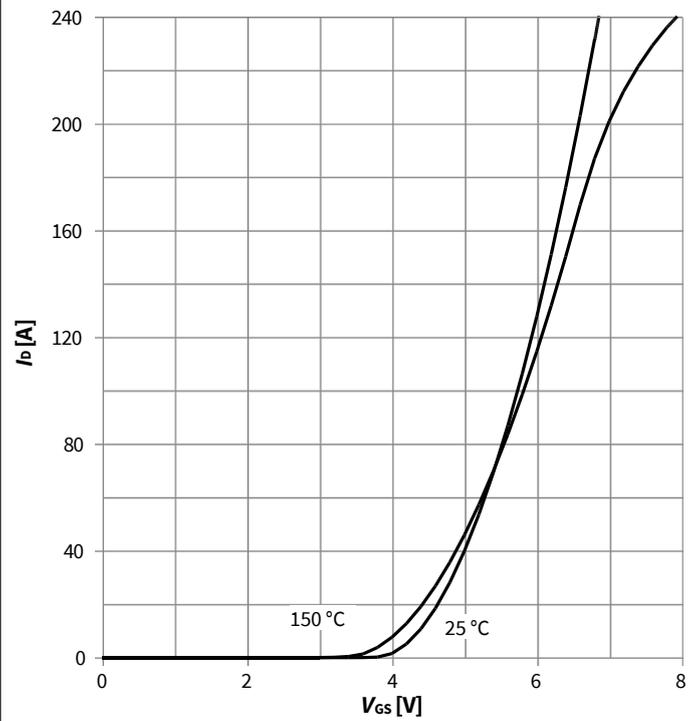
$I_D = f(V_{DS})$, $T_j = 25^\circ\text{C}$; 参数: V_{GS}

图 6: 典型漏源导通电阻



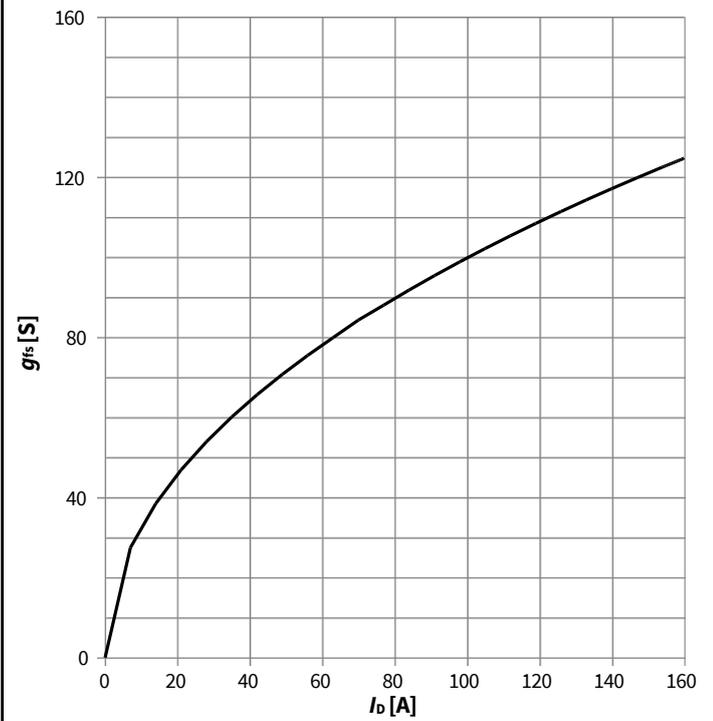
$R_{DS(on)} = f(I_D)$, $T_j = 25^\circ\text{C}$; 参数: V_{GS}

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

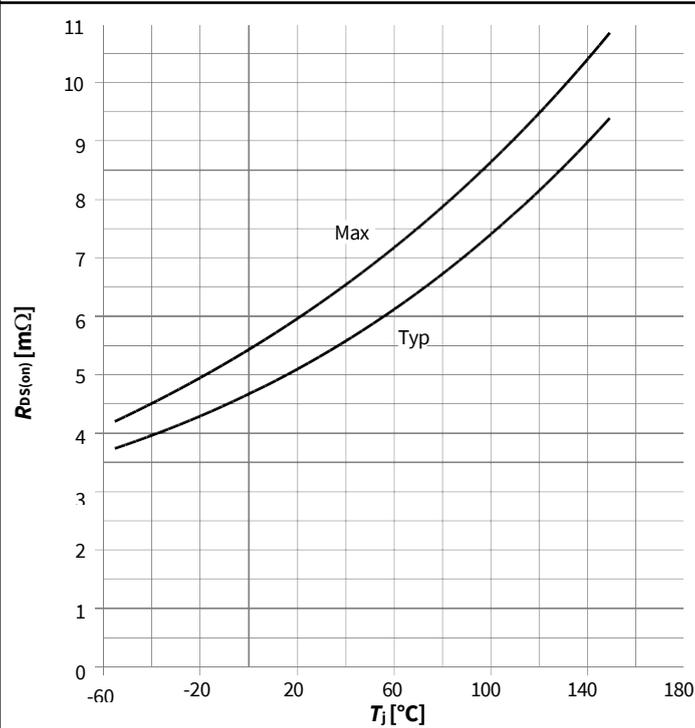
图 8: 典型正向跨导



$g_{fs} = f(I_D)$; $T_j = 25^\circ\text{C}$

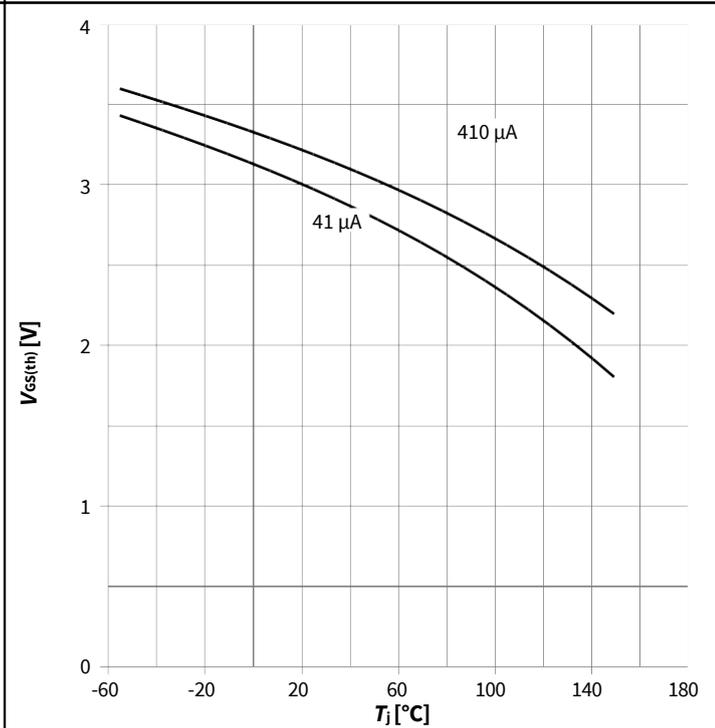
OptiMOS™5 功率晶体管, 80 V

图 9: 漏源导通电阻



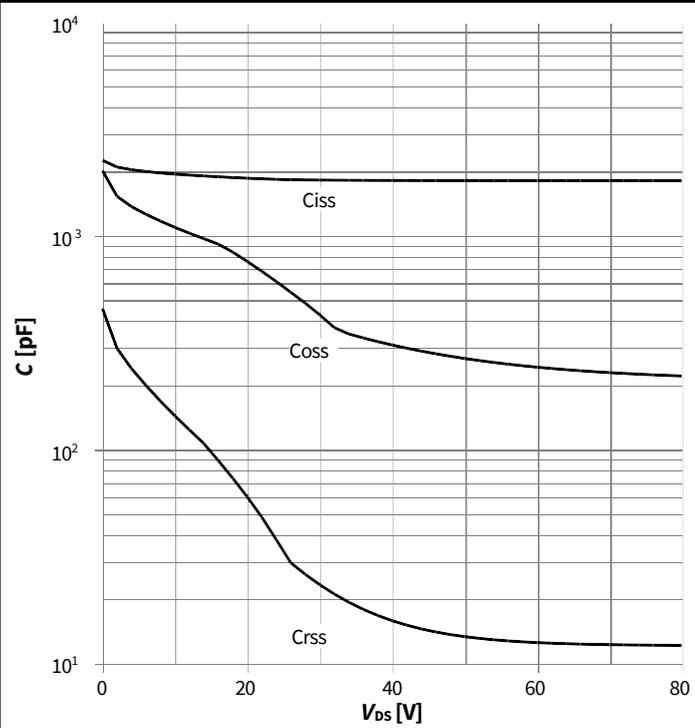
$R_{DS(on)}=f(T_j); I_D=41\text{ A}; V_{GS}=10\text{ V}$

图 10: 典型栅极阈值电压



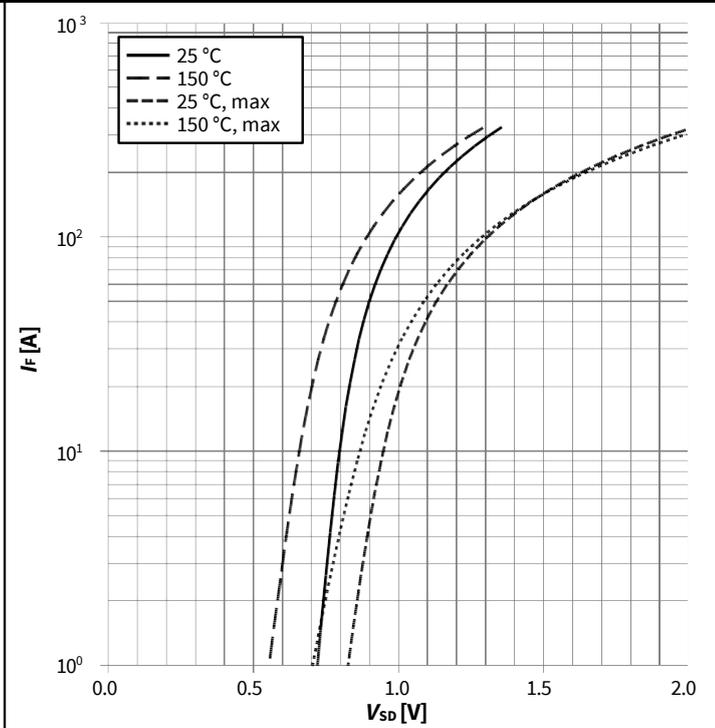
$V_{GS(th)}=f(T_j); V_{GS}=V_{DS}$

图 11: 典型电容值



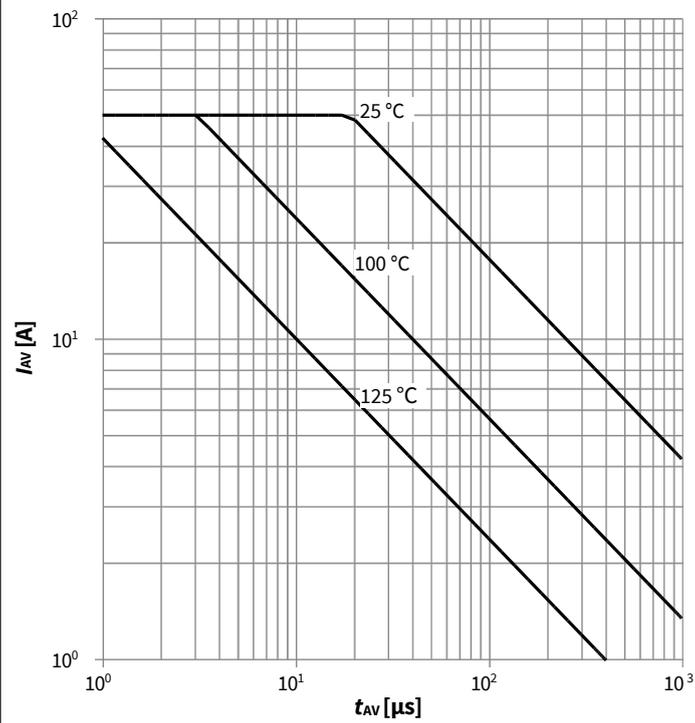
$C=f(V_{DS}); V_{GS}=0\text{ V}; f=1\text{ MHz}$

图 12: 反向二极管的正向特性



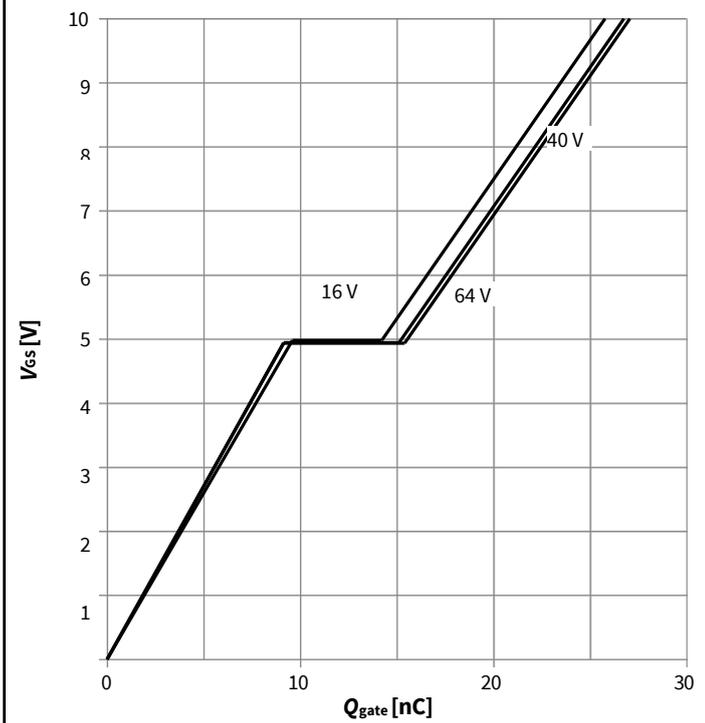
$I_F=f(V_{SD});$ 参数: T_j

图 13: 雪崩特性



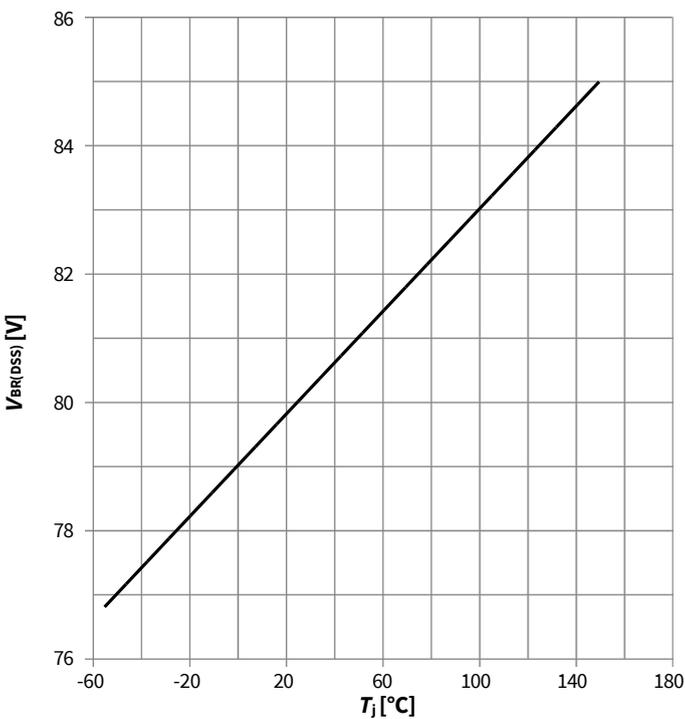
$I_{AS}=f(t_{AV}); R_{GS}=25\ \Omega$; 参数: $T_{j(start)}$

图 14: 典型栅极电荷



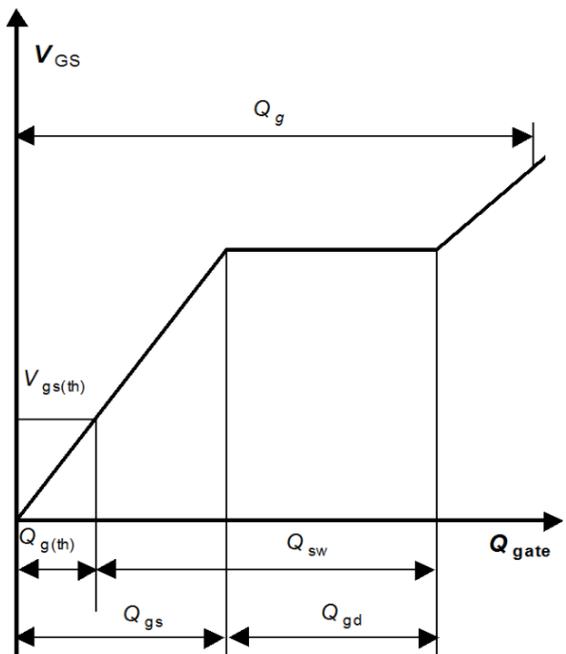
$V_{GS}=f(Q_{gate}); I_D=41\ \text{A pulsed}$; 参数: V_{DD}

图 15: 漏源击穿电压

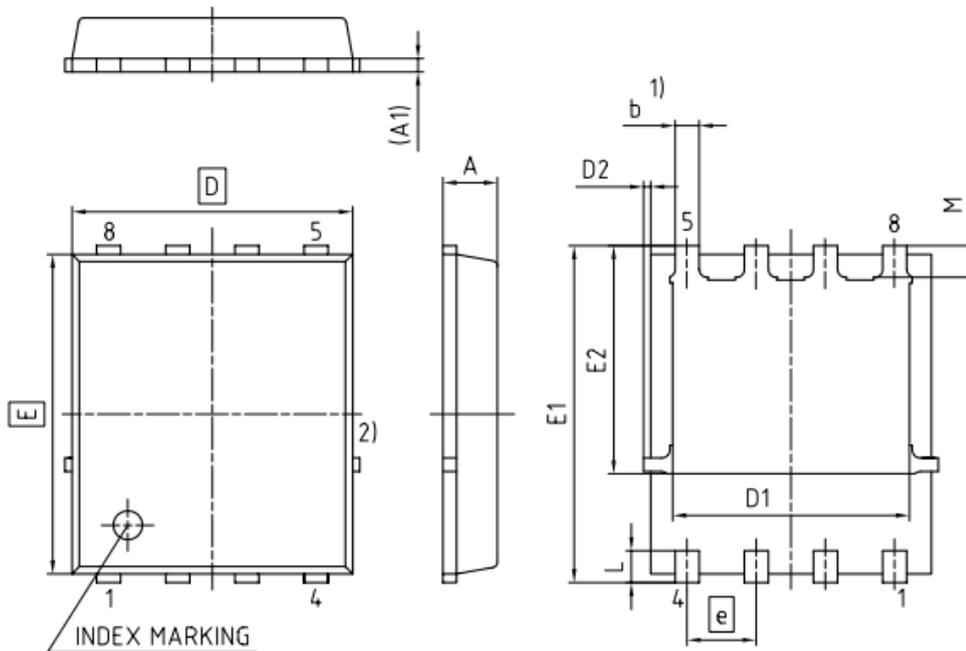


$V_{BR(DSS)}=f(T_j); I_D=1\ \text{mA}$

图 栅极充电波形



5 封装外形



- 1) EXCLUDING MOLD FLASH
 - 2) REMOVAL ON MOLD GATE
INTRUSION 0.1 MM
PROTRUSION 0.1 MM
- LEAD LENGTH UP TO ANTI FLASH LINE
ALL METAL SURFACES ARE PLATED, EXCEPT AREA OF CUT

DIMENSION	MILLIMETERS	
	MIN.	MAX.
A	0.90	1.20
A1	0.15	0.35
b	0.34	0.54
D	4.80	5.35
D1	3.90	4.40
D2	0.03	0.23
E	5.70	6.10
E1	5.90	6.42
E2	3.88	4.31
e	1.27	
L	0.45	0.71
M	0.45	0.69

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EXCEPT AREA OF CUT

图 1 PG-TDSON-8 外形图, 尺寸单位为毫米

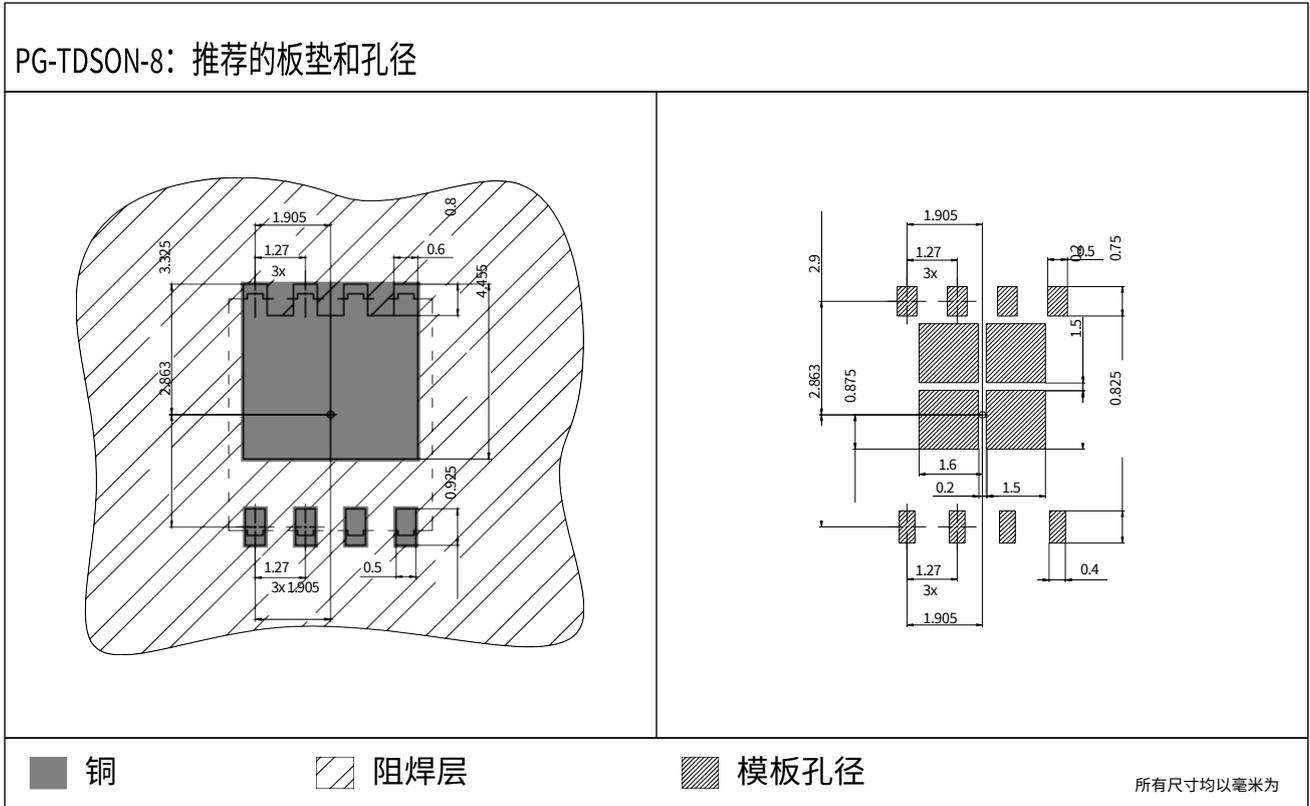


图 3 外形板焊盘 (TDSON-8), 尺寸单位为毫米

修订记录

BSC061N08NS5

Revision: 2019-11-04, Rev. 2.1

历史修订版本

Revision	Date	Subjects (major changes since last revision)
2.0	2014-12-27	Release of final version
2.1	2019-11-04	Update package drawings

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