

MOSFET

英飞凌高耐热80V OptiMOS™ 5 功率晶体管

特性

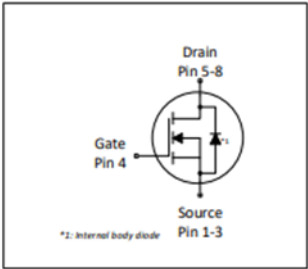
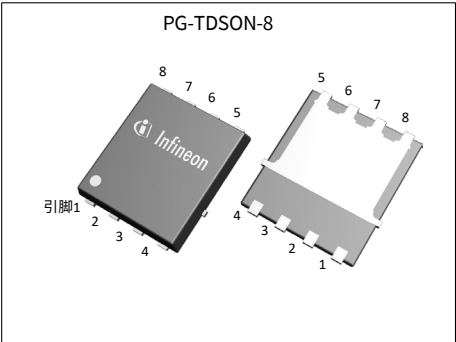
- 针对高性能 SMPS（例如同步整流）进行优化
- 100% 雪崩测试
- 卓越的耐热性
- N沟道，逻辑电平
- 无铅镀层；符合RoHS标准
- 符合 IEC61249-2-21 标准的无卤素

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
$R_{DS(on),max}$	2.5	mΩ
I_D	187	A
Q_{oss}	88	nC
$Q_G(0V..4.5V)$	44	nC



Type / Ordering Code	Package	Marking	Related Links
BSC025N08LS5	PG-TDSON-8	025N08LS	-

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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 ¹⁾	I_D	-	-	187 141 24	A	$V_{GS}=10\text{ V}$, $T_C=25\text{ °C}$ $V_{GS}=10\text{ V}$, $T_C=100\text{ °C}$ $V_{GS}=10\text{ V}$, $T_A=25\text{ °C}$, $R_{thJA}=50\text{ °C/W}^{2)}$
Pulsed drain current ³⁾	$I_{D,pulse}$	-	-	748	A	$T_A=25\text{ °C}$
Avalanche energy, single pulse ⁴⁾	E_{AS}	-	-	370	mJ	$I_D=50\text{ A}$, $R_{GS}=25\text{ }\Omega$
Gate source voltage	V_{GS}	-20	-	20	V	-
Power dissipation	P_{tot}	-	-	156 2.5	W	$T_C=25\text{ °C}$ $T_A=25\text{ °C}$, $R_{thJA}=50\text{ °C/W}^{2)}$
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	R_{thJC}	-	0.5	0.8	°C/W	-
Device on PCB, 6 cm ² cooling area ²⁾	R_{thJA}	-	-	50	°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

OptiMOS™ 5 Power-Transistor, 80 V

BSC025N08LS5

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	$V_{(BR)DSS}$	80	-	-	V	$V_{GS}=0\text{ V}$, $I_D=1\text{ mA}$
Gate threshold voltage	$V_{GS(th)}$	1.1	1.7	2.3	V	$V_{DS}=V_{GS}$, $I_D=115\text{ }\mu\text{A}$
Zero gate voltage drain current	I_{DSS}	-	0.1 10	1 100	μA	$V_{DS}=80\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=25\text{ °C}$ $V_{DS}=80\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=125\text{ °C}$
Gate-source leakage current	I_{GSS}	-	10	100	nA	$V_{GS}=20\text{ V}$, $V_{DS}=0\text{ V}$
Drain-source on-state resistance	$R_{DS(on)}$	-	2.1 2.6	2.5 3.3	m Ω	$V_{GS}=10\text{ V}$, $I_D=50\text{ A}$ $V_{GS}=4.5\text{ V}$, $I_D=25\text{ A}$
Gate resistance ¹⁾	R_G	-	1.7	2.6	Ω	-
Transconductance	g_{fs}	70	140	-	S	$ V_{DS} \geq 2 I_D R_{DS(on)max}$, $I_D=50\text{ A}$

表5 动态特性

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Input capacitance ¹⁾	C_{iss}	-	5800	7500	pF	$V_{GS}=0\text{ V}$, $V_{DS}=40\text{ V}$, $f=1\text{ MHz}$
Output capacitance ¹⁾	C_{oss}	-	840	1100	pF	$V_{GS}=0\text{ V}$, $V_{DS}=40\text{ V}$, $f=1\text{ MHz}$
Reverse transfer capacitance ¹⁾	C_{rss}	-	34	60	pF	$V_{GS}=0\text{ V}$, $V_{DS}=40\text{ V}$, $f=1\text{ MHz}$
Turn-on delay time	$t_{d(on)}$	-	10.4	-	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	-	10.3	-	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	$t_{d(off)}$	-	51	-	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	-	18.6	-	ns	$V_{DD}=40\text{ V}$, $V_{GS}=10\text{ V}$, $I_D=50\text{ A}$, $R_{G,ext}=3\text{ }\Omega$

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}	-	16	-	nC	$V_{DD}=40\text{ V}$, $I_D=50\text{ A}$, $V_{GS}=0\text{ to }4.5\text{ V}$
Gate charge at threshold	$Q_{g(th)}$	-	10	-	nC	$V_{DD}=40\text{ V}$, $I_D=50\text{ A}$, $V_{GS}=0\text{ to }4.5\text{ V}$
Gate to drain charge ¹⁾	Q_{gd}	-	15	22	nC	$V_{DD}=40\text{ V}$, $I_D=50\text{ A}$, $V_{GS}=0\text{ to }4.5\text{ V}$
Switching charge	Q_{sw}	-	21	-	nC	$V_{DD}=40\text{ V}$, $I_D=50\text{ A}$, $V_{GS}=0\text{ to }4.5\text{ V}$
Gate charge total ¹⁾	Q_g	-	44	55	nC	$V_{DD}=40\text{ V}$, $I_D=50\text{ A}$, $V_{GS}=0\text{ to }4.5\text{ V}$
Gate plateau voltage	$V_{plateau}$	-	2.8	-	V	$V_{DD}=40\text{ V}$, $I_D=50\text{ A}$, $V_{GS}=0\text{ to }4.5\text{ V}$
Gate charge total, sync. FET	$Q_{g(sync)}$	-	80	-	nC	$V_{DS}=0.1\text{ V}$, $V_{GS}=0\text{ to }10\text{ V}$
Output charge ¹⁾	Q_{oss}	-	88	117	nC	$V_{DS}=40\text{ V}$, $V_{GS}=0\text{ V}$

¹⁾由设计标定, 不受制于生产测试。

²⁾参数定义 请参见“栅极电荷波形”

表 7 反向二极管

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Diode continuous forward current	I_S	-	-	110	A	$T_C=25\text{ °C}$
Diode pulse current	$I_{S,pulse}$	-	-	748	A	$T_C=25\text{ °C}$
Diode forward voltage	V_{SD}	-	0.85	1.2	V	$V_{GS}=0\text{ V}$, $I_F=50\text{ A}$, $T_J=25\text{ °C}$
Reverse recovery time ¹⁾	t_{rr}	-	44	87	ns	$V_R=40\text{ V}$, $I_F=50\text{ A}$, $di_F/dt=100\text{ A}/\mu\text{s}$
Reverse recovery charge ¹⁾	Q_{rr}	-	47	93	nC	$V_R=40\text{ V}$, $I_F=50\text{ A}$, $di_F/dt=100\text{ A}/\mu\text{s}$

¹⁾由设计标定，不受制于生产测试。

4 电气特性图

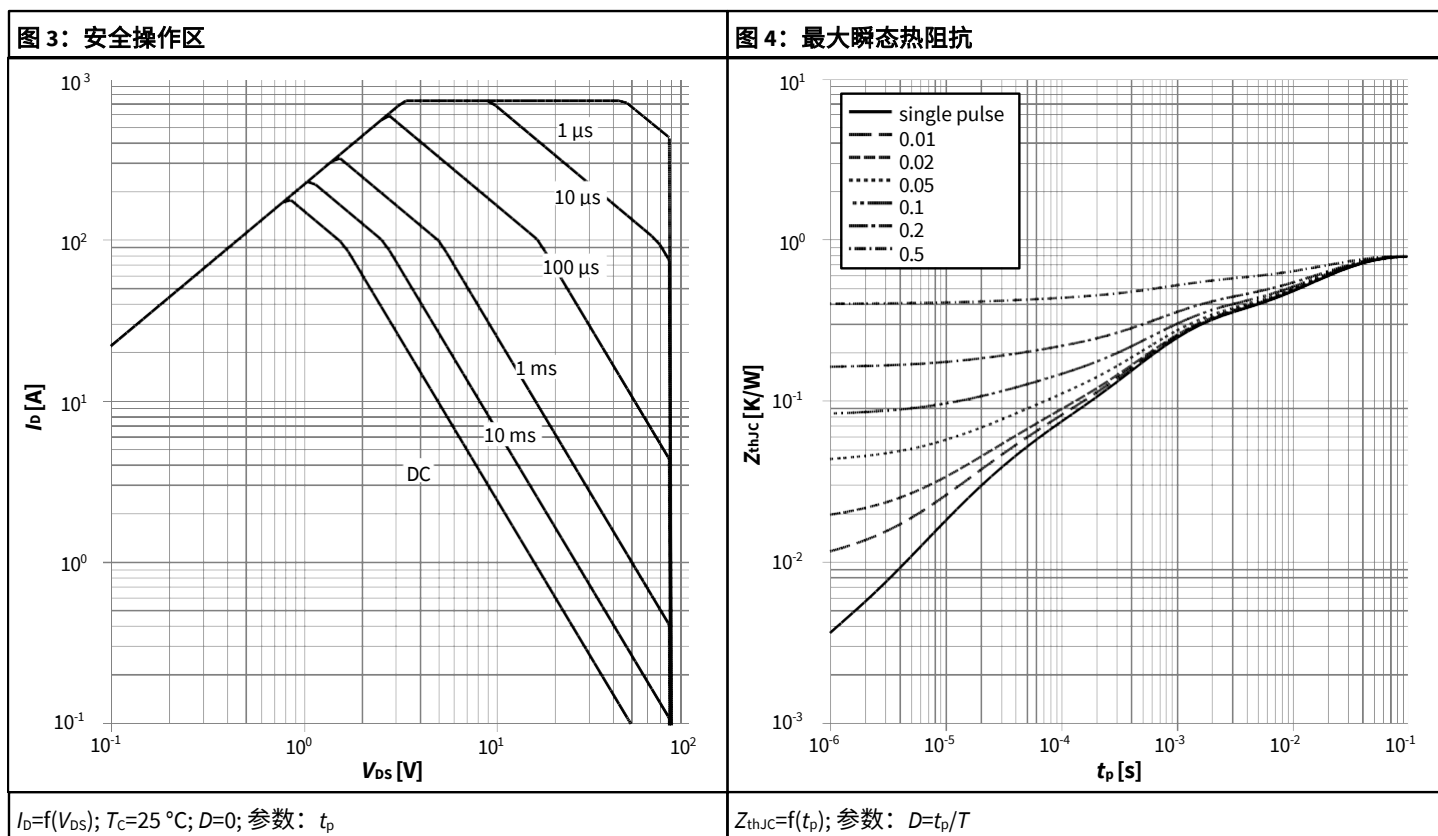
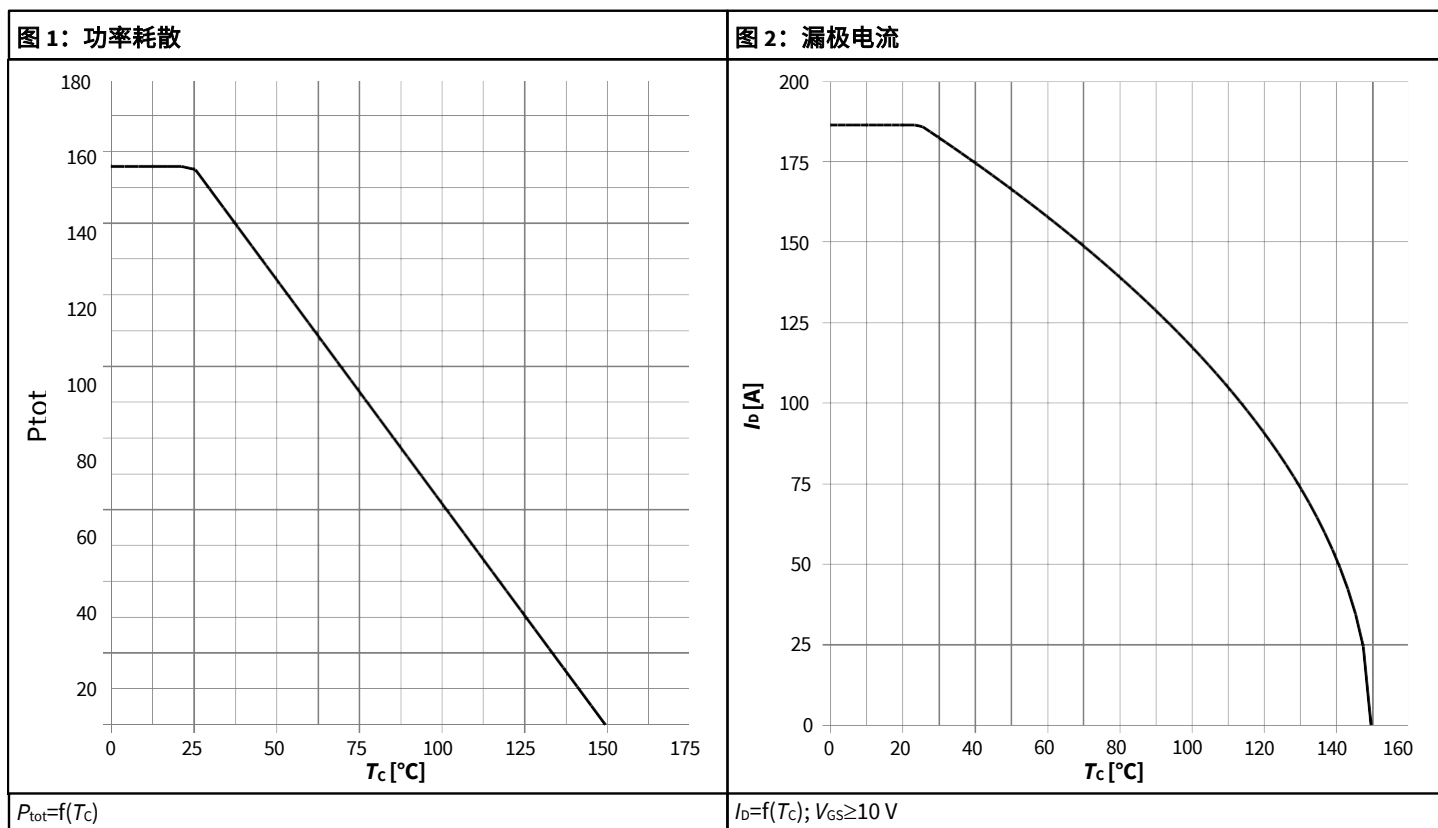
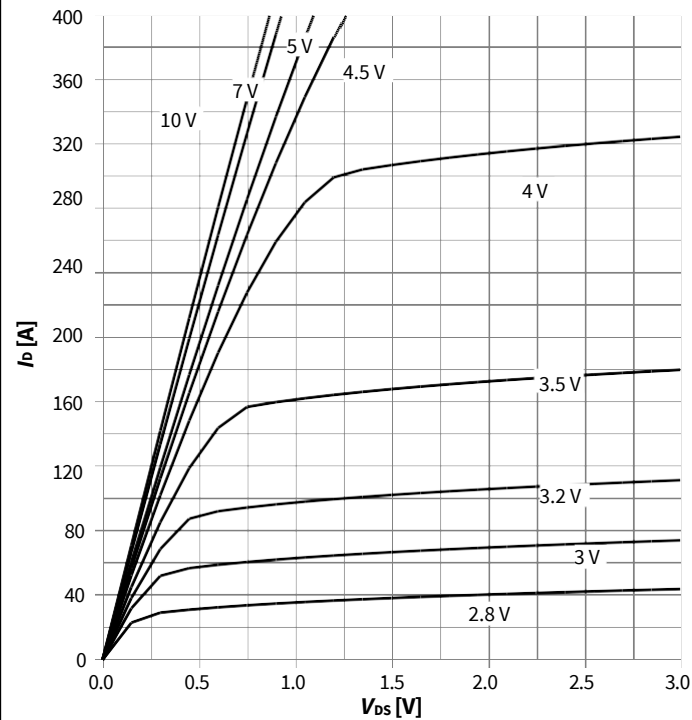
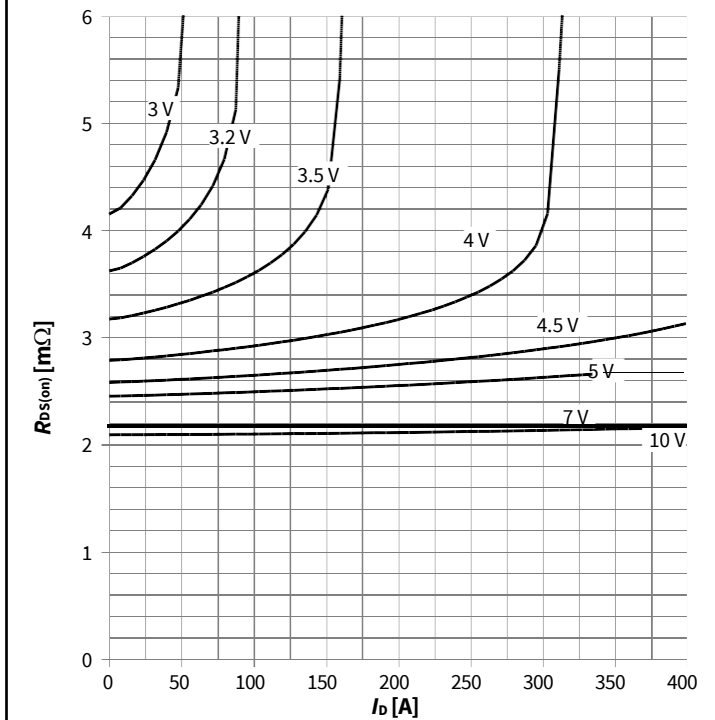


图 5：典型输出特性



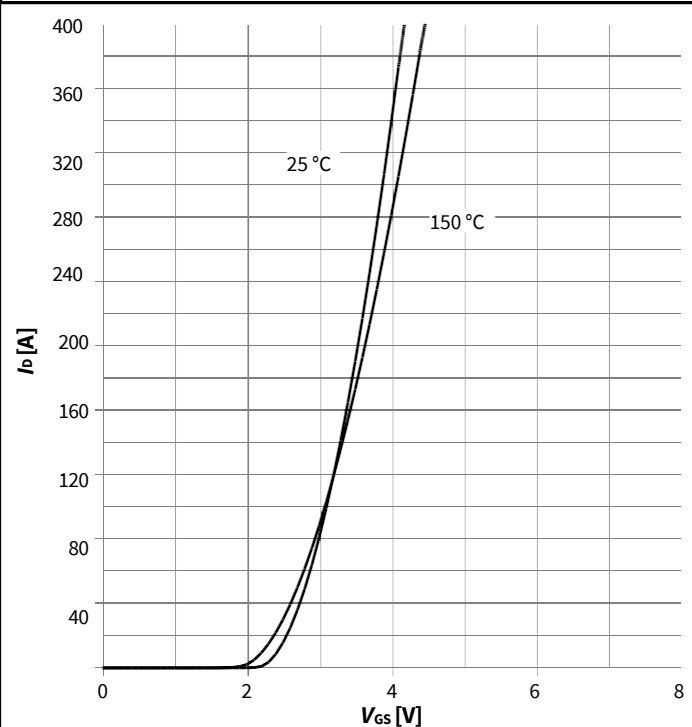
$I_D = f(V_{DS})$, $T_j = 25^\circ\text{C}$; 参数: V_{GS}

图 6：典型漏源导通电阻



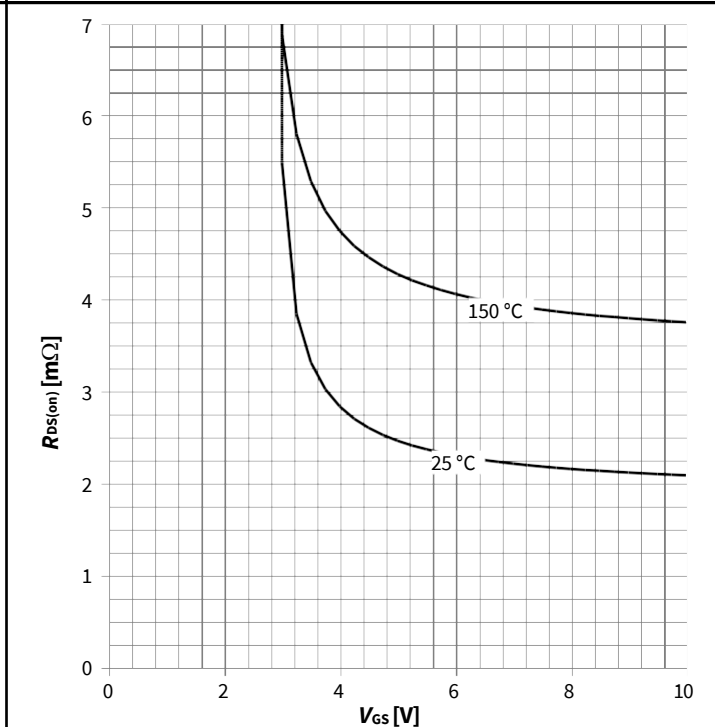
$R_{DS(on)} = f(I_D)$, $T_j = 25^\circ\text{C}$; 参数: V_{GS}

图 7：典型转移特性



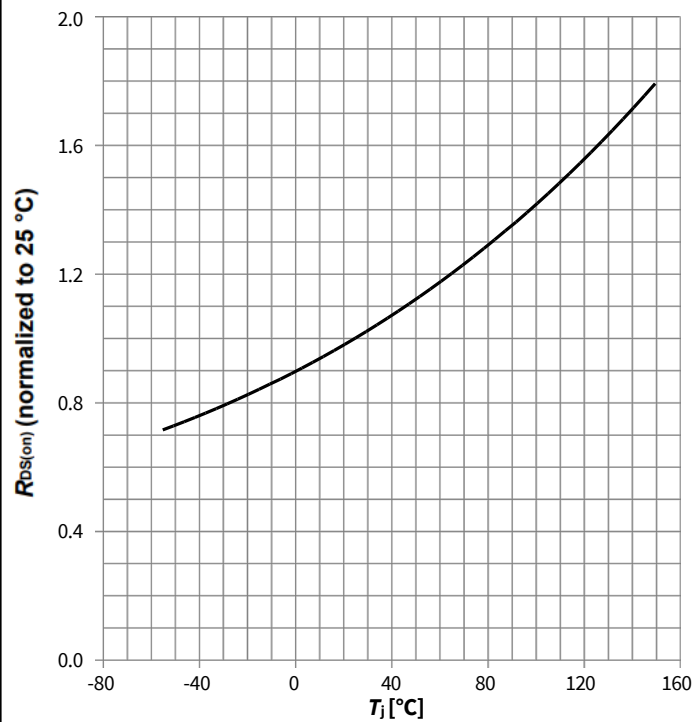
$I_D = f(V_{GS})$, $|V_{DS}| > 2|I_D|R_{DS(on)max}$; 参数: T_j

图 8：典型漏源导通电阻



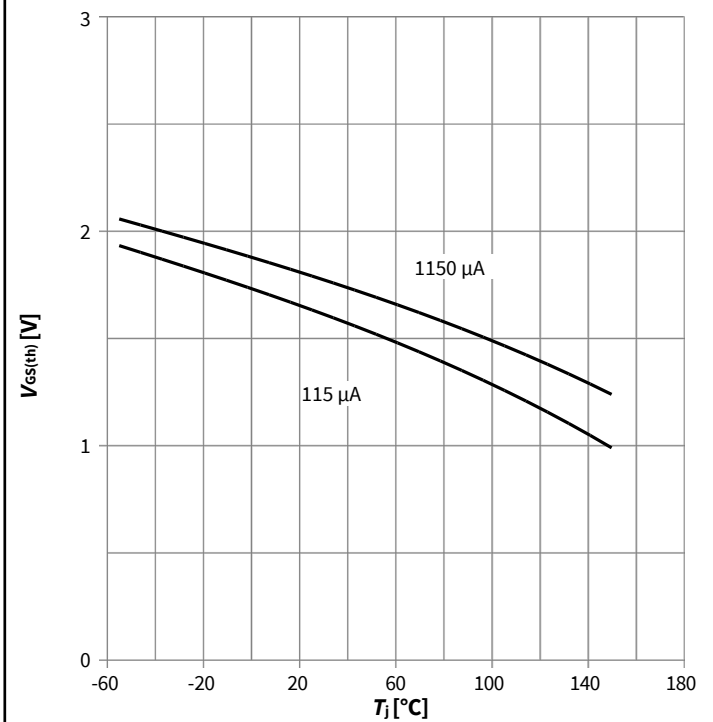
$R_{DS(on)} = f(V_{GS})$, $I_D = 50\text{ A}$; 参数: T_j

图 9：漏源导通电阻



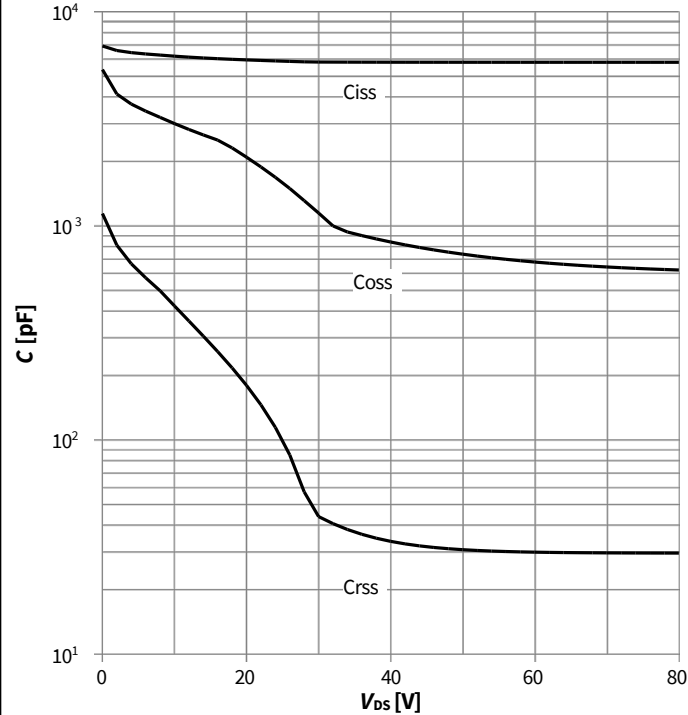
$R_{DS(on)} = f(T_j)$, $I_D = 50 \text{ A}$, $V_{GS} = 10 \text{ V}$

图 10：典型栅极阈值电压



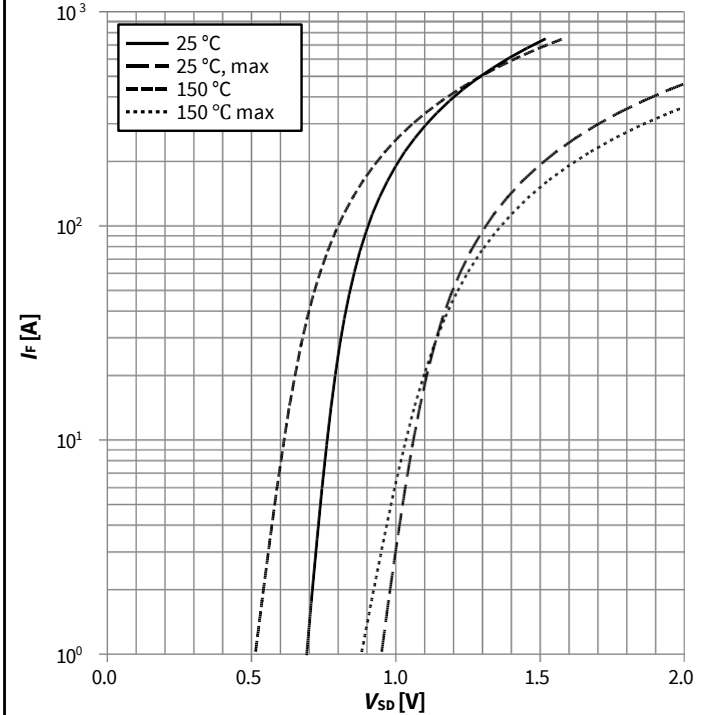
$V_{GS(th)} = f(T_j)$, $V_{GS} = V_{DS}$; 参数: I_D

图 11：典型电容值



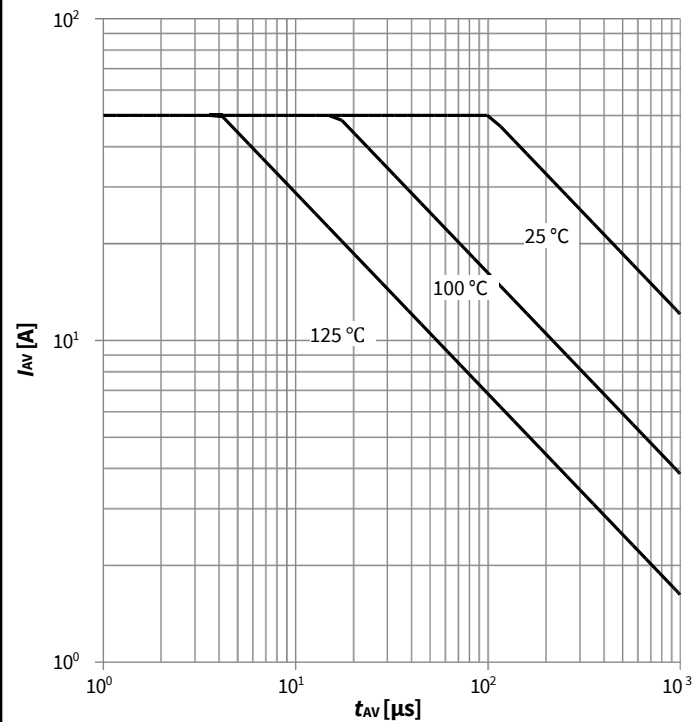
$C = f(V_{DS})$; $V_{GS} = 0 \text{ V}$; $f = 1 \text{ MHz}$

图 12：反向二极管的正向特性



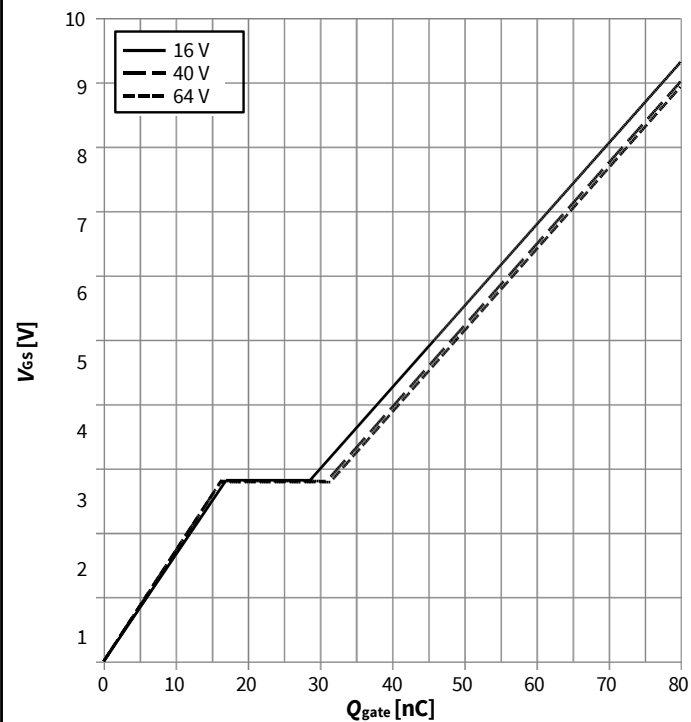
$I_F = f(V_{SD})$; 参数: T_j

图 13: 雪崩特性



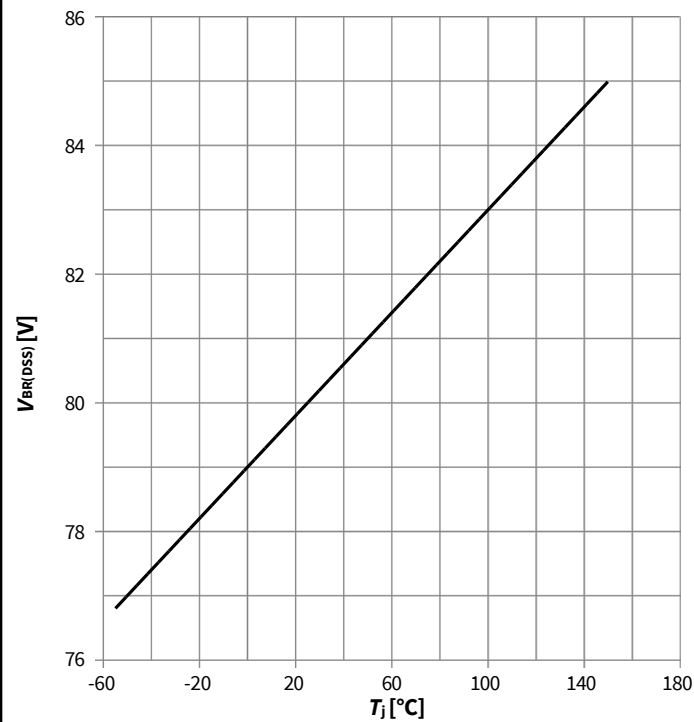
$I_{AS}=f(t_{AV}); R_{GS}=25\ \Omega$; 参数: $T_{j,start}$

图 14: 典型栅极电荷



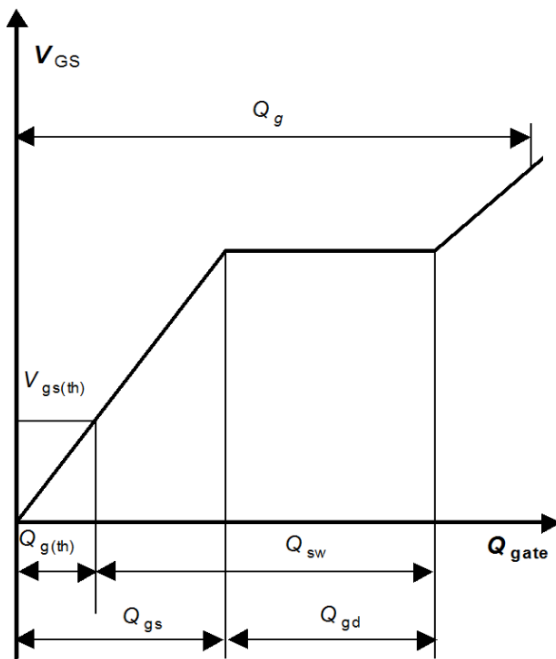
$V_{GS}=f(Q_{gate}), I_D=40\text{ A pulsed}, T_j=25\text{ °C}$; 参数: V_{DD}

图 15: 漏源击穿电压

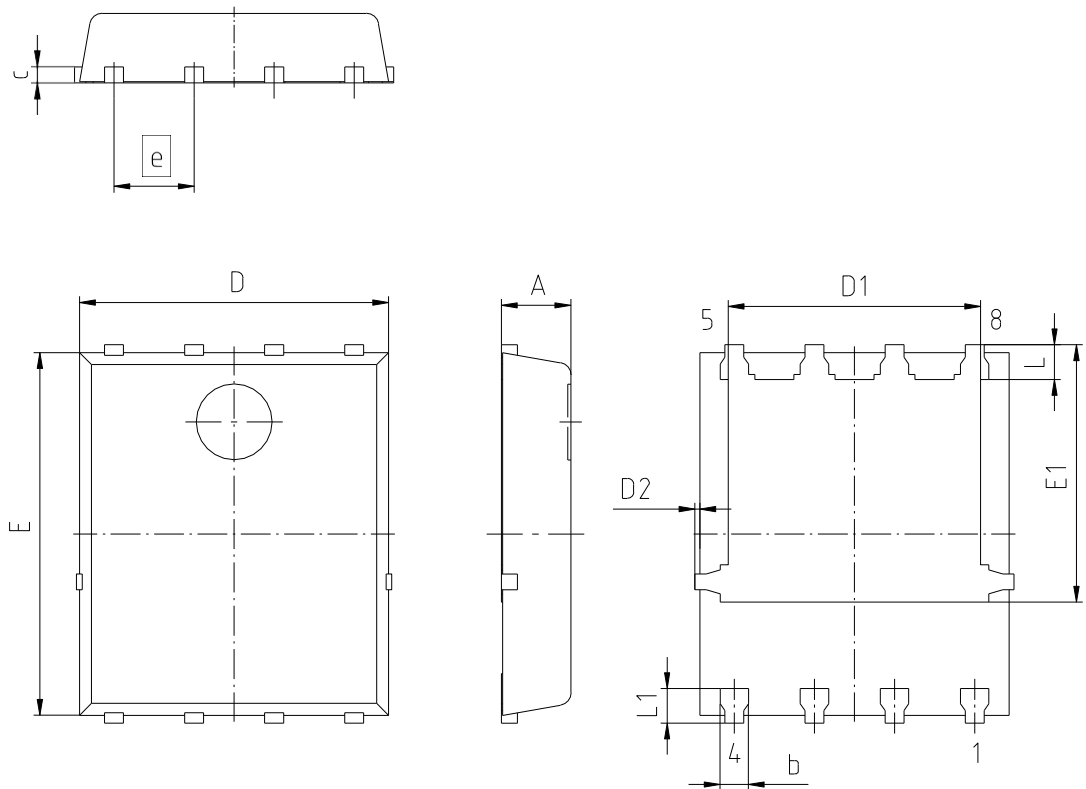


$V_{BR(DSS)}=f(T_j); I_D=1\text{ mA}$

栅极充电波形



5 封装外形



PACKAGE - GROUP PG-TDSON-8-U08		
NUMBER:		
DIMENSIONS	MILLIMETERS	
	MIN.	MAX.
A	0.90	1.20
b	0.34	0.54
c	0.15	0.35
D	4.80	5.35
D1	3.90	4.40
D2	0.00	0.22
E	5.70	6.10
E1	4.05	4.25
e	1.27	
L	0.45	0.65
L1	0.45	0.65

- 1) EXCLUDING MOLD FLASH
- 2) REMOVAL ON MOLD GATE
INTRUSION 0.1 MM
PROTRUSION 0.1 MM
- 3) ALL METAL SURFACES ARE PLATED,
EXCEPT AREA OF CUT

图 1 PG-TDSON-8 外形图，尺寸单位为毫米

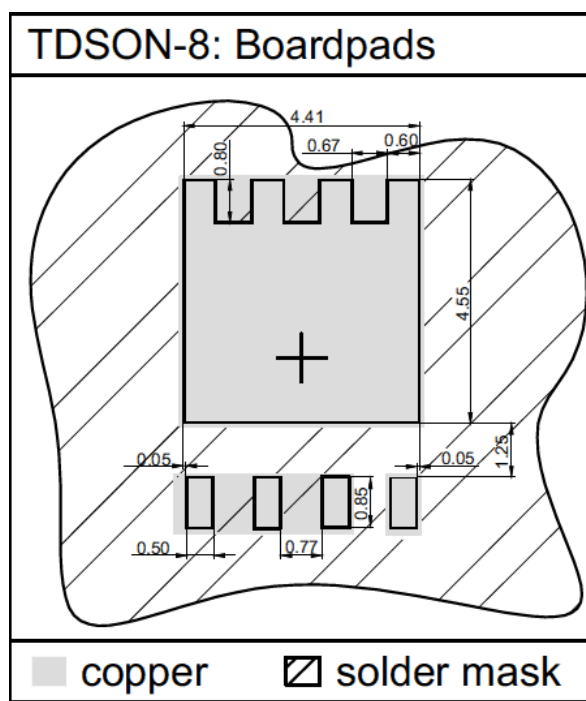


图 2 外形封装 (TDSON-8)

修订记录

BSC025N08LS5

Revision: 2022-09-22, Rev. 2.4

历史修订版本

Revision	Date	Subjects (major changes since last revision)
2.0	2016-10-14	Release of final version
2.1	2016-10-25	Update Rg and EAS
2.2	2019-05-10	Update Diagrams 5, 8, and 9
2.3	2020-12-15	Update current rating and Vsd typ
2.4	2022-09-22	Update outline drawing

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Edition 2025-04-21

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