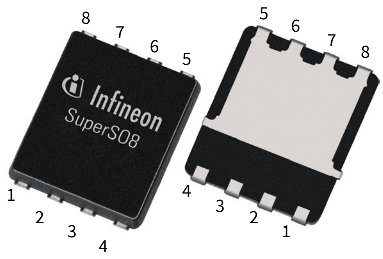
MOSFET

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
- 额定温度为 175°C
- 100% 雪崩测试
- 卓越的耐热性
- N沟道
- 符合 JEDEC [1]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

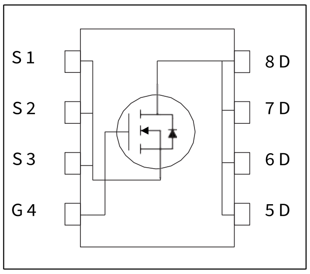


表 1　　主要性能参数

Parameter	Value	Unit
V_{DS}	60	V
$R_{DS(on),max}$	9.7	mΩ
I_D	48	A
Q_{OSS}	14	nC
Q_G(0V..10V)	12	nC

Type / Ordering Code	Package	Marking	Related Links
BSC097N06NST	PG-TDSON-8	097N06NT	-

[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

1 最大额定值

除非另有规定，$T_A = 25\ °C$

表 2 最大额定值

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Continuous drain current	I_D	- - -	- - -	48 34 13	A	V_{GS}=10 V, T_C=25 °C V_{GS}=10 V, T_C=100 °C V_{GS}=10 V, T_A=25 °C, R_{thJA} =50K/W[1)]
Pulsed drain current[2)]	$I_{D,pulse}$	-	-	192	A	T_C=25 °C
Avalanche energy, single pulse[3)]	E_{AS}	-	-	13	mJ	I_D=30 A, R_{GS}=25 Ω
Gate source voltage	V_{GS}	-20	-	20	V	-
Power dissipation	P_{tot}	- -	- -	43 3.0	W	T_C=25 °C T_A=25 °C, R_{thJA}=50 K/W[1)]
Operating and storage temperature	T_j, T_{stg}	-55	-	175	°C	-

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}	-	2.1	3.5	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	$V_{(BR)DSS}$	60	-	-	V	V_{GS}=0 V, I_D=1 mA
Gate threshold voltage	$V_{GS(th)}$	2.1	2.8	3.3	V	V_{DS}=V_{GS}, I_D=14 µA
Zero gate voltage drain current	I_{DSS}	- -	0.1 10	1 100	µA	V_{DS}=60 V, V_{GS}=0 V, T_j=25 °C V_{DS}=60 V, V_{GS}=0 V, T_j=125 °C
Gate-source leakage current	I_{GSS}	-	10	100	nA	V_{GS}=20 V, V_{DS}=0 V
Drain-source on-state resistance	$R_{DS(on)}$	- -	8.0 12.0	9.7 14.6	mΩ	V_{GS}=10 V, I_D=40 A V_{GS}=6 V, I_D=10 A
Gate resistance[1]	R_G	-	1.1	1.7	Ω	-
Transconductance	g_{fs}	24	48	-	S	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=40 A

表5 动态特性[1]

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Input capacitance	C_{iss}	-	860	1075	pF	V_{GS}=0 V, V_{DS}=30 V, f=1 MHz
Output capacitance	C_{oss}	-	210	263	pF	V_{GS}=0 V, V_{DS}=30 V, f=1 MHz
Reverse transfer capacitance	C_{rss}	-	16	32	pF	V_{GS}=0 V, V_{DS}=30 V, f=1 MHz
Turn-on delay time	$t_{d(on)}$	-	6	-	ns	V_{DD}=30 V, V_{GS}=10 V, I_D=40 A, $R_{G,ext}$,ext=1.6 Ω
Rise time	t_r	-	2	-	ns	V_{DD}=30 V, V_{GS}=10 V, I_D=40 A, $R_{G,ext}$,ext=1.6 Ω
Turn-off delay time	$t_{d(off)}$	-	10	-	ns	V_{DD}=30 V, V_{GS}=10 V, I_D=40 A, $R_{G,ext}$,ext=1.6 Ω
Fall time	t_f	-	2	-	ns	V_{DD}=30 V, V_{GS}=10 V, I_D=40 A, $R_{G,ext}$,ext=1.6 Ω

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}	-	4.5	-	nC	V_{DD}=30 V, I_D=40 A, V_{GS}=0 to 10 V
Gate charge at threshold	$Q_{g(th)}$	-	2.4	-	nC	V_{DD}=30 V, I_D=40 A, V_{GS}=0 to 10 V
Gate to drain charge	Q_{gd}	-	2.6	3.7	nC	V_{DD}=30 V, I_D=40 A, V_{GS}=0 to 10 V
Switching charge	Q_{sw}	-	4.7	-	nC	V_{DD}=30 V, I_D=40 A, V_{GS}=0 to 10 V
Gate charge total	Q_g	-	12	15	nC	V_{DD}=30 V, I_D=40 A, V_{GS}=0 to 10 V
Gate plateau voltage	$V_{plateau}$	-	5.2	-	V	V_{DD}=30 V, I_D=40 A, V_{GS}=0 to 10 V
Gate charge total, sync. FET	$Q_{g(sync)}$	-	10	-	nC	V_{DS}=0.1 V, V_{GS}=0 to 10 V
Output charge	Q_{oss}	-	14	19	nC	V_{DD}=30 V, V_{GS}=0 V

[1]由设计标定，不受制于生产测试。
[2]由设计标定，不受制于生产测试。有关栅极电荷参数定义，请参阅栅极电荷波形

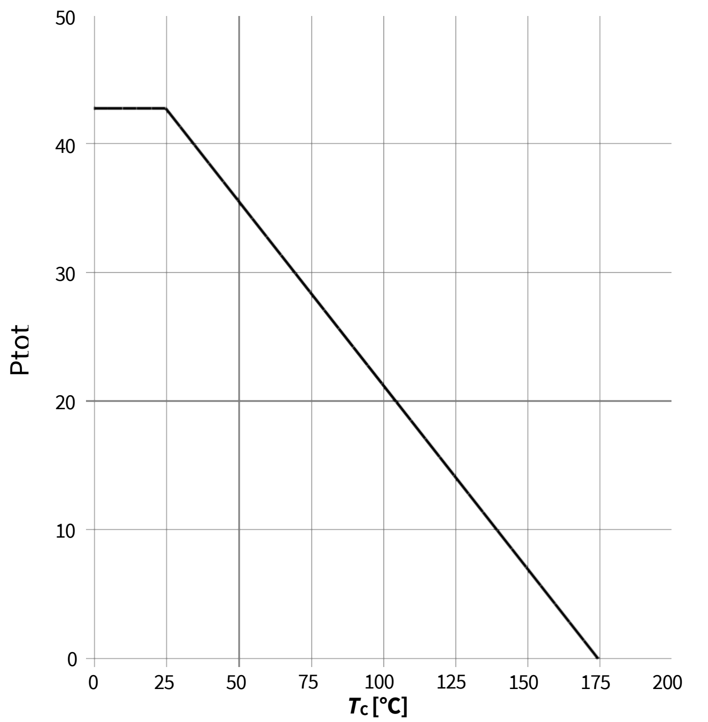
表 7　　反向二极管

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Diode continuous forward current	I_S	-	-	36	A	T_C=25 °C
Diode pulse current	$I_{S,pulse}$	-	-	192	A	T_C=25 °C
Diode forward voltage	V_{SD}	-	1.0	1.2	V	V_{GS}=0 V, I_F=30 A, T_j=25 °C
Reverse recovery time[1)]	t_{rr}	-	33	53	ns	V_R=30 V, I_F=30 A, di_F/dt=100 A/µs
Reverse recovery charge[1)]	Q_{rr}	-	30	-	nC	V_R=30 V, I_F=30 A, di_F/dt=100 A/µs

[1)]由设计标定，不受制于生产测试。

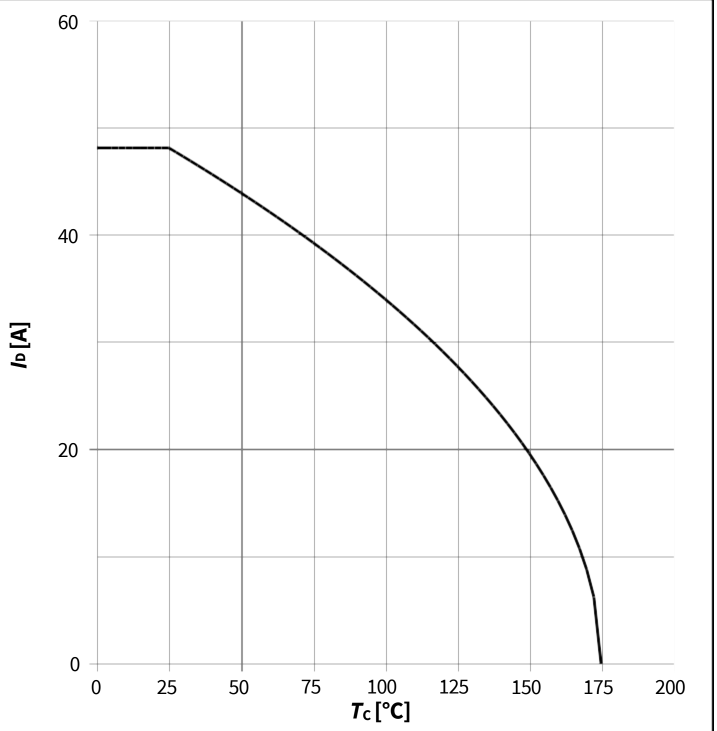
4 电气特性图

图 1：功率耗散



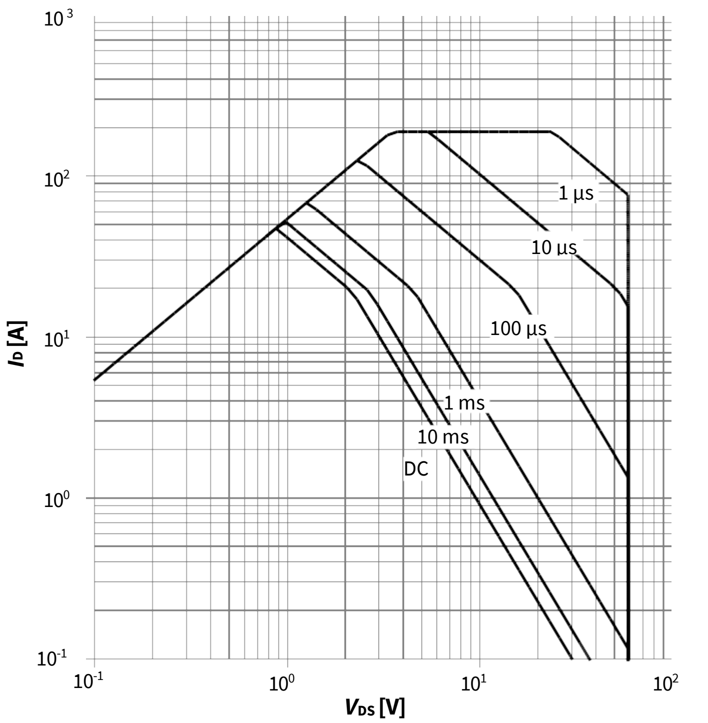
P_{tot}=f(T_C)

图 2：漏极电流



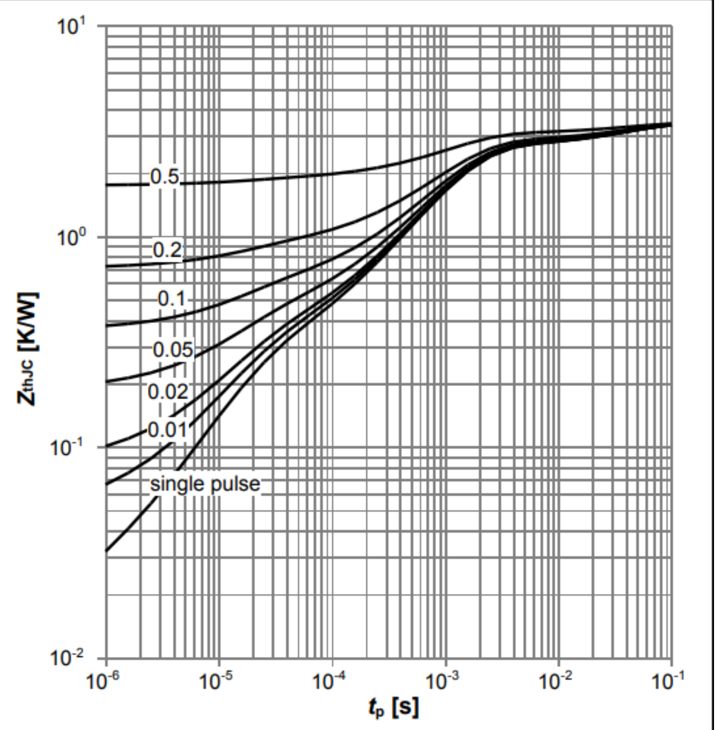
I_D=f(T_C); V_{GS}≥10 V

图 3：安全操作区



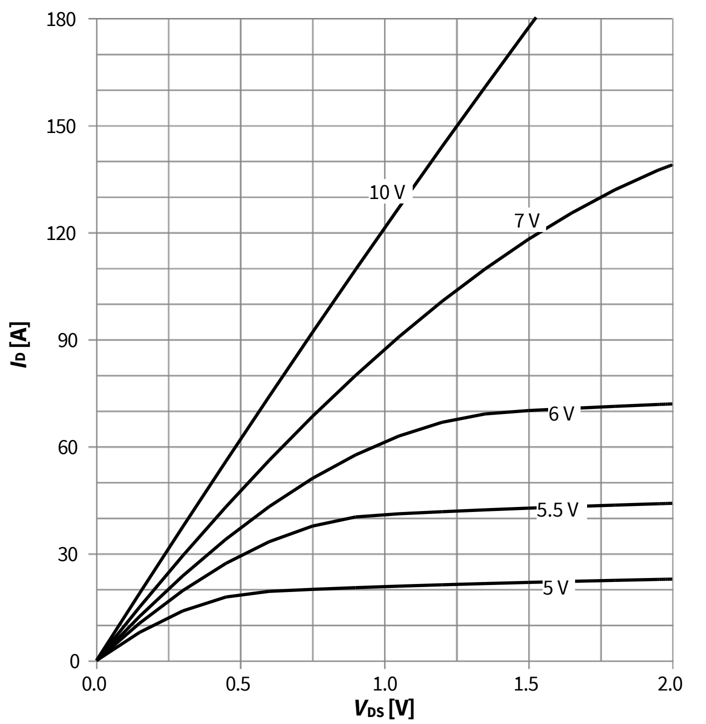
I_D=f(V_{DS}); T_C=25 °C; D=0; 参数：t_p

图 4：最大瞬态热阻抗



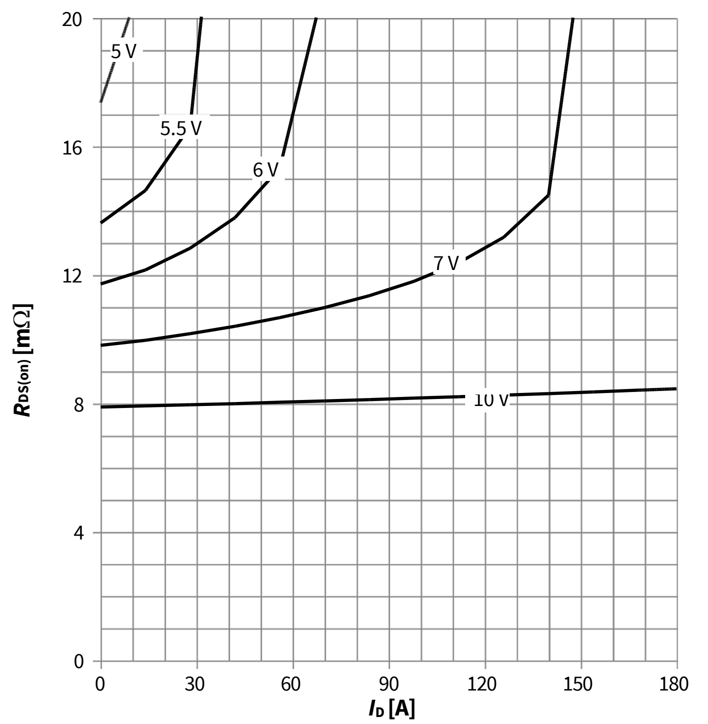
Z_{thJC}=f(t_p); 参数：D=t_p/T

图 5：典型输出特性



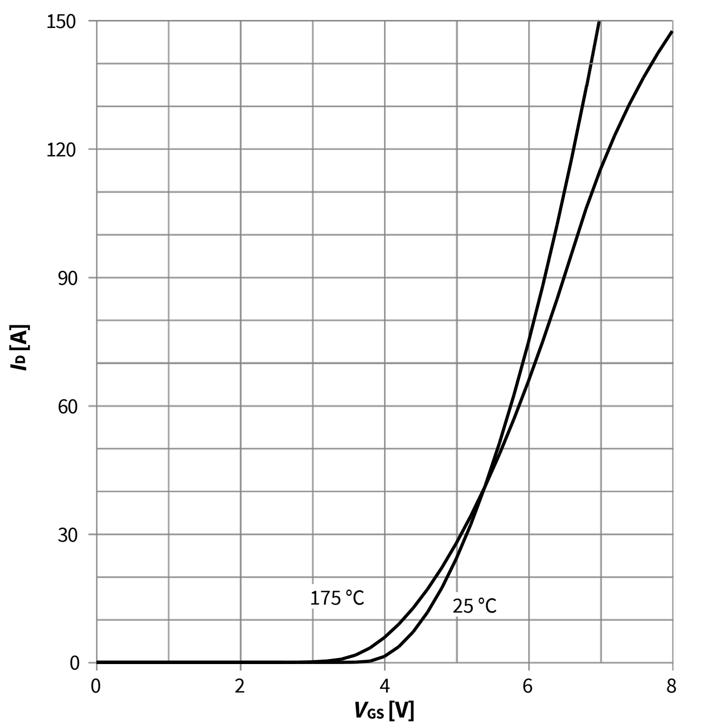
I_D=f(V_{DS}), T_j=25 °C; 参数： V_{GS}

图 6：典型漏源导通电阻



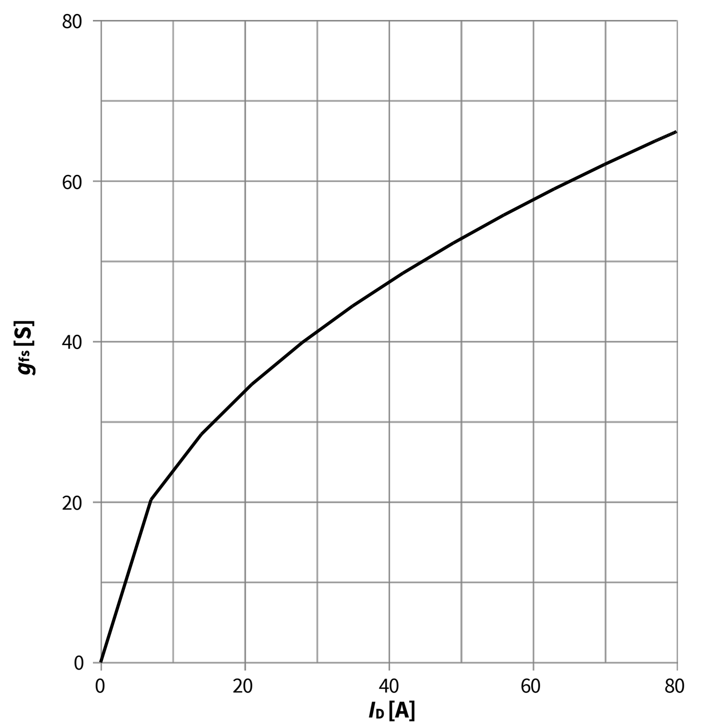
$R_{DS(on)}$=f(I_D), T_j=25 °C; 参数： V_{GS}

图 7：典型转移特性



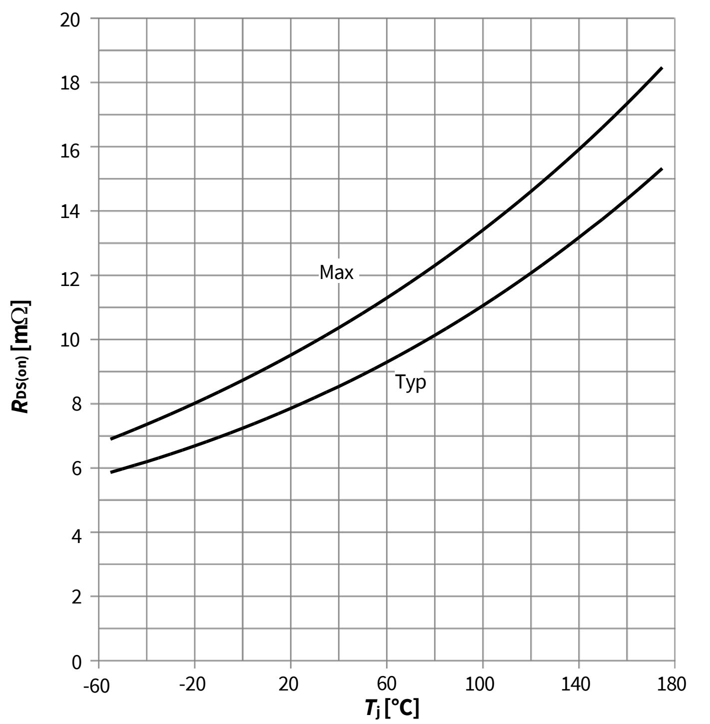
I_D=f(V_{GS}), $|V_{DS}|$>2$|I_D|R_{DS(on)max}$; 参数： T_j

图 8：典型正向跨导



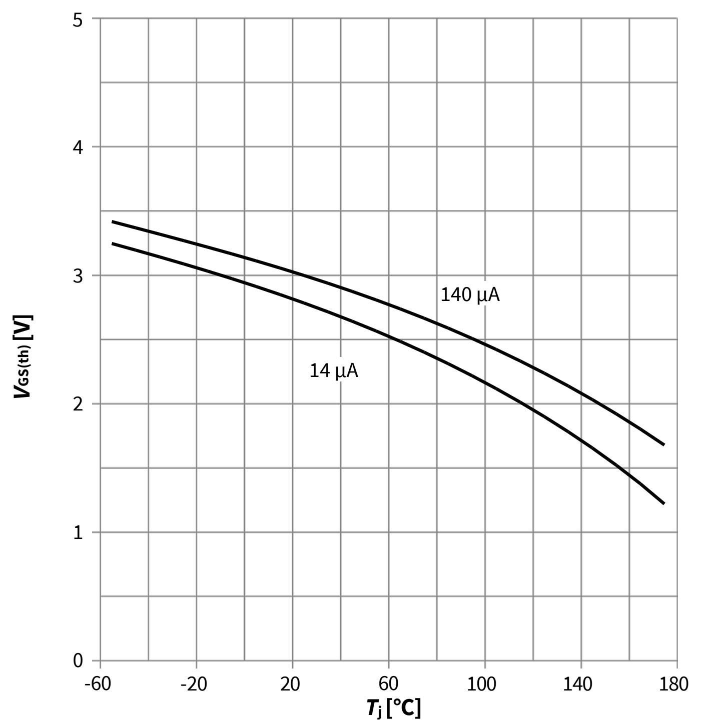
g_{fs}=f(I_D); T_j=25 °C

图 9：漏源导通电阻



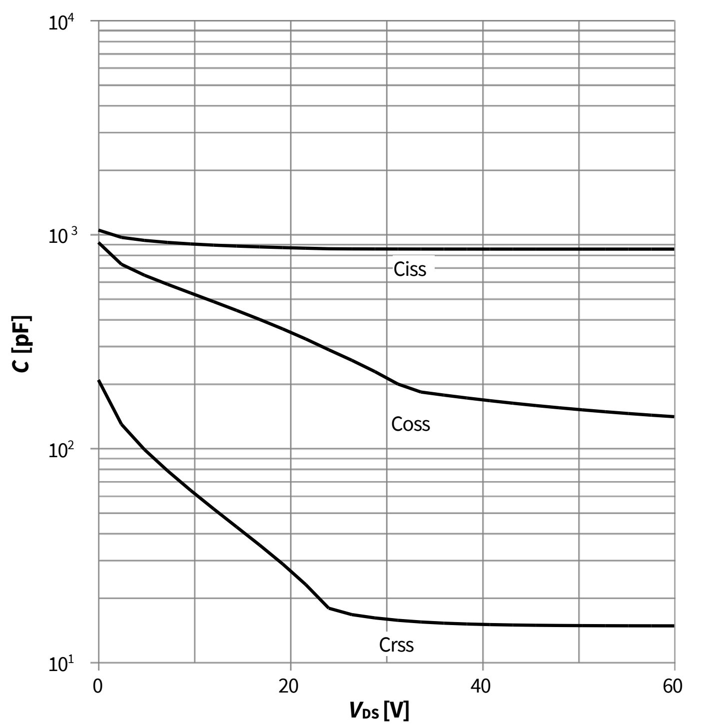
$R_{DS(on)}$=f(T_j); I_D=40 A; V_{GS}=10 V

图 10：典型栅极阈值电压



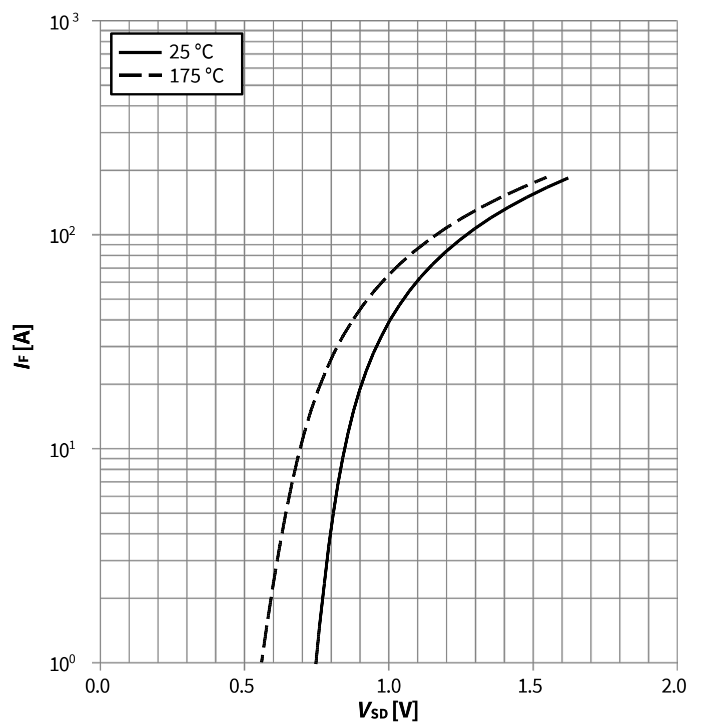
$V_{GS(th)}$=f(T_j); V_{GS}=V_{DS}

图 11：典型电容值



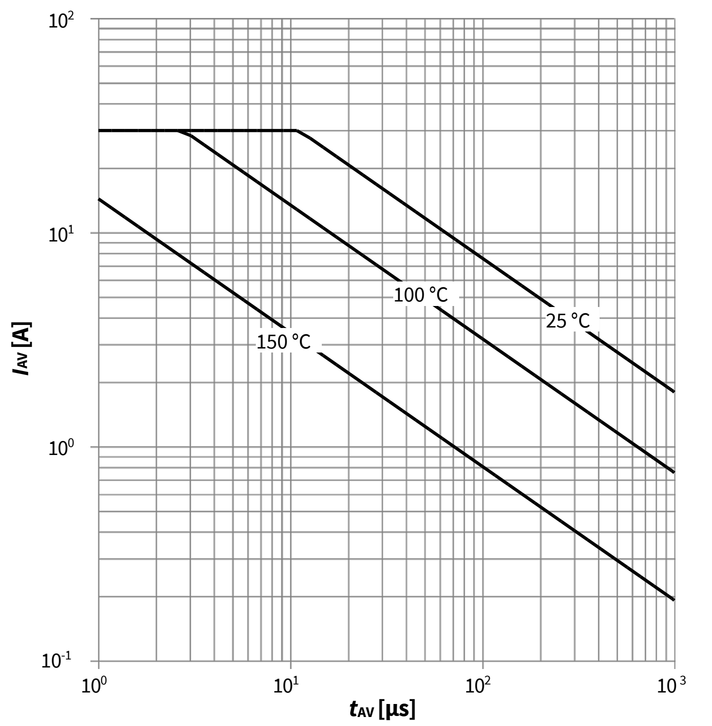
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz

图 12：反向二极管的正向特性



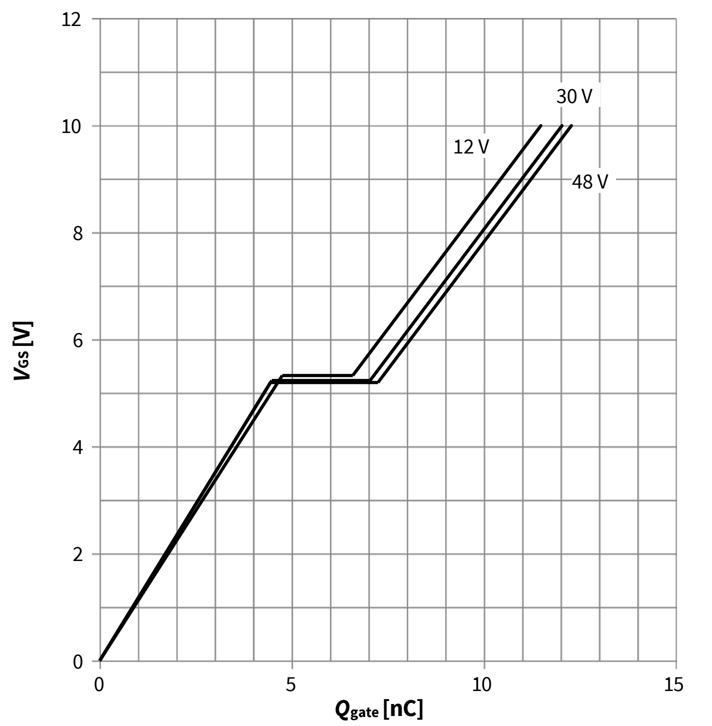
I_F=f(V_{SD}); 参数：T_j

图 13：雪崩特性



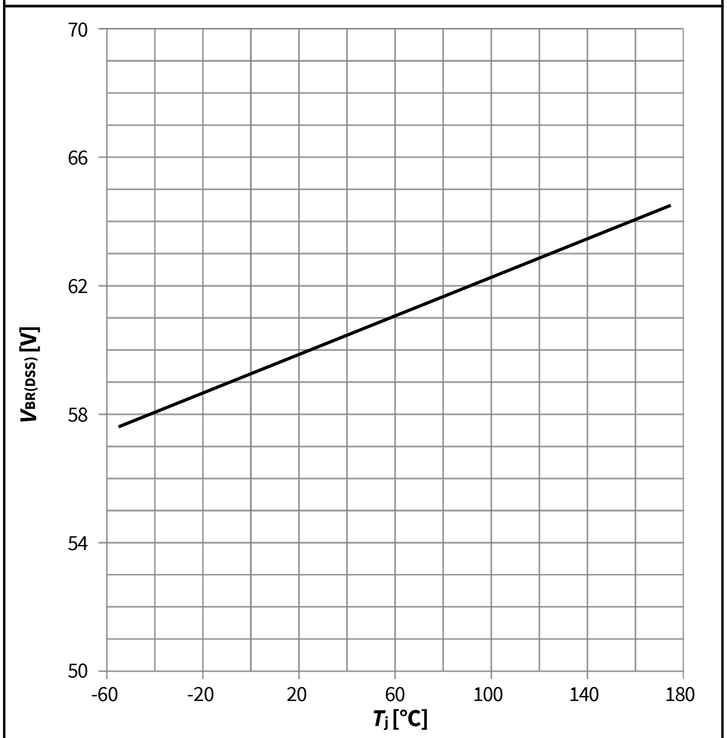
I_{AS}=f(t_{AV}); R_{GS}=25 Ω; 参数: $T_{j(start)}$

图 14：典型栅极电荷



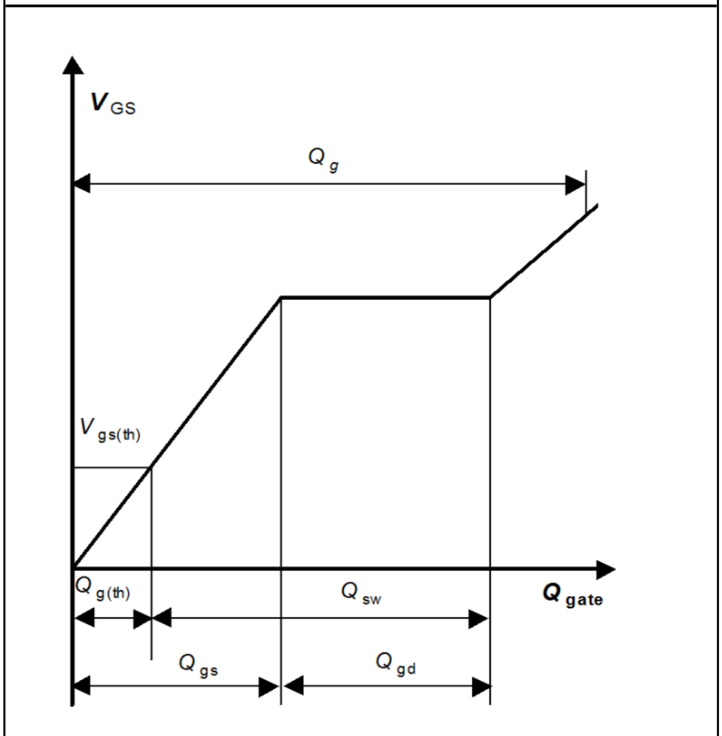
V_{GS}=f(Q_{gate}); I_D=40 A pulsed; 参数: V_{DD}

图 15：漏源击穿电压

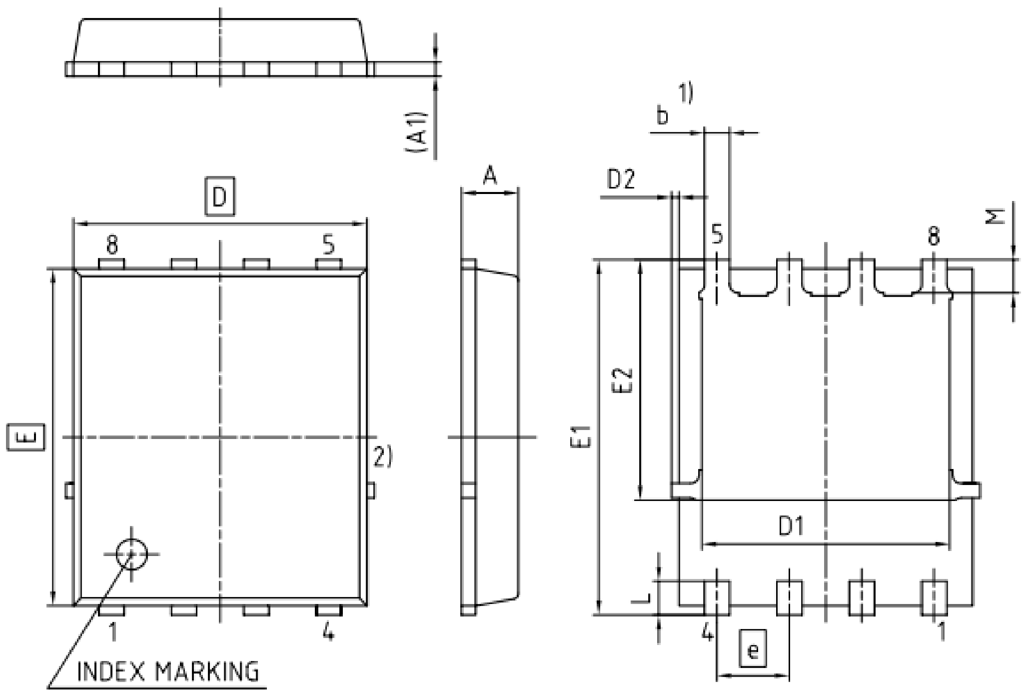


$V_{BR(DSS)}$ = f(T_j); I_D = 1 mA

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	0.33
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

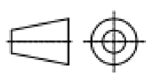
DOCUMENT NO.
Z8B00003332

REVISION
07

SCALE 10:1

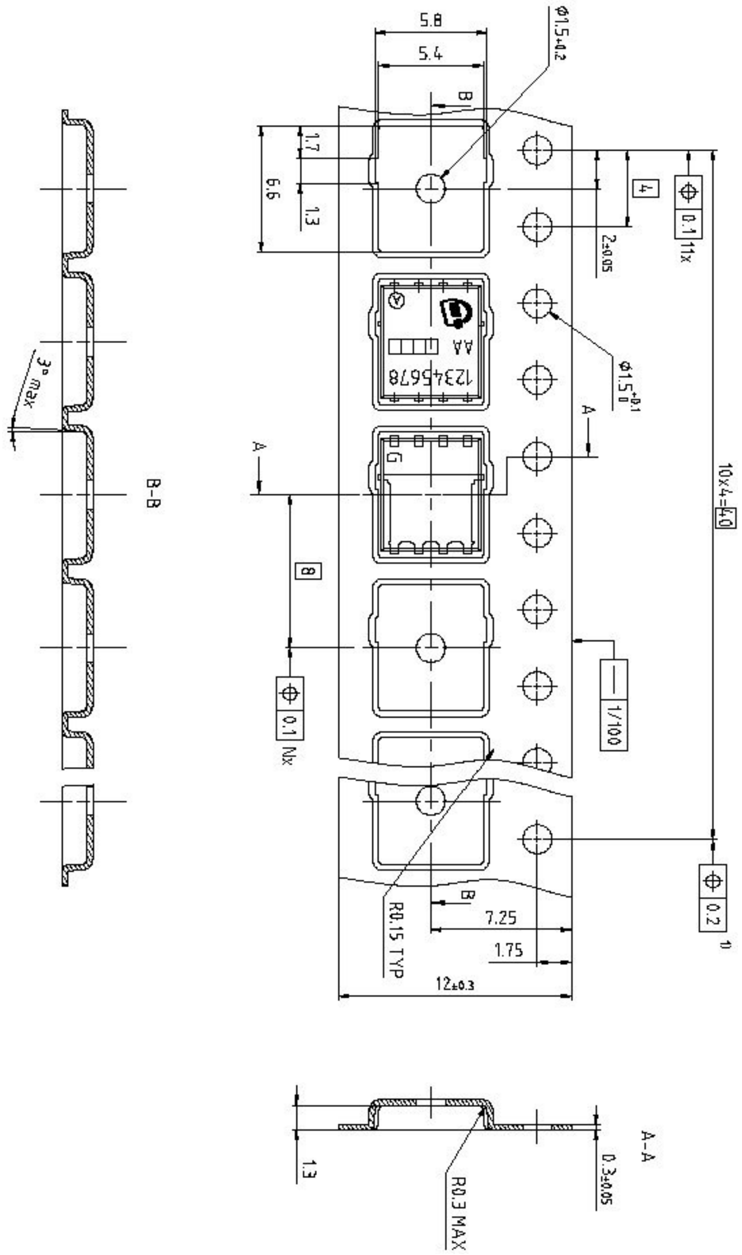
0 1 2 3mm

EUROPEAN PROJECTION



ISSUE DATE
06.06.2019

图 1　　PG-TDSON-8 外形图，尺寸单位为毫米



尺寸（毫米）

图2　　　封装外形胶带（TDSON-8）

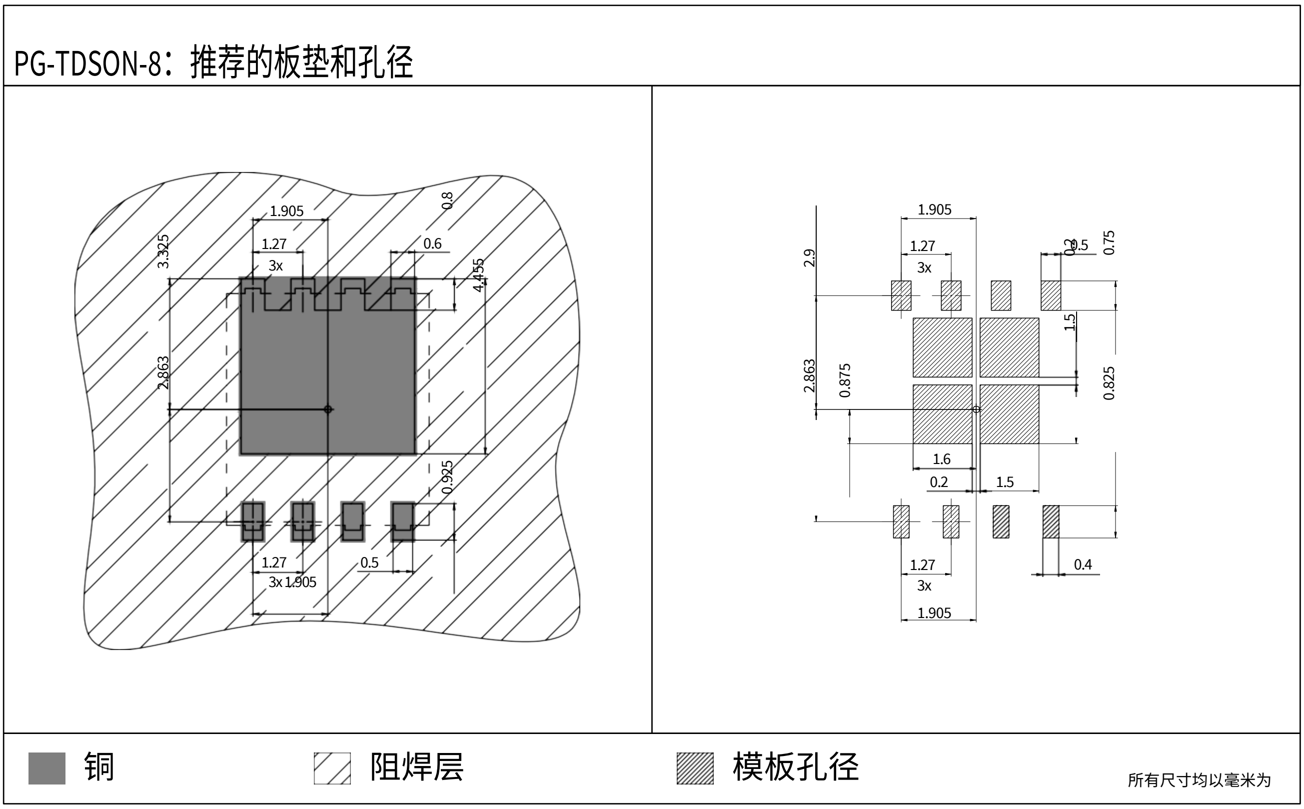


图 3　　外形板焊盘 (TDSON-8)，尺寸单位为毫米

修订记录

BSC097N06NST

Revision: 2019-11-15, Rev. 2.1

历史修订版本

Revision	Date	Subjects (major changes since last revision)
2.0	2017-10-19	Release of final version
2.1	2019-11-15	Update package drawings

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