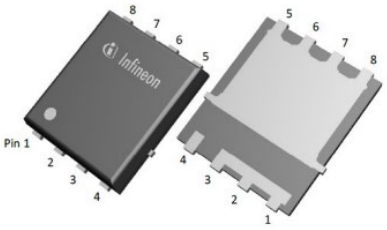
MOSFET

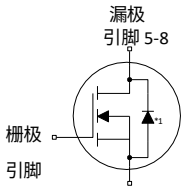
英飞凌工业用高耐热 60V OptiMOS™ 功率MOSFET

PG-TDSON-8



特性

- 针对同步整流进行了优化
- 额定温度为 175°C
- 100% 雪崩测试
- 卓越的耐热性
- N通道
- 无铅镀层；符合RoHS标准
- 符合 IEC61249-2-21 标准的无卤素
- 源极互连尺寸增大，焊点可靠性更高



*1：内部体二极管

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
$R_{DS(on),max}$	1.6	mΩ
I_D	234	A
Q_{OSS}	81	nC
Q_G(0V..10V)	71	nC

Type/Ordering Code	Package	Marking	Related Links
BSC016N06NS	PG-TDSON-8	016N06NS	-

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

表 2 最大额定值

Parameter	Symbol	Values			Unit	Note/ Test Condition
		Min.	Typ.	Max.		
Continuous drain current [1]	I_D	-	-	234 164 31	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}=50 K/W [2]
Pulsed drain current [3]	$I_{D,pulse}$	-	-	936	A	T_C=25 °C
Avalanche energy, single pulse [4]	E_{AS}	-	-	380	mJ	I_D=50 A, R_{GS}=25 Ω
Gate source voltage	V_{GS}	-20	-	20	V	-
Power dissipation	P_{tot}	-	-	167 3.0	W	T_C=25 °C T_A=25 °C, R_{thJA}=50 K/W
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。

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) 器件置于40 mm × 40 mm × 1.5 mm 环氧树脂 PCB FR4基板上，配有6 cm^2（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}	-	0.5	0.9	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 cm^2（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	$V_{(BR)DSS}$	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=95 µA
Zero gate voltage drain current	I_{DSS}	-	0.5 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	$R_{DS(on)}$	-	1.4 1.9	1.6 2.4	mΩ	V_{GS}=10 V, I_D=50 A V_{GS}=6 V, I_D=12.5 A
Gate resistance [6]	R_G	-	1.9	2.9	Ω	-
Transconductance	g_{fs}	70	140	-	S	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=50 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}	3900	5200	6500	pF	V_{GS}=0 V, V_{DS}=30 V, f=1 MHz
Output capacitance	C_{oss}	900	1200	1500	pF	V_{GS}=0 V, V_{DS}=30 V, f=1 MHz
Reverse transfer capacitance	C_{rss}	14	48	96	pF	V_{GS}=0 V, V_{DS}=30 V, f=1 MHz
Turn-on delay time	$t_{d(on)}$	-	19	38	ns	V_{DD}=30 V, V_{GS}=10 V, I_D=30 A, $R_{G,ext}$=1.6 Ω
Rise time	t_r	-	9	18	ns	V_{DD}=30 V, V_{GS}=10 V, I_D=30 A, $R_{G,ext}$=1.6 Ω
Turn-off delay time	$t_{d(off)}$	-	35	70	ns	V_{DD}=30 V, V_{GS}=10 V, I_D=30 A, $R_{G,ext}$=1.6 Ω
Fall time	t_f	-	9	18	ns	V_{DD}=30 V, V_{GS}=10 V, I_D=30 A, $R_{G,ext}$=1.6 Ω

[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}	16	22	30	nC	V_{DD}=30 V, I_D=50 A, V_{GS}=0 to 10 V
Gate charge at threshold	$Q_{g(th)}$	10	14	19	nC	V_{DD}=30 V, I_D=50 A, V_{GS}=0 to 10 V
Gate to drain charge	Q_{gd}	8.8	13	20	nC	V_{DD}=30 V, I_D=50 A, V_{GS}=0 to 10 V

表 6　　栅极电荷特性 [8)]

Parameter	Symbol	Values			Unit	Note/ Test Condition
		Min.	Typ.	Max.		
Switching charge	Q_{sw}	14	21	30	nC	V_{DD}=30 V, I_D=50 A, V_{GS}=0 to 10 V
Gate charge total	Q_g	58	71	95	nC	V_{DD}=30 V, I_D=50 A, V_{GS}=0 to 10 V
Gate plateau voltage	$V_{plateau}$	3.7	4.3	4.9	V	V_{DD}=30 V, I_D=50 A, V_{GS}=0 to 10 V
Gate charge total, sync. FET	$Q_{g(sync)}$	49	62	86	nC	V_{DS}=0.1 V, V_{GS}=0 to 10 V
Output charge	Q_{oss}	60	81	102	nC	V_{DD}=30 V, V_{GS}=0 V

[8)] 有关参数定义，请参见“栅极电荷波形”。由设计定义。未经过生产测试。

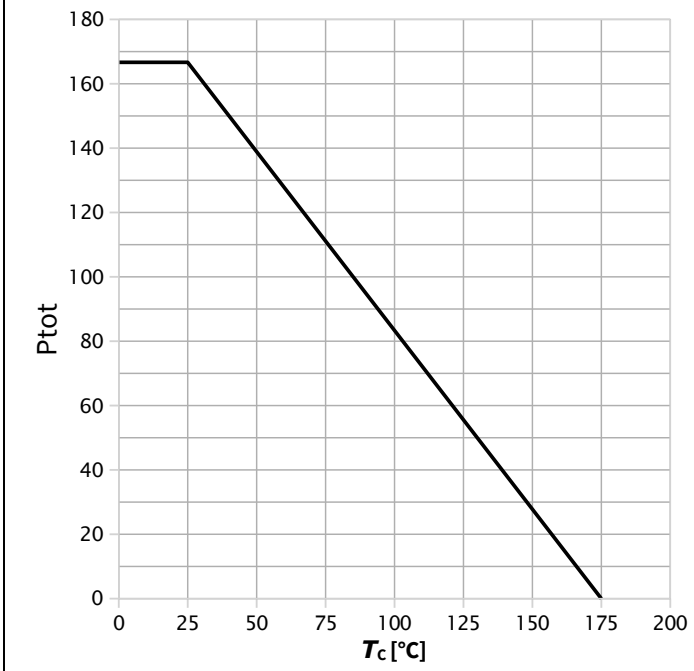
表 7　　反向二极管

Parameter	Symbol	Values			Unit	Note/ Test Condition
		Min.	Typ.	Max.		
Diode continuous forward current	I_S	-	-	167	A	T_C=25 °C
Diode pulse current	$I_{S,pulse}$	-	-	936	A	T_C=25 °C
Diode forward voltage	V_{SD}	-	0.9	1.2	V	V_{GS}=0 V, I_F=50 A, T_j=25 °C
Reverse recovery time [9)]	t_{rr}	24	61	98	ns	V_R=30 V, I_F=50A, di_F/dt=100 A/µs
Reverse recovery charge [9)]	Q_{rr}	39	78	156	nC	V_R=30 V, I_F=50A, di_F/dt=100 A/µs

[9)] 由设计定义。未经过生产测试。

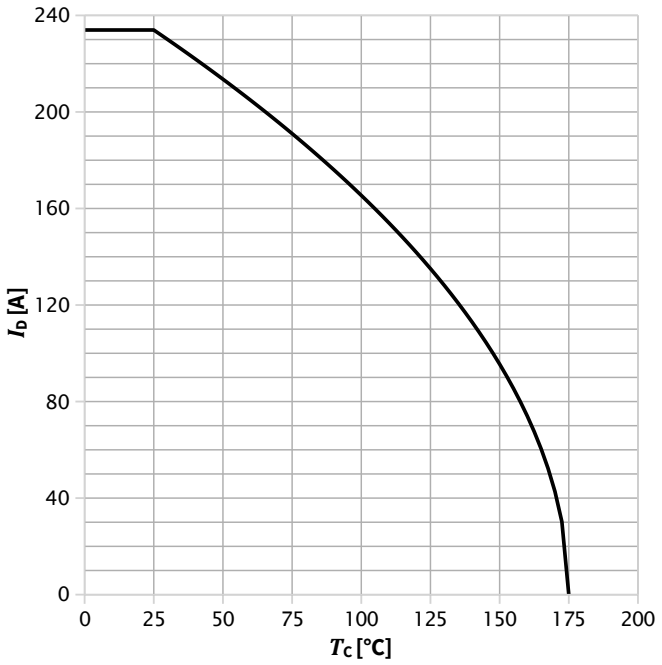
4 电气特性图

图 1：功率耗散



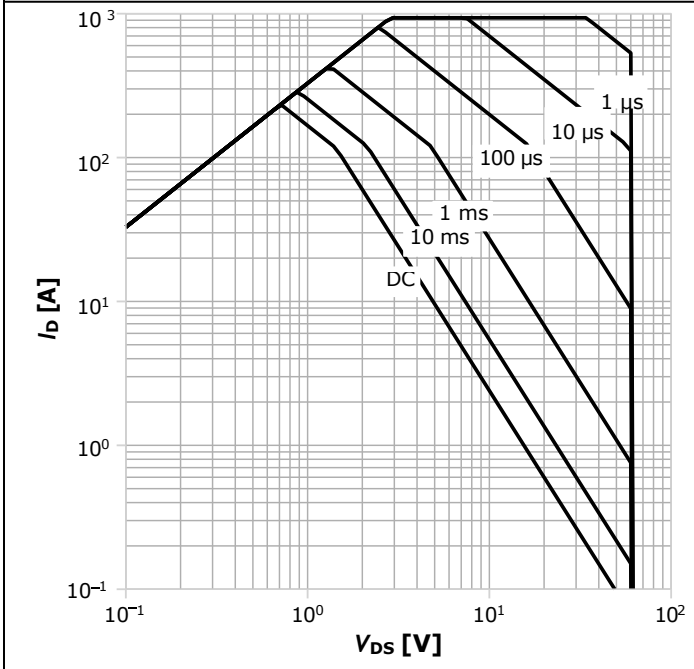
$P_{tot}=f(T_C)$

图 2：漏极电流



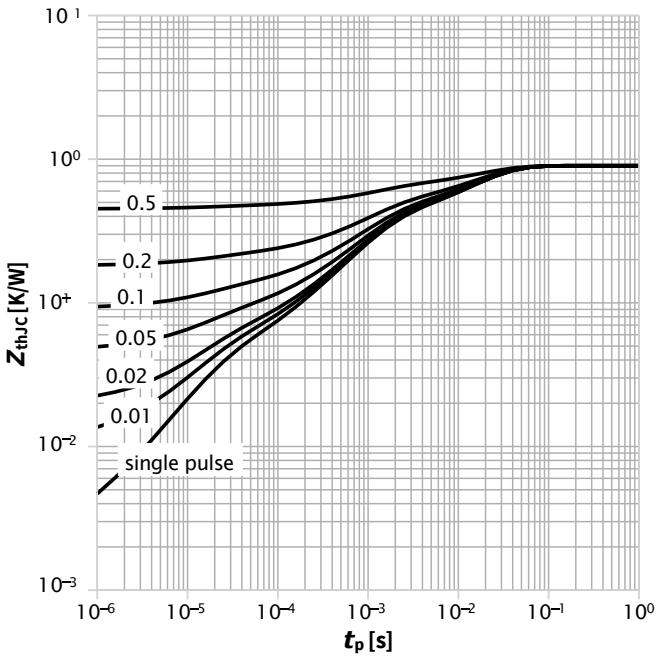
$I_D=f(T_C)$; $V_{GS}\geq 10$ V

图 3：安全操作区



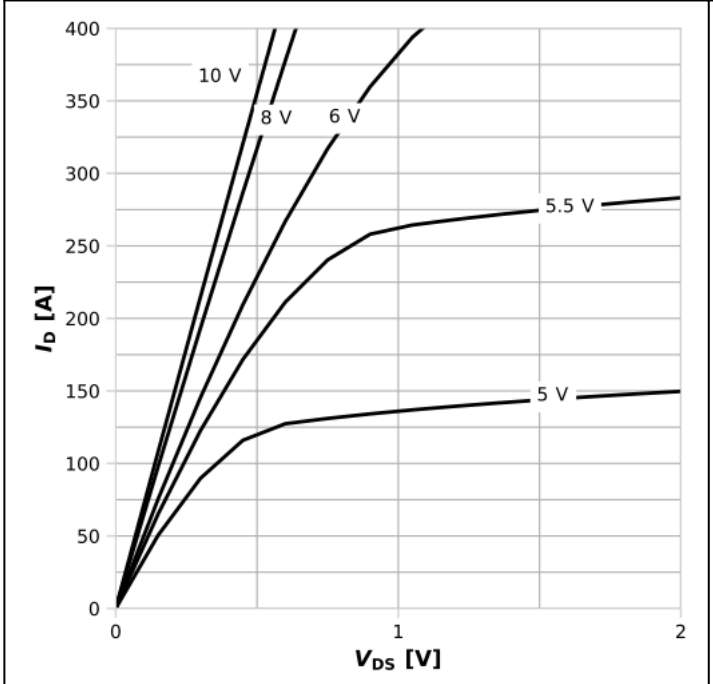
$I_D=f(V_{DS})$; T_C=25 °C; D=0; 参数: t_p

图 4：最大瞬态热阻抗



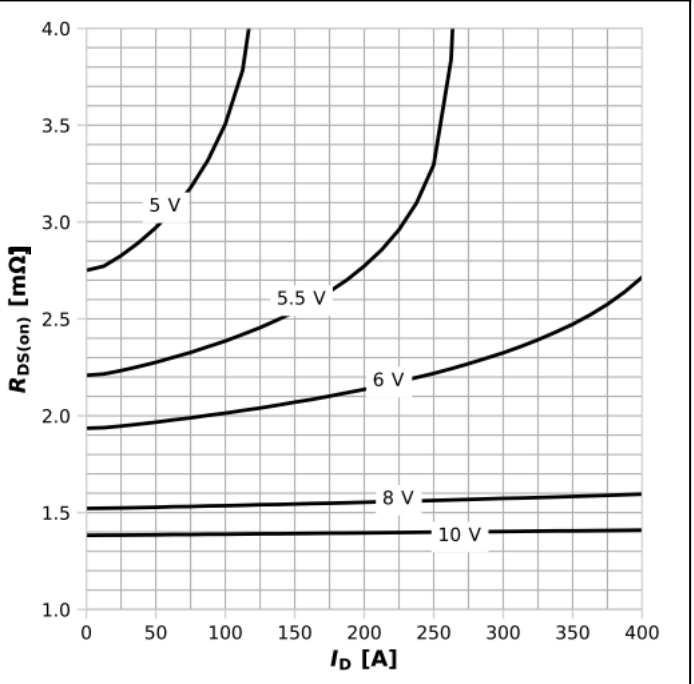
$Z_{thJC}=f(t_p)$; 参数：$D=t_p/T$

图 5：典型输出特性



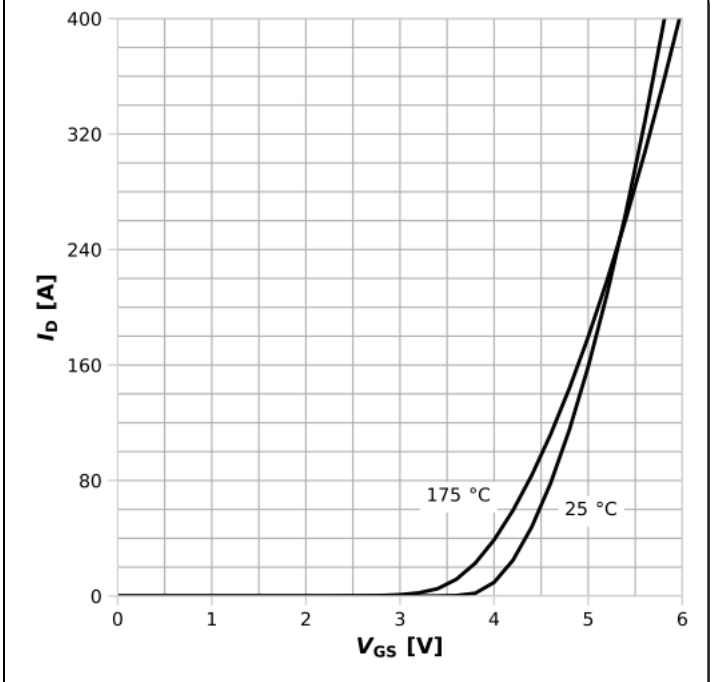
I_D=f(V_{DS}); T_j=25 °C; parameter: V_{GS}

图 6：典型漏源导通电阻



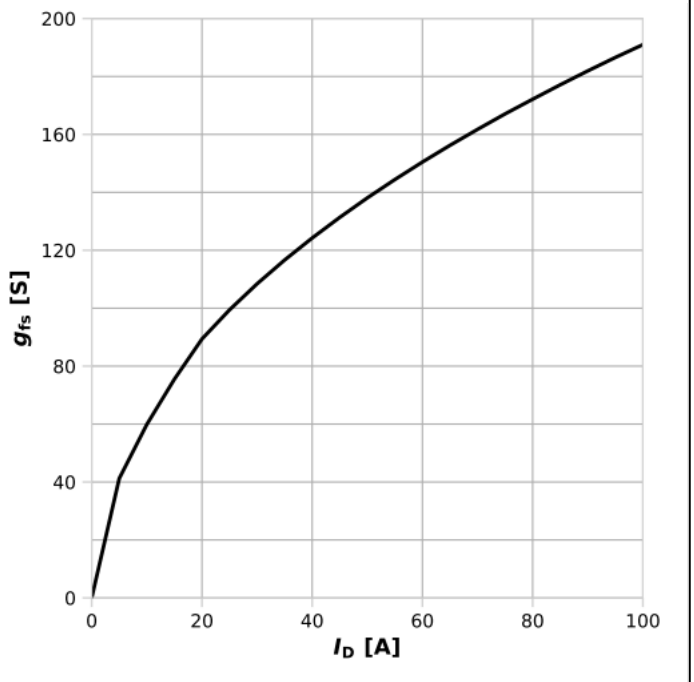
$R_{DS(on)}$=f(I_D); T_j=25 °C; parameter: V_{GS}

图 7：典型转移特性



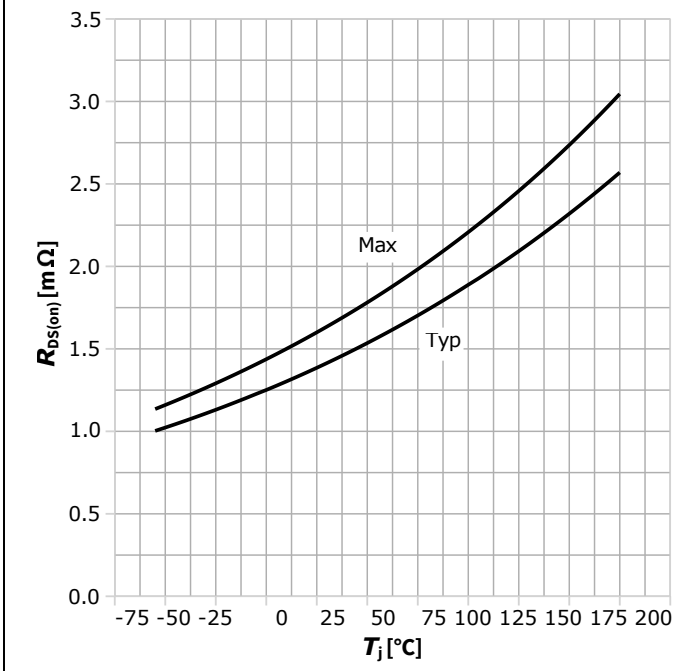
I_D=f(V_{GS}); $|V_{DS}|>2|I_D|R_{DS(on)max}$; parameter: T_j

图 8：典型正向跨导



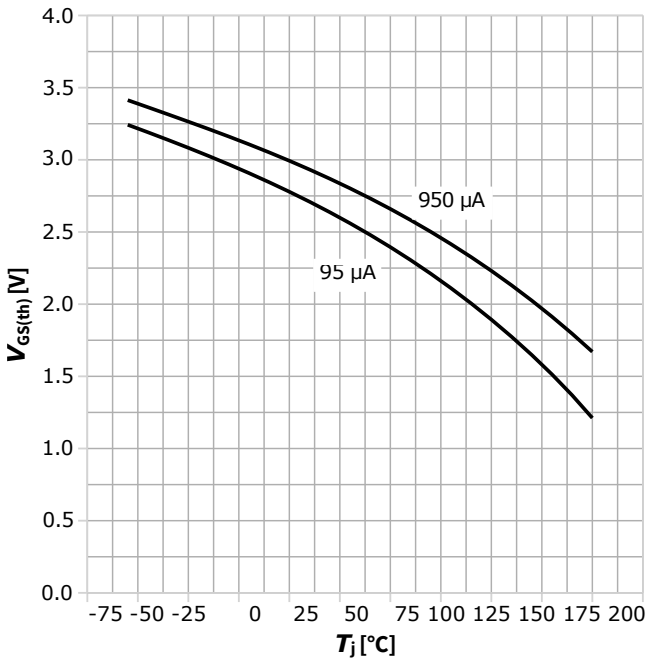
g_{fs}=f(I_D); T_j=25 °C

图 9：漏源导通电阻



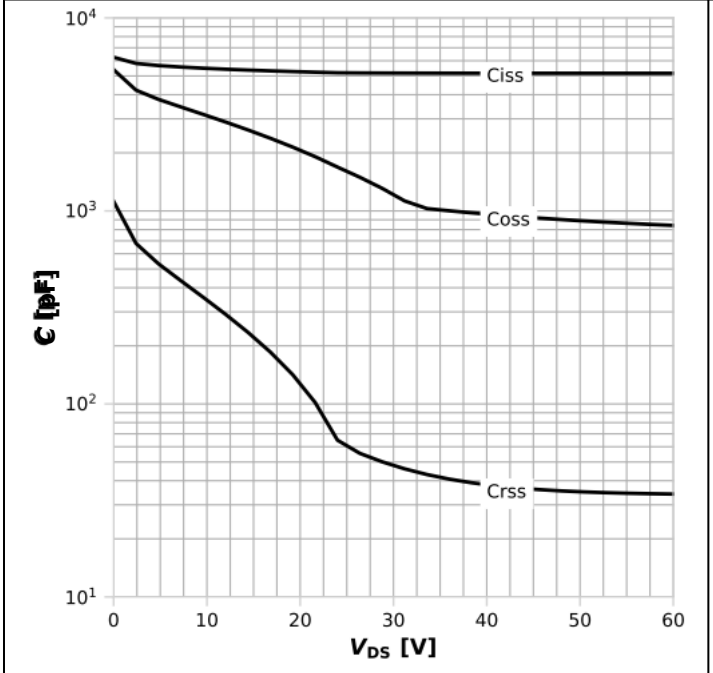
$R_{DS(on)}=f(T_j)$; I_D=50 A; V_{GS}=10 V

图 10：典型栅极阈值电压



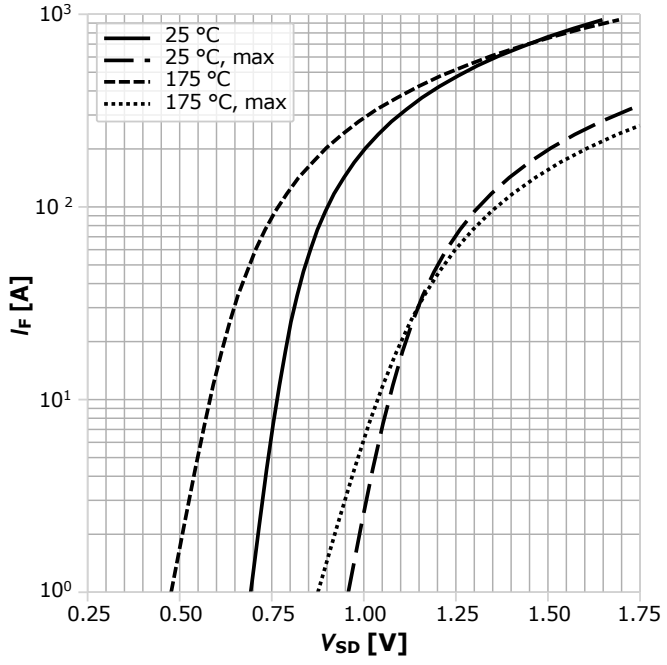
$V_{GS(th)}=f(T_j)$; $V_{GS}=V_{DS}$

图 11：典型电容值



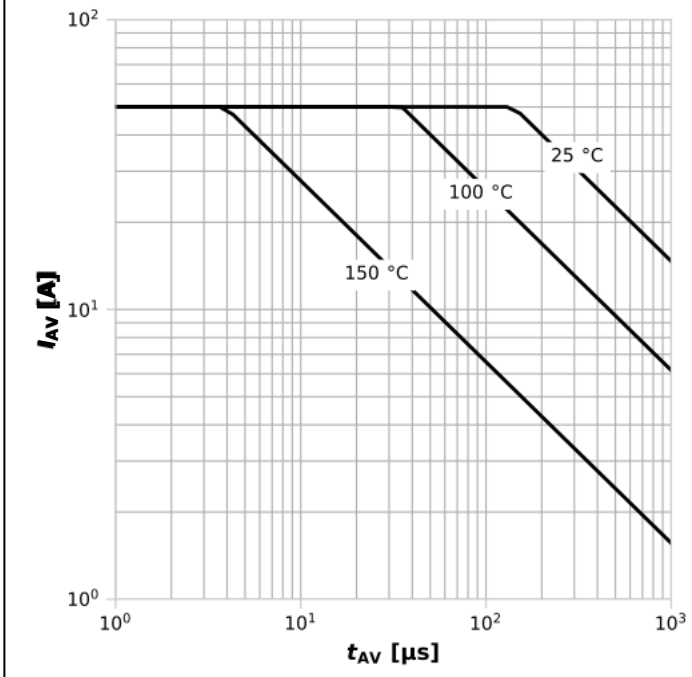
$C=f(V_{DS})$; V_{GS}=0 V; f=1 MHz

图 12：反向二极管的正向特性



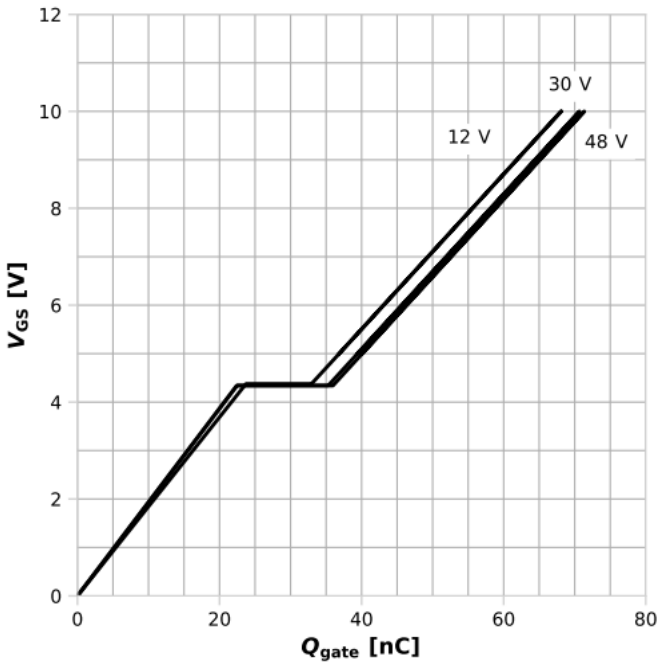
$I_F=f(V_{SD})$; 参数：T_j

图 13：雪崩特性



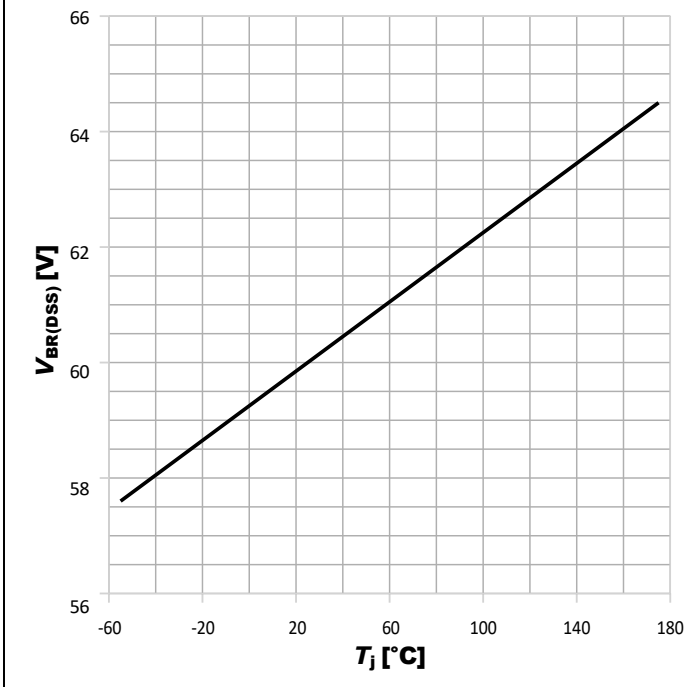
$I_{AS}=f(t_{AV})$; $R_{GS}=25\ \Omega$; parameter: $T_{j(start)}$

图 14：典型栅极电荷



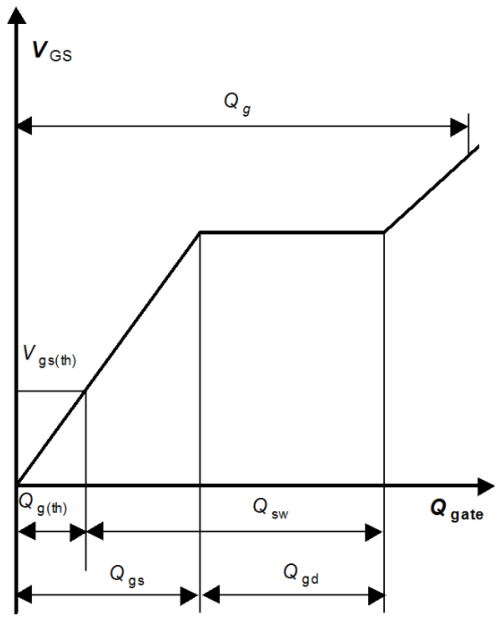
$V_{GS}=f(Q_{gate})$; $I_D=50$ A pulsed; parameter: V_{DD}

图 15：漏源击穿电压



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

栅极充电波形



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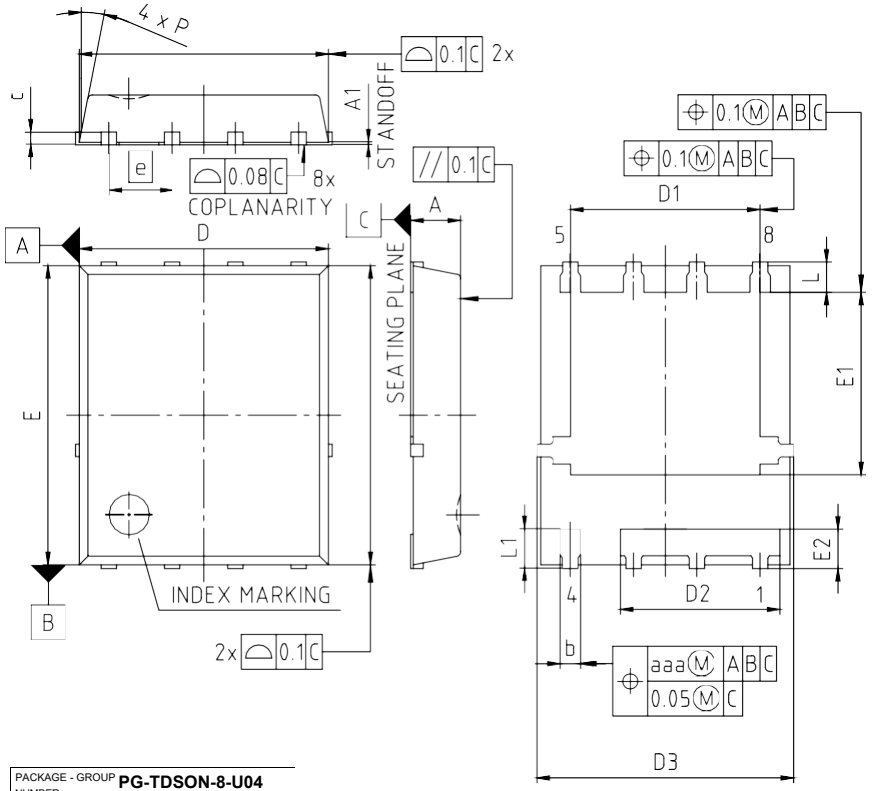
5 封装外形尺寸



PACKAGE - GROUP NUMBER:	PG-TDSON-8-U04	
DIMENSIONS	**MILLIMETERS**	
	MIN.	MAX.
A	0.90	1.20
A1	0	0.05
b	0.26	0.54
c	0.15	0.35
D	4.80	5.35
D1	3.70	4.40
D2	2.94	3.25
D3	4.80	5.15
E	5.70	6.10
E1	3.40	3.76
E2	0.69	0.90
e	1.27	
L	0.45	0.72
L1	0.69	0.90
aaa	0.10	0.25
P	8°	12°

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

图 1 PG- TDSON- 8 外形图，尺寸单位为毫米

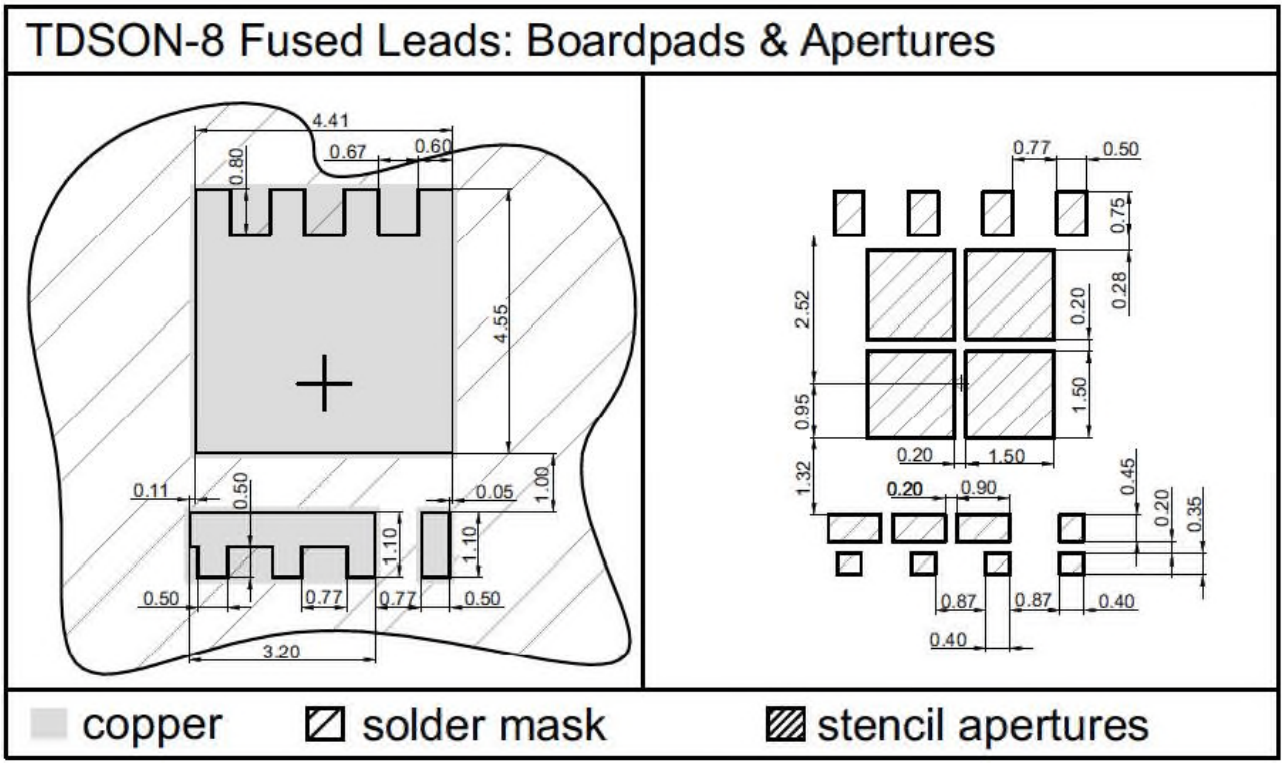


图 2 PG- TDSON- 8 外形图，尺寸单位为毫米

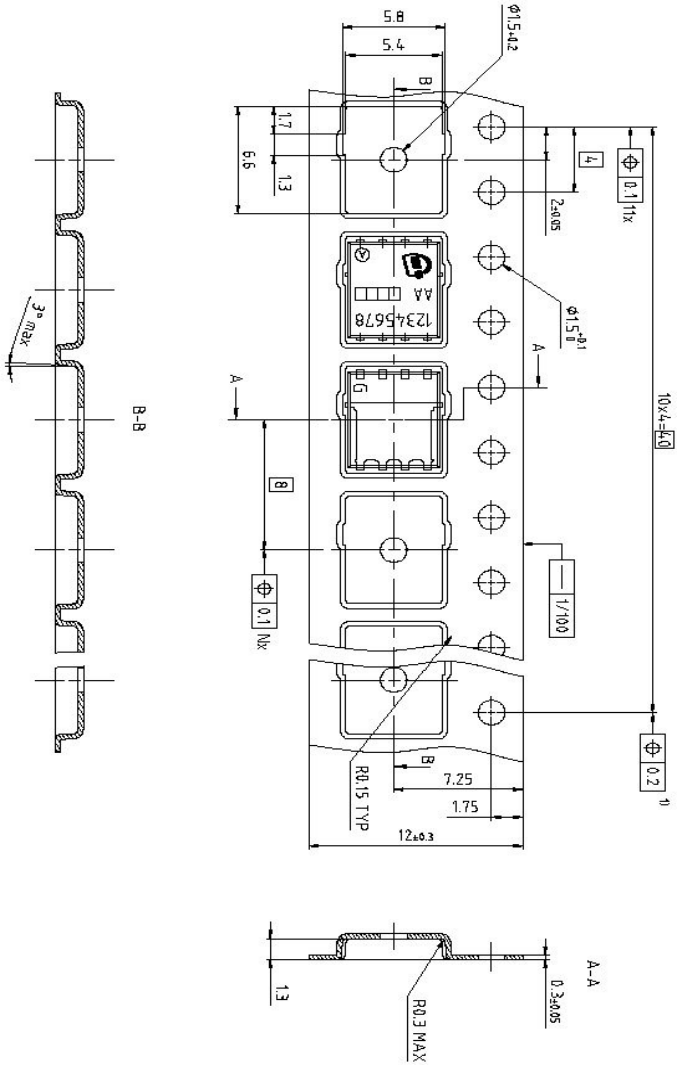


图 3 PG- TDSON- 8 外形图，尺寸单位为毫米

修订记录

BSC016N06NS

Revision 2024 - 06 - 11 , Rev. 2 . 6

历史修订版本

Revision	Date	Subjects (major changes since last revision)
2.0	2012-06-18	Release of final version
2.3	2014-11-11	Added RthJC_typ and footprint drawing, insert footnote "Define by design. ..... "
2.4	2019-10-17	Update package drawings
2.5	2020-03-17	Update current rating
2.6	2024-06-11	Upgrade Operating and storage temperature max to 175°C. Update drawings in section 5 Package Outlines. Production validation added on page1.Updated foot notes.

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