

英飞凌 MOSFET

OptiMOS™ 6 功率晶体管，60 V

特性

- 针对低压驱动和电池供电应用进行了优化
- 针对高性能 SMPS 进行了优化
- N沟道，标准电平
- 极低的导通电阻 $R_{DS(on)}$
- 卓越的热阻
- 100% 雪崩测试
- 无铅镀层；符合 RoHS 标准
- 符合 IEC61249-2-21 标准的无卤素

产品验证

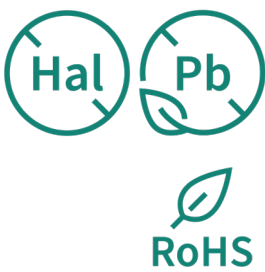
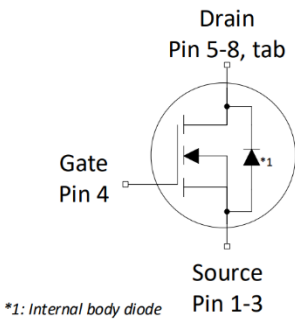
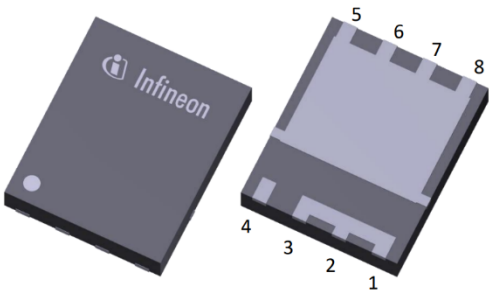
完全符合 JEDEC 工业应用标准

表 1 主要性能参数

Parameter	Value	Unit
V_{DS}	60	V
$R_{DS(on),max}$	0.75	mΩ
I_D	411	A
Q_{oss}	171	nC
Q_G	122	nC
$Q_{tr}(1000A/\mu s)$	312	nC

Part number	Package	Marking	Related links
ISC007N06NM6	PG-TSON-8	007N6N6	-

PG-TSON-8



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1 最大额定值

除非另有规定, $T_A = 25\text{ °C}$

表 2 最大额定值

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Continuous drain current ¹⁾	I_D	-	-	411	A	$V_{GS}=10\text{ V}, T_C=25\text{ °C}$
				291		$V_{GS}=10\text{ V}, T_C=100\text{ °C}$
				252		$V_{GS}=6\text{ V}, T_C=100\text{ °C}$
				44		$V_{GS}=10\text{ V}, T_A=25\text{ °C}, R_{thJA}=50\text{ °C/W}^{2)}$
Pulsed drain current ³⁾	$I_{D,pulse}$	-	-	1644	A	$T_C=25\text{ °C}$
Avalanche energy, single pulse ⁴⁾	E_{AS}	-	-	925	mJ	$I_D=50\text{ A}, R_{GS}=25\text{ }\Omega$
Gate source voltage	V_{GS}	-20	-	20	V	-
Power dissipation	P_{tot}	-	-	259	W	$T_C=25\text{ °C}$
				3.0		$T_A=25\text{ °C}, R_{thJA}=50\text{ °C/W}^{2)}$
Operating and storage temperature	T_j, T_{stg}	-55	-	175	°C	-

¹⁾ 额定值指产品仅具有数据手册指定的绝对最大值, 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⁾ 器件置于 40 mm × 40 mm × 1.5 mm 环氧树脂 PCB FR4 上, 配有 6 cm² (单层, 70 μm 厚) 铜层面积用于漏极连接。PCB 在静止空气中垂直放置。

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}	-	0.29	0.58	°C/W	-
Thermal resistance, junction - case, top	R_{thJC}		-	20		
Thermal resistance, junction - ambient, 6 cm ² cooling area ⁵⁾	R_{thJA}		-	50		

5) 器件置于 40 mm × 40 mm × 1.5 mm 环氧树脂 PCB FR4 上, 配有 6 cm² (单层, 70 μm 厚) 铜层面积用于漏极连接。PCB 在静止空气中垂直放置。

3 电气特性

除非另有规定, $T_j = 25^\circ\text{C}$

表 4 静态特性

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Drain-source breakdown voltage	$V_{(BR)DSS}$	60	-	-	V	$V_{GS}=0\text{ V}, I_D=1\text{ mA}$
Gate threshold voltage	$V_{GS(th)}$	2.1	2.7	3.3	V	$V_{DS}=V_{GS}, I_D=148\text{ }\mu\text{A}$
Zero gate voltage drain current	I_{DSS}	-	0.1	1.0	μA	$V_{DS}=48\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ }^\circ\text{C}$
			10	100		$V_{DS}=48\text{ V}, V_{GS}=0\text{ V}, T_j=125\text{ }^\circ\text{C}$
Gate-source leakage current	I_{GSS}	-	10	100	nA	$V_{GS}=20\text{ V}, V_{DS}=0\text{ V}$
Drain-source on-state resistance	$R_{DS(on)}$	-	0.63	0.75	m Ω	$V_{GS}=10\text{ V}, I_D=50\text{ A}$
Drain-source on-state resistance ⁶⁾	$R_{DS(on)}$	-	0.69	0.95	m Ω	$V_{GS}=8\text{ V}, I_D=25\text{ A}$
Gate resistance	R_G	-	0.9	-	Ω	-
Transconductance ⁶⁾	g_{fs}	115	230	-	S	$ V_{DS} \geq 2 I_D R_{DS(on)max}, I_D=50\text{ A}$

6) 由设计指定, 未经过生产测试。

表 5 动态特性

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Input capacitance ⁷⁾	C_{iss}	-	8100	11000	pF	$V_{GS}=0\text{ V}, V_{DS}=30\text{ V}, f=1\text{ MHz}$
Output capacitance ⁷⁾	C_{oss}		2700	3500		
Reverse transfer capacitance ⁷⁾	C_{rss}		88	150		
Turn-on delay time	$t_{d(on)}$	-	14.9	-	ns	$V_{DD}=30\text{ V}, V_{GS}=10\text{ V}, I_D=50\text{ A},$ $R_{G,ext}=1.6\text{ }\Omega$
Rise time	t_r		7.7			
Turn-off delay time	$t_{d(off)}$		42.8			
Fall time	t_f		12.7			

7) 由设计指定, 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}	-	35	-	nC	$V_{DD}=30\text{ V}$, $I_D=50\text{ A}$, $V_{GS}=0\text{ to }10\text{ V}$
Gate charge at threshold	$Q_{g(th)}$		22	-	nC	
Gate to drain charge ⁹⁾	Q_{gd}		25	38	nC	
Switching charge	Q_{sw}		38	-	nC	
Gate charge total ⁹⁾	Q_g		122	153	nC	
Gate plateau voltage	$V_{plateau}$	-	4.3	-	V	$V_{DS}=30\text{ V}$, $V_{GS}=0\text{ V}$
Output charge ⁹⁾	Q_{oss}	-	171	227	nC	

8) 参数定义请参阅“栅极电荷波形”。

9) 由设计指定, 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	-	-	231	A	$T_C=25\text{ °C}$
Diode pulse current	$I_{S,pulse}$			1644		
Diode forward voltage	V_{SD}	-	0.78	1.0	V	$V_{GS}=0\text{ V}$, $I_F=50\text{ A}$, $T_J=25\text{ °C}$
Reverse recovery time ¹⁰⁾	t_{rr}	-	53	106	ns	$V_R=30\text{ V}$, $I_F=50\text{ A}$, $di_F/dt=100\text{ A}/\mu\text{s}$
Reverse recovery charge ¹⁰⁾	Q_{rr}		77	154	nC	
Reverse recovery time ¹⁰⁾	t_{rr}	-	32	64	ns	$V_R=30\text{ V}$, $I_F=50\text{ A}$, $di_F/dt=1000\text{ A}/\mu\text{s}$
Reverse recovery charge ¹⁰⁾	Q_{rr}		312	624	nC	

10) 由设计指定。未经过生产测试。

4 电气特性图

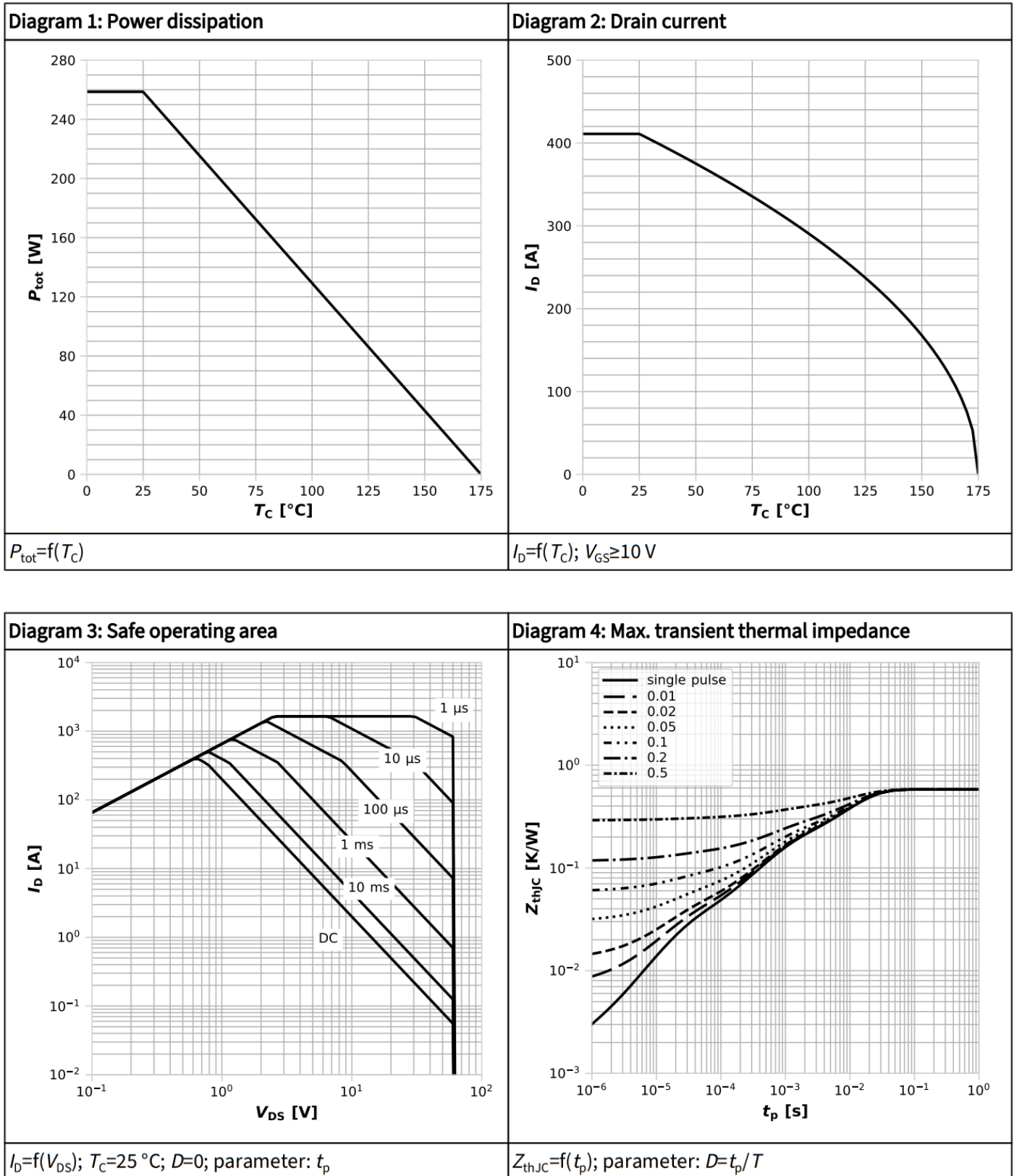
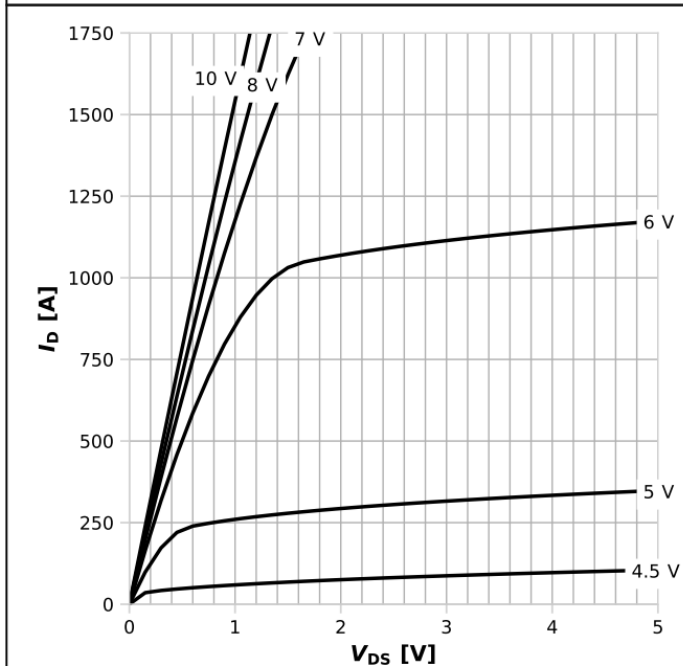
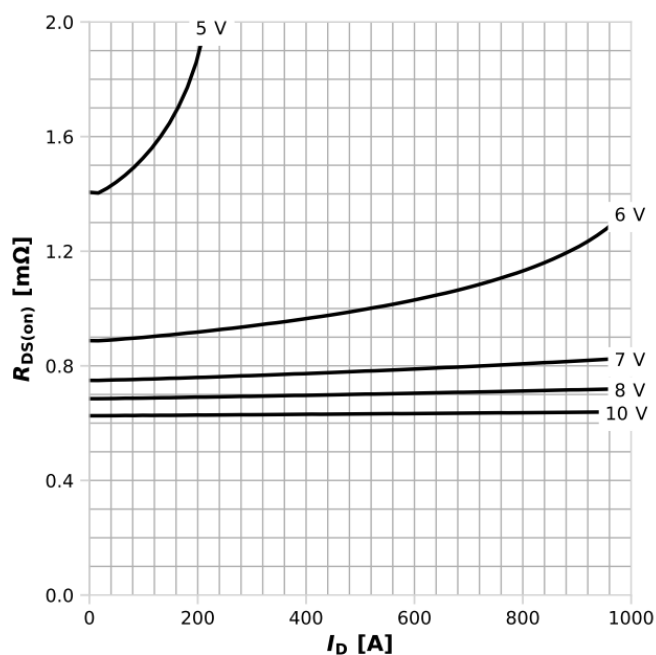


Diagram 5: Typ. output characteristics



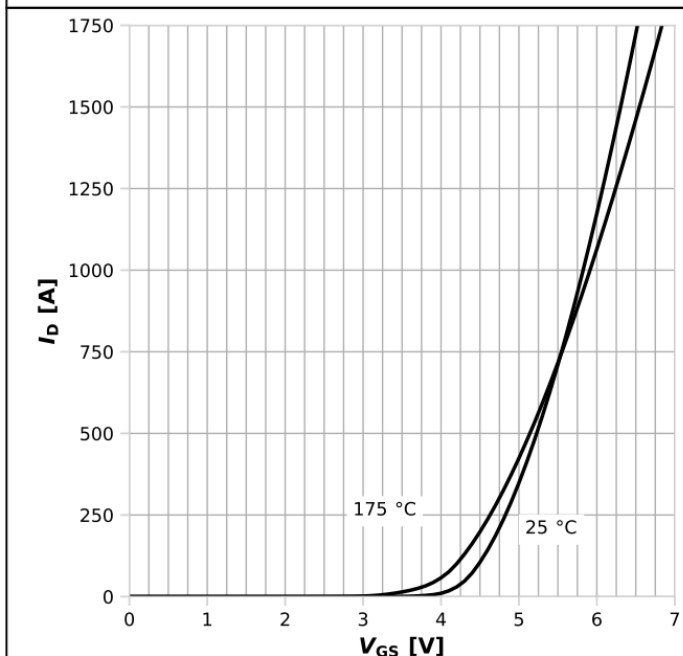
$$I_D = f(V_{DS}), T_j = 25^\circ\text{C}; \text{parameter: } V_{GS}$$

Diagram 6: Typ. drain-source on resistance



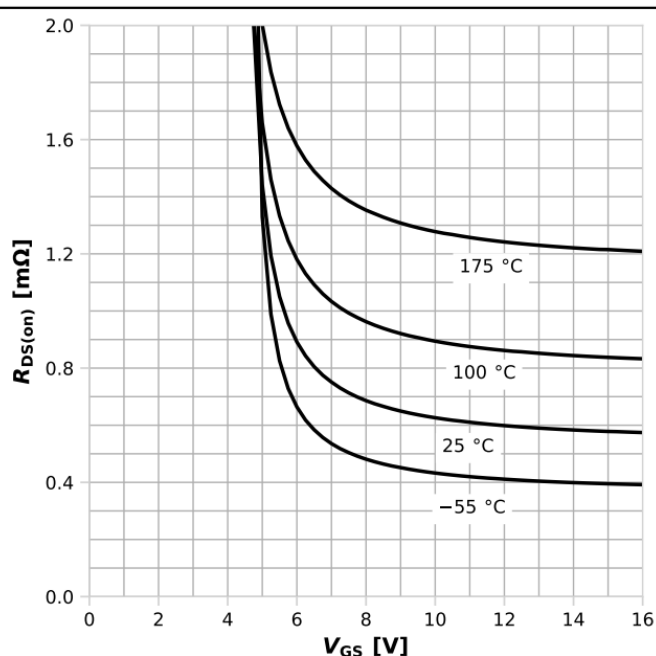
$$R_{DS(on)} = f(I_D), T_j = 25^\circ\text{C}; \text{parameter: } V_{GS}$$

Diagram 7: Typ. transfer characteristics



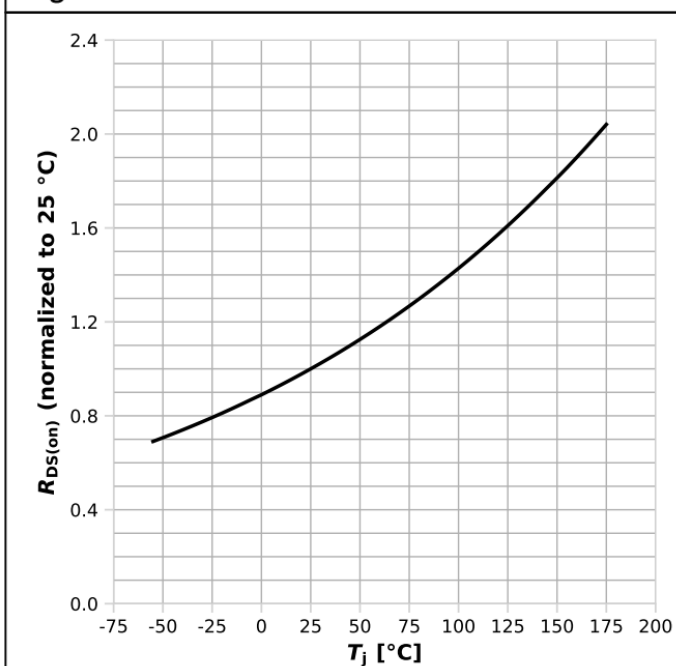
$$I_D = f(V_{GS}), |V_{DS}| > 2|I_D|R_{DS(on)\max}; \text{parameter: } T_j$$

Diagram 8: Typ. drain-source on resistance



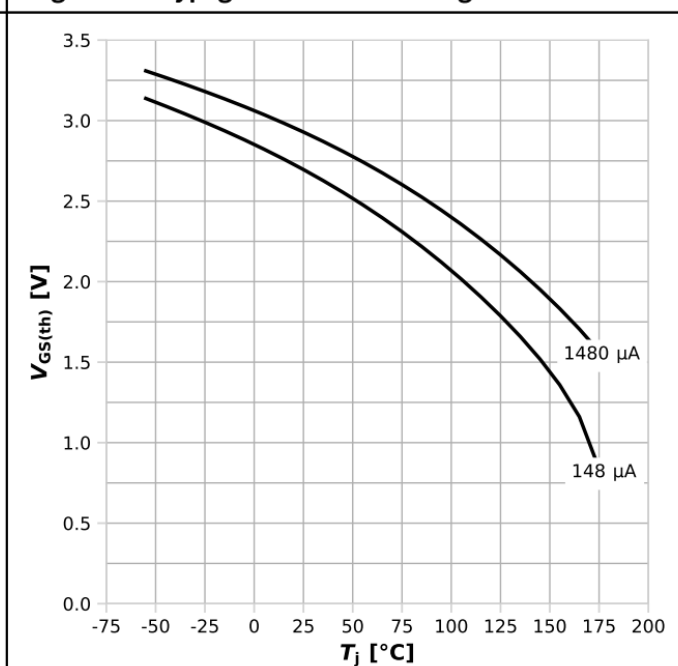
$$R_{DS(on)} = f(V_{GS}), I_D = 50\text{ A}; \text{parameter: } T_j$$

Diagram 9: Normalized drain-source on resistance



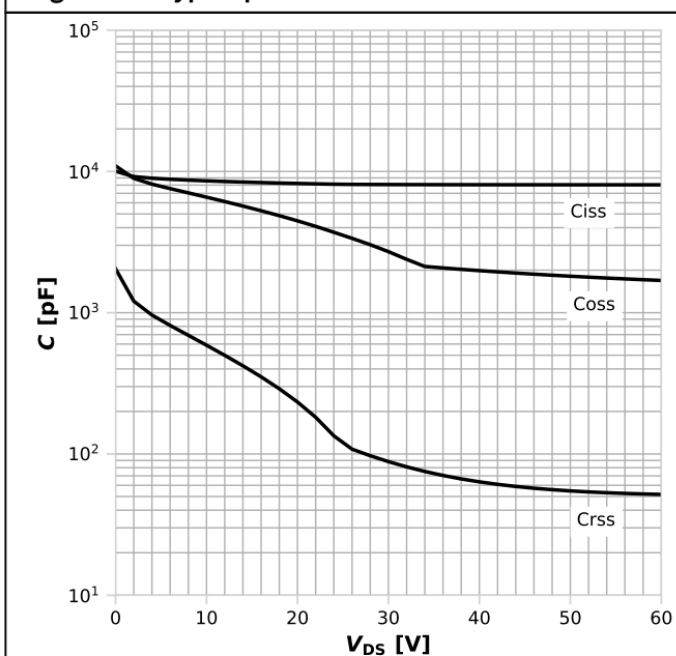
$$R_{DS(on)} = f(T_j), I_D = 50 \text{ A}, V_{GS} = 10 \text{ V}$$

Diagram 10: Typ. gate threshold voltage



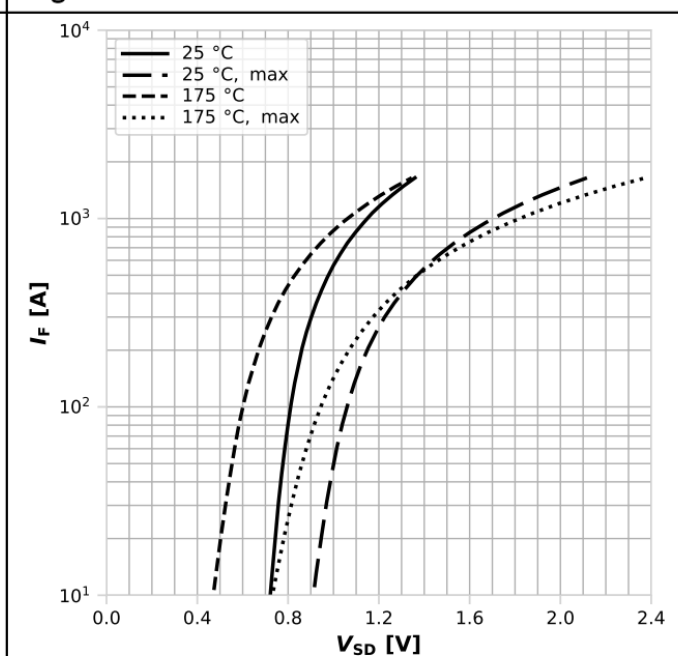
$$V_{GS(th)} = f(T_j), V_{GS} = V_{DS}; \text{ parameter: } I_D$$

Diagram 11: Typ. capacitances



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

Diagram 12: Forward characteristics of reverse diode



$$I_F = f(V_{SD}); \text{ parameter: } T_j$$

Diagram 13: Avalanche characteristics

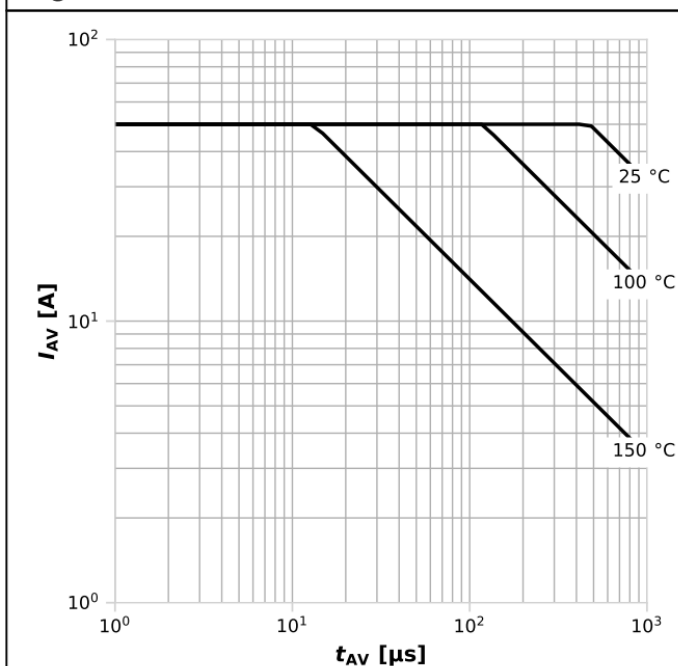

 $I_{AS}=f(t_{AV}); R_{GS}=25\ \Omega; \text{parameter: } T_{j,start}$

Diagram 14: Typ. gate charge

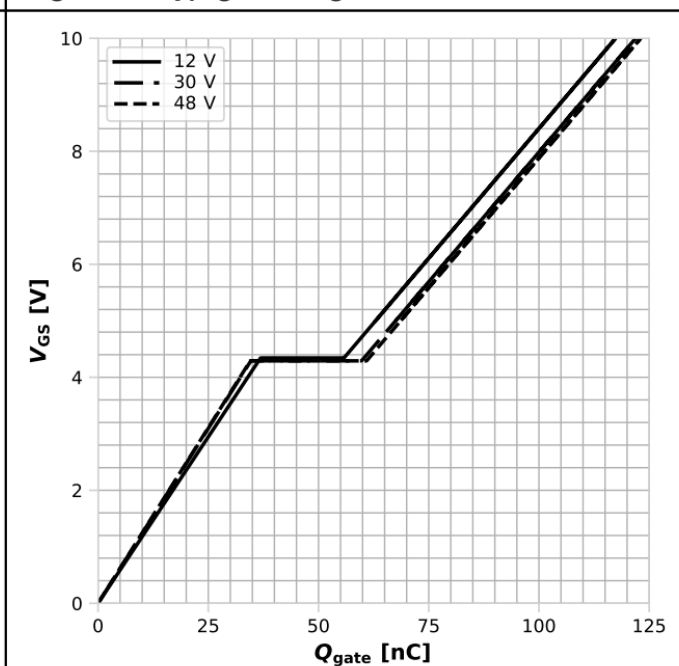
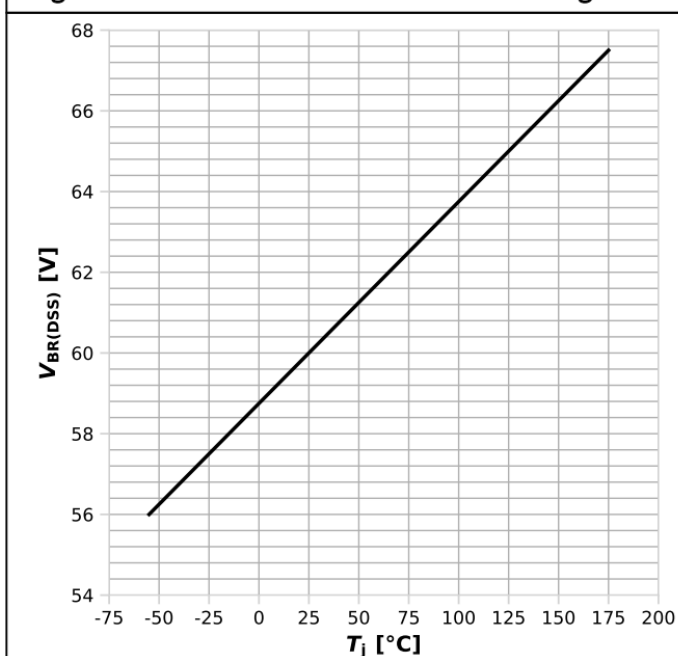
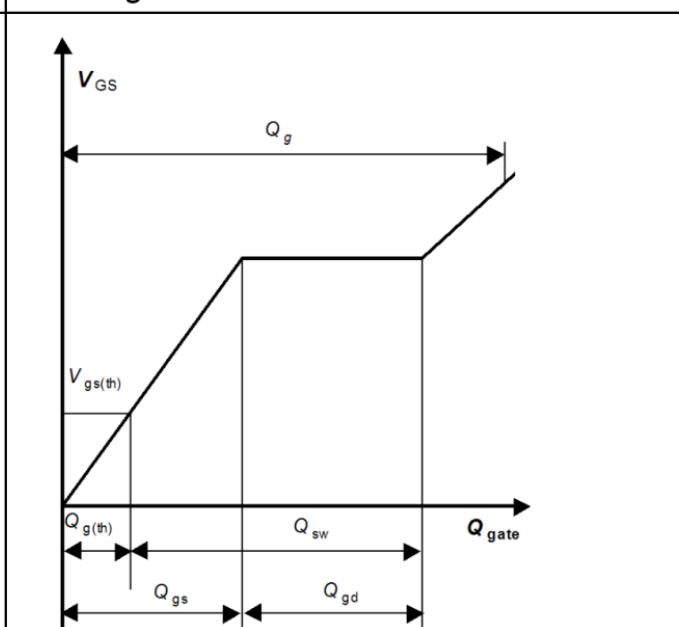

 $V_{GS}=f(Q_{gate}), I_D=50\text{ A pulsed}, T_j=25\text{ °C}; \text{parameter: } V_{DD}$

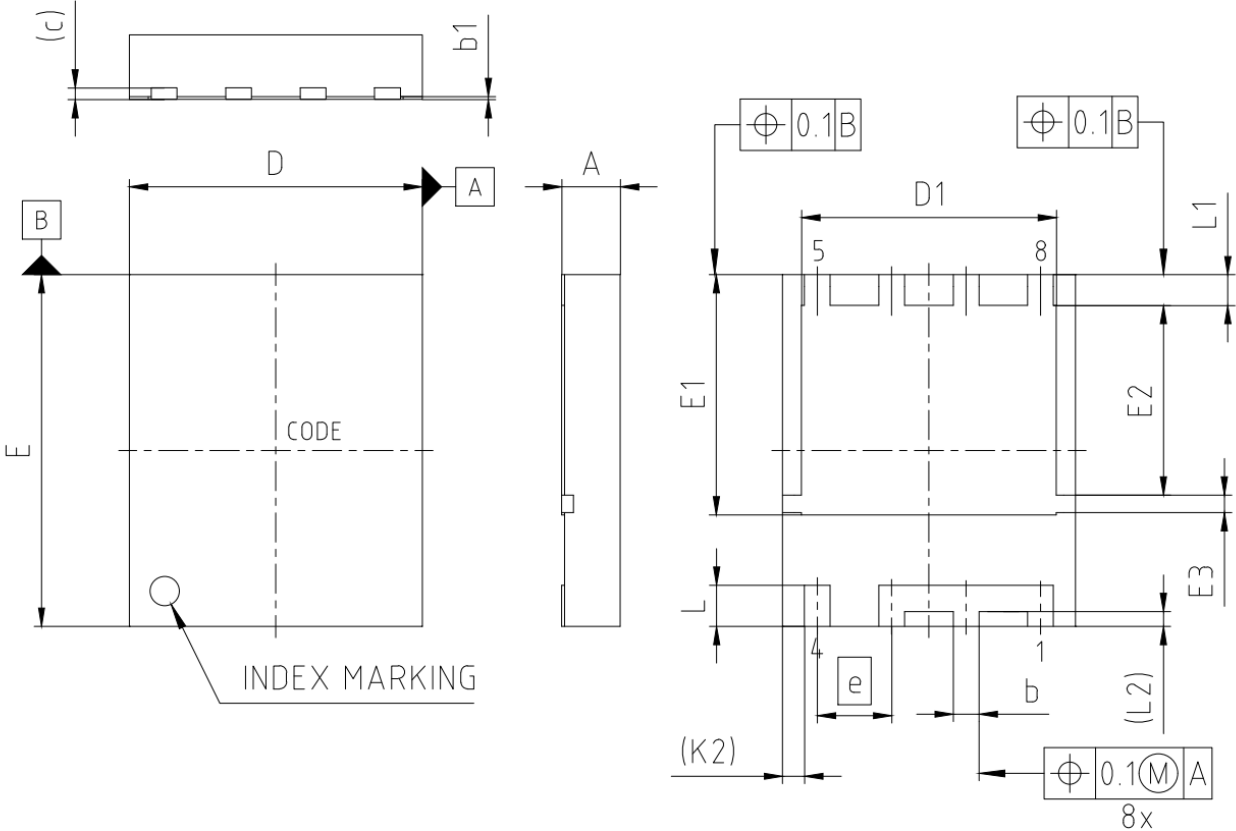
Diagram 15: Min. drain-source breakdown voltage


 $V_{BR(DSS)}=f(T_j); I_D=10\text{ mA}$

Gate charge waveforms



5 封装外形



PACKAGE - GROUP NUMBER: PG-TSON-8-U05		
DIMENSION	MILLIMETERS	
	MIN.	MAX.
A	0.90	1.10
b	0.34	0.54
b1	0.00	0.05
c	0.20	
D	4.90	5.10
D1	4.25	4.45
E	5.90	6.10
E1	4.00	4.20
E2	3.14	3.34
E3	0.20	0.40
e	1.27	
K2	0.38	
L	0.60	0.80
L1	0.43	0.63
L2	0.25	

NOTE: DIMENSIONS DO NOT INCLUDE MOLD FLASH, PROTRUSION OR GATE BURRS

图 1 PG-TSON-8 外形图，尺寸单位为毫米

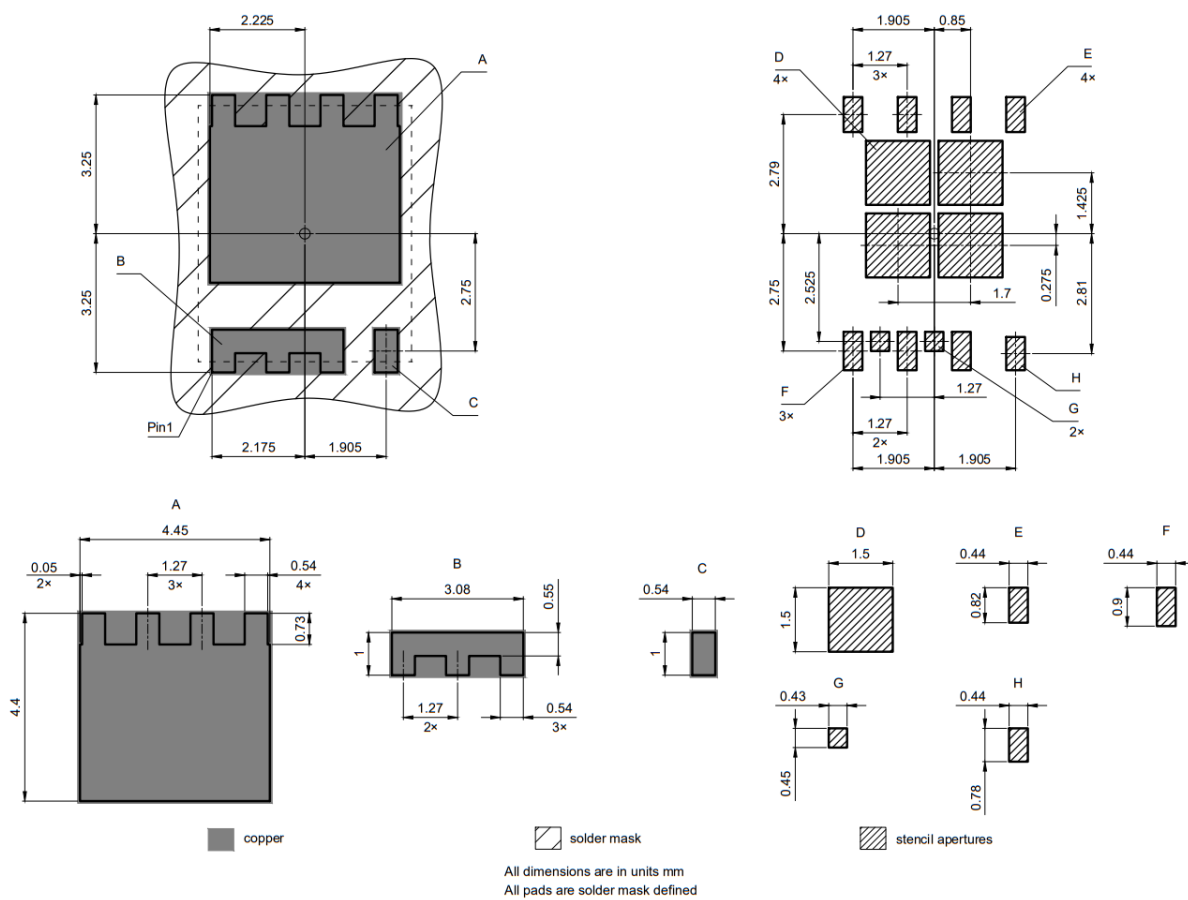
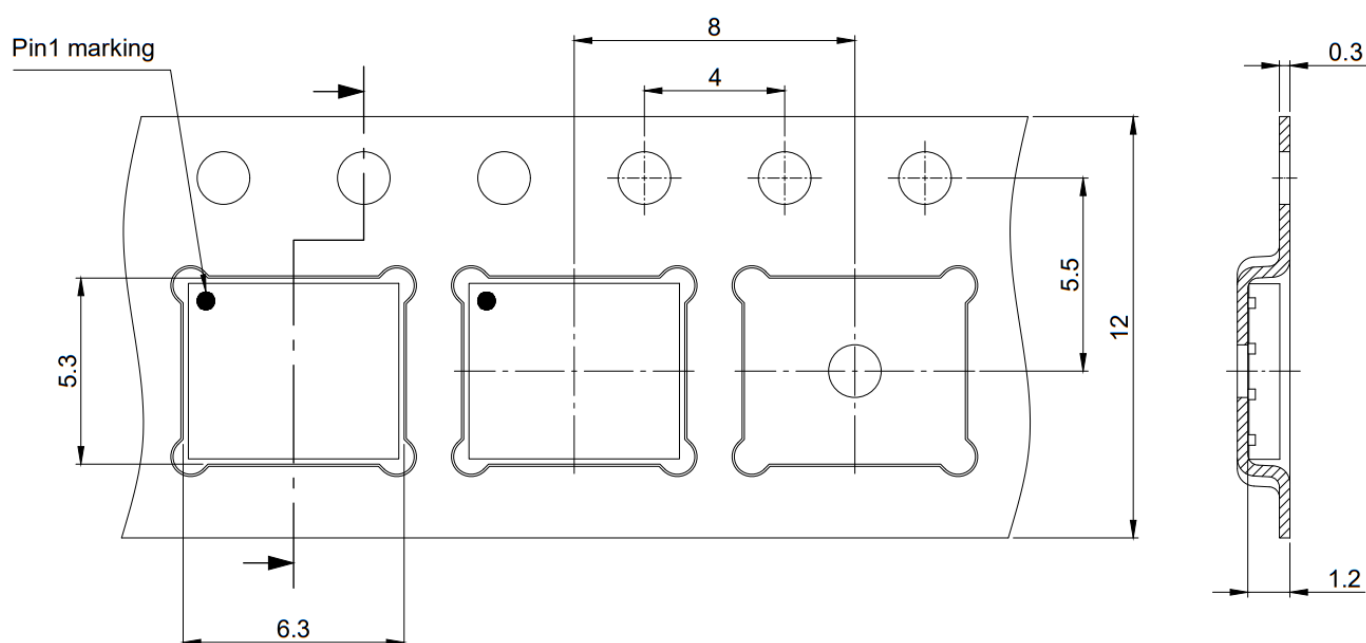


图 2 PG-TSON-8 焊盘图, 尺寸单位为毫米



All dimensions are in units mm

The drawing is in compliance with ISO 128-30, Projection Method 1 []

图 3 PG-TSON-8 封装变体，尺寸单位为毫米



修订记录

ISC007N06NM6

Revision 2025 - 03 - 24 , Rev. 2 . 2

历史修订版本

Revision	Date	Subjects (major changes since last revision)
2.0	2024-05-07	Release of final
2.1	2025-01-07	Revised Rdson at Vgs from 6V to 8V
2.2	2025-03-24	Updated POD index misalignment against outline

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