

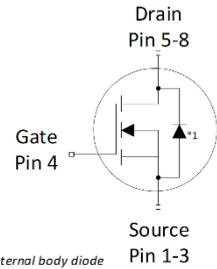
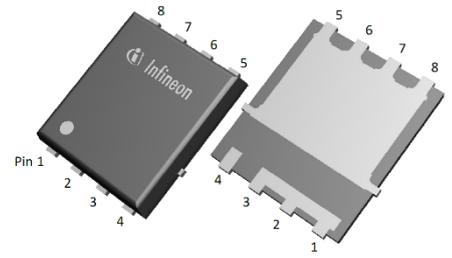
英飞凌MOSFET

PG-TDSON-8

StrongIRFET™ 2 功率场效应管, 30 V

特性

- 针对多种应用进行了优化
- N沟道, 逻辑电平
- 100% 雪崩测试
- 额定温度为 175°C
- 无铅镀层; 符合RoHS标准
- 符合 IEC61249-2-21 标准的无卤素

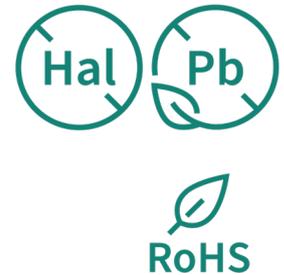


产品验证

符合 JEDEC 标准。

表 1 主要性能参数

| Parameter | Value | Unit |
|------------------|-------|------|
| V_{DS} | 30 | V |
| $R_{DS(on),max}$ | 1.5 | mΩ |
| I_D | 214 | A |
| Q_{oss} | 39 | nC |
| $Q_G(0V..4.5V)$ | 24 | nC |



| Type / Ordering code | Package | Marking | Related links |
|----------------------|------------|----------|---------------|
| ISC015N03LF2S | PG-TDSON-8 | 015N03F2 | - |

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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 | - | - | 214 151 43 | 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⁾ | $I_{D,pulse}$ | - | - | 856 | A | $T_C=25\text{ °C}$ |
| Avalanche energy, single pulse ⁴⁾ | E_{AS} | - | - | 246 493 | mJ | $I_D=50\text{ A}, R_{GS}=25\text{ }\Omega$ $I_D=25\text{ A}, R_{GS}=25\text{ }\Omega$ |
| Gate source voltage | V_{GS} | -20 | - | 20 | V | - |
| Power dissipation | P_{tot} | - | - | 125 3.0 | 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 | - | 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 环氧树脂印刷电路板 FR4 上，配有6 cm² (单层，70 μm厚) 铜层面积用于漏极连接。印刷电路板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 | R_{thJC} | - | - | 1.2 | °C/W | - |
| Thermal resistance, junction - case, top | R_{thJC} | - | - | 20 | °C/W | |
| Thermal resistance, junction - ambient, minimal footprint ⁵⁾ | R_{thJA} | - | - | 50 | °C/W | |

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

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 | $V_{(BR)DSS}$ | 30 | - | - | V | $V_{GS}=0\text{ V}, I_D=2\text{ mA}$ |
| Gate threshold voltage | $V_{GS(th)}$ | 1.35 | 1.85 | 2.35 | V | $V_{DS}=V_{GS}, I_D=60\text{ }\mu\text{A}$ |
| Zero gate voltage drain current | I_{DSS} | - | 0.1 10 | 1 100 | μA | $V_{DS}=30\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ °C}$ $V_{DS}=30\text{ V}, V_{GS}=0\text{ V}, T_j=125\text{ °C}$ |
| Gate-source leakage current | I_{GSS} | - | 10 | 100 | nA | $V_{GS}=20\text{ V}, V_{DS}=0\text{ V}$ |
| Drain-source on-state resistance | $R_{DS(on)}$ | - | 1.28 1.69 | 1.5 2.6 | 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 | R_G | - | 1.9 | - | Ω | - |
| Transconductance ⁶⁾ | g_{fs} | 85 | - | - | 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 | C_{iss} | - | 3400 | - | pF | $V_{GS}=0\text{ V}, V_{DS}=15\text{ V}, f=1\text{ MHz}$ |
| Output capacitance | C_{oss} | - | 660 | - | pF | |
| Reverse transfer capacitance | C_{rss} | - | 170 | - | pF | |
| Turn-on delay time | $t_{d(on)}$ | - | 19 | - | ns | $V_{DD}=15\text{ V}, V_{GS}=4.5\text{ V}, I_D=50\text{ A},$ $R_{G,ext}=1.6\text{ }\Omega$ |
| Rise time | t_r | - | 13 | - | ns | |
| Turn-off delay time | $t_{d(off)}$ | - | 15 | - | ns | |
| Fall time | t_f | - | 8.3 | - | ns | |

表 6 栅极电荷特性⁷⁾

| Parameter | Symbol | Values | | | Unit | Note / Test condition |
|---------------------------------|---------------|--------|------|------|------|------------------------------------------------------------------------|
| | | Min. | Typ. | Max. | | |
| Gate to source charge | Q_{gs} | - | 11 | - | nC | $V_{DD}=15\text{ V}, I_D=50\text{ A}, V_{GS}=0\text{ to }4.5\text{ V}$ |
| Gate charge at threshold | $Q_{g(th)}$ | - | 6.2 | - | nC | |
| Gate to drain charge | Q_{gd} | - | 7.2 | - | nC | |
| Switching charge | Q_{sw} | - | 12 | - | nC | |
| Gate charge total ⁸⁾ | Q_g | - | 24 | 36 | nC | |
| Gate plateau voltage | $V_{plateau}$ | - | 3.2 | - | V | |
| Gate charge total ⁸⁾ | Q_g | - | 50 | 75 | nC | $V_{DD}=15\text{ V}, I_D=50\text{ A}, V_{GS}=0\text{ to }10\text{ V}$ |
| Gate charge total, sync. FET | $Q_{g(sync)}$ | - | 21 | - | nC | $V_{DS}=0.1\text{ V}, V_{GS}=0\text{ to }4.5\text{ V}$ |

表6 栅极电荷特性⁷⁾

| Parameter | Symbol | Values | | | Unit | Note / Test condition |
|---------------|-----------|--------|------|------|------|-----------------------------------------|
| | | Min. | Typ. | Max. | | |
| Output charge | Q_{oss} | - | 39 | - | nC | $V_{DS}=15\text{ V}, V_{GS}=0\text{ V}$ |

7) 参数定义请参见“栅极充电波形”。

8) 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 | - | - | 122 | A | $T_C=25\text{ °C}$ |
| Diode pulse current | $I_{S,pulse}$ | - | - | 856 | A | |
| Diode forward voltage | V_{SD} | - | 0.80 | 1.0 | V | $V_{GS}=0\text{ V}, I_F=50\text{ A}, T_J=25\text{ °C}$ |
| Reverse recovery time | t_{rr} | - | 18 | - | ns | $V_R=15\text{ V}, I_F=50\text{ A}, di_F/dt=500\text{ A}/\mu\text{s}$ |
| Reverse recovery charge | Q_{rr} | - | 54 | - | nC | |

4 电气特性图

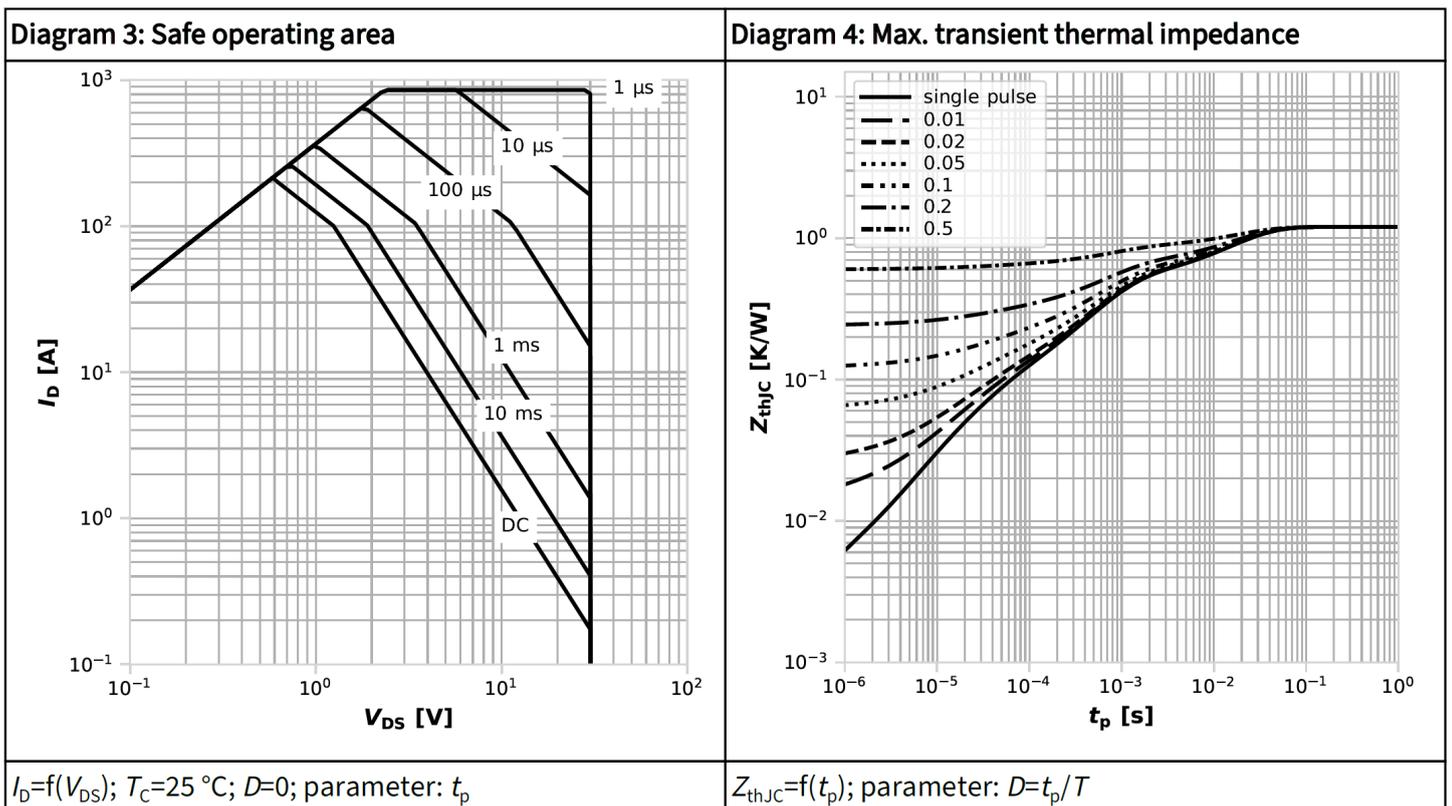
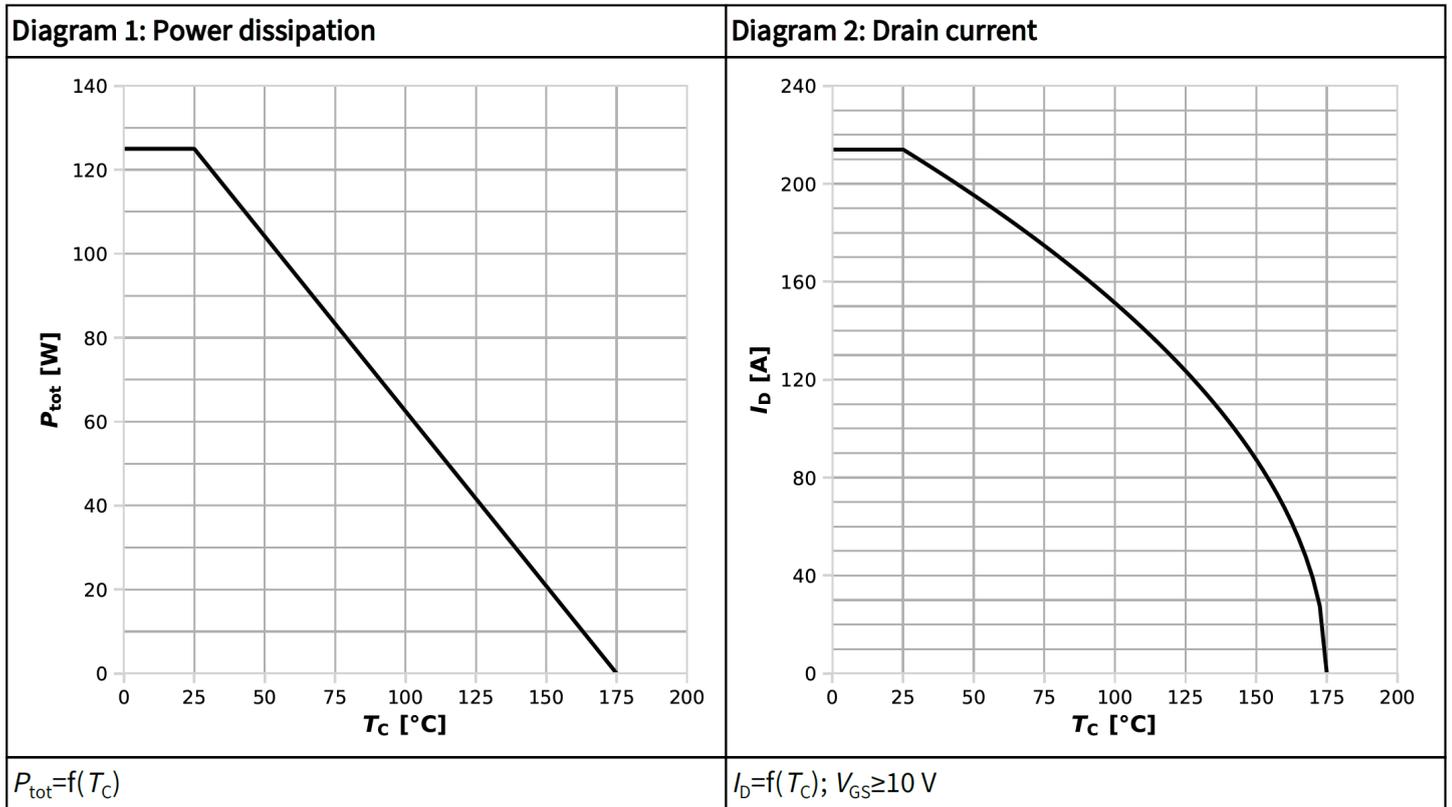
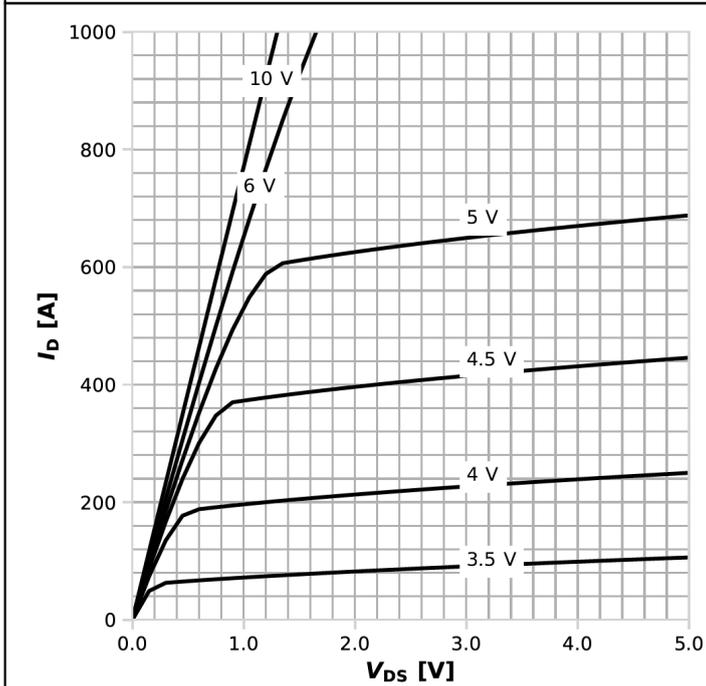
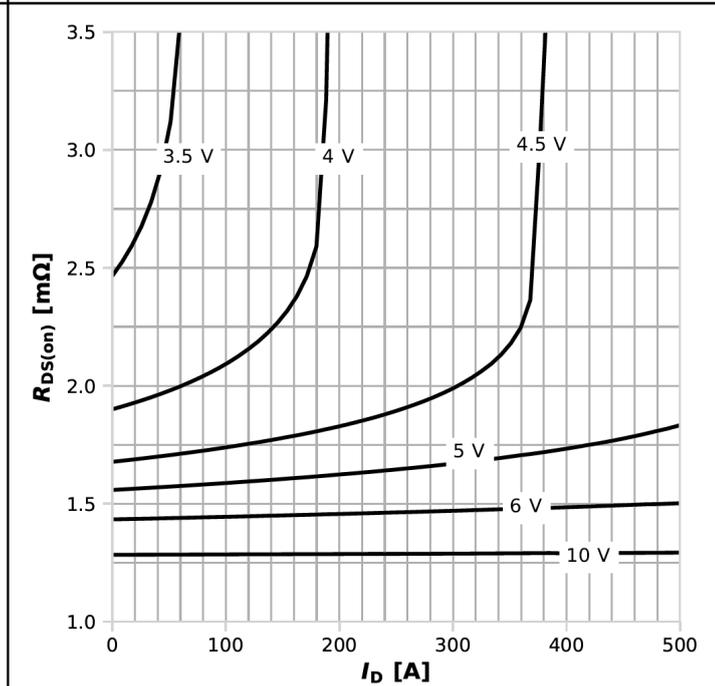


Diagram 5: Typ. output characteristics



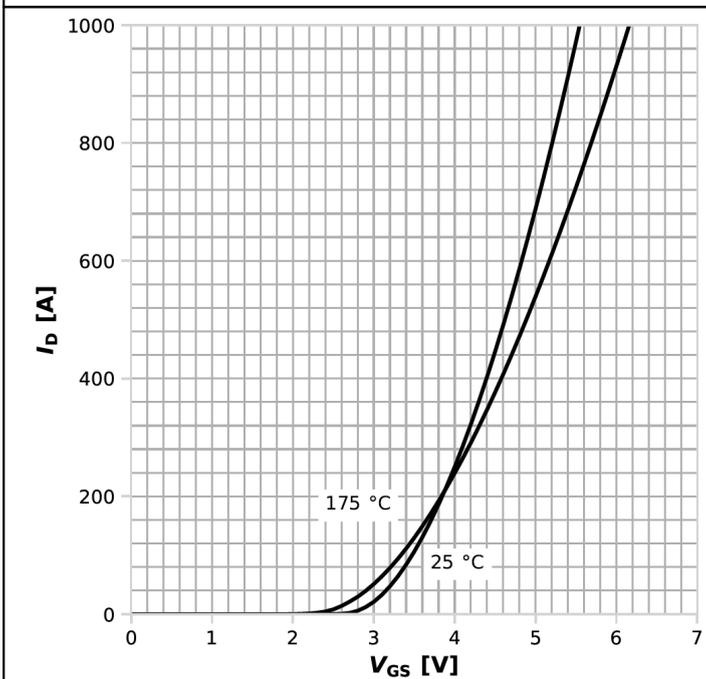
$$I_D = f(V_{DS}), T_j = 25^\circ\text{C}; \text{ parameter: } V_{GS}$$

Diagram 6: Typ. drain-source on resistance



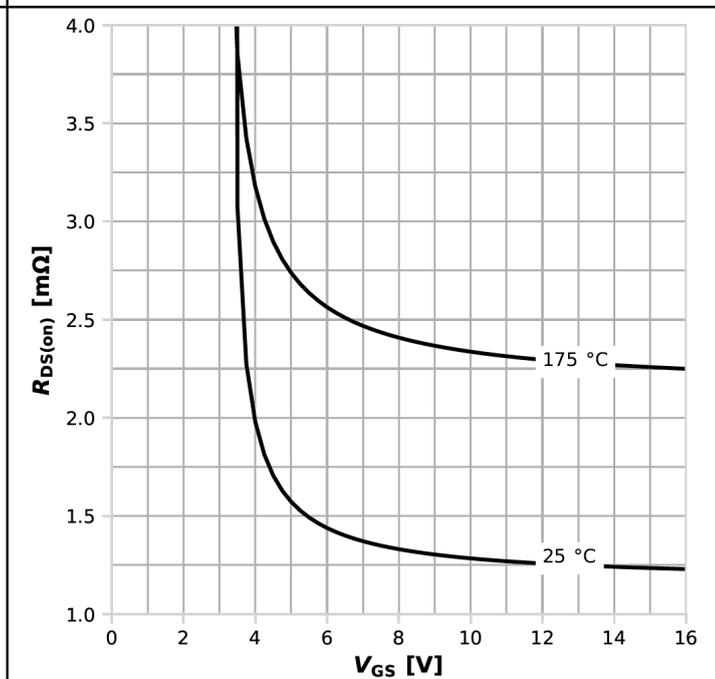
$$R_{DS(on)} = f(I_D), T_j = 25^\circ\text{C}; \text{ parameter: } V_{GS}$$

Diagram 7: Typ. transfer characteristics



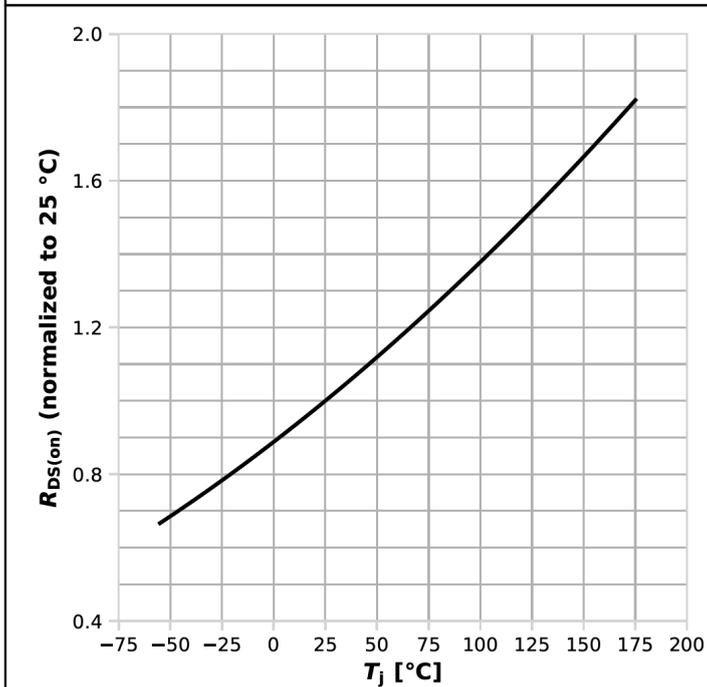
$$I_D = f(V_{GS}), |V_{DS}| > 2|I_D|R_{DS(on)\max}; \text{ parameter: } T_j$$

Diagram 8: Typ. drain-source on resistance



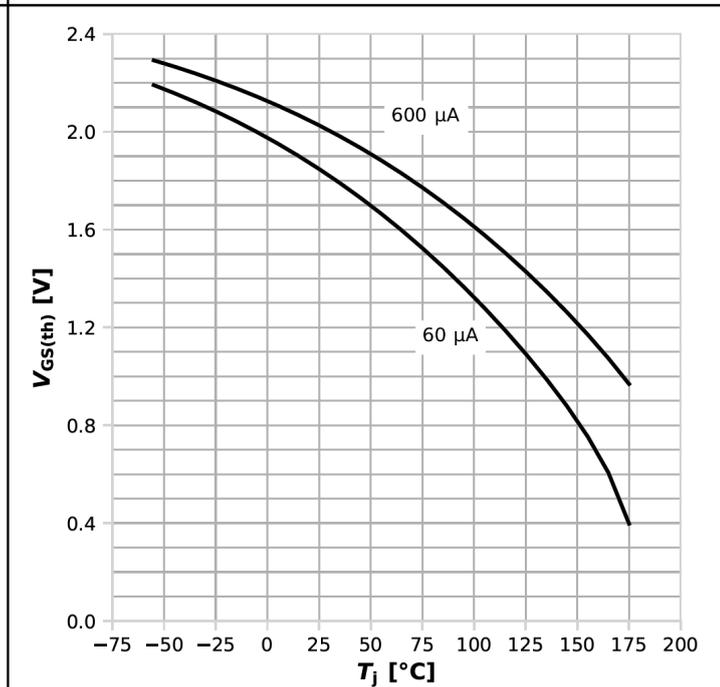
$$R_{DS(on)} = f(V_{GS}), I_D = 50 \text{ A}; \text{ parameter: } T_j$$

Diagram 9: Normalized drain-source on resistance



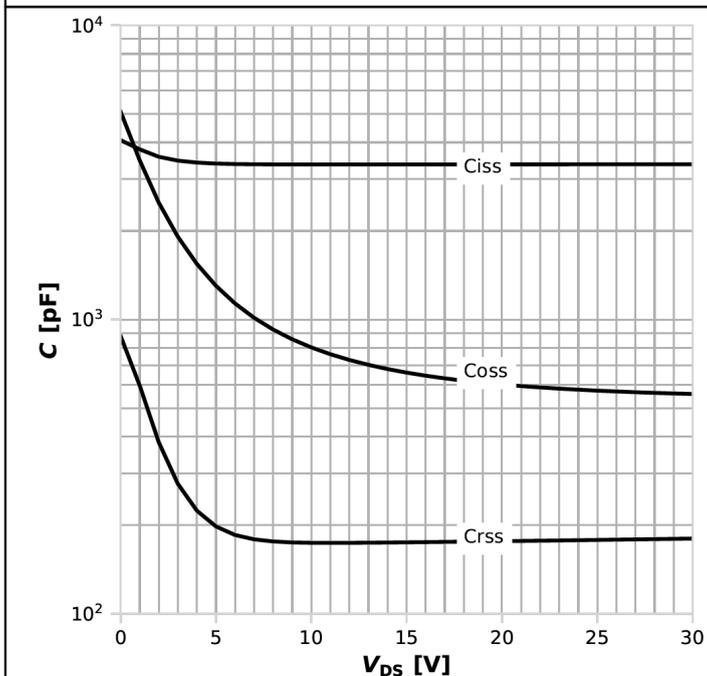
$$R_{DS(on)} = f(T_j), I_D = 50 \text{ A}, V_{GS} = 10 \text{ V}$$

Diagram 10: Typ. gate threshold voltage



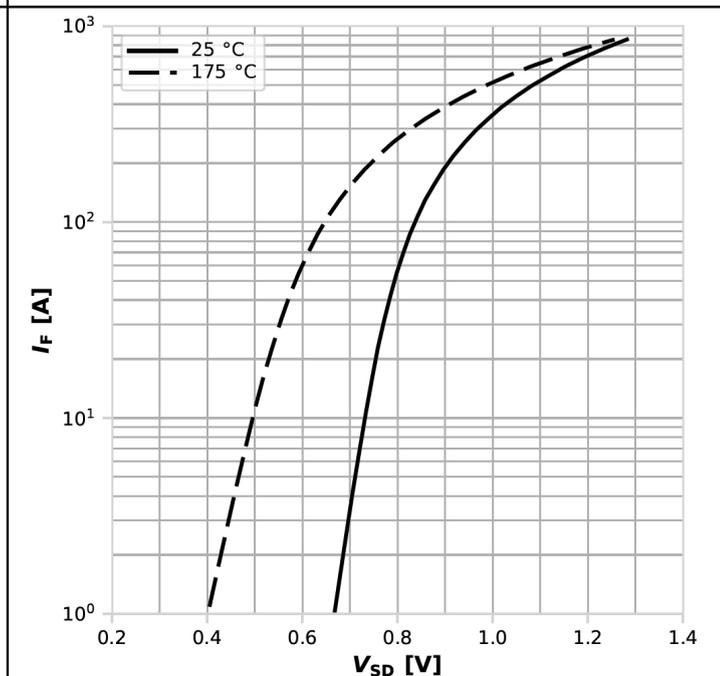
$$V_{GS(th)} = f(T_j), V_{GS} = V_{DS}; \text{ parameter: } I_D$$

Diagram 11: Typ. capacitances



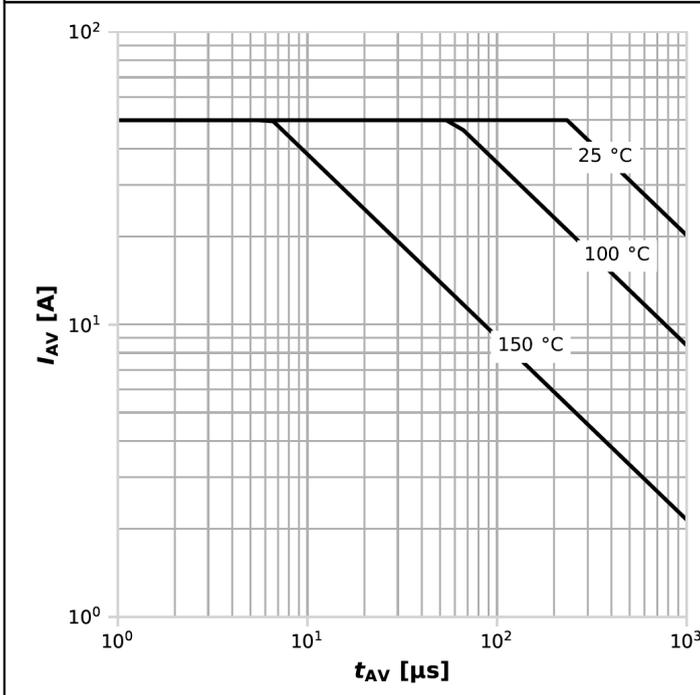
$$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$$

Diagram 12: Forward characteristics of reverse diode



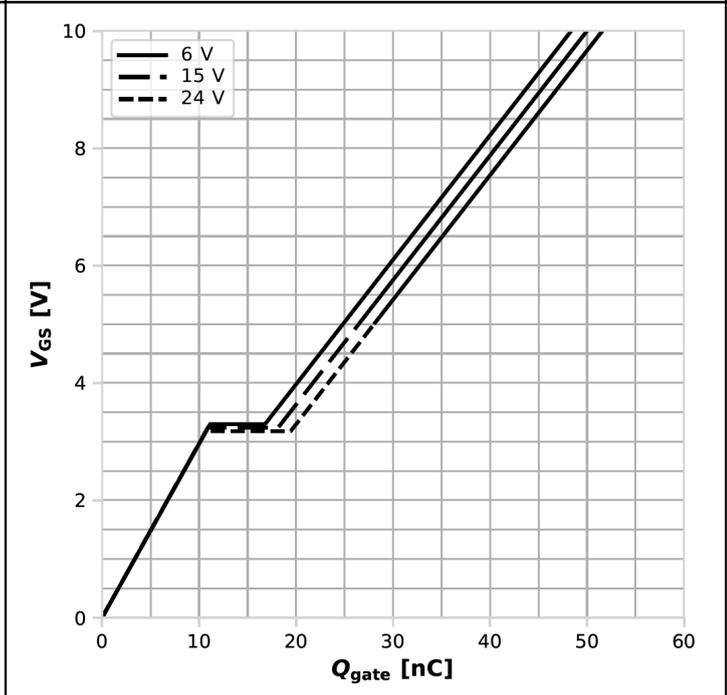
$$I_F = f(V_{SD}); \text{ parameter: } T_j$$

Diagram 13: Avalanche characteristics



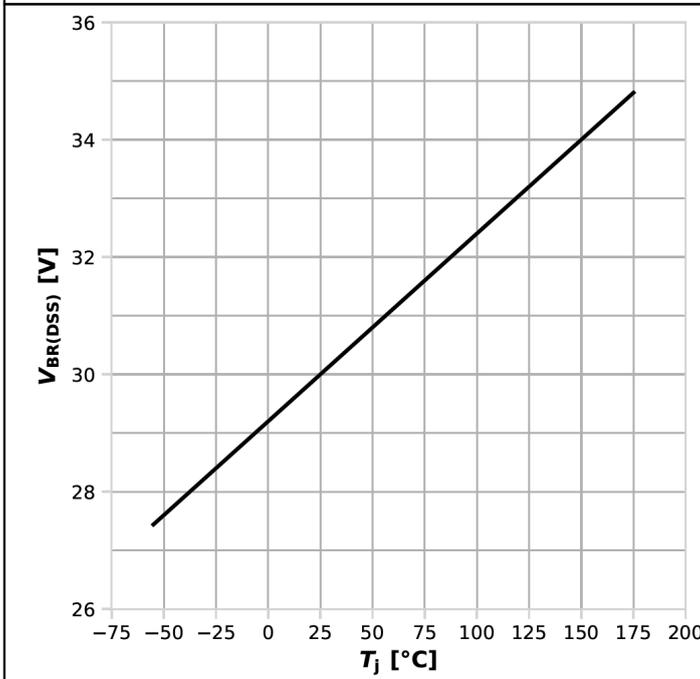
$I_{AS}=f(t_{AV}); R_{GS}=25 \Omega; \text{parameter: } T_{j,start}$

Diagram 14: Typ. gate charge



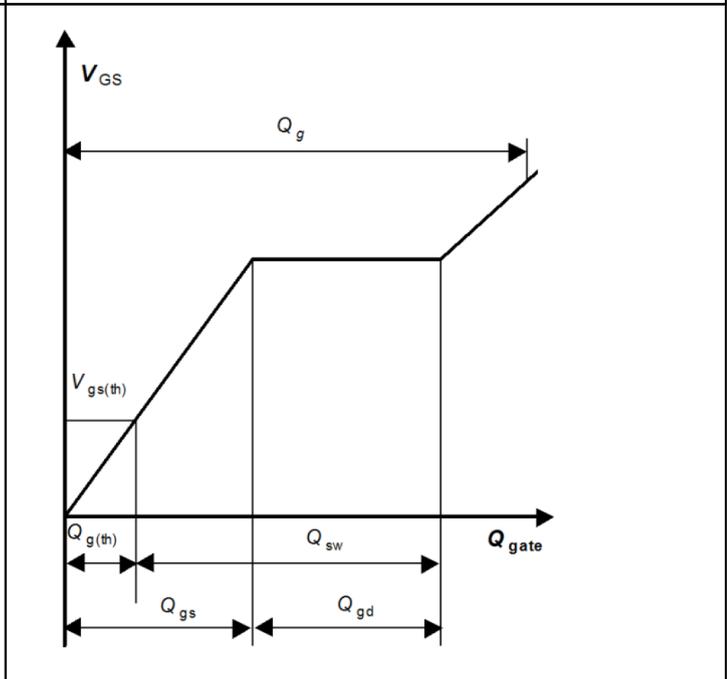
$V_{GS}=f(Q_{gate}), I_D=50 \text{ A pulsed}, T_j=25 \text{ °C}; \text{parameter: } V_{DD}$

Diagram 15: Drain-source breakdown voltage



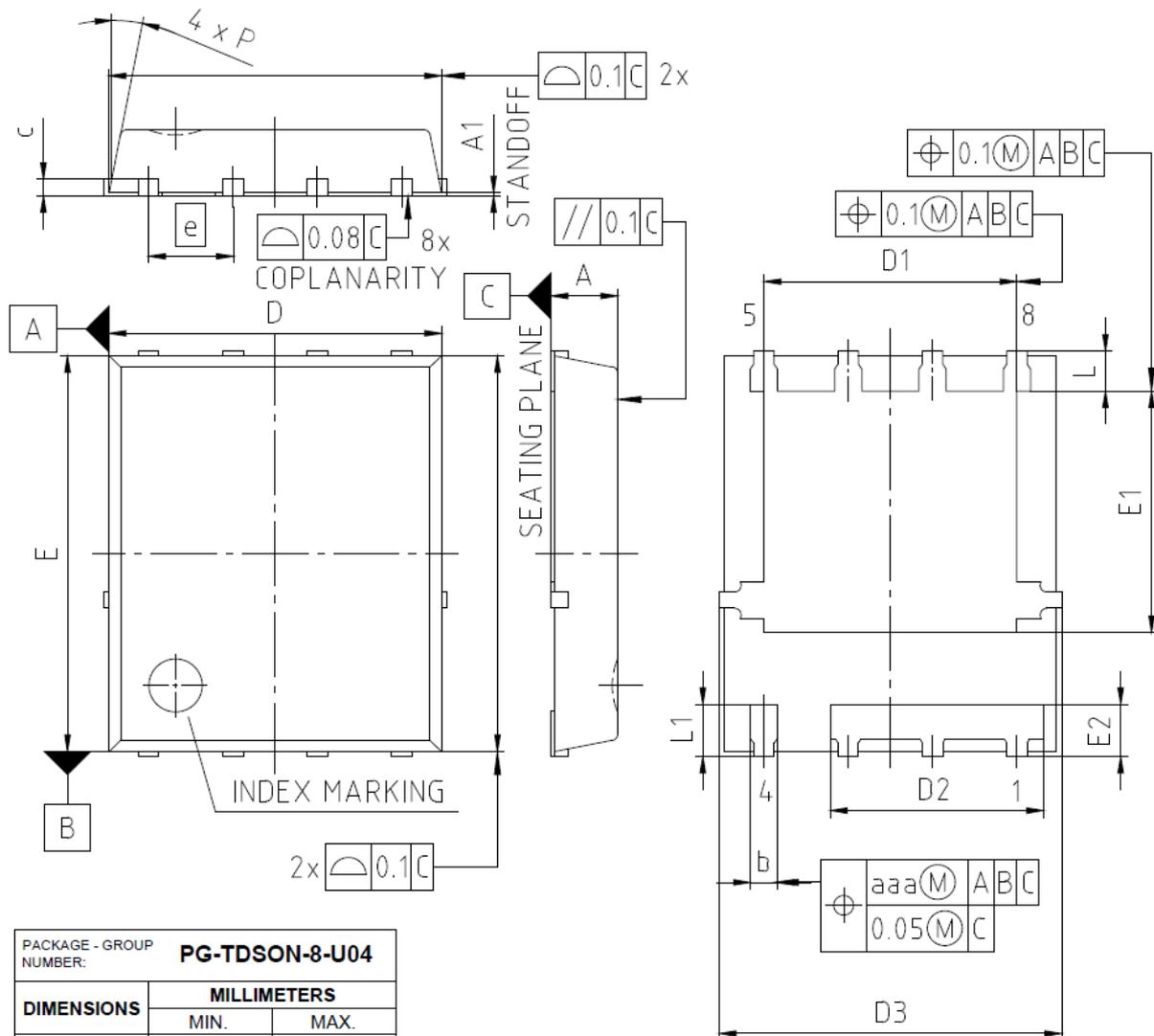
$V_{BR(DSS)}=f(T_j); I_D=2 \text{ mA}$

Gate charge waveforms



-

5 封装外形



- 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

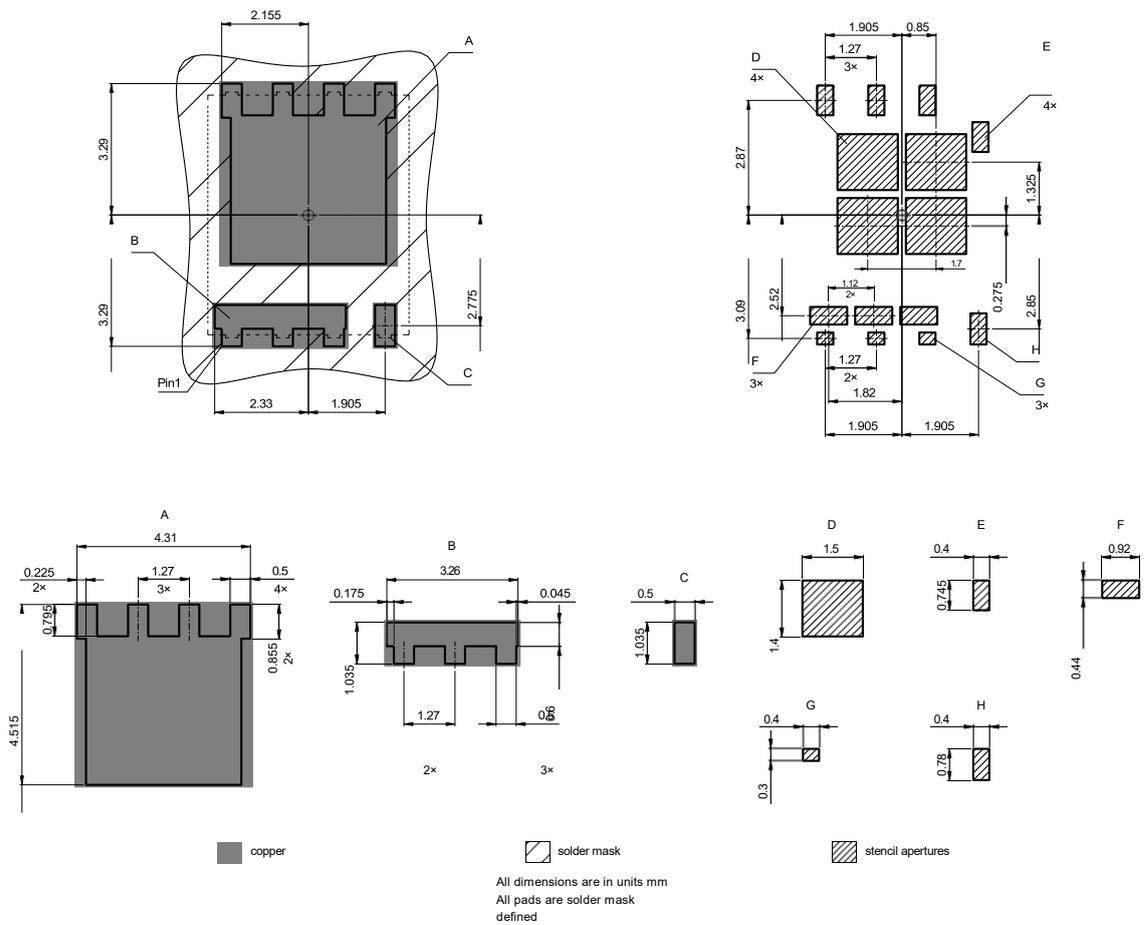


图2 PG-TDSON-8封装图，尺寸单位为毫米

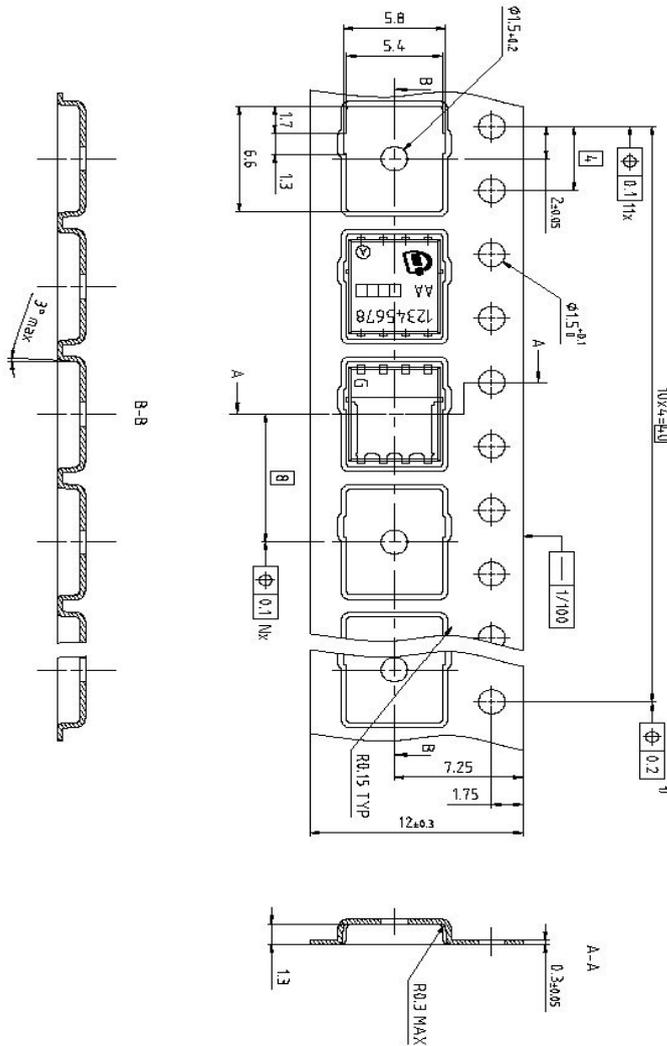


图 3 PG-TDSON-8 包装型号，尺寸单位为毫米

修订记录

ISC015N03LF2S

Revision 2024 - 11 - 25, Rev. 1. 1

历史修订版本

| Revision | Date | Subjects (major changes since last revision) |
|----------|------------|--------------------------------------------------------------------|
| 1.0 | 2024-10-08 | Release of final |
| 1.1 | 2024-11-25 | updated product validation to "JEDEC standard" and Package outline |

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