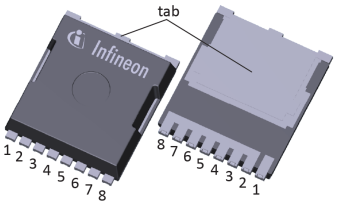
## MOSFET

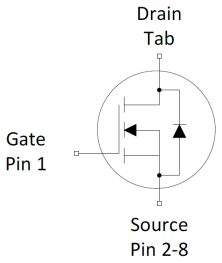
英飞凌OptiMOS™ 8 功率晶体管， 100 V

TOLL




## 特性

- N沟道，标准电平
- 极低的导通电阻$R_{DS(on)}$
- 高额定电流
- 紧密$_{VGS\ (th)}$传播
- 软体二极管的恢复特性与低$Q_{rr}$
- 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
- 基于 J-STD-020 的 MSL 1 分类




## 产品验证

已通过 JEDEC 相关测试。

**表 1　　主要性能参数**

| Parameter | Value | Unit |
|---|---|---|
| $V_{DS}$ | 100 | V |
| $R_{DS(on),max}$ | 1.84 | mΩ |
| $I_D$ | 265 | A |
| $Q_{OSS}$ | 237 | nC |
| $Q_G$ (0 V...10 V) | 123 | nC |
| $Q_{rr}$ (100 A/µs) | 58 | nC |

| Part number | Package | Marking | Related links |
|---|---|---|---|
| IPT018N10NM8 | PG-HSOF-8 | 018N10N8 | - |

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# 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 [1] | $I_D$ | - | - | 265 | A | $V_{GS}$=10 V, $T_C$=25 °C |
| | | | | 188 | | $V_{GS}$=10 V, $T_C$=100 °C |
| | | | | 190 | | $V_{GS}$=15 V, $T_C$=100 °C |
| | | | | 30 | | $V_{GS}$=10 V, $T_A$=25 °C, $R_{THJA}$=40 °C/W [2] |
| Pulsed drain current [3] | $I_{D,pulse}$ | - | - | 1060 | A | $T_A$=25 °C |
| Avalanche energy, single pulse [4] | $E_{AS}$ | - | - | 527 | mJ | $I_D$=50 A, $R_{GS}$=25 Ω |
| Gate source voltage | $V_{GS}$ | -20 | - | 20 | V | - |
| Power dissipation | $P_{tot}$ | - | - | 300 | W | $T_C$=25 °C |
| | | | | 3.8 | | $T_A$=25 °C, $R_{THJA}$=40 °C/W [2] |
| Operating and storage temperature | $T_j$, $T_{stg}$ | -55 | - | 175 | °C | IEC climatic category; DIN IEC 68-1: 55/175/56 |

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更高的外壳温度请参见图 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 $cm^2$（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 14.

## 2 热特性

**表 3 热特性**

| Parameter | Symbol | Values | | | Unit | Note / Test condition |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Thermal resistance, junction - case | $R_{thJC}$ | - | 0.33 | 0.5 | °C/W | - |
| Thermal resistance, junction - ambient, 6 $cm^2$ cooling area [5)] | $R_{thJA}$ | | - | 40 | | |
| Thermal resistance, junction - ambient, minimal footprint | $R_{thJA}$ | | - | 62 | | |

5) 器件置于40 mm × 40 mm × 1.5 mm 环氧树脂 PCB FR4 上，配有6 $cm^2$（单层，70 µm厚）铜层面积用于漏极连接。PCB垂直放置在静止空气中。

# 3 电气特性

除非另有规定，$T_j$ = 25°C

**表 4 静态特性**

| Parameter | Symbol | Values | | | Unit | Note / Test condition |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | 100 | - | - | V | $V_{GS}$=0 V, $I_D$=1 mA |
| Gate threshold voltage | $V_{GS(th)}$ | 2.4 | 2.8 | 3.2 | V | $V_{DS}$=$V_{GS}$, $I_D$=133 µA |
| Zero gate voltage drain current | $I_{DSS}$ | - | 0.1 | 1 | µA | $V_{DS}$=80 V, $V_{GS}$=0 V, $T_j$=25 °C |
| Zero gate voltage drain current [6] | $I_{DSS}$ | - | 10 | 100 | µA | $V_{DS}$=80 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 | $R_{DS(on)}$ | - | 1.52 | 1.84 | mΩ | $V_{GS}$=15 V, $I_D$=50 A |
| | | | 1.61 | 1.89 | | $V_{GS}$=10 V, $I_D$=50 A |
| | | | 1.73 | 2.02 | | $V_{GS}$=8 V, $I_D$=25 A |
| Gate resistance [6] | $R_G$ | - | 0.9 | 1.8 | Ω | - |
| Transconductance [6] | $g_{fs}$ | 80 | 160 | - | S | $\|V_{DS}\|\geq 2\|I_D\|R_{DS(on)max}$, $I_D$=50 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] | $C_{iss}$ | - | 7900 | 10000 | pF | $V_{GS}$=0 V, $V_{DS}$=50 V, $f$=1 MHz |
| Output capacitance [7] | $C_{oss}$ | | 1200 | 1600 | | |
| Reverse transfer capacitance [7] | $C_{rss}$ | | 220 | 380 | | |
| Turn-on delay time | $t_{d(on)}$ | - | 20 | - | ns | $V_{DD}$=50 V, $V_{GS}$=10 V, $I_D$=25 A, $R_{G,ext}$=1.6 Ω |
| Rise time | $t_r$ | | 7.2 | | | |
| Turn-off delay time | $t_{d(off)}$ | | 52 | | | |
| Fall time | $t_f$ | | 18 | | | |

[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 | $Q_{gs}$ | - | 33 | - | nC | $V_{DD}$=50 V, $I_D$=25 A, $V_{GS}$=0 to 10 V |
| Gate charge at threshold | $Q_{g(th)}$ | | 22 | - | nC | |
| Gate to drain charge [9)] | $Q_{gd}$ | | 30 | 45 | nC | |
| Switching charge | $Q_{sw}$ | | 41 | - | nC | |
| Gate charge total [9)] | $Q_g$ | | 123 | 154 | nC | |
| Gate plateau voltage | $V_{plateau}$ | | 4.2 | - | V | |
| Gate charge total, sync. FET | $Q_{g(sync)}$ | - | 102 | - | nC | $V_{DS}$=0.1 V, $V_{GS}$=0 to 10 V |
| Output charge [9)] | $Q_{oss}$ | - | 237 | 315 | nC | $V_{DS}$=50 V, $V_{GS}$=0 V |

8)　参数定义请参数见“栅极充电波形”。

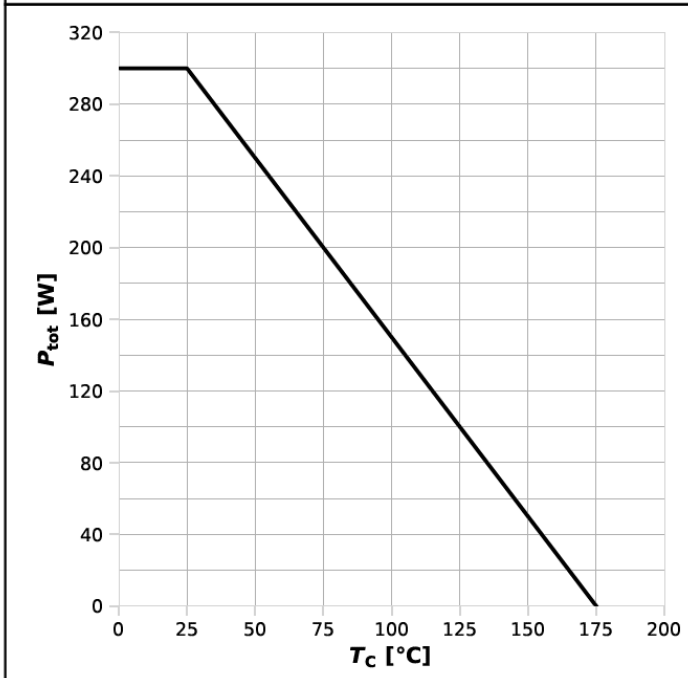
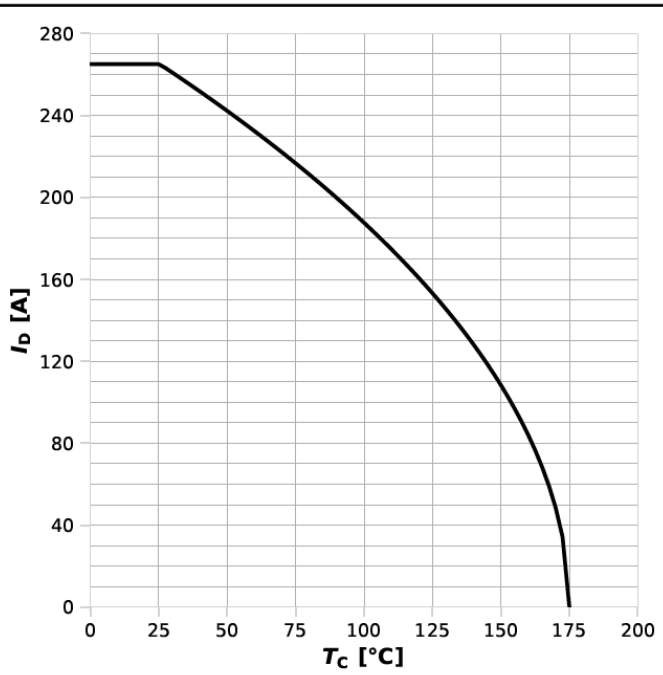
9)　由设计指定，未经过生产测试。

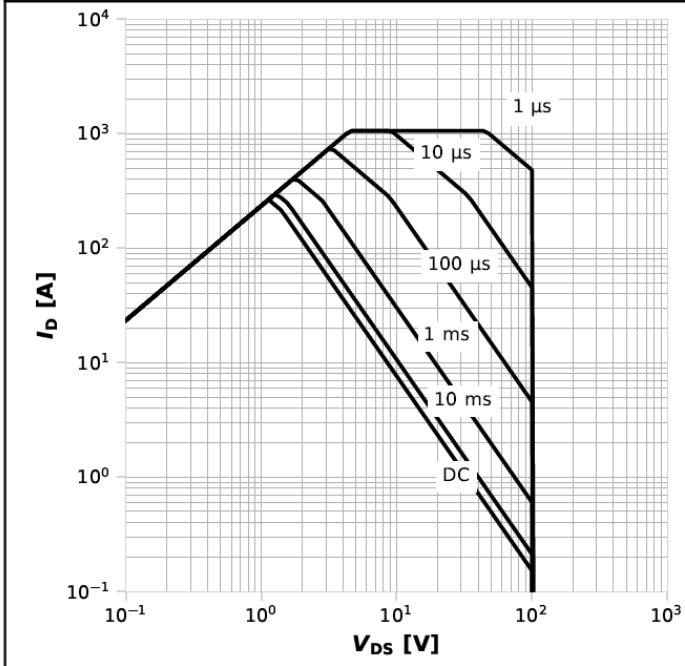
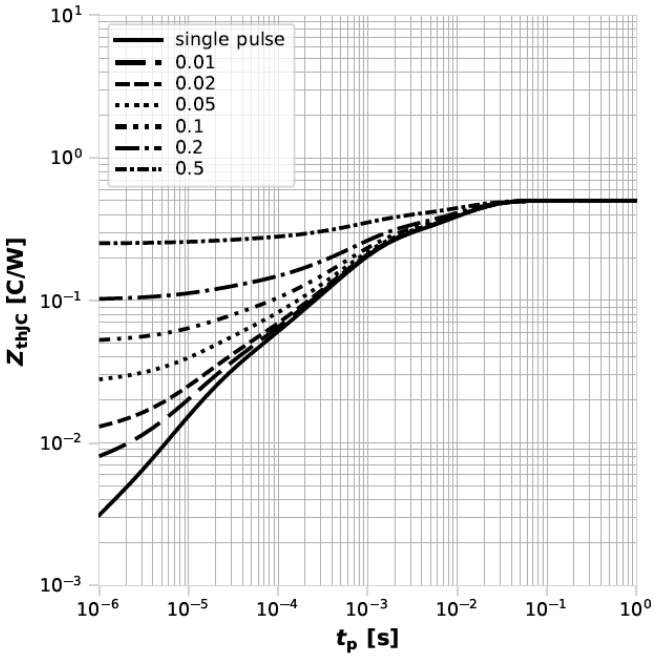
**表 7　　反向二极管**

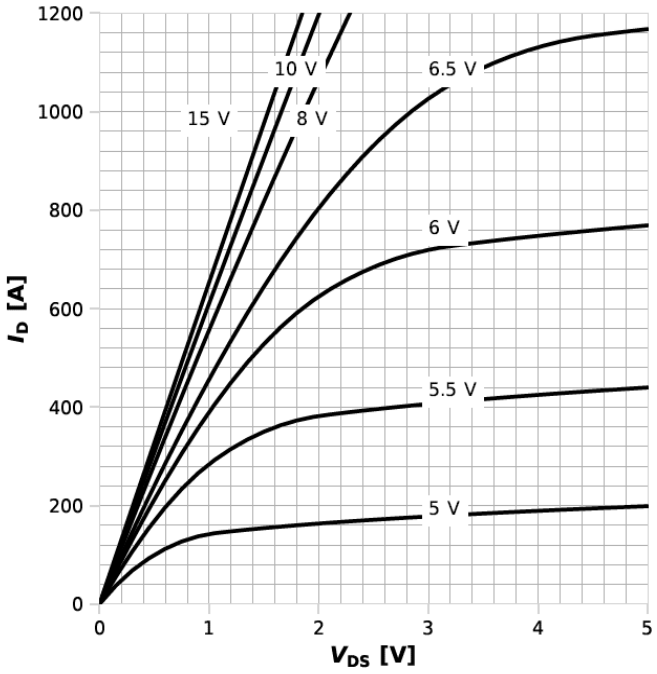
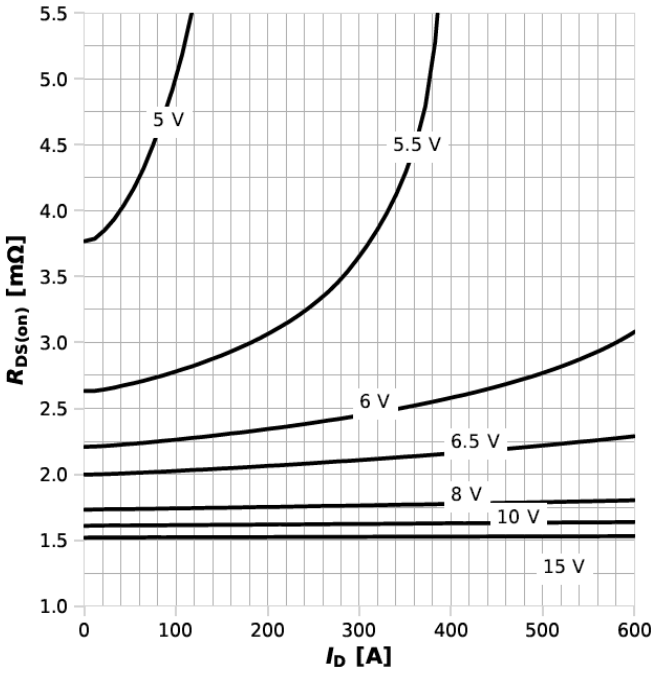
| Parameter | Symbol | Values | | | Unit | Note / Test condition |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Diode continuous forward current | $I_S$ | - | - | 242 | A | $T_C$=25 °C |
| Diode pulse current | $I_{S,pulse}$ | | | 1060 | | |
| Diode forward voltage | $V_{SD}$ | - | 0.82 | 1 | V | $V_{GS}$=0 V, $I_F$=50 A, $T_j$=25 °C |
| Reverse recovery time [10)] | $t_{rr}$ | - | 38 | 76 | ns | $V_R$=50 V, $I_F$=25 A, d$i_F$/d$t$=100 A/µs |
| Reverse recovery charge [10)] | $Q_{rr}$ | | 58 | 116 | nC | |
| Reverse recovery time [10)] | $t_{rr}$ | - | 36 | 72 | ns | $V_R$=50 V, $I_F$=25 A, d$i_F$/d$t$=1000 A/µs |
| Reverse recovery charge [10)] | $Q_{rr}$ | | 444 | 888 | nC | |

10)　由设计指定，未经过生产测试。

# 4 电气特性图

| Diagram 1: Power dissipation | Diagram 2: Drain current |
|---|---|
|  |  |
| $P_{tot}=f(T_C)$ | $I_D=f(T_C)$; $V_{GS}\geq 10$ V |

| Diagram 3: Safe operating area | Diagram 4: Max. transient thermal impedance |
|---|---|
|  |  |
| $I_D=f(V_{DS})$; $T_C=25$ °C; $D=0$; parameter: $t_p$ | $Z_{thJC}=f(t_p)$; parameter: $D=t_p/T$ |

| Diagram 5: Typ. output characteristics | Diagram 6: Typ. drain-source on resistance |
|---|---|
|  |  |
| $I_D$=f($V_{DS}$), $T_j$=25 °C; parameter: $V_{GS}$ | $R_{DS(on)}$=f($I_D$), $T_j$=25 °C; parameter: $V_{GS}$ |

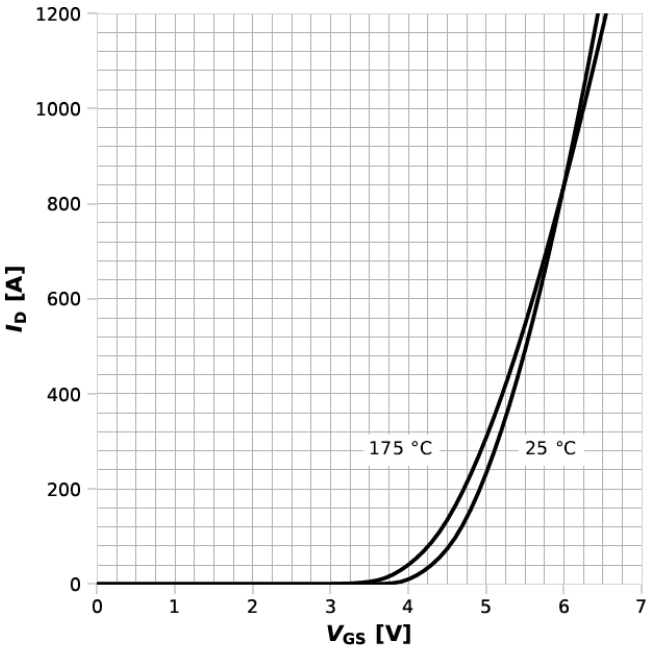
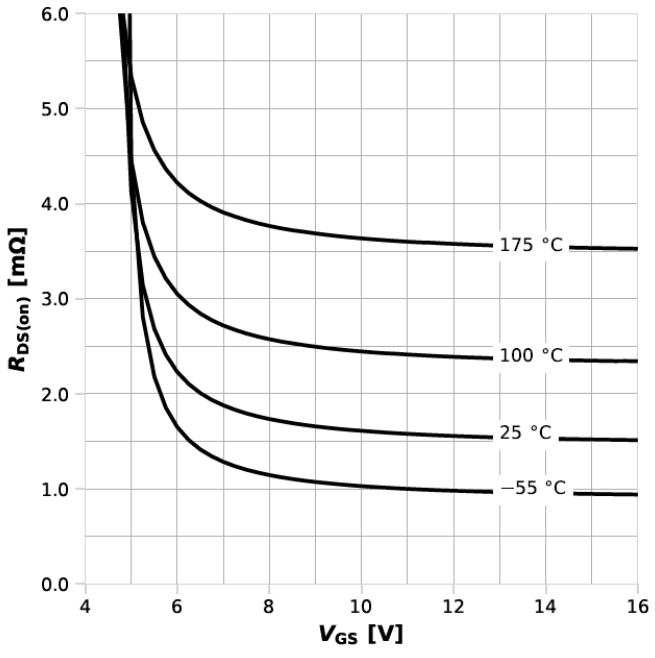
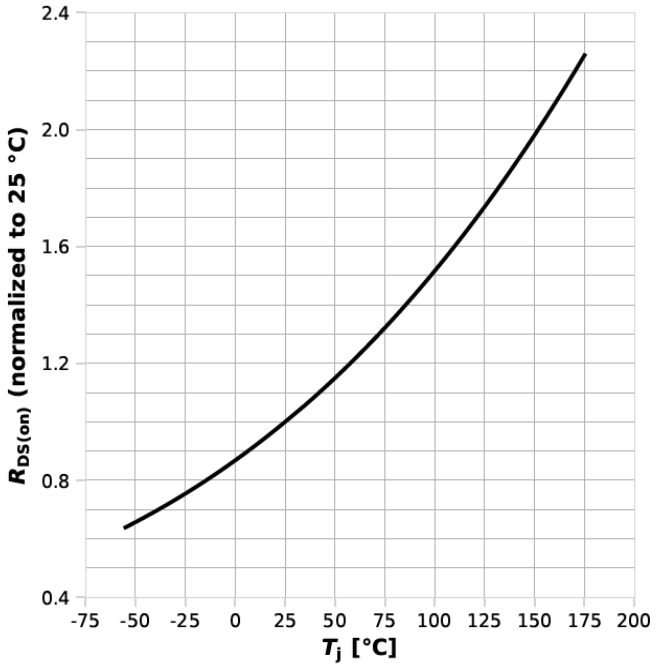
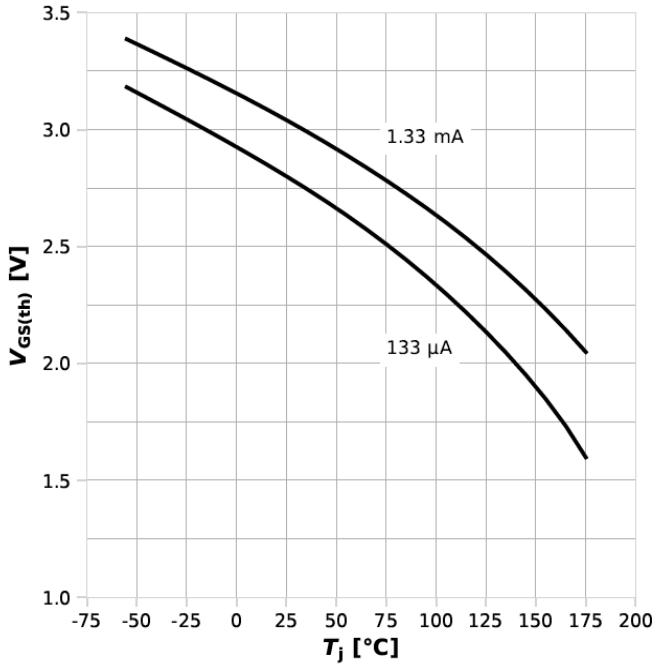
| Diagram 7: Typ. transfer characteristics | Diagram 8: Typ. drain-source on resistance |
|---|---|
|  |  |
| $I_D$=f($V_{GS}$), \|$V_{DS}$\|>2\|$I_D$\|$R_{DS(on)max}$; parameter: $T_j$ | $R_{DS(on)}$=f($V_{GS}$), $I_D$=50 A; parameter: $T_j$ |

**Diagram 9: Normalized drain-source on resistance**



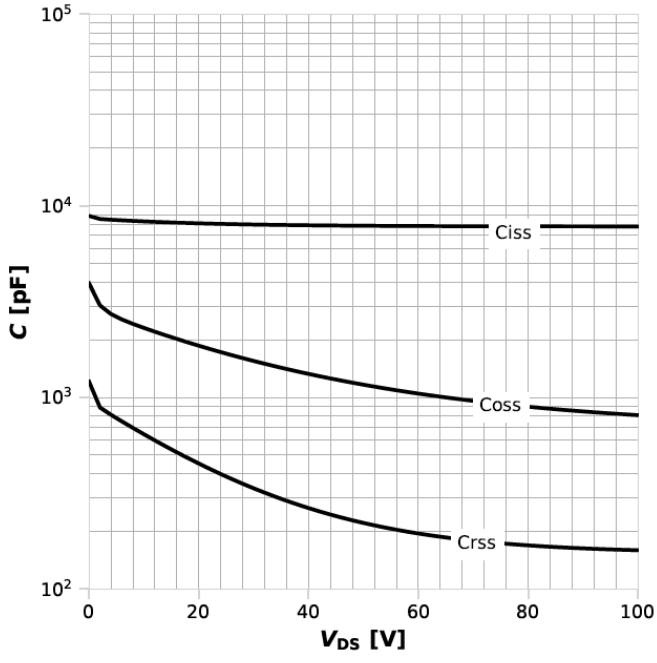

$R_{DS(on)}$=f($T_j$), $I_D$=50 A, $V_{GS}$=10 V

**Diagram 10: Typ. gate threshold voltage**



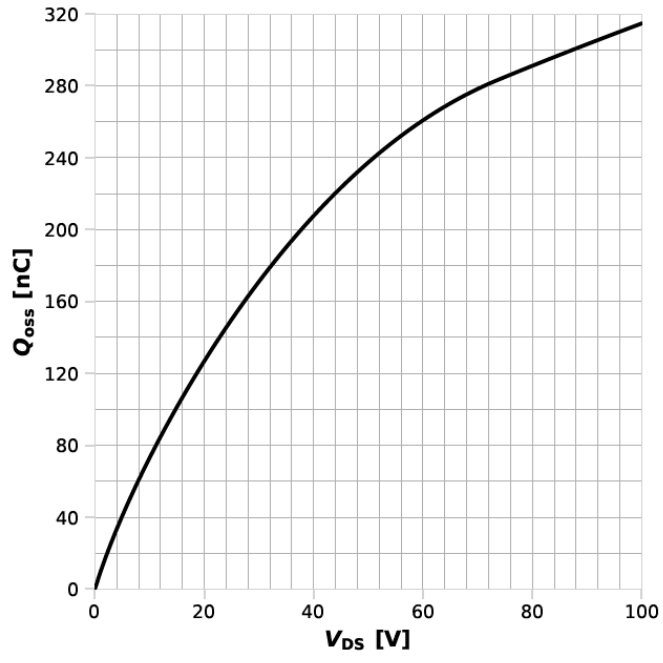

$V_{GS(th}$=f($T_j$), $V_{GS}$=$V_{DS}$; parameter: $I_D$

**Diagram 11: Typ. capacitances**



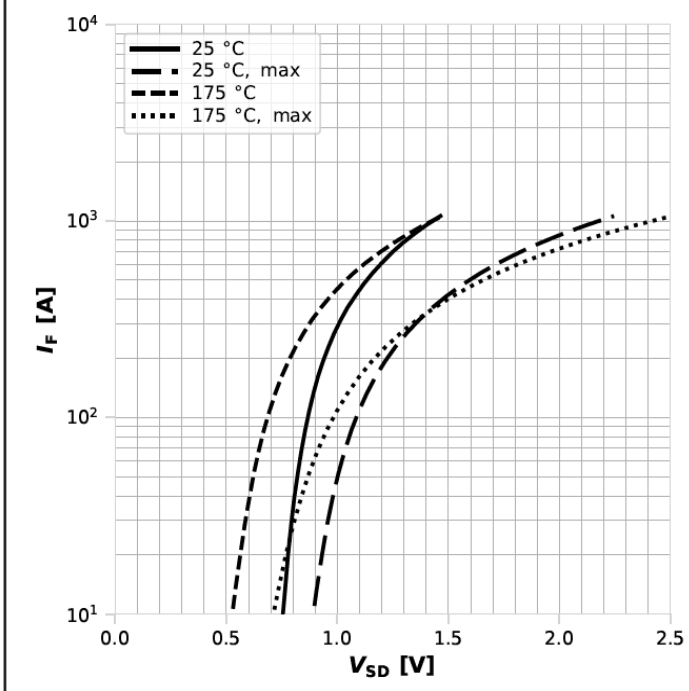

$C$=f($V_{DS}$); $V_{GS}$=0 V; $f$=1 MHz

**Diagram 12: Typ. output charge**



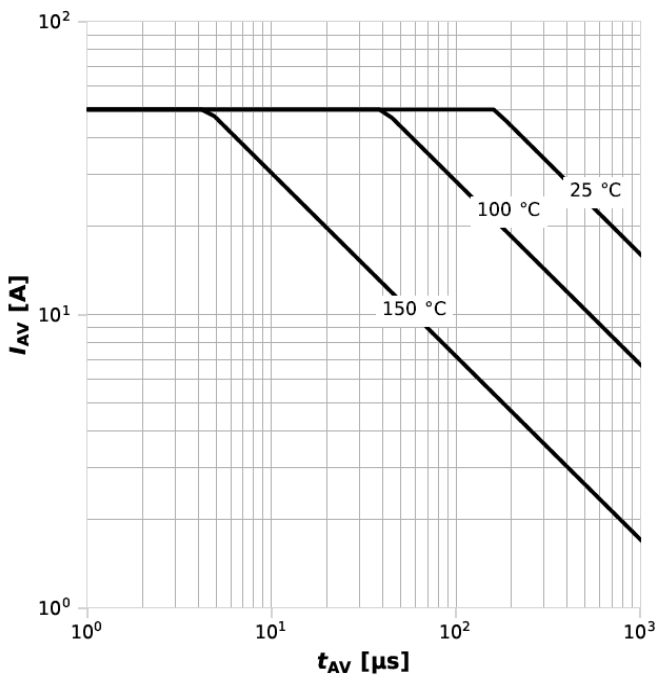

$Q_{oss}$=f($V_{DS}$), $V_{GS}$=0 V

Diagram 13: Forward characteristics of reverse diode



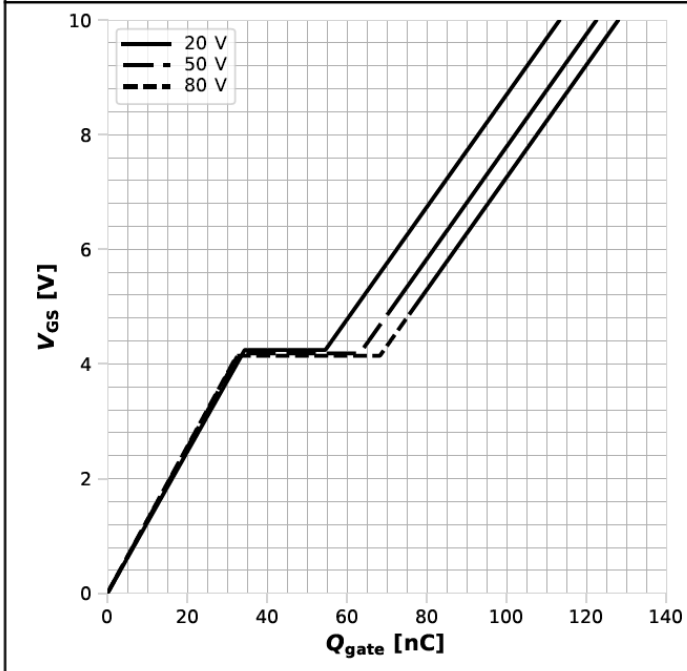

$I_F$=f($V_{SD}$); parameter: $T_j$

Diagram 14: Avalanche characteristics



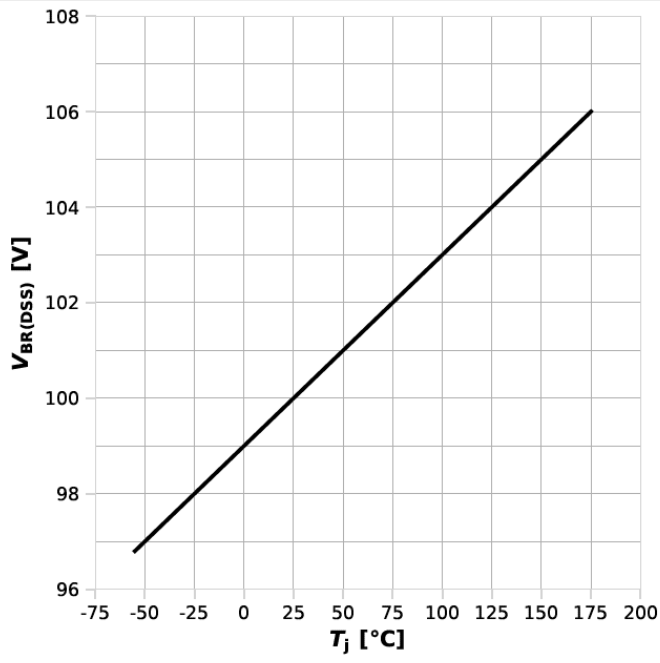

$I_{AS}$=f($t_{AV}$); $R_{GS}$=25 Ω; parameter: $T_{j,start}$

Diagram 15: Typ. gate charge



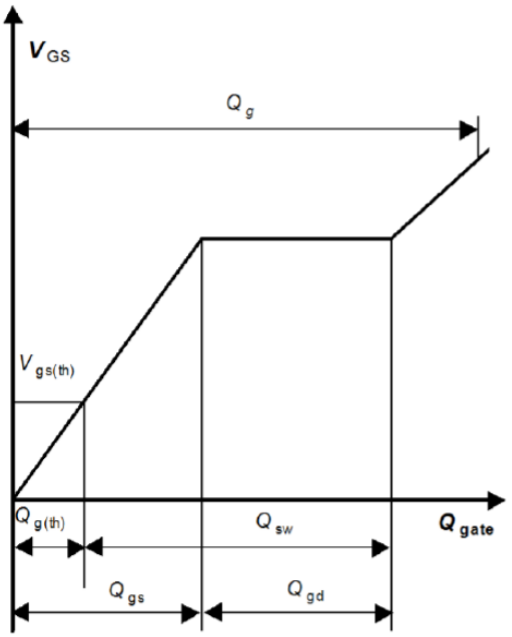

$V_{GS}$=f($Q_{gate}$), $I_D$=25 A pulsed, $T_j$=25 °C; parameter: $V_{DD}$

Diagram 16: Min. drain-source breakdown voltage




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

Gate charge waveforms

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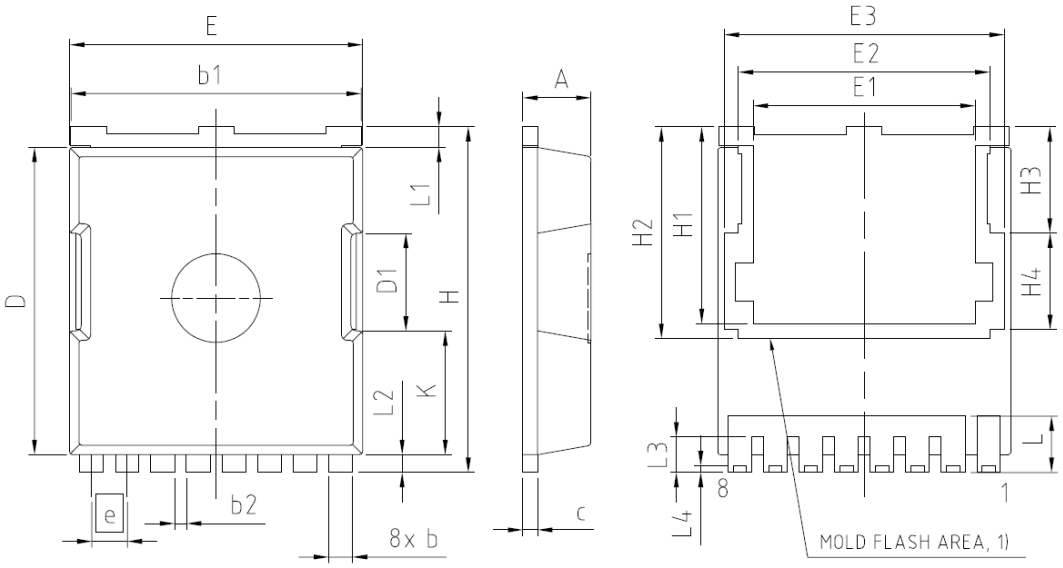
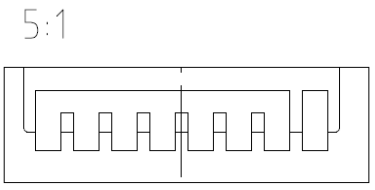
# 5 封装外形




| PACKAGE - GROUP NUMBER: | PG-HSOF-8-U01 | |
|---|---|---|
| DIMENSIONS | MILLIMETERS | |
| | MIN. | MAX. |
| A | 2.20 | 2.40 |
| b | 0.70 | 0.90 |
| b1 | 9.70 | 9.90 |
| b2 | 0.30 | 0.50 |
| c | 0.40 | 0.60 |
| D | 10.28 | 10.58 |
| D1 | 3.30 | |
| E | 9.70 | 10.10 |
| E1 | 7.50 | |
| E2 | 8.50 | |
| E3 | 9.46 | |
| e | 1.20 (BSC) | |
| H | 11.48 | 11.88 |
| H1 | 6.55 | 6.95 |
| H2 | 7.15 | 7.50 |
| H3 | 3.59 | |
| H4 | 3.26 | |
| N | 8 | |
| K | 4.03 | 4.33 |
| L | 1.60 | 2.10 |
| L1 | 0.50 | 0.90 |
| L2 | 0.45 | 0.75 |
| L3 | 1.00 | 1.30 |
| L4 | 0.13 | 0.33 |




OPTIONAL LEAD FORM:
WITHOUT LTI OPTION

1) PATIALLY COVERED WITH MOLD FLASH

**图 1** PG-HSOF-8 封装外形图，尺寸单位为毫米

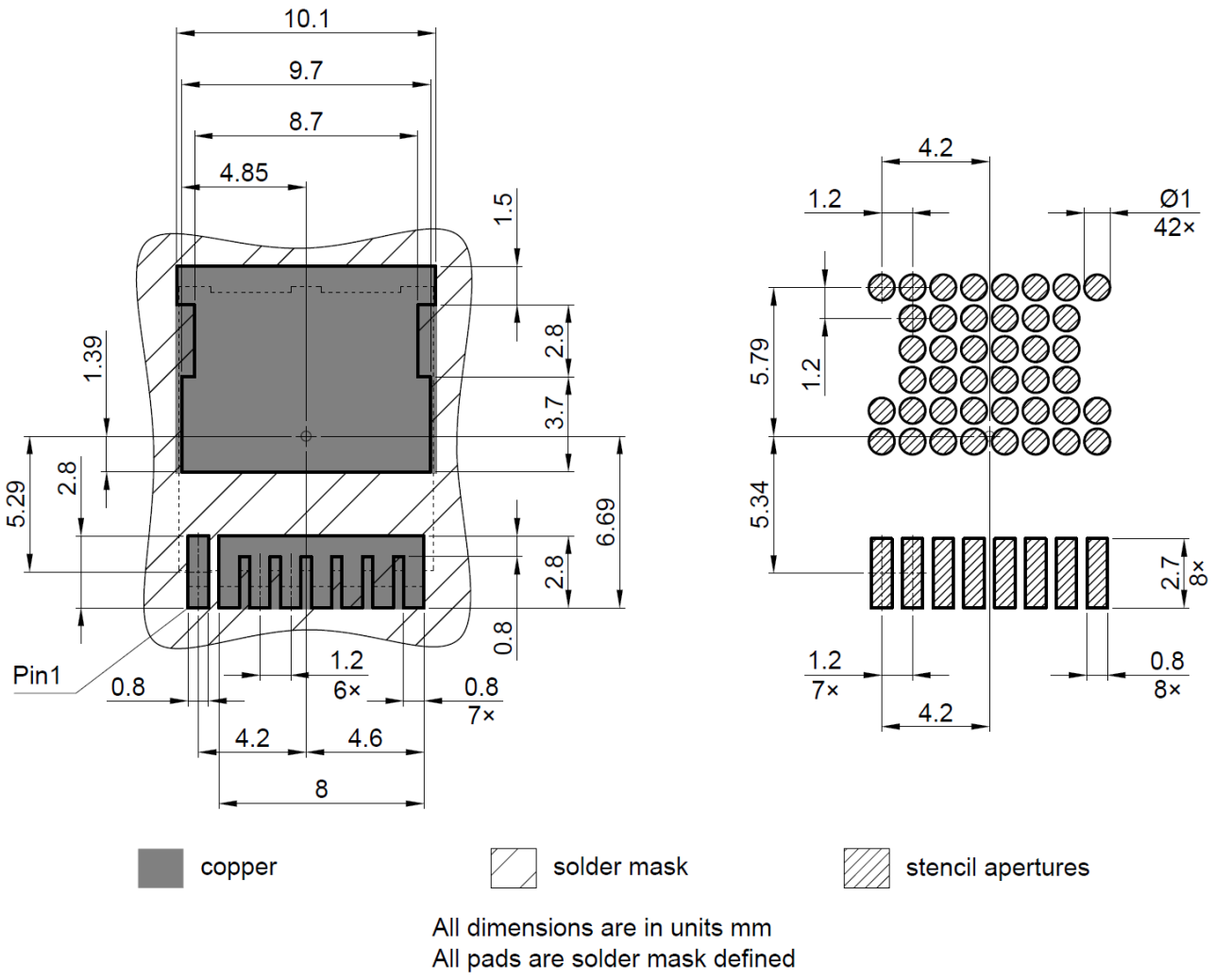



**图 2** PG-HSOF-8 封装图，尺寸单位为毫米

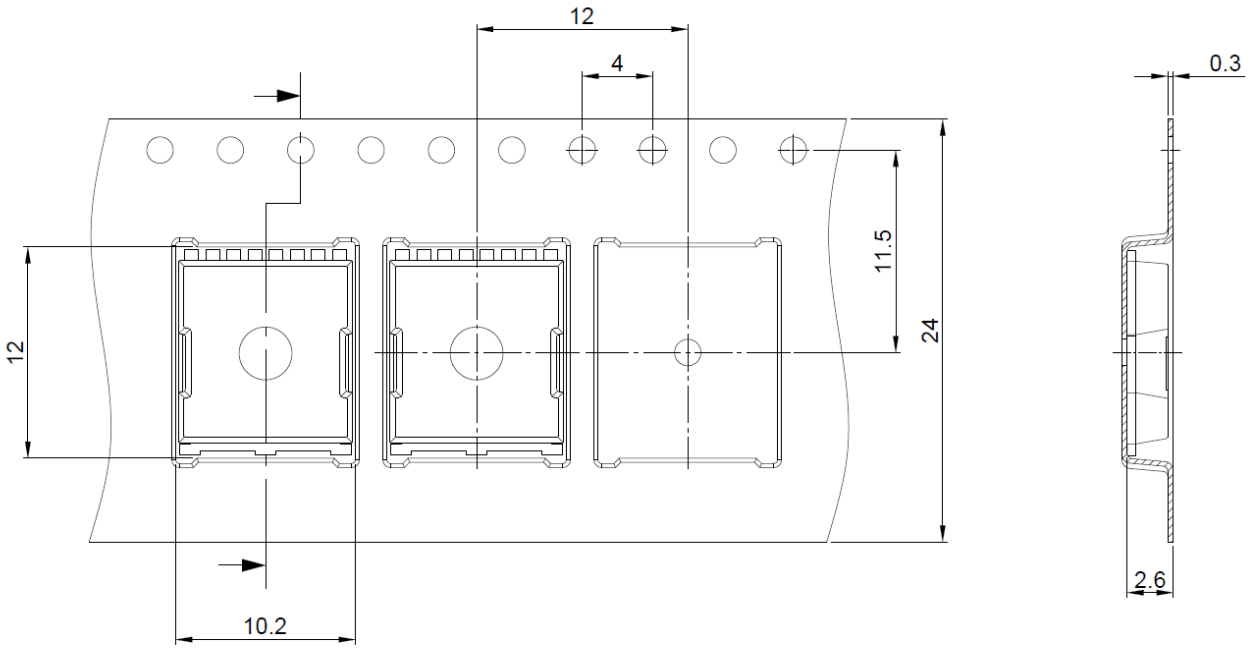



**图 3** PG-HSOF-8 封装变体，尺寸单位为毫米

## 修订记录

IPT018N10NM8

**Revision 2025 - 12 - 10 , Rev. 1 . 0**

Previous revisions

| Revision | Date | Subjects (major changes since last revision) |
|---|---|---|
| 1.0 | 2025-12-10 | Release of final version |

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