# 英飞凌汽车级60V 175°C N沟道

# 增强型OptiMOS™5 功率晶体管

AEC Qualified RoHS

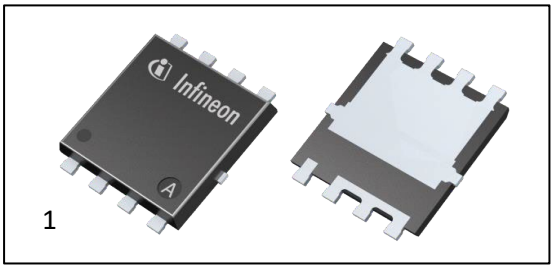
## 特点

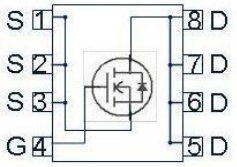
- 适用于汽车应用的功率MOSFET
- N 沟道 - 增强型 - 标准电平
- MSL1 回流焊峰值温度高达 260°C
- 工作温度 175°C
- 绿色产品：符合 RoHS 标准
- 100% 雪崩测试

## 产品概述

| | | |
|---|---|---|
| $V_{DS}$ | 60 | V |
| $R_{DS(on),max}$ | 1.7 | mΩ |
| $I_D$ | 120 | A |

PG-TDSON-8-43




| Type | Package | Marking |
|---|---|---|
| IAUC120N06S5N017 | PG-TDSON-8-43 | 5N06N017 |

除非另有规定，否则均为 $T_j$=25 °C 的**最大额定值。**

| Parameter | Symbol | Conditions | Value | Unit |
|---|---|---|---|---|
| Drain current | $I_D$ | $V_{GS}$=10 V, Chip limitation[1,2)] | 226 | A |
| | | $V_{GS}$=10V, DC current[3)] | 120 | |
| | | $T_a$=85 °C, $V_{GS}$=10 V, $R_{thJA}$ on 2s2p[2,4)] | 30 | |
| Pulsed drain current[2)] | $I_{D,pulse}$ | $T_C$=25 °C, $t_p$= 100 µs | 757 | |
| Avalanche energy, single pulse[2)] | $E_{AS}$ | $I_D$=60 A | 345 | mJ |
| Avalanche current, single pulse | $I_{AS}$ | - | 120 | A |
| Gate source voltage | $V_{GS}$ | - | ±20 | V |
| Power dissipation | $P_{tot}$ | $T_C$=25 °C | 167 | W |
| Operating and storage temperature | $T_j$, $T_{stg}$ | - | -55 ... +175 | °C |

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| Parameter | Symbol | Conditions | Values | | | Unit |
|---|---|---|---|---|---|---|
| | | | min. | typ. | max. | |

**热特性**[2)]

| | | | | | | |
|---|---|---|---|---|---|---|
| Thermal resistance, junction - case | $R_{thJC}$ | - | - | - | 0.9 | K/W |
| Thermal resistance, junction - ambient[4)] | $R_{thJA}$ | - | - | 23.3 | - | |

除非另有规定，否则均为 $T_j$=25 °C 的**电气特性。**

**静态参数特性**

| | | | | | | |
|---|---|---|---|---|---|---|
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}$=0V, $I_D$=1mA | 60 | - | - | V |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=94µA | 2.2 | 2.8 | 3.4 | |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$=60V, $V_{GS}$=0V, $T_j$=25°C | - | - | 1 | µA |
| | | $V_{DS}$=60V, $V_{GS}$=0V, $T_j$=125°C[1)] | - | - | 100 | |
| Gate-source leakage current | $I_{GSS}$ | $V_{GS}$=20V, $V_{DS}$=0V | - | - | 100 | nA |
| Drain-source on-state resistance | $R_{DS(on)}$ | $V_{GS}$=7V, $I_D$=30A | - | 1.6 | 1.9 | mΩ |
| | | $V_{GS}$=10V, $I_D$=60A | - | 1.3 | 1.7 | |
| Gate resistance[2)] | $R_G$ | - | - | 1.6 | - | Ω |

| Parameter | Symbol | Conditions | Values | | | Unit |
|---|---|---|---|---|---|---|
| | | | min. | typ. | max. | |
| **动态参数特性[2)]** | | | | | | |
| Input capacitance | $C_{iss}$ | $V_{GS}$=0V, $V_{DS}$=30V, $f$=1MHz | - | 5348 | 6952 | pF |
| Output capacitance | $C_{oss}$ | | - | 1160 | 1507 | |
| Reverse transfer capacitance | $C_{rss}$ | | - | 56 | 84 | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}$=30V, $V_{GS}$=10V, $I_D$=60A, $R_{G,ext}$=3.5 Ω | - | 13.4 | - | ns |
| Turn-off delay time | $t_{d(off)}$ | | - | 26.9 | - | |
| Rise time | $t_r$ | | - | 7.0 | - | |
| Fall time | $t_f$ | | - | 17.2 | - | |
| **栅极电荷特性[2)]** | | | | | | |
| Gate to source charge | $Q_{gs}$ | $V_{DD}$=30V, $I_D$=60A, $V_{GS}$=0 to 10V | - | 24.0 | 31.2 | nC |
| Gate to drain charge | $Q_{gd}$ | | - | 13.7 | 20.6 | |
| Gate charge total | $Q_g$ | | - | 73.7 | 95.9 | |
| Gate plateau voltage | $V_{plateau}$ | | - | 4.5 | - | V |
| **反向二极管** | | | | | | |
| Diode continous forward current[2)] | $I_S$ | $T_C$=25 °C | - | - | 120 | A |
| Diode pulse current[2)] | $I_{S,pulse}$ | $T_C$=25 °C, $t_p$= 100 µs | - | - | 757 | |
| Diode forward voltage | $V_{SD}$ | $V_{GS}$=0V, $I_F$=60A, $T_j$=25°C | - | 0.8 | 1.1 | V |
| Reverse recovery time[2)] | $t_{rr}$ | $V_R$=30V, $I_F$=50A, d$i_F$/d$t$ =100A/µs | - | 49 | - | ns |
| Reverse recovery charge[2)] | $Q_{rr}$ | | - | 49 | - | nC |

[1)] 实际上，电流能力受到包括客户特定的印刷电路板在内的整体系统设计的限制。

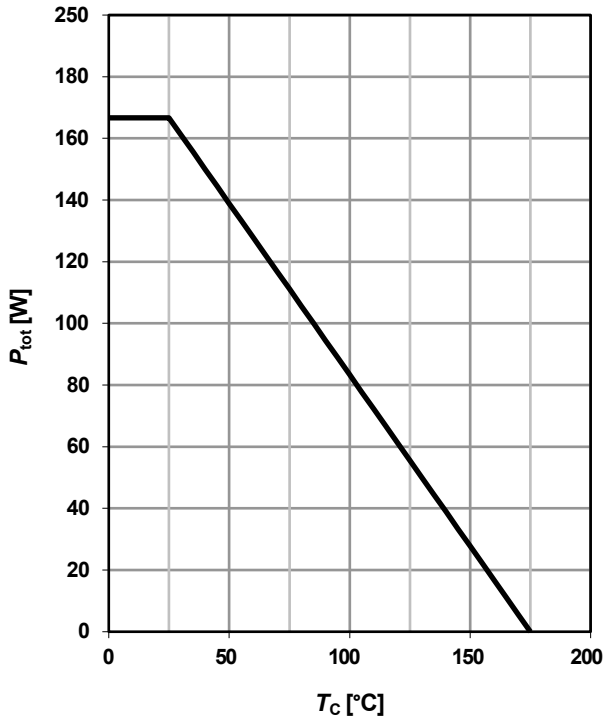
[2)]这些参数不经过生产测试，但经过设计和/或特性验证。

[3)]该产品可以根据最佳实践在指定电流下运行，以最大限度地减少焊点处的电迁移。对于罕见事件和浪涌电流，该值可能会被超出。

[4)]器件放置于根据JEDEC标准 (JESD51-5, -7) 定义的 2s2p FR4 印刷电路板上。印刷电路板垂直放置在静止空气中。

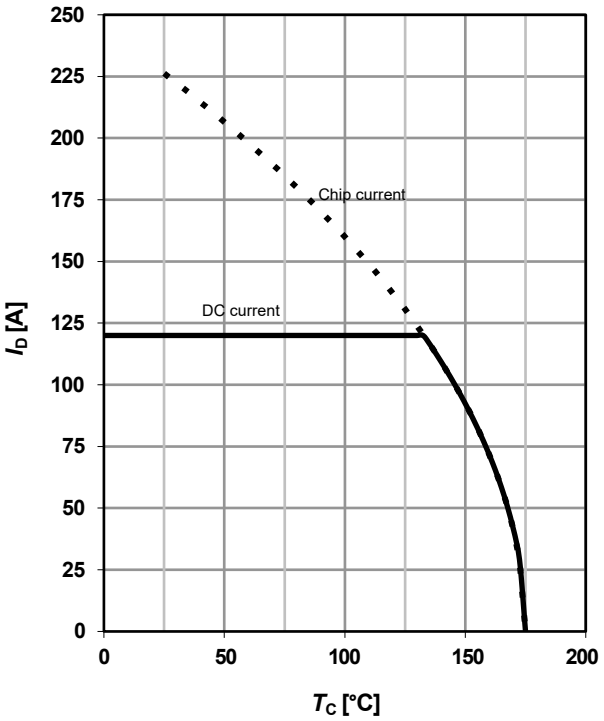
## 1 功率耗散

$P_{tot} = f(T_C)$; $V_{GS} = 10$ V




## 2 漏极电流

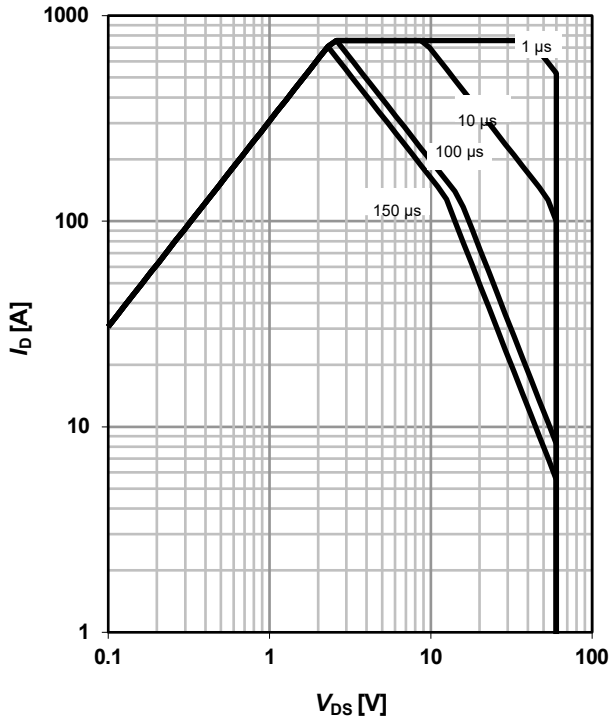
$I_D = f(T_C)$; $V_{GS} = 10$ V




## 3 安全工作区

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

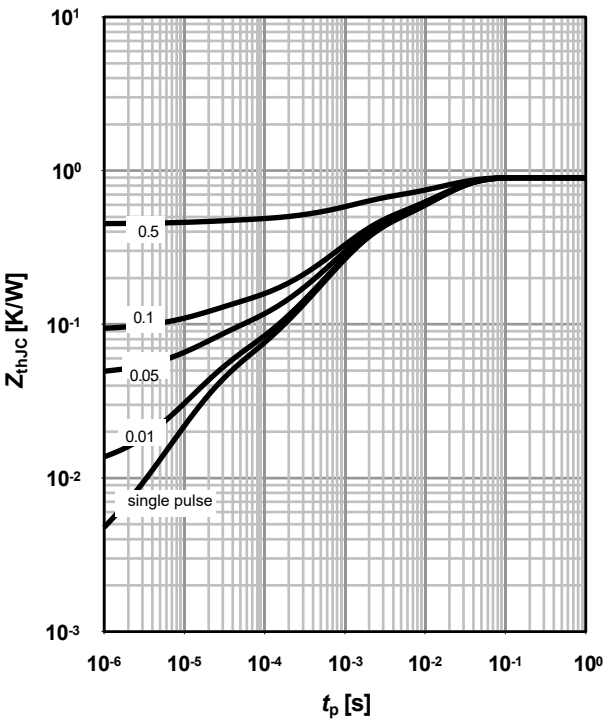
parameter: $t_p$




## 4 最大瞬态热阻抗

$Z_{thJC} = f(t_p)$

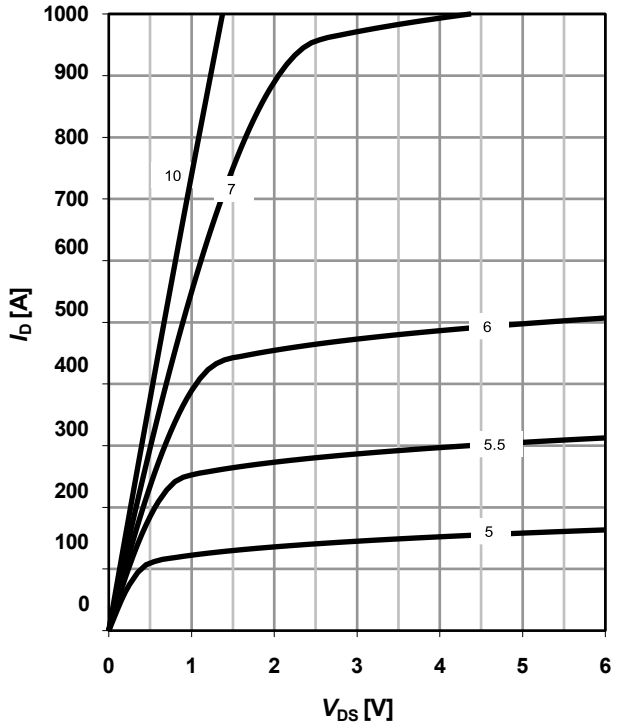
parameter: $D = t_p/T$



## 5 典型输出特性

$I_D = f(V_{DS})$; $T_j = 25\ °C$

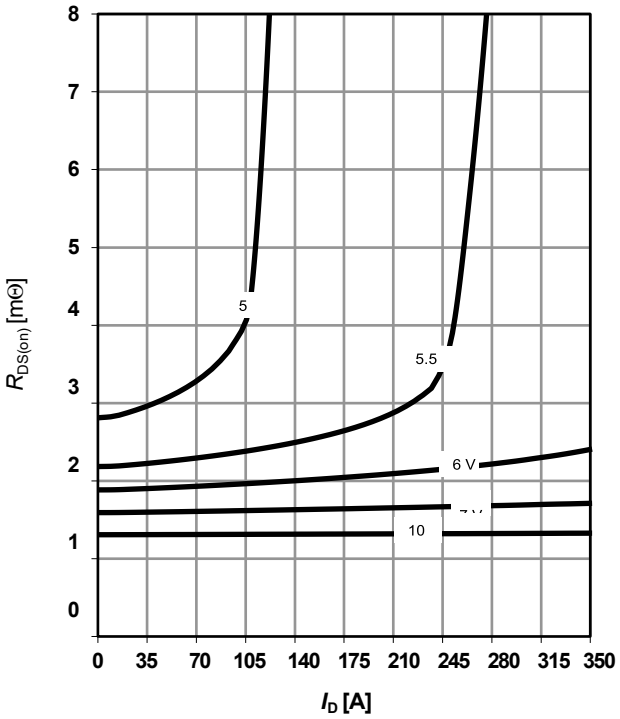
parameter: $V_{GS}$




## 6 典型漏源导通电阻

$R_{DS(on)} = f(I_D)$; $T_j = 25\ °C$

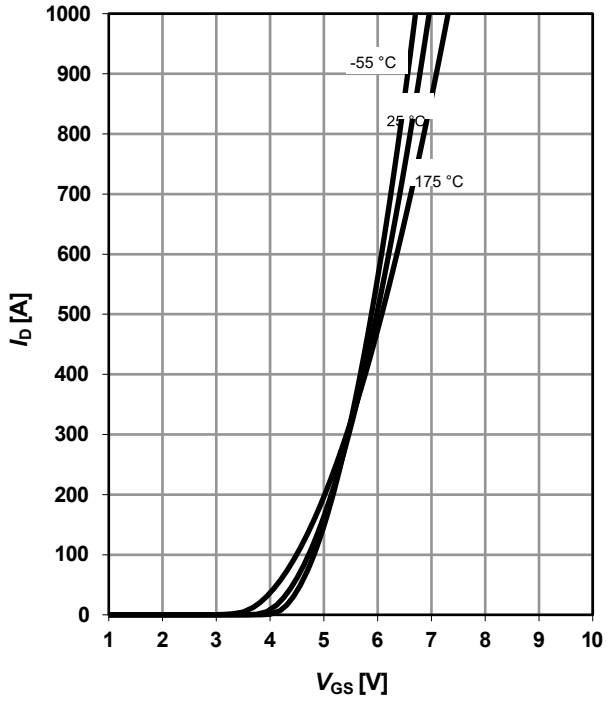
parameter: $V_{GS}$




## 7 典型转移特性

$I_D = f(V_{GS})$; $V_{DS} = 6V$

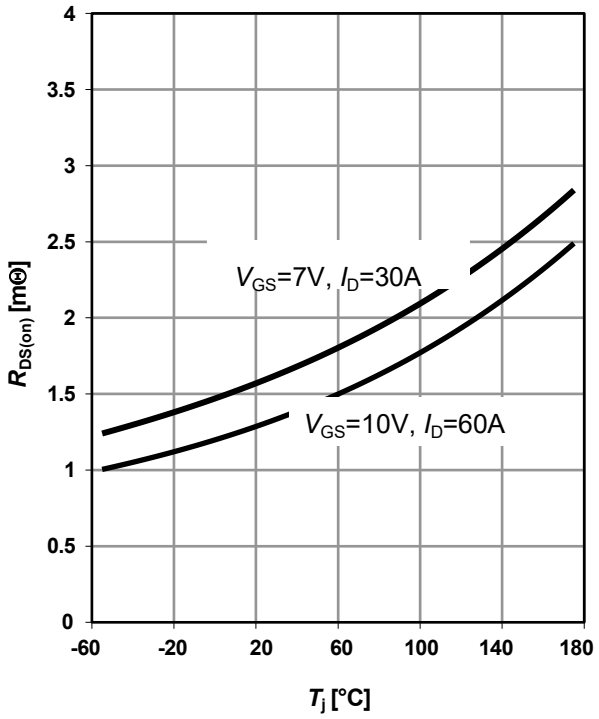
parameter: $T_j$




## 8 典型漏源导通电阻

$R_{DS(on)} = f(T_j)$;

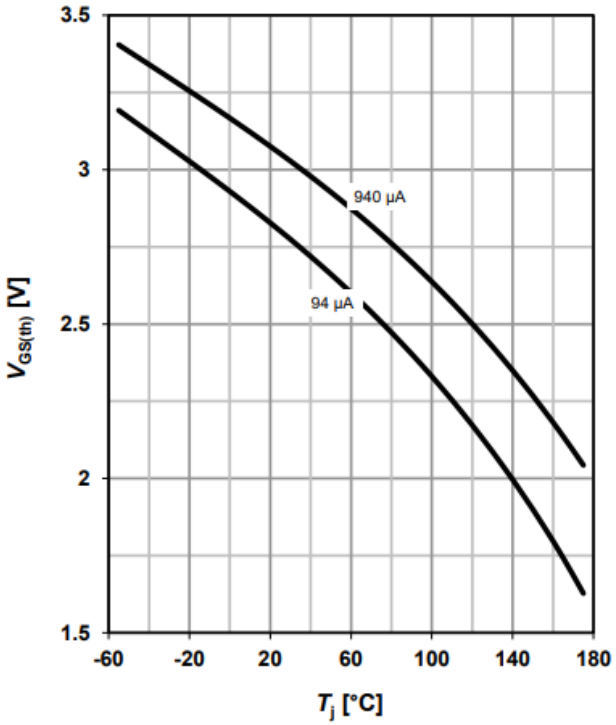
parameter: $I_D$, $V_{GS}$



### 9 典型栅极阈值电压

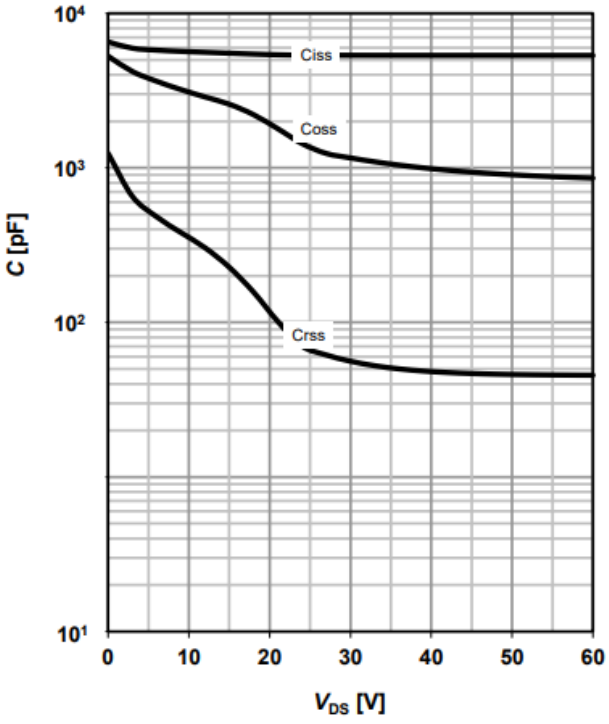
$V_{GS(th)} = f(T_j)$; $V_{GS} = V_{DS}$

parameter: $I_D$




### 10 典型电容值

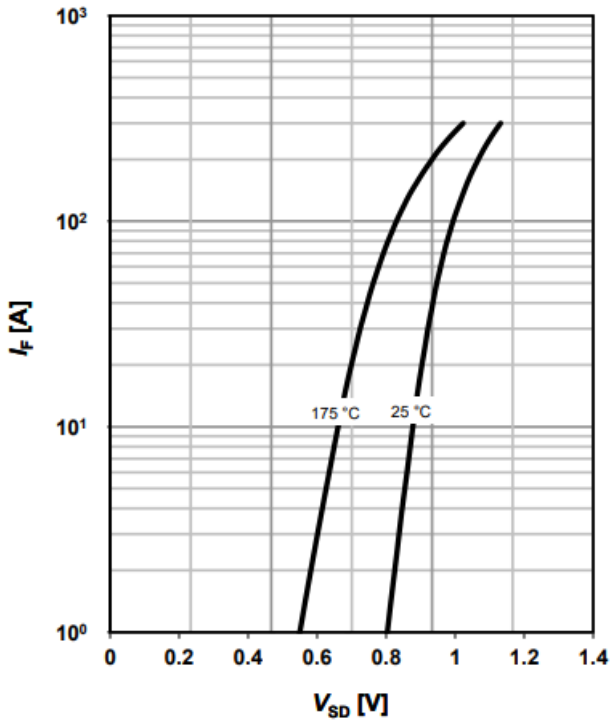
$C = f(V_{DS})$; $V_{GS} = 0$ V; $f = 1$ MHz




### 11 典型二极管正向导通特性

$I_F = f(V_{SD})$

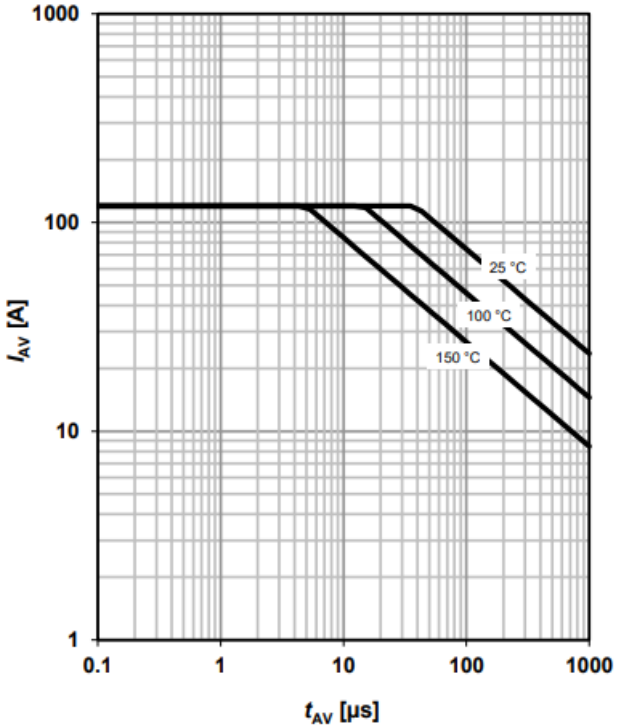
parameter: $T_j$




### 12 典型雪崩特性

$I_{AS} = f(t_{AV})$

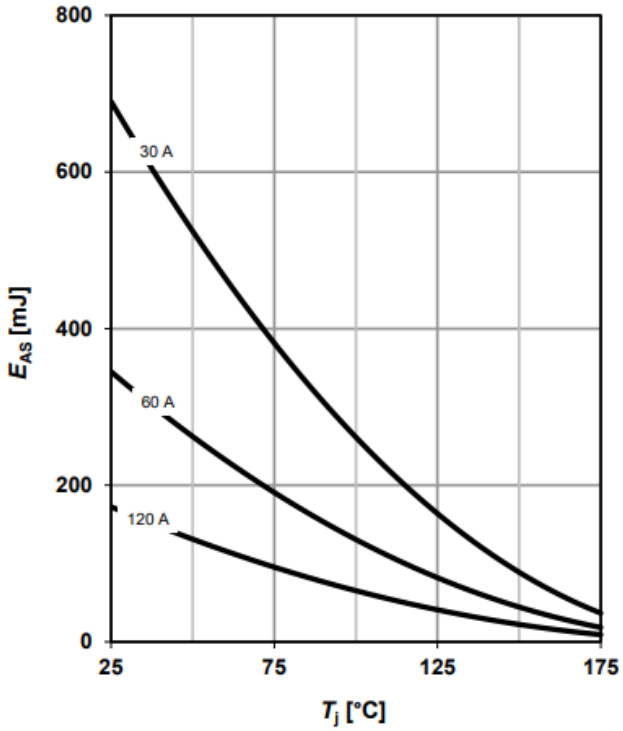
parameter: $T_{j(start)}$



## 13 典型雪崩能量

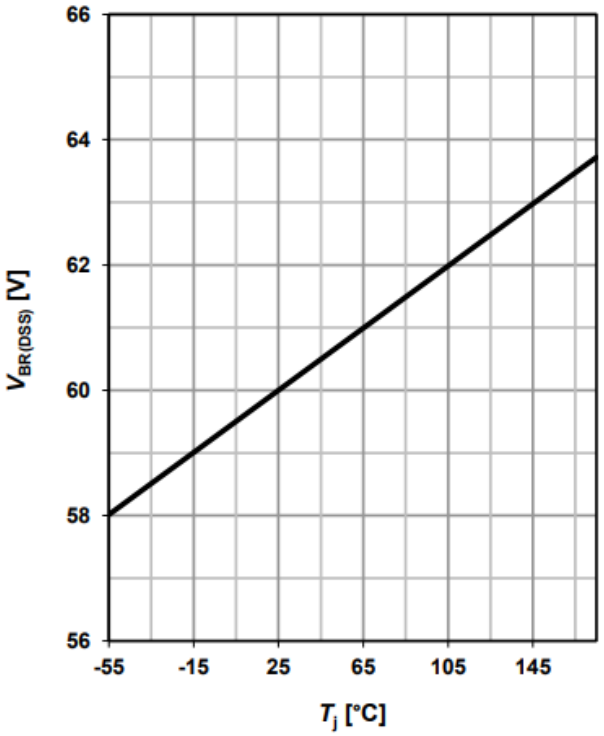
$E_{AS} = f(T_j)$

parameter: $I_D$




## 14 漏源击穿电压

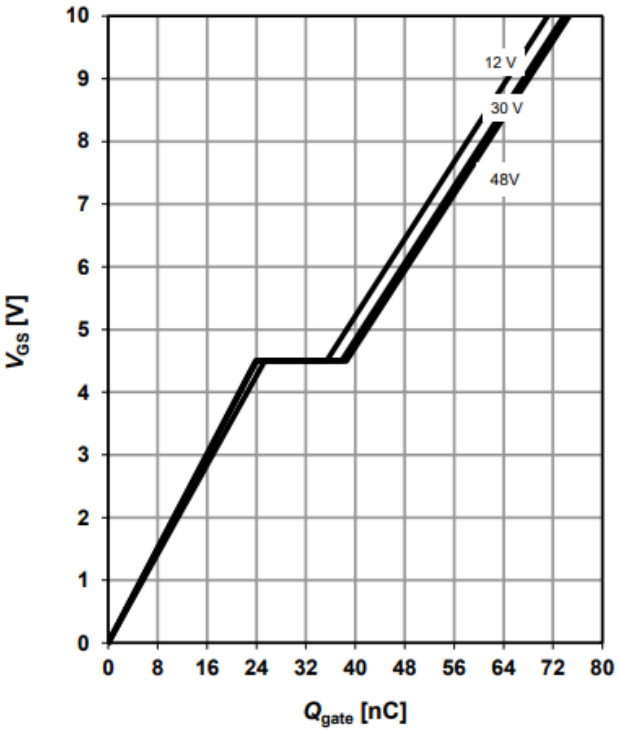
$V_{BR(DSS)} = f(T_j)$; $I_D = 1$ mA



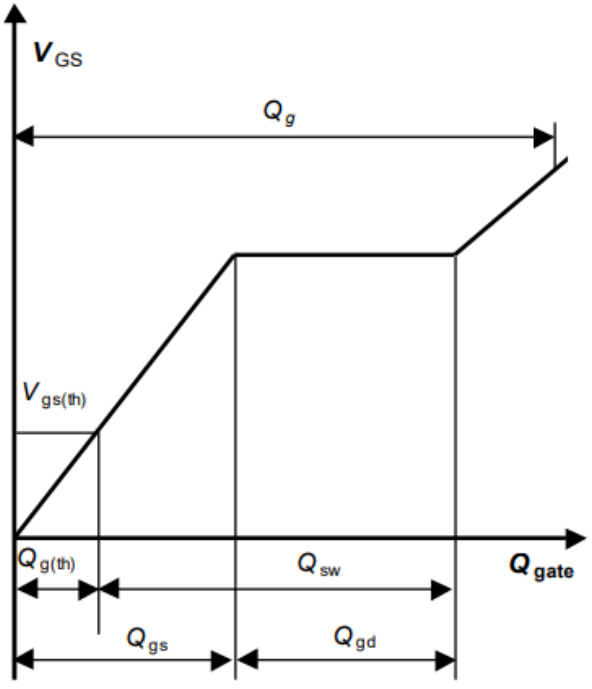

## 15 典型栅极电荷

$V_{GS} = f(Q_{gate})$; $I_D = 60$ A pulsed

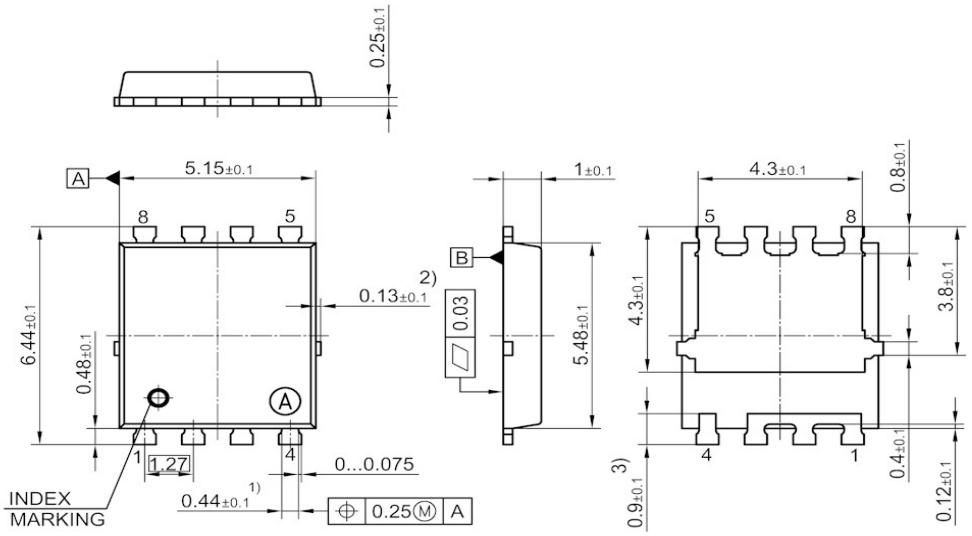
parameter: $V_{DD}$




## 16 栅极充电波形

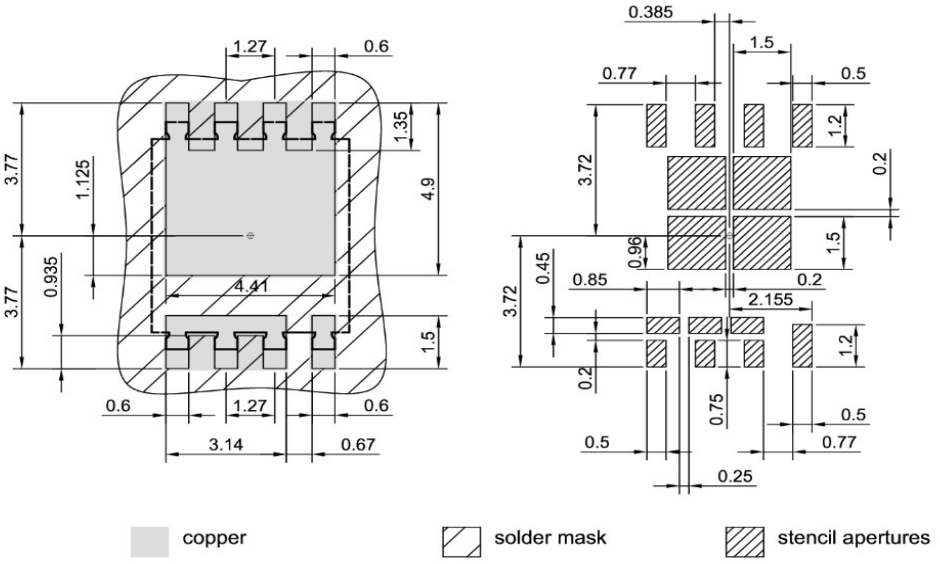


## 封装外形



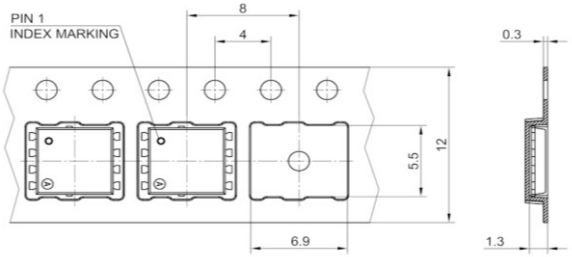

1) EXCLUDE MOLD FLASH
2) REMOVAL ON MOLD GATE, INTRUSION 0.1MM AND PROTRUSION 0.1MM
3) LEAD LENGTH UP TO ANTI FLASH LINE
4)ALL METAL SURFACE ARE PLATED, EXCEPT AREA OF CUT
ALL DIMENSIONS ARE IN UNITS MM
THE DRAWING IS IN COMPLIANCE WITH ISO 128 & PROJECTION METHOD 1 [ ]

## Footprint




All dimensions are in units mm

## 包装信息



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Revision History

| **Version** | Date | Changes |
|---|---|---|
| Revision 1.0 | 04.05.2020 | Final Data Sheet |

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