# OptiMOS™-5 Power-Transistor

AEC Qualified RoHS

## Features

- OptiMOS™ - power MOSFET for automotive applications
- N-channel - Enhancement mode - Logic Level
- MSL1 up to 260°C peak reflow
- 175°C operating temperature
- Green product (RoHS compliant)
- 100% Avalanche tested

## Quality Features

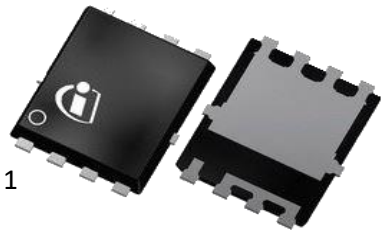
- Infineon Automotive Quality
- Extended qualification beyond AEC Q101
- Enhanced testing
- Advanced adhesion against delamination
- Complementary testing for board level reliability

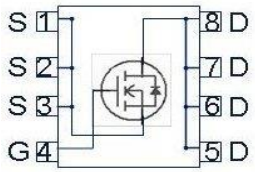
Advanced adhesion  Robust  Enhanced tested

## Product Summary

| | | |
|---|---|---|
| $V_{DS}$ | 80 | V |
| $R_{DS(on)}$ | 23 | mΩ |
| $I_D$ | 28 | A |

PG-TDSON-8




| Type | Package | Marking |
|---|---|---|
| IAUC28N08S5L230 | PG-TDSON-8 | 5N08L230 |

**Maximum ratings,** at $T_j$=25 °C, unless otherwise specified

| Parameter | Symbol | Conditions | Value | Unit |
|---|---|---|---|---|
| Continous drain current | $I_D$ | $T_C$=25°C, $V_{GS}$=10V | 28 | A |
| | | $T_C$=100 °C, $V_{GS}$=10 V[1)] | 20 | |
| Pulsed drain current[1)] | $I_{D,pulse}$ | $T_C$=25°C | 112 | |
| Avalanche energy, single pulse[1)] | $E_{AS}$ | $I_D$=14 A | 28 | mJ |
| Avalanche current, single pulse | $I_{AS}$ | - | 14 | A |
| Gate source voltage | $V_{GS}$ | - | ±20 | V |
| Power dissipation | $P_{tot}$ | $T_C$=25 °C | 38 | W |
| Operating and storage temperature | $T_j$, $T_{stg}$ | - | -55 ... +175 | °C |
| IEC climatic category; DIN IEC 68-1 | - | - | 55/175/56 | |



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| Parameter | Symbol | Conditions | Values | | | Unit |
|---|---|---|---|---|---|---|
| | | | min. | typ. | max. | |
| **Thermal characteristics**[1] | | | | | | |
| Thermal resistance, junction - case | $R_{thJC}$ | - | - | - | 3.9 | K/W |
| Thermal resistance, junction - ambient[2] | $R_{thJA}$ | - | - | 28.5 | - | |
| **Electrical characteristics,** at $T_j$=25 °C, unless otherwise specified | | | | | | |
| **Static characteristics** | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}$=0 V, $I_D$=1 mA | 80 | - | - | V |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=11 µA | 1.2 | 1.6 | 2.0 | |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$=80 V, $V_{GS}$=0 V, $T_j$=25 °C | - | - | 1 | µA |
| | | $V_{DS}$=80 V, $V_{GS}$=0 V, $T_j$=85 °C[1] | - | - | 100 | |
| Gate-source leakage current | $I_{GSS}$ | $V_{GS}$=20 V, $V_{DS}$=0 V | - | - | 100 | nA |
| Drain-source on-state resistance | $R_{DS(on)}$ | $V_{GS}$=4.5 V, $I_D$=14 A | - | 21 | 28 | mΩ |
| | | $V_{GS}$=10 V, $I_D$=14 A | - | 15 | 23 | |
| Gate resistance[1] | $R_G$ | - | - | 0.9 | - | Ω |

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| Parameter | Symbol | Conditions | Values | | | Unit |
|---|---|---|---|---|---|---|
| | | | min. | typ. | max. | |
| **Dynamic characteristics**[1] | | | | | | |
| Input capacitance | $C_{iss}$ | $V_{GS}$=0 V, $V_{DS}$=40 V, $f$=1 MHz | - | 667 | 867 | pF |
| Output capacitance | $C_{oss}$ | | - | 118 | 153 | |
| Reverse transfer capacitance | $C_{rss}$ | | - | 9.3 | 14 | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}$=40 V, $V_{GS}$=10 V, $I_D$=28 A, $R_G$=3.5 Ω | - | 2 | - | ns |
| Rise time | $t_r$ | | - | 1 | - | |
| Turn-off delay time | $t_{d(off)}$ | | - | 6 | - | |
| Fall time | $t_f$ | | - | 4 | - | |
| **Gate Charge Characteristics**[1] | | | | | | |
| Gate to source charge | $Q_{gs}$ | $V_{DD}$=40 V, $I_D$=14 A, $V_{GS}$=0 to 10 V | - | 2.1 | 2.7 | nC |
| Gate to drain charge | $Q_{gd}$ | | - | 2.5 | 3.7 | |
| Gate charge total | $Q_g$ | | - | 11.6 | 15.1 | |
| Gate plateau voltage | $V_{plateau}$ | | - | 3.1 | - | V |
| **Reverse Diode** | | | | | | |
| Diode continous forward current[1] | $I_S$ | $T_C$=25 °C | - | - | 28 | A |
| Diode pulse current[1] | $I_{S,pulse}$ | | - | - | 70 | |
| Diode forward voltage | $V_{SD}$ | $V_{GS}$=0 V, $I_F$=14 A, $T_j$=25 °C | - | 0.9 | 1.2 | V |
| Reverse recovery time[1] | $t_{rr}$ | $V_R$=40 V, $I_F$=28A, d$i_F$/d$t$=100 A/µs | - | 30 | - | ns |
| Reverse recovery charge[1] | $Q_{rr}$ | | - | 22 | - | nC |

[1] The parameter is not subject to production test - verified by design/chracterization.

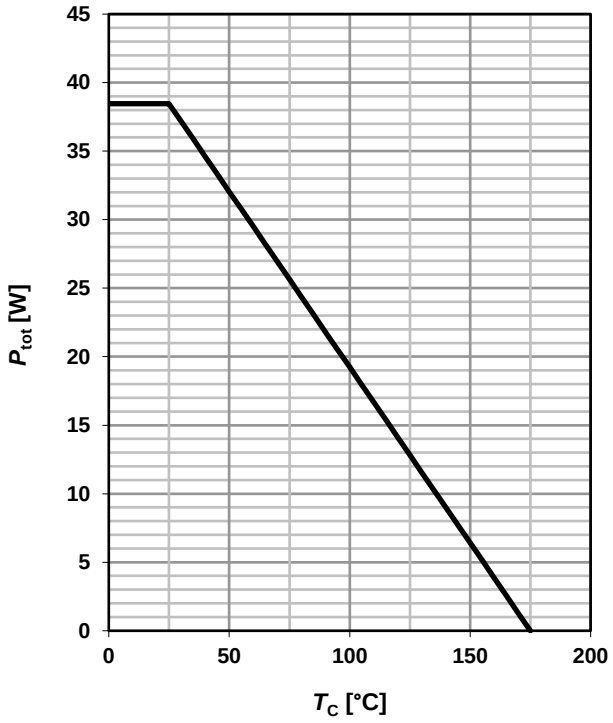
[2] Device on four layer 2s2p PCB defined in accordance with JEDEC standards (JESD51-5-7).
PCB is vertical in still air.



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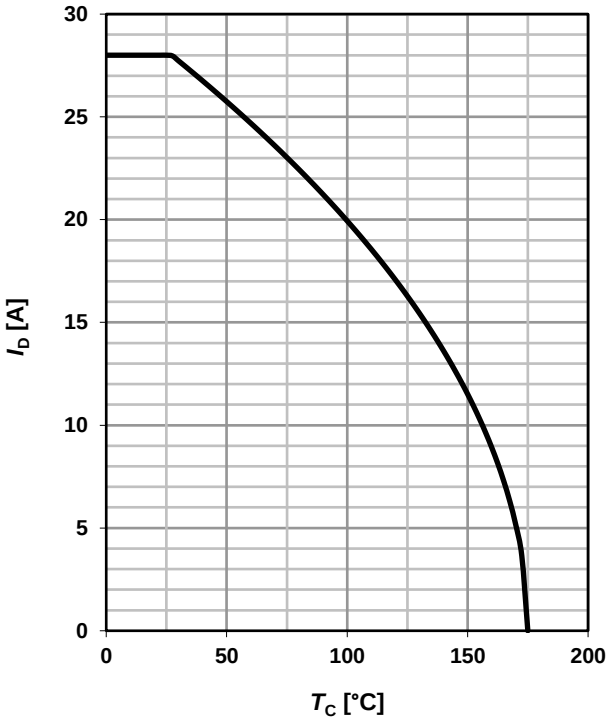
## 1 Power dissipation

$P_{tot} = f(T_C)$; $V_{GS} \geq 6$ V




## 2 Drain current

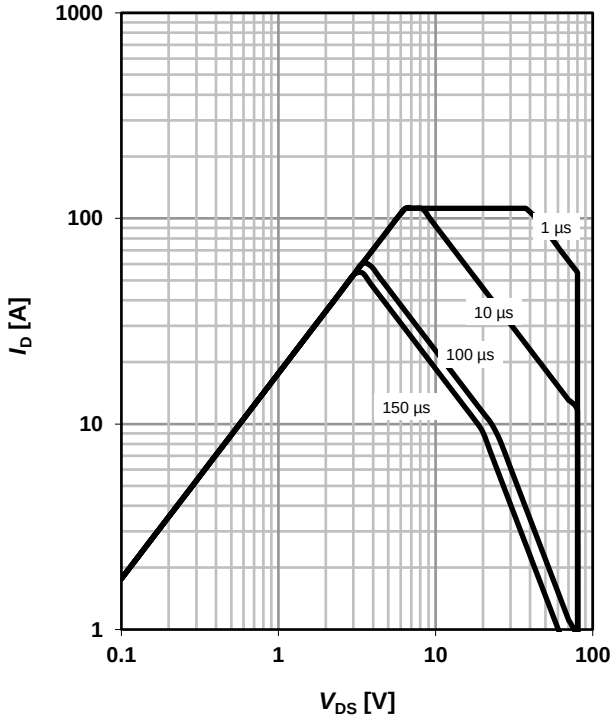
$I_D = f(T_C)$; $V_{GS} \geq 6$ V




## 3 Safe operating area

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

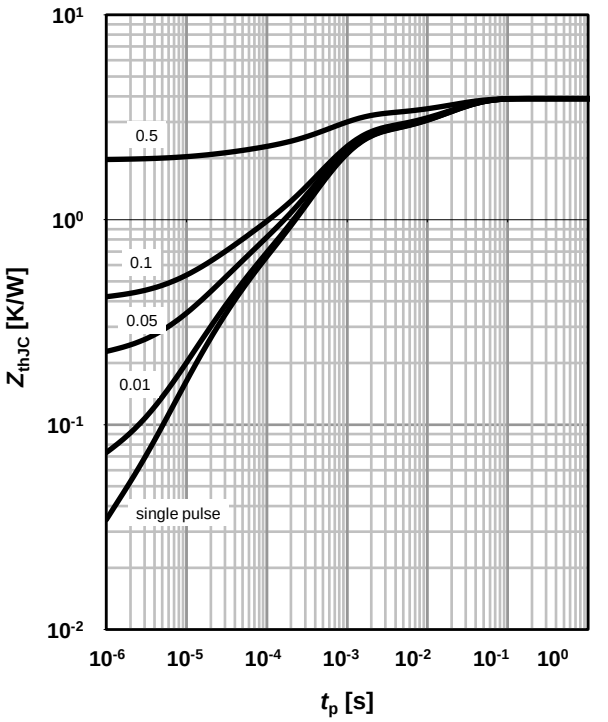
parameter: $t_p$




## 4 Max. transient thermal impedance

$Z_{thJC} = f(t_p)$

parameter: $D = t_p/T$



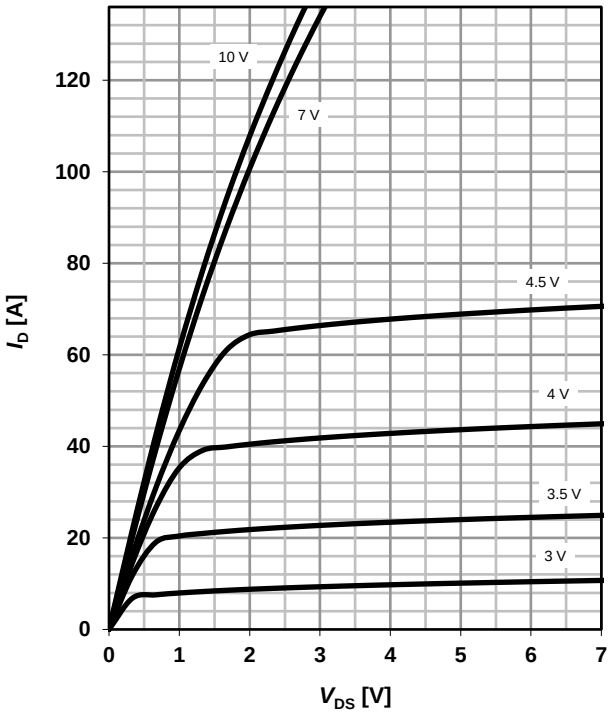



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## 5 Typ. output characteristics

$I_D = f(V_{DS})$; $T_j = 25$ °C

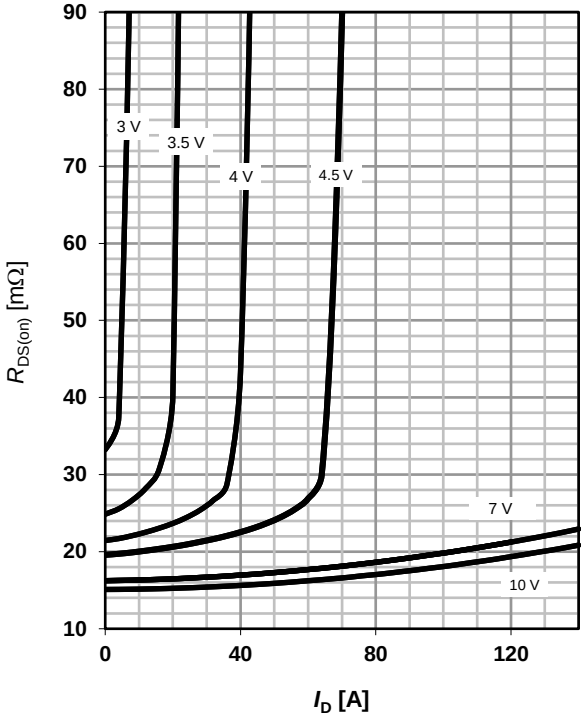
parameter: $V_{GS}$




## 6 Typ. drain-source on-state resistance

$R_{DS(on)} = (I_D)$; $T_j = 25$ °C

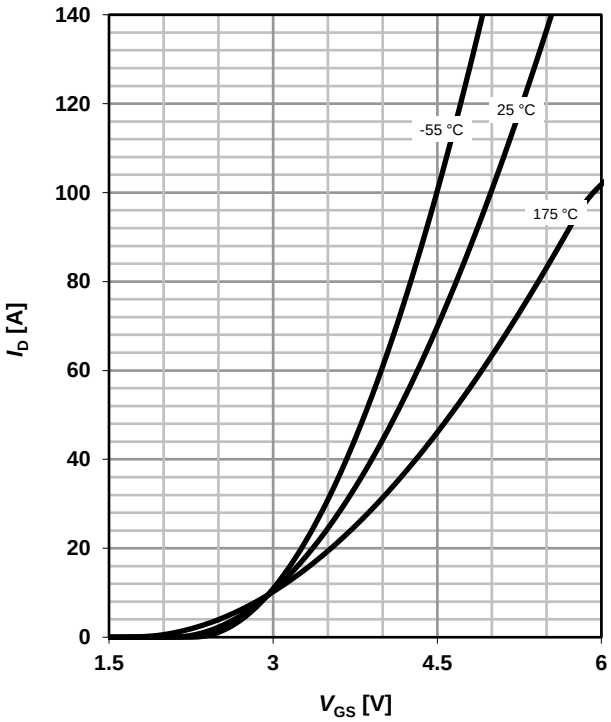
parameter: $V_{GS}$




## 7 Typ. transfer characteristics

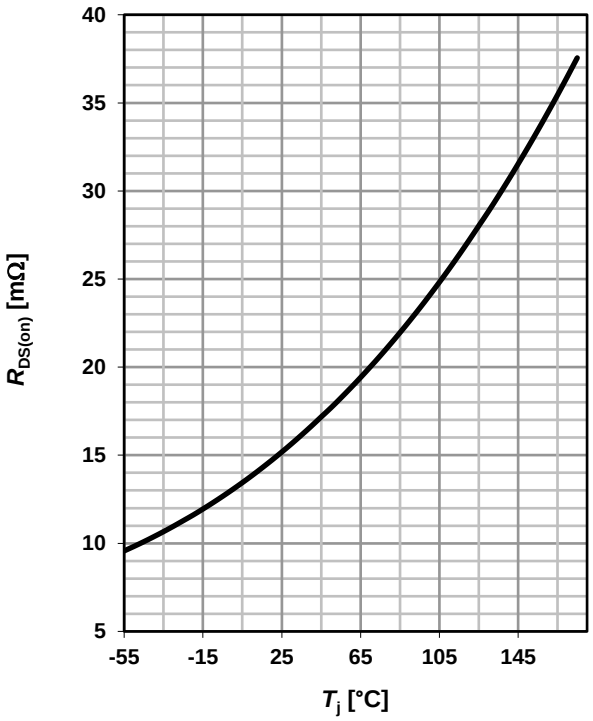
$I_D = f(V_{GS})$; $V_{DS} = 6$V

parameter: $T_j$




## 8 Typ. drain-source on-state resistance

$R_{DS(on)} = f(T_j)$; $I_D = 14$ A; $V_{GS} = 10$ V



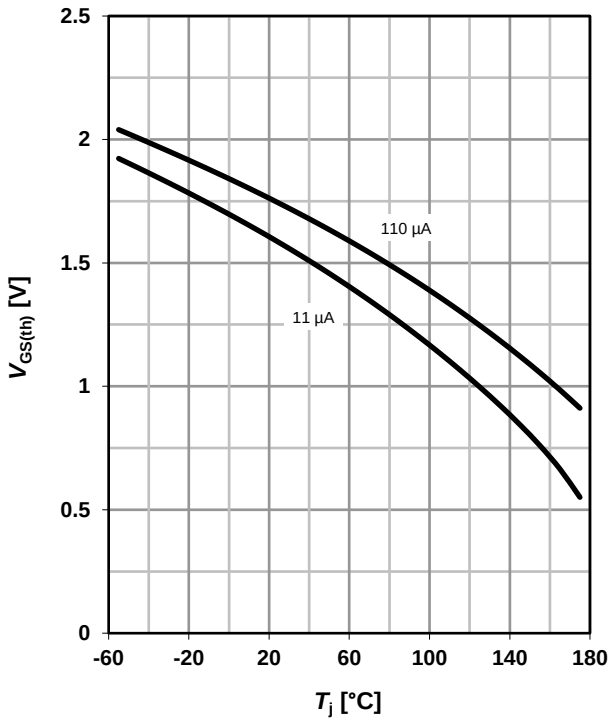



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### 9 Typ. gate threshold voltage

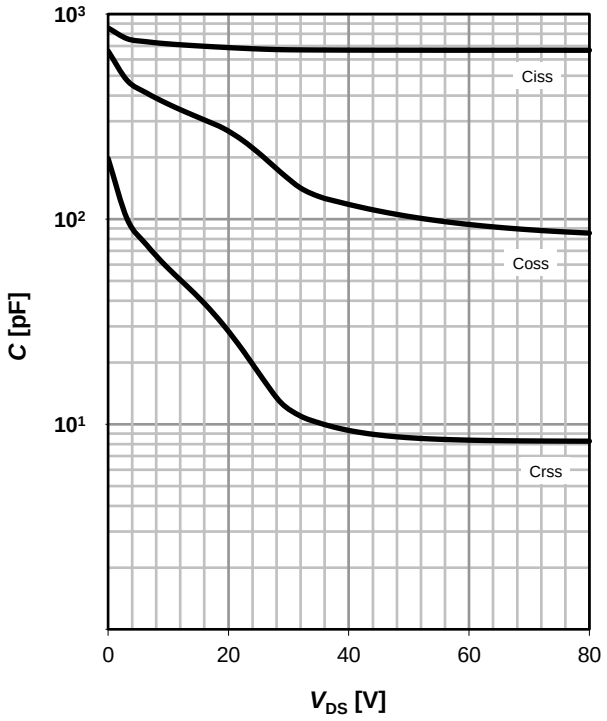
$V_{GS(th)} = f(T_j)$; $V_{GS} = V_{DS}$

parameter: $I_D$




### 10 Typ. capacitances

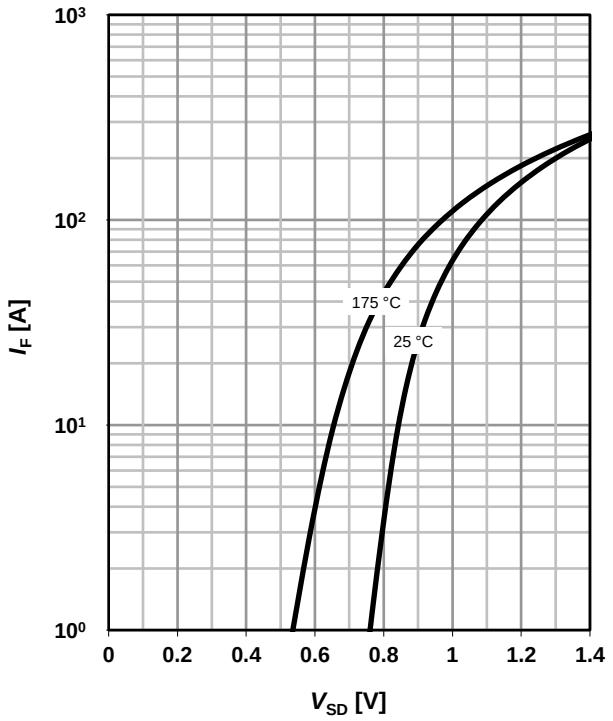
$C = f(V_{DS})$; $V_{GS} = 0$ V; $f$ = 1 MHz




### 11 Typical forward diode characteristicis

IF = f($V_{SD}$)

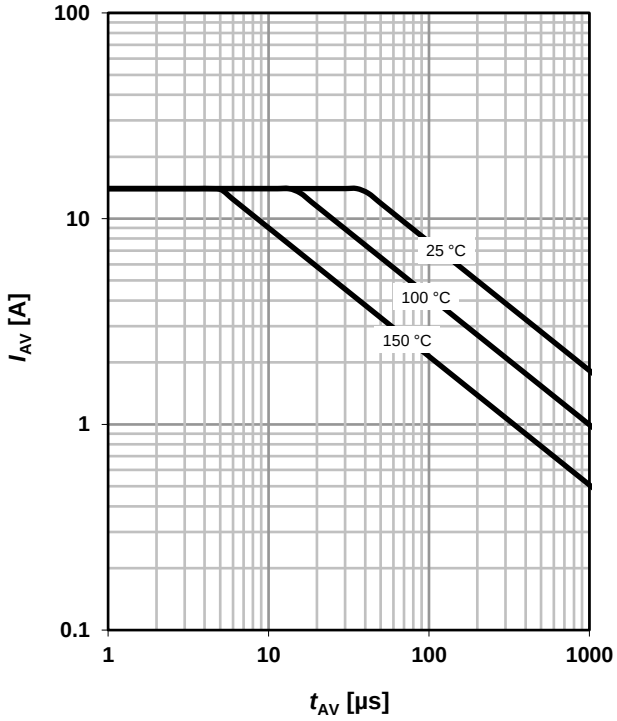
parameter: $T_j$




### 12 Typ. avalanche characteristics

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

parameter: $T_{j(start)}$



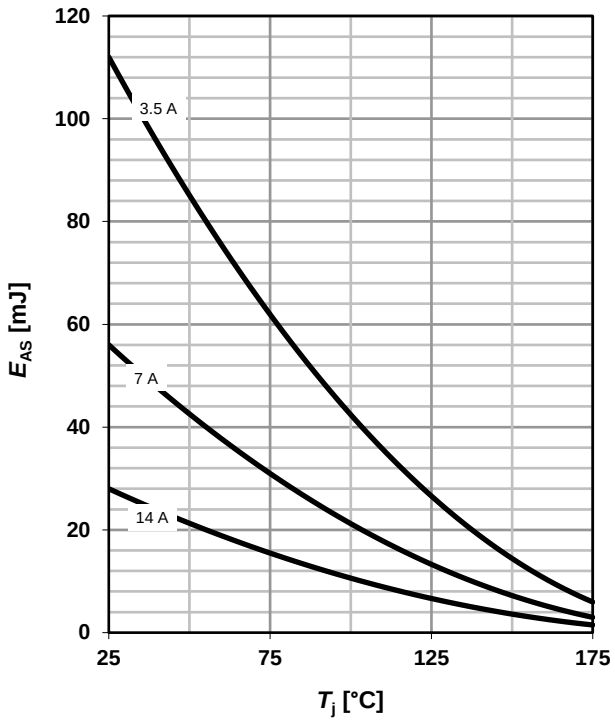



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## 13 Typical avalanche energy

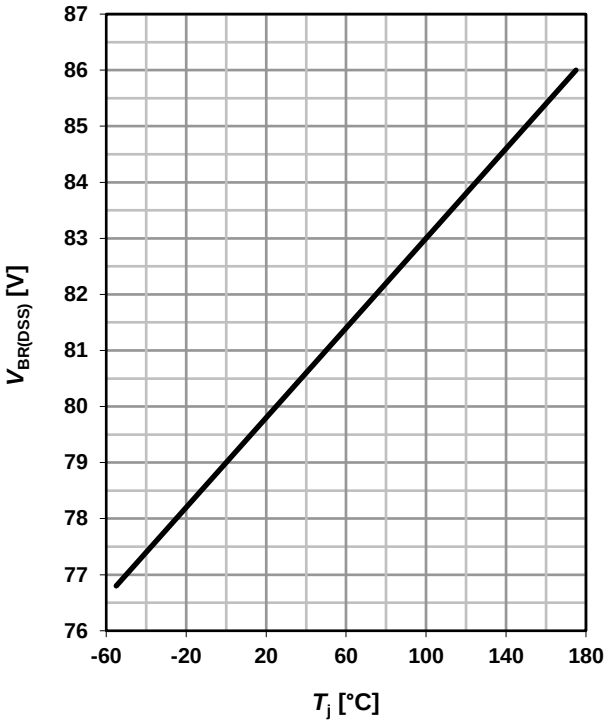
$E_{AS} = f(T_j)$

parameter: $I_D$




## 14 Drain-source breakdown voltage

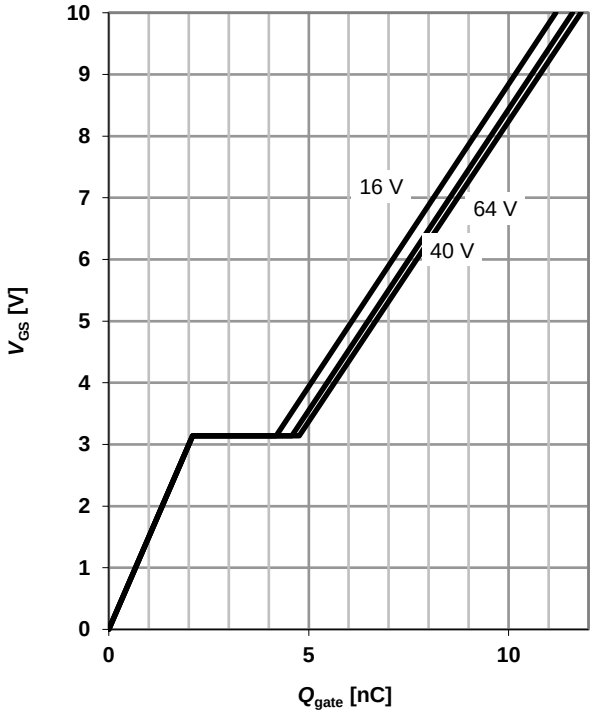
$V_{BR(DSS)} = f(T_j)$; $I_{D_typ} = 1$ mA



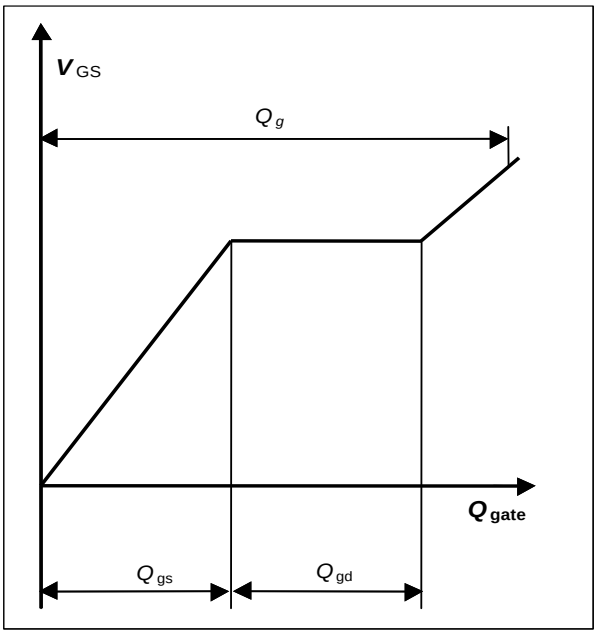

## 15 Typ. gate charge

$V_{GS} = f(Q_{gate})$; $I_D = 14$ A pulsed

parameter: $V_{DD}$



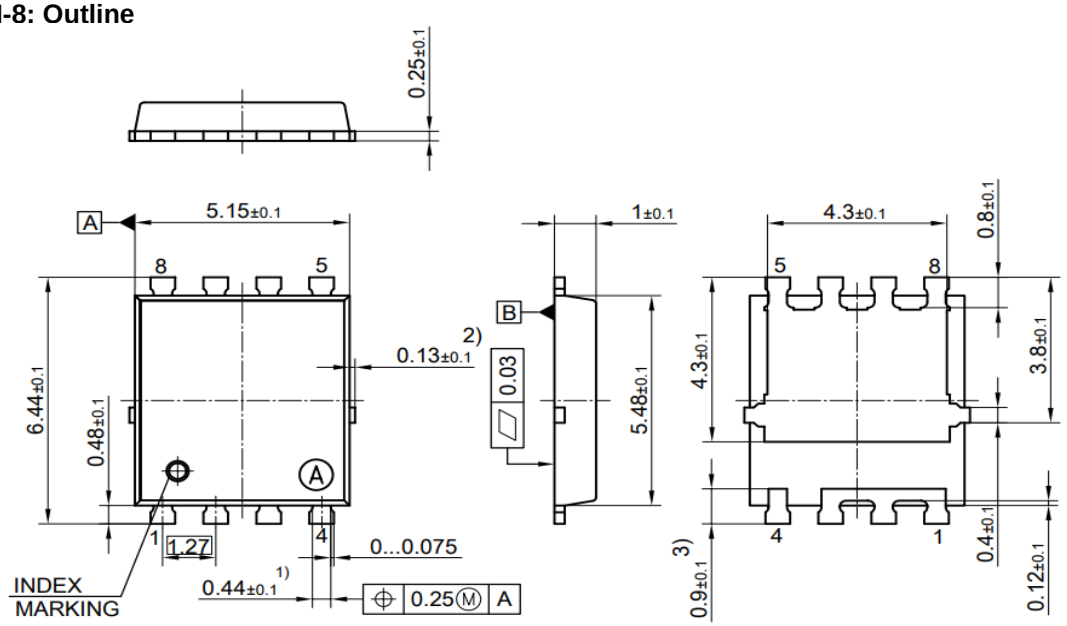

## 16 Gate charge waveforms





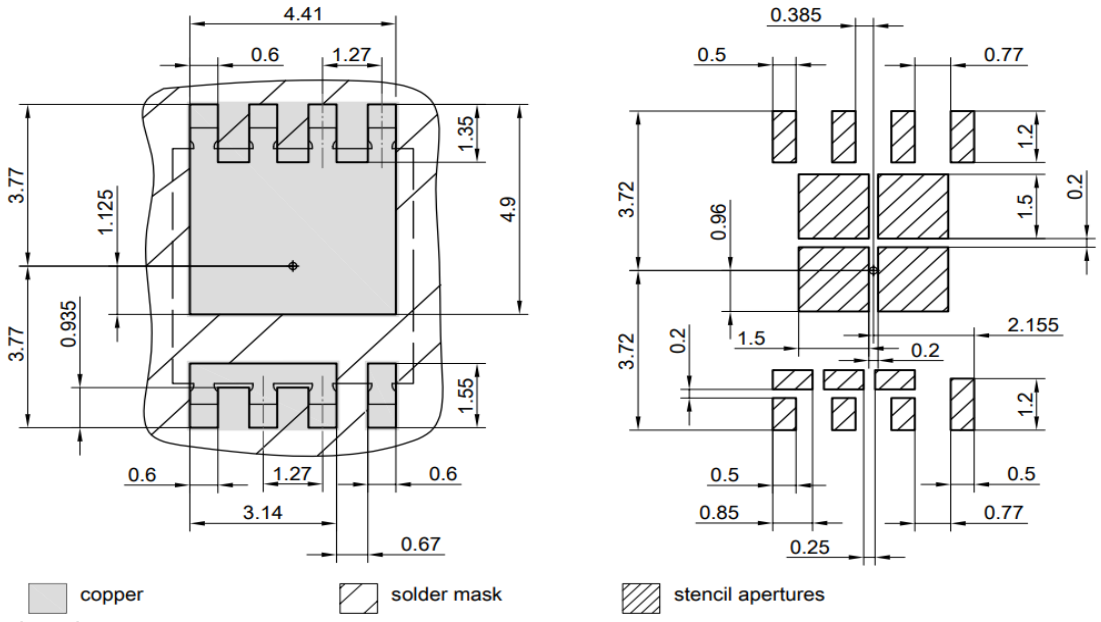

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## PG-TDSON-8: Outline



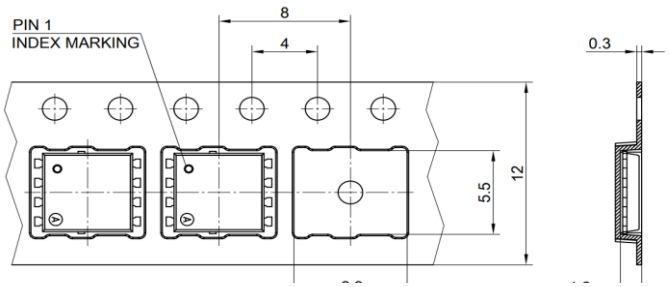

1) EXCLUDE MOLD FLASH
2) REMOVAL ON MOLD GATE, INTRUSION 0.1MM AND PROTRUSION 0.1MM
3) LEAD LENGTH UP TO ANTI FLASH LINE
4)ALL METAL SURFACE ARE PLATED, EXCEPT AREA OF CUT
ALL DIMENSIONS ARE IN UNITS MM
THE DRAWING IS IN COMPLIANCE WITH ISO 128 & PROJECTION METHOD 1 [ ]

## Footprint




Dimensions in mm

## Packaging






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