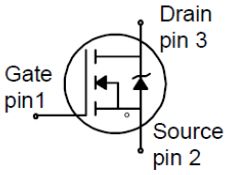
# OptiMOS™ Small-Signal-Transistor

## Features

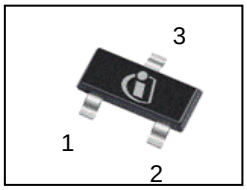
- N-channel
- Enhancement mode
- Logic level (4.5V rated)
- Avalanche rated
- Qualified according to AEC Q101
- 100% lead-free; RoHS compliant; Halogen free

## Product Summary

| | | | |
|---|---|---|---|
| $V_{DS}$ | | 100 | V |
| $R_{DS(on),max}$ | $V_{GS}$=10 V | 6 | Ω |
| | $V_{GS}$=4.5 V | 10 | |
| $I_D$ | | 0.19 | A |


PG-SOT23




| Type | Package | Tape and Reel Information | Marking | Halogen free | Packing |
|---|---|---|---|---|---|
| BSS119N | SOT23 | H6327: 3000 pcs/ reel | sSH | Yes | Non dry |

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

| Parameter | Symbol | Conditions | Value | Unit |
|---|---|---|---|---|
| Continuous drain current | $I_D$ | $T_A$=25 °C | 0.19 | A |
| | | $T_A$=70 °C | 0.15 | |
| Pulsed drain current | $I_{D,pulse}$ | $T_A$=25 °C | 0.77 | |
| Avalanche energy, single pulse | $E_{AS}$ | $I_D$=0.19 A, $R_{GS}$=25 Ω | 2.0 | mJ |
| Reverse diode d$v$/d$t$ | d$v$/d$t$ | $I_D$=0.19 A, $V_{DS}$=80 V, d$i$/d$t$=200 A/µs, $T_{j,max}$=150 °C | 6 | kV/µs |
| Gate source voltage | $V_{GS}$ | | ±20 | V |
| Power dissipation[1)] | $P_{tot}$ | $T_A$=25 °C | 0.5 | W |
| Operating and storage temperature | $T_j$, $T_{stg}$ | | -55 ... 150 | °C |
| ESD Class | | JESD22-A114 -HBM | 0 (<250V) | |
| Soldering Temperature | | | 260 °C | |
| IEC climatic category; DIN IEC 68-1 | | | 55/150/56 | |

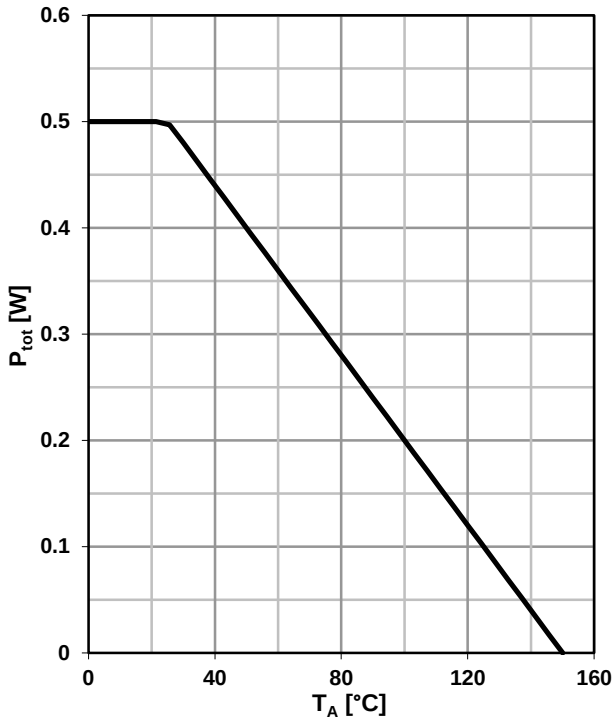
| Parameter | Symbol | Conditions | Values | | | Unit |
|---|---|---|---|---|---|---|
| | | | min. | typ. | max. | |
| **Thermal characteristics** | | | | | | |
| Thermal resistance, junction - ambient | $R_{thJA}$ | minimal footprint [1] | - | - | 250 | K/W |
| **Electrical characteristics,** at $T_j$=25 °C, unless otherwise specified | | | | | | |
| **Static characteristics** | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}$=0 V, $I_D$=250 µA | 100 | - | - | V |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}$=Vgs V, $I_D$=13 µA | 1.3 | 1.9 | 2.3 | |
| Drain-source leakage current | $I_{DSS}$ | $V_{DS}$=100 V, $V_{GS}$=0 V, $T_j$=25 °C | - | - | 0.01 | µA |
| | | $V_{DS}$=100 V, $V_{GS}$=0 V, $T_j$=150 °C | - | - | 5 | |
| Gate-source leakage current | $I_{GSS}$ | $V_{GS}$=20 V, $V_{DS}$=0 V | - | - | 10 | nA |
| Drain-source on-state resistance | $R_{DS(on)}$ | $V_{GS}$=4.5 V, $I_D$=0.15 A | - | 2915 | 10000 | mΩ |
| | | $V_{GS}$=10 V, $I_D$=0.19 A | - | 2406 | 6000 | |
| Transconductance | $g_{fs}$ | $\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, $I_D$=0.15 A | | 0.35 | - | S |

[1] Performed on 40mm² FR4 PCB. The traces are 1mm wide, 70µm thick and 20mm long; they are present on both sides of the PCB

| Parameter | Symbol | Conditions | Values | | | Unit |
|---|---|---|---|---|---|---|
| | | | min. | typ. | max. | |
| **Dynamic characteristics** | | | | | | |
| Input capacitance | $C_{iss}$ | $V_{GS}$=0 V, $V_{DS}$=25 V, $f$=1 MHz | - | 15.7 | 20.9 | pF |
| Output capacitance | $C_{oss}$ | | - | 3.4 | 4.5 | |
| Reverse transfer capacitance | $C_{rss}$ | | - | 2.1 | 3.1 | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}$=50 V, $V_{GS}$=10 V, $I_D$=0.19 A, $R_G$=6 Ω | - | 2.7 | - | ns |
| Rise time | $t_r$ | | - | 3.3 | - | |
| Turn-off delay time | $t_{d(off)}$ | | - | 7.0 | - | |
| Fall time | $t_f$ | | - | 18.8 | - | |
| Gate Charge Characteristics | | | | | | |
| Gate to source charge | $Q_{gs}$ | $V_{DD}$=50 V, $I_D$=0.19 A, $V_{GS}$=0 to 10 V | - | 0.05 | - | nC |
| Gate to drain charge | $Q_{gd}$ | | - | 0.25 | - | |
| Gate charge total | $Q_g$ | | - | 0.6 | - | |
| Gate plateau voltage | $V_{plateau}$ | | - | 3.2 | - | V |
| **Reverse Diode** | | | | | | |
| Diode continous forward current | $I_S$ | $T_A$=25 °C | - | - | 0.19 | A |
| Diode pulse current | $I_{S,pulse}$ | | - | - | 0.77 | |
| Diode forward voltage | $V_{SD}$ | $V_{GS}$=0 V, $I_F$=0.19 A, $T_j$=25 °C | - | 0.8 | 1.1 | V |
| Reverse recovery time | $t_{rr}$ | $V_R$=50 V, $I_F$=0.19 A, d$i_F$/d$t$ =100 A/µs | - | 12 | - | ns |
| Reverse recovery charge | $Q_{rr}$ | | - | 5 | - | nC |

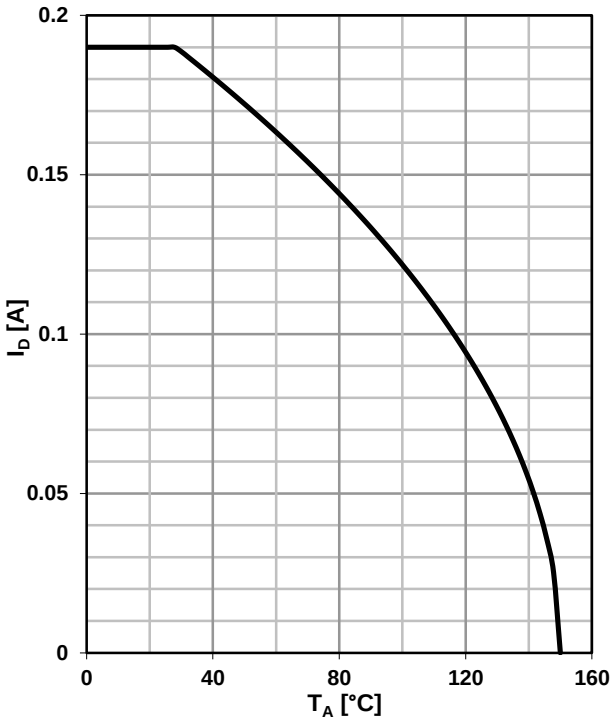
## 1 Power dissipation

$P_{tot}=f(T_A)$




## 2 Drain current

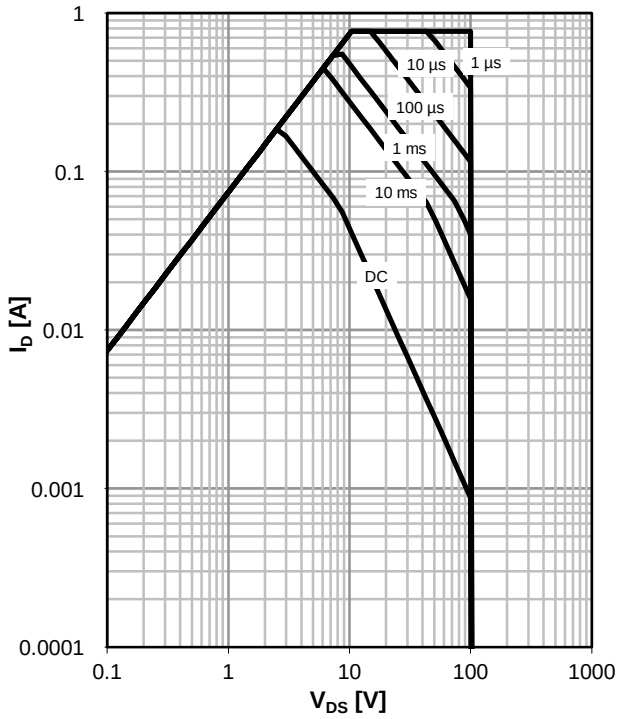
$I_D=f(T_A)$; $V_{GS}\geq 10$ V




## 3 Safe operating area

$I_D=f(V_{DS})$; $T_A=25$ °C; $D=0$

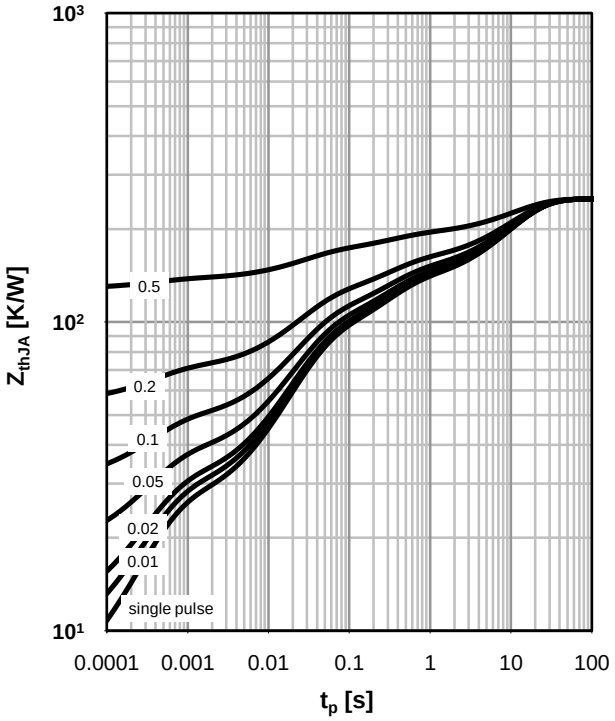
parameter: $t_p$




## 4 Max. transient thermal impedance

$Z_{thJA}=f(t_p)$

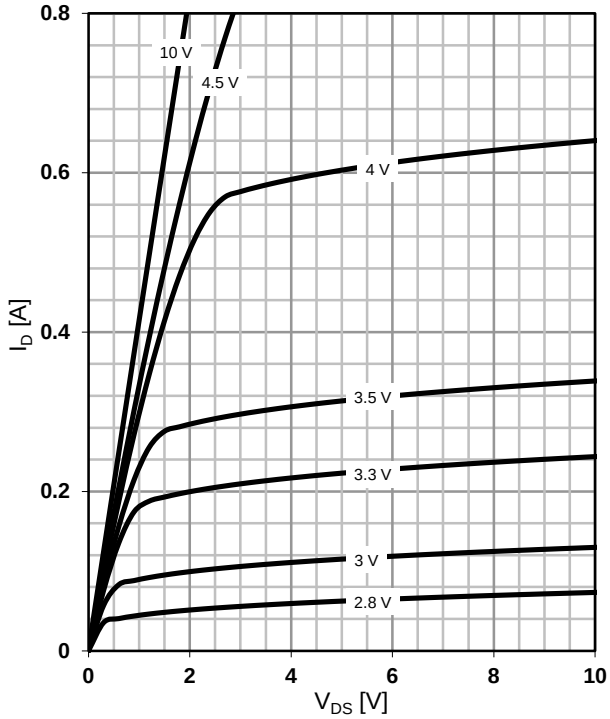
parameter: $D=t_p/T$



## 5 Typ. output characteristics

$I_D=f(V_{DS})$; $T_j=25$ °C

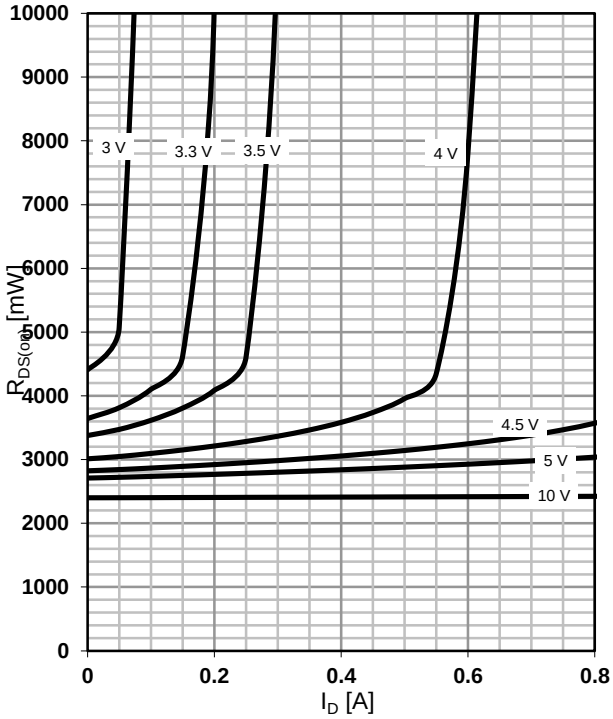
parameter: $V_{GS}$




## 6 Typ. drain-source on resistance

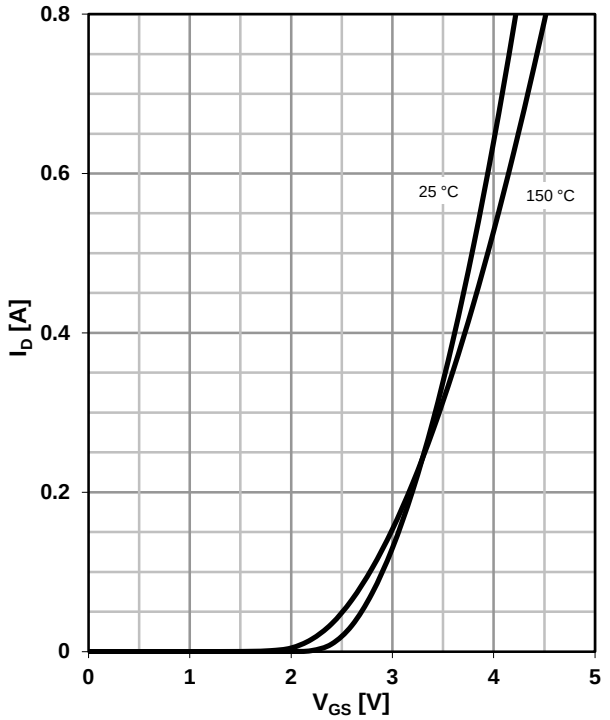
$R_{DS(on)}=f(I_D)$; $T_j=25$ °C

parameter: $V_{GS}$



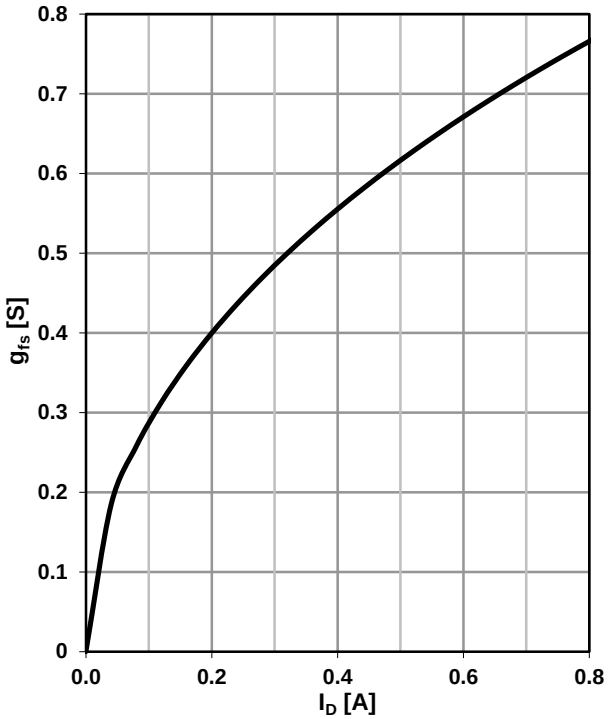

## 7 Typ. transfer characteristics

$I_D=f(V_{GS})$; $|V_{DS}|>2|I_D|R_{DS(on)max}$



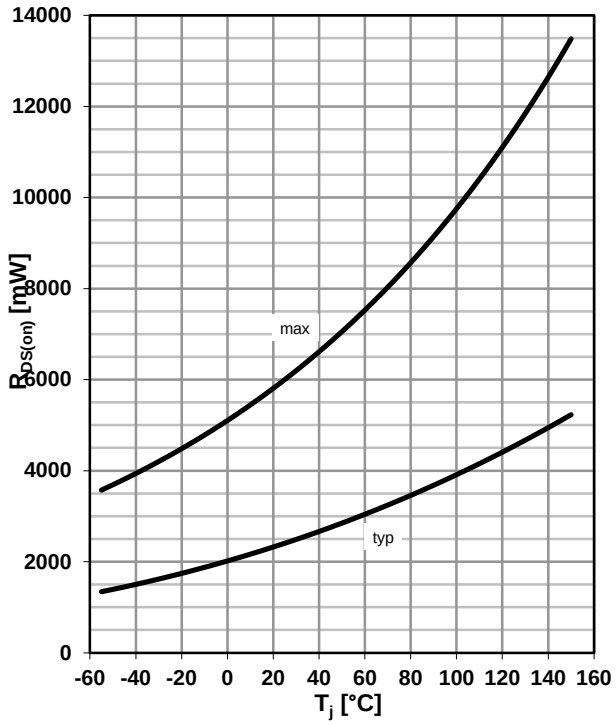

## 8 Typ. forward transconductance

$g_{fs}=f(I_D)$; $T_j=25$ °C



### 9 Drain-source on-state resistance

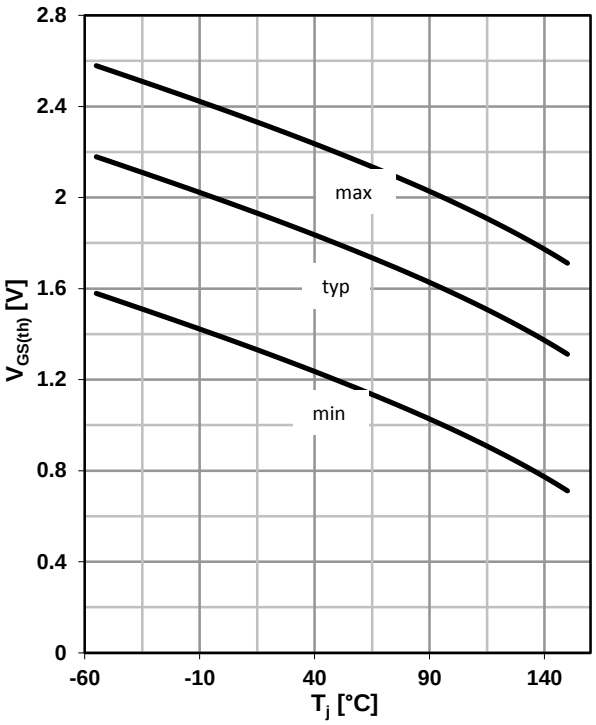
$R_{DS(on)}=f(T_j)$; $I_D=0.19$ A; $V_{GS}=10$ V




### 10 Typ. gate threshold voltage

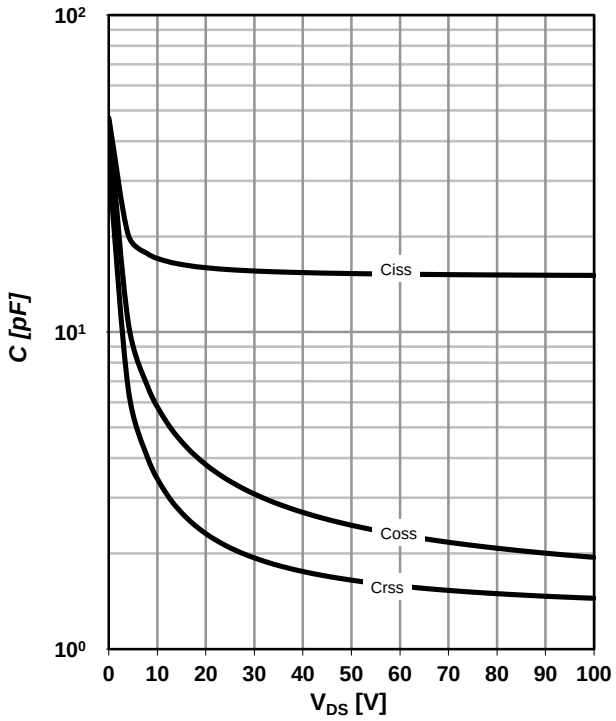
$V_{GS(th)}=f(T_j)$; $V_{DS}=V_{GS}$; $I_D=13$ µA

parameter: $I_D$




### 11 Typ. capacitances

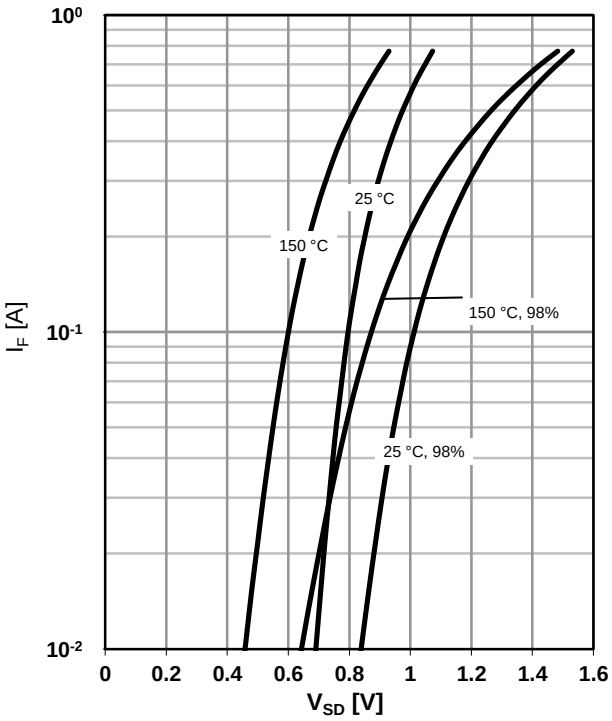
$C=f(V_{DS})$; $V_{GS}=0$ V; $f=1$ MHz; $T_j=25$°C




### 12 Forward characteristics of reverse diode

$I_F=f(V_{SD})$

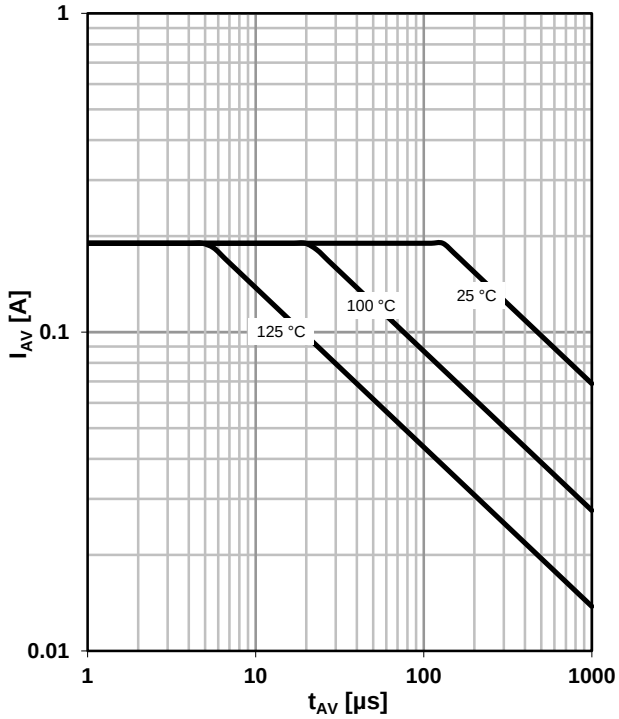
parameter: $T_j$



## 13 Avalanche characteristics

$I_{AS}$=f($t_{AV}$); $R_{GS}$=25 Ω

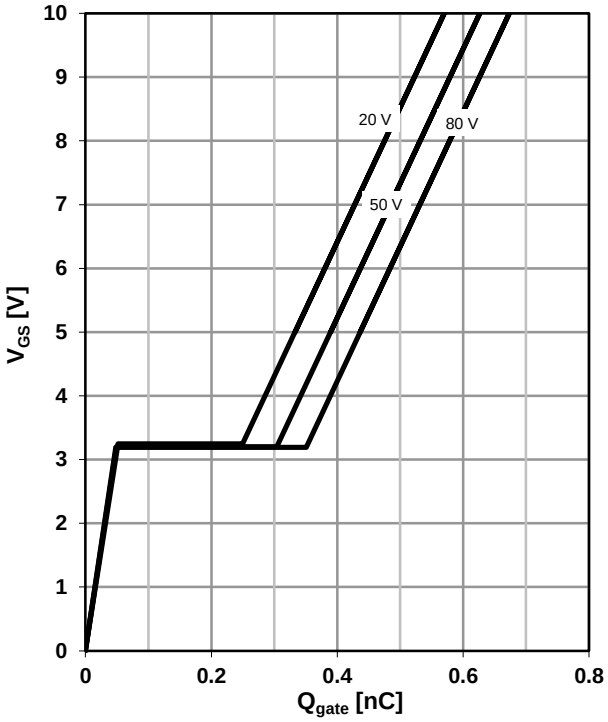
parameter: $T_{j(start)}$




## 14 Typ. gate charge

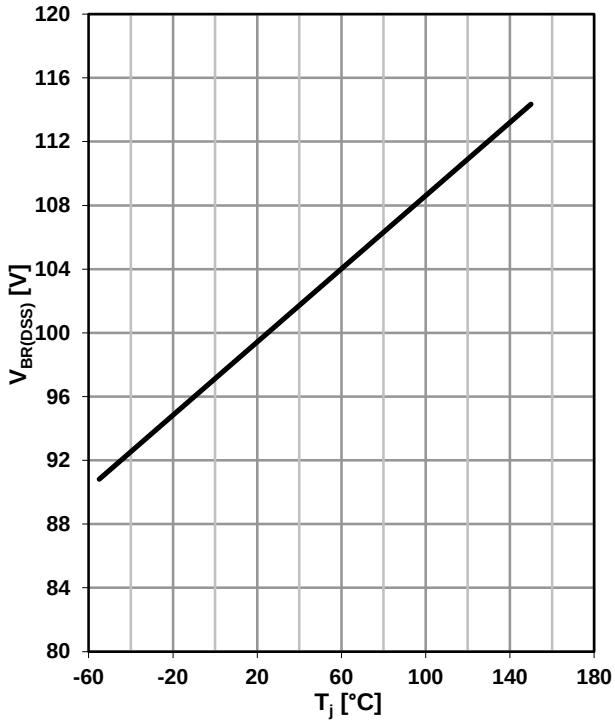
$V_{GS}$=f($Q_{gate}$); $I_D$=0.19 A pulsed

parameter: $V_{DD}$

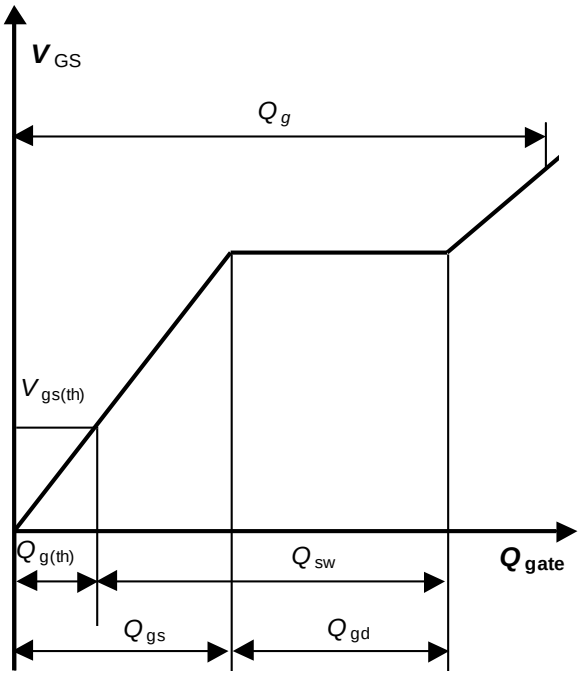



## 15 Drain-source breakdown voltage

$V_{BR(DSS)}$=f($T_j$); $I_D$=250 µA

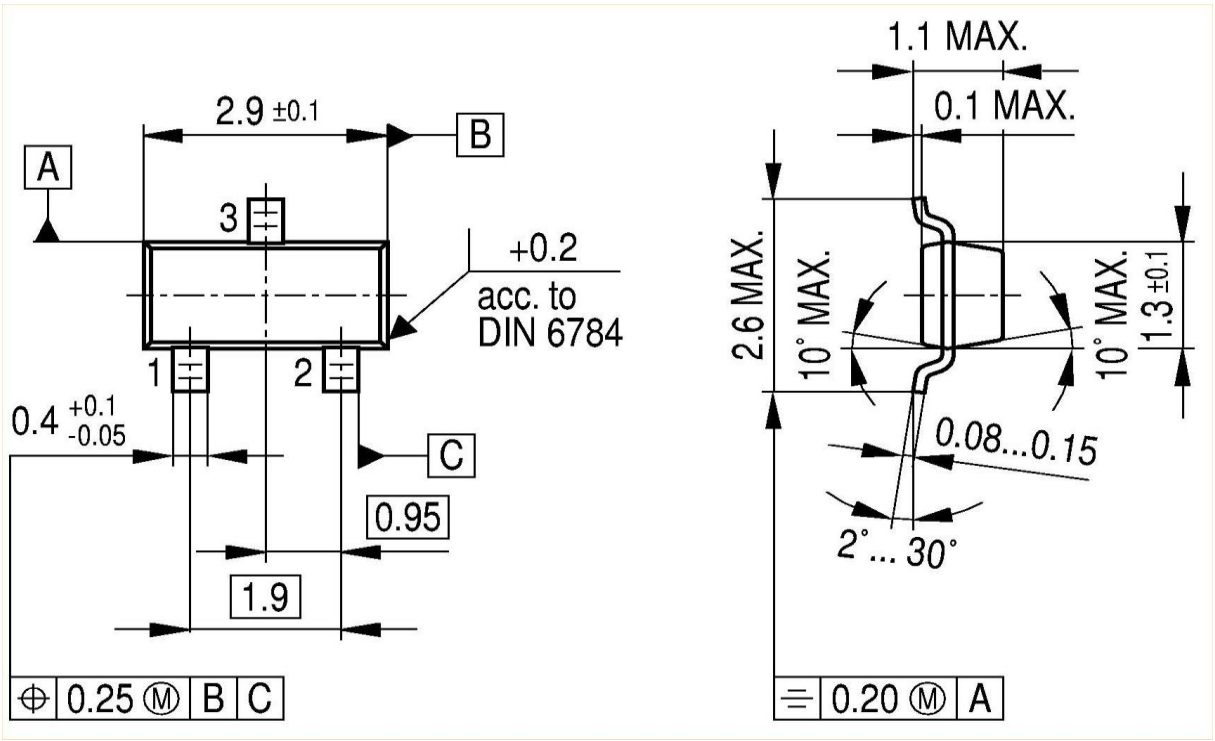



## 16 Gate charge waveforms

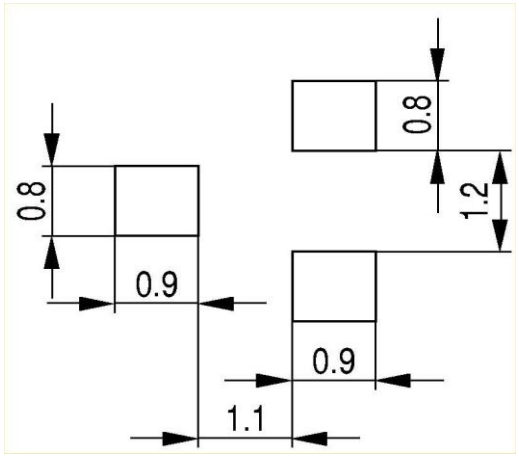


**SOT23**

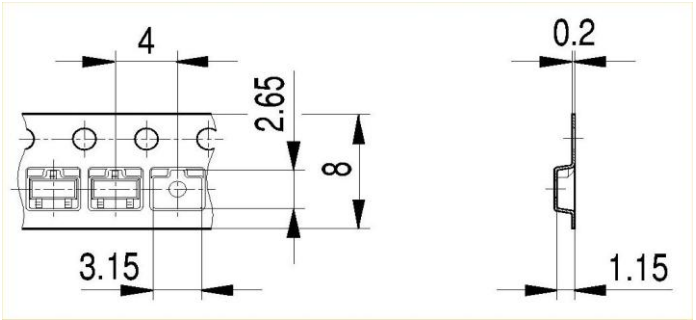
**Package Outline:**




**Footprint:**




**Packaging:**




Dimensions in mm

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