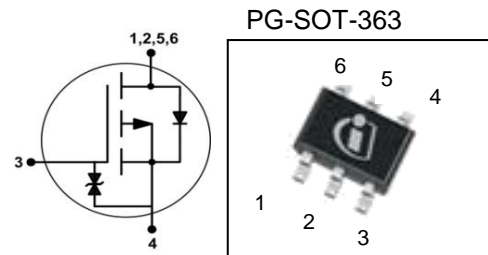


OptiMOS™-P 3 Small-Signal-Transistor
Features

- P-channel
- Enhancement mode
- Logic level (4.5V rated)
- ESD protected
- Qualified according AEC Q101
- 100% Lead-free; RoHS compliant
- Halogen-free according to IEC61249-2-21


Product Summary

| | | |
|------------------|------------------------|-----|
| V_{DS} | 30 | V |
| $R_{DS(on),max}$ | $V_{GS}=-10\text{ V}$ | 140 |
| | $V_{GS}=-4.5\text{ V}$ | 230 |
| I_D | -1.5 | A |



| Type | Package | Tape and Reel Information | Marking | Lead Free | Packing |
|-----------|------------|---------------------------|---------|-----------|---------|
| BSD314SPE | PG-SOT-363 | L6327: 3000 pcs/ reel | XD5 | Yes | Non dry |

Maximum ratings, at $T_j=25\text{ °C}$, unless otherwise specified

| Parameter | Symbol | Conditions | Value | Unit |
|-------------------------------------|----------------|--|------------------------|--------------------|
| Continuous drain current | I_D | $T_A=25\text{ °C}$ | -1.5 | A |
| | | $T_A=70\text{ °C}$ | -1.2 | |
| Pulsed drain current | $I_{D,pulse}$ | $T_A=25\text{ °C}$ | -6.1 | |
| Avalanche energy, single pulse | E_{AS} | $I_D=-1.5\text{ A}$, $R_{GS}=25\ \Omega$ | 6 | mJ |
| Reverse diode dv/dt | dv/dt | $I_D=-1.5\text{ A}$, $V_{DS}=-16\text{ V}$, $di/dt=-200\text{ A}/\mu\text{s}$, $T_{j,max}=150\text{ °C}$ | 6 | kV/ μs |
| Gate source voltage | V_{GS} | | ± 20 | V |
| Power dissipation ¹⁾ | P_{tot} | $T_A=25\text{ °C}$ | 0.5 | W |
| Operating and storage temperature | T_j, T_{stg} | | -55 ... 150 | $^{\circ}\text{C}$ |
| ESD Class | | JESD22-A114 -HBM | 1000V to 2000V | |
| Soldering Temperature | | | 260 $^{\circ}\text{C}$ | $^{\circ}\text{C}$ |
| IEC climatic category; DIN IEC 68-1 | | | 55/150/56 | $^{\circ}\text{C}$ |

| 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 $T_j=25\text{ °C}$, unless otherwise specified
Static characteristics

| | | | | | | |
|----------------------------------|---------------|---|-----|------|------|-----------|
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=-250\mu A$ | -30 | - | - | V |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=-6.3\mu A$ | -1 | -1.5 | -2 | |
| Drain-source leakage current | I_{DSS} | $V_{DS}=-30V, V_{GS}=0V, T_j=25\text{ °C}$ | - | - | -1 | μA |
| | | $V_{DS}=-30V, V_{GS}=0V, T_j=150\text{ °C}$ | - | - | -100 | |
| Gate-source leakage current | I_{GSS} | $V_{GS}=-20V, V_{DS}=0V$ | - | - | -5 | μA |
| Drain-source on-state resistance | $R_{DS(on)}$ | $V_{GS}=-4.5V, I_D=-1.2A$ | - | 153 | 230 | $m\Omega$ |
| | | $V_{GS}=-10V, I_D=-1.5A$ | - | 107 | 140 | |
| Transconductance | g_{fs} | $ V_{DS} >2 I_D R_{DS(on)max}, I_D=-1.2A$ | | 3 | - | S |

¹⁾ Performed on 40mm² FR4 PCB. The traces are 1mm wide, 70 μ m 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} | $V_{GS}=0\text{ V}$, $V_{DS}=-15\text{ V}$, $f=1\text{ MHz}$ | - | 221 | 294 | pF |
| Output capacitance | C_{oss} | | - | 126 | 168 | |
| Reverse transfer capacitance | C_{rss} | | - | 7 | 11 | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}=-15\text{ V}$, $V_{GS}=-10\text{ V}$, $I_D=-1.5\text{ A}$, $R_G=6\ \Omega$ | - | 5.1 | - | ns |
| Rise time | t_r | | - | 3.9 | - | |
| Turn-off delay time | $t_{d(off)}$ | | - | 12.4 | - | |
| Fall time | t_f | | - | 2.8 | - | |

Gate Charge Characteristics

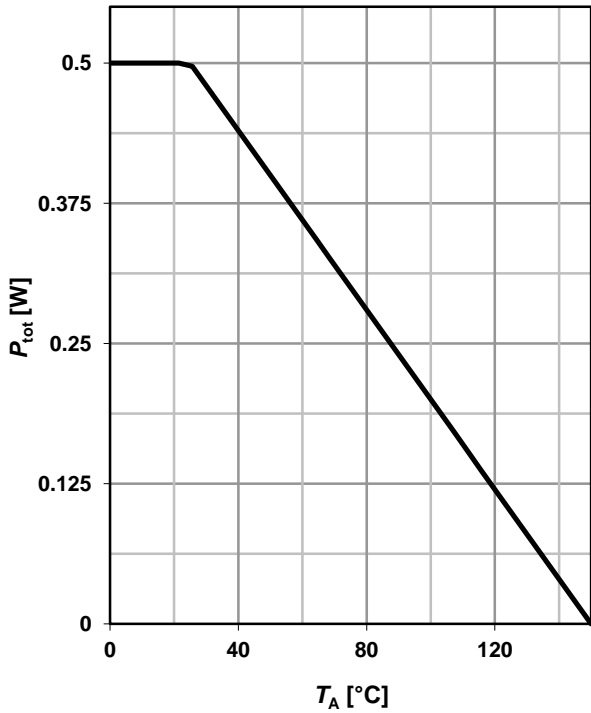
| | | | | | | |
|-----------------------|---------------|---|---|------|---|----|
| Gate to source charge | Q_{gs} | $V_{DD}=-15\text{ V}$, $I_D=-1.5\text{ A}$, $V_{GS}=0\text{ to }-10\text{ V}$ | - | -0.7 | - | nC |
| Gate to drain charge | Q_{gd} | | - | -0.3 | - | |
| Gate charge total | Q_g | | - | -2.9 | - | |
| Gate plateau voltage | $V_{plateau}$ | | - | -3.2 | - | V |

Reverse Diode

| | | | | | | |
|----------------------------------|---------------|--|---|------|------|----|
| Diode continuous forward current | I_S | $T_A=25\text{ °C}$ | - | - | -0.5 | A |
| Diode pulse current | $I_{S,pulse}$ | | - | - | -6.1 | |
| Diode forward voltage | V_{SD} | $V_{GS}=0\text{ V}$, $I_F=-1.5\text{ A}$, $T_j=25\text{ °C}$ | - | 0.8 | 1.1 | V |
| Reverse recovery time | t_{rr} | $V_R=-15\text{ V}$, $I_F=-1.5\text{ A}$, $di_F/dt=100\text{ A}/\mu\text{s}$ | - | 12.5 | - | ns |
| Reverse recovery charge | Q_{rr} | | - | 4.3 | - | nC |

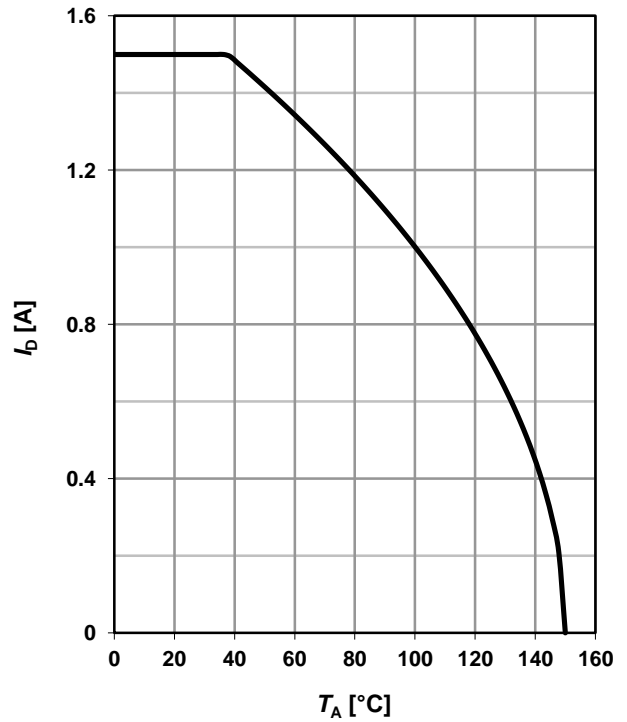
1 Power dissipation

$P_{tot}=f(T_A)$



2 Drain current

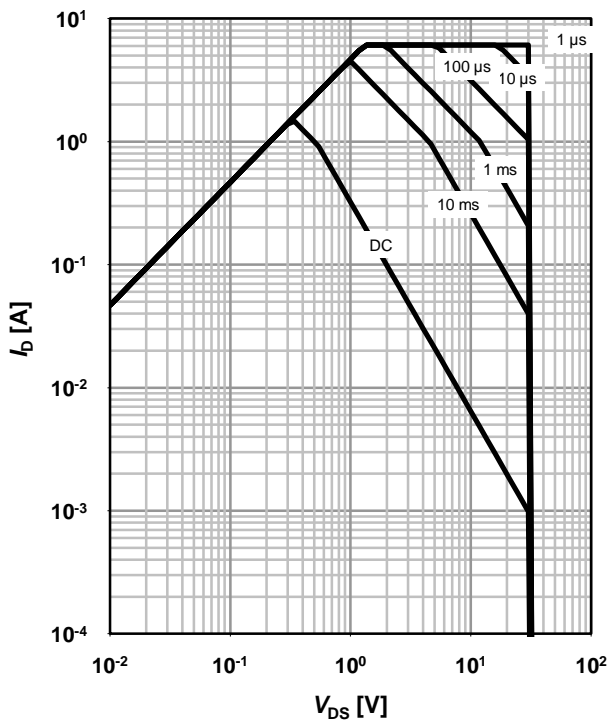
$I_D=f(T_A); V_{GS} \leq -10\text{ V}$



3 Safe operating area

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

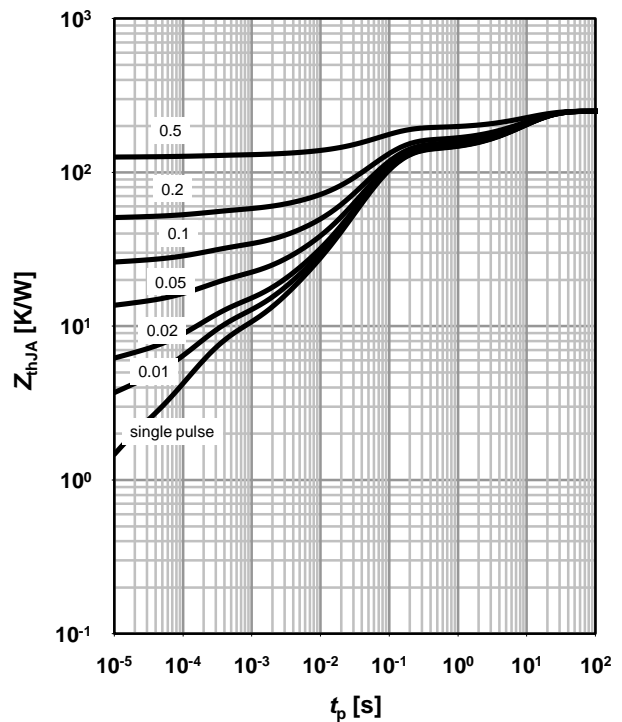
parameter: t_p



4 Max. transient thermal impedance

$Z_{thJA}=f(t_p)$

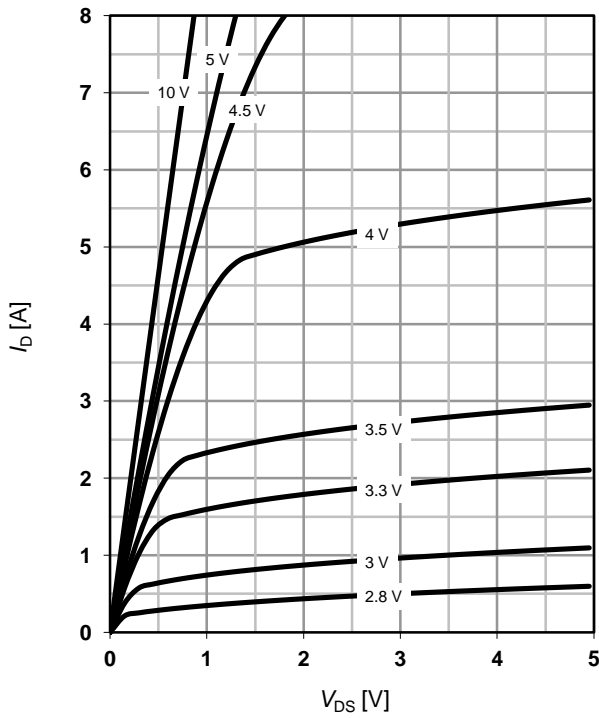
parameter: $D=t_p/T$



5 Typ. output characteristics

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

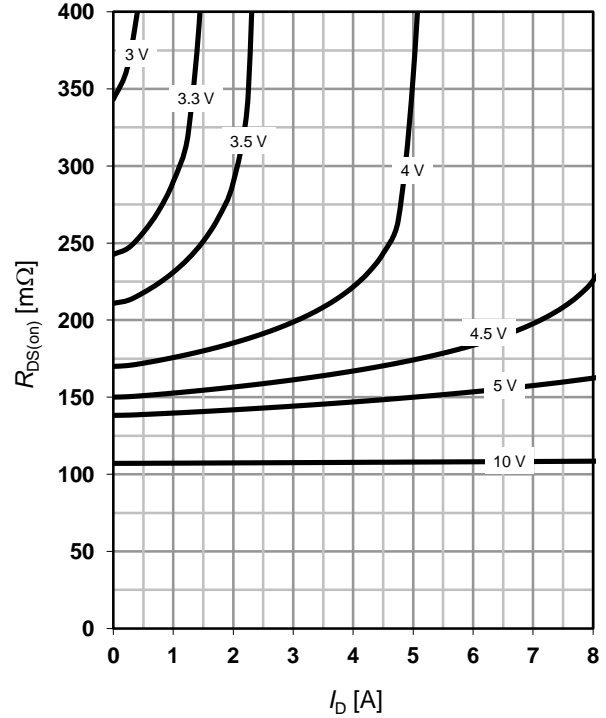
parameter: V_{GS}



6 Typ. drain-source on resistance

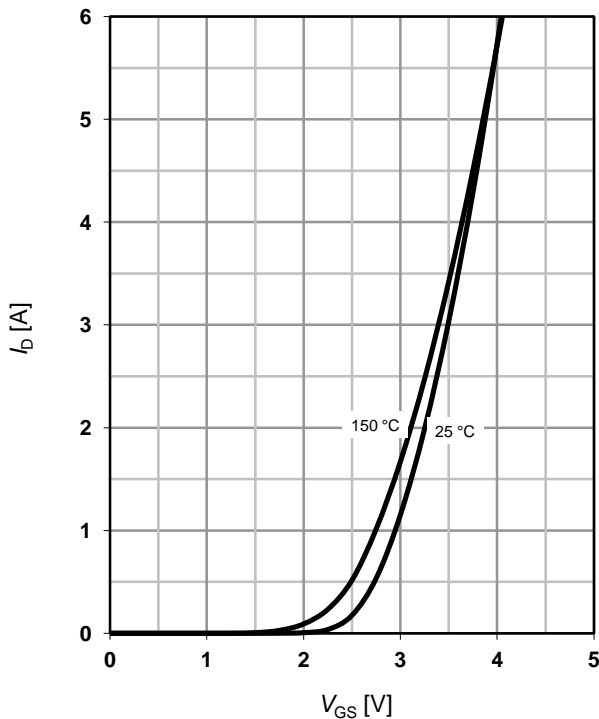
$R_{DS(on)} = f(I_D); T_j = 25\text{ }^\circ\text{C}$

parameter: V_{GS}



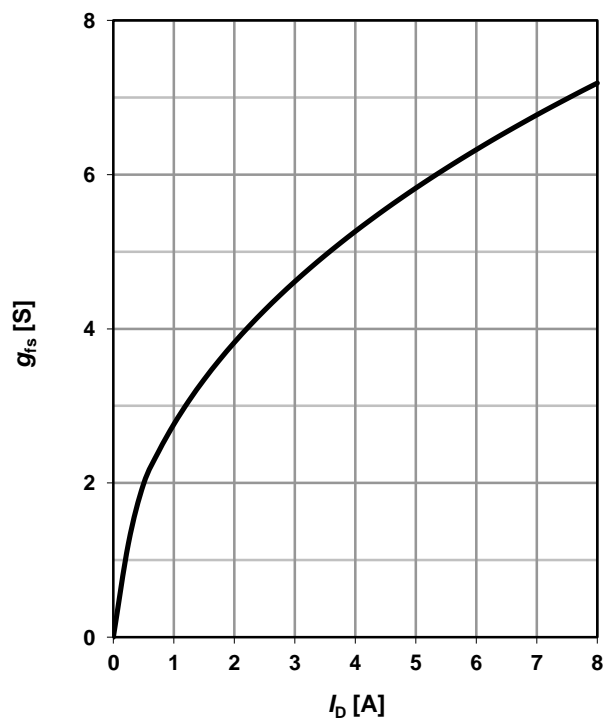
7 Typ. transfer characteristics

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



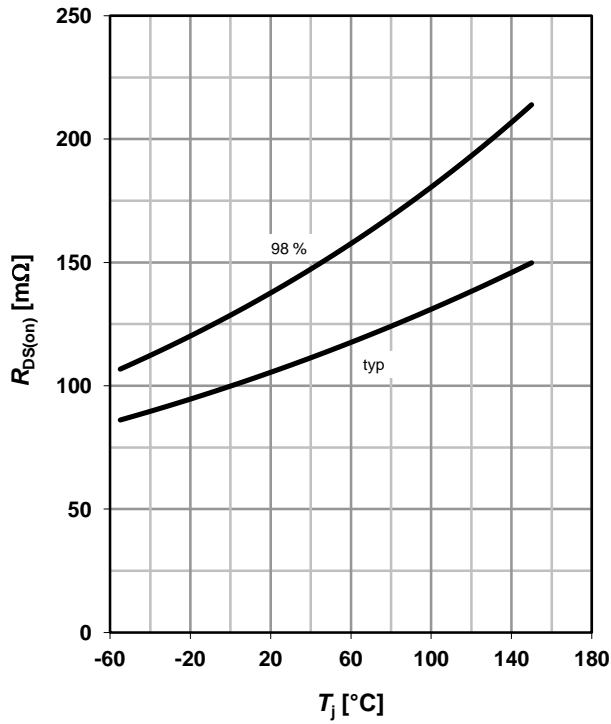
8 Typ. forward transconductance

$g_{fs} = f(I_D); T_j = 25\text{ }^\circ\text{C}$



9 Drain-source on-state resistance

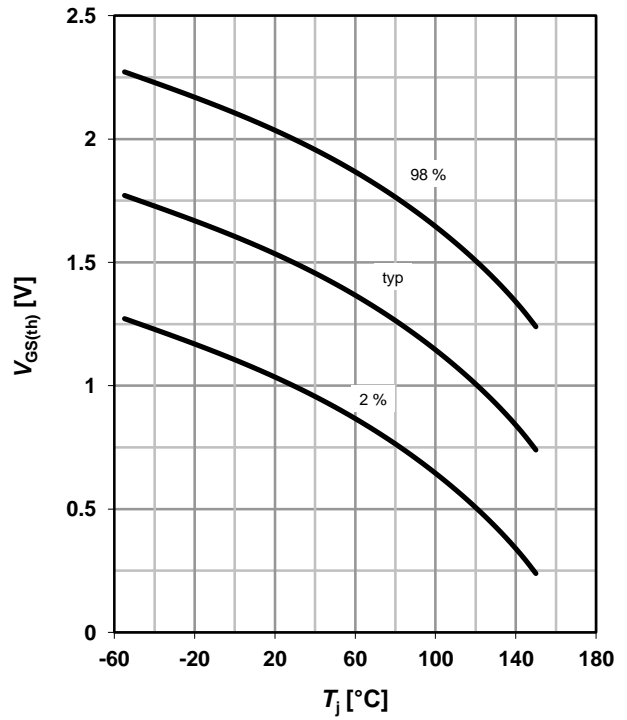
$R_{DS(on)}=f(T_j)$; $I_D=-1.5\text{ A}$; $V_{GS}=-10\text{ V}$



10 Typ. gate threshold voltage

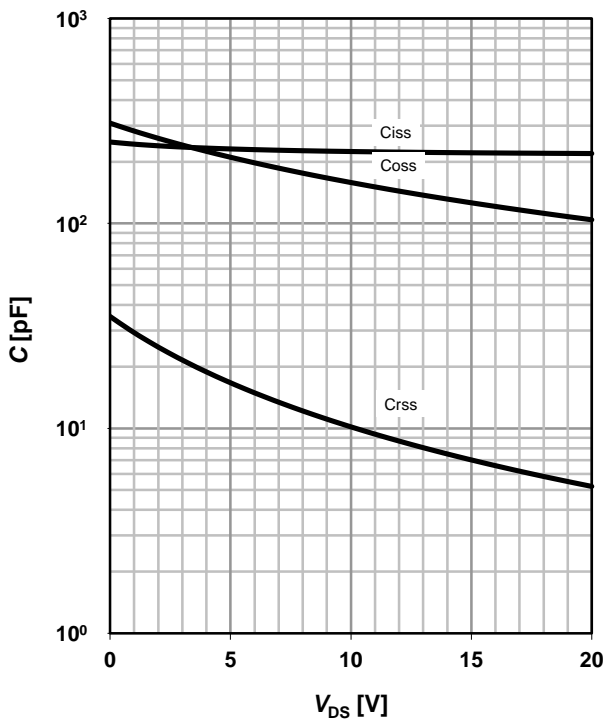
$V_{GS(th)}=f(T_j)$; $V_{DS}=V_{GS}$; $I_D=-6.3\ \mu\text{A}$

parameter: I_D



11 Typ. capacitances

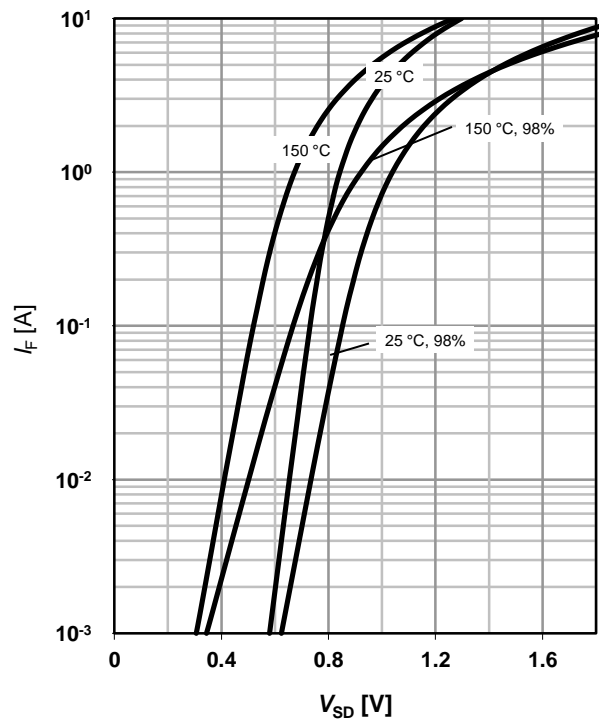
$C=f(V_{DS})$; $V_{GS}=0\text{ V}$; $f=1\text{ MHz}$; $T_j=25^\circ\text{C}$



12 Forward characteristics of reverse diode

$I_F=f(V_{SD})$

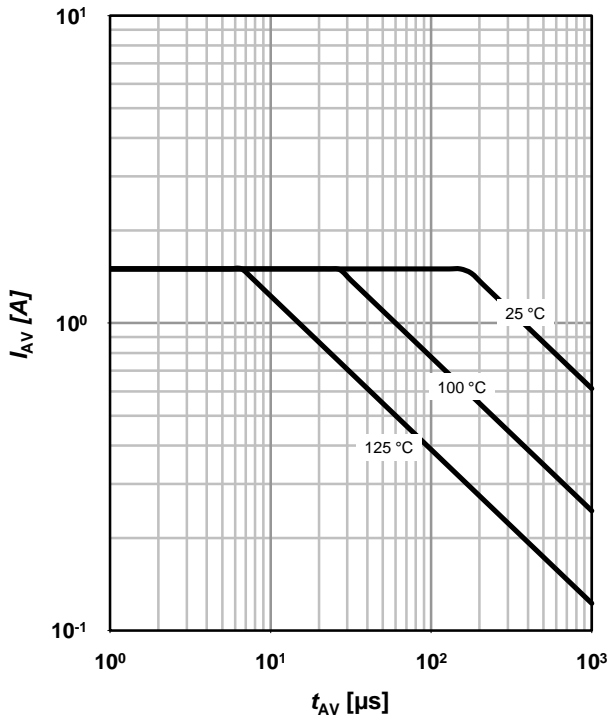
parameter: T_j



13 Avalanche characteristics

$I_{AS}=f(t_{AV}); R_{GS}=25 \Omega$

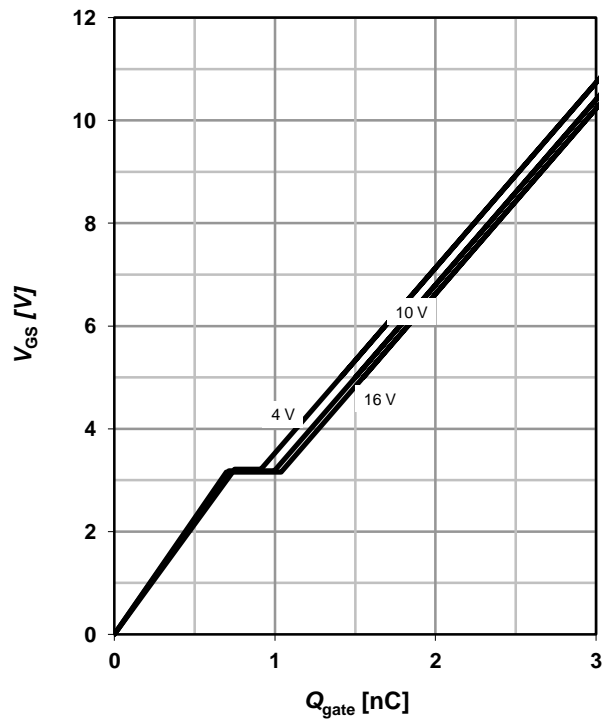
parameter: $T_{j(\text{start})}$



14 Typ. gate charge

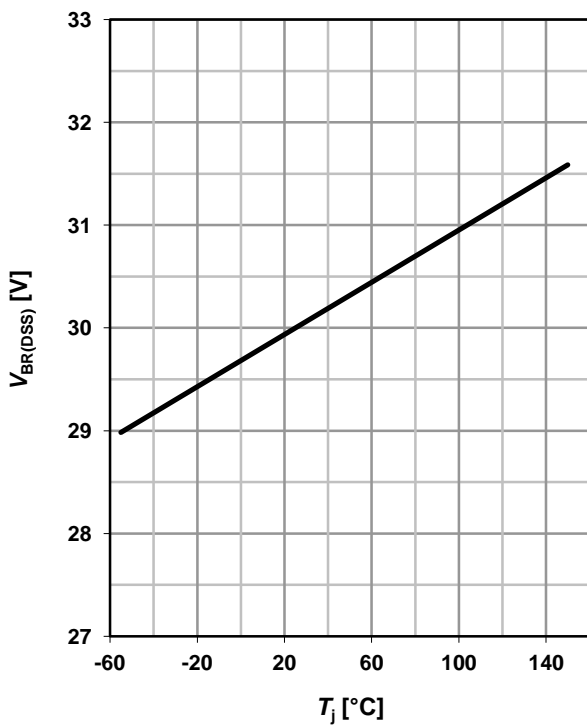
$V_{GS}=f(Q_{\text{gate}}); I_D=-1.5 \text{ A pulsed}$

parameter: V_{DD}

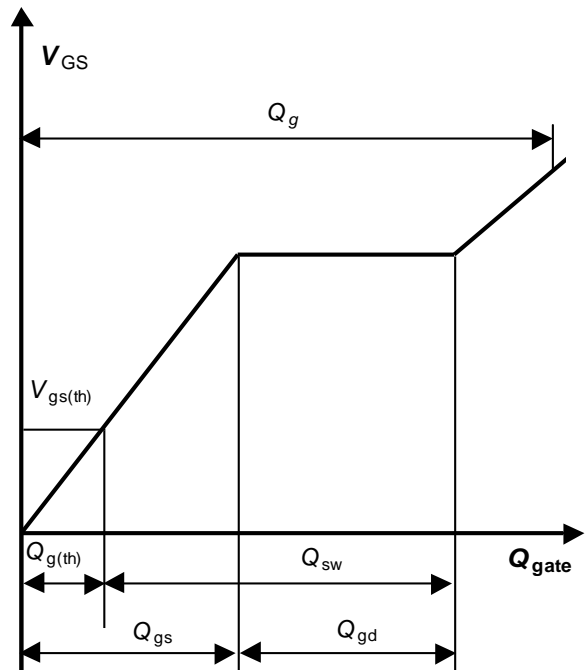


15 Drain-source breakdown voltage

$V_{BR(DSS)}=f(T_j); I_D=-250 \mu\text{A}$

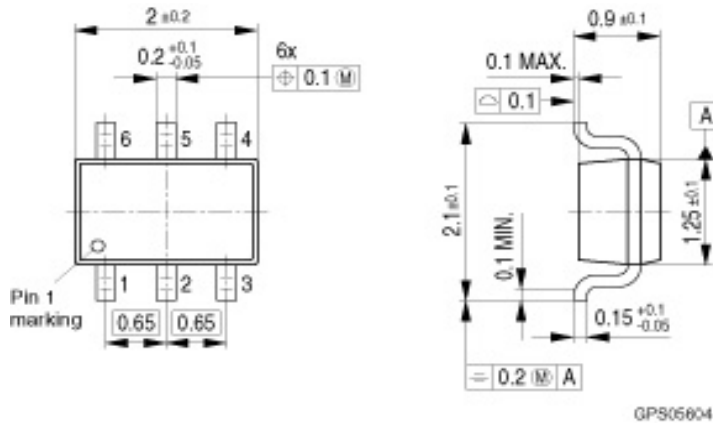


16 Gate charge waveforms

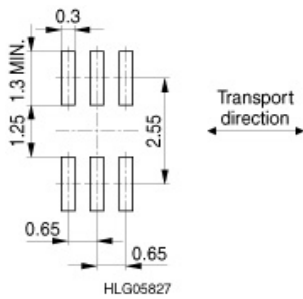


SOT-363

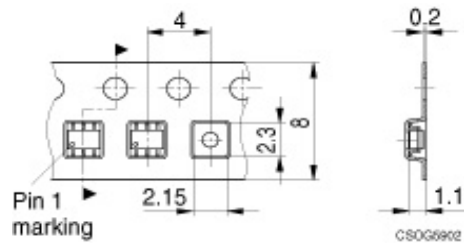
Package Outline:



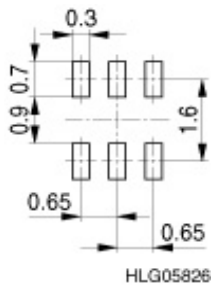
Footprint:



Packing:



Reflow soldering:



Dimensions in mm

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Infineon Technologies AG
81726 Munich, Germany
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