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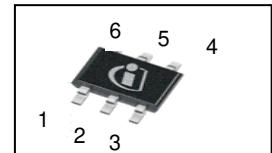
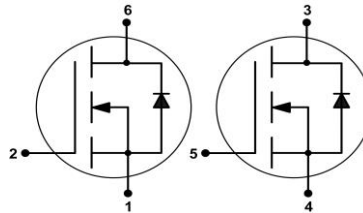


OptiMOS™2 Small-Signal-Transistor
Features

- Dual N-channel
- Enhancement mode
- Ultra Logic level (1.8V rated)
- Avalanche rated
- Qualified according to AEC Q101
- 100% lead-free; RoHS compliant
- Halogen-free according to IEC61249-2-21

Product Summary

| | | |
|------------------|-----------------------|-----|
| V_{DS} | 20 | V |
| $R_{DS(on),max}$ | $V_{GS}=2.5\text{ V}$ | 400 |
| | $V_{GS}=1.8\text{ V}$ | 560 |
| I_D | 0.88 | A |

PG-SOT-363


| Type | Package | Tape and Reel Information | Marking | Lead Free | Packing |
|---------|------------|---------------------------|---------|-----------|---------|
| BSD840N | PG-SOT-363 | H6327: 3000 pcs/ reel | XBs | Yes | Non dry |

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

| Parameter ¹⁾ | Symbol | Conditions | Value | Unit |
|-------------------------------------|-------------------|---|------------------------|--------------------|
| Continuous drain current | I_D | $T_A=25\text{ °C}$ | 0.88 | A |
| | | $T_A=70\text{ °C}$ | 0.71 | |
| Pulsed drain current | $I_{D,pulse}$ | $T_A=25\text{ °C}$ | 3.5 | |
| Avalanche energy, single pulse | E_{AS} | $I_D=0.88\text{ A}$, $R_{GS}=16\ \Omega$ | 1.6 | mJ |
| Reverse diode dv/dt | dv/dt | $I_D=0.88\text{ A}$, $V_{DS}=16\text{ V}$, $di/dt=200\text{ A}/\mu\text{s}$, $T_{j,max}=150\text{ °C}$ | 6 | kV/ μs |
| Gate source voltage | V_{GS} | | ± 8 | V |
| Power dissipation ²⁾ | 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 | 0 (<250V) | |
| Soldering Temperature | | | 260 $^{\circ}\text{C}$ | |
| IEC climatic category; DIN IEC 68-1 | | | 55/150/56 | |

¹⁾ Remark: only one of both transistors in operation.

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

Thermal characteristics

| | | | | | | |
|--|------------|---------------------------------|---|---|-----|-----|
| Thermal resistance, junction - ambient | R_{thJA} | minimal footprint ²⁾ | - | - | 250 | K/W |
|--|------------|---------------------------------|---|---|-----|-----|

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

| | | | | | | |
|----------------------------------|---------------|--|-----|------|------|------------------|
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}=0\text{ V}, I_D=250\text{ }\mu\text{A}$ | 20 | - | - | V |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=1.6\text{ }\mu\text{A}$ | 0.3 | 0.55 | 0.75 | |
| Drain-source leakage current | I_{DSS} | $V_{DS}=20\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ °C}$ | - | - | 1 | μA |
| | | $V_{DS}=20\text{ V}, V_{GS}=0\text{ V}, T_j=150\text{ °C}$ | - | - | 100 | |
| Gate-source leakage current | I_{GSS} | $V_{GS}=8\text{ V}, V_{DS}=0\text{ V}$ | - | - | 100 | nA |
| Drain-source on-state resistance | $R_{DS(on)}$ | $V_{GS}=1.8\text{ V}, I_D=0.19\text{ A}$ | - | 373 | 560 | $\text{m}\Omega$ |
| | | $V_{GS}=2.5\text{ V}, I_D=0.88\text{ A}$ | - | 270 | 400 | |
| Transconductance | g_{fs} | $ V_{DS} >2 I_D R_{DS(on)max}, I_D=0.71\text{ A}$ | | 2.5 | - | S |

²⁾ Performed on 40 mm² FR4 PCB. The traces are 1mm wide, 70 μm 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} | $V_{GS}=0\text{ V}, V_{DS}=10\text{ V},$ $f=1\text{ MHz}$ | - | 55 | 78 | pF |
| Output capacitance | C_{oss} | | - | 25 | 36 | |
| Reverse transfer capacitance | C_{rss} | | - | 3.5 | - | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}=10\text{ V}, V_{GS}=2.5\text{ V},$ $I_D=0.88\text{ A}, R_{G,ext}=6\ \Omega$ | - | 1.9 | - | ns |
| Rise time | t_r | | - | 2.2 | - | |
| Turn-off delay time | $t_{d(off)}$ | | - | 7.8 | - | |
| Fall time | t_f | | - | 0.9 | - | |

Gate Charge Characteristics

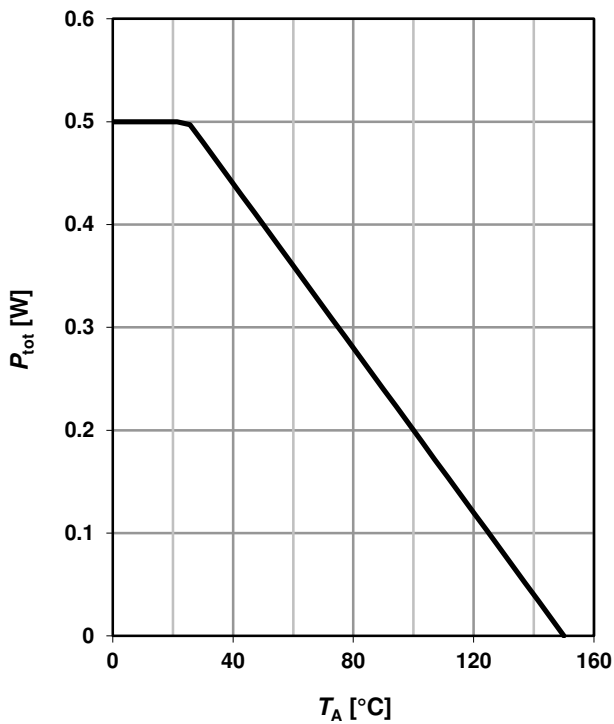
| | | | | | | |
|-----------------------|---------------|---|---|------|---|----|
| Gate to source charge | Q_{gs} | $V_{DD}=10\text{ V}, I_D=0.88\text{ A},$ $V_{GS}=0\text{ to }2.5\text{ V}$ | - | 0.10 | - | nC |
| Gate to drain charge | Q_{gd} | | - | 0.10 | - | |
| Gate charge total | Q_g | | - | 0.26 | - | |
| Gate plateau voltage | $V_{plateau}$ | | - | 1.7 | - | V |

Reverse Diode

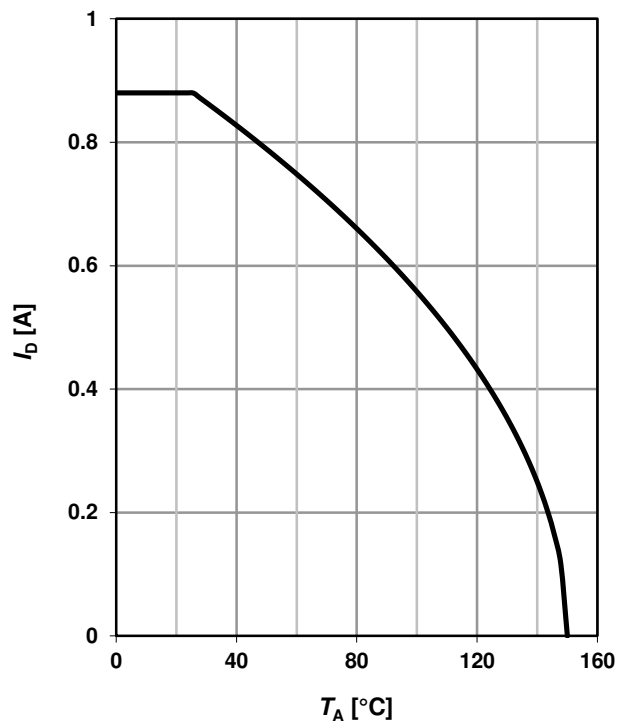
| | | | | | | |
|----------------------------------|---------------|---|---|------|-----|----|
| Diode continuous forward current | I_S | $T_A=25\text{ }^\circ\text{C}$ | - | - | 0.5 | A |
| Diode pulse current | $I_{S,pulse}$ | | - | - | 3.5 | |
| Diode forward voltage | V_{SD} | $V_{GS}=0\text{ V}, I_F=0.88\text{ A},$ $T_j=25\text{ }^\circ\text{C}$ | - | 0.94 | 1.1 | V |
| Reverse recovery time | t_{rr} | $V_R=10\text{ V}, I_F=0.88\text{ A},$ $di_F/dt=100\text{ A}/\mu\text{s}$ | - | 5.3 | - | ns |
| Reverse recovery charge | Q_{rr} | | - | 0.82 | - | nC |

1 Power dissipation

$$P_{\text{tot}} = f(T_A)$$

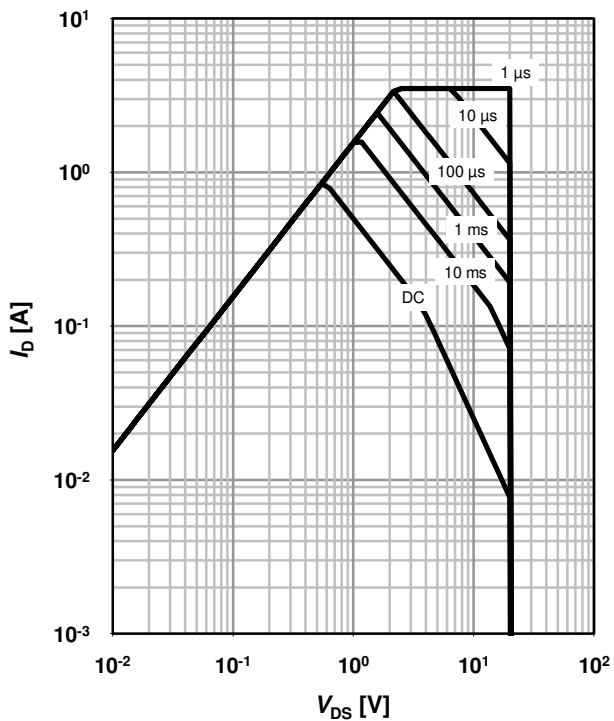

2 Drain current

$$I_D = f(T_A); V_{\text{GS}} \geq 2.5 \text{ V}$$


3 Safe operating area

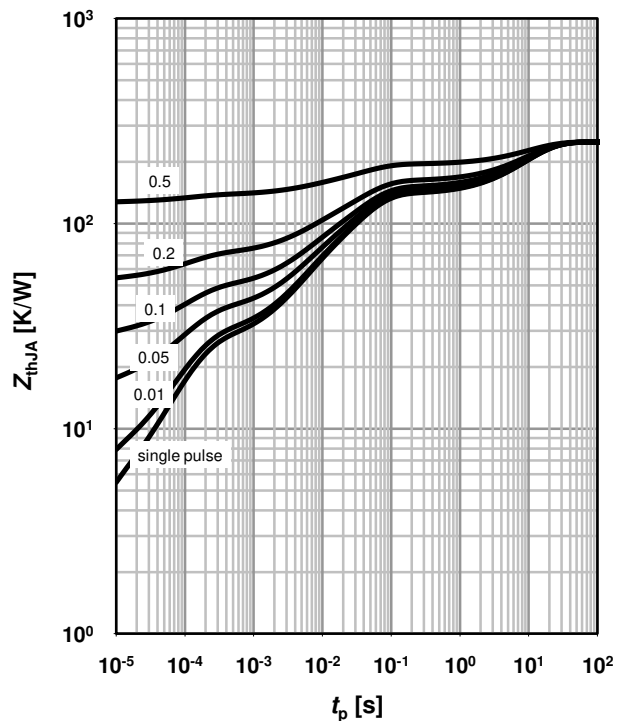
$$I_D = f(V_{\text{DS}}); T_A = 25 \text{ °C}; D = 0$$

parameter: t_p


4 Max. transient thermal impedance

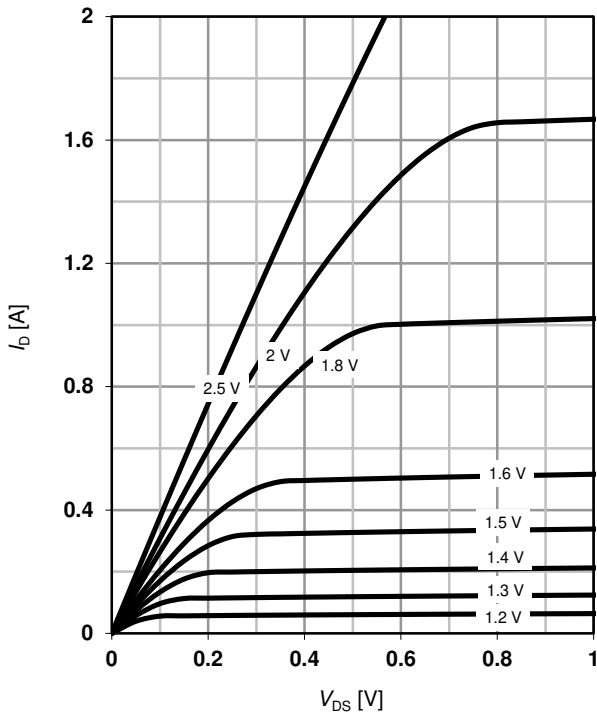
$$Z_{\text{thJA}} = f(t_p)$$

parameter: $D = t_p/T$

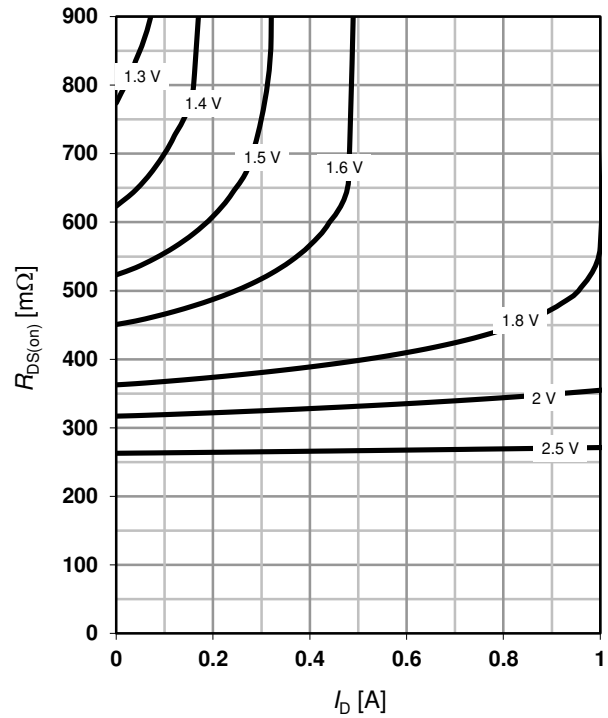


5 Typ. output characteristics

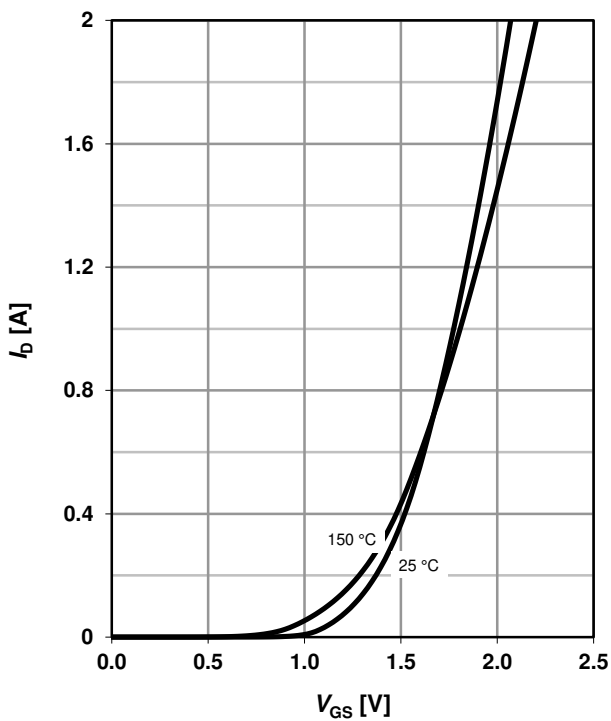
$$I_D = f(V_{DS}); T_j = 25\text{ °C}$$

 parameter: V_{GS}

6 Typ. drain-source on resistance

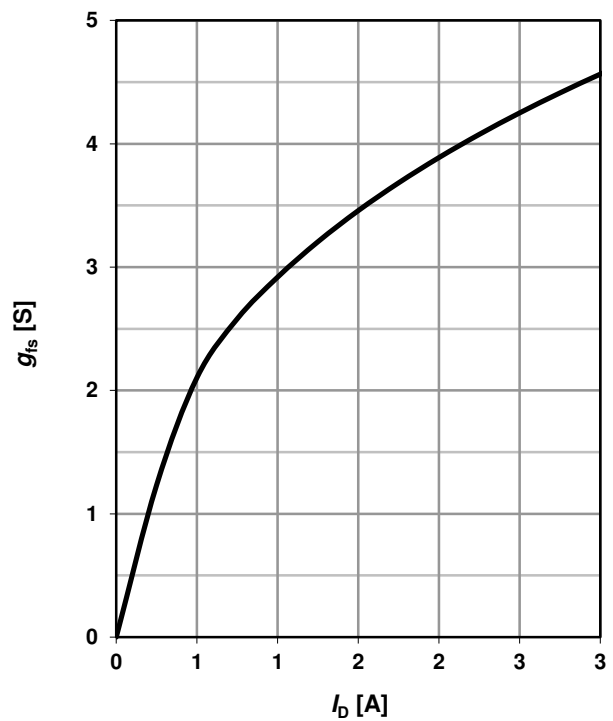
$$R_{DS(on)} = f(I_D); T_j = 25\text{ °C}$$

 parameter: V_{GS}

7 Typ. transfer characteristics

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

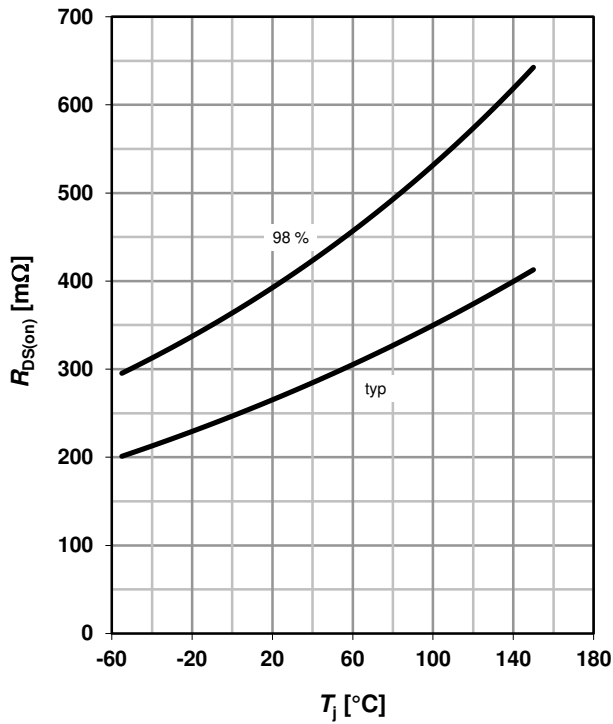

8 Typ. forward transconductance

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



9 Drain-source on-state resistance

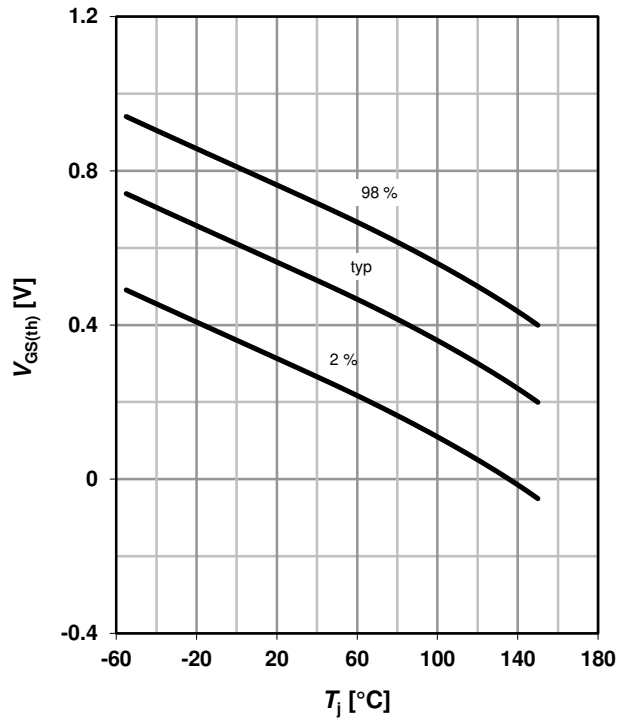
$R_{DS(on)}=f(T_j); I_D=0.88\text{ A}; V_{GS}=2.5\text{ V}$



10 Typ. gate threshold voltage

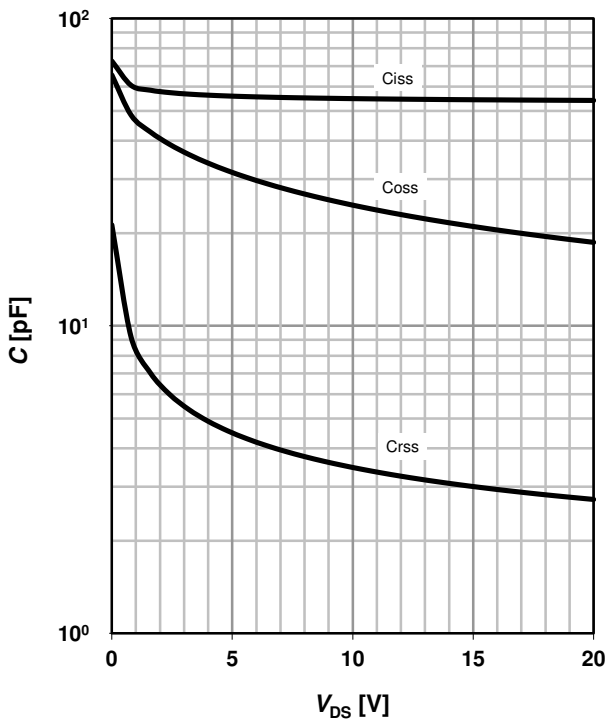
$V_{GS(th)}=f(T_j); V_{DS}=V_{GS}; I_D=1.6\text{ }\mu\text{A}$

parameter: I_D



11 Typ. capacitances

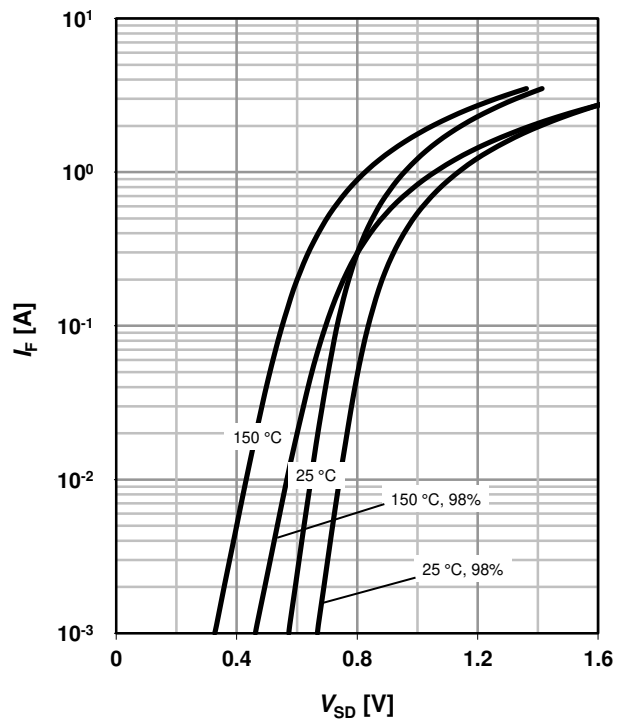
$C=f(V_{DS}); V_{GS}=0\text{ V}; f=1\text{ MHz}; T_j=25^\circ\text{C}$



12 Forward characteristics of reverse diode

$I_F=f(V_{SD})$

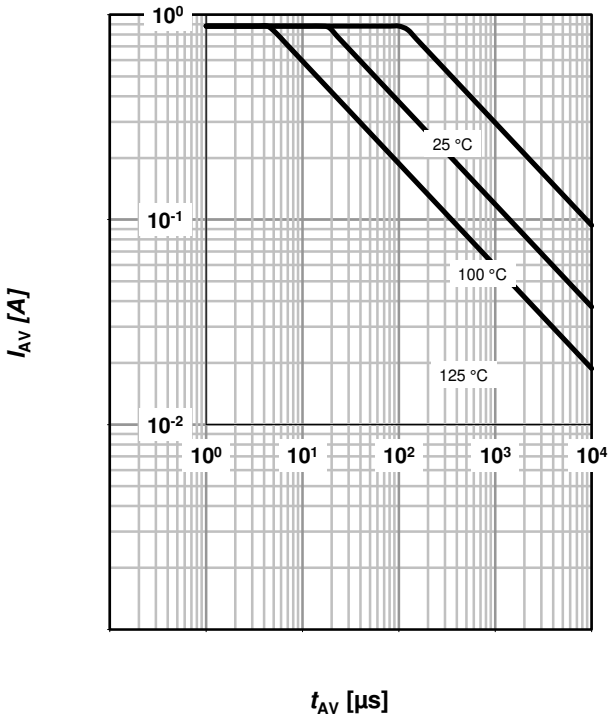
parameter: T_j



13 Avalanche characteristics

$I_{AS}=f(t_{AV}); R_{GS}=16 \Omega$

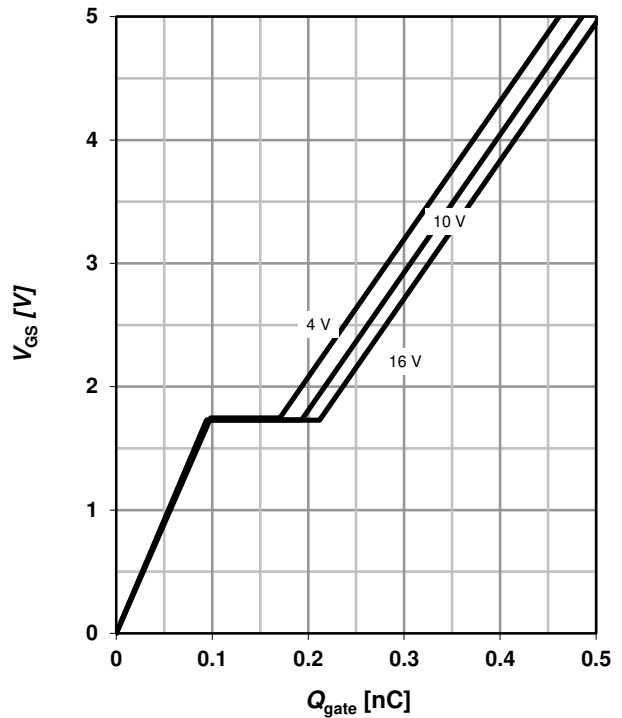
parameter: $T_{j(\text{start})}$



14 Typ. gate charge

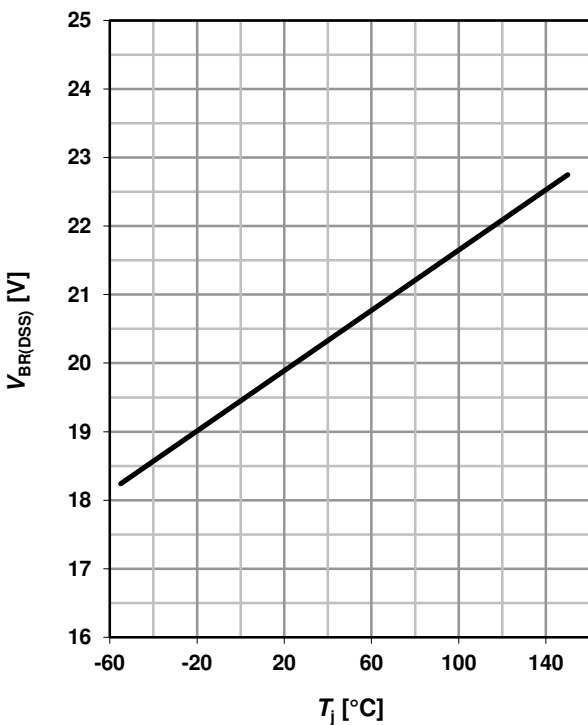
$V_{GS}=f(Q_{\text{gate}}); I_D=0.88 \text{ A pulsed}$

parameter: V_{DD}

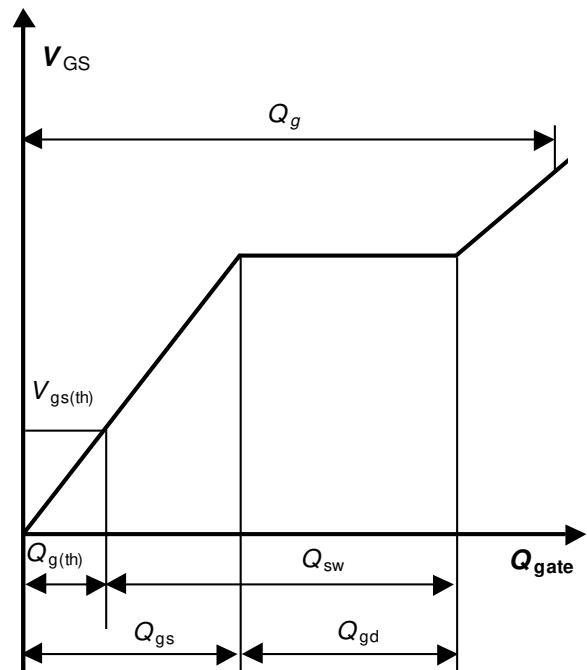


15 Drain-source breakdown voltage

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

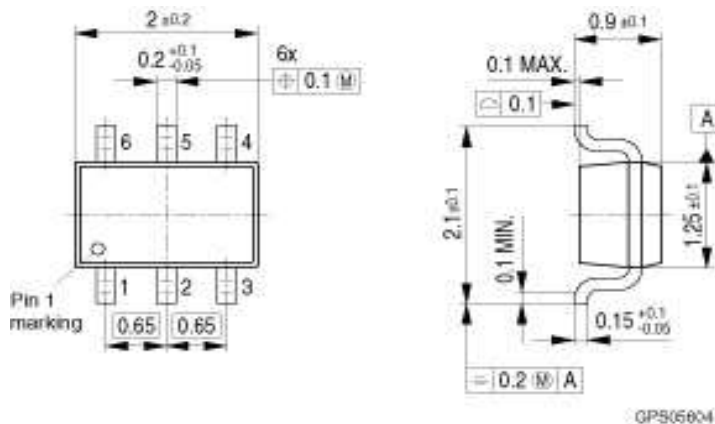


16 Gate charge waveforms

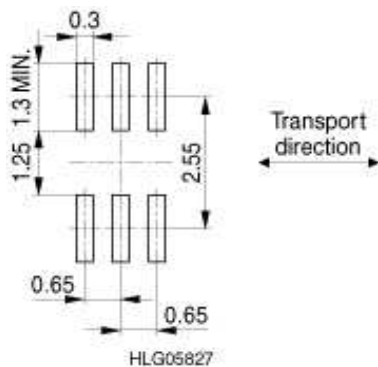


SOT-363

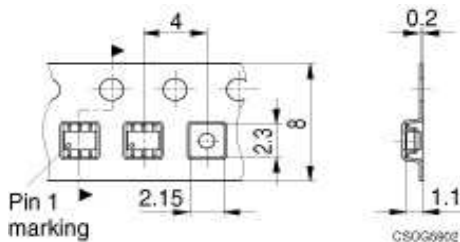
Package Outline:



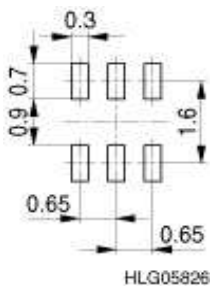
Footprint:



Packing:



Reflow soldering:



Note: For symmetric types there is no defined Pin 1 orientation in the reel.

Dimensions in mm

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