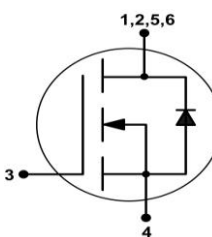


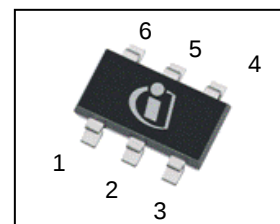
## OptiMOS™2 Small-Signal-Transistor

### Features

- 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



PG-TSOP6



| Type     | Package  | Tape and Reel Information | Marking | Lead Free | Packing |
|----------|----------|---------------------------|---------|-----------|---------|
| BSL802SN | PG-TSOP6 | H6327: 3000 pcs/ reel     | sPP     | Yes       | Non dry |

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

| Parameter                           | Symbol            | Conditions                                                                                                     | Value       | Unit              |
|-------------------------------------|-------------------|----------------------------------------------------------------------------------------------------------------|-------------|-------------------|
| Continuous drain current            | $I_D$             | $T_A=25\text{ °C}$                                                                                             | 7.5         | A                 |
|                                     |                   | $T_A=70\text{ °C}$                                                                                             | 6.0         |                   |
| Pulsed drain current                | $I_{D,pulse}$     | $T_A=25\text{ °C}$                                                                                             | 30          |                   |
| Avalanche energy, single pulse      | $E_{AS}$          | $I_D=7.5\text{ A}$ , $R_{GS}=25\text{ }\Omega$                                                                 | 30          | mJ                |
| Reverse diode $dv/dt$               | $dv/dt$           | $I_D=7.5\text{ A}$ , $V_{DS}=16\text{ V}$ ,<br>$di/dt=200\text{ A}/\mu\text{s}$ ,<br>$T_{j,max}=150\text{ °C}$ | 6           | kV/ $\mu\text{s}$ |
| Gate source voltage                 | $V_{GS}$          |                                                                                                                | $\pm 8$     | V                 |
| Power dissipation <sup>1)</sup>     | $P_{tot}$         | $T_A=25\text{ °C}$                                                                                             | 2           | 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 - minimal footprint | $R_{thJS}$ |                                              | - | - | 50   | K/W |
| SMD version, device on PCB                       | $R_{thJA}$ | minimal footprint                            | - | - | 230  |     |
|                                                  |            | 6 cm <sup>2</sup> cooling area <sup>1)</sup> | - | - | 62.5 |     |

#### Electrical characteristics, at $T_j=25\text{ }^{\circ}\text{C}$ , 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           | $V_{GS(th)}$  | $V_{DS}=V_{GS}, I_D=30\text{ }\mu\text{A}$                               | 0.3 | 0.55 | 0.75 |               |
| Drain-source leakage current     | $I_{DSS}$     | $V_{DS}=20\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ }^{\circ}\text{C}$  | -   | -    | 1    | $\mu\text{A}$ |
|                                  |               | $V_{DS}=20\text{ V}, V_{GS}=0\text{ V}, T_j=150\text{ }^{\circ}\text{C}$ | -   | -    | 100  |               |
| Gate-source leakage current      | $I_{GSS}$     | $V_{GS}=8\text{ V}, V_{DS}=0\text{ V}$                                   | -   | -    | 100  | nA            |
| Drain-source on-state resistance | $R_{DS(on)}$  | $V_{GS}=1.8\text{ V}, I_D=3.6\text{ A}$                                  | -   | 23   | 31   | m $\Omega$    |
|                                  |               | $V_{GS}=2.5\text{ V}, I_D=7.5\text{ A}$                                  | -   | 18   | 22   |               |
| Transconductance                 | $g_{fs}$      | $ V_{DS} >2 I_D R_{DS(on)max}, I_D=6\text{ A}$                           |     | 25   | -    | S             |

<sup>1)</sup> Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm<sup>2</sup> (single layer, 70  $\mu\text{m}$  thick) copper area for drain connection. PCB is vertical in still air. ( $t < 5\text{ sec.}$ )

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

#### Dynamic characteristics

|                              |              |                                                                                             |   |      |      |    |
|------------------------------|--------------|---------------------------------------------------------------------------------------------|---|------|------|----|
| Input capacitance            | $C_{iss}$    | $V_{GS}=0\text{ V}, V_{DS}=10\text{ V},$<br>$f=1\text{ MHz}$                                | - | 1013 | 1347 | pF |
| Output capacitance           | $C_{oss}$    |                                                                                             | - | 290  | 385  |    |
| Reverse transfer capacitance | $C_{rss}$    |                                                                                             | - | 51   | 77   |    |
| Turn-on delay time           | $t_{d(on)}$  | $V_{DD}=10\text{ V}, V_{GS}=2.5\text{ V},$<br>$I_D=3.7\text{ A}, R_{G,ext}=6\text{ }\Omega$ | - | 10   | -    | ns |
| Rise time                    | $t_r$        |                                                                                             | - | 30   | -    |    |
| Turn-off delay time          | $t_{d(off)}$ |                                                                                             | - | 20   | -    |    |
| Fall time                    | $t_f$        |                                                                                             | - | 5.5  | -    |    |

#### Gate Charge Characteristics

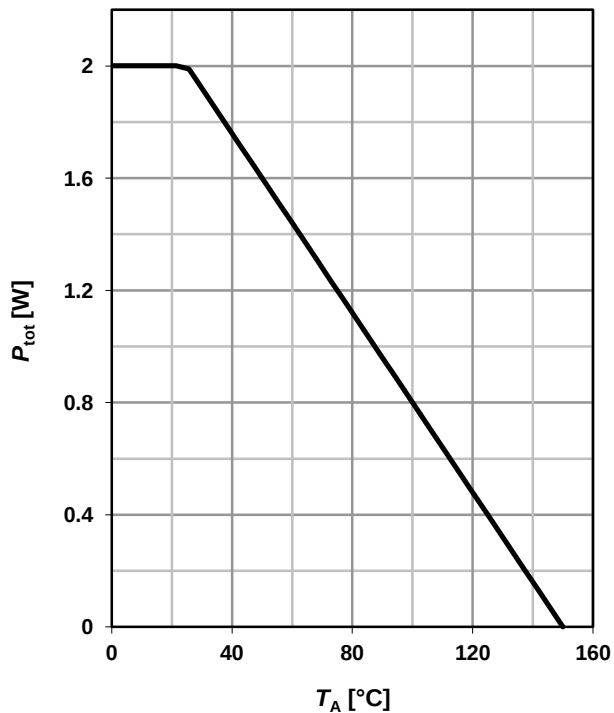
|                       |               |                                                                              |   |     |   |    |
|-----------------------|---------------|------------------------------------------------------------------------------|---|-----|---|----|
| Gate to source charge | $Q_{gs}$      | $V_{DD}=10\text{ V}, I_D=7.5\text{ A},$<br>$V_{GS}=0\text{ to }2.5\text{ V}$ | - | 1.6 | - | nC |
| Gate to drain charge  | $Q_{gd}$      |                                                                              | - | 1.6 | - |    |
| Gate charge total     | $Q_g$         |                                                                              | - | 4.7 | - |    |
| Gate plateau voltage  | $V_{plateau}$ |                                                                              | - | 1.5 | - | V  |

#### Reverse Diode

|                                  |               |                                                                            |   |      |     |    |
|----------------------------------|---------------|----------------------------------------------------------------------------|---|------|-----|----|
| Diode continuous forward current | $I_S$         | $T_A=25\text{ }^\circ\text{C}$                                             | - | -    | 1.8 | A  |
| Diode pulse current              | $I_{S,pulse}$ |                                                                            | - | -    | 30  |    |
| Diode forward voltage            | $V_{SD}$      | $V_{GS}=0\text{ V}, I_F=7.5\text{ A},$<br>$T_j=25\text{ }^\circ\text{C}$   | - | 0.86 | 1.1 | V  |
| Reverse recovery time            | $t_{rr}$      | $V_R=10\text{ V}, I_F=7.5\text{ A},$<br>$di_F/dt=100\text{ A}/\mu\text{s}$ | - | 15   | -   | ns |
| Reverse recovery charge          | $Q_{rr}$      |                                                                            | - | 5.1  | -   | nC |

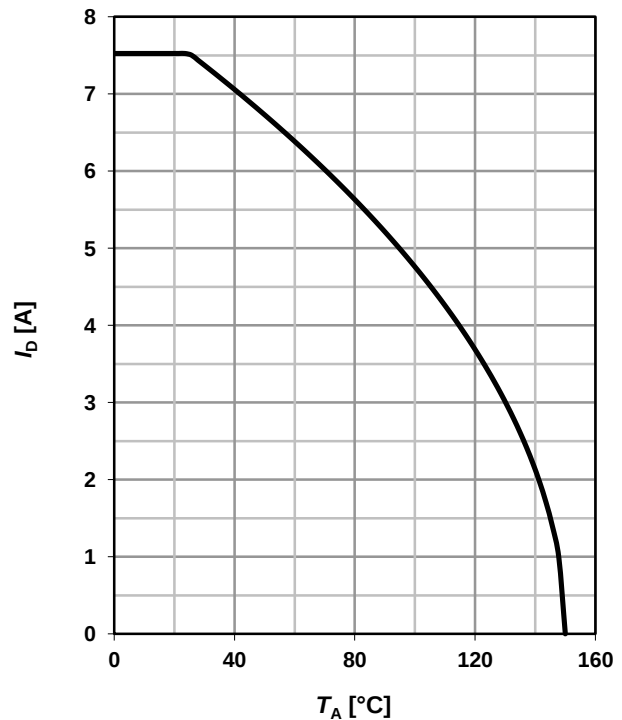
## 1 Power dissipation

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



## 2 Drain current

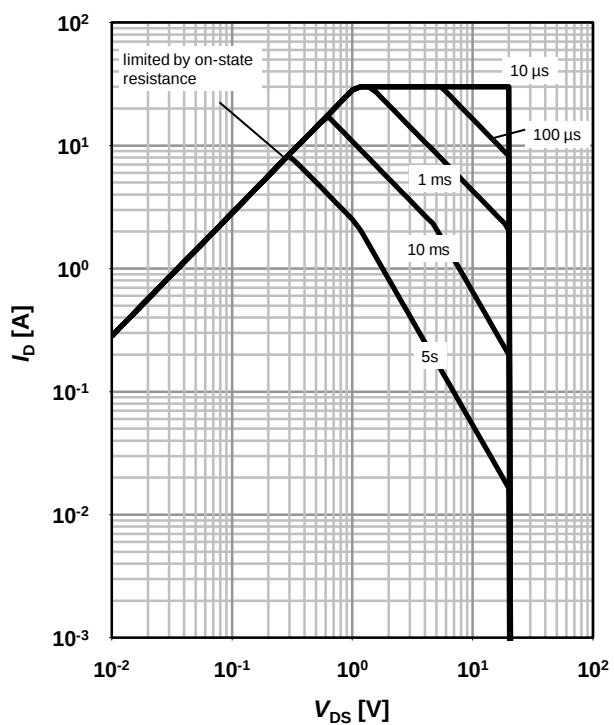
$$I_D = f(T_A); V_{GS} \geq 2.5 \text{ V}$$



## 3 Safe operating area

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

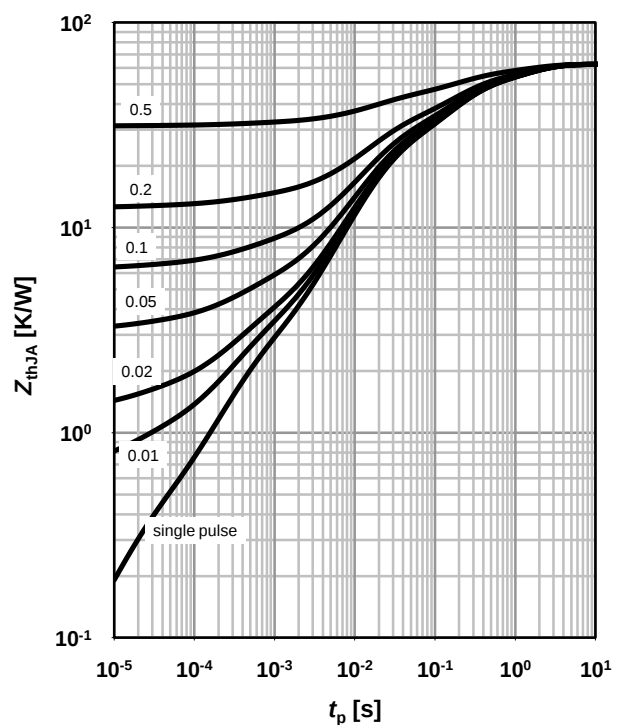
parameter:  $t_p$



## 4 Max. transient thermal impedance

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

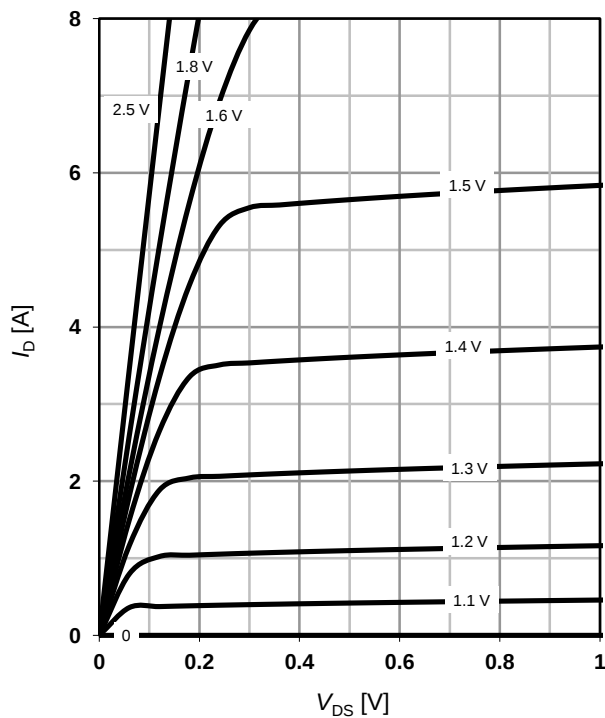
parameter:  $D = t_p/T$



### 5 Typ. output characteristics

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

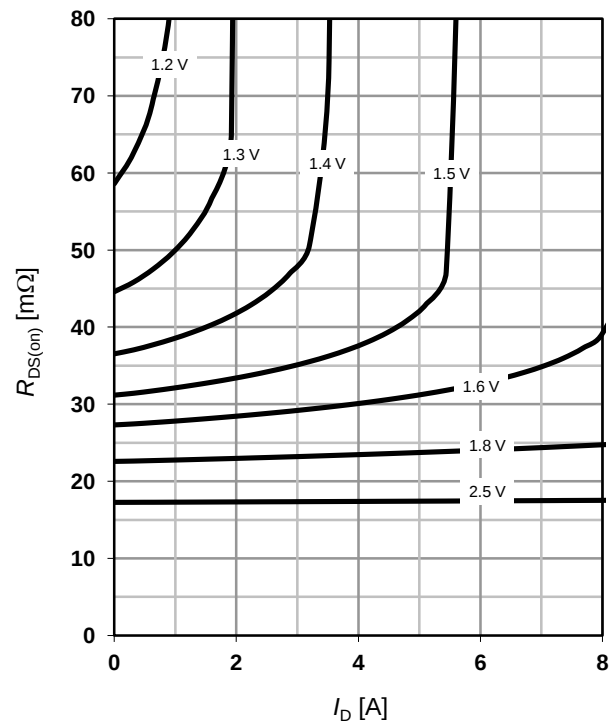
parameter:  $V_{GS}$



### 6 Typ. drain-source on resistance

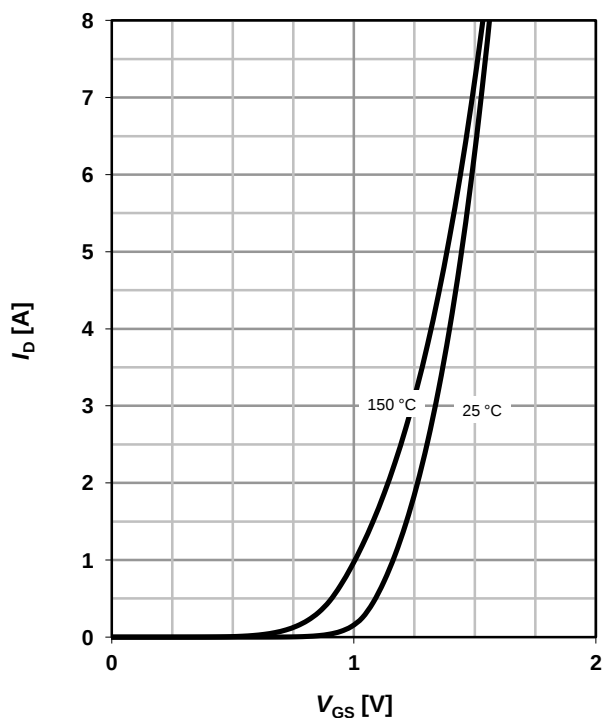
$$R_{DS(on)} = f(I_D); T_j = 25^\circ\text{C}$$

parameter:  $V_{GS}$



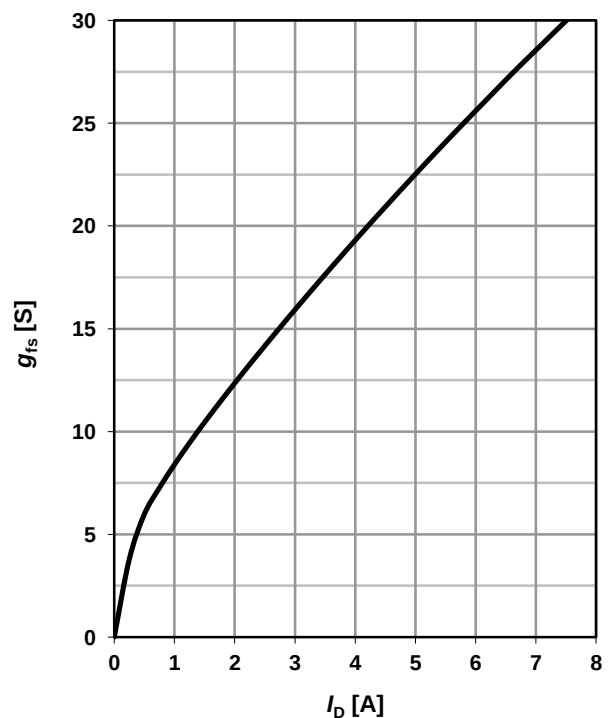
### 7 Typ. transfer characteristics

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



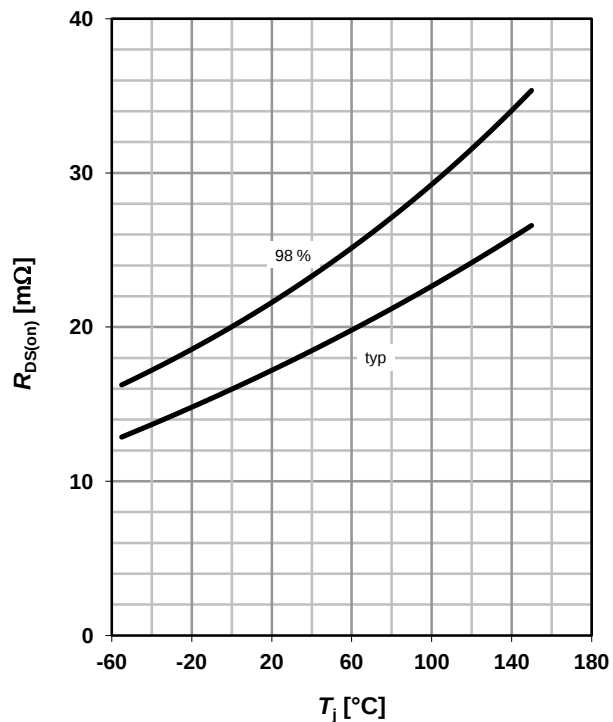
### 8 Typ. forward transconductance

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



## 9 Drain-source on-state resistance

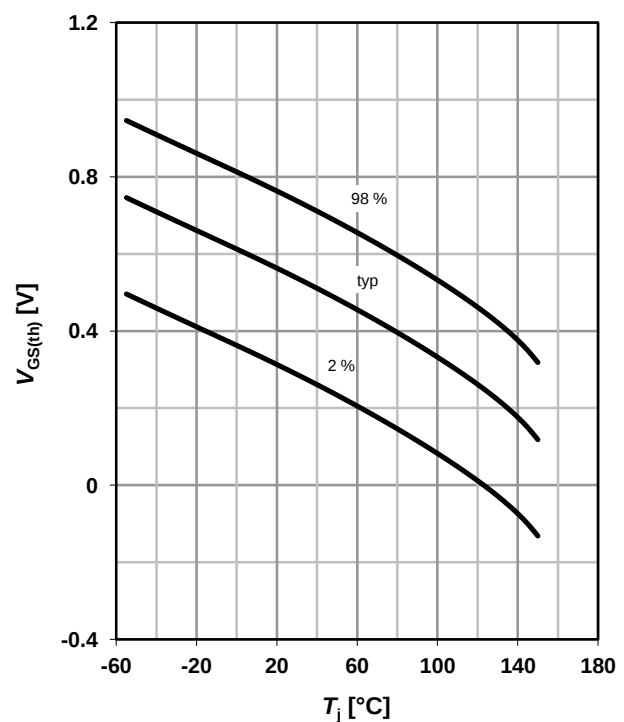
$$R_{DS(on)} = f(T_j); I_D = 7.5 \text{ A}; V_{GS} = 2.5 \text{ V}$$



## 10 Typ. gate threshold voltage

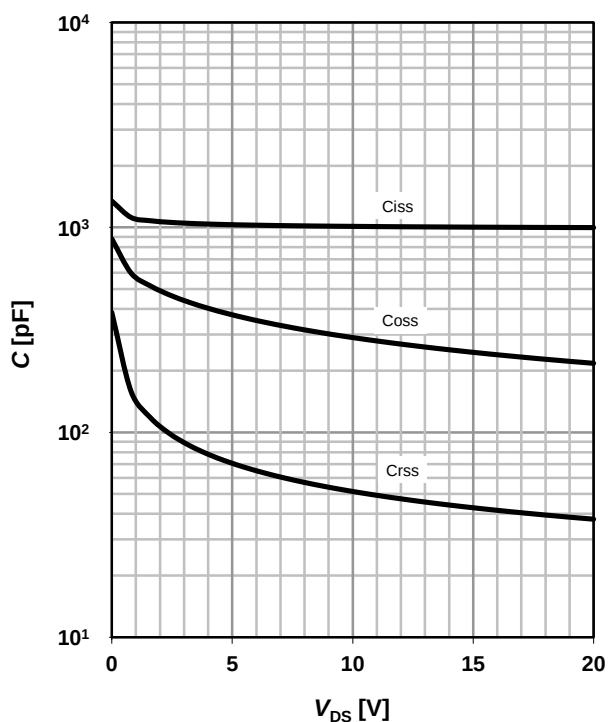
$$V_{GS(th)} = f(T_j); V_{DS} = V_{GS}; I_D = 30 \mu\text{A}$$

parameter:  $I_D$



## 11 Typ. capacitances

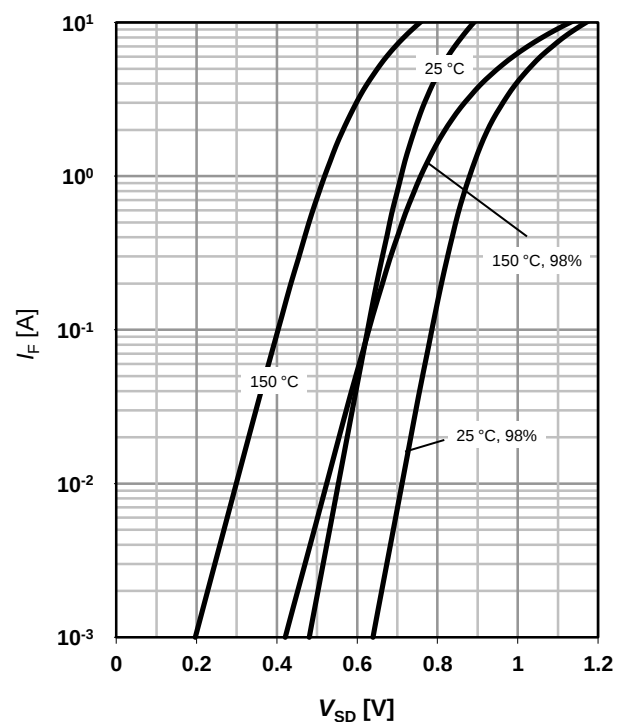
$$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}; T_j = 25^\circ\text{C}$$



## 12 Forward characteristics of reverse diode

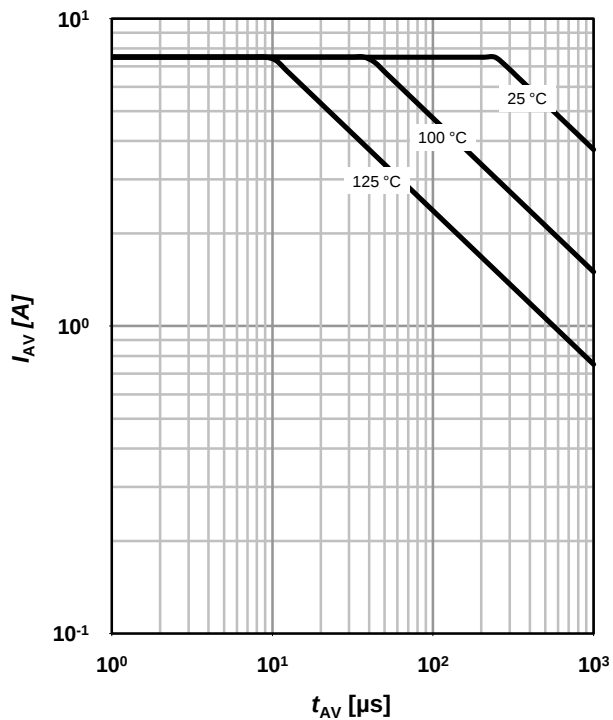
$$I_F = f(V_{SD})$$

parameter:  $T_j$



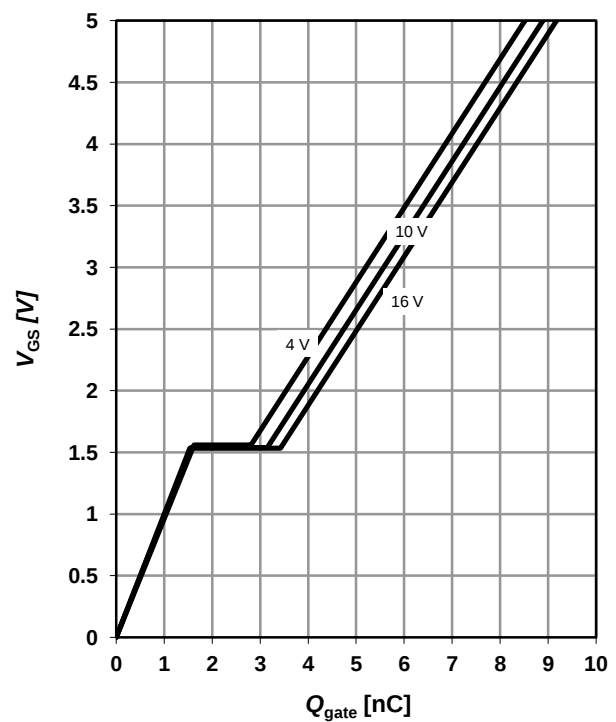
### 13 Avalanche characteristics

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

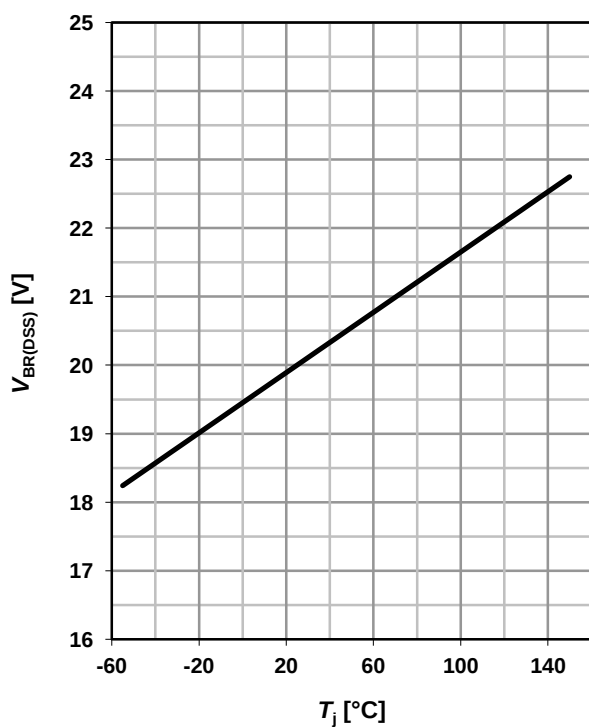
parameter:  $T_{j(\text{start})}$ 


### 14 Typ. gate charge

 $V_{GS}=f(Q_{\text{gate}}); I_D=7.5\ \text{A pulsed}$ 

parameter:  $V_{DD}$ 


### 15 Drain-source breakdown voltage

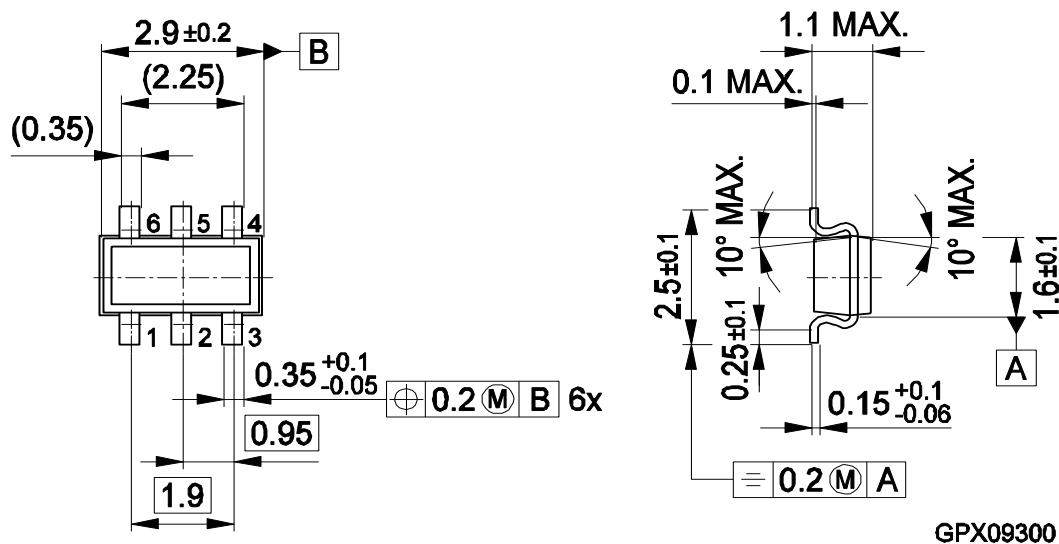
 $V_{BR(DSS)}=f(T_j); I_D=250\ \mu\text{A}$ 


### 16 Gate charge waveforms

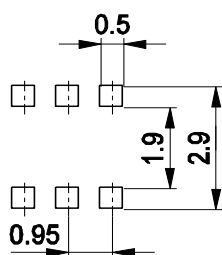


# TSOP6

## Package Outline:



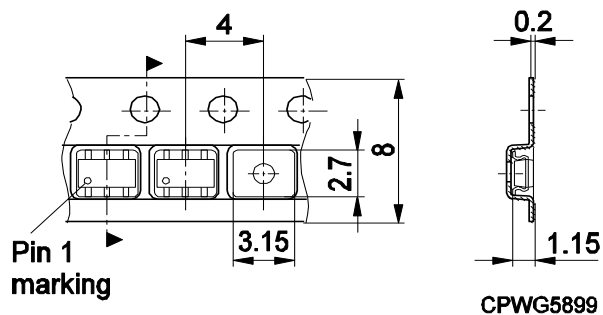
## Footprint:



Remark: Wave soldering possible dep.  
on customers process conditions

HLG09283

## Packaging:



Dimensions in mm

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