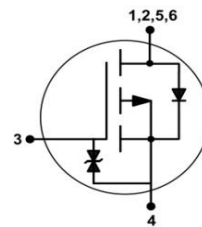
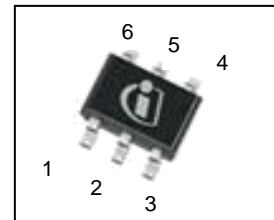


**OptiMOS™-P 3 Small-Signal-Transistor**
**Features**

- 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   |


**PG-SOT-363**


| Type      | Package    | Tape and Reel Information | Marking | Lead Free | Packing |
|-----------|------------|---------------------------|---------|-----------|---------|
| BSD314SPE | PG-SOT-363 | H6327: 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 $dv/dt$               | $dv/dt$        | $I_D=-1.5\text{ A}$ ,<br>$V_{DS}=-16\text{ V}$ ,<br>$di/dt=-200\text{ A}/\mu\text{s}$ ,<br>$T_{j,max}=150\text{ °C}$ | 6                      | kV/ $\mu\text{s}$  |
| Gate source voltage                 | $V_{GS}$       |  | $\pm 20$               | V                  |
| Power dissipation <sup>1)</sup>     | $P_{tot}$      | $T_A=25\text{ °C}$   | 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 <sup>1)</sup> | - | - | 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   | $\mu A$   |
|                                  |               | $V_{DS}=-30V, V_{GS}=0V, T_j=150\text{ °C}$ | -   | -    | -100 |           |
| Gate-source leakage current      | $I_{GSS}$     | $V_{GS}=-20V, V_{DS}=0V$                    | -   | -    | -5   | $\mu A$   |
| 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         |

<sup>1)</sup> Performed on 40mm<sup>2</sup> FR4 PCB. The traces are 1mm wide, 70 $\mu$ 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            | $C_{iss}$    | $V_{GS}=0\text{ V}$ ,<br>$V_{DS}=-15\text{ V}$ , $f=1\text{ MHz}$                                 | - | 221  | 294 | pF |
| Output capacitance           | $C_{oss}$    |   | - | 126  | 168 |    |
| Reverse transfer capacitance | $C_{rss}$    |   | - | 7    | 11  |    |
| Turn-on delay time           | $t_{d(on)}$  | $V_{DD}=-15\text{ V}$ ,<br>$V_{GS}=-10\text{ V}$ ,<br>$I_D=-1.5\text{ A}$ , $R_{G,ext}=6\ \Omega$ | - | 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**

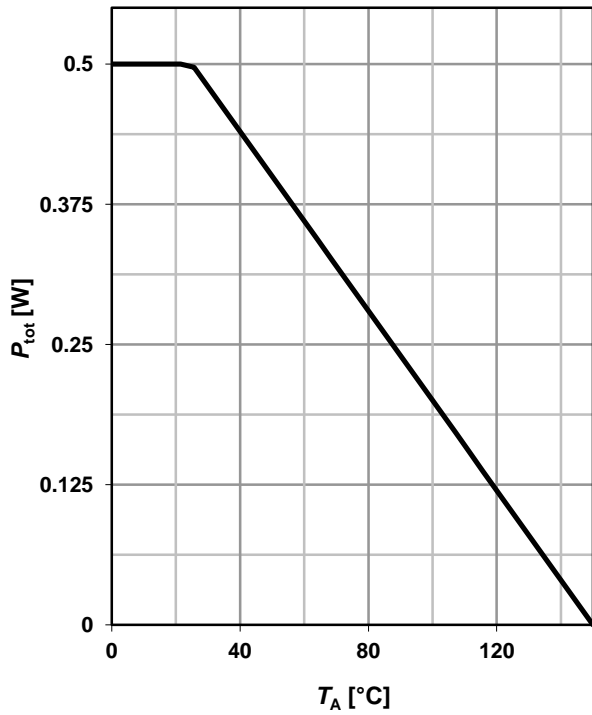
|                       |               |   |   |      |   |    |
|-----------------------|---------------|---|---|------|---|----|
| Gate to source charge | $Q_{gs}$      | $V_{DD}=-15\text{ V}$ ,<br>$I_D=-1.5\text{ A}$ ,<br>$V_{GS}=0\text{ to }-10\text{ V}$ | - | -0.7 | - | nC |
| Gate to drain charge  | $Q_{gd}$      |   | - | -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            | $V_{SD}$      | $V_{GS}=0\text{ V}$ , $I_F=-1.5\text{ A}$ ,<br>$T_j=25\text{ °C}$                | - | 0.8  | 1.1  | V  |
| Reverse recovery time            | $t_{rr}$      | $V_R=-15\text{ V}$ , $I_F=-1.5\text{ A}$ ,<br>$di_F/dt=100\text{ A}/\mu\text{s}$ | - | 12.5 | -    | ns |
| Reverse recovery charge          | $Q_{rr}$      |  | - | 4.3  | -    | nC |

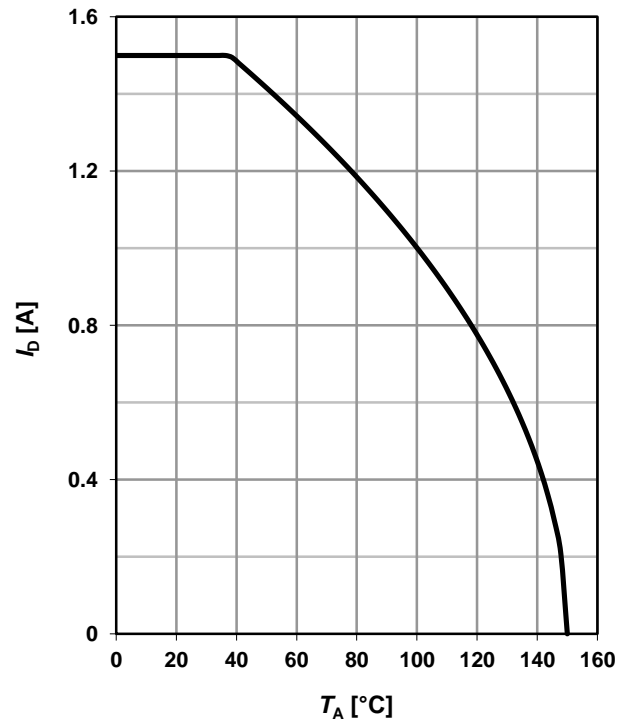
**1 Power dissipation**

$P_{tot}=f(T_A)$



**2 Drain current**

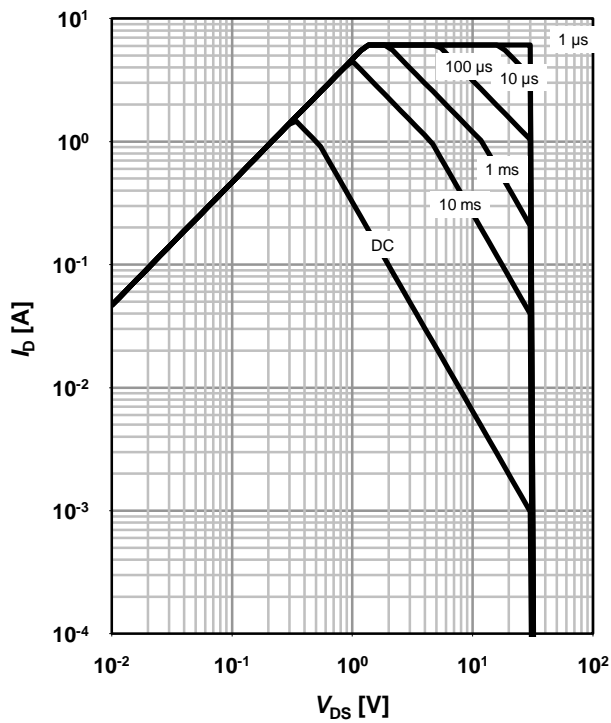
$I_D=f(T_A); V_{GS} \leq -10\text{ V}$



**3 Safe operating area**

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

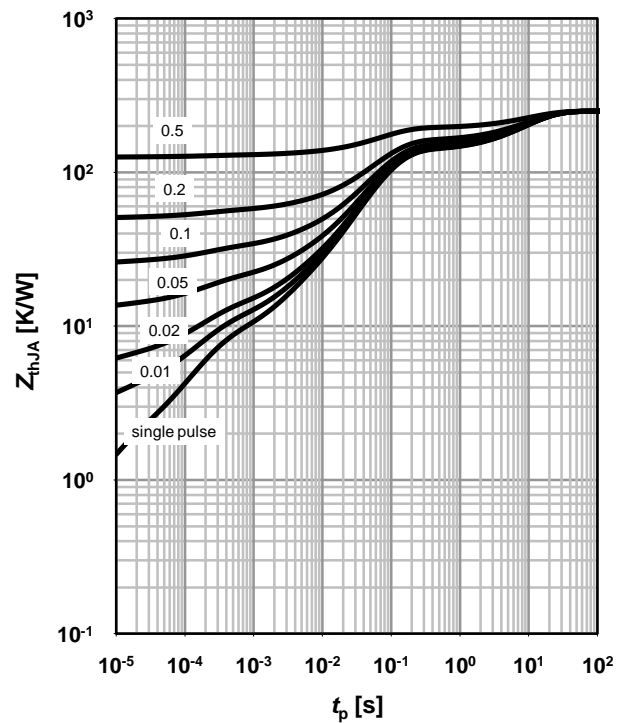
parameter:  $t_p$



**4 Max. transient thermal impedance**

$Z_{thJA}=f(t_p)$

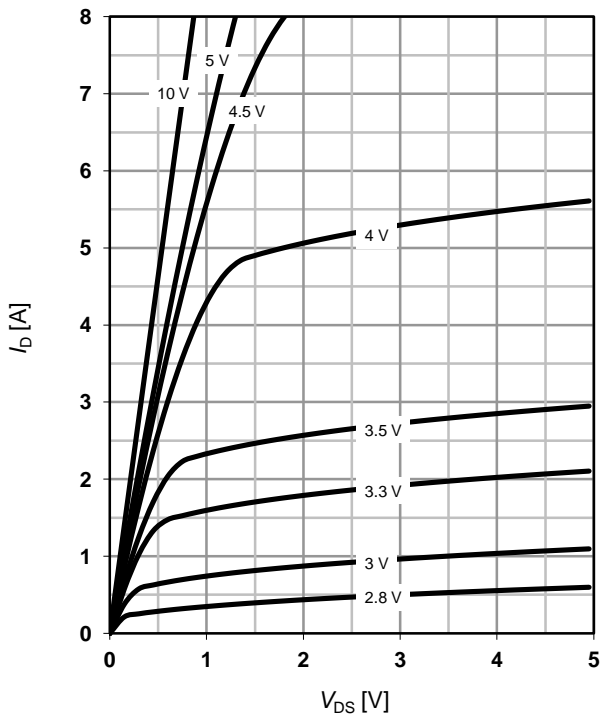
parameter:  $D=t_p/T$



**5 Typ. output characteristics**

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

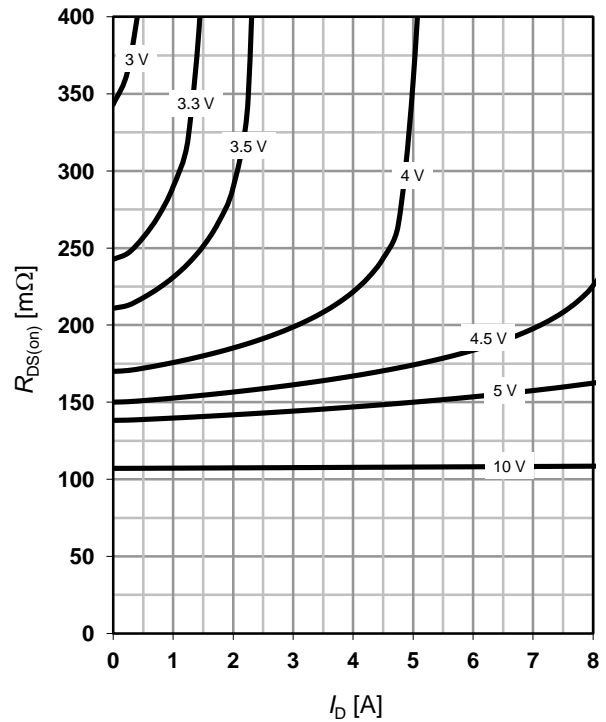
parameter:  $V_{GS}$



**6 Typ. drain-source on resistance**

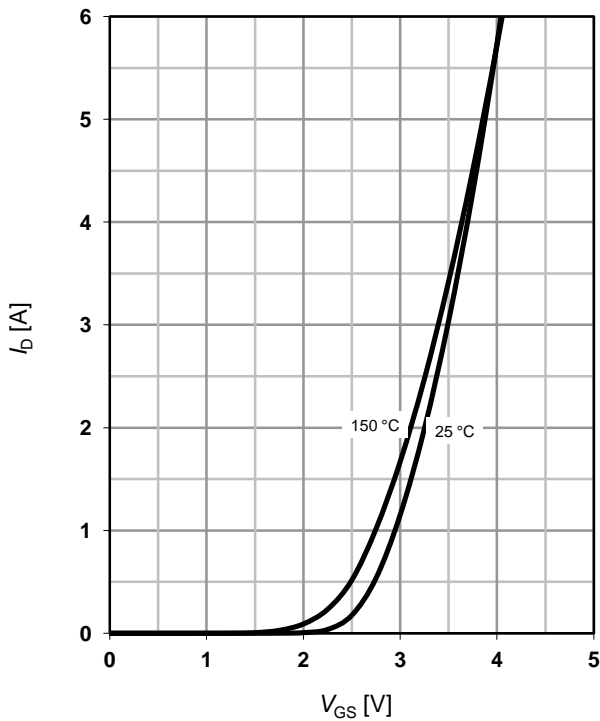
$R_{DS(on)}=f(I_D); T_j=25\text{ }^\circ\text{C}$

parameter:  $V_{GS}$



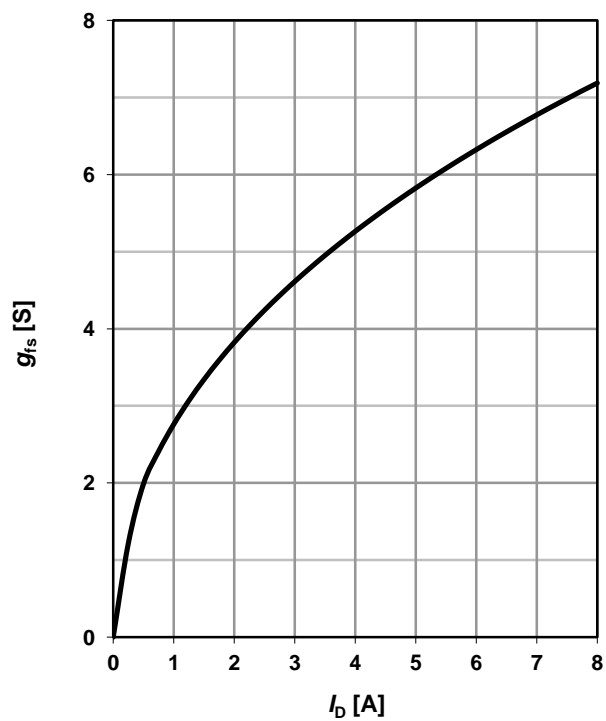
**7 Typ. transfer characteristics**

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



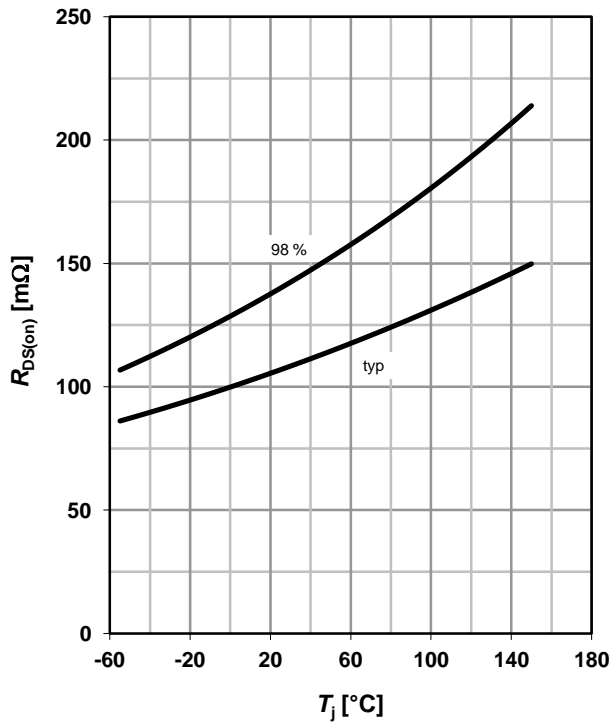
**8 Typ. forward transconductance**

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



**9 Drain-source on-state resistance**

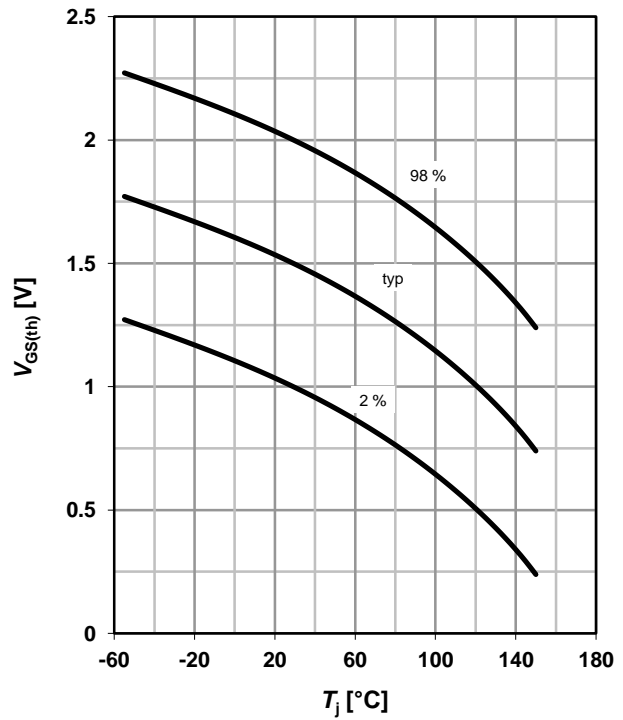
$R_{DS(on)}=f(T_j); I_D=-1.5\text{ A}; V_{GS}=-10\text{ V}$



**10 Typ. gate threshold voltage**

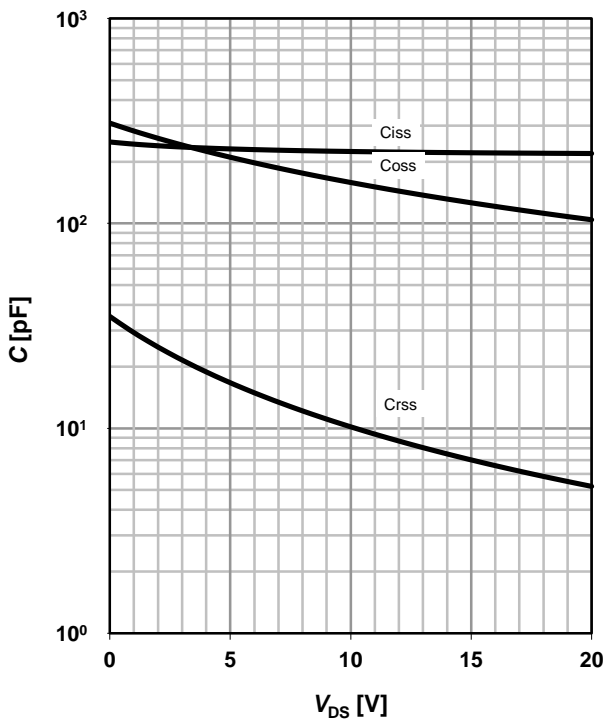
$V_{GS(th)}=f(T_j); V_{DS}=V_{GS}; I_D=-6.3\ \mu\text{A}$

parameter:  $I_D$



**11 Typ. capacitances**

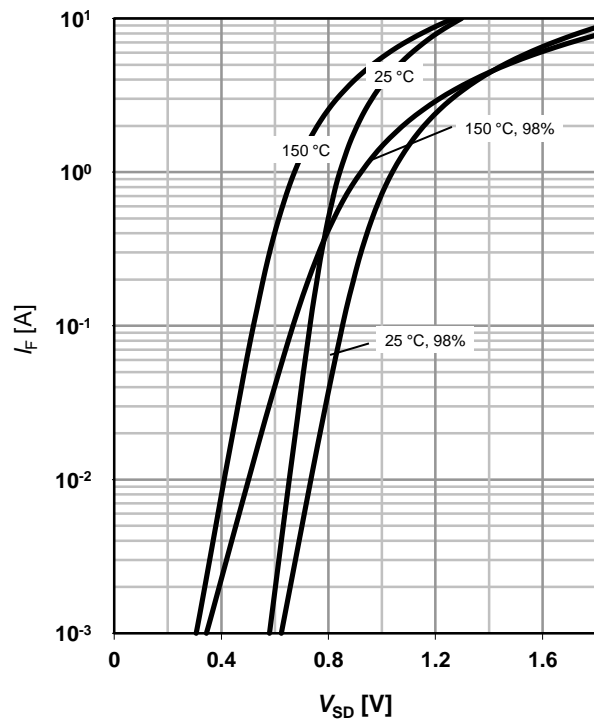
$C=f(V_{DS}); V_{GS}=0\text{ V}; f=1\text{ MHz}; T_j=25^\circ\text{C}$



**12 Forward characteristics of reverse diode**

$I_F=f(V_{SD})$

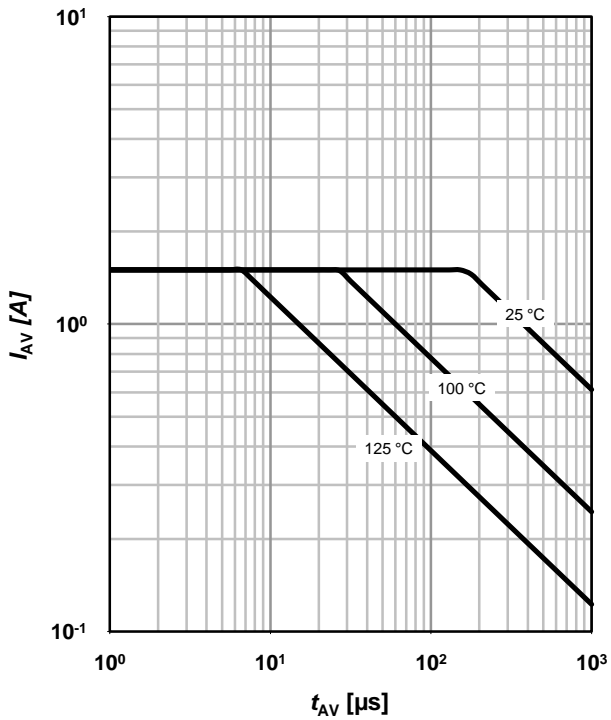
parameter:  $T_j$



**13 Avalanche characteristics**

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

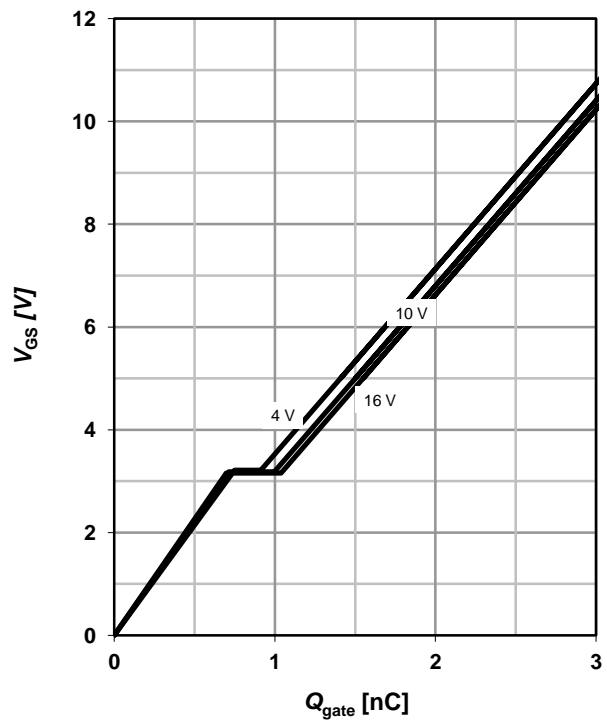
parameter:  $T_{j(\text{start})}$



**14 Typ. gate charge**

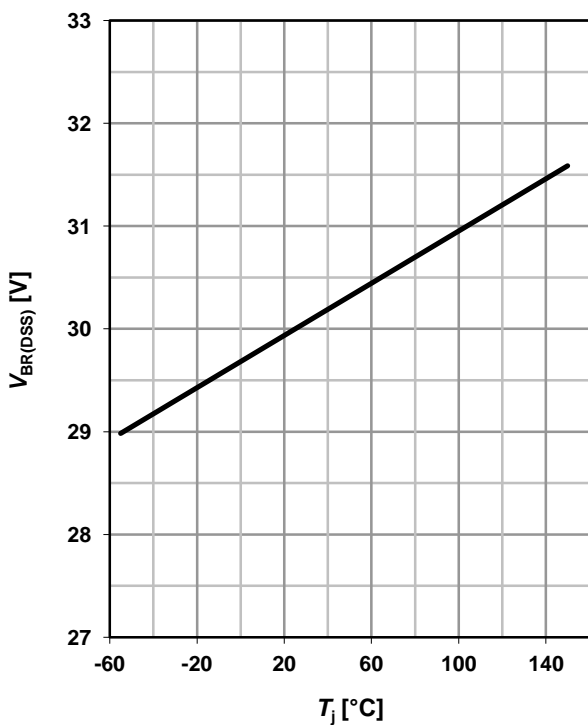
$V_{GS}=f(Q_{\text{gate}}); I_D=-1.5 \text{ A pulsed}$

parameter:  $V_{DD}$



**15 Drain-source breakdown voltage**

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

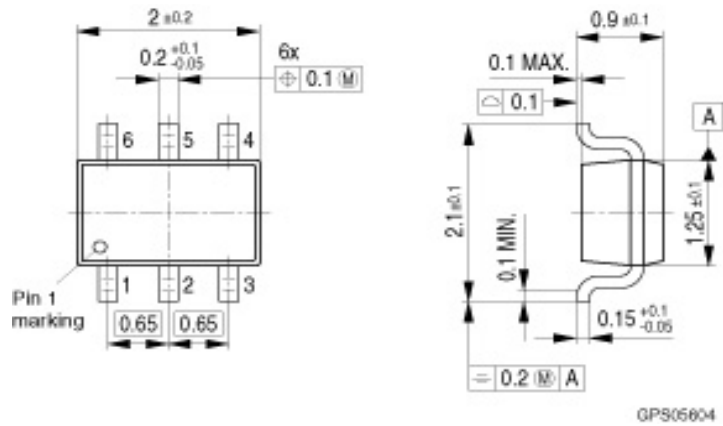


**16 Gate charge waveforms**

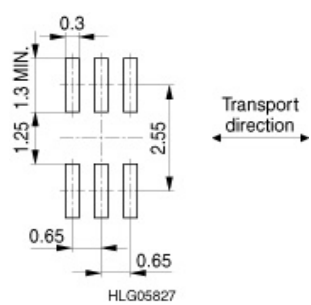


SOT-363

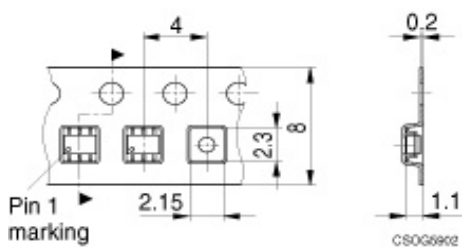
Package Outline:



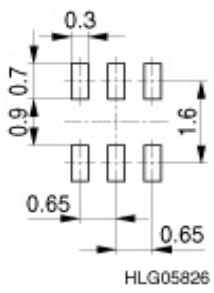
Footprint:



Packing:



Reflow soldering:



Dimensions in mm



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