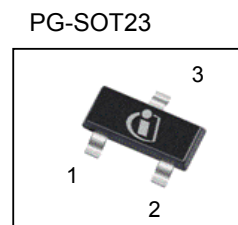
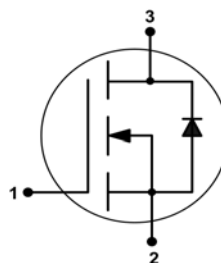


**OptiMOS™ 2 Small-Signal-Transistor**
**Features**

- N-channel
- Enhancement mode
- Logic level (4.5V rated)
- Avalanche rated
- Qualified according to AEC Q101
- 100%lead-free; RoHS compliant
- Halogen-free according to IEC61249-2-21


**Product Summary**

|                  |                       |     |            |
|------------------|-----------------------|-----|------------|
| $V_{DS}$         |                       | 30  | V          |
| $R_{DS(on),max}$ | $V_{GS}=10\text{ V}$  | 160 | m $\Omega$ |
|                  | $V_{GS}=4.5\text{ V}$ | 280 |            |
| $I_D$            |                       | 1.4 | A          |



| Type    | Package | Tape and Reel Information | Marking | Lead Free | Packing |
|---------|---------|---------------------------|---------|-----------|---------|
| BSS316N | SOT23   | H6327: 3000 pcs/ reel     | SYs     | Yes       | Non dry |

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

| Parameter                           | Symbol            | Conditions   | Value                  | Unit               |
|-------------------------------------|-------------------|--|------------------------|--------------------|
| Continuous drain current            | $I_D$             | $T_A=25\text{ °C}$   | 1.4                    | A                  |
|                                     |                   | $T_A=70\text{ °C}$   | 1.1                    |                    |
| Pulsed drain current                | $I_{D,pulse}$     | $T_A=25\text{ °C}$   | 5.6                    |                    |
| Avalanche energy, single pulse      | $E_{AS}$          | $I_D=1.4\text{ A}$ , $R_{GS}=25\text{ }\Omega$   | 3.7                    | mJ                 |
| Reverse diode $dv/dt$               | $dv/dt$           | $I_D=1.4\text{ A}$ , $V_{DS}=16\text{ V}$ ,<br>$di/dt=200\text{ A}/\mu\text{s}$ ,<br>$T_{j,max}=150\text{ °C}$ | 6                      | kV/ $\mu\text{s}$  |
| Gate source voltage                 | $V_{GS}$          |  | $\pm 20$               | V                  |
| Power dissipation                   | $P_{tot}$         | $T_A=25\text{ °C}$   | 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              |                    |

| 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   | $V_{(BR)DSS}$ | $V_{GS}=0\text{ V}$ , $I_D=250\text{ }\mu\text{A}$               | 30  | -   | -   | V                |
| Gate threshold voltage           | $V_{GS(th)}$  | $V_{DS}=V_{GS}$ , $I_D=3.7\text{ }\mu\text{A}$                   | 1.2 | 1.6 | 2.0 |                  |
| Drain-source leakage current     | $I_{DSS}$     | $V_{DS}=30\text{ V}$ , $V_{GS}=0\text{ V}$ , $T_j=25\text{ °C}$  | -   | -   | 1   | $\mu\text{A}$    |
|                                  |               | $V_{DS}=30\text{ V}$ , $V_{GS}=0\text{ V}$ , $T_j=150\text{ °C}$ | -   | -   | 100 |                  |
| Gate-source leakage current      | $I_{GSS}$     | $V_{GS}=30\text{ V}$ , $V_{DS}=0\text{ V}$                       | -   | -   | 100 | nA               |
| Drain-source on-state resistance | $R_{DS(on)}$  | $V_{GS}=4.5\text{ V}$ , $I_D=1.1\text{ A}$                       | -   | 191 | 280 | $\text{m}\Omega$ |
|                                  |               | $V_{GS}=10\text{ V}$ , $I_D=1.4\text{ A}$                        | -   | 119 | 160 |                  |
| Transconductance                 | $g_{fs}$      | $ V_{DS} >2 I_D R_{DS(on)max}$ , $I_D=1.1\text{ A}$              |     | 2.3 | -   | S                |

<sup>1)</sup> Performed on 40mm<sup>2</sup> FR4 PCB. The traces are 1mm wide, 70 $\mu\text{m}$  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            | $C_{iss}$    | $V_{GS}=0\text{ V}, V_{DS}=15\text{ V},$<br>$f=1\text{ MHz}$                   | - | 71  | 94 | pF |
| Output capacitance           | $C_{oss}$    |  | - | 26  | 35 |    |
| Reverse transfer capacitance | $C_{rss}$    |  | - | 5   | 7  |    |
| Turn-on delay time           | $t_{d(on)}$  | $V_{DD}=15\text{ V}, V_{GS}=10\text{ V},$<br>$I_D=1.4\text{ A}, R_G=6\ \Omega$ | - | 3.4 | -  | ns |
| Rise time                    | $t_r$        |  | - | 2.3 | -  |    |
| Turn-off delay time          | $t_{d(off)}$ |  | - | 5.8 | -  |    |
| Fall time                    | $t_f$        |  | - | 1   | -  |    |

**Gate Charge Characteristics**

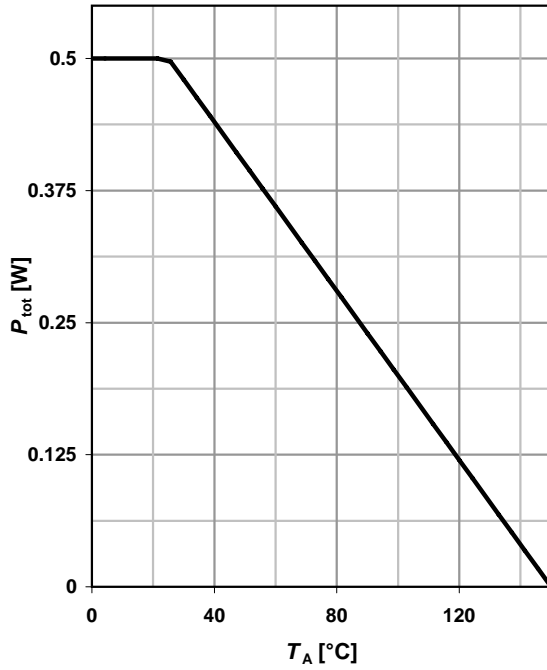
|                       |               |  |   |     |   |    |
|-----------------------|---------------|--|---|-----|---|----|
| Gate to source charge | $Q_{gs}$      | $V_{DD}=15\text{ V}, I_D=1.4\text{ A},$<br>$V_{GS}=0\text{ to }5\text{ V}$ | - | 0.3 | - | nC |
| Gate to drain charge  | $Q_{gd}$      |  | - | 0.2 | - |    |
| Gate charge total     | $Q_g$         |  | - | 0.6 | - |    |
| Gate plateau voltage  | $V_{plateau}$ |  | - | 3.4 | - | V  |

**Reverse Diode**

|                                  |               |  |   |     |     |    |
|----------------------------------|---------------|--|---|-----|-----|----|
| Diode continuous forward current | $I_S$         | $T_A=25\text{ }^\circ\text{C}$   | - | -   | 0.5 | A  |
| Diode pulse current              | $I_{S,pulse}$ |  | - | -   | 5.6 |    |
| Diode forward voltage            | $V_{SD}$      | $V_{GS}=0\text{ V}, I_F=1.4\text{ A},$<br>$T_j=25\text{ }^\circ\text{C}$   | - | 0.8 | 1.1 | V  |
| Reverse recovery time            | $t_{rr}$      | $V_R=10\text{ V}, I_F=1.4\text{ A},$<br>$di_F/dt=100\text{ A}/\mu\text{s}$ | - | 9.1 | -   | ns |
| Reverse recovery charge          | $Q_{rr}$      |  | - | 2.6 | -   | nC |

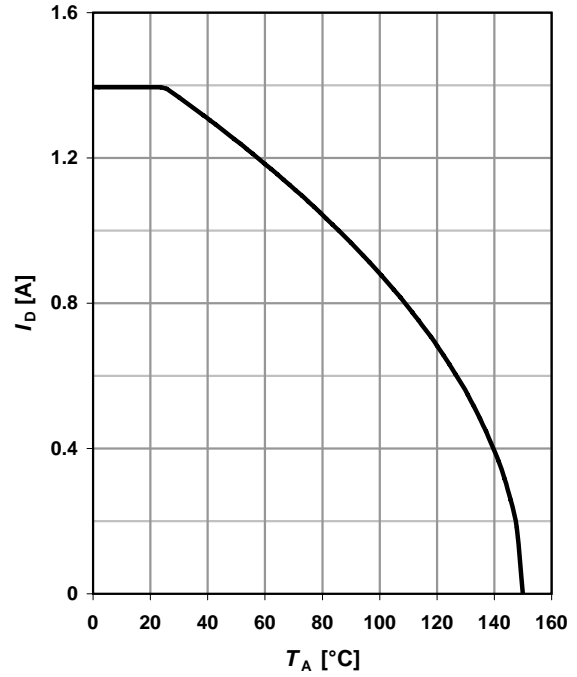
**1 Power dissipation**

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



**2 Drain current**

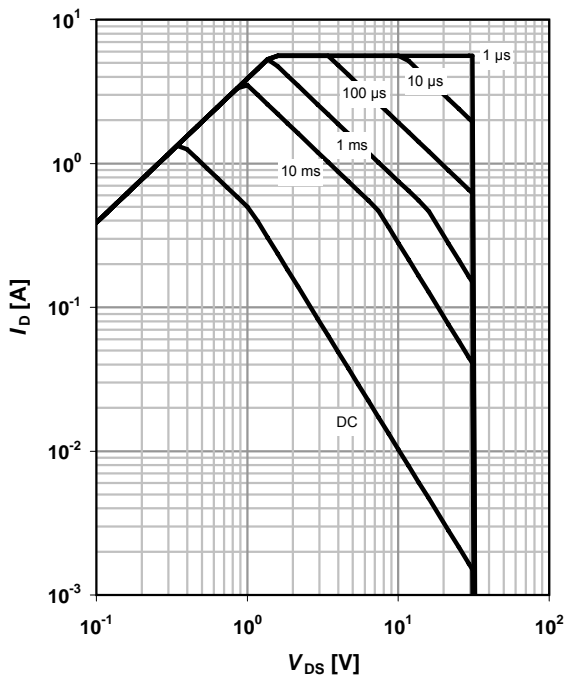
$$I_D = f(T_A); V_{\text{GS}} \geq 10 \text{ V}$$



**3 Safe operating area**

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

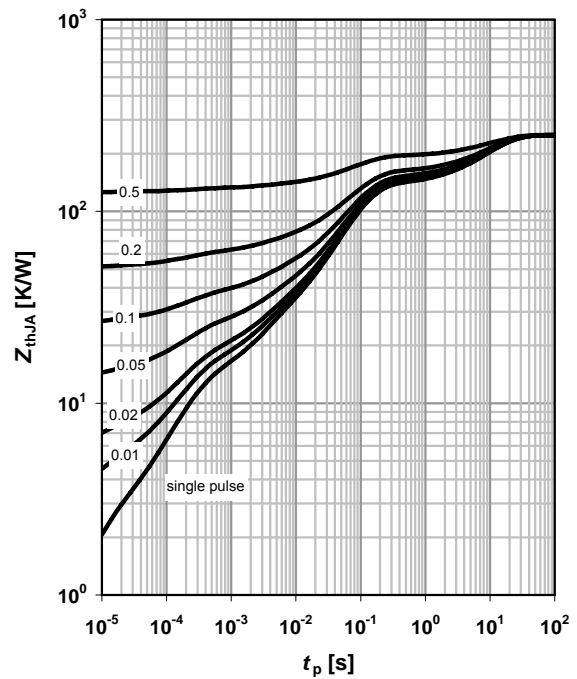
parameter:  $t_p$



**4 Max. transient thermal impedance**

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

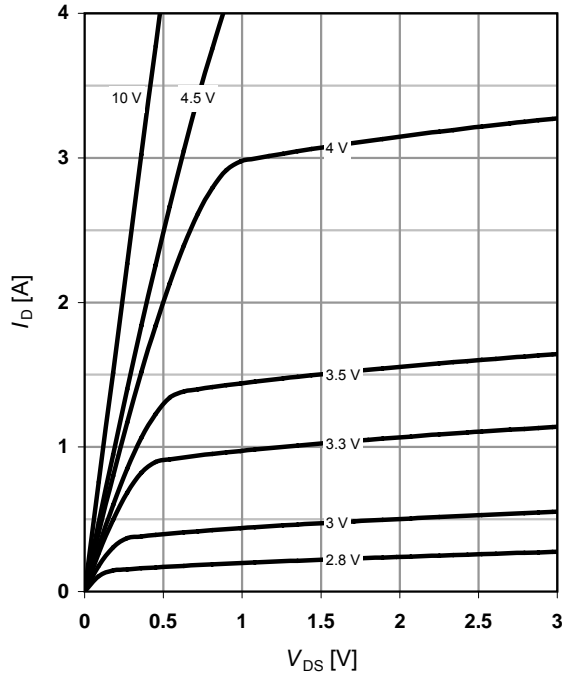
parameter:  $D = t_p/T$



**5 Typ. output characteristics**

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

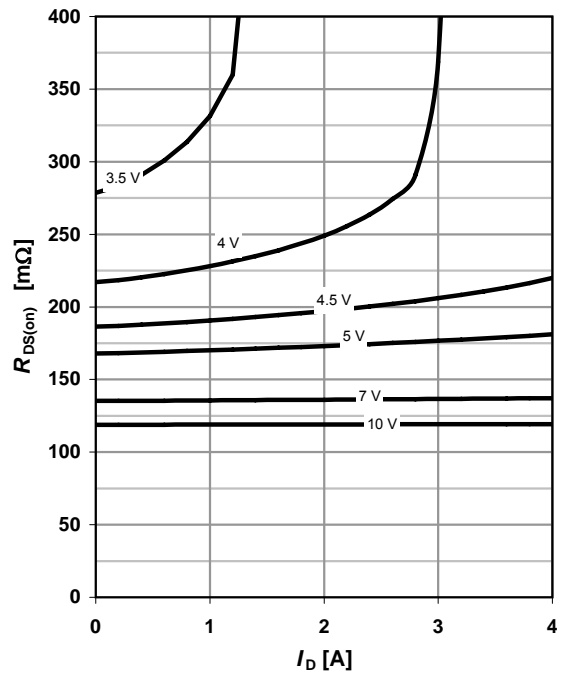
parameter:  $V_{GS}$



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

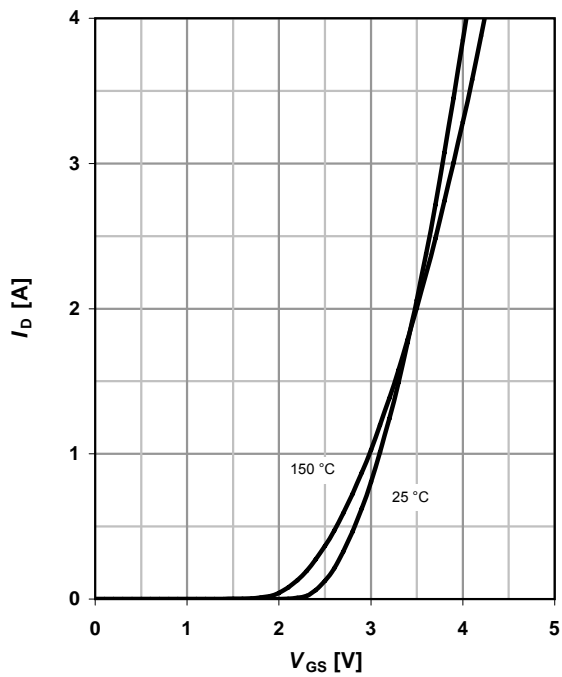
$R_{DS(on)} = f(I_D); T_j = 25\text{ }^\circ\text{C}$

parameter:  $V_{GS}$



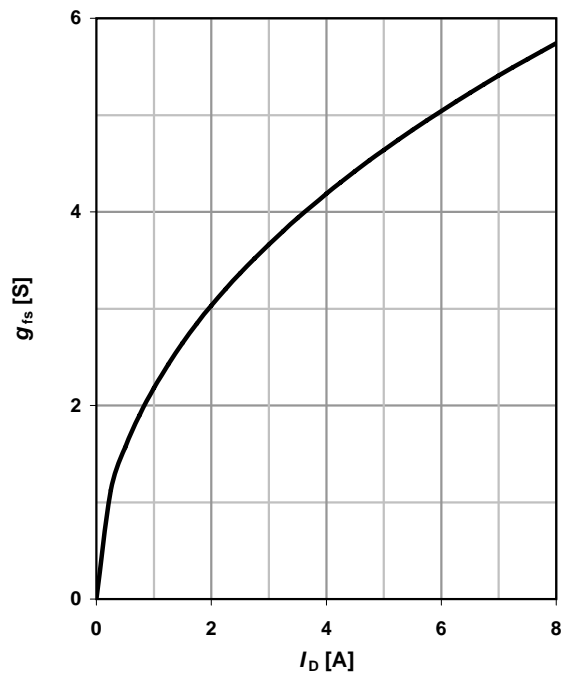
**7 Typ. transfer characteristics**

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



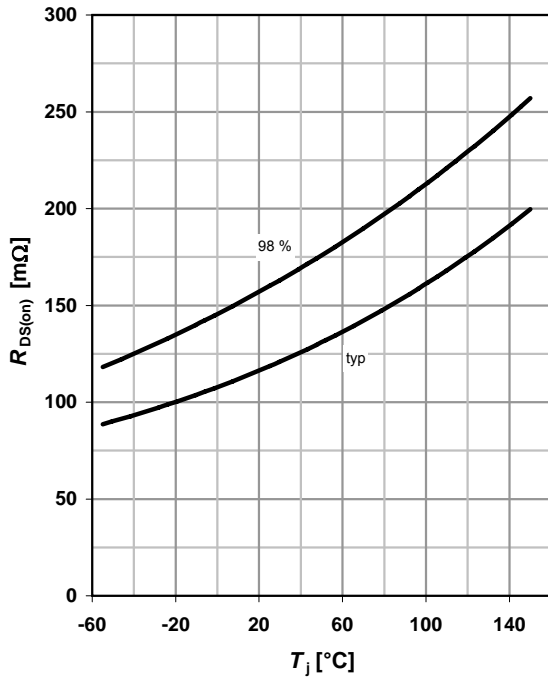
**8 Typ. forward transconductance**

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



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

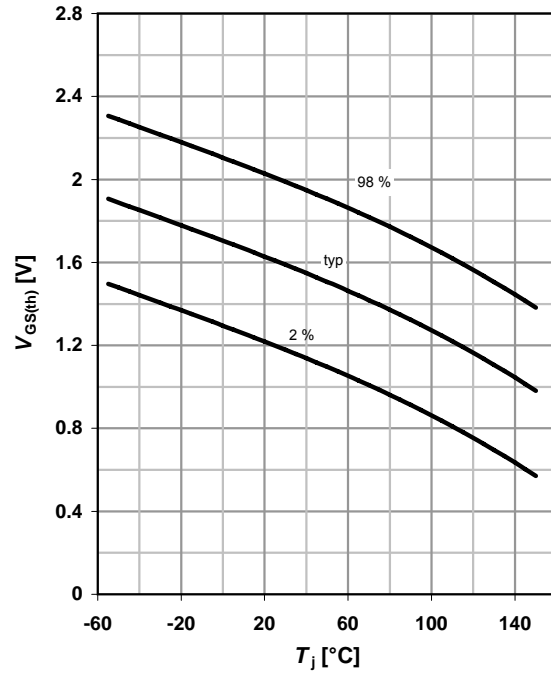
$R_{DS(on)}=f(T_j); I_D=1.4 \text{ A}; V_{GS}=10 \text{ V}$



**10 Typ. gate threshold voltage**

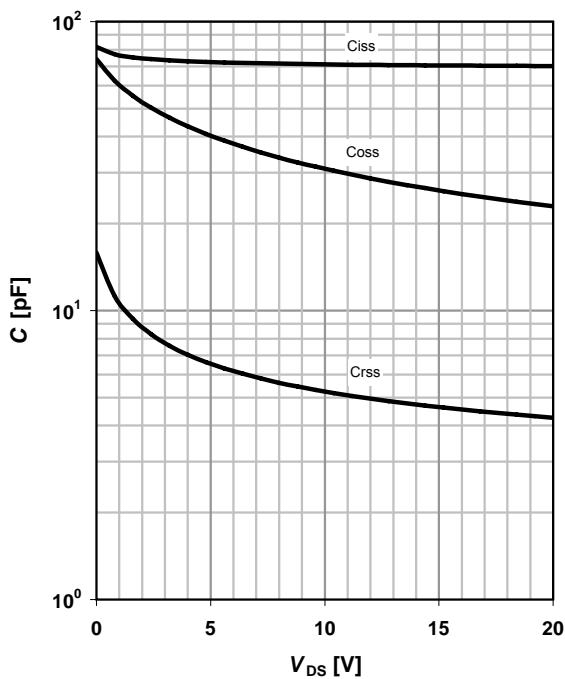
$V_{GS(th)}=f(T_j); V_{DS}=V_{GS}; I_D=3.7 \mu\text{A}$

parameter:  $I_D$



**11 Typ. capacitances**

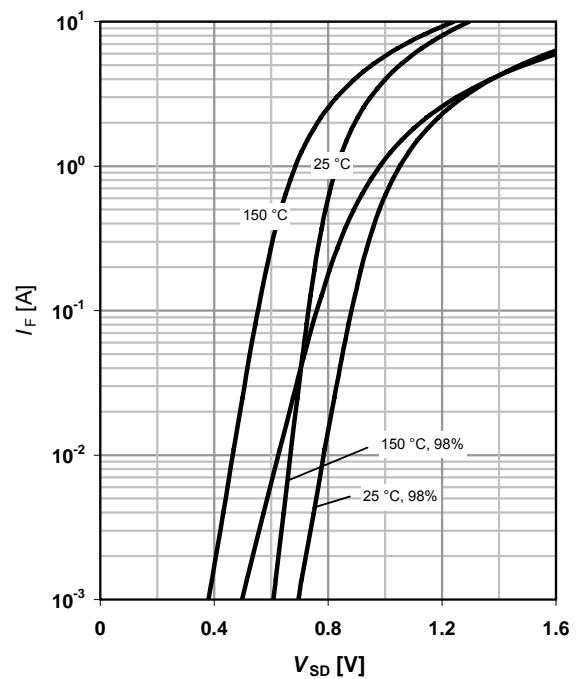
$C=f(V_{DS}); V_{GS}=0 \text{ V}; f=1 \text{ MHz}; T_j=25^\circ\text{C}$



**12 Forward characteristics of reverse diode**

$I_F=f(V_{SD})$

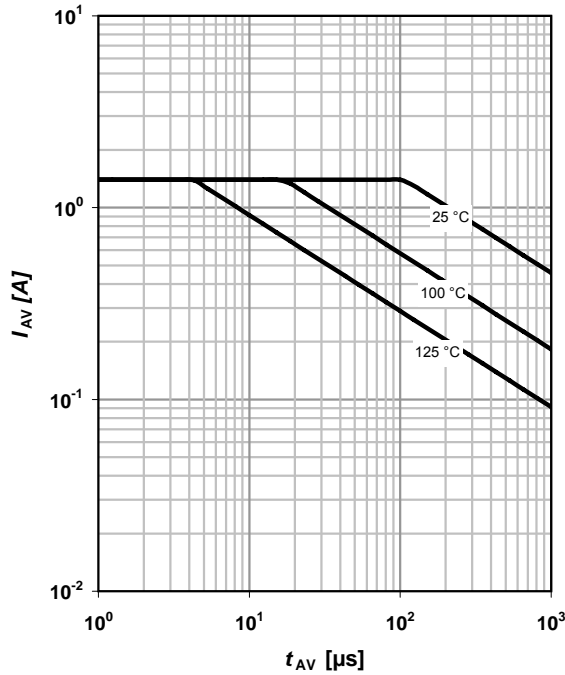
parameter:  $T_j$



**13 Avalanche characteristics**

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

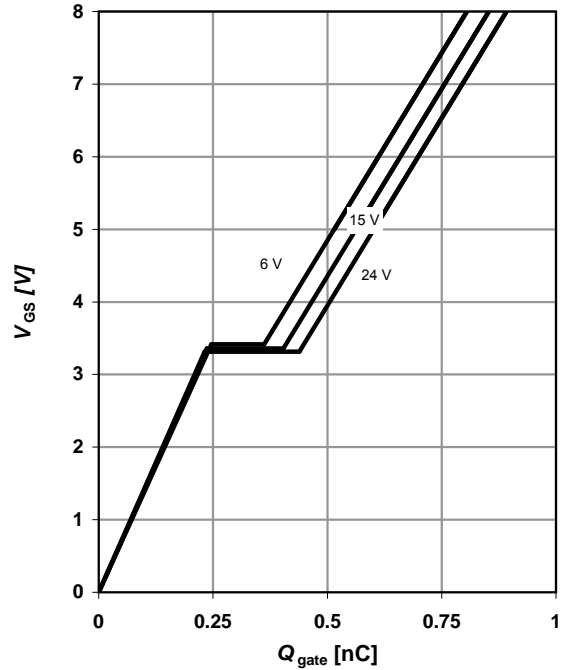
parameter:  $T_{j(start)}$



**14 Typ. gate charge**

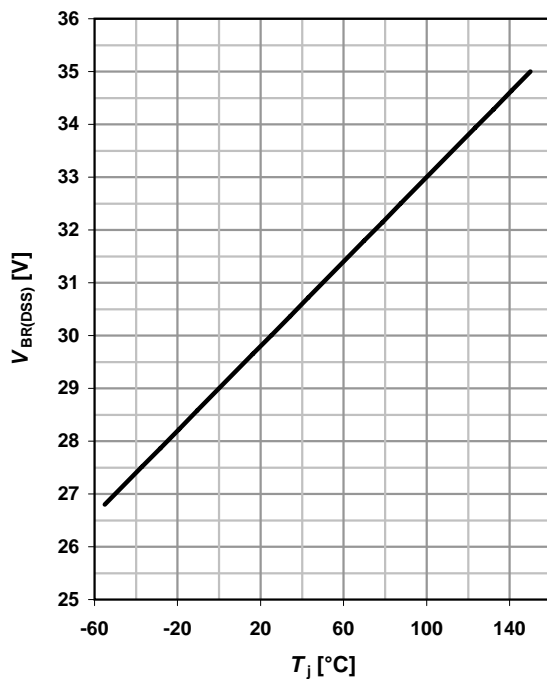
$V_{GS}=f(Q_{gate}); I_D=1.4 \text{ A pulsed}$

parameter:  $V_{DD}$



**15 Drain-source breakdown voltage**

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

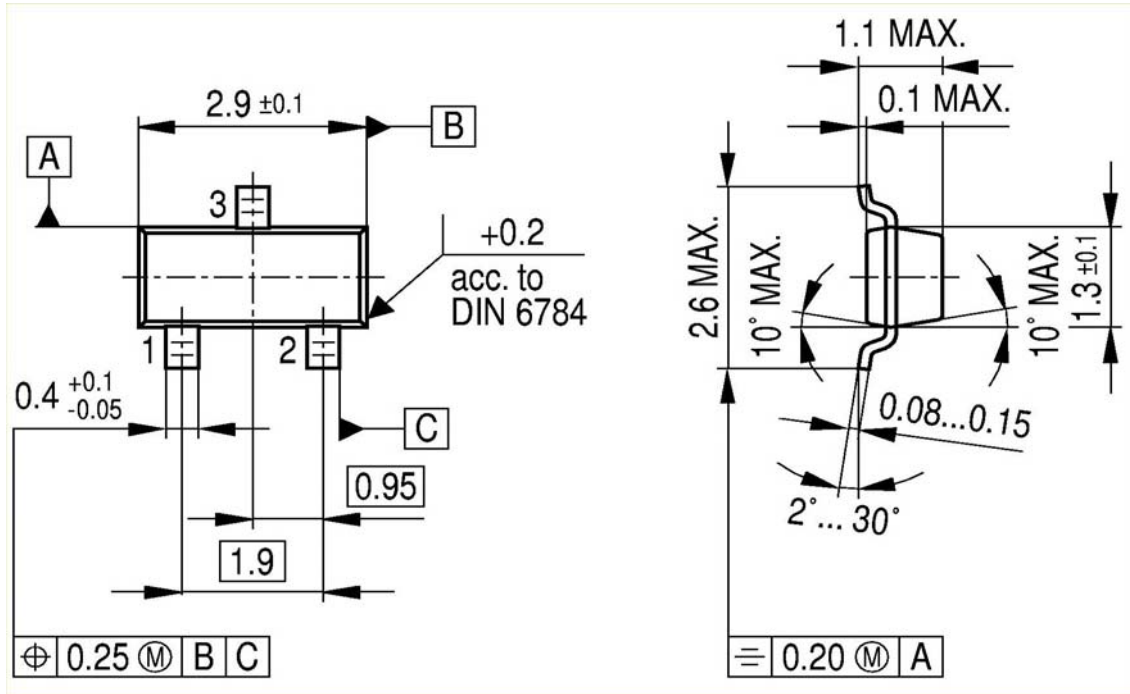


**16 Gate charge waveforms**

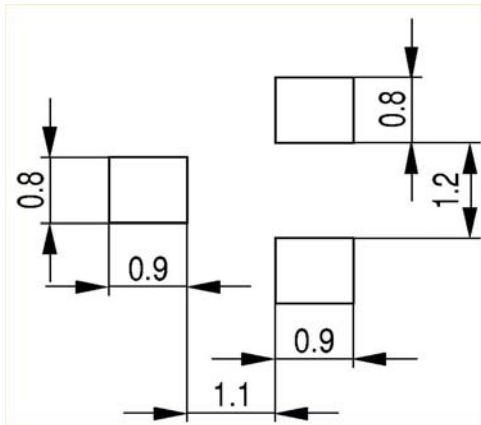


SOT23

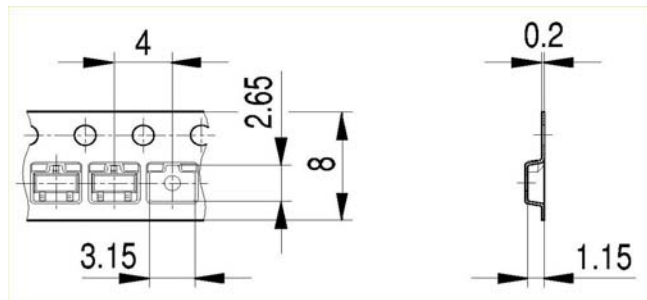
Package Outline:



Footprint:



Packaging:



Dimensions in mm



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