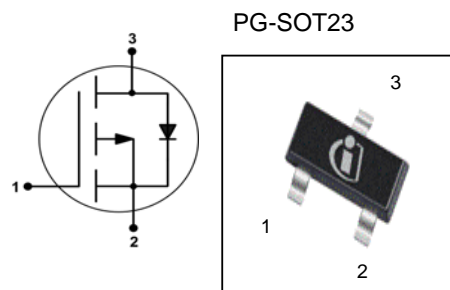


**OptiMOS™ P2 Small-Signal-Transistor**
**Features**

- P-channel
- Enhancement mode
- Super Logic Level (2.5V rated)
- Avalanche rated
- Qualified according to AEC Q101
- 100% lead-free; RoHS compliant
- Halogen-free according to IEC61249-2-21


**Product Summary**

|                  |                        |      |           |
|------------------|------------------------|------|-----------|
| $V_{DS}$         |                        | -20  | V         |
| $R_{DS(on),max}$ | $V_{GS}=-4.5\text{ V}$ | 150  | $m\Omega$ |
|                  | $V_{GS}=-2.5\text{ V}$ | 280  |           |
| $I_D$            |                        | -1.5 | A         |



| Type    | Package  | Tape and Reel Information | Marking | Lead Free | Packing |
|---------|----------|---------------------------|---------|-----------|---------|
| BSS215P | PG-SOT23 | H6327: 3000 pcs/ reel     | YDs     | 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                  |
|                                     |                   | $T_A=70\text{ °C}$   | -1.18                  |                    |
| Pulsed drain current                | $I_{D,pulse}$     | $T_A=25\text{ °C}$   | -6                     |                    |
| Avalanche energy, single pulse      | $E_{AS}$          | $I_D=-1.5\text{ A}$ , $R_{GS}=25\ \Omega$  | 11                     | 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                 | $V_{GS}$          |  | $\pm 12$               | 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   | 0 (<250V)              | V                  |
| 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   | $V_{(BR)DSS}$ | $V_{GS}=0\text{ V}$ , $I_D=-250\text{ }\mu\text{A}$                  | -20  | -    | -    | V                |
| Gate threshold voltage           | $V_{GS(th)}$  | $V_{DS}=V_{GS}$ , $I_D=-11\text{ }\mu\text{A}$                       | -1.2 | -0.9 | -0.6 |                  |
| Drain-source leakage current     | $I_{DSS}$     | $V_{DS}=-20\text{ V}$ , $V_{GS}=0\text{ V}$ ,<br>$T_j=25\text{ °C}$  | -    | -    | -1   | $\mu\text{A}$    |
|                                  |               | $V_{DS}=-20\text{ V}$ , $V_{GS}=0\text{ V}$ ,<br>$T_j=150\text{ °C}$ | -    | -    | -100 |                  |
| Gate-source leakage current      | $I_{GSS}$     | $V_{GS}=-12\text{ V}$ , $V_{DS}=0\text{ V}$                          | -    | -    | -100 | nA               |
| Drain-source on-state resistance | $R_{DS(on)}$  | $V_{GS}=2.5\text{ V}$ ,<br>$I_D=-1.1\text{ A}$                       | -    | 166  | 280  | $\text{m}\Omega$ |
|                                  |               | $V_{GS}=4.5\text{ V}$ ,<br>$I_D=-1.5\text{ A}$                       | -    | 105  | 150  |                  |
| Transconductance                 | $g_{fs}$      | $ V_{DS} >2 I_D R_{DS(on)max}$ ,<br>$I_D=1.18\text{ A}$              | -    | 4.5  | -    | 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            | $C_{iss}$    | $V_{GS}=0\text{ V},$<br>$V_{DS}=-15\text{ V}, f=1\text{ MHz}$                           | - | 260  | 346 | pF |
| Output capacitance           | $C_{oss}$    |   | - | 102  | 135 |    |
| Reverse transfer capacitance | $C_{rss}$    |   | - | 85   | 128 |    |
| Turn-on delay time           | $t_{d(on)}$  | $V_{DD}=-10\text{ V},$<br>$V_{GS}=-4.5\text{ V},$<br>$I_D=-1.5\text{ A}, R_G=6\ \Omega$ | - | 6.7  | -   | ns |
| Rise time                    | $t_r$        |   | - | 9.7  | -   |    |
| Turn-off delay time          | $t_{d(off)}$ |   | - | 14.5 | -   |    |
| Fall time                    | $t_f$        |   | - | 14.0 | -   |    |

**Gate Charge Characteristics**

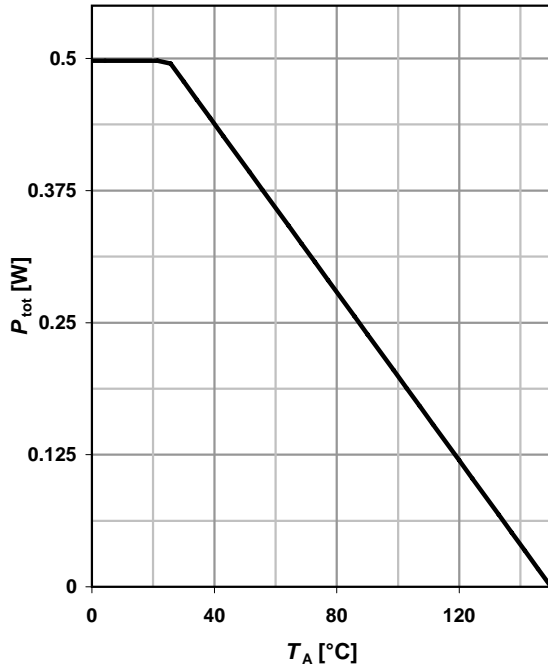
|                       |               |   |   |       |   |    |
|-----------------------|---------------|---|---|-------|---|----|
| Gate to source charge | $Q_{gs}$      | $V_{DD}=16\text{ V},$<br>$I_D=-1.5\text{ A},$<br>$V_{GS}=0\text{ to }-4.5\text{ V}$ | - | -0.49 | - | nC |
| Gate to drain charge  | $Q_{gd}$      |   | - | -1.9  | - |    |
| Gate charge total     | $Q_g$         |   | - | -3.6  | - |    |
| Gate plateau voltage  | $V_{plateau}$ |   | - | -1.9  | - | V  |

**Reverse Diode**

|                                  |               |   |   |      |      |    |
|----------------------------------|---------------|---|---|------|------|----|
| Diode continuous forward current | $I_S$         | $T_A=25\text{ }^\circ\text{C}$  | - | -    | -0.5 | A  |
| Diode pulse current              | $I_{S,pulse}$ |   | - | -    | -6   |    |
| Diode forward voltage            | $V_{SD}$      | $V_{GS}=0\text{ V}, I_F=-1.5\text{ A},$<br>$T_j=25\text{ }^\circ\text{C}$   | - | -0.8 | -1.1 | V  |
| Reverse recovery time            | $t_{rr}$      | $V_R=10\text{ V}, I_F=-1.5\text{ A},$<br>$di_F/dt=100\text{ A}/\mu\text{s}$ | - | 21.0 | -    | ns |
| Reverse recovery charge          | $Q_{rr}$      |   | - | -3.7 | -    |    |

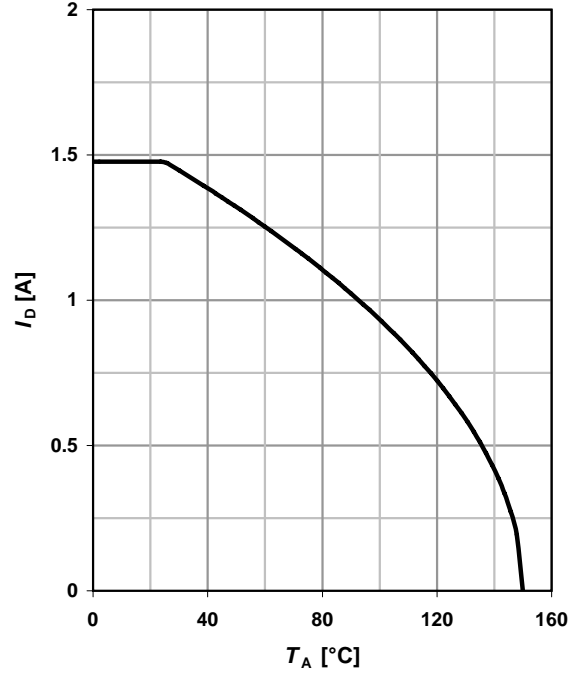
**1 Power dissipation**

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



**2 Drain current**

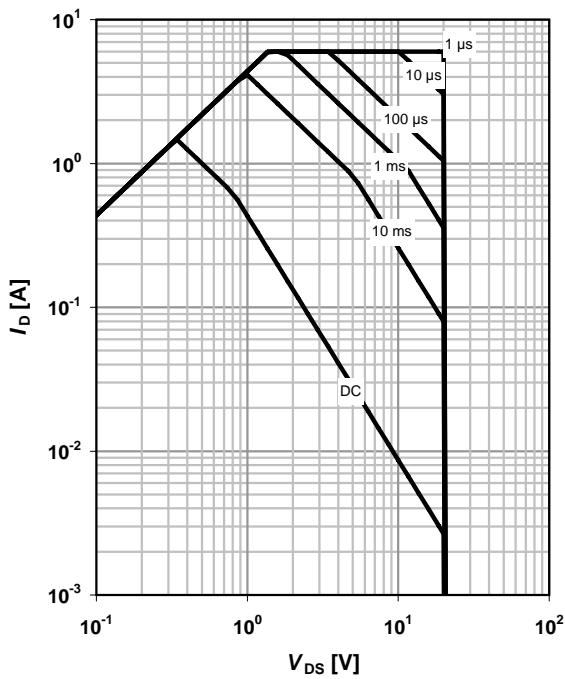
$$I_D = f(T_A); V_{GS} \leq -4.5 \text{ V}$$



**3 Safe operating area**

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

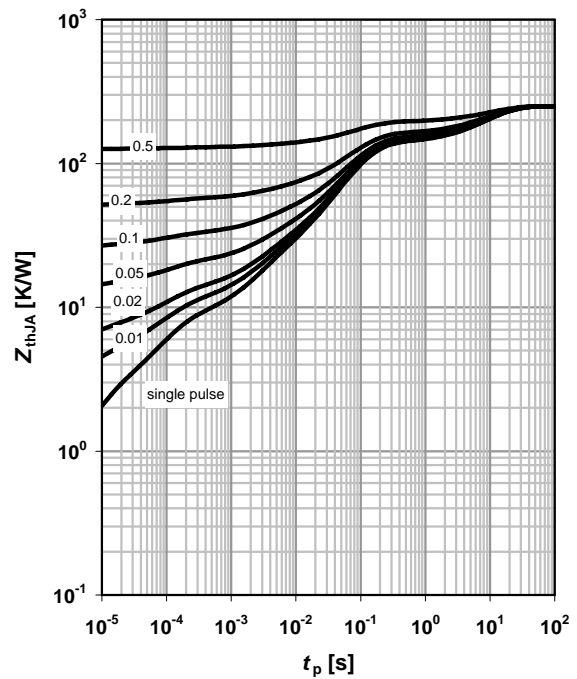
parameter:  $t_p$



**4 Max. transient thermal impedance**

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

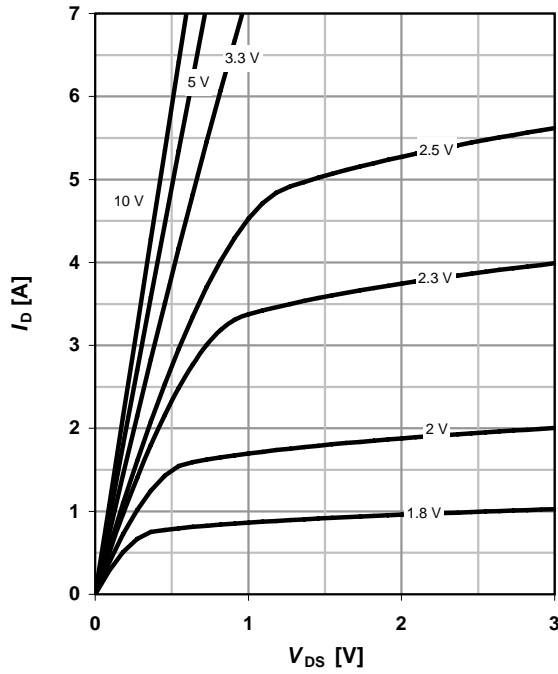
parameter:  $D = t_p/T$



**5 Typ. output characteristics**

$I_D = f(V_{DS}); T_j = 25\text{ °C}$

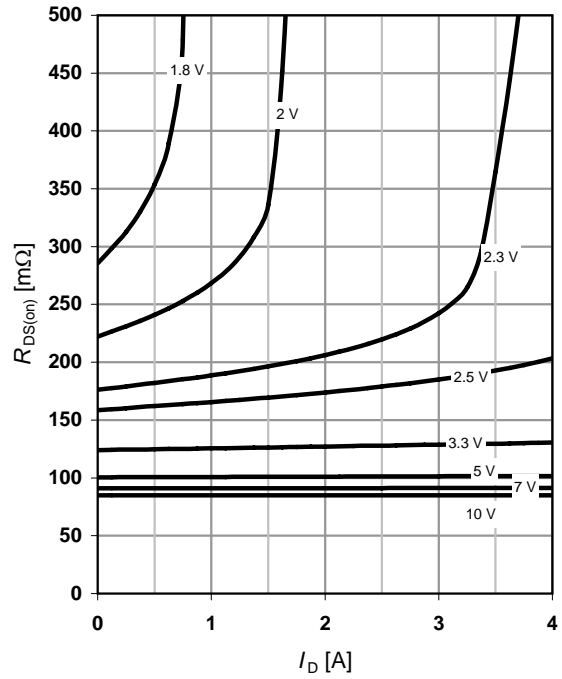
parameter:  $V_{GS}$



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

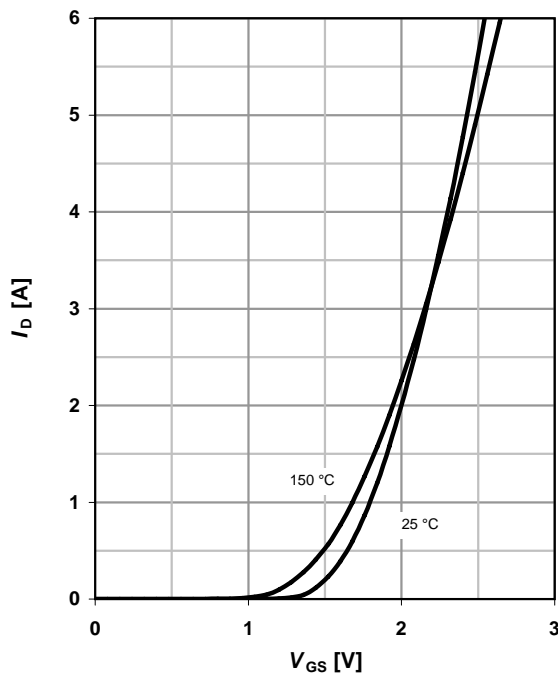
$R_{DS(on)} = f(I_D); T_j = 25\text{ °C}$

parameter:  $V_{GS}$



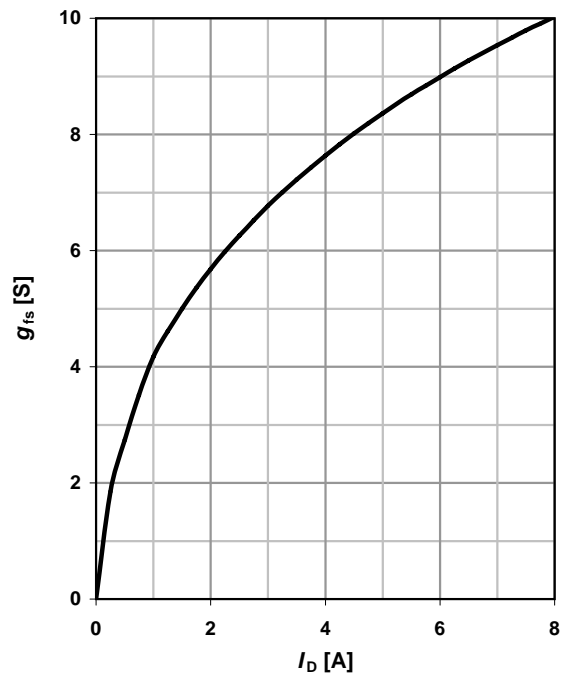
**7 Typ. transfer characteristics**

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



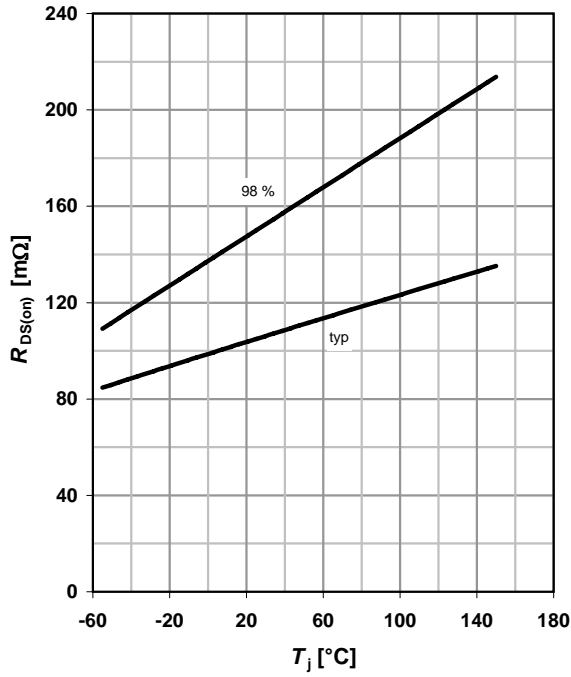
**8 Typ. forward transconductance**

$g_{fs} = f(I_D); T_j = 25\text{ °C}$



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

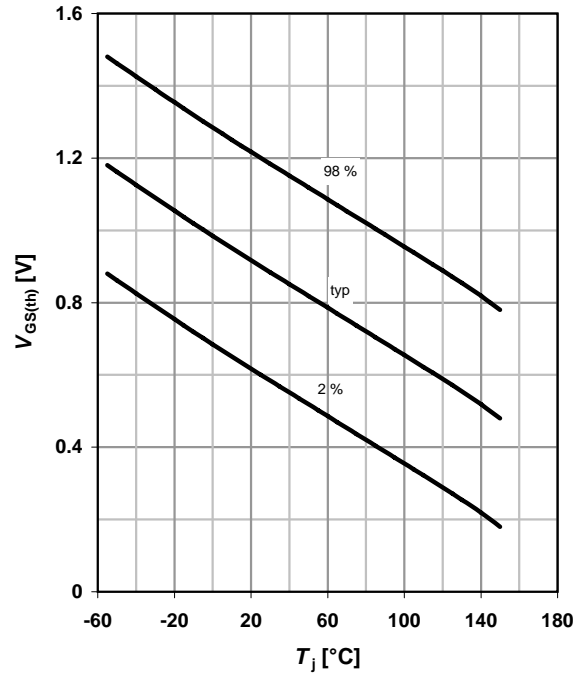
$R_{DS(on)}=f(T_j); I_D=-1.5\text{ A}; V_{GS}=-4.5\text{ V}$



**10 Typ. gate threshold voltage**

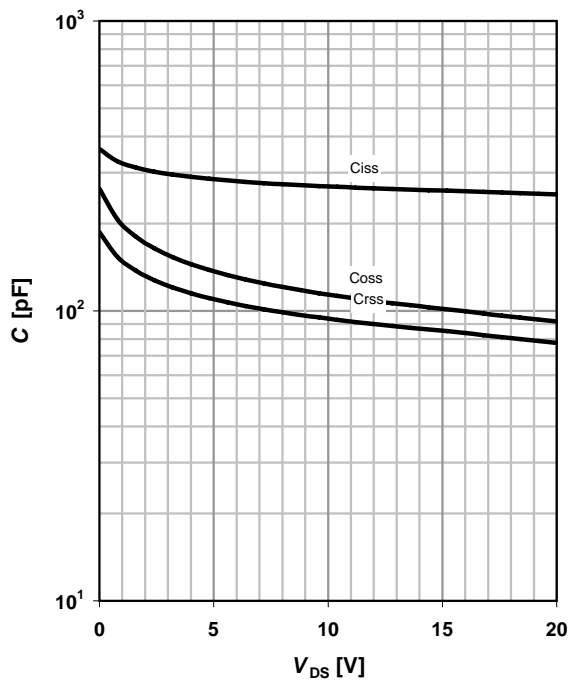
$V_{GS(th)}=f(T_j); V_{DS}=V_{GS}; I_D=-11\ \mu\text{A}$

parameter:  $I_D$



**11 Typ. capacitances**

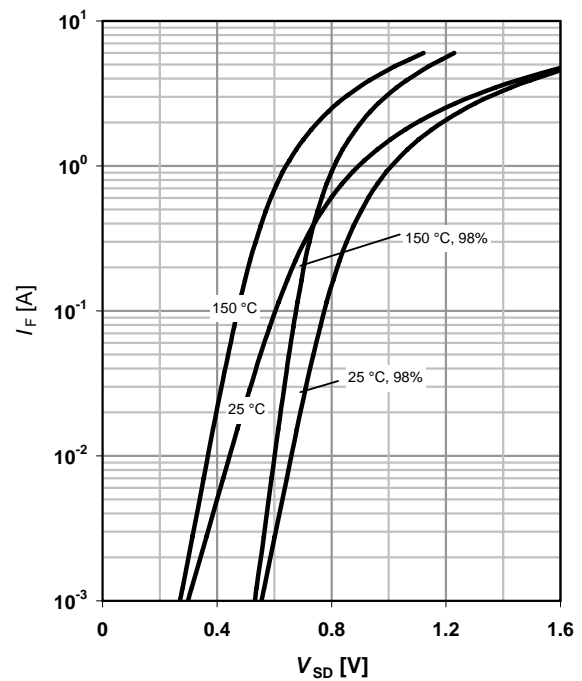
$C=f(V_{DS}); V_{GS}=0\text{ V}; f=1\text{ MHz}; T_j=25^\circ\text{C}$



**12 Forward characteristics of reverse diode**

$I_F=f(V_{SD})$

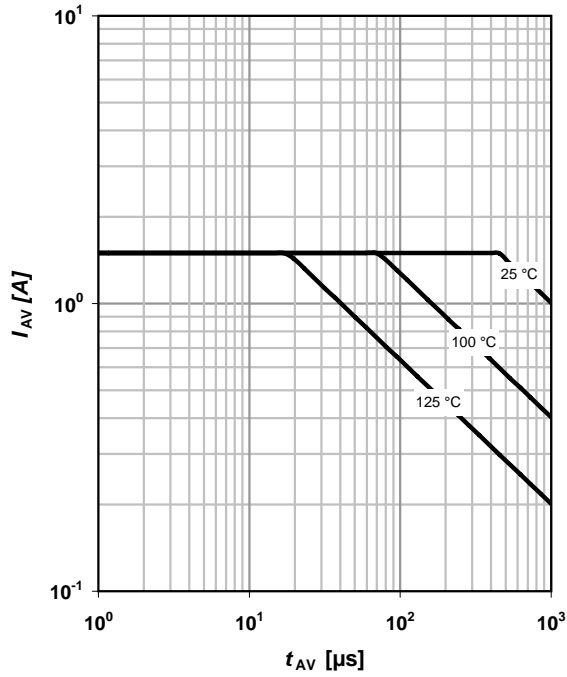
parameter:  $T_j$



**13 Avalanche characteristics**

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

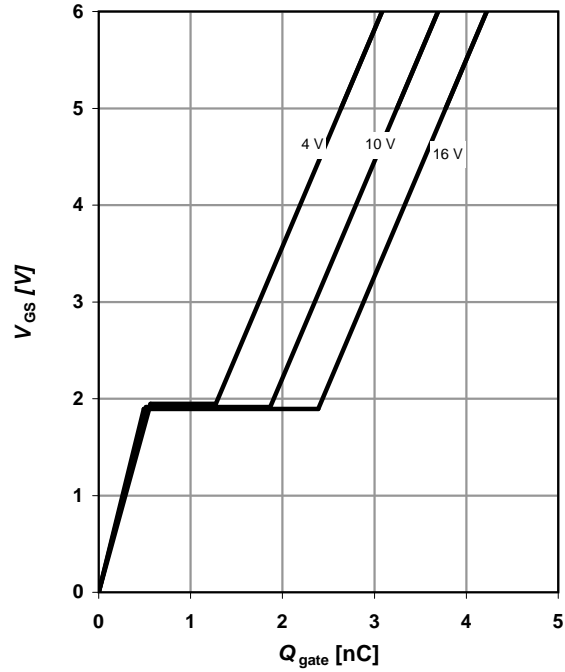
parameter:  $T_{j(start)}$



**14 Typ. gate charge**

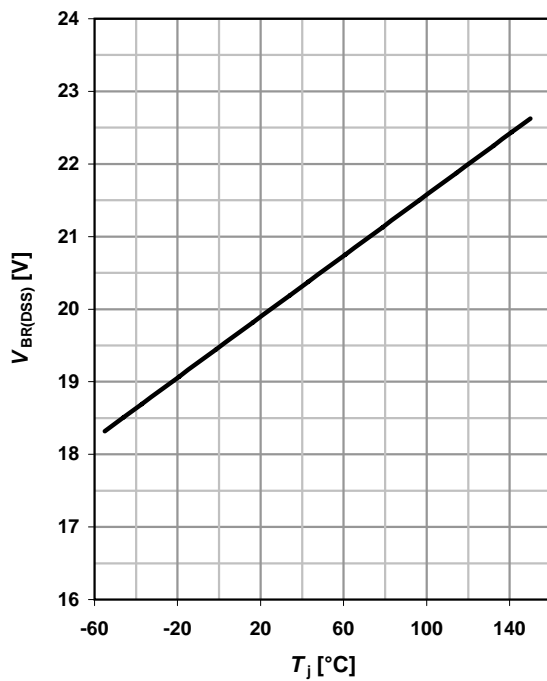
$V_{GS}=f(Q_{gate}); I_D=-1.5 \text{ A pulsed}$

parameter:  $V_{DD}$

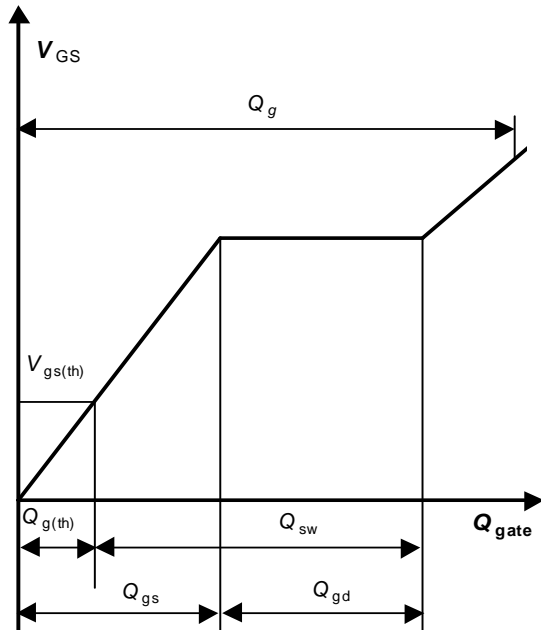


**15 Drain-source breakdown voltage**

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

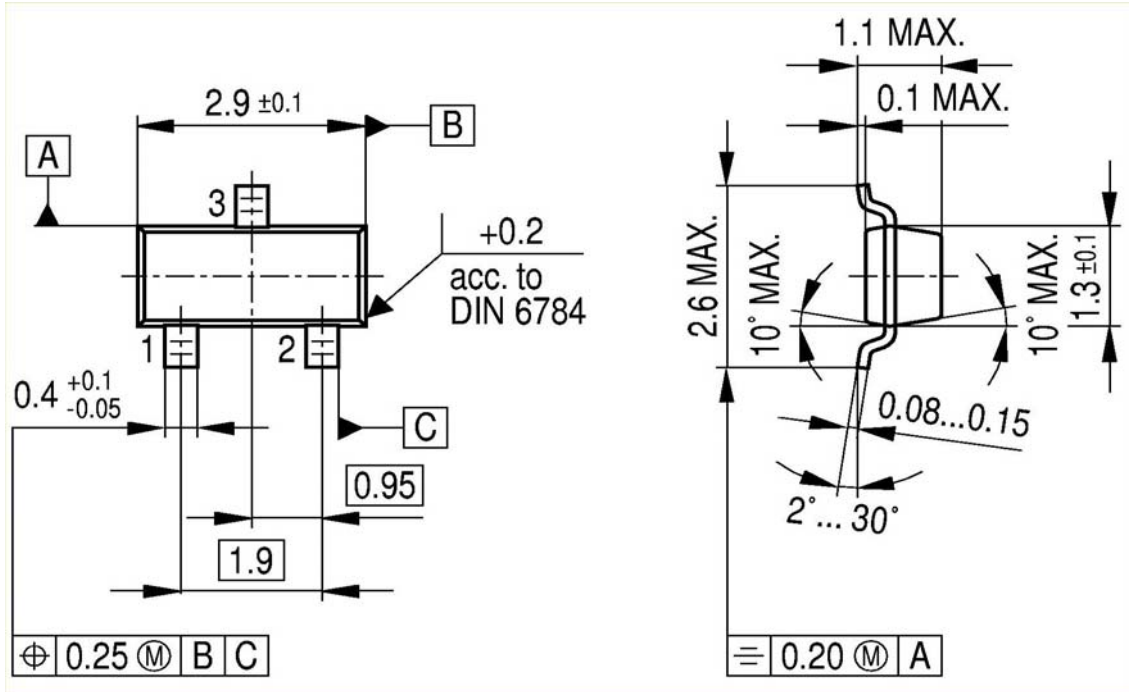


**16 Gate charge waveforms**

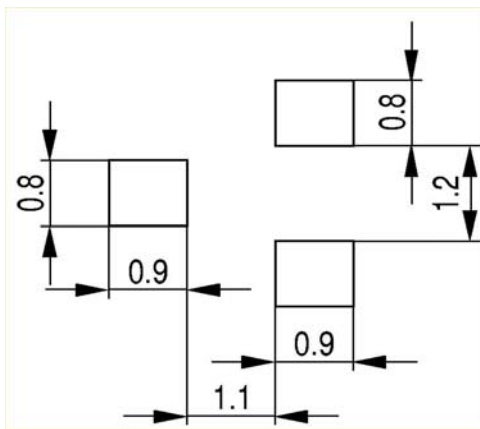


SOT23

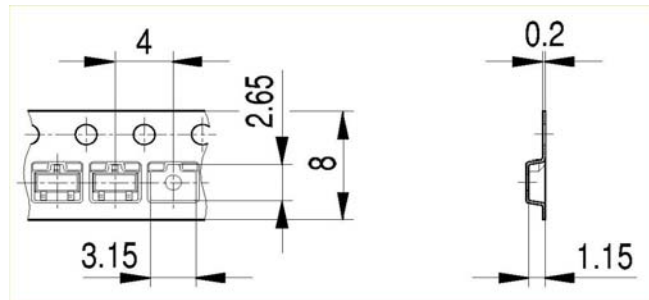
Package Outline:



Footprint:



Packaging:





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