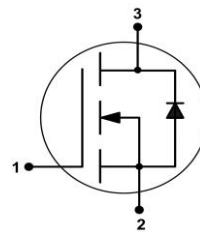
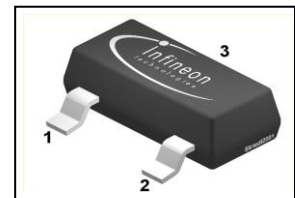


**SIPMOS<sup>®</sup> Small-Signal-Transistor**
**Features**

- n-channel
- enhancement mode
- Logic level (4.5V rated)
- dv/dt rated
- 100%lead-free; RoHS compliant
- Qualified according to AEC Q101
- Halogen-free according to IEC61249-2-21

**Product Summary**

|                  |       |          |
|------------------|-------|----------|
| $V_{DS}$         | 600   | V        |
| $R_{DS(on),max}$ | 500   | $\Omega$ |
| $I_D$            | 0.021 | A        |


**PG-SOT-23**


| Type   | Package   | Pb-free | Halogen-free | Tape and Reel Information | Marking |
|--------|-----------|---------|--------------|---------------------------|---------|
| BSS127 | PG-SOT-23 | Yes     | Yes          | H6327: 3000PCS/reel       | SIs     |

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

| Parameter                           | Symbol         | Conditions   | Value       | Unit               |
|-------------------------------------|----------------|--|-------------|--------------------|
| Continuous drain current            | $I_D$          | $T_A=25\text{ °C}$   | 0.021       | A                  |
|                                     |                | $T_A=70\text{ °C}$   | 0.017       |                    |
| Pulsed drain current                | $I_{D,pulse}$  | $T_A=25\text{ °C}$   | 0.09        |                    |
| Reverse diode dv/dt                 | dv/dt          | $I_D=0.021\text{ A}$ ,<br>$V_{DS}=480\text{ V}$ ,<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                  |
| ESD class (JEDEC22-A114-HBM)        |                |  | 0 (<250)    |                    |
| Power dissipation                   | $P_{tot}$      | $T_A=25\text{ °C}$   | 0.50        | W                  |
| Operating and storage temperature   | $T_j, T_{stg}$ |  | -55 ... 150 | $^{\circ}\text{C}$ |
| IEC climatic category; DIN IEC 68-1 |                |  | 55/150/56   |                    |

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

**Thermal characteristics**

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

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

|                                  |               |   |       |       |     |               |
|----------------------------------|---------------|---|-------|-------|-----|---------------|
| Drain-source breakdown voltage   | $V_{(BR)DSS}$ | $V_{GS}=0\text{ V}, I_D=250\text{ }\mu\text{A}$             | 600   | -     | -   | V             |
| Gate threshold voltage           | $V_{GS(th)}$  | $V_{DS}=V_{GS}, I_D=8\text{ }\mu\text{A}$                   | 1.4   | 2.0   | 2.6 |               |
| Drain-source leakage current     | $I_{D(off)}$  | $V_{DS}=600\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ °C}$  | -     | -     | 0.1 | $\mu\text{A}$ |
|                                  |               | $V_{DS}=600\text{ V}, V_{GS}=0\text{ V}, T_j=150\text{ °C}$ | -     | -     | 10  |               |
| Gate-source leakage current      | $I_{GSS}$     | $V_{GS}=20\text{ V}, V_{DS}=0\text{ V}$                     | -     | 10    | 100 | nA            |
| Drain-source on-state resistance | $R_{DS(on)}$  | $V_{GS}=4.5\text{ V}, I_D=0.016\text{ A}$                   | -     | 330   | 600 | $\Omega$      |
|                                  |               | $V_{GS}=10\text{ V}, I_D=0.016\text{ A}$                    | -     | 310   | 500 |               |
| Transconductance                 | $g_{fs}$      | $ V_{DS} >2 I_D R_{DS(on)max}, I_D=0.01\text{ A}$           | 0.007 | 0.015 | -   | S             |

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

**Dynamic characteristics**

|                              |              |   |   |     |      |    |
|------------------------------|--------------|---|---|-----|------|----|
| Input capacitance            | $C_{iss}$    | $V_{GS}=0\text{ V}, V_{DS}=25\text{ V},$<br>$f=1\text{ MHz}$                                | - | 21  | 28   | pF |
| Output capacitance           | $C_{oss}$    |   | - | 2.4 | 3    |    |
| Reverse transfer capacitance | $C_{rss}$    |   | - | 1.0 | 1.5  |    |
| Turn-on delay time           | $t_{d(on)}$  | $V_{DD}=300\text{ V},$<br>$V_{GS}=10\text{ V}, I_D=0.01\text{ A},$<br>$R_{G,ext}=6\ \Omega$ | - | 6.1 | 19.0 | ns |
| Rise time                    | $t_r$        |   | - | 9.7 | 14.5 |    |
| Turn-off delay time          | $t_{d(off)}$ |   | - | 14  | 21   |    |
| Fall time                    | $t_f$        |   | - | 115 | 170  |    |

**Gate Charge Characteristics**

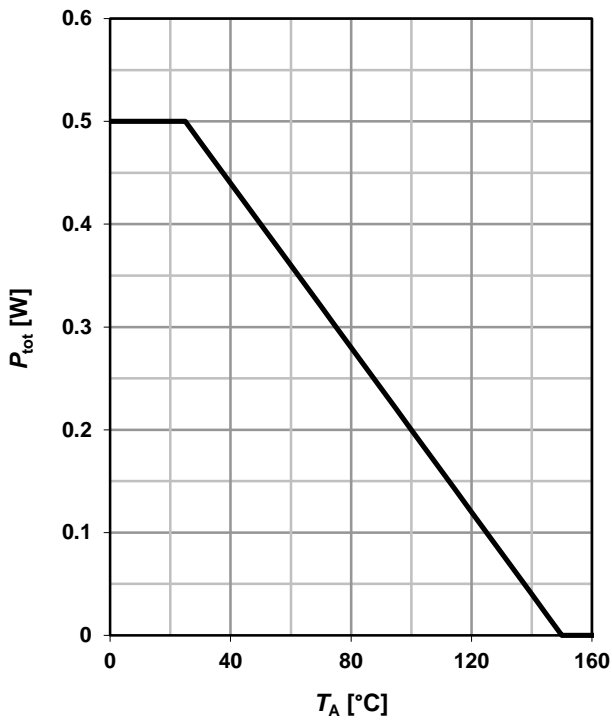
|                       |               |  |   |      |      |    |
|-----------------------|---------------|--|---|------|------|----|
| Gate to source charge | $Q_{gs}$      | $V_{DD}=300\text{ V},$<br>$I_D=0.01\text{ A},$<br>$V_{GS}=0\text{ to }10\text{ V}$ | - | 0.07 | 0.10 | nC |
| Gate to drain charge  | $Q_{gd}$      |  | - | 0.31 | 0.5  |    |
| Gate charge total     | $Q_g$         |  | - | 0.65 | 1.0  |    |
| Gate plateau voltage  | $V_{plateau}$ |  | - | 3.56 | -    | V  |

**Reverse Diode**

|                                  |               |  |   |      |       |    |
|----------------------------------|---------------|--|---|------|-------|----|
| Diode continuous forward current | $I_S$         | $T_A=25\text{ }^\circ\text{C}$   | - | -    | 0.016 | A  |
| Diode pulse current              | $I_{S,pulse}$ |  | - | -    | 0.09  |    |
| Diode forward voltage            | $V_{SD}$      | $V_{GS}=0\text{ V}, I_F=0.016\text{ A},$<br>$T_j=25\text{ }^\circ\text{C}$         | - | 0.82 | 1.2   | V  |
| Reverse recovery time            | $t_{rr}$      | $V_R=300\text{ V},$<br>$I_F=0.016\text{ A},$<br>$di_F/dt=100\text{ A}/\mu\text{s}$ | - | 160  | 240   | ns |
| Reverse recovery charge          | $Q_{rr}$      |  | - | 13.2 | 19.8  | nC |

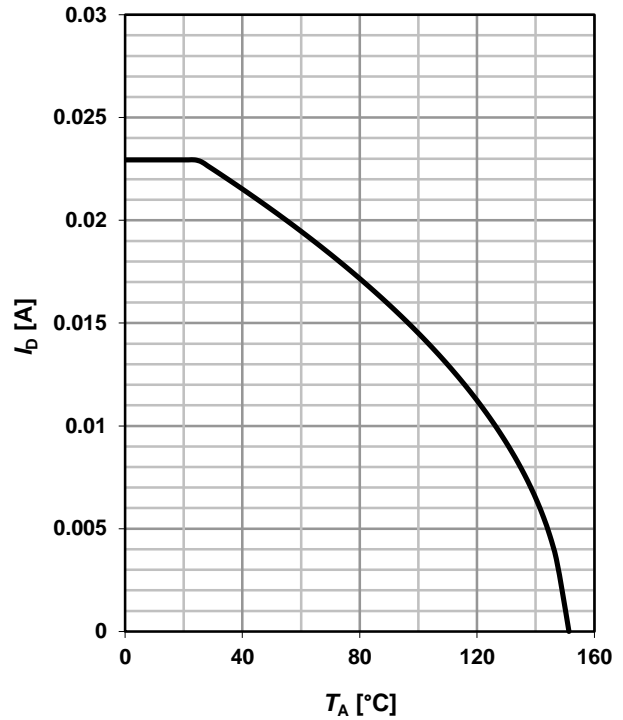
**1 Power dissipation**

$P_{tot}=f(T_A)$



**2 Drain current**

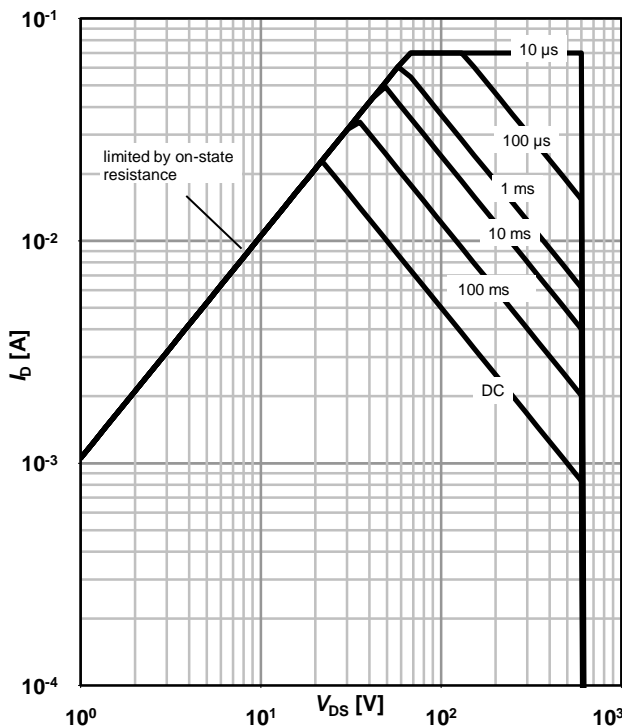
$I_D=f(T_A); V_{GS} \geq 10\text{ V}$



**3 Safe operating area**

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

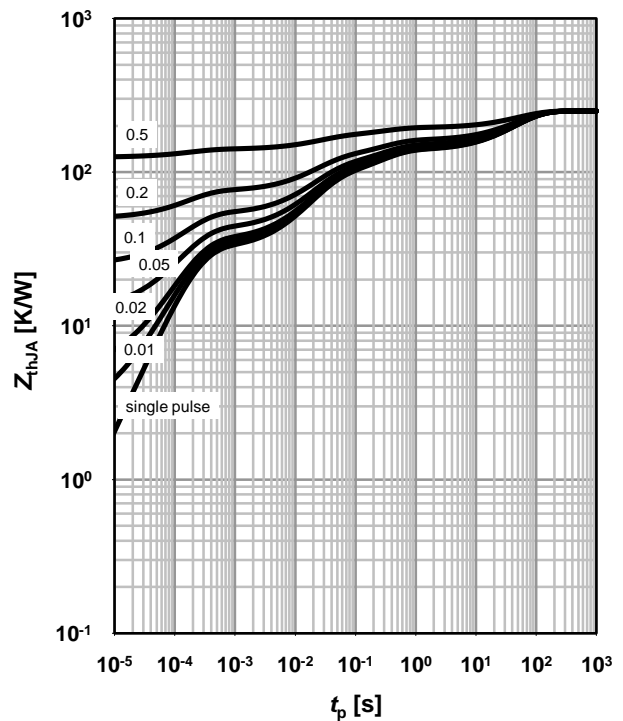
parameter:  $t_p$



**4 Max. transient thermal impedance**

$Z_{thJA}=f(t_p)$

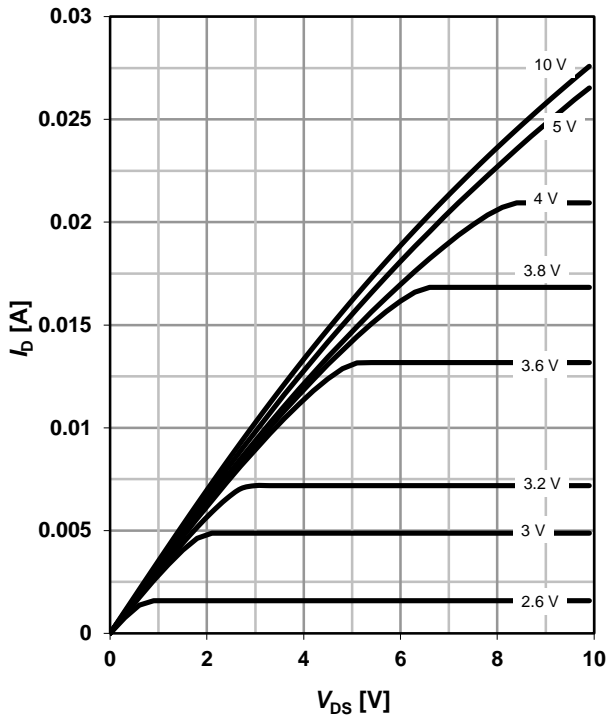
parameter:  $D=t_p/T$



**5 Typ. output characteristics**

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

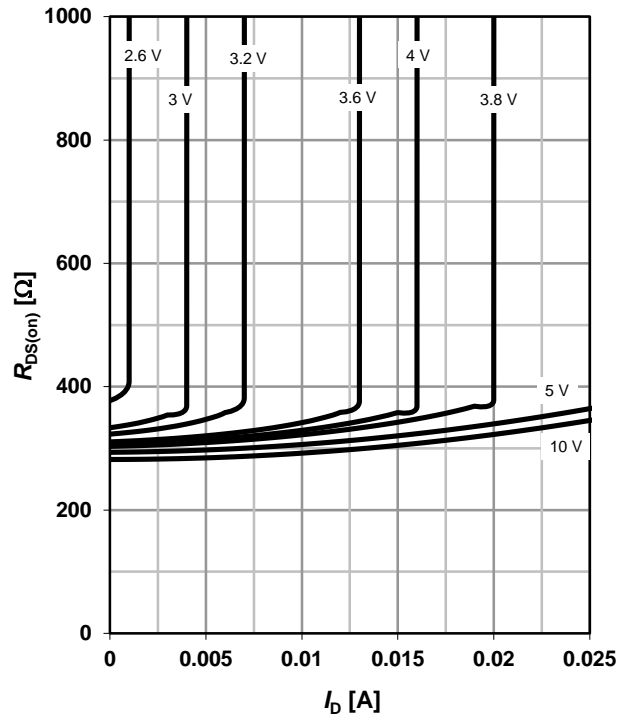
parameter:  $V_{GS}$



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

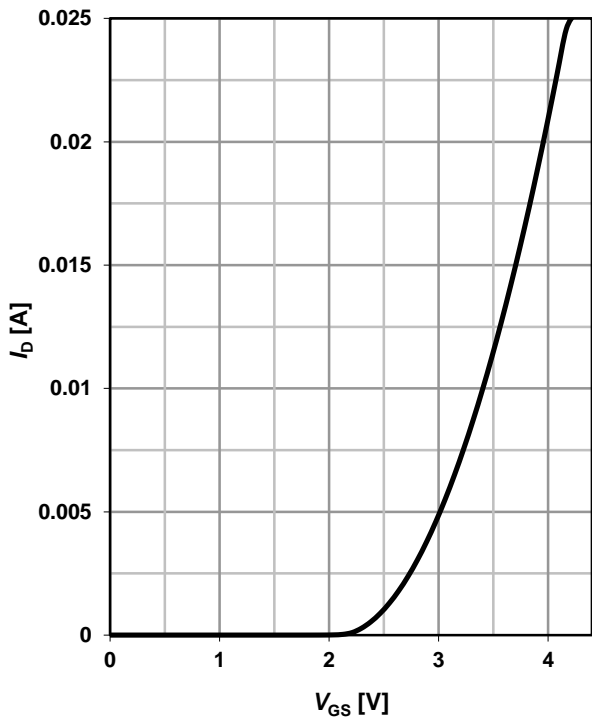
$R_{DS(on)} = f(I_D); T_j = 25\text{ }^\circ\text{C}$

parameter:  $V_{GS}$



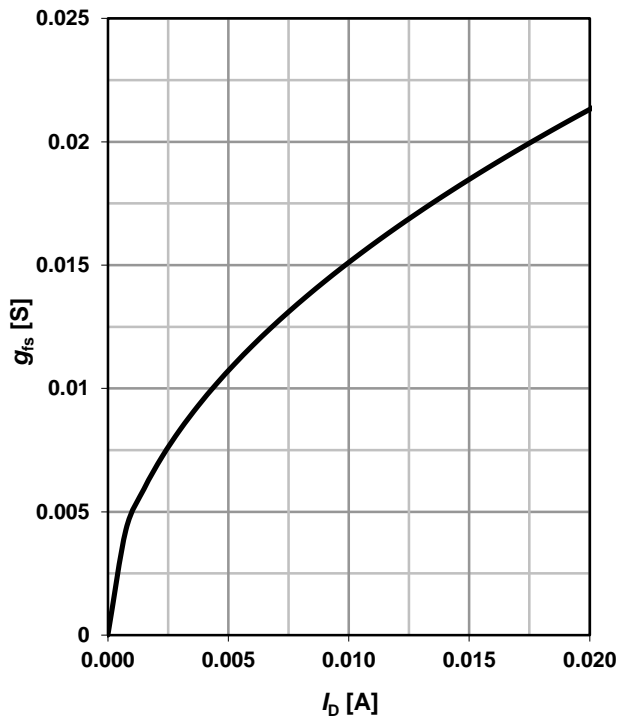
**7 Typ. transfer characteristics**

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



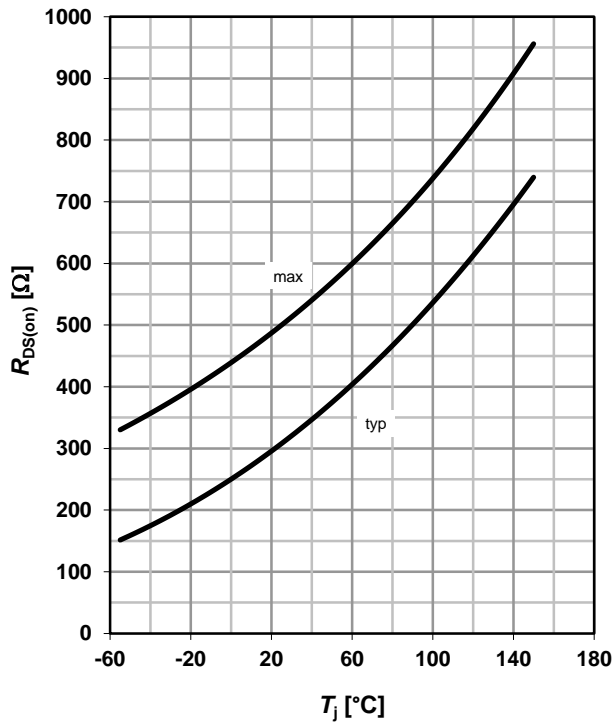
**8 Typ. forward transconductance**

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



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

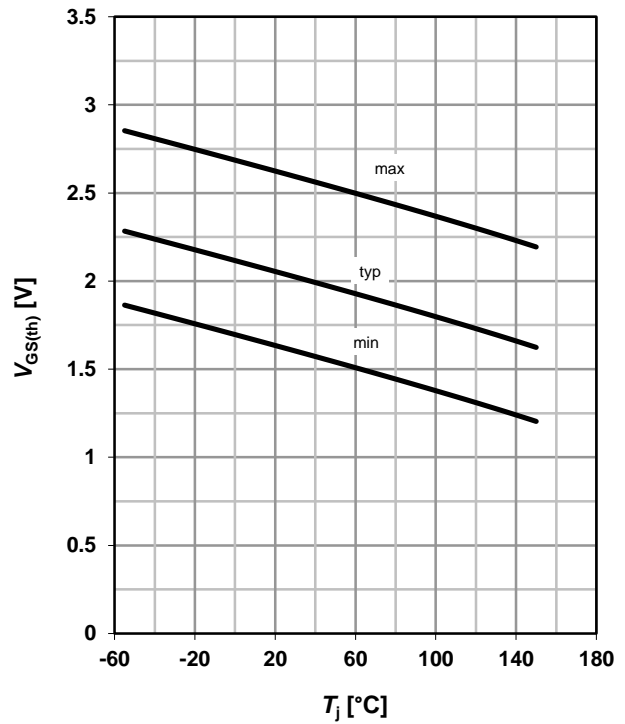
$R_{DS(on)}=f(T_j); I_D=0.016\text{ A}; V_{GS}=10\text{ V}$



**10 Typ. gate threshold voltage**

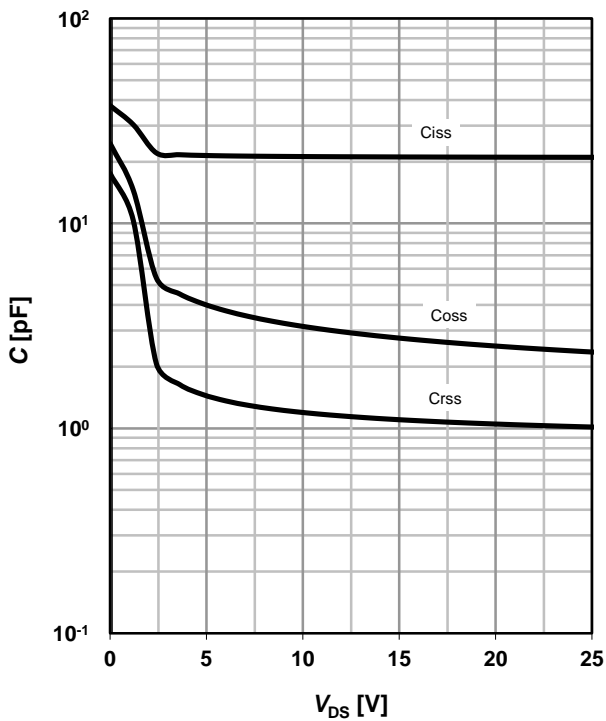
$V_{GS(th)}=f(T_j); V_{DS}=V_{GS}; I_D=8\text{ }\mu\text{A}$

parameter:  $I_D$



**11 Typ. capacitances**

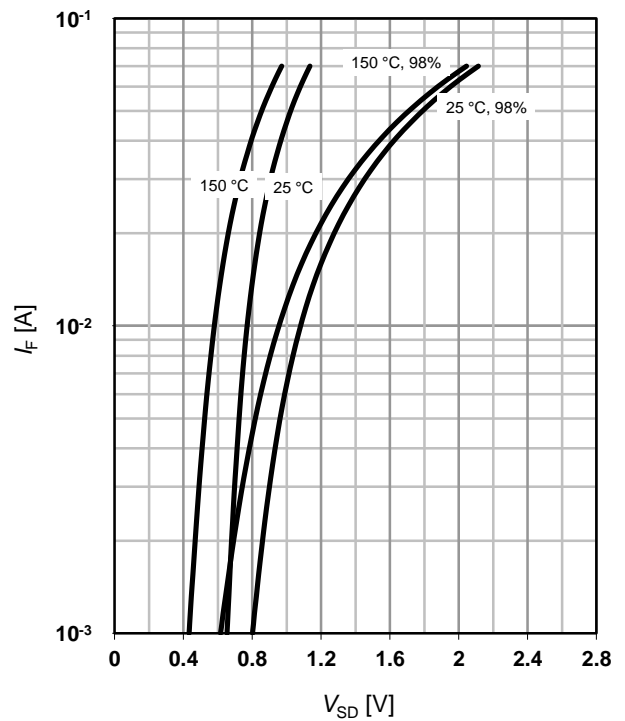
$C=f(V_{DS}); V_{GS}=0\text{ V}; f=1\text{ MHz}; T_j=25^\circ\text{C}$



**12 Forward characteristics of reverse diode**

$I_F=f(V_{SD})$

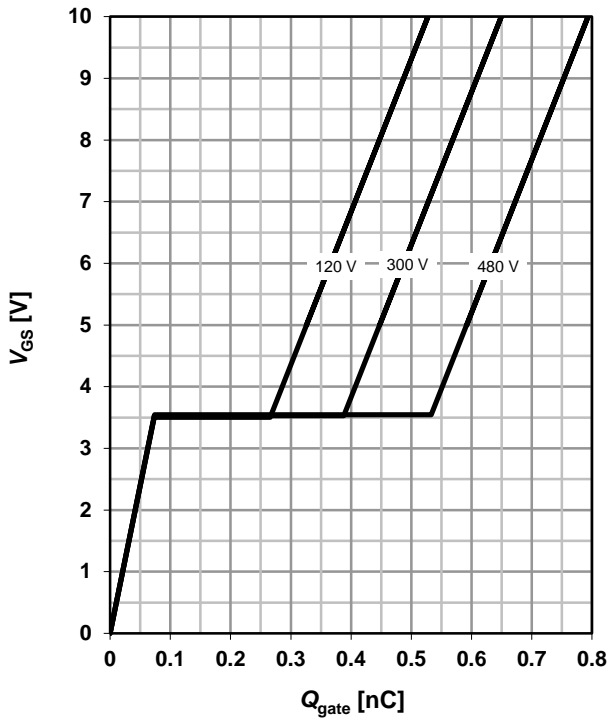
parameter:  $T_j$



**13 Typ. gate charge**

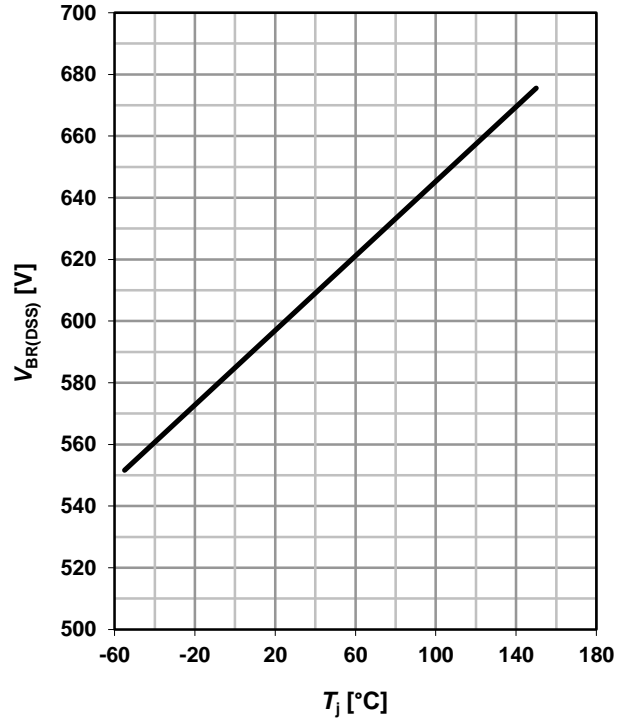
$V_{GS}=f(Q_{gate}); I_D=0.01\text{ A pulsed}$

parameter:  $V_{DD}$

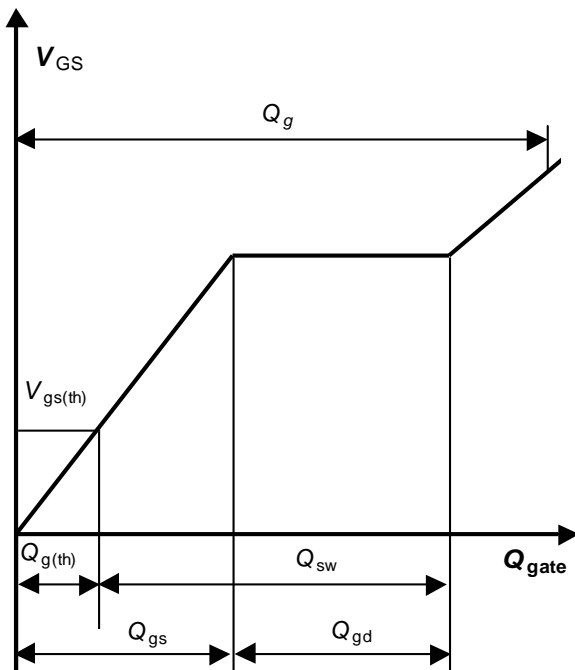


**14 Drain-source breakdown voltage**

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

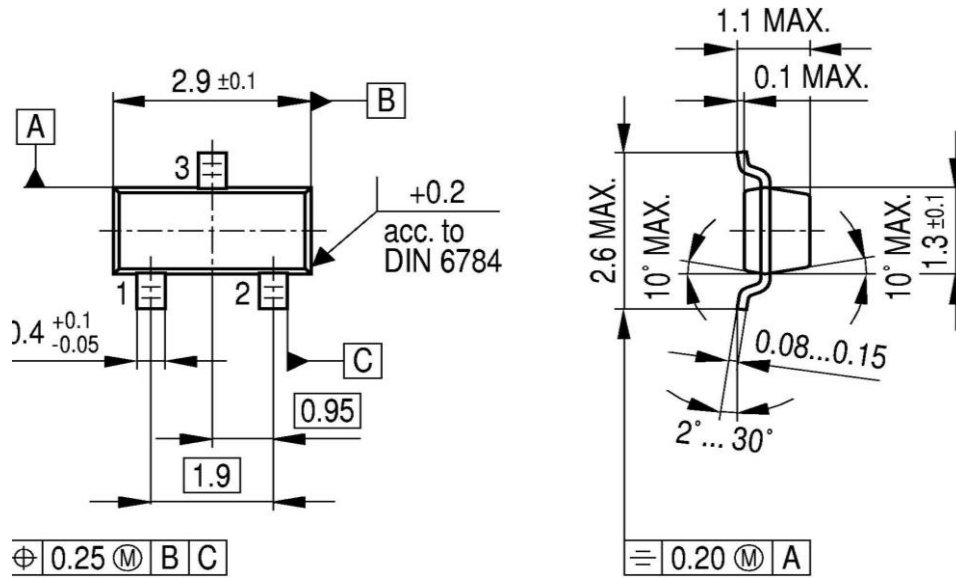


**15 Gate charge waveforms**

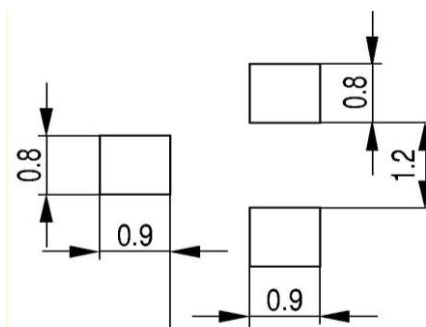


SOT-23

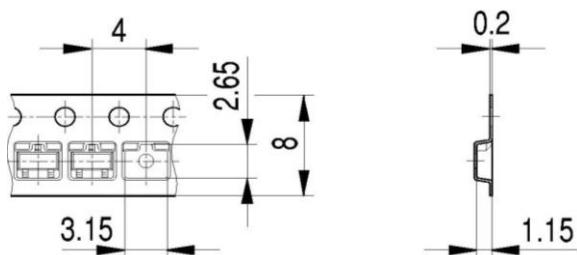
Package Outline:



Footprint:



Packaging:





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