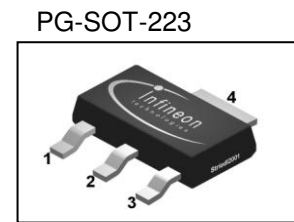


SIPMOS[®] Small-Signal-Transistor
Features

- P-Channel
- Enhancement mode
- Logic level
- Avalanche rated
- Pb-free lead plating; RoHS compliant
- Qualified according to AEC Q101
- Halogen-free according to IEC61249-2-21

Product Summary

| | | |
|------------------|------|------------|
| V_{DS} | -100 | V |
| $R_{DS(on),max}$ | 800 | m Ω |
| I_D | -1 | A |



| Type | Package | Tape and Reel Information | Marking | Lead free | Packing |
|---------|------------|---------------------------|---------|-----------|---------|
| BSP322P | PG-SOT-223 | H6327: 1000 pcs/reel | BSP322P | Yes | Non dry |

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

| Parameter | Symbol | Conditions | Value | Unit |
|-------------------------------------|-------------------|---|------------------------|--------------------|
| Continuous drain current | I_D | $T_C=25\text{ °C}$ | 1 | A |
| | | $T_C=70\text{ °C}$ | 0.8 | |
| Pulsed drain current | $I_{D,pulse}$ | $T_C=25\text{ °C}$ | 4 | |
| Avalanche energy, single pulse | E_{AS} | $I_D=-1\text{ A}$, $R_{GS}=25\text{ }\Omega$ | 57 | mJ |
| Gate source voltage | V_{GS} | | ± 20 | V |
| Power dissipation | P_{tot} | $T_C=25\text{ °C}$ | 1.8 | W |
| Operating and storage temperature | T_j , T_{stg} | | -55 ... 150 | $^{\circ}\text{C}$ |
| ESD Class | | JESD22-A114-HBM | 1A (250V to 500V) | |
| 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, steady state | - | - | 115 | K/W |
| | | 6 cm ² cooling area ¹⁾ , steady state | - | - | 70 | |

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

| | | | | | | |
|----------------------------------|---------------|--|------|------|------|---------------|
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}=0\text{ V}, I_D=-250\text{ }\mu\text{A}$ | -100 | - | - | V |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=-380\text{ }\mu\text{A}$ | -2.0 | -1.5 | -1.0 | |
| Zero gate voltage drain current | I_{DSS} | $V_{DS}=-100\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ °C}$ | - | -0.1 | -1 | μA |
| | | $V_{DS}=-100\text{ V}, V_{GS}=0\text{ V}, T_j=150\text{ °C}$ | - | -10 | -100 | |
| Gate-source leakage current | I_{GSS} | $V_{GS}=-20\text{ V}, V_{DS}=0\text{ V}$ | - | -10 | -100 | nA |
| Drain-source on-state resistance | $R_{DS(on)}$ | $V_{GS}=-10\text{ V}, I_D=-1\text{ A}$ | - | 600 | 800 | m Ω |
| | | $V_{GS}=-4.5\text{ V}, I_D=-0.93\text{ A}$ | - | 808 | 1000 | |
| Transconductance | g_{fs} | $ V_{DS} >2 I_D R_{DS(on)max}, I_D=-0.8\text{ A}$ | 0.7 | 1.4 | - | S |

¹⁾ Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm² (one layer, 70 μm thick) copper area for drain connection. PCB is vertical in still air.

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

Dynamic characteristics

| | | | | | | |
|------------------------------|--------------|---|---|------|------|----|
| Input capacitance | C_{iss} | $V_{GS}=0\text{ V}, V_{DS}=-25\text{ V},$ $f=1\text{ MHz}$ | - | 280 | 372 | pF |
| Output capacitance | C_{oss} | | - | 70 | 94 | |
| Reverse transfer capacitance | C_{rss} | | - | 34 | 51 | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}=-50\text{ V}, V_{GS}=-$ $10\text{ V}, I_D=-1\text{ A},$ $R_G=6\ \Omega$ | - | 4.6 | 6.9 | ns |
| Rise time | t_r | | - | 4.3 | 6.5 | |
| Turn-off delay time | $t_{d(off)}$ | | - | 21.2 | 31.8 | |
| Fall time | t_f | | - | 8.3 | 12.5 | |

Gate Charge Characteristics²⁾

| | | | | | | |
|-----------------------|---------------|--|---|------|------|----|
| Gate to source charge | Q_{gs} | $V_{DD}=-80\text{ V}, I_D=-1\text{ A},$ $V_{GS}=0\text{ to }-10\text{ V}$ | - | 0.8 | 1.0 | nC |
| Gate to drain charge | Q_{gd} | | - | 4.3 | 6.4 | |
| Gate charge total | Q_g | | - | 12.4 | 16.5 | |
| Gate plateau voltage | $V_{plateau}$ | | - | 2.9 | - | V |

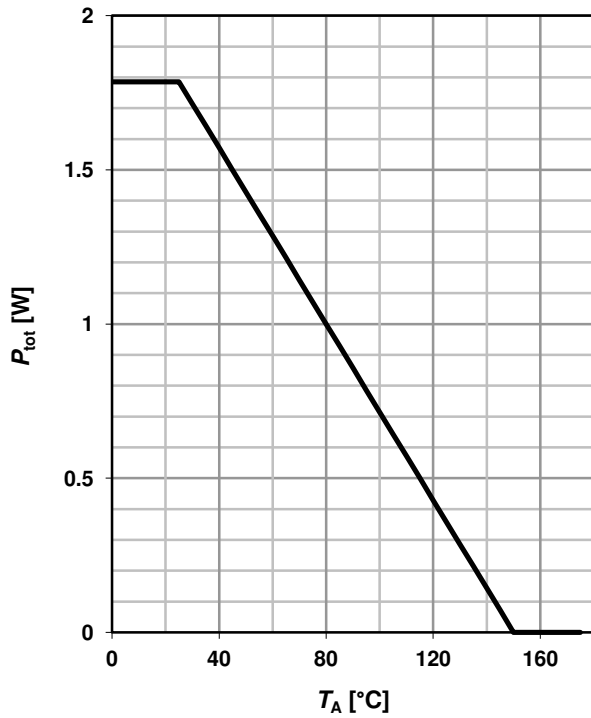
Reverse Diode

| | | | | | | |
|----------------------------------|---------------|---|---|------|------|----|
| Diode continuous forward current | I_S | $T_C=25\text{ }^\circ\text{C}$ | - | - | -1.0 | A |
| Diode pulse current | $I_{S,pulse}$ | | - | - | -4.0 | |
| Diode forward voltage | V_{SD} | $V_{GS}=0\text{ V}, I_F=-1\text{ A},$ $T_j=25\text{ }^\circ\text{C}$ | - | 0.84 | 1.2 | V |
| Reverse recovery time | t_{rr} | $V_R=50\text{ V}, I_F= I_S ,$ $di_F/dt=100\text{ A}/\mu\text{s}$ | - | 47 | - | ns |
| Reverse recovery charge | Q_{rr} | | - | 84 | - | nC |

²⁾ See figure 16 for gate charge parameter definition

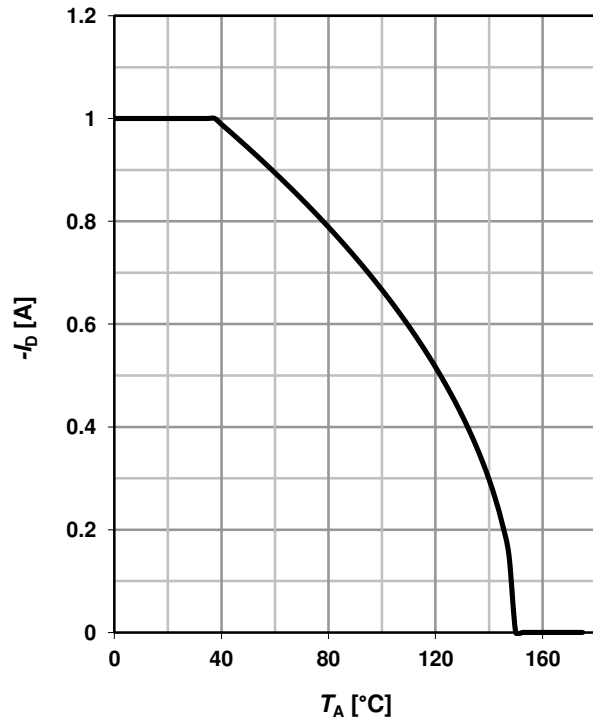
1 Power dissipation

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



2 Drain current

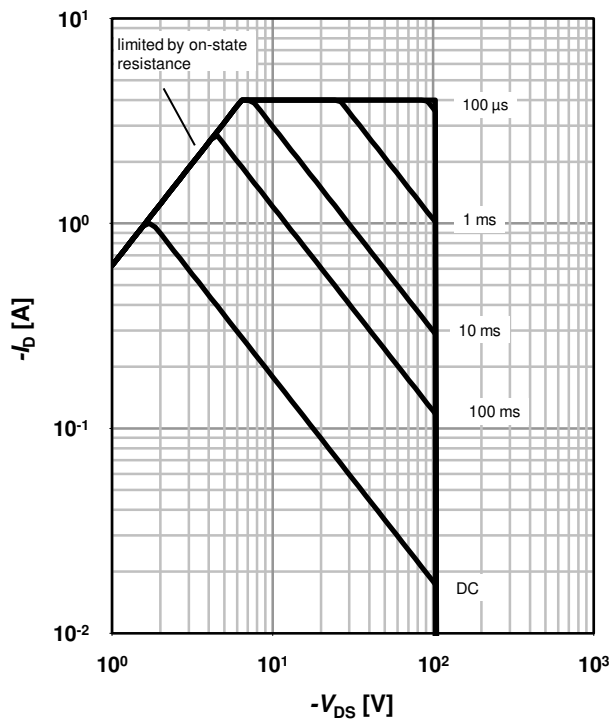
$$I_D = f(T_C); |V_{GS}| \geq 10 \text{ V}$$



3 Safe operating area

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

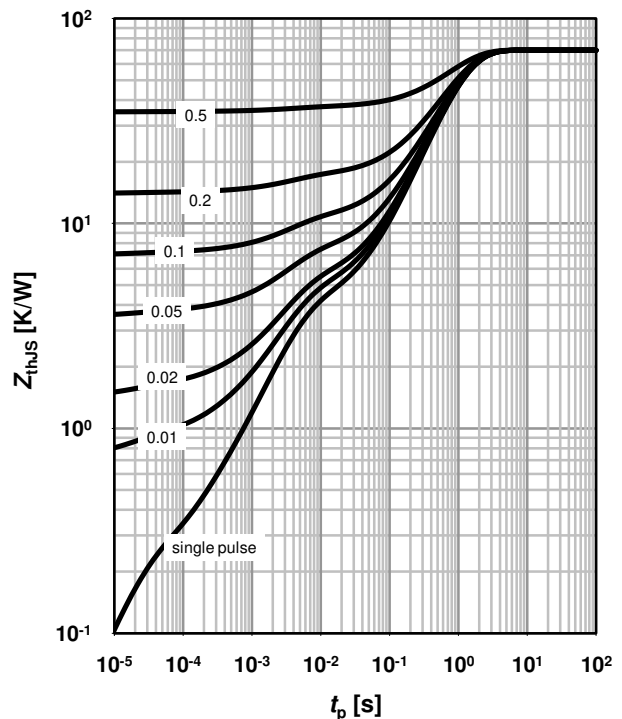
parameter: t_p



4 Max. transient thermal impedance

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

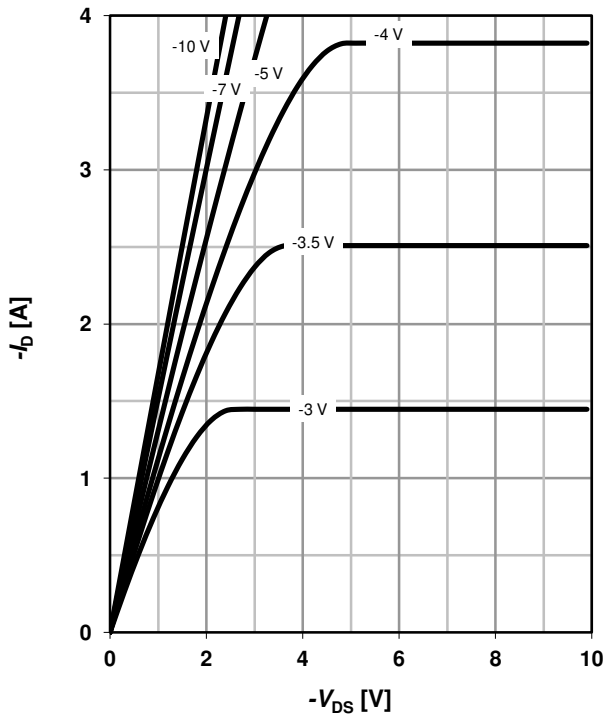
parameter: $D = t_p/T$



5 Typ. output characteristics

$I_D = f(V_{DS}); T_j = 25\text{ °C}$

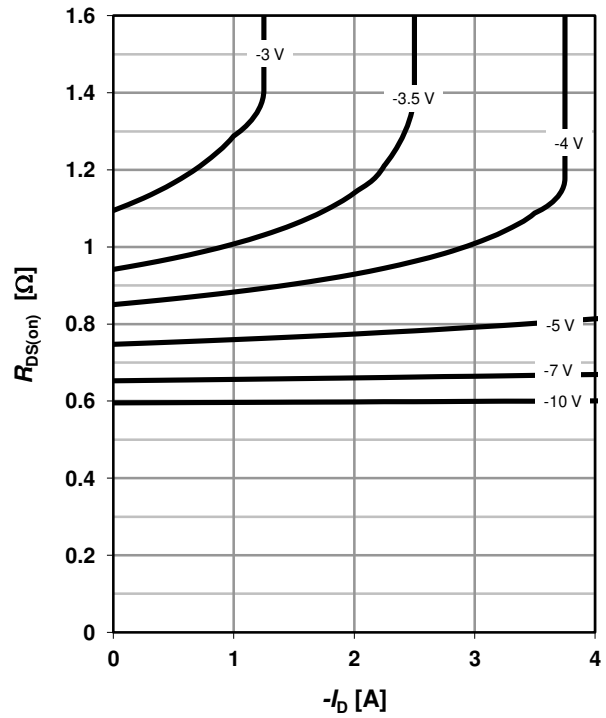
parameter: V_{GS}



6 Typ. drain-source on resistance

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

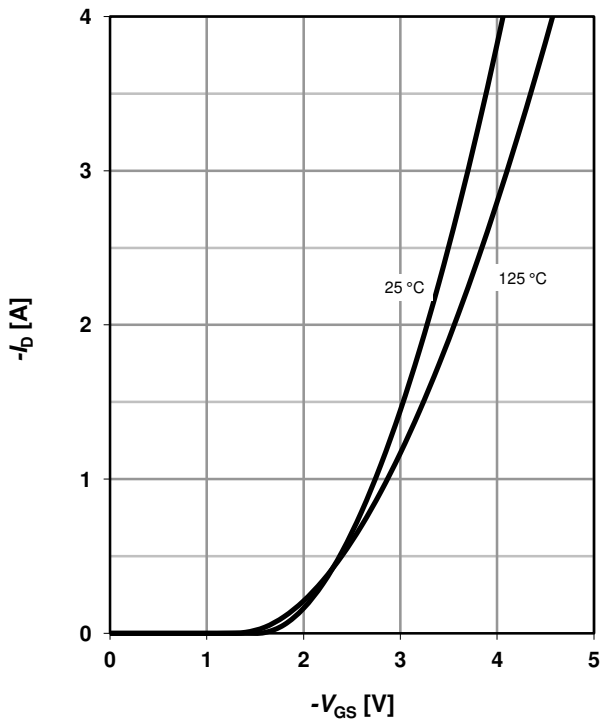
parameter: V_{GS}



7 Typ. transfer characteristics

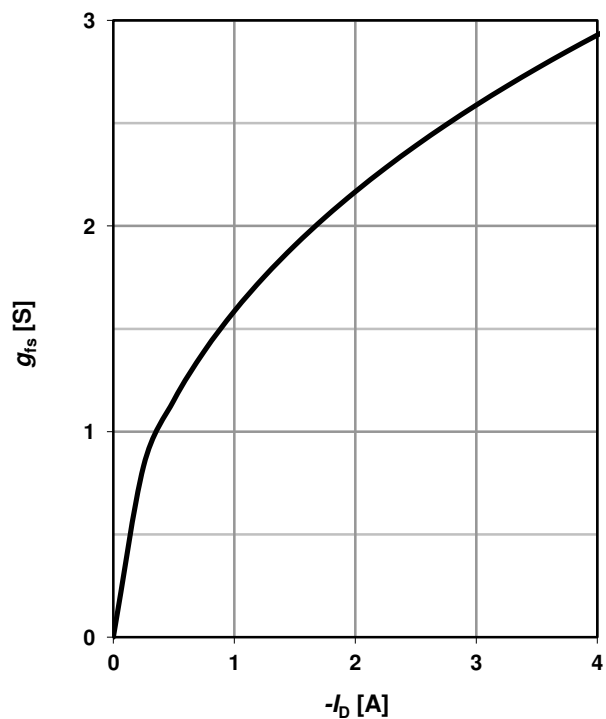
$I_D = f(V_{GS}); |V_{DS}| > 2|I_D|R_{DS(on)max}$

parameter: T_j



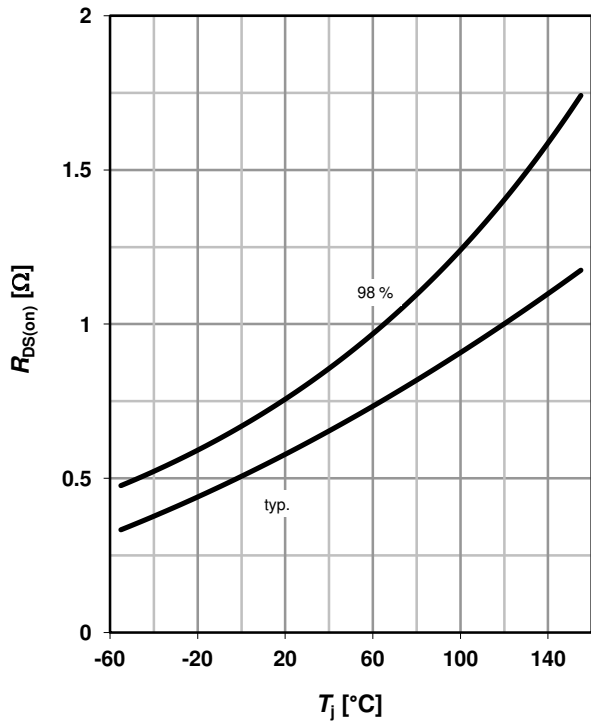
8 Typ. forward transconductance

$g_{fs} = f(I_D); T_j = 25\text{ °C}$



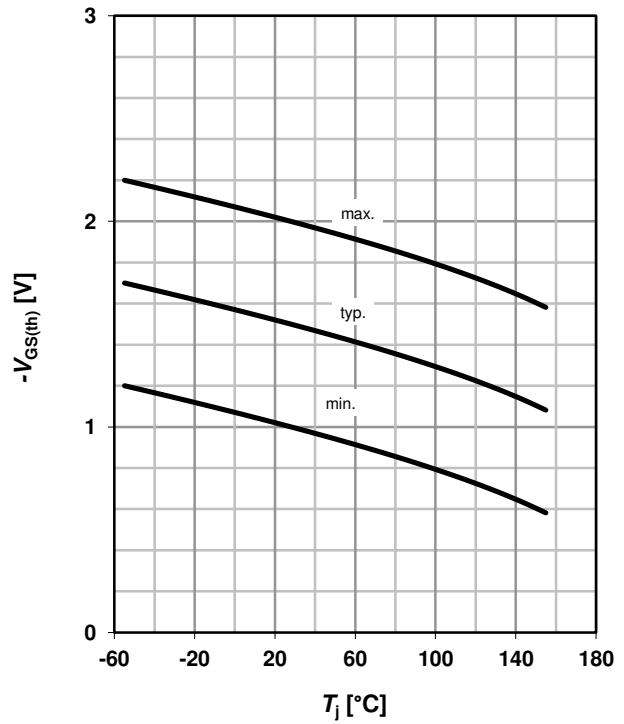
9 Drain-source on-state resistance

$R_{DS(on)}=f(T_j); I_D=-1\text{ A}; V_{GS}=-10\text{ V}$



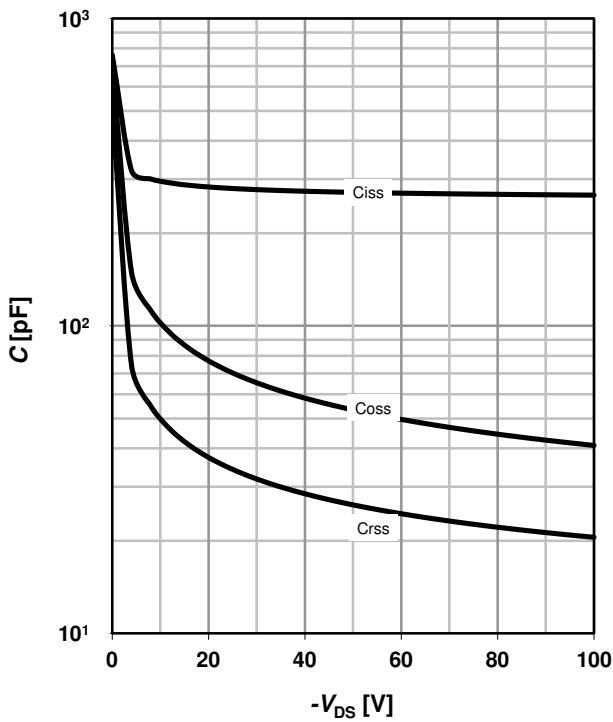
10 Typ. gate threshold voltage

$V_{GS(th)}=f(T_j); V_{GS}=V_{DS}; I_D=-380\text{ }\mu\text{A}$



11 Typ. capacitances

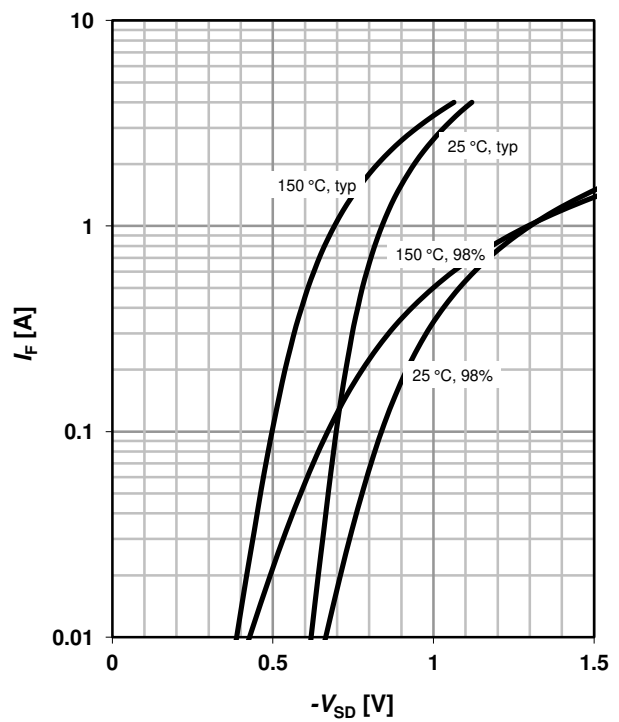
$C=f(V_{DS}); V_{GS}=0\text{ V}; f=1\text{ MHz}$



12 Forward characteristics of reverse diode

$I_F=f(V_{SD})$

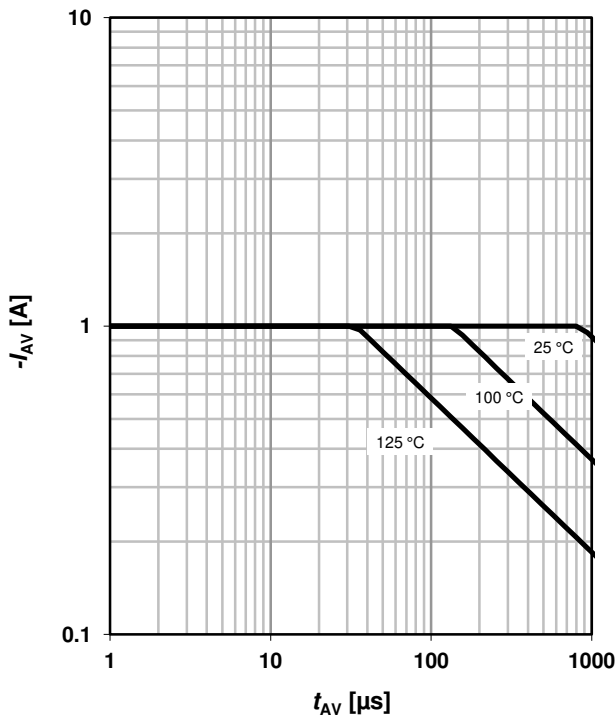
parameter: T_j



13 Avalanche characteristics

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

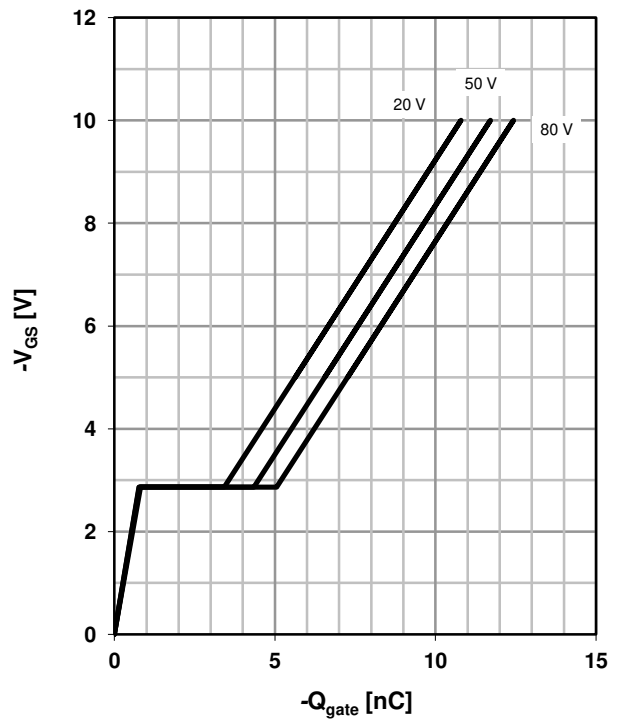
parameter: $T_{j(\text{start})}$



14 Typ. gate charge

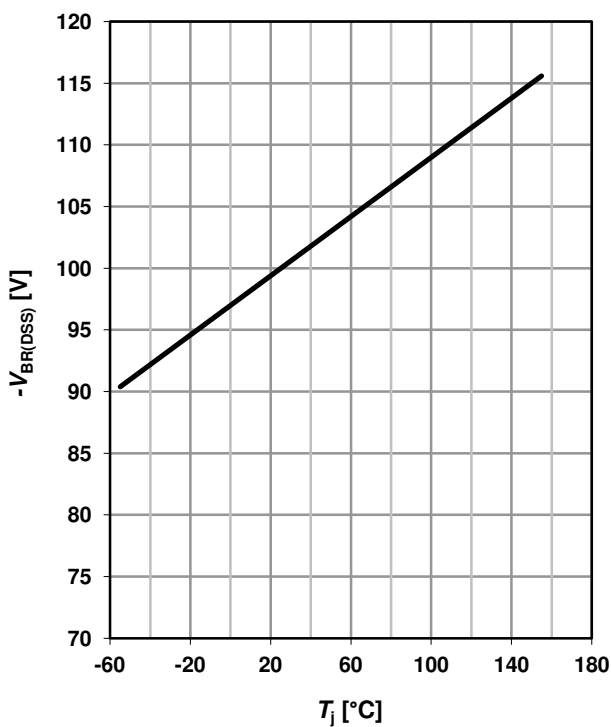
$V_{GS}=f(Q_{\text{gate}}); I_D=-1 \text{ A pulsed}$

parameter: V_{DD}

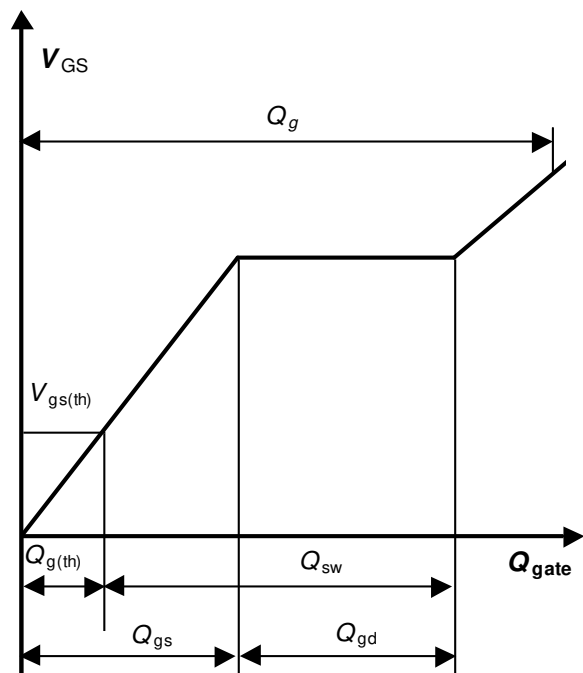


15 Drain-source breakdown voltage

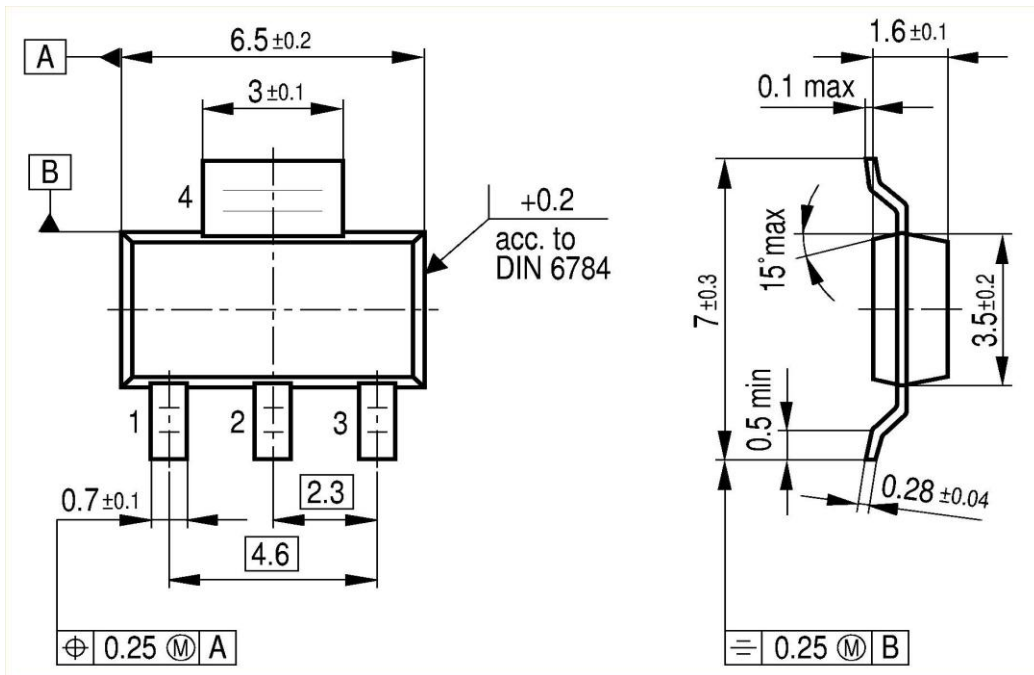
$V_{BR(DSS)}=f(T_j); I_D=-250 \mu\text{A}$



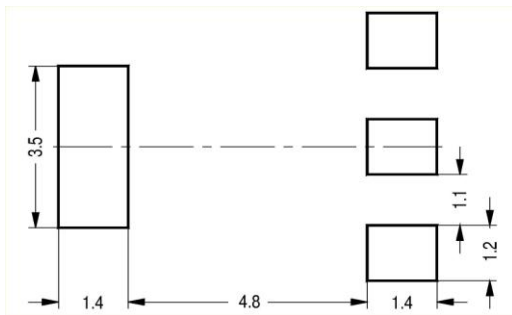
16 Gate charge waveforms



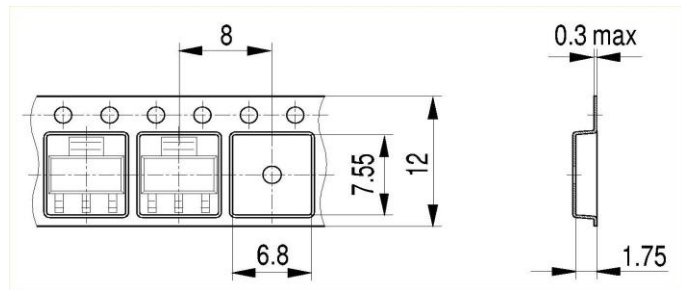
Package Outline: PG-SOT-223



Footprint:



Packaging:



Dimensions in mm

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