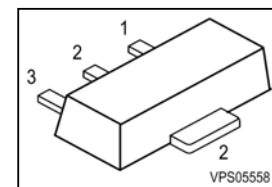
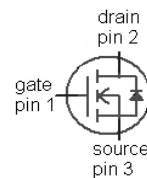


SIPMOS® Small-Signal-Transistor
Feature

- n-channel
- enhancement mode
- Logic level
- dv/dt rated
- Qualified according to AEC Q101
- Halogen-free according to IEC61249-2-21


Product Summary

| | | |
|------------------|------|----------|
| $V_{DS}^{1)}$ | 600 | V |
| $R_{DS(on),max}$ | 45 | Ω |
| I_D | 0.09 | A |

SOT89


| Type | Package | Pb-free | Tape and Reel Information | Marking |
|--------|---------|---------|---------------------------|---------|
| BSS225 | SOT89 | Yes | H6327: 3000PCS/reel | KD |

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

| Parameter | Symbol | Conditions | Value | Unit |
|-------------------------------------|----------------|---|-------------|--------------------|
| Continuous drain current | I_D | $T_A=25\text{ °C}$ | 0.09 | A |
| | | $T_A=70\text{ °C}$ | 0.073 | |
| Pulsed drain current | $I_{D,pulse}$ | $T_A=25\text{ °C}$ | 0.36 | |
| Reverse diode dv/dt | dv/dt | $I_D=0.09\text{ A}$, $V_{DS}=480\text{ V}$, $di/dt=200\text{ A}/\mu\text{s}$, $T_{j,max}=150\text{ °C}$ | 6 | kV/ μs |
| Gate source voltage | V_{GS} | | ± 20 | V |
| ESD Class JESD22-A114-HBM | | | Class 1a | |
| Power dissipation | P_{tot} | $T_A=25\text{ °C}$ | 1.00 | 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} | | - | - | 125 | K/W |
|--|------------|--|---|---|-----|-----|

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

| | | | | | | |
|--|---------------|---|------|------|-----|---------------|
| Drain-source breakdown voltage ¹⁾ | $V_{(BR)DSS}$ | $V_{GS}=0\text{ V}, I_D=250\text{ }\mu\text{A}$ | 600 | - | - | V |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}; I_D=94\text{ }\mu\text{A}$ | 1.3 | 1.9 | 2.3 | |
| Drain-source leakage current | $I_{D(off)}$ | $V_{DS}=600\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ °C}$ | - | - | 0.1 | μA |
| | | $V_{DS}=600\text{ V}, V_{GS}=0\text{ V}, T_j=150\text{ °C}$ | - | - | 5 | |
| Gate-source leakage current | I_{GSS} | $V_{GS}=20\text{ V}, V_{DS}=0\text{ V}$ | - | 10 | 100 | nA |
| Drain-source on-state resistance | $R_{DS(on)}$ | $V_{GS}=4.5\text{ V}, I_D=0.09\text{ A}$ | - | 30 | 45 | Ω |
| | | $V_{GS}=10\text{ V}, I_D=0.09\text{ A}$ | - | 28 | 45 | |
| Transconductance | g_{fs} | $ V_{DS} >2 I_D R_{DS(on)max}, I_D=0.075\text{ A}$ | 0.05 | 0.14 | - | S |

¹⁾ V_{DS} is zero-hour rated, see note at p.8

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

Dynamic characteristics

| | | | | | | |
|------------------------------|--------------|---|---|------|------|----|
| Input capacitance | C_{iss} | $V_{GS}=0\text{ V}, V_{DS}=25\text{ V},$ $f=1\text{ MHz}$ | - | 99 | 131 | pF |
| Output capacitance | C_{oss} | | - | 7.6 | 11 | |
| Reverse transfer capacitance | C_{rss} | | - | 3.1 | 4.4 | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}=300\text{ V},$ $V_{GS}=10\text{ V}, I_D=0.09\text{ A},$ $R_G=6\ \Omega$ | - | 14.0 | 20.0 | ns |
| Rise time | t_r | | - | 38.0 | 57.0 | |
| Turn-off delay time | $t_{d(off)}$ | | - | 62.0 | 93 | |
| Fall time | t_f | | - | 41.0 | 62 | |

Gate Charge Characteristics

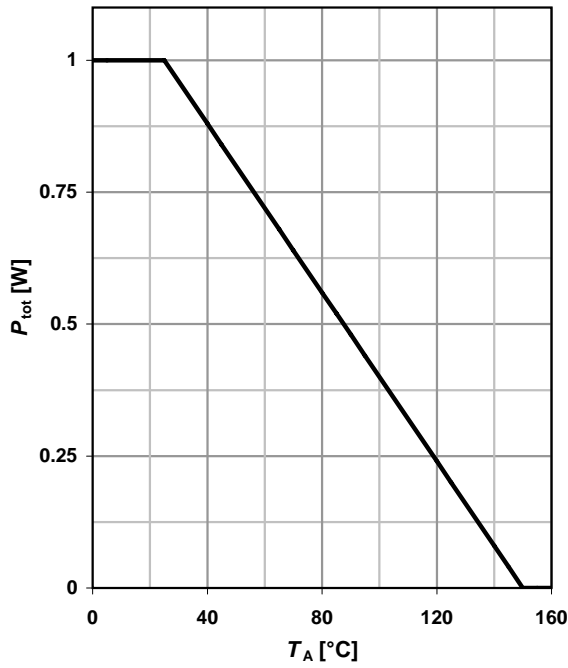
| | | | | | | |
|-----------------------|---------------|--|---|------|------|----|
| Gate to source charge | Q_{gs} | $V_{DD}=400\text{ V},$ $I_D=0.09\text{ A},$ $V_{GS}=0\text{ to }10\text{ V}$ | - | 0.32 | 0.43 | nC |
| Gate to drain charge | Q_{gd} | | - | 1.4 | 2.1 | |
| Gate charge total | Q_g | | - | 3.9 | 5.8 | |
| Gate plateau voltage | $V_{plateau}$ | | - | 3.3 | - | V |

Reverse Diode

| | | | | | | |
|----------------------------------|---------------|--|---|------|------|----|
| Diode continuous forward current | I_S | $T_A=25\text{ }^\circ\text{C}$ | - | - | 0.09 | A |
| Diode pulse current | $I_{S,pulse}$ | | - | - | 0.36 | |
| Diode forward voltage | V_{SD} | $V_{GS}=0\text{ V}, I_F=0.09\text{ A},$ $T_j=25\text{ }^\circ\text{C}$ | - | 0.75 | 1.2 | V |
| Reverse recovery time | t_{rr} | $V_R=300\text{ V}, I_F=0.09\text{ A},$ $di_F/dt=100\text{ A}/\mu\text{s}$ | - | 246 | 370 | ns |
| Reverse recovery charge | Q_{rr} | | - | 248 | 373 | |

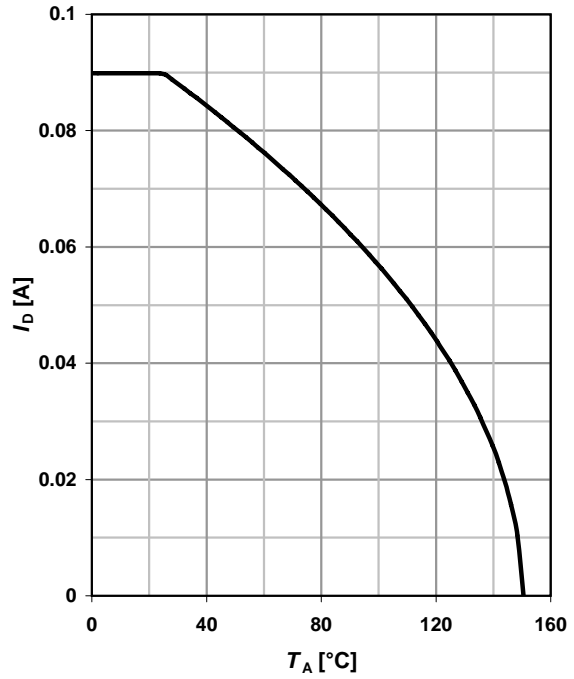
1 Power dissipation

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



2 Drain current

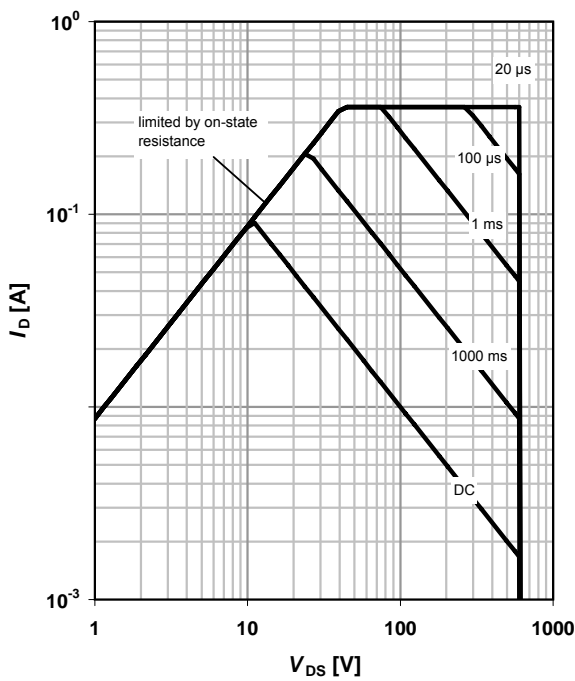
$$I_D = f(T_A); V_{GS} \geq 10 \text{ V}$$



3 Safe operating area

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

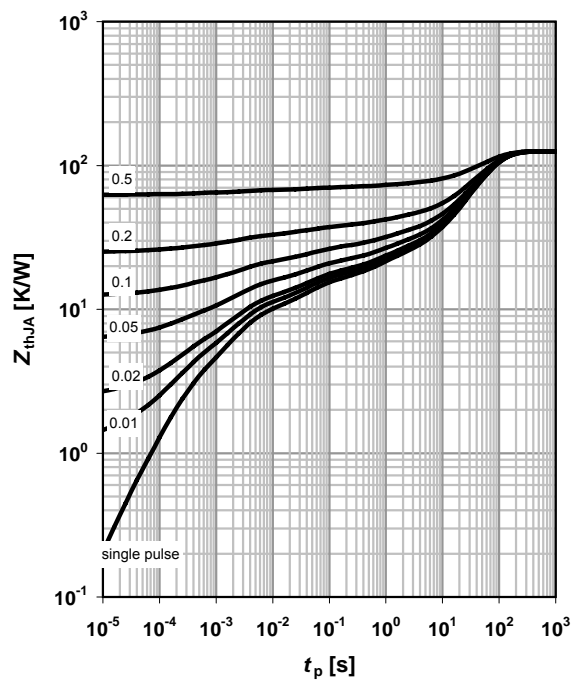
parameter: t_p



4 Max. transient thermal impedance

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

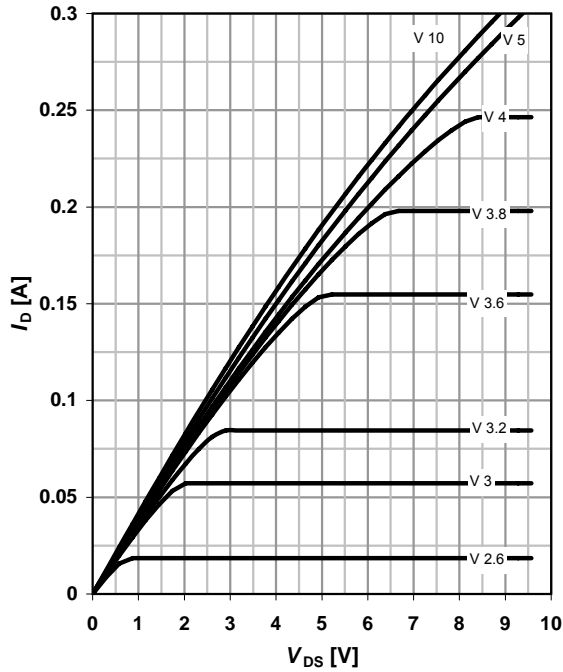
parameter: $D = t_p / T$



5 Typ. output characteristics

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

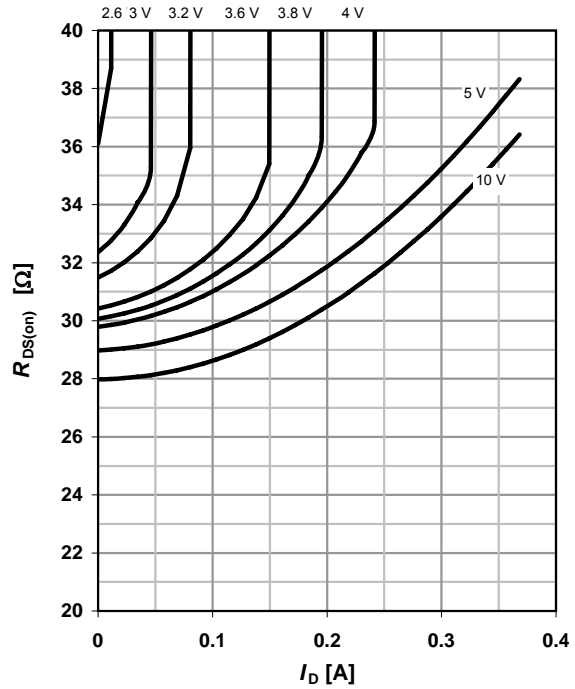
parameter: V_{GS}



6 Typ. drain-source on resistance

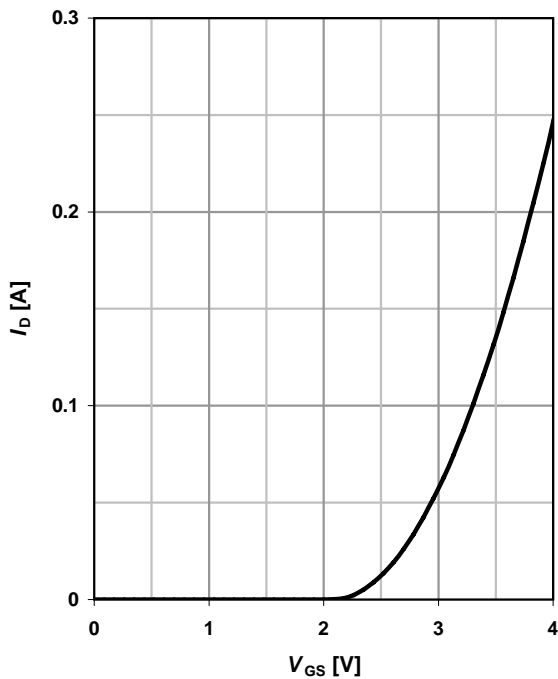
$$R_{DS(on)} = f(I_D); T_j = 25\text{ }^\circ\text{C}$$

parameter: V_{GS}



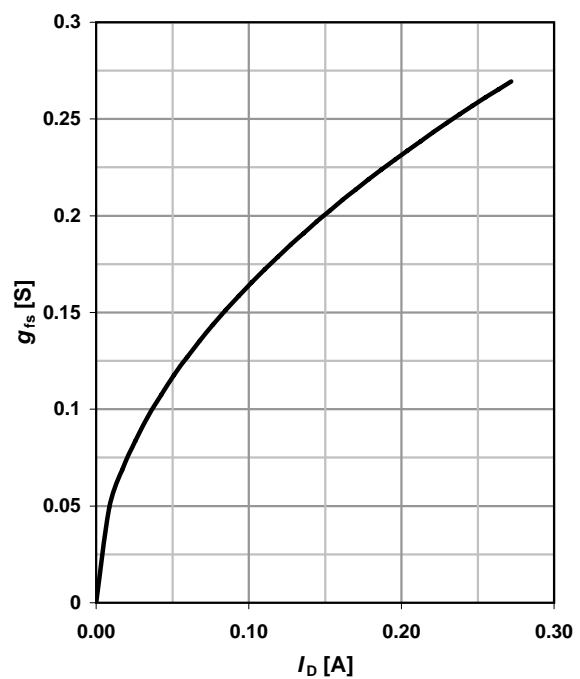
7 Typ. transfer characteristics

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



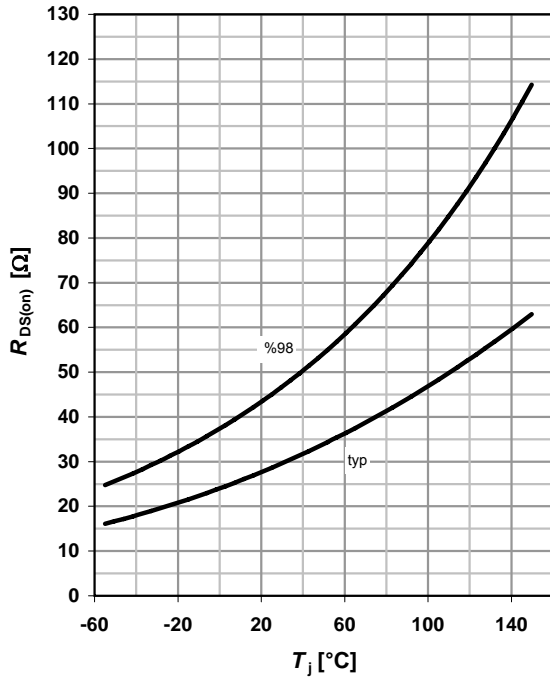
8 Typ. forward transconductance

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



9 Drain-source on-state resistance

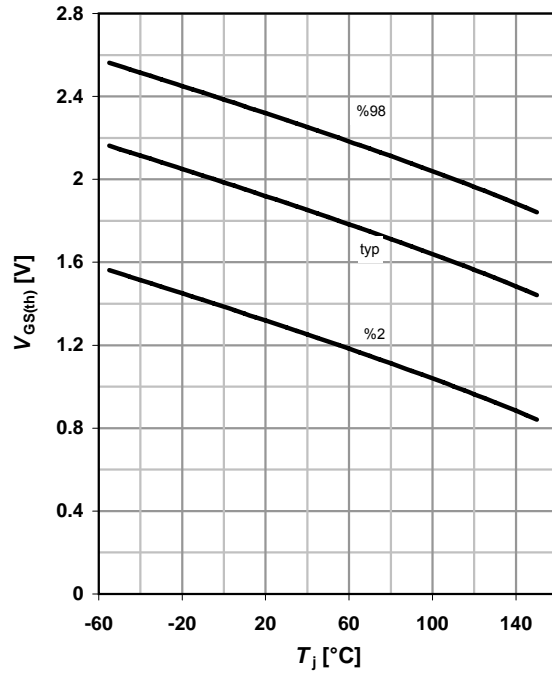
$R_{DS(on)} = f(T_j); I_D = 0.1 \text{ A}; V_{GS} = 10 \text{ V}$



10 Typ. gate threshold voltage

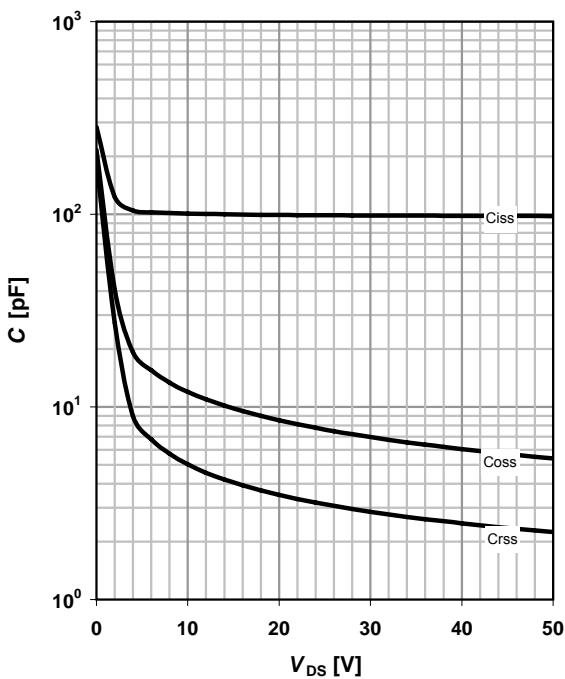
$V_{GS(th)} = f(T_j); V_{DS} = V_{GS}; I_D = 94 \mu\text{A}$

parameter: I_D



11 Typ. capacitances

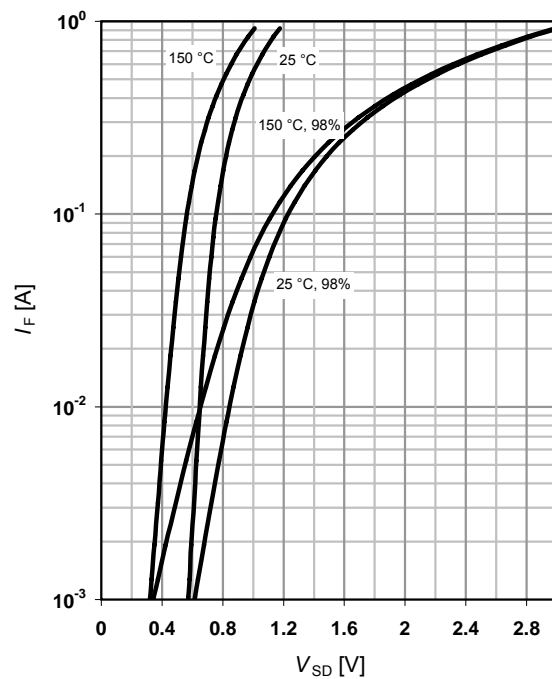
$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}; T_j = 25^\circ\text{C}$



12 Forward characteristics of reverse diode

$I_F = f(V_{SD})$

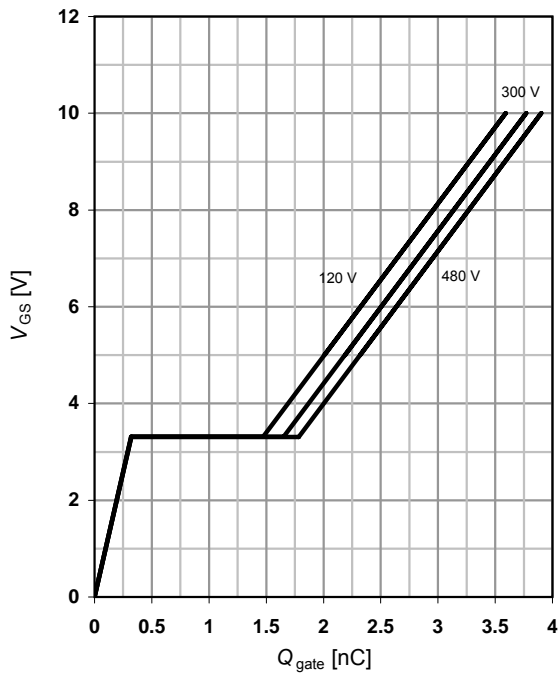
parameter: T_j



13 Typ. gate charge

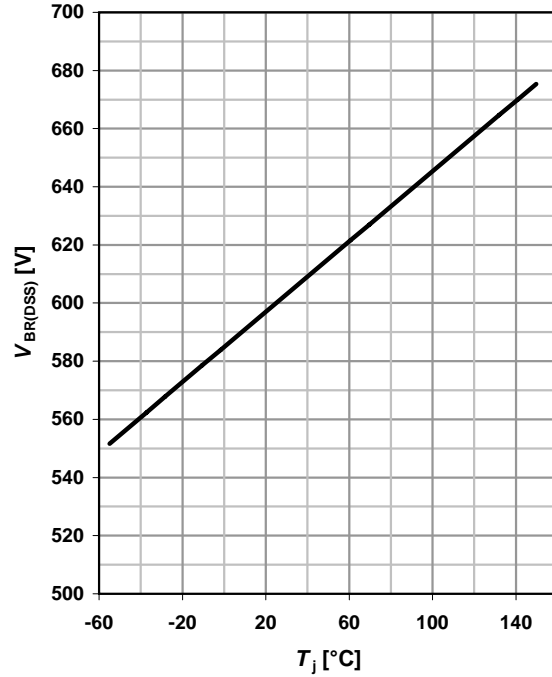
$$V_{GS} = f(Q_{gate}); I_D = 0.1 \text{ A pulsed}$$

parameter: V_{DD}

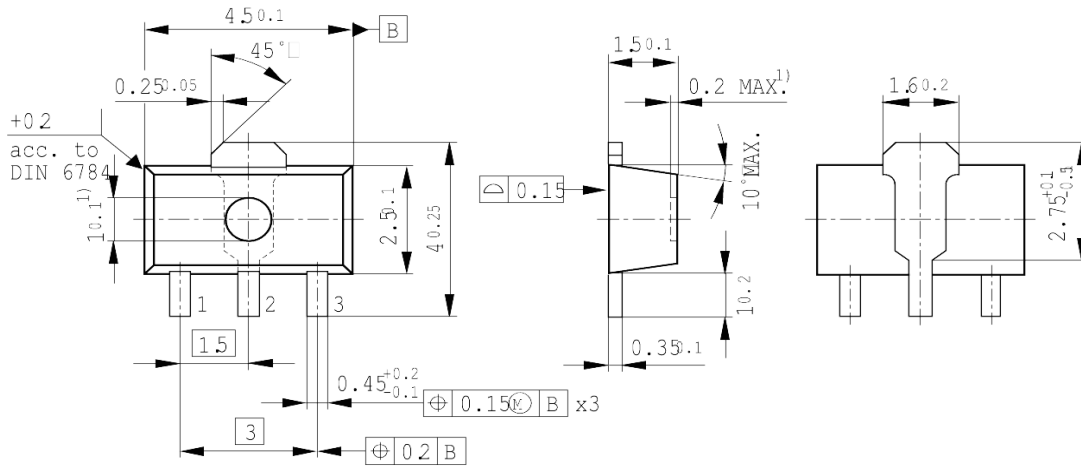


14 Drain-source breakdown voltage

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

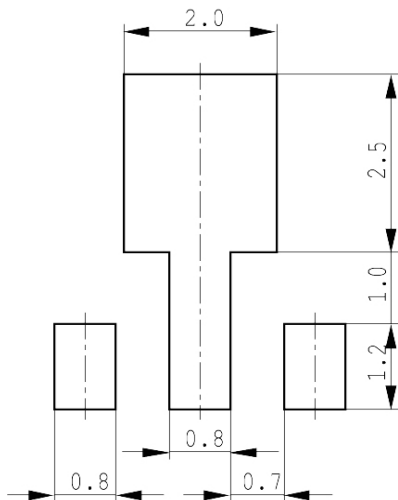


Package Outline:



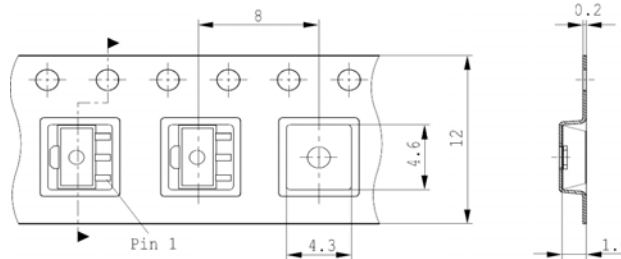
¹⁾Ejector pin markings possible

Footprint:



Dimensions in mm

Packaging:



note:

Due to small size of the package, creeping currents between leads external to the package can occur in the application. Extra protection from contamination for the package (i.e. protective laquer) is necessary to maintain the values, specified in this document. Values given in this document are only valid for 0 hour lifetime, if no suitable external protection is applied.

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