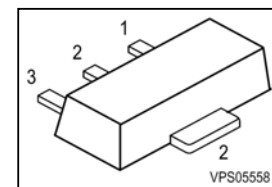
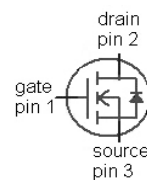


SIPMOS® Small-Signal-Transistor
Feature

- 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

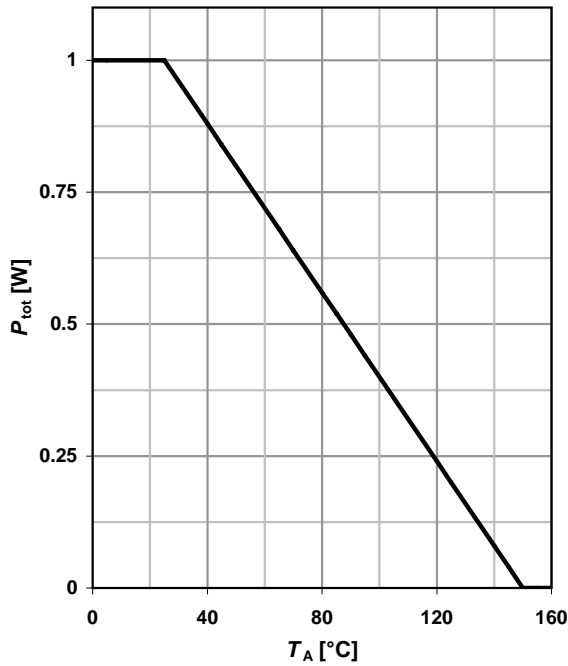
| | | | | | | |
|-----------------------|---------------|--|---|------|------|----|
| Gate to source charge | Q_{gs} | $V_{DD}=400\text{ V},$ $I_D=0.09\text{ A},$ $V_{GS}=0\text{ to }10\text{ V}$ | - | 0.32 | 0.43 | nC |
| Gate to drain charge | Q_{gd} | | - | 1.4 | 2.1 | |
| Gate charge total | Q_g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

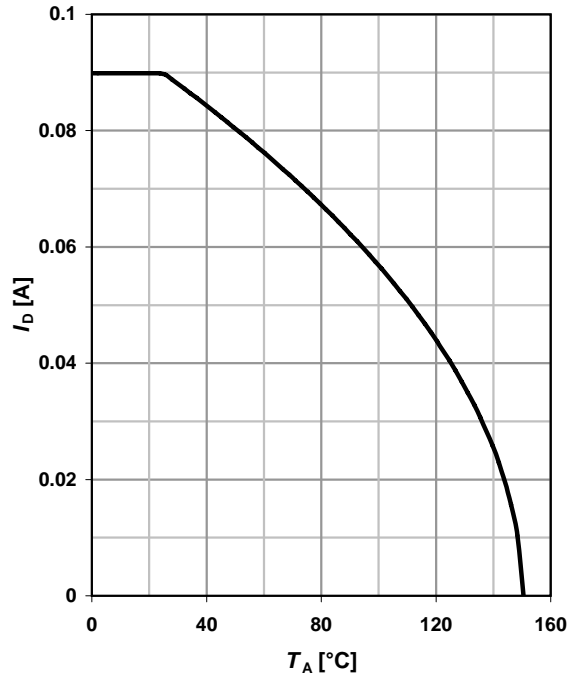
1 Power dissipation

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



2 Drain current

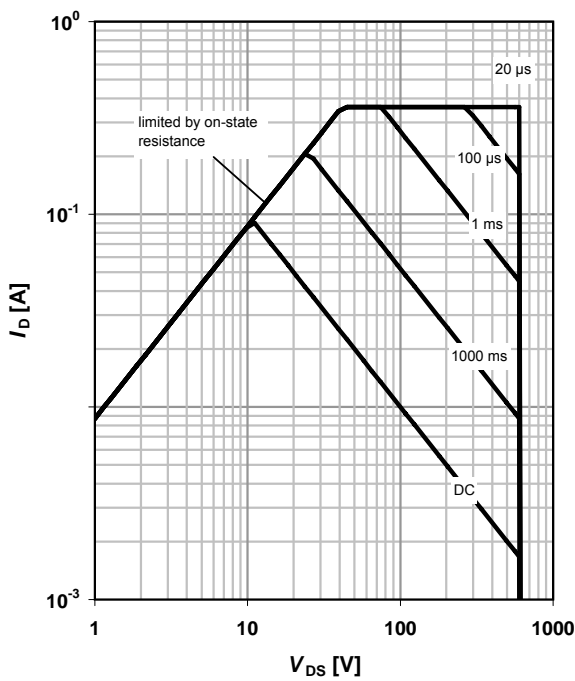
$$I_D = f(T_A); V_{GS} \geq 10 \text{ V}$$



3 Safe operating area

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

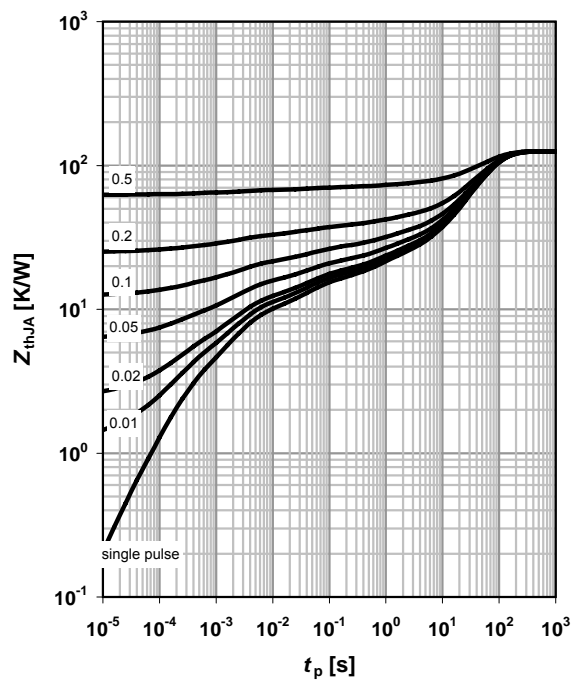
parameter: t_p



4 Max. transient thermal impedance

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

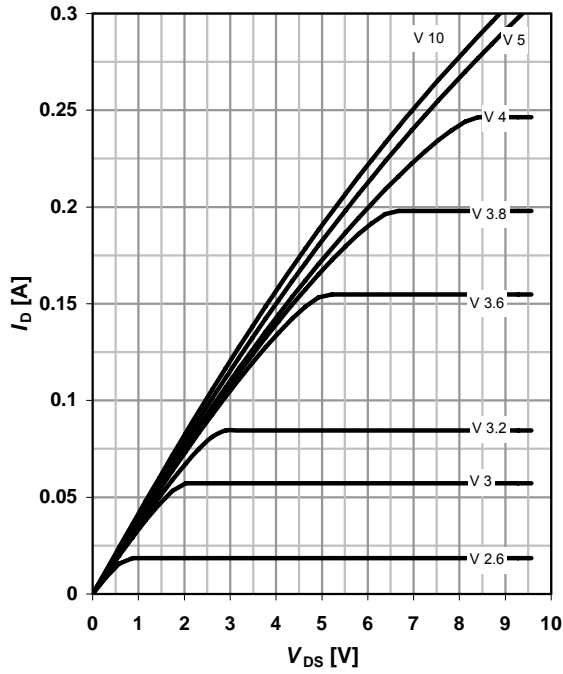
parameter: $D = t_p / T$



5 Typ. output characteristics

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

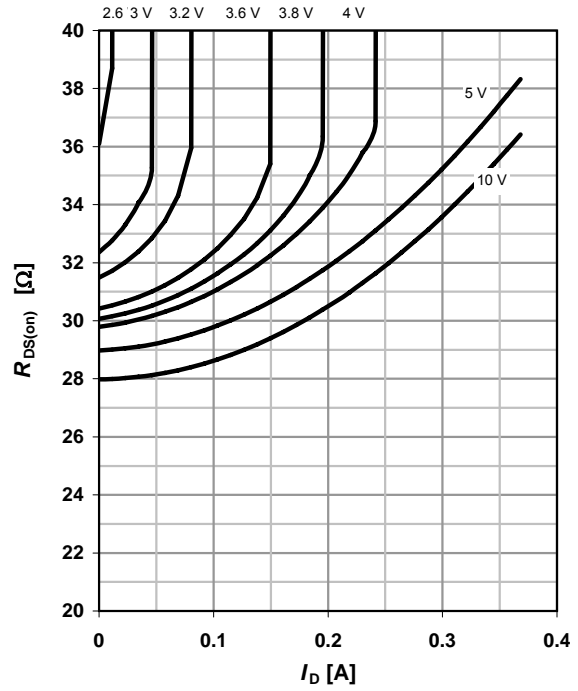
parameter: V_{GS}



6 Typ. drain-source on resistance

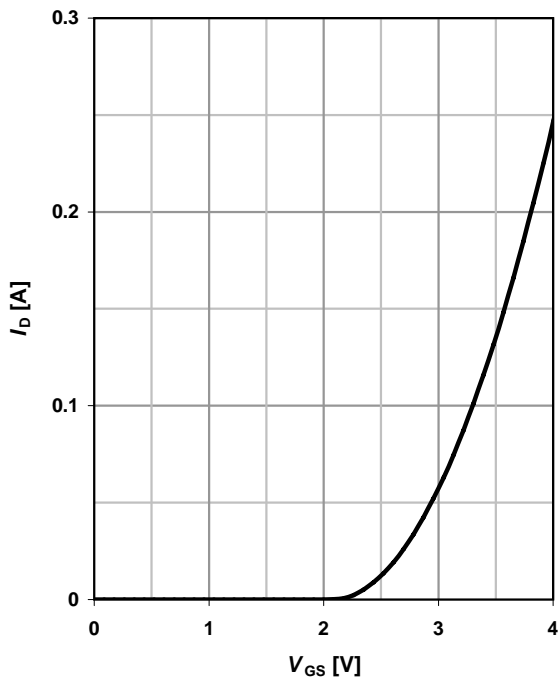
$R_{DS(on)} = f(I_D); T_j = 25\text{ }^\circ\text{C}$

parameter: V_{GS}



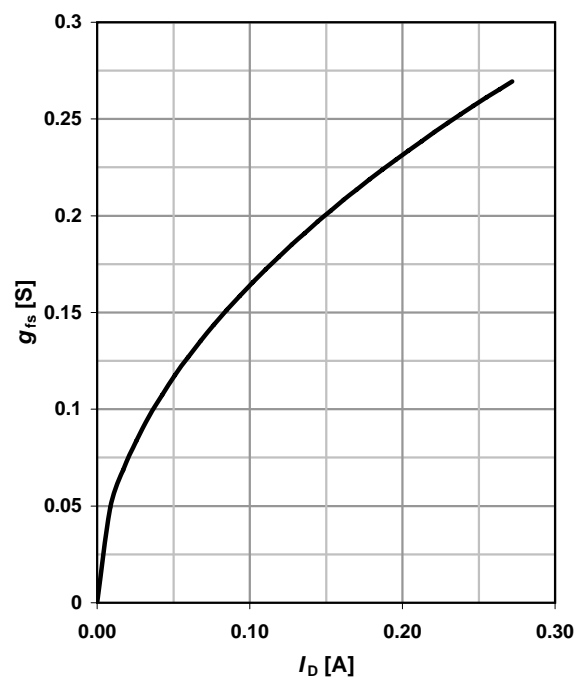
7 Typ. transfer characteristics

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



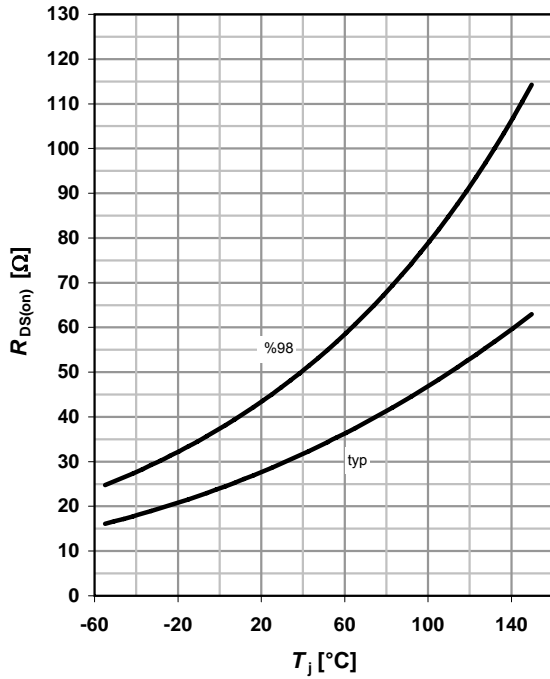
8 Typ. forward transconductance

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



9 Drain-source on-state resistance

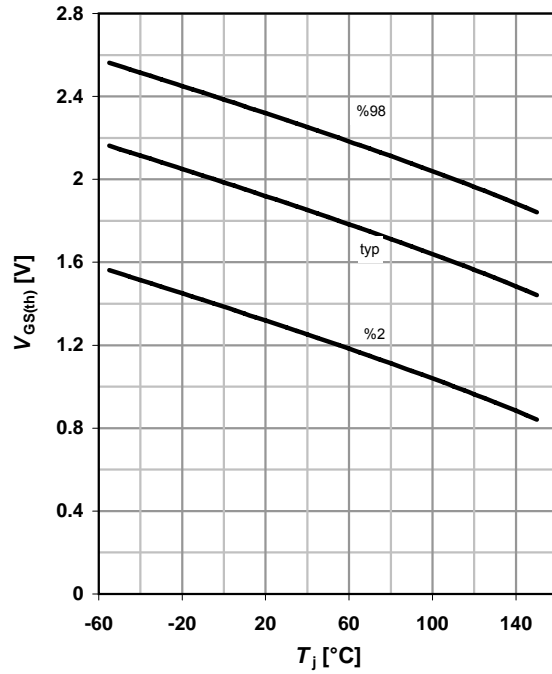
$R_{DS(on)} = f(T_j); I_D = 0.1 \text{ A}; V_{GS} = 10 \text{ V}$



10 Typ. gate threshold voltage

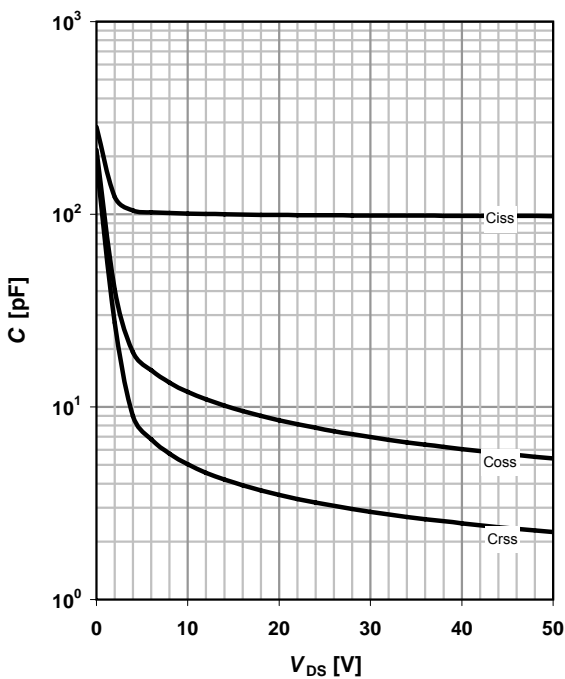
$V_{GS(th)} = f(T_j); V_{DS} = V_{GS}; I_D = 94 \mu\text{A}$

parameter: I_D



11 Typ. capacitances

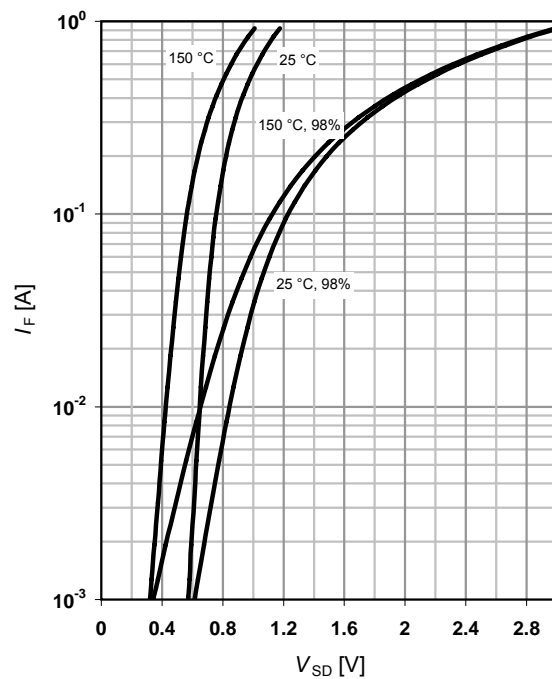
$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}; T_j = 25^\circ\text{C}$



12 Forward characteristics of reverse diode

$I_F = f(V_{SD})$

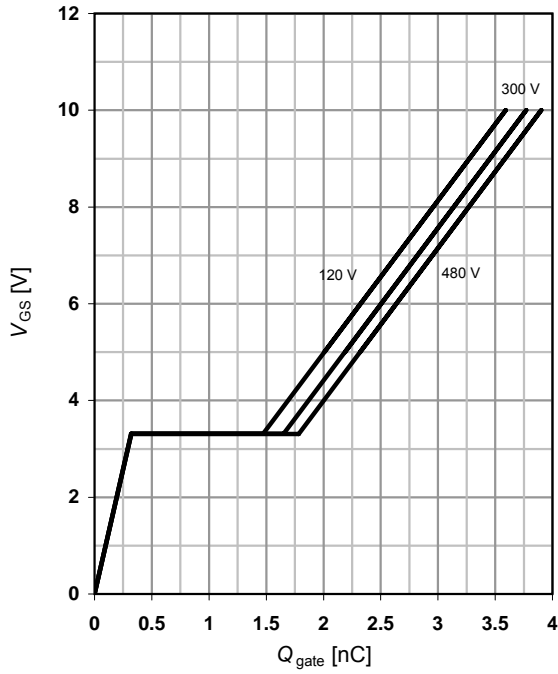
parameter: T_j



13 Typ. gate charge

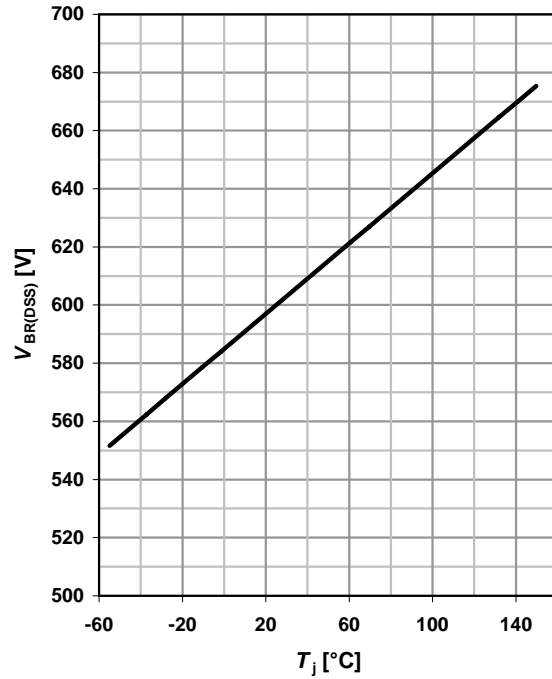
$V_{GS}=f(Q_{gate}); I_D=0.1 \text{ A pulsed}$

parameter: V_{DD}



14 Drain-source breakdown voltage

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



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