

MOSFET

OptiMOS™ 2 Small-Signal-Transistor, 30 V

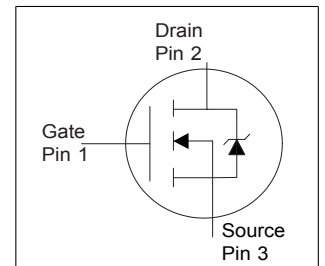
Features

- N-channel
- Enhancement mode
- Logic level (4.5V rated)
- Avalanche rated
- Qualified according to AEC Q101
- 100% lead-free; RoHS compliant
- Halogen-free according to IEC61249-2-21



Table 1 Key Performance Parameters

| Parameter | Value | Unit |
|---------------------------------------|-------|-----------|
| V_{DS} | 30 | V |
| $R_{DS(on),max}, V_{GS}=4.5\text{ V}$ | 600 | $m\Omega$ |
| $R_{DS(on),max}, V_{GS}=10\text{ V}$ | 400 | $m\Omega$ |
| I_D | 0.88 | A |



| Type / Ordering Code | Package | Marking | Related Links |
|----------------------|-----------|---------|---------------|
| BSS340NW | PG-SOT323 | XGs | - |

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1 Maximum ratings

at $T_A=25\text{ °C}$, unless otherwise specified

Table 2 Maximum ratings

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|-----------------------------------|-------------------|--------|------|--------------|-------------|--|
| | | Min. | Typ. | Max. | | |
| Continuous drain current | I_D | - | - | 0.88 0.71 | A | $T_A=25\text{ °C}$ $T_A=70\text{ °C}$ |
| Pulsed drain current | $I_{D,pulse}$ | - | - | 3.5 | A | $T_A=25\text{ °C}$ |
| Avalanche energy, single pulse | E_{AS} | - | - | 1.6 | mJ | $I_D=0.88\text{ A}$, $R_{GS}=16\ \Omega$ |
| Reverse diode dv/dt | dv/dt | - | - | 6 | kV/ μ s | $I_D=0.88\text{ A}$, $V_{DS}=16\text{ V}$, $di/dt=200\text{ A}/\mu\text{s}$, $T_{j,max}=150\text{ °C}$ |
| Gate source voltage | V_{GS} | -20 | - | 20 | V | - |
| Power dissipation | P_{tot} | - | - | 0.5 | W | $T_A=25\text{ °C}$ |
| Operating and storage temperature | T_j , T_{stg} | -55 | - | 150 | °C | IEC climatic category; DIN IEC 68-1: 55/150/56 |
| ESD Class | - | - | - | 0 | - | JESD22-A114 -HBM, ESD Class 0 = < 250V |
| Soldering Temperature | - | - | - | 260 | °C | - |

2 Thermal characteristics

Table 3 Thermal characteristics

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|---|------------|--------|------|------|------|-----------------------|
| | | Min. | Typ. | Max. | | |
| Thermal resistance, junction - ambient, minimal footprint ¹⁾ | R_{thJA} | - | - | 250 | K/W | - |

3 Electrical characteristics

Table 4 Static characteristics

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|----------------------------------|---------------|--------|------------|------------|------------|---|
| | | Min. | Typ. | Max. | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | 30 | - | - | V | $V_{GS}=0\text{ V}$, $I_D=250\ \mu\text{A}$ |
| Gate threshold voltage | $V_{GS(th)}$ | 1.2 | 1.6 | 2.0 | V | $V_{DS}=V_{GS}$, $I_D=1.6\ \mu\text{A}$ |
| Drain-source leakage current | I_{DSS} | - | - | 0.01 5 | A | $V_{DS}=30\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=25\text{ °C}$ $V_{DS}=30\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=150\text{ °C}$ |
| Gate-source leakage current | I_{GSS} | - | - | 10 | nA | $V_{GS}=20\text{ V}$, $V_{DS}=0\text{ V}$ |
| Drain-source on-state resistance | $R_{DS(on)}$ | - | 447 286 | 600 400 | m Ω | $V_{GS}=4.5\text{ V}$, $I_D=0.29\text{ A}$ $V_{GS}=10\text{ V}$, $I_D=0.88\text{ A}$ |
| Transconductance | g_{fs} | - | 1.2 | - | S | $ V_{DS} >2 I_D R_{DS(on)max}$, $I_D=0.71\text{ A}$ |

¹⁾ Performed on 40 mm x 40 mm FR4 PCB. The traces are 1mm wide, 70m thick and 20mm long; they are present on both sides of the PCB

Table 5 Dynamic characteristics¹⁾

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|------------------------------|--------------|--------|------|------|------|---|
| | | Min. | Typ. | Max. | | |
| Input capacitance | C_{iss} | - | 31 | 41 | pF | $V_{GS}=0\text{ V}$, $V_{DS}=15\text{ V}$, $f=1\text{ MHz}$ |
| Output capacitance | C_{oss} | - | 12 | 16 | pF | $V_{GS}=0\text{ V}$, $V_{DS}=15\text{ V}$, $f=1\text{ MHz}$ |
| Reverse transfer capacitance | C_{rss} | - | 2.4 | 3.6 | pF | $V_{GS}=0\text{ V}$, $V_{DS}=15\text{ V}$, $f=1\text{ MHz}$ |
| Turn-on delay time | $t_{d(on)}$ | - | 2.6 | - | ns | $V_{DD}=15\text{ V}$, $V_{GS}=10\text{ V}$, $I_D=0.88\text{ A}$, $R_{G,ext}=6\ \Omega$ |
| Rise time | t_r | - | 6.3 | - | ns | $V_{DD}=15\text{ V}$, $V_{GS}=10\text{ V}$, $I_D=0.88\text{ A}$, $R_{G,ext}=6\ \Omega$ |
| Turn-off delay time | $t_{d(off)}$ | - | 4.6 | - | ns | $V_{DD}=15\text{ V}$, $V_{GS}=10\text{ V}$, $I_D=0.88\text{ A}$, $R_{G,ext}=6\ \Omega$ |
| Fall time | t_f | - | 2.5 | - | ns | $V_{DD}=15\text{ V}$, $V_{GS}=10\text{ V}$, $I_D=0.88\text{ A}$, $R_{G,ext}=6\ \Omega$ |

Table 6 Gate charge characteristics¹⁾

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|-----------------------|---------------|--------|------|------|------|---|
| | | Min. | Typ. | Max. | | |
| Gate to source charge | Q_{gs} | - | 0.11 | 0.15 | nC | $V_{DD}=15\text{ V}$, $I_D=0.88\text{ A}$, $V_{GS}=0\text{ to }10\text{ V}$ |
| Gate to drain charge | Q_{gd} | - | 0.08 | 0.1 | nC | $V_{DD}=15\text{ V}$, $I_D=0.88\text{ A}$, $V_{GS}=0\text{ to }10\text{ V}$ |
| Gate charge total | Q_g | - | 0.46 | 0.7 | nC | $V_{DD}=15\text{ V}$, $I_D=0.88\text{ A}$, $V_{GS}=0\text{ to }10\text{ V}$ |
| Gate plateau voltage | $V_{plateau}$ | - | 3.6 | - | V | $V_{DD}=15\text{ V}$, $I_D=0.88\text{ A}$, $V_{GS}=0\text{ to }10\text{ V}$ |

Table 7 Reverse diode

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|---------------------------------------|---------------|--------|------|------|------|--|
| | | Min. | Typ. | Max. | | |
| Diode continuous forward current | I_S | - | - | 0.4 | A | $T_A=25\text{ °C}$ |
| Diode pulse current | $I_{S,pulse}$ | - | - | 3.5 | A | $T_A=25\text{ °C}$ |
| Diode forward voltage | V_{SD} | - | 0.9 | 1.1 | V | $V_{GS}=0\text{ V}$, $I_F=0.88\text{ A}$, $T_J=25\text{ °C}$ |
| Reverse recovery time ¹⁾ | t_{rr} | - | 7.8 | - | ns | $V_R=15\text{ V}$, $I_F=0.88\text{ A}$, $di_F/dt=100\text{ A}/\mu\text{s}$ |
| Reverse recovery charge ¹⁾ | Q_{rr} | - | 1.9 | - | nC | $V_R=15\text{ V}$, $I_F=0.88\text{ A}$, $di_F/dt=100\text{ A}/\mu\text{s}$ |

¹⁾ Defined by design. Not subjected to production test.

4 Electrical characteristics diagrams

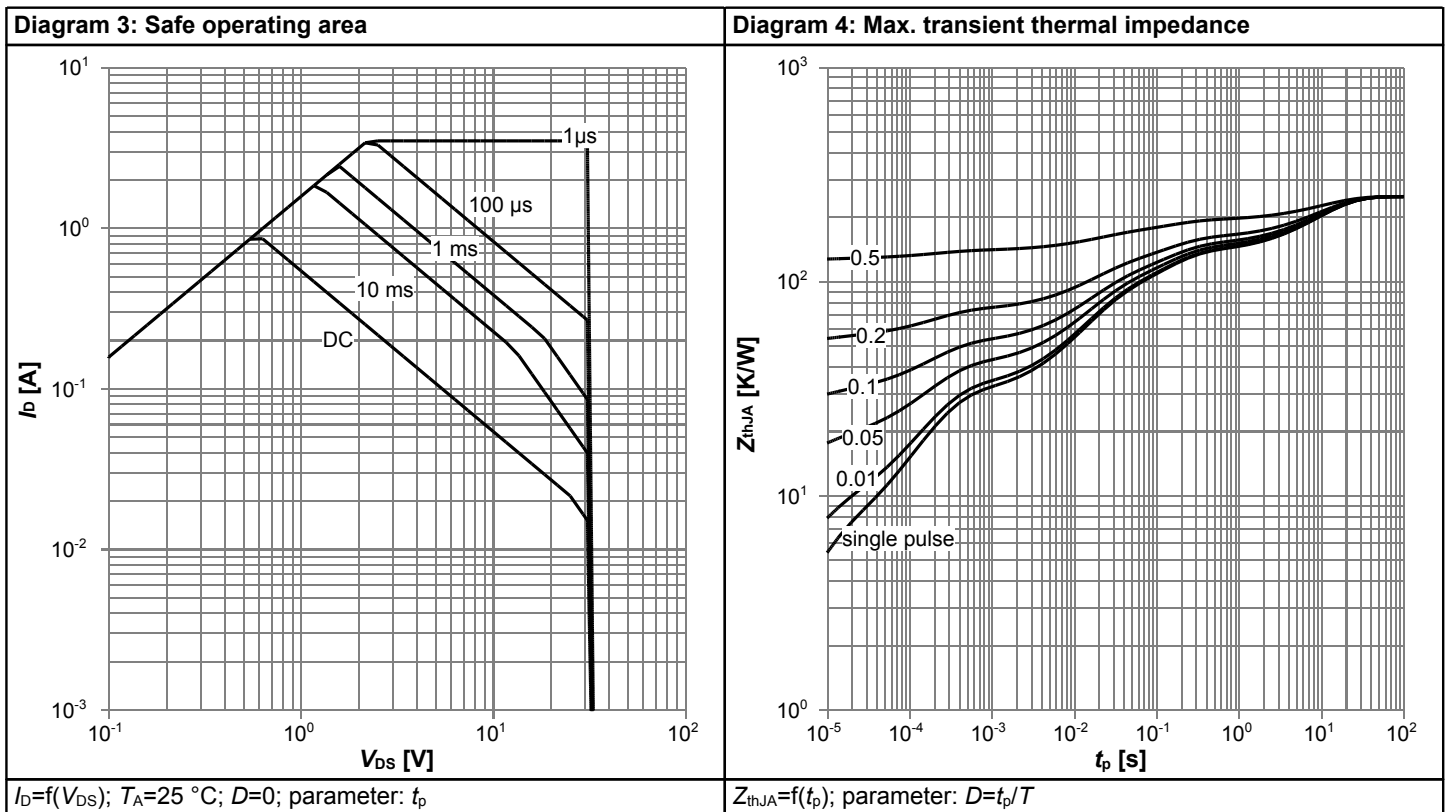
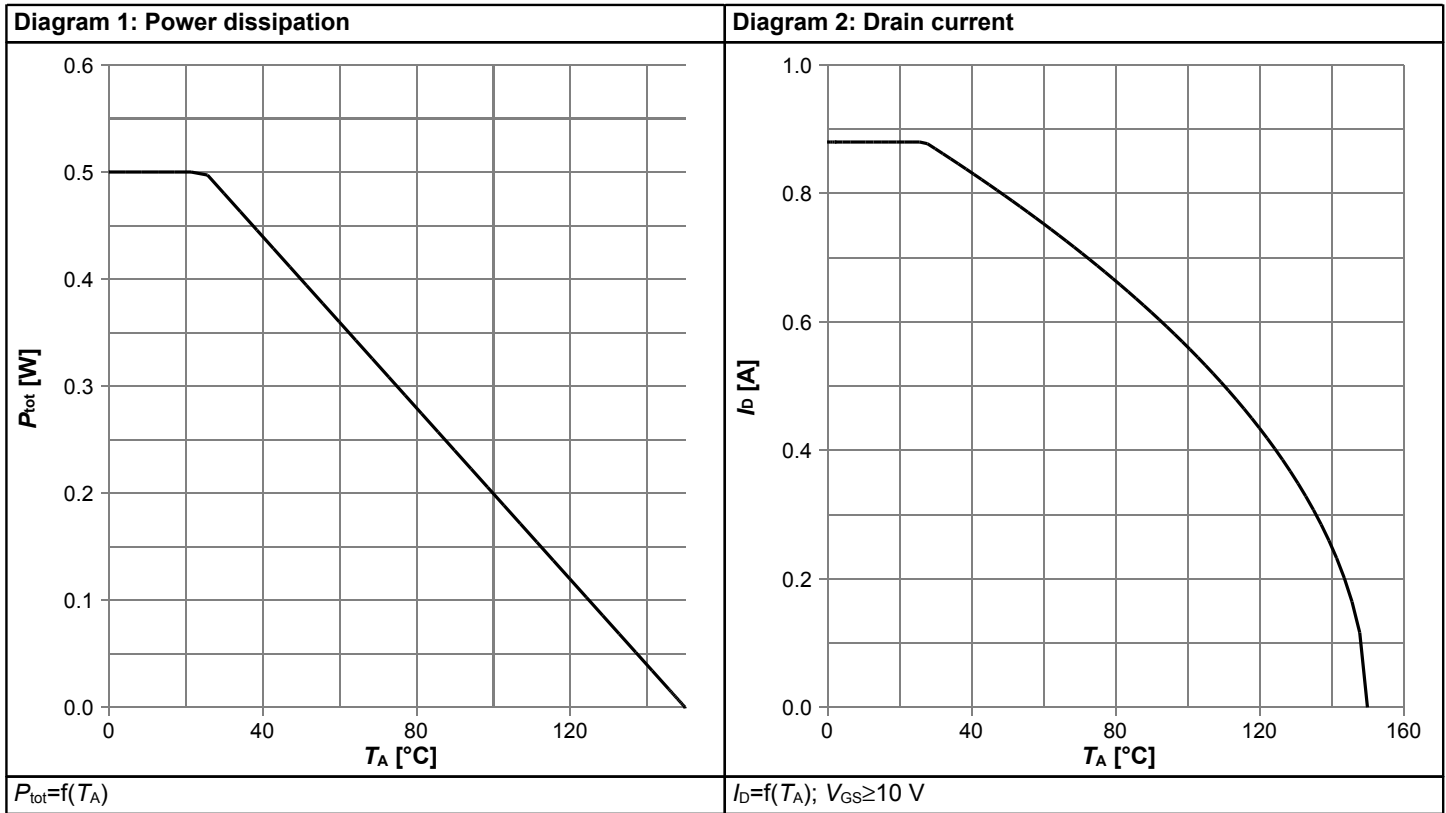
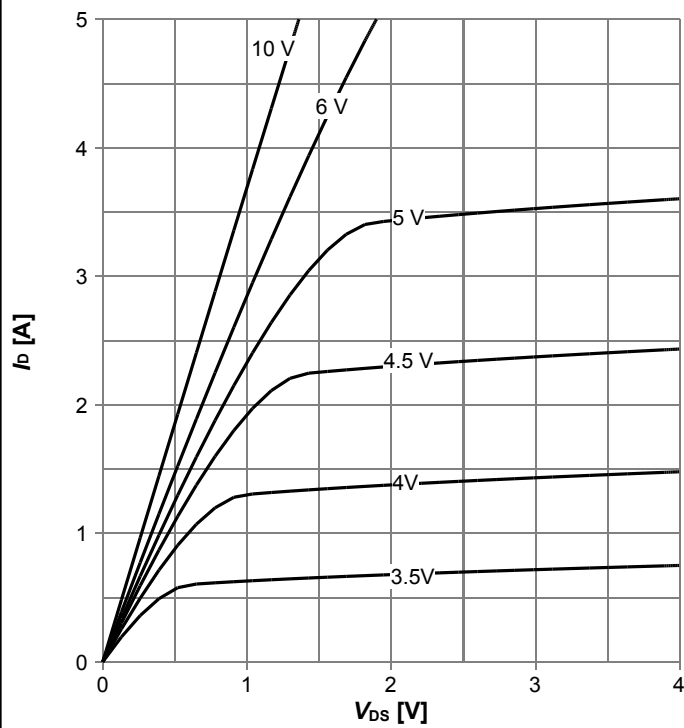
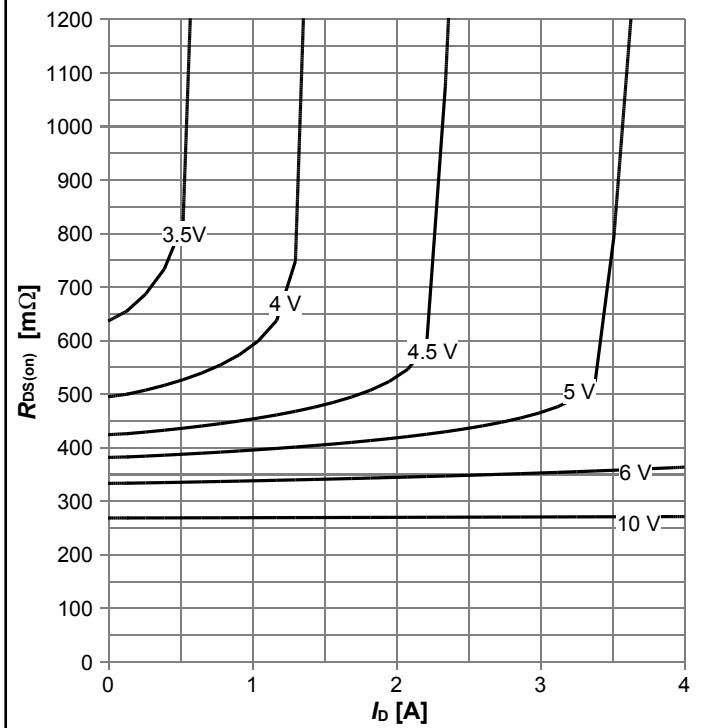


Diagram 5: Typ. output characteristics



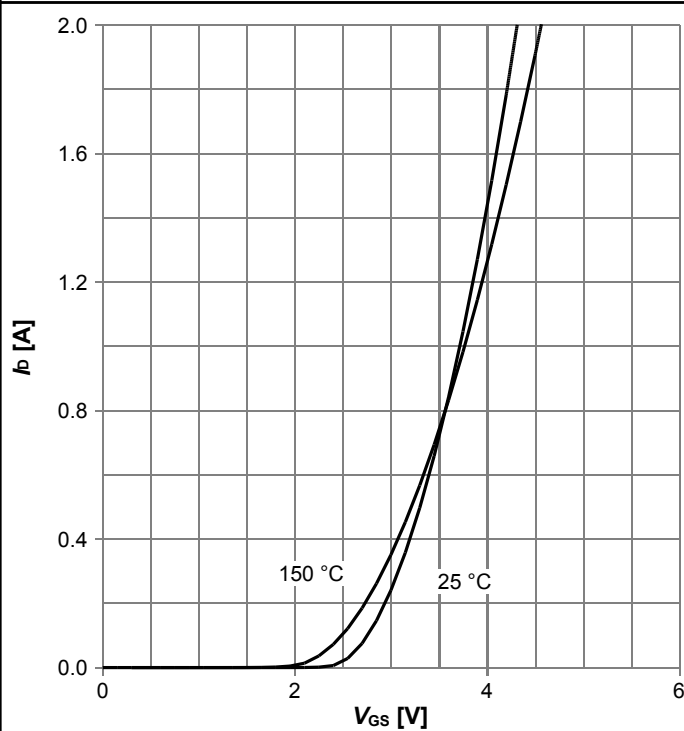
$I_D = f(V_{DS}); T_j = 25\text{ °C};$ parameter: V_{GS}

Diagram 6: Typ. drain-source on resistance



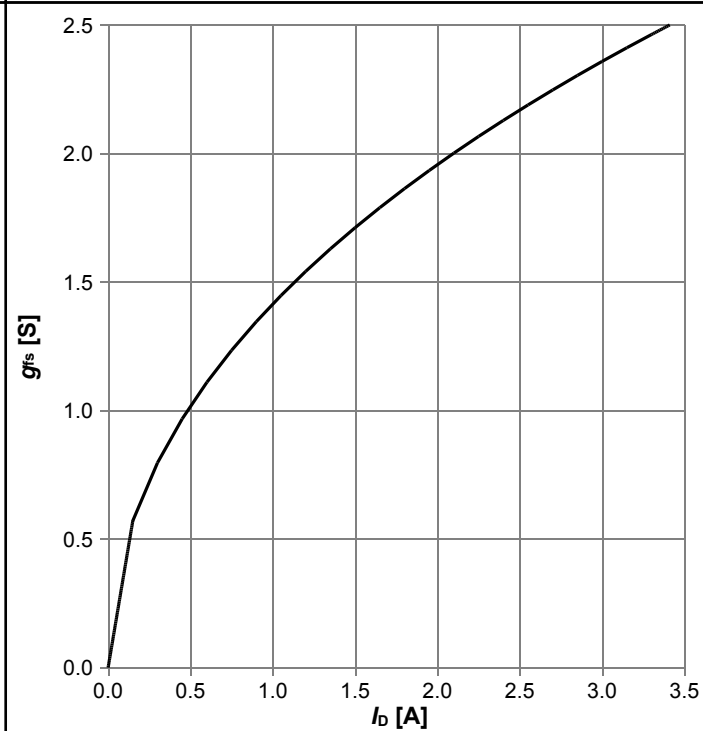
$R_{DS(on)} = f(I_D); T_j = 25\text{ °C};$ parameter: V_{GS}

Diagram 7: Typ. transfer characteristics



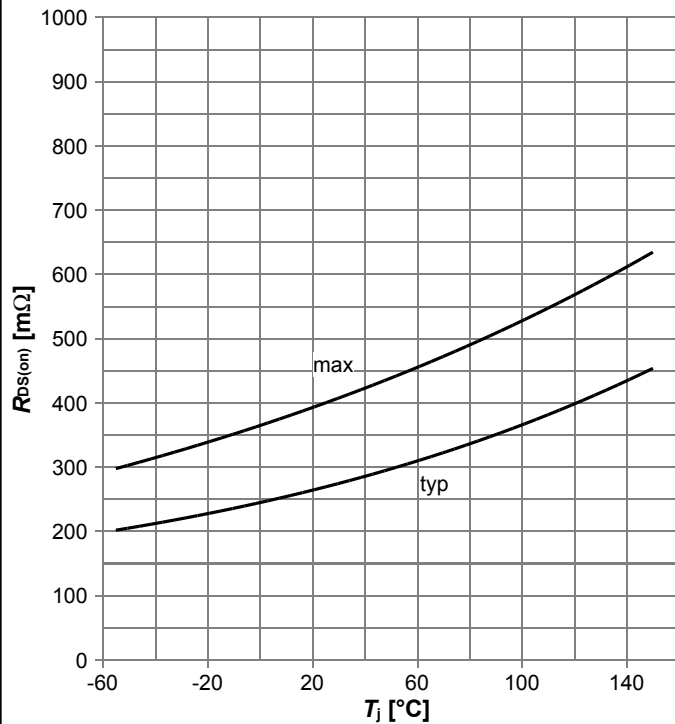
$I_D = f(V_{GS}); |V_{DS}| > 2|I_D|R_{DS(on)max}$

Diagram 8: Typ. forward transconductance



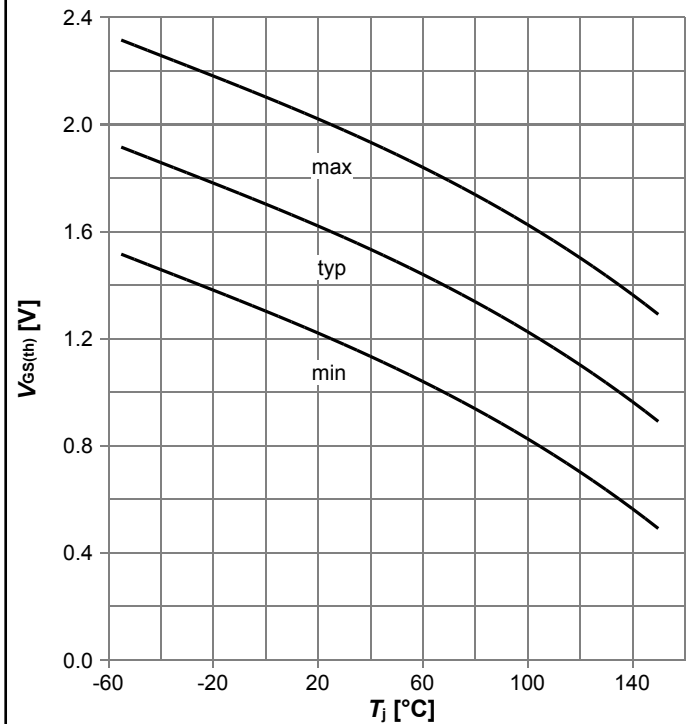
$g_{fs} = f(I_D); T_j = 25\text{ °C}$

Diagram 9: Drain-source on-state resistance



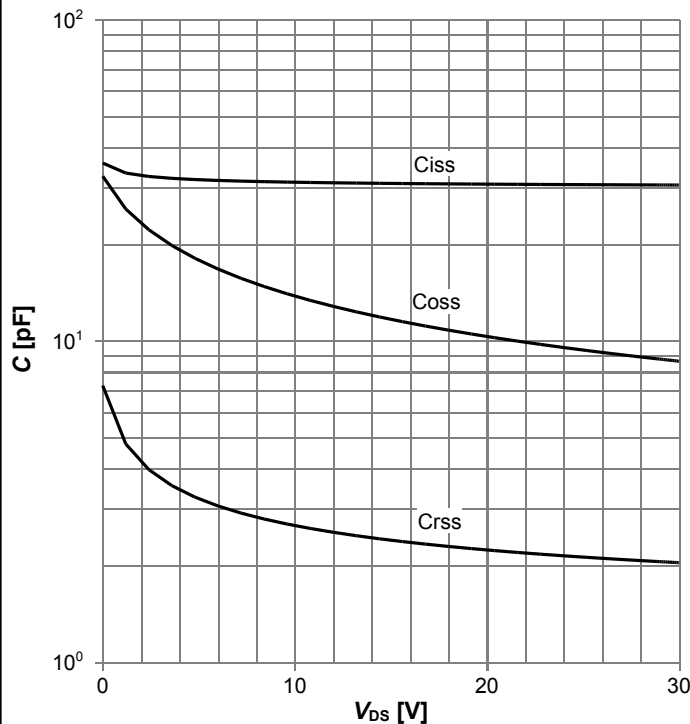
$R_{DS(on)}=f(T_j)$; $I_D=0.88$ A; $V_{GS}=10$ V

Diagram 10: Typ. gate threshold voltage



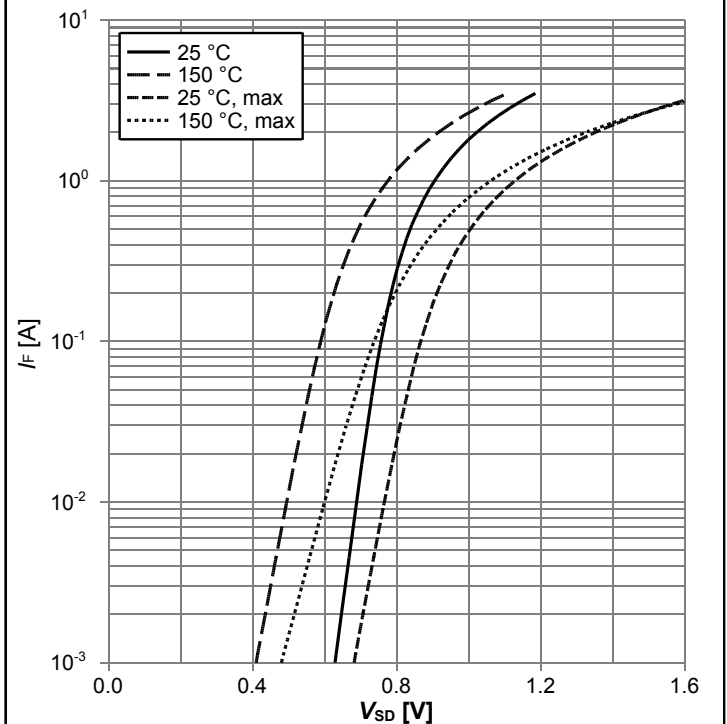
$V_{GS(th)}=f(T_j)$; $V_{DS}=V_{GS}$; $I_D=1.6$ μ A; parameter: I_D

Diagram 11: Typ. capacitances



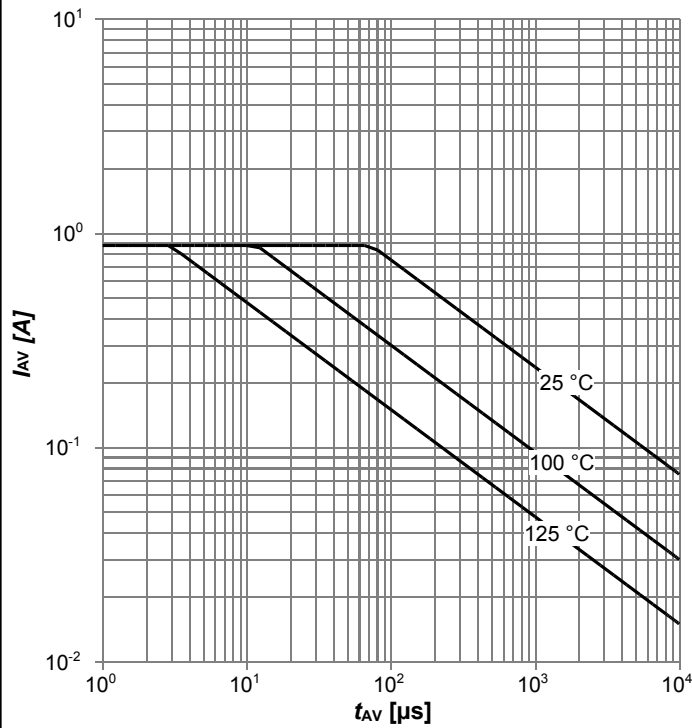
$C=f(V_{DS})$; $V_{GS}=0$ V; $f=1$ MHz; $T_j=25^\circ$ C

Diagram 12: Forward characteristics of reverse diode



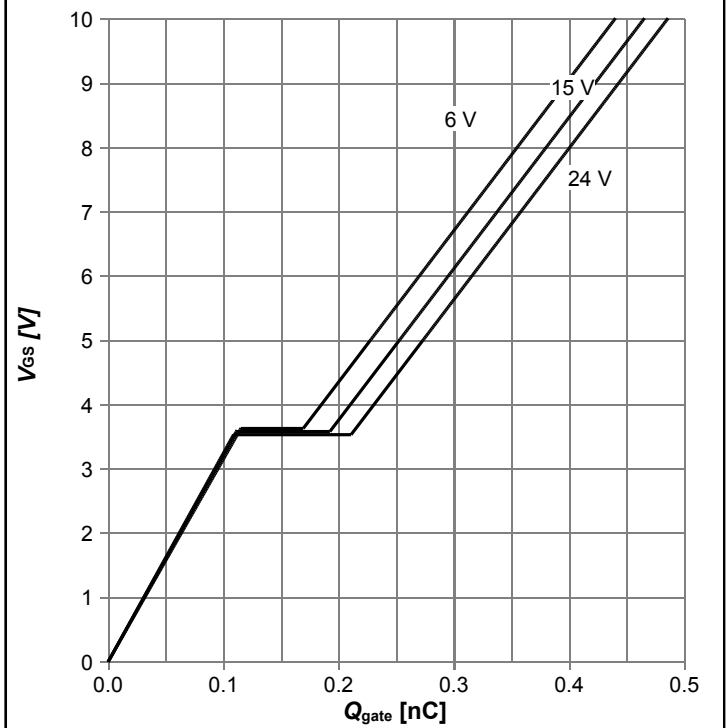
$I_F=f(V_{SD})$; parameter: T_j

Diagram 13: Avalanche characteristics



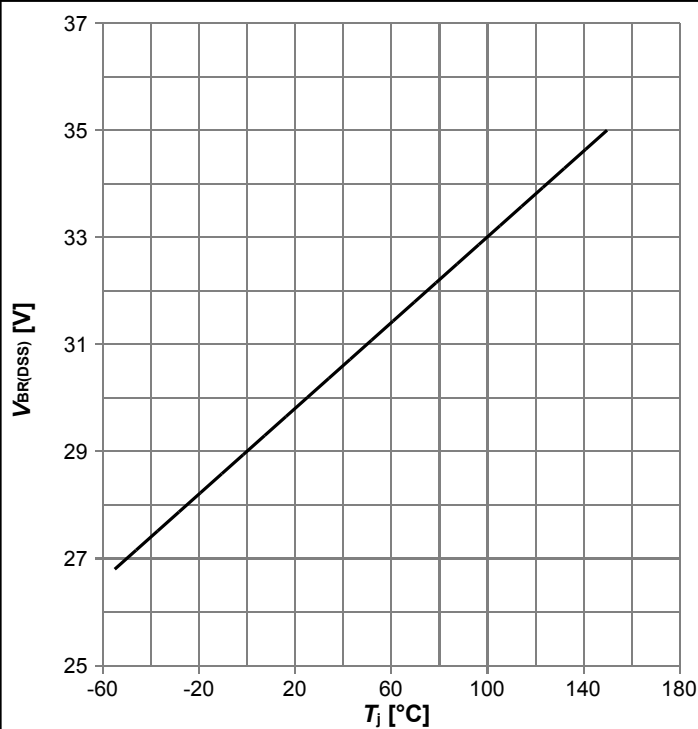
$I_{AS}=f(t_{AV}); R_{GS}=16 \Omega$; parameter: $T_{j(start)}$

Diagram 14: Typ. gate charge



$V_{GS}=f(Q_{gate}); I_D=0.88$ A pulsed; parameter: V_{DD}

Diagram 15: Drain-source breakdown voltage



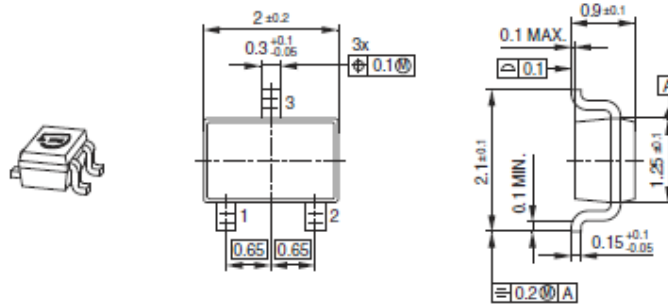
$V_{BR(DSS)}=f(T_j); I_D=250 \mu$ A

Gate charge waveforms



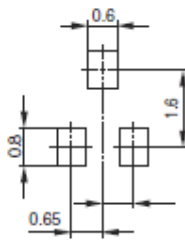
5 Package Outlines

Package Outline

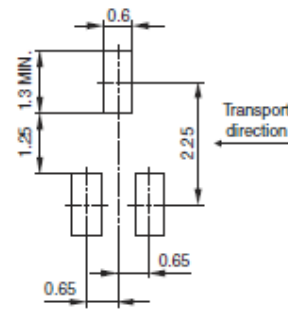


Foot Print

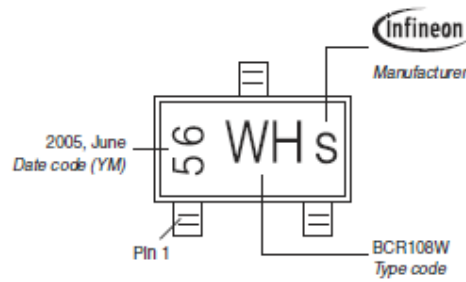
Soldering Type: Reflow Soldering



Soldering Type: Wave Soldering



Marking Layout (Example)



Tape and Reel

Reel \varnothing 180 mm: 3.000 Pieces/Reel
 Reels/Box: 1 x 3.000 = 3.000
 Reels/Box: 10 x 3.000 = 30.000

Reel \varnothing 330 mm: 10.000 Pieces/Reel
 Reels/Box: 1 x 10.000 = 10.000

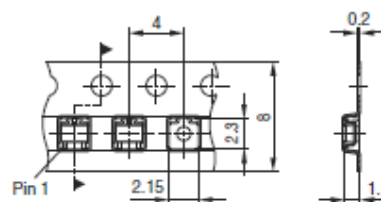


Figure 1 Outline PG-SOT323, dimensions in mm

Revision History

BSS340NW

Revision: 2016-06-23, Rev. 2.0

Previous Revision

| Revision | Date | Subjects (major changes since last revision) |
|----------|------------|--|
| 2.0 | 2016-06-23 | Release of final version |

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Infineon Technologies AG

81726 München, Germany

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