

BUK98180-100A-VB Datasheet

N-Channel 100-V (D-S) MOSFET

PRODUCT SUMMARY

| V_{DS} (V) | $R_{DS(on)}$ (Ω) | I_D (A) |
|--------------|---------------------------|-----------|
| 100 | 0.100 at $V_{GS} = 10$ V | 5.0 |
| | 0.120 at $V_{GS} = 4.5$ V | 4.5 |

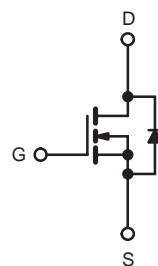
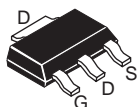
FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- Trench Power MOSFETs
- 175 °C Maximum Junction Temperature
- Compliant to RoHS Directive 2002/95/EC



RoHS
COMPLIANT

SOT-223



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted

| Parameter | Symbol | 10 s | Steady State | Unit |
|---------------------------------------------------------|----------------|-------------|--------------|------|
| Drain-Source Voltage | V_{DS} | 100 | | V |
| Gate-Source Voltage | V_{GS} | ± 20 | | |
| Continuous Drain Current ($T_J = 175$ °C) ^a | $T_A = 25$ °C | I_D | 5.0 | 4.5 |
| | $T_A = 70$ °C | | 3.5 | 3.0 |
| Pulsed Drain Current | I_{DM} | 25 | | A |
| Avalanche Current | I_{AS} | 15 | | |
| Single Pulse Avalanche Energy | E_{AS} | 11 | | mJ |
| Maximum Power Dissipation ^a | $T_A = 25$ °C | P_D | 3.3 | 1.7 |
| | $T_A = 70$ °C | | 2.3 | 1.2 |
| Operating Junction and Storage Temperature Range | T_J, T_{stg} | - 55 to 175 | | °C |

THERMAL RESISTANCE RATINGS

| Parameter | Symbol | Typical | Maximum | Unit |
|------------------------------------------|------------|---------------|---------|------|
| Maximum Junction-to-Ambient ^a | R_{thJA} | $t \leq 10$ s | 36 | 45 |
| | | Steady State | 75 | 90 |
| Maximum Junction-to-Foot (Drain) | R_{thJF} | 17 | 20 | °C/W |

Notes:

a. Surface Mounted on 1" x 1" FR4 board.

| SPECIFICATIONS $T_J = 25^\circ\text{C}$, unless otherwise noted | | | | | | |
|------------------------------------------------------------------|--------------|------------------------------------------------------------------------------------------------------------------------|------|-------|-----------|---------------|
| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
| Static | | | | | | |
| Drain-Source Breakdown Voltage | V_{DS} | $V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$ | 100 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$ | 1.5 | | 3 | V |
| Gate-Body Leakage | I_{GSS} | $V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$ | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}$ | | | 1 | μA |
| | | $V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}, T_J = 55^\circ\text{C}$ | | | 20 | |
| On-State Drain Current ^a | $I_{D(on)}$ | $V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$ | 40 | | | A |
| Drain-Source On-State Resistance ^a | $R_{DS(on)}$ | $V_{GS} = 10\text{ V}, I_D = 6.0\text{ A}$ | | 0.110 | | Ω |
| | | $V_{GS} = 10\text{ V}, I_D = 4.0\text{ A}, T_J = 125^\circ\text{C}$ | | 0.122 | | |
| | | $V_{GS} = 10\text{ V}, I_D = 4.0\text{ A}, T_J = 175^\circ\text{C}$ | | 0.140 | | |
| | | $V_{GS} = 4.5\text{ V}, I_D = 3.1\text{ A}$ | | 0.120 | | |
| Forward Transconductance ^a | g_{fs} | $V_{DS} = 15\text{ V}, I_D = 4.0\text{ A}$ | | 25 | | S |
| Diode Forward Voltage ^a | V_{SD} | $I_S = 1.7\text{ A}, V_{GS} = 0\text{ V}$ | | 0.8 | 1.2 | V |
| Dynamic^b | | | | | | |
| Total Gate Charge | Q_g | $V_{DS} = 50\text{ V}, V_{GS} = 10\text{ V}, I_D = 4.0\text{ A}$ | | 18 | 27 | nC |
| Gate-Source Charge | Q_{gs} | | | 3.4 | | |
| Gate-Drain Charge | Q_{gd} | | | 5.3 | | |
| Gate Resistance | R_g | $V_{GS} = 0.1\text{ V}, f = 5\text{ MHz}$ | 0.5 | 1.4 | 2.4 | Ω |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD} = 50\text{ V}, R_L = 30\text{ }\Omega$ $I_D \cong 1\text{ A}, V_{GEN} = 10\text{ V}, R_g = 6\text{ }\Omega$ | | 10 | 20 | ns |
| Rise Time | t_r | | | 10 | 20 | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 25 | 50 | |
| Fall Time | t_f | | | 12 | 24 | |
| Source-Drain Reverse Recovery Time | t_{rr} | $I_F = 1.7\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$ | | 50 | 80 | |

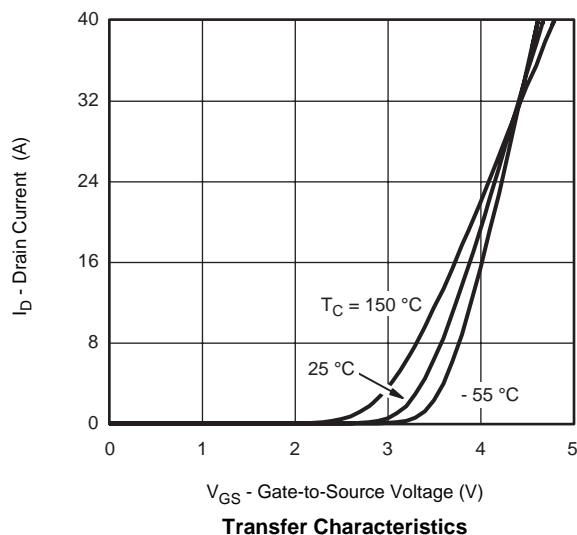
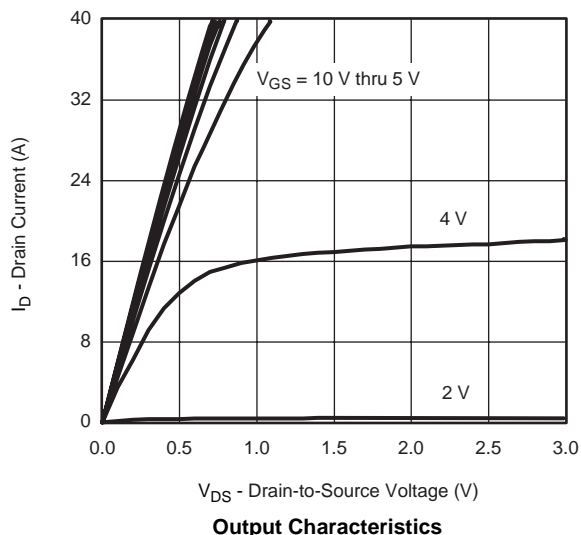
Notes:

a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS 25°C , unless otherwise noted



TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



On-Resistance vs. Drain Current



Capacitance



Gate Charge



On-Resistance vs. Junction Temperature

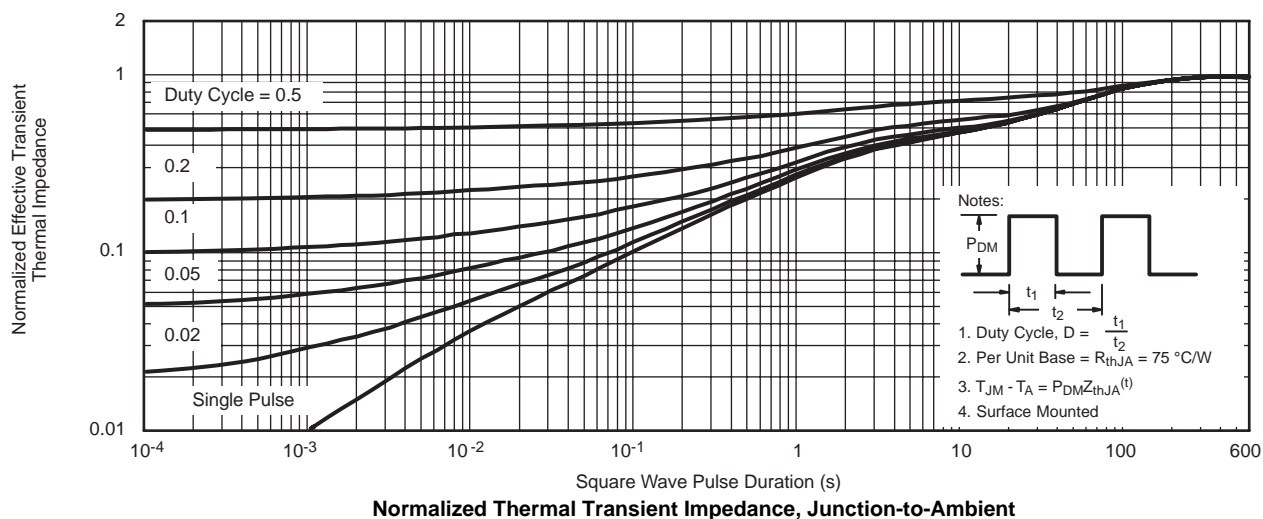


Source-Drain Diode Forward Voltage

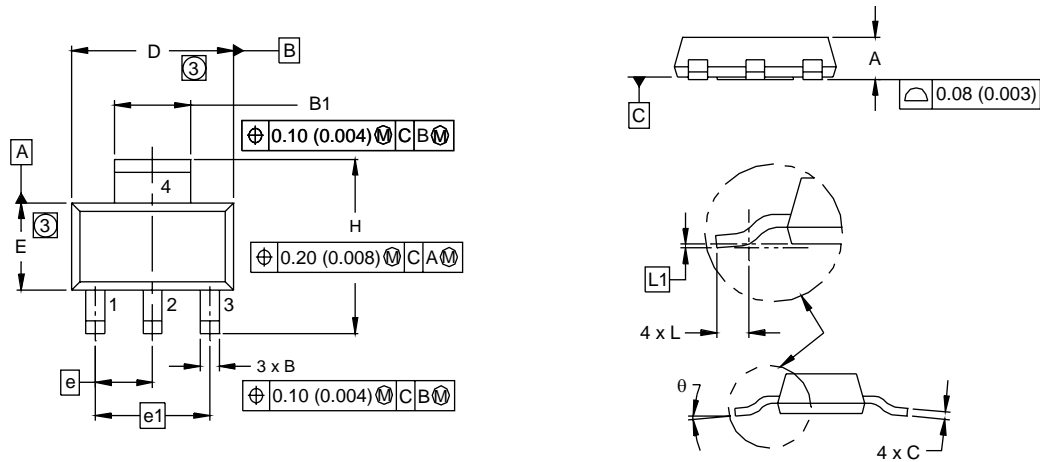


On-Resistance vs. Gate-to-Source Voltage

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



SOT-223 (HIGH VOLTAGE)



| DIM. | MILLIMETERS | | INCHES | |
|---------------------------------------------|-------------|------|------------|-------|
| | MIN. | MAX. | MIN. | MAX. |
| A | 1.55 | 1.80 | 0.061 | 0.071 |
| B | 0.65 | 0.85 | 0.026 | 0.033 |
| B1 | 2.95 | 3.15 | 0.116 | 0.124 |
| C | 0.25 | 0.35 | 0.010 | 0.014 |
| D | 6.30 | 6.70 | 0.248 | 0.264 |
| E | 3.30 | 3.70 | 0.130 | 0.146 |
| e | 2.30 BSC | | 0.0905 BSC | |
| e1 | 4.60 BSC | | 0.181 BSC | |
| H | 6.71 | 7.29 | 0.264 | 0.287 |
| L | 0.91 | - | 0.036 | - |
| L1 | 0.061 BSC | | 0.0024 BSC | |
| θ | - | 10° | - | 10° |
| ECN: S-82109-Rev. A, 15-Sep-08 DWG: 5969 | | | | |

Notes

1. Dimensioning and tolerancing per ASME Y14.5M-1994.
2. Dimensions are shown in millimeters (inches).
3. Dimension do not include mold flash.
4. Outline conforms to JEDEC outline TO-261AA.

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