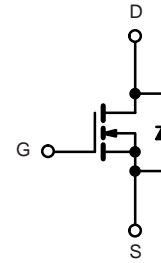


N-Channel 100 V (D-S) MOSFET

PRODUCT SUMMARY

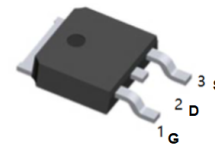
| | | |
|--------------|---------------------------|-----------|
| V_{DS} (V) | $R_{DS(on)}$ (Ω) | I_D (A) |
| 100 | 0.114 at $V_{GS} = 10$ V | 15 |



N-Channel MOSFET

APPLICATIONS

- Primary Side Switch



TO-252(DPAK) top view

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

| Parameter | Symbol | Limit | Unit |
|---|----------------|----------------|-----------------|
| Drain-Source Voltage | V_{DS} | 100 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | |
| Continuous Drain Current ($T_J = 175$ °C) ^b | I_D | $T_C = 25$ °C | 15 |
| | | $T_C = 125$ °C | 13 |
| Pulsed Drain Current | I_{DM} | 40 | A |
| Continuous Source Current (Diode Conduction) | I_S | 3 | |
| Avalanche Current | I_{AS} | 3 | |
| Single Pulse Avalanche Energy | E_{AS} | 18 | mJ |
| Maximum Power Dissipation | P_D | $T_C = 25$ °C | 96 ^b |
| | | $T_A = 25$ °C | 3 ^a |
| Operating Junction and Storage Temperature Range | T_J, T_{stg} | - 55 to 175 | °C |

THERMAL RESISTANCE RATINGS

| Parameter | Symbol | Typical | Maximum | Unit |
|----------------------------------|------------|---------------|---------|------|
| Junction-to-Ambient ^a | R_{thJA} | $t \leq 10$ s | 15 | 18 |
| | | Steady State | 40 | 50 |
| Junction-to-Case (Drain) | R_{thJC} | 0.85 | 1.1 | °C/W |

Notes:

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

b. See SOA curve for voltage derating.

SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)

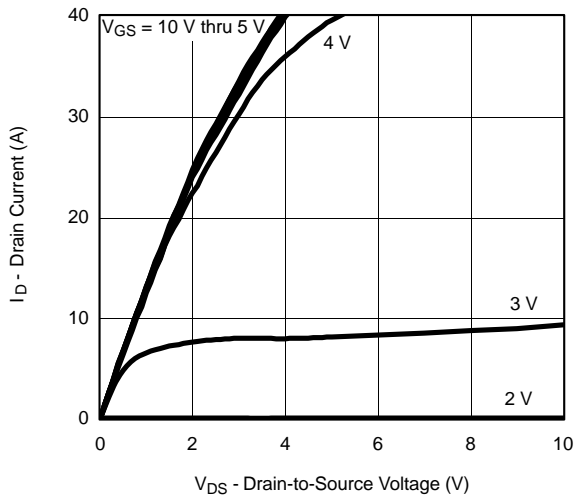
| Parameter | Symbol | Test Conditions | Min. | Typ. ^a | Max. | Unit |
|--|--------------|---|------|-------------------|-----------|---------------|
| Static | | | | | | |
| Drain-Source Breakdown Voltage | V_{DS} | $V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$ | 100 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$ | 1.0 | | 2.5 | |
| 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 |
| | | $V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$ | | | 50 | |
| | | $V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}, T_J = 175\text{ }^\circ\text{C}$ | | | 250 | |
| On-State Drain Current ^b | $I_{D(on)}$ | $V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$ | 40 | | | A |
| Drain-Source On-State Resistance ^b | $R_{DS(on)}$ | $V_{GS} = 10\text{ V}, I_D = 3\text{ A}$ | | 114 | | m Ω |
| | | $V_{GS} = 10\text{ V}, I_D = 3\text{ A}, T_J = 125\text{ }^\circ\text{C}$ | | 120 | | |
| | | $V_{GS} = 10\text{ V}, I_D = 3\text{ A}, T_J = 175\text{ }^\circ\text{C}$ | | 140 | | |
| | | $V_{GS} = 4.5\text{ V}, I_D = 3\text{ A}$ | | 120 | | |
| Forward Transconductance ^b | g_{fs} | $V_{DS} = 15\text{ V}, I_D = 3\text{ A}$ | | 35 | | S |
| Dynamic^a | | | | | | |
| Input Capacitance | C_{iss} | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, F = 1\text{ MHz}$ | | 950 | | pF |
| Output Capacitance | C_{oss} | | | 120 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 60 | | |
| Total Gate Charge ^c | Q_g | $V_{DS} = 50\text{ V}, V_{GS} = 10\text{ V}, I_D = 3\text{ A}$ | | 24 | 41 | nC |
| Gate-Source Charge ^c | Q_{gs} | | | 8 | | |
| Gate-Drain Charge ^c | Q_{gd} | | | 12 | | |
| Gate Resistance | R_g | | 0.5 | | 2.9 | Ω |
| Turn-On Delay Time ^c | $t_{d(on)}$ | $V_{DD} = 50\text{ V}, R_L = 5.2\text{ }\Omega$ $I_D \cong 3\text{ A}, V_{GEN} = 10\text{ V}, R_g = 2.5\text{ }\Omega$ | | 15 | 25 | ns |
| Rise Time ^c | t_r | | | 50 | 75 | |
| Turn-Off Delay Time ^c | $t_{d(off)}$ | | | 30 | 45 | |
| Fall Time ^c | t_f | | | 60 | 90 | |
| Source-Drain Diode Ratings and Characteristics ($T_C = 25\text{ }^\circ\text{C}$) | | | | | | |
| Pulsed Current | I_{SM} | | | | 5 | A |
| Diode Forward Voltage ^b | V_{SD} | $I_F = 3\text{ A}, V_{GS} = 0\text{ V}$ | | 0.9 | 1.5 | V |
| Source-Drain Reverse Recovery Time | t_{rr} | $I_F = 3\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$ | | 180 | 250 | ns |

Notes:

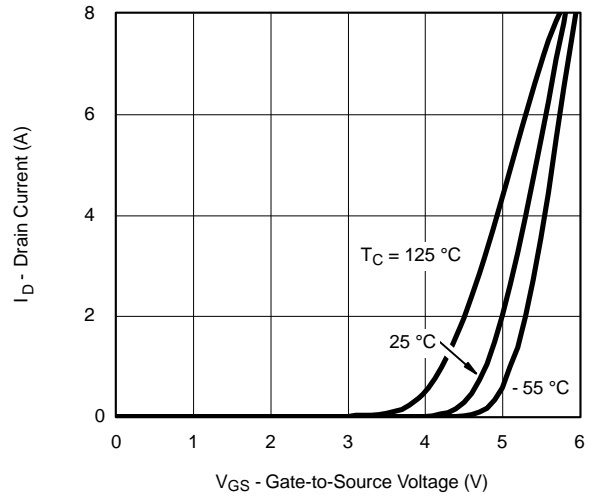
- Guaranteed by design, not subject to production testing.
- Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- Independent of operating temperature.

N-Channel 100 V (D-S) MOSFET

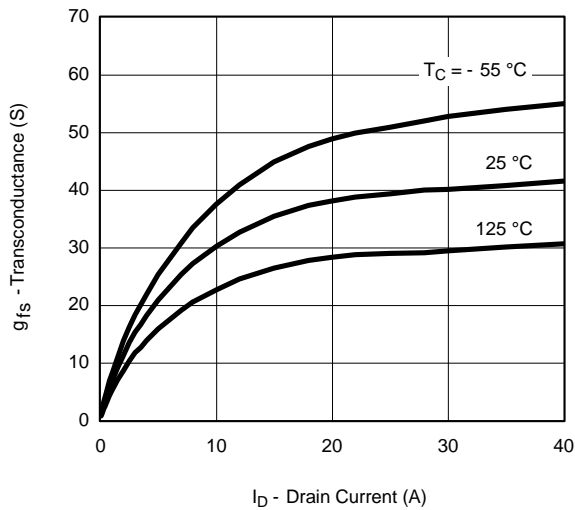
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



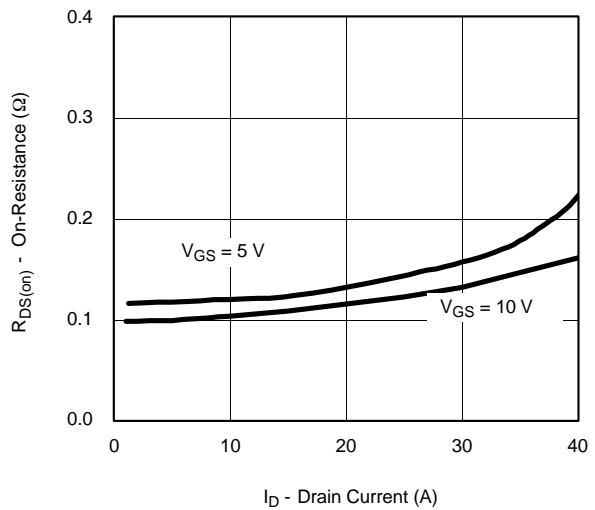
Output Characteristics



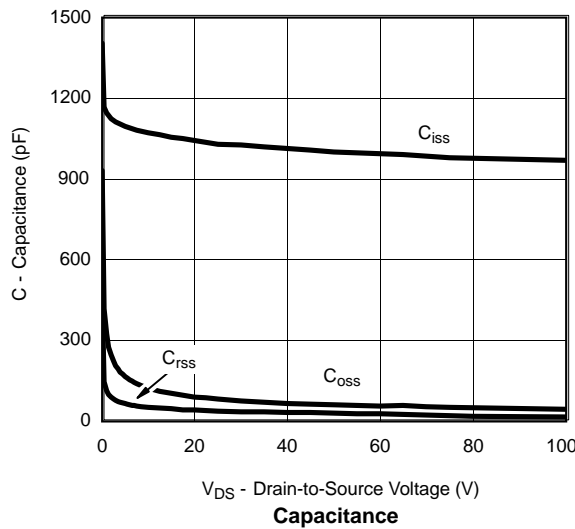
Transfer Characteristics



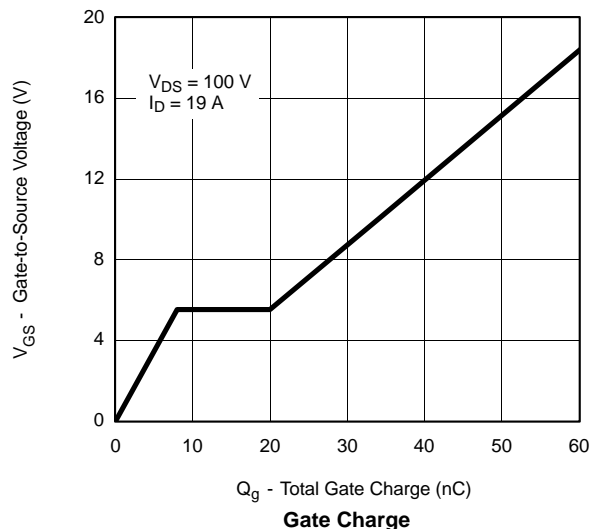
Transconductance



On-Resistance vs. Drain Current



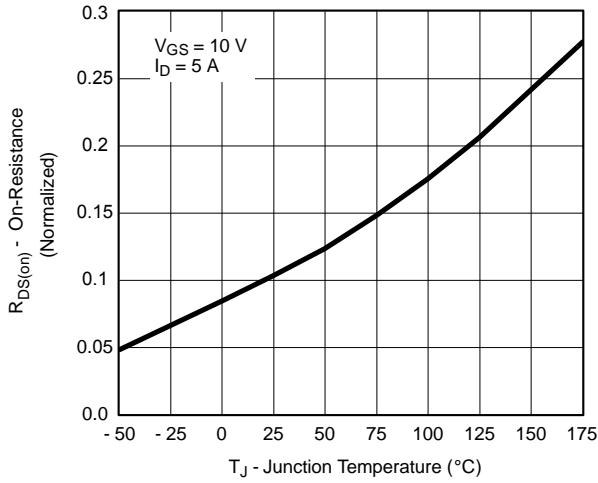
Capacitance



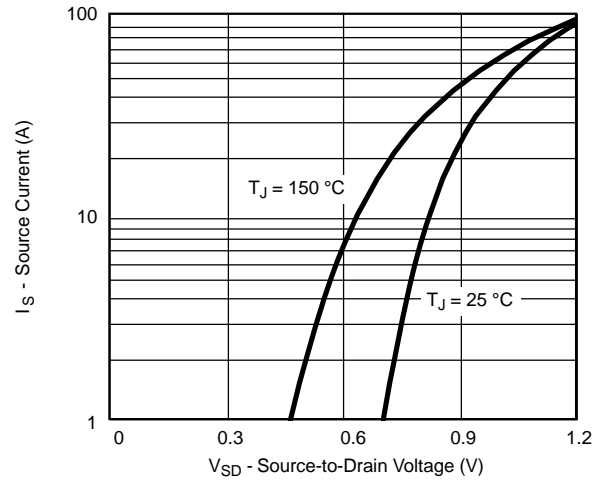
Gate Charge

N-Channel 100 V (D-S) MOSFET

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



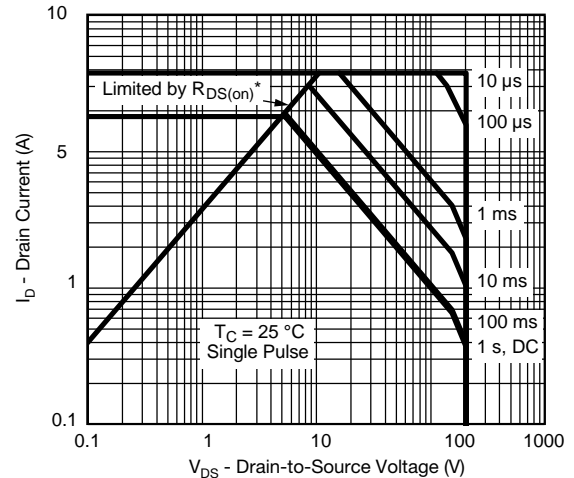
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage



Maximum Avalanche Drain Current vs. Case Temperature

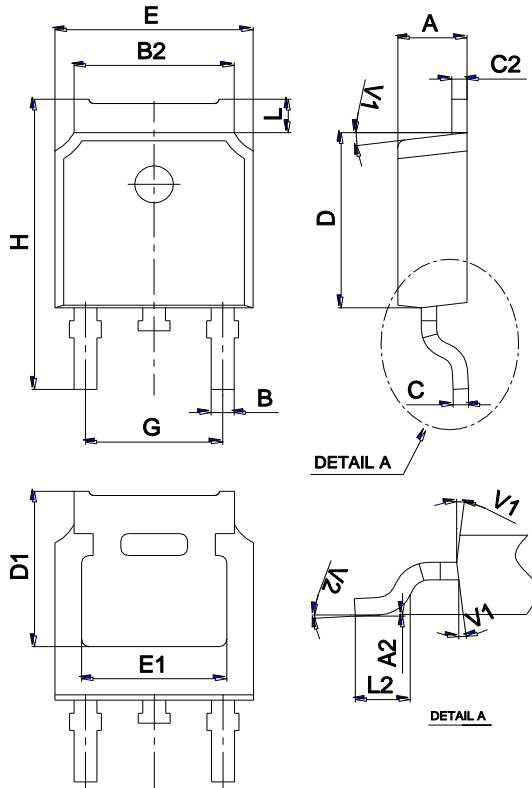


Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

Package Mechanical Data TO-252



| Ref. | Dimensions | | | | | |
|------|-------------|------|-------|----------|------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 2.10 | | 2.50 | 0.083 | | 0.098 |
| A2 | 0 | | 0.10 | 0 | | 0.004 |
| B | 0.66 | | 0.86 | 0.026 | | 0.034 |
| B2 | 5.18 | | 5.48 | 0.202 | | 0.216 |
| C | 0.40 | | 0.60 | 0.016 | | 0.024 |
| C2 | 0.44 | | 0.58 | 0.017 | | 0.023 |
| D | 5.90 | | 6.30 | 0.232 | | 0.248 |
| D1 | 5.30REF | | | 0.209REF | | |
| E | 6.40 | | 6.80 | 0.252 | | 0.268 |
| E1 | 4.63 | | | 0.182 | | |
| G | 4.47 | | 4.67 | 0.176 | | 0.184 |
| H | 9.50 | | 10.70 | 0.374 | | 0.421 |
| L | 1.09 | | 1.21 | 0.043 | | 0.048 |
| L2 | 1.35 | | 1.65 | 0.053 | | 0.065 |
| V1 | | 7° | | | 7° | |
| V2 | 0° | | 6° | 0° | | 6° |

Ordering information

| Order code | Package | Baseqty | Delivery mode |
|------------|---------|---------|---------------|
| UMW 12N10 | TO-252 | 2500 | Tape and reel |