

N-Channel 100 V (D-S) MOSFET

PRODUCT SUMMARY

| V_{DS} (V) | $R_{DS(on)}$ (Ω) | I_D (A) |
|--------------|---------------------------|-----------|
| 100 | 0.115 at $V_{GS} = 10$ V | 15 |
| | 0.120 at $V_{GS} = 6$ V | 15 |

FEATURES

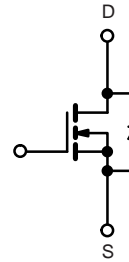
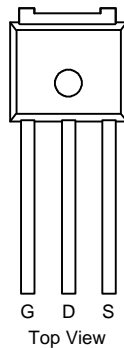
- DT-Trench Power MOSFET
- 175 °C Junction Temperature
- 100 % R_g Tested


RoHS
 COMPLIANT

APPLICATIONS

- Primary Side Switch

TO-251



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_C = 25$ °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 | $T_C = 25$ °C | I_D | 15 | A |
| | $T_C = 125$ °C | | 8.7 | |
| Pulsed Drain Current | | I_{DM} | 45 | |
| Continuous Source Current (Diode Conduction) | | I_S | 15 | |
| Avalanche Current | | I_{AR} | 15 | mJ |
| Repetitive Avalanche Energy (Duty Cycle ≤ 1 %) | $L = 0.1$ mH | E_{AR} | 11.3 | |
| Maximum Power Dissipation | $T_C = 25$ °C | P_D | 61 ^b | W |
| | $T_A = 25$ °C | | 2.7 ^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 | $t \leq 10$ s | R_{thJA} | 16 | 20 | °C/W |
| | Steady State | | 45 | 55 | |
| Junction-to-Case | | R_{thJC} | 2 | 2.4 | |

Notes:

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

b. See SOA curve for voltage derating.

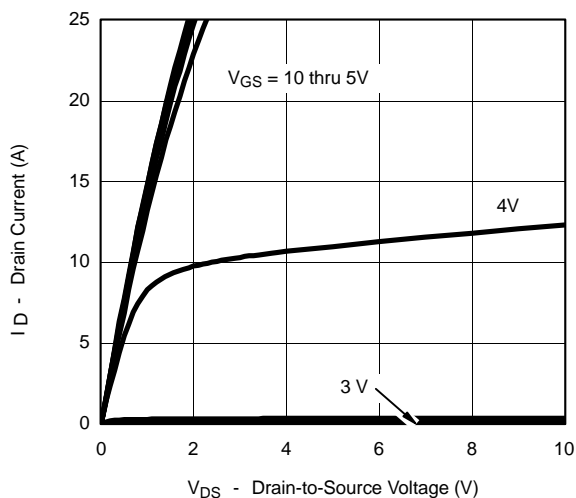
| SPECIFICATIONS (T _J = 25 °C, unless otherwise noted) | | | | | | |
|--|---------------------|--|------|-------------------|-------|------|
| Parameter | Symbol | Test Conditions | Min. | Typ. ^a | Max. | Unit |
| Static | | | | | | |
| Drain-Source Breakdown Voltage | V _{DS} | V _{GS} = 0 V, I _D = 250 μA | 100 | | | V |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D = 250 μA | 1.0 | | 3.0 | |
| Gate-Body Leakage | I _{GSS} | V _{DS} = 0 V, V _{GS} = ± 20 V | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = 100 V, V _{GS} = 0 V | | | 1 | μA |
| | | V _{DS} = 100 V, V _{GS} = 0 V, T _J = 125 °C | | | 50 | |
| | | V _{DS} = 100 V, V _{GS} = 0 V, T _J = 175 °C | | | 250 | |
| On-State Drain Current ^b | I _{D(on)} | V _{DS} = 5 V, V _{GS} = 10 V | 15 | | | A |
| Drain-Source On-State Resistance ^b | R _{DS(on)} | V _{GS} = 10 V, I _D = 15 A | | 0.110 | | Ω |
| | | V _{GS} = 10 V, I _D = 15 A, T _J = 125 °C | | 0.170 | | |
| | | V _{GS} = 10 V, I _D = 15 A, T _J = 175 °C | | 0.230 | | |
| | | V _{GS} = 6 V, I _D = 10 A | | 0.115 | | |
| Forward Transconductance ^b | g _{fs} | V _{DS} = 15 V, I _D = 15 A | | 25 | | S |
| Dynamic ^a | | | | | | |
| Input Capacitance | C _{iss} | V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz | | 892 | | pF |
| Output Capacitance | C _{oss} | | | 110 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 70 | | |
| Total Gate Charge ^c | Q _g | V _{DS} = 75 V, V _{GS} = 10 V, I _D = 15 A | | 20 | 25 | nC |
| Gate-Source Charge ^c | Q _{gs} | | | 5.5 | | |
| Gate-Drain Charge ^c | Q _{gd} | | | 7 | | |
| Gate Resistance | R _g | | 1 | | 3.2 | Ω |
| Turn-On Delay Time ^c | t _{d(on)} | V _{DD} = 75 V, R _L = 5 Ω I _D ≅ 15 A, V _{GEN} = 10 V, R _G = 2.5 Ω | | 8 | 12 | ns |
| Rise Time ^c | t _r | | | 35 | 55 | |
| Turn-Off Delay Time ^c | t _{d(off)} | | | 17 | 25 | |
| Fall Time ^c | t _f | | | 30 | 45 | |
| Source-Drain Diode Ratings and Characteristic (T _C = 25 °C) | | | | | | |
| Pulsed Current | I _{SM} | | | | 45 | A |
| Diode Forward Voltage ^b | V _{SD} | I _F = 15 A, V _{GS} = 0 V | | 0.9 | 1.5 | V |
| Source-Drain Reverse Recovery Time | t _{rr} | I _F = 15 A, dI/dt = 100 A/μs | | 55 | 85 | ns |

Notes:

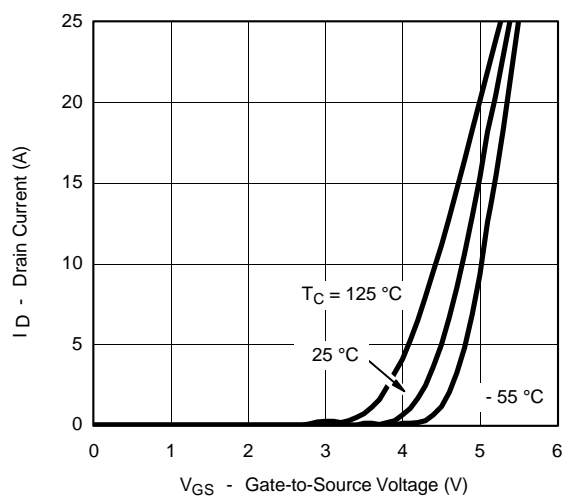
- a. Guaranteed by design, not subject to production testing.
 b. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
 c. Independent of operating temperature.

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.

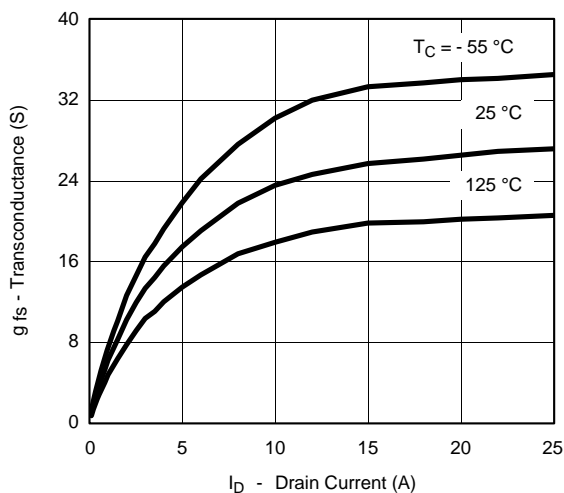
TYPICAL CHARACTERISTICS (25 °C unless noted)



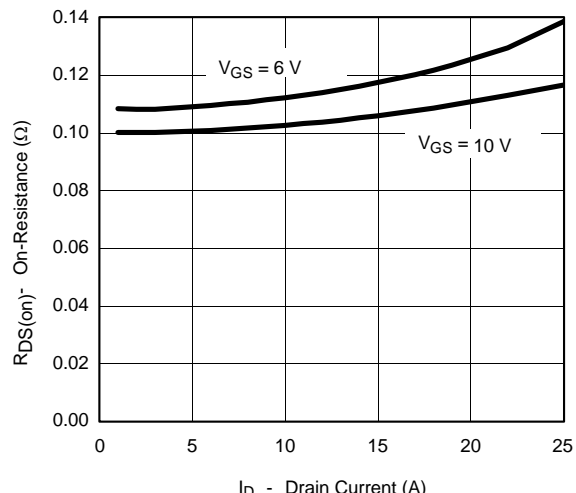
Output Characteristics



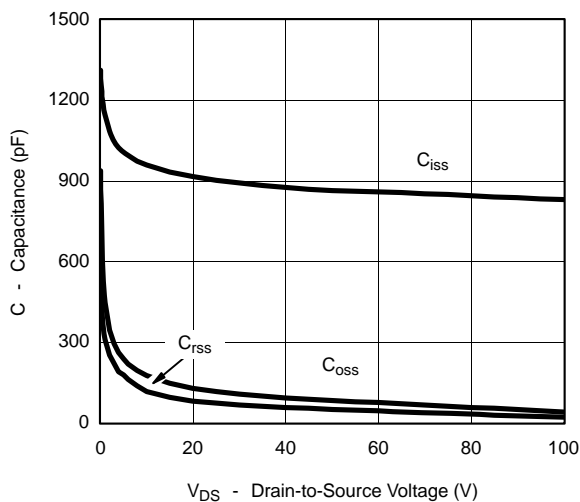
Transfer Characteristics



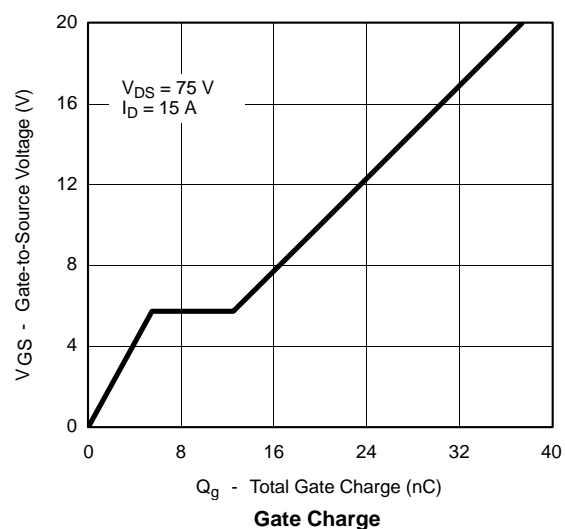
Transconductance



On-Resistance vs. Drain Current

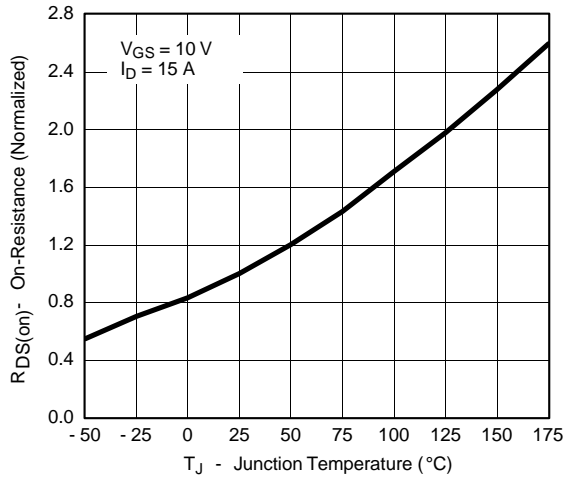


Capacitance

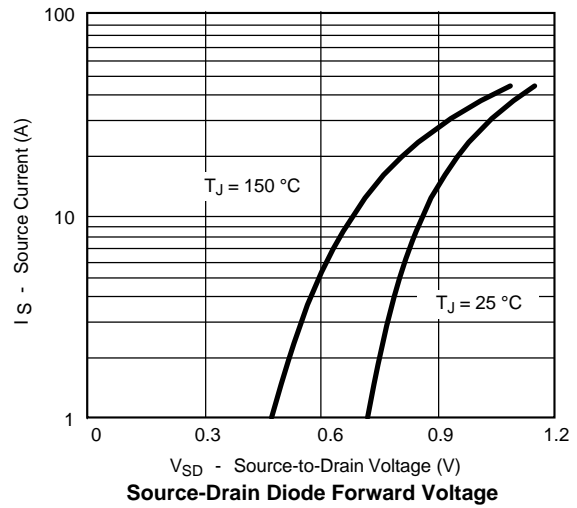


Gate Charge

TYPICAL CHARACTERISTICS (25 °C unless noted)

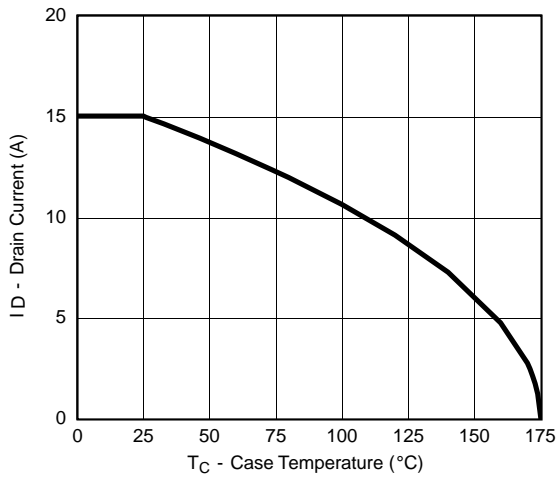


On-Resistance vs. Junction Temperature

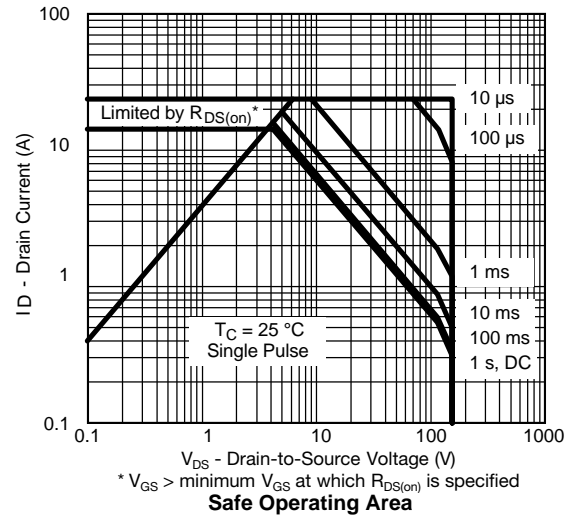


Source-Drain Diode Forward Voltage

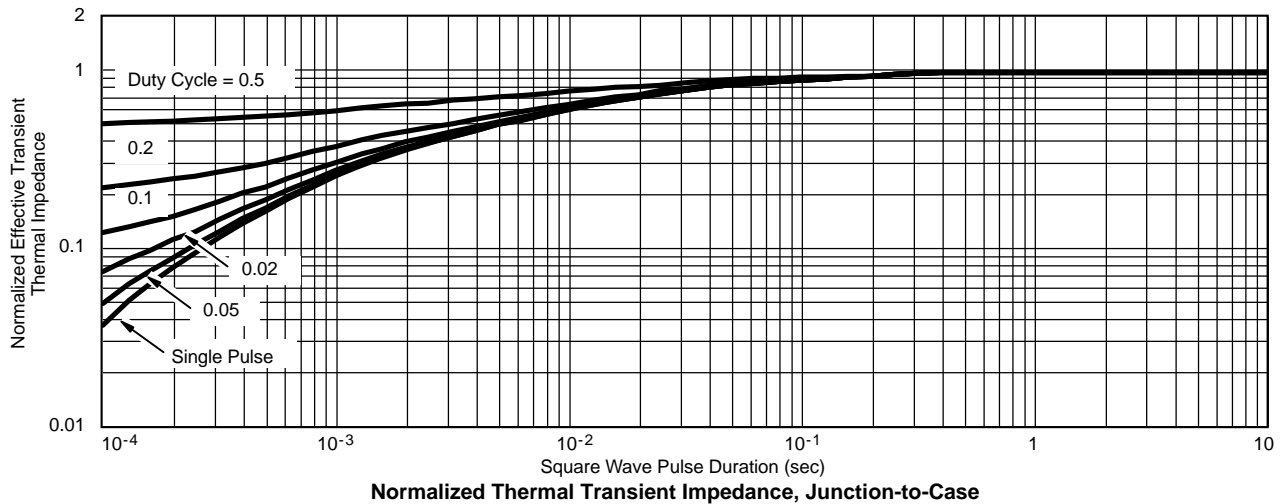
THERMAL RATINGS



Maximum Avalanche Drain Current
vs. Case Temperature

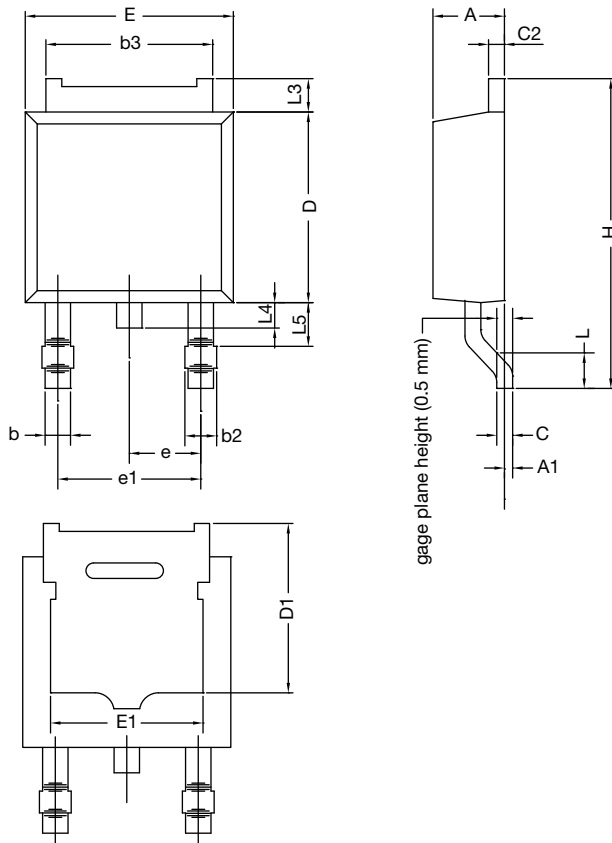


* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified
Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

TO-252AA CASE OUTLINE

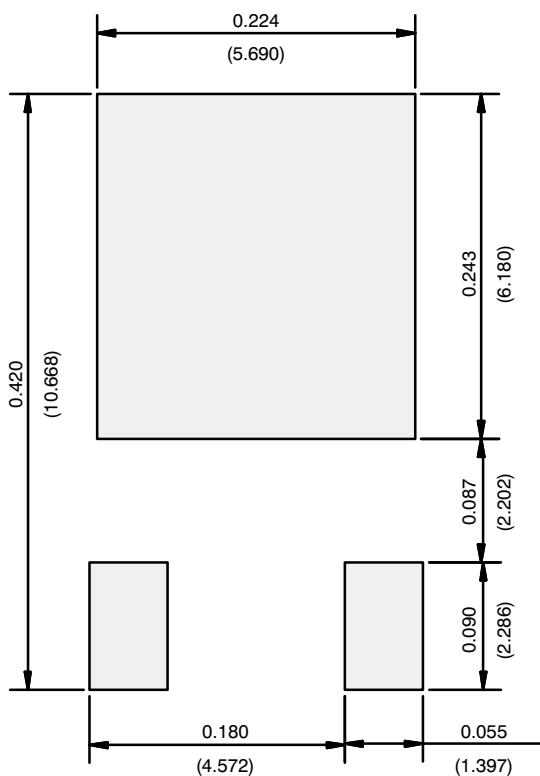


| DIM. | MILLIMETERS | | INCHES | |
|---------------------------------|-------------|-------|-----------|-------|
| | MIN. | MAX. | MIN. | MAX. |
| A | 2.18 | 2.38 | 0.086 | 0.094 |
| A1 | - | 0.127 | - | 0.005 |
| b | 0.64 | 0.88 | 0.025 | 0.035 |
| b2 | 0.76 | 1.14 | 0.030 | 0.045 |
| b3 | 4.95 | 5.46 | 0.195 | 0.215 |
| C | 0.46 | 0.61 | 0.018 | 0.024 |
| C2 | 0.46 | 0.89 | 0.018 | 0.035 |
| D | 5.97 | 6.22 | 0.235 | 0.245 |
| D1 | 5.21 | - | 0.205 | - |
| E | 6.35 | 6.73 | 0.250 | 0.265 |
| E1 | 4.32 | - | 0.170 | - |
| H | 9.40 | 10.41 | 0.370 | 0.410 |
| e | 2.28 BSC | | 0.090 BSC | |
| e1 | 4.56 BSC | | 0.180 BSC | |
| L | 1.40 | 1.78 | 0.055 | 0.070 |
| L3 | 0.89 | 1.27 | 0.035 | 0.050 |
| L4 | - | 1.02 | - | 0.040 |
| L5 | 1.14 | 1.52 | 0.045 | 0.060 |
| ECN: X12-0247-Rev. M, 24-Dec-12 | | | | |
| DWG: 5347 | | | | |

Note

- Dimension L3 is for reference only.

RECOMMENDED MINIMUM PADS FOR DPAK (TO-252)



Recommended Minimum Pads
Dimensions in Inches/(mm)

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