

LR3140-VB Datasheet N-Channel 100 V (D-S) MOSFET

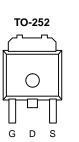
| PRODUCT SUMMARY | | | | |
|---------------------|---------------------------------|--------------------|--|--|
| V _{DS} (V) | R _{DS(on)} (Ω) | I _D (A) | | |
| 100 | 0.114 at V _{GS} = 10 V | 15 | | |

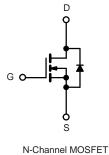
FEATURES

- Trench Power MOSFET
- 150 °C Junction Temperature
- PWM Optimized
- 100 % R_a Tested
- Compliant to RoHS Directive 2002/95/EC

APPLICATIONS

• Primary Side Switch





| ABSOLUTE MAXIMUM RATINGS ($T_A = 25 \text{ °C}$, unless otherwise noted) | | | | | | | |
|---|-----------------------------------|-----------------|-----------------|----|--|--|--|
| Parameter | Symbol | Limit | Unit | | | | |
| Drain-Source Voltage | V _{DS} | 100 | N/ | | | | |
| Gate-Source Voltage | | | ± 20 | V | | | |
| Continuous Drain Current (T. 175 °C) | T _C = 25 °C | I _D | 15 | | | | |
| Continuous Drain Current (T _J = 175 °C) ^b | T _C = 125 °C | | 13 | | | | |
| Pulsed Drain Current | I _{DM} | 40 | A | | | | |
| Continuous Source Current (Diode Conduction) | ۱ _S | 3 | | | | | |
| Avalanche Current | I _{AS} | 3 | | | | | |
| Single Pulse Avalanche Energy | L = 0.1 mH | E _{AS} | 18 | mJ | | | |
| Maximum Dawar Dissinction | T _C = 25 °C | PD | 96 ^b | w | | | |
| Maximum Power Dissipation | T _A = 25 °C | ' D | 3 ^a | | | | |
| Operating Junction and Storage Temperature Range | T _J , T _{stg} | - 55 to 150 | °C | | | | |

| THERMAL RESISTANCE RATINGS | | | | | | | |
|----------------------------------|--------------|-------------------|---------|---------|------|--|--|
| Parameter | | Symbol | Typical | Maximum | Unit | | |
| | t ≤ 10 s | R _{thJA} | 15 | 18 | °C/W | | |
| Junction-to-Ambient ^a | Steady State | | 40 | 50 | | | |
| Junction-to-Case (Drain) | | R _{thJC} | 0.85 | 1.1 | | | |

Notes:

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

b. See SOA curve for voltage derating.



| 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)} | $V_{DS} = V_{GS}, I_D = 250 \ \mu A$ | 1.0 | | 3.5 | v | |
| Gate-Body Leakage | I _{GSS} | $V_{DS} = 0 V, V_{GS} = \pm 20 V$ | | | ± 100 | nA | |
| | | V _{DS} = 100 V, V _{GS} = 0 V | | | 1 | | |
| Zero Gate Voltage Drain Current | I _{DSS} | $V_{DS} = 100 \text{ V}, \text{ V}_{GS} = 0 \text{ V}, \text{ T}_{J} = 125 \text{ °C}$ | | | 50 | μA | |
| | | $V_{DS} = 100 \text{ V}, \text{ V}_{GS} = 0 \text{ V}, \text{ T}_{J} = 175 ^{\circ}\text{C}$ | | | 250 | | |
| On-State Drain Current ^b | I _{D(on)} | V _{DS} = 5 V, V _{GS} = 10 V | 40 | | | А | |
| | | $V_{GS} = 10 \text{ V}, \text{ I}_{D} = 3 \text{ A}$ | | 0.114 | | _ | |
| | D | V_{GS} = 10 V, I _D = 3 A, T _J = 125 °C | | 0.120 | | | |
| Drain-Source On-State Resistance ^b | R _{DS(on)} | $V_{GS} = 10 \text{ V}, \text{ I}_{D} = 3 \text{ A}, \text{ T}_{J} = 175 \text{ °C}$ | | 0.140 | | Ω | |
| | | $V_{GS} = 4.5 \text{ V} \text{ I}_{D} = 3 \text{ A}$ | | 0.120 | | | |
| Forward Transconductanceb | 9 _{fs} | V _{DS} = 15 V, I _D = 3 A | | 35 | | S | |
| Dynamic ^a | | | | | | | |
| Input Capacitance | C _{iss} | | | 950 | | pF | |
| Output Capacitance | C _{oss} | V_{GS} = 0 V, V_{DS} = 25 V, F = 1 MHz | | 120 | | | |
| Reverse Transfer Capacitance | C _{rss} | | | 60 | | | |
| Total Gate Charge ^c | Qg | | | 24 | 41 | | |
| Gate-Source Charge ^c | Q _{gs} | $V_{DS} = 50 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 3 \text{ A}$ | | 8 | | nC | |
| Gate-Drain Charge ^c | Q _{gd} | | | 12 | | | |
| Gate Resistance | R _g | | 0.5 | | 2.9 | Ω | |
| Turn-On Delay Time ^c | t _{d(on)} | | | 15 | 25 | | |
| Rise Time ^c | t _r | $V_{DD} = 50 \text{ V}, \text{ R}_{L} = 5.2 \Omega$ | | 50 | 75 | ns | |
| Turn-Off Delay Time ^c | t _{d(off)} | $I_D \cong$ 3 A, V_{GEN} = 10 V, R_g = 2.5 Ω | | 30 | 45 | | |
| Fall Time ^c | t _f | | | 60 | 90 | | |
| Source-Drain Diode Ratings and Char | acteristics (1 | Γ _C = 25 °C) | | | | | |
| Pulsed Current | I _{SM} | | | | 5 | А | |
| Diode Forward Voltage ^b | V _{SD} | I _F = 3 A, V _{GS} = 0 V | | 0.9 | 1.5 | V | |
| Source-Drain Reverse Recovery Time | t _{rr} | I _F = 3 A, dl/dt = 100 A/μs | | 180 | 250 | ns | |

Notes:

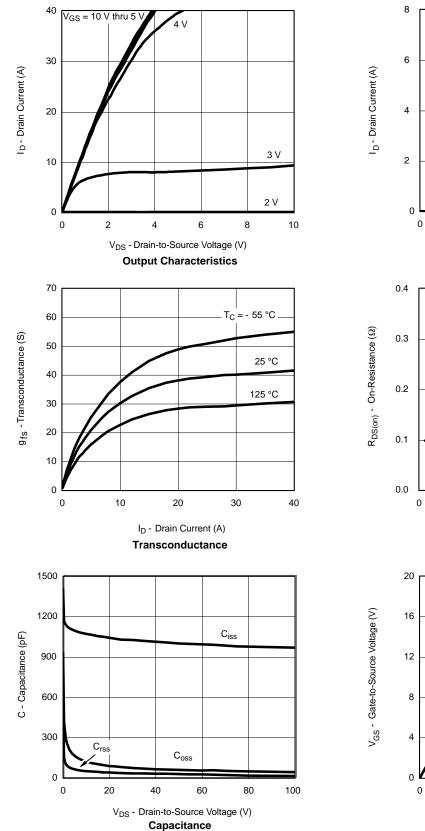
a. Guaranteed by design, not subject to production testing.

b. Pulse test; pulse width \leq 300 µs, duty cycle \leq 2 %.

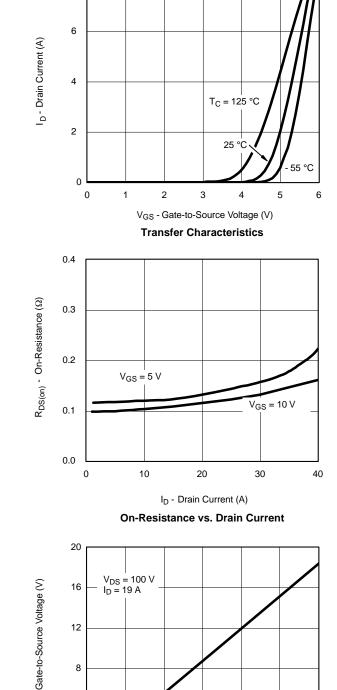
c. Independent of operating temperature.

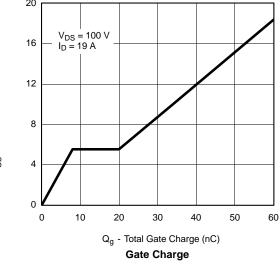
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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





TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



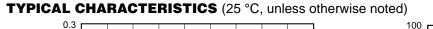


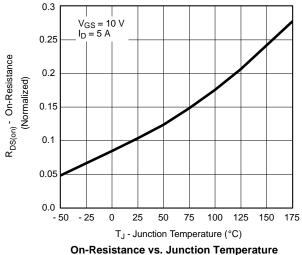


T_J = 25 °C

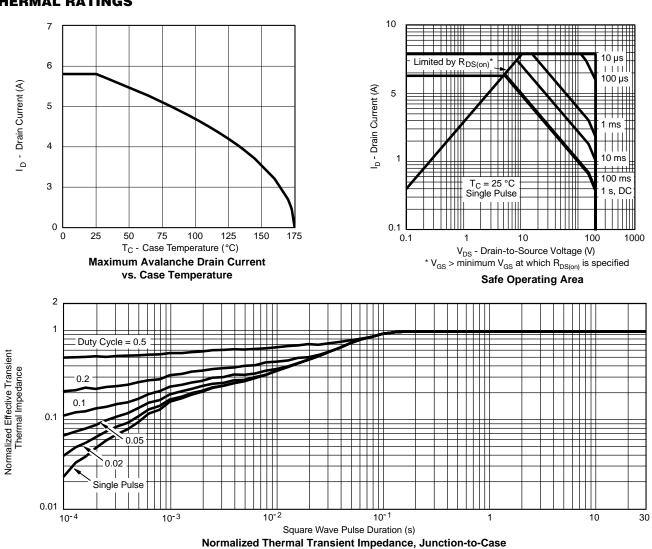
0.9

1.2





THERMAL RATINGS



I_S - Source Current (A)

10

1

0

0.3

T_J = 150 °C

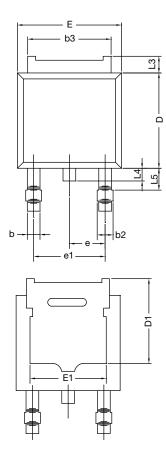
0.6

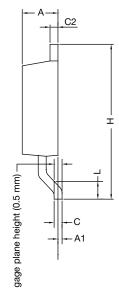
Source-Drain Diode Forward Voltage

V_{SD} - Source-to-Drain Voltage (V)



TO-252AA CASE OUTLINE





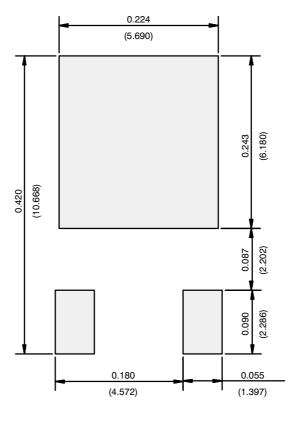
| | MILLIN | METERS | INC | HES | |
|--|--------|--------|-----------|-------|--|
| DIM. | MIN. | MAX. | MIN. | MAX. | |
| А | 2.18 | 2.38 | 0.086 | 0.094 | |
| A1 | - | 0.127 | - | 0.005 | |
| b | 0.64 | 0.88 | 0.025 | 0.035 | |
| b2 | 0.76 | 1.14 | 0.030 | 0.045 | |
| b3 | 4.95 | 5.46 | 0.195 | 0.215 | |
| С | 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 | - | |
| Н | 9.40 | 10.41 | 0.370 | 0.410 | |
| е | 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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