

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)}$ | I_D $T_A = 25^\circ C$ |
|---------------|--------------------------------|-----------------------------|
| 30V | 24m Ω @ $V_{GS} = 10V$ | 7.2A |
| | 36m Ω @ $V_{GS} = 4.5V$ | 5.8A |

Description and Applications

This new generation MOSFET has been designed to minimize the on-state resistance ($R_{DS(on)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

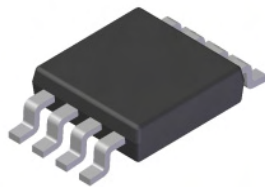
- Motor control
- Backlighting
- DC-DC Converters
- Power management functions

Features and Benefits

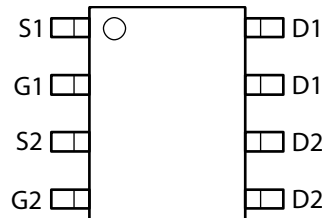
- Low on-resistance
- Fast switching speed
- "Green" component and RoHS compliant (Note 1)

Mechanical Data

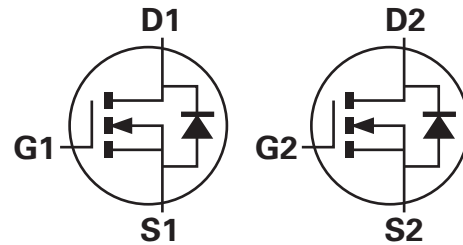
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0 (Note 1)
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals Connections: See Diagram
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method 208
- Weight: 0.074 grams (approximate)



TOP VIEW



Top view

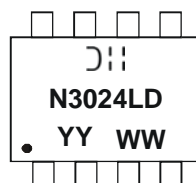


Ordering Information (Note 1)

| Product | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|---------------|---------|--------------------|-----------------|-------------------|
| DMN3024LSD-13 | N3024LD | 13 | 12 | 2,500 |

Note: 1. Diodes, Inc. defines "Green" products as those which are Eu RoHS compliant and contain no halogens or antimony compounds; further information about Diodes Inc.'s "Green" Policy can be found on our website. For packaging details, go to our website.

Marking Information



N3024LD = Product Type Marking Code
 ⓁⓂ = Manufacturer's Marking
 YYWW = Date Code Marking
 YY = Year (ex: 09 = 2009)
 WW = Week (01-52)

Maximum Ratings @T_A = 25°C unless otherwise specified

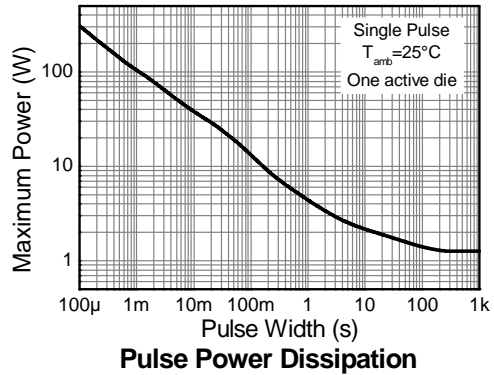
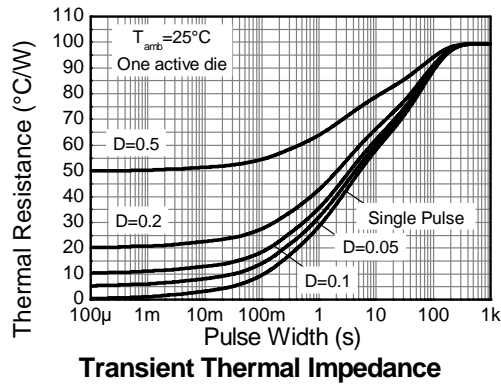
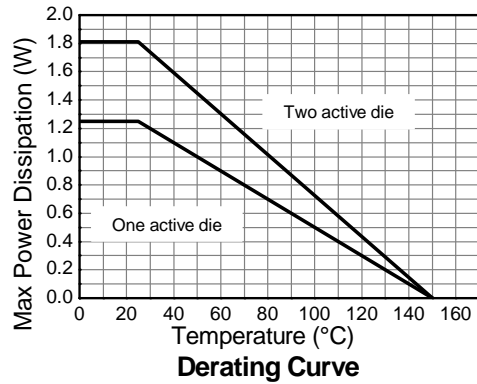
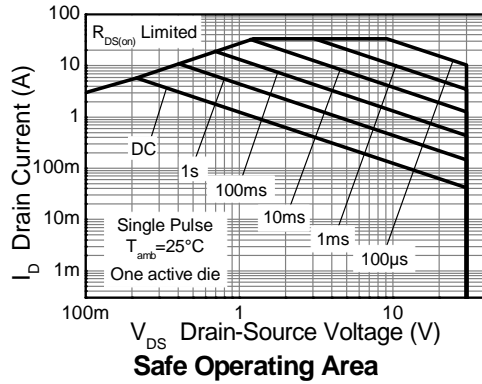
| Characteristic | | Symbol | Value | Unit |
|--|-----------------------|-------------------------------------|-------|------|
| Drain-Source voltage | | V _{DSS} | 30 | V |
| Gate-Source voltage | | V _{GS} | ±20 | V |
| Continuous Drain current | V _{GS} = 10V | (Notes 3 & 5) | 7.2 | A |
| | | T _A = 70°C (Notes 3 & 5) | 5.8 | |
| | | (Notes 2 & 5) | 5.7 | |
| | | (Notes 2 & 6) | 6.8 | |
| Pulsed Drain current | V _{GS} = 10V | I _{DM} | 34 | A |
| Continuous Source current (Body diode) | | I _S | 3.3 | A |
| Pulsed Source current (Body diode) | | I _{SM} | 34 | A |

Thermal Characteristics @T_A = 25°C unless otherwise specified

| Characteristic | | Symbol | Value | Unit |
|---|---------------|-----------------------------------|------------|------------|
| Power dissipation Linear derating factor | (Notes 2 & 5) | P _D | 1.3 | W mW/°C |
| | | | 10.0 | |
| | (Notes 2 & 6) | | 1.8 | |
| | | | 14.3 | |
| Thermal Resistance, Junction to Ambient | (Notes 3 & 5) | R _{θJA} | 2.0 | °C/W |
| | | | 15.9 | |
| | (Notes 2 & 5) | | 100 | |
| | (Notes 2 & 6) | | 70 | |
| Thermal Resistance, Junction to Lead | (Notes 3 & 5) | R _{θJL} | 63 | °C/W |
| | (Notes 5 & 7) | | 53 | |
| Operating and storage temperature range | | T _J , T _{STG} | -55 to 150 | °C |

- Notes:
- For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
 - Same as note (2), except the device is measured at t ≤ 10 sec.
 - Same as note (2), except the device is pulsed with D= 0.02 and pulse width 300 μs. The pulse current is limited by the maximum junction temperature.
 - For a dual device with one active die.
 - For a device with two active die running at equal power.
 - Thermal resistance from junction to solder-point (at the end of the drain lead); the device is operating in a steady-state condition.

Thermal Characteristics

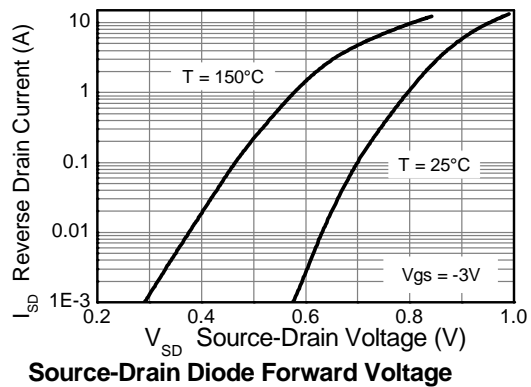
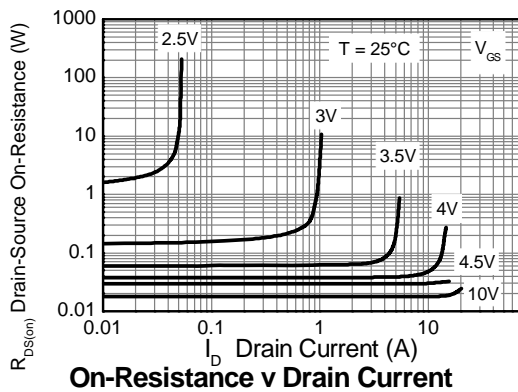
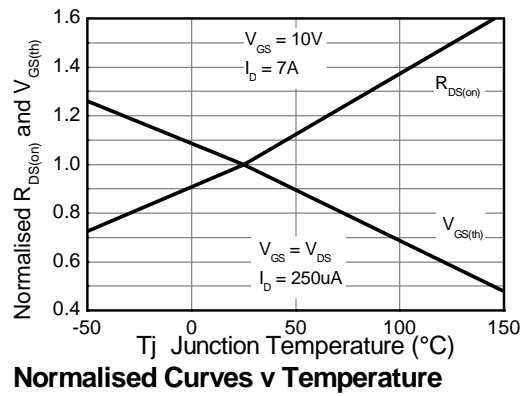
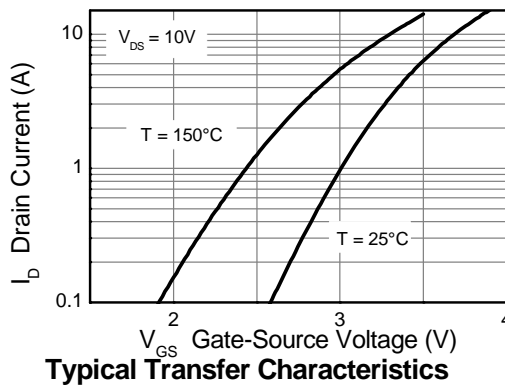
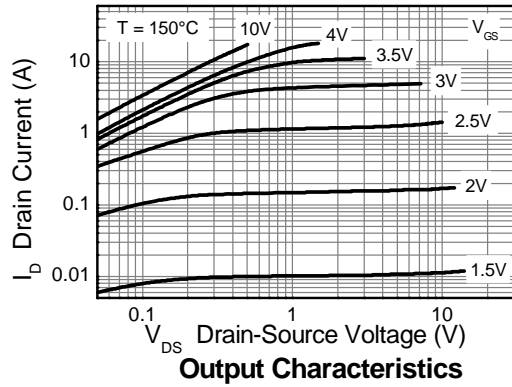
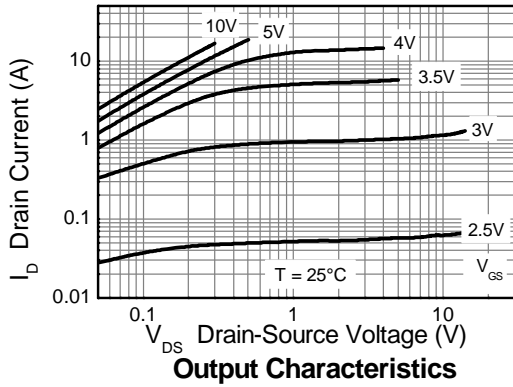


Electrical Characteristics @T_A = 25°C unless otherwise specified

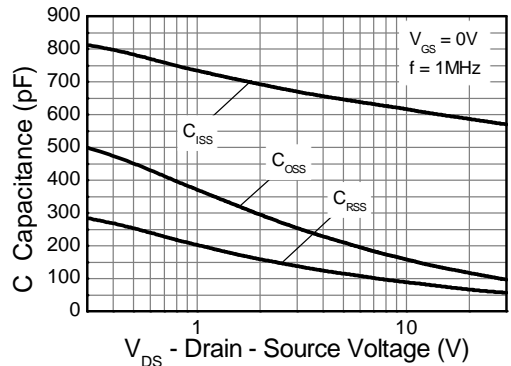
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|---------------------|-----|------|-------|------|--|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 30 | — | — | V | I _D = 250μA, V _{GS} = 0V |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | 0.5 | μA | V _{DS} = 30V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 | nA | V _{GS} = ±20V, V _{DS} = 0V |
| ON CHARACTERISTICS | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | 1.0 | — | 3.0 | V | I _D = 250μA, V _{DS} = V _{GS} |
| Static Drain-Source On-Resistance (Note 8) | R _{DS(ON)} | — | — | 0.024 | Ω | V _{GS} = 10V, I _D = 7.0A |
| | | | | 0.036 | | V _{GS} = 4.5V, I _D = 6.0A |
| Forward Transconductance (Notes 8 & 9) | g _{fs} | — | 16.5 | — | S | V _{DS} = 15V, I _D = 7.1A |
| Diode Forward Voltage (Note 8) | V _{SD} | — | 0.82 | 1.2 | V | I _S = 1.7A, V _{GS} = 0V |
| Reverse recovery time (Note 9) | t _{rr} | — | 12 | — | ns | I _S = 2.2A, di/dt = 100A/μs |
| Reverse recovery charge (Note 9) | Q _{rr} | — | 4.8 | — | nC | |
| DYNAMIC CHARACTERISTICS (Note 9) | | | | | | |
| Input Capacitance | C _{iss} | — | 608 | — | pF | V _{DS} = 15V, V _{GS} = 0V f = 1MHz |
| Output Capacitance | C _{oss} | — | 132 | — | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 71 | — | pF | |
| Total Gate Charge | Q _g | — | 6.3 | — | nC | V _{DS} = 15V, V _{GS} = 4.5V I _D = 7A |
| Total Gate Charge | Q _g | — | 12.9 | — | nC | V _{DS} = 15V, V _{GS} = 10V I _D = 7A |
| Gate-Source Charge | Q _{gs} | — | 2.5 | — | nC | |
| Gate-Drain Charge | Q _{gd} | — | 2.5 | — | nC | |
| Turn-On Delay Time (Note 10) | t _{D(on)} | — | 2.9 | — | ns | V _{DD} = 15V, V _{GS} = 10V I _D = 1A, R _G = 6.0Ω |
| Turn-On Rise Time (Note 10) | t _r | — | 3.3 | — | ns | |
| Turn-Off Delay Time (Note 10) | t _{D(off)} | — | 16 | — | ns | |
| Turn-Off Fall Time (Note 10) | t _f | — | 8 | — | ns | |

- Notes:
8. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%
 9. For design aid only, not subject to production testing.
 10. Switching characteristics are independent of operating junction temperatures.

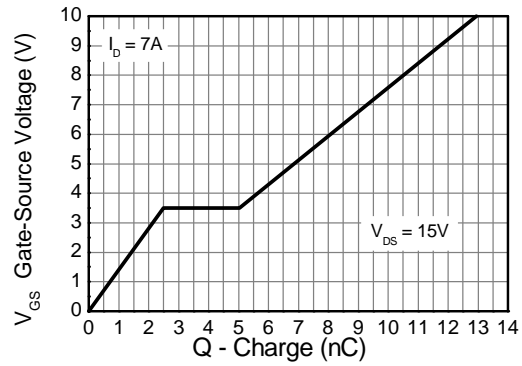
Typical Characteristics



Typical Characteristics - continued

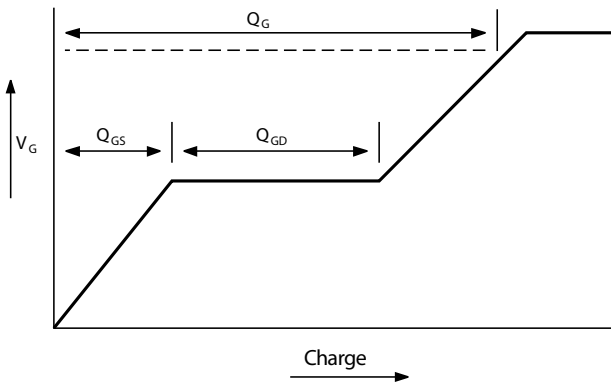


Capacitance v Drain-Source Voltage

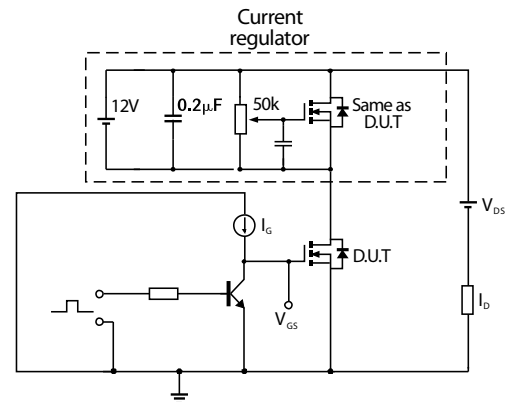


Gate-Source Voltage v Gate Charge

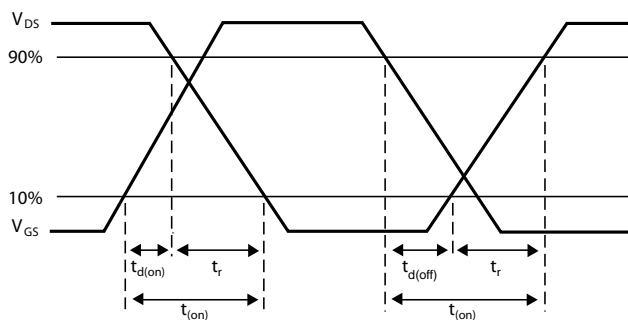
Test Circuits



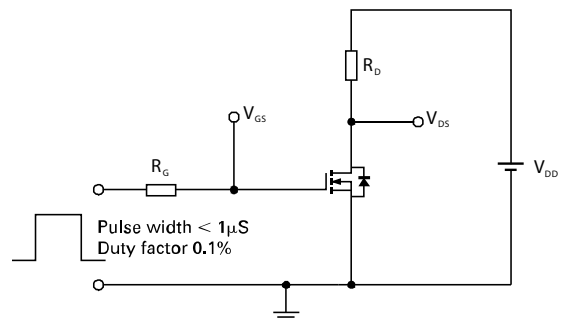
Basic gate charge waveform



Gate charge test circuit

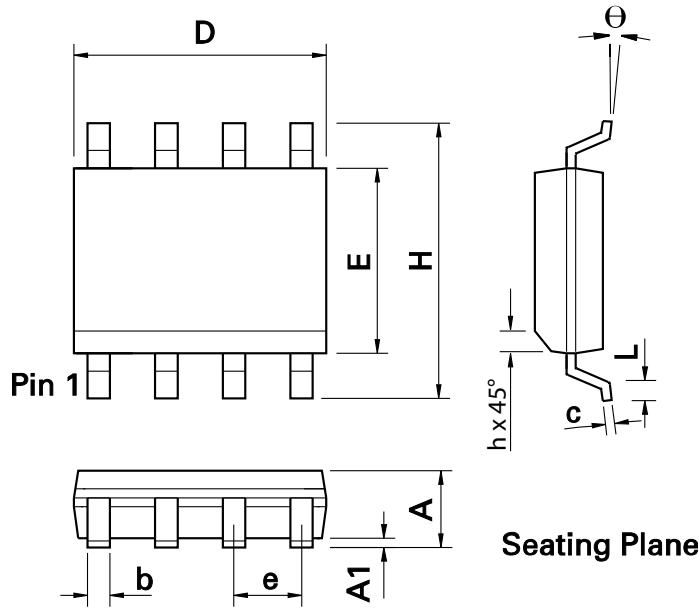


Switching time waveforms



Switching time test circuit

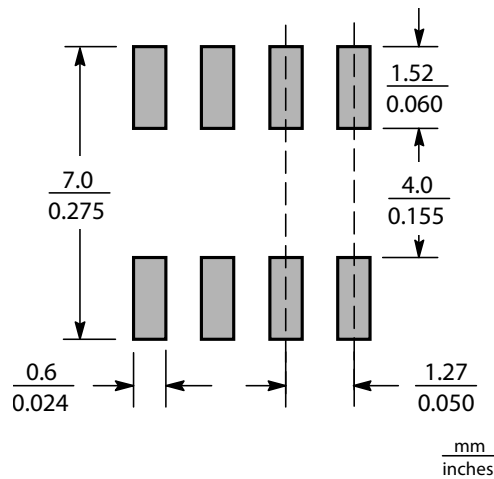
Package Outline Dimensions



Seating Plane

| DIM | Inches | | Millimeters | | DIM | Inches | | Millimeters | |
|-----|--------|-------|-------------|------|-----|-----------|-------|-------------|------|
| | Min. | Max. | Min. | Max. | | Min. | Max. | Min. | Max. |
| A | 0.053 | 0.069 | 1.35 | 1.75 | e | 0.050 BSC | | 1.27 BSC | |
| A1 | 0.004 | 0.010 | 0.10 | 0.25 | b | 0.013 | 0.020 | 0.33 | 0.51 |
| D | 0.189 | 0.197 | 4.80 | 5.00 | c | 0.008 | 0.010 | 0.19 | 0.25 |
| H | 0.228 | 0.244 | 5.80 | 6.20 | θ | 0° | 8° | 0° | 8° |
| E | 0.150 | 0.157 | 3.80 | 4.00 | h | 0.010 | 0.020 | 0.25 | 0.50 |
| L | 0.016 | 0.050 | 0.40 | 1.27 | - | - | - | - | - |

Suggested Pad Layout



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