

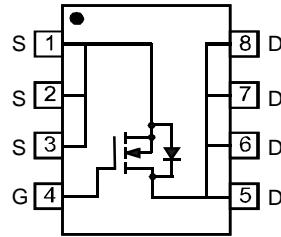
Features

- Low On-Resistance
 - 8mΩ @ V_{GS} = 10V
 - 9mΩ @ V_{GS} = 4.5V
 - 12mΩ @ V_{GS} = 2.5V
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Lead Free By Design/RoHS Compliant (Note 2)**
- **"Green" Device (Note 4)**
- **Qualified to AEC-Q101 Standards for High Reliability**



TOP VIEW

SOP-8L


 TOP VIEW
Internal Schematic

Mechanical Data

- Case: SOP-8L
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- 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
- Marking Information: See Page 4
- Ordering Information: See Page 4
- Weight: 0.072g (approximate)

Maximum Ratings @T_A = 25°C unless otherwise specified

| Characteristic | | | Symbol | Value | Units |
|-------------------------------|--------------|-----------------------|------------------|-------|-------|
| Drain-Source Voltage | | | V _{DSS} | 20 | V |
| Gate-Source Voltage | | | V _{GSS} | ±12 | V |
| Drain Current (Note 1) | Steady State | T _A = 25°C | I _D | 12 | A |
| | | T _A = 70°C | | 9.6 | |
| Pulsed Drain Current (Note 3) | | | I _{DM} | 42 | A |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|-----------------------------------------|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 1) | P _D | 2 | W |
| Thermal Resistance, Junction to Ambient | R _{θJA} | 62.5 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

- Notes:
1. Device mounted on 2 oz, FR-4 PCB, with R_{θJA} = 62.5°C/W
 2. No purposefully added lead.
 3. Pulse width ≤10μS, Duty Cycle ≤1%.
 4. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.

Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|-------------------------------------|--------------|-----|--------------|-----------|------------|------------------------------------------|
| OFF CHARACTERISTICS (Note 5) | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | 20 | — | — | V | $V_{GS} = 0V, I_D = 250\mu A$ |
| Zero Gate Voltage Drain Current | I_{DSS} | — | — | 1 | μA | $V_{DS} = 20V, V_{GS} = 0V$ |
| Gate-Source Leakage | I_{GSS} | — | — | ± 100 | nA | $V_{GS} = \pm 12V, V_{DS} = 0V$ |
| ON CHARACTERISTICS (Note 5) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | 0.5 | — | 1.2 | V | $V_{DS} = V_{GS}, I_D = 250\mu A$ |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | — | — | 8 | m Ω | $V_{GS} = 10V, I_D = 12A$ |
| | | — | — | 9 | | $V_{GS} = 4.5V, I_D = 10A$ |
| | | — | — | 12 | | $V_{GS} = 2.5V, I_D = 8A$ |
| Forward Transconductance | g_{fs} | — | 27 | — | S | $V_{DS} = 5V, I_D = 6.5A$ |
| Diode Forward Voltage (Note 5) | V_{SD} | 0.5 | 0.7 | 1.2 | V | $V_{GS} = 0V, I_S = 3A$ |
| DYNAMIC CHARACTERISTICS | | | | | | |
| Input Capacitance | C_{iss} | — | 2555 | — | pF | $V_{DS} = 10V, V_{GS} = 0V, f = 1.0MHz$ |
| Output Capacitance | C_{oss} | — | 523 | — | pF | |
| Reverse Transfer Capacitance | C_{rss} | — | 496 | — | pF | |
| Gate Resistance | R_G | — | 1.1 | — | Ω | $V_{GS} = 0V, V_{DS} = 0V, f = 1MHz$ |
| SWITCHING CHARACTERISTICS | | | | | | |
| Total Gate Charge | Q_g | — | 28.9 58.3 | — | nC | $V_{DS} = 10V, V_{GS} = 4.5V, I_D = 12A$ |
| Gate-Source Charge | Q_{gs} | — | 3.7 | — | | $V_{DS} = 10V, V_{GS} = 10V, I_D = 12A$ |
| Gate-Drain Charge | Q_{gd} | — | 11.4 | — | | $V_{DS} = 10V, V_{GS} = 10V, I_D = 12A$ |
| | | | | | | $V_{DS} = 10V, V_{GS} = 10V, I_D = 12A$ |

Notes: 5. Short duration pulse test used to minimize self-heating effect.

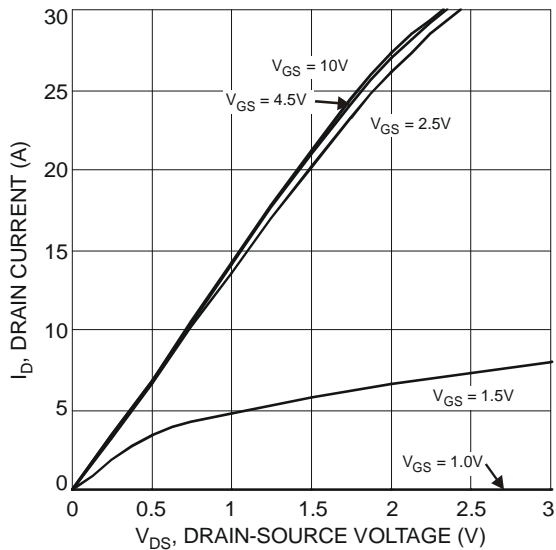


Fig. 1 Typical Output Characteristics

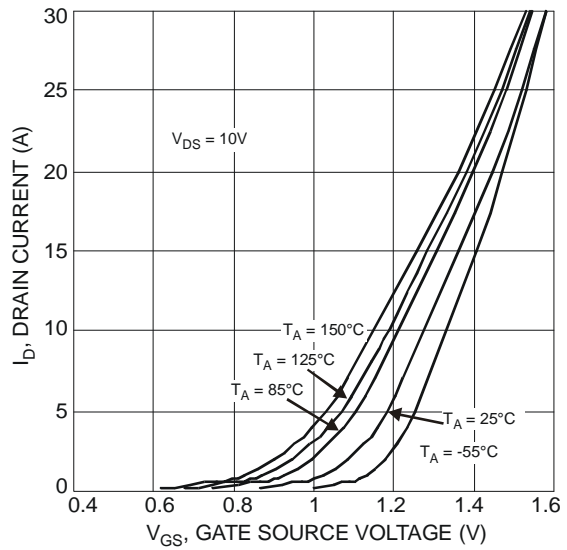


Fig. 2 Typical Transfer Characteristics

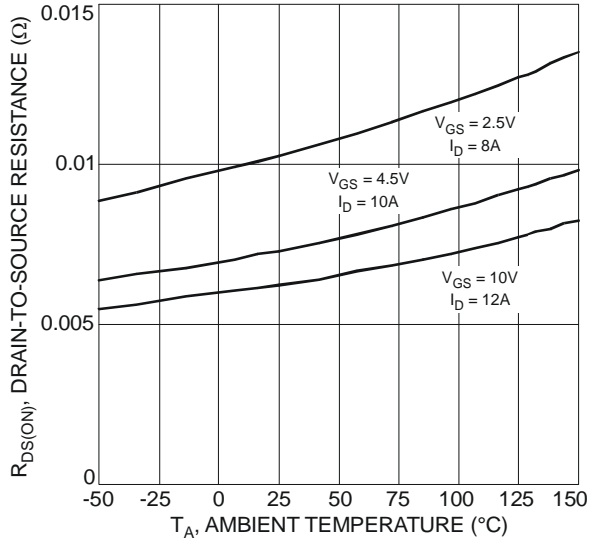


Fig. 3 On-Resistance Variation with Temperature

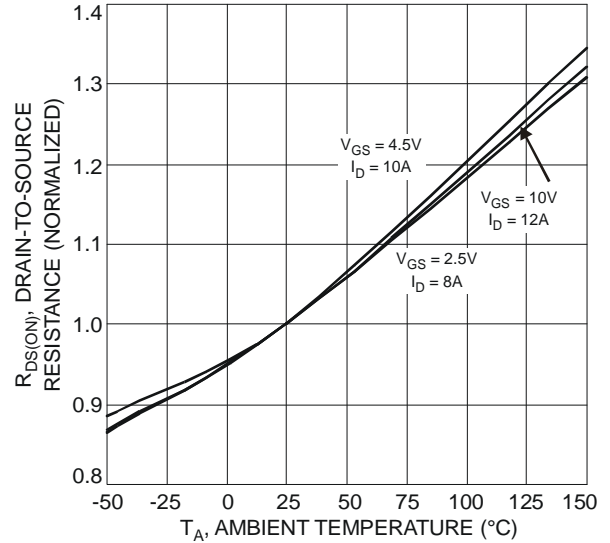


Fig. 4 On-Resistance Variation with Temperature

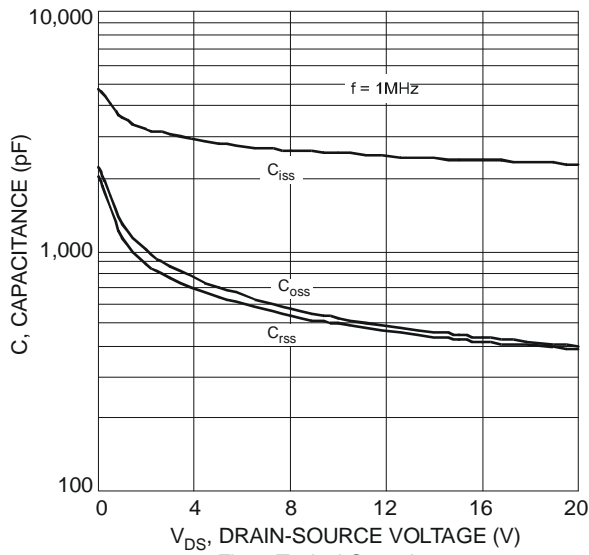


Fig. 5 Typical Capacitance

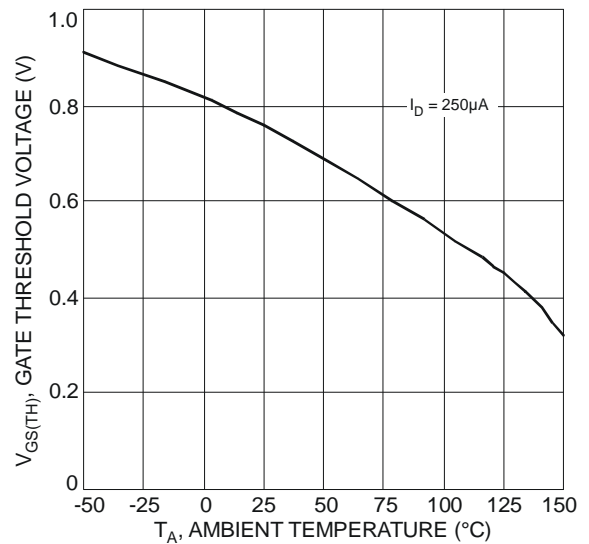


Fig. 6 Gate Threshold Variation vs. Ambient Temperature

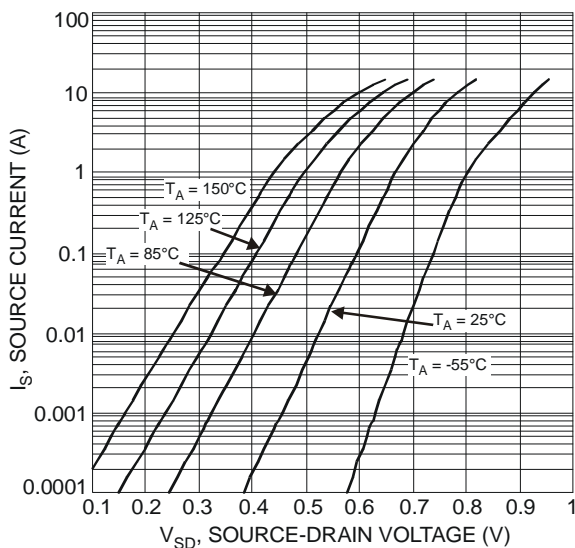


Fig. 7 Diode Forward Voltage vs. Current

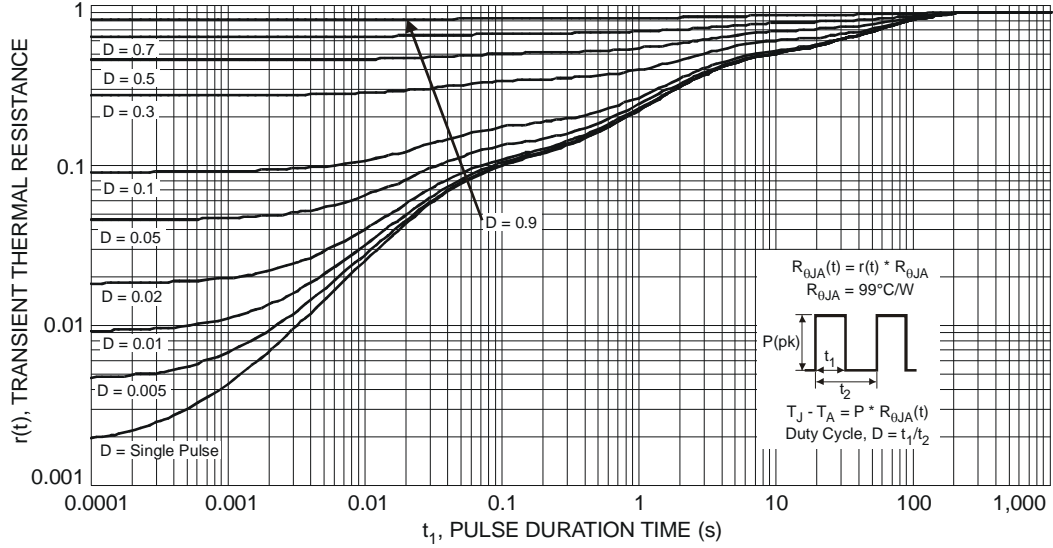


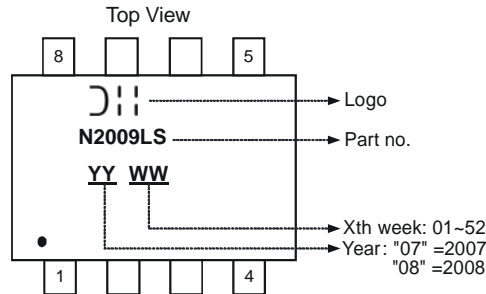
Fig. 8 Transient Thermal Response

Ordering Information (Note 6)

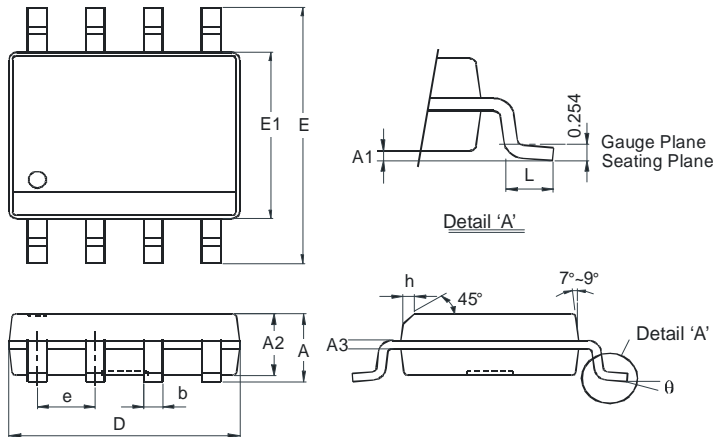
| Part Number | Case | Packaging |
|---------------|--------|------------------|
| DMN2009LSS-13 | SOP-8L | 2500/Tape & Reel |

Notes: 6. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

Marking Information

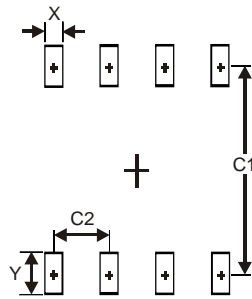


Package Outline Dimensions



| SOP-8L | | |
|----------------------|----------|------|
| Dim | Min | Max |
| A | - | 1.75 |
| A1 | 0.08 | 0.25 |
| A2 | 1.40 | 1.50 |
| A3 | 0.20 Typ | |
| b | 0.3 | 0.5 |
| D | 4.85 | 4.95 |
| E | 5.90 | 6.10 |
| E1 | 3.80 | 3.90 |
| e | 1.27 Typ | |
| h | - | 0.35 |
| L | 0.60 | 0.80 |
| θ | 0° | 8° |
| All Dimensions in mm | | |

Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| X | 0.60 |
| Y | 1.55 |
| C1 | 5.4 |
| C2 | 1.27 |

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