

## Features

- Dual N-Channel MOSFET
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

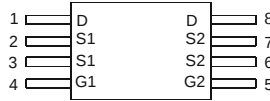
- Case: TSSOP-8L
- Case Material: Molded Plastic, "Green" Molding Compound.  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Marking Information: See Page 4
- Ordering Information: See Page 4
- Weight: 0.039 grams (approximate)



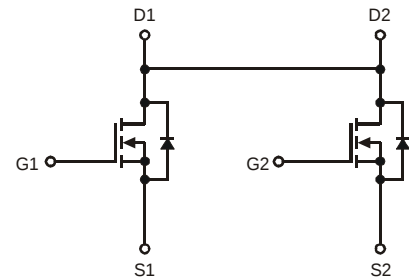
TOP VIEW



BOTTOM VIEW



Top View  
Pin Configuration



Internal Schematic

## Maximum Ratings @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic                    |              |                       | Symbol           | Value | Unit |
|-----------------------------------|--------------|-----------------------|------------------|-------|------|
| Drain-Source Voltage              |              |                       | V <sub>DSS</sub> | 20    | V    |
| Gate-Source Voltage               |              |                       | V <sub>GSS</sub> | ±12   | V    |
| Continuous Drain Current (Note 3) | Steady State | T <sub>A</sub> = 25°C | I <sub>D</sub>   | 6.7   | A    |
|                                   |              | T <sub>A</sub> = 70°C |                  | 4.9   |      |
| Pulsed Drain Current (Note 4)     |              |                       | I <sub>DM</sub>  | 30    | A    |

## Thermal Characteristics

| Characteristic                                                 |  |  | Symbol                            | Value       | Unit |
|----------------------------------------------------------------|--|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 3)                                     |  |  | P <sub>D</sub>                    | 0.89        | W    |
| Thermal Resistance, Junction to Ambient @T <sub>A</sub> = 25°C |  |  | R <sub>θJA</sub>                  | 140         | °C/W |
| Operating and Storage Temperature Range                        |  |  | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

- Notes:
1. No purposefully added lead.
  2. Diodes Inc.'s "Green" policy can be found on our website at [http://www.diodes.com/products/lead\\_free/index.php](http://www.diodes.com/products/lead_free/index.php).
  3. Device mounted on FR-4 PCB with minimum recommended pad layout.
  4. Repetitive rating, pulse width limited by junction temperature.

# Electrical Characteristics @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic                     | Symbol               | Min | Typ  | Max  | Unit | Test Condition                                                                               |
|------------------------------------|----------------------|-----|------|------|------|----------------------------------------------------------------------------------------------|
| OFF CHARACTERISTICS (Note 5)       |                      |     |      |      |      |                                                                                              |
| Drain-Source Breakdown Voltage     | BV <sub>DSS</sub>    | 20  | -    | -    | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA                                                 |
| Zero Gate Voltage Drain Current    | I <sub>DSS</sub>     | -   | -    | 1.0  | μA   | V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V                                                  |
| Gate-Source Leakage                | I <sub>GSS</sub>     | -   | -    | ±100 | nA   | V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0V                                                 |
| ON CHARACTERISTICS (Note 5)        |                      |     |      |      |      |                                                                                              |
| Gate Threshold Voltage             | V <sub>GS(th)</sub>  | 0.5 | -    | 1.2  | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA                                   |
| Static Drain-Source On-Resistance  | R <sub>DS (ON)</sub> | -   | 19   | 26   | mΩ   | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 6.0A                                                |
|                                    |                      |     | 26   | 36   |      | V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 5.2A                                                |
| Forward Transfer Admittance        | Y <sub>fs</sub>      | -   | 8    | -    | S    | V <sub>DS</sub> = 10V, I <sub>D</sub> = 6A                                                   |
| Diodes Forward Voltage             | V <sub>SD</sub>      | -   | 0.7  | 1.2  | V    | I <sub>S</sub> = 1.7A, V <sub>GS</sub> = 0V                                                  |
| DYNAMIC CHARACTERISTICS (Note 6)   |                      |     |      |      |      |                                                                                              |
| Input Capacitance                  | C <sub>ISS</sub>     | -   | 570  | -    | pF   | V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V,<br>f = 1.0MHz                                   |
| Output Capacitance                 | C <sub>OSS</sub>     | -   | 85   | -    | pF   |                                                                                              |
| Reverse Transfer Capacitance       | C <sub>RSS</sub>     | -   | 75   | -    | pF   | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz                                         |
| Gate Resistance                    | R <sub>g</sub>       | -   | 1.23 | -    | Ω    |                                                                                              |
| SWITCHING CHARACTERISTICS (Note 6) |                      |     |      |      |      |                                                                                              |
| Total Gate Charge                  | Q <sub>g</sub>       | -   | 5.2  | -    | nC   | V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 10V,<br>I <sub>D</sub> = 7A                        |
| Gate-Source Charge                 | Q <sub>gs</sub>      | -   | 0.86 | -    | nC   |                                                                                              |
| Gate-Drain Charge                  | Q <sub>gd</sub>      | -   | 1.25 | -    | nC   |                                                                                              |
| Turn-On Delay Time                 | t <sub>D(on)</sub>   | -   | 5.2  | -    | ns   | V <sub>DD</sub> = 10V, V <sub>GS</sub> = 4.5V,<br>R <sub>L</sub> = 1.5Ω, R <sub>G</sub> = 1Ω |
| Turn-On Rise Time                  | t <sub>r</sub>       | -   | 13.5 | -    | ns   |                                                                                              |
| Turn-Off Delay Time                | t <sub>D(off)</sub>  | -   | 19.8 | -    | ns   |                                                                                              |
| Turn-Off Fall Time                 | t <sub>f</sub>       | -   | 6.1  | -    | ns   |                                                                                              |

Notes: 5. Short duration pulse test used to minimize self-heating effects.  
6. Guaranteed by design. Not subject to production testing.

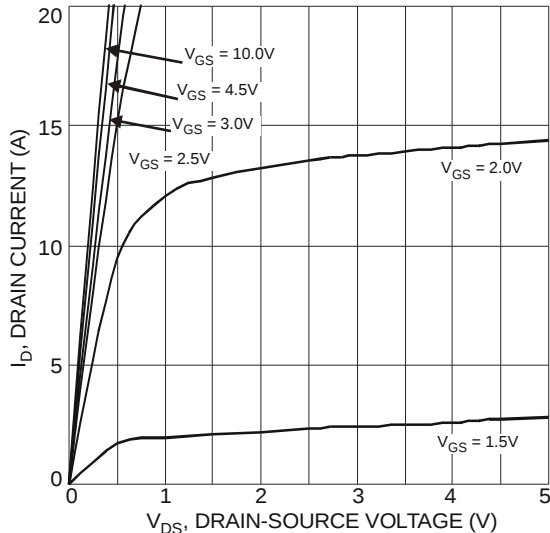


Fig. 1 Typical Output Characteristics

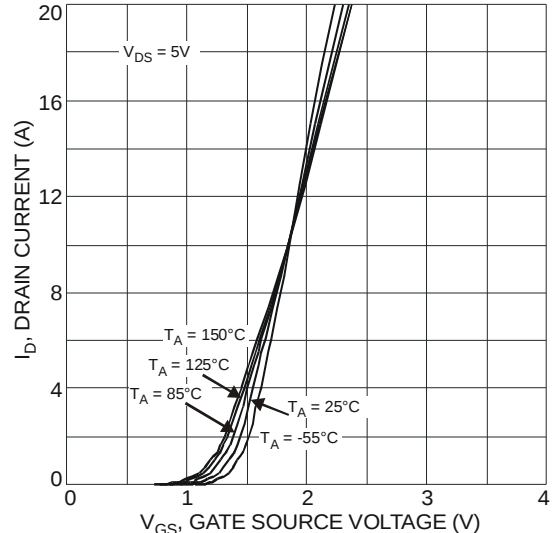


Fig. 2 Typical Transfer Characteristics

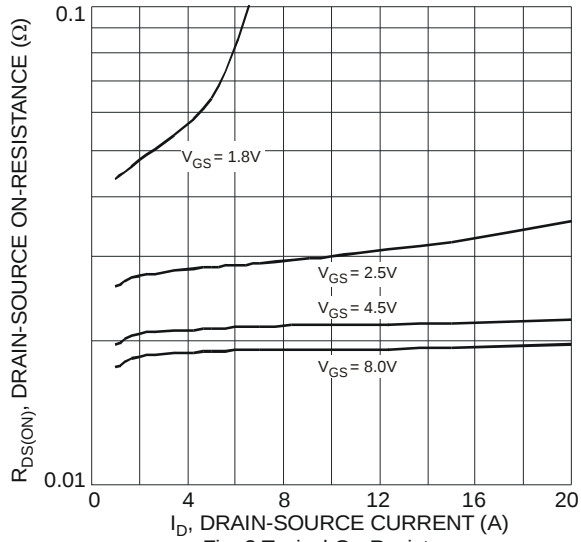


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

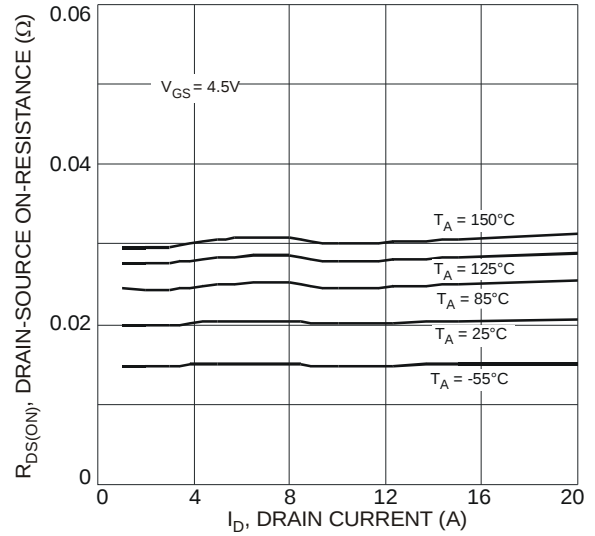


Fig. 4 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

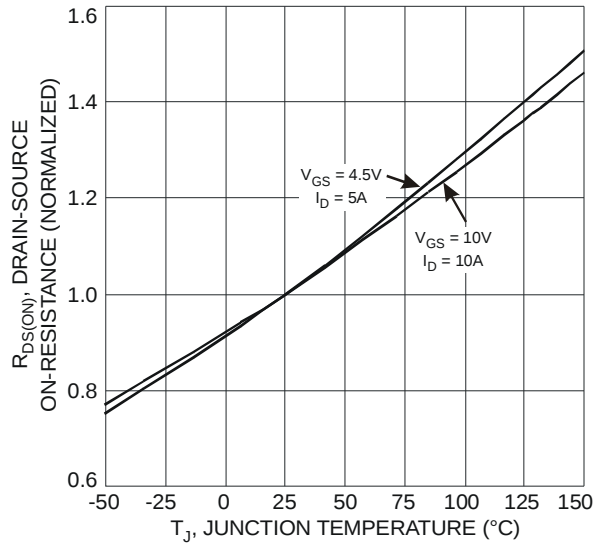


Fig. 5 On-Resistance Variation with Temperature

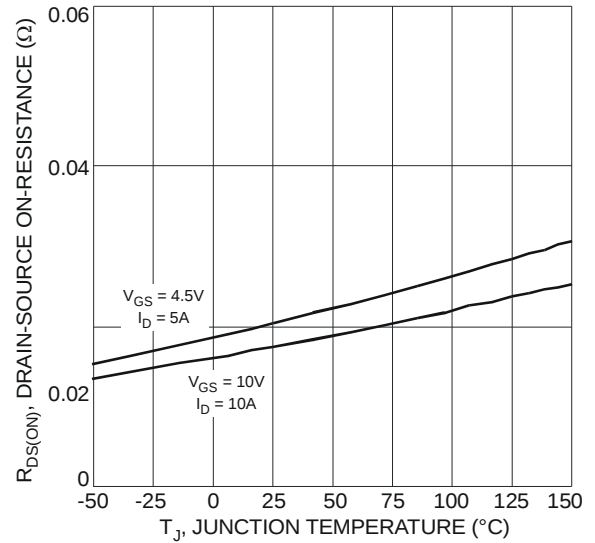


Fig. 6 On-Resistance Variation with Temperature

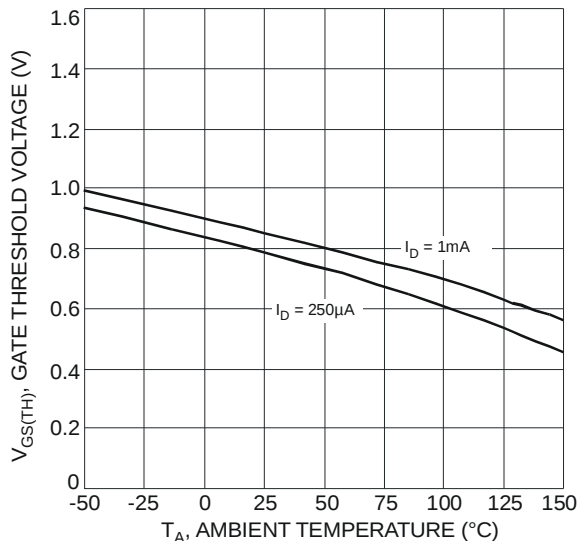


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

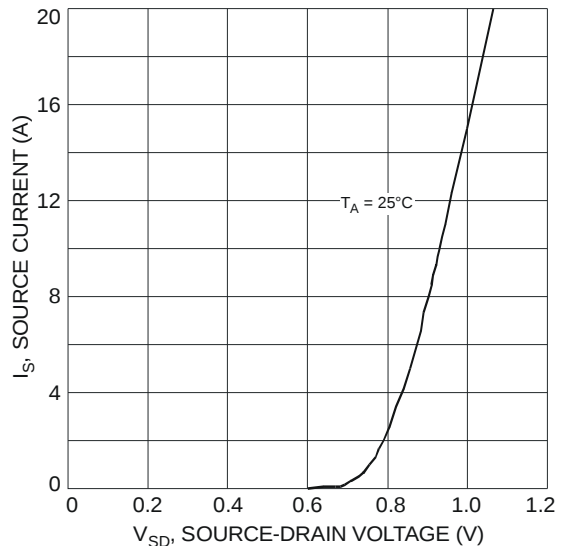


Fig. 8 Diode Forward Voltage vs. Current

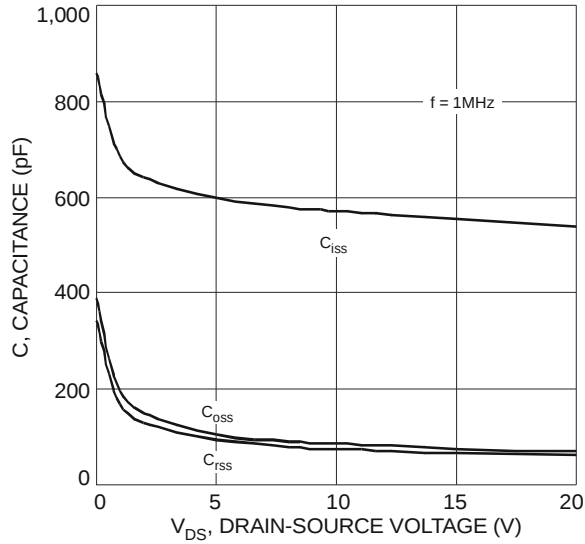


Fig. 9 Typical Capacitance

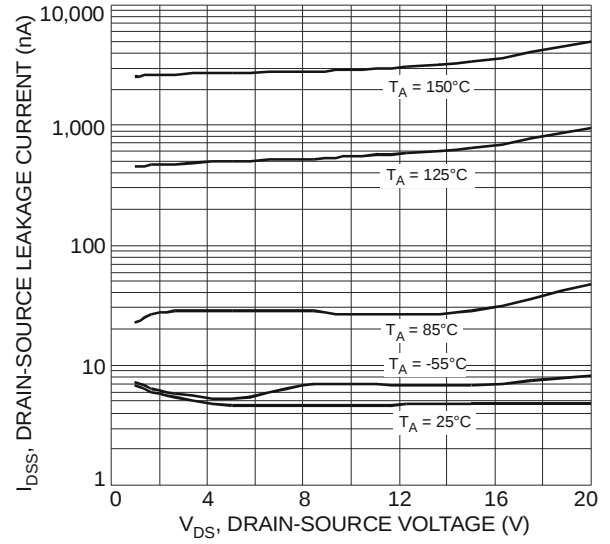


Fig. 10 Typical Drain-Source Leakage Current vs. Drain-Source Voltage

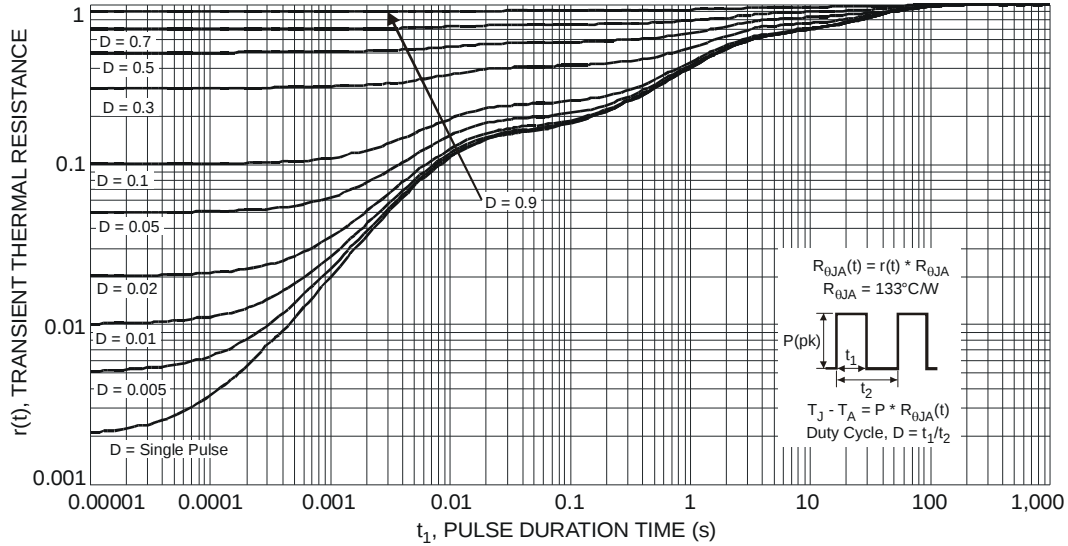


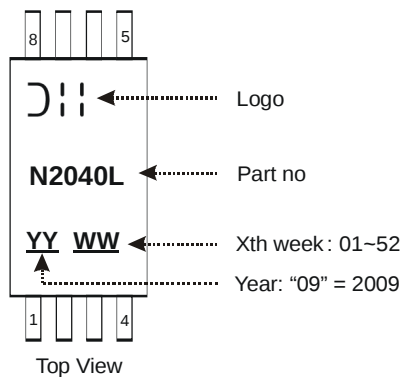
Fig. 11 Transient Thermal Response

## Ordering Information (Note 7)

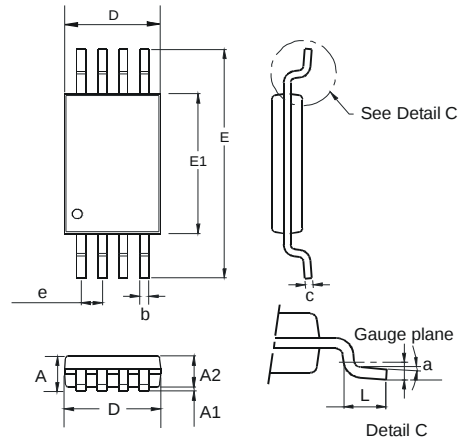
| Part Number   | Case     | Packaging          |
|---------------|----------|--------------------|
| DMN2040LTS-13 | TSSOP-8L | 2500 / Tape & Reel |

Notes: 7. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

## Marking Information

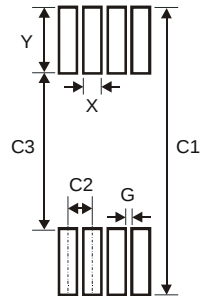


## Package Outline Dimensions



| TSSOP-8L             |       |       |       |
|----------------------|-------|-------|-------|
| Dim                  | Min   | Max   | Typ   |
| a                    | 0.09  | —     | —     |
| A                    | —     | 1.20  | —     |
| A1                   | 0.05  | 0.15  | —     |
| A2                   | 0.825 | 1.025 | 0.925 |
| b                    | 0.19  | 0.30  | —     |
| c                    | 0.09  | 0.20  | —     |
| D                    | 2.90  | 3.10  | 3.025 |
| e                    | —     | —     | 0.65  |
| E                    | —     | —     | 6.40  |
| E1                   | 4.30  | 4.50  | 4.425 |
| L                    | 0.45  | 0.75  | 0.60  |
| All Dimensions in mm |       |       |       |

## Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| X          | 0.45          |
| Y          | 1.78          |
| C1         | 7.72          |
| C2         | 0.65          |
| C3         | 4.16          |
| G          | 0.20          |

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