



**THE DATASHEET OF
DMN2040LTS-13**



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

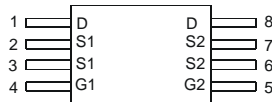
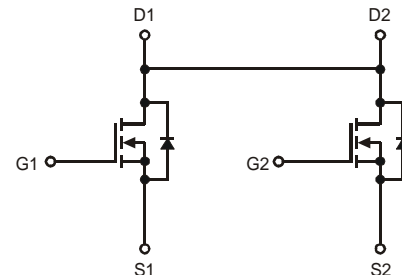
- Case: TSSOP-8L
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Marking Information: See Page 4
- Ordering Information: See Page 4
- Weight: 0.039 grams (approximate)



TOP VIEW



BOTTOM VIEW


 Top View
Pin Configuration


Internal Schematic

Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | | | Symbol | Value | Unit |
|-----------------------------------|--------------|--------------------------|-----------|----------|------|
| Drain-Source Voltage | | | V_{DSS} | 20 | V |
| Gate-Source Voltage | | | V_{GSS} | ± 12 | V |
| Continuous Drain Current (Note 3) | Steady State | $T_A = 25^\circ\text{C}$ | I_D | 6.7 | A |
| | | $T_A = 70^\circ\text{C}$ | | 4.9 | |
| Pulsed Drain Current (Note 4) | | | I_{DM} | 30 | A |

Thermal Characteristics

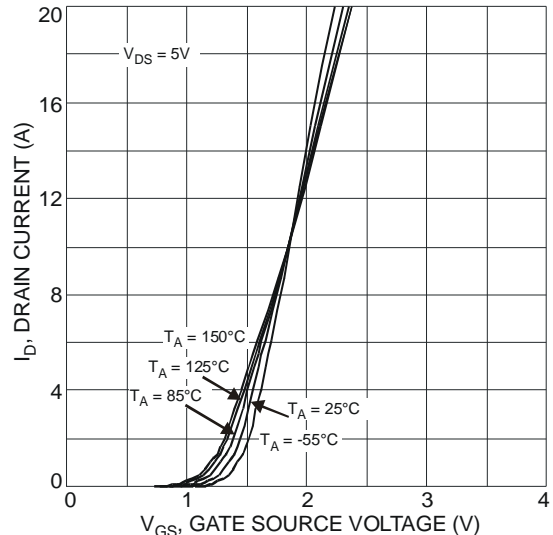
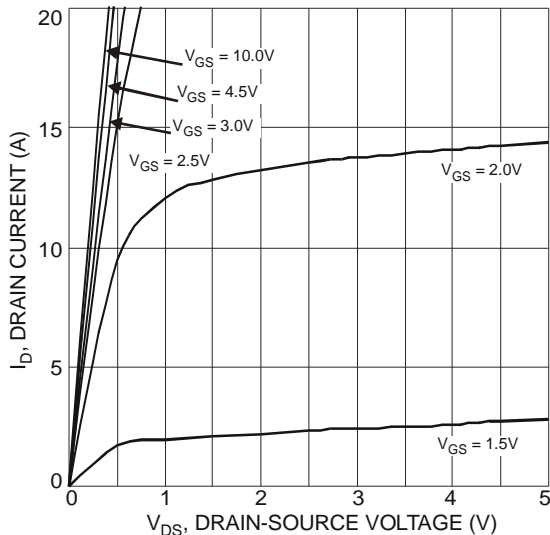
| Characteristic | | | Symbol | Value | Unit |
|--|--|--|-----------------|-------------|--------------------|
| Power Dissipation (Note 3) | | | P_D | 0.89 | W |
| Thermal Resistance, Junction to Ambient @ $T_A = 25^\circ\text{C}$ | | | $R_{\theta JA}$ | 140 | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range | | | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

- 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.
 3. Device mounted on FR-4 PCB with minimum recommended pad layout.
 4. Repetitive rating, pulse width limited by junction temperature.

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} | - | - | 1.0 | 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 | $R_{DS(on)}$ | - | 19 | 26 | m Ω | $V_{GS} = 4.5V, I_D = 6.0A$ |
| | | | 26 | 36 | | $V_{GS} = 2.5V, I_D = 5.2A$ |
| Forward Transfer Admittance | $ Y_{fs} $ | - | 8 | - | S | $V_{DS} = 10V, I_D = 6A$ |
| Diodes Forward Voltage | V_{SD} | - | 0.7 | 1.2 | V | $I_S = 1.7A, V_{GS} = 0V$ |
| DYNAMIC CHARACTERISTICS (Note 6) | | | | | | |
| Input Capacitance | C_{iss} | - | 570 | - | pF | $V_{DS} = 10V, V_{GS} = 0V, f = 1.0MHz$ |
| Output Capacitance | C_{oss} | - | 85 | - | pF | |
| Reverse Transfer Capacitance | C_{rss} | - | 75 | - | pF | |
| Gate Resistance | R_g | - | 1.23 | - | Ω | $V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$ |
| SWITCHING CHARACTERISTICS (Note 6) | | | | | | |
| Total Gate Charge | Q_g | - | 5.2 | - | nC | $V_{GS} = 4.5V, V_{DS} = 10V, I_D = 7A$ |
| Gate-Source Charge | Q_{gs} | - | 0.86 | - | nC | |
| Gate-Drain Charge | Q_{gd} | - | 1.25 | - | nC | |
| Turn-On Delay Time | $t_{D(on)}$ | - | 5.2 | - | ns | $V_{DD} = 10V, V_{GS} = 4.5V, R_L = 1.5\Omega, R_G = 1\Omega$ |
| Turn-On Rise Time | t_r | - | 13.5 | - | ns | |
| Turn-Off Delay Time | $t_{D(off)}$ | - | 19.8 | - | ns | |
| Turn-Off Fall Time | t_f | - | 6.1 | - | ns | |

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



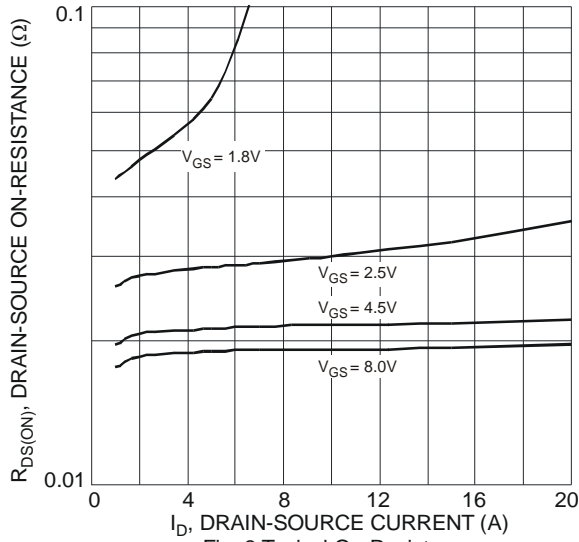


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

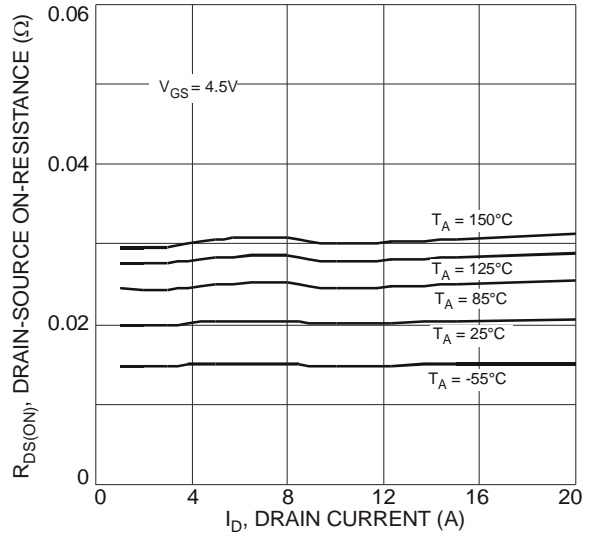


Fig. 4 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

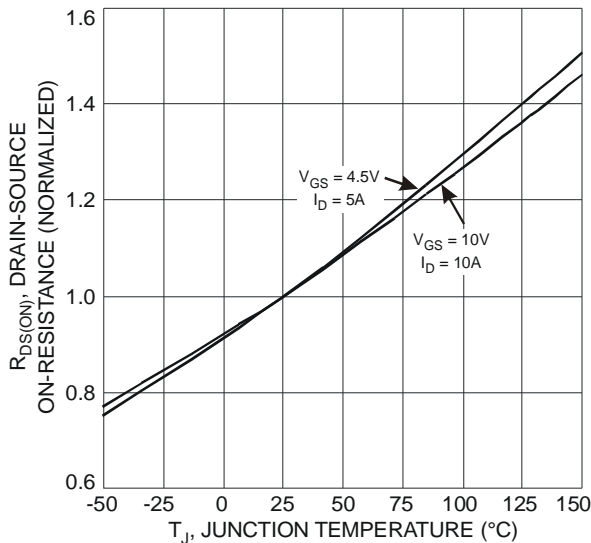


Fig. 5 On-Resistance Variation with Temperature

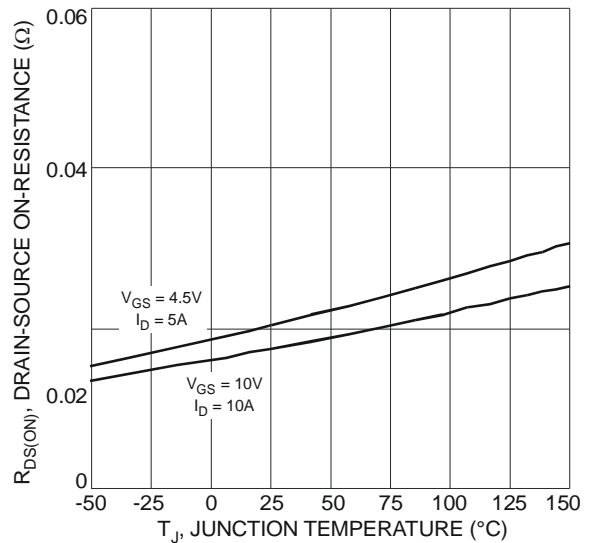


Fig. 6 On-Resistance Variation with Temperature

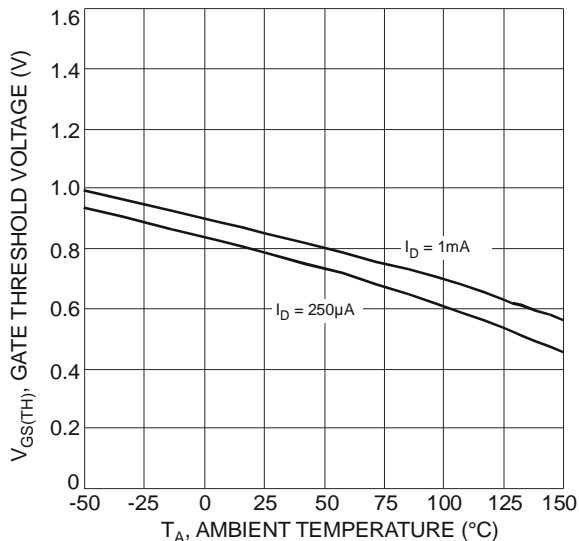


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

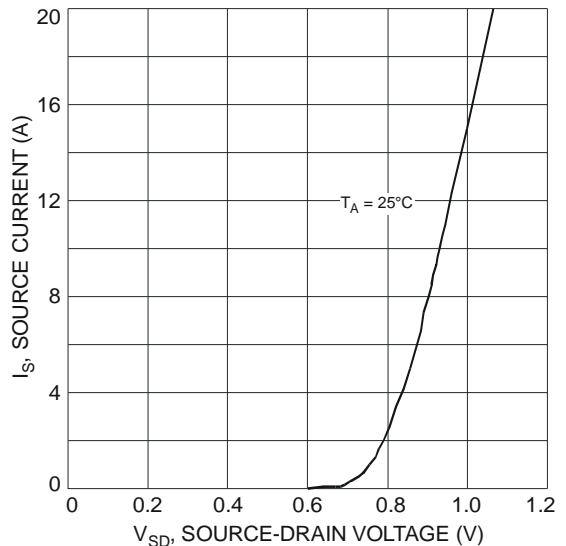
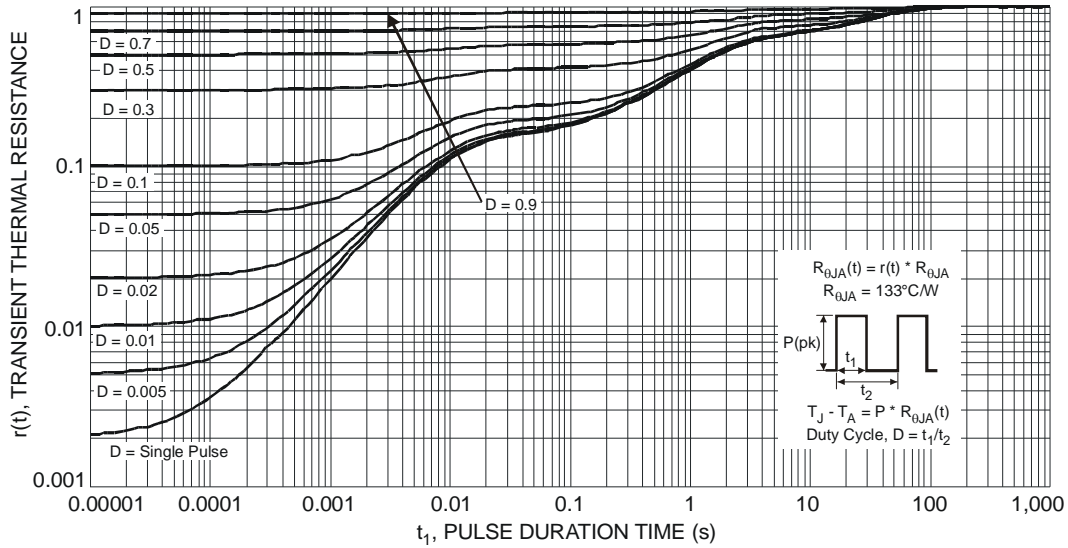
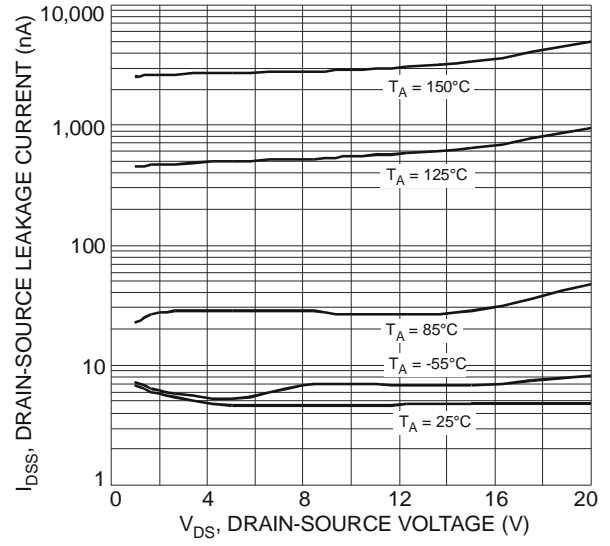
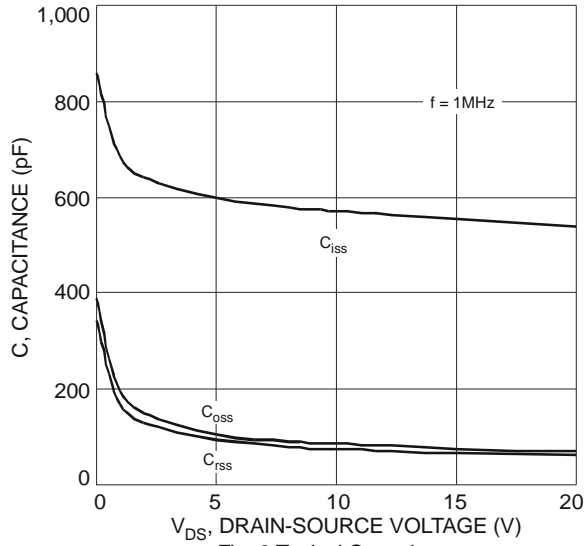


Fig. 8 Diode Forward Voltage vs. Current

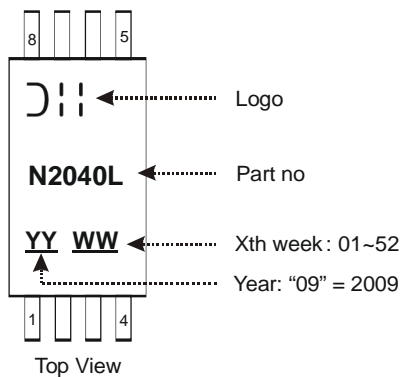


Ordering Information (Note 7)

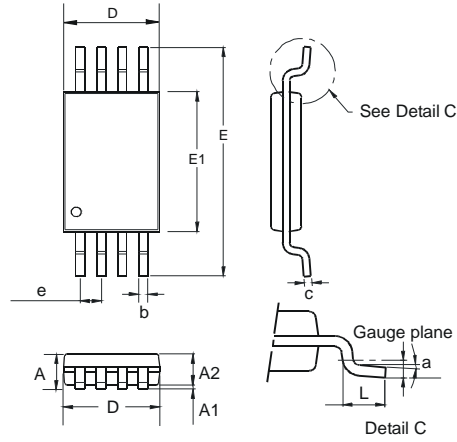
| Part Number | Case | Packaging |
|---------------|----------|--------------------|
| DMN2040LTS-13 | TSSOP-8L | 2500 / Tape & Reel |

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

Marking Information

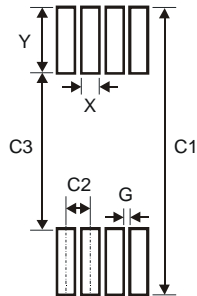


Package Outline Dimensions



| 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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