# DMN3404L

**N-CHANNEL ENHANCEMENT MODE MOSFET**

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ max | $I_D$ max $T_A$ = +25°C |
|---|---|---|
| 30V | 28mΩ @ $V_{GS}$ = 10V | 5.8A |
| | 42mΩ @ $V_{GS}$ = 4.5V | 4.8A |
| | 82mΩ @ $V_{GS}$ = 3V | 2.0A |

## Description

This 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.

## Applications

- Battery Charging
- Power Management Functions
- DC-DC Converters
- Portable Power Adaptors

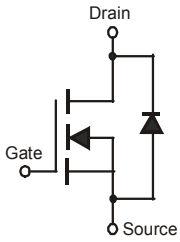
## Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

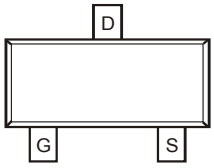
## Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 e3
- Terminals Connections: See Diagram Below
- Weight: 0.008 grams (approximate)

Top View




Internal Schematic




Top View

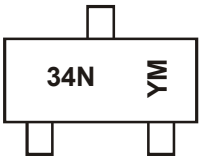
## Ordering Information (Note 4 & 5)

| Part Number | Compliance | Case | Packaging |
|---|---|---|---|
| DMN3404L-7 | Standard | SOT23 | 3000/Tape & Reel |
| DMN3404LQ-7 | Automotive | SOT23 | 3000/Tape & Reel |

Notes: 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.

2. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

## Marking Information




34N = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: W = 2009)
M = Month (ex: 9 = September)

Date Code Key

| Year | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|
| Code | W | X | Y | Z | A | B | C |

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | O | N | D |

## Maximum Ratings (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | | | Symbol | Value | Units |
|---|---|---|---|---|---|
| **Drain-Source Voltage (Note 6 & 7)** | | | **VDSS** | **30** | **V** |
| **Gate-Source Voltage** | | | **VGSS** | **±20** | **V** |
| Continuous Drain Current (Note 6) $V_{GS}$ = 10V | Steady State | $T_A$ = -40°C<br>$T_A$ = +25°C<br>$T_A$ = +85°C | $I_D$ | 4.6<br>4.2<br>3.0 | A |
| Continuous Drain Current (Note 7) $V_{GS}$ = 10V | Steady State | $T_A$ = -40°C<br>$T_A$ = +25°C<br>$T_A$ = +85°C | $I_D$ | 6.2<br>5.8<br>4.0 | A |
| Continuous Drain Current (Note 7) $V_{GS}$ = 4.5V | Steady State | $T_A$ = -40°C<br>$T_A$ = +25°C<br>$T_A$ = +85°C | $I_D$ | 5.2<br>4.8<br>3.2 | A |
| Continuous Drain Current (Note 7) $V_{GS}$ = 3V | Steady State | $T_A$ = -40°C<br>$T_A$ = +25°C<br>$T_A$ = +85°C | $I_D$ | 2.2<br>2.0<br>1.0 | A |
| Pulsed Drain Current | | | $I_{DM}$ | 30 | A |

## Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Power Dissipation (Note 6) | $P_D$ | 0.72 | W |
| Thermal Resistance, Junction to Ambient @$T_A$ = +25°C | $R_{\theta JA}$ | 173 | °C/W |
| Power Dissipation (Note 7) | $P_D$ | 1.4 | W |
| Thermal Resistance, Junction to Ambient @$T_A$ = +25°C | $R_{\theta JA}$ | 90 | °C/W |
| Operating and Storage Temperature Range | $T_J$, $T_{STG}$ | -55 to +150 | °C |

Notes: 3. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
4. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.

## Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS (Note 8)** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | 30 | — | — | V | $V_{GS}$ = 0V, $I_D$ = 250μA |
| Zero Gate Voltage Drain Current $T_J$ = +25°C | $I_{DSS}$ | — | — | 1.0 | μA | $V_{DS}$ = 30V, $V_{GS}$ = 0V |
| Gate-Source Leakage | $I_{GSS}$ | — | — | ±100 | nA | $V_{GS}$ = ±20V, $V_{DS}$ = 0V |
| **ON CHARACTERISTICS (Note 8 )** | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | 1.0 | 1.5 | 2.0 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA |
| Static Drain-Source On-Resistance $T_J$ = -40°C **(Note 9)** | $R_{DS(ON)}$ | — | 23 | 27 | — | $V_{GS}$ = 4.5V, $I_D$ = 4.8A |
| | | — | 57 | 74 | — | $V_{GS}$=3V, $I_D$ =2A |
| Static Drain-Source On-Resistance $T_J$ = +25°C | $R_{DS(ON)}$ | — | 24 | 28 | mΩ | $V_{GS}$ = 10V, $I_D$ = 5.8A |
| | | — | 33 | 42 | | $V_{GS}$ = 4.5V, $I_D$ = 4.8A |
| | | — | 63 | 82 | | $V_{GS}$=3V, $I_D$ =2A |
| Static Drain-Source On-Resistance $T_J$ = +85°C **(Note 9)** | $R_{DS(ON)}$ | — | 71 | 95 | mΩ | $V_{GS}$=3V, $I_D$ =2A |
| Forward Transfer Admittance | $\|Y_{fs}\|$ | — | 10 | — | S | $V_{DS}$ = 5V, $I_D$ = 5.8A |
| Diode Forward Voltage | $V_{SD}$ | — | 0.75 | 1.0 | V | $V_{GS}$ = 0V, $I_S$ = 1A |
| **DYNAMIC CHARACTERISTICS (Note 10)** | | | | | | |
| Input Capacitance | $C_{iss}$ | — | 498 | — | pF | $V_{DS}$ = 15V, $V_{GS}$ = 0V, f = 1.0MHz |
| Output Capacitance | $C_{oss}$ | — | 52 | — | pF | |
| Reverse Transfer Capacitance | $C_{rss}$ | — | 45 | — | pF | |
| Gate Resistance | $R_g$ | — | 1.75 | 2.8 | Ω | $V_{DS}$ = 0V, $V_{GS}$ = 0V, f = 1MHz |
| Total Gate Charge ($V_{GS}$ = 3V) | $Q_g$ | — | 3.8 | 5.3 | nC | $V_{GS}$ = 3V, $V_{DS}$ = 15V, $I_D$ = 1A |
| Total Gate Charge ($V_{GS}$ = 4.5V) | $Q_g$ | — | 5.3 | 7.5 | nC | $V_{GS}$ = 10V/4.5V, $V_{DS}$ = 15V, $I_D$ = 5.8A |
| Total Gate Charge ($V_{GS}$ = 10V) | $Q_g$ | — | 11.3 | 16 | nC | |
| Gate-Source Charge | $Q_{gs}$ | — | 1.4 | — | nC | |
| Gate-Drain Charge | $Q_{gd}$ | — | 2.1 | — | nC | |
| Turn-On Delay Time | $t_{D(on)}$ | — | 3.41 | 10 | ns | $V_{DD}$ = 15V, $V_{GS}$ = 10V, $R_L$ = 2.6Ω, $R_G$ = 3Ω |
| Turn-On Rise Time | $t_r$ | — | 6.18 | 13 | ns | |
| Turn-Off Delay Time | $t_{D(off)}$ | — | 13.92 | 28 | ns | |
| Turn-Off Fall Time | $t_f$ | — | 2.84 | 10 | ns | |

Notes: 5. Short duration pulse test used to minimize self-heating effect.
6. Guaranteed by design and 25°C data. Not subject to production testing
7. Guaranteed by design. Not subject to production testing.