

## Product Summary

| BV <sub>DSS</sub> | R <sub>D(S)</sub>             | I <sub>D</sub><br>T <sub>A</sub> = +25°C |
|-------------------|-------------------------------|--|
| 60V               | 2Ω @ V <sub>GS</sub> = 4V     | 407mA                                    |
|                   | 2.5Ω @ V <sub>GS</sub> = 2.5V | 364mA                                    |

## Description and Applications

This new generation MOSFET is designed to minimize the on-state resistance (R<sub>D(S)</sub>) yet maintain superior switching performance, which makes it ideal for high-efficiency power management applications.

- DC-DC Converters
- Power Management Functions
- Battery Operated Systems and Solid-State Relays

## Features and Benefits

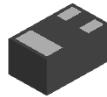
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- ESD Protected**
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**

## Mechanical Data

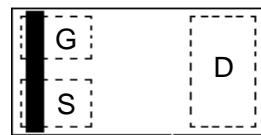
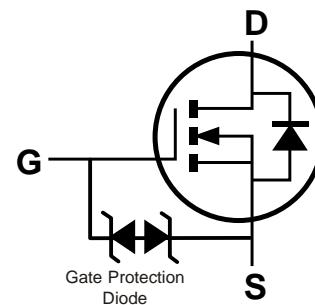
- Case: X1-DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish—NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 <sup>(e4)</sup>
- Weight: 0.001 grams (Approximate)



X1-DFN1006-3



Bottom View

Top View  
Pin-Out

Equivalent Circuit

## Ordering Information (Note 4)

| Part Number   | Marking | Reel Size (inches) | Tape Width (mm) | Quantity Per Reel |
|---------------|---------|--------------------|-----------------|-------------------|
| DMN62D1LFB-7B | NQ      | 7                  | 8               | 10,000            |

Notes:

- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
- See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
- Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
- For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information

|               |  |                        |
|---------------|--|------------------------|
| DMN62D1LFB-7B | <p>Top View<br/>Bar Denotes Gate and Source Side</p> | NQ = Part Marking Code |
|               |  |                        |

**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic   |              |  | Symbol    | Value      | Unit |
|--|--------------|--|-----------|------------|------|
| Drain-Source Voltage                                   |              |  | $V_{DSS}$ | 60         | V    |
| Gate-Source Voltage                                    |              |  | $V_{GSS}$ | $\pm 20$   | V    |
| Continuous Drain Current (Note 5) $V_{GS} = 4\text{V}$ | Steady State | $T_A = +25^\circ\text{C}$<br>$T_A = +70^\circ\text{C}$ | $I_D$     | 407<br>325 | mA   |
| Pulsed Drain Current (Note 6)                          |              |  | $I_{DM}$  | 1          | A    |

**Thermal Characteristics**

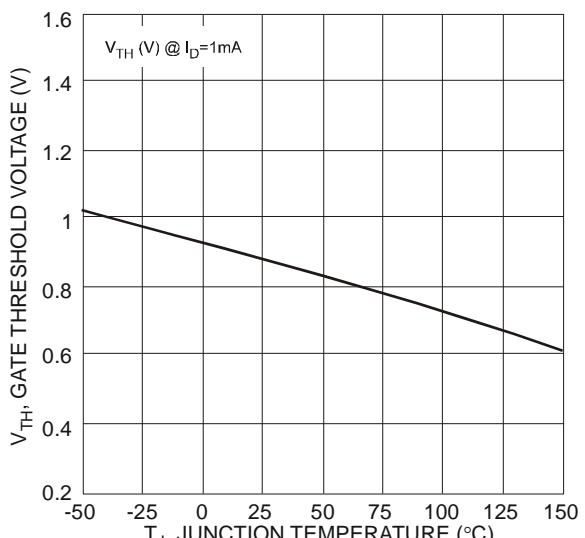
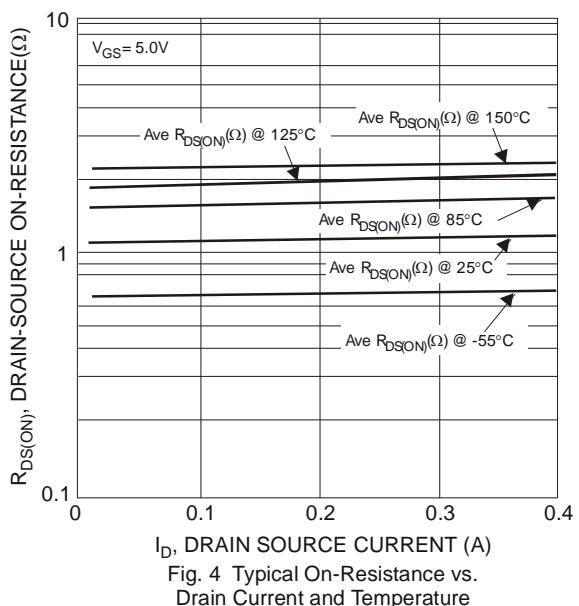
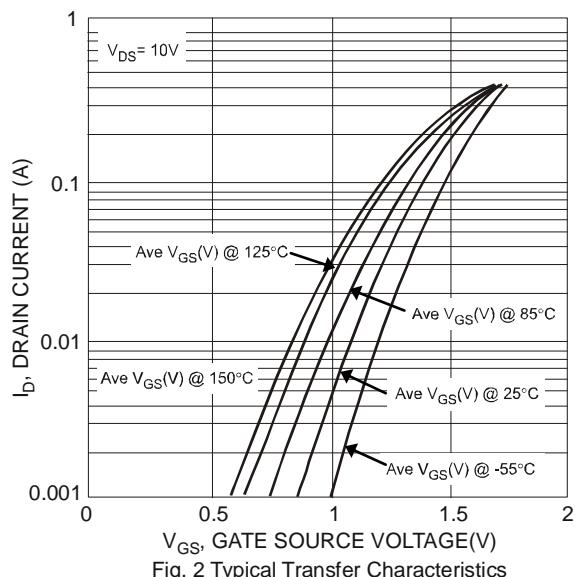
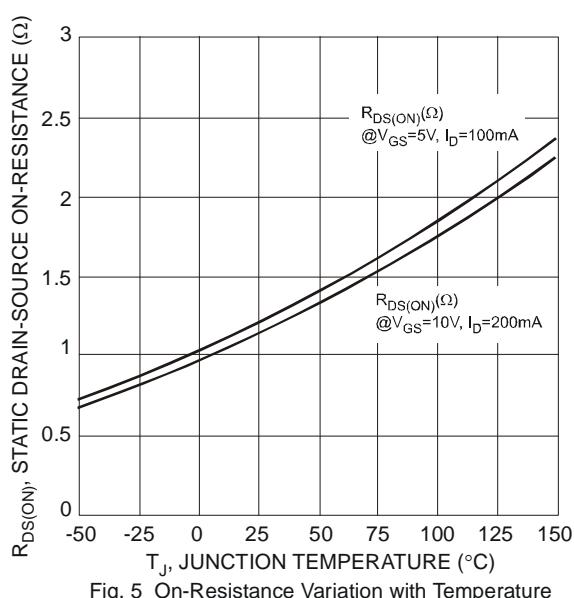
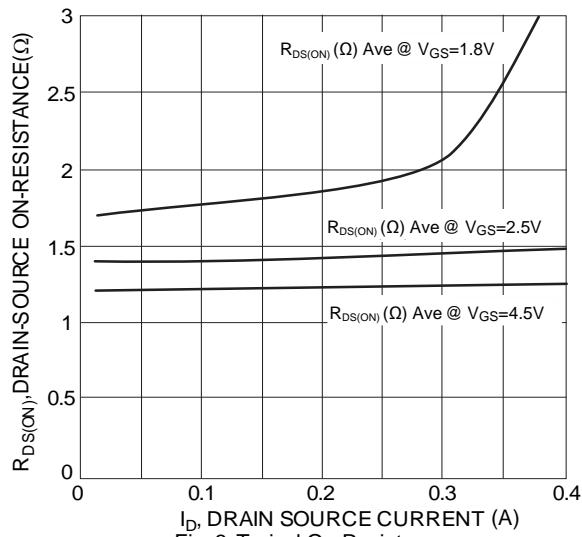
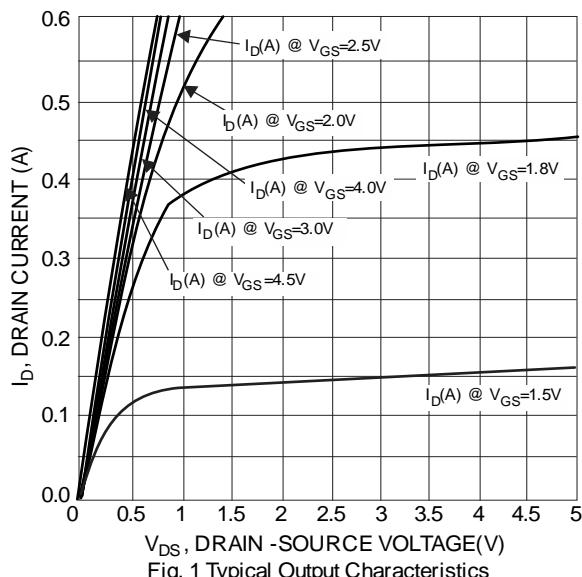
| Characteristic   | Symbol          | Max         | Unit                      |
|--|-----------------|-------------|---------------------------|
| Power Dissipation (Note 5)   | $P_D$           | 0.5         | W                         |
| Thermal Resistance, Junction to Ambient @ $T_A = +25^\circ\text{C}$ (Note 5) | $R_{\Theta JA}$ | 251         | $^\circ\text{C}/\text{W}$ |
| Operating and Storage Temperature Range                                      | $T_J, T_{STG}$  | -55 to +150 | $^\circ\text{C}$          |

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise stated.)

| Characteristic  | Symbol       | Min | Typ  | Max       | Unit          | Test Condition  |
|---|--------------|-----|------|-----------|---------------|---|
| <b>OFF CHARACTERISTICS (Note 7)</b>                       |              |     |      |           |               |   |
| Drain-Source Breakdown Voltage                            | $BV_{DSS}$   | 60  | —    | —         | V             | $V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$  |
| Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$ | $I_{DSS}$    | —   | —    | 1.0       | $\mu\text{A}$ | $V_{DS} = 60\text{V}, V_{GS} = 0\text{V}$   |
| Gate-Source Leakage                                       | $I_{GSS}$    | —   | —    | $\pm 100$ | nA            | $V_{GS} = \pm 5\text{V}, V_{DS} = 0\text{V}$  |
|   |              | —   | —    | $\pm 500$ | nA            | $V_{GS} = \pm 10\text{V}, V_{DS} = 0\text{V}$   |
|   |              | —   | —    | $\pm 2.0$ | $\mu\text{A}$ | $V_{GS} = \pm 15\text{V}, V_{DS} = 0\text{V}$   |
| <b>ON CHARACTERISTICS (Note 7)</b>                        |              |     |      |           |               |   |
| Gate Threshold Voltage                                    | $V_{GS(TH)}$ | 0.6 | —    | 1.0       | V             | $V_{DS} = V_{GS}, I_D = 250\mu\text{A}$   |
| Static Drain-Source On-Resistance                         | $R_{DS(ON)}$ | —   | 1.3  | 2         | $\Omega$      | $V_{GS} = 4\text{V}, I_D = 100\text{mA}$  |
|   |              | —   | 1.5  | 2.5       |               | $V_{GS} = 2.5\text{V}, I_D = 50\text{mA}$   |
|   |              | —   | 1.9  | 3         |               | $V_{GS} = 1.8\text{V}, I_D = 50\text{mA}$   |
| Diode Forward Voltage                                     | $V_{SD}$     | —   | 0.9  | 1.3       | V             | $V_{GS} = 0\text{V}, I_S = 115\text{mA}$  |
| <b>DYNAMIC CHARACTERISTICS (Note 8)</b>                   |              |     |      |           |               |   |
| Input Capacitance   | $C_{iss}$    | —   | 32   | 64        | pF            | $V_{DS} = 25\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$                                    |
| Output Capacitance  | $C_{oss}$    | —   | 4.4  | 9         |               |   |
| Reverse Transfer Capacitance                              | $C_{rss}$    | —   | 2.9  | 6         |               |   |
| Gate Resistance   | $R_g$        | —   | 126  | 250       | $\Omega$      | $V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$                                       |
| Total Gate Charge   | $Q_g$        | —   | 0.45 | 0.9       | nC            | $V_{GS} = 4.5\text{V}, V_{DS} = 10\text{V}, I_D = 250\text{mA}$                                 |
| Gate-Source Charge  | $Q_{gs}$     | —   | 0.08 | 0.2       |               |   |
| Gate-Drain Charge   | $Q_{gd}$     | —   | 0.08 | 0.2       |               |   |
| Turn-On Delay Time  | $t_{D(ON)}$  | —   | 3.4  | 10        | ns            | $V_{GS} = 10\text{V}, V_{DS} = 30\text{V}, R_L = 150\Omega, R_G = 25\Omega, I_D = 200\text{mA}$ |
| Turn-On Rise Time   | $t_R$        | —   | 3.4  | 10        | ns            |   |
| Turn-Off Delay Time                                       | $t_{D(OFF)}$ | —   | 26.4 | 45        | ns            |   |
| Turn-Off Fall Time  | $t_F$        | —   | 16.3 | 30        | ns            |   |

Notes:

5. Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
6. Repetitive rating, pulse width limited by junction temperature.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.



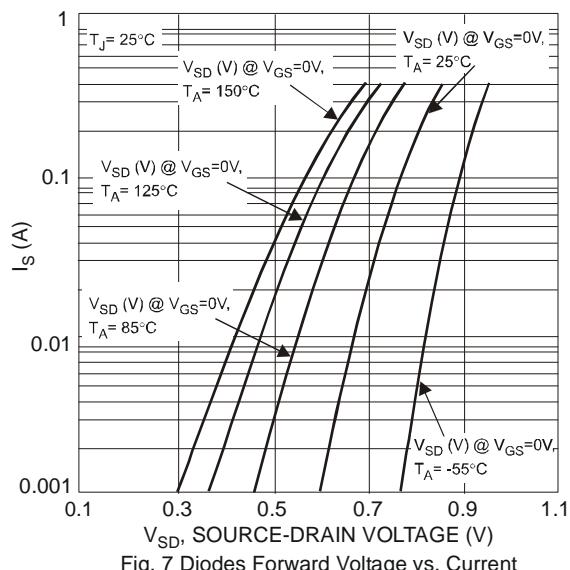


Fig. 7 Diodes Forward Voltage vs. Current

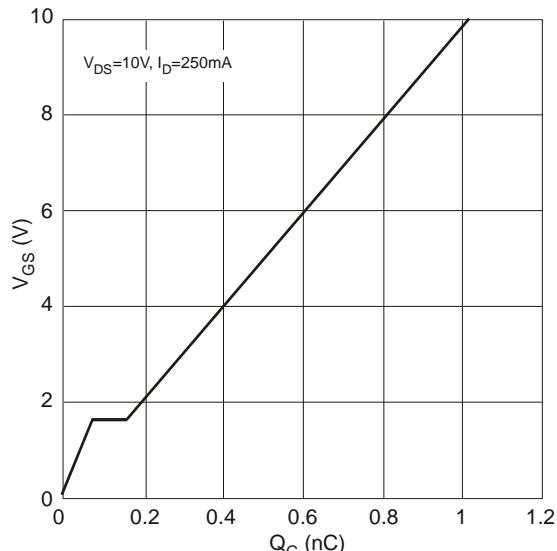


Fig. 9 Gate Charge Characteristics

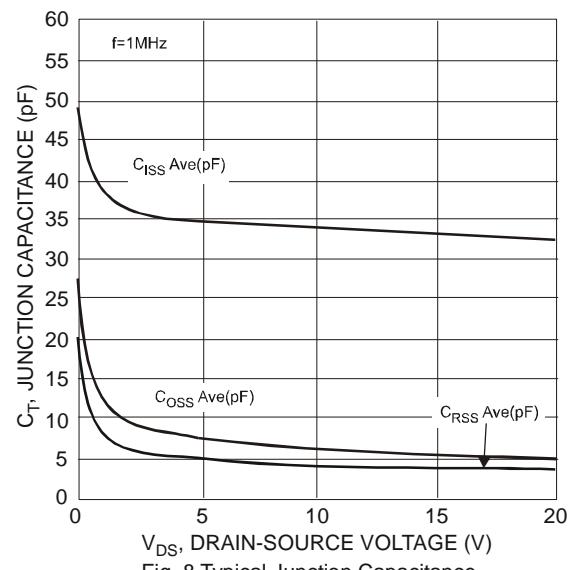


Fig. 8 Typical Junction Capacitance

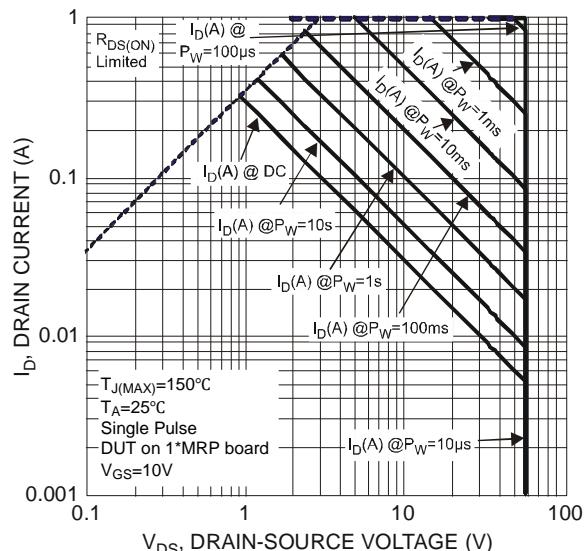


Fig. 10 SOA, Safe Operation Area

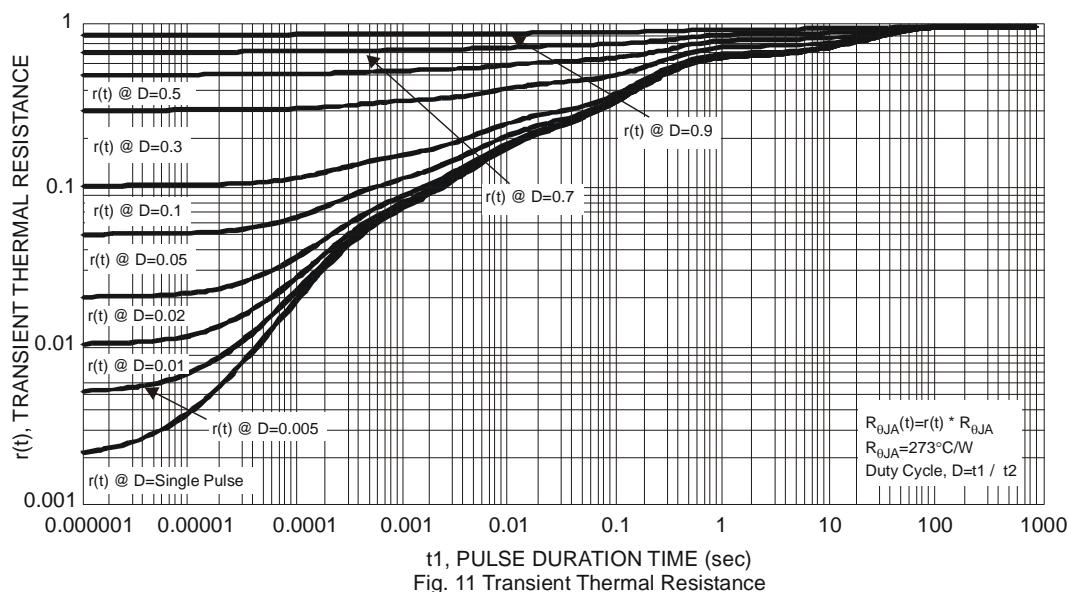
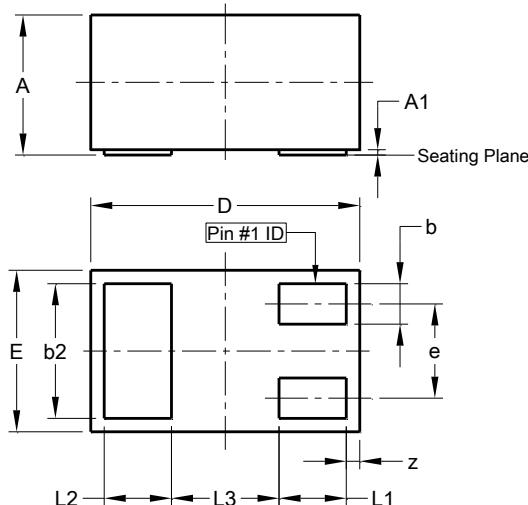


Fig. 11 Transient Thermal Resistance

## Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

X1-DFN1006-3

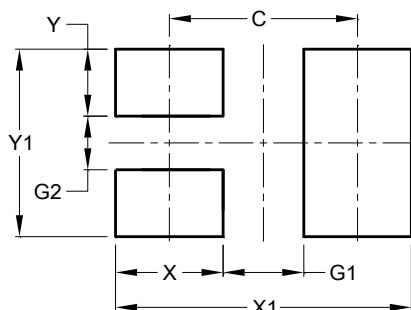


| X1-DFN1006-3         |      |       |      |
|----------------------|------|-------|------|
| Dim                  | Min  | Max   | Typ  |
| A                    | 0.47 | 0.53  | 0.50 |
| A1                   | 0.00 | 0.05  | 0.03 |
| b                    | 0.10 | 0.20  | 0.15 |
| b2                   | 0.45 | 0.55  | 0.50 |
| D                    | 0.95 | 1.075 | 1.00 |
| E                    | 0.55 | 0.675 | 0.60 |
| e                    | -    | -     | 0.35 |
| L1                   | 0.20 | 0.30  | 0.25 |
| L2                   | 0.20 | 0.30  | 0.25 |
| L3                   | -    | -     | 0.40 |
| z                    | 0.02 | 0.08  | 0.05 |
| All Dimensions in mm |      |       |      |

## Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

X1-DFN1006-3



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 0.70          |
| G1         | 0.30          |
| G2         | 0.20          |
| X          | 0.40          |
| X1         | 1.10          |
| Y          | 0.25          |
| Y1         | 0.70          |

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