

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)}$ Max | I_D Max @ $T_A = +25^\circ C$ |
|---------------|------------------------|---------------------------------|
| 60V | 1.4Ω @ $V_{GS} = 10V$ | 0.41A |
| | 1.6Ω @ $V_{GS} = 4.5V$ | 0.38A |

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

- Load Switch
- Portable Applications
- Power Management Functions

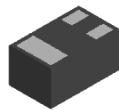
Features and Benefits

- Footprint of just 0.6mm² – thirteen times smaller than SOT23
- Low On-Resistance
- Low Gate Threshold Voltage
- Fast Switching Speed
- Ultra-Small Surface Mount Package
- ESD Protected Gate 200V
- **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**

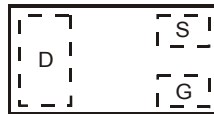
Mechanical Data

- Case: 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⁽⁴⁾
- Weight: 0.001 grams (approximate)

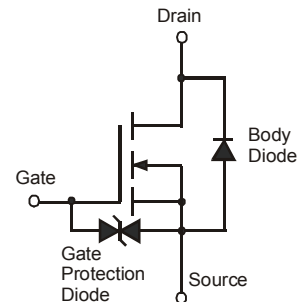
X1-DFN1006-3



Bottom View



Top View
Internal Schematic



Equivalent Circuit

Ordering Information (Note 4)

| Product | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|---------------|---------|--------------------|-----------------|-------------------|
| DMN62D1SFB-7B | NH | 7 | 8 | 10,000 |

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

Marking Information

DMN62D1SFB-7B



Top View
Bar Denotes Gate and Source Side

NH = Product Type Marking Code

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

| Characteristic | | | Symbol | Value | Unit |
|-----------------------------------|-----------------------|------------------------|------------------|-------|------|
| Drain-Source Voltage | | | V _{DSS} | 60 | V |
| Gate-Source Voltage | | | V _{GSS} | ±20 | V |
| Continuous Drain Current (Note 5) | V _{GS} = 10V | T _A = +25°C | I _D | 0.41 | A |
| | | T _A = +85°C | | 0.30 | |
| Pulsed Drain Current (Note 6) | | | I _{DM} | 2.64 | A |

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | | | Symbol | Value | Unit |
|---|--|-------------------------|-----------------------------------|-------------|------|
| Power Dissipation (Note 5) | | | P _D | 0.47 | W |
| Thermal Resistance, Junction to Ambient | | @T _A = +25°C | R _{θJA} | 258 | °C/W |
| Operating and Storage Temperature Range | | | T _J , T _{STG} | -55 to +150 | °C |

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

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|---------------------|-----|-------|------|------|--|
| OFF CHARACTERISTICS (Note 7) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 60 | — | — | V | V _{GS} = 0V, I _D = 250μA |
| Zero Gate Voltage Drain Current T _J = +25°C | I _{DSS} | — | — | 100 | nA | V _{DS} = 60V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | 10 | μA | V _{GS} = ±20V, V _{DS} = 0V |
| | | | | 1 | | V _{GS} = ±5V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | 1.3 | 1.6 | 2.3 | V | V _{DS} = V _{GS} , I _D = 250μA |
| Static Drain-Source On-Resistance | R _{DS(ON)} | — | — | 1.40 | Ω | V _{GS} = 10V, I _D = 40mA |
| | | | | 1.60 | | V _{GS} = 4.5V, I _D = 35mA |
| Forward Transfer Admittance | Y _{fs} | 100 | — | — | mS | V _{DS} = 5V, I _D = 40mA |
| Diode Forward Voltage | V _{SD} | — | 0.7 | 1.1 | V | V _{GS} = 0V, I _S = 300mA |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | |
| Input Capacitance | C _{iss} | — | 40 | 80 | pF | V _{DS} = 40V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 3.5 | 7 | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 2.8 | 5.6 | pF | |
| Gate Resistance | R _g | — | 81.3 | 200 | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1MHz |
| Total Gate Charge | Q _g | — | 0.73 | 1.5 | nC | V _{GS} = 4.5V V _{GS} = 10V |
| Total Gate Charge | Q _g | — | 1.39 | 2.8 | nC | |
| Gate-Source Charge | Q _{gs} | — | 0.2 | 0.4 | nC | |
| Gate-Drain Charge | Q _{gd} | — | 0.23 | 0.5 | nC | |
| Turn-On Delay Time | t _{D(on)} | — | 3.89 | 10 | ns | V _{DS} = 50V, I _D = 1A V _{GS} = 10V, R _G = 6Ω |
| Turn-On Rise Time | t _r | — | 4.93 | 10 | ns | |
| Turn-Off Delay Time | t _{D(off)} | — | 18.80 | 40 | ns | |
| Turn-Off Fall Time | t _f | — | 11.96 | 25 | ns | |

- Notes:
5. Device mounted on FR-4 PCB, with minimum recommended pad layout.
 6. Device mounted on minimum recommended pad layout test board, 10μs pulse duty cycle = 1%.
 7. Short duration pulse test used to minimize self-heating effect.
 8. Guaranteed by design. Not subject to production testing.

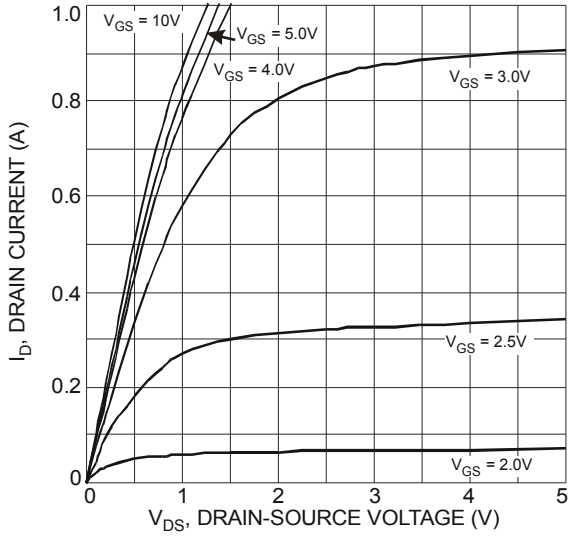


Fig. 1 Typical Output Characteristic

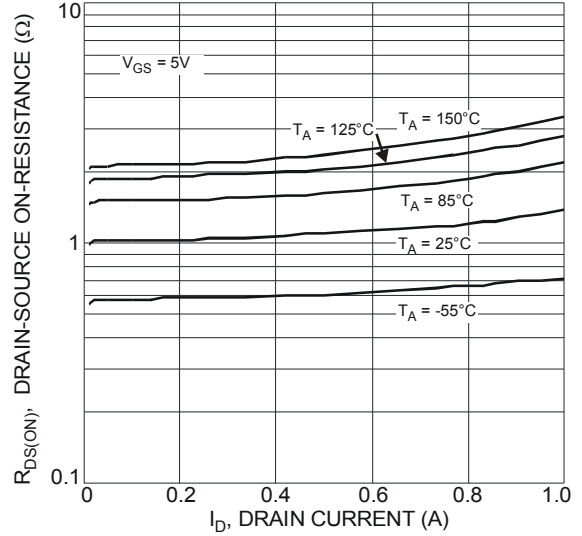


Fig. 2 Typical On-Resistance vs. Drain Current and Temperature

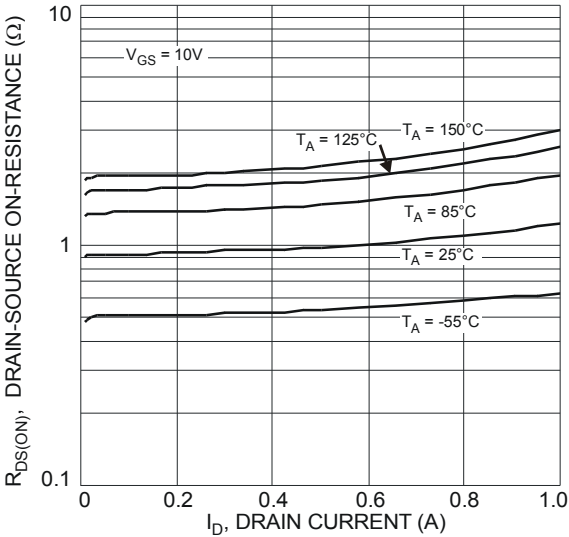


Fig. 3 Typical On-Resistance vs. Drain Current and Temperature

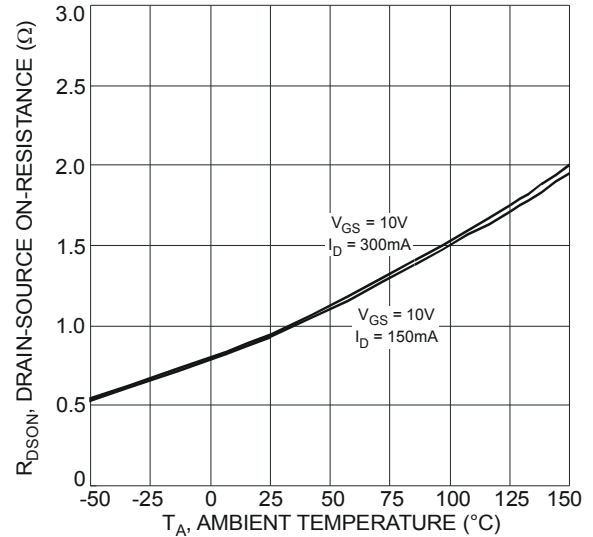


Fig. 4 On-Resistance Variation with Temperature

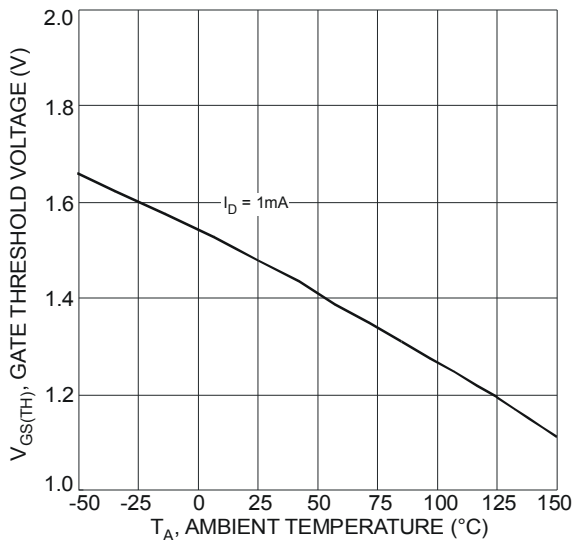


Fig. 5 Gate Threshold Variation vs. Ambient Temperature

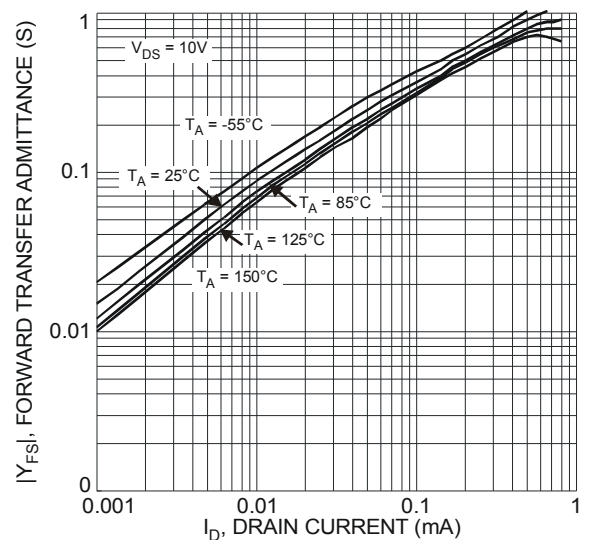


Fig. 6 Forward Transfer Admittance vs. Drain Current

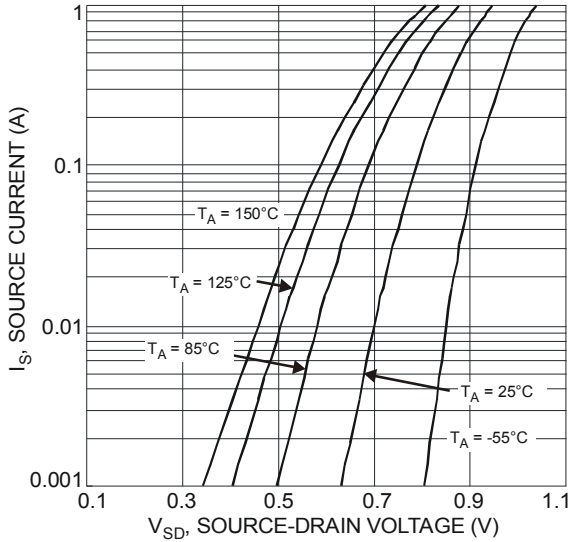


Fig. 7 Diode Forward Voltage vs. Current

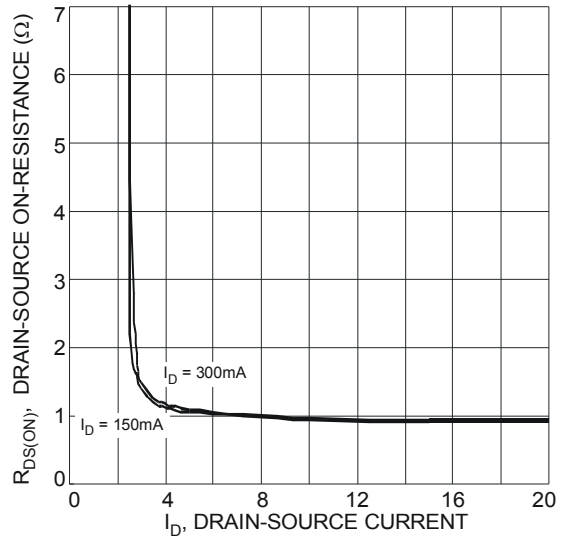


Fig. 8 On-Resistance vs. Drain-Source Current

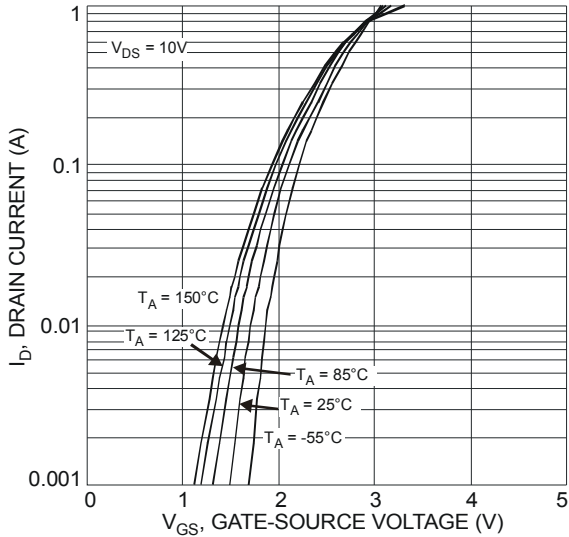


Fig. 9 Typical Transfer Characteristic

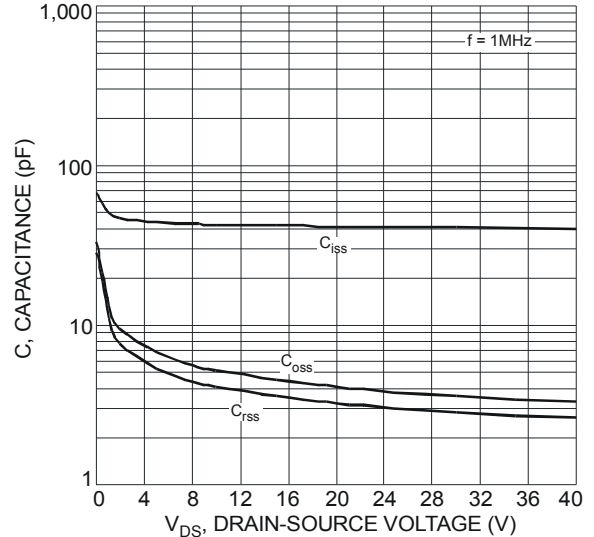


Fig. 10 Typical Total Capacitance

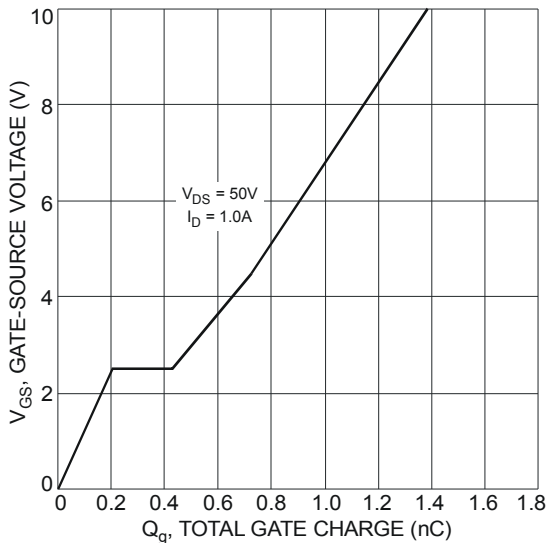


Fig. 11 Gate-Charge Characteristics

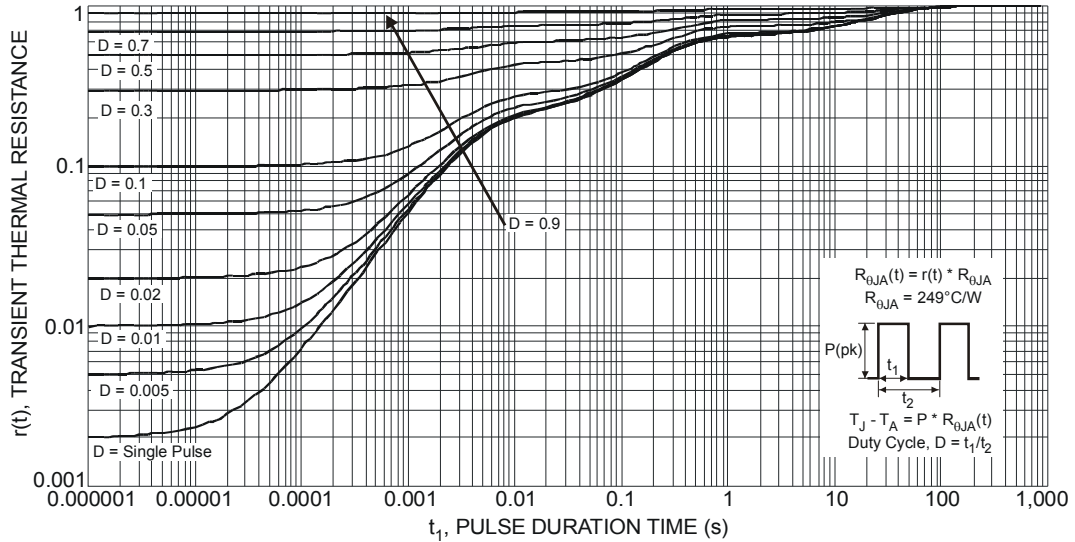
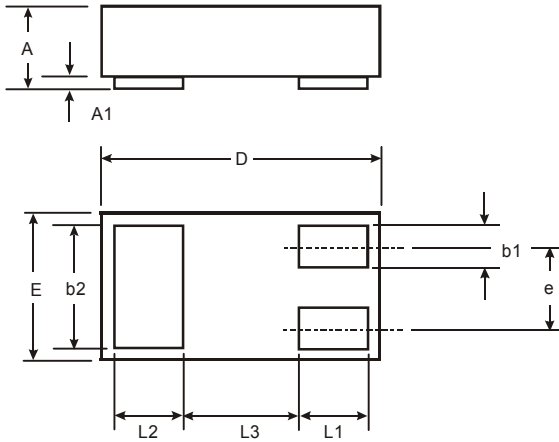


Fig. 12 Transient Thermal Response

Package Outline Dimensions

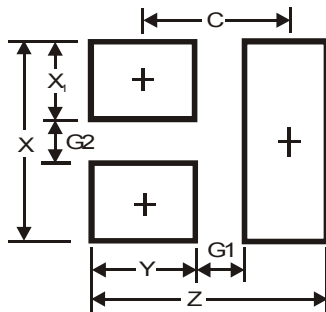
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| X1-DFN1006-3 | | | |
|----------------------|------|-------|------|
| Dim | Min | Max | Typ |
| A | 0.47 | 0.53 | 0.50 |
| A1 | 0 | 0.05 | 0.03 |
| b1 | 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 |
| All Dimensions in mm | | | |

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for latest version.



| Dimensions | Value (in mm) |
|------------|---------------|
| Z | 1.1 |
| G1 | 0.3 |
| G2 | 0.2 |
| X | 0.7 |
| X1 | 0.25 |
| Y | 0.4 |
| C | 0.7 |

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