## Features

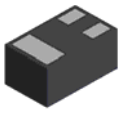
- Low On-Resistance
- Low Gate Threshold Voltage
- Fast Switching Speed
- Low Input/Output Leakage
- Ultra-Small Surface Mount Package
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **ESD Protected Gate**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

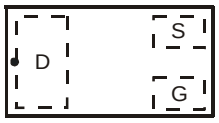
- Case: X1-DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208 e4
- Weight: 0.001 grams (approximate)

ESD PROTECTED

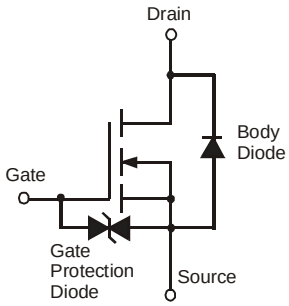
X1-DFN1006-3



Bottom View




Top View
Internal Schematic




Equivalent Circuit

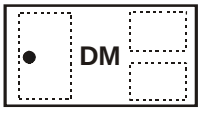
## Ordering Information (Note 4)

| Part Number | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|---|---|---|---|---|
| DMN2005LPK-7 | DM | 7 | 8 | 3,000 |
| DMN2005LPK-7B | DM | 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 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.

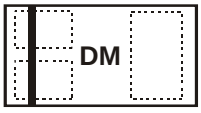
## Marking Information

DMN2005LPK-7




Top View
Dot Denotes
Drain Side

DMN2005LPK-7B




Top View
Bar Denotes Gate
and Source Side

DM = Product Type Marking Code

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

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DSS}$ | 20 | V |
| Gate-Source Voltage | $V_{GSS}$ | ±10 | V |
| Drain Current per element (Note 5) | $I_D$ | 440 | mA |

## Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Total Power Dissipation (Note 5) | $P_D$ | 450 | mW |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 218 | °C/W |
| Operating and Storage Temperature Range | $T_j$, $T_{STG}$ | -65 to +150 | °C |

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

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS (Note 6)** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | 20 | — | — | V | $V_{GS}$ = 0V, $I_D$ = 100μA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | — | — | 10 | μA | $V_{DS}$ = 17V, $V_{GS}$ = 0V |
| Gate-Source Leakage | $I_{GSS}$ | — | — | ±5 | μA | $V_{GS}$ = ±8V, $V_{DS}$ = 0V |
| **ON CHARACTERISTICS (Note 6)** | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | 0.53 | — | 1.2 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = 100μA |
| Static Drain-Source On-Resistance | $R_{DS\ (ON)}$ | —<br>—<br>—<br>—<br>— | 0.35<br>0.4<br>0.45<br>0.55<br>0.65 | 1.5<br>1.7<br>1.7<br>3.5<br>3.5 | Ω | $V_{GS}$ = 4V, $I_D$ = 10mA<br>$V_{GS}$ = 2.7V, $I_D$ = 200mA<br>$V_{GS}$ = 2.5V, $I_D$ = 10mA<br>$V_{GS}$ = 1.8V, $I_D$ = 200mA<br>$V_{GS}$ = 1.5V, $I_D$ = 1mA |
| Forward Transfer Admittance | $\|Y_{fs}\|$ | 40 | — | — | mS | $V_{DS}$ = 3V, $I_D$ = 10mA |

Notes: 5. Device mounted on FR-4 PCB.
6. Short duration pulse test used to minimize self-heating effect.

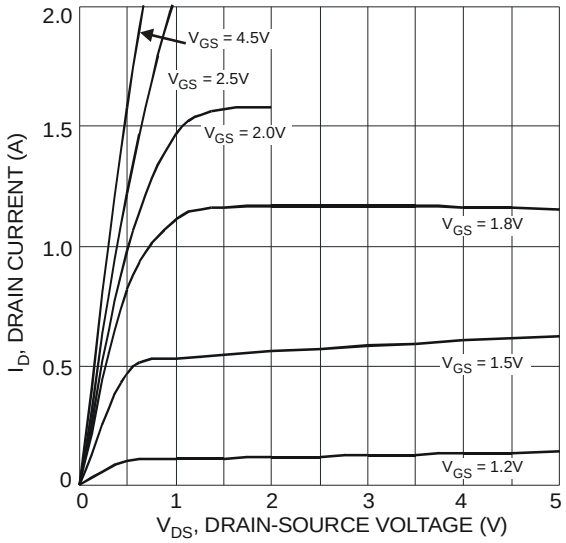



Fig. 1 Typical Output Characteristics

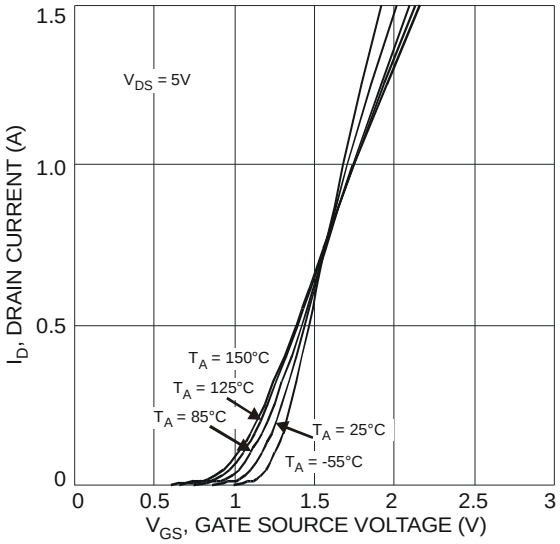



Fig. 2 Typical Transfer Characteristics

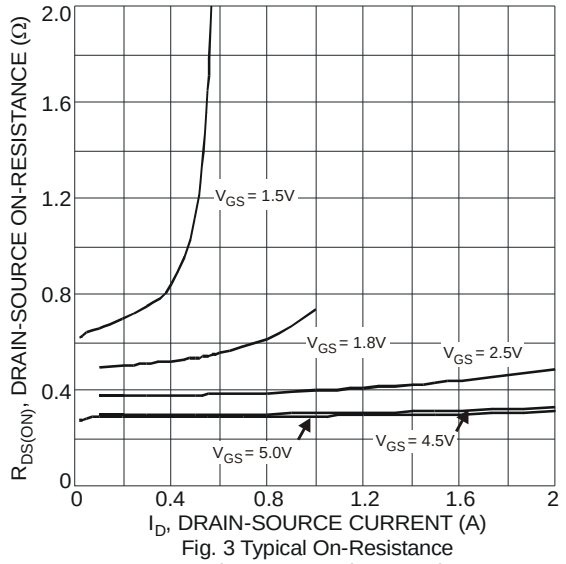



Fig. 3 Typical On-Resistance
vs. Drain Current and Gate Voltage

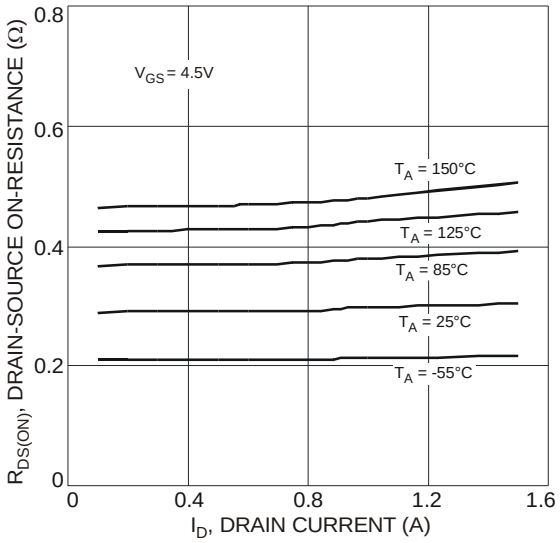



Fig. 4 Typical Drain-Source On-Resistance
vs. Drain Current and Temperature

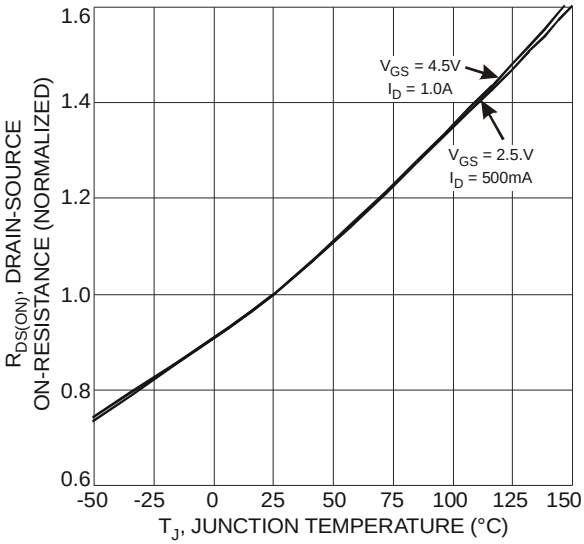



Fig. 5 On-Resistance Variation with Temperature

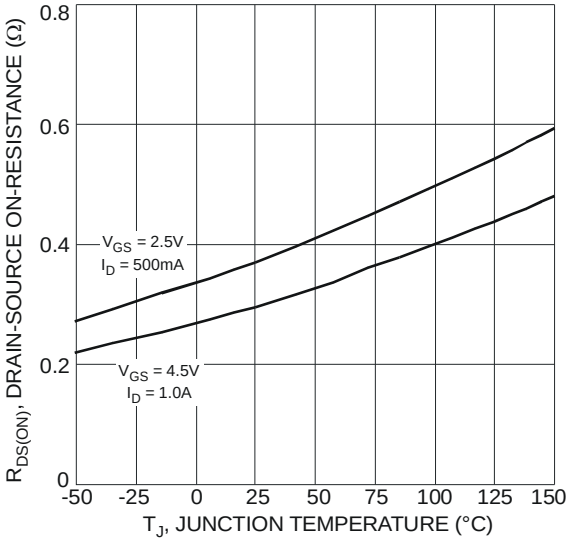



Fig. 6 On-Resistance Variation with Temperature

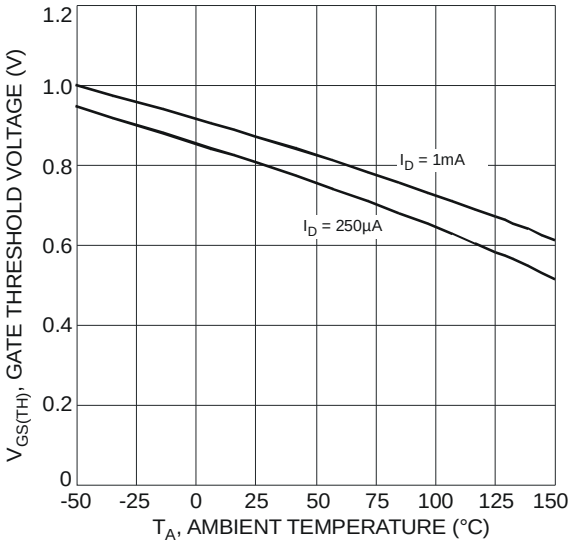



Fig. 7 Gate Threshold Variation vs. Ambient Temperature

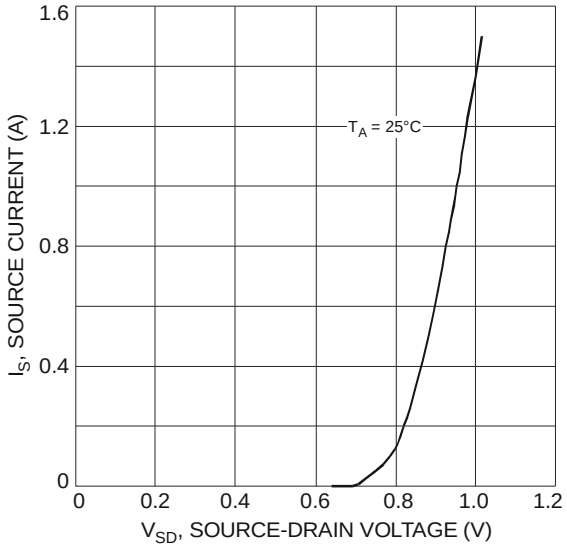



Fig. 8 Diode Forward Voltage vs. Current

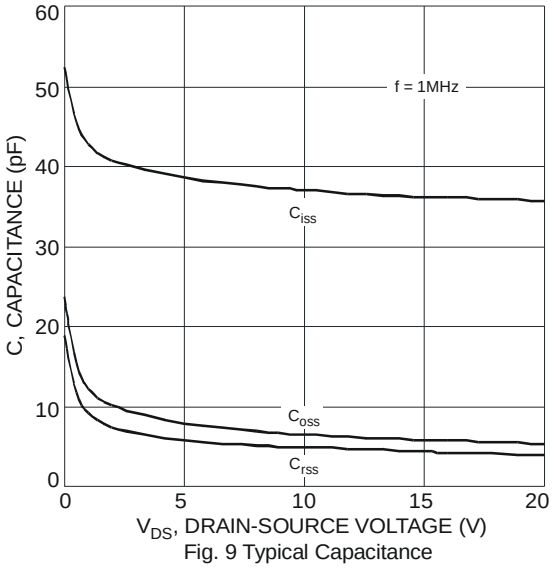



Fig. 9 Typical Capacitance

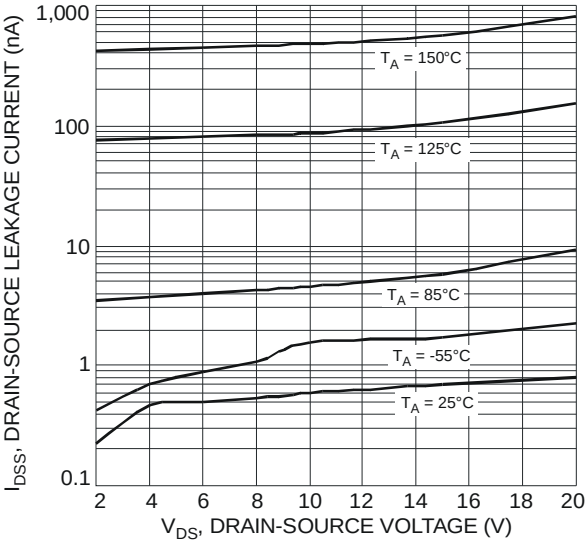



Fig. 10 Typical Drain-Source Leakage Current vs. Drain-Source Voltage

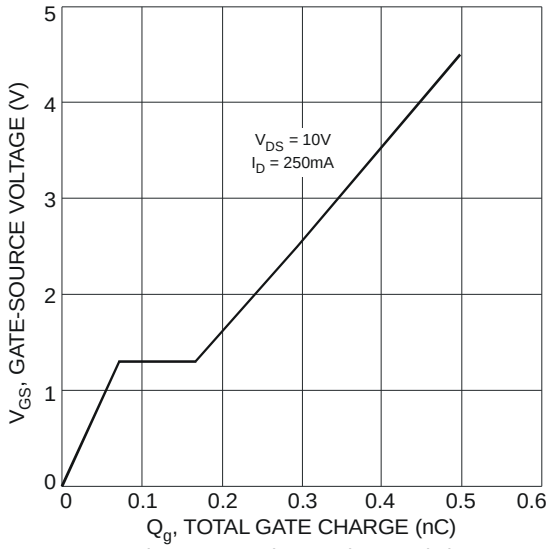



Fig. 11 Gate-Charge Characteristics

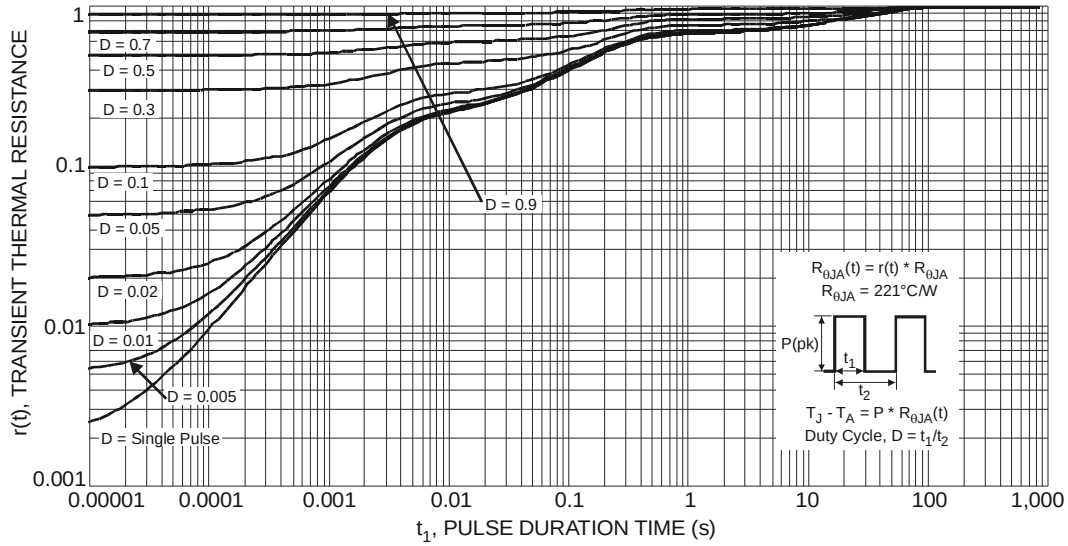
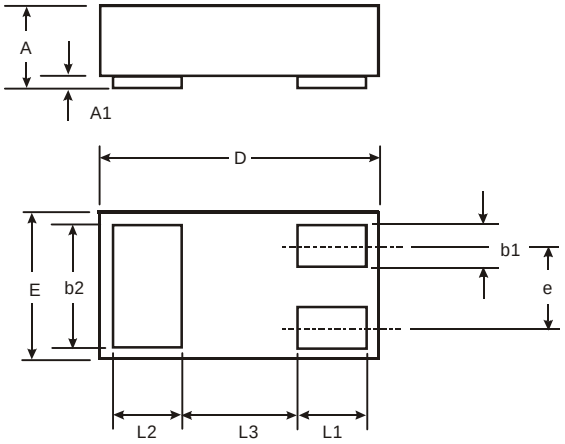


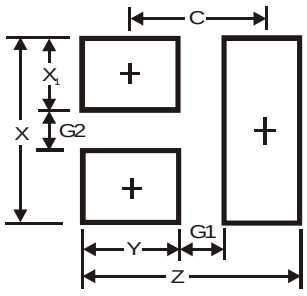

Fig. 12 Transient Thermal Response

## Package Outline Dimensions




| 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




| 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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