**Features**

- Ultra Low Profile Package
- Low On-Resistance
- Very Low Gate Threshold Voltage, 0.9V Max.
- Fast Switching Speed
- Low Input/Output Leakage
- Ultra-Small Surface Mount Package
- ESD Protected Gate
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

**Mechanical Data**

- Case: X2-DFN1310-6
- 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@3

**Ordering Information** (Note 4)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Case</th>
<th>Packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMN2005DLP4K-7</td>
<td>X2-DFN1310-6</td>
<td>3000/Tape &amp; Reel</td>
</tr>
</tbody>
</table>

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. 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.
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 https://www.diodes.com/design/support/packaging/diodes-packaging/.

**Marking Information**

DL = Product Type Marking Code
Maximum Ratings (@$T_A = +25^\circ C$, unless otherwise specified.)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Symbol</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drain-Source Voltage</td>
<td>$V_{DSS}$</td>
<td>20</td>
<td>V</td>
</tr>
<tr>
<td>Gate-Source Voltage</td>
<td>$V_{GSS}$</td>
<td>±10</td>
<td>V</td>
</tr>
<tr>
<td>Drain Current Per Element (Note 5)</td>
<td>$I_D$</td>
<td>300-350</td>
<td>mA</td>
</tr>
</tbody>
</table>

Thermal Characteristics (@$T_A = +25^\circ C$, unless otherwise specified.)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Symbol</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Power Dissipation (Note 5)</td>
<td>$P_D$</td>
<td>400</td>
<td>mW</td>
</tr>
<tr>
<td>Thermal Resistance, Junction to Ambient</td>
<td>$R_{thJA}$</td>
<td>231</td>
<td>°C/W</td>
</tr>
<tr>
<td>Operating and Storage Temperature Range</td>
<td>$T_{JE, TSTG}$</td>
<td>-65 to +150</td>
<td>°C</td>
</tr>
</tbody>
</table>

Electrical Characteristics (@$T_A = +25^\circ C$, unless otherwise specified.)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Symbol</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
<th>Test Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF CHARACTERISTICS (Per Element) (Note 7)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drain-Source Breakdown Voltage</td>
<td>$BVDSS$</td>
<td>20</td>
<td></td>
<td></td>
<td>V</td>
<td>$V_{GS} = 0V, I_D = 100\mu A$</td>
</tr>
<tr>
<td>Zero Gate Voltage Drain Current</td>
<td>$I_{DSS}$</td>
<td></td>
<td></td>
<td>10</td>
<td>µA</td>
<td>$V_{DS} = 17V, V_{GS} = 0V$</td>
</tr>
<tr>
<td>Gate-Source Leakage</td>
<td>$I_{GSS}$</td>
<td></td>
<td></td>
<td>±5</td>
<td>µA</td>
<td>$V_{GS} = ±8V, V_{DS} = 0V$</td>
</tr>
<tr>
<td>ON CHARACTERISTICS (Per Element) (Note 7)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gate Threshold Voltage</td>
<td>$V_{GS(TH)}$</td>
<td>0.53</td>
<td></td>
<td>0.9</td>
<td>V</td>
<td>$V_{DS} = V_{GS}, I_D = 100\mu A$</td>
</tr>
<tr>
<td>Static Drain-Source On-Resistance</td>
<td>$R_{DS(ON)}$</td>
<td></td>
<td></td>
<td></td>
<td>Ω</td>
<td>$V_{DS} = 4V, I_D = 10mA$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$V_{DS} = 2.7V, I_D = 200mA$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$V_{DS} = 2.5V, I_D = 10mA$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$V_{DS} = 1.8V, I_D = 20mA$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$V_{DS} = 1.5V, I_D = 1mA$</td>
</tr>
<tr>
<td>Forward Transfer Admittance</td>
<td>$Y_{fs}$</td>
<td>40</td>
<td></td>
<td></td>
<td>mS</td>
<td>$V_{DS} = 3V, I_D = 10mA$</td>
</tr>
</tbody>
</table>

Notes:
5. Device mounted on FR-4 PCB.
6. Pulse width ≤10µS, Duty Cycle ≤1%.
7. Short duration pulse test used to minimize self-heating effect.

Figure 1 Typical Output Characteristics

$V_{Ds} = 1.5V$
$V_{Gs} = 2.0V$
$V_{Ds} = 2.5V$
$V_{Gs} = 4.5V$

Figure 2 Typical Transfer Characteristics

$V_{Ds} = 5V$
$T_A = 150^\circ C$
$T_A = 125^\circ C$
$T_A = 85^\circ C$
$T_A = 55^\circ C$
Figure 3: Typical On-Resistance vs. Drain Current and Gate Voltage

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

Figure 5: On-Resistance Variation with Temperature

Figure 6: On-Resistance Variation with Temperature

Figure 7: Gate Threshold Variation vs. Ambient Temperature

Figure 8: Diode Forward Voltage vs. Current
Figure 9 Typical Capacitance

VDS, DRAIN-SOURCE VOLTAGE (V)
C, CAPACITANCE (pF)
f = 1MHz
Ciss
Coss
Crss

Package Outline Dimensions
Please see http://www.diodes.com/package-outlines.html for the latest version.

X2-DFN1310-6

Suggested Pad Layout
Please see http://www.diodes.com/package-outlines.html for the latest version.

X2-DFN1310-6
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   2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

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