Product Summary

<table>
<thead>
<tr>
<th>$V_{BR(DSS)}$</th>
<th>$R_{DS(ON)}$</th>
<th>$I_D$</th>
</tr>
</thead>
<tbody>
<tr>
<td>60V</td>
<td>1.8Ω @ $V_{GS} = 10V$</td>
<td>440mA</td>
</tr>
<tr>
<td></td>
<td>2.1Ω @ $V_{GS} = 4.5V$</td>
<td>410mA</td>
</tr>
</tbody>
</table>

Description

This new generation MOSFET is 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 Operated Systems and Solid-State Relays
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.
- DC-DC Converters
- Power Management Functions

Features

- 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: SOT563
- 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
- Terminal Connections: See Diagram Below
- Weight: 0.006 grams (Approximate)

Ordering Information (Note 4)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Case</th>
<th>Packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMG1026UV-7</td>
<td>SOT563</td>
<td>3,000 / 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) compliant.
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.

Marking Information (Note 5)

Date Code Key

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Code</td>
<td>W</td>
<td>~</td>
<td>D</td>
<td>E</td>
<td>F</td>
<td>G</td>
<td>H</td>
<td>I</td>
<td>J</td>
<td>K</td>
</tr>
<tr>
<td>Month</td>
<td>Jan</td>
<td>Feb</td>
<td>Mar</td>
<td>Apr</td>
<td>May</td>
<td>Jun</td>
<td>Jul</td>
<td>Aug</td>
<td>Sep</td>
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<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>0</td>
</tr>
</tbody>
</table>

Note:
5. Product manufactured with Date Code D9 (September, 2016) and newer are built with additional Pin 1 dot in marking information. Product manufactured prior to Date Code D9 are built without Pin 1 dot.
### Maximum Ratings (@TA = +25°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>VDDS</td>
<td>60</td>
<td>V</td>
</tr>
<tr>
<td>Gate-Source Voltage</td>
<td>VGS</td>
<td>±20</td>
<td>V</td>
</tr>
<tr>
<td>Continuous Drain Current (Note 6) VGS = 10V Steady State</td>
<td>T_A = +25°C</td>
<td>I_D</td>
<td>mA</td>
</tr>
<tr>
<td></td>
<td>T_A = +85°C</td>
<td>410</td>
<td>300</td>
</tr>
<tr>
<td>Continuous Drain Current (Note 7) VGS = 10V t ≤ 10s</td>
<td>T_A = +25°C</td>
<td>I_D</td>
<td>mA</td>
</tr>
<tr>
<td></td>
<td>T_A = +85°C</td>
<td>440</td>
<td>320</td>
</tr>
<tr>
<td>Continuous Drain Current (Note 6) VGS = 4.5V Steady State</td>
<td>T_A = +25°C</td>
<td>I_D</td>
<td>mA</td>
</tr>
<tr>
<td></td>
<td>T_A = +85°C</td>
<td>380</td>
<td>270</td>
</tr>
<tr>
<td>Continuous Drain Current (Note 7) VGS = 4.5V t ≤ 10s</td>
<td>T_A = +25°C</td>
<td>I_D</td>
<td>mA</td>
</tr>
<tr>
<td></td>
<td>T_A = +85°C</td>
<td>410</td>
<td>295</td>
</tr>
<tr>
<td>Pulsed Drain Current (Note 8)</td>
<td>I_DM</td>
<td>1.0</td>
<td>A</td>
</tr>
</tbody>
</table>

### Thermal Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Symbol</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Dissipation (Note 6)</td>
<td>PD</td>
<td>0.58</td>
<td>W</td>
</tr>
<tr>
<td>Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 6)</td>
<td>R_JA</td>
<td>213</td>
<td>°C/W</td>
</tr>
<tr>
<td>Power Dissipation (Note 7) t ≤ 10s</td>
<td>PD</td>
<td>0.65</td>
<td>W</td>
</tr>
<tr>
<td>Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 7) t ≤ 10s</td>
<td>R_JA</td>
<td>192</td>
<td>°C/W</td>
</tr>
</tbody>
</table>

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

**OFF CHARACTERISTICS (Note 9)**

<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>Drain-Source Breakdown Voltage</td>
<td>BV_DSS</td>
<td>60</td>
<td>—</td>
<td>—</td>
<td>V</td>
<td>V GS = 0V, I D = 250µA</td>
</tr>
<tr>
<td>Zero Gate Voltage Drain Current T_J = +25°C</td>
<td>I_DSS</td>
<td>—</td>
<td>—</td>
<td>1.0</td>
<td>µA</td>
<td>V GS = 50V, V GS = 0V</td>
</tr>
<tr>
<td>Gate-Source Leakage</td>
<td>I_GSS</td>
<td>—</td>
<td>—</td>
<td>±50</td>
<td>nA</td>
<td>V GS = ±5V, V DS = 0V</td>
</tr>
</tbody>
</table>

**ON CHARACTERISTICS (Note 9)**

<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>Gate Threshold Voltage</td>
<td>V_GS(th)</td>
<td>0.5</td>
<td>—</td>
<td>1.8</td>
<td>V</td>
<td>V DS = V GS, I D = 250µA</td>
</tr>
<tr>
<td>Static Drain-Source On-Resistance</td>
<td>R_DS(ON)</td>
<td>—</td>
<td>1.2</td>
<td>1.8</td>
<td>Ω</td>
<td>V GS = 10V, I D = 500mA</td>
</tr>
<tr>
<td>Forward Transfer Admittance</td>
<td></td>
<td>—</td>
<td>1.4</td>
<td>2.1</td>
<td>mS</td>
<td>V GS = 4.5V, I D = 200mA</td>
</tr>
<tr>
<td>Continuous Source Current (9)</td>
<td>I_S</td>
<td>—</td>
<td>—</td>
<td>200</td>
<td>mA</td>
<td>V GS = 0V, I G = 200mA</td>
</tr>
<tr>
<td>Diode Forward Voltage</td>
<td>V_SD</td>
<td>—</td>
<td>0.8</td>
<td>1.3</td>
<td>V</td>
<td>V GS = 0V, I G = 200mA</td>
</tr>
</tbody>
</table>

**DYNAMIC CHARACTERISTICS (Note 10)**

<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>Input Capacitance</td>
<td>C_GS</td>
<td>32</td>
<td>—</td>
<td>—</td>
<td>pF</td>
<td>V_D = 25V, V_GS = 0V, f = 1.0MHz</td>
</tr>
<tr>
<td>Output Capacitance</td>
<td>C_GS</td>
<td>4.4</td>
<td>—</td>
<td>—</td>
<td>pF</td>
<td>V_D = 25V, V_GS = 0V, f = 1.0MHz</td>
</tr>
<tr>
<td>Reverse Transfer Capacitance</td>
<td>C_GS</td>
<td>2.9</td>
<td>—</td>
<td>—</td>
<td>pF</td>
<td>V_D = 25V, V_GS = 0V, f = 1.0MHz</td>
</tr>
<tr>
<td>Gate Resistance</td>
<td>R_G</td>
<td>126</td>
<td>—</td>
<td>—</td>
<td>Ω</td>
<td>V GS = 0V, V GS = 0V, f = 1MHz</td>
</tr>
<tr>
<td>Total Gate Charge</td>
<td>Q_G</td>
<td>0.45</td>
<td>—</td>
<td>—</td>
<td>pC</td>
<td>V GS = 4.5V, I D = 250mA</td>
</tr>
<tr>
<td>Gate-Source Charge</td>
<td>Q_GS</td>
<td>—</td>
<td>0.08</td>
<td>—</td>
<td>ns</td>
<td>V GS = 0V, I D = 250mA</td>
</tr>
<tr>
<td>Gate-Drain Charge</td>
<td>Q_D</td>
<td>—</td>
<td>0.08</td>
<td>—</td>
<td>ns</td>
<td>V GS = 0V, I D = 250mA</td>
</tr>
<tr>
<td>Turn-On Delay Time</td>
<td>t_D(on)</td>
<td>—</td>
<td>3.4</td>
<td>—</td>
<td>ns</td>
<td>V GS = 0V, I D = 250mA</td>
</tr>
<tr>
<td>Turn-On Rise Time</td>
<td>t_R</td>
<td>—</td>
<td>3.4</td>
<td>—</td>
<td>ns</td>
<td>V GS = 0V, I D = 250mA</td>
</tr>
<tr>
<td>Turn-Off Delay Time</td>
<td>t_D(off)</td>
<td>—</td>
<td>26.4</td>
<td>—</td>
<td>ns</td>
<td>V GS = 0V, I D = 250mA</td>
</tr>
<tr>
<td>Turn-Off Fall Time</td>
<td>t_F</td>
<td>—</td>
<td>16.3</td>
<td>—</td>
<td>ns</td>
<td>V GS = 0V, I D = 250mA</td>
</tr>
</tbody>
</table>

Notes:
6. Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
7. Device mounted on FR-4 PCB with minimum recommended pad layout, measured in t ≤ 10s.
8. Short duration pulse test used to minimize self-heating effect.
9. Short duration pulse test used to minimize self-heating effect.
10. Guaranteed by design. Not subject to production testing.

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Figure 7 Gate Threshold Variation vs. Ambient Temperature

Figure 8 Diode Forward Voltage vs. Current

Figure 9 Typical Total Capacitance

Figure 10 Typical Leakage Current vs. Drain-Source Voltage

Figure 11 Gate Charge

Figure 12 SOA, Safe Operation Area
Figure 13 Transient Thermal Response

\[ \frac{t_1}{t_2} = P \cdot R(t) \]

Duty Cycle, \( D = \frac{t_1}{t_2} \)

\[ \theta_J - \theta_A = P \cdot R(t) \]

\[ R_{\text{JA}} = \frac{220}{C/W} \]

### Package Outline Dimensions

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

<table>
<thead>
<tr>
<th>Dim</th>
<th>Min</th>
<th>Max</th>
<th>Typ</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.15</td>
<td>0.30</td>
<td>0.20</td>
</tr>
<tr>
<td>B</td>
<td>1.10</td>
<td>1.25</td>
<td>1.20</td>
</tr>
<tr>
<td>C</td>
<td>1.55</td>
<td>1.70</td>
<td>1.60</td>
</tr>
<tr>
<td>D</td>
<td>-</td>
<td>-</td>
<td>0.50</td>
</tr>
<tr>
<td>G</td>
<td>0.90</td>
<td>1.10</td>
<td>1.00</td>
</tr>
<tr>
<td>H</td>
<td>1.50</td>
<td>1.70</td>
<td>1.60</td>
</tr>
<tr>
<td>K</td>
<td>0.55</td>
<td>0.60</td>
<td>0.60</td>
</tr>
<tr>
<td>L</td>
<td>0.10</td>
<td>0.30</td>
<td>0.20</td>
</tr>
<tr>
<td>M</td>
<td>0.10</td>
<td>0.18</td>
<td>0.11</td>
</tr>
</tbody>
</table>

All Dimensions in mm

### Suggested Pad Layout

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