

**Features**

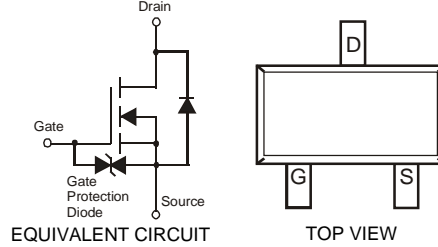
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Lead Free By Design/RoHS Compliant (Note 2)**
- **ESD Protected up to 2kV**
- **"Green" Device (Note 4)**
- **Qualified to AEC-Q101 standards for High Reliability**

**Mechanical Data**

- Case: SOT-523
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Finish — Matte Tin annealed over Alloy 42 leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Marking Information: See Page 4
- Ordering Information: See Page 4
- Weight: 0.002 grams (approximate)



SOT-523



**Maximum Ratings** @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic                |              |                       | Symbol           | Value | Units |
|-------------------------------|--------------|-----------------------|------------------|-------|-------|
| Drain-Source Voltage          |              |                       | V <sub>DSS</sub> | 20    | V     |
| Gate-Source Voltage           |              |                       | V <sub>GSS</sub> | ±8    | V     |
| Drain Current (Note 1)        | Steady State | T <sub>A</sub> = 25°C | I <sub>D</sub>   | 540   | mA    |
|                               |              | T <sub>A</sub> = 85°C |                  | 390   |       |
| Pulsed Drain Current (Note 3) |              |                       | I <sub>DM</sub>  | 1.5   | A     |

**Thermal Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic                          | Symbol                            | Value       | Units |
|---|-----------------------------------|-------------|-------|
| Total Power Dissipation (Note 1)        | P <sub>D</sub>                    | 150         | mW    |
| Thermal Resistance, Junction to Ambient | R <sub>θJA</sub>                  | 833         | °C/W  |
| Operating and Storage Temperature Range | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C    |

**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic                      | Symbol              | Min | Typ | Max  | Unit | Test Condition   |
|-------------------------------------|---------------------|-----|-----|------|------|--|
| <b>OFF CHARACTERISTICS (Note 5)</b> |                     |     |     |      |      |  |
| Drain-Source Breakdown Voltage      | BV <sub>DSS</sub>   | 20  | —   | —    | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = 10μA                |
| Zero Gate Voltage Drain Current     | I <sub>DSS</sub>    | —   | —   | 1    | μA   | V <sub>DS</sub> = 16V, V <sub>GS</sub> = 0V                |
| Gate-Source Leakage                 | I <sub>GSS</sub>    | —   | —   | ±1   | μA   | V <sub>GS</sub> = ±4.5V, V <sub>DS</sub> = 0V              |
| <b>ON CHARACTERISTICS (Note 5)</b>  |                     |     |     |      |      |  |
| Gate Threshold Voltage              | V <sub>GS(th)</sub> | 0.5 | —   | 1.0  | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA |
| Static Drain-Source On-Resistance   | R <sub>DS(ON)</sub> | —   | 0.4 | 0.55 | Ω    | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 540mA             |
|                                     |                     |     | 0.5 | 0.70 |      | V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 500mA             |
|                                     |                     |     | 0.7 | 0.9  |      | V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 350mA             |
| Forward Transfer Admittance         | Y <sub>fs</sub>     | 200 | —   | —    | ms   | V <sub>DS</sub> = 10V, I <sub>D</sub> = 0.2A               |
| Diode Forward Voltage (Note 5)      | V <sub>SD</sub>     | 0.5 | —   | 1.4  | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 115mA               |
| <b>DYNAMIC CHARACTERISTICS</b>      |                     |     |     |      |      |  |
| Input Capacitance                   | C <sub>iss</sub>    | —   | —   | 150  | pF   | V <sub>DS</sub> = 16V, V <sub>GS</sub> = 0V<br>f = 1.0MHz  |
| Output Capacitance                  | C <sub>oss</sub>    | —   | —   | 25   | pF   |  |
| Reverse Transfer Capacitance        | C <sub>rss</sub>    | —   | —   | 20   | pF   |  |

- Notes:
1. Device mounted on FR-4 PCB.
  2. No purposefully added lead.
  3. Pulse width ≤10μs, Duty Cycle ≤1%
  4. Diodes Inc.'s "Green" policy can be found on our website at [http://www.diodes.com/products/lead\\_free/index.php](http://www.diodes.com/products/lead_free/index.php).
  5. Short duration pulse test used to minimize self-heating effect.

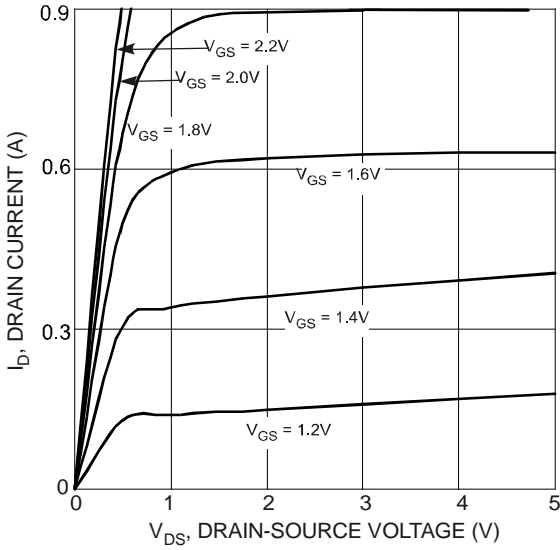


Fig. 1 Typical Output Characteristics

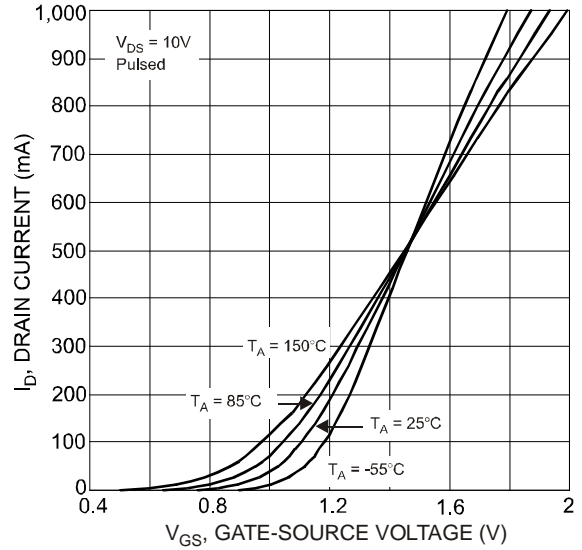


Fig. 2 Reverse Drain Current vs. Source-Drain Voltage

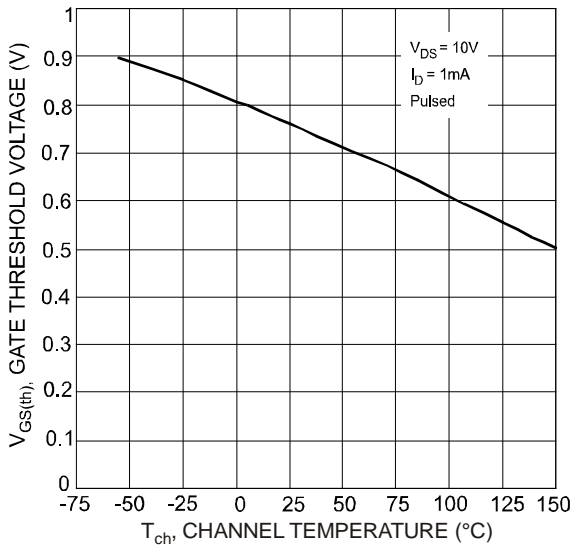


Fig. 3 Gate Threshold Voltage vs. Channel Temperature

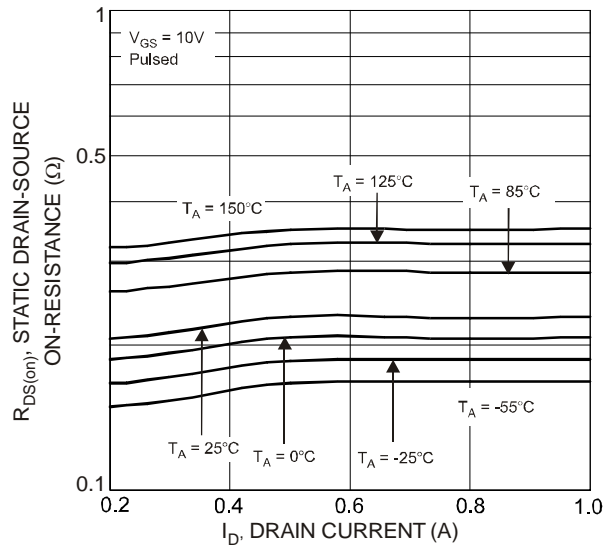


Fig. 4 Static Drain-Source On-Resistance vs. Drain Current

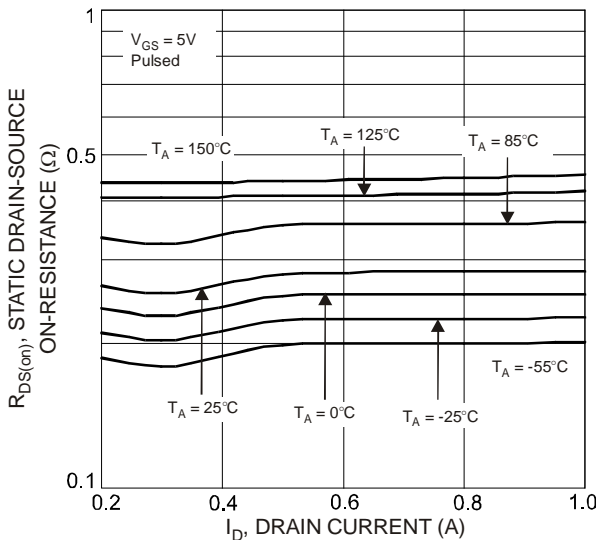


Fig. 5 Static Drain-Source On-Resistance vs. Drain Current

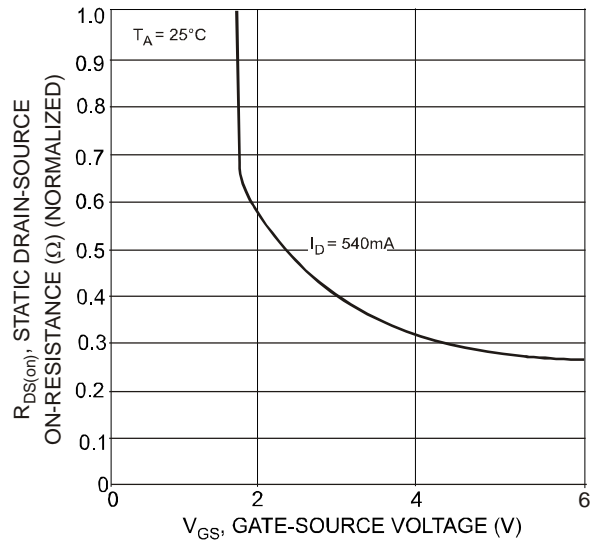


Fig. 6 Static Drain-Source, On-Resistance vs. Gate-Source Voltage

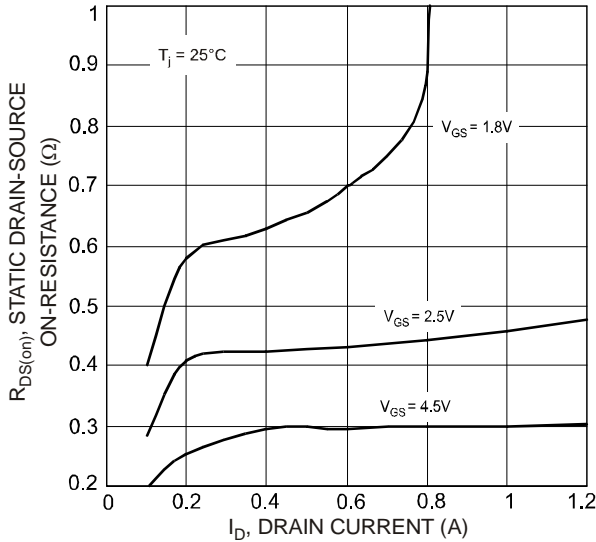


Fig. 7 On-Resistance vs. Drain Current and Gate Voltage

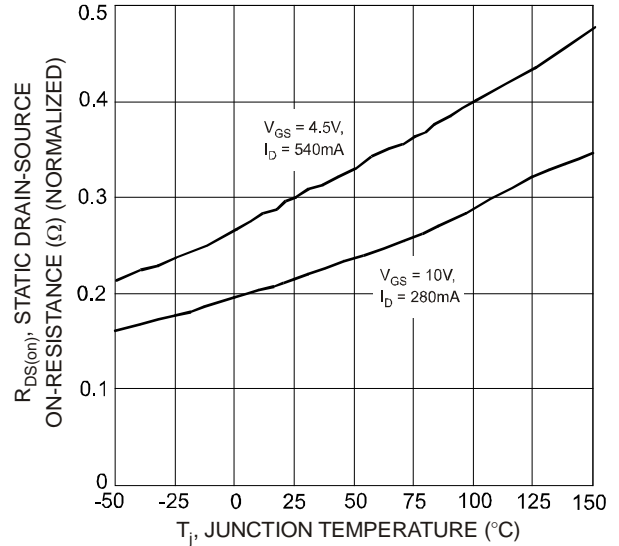


Fig. 8 Static Drain-Source, On-Resistance vs. Temperature

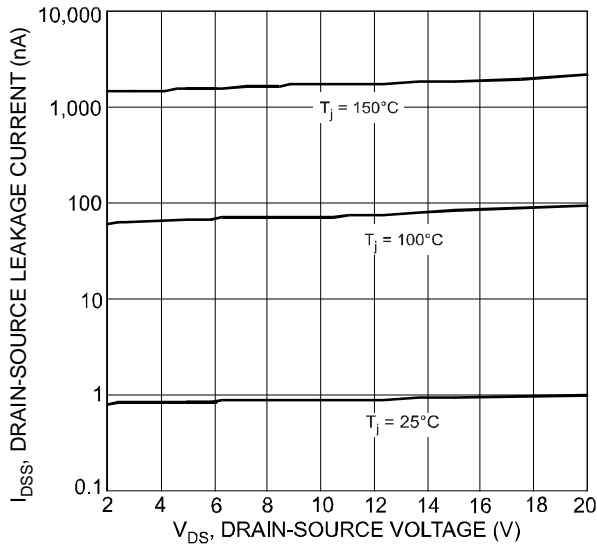


Fig. 9 Drain Source Leakage Current vs. Voltage

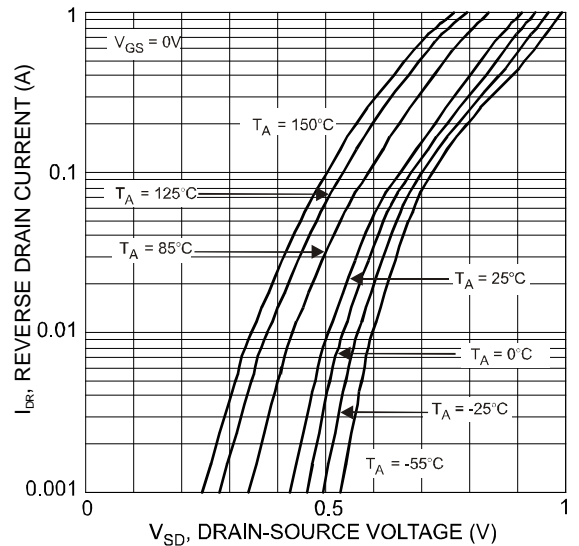


Fig. 10 Reverse Drain Current vs. Source-Drain Voltage

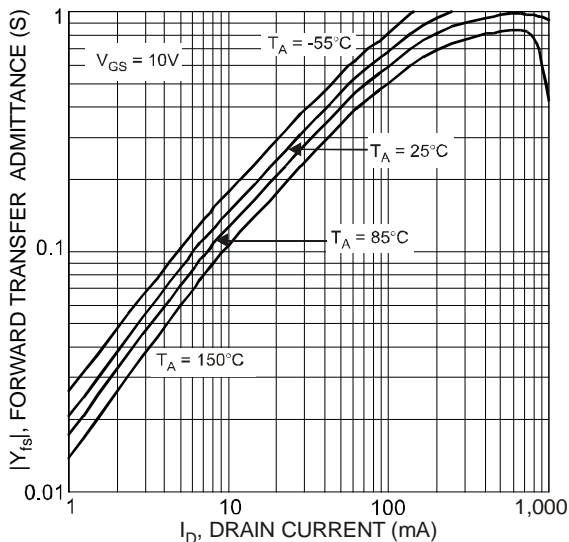


Fig. 11 Forward Transfer Admittance vs. Drain Current

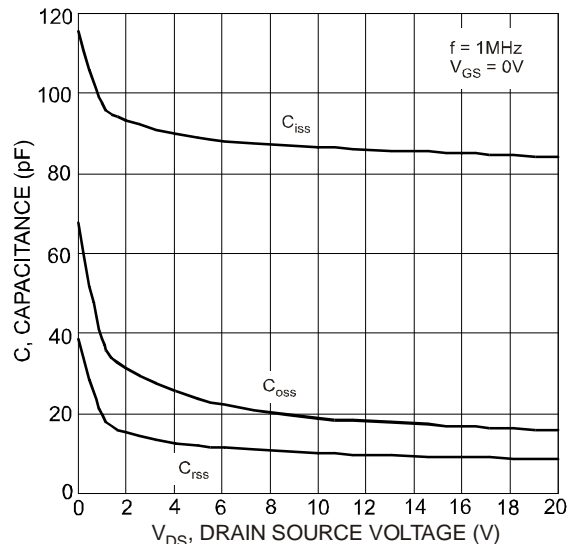


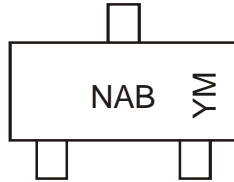
Fig. 12 Capacitance Variation

**Ordering Information** (Note 6)

| Part Number | Case    | Packaging        |
|-------------|---------|------------------|
| DMN2004TK-7 | SOT-523 | 3000/Tape & Reel |

Notes: 6. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

**Marking Information**



NAB = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year ex: T = 2006  
 M = Month ex: 9 = September

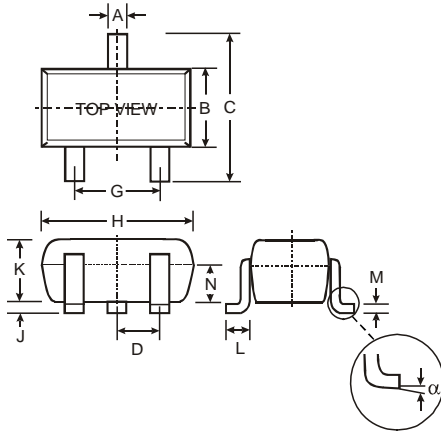
Date Code Key

| Year | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------|------|------|------|------|------|------|------|
| Code | T    | U    | V    | W    | X    | Y    | Z    |

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code  | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | O   | N   | D   |

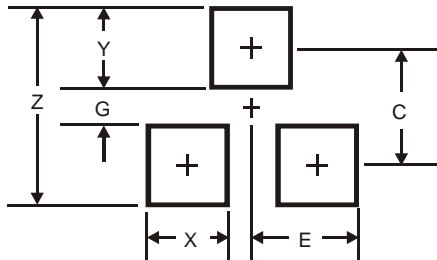
**Package Outline Dimensions**



| SOT-523 |      |      |      |
|---------|------|------|------|
| Dim     | Min  | Max  | Typ  |
| A       | 0.15 | 0.30 | 0.22 |
| B       | 0.75 | 0.85 | 0.80 |
| C       | 1.45 | 1.75 | 1.60 |
| D       | —    | —    | 0.50 |
| G       | 0.90 | 1.10 | 1.00 |
| H       | 1.50 | 1.70 | 1.60 |
| J       | 0.00 | 0.10 | 0.05 |
| K       | 0.60 | 0.80 | 0.75 |
| L       | 0.10 | 0.30 | 0.22 |
| M       | 0.10 | 0.20 | 0.12 |
| N       | 0.45 | 0.65 | 0.50 |
| α       | 0°   | 8°   | —    |

All Dimensions in mm

**Suggested Pad Layout**



| Dimensions | Value (in mm) |
|------------|---------------|
| Z          | 1.9           |
| G          | 0.9           |
| X          | 0.5           |
| Y          | 0.5           |
| C          | 1.4           |
| E          | 0.5           |

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