

Features

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **ESD Protected up to 2kV**
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**
- **Qualified to AEC-Q101 standards for High Reliability**

Mechanical Data

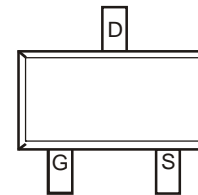
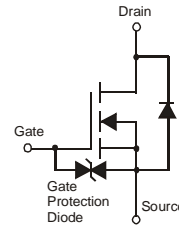
- Case: SOT-523
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin annealed over Alloy 42 leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram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



SOT-523



Top View



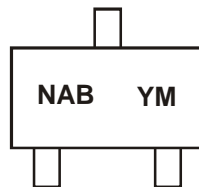
Top View

Ordering Information (Note 3)

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

- Notes:
1. No purposefully added lead.
 2. Diodes Inc.'s "Green" policy can be found on our website at <http://www.diodes.com>.
 3. For packaging details, go to our website at <http://www.diodes.com>.

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 |

Maximum Ratings @T_A = 25°C unless otherwise specified

| Characteristic | | | Symbol | Value | Units |
|-------------------------------|--------------|-----------------------|------------------|-------|-------|
| Drain-Source Voltage | | | V _{DSS} | 20 | V |
| Gate-Source Voltage | | | V _{GSS} | ±8 | V |
| Drain Current (Note 4) | Steady State | T _A = 25°C | I _D | 540 | mA |
| | | T _A = 85°C | | 390 | |
| Pulsed Drain Current (Note 5) | | | I _{DM} | 1.5 | A |

Thermal Characteristics @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Units |
|---|-----------------------------------|-------------|-------|
| Total Power Dissipation (Note 4) | P _D | 150 | mW |
| Thermal Resistance, Junction to Ambient | R _{θJA} | 833 | °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 6) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 20 | — | — | V | V _{GS} = 0V, I _D = 10μA |
| Zero Gate Voltage Drain Current | I _{DSS} | — | 0.8 | 300 | nA | V _{DS} = 16V, V _{GS} = 0V |
| | | — | 0.9 | — | nA | |
| Gate-Source Leakage | I _{GSS} | — | — | ±1 | μA | V _{GS} = ±4.5V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 6) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | 0.5 | — | 1.0 | V | V _{DS} = V _{GS} , I _D = 250μA |
| Static Drain-Source On-Resistance | R _{DS(on)} | — | 0.4 | 0.55 | Ω | V _{GS} = 4.5V, I _D = 540mA |
| | | — | 0.5 | 0.70 | | V _{GS} = 2.5V, I _D = 500mA |
| | | — | 0.7 | 0.9 | | V _{GS} = 1.8V, I _D = 350mA |
| Forward Transfer Admittance | Y _{fs} | 200 | — | — | ms | V _{DS} = 10V, I _D = 0.2A |
| Diode Forward Voltage (Note 6) | V _{SD} | 0.5 | — | 1.4 | V | V _{GS} = 0V, I _S = 115mA |
| DYNAMIC CHARACTERISTICS | | | | | | |
| Input Capacitance | C _{iss} | — | — | 150 | pF | V _{DS} = 16V, V _{GS} = 0V f = 1.0MHz |
| Output Capacitance | C _{oss} | — | — | 25 | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | — | 20 | pF | |
| SWITCHING CHARACTERISTICS | | | | | | |
| Turn-On Delay Time | t _{d(on)} | — | 8.5 | — | ns | V _{DD} = 10V, R _L = 47Ω, I _D = 200mA, V _{GEN} = 4.5V, R _G = 10Ω |
| Rise Time | t _r | — | 9.1 | — | ns | |
| Turn-Off Delay Time | t _{d(off)} | — | 51 | — | ns | |
| Fall Time | t _f | — | 28 | — | ns | |

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

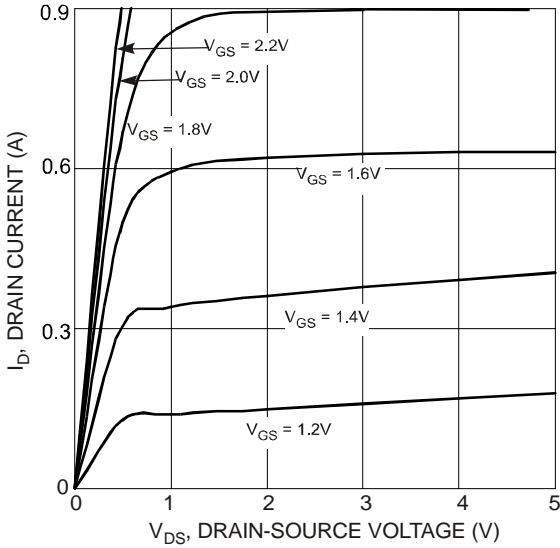


Fig. 1 Typical Output Characteristics

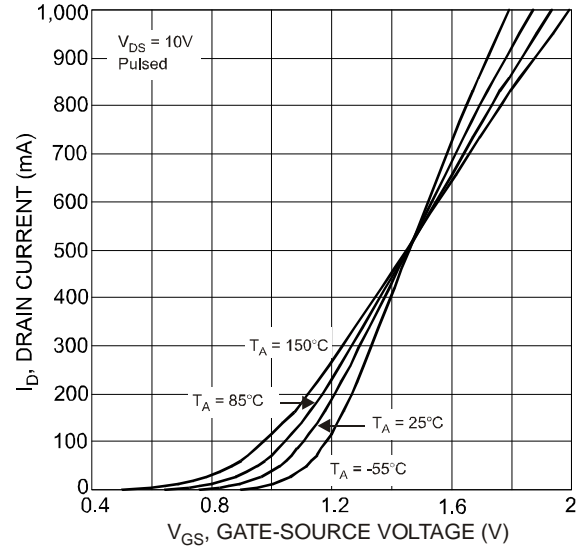


Fig. 2 Reverse Drain Current vs. Source-Drain Voltage

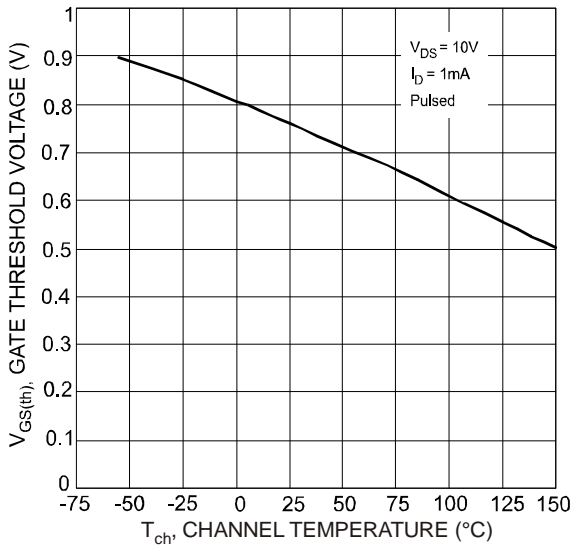


Fig. 3 Gate Threshold Voltage vs. Channel Temperature

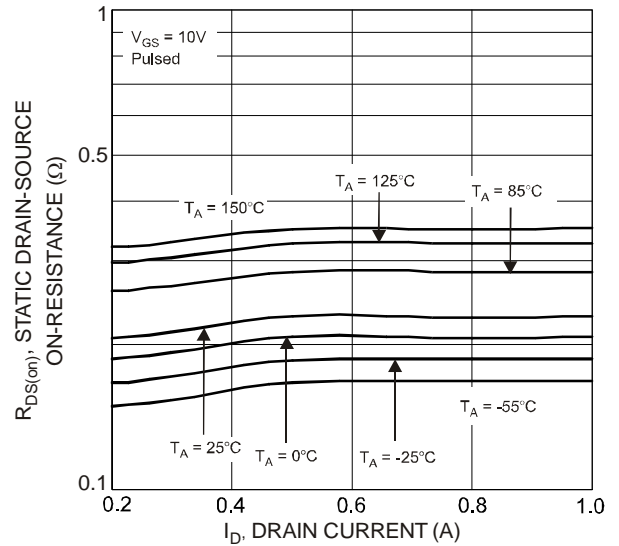


Fig. 4 Static Drain-Source On-Resistance vs. Drain Current

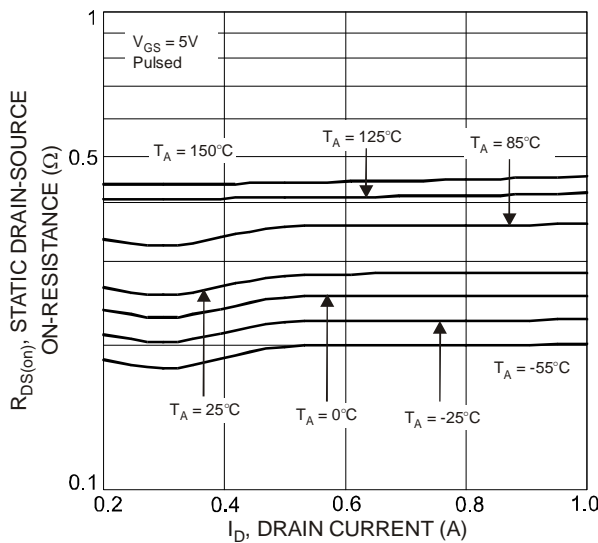


Fig. 5 Static Drain-Source On-Resistance vs. Drain Current

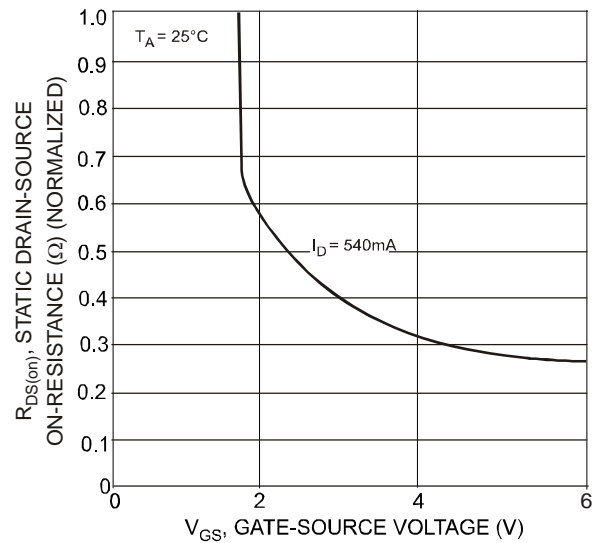


Fig. 6 Static Drain-Source, On-Resistance vs. Gate-Source Voltage

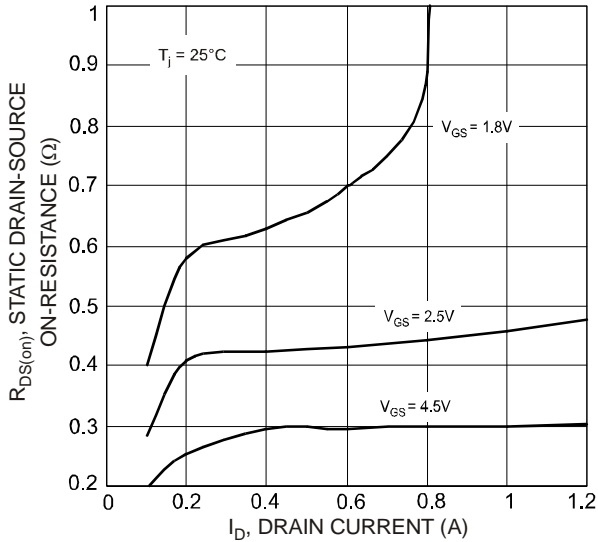


Fig. 7 On-Resistance vs. Drain Current and Gate Voltage

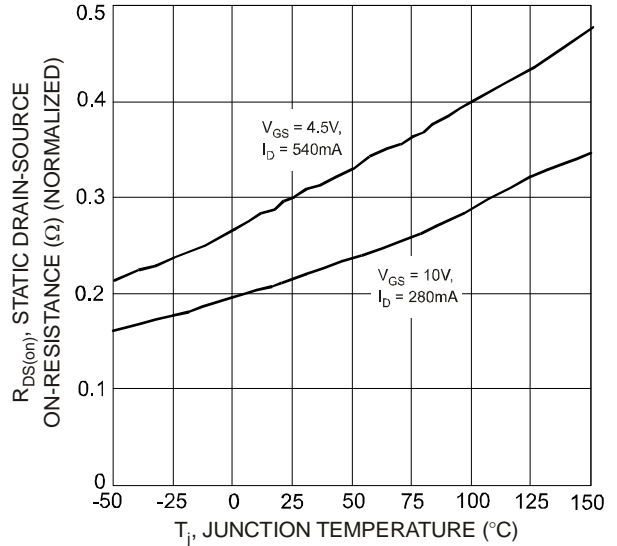


Fig. 8 Static Drain-Source, On-Resistance vs. Temperature

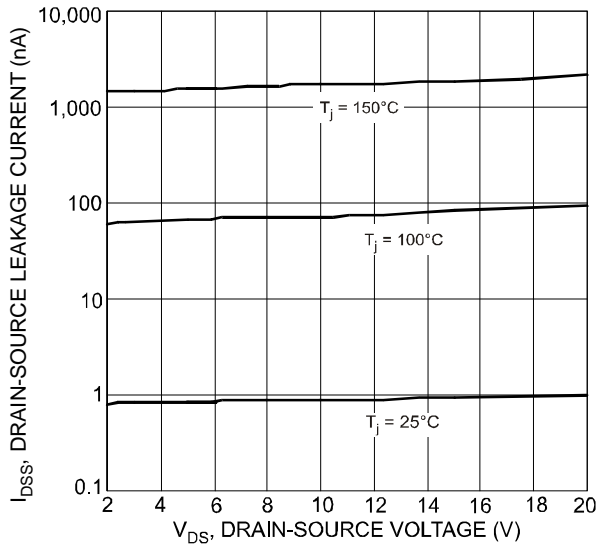


Fig. 9 Drain Source Leakage Current vs. Voltage

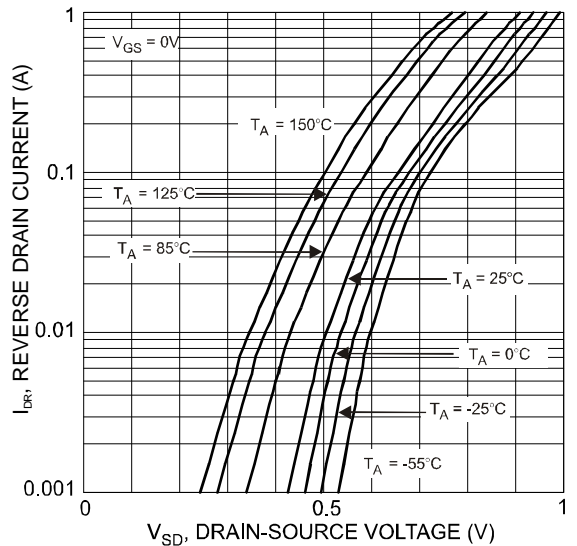


Fig. 10 Reverse Drain Current vs. Source-Drain Voltage

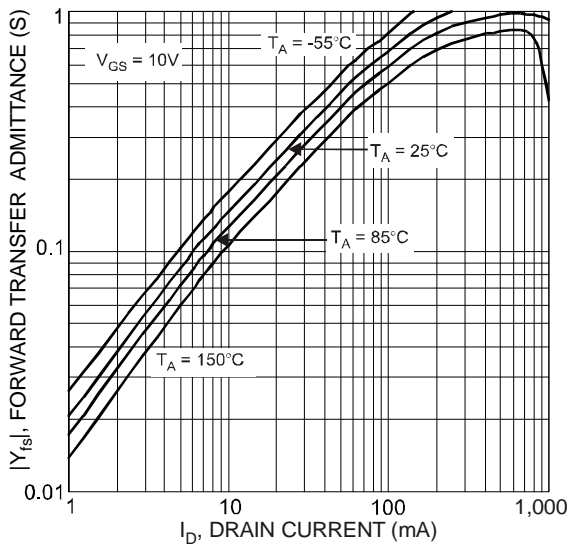


Fig. 11 Forward Transfer Admittance vs. Drain Current

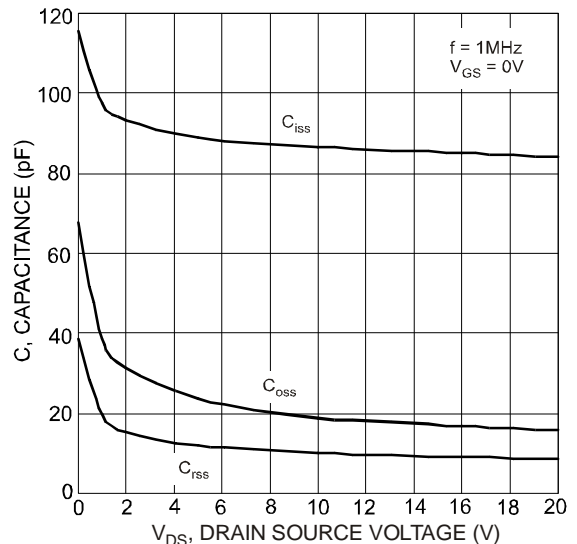
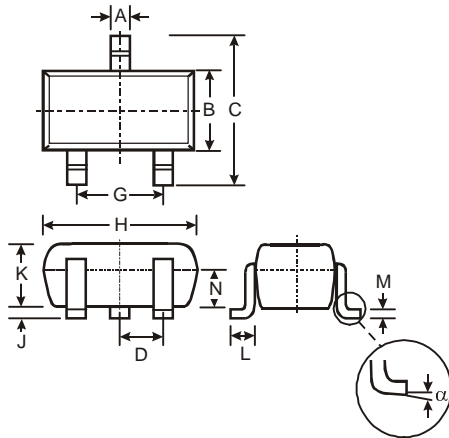


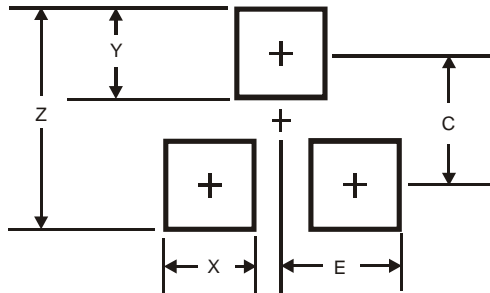
Fig. 12 Capacitance Variation

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 | 1.8 |
| X | 0.4 |
| Y | 0.51 |
| C | 1.3 |
| E | 0.7 |

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