

N-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR

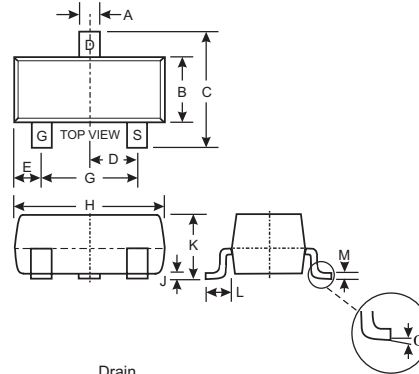
NEW PRODUCT

Features

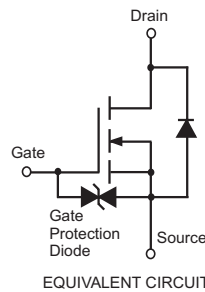
- Low On-Resistance: $R_{DS(ON)}$
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Lead Free By Design/RoHS Compliant (Note 2)**
- **ESD Protected up to 2KV**
- "Green" Device (Note 4)
- **Qualified to AEC-Q101 standards for High Reliability**

Mechanical Data

- Case: SOT-23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture sensitivity: Level 1 per J-STD-020C
- Terminals: Finish — Matte Tin annealed over Alloy 42 leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Marking: See Last Page
- Ordering & Date Code Information: See Last Page
- Weight: 0.008 grams (approximate)



| SOT-23 | | |
|----------------------|-------|-------|
| Dim | Min | Max |
| A | 0.37 | 0.51 |
| B | 1.20 | 1.40 |
| C | 2.30 | 2.50 |
| D | 0.89 | 1.03 |
| E | 0.45 | 0.60 |
| G | 1.78 | 2.05 |
| H | 2.80 | 3.00 |
| J | 0.013 | 0.10 |
| K | 0.903 | 1.10 |
| L | 0.45 | 0.61 |
| M | 0.085 | 0.180 |
| α | 0° | 8° |
| All Dimensions in mm | | |



Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

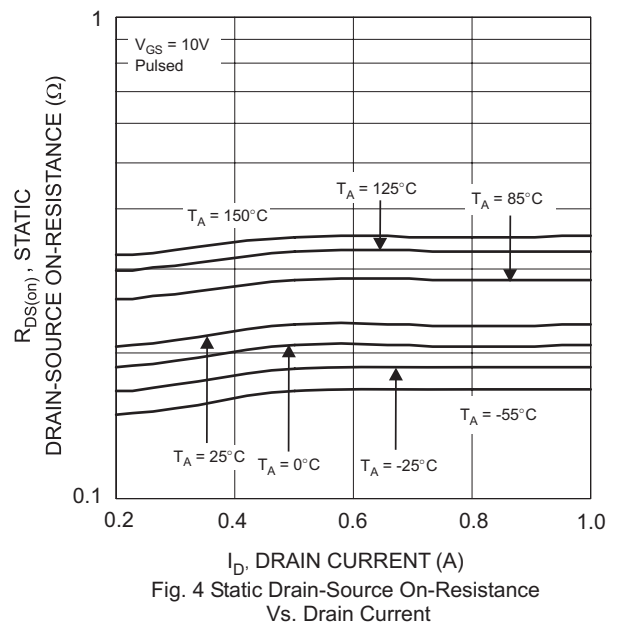
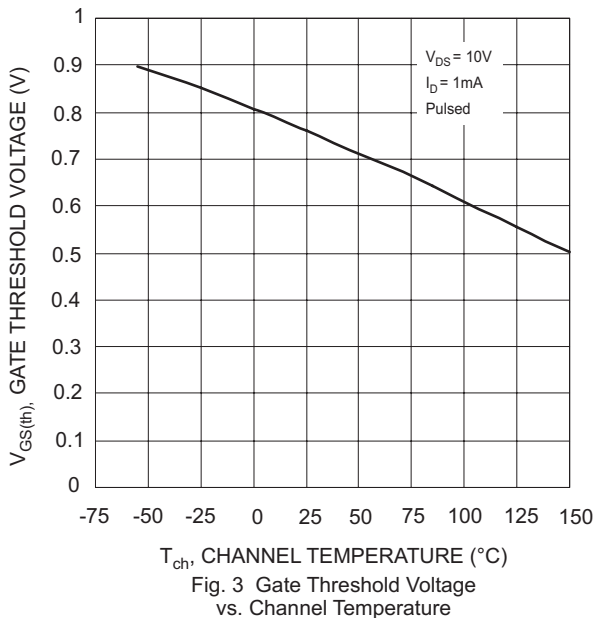
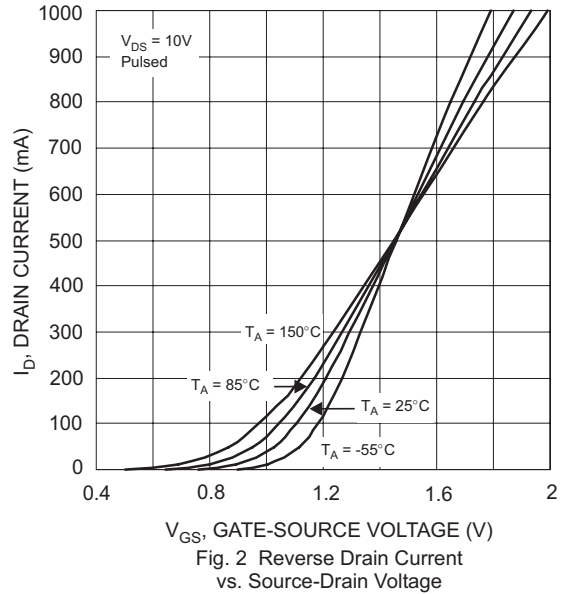
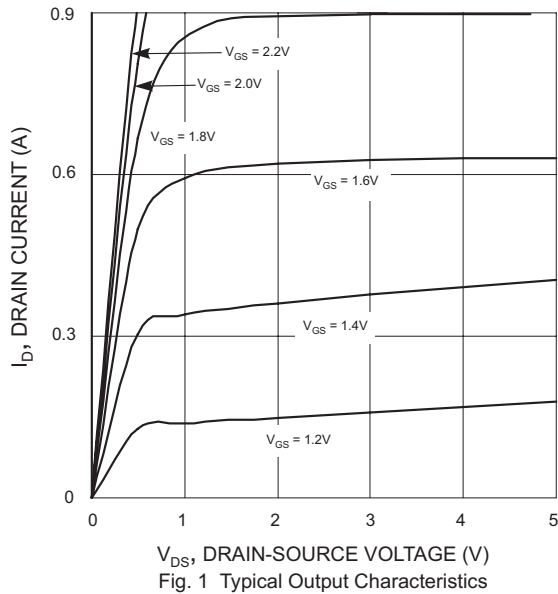
| Characteristic | | Symbol | Value | Units | |
|---|--------------|-----------------|--------------------------|--------------------|----|
| Drain-Source Voltage | | V_{DSS} | 20 | V | |
| Gate-Source Voltage | | V_{GSS} | ± 8 | V | |
| Drain Current (Note 1) | Steady State | I_D | $T_A = 25^\circ\text{C}$ | 540 | mA |
| | | | $T_A = 85^\circ\text{C}$ | 390 | |
| Pulsed Drain Current (Note 3) | | I_{DM} | 1.5 | A | |
| Total Power Dissipation (Note 1) | | P_d | 350 | mW | |
| Thermal Resistance, Junction to Ambient | | $R_{\theta JA}$ | 357 | $^\circ\text{C/W}$ | |
| Operating and Storage Temperature Range | | T_j, T_{STG} | -65 to +150 | $^\circ\text{C}$ | |

- Note:
1. Device mounted on FR-4 PCB.
 2. No purposefully added lead.
 3. Pulse width $\leq 10\mu\text{s}$, Duty Cycle $\leq 1\%$.
 4. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.

Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|-------------------------------------|--------------|-----|-----|---------|----------|---|
| OFF CHARACTERISTICS (Note 5) | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | 20 | — | — | V | $V_{GS} = 0V, I_D = 10\mu A$ |
| Zero Gate Voltage Drain Current | I_{DSS} | — | — | 1 | μA | $V_{DS} = 16V, V_{GS} = 0V$ |
| Gate-Source Leakage | I_{GSS} | — | — | ± 1 | μA | $V_{GS} = \pm 4.5V, V_{DS} = 0V$ |
| ON CHARACTERISTICS (Note 5) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | 0.5 | — | 1.0 | V | $V_{DS} = V_{GS}, I_D = 250\mu A$ |
| 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 5) | 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 | |

Notes: 5. Short duration test pulse used to minimize self-heating effect.



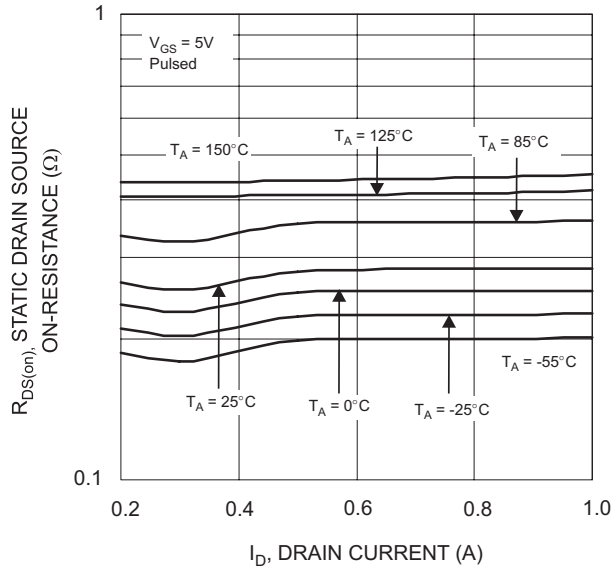


Fig. 5 Static Drain-Source On-Resistance vs. Drain Current

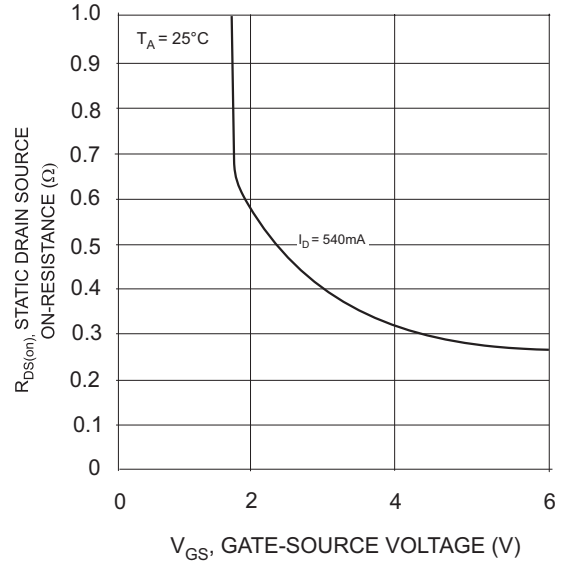


Fig. 6 Static Drain-Source, On-Resistance vs. Gate-Source Voltage

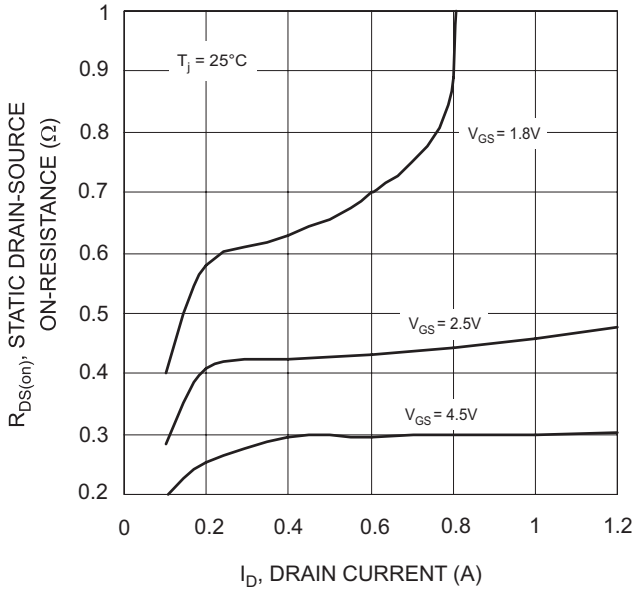


Fig. 7 On-Resistance vs. Drain Current and Gate Voltage

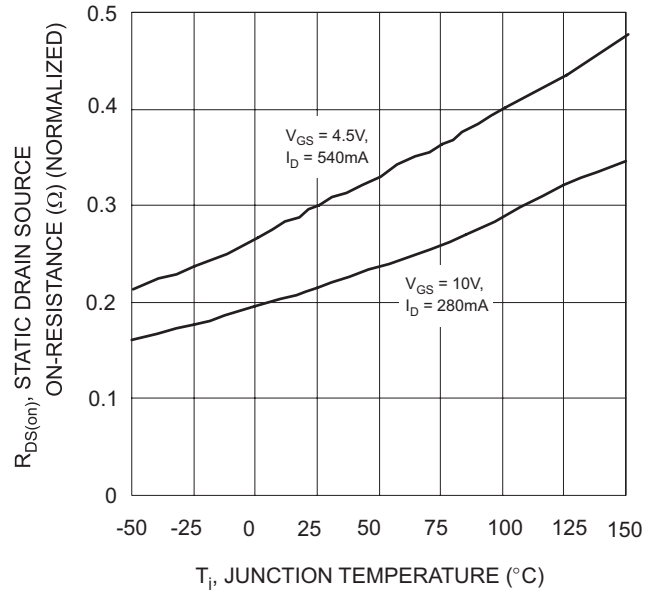


Fig. 8 Static Drain-Source, On-Resistance vs. Temperature

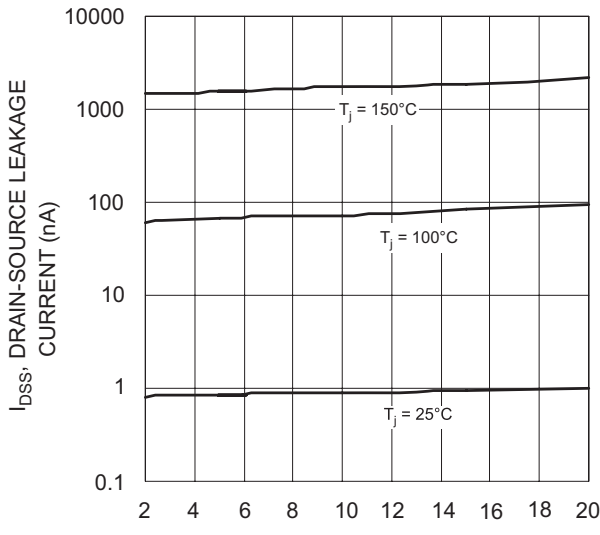


Fig. 9 Drain Source Leakage Current vs. Voltage

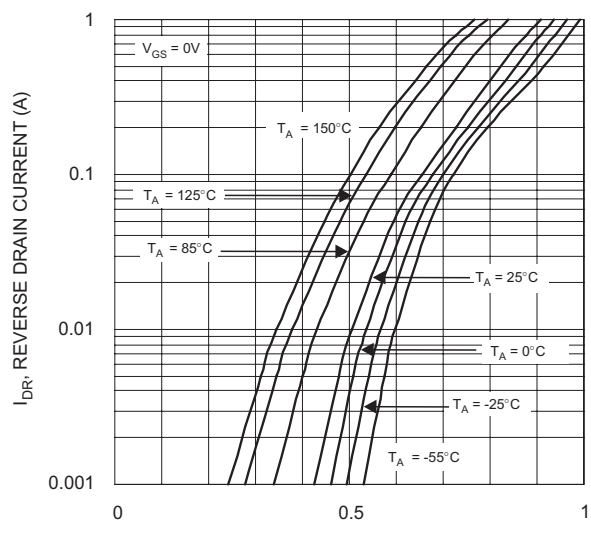


Fig. 10 Reverse Drain Current vs. Source-Drain Voltage

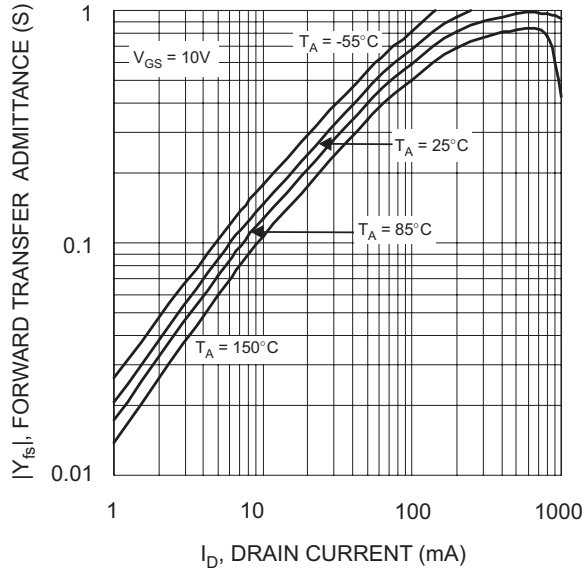


Fig. 11 Forward Transfer Admittance vs. Drain Current

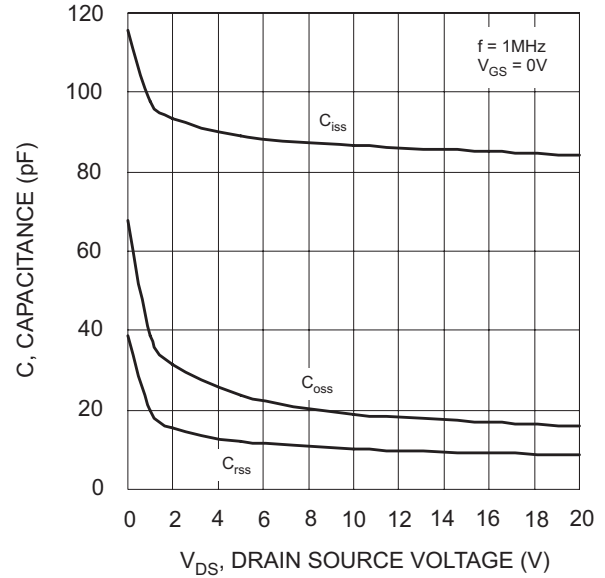


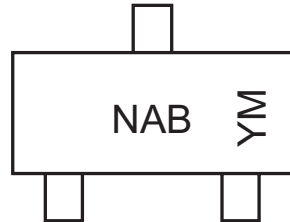
Fig. 12 Capacitance Variation

Ordering Information (Note 6)

| Device | Packaging | Shipping |
|------------|-----------|------------------|
| DMN2004K-7 | SOT-23 | 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 |
|------|------|------|------|------|
| Code | T | U | V | W |

| 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 |

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