

**N-CHANNEL ENHANCEMENT MODE MOSFET**

**Product Summary**

| $V_{(BR)DSS}$ | $R_{DS(ON)}$           | $I_D$<br>$T_A = +25^\circ C$ |
|---------------|------------------------|------------------------------|
| 50V           | 2.0Ω @ $V_{GS} = 5.0V$ | 300 mA                       |
|               | 2.5Ω @ $V_{GS} = 2.5V$ | 200 mA                       |

**Features and Benefits**

- Low On-Resistance
- Very Low Gate Threshold Voltage (1.0V max)
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- ESD Protected Up To 2kV
- **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**

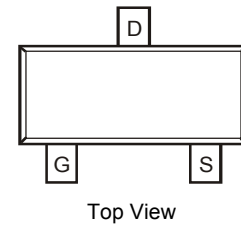
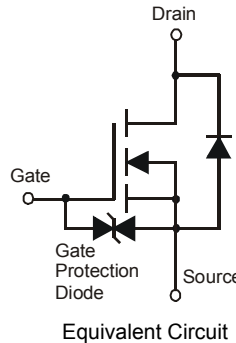
**Description and Applications**

This new generation 50V N-Channel Enhancement Mode MOSFET has been designed to minimize RDS(on) and yet maintain superior switching performance. This device is ideal for use in Notebook battery power management and Load switch.

- Load switches
- Level switches

**Mechanical Data**

- Case: SOT23
- 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: 0.008 grams (approximate)

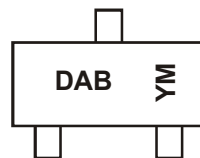


**Ordering Information (Note 4)**

| Part Number | Qualification | Case  | Packaging        |
|-------------|---------------|-------|------------------|
| DMN5L06K-7  | Commercial    | SOT23 | 3000/Tape & Reel |
| DMN5L06KQ-7 | Automotive    | SOT23 | 3000/Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) 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 <http://www.diodes.com/products/packages.html>.

**Marking Information**



DAB = 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 | 2013 | 2014 | 2015 | 2016 | 2017 |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| Code  | T    | U    | V    | W    | X    | Y    | Z    | A    | B    | C    | D    | E    |
| 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** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic         | Symbol    | Value           | Unit |
|------------------------|-----------|-----------------|------|
| Drain Source Voltage   | $V_{DSS}$ | 50              | V    |
| Gate-Source Voltage    | $V_{GSS}$ | $\pm 20$        | V    |
| Drain Current (Note 5) | $I_D$     | Continuous      | 300  |
|                        |           | Pulsed (Note 6) | 800  |

**Thermal Characteristics**

| Characteristic                          | Symbol          | Value       | Unit               |
|---|-----------------|-------------|--------------------|
| Total Power Dissipation (Note 5)        | $P_D$           | 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 | $^\circ\text{C}$   |

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

| Characteristic                      | Symbol       | Min  | Typ | Max | Unit          | Test Condition   |
|-------------------------------------|--------------|------|-----|-----|---------------|--|
| <b>OFF CHARACTERISTICS (Note 7)</b> |              |      |     |     |               |  |
| Drain-Source Breakdown Voltage      | $BV_{DSS}$   | 50   | —   | —   | V             | $V_{GS} = 0V, I_D = 10\mu\text{A}$                         |
| Zero Gate Voltage Drain Current     | $I_{DSS}$    | —    | —   | 60  | nA            | @ $T_C = +25^\circ\text{C}$<br>$V_{DS} = 50V, V_{GS} = 0V$ |
| Gate-Body Leakage                   | $I_{GSS}$    | —    | —   | 1   | $\mu\text{A}$ | $V_{GS} = \pm 12V, V_{DS} = 0V$                            |
|                                     |              |      |     | 500 | nA            | $V_{GS} = \pm 10V, V_{DS} = 0V$                            |
|                                     |              |      |     | 50  | nA            | $V_{GS} = \pm 5V, V_{DS} = 0V$                             |
| <b>ON CHARACTERISTICS (Note 7)</b>  |              |      |     |     |               |  |
| Gate Threshold Voltage              | $V_{GS(th)}$ | 0.49 | —   | 1.0 | V             | $V_{DS} = V_{GS}, I_D = 250\mu\text{A}$                    |
| Static Drain-Source On-Resistance   | $R_{DS(on)}$ | —    | —   | 3.0 | $\Omega$      | $V_{GS} = 1.8V, I_D = 50\text{mA}$                         |
|                                     |              |      |     | 2.5 |               | $V_{GS} = 2.5V, I_D = 50\text{mA}$                         |
|                                     |              |      |     | 2.0 |               | $V_{GS} = 5.0V, I_D = 50\text{mA}$                         |
| On-State Drain Current              | $I_{D(on)}$  | 0.5  | 1.4 | —   | A             | $V_{GS} = 10V, V_{DS} = 7.5V$                              |
| Forward Transconductance            | $ Y_{fs} $   | 200  | —   | —   | mS            | $V_{DS} = 10V, I_D = 0.2A$                                 |
| Source-Drain Diode Forward Voltage  | $V_{SD}$     | 0.5  | —   | 1.4 | V             | $V_{GS} = 0V, I_S = 115\text{mA}$                          |
| <b>DYNAMIC CHARACTERISTICS</b>      |              |      |     |     |               |  |
| Input Capacitance                   | $C_{iss}$    | —    | —   | 50  | pF            | $V_{DS} = 25V, V_{GS} = 0V$<br>$f = 1.0\text{MHz}$         |
| Output Capacitance                  | $C_{oss}$    | —    | —   | 25  | pF            |  |
| Reverse Transfer Capacitance        | $C_{rss}$    | —    | —   | 5.0 | pF            |  |

- Notes:
5. Device mounted on FR-4 PCB
  6. Pulse width  $\leq 10\text{ms}$ , Duty Cycle  $\leq 1\%$ .
  7. Short duration pulse test used to minimize self-heating effect.

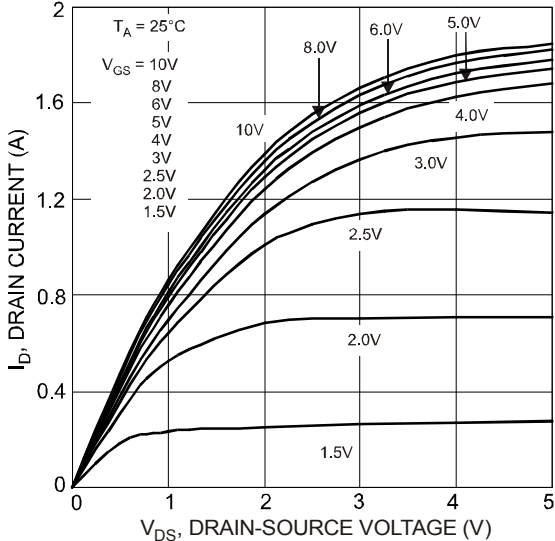


Fig. 1 Typical Output Characteristics

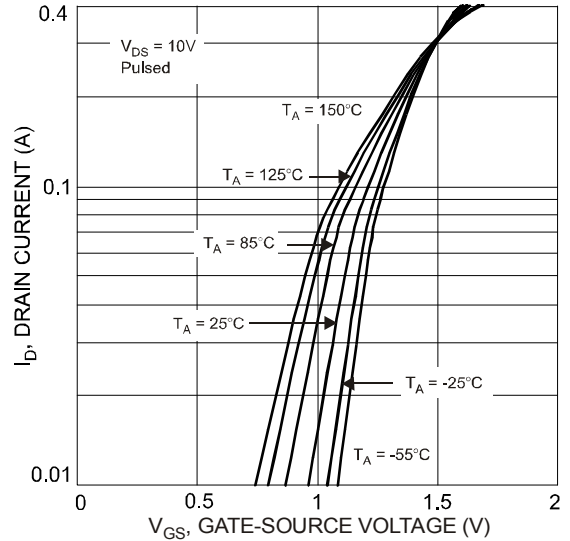


Fig. 2 Typical Transfer Characteristics

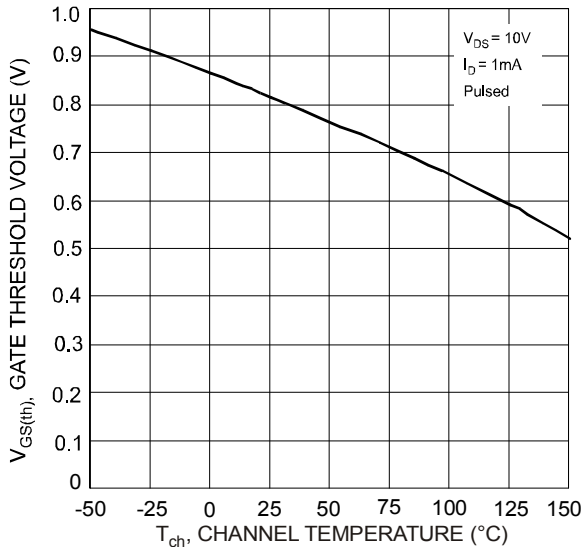


Fig. 3 Gate Threshold Voltage vs. Channel Temperature

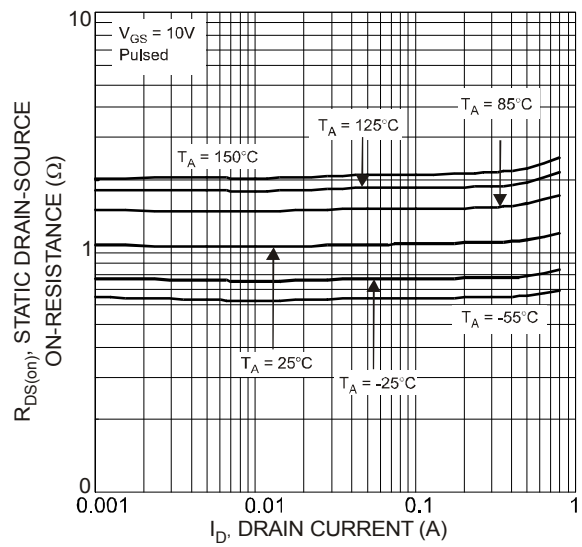


Fig. 4 Static Drain-Source On-Resistance vs. Drain Current

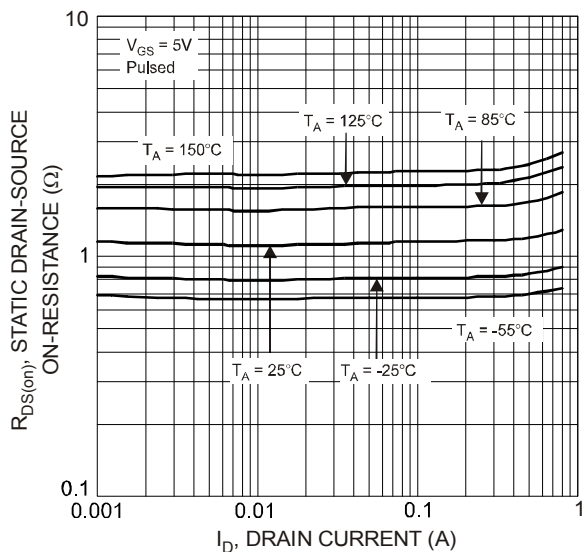


Fig. 5 Static Drain-Source On-Resistance vs. Drain Current

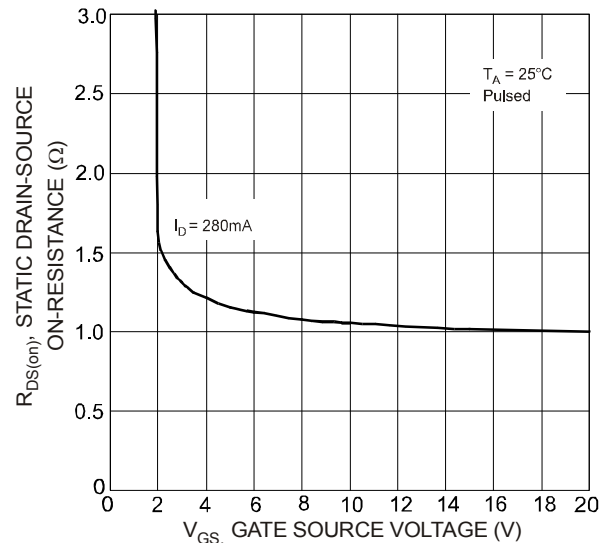


Fig. 6 Static Drain-Source On-Resistance vs. Gate-Source Voltage

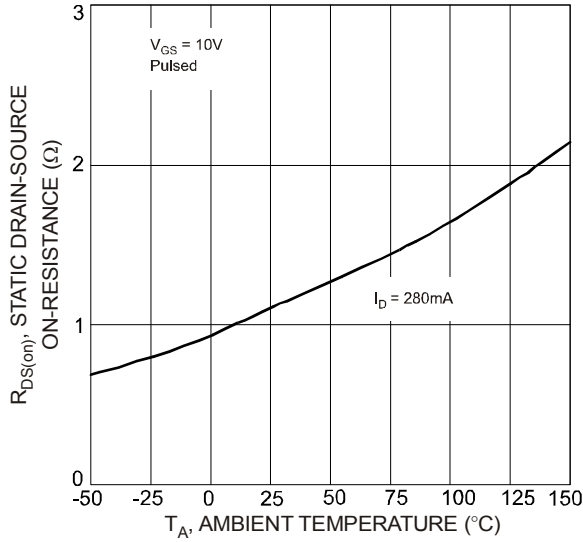


Fig. 7 Static Drain-Source On-State Resistance vs. Ambient Temperature

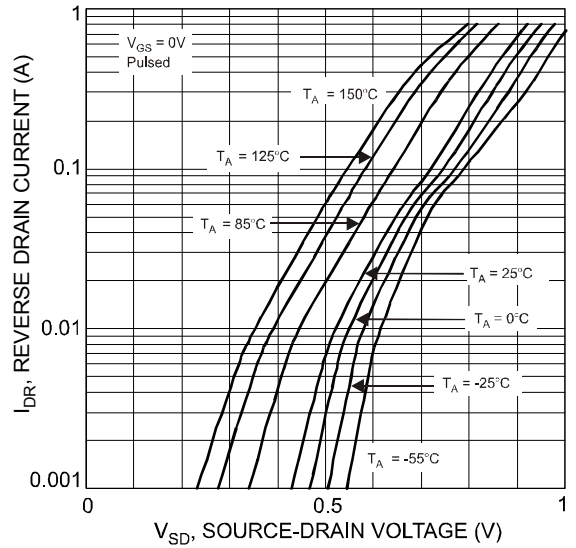


Fig. 8 Reverse Drain Current vs. Source-Drain Voltage

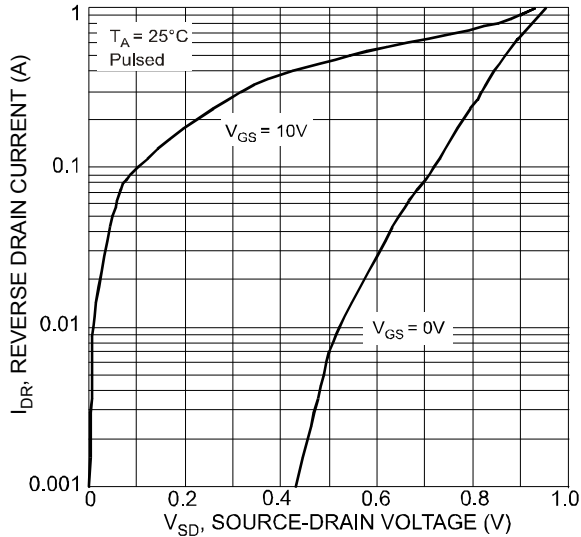


Fig. 9 Reverse Drain Current vs. Source-Drain Voltage

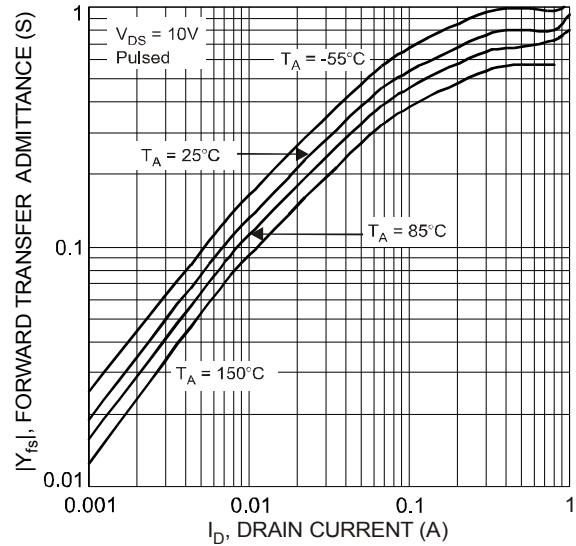


Fig. 10 Forward Transfer Admittance vs. Drain Current

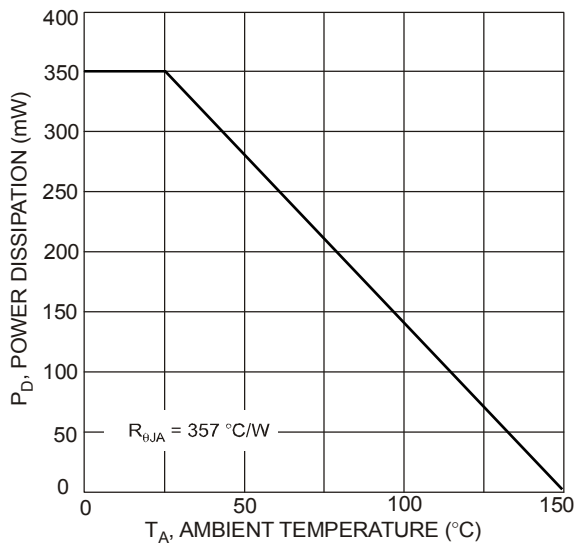


Fig. 11 Derating Curve - Total

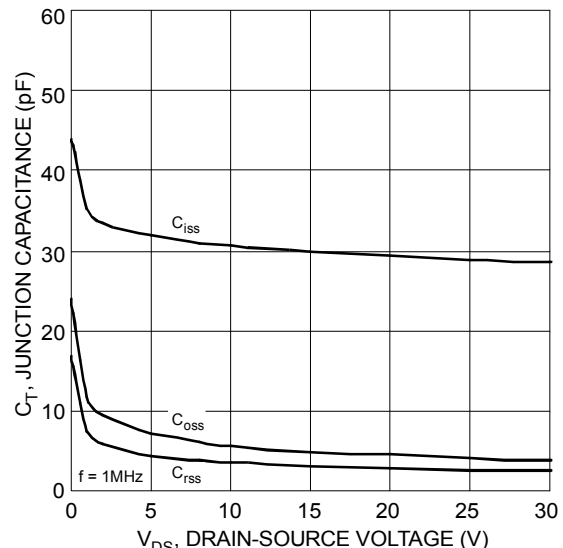
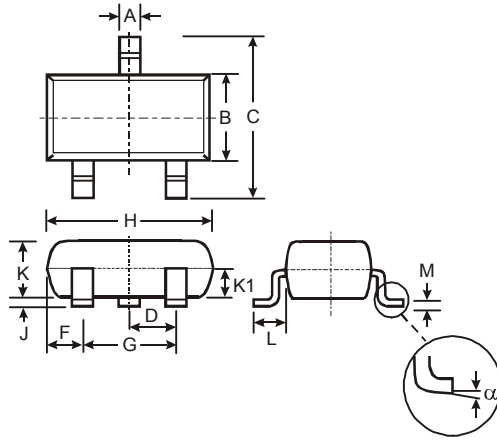


Figure 12 Typical Junction Capacitance

**Package Outline Dimensions**

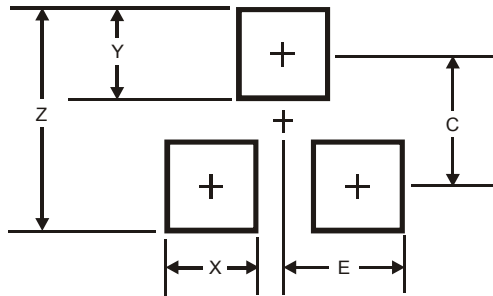
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| SOT23                |       |      |       |
|----------------------|-------|------|-------|
| Dim                  | Min   | Max  | Typ   |
| A                    | 0.37  | 0.51 | 0.40  |
| B                    | 1.20  | 1.40 | 1.30  |
| C                    | 2.30  | 2.50 | 2.40  |
| D                    | 0.89  | 1.03 | 0.915 |
| F                    | 0.45  | 0.60 | 0.535 |
| G                    | 1.78  | 2.05 | 1.83  |
| H                    | 2.80  | 3.00 | 2.90  |
| J                    | 0.013 | 0.10 | 0.05  |
| K                    | 0.903 | 1.10 | 1.00  |
| K1                   | -     | -    | 0.400 |
| L                    | 0.45  | 0.61 | 0.55  |
| M                    | 0.085 | 0.18 | 0.11  |
| α                    | 0°    | 8°   | -     |
| All Dimensions in mm |       |      |       |

**Suggested Pad Layout**

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



| Dimensions | Value (in mm) |
|------------|---------------|
| Z          | 2.9           |
| X          | 0.8           |
| Y          | 0.9           |
| C          | 2.0           |
| E          | 1.35          |

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