# P-CHANNEL ENHANCEMENT MODE MOSFET

Please click here to visit our online spice models database.

## Features

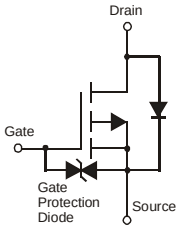
- Low On-Resistance
- Very Low Gate Threshold Voltage $V_{GS(th)}$ < 1V
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **ESD Protected Gate**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

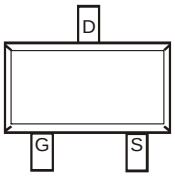
- Case: SOT323
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin annealed over Alloy 42 leadframe. Solderable per MIL-STD-202, Method 208 e3
- Terminal Connections: See Diagram
- Weight: 0.006 grams (approximate)


SOT323

Top View




Equivalent Circuit



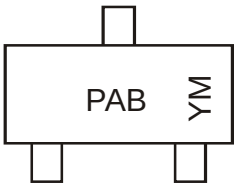

Top View

## Ordering Information (Note 4)

| Part Number | Case | Packaging |
|---|---|---|
| DMP2004WK-7 | SOT323 | 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 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.

## Marking Information




PAB = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: U = 2007)
M = Month (ex: 9 = September)

Date Code Key

| Year | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | 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°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 5) | $I_D$ | -400 | mA |
| Pulsed Drain Current | $I_{DM}$ | -1.4 | A |

## Thermal Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Units |
|---|---|---|---|
| Total Power Dissipation (Note 5) | $P_d$ | 250 | mW |
| Thermal Resistance, Junction to Ambient (Note 5) | $R_{\theta JA}$ | 500 | °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, $I_D$ = -250μA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | — | — | -1.0 | μA | $V_{DS}$ = -20V, $V_{GS}$ = 0V |
| Gate-Source Leakage | $I_{GSS}$ | — | — | ±1.0 | 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 | $R_{DS\ (ON)}$ | — | 0.7<br>1.1<br>1.7 | 0.9<br>1.4<br>2.0 | Ω | $V_{GS}$ = -4.5V, $I_D$ = -430mA<br>$V_{GS}$ = -2.5V, $I_D$ = -300mA<br>$V_{GS}$ = -1.8V, $I_D$ = -150mA |
| Forward Transfer Admittance | $\|Y_{fs}\|$ | 200 | — | — | mS | $V_{DS}$ =10V, $I_D$ = -0.2A |
| Diode Forward Voltage (Note 6) | $V_{SD}$ | -0.5 | — | -1.2 | V | $V_{GS}$ = 0V, $I_S$ = -115mA |
| **DYNAMIC CHARACTERISTICS** | | | | | | |
| Input Capacitance | $C_{iss}$ | — | — | 175 | pF | $V_{DS}$ = -16V, $V_{GS}$ = 0V<br>f = 1.0MHz |
| Output Capacitance | $C_{oss}$ | — | — | 30 | pF | |
| Reverse Transfer Capacitance | $C_{rss}$ | — | — | 20 | pF | |

Notes: 5. Device mounted on FR-4 PCB.
6. Short duration pulse test used to minimize self-heating effect.

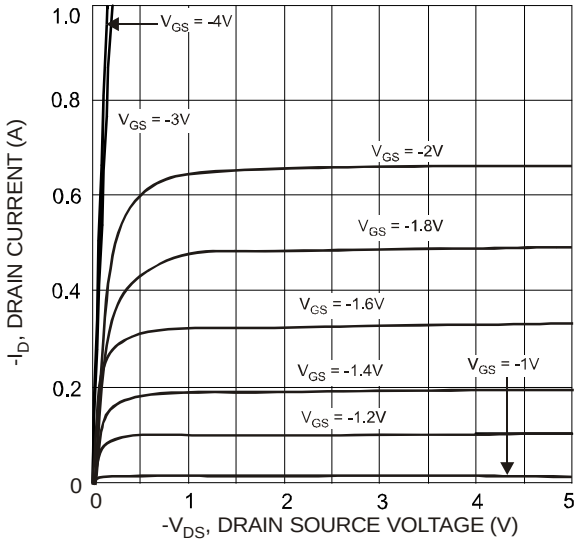



Fig. 1 Typical Output Characteristics

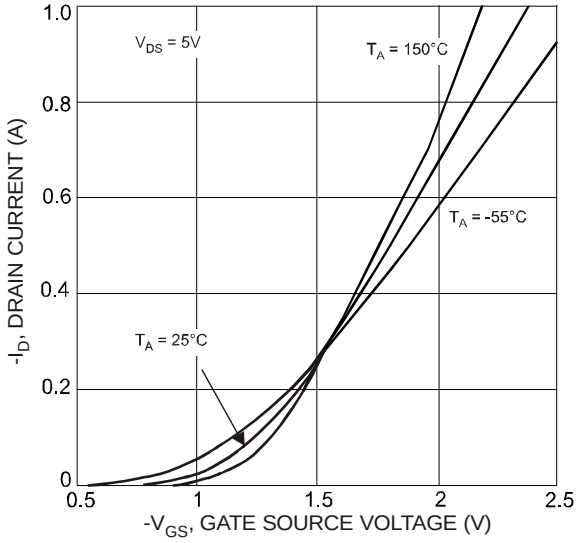



Fig. 2 Typical Transfer Characteristics

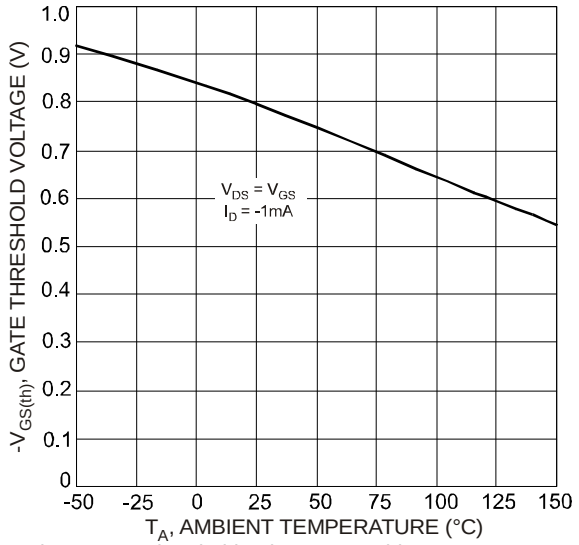



Fig. 3 Gate Threshold Voltage vs. Ambient Temperature

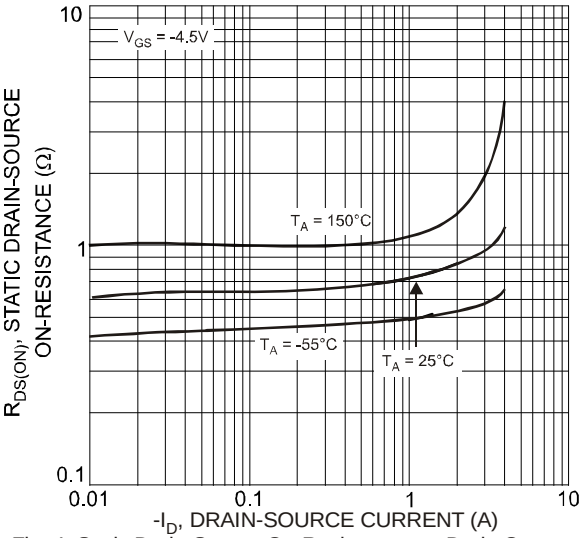



Fig. 4 Static Drain-Source On-Resistance vs. Drain Current

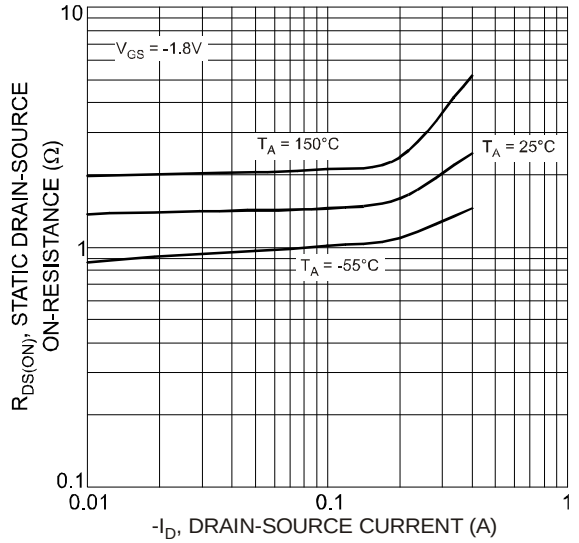



Fig. 5 Static Drain-Source On-Resistance vs. Drain Current

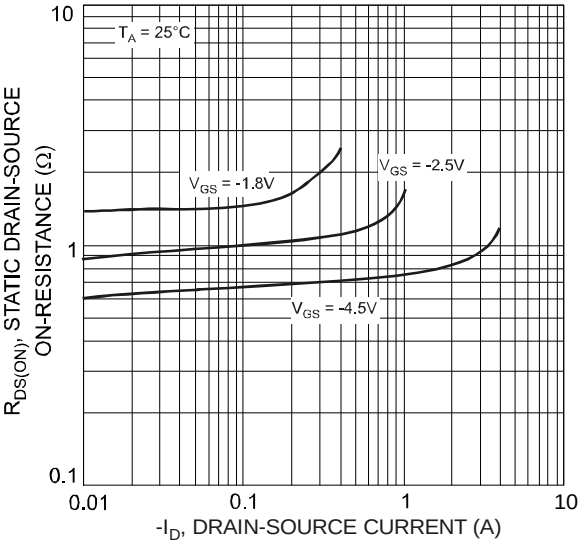



Fig. 6 Static Drain-Source On-Resistance vs. Drain-Source Current vs. Gate Source Voltage

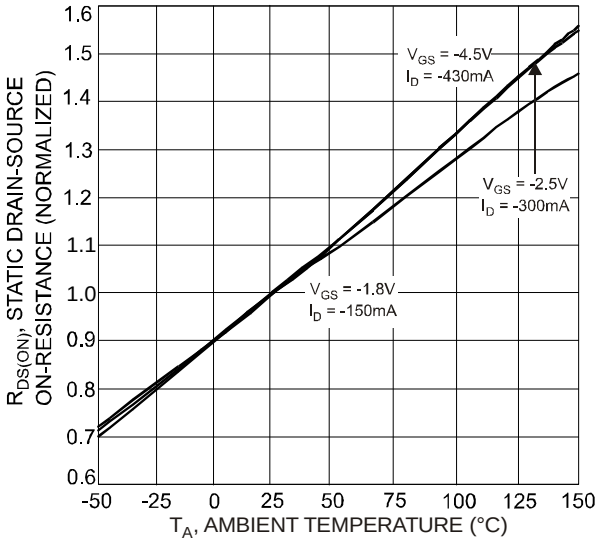



Fig. 7 Static Drain-Source On-State Resistance vs. Ambient Temperature

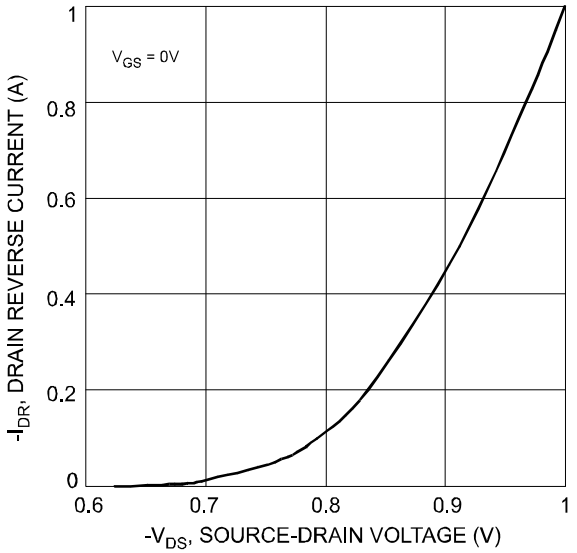



Fig. 8 Drain Reverse Current vs. Source-Drain Voltage

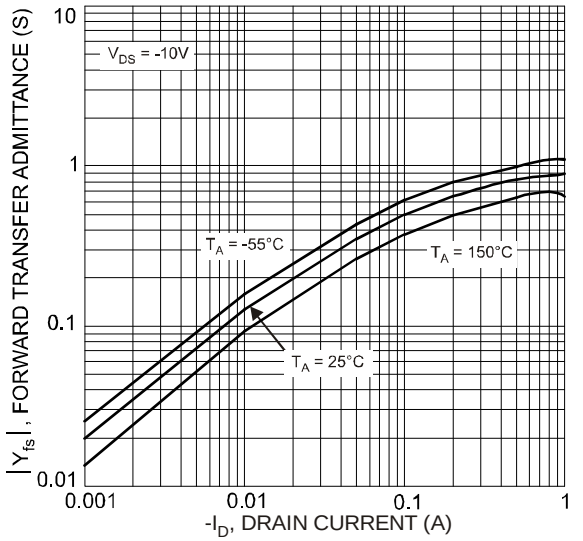



Fig. 9 Forward Transfer Admittance vs. Drain Current

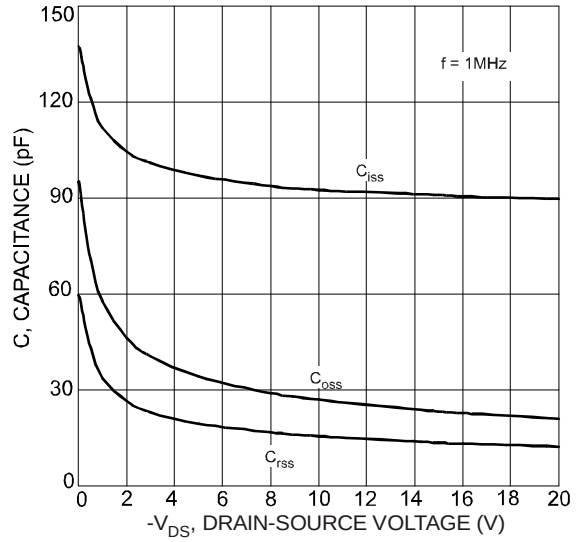
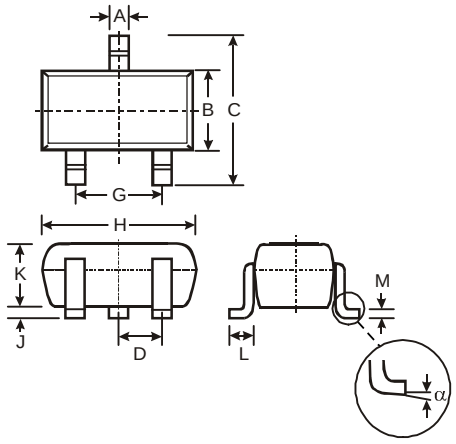



Fig. 10 Typical Capacitance

## Package Outline Dimensions

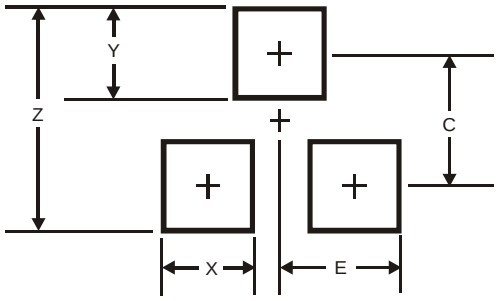
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.




| SOT323 | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 0.25 | 0.40 | 0.30 |
| **B** | 1.15 | 1.35 | 1.30 |
| **C** | 2.00 | 2.20 | 2.10 |
| **D** | - | - | 0.65 |
| **G** | 1.20 | 1.40 | 1.30 |
| **H** | 1.80 | 2.20 | 2.15 |
| **J** | 0.0 | 0.10 | 0.05 |
| **K** | 0.90 | 1.00 | 1.00 |
| **L** | 0.25 | 0.40 | 0.30 |
| **M** | 0.10 | 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** | 2.8 |
| **X** | 0.7 |
| **Y** | 0.9 |
| **C** | 1.9 |
| **E** | 1.0 |