# DMP2160UFDB

## DUAL P-CHANNEL ENHANCEMENT MODE MOSFET

Please click here to visit our online spice models database.

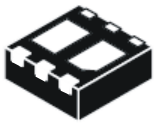
## Features

- Low On-Resistance
  - 70mΩ @$V_{GS}$ = -4.5V
  - 85mΩ @$V_{GS}$ = -2.5V
  - 86mΩ (typ) @$V_{GS}$ = -1.8V
- Low Gate Threshold Voltage, -0.9V Max
- Fast Switching Speed
- Low Input/Output Leakage
- Low Profile, 0.5mm Max Height
- **Lead Free/RoHS Compliant (Note 2)**
- **"Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

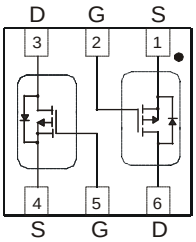
## Mechanical Data

- Case: DFN2020B-6
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – NiPdAu annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 4
- Ordering Information: See Page 4
- Weight: 0.0065 grams (approximate)

DFN2020B-6



BOTTOM VIEW




TOP VIEW
Internal Schematic

## Maximum Ratings @$T_A$ = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Power Dissipation (Note 1) | $P_D$ | 1.4 | W |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 89 | °C/W |
| Operating and Storage Temperature Range | $T_J$, $T_{STG}$ | -55 to +150 | °C |

## Maximum Ratings @$T_A$ = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Units |
|---|---|---|---|
| Drain-Source Voltage | $V_{DSS}$ | -20 | V |
| Gate-Source Voltage | $V_{GSS}$ | ±12 | V |
| Drain Current (Note 1) | $I_D$ | -3.8 | A |
| Pulsed Drain Current (Note 4) | $I_{DM}$ | -13 | A |

Notes:
1. Device mounted on FR-4 PCB, on minimum recommended, 2oz Copper pad layout.
2. No purposefully added lead.
3. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.
4. Repetitive rating, pulse width limited by junction temperature.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## Electrical Characteristics @$T_A$ = 25°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, $I_D$ = -250μA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | — | — | -1 | μA | $V_{DS}$ = -20V, $V_{GS}$ = 0V |
| Gate-Source Leakage | $I_{GSS}$ | —<br>— | —<br>— | ±100<br>±800 | nA | $V_{GS}$ = ±8V, $V_{DS}$ = 0V<br>$V_{GS}$ = ±12V, $V_{DS}$ = 0V |
| **ON CHARACTERISTICS (Note 5)** | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | -0.45 | — | -0.9 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = -250μA |
| Static Drain-Source On-Resistance | $R_{DS\ (ON)}$ | —<br>—<br>— | 54<br>68<br>86 | 70<br>85<br>— | mΩ | $V_{GS}$ = -4.5V, $I_D$ = -2.8A<br>$V_{GS}$ = -2.5V, $I_D$ = -2.0A<br>$V_{GS}$ = -1.8V, $I_D$ = -1.0A |
| Forward Transfer Admittance | $\|Y_{fs}\|$ | — | 8 | — | S | $V_{DS}$ = -5V, $I_D$ = -2.8A |
| Diode Forward Voltage (Note 5) | $V_{SD}$ | — | 0.7 | -1.2 | V | $V_{GS}$ = 0V, $I_S$ = -1.6A |
| **DYNAMIC CHARACTERISTICS** | | | | | | |
| Input Capacitance | $C_{iss}$ | — | 536 | — | pF | $V_{DS}$ = -10V, $V_{GS}$ = 0V<br>f = 1.0MHz |
| Output Capacitance | $C_{oss}$ | — | 68 | — | pF | |
| Reverse Transfer Capacitance | $C_{rss}$ | — | 59 | — | pF | |
| Gate Resistance | $R_g$ | - | 8.72 | - | Ω | $V_{DS}$ = 0V, $V_{GS}$ = 0V, f = 1MHz |
| Total Gate Charge | $Q_g$ | - | 6.5 | - | nC | $V_{GS}$ = -4.5V, $V_{DD}$ = -10V,<br>$I_D$ = -1.5A |
| Gate-Source Charge | $Q_{gs}$ | - | 0.8 | - | nC | |
| Gate-Drain Charge | $Q_{gd}$ | - | 1.4 | - | nC | |
| Turn-On Delay Time | $t_{D(on)}$ | - | 11.51 | - | ns | $V_{GEN}$ = -4.5V, $V_{DD}$ = -10V,<br>$R_L$ = 10Ω, $R_G$ = 6Ω |
| Turn-On Rise Time | $t_r$ | - | 12.09 | - | ns | |
| Turn-Off Delay Time | $t_{D(off)}$ | - | 55.34 | - | ns | |
| Turn-Off Fall Time | $t_f$ | - | 27.54 | - | ns | |

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

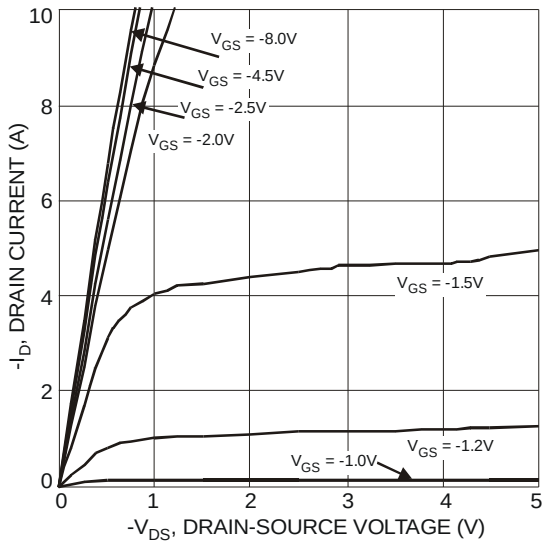

Fig. 1 Typical Output Characteristics

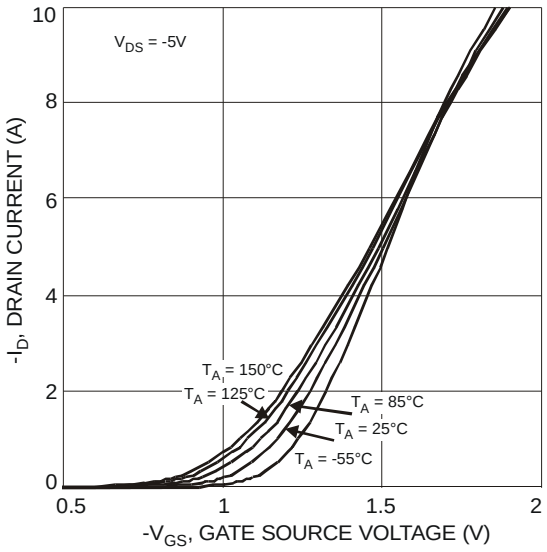

Fig. 2 Typical Transfer Characteristics


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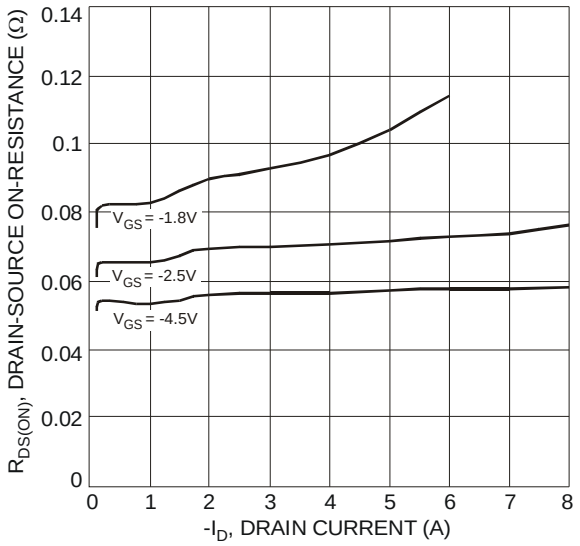


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

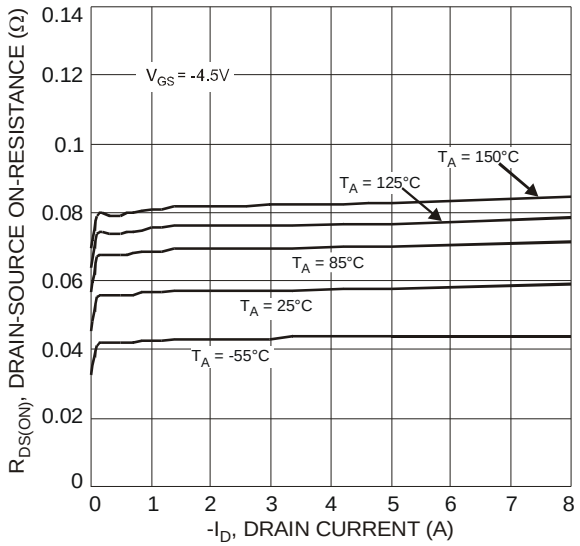


Fig. 4 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

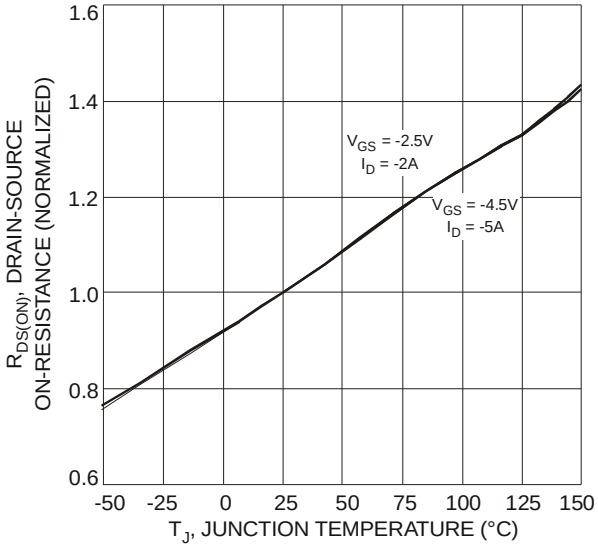


Fig. 5 On-Resistance Variation with Temperature

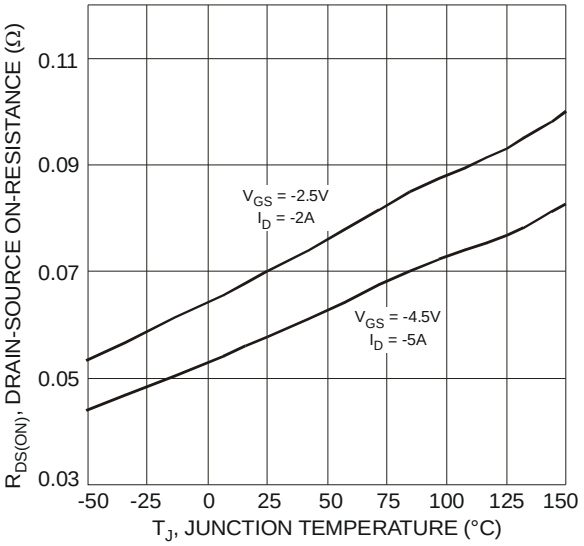


Fig. 6 On-Resistance Variation with Temperature

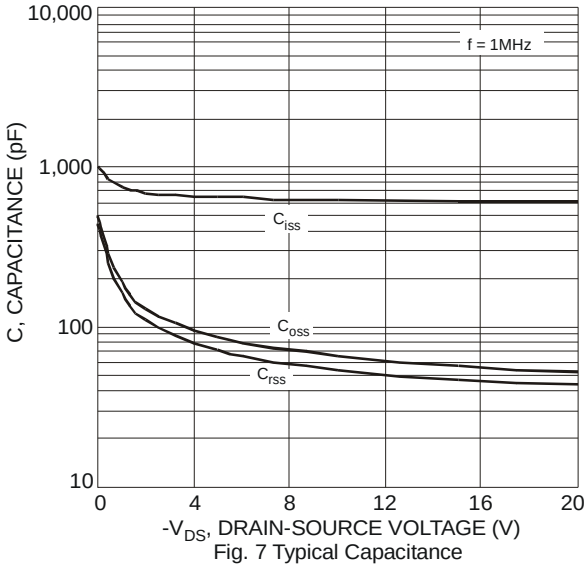


Fig. 7 Typical Capacitance

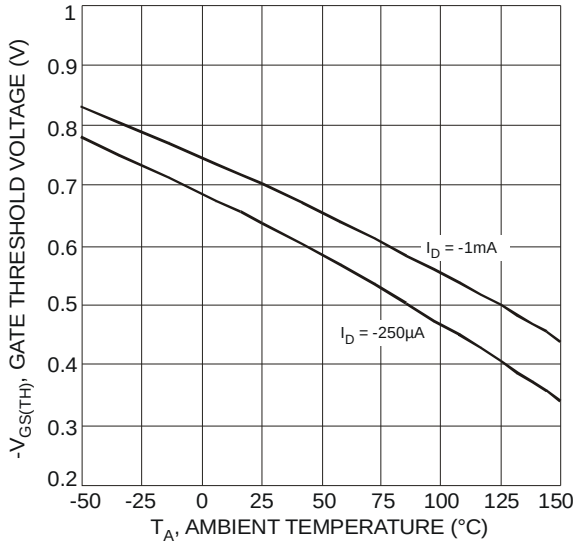


Fig. 8 Gate Threshold Variation vs. Ambient Temperature


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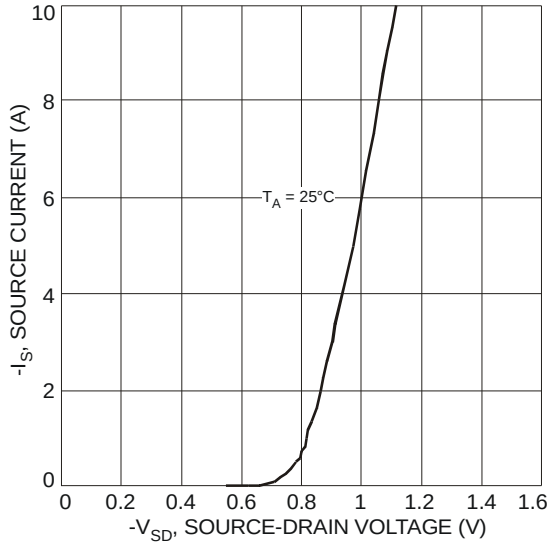


Fig. 9 Diode Forward Voltage vs. Current

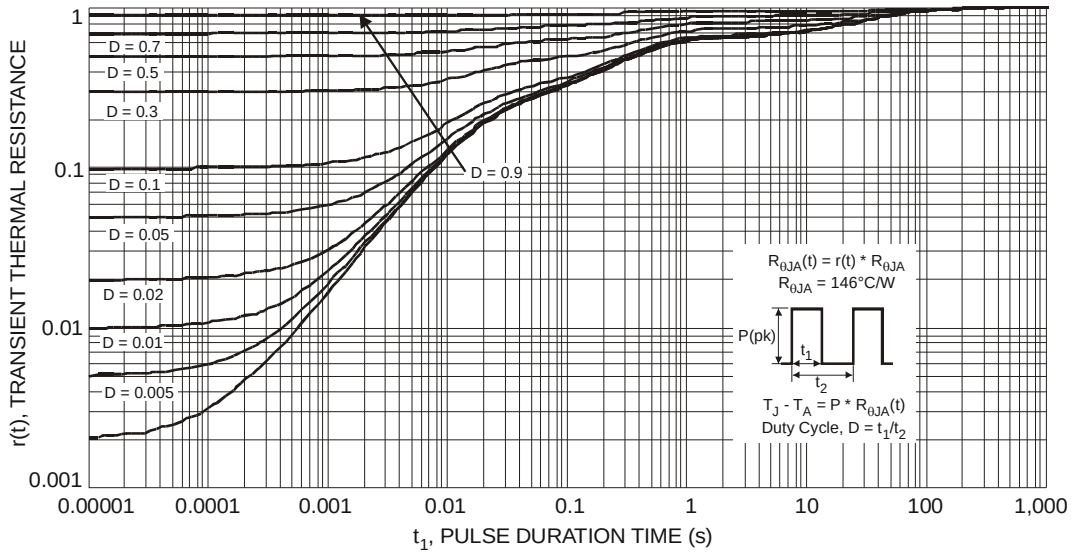


Fig. 10 Transient Thermal Response

## Ordering Information (Note 6)

| Part Number | Case | Packaging |
|---|---|---|
| DMP2160UFDB-7 | DFN2020B-6 | 3000/Tape & Reel |

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

## Marking Information

P2 = Marking Code
YM = Date Code Marking
Y = Year (ex: V = 2008)
M = Month (ex: 9 = September)
Dot denotes Pin 1

Date Code Key

| Year | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|
| Code | V | W | X | Y | Z | A | B | C |

| 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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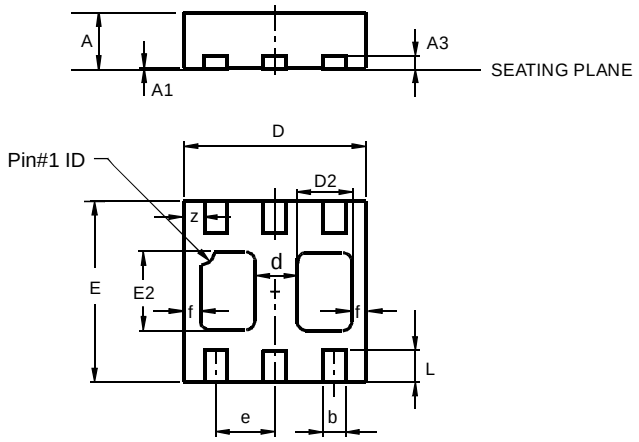
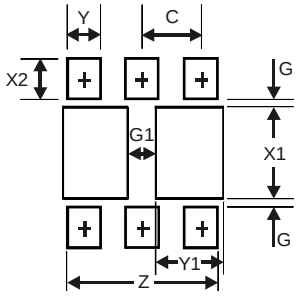
## Package Outline Dimensions




| DFN2020B-6 | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 0.545 | 0.605 | 0.575 |
| **A1** | 0 | 0.05 | 0.02 |
| **A3** | — | — | 0.13 |
| **b** | 0.20 | 0.30 | 0.25 |
| **D** | 1.95 | 2.075 | 2.00 |
| **d** | — | — | 0.45 |
| **D2** | 0.50 | 0.70 | 0.60 |
| **e** | — | — | 0.65 |
| **E** | 1.95 | 2.075 | 2.00 |
| **E2** | 0.90 | 1.10 | 1.00 |
| **f** | — | — | 0.15 |
| **L** | 0.25 | 0.35 | 0.30 |
| **z** | — | — | 0.225 |
| **All Dimensions in mm** | | | |

## Suggested Pad Layout




| Dimensions | Value (in mm) |
|---|---|
| **Z** | 1.67 |
| **G** | 0.20 |
| **G1** | 0.40 |
| **X1** | 1.0 |
| **X2** | 0.45 |
| **Y** | 0.37 |
| **Y1** | 0.70 |
| **C** | 0.65 |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