

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on) \max}$                      | $I_D$<br>$T_A = +25^\circ\text{C}$ |
|---------------|--|------------------------------------|
| -30V          | 45m $\Omega$ @ $V_{GS} = -10\text{V}$  | -6.9A                              |
|               | 65m $\Omega$ @ $V_{GS} = -4.5\text{V}$ | -5.1A                              |

## Description

This new generation MOSFET has been designed to minimize the on-state resistance ( $R_{DS(ON)}$ ) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

## Applications

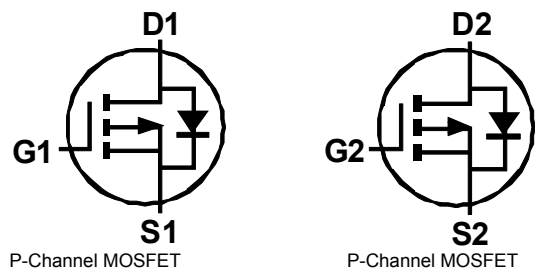
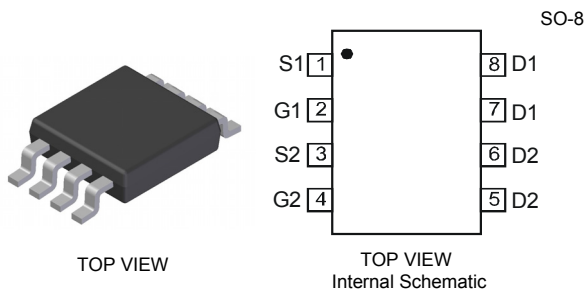
- Power Management Functions
- Backlighting
- DC-DC Converters

## Features

- Dual P-Channel MOSFET
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **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: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method 208  $\text{\textcircled{3}}$
- Weight: 0.072g (approximate)

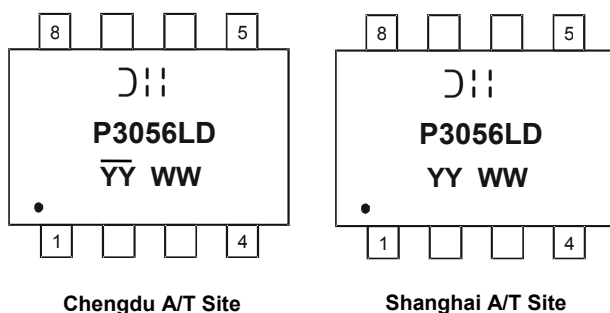


## Ordering Information (Note 4)

| Part Number   | Case | Packaging         |
|---------------|------|-------------------|
| DMP3056LSD-13 | SO-8 | 2,500/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



$\text{\textcircled{D}}$  ::= Manufacturer's Marking  
 P3056LD = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY or YY = Year (ex: 14 = 2014)  
 WW = Week (01 - 53)  
 $\overline{\text{YY}}$  = Date Code Marking for SAT (Shanghai Assembly/ Test site)  
 $\overline{\text{YY}}$  = Date Code Marking for CAT (Chengdu Assembly/ Test site)

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                |              |                        | Symbol           | Value | Units |
|-------------------------------|--------------|------------------------|------------------|-------|-------|
| Drain-Source Voltage          |              |                        | V <sub>DSS</sub> | -30   | V     |
| Gate-Source Voltage           |              |                        | V <sub>GSS</sub> | ±20   | V     |
| Drain Current (Note 5)        | Steady State | T <sub>A</sub> = +25°C | I <sub>D</sub>   | -6.9  | A     |
|                               |              | T <sub>A</sub> = +70°C |                  | -5.8  |       |
| Pulsed Drain Current (Note 6) |              |                        | I <sub>DM</sub>  | -24   | A     |

**Thermal Characteristics**

| Characteristic                                   | Symbol                            | Value       | Unit |
|--|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 5)                 | P <sub>D</sub>                    | 2.5         | W    |
| Thermal Resistance, Junction to Ambient (Note 5) | R <sub>θJA</sub>                  | 50          | °C/W |
| Operating and Storage Temperature Range          | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                      | Symbol              | Min  | Typ  | Max          | Unit | Test Condition  |
|-------------------------------------|---------------------|------|------|--------------|------|---|
| <b>OFF CHARACTERISTICS (Note 7)</b> |                     |      |      |              |      |   |
| Drain-Source Breakdown Voltage      | BV <sub>DSS</sub>   | -30  | —    | —            | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA   |
| Zero Gate Voltage Drain Current     | I <sub>DSS</sub>    | —    | —    | -1           | μA   | V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V  |
| Gate-Source Leakage                 | I <sub>GSS</sub>    | —    | —    | ±100<br>±800 | nA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V<br>V <sub>GS</sub> = ±25V, V <sub>DS</sub> = 0V      |
| <b>ON CHARACTERISTICS (Note 7)</b>  |                     |      |      |              |      |   |
| Gate Threshold Voltage              | V <sub>GS(th)</sub> | -1   | -1.7 | -2.1         | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA                                       |
| Static Drain-Source On-Resistance   | R <sub>DS(ON)</sub> | —    | —    | 45           | mΩ   | V <sub>GS</sub> = -10V, I <sub>D</sub> = -6.0A<br>V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -5.0A |
|                                     |                     | —    | —    | 65           |      |   |
| Forward Transconductance            | g <sub>fs</sub>     | —    | 8    | —            | S    | V <sub>DS</sub> = -10V, I <sub>D</sub> = -5.3A  |
| Diode Forward Voltage (Note 7)      | V <sub>SD</sub>     | -0.5 | —    | -1.2         | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = -1.7A  |
| <b>DYNAMIC CHARACTERISTICS</b>      |                     |      |      |              |      |   |
| Input Capacitance                   | C <sub>iss</sub>    | —    | 722  | —            | pF   | V <sub>DS</sub> = -25V, V <sub>GS</sub> = 0V<br>f = 1.0MHz  |
| Output Capacitance                  | C <sub>oss</sub>    | —    | 114  | —            | pF   |   |
| Reverse Transfer Capacitance        | C <sub>rss</sub>    | —    | 92   | —            | pF   |   |
| Gate Resistance                     | R <sub>G</sub>      | —    | 3.3  | —            | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V<br>f = 1.0MHz  |
| <b>SWITCHING CHARACTERISTICS</b>    |                     |      |      |              |      |   |
| Total Gate Charge                   | Q <sub>G</sub>      | —    | 6.8  | —            | nC   | V <sub>DS</sub> = -15V, V <sub>GS</sub> = -4.5V,<br>I <sub>D</sub> = -6A                          |
|                                     | Q <sub>G</sub>      | —    | 13.7 | —            |      |   |
| Gate-Source Charge                  | Q <sub>GS</sub>     | —    | 1.6  | —            | nC   | V <sub>DS</sub> = -15V, V <sub>GS</sub> = -10V,<br>I <sub>D</sub> = -6A                           |
| Gate-Drain Charge                   | Q <sub>GD</sub>     | —    | 4.2  | —            |      |   |
| Turn-On Delay Time                  | t <sub>d(on)</sub>  | —    | 6.4  | —            | ns   | V <sub>DS</sub> = -15V, V <sub>GS</sub> = -10V,<br>I <sub>D</sub> = -1A, R <sub>G</sub> = 6.0Ω    |
| Rise Time                           | t <sub>r</sub>      | —    | 5.3  | —            |      |   |
| Turn-Off Delay Time                 | t <sub>d(off)</sub> | —    | 26.5 | —            |      |   |
| Fall Time                           | t <sub>f</sub>      | —    | 14.7 | —            |      |   |

- Notes: 5. Device mounted on 2 oz. 1" x 1" Copper pads on 2" x 2" FR-4 PCB.  
6. Pulse width ≤10μs, Duty Cycle ≤1%.  
7. Short duration pulse test used to minimize self-heating effect.

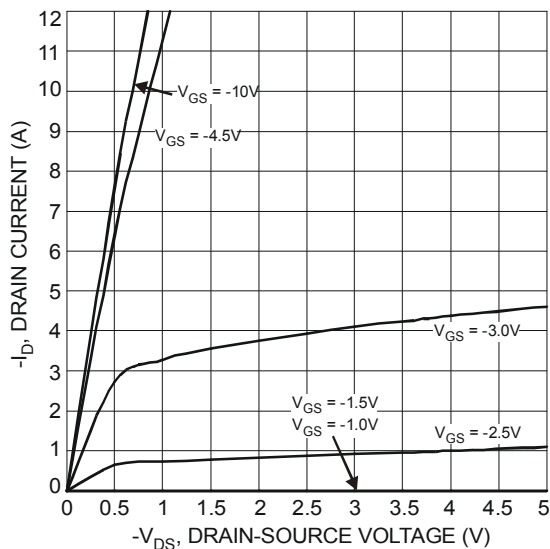


Fig. 1 Typical Output Characteristics

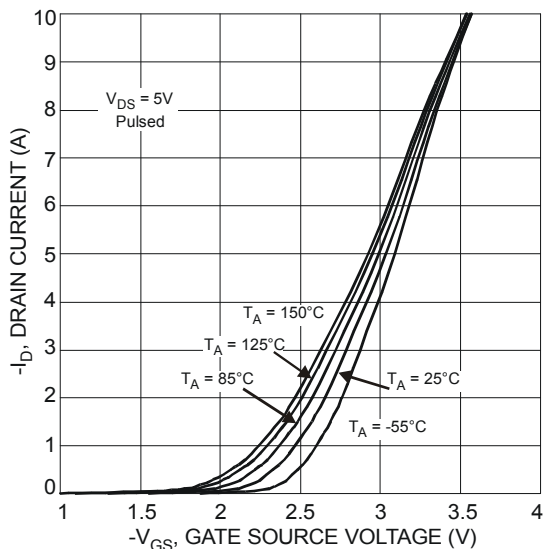


Fig. 2 Typical Transfer Characteristics

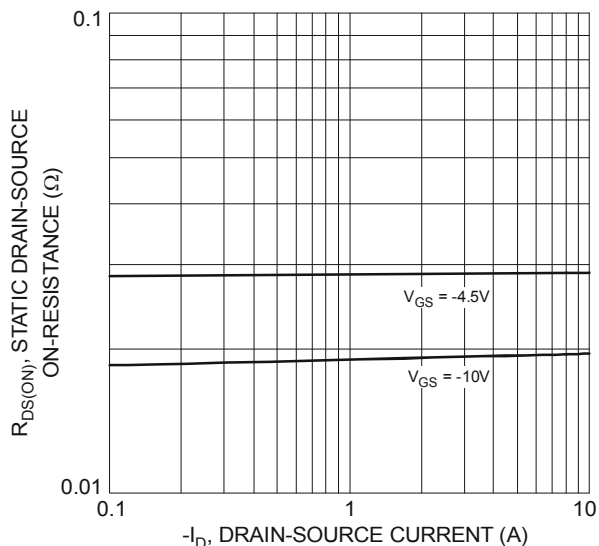


Fig. 3 On-Resistance vs. Drain Current & Gate Voltage

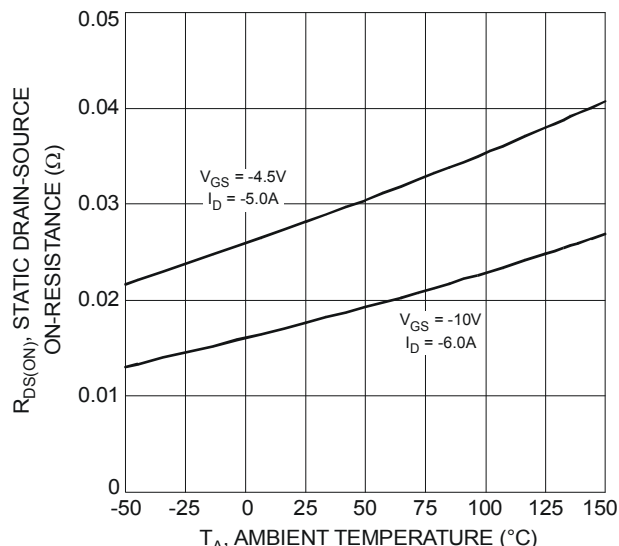


Fig. 4 Static Drain-Source On-Resistance vs. Ambient Temperature

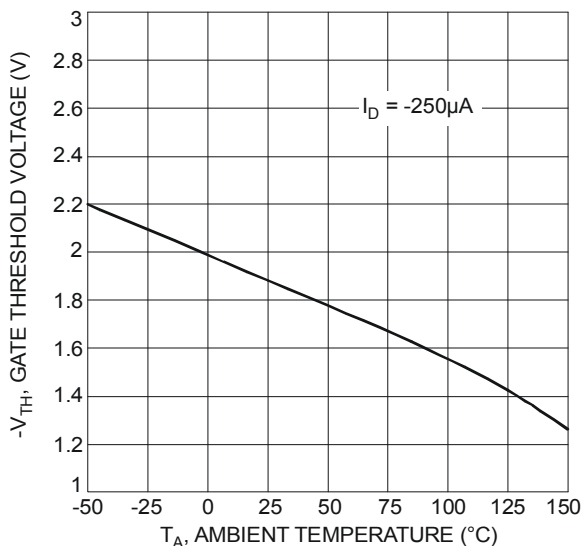


Fig. 5 Gate Threshold Variation vs. Ambient Temperature

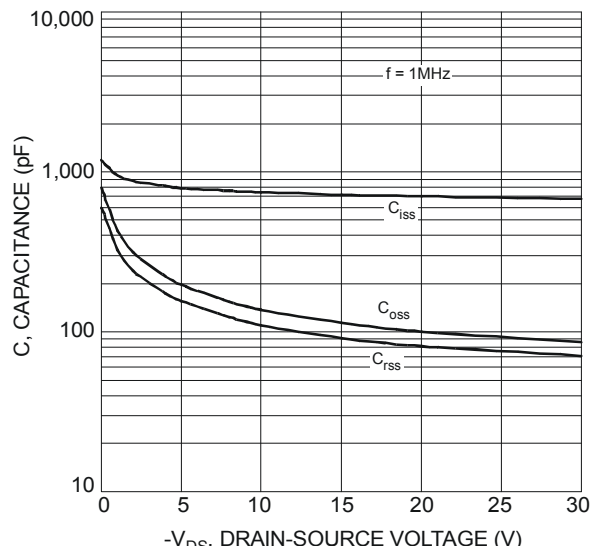


Fig. 6 Typical Total Capacitance

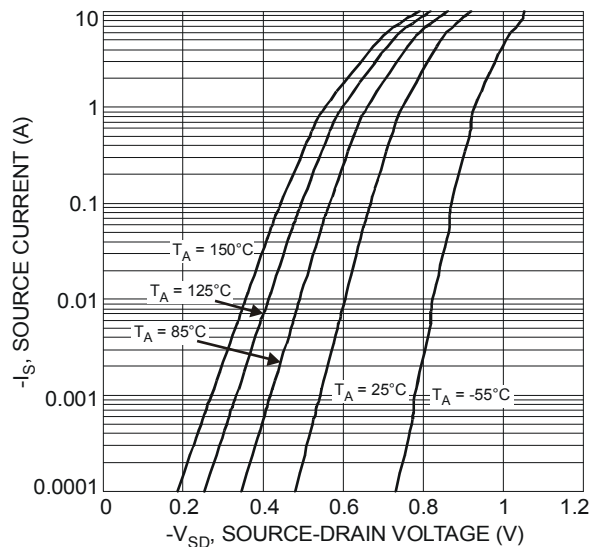
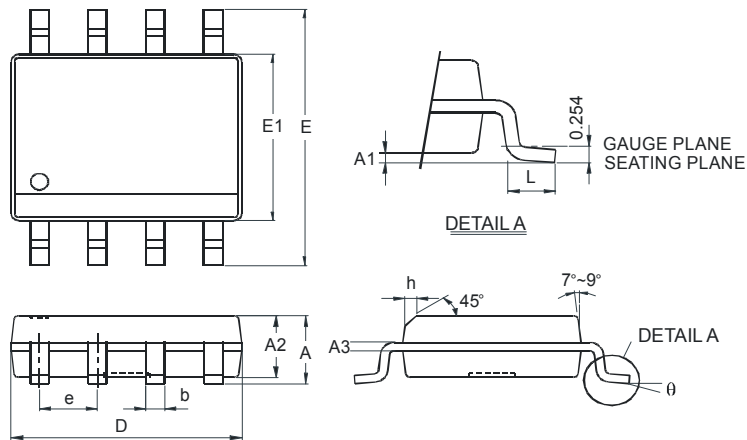


Fig. 7 Reverse Drain Current vs. Source-Drain Voltage

### Package Outline Dimensions

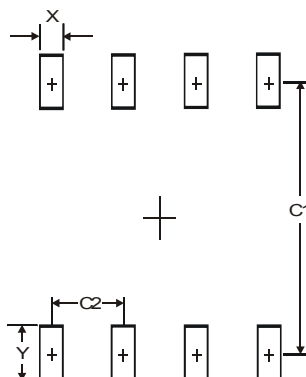
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| SO-8                 |          |      |
|----------------------|----------|------|
| Dim                  | Min      | Max  |
| A                    | -        | 1.75 |
| A1                   | 0.10     | 0.20 |
| A2                   | 1.30     | 1.50 |
| A3                   | 0.15     | 0.25 |
| b                    | 0.3      | 0.5  |
| D                    | 4.85     | 4.95 |
| E                    | 5.90     | 6.10 |
| E1                   | 3.85     | 3.95 |
| e                    | 1.27 Typ |      |
| h                    | -        | 0.35 |
| L                    | 0.62     | 0.82 |
| θ                    | 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) |
|------------|---------------|
| X          | 0.60          |
| Y          | 1.55          |
| C1         | 5.4           |
| C2         | 1.27          |

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