

Product Summary

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

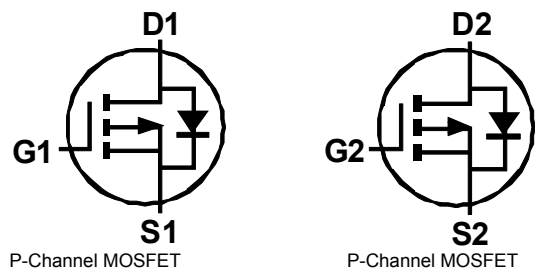
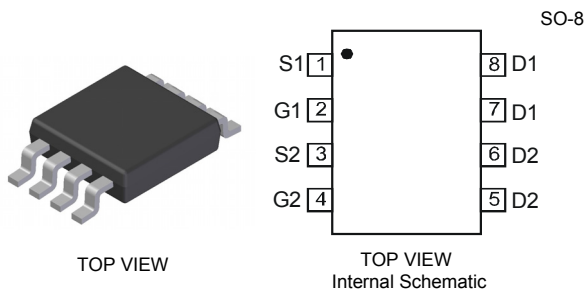
- Power Management Functions
- Backlighting
- DC-DC Converters

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)

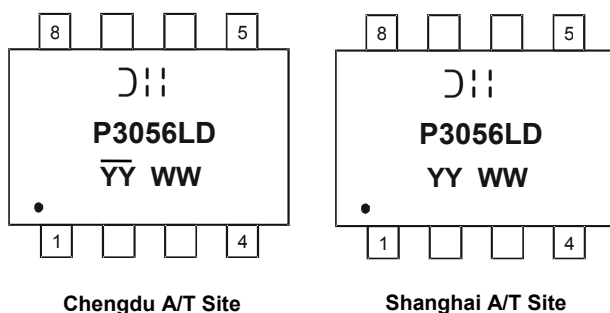


Ordering Information (Note 4)

| 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 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{YY} = Date Code Marking for SAT (Shanghai Assembly/ Test site)
 \overline{YY} = Date Code Marking for CAT (Chengdu Assembly/ Test site)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

| Characteristic | | | Symbol | Value | Units |
|-------------------------------|--------------|------------------------|------------------|-------|-------|
| Drain-Source Voltage | | | V _{DSS} | -30 | V |
| Gate-Source Voltage | | | V _{GSS} | ±20 | V |
| Drain Current (Note 5) | Steady State | T _A = +25°C | I _D | -6.9 | A |
| | | T _A = +70°C | | -5.8 | |
| Pulsed Drain Current (Note 6) | | | I _{DM} | -24 | A |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 5) | P _D | 2.5 | W |
| Thermal Resistance, Junction to Ambient (Note 5) | R _{θJA} | 50 | °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 7) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | -30 | — | — | V | V _{GS} = 0V, I _D = -250μA |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | -1 | μA | V _{DS} = -30V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 ±800 | nA | V _{GS} = ±20V, V _{DS} = 0V V _{GS} = ±25V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | -1 | -1.7 | -2.1 | V | V _{DS} = V _{GS} , I _D = -250μA |
| Static Drain-Source On-Resistance | R _{DS(ON)} | — | — | 45 | mΩ | V _{GS} = -10V, I _D = -6.0A V _{GS} = -4.5V, I _D = -5.0A |
| | | — | — | 65 | | |
| Forward Transconductance | g _{fs} | — | 8 | — | S | V _{DS} = -10V, I _D = -5.3A |
| Diode Forward Voltage (Note 7) | V _{SD} | -0.5 | — | -1.2 | V | V _{GS} = 0V, I _S = -1.7A |
| DYNAMIC CHARACTERISTICS | | | | | | |
| Input Capacitance | C _{iss} | — | 722 | — | pF | V _{DS} = -25V, V _{GS} = 0V f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 114 | — | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 92 | — | pF | |
| Gate Resistance | R _G | — | 3.3 | — | Ω | V _{DS} = 0V, V _{GS} = 0V f = 1.0MHz |
| SWITCHING CHARACTERISTICS | | | | | | |
| Total Gate Charge | Q _G | — | 6.8 | — | nC | V _{DS} = -15V, V _{GS} = -4.5V, I _D = -6A |
| | Q _G | — | 13.7 | — | | |
| Gate-Source Charge | Q _{GS} | — | 1.6 | — | nC | V _{DS} = -15V, V _{GS} = -10V, I _D = -6A |
| Gate-Drain Charge | Q _{GD} | — | 4.2 | — | | |
| Turn-On Delay Time | t _{d(on)} | — | 6.4 | — | ns | V _{DS} = -15V, V _{GS} = -10V, I _D = -1A, R _G = 6.0Ω |
| Rise Time | t _r | — | 5.3 | — | | |
| Turn-Off Delay Time | t _{d(off)} | — | 26.5 | — | | |
| Fall Time | t _f | — | 14.7 | — | | |

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

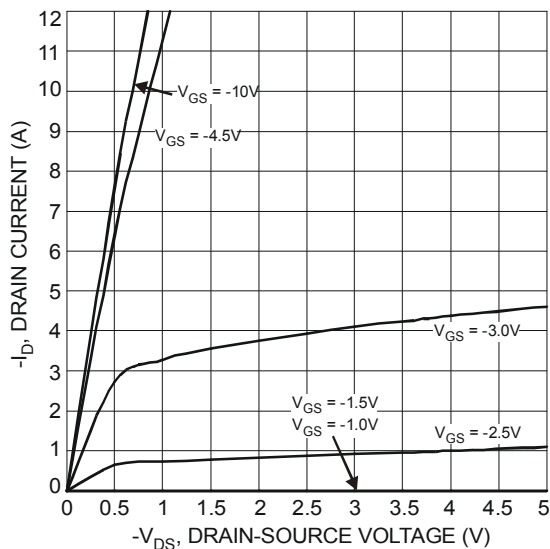


Fig. 1 Typical Output Characteristics

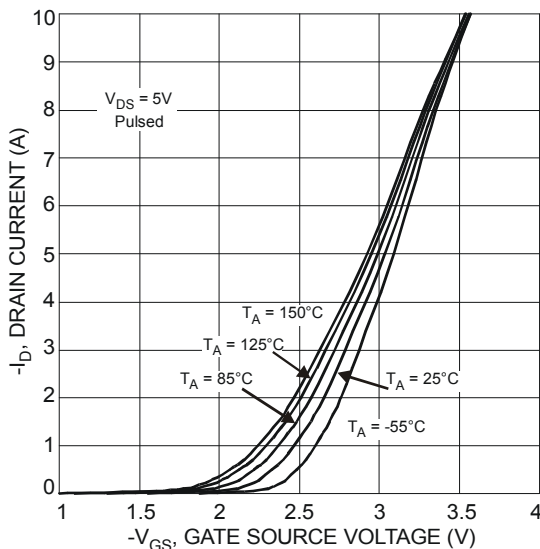


Fig. 2 Typical Transfer Characteristics

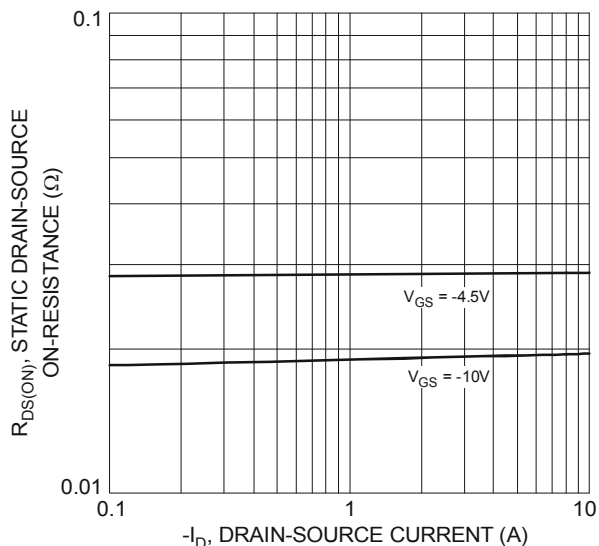


Fig. 3 On-Resistance vs. Drain Current & Gate Voltage

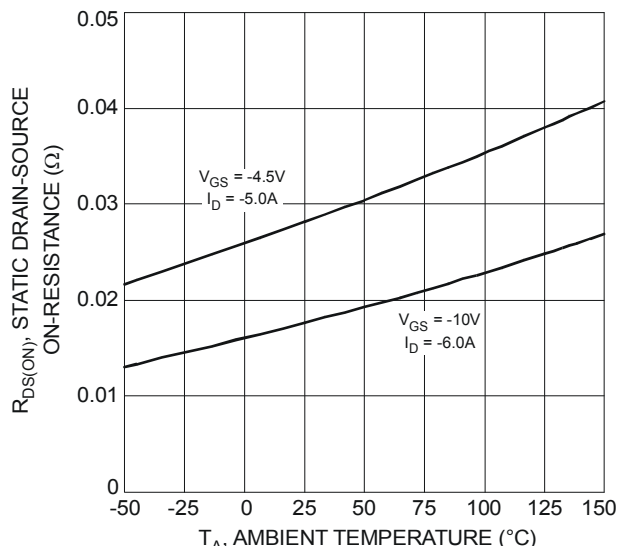


Fig. 4 Static Drain-Source On-Resistance vs. Ambient Temperature

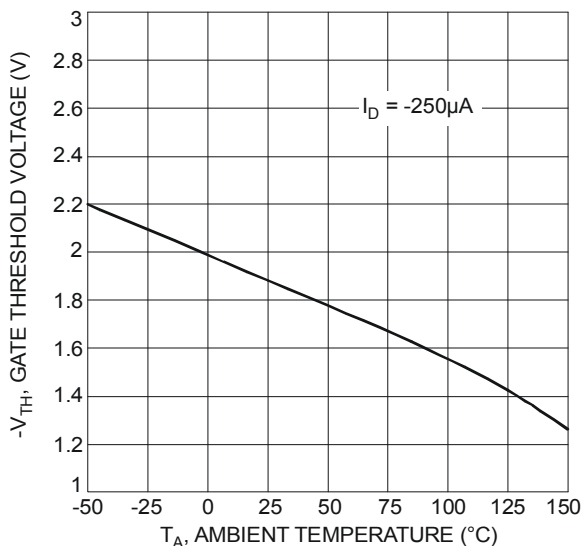


Fig. 5 Gate Threshold Variation vs. Ambient Temperature

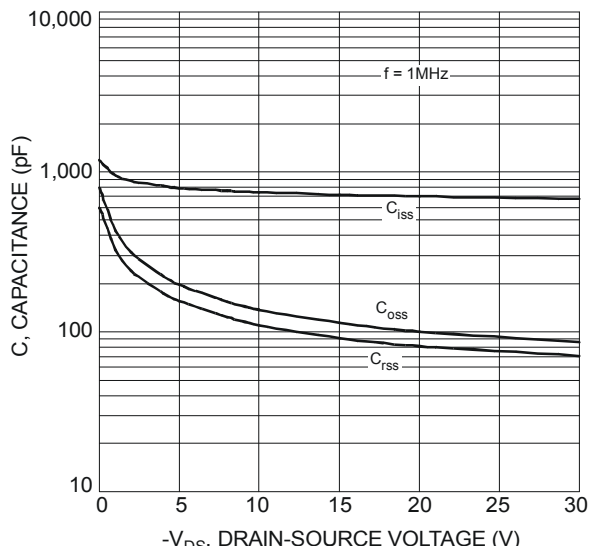


Fig. 6 Typical Total Capacitance

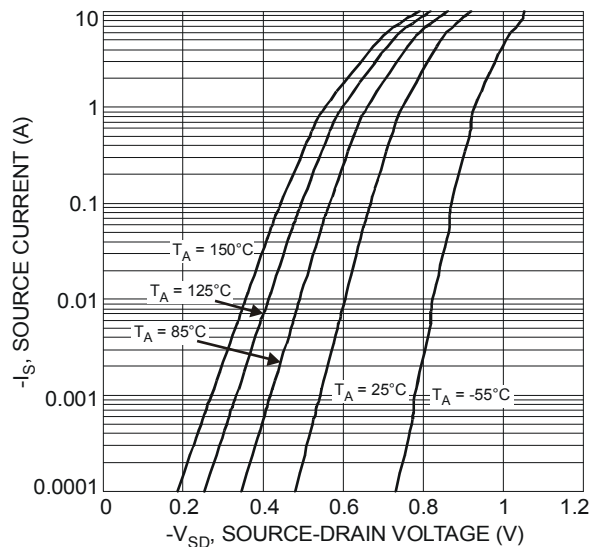
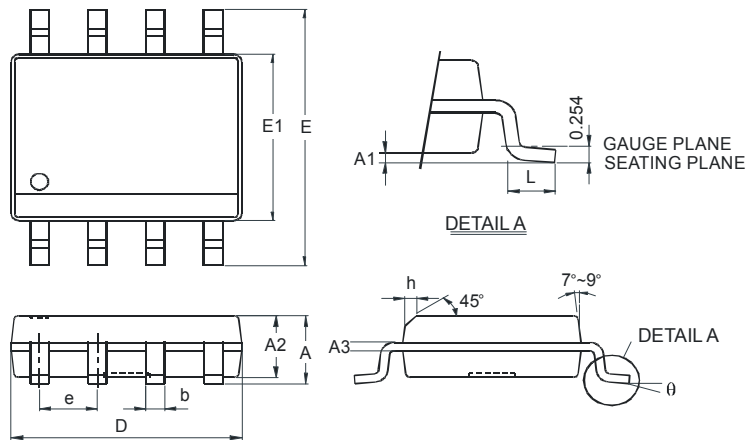


Fig. 7 Reverse Drain Current vs. Source-Drain Voltage

Package Outline Dimensions

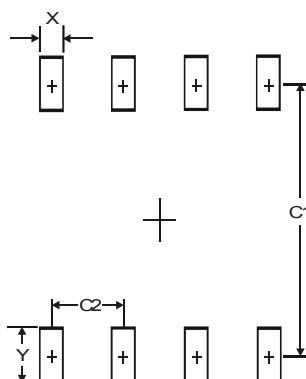
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| 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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