

## Product Summary

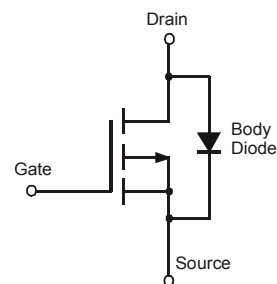
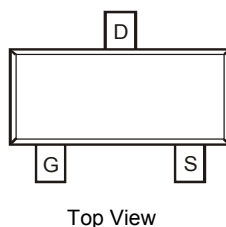
| $V_{(BR)DSS}$ | $R_{DS(on)}$                    | $I_D$<br>$T_A = +25^\circ\text{C}$ |
|---------------|---------------------------------|------------------------------------|
| -30V          | 122mΩ @ $V_{GS} = -10\text{V}$  | -2.7A                              |
|               | 190mΩ @ $V_{GS} = -4.5\text{V}$ | -2.0A                              |

## 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

- DC-DC Converters
- Power Management Functions



Equivalent Circuit

## Features

- 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**
- **PPAP Capable (Note 4)**

## Mechanical Data

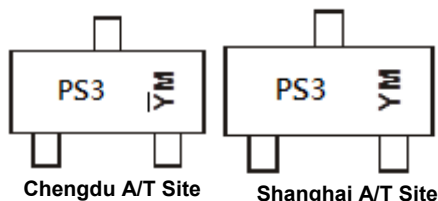
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 (3)
- Terminal Connections: See Diagram
- Weight: 0.008 grams (approximate)

## Ordering Information (Note 4 & 5)

| Part Number | Compliance | Case  | Packaging        |
|-------------|------------|-------|------------------|
| DMP3160L-7  | Standard   | SOT23 | 3000/Tape & Reel |
| DMP3160LQ-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>.
  5. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to [http://www.diodes.com/quality/product\\_grade\\_definitions/](http://www.diodes.com/quality/product_grade_definitions/).

## Marking Information



PS3 = Product Type Marking Code  
 YM = Date Code Marking for SAT (Shanghai Assembly/ Test site)  
 YM = Date Code Marking for CAT (Chengdu Assembly/ Test site)  
 Y or Y̅ = Year (ex: A = 2013)  
 M = Month (ex: 9 = September)

### Date Code Key

| Year | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|------|------|------|------|------|------|------|------|------|------|
| Code | U    | 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   |

**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 6) V <sub>GS</sub> = -10V | Steady State | T <sub>A</sub> = +25°C<br>T <sub>A</sub> = +70°C | I <sub>D</sub>   | -2.7<br>-2 | A     |
| Pulsed Drain Current (Note 7)                 |              |  | I <sub>DM</sub>  | -8         | A     |

**Thermal Characteristics**

| Characteristic   | Symbol                            | Value       | Units |
|--|-----------------------------------|-------------|-------|
| Total Power Dissipation (Note 6)   | P <sub>D</sub>                    | 1.08        | W     |
| Thermal Resistance, Junction to Ambient @T <sub>A</sub> = +25°C (Note 6) | R <sub>θJA</sub>                  | 115         | °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 8)</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>    | —    | —         | -800        | nA   | V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V  |
| Gate-Source Leakage                         | I <sub>GSS</sub>    | —    | —         | ±80<br>±800 | nA   | V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0V<br>V <sub>GS</sub> = ±15V, V <sub>DS</sub> = 0V      |
| <b>ON CHARACTERISTICS (Note 8)</b>          |                     |      |           |             |      |   |
| Gate Threshold Voltage                      | V <sub>GS(th)</sub> | -1.3 | -1.8      | -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> | —    | 97<br>165 | 122<br>190  | mΩ   | V <sub>GS</sub> = -10V, I <sub>D</sub> = -2.7A<br>V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -2.0A |
| Forward Transfer Admittance                 | Y <sub>fs</sub>     | —    | 5.9       | —           | S    | V <sub>DS</sub> = -5V, I <sub>D</sub> = -2.7A   |
| Diode Forward Voltage (Note 8)              | V <sub>SD</sub>     | —    | —         | -1.26       | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = -2.7A  |
| <b>DYNAMIC CHARACTERISTICS (Note 9)</b>     |                     |      |           |             |      |   |
| Input Capacitance                           | C <sub>iss</sub>    | —    | 384.4     | —           | pF   | V <sub>DS</sub> = -10V, V <sub>GS</sub> = 0V<br>f = 1.0MHz  |
| Output Capacitance                          | C <sub>oss</sub>    | —    | 59.4      | —           | pF   |   |
| Reverse Transfer Capacitance                | C <sub>rss</sub>    | —    | 52.8      | —           | pF   |   |
| Gate Resistance                             | R <sub>G</sub>      | —    | 17.1      | —           | Ω    | V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V,<br>f = 1.0MHz   |
| Total Gate Charge (V <sub>GS</sub> = -4.5V) | Q <sub>g</sub>      | —    | 4.0       | —           | nC   | V <sub>GS</sub> = -10V/-4.5V,<br>V <sub>DS</sub> = -15V, I <sub>D</sub> = -3A                     |
| Total Gate Charge (V <sub>GS</sub> = -10V)  | Q <sub>g</sub>      | —    | 8.2       | —           | nC   |   |
| Gate-Source Charge                          | Q <sub>gs</sub>     | —    | 0.9       | —           | nC   |   |
| Gate-Drain Charge                           | Q <sub>gd</sub>     | —    | 1.2       | —           | nC   |   |
| Turn-On Delay Time                          | t <sub>D(on)</sub>  | —    | 4.8       | —           | ns   | V <sub>DS</sub> = -15V, V <sub>GS</sub> = -10V,<br>R <sub>G</sub> = 6Ω, I <sub>D</sub> = -1A      |
| Turn-On Rise Time                           | t <sub>r</sub>      | —    | 7.3       | —           | ns   |   |
| Turn-Off Delay Time                         | t <sub>D(off)</sub> | —    | 22.5      | —           | ns   |   |
| Turn-Off Fall Time                          | t <sub>f</sub>      | —    | 13.4      | —           | ns   |   |

- Notes:
6. Device mounted on FR-4 PCB. t ≤ 10 sec.
  7. Pulse width ≤ 10μs, Duty Cycle ≤ 1%.
  8. Short duration pulse test used to minimize self-heating effect.
  9. Guaranteed by design. Not subject to product testing.

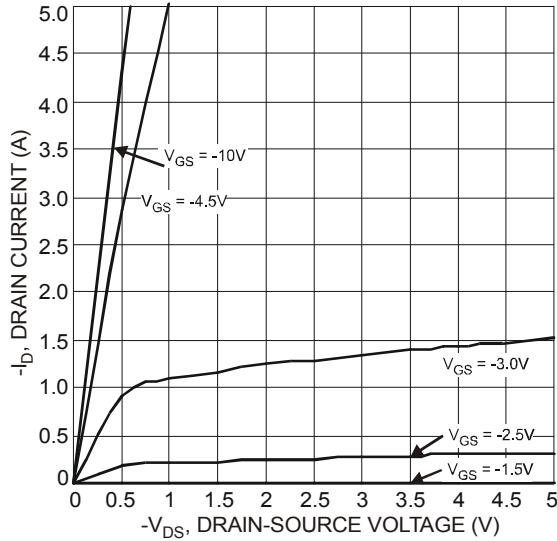


Fig. 1 Typical Output Characteristics

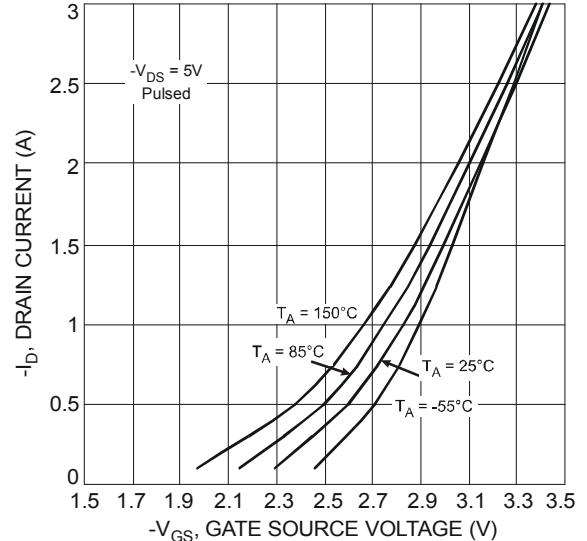


Fig. 2 Typical Transfer Characteristics

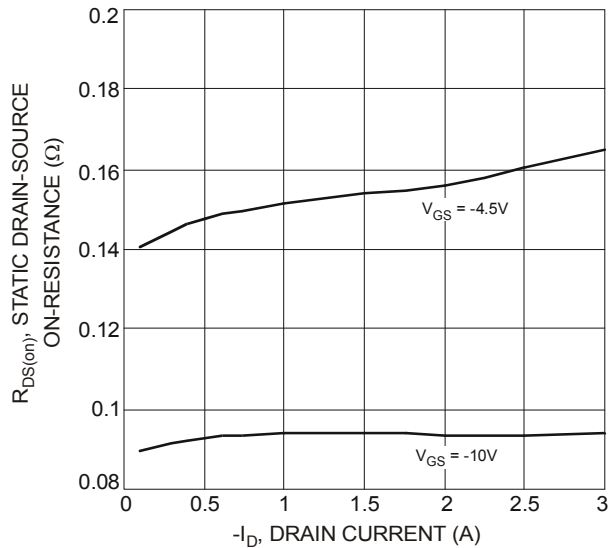


Fig. 3 On-Resistance vs. Drain Current and Gate Voltage

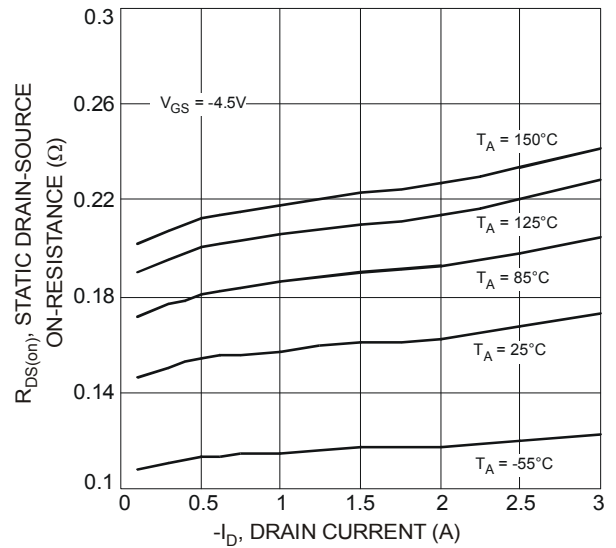


Fig. 4 On-Resistance vs. Drain Current and Gate Voltage

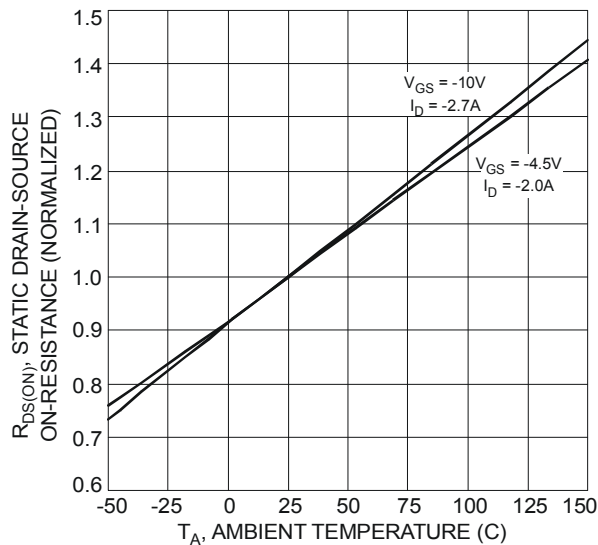


Fig. 5 Normalized Static Drain-Source On-Resistance vs. Ambient Temperature

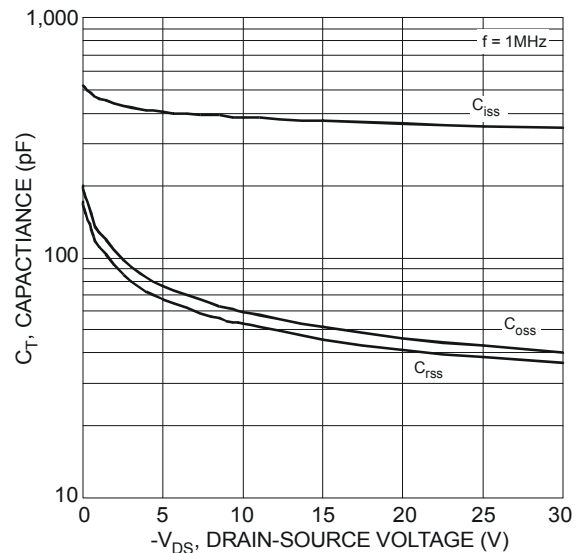


Fig. 6 Typical Capacitance

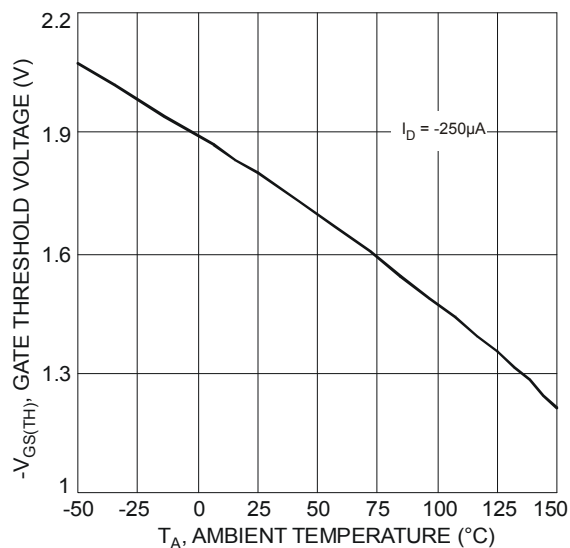


Fig. 7 Gate Threshold Voltage vs. Ambient Temperature

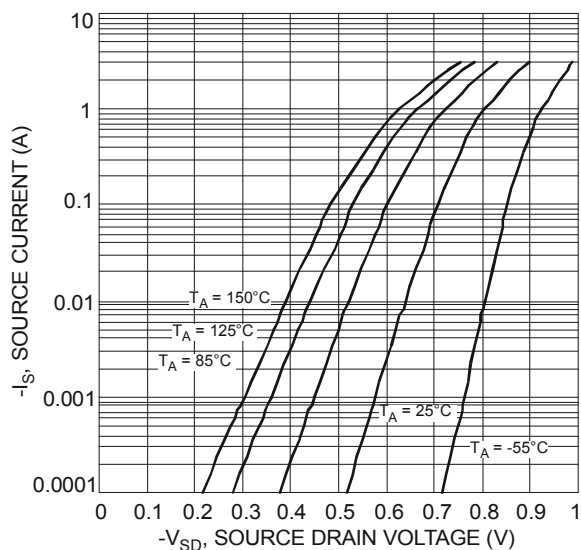


Fig. 8 Reverse Drain Current vs. Source-Drain Voltage

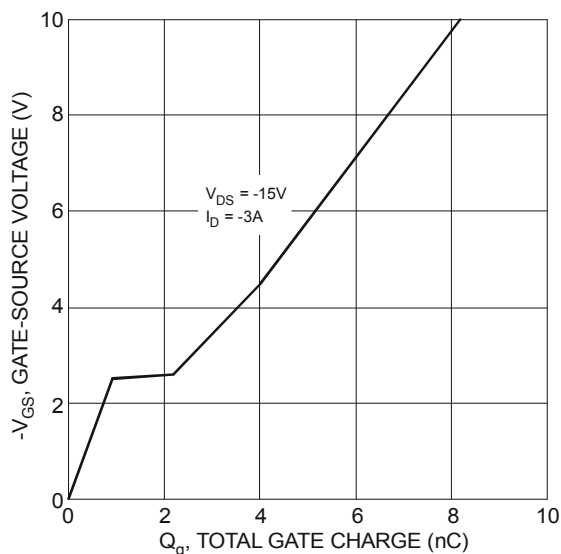
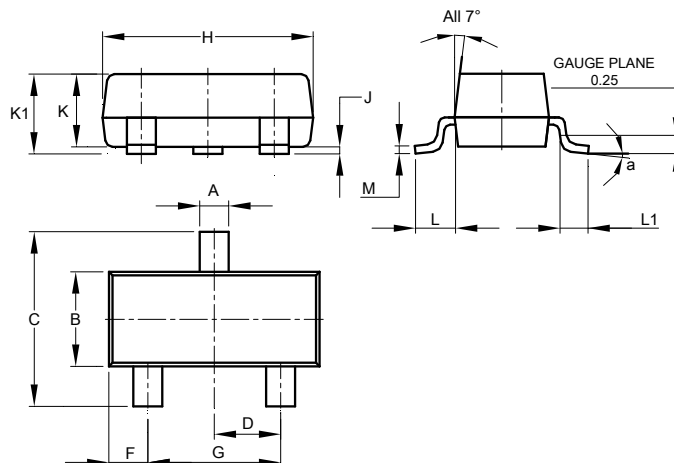


Figure 9 Gate-Charge Characteristics

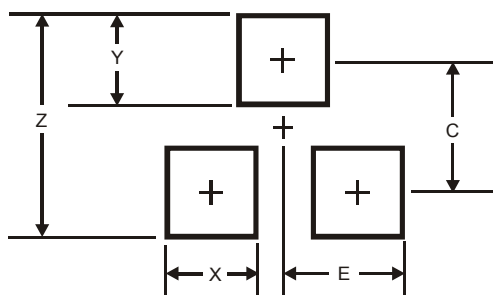
## Package Outline Dimensions

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


| SOT23                |       |       |       |
|----------------------|-------|-------|-------|
| Dim                  | Min   | Max   | Typ   |
| A                    | 0.927 | 0.951 | 0.940 |
| B                    | 1.120 | 1.140 | 1.130 |
| C                    | 2.300 | 2.500 | 2.400 |
| D                    | 0.989 | 1.003 | 0.995 |
| F                    | 0.445 | 0.600 | 0.555 |
| G                    | 1.788 | 2.005 | 1.833 |
| H                    | 2.300 | 3.000 | 2.600 |
| J                    | 0.033 | 0.100 | 0.065 |
| K                    | 0.890 | 1.000 | 0.975 |
| K1                   | 0.903 | 1.100 | 1.025 |
| L                    | 0.445 | 0.611 | 0.555 |
| L1                   | 0.225 | 0.555 | 0.400 |
| M                    | 0.085 | 0.550 | 0.100 |
| α                    | 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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