

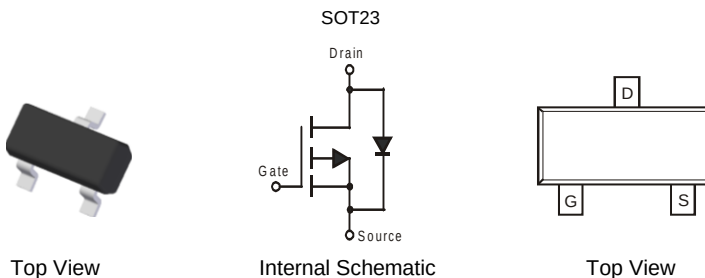
**P-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR**

**Features**

- Low  $R_{DS(ON)}$ 
  - 72m $\Omega$  @  $V_{GS} = -4.5V$
  - 108m $\Omega$  @  $V_{GS} = -2.7V$
  - 123m $\Omega$  @  $V_{GS} = -2.5V$
- 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 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 (B3)
- Terminal Connections: See Diagram Below
- Weight: 0.008 grams (Approximate)

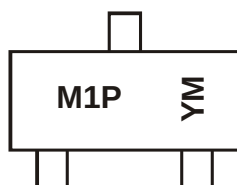


**Ordering Information** (Note 5)

| Part Number  | Case  | Packaging          |
|--------------|-------|--------------------|
| DMP2123LQ-7  | SOT23 | 3,000/Tape & Reel  |
| DMP2123LQ-13 | SOT23 | 10,000/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. Automotive products are AEC-Q101 qualified and are PPAP capable. For more information, please refer to [http://www.diodes.com/product\\_compliance\\_definitions.html](http://www.diodes.com/product_compliance_definitions.html).
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**



M1P = Product Type Marking Code  
YM = Date Code Marking  
Y = Year (ex: C = 2015)  
M = Month (ex: 9 = September)

**Date Code Key**

| Year | 2007 | ... | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|------|------|-----|------|------|------|------|------|------|------|------|------|
| Code | U    | ... | C    | D    | E    | F    | G    | H    | I    | J    | K    |

| 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        | Unit |
|---------------------------------------------------------------------------------------|------------------|--------------|------|
| Drain-Source Voltage                                                                  | V <sub>DSS</sub> | -20          | V    |
| Gate-Source Voltage                                                                   | V <sub>GSS</sub> | ±12          | V    |
| Drain Current (Note 6) Continuous<br>T <sub>A</sub> = +25°C<br>T <sub>A</sub> = +70°C | I <sub>D</sub>   | -3.0<br>-2.4 | A    |
| Pulsed Drain Current (Note 7)                                                         | I <sub>DM</sub>  | -15          | A    |
| Body-Diode Continuous Current (Note 6)                                                | I <sub>S</sub>   | -2.0         | A    |

**Thermal Characteristics**

| Characteristic                                                 | Symbol                            | Value       | Unit |
|----------------------------------------------------------------|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 6)                               | P <sub>D</sub>                    | 1.4         | W    |
| Thermal Resistance, Junction to Ambient (Note 6); Steady-State | R <sub>θJA</sub>                  | 90          | °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>STATIC PARAMETERS</b>                                  |                     |      |                |                  |      |                                                                                                                                                       |
| Drain-Source Breakdown Voltage                            | BV <sub>DSS</sub>   | -20  | —              | —                | V    | I <sub>D</sub> = -250μA, V <sub>GS</sub> = 0V                                                                                                         |
| Zero Gate Voltage Drain Current<br>T <sub>J</sub> = +25°C | I <sub>DSS</sub>    | —    | —              | -1               | μA   | V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V                                                                                                          |
| Gate-Body Leakage Current                                 | I <sub>GSS</sub>    | —    | —              | ±100             | nA   | V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±12V                                                                                                          |
| Gate Threshold Voltage                                    | V <sub>GS(TH)</sub> | -0.6 | —              | -1.25            | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA                                                                                           |
| On State Drain Current (Note 8)                           | I <sub>D(ON)</sub>  | -15  | —              | —                | A    | V <sub>GS</sub> = -4.5V, V <sub>DS</sub> = -5V                                                                                                        |
| Static Drain-Source On-Resistance (Note 8)                | R <sub>DS(ON)</sub> | —    | 51<br>87<br>99 | 72<br>108<br>123 | mΩ   | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -3.5A<br>V <sub>GS</sub> = -2.7V, I <sub>D</sub> = -3.0A<br>V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -2.6A |
| Forward Transconductance (Note 8)                         | g <sub>FS</sub>     | —    | 7.3            | —                | S    | V <sub>DS</sub> = -10V, I <sub>D</sub> = -3.0A                                                                                                        |
| Diode Forward Voltage (Note 6)                            | V <sub>SD</sub>     | —    | -0.79          | -1.26            | V    | I <sub>S</sub> = -1.7A, V <sub>GS</sub> = 0V                                                                                                          |
| Maximum Body-Diode Continuous Current (Note 6)            | I <sub>S</sub>      | —    | —              | -1.7             | A    | —                                                                                                                                                     |
| <b>DYNAMIC PARAMETERS (Note 9)</b>                        |                     |      |                |                  |      |                                                                                                                                                       |
| Total Gate Charge                                         | Q <sub>g</sub>      | —    | 7.3            | —                | nC   | V <sub>GS</sub> = -4.5V, V <sub>DS</sub> = -10V, I <sub>D</sub> = -3.0A                                                                               |
| Gate-Source Charge                                        | Q <sub>gs</sub>     | —    | 2.0            | —                | nC   | V <sub>GS</sub> = -4.5V, V <sub>DS</sub> = -10V, I <sub>D</sub> = -3.0A                                                                               |
| Gate-Drain Charge                                         | Q <sub>gd</sub>     | —    | 1.9            | —                | nC   | V <sub>GS</sub> = -4.5V, V <sub>DS</sub> = -10V, I <sub>D</sub> = -3.0A                                                                               |
| Turn-On Delay Time                                        | t <sub>D(ON)</sub>  | —    | 12             | —                | ns   | V <sub>DS</sub> = -10V, V <sub>GS</sub> = -4.5V,<br>R <sub>L</sub> = 10Ω, R <sub>G</sub> = 6Ω                                                         |
| Turn-On Rise Time                                         | t <sub>r</sub>      | —    | 20             | —                | ns   |                                                                                                                                                       |
| Turn-Off Delay Time                                       | t <sub>D(OFF)</sub> | —    | 38             | —                | ns   |                                                                                                                                                       |
| Turn-Off Fall Time                                        | t <sub>f</sub>      | —    | 41             | —                | ns   |                                                                                                                                                       |
| Input Capacitance                                         | C <sub>iss</sub>    | —    | 443            | —                | pF   | V <sub>DS</sub> = -16V, V <sub>GS</sub> = 0V<br>f = 1.0MHz                                                                                            |
| Output Capacitance                                        | C <sub>oss</sub>    | —    | 128            | —                | pF   |                                                                                                                                                       |
| Reverse Transfer Capacitance                              | C <sub>rss</sub>    | —    | 101            | —                | pF   |                                                                                                                                                       |

- Notes:
6. Device mounted on 1" x 1", FR-4 PC board with 2 oz. copper and test pulse width t ≤ 10s.
  7. Repetitive Rating, pulse width limited by junction temperature.
  8. Test pulse width t = 300μs.
  9. Guaranteed by design. Not subject to product testing.

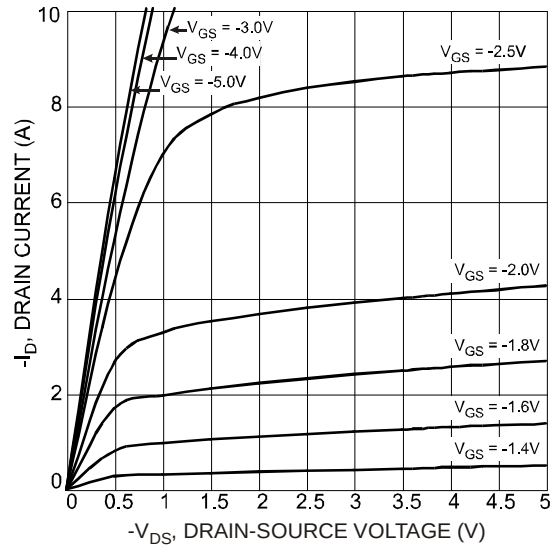


Fig. 1 Typical Output Characteristics

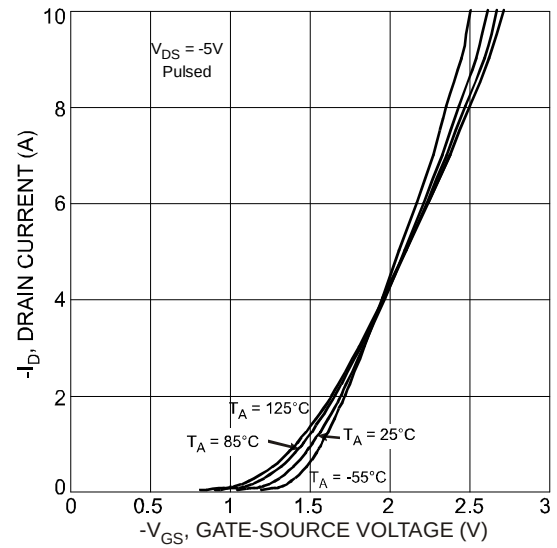


Fig. 2 Typical Transfer Characteristics

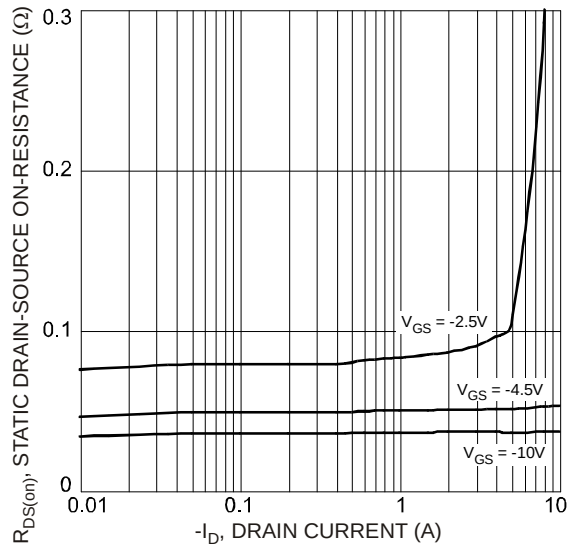


Fig. 3 On-Resistance vs. Drain Current and Gate Voltage

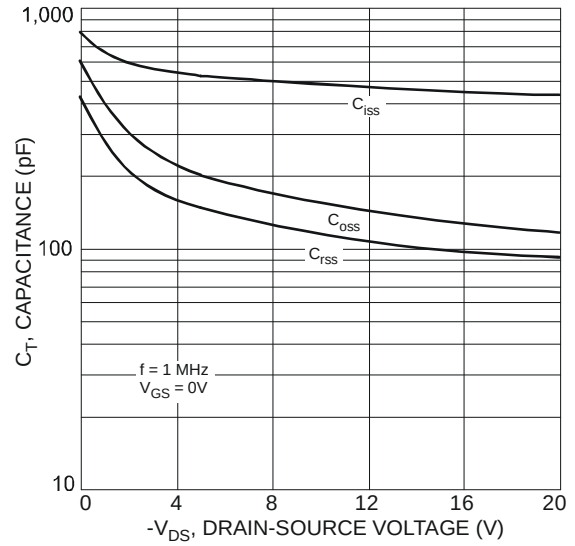


Fig. 4 Typical Total Capacitance

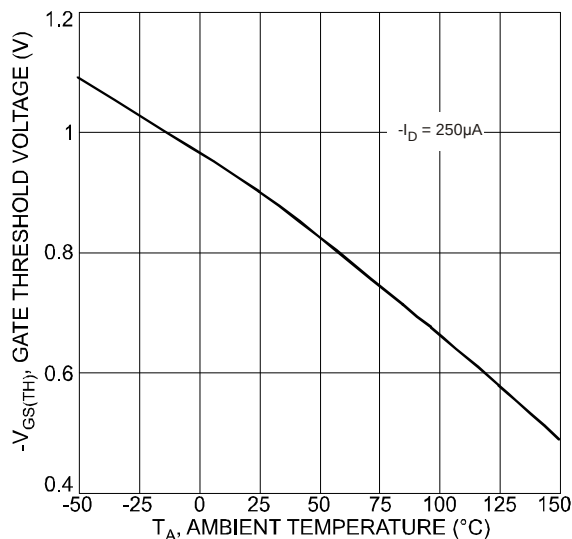


Fig. 5 Gate Threshold Voltage vs. Ambient Temperature

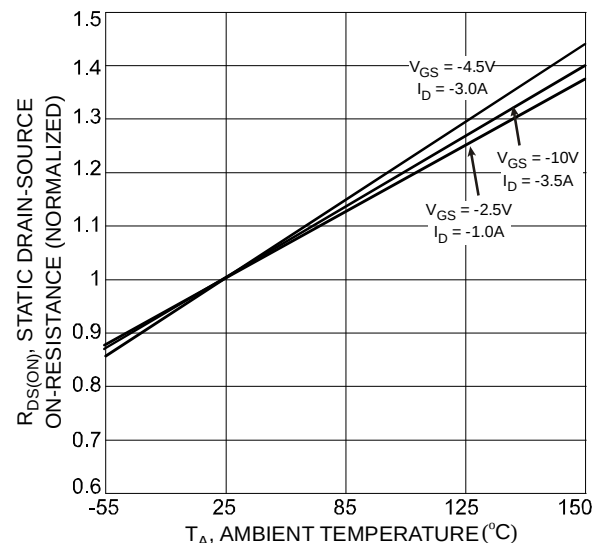


Fig. 6 Normalized Static Drain-Source On-Resistance vs. Ambient Temperature

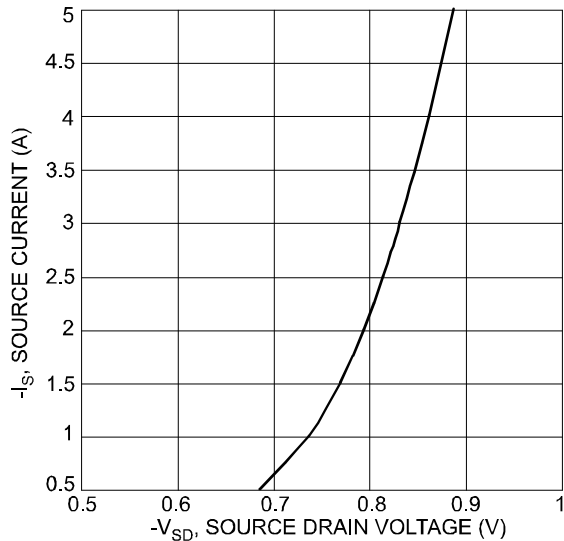


Fig. 7 Reverse Drain Current vs. Source-Drain Voltage

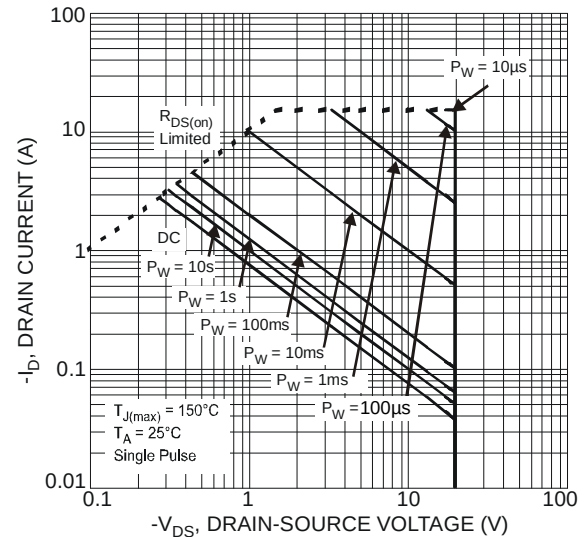
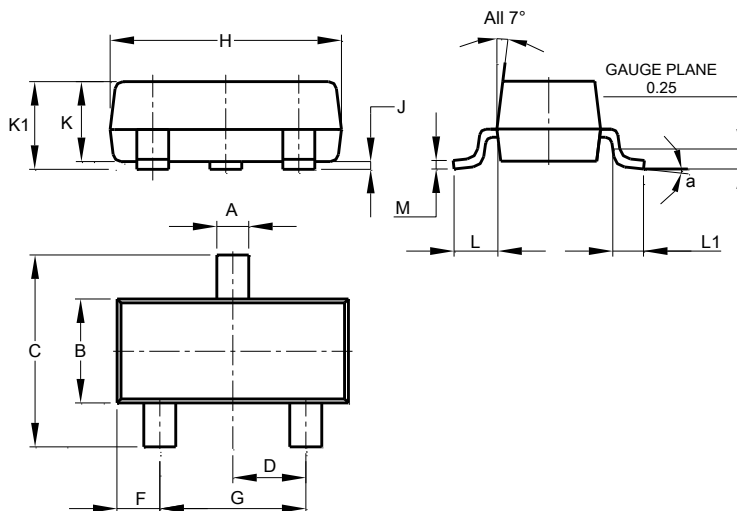


Fig. 8 SOA, Safe Operation Area

## Package Outline Dimensions

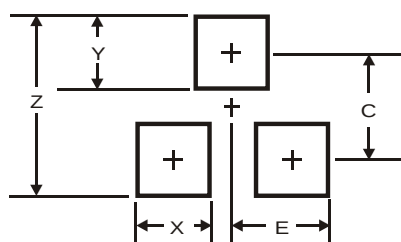
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| SOT23                |       |       |       |
|----------------------|-------|-------|-------|
| Dim                  | Min   | Max   | Typ   |
| A                    | 0.37  | 0.51  | 0.40  |
| B                    | 1.20  | 1.40  | 1.30  |
| C                    | 2.30  | 2.50  | 2.40  |
| D                    | 0.89  | 1.03  | 0.915 |
| F                    | 0.45  | 0.60  | 0.535 |
| G                    | 1.78  | 2.05  | 1.83  |
| H                    | 2.80  | 3.00  | 2.90  |
| J                    | 0.013 | 0.10  | 0.05  |
| K                    | 0.890 | 1.00  | 0.975 |
| K1                   | 0.903 | 1.10  | 1.025 |
| L                    | 0.45  | 0.61  | 0.55  |
| L1                   | 0.25  | 0.55  | 0.40  |
| M                    | 0.085 | 0.150 | 0.110 |
| a                    | 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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