



## Description

The DMP510DL-7 uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. It can be used in a wide variety of applications.

## General Features

$V_{DS} = -50V, I_D = -0.1A$

$R_{DS(ON)} < 5 \Omega @ V_{GS} = -10V$

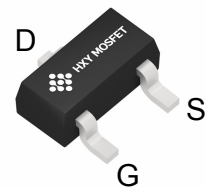
$R_{DS(ON)} < 6 \Omega @ V_{GS} = -4.5V$

## Application

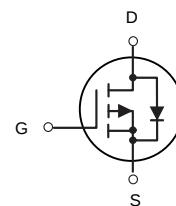
Power switching application

Hard switched and high frequency circuits

DC-DC converter



SOT-23



P-Channel MOSFET

## Package Marking and Ordering Information

| Product ID | Pack   | Marking | Qty(PCS) |
|------------|--------|---------|----------|
| DMP510DL-7 | SOT-23 | PD      | 3000     |

## Absolute Maximum Ratings ( $T_A = 25^\circ C$ unless otherwise noted)

| Parameter                                                   | Symbol          | Limit      | Unit         |
|-------------------------------------------------------------|-----------------|------------|--------------|
| Drain-Source Voltage                                        | $V_{DS}$        | -50        | V            |
| Gate-Source Voltage                                         | $V_{GS}$        | $\pm 20$   | V            |
| Drain Current-Continuous                                    | $I_D$           | -0.1       | A            |
| Pulsed Drain Current                                        | $I_{DM}$        | -0.5       | A            |
| Maximum Power Dissipation                                   | $P_D$           | 0.35       | W            |
| Operating Junction and Storage Temperature Range            | $T_J, T_{STG}$  | -55 To 150 | $^\circ C$   |
| Thermal Resistance ,Junction-to-Ambient <sup>(Note 2)</sup> | $R_{\theta JA}$ | 62.5       | $^\circ C/W$ |



Electrical Characteristics (Ta=25°C unless otherwise specified)

| Symbol                 | Parameter                                 | Test conditions                                                                               | Min  | Typ  | Max  | Unit |
|------------------------|-------------------------------------------|-----------------------------------------------------------------------------------------------|------|------|------|------|
| Static                 |                                           |                                                                                               |      |      |      |      |
| V <sub>(BR)DSS</sub>   | Drain-source breakdown voltage            | V <sub>GS</sub> =0, I <sub>D</sub> =250μA                                                     | -50  |      |      | V    |
| V <sub>GS(th)</sub>    | Gate threshold voltage                    | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA                                     | -0.8 |      | -2.0 | V    |
| I <sub>GSS</sub>       | Gate-body leakage current                 | V <sub>DS</sub> =0, V <sub>GS</sub> =±10V                                                     |      |      | ±10  | μA   |
| I <sub>DSS</sub>       | Zero gate voltage drain current           | V <sub>DS</sub> =-50V, V <sub>GS</sub> =0V                                                    |      |      | -10  | μA   |
|                        |                                           | V <sub>DS</sub> =-40V, V <sub>GS</sub> =0V                                                    |      |      | -100 | nA   |
| R <sub>DS(on)</sub>    | Drain-source on-resistance <sup>a</sup>   | V <sub>GS</sub> =-10V, I <sub>D</sub> =-0.13A                                                 |      | 2    | 5    | Ω    |
|                        |                                           | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-0.13A                                                |      | 2.5  | 6    | Ω    |
| g <sub>FS</sub>        | Forward transconductance <sup>a</sup>     | V <sub>DS</sub> =-25V, I <sub>D</sub> =-0.13A                                                 | 50   |      |      | mS   |
| V <sub>SD</sub>        | Diode forward voltage                     | I <sub>S</sub> =-0.13A, V <sub>GS</sub> =0V                                                   |      |      | -1.0 | V    |
| Dynamic                |                                           |                                                                                               |      |      |      |      |
| C <sub>iss</sub>       | Input capacitance                         | V <sub>DS</sub> =-25V, V <sub>GS</sub> =0V, f=1MHz                                            |      | 25   |      | pF   |
| C <sub>oss</sub>       | Output capacitance                        |                                                                                               |      | 15   |      |      |
| C <sub>rss</sub>       | Reverse transfer capacitance <sup>b</sup> |                                                                                               |      | 3.5  |      |      |
| Switching <sup>b</sup> |                                           |                                                                                               |      |      |      |      |
| t <sub>d(on)</sub>     | Turn-on delay time                        | V <sub>GS</sub> =-10V, V <sub>DS</sub> =-15V<br>I <sub>D</sub> =-200mA, R <sub>GEN</sub> =25Ω |      | 16.7 |      | nS   |
| t <sub>r</sub>         | Rise time                                 |                                                                                               |      | 8.6  |      |      |
| t <sub>d(off)</sub>    | Turn-off delay time                       |                                                                                               |      | 17.9 |      |      |
| t <sub>f</sub>         | Fall time                                 |                                                                                               |      | 5.3  |      |      |

Notes :

a. Pulse Test : Pulse width $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .

b. Guaranteed by design, not subject to producing.



## Typical Characteristics

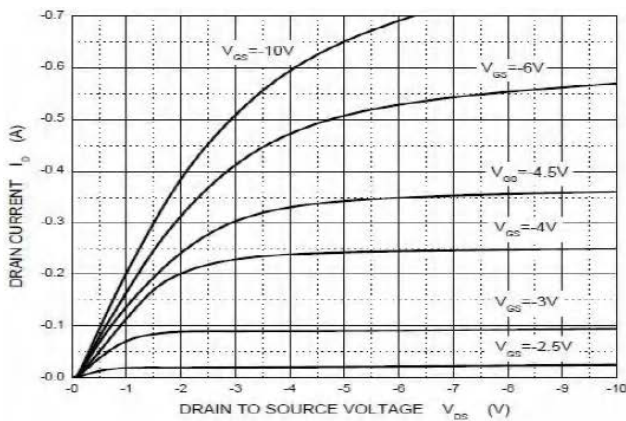


Figure1. Output Characteristics

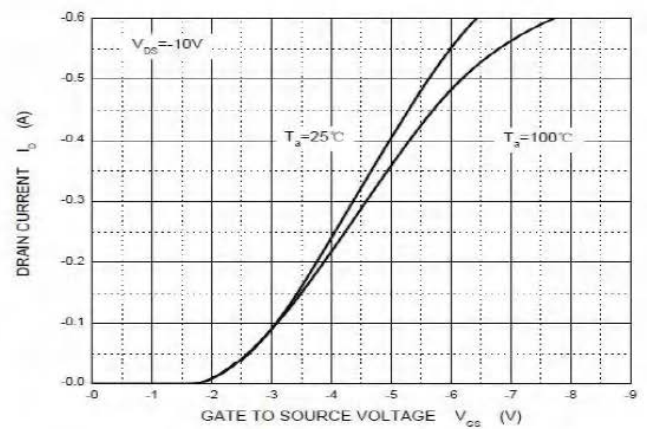


Figure2. Transfer Characteristics

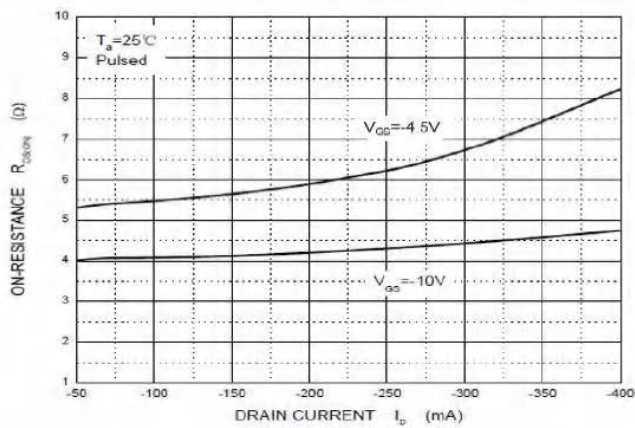


Figure3. Drain-Source on Resistance

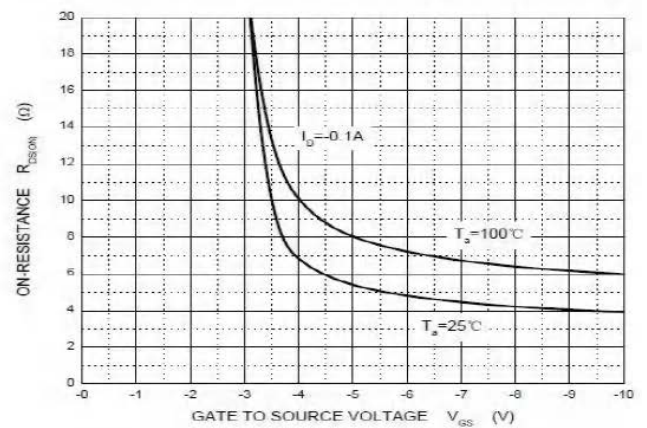


Figure4. Drain-Source on Resistance

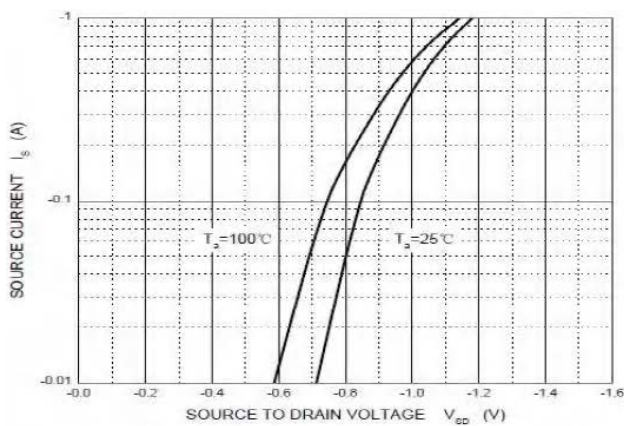


Figure5. Diode Forward Voltage vs. current

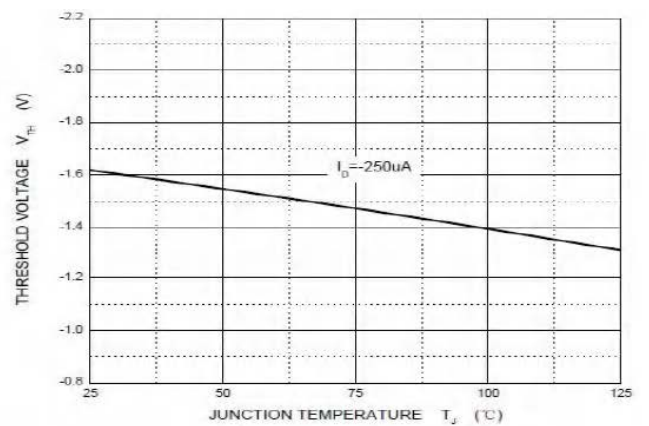
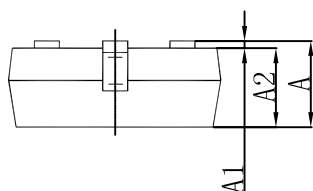
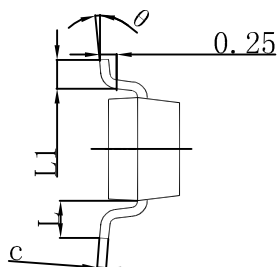
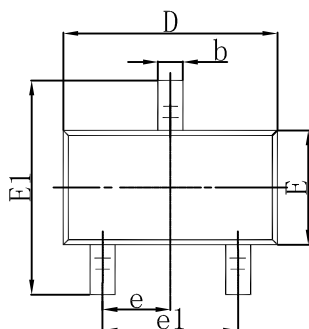


Figure6. Gate Threshold vs. Junction Temperature

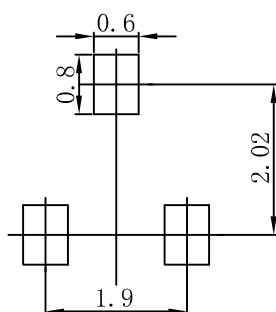


## SOT-23 Package Outline Dimensions



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 0.900                     | 1.150 | 0.035                | 0.045 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 0.900                     | 1.050 | 0.035                | 0.041 |
| b      | 0.300                     | 0.500 | 0.012                | 0.020 |
| c      | 0.080                     | 0.150 | 0.003                | 0.006 |
| D      | 2.800                     | 3.000 | 0.110                | 0.118 |
| E      | 1.200                     | 1.400 | 0.047                | 0.055 |
| E1     | 2.250                     | 2.550 | 0.089                | 0.100 |
| e      | 0.950 TYP                 |       | 0.037 TYP            |       |
| e1     | 1.800                     | 2.000 | 0.071                | 0.079 |
| L      | 0.550 REF                 |       | 0.022 REF            |       |
| L1     | 0.300                     | 0.500 | 0.012                | 0.020 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

## SOT-23 Suggested Pad Layout



### Note:

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.



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