



# Power MOSFETS

## DATASHEET

---

**LM30598PLI3A**

P-Channel  
Enhancement Mode MOSFET

 Leadpower-semiconductor Corp., Ltd

 [sales@leadpower-semi.com](mailto:sales@leadpower-semi.com)

 (03) 6577339 FAX : (03) 6577229

 [www.leadpower-semi.com](http://www.leadpower-semi.com)



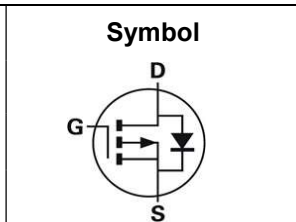
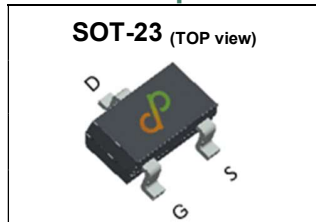
Quality Management Systems

ISO 9001:2015 Certificate

# LM30598PLI3A

## P-Channel Enhancement Mode MOSFET

### Pin Description



### Product Summary

| Symbol           | P-Channel | Unit |
|------------------|-----------|------|
| $V_{DSS}$        | -30       | V    |
| $R_{DS(ON)-Max}$ | 59.8      | mΩ   |
| $I_D$            | -3.4      | A    |

### Feature

- Lower  $Q_g$  and  $Q_{gd}$  for high-speed switching
- Reliable and Rugged
- ROHS Compliant & Halogen-Free

### Applications

- Power Management in Notebook Computer, Portable Equipment and Battery Powered Systems

### Ordering Information

| Orderable Part Number | Package Type | Form        | Shipping           | Marking |
|-----------------------|--------------|-------------|--------------------|---------|
| LM30598PLI3A          | SOT-23       | Tape & Reel | 3000 / Tape & Reel | 05□□□   |

Note : □□□ = Lot Code

### Absolute Maximum Ratings ( $T_J=25^{\circ}\text{C}$ Unless Otherwise Noted)

| Symbol         | Parameter                       | P-Channel                | Unit               |
|----------------|---------------------------------|--------------------------|--------------------|
| $V_{DSS}$      | Drain-Source Voltage            | -30                      | V                  |
| $V_{GSS}$      | Gate-Source Voltage             | $\pm 12$                 |                    |
| $T_J$          | Maximum Junction Temperature    | 150                      | $^{\circ}\text{C}$ |
| $T_{STG}$      | Storage Temperature Range       | -55 to 150               | $^{\circ}\text{C}$ |
| $I_{DM}^{(1)}$ | Pulse Drain Current Tested      | $T_A=25^{\circ}\text{C}$ | A                  |
| $I_D$          | Continuous Drain Current        | $T_A=25^{\circ}\text{C}$ | A                  |
|                |                                 | $T_A=70^{\circ}\text{C}$ |                    |
| $P_D$          | Maximum Power Dissipation       | $T_A=25^{\circ}\text{C}$ | W                  |
|                |                                 | $T_A=70^{\circ}\text{C}$ |                    |
| $I_{AS}^{(2)}$ | Avalanche Current, Single pulse | $L=0.1\text{mH}$         | A                  |
| $E_{AS}^{(2)}$ | Avalanche Energy, Single pulse  | $L=0.1\text{mH}$         | mJ                 |

### Thermal Characteristics

| Symbol                | Parameter                              | Rating       | Unit                 |
|-----------------------|----------------------------------------|--------------|----------------------|
| $R_{\theta JA}^{(3)}$ | Thermal Resistance-Junction to Ambient | Steady State | $^{\circ}\text{C/W}$ |

Note ① : Max. current is limited by junction temperature.

Note ② : UIS tested and pulse width are limited by maximum junction temperature  $150^{\circ}\text{C}$

Note ③ : Surface Mounted on  $1\text{in}^2$  FR-4 board with 1oz.

## P-Channel Electrical Characteristics (T<sub>J</sub>=25°C Unless Otherwise Noted)

| Symbol                               | Parameter                        | Test Conditions                                                                         | Min. | Typ.  | Max. | Unit |
|--------------------------------------|----------------------------------|-----------------------------------------------------------------------------------------|------|-------|------|------|
| Static Electrical Characteristics    |                                  |                                                                                         |      |       |      |      |
| BV <sub>DSS</sub>                    | Drain-Source Breakdown Voltage   | V <sub>GS</sub> =0V, I <sub>DS</sub> =-250uA                                            | -30  | -     | -    | V    |
| I <sub>DSS</sub>                     | Zero Gate Voltage Drain Current  | V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V                                              | -    | -     | -1   | uA   |
| V <sub>GS(th)</sub>                  | Gate Threshold Voltage           | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =-250uA                              | -0.6 | -0.85 | -1.1 | V    |
| I <sub>GSS</sub>                     | Gate Leakage Current             | V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V                                              | -    | -     | ±100 | nA   |
| R <sub>DS(ON)</sub> <sup>④</sup>     | Drain-Source On-state Resistance | V <sub>GS</sub> =-10V, I <sub>DS</sub> =-4.2A                                           | -    | 50    | 59.8 | mΩ   |
|                                      |                                  | V <sub>GS</sub> =-4.5V, I <sub>DS</sub> =-4A                                            | -    | 61    | 76   |      |
|                                      |                                  | V <sub>GS</sub> =-2.5V, I <sub>DS</sub> =-1A                                            | -    | 83    | 112  |      |
| gfs                                  | Forward Transconductance         | V <sub>DS</sub> =-5V, I <sub>DS</sub> =-5A                                              | -    | 11    | -    | S    |
| Dynamic Characteristics <sup>⑤</sup> |                                  |                                                                                         |      |       |      |      |
| R <sub>G</sub>                       | Gate Resistance                  | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, Freq.=1MHz                                    | -    | 7.5   | -    | Ω    |
| C <sub>iss</sub>                     | Input Capacitance                | V <sub>GS</sub> =0V, V <sub>DS</sub> =-15V, Freq.=1MHz                                  | -    | 680   | -    | pF   |
| C <sub>oss</sub>                     | Output Capacitance               |                                                                                         | -    | 53    | -    |      |
| C <sub>rss</sub>                     | Reverse Transfer Capacitance     |                                                                                         | -    | 49    | -    |      |
| td(ON)                               | Turn-on Delay Time               | V <sub>GS</sub> =-10V, V <sub>DS</sub> =-15V, I <sub>D</sub> =-1A, R <sub>GEN</sub> =6Ω | -    | 0.7   | -    | nS   |
| t <sub>r</sub>                       | Turn-on Rise Time                |                                                                                         | -    | 22.5  | -    |      |
| t <sub>d(OFF)</sub>                  | Turn-off Delay Time              |                                                                                         | -    | 50    | -    |      |
| t <sub>f</sub>                       | Turn-off Fall Time               |                                                                                         | -    | 19.8  | -    |      |
| Q <sub>g</sub>                       | Total Gate Charge                | V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-25V I <sub>D</sub> =-4.2A                     | -    | 9.4   | -    | nC   |
| Q <sub>g</sub>                       | Total Gate Charge                | V <sub>GS</sub> =-10V, V <sub>DS</sub> =-25V, I <sub>D</sub> =-4.2A                     | -    | 20.4  | -    |      |
| Q <sub>gs</sub>                      | Gate-Source Charge               |                                                                                         | -    | 1.8   | -    |      |
| Q <sub>gd</sub>                      | Gate-Drain Charge                |                                                                                         | -    | 3.4   | -    |      |
| Source-Drain Characteristics         |                                  |                                                                                         |      |       |      |      |
| V <sub>SD</sub> <sup>④</sup>         | Diode Forward Voltage            | I <sub>SD</sub> =-1A, V <sub>GS</sub> =0V                                               | -    | -0.75 | -1.1 | V    |
| t <sub>rr</sub>                      | Reverse Recovery Time            | I <sub>F</sub> =-2A, V <sub>R</sub> =0V                                                 | -    | 9.9   | -    | nS   |
| Q <sub>rr</sub>                      | Reverse Recovery Charge          | dI <sub>F</sub> /dt=100A/μs                                                             | -    | 4.1   | -    | nC   |

Note ④ : Pulse test (pulse width≤300us, duty cycle≤2%).

Note ⑤ : Guaranteed by design, not subject to production testing.

## P-Channel Typical Characteristics

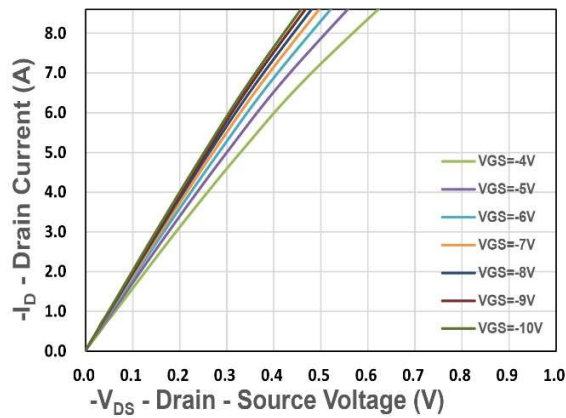


Figure 1. Output Characteristics

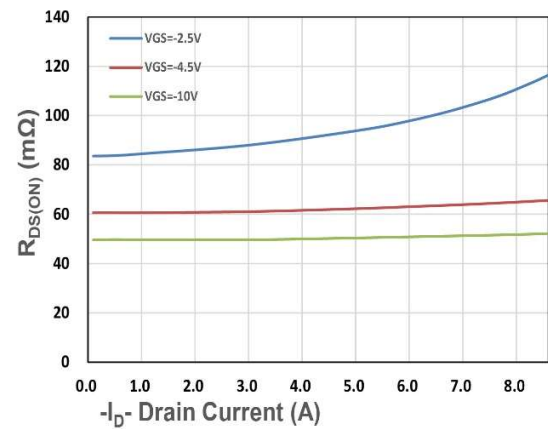


Figure 2. On-Resistance vs. ID

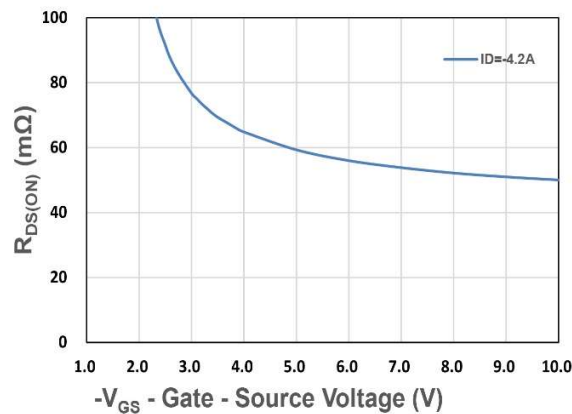


Figure 3. On-Resistance vs. VGS

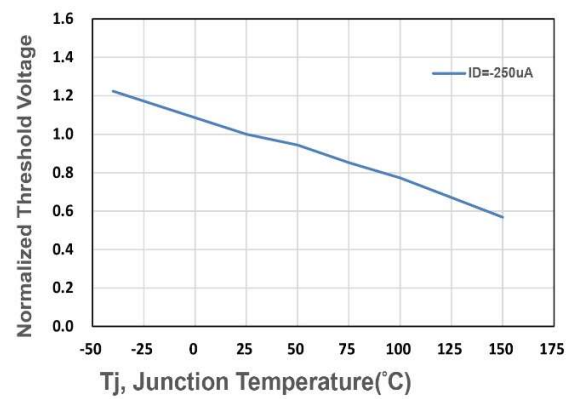


Figure 4. Gate Threshold Voltage

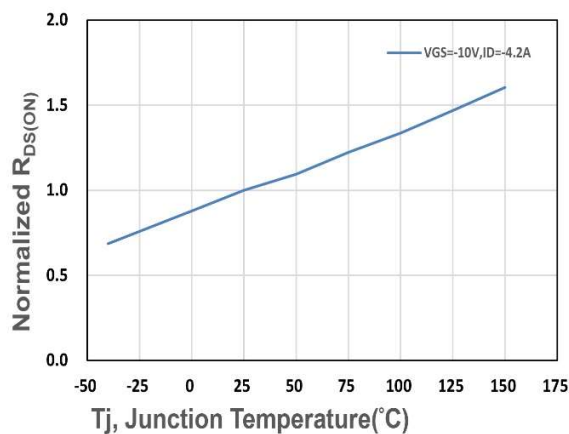


Figure 5. Drain-Source On Resistance

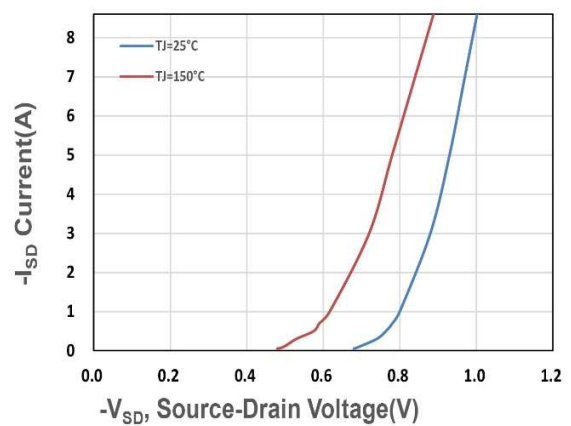


Figure 6. Source-Drain Diode Forward

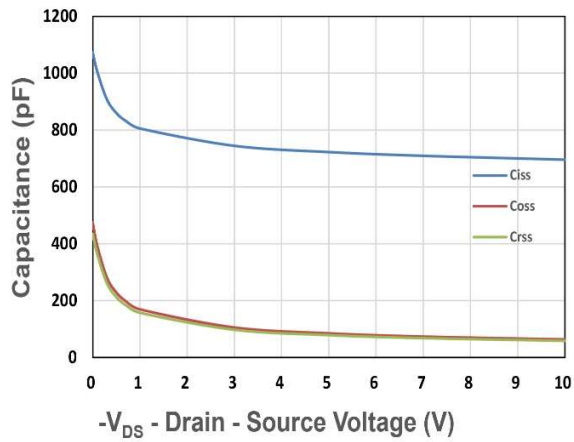


Figure 7. Capacitance

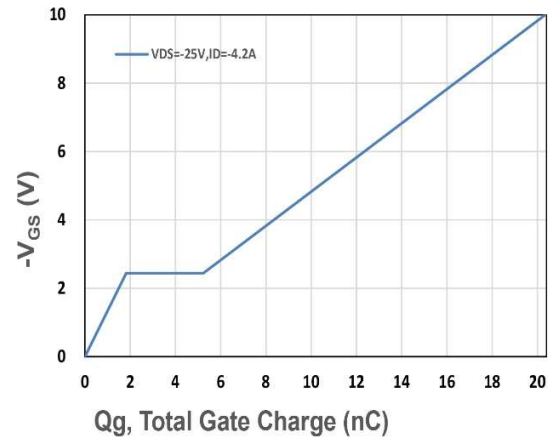


Figure 8. Gate Charge Characteristics

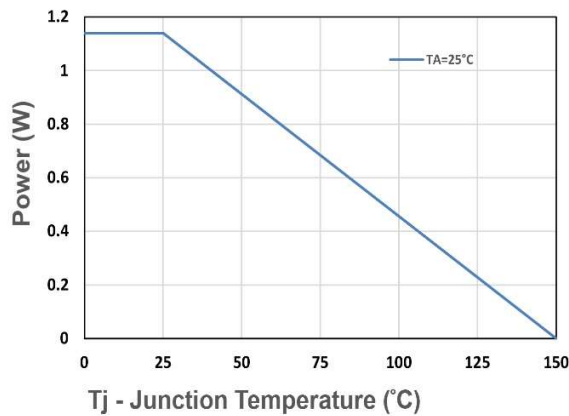


Figure 9. Power Dissipation

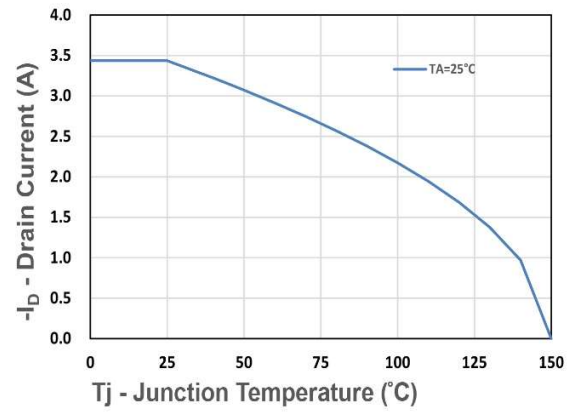


Figure 10. Drain Current

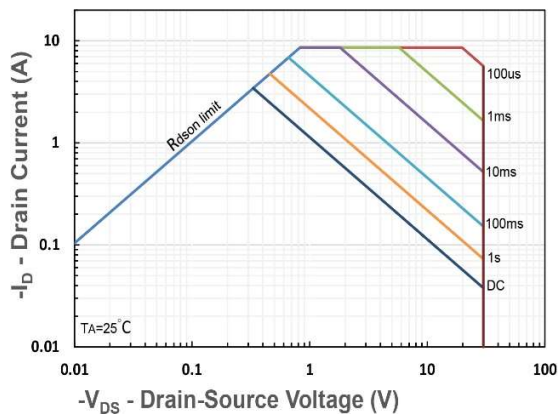


Figure 11. Safe Operating Area

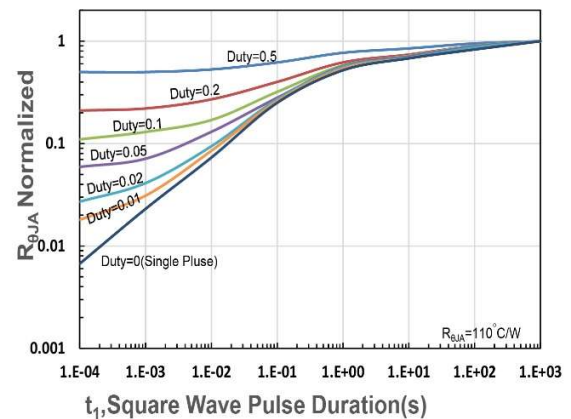


Figure 12.  $R_{\theta JA}$  Transient Thermal Impedance