# Power MOSFETS

## DATASHEET

## LM30210PAK8A

P-Channel

Enhancement Mode MOSFET

Leadpower-semiconductor Corp., Ltd

sales@leadpower-semi.com

(03) 6577339　FAX：(03) 6577229

www.leadpower-semi.com

Quality Management Systems

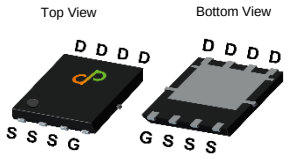
ISO 9001:2015 Certificate

# LM30210PAK8A

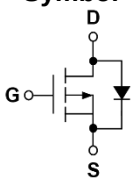
## P-Channel Enhancement Mode MOSFET

### Pin Description

PDFN5*6




Symbol




### Product Summary

| Symbol | P-Channel | Unit |
|---|---|---|
| $V_{DSS}$ | -30 | V |
| $R_{DS(ON)-Max}$ | 23 | mΩ |
| ID | -30 | A |

### Feature

- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- 100% UIS Tested

### Applications

- Portable Equipment
- Battery Powered System

### Ordering Information

| Orderable Part Number | Package Type | Form | Shipping | Marking |
|---|---|---|---|---|
| LM30210PAK8A | PDFN5*6 | Tape & Reel | 5000 / Tape & Reel | 30210<br>□□□□□□ |

Note：□□□□□□= Lot Code

### Absolute Maximum Ratings ($T_J$=25°C Unless Otherwise Noted)

| Symbol | Parameter | | P-Channel | Unit |
|---|---|---|---|---|
| $V_{DSS}$ | Drain-Source Voltage | | -30 | V |
| $V_{GSS}$ | Gate-Source Voltage | | ±25 | |
| $T_J$ | Maximum Junction Temperature | | 150 | °C |
| $T_{STG}$ | Storage Temperature Range | | -55 to 150 | °C |
| $I_{DM}$① | Pulse Drain Current Tested | $T_C$=25°C | -71 | A |
| $I_D$ | Continuous Drain Current | $T_C$=25°C | -30 | A |
| | | $T_C$=100°C | -19 | |
| $P_D$ | Maximum Power Dissipation | $T_C$=25°C | 32 | W |
| | | $T_C$=100°C | 13 | |
| $I_{AS}$② | Avalanche Current, Single pulse | L=0.1mH | -18.5 | A |
| $E_{AS}$② | Avalanche Energy, Single pulse | L=0.1mH | 17 | mJ |

### Thermal Characteristics

| Symbol | Parameter | | Rating | Unit |
|---|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance-Junction to Case | Steady State | 3.9 | °C/W |
| $R_{\theta JA}$③ | Thermal Resistance-Junction to Ambient | Steady State | 75 | °C/W |

Note ①：Max. current is limited by bonding wire

Note ②：UIS tested and pulse width are limited by maximum junction temperature 150°C

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

## P-Channel Electrical Characteristics ($T_J$=25°C Unless Otherwise Noted)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static Electrical Characteristics** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_{DS}$=-250uA | -30 | - | - | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=-24V, $V_{GS}$=0V | - | - | -1 | uA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_{DS}$=-250uA | -1 | -1.7 | -2.3 | V |
| $I_{GSS}$ | Gate Leakage Current1 | $V_{GS}$=±25V, $V_{DS}$=0V | - | - | ±100 | nA |
| $R_{DS(ON)}$④ | Drain-Source On-state Resistance | $V_{GS}$=-10V, $I_{DS}$=-15A | - | 19 | 23 | mΩ |
| | | $V_{GS}$=-4.5V, $I_{DS}$=-10A | - | 26 | 34 | |
| gfs | Forward Transconductance | $V_{DS}$=-5V, $I_{DS}$=-7.5A | - | 14 | - | S |
| **Dynamic Characteristics** ⑤ | | | | | | |
| $R_G$ | Gate Resistance | $V_{GS}$=0V,$V_{DS}$=0V, Freq.=1MHz | - | 15 | - | Ω |
| $C_{iss}$ | Input Capacitance | $V_{GS}$=0V, $V_{DS}$=-15V, Freq.=1MHz | - | 1223 | - | pF |
| $C_{oss}$ | Output Capacitance | | - | 135 | - | |
| $C_{rss}$ | Reverse Transfer Capacitance | | - | 116 | - | |
| $td_{(ON)}$ | Turn-on Delay Time | $V_{GS}$=-10V,$V_{DS}$=-15V, $I_D$=-1A,$R_{GEN}$=6Ω | - | 3.2 | - | nS |
| $t_r$ | Turn-on Rise Time | | - | 22.8 | - | |
| $t_{d(OFF)}$ | Turn-off Delay Time | | - | 105.2 | - | |
| $t_f$ | Turn-off Fall Time | | - | 47.8 | - | |
| $Q_g$ | Total Gate Charge | $V_{GS}$=-4.5V,$V_{DS}$=-15V $I_D$=-15A | - | 13.3 | - | nC |
| $Q_g$ | Total Gate Charge | $V_{GS}$=-10V,$V_{DS}$=-15V, $I_D$=-15A | - | 27.3 | - | |
| $Q_{gs}$ | Gate-Source Charge | | - | 5.19 | - | |
| $Q_{gd}$ | Gate-Drain Charge | | - | 5.32 | - | |
| **Source-Drain Characteristics** | | | | | | |
| $V_{SD}$④ | Diode Forward Voltage | $I_{SD}$=-7.5A, $V_{GS}$=0V | - | -0.8 | -1.1 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_F$=-7.5A, $V_R$=-15V dI$_F$/dt=100A/μs | - | 12.7 | - | nS |
| $Q_{rr}$ | Reverse Recovery Charge | | - | 5.5 | - | 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

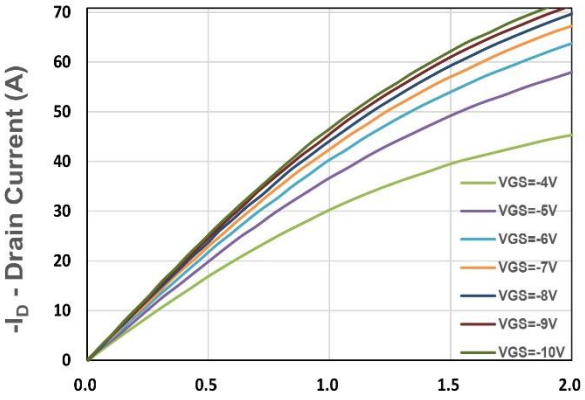



Figure 1. Output Characteristics

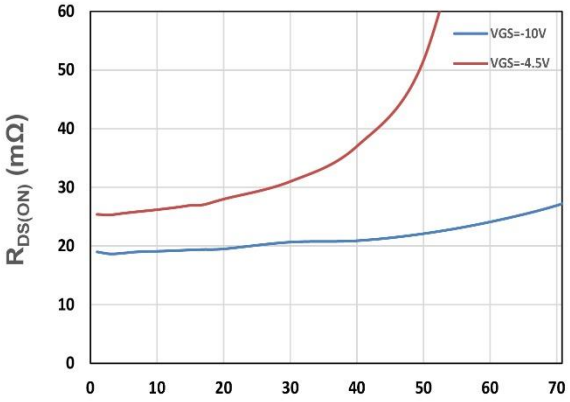



Figure 2. On-Resistance vs. ID

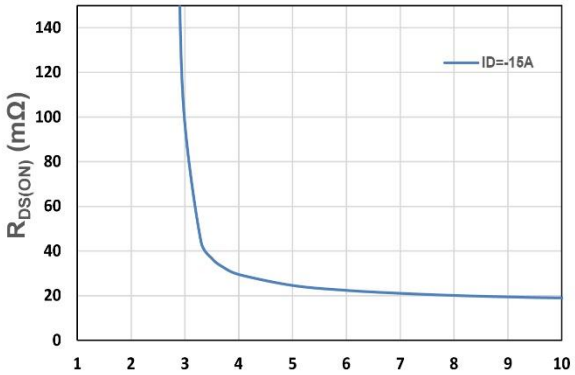



Figure 3. On-Resistance vs. VGS

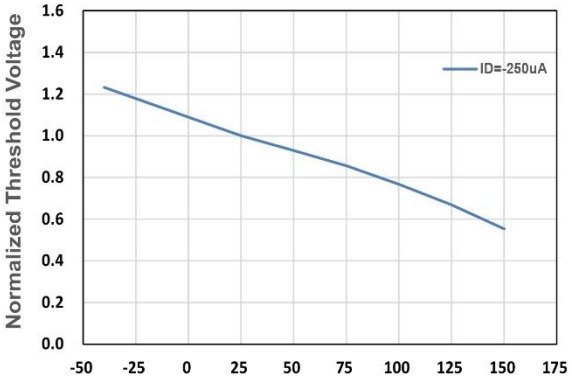



Figure 4. Gate Threshold Voltage

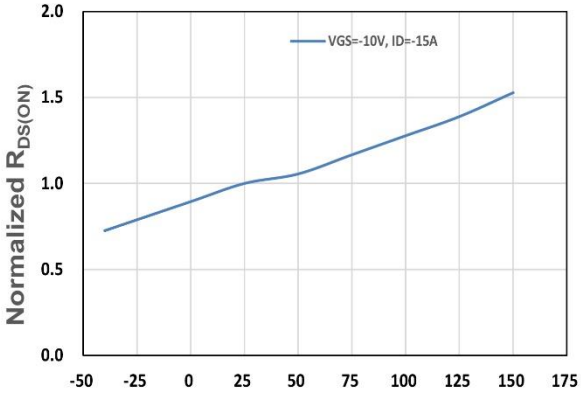



Figure 5. Drain-Source On Resistance

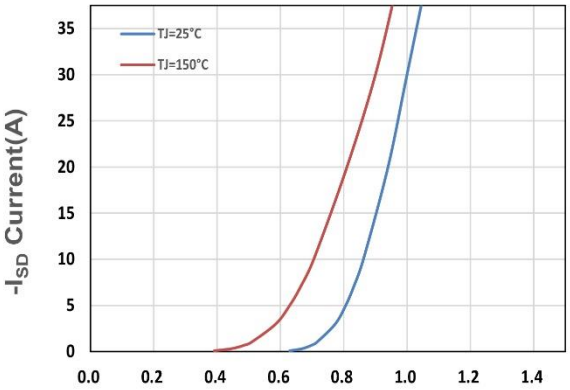
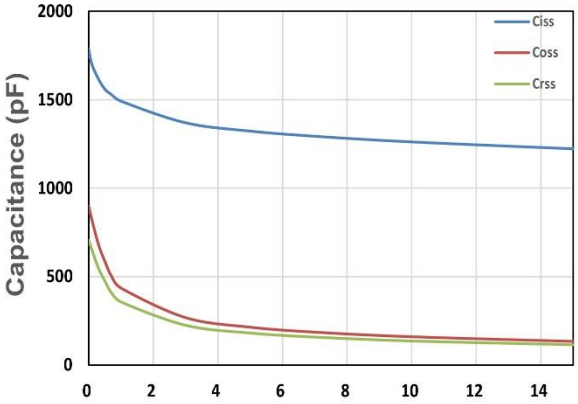
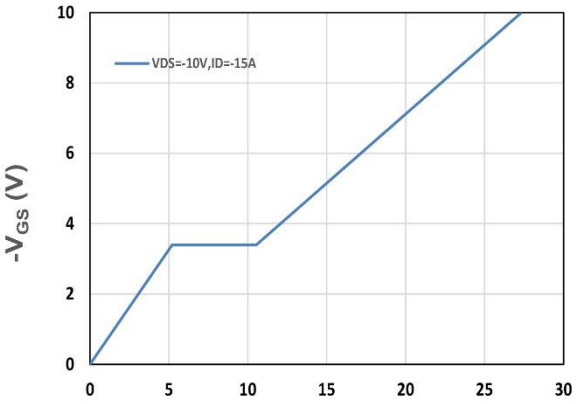



Figure 6. Source-Drain Diode Forward



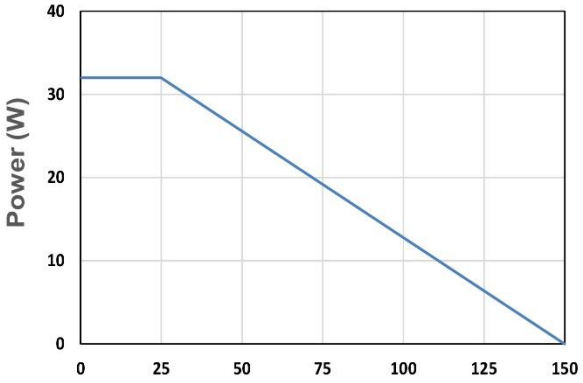

$-V_{DS}$ - Drain - Source Voltage (V)

Figure 7. Capacitance



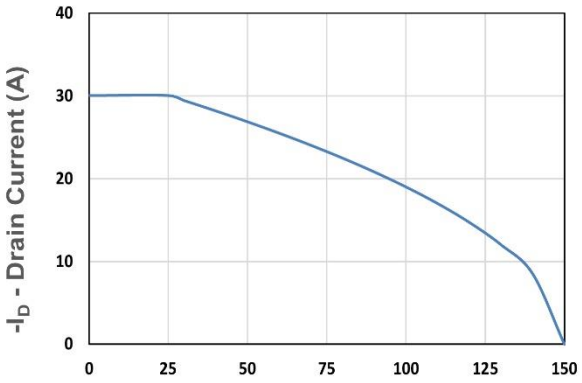

Qg, Total Gate Charge (nC)

Figure 8. Gate Charge Characteristics



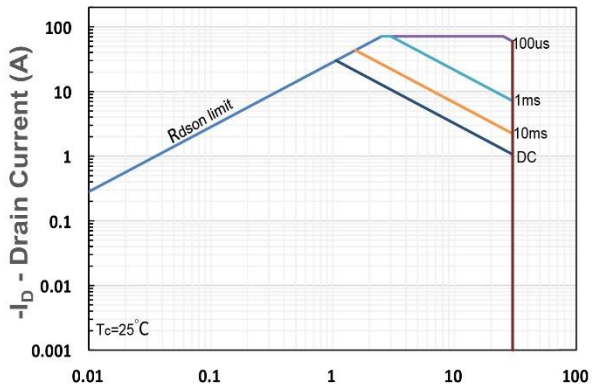

Tc - Case Temperature (°C)

Figure 9. Power Dissipation



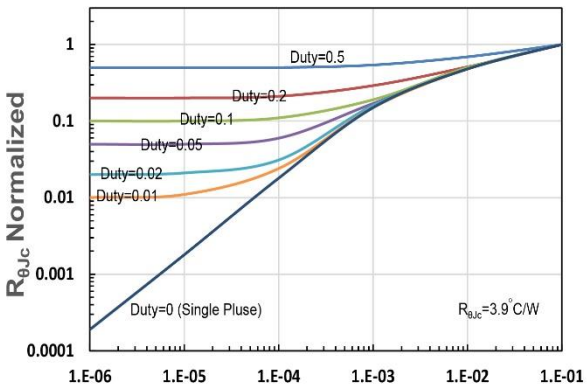

Tc - Case Temperature (°C)

Figure 10. Drain Current




$-V_{DS}$ - Drain-Source Voltage (V)

Figure 11. Safe Operating Area




$t_1$,Square Wave Pulse Duration(s)

Figure 12. RθJC Transient Thermal Impedance