




# Power MOSFETS

## DATASHEET

---

**LM30210PAN3A**

P-Channel  
Enhancement Mode MOSFET

 Leadpower-semi CO., LTD.

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

 (03) 6577339 FAX : (03) 6577229

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

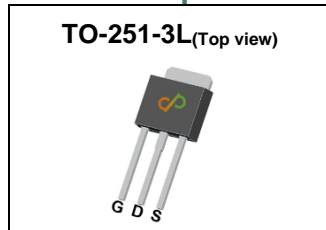


Quality Management Systems

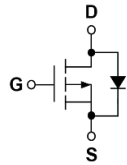
ISO 9001:2015 Certificate

## P-Channel Enhancement Mode MOSFET

### Pin Description



### Symbol



### Product Summary

Symbol	P-Channel	Unit
$V_{DSS}$	-30	V
$R_{DS(ON)-Max}$	23	m $\Omega$
ID	-32	A

### Feature

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

### Applications

- Portable Equipment
- Battery Powered System

### Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM30210PAN3A	TO-251-3L	Tube	75 / Tube	30210 □□□□□□

Note : □□□□□□ = Lot Code

### Absolute Maximum Ratings (T<sub>J</sub>=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
$I_S$	Diode Continuous Forward Current	T <sub>C</sub> =25°C -13	A
$I_{DM}^{①}$	Pulse Drain Current Tested	T <sub>C</sub> =25°C -81	A
$I_D$	Continuous Drain Current	T <sub>C</sub> =25°C -32	A
		T <sub>C</sub> =100°C -20	
$P_D$	Maximum Power Dissipation	T <sub>C</sub> =25°C 36.8	W
		T <sub>C</sub> =100°C 14.7	
$I_D$	Continuous Drain Current	T <sub>A</sub> =25°C -7.7	A
		T <sub>A</sub> =70°C -6.2	
$P_D$	Maximum Power Dissipation	T <sub>A</sub> =25°C 2.1	W
		T <sub>A</sub> =70°C 1.3	
$I_{AS}^{②}$	Avalanche Current, Single pulse	L=0.1mH -18.5	A
		L=0.5mH -9	
$E_{AS}^{②}$	Avalanche Energy, Single pulse	L=0.1mH 17	mJ
		L=0.5mH 20	

### Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State 3.4	°C/W
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	Steady State 60	°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°C

Note ③ : Surface Mounted on 1in<sup>2</sup> 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
<b>Static Electrical Characteristics</b>						
<b>BV<sub>DSS</sub></b>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>DS</sub> =-250uA	-30	-	-	V
<b>I<sub>DSS</sub></b>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V	-	-	-1	uA
<b>V<sub>GS(th)</sub></b>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =-250uA	-1	-1.7	-2.3	V
<b>I<sub>GSS</sub></b>	Gate Leakage Current1	V <sub>GS</sub> =±25V, V <sub>DS</sub> =0V	-	-	±100	nA
<b>R<sub>DS(ON)</sub><sup>④</sup></b>	Drain-Source On-state Resistance	V <sub>GS</sub> =-10V, I <sub>DS</sub> =-15A	-	19	23	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>DS</sub> =-10A	-	26	34	
<b>gfs</b>	Forward Transconductance	V <sub>DS</sub> =-5V, I <sub>DS</sub> =-7.5A	-	14	-	S
<b>Dynamic Characteristics<sup>®</sup></b>						
<b>R<sub>G</sub></b>	Gate Resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, Freq.=1MHz	-	15	-	Ω
<b>C<sub>iss</sub></b>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =-15V, Freq.=1MHz	-	1225	-	pF
<b>C<sub>oss</sub></b>	Output Capacitance					
<b>C<sub>rss</sub></b>	Reverse Transfer Capacitance					
<b>td(ON)</b>	Turn-on Delay Time	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-15V, I <sub>D</sub> =-1A, R <sub>GEN</sub> =6Ω	-	3.2	-	nS
<b>t<sub>r</sub></b>	Turn-on Rise Time					
<b>t<sub>d(OFF)</sub></b>	Turn-off Delay Time					
<b>t<sub>f</sub></b>	Turn-off Fall Time					
<b>Q<sub>g</sub></b>	Total Gate Charge	V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-15V, I <sub>D</sub> =-15A	-	13.3	-	nC
<b>Q<sub>g</sub></b>	Total Gate Charge	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-15V, I <sub>D</sub> =-15A	-	27.3	-	
<b>Q<sub>gs</sub></b>	Gate-Source Charge		-	5.19	-	
<b>Q<sub>gd</sub></b>	Gate-Drain Charge		-	5.32	-	
<b>Source-Drain Characteristics</b>						
<b>V<sub>SD</sub><sup>④</sup></b>	Diode Forward Voltage	I <sub>SD</sub> =-7.5A, V <sub>GS</sub> =0V	-	-0.8	-1.1	V
<b>t<sub>rr</sub></b>	Reverse Recovery Time	I <sub>F</sub> =-7.5A, V <sub>R</sub> =-15V	-	12.7	-	nS
<b>Q<sub>rr</sub></b>	Reverse Recovery Charge	dI <sub>F</sub> /dt=100A/μs	-	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

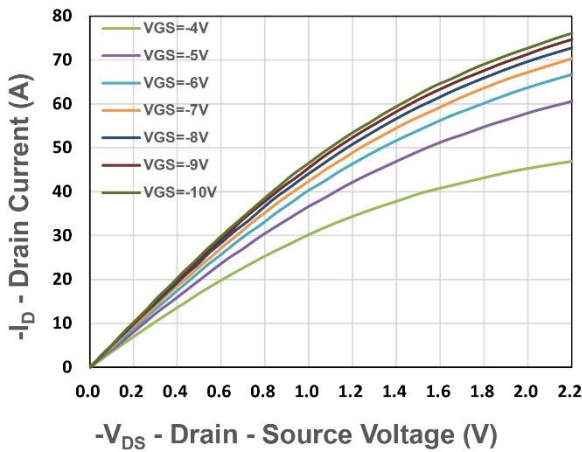


Figure 1. Output Characteristics

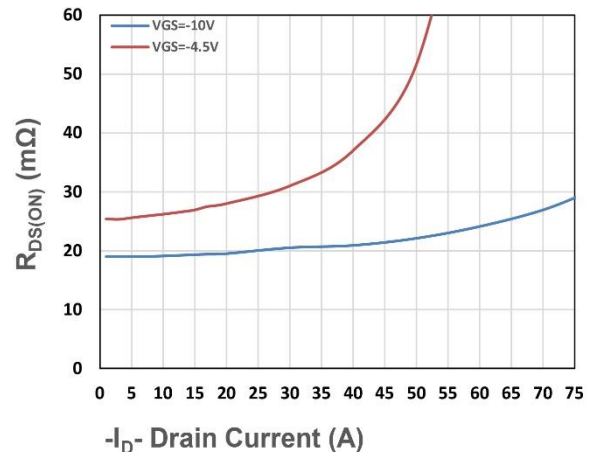


Figure 2. On-Resistance vs. ID

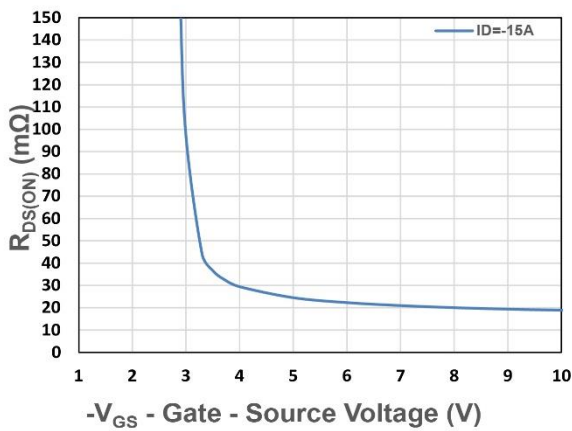


Figure 3. On-Resistance vs. VGS

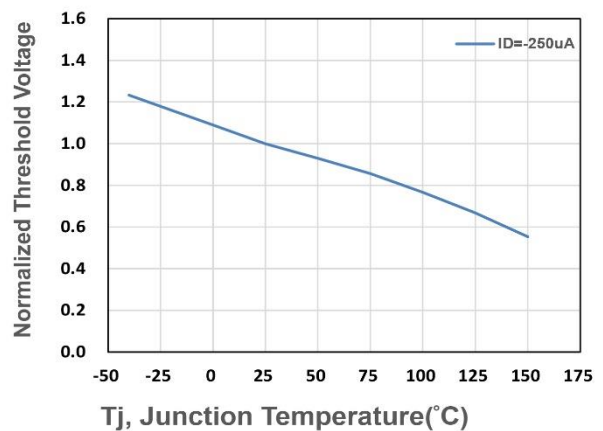


Figure 4. Gate Threshold Voltage

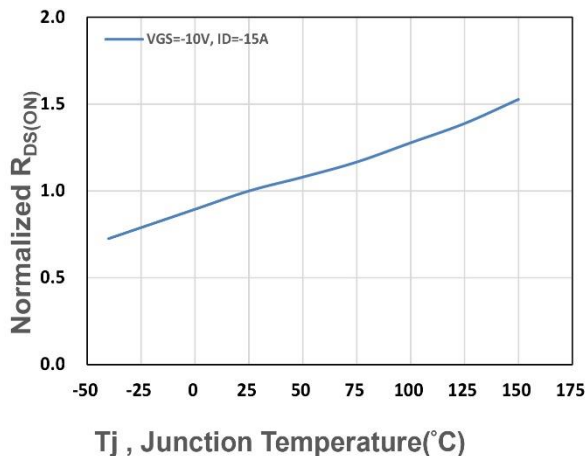


Figure 5. Drain-Source On Resistance

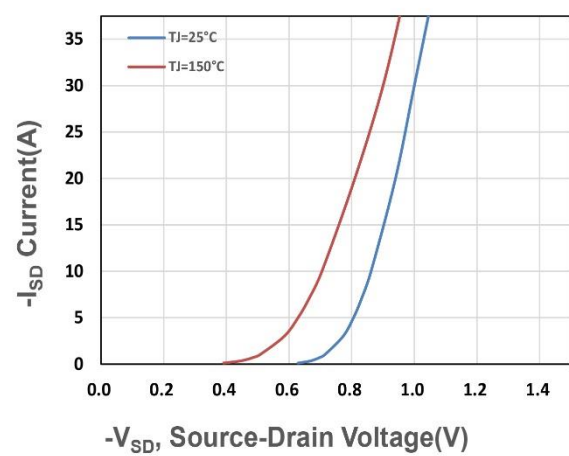
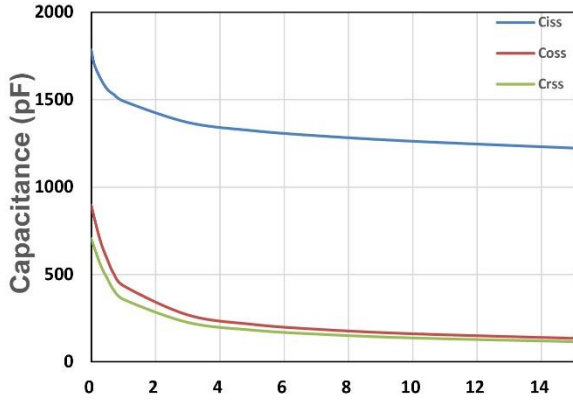
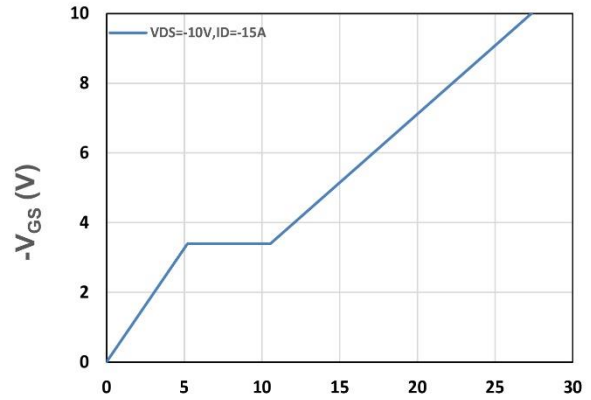


Figure 6. Source-Drain Diode Forward



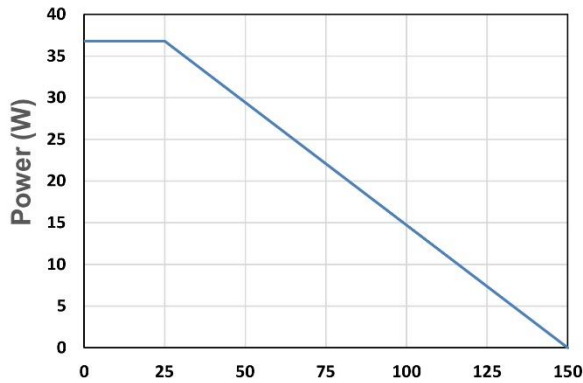
$-V_{DS}$  - Drain - Source Voltage (V)

Figure 7. Capacitance



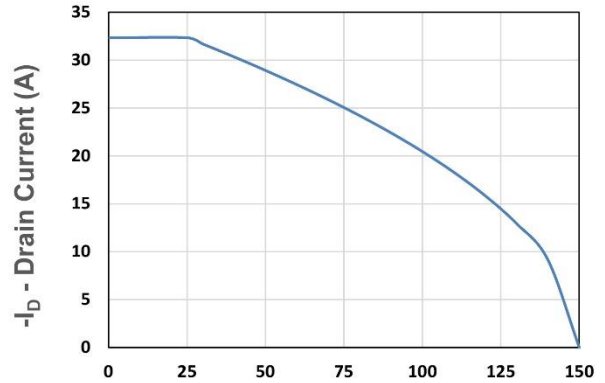
$Q_g$ , Total Gate Charge (nC)

Figure 8. Gate Charge Characteristics



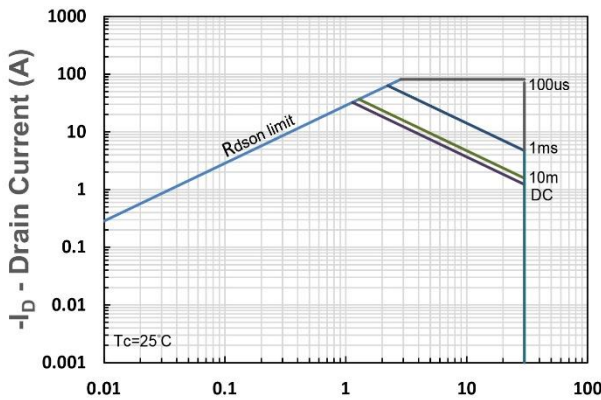
$T_c$  - Case Temperature ( $^{\circ}C$ )

Figure 9. Power Dissipation



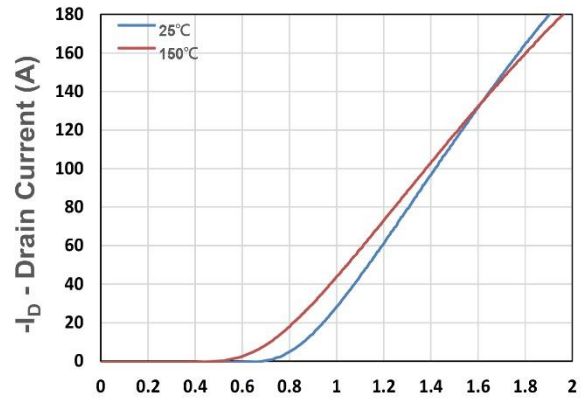
$T_c$  - Case Temperature ( $^{\circ}C$ )

Figure 10. Drain Current



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

Figure 11. Safe Operating Area



$-V_{GS}$  - Gate - Source Voltage (V)

Figure 12. Transfer Characteristics

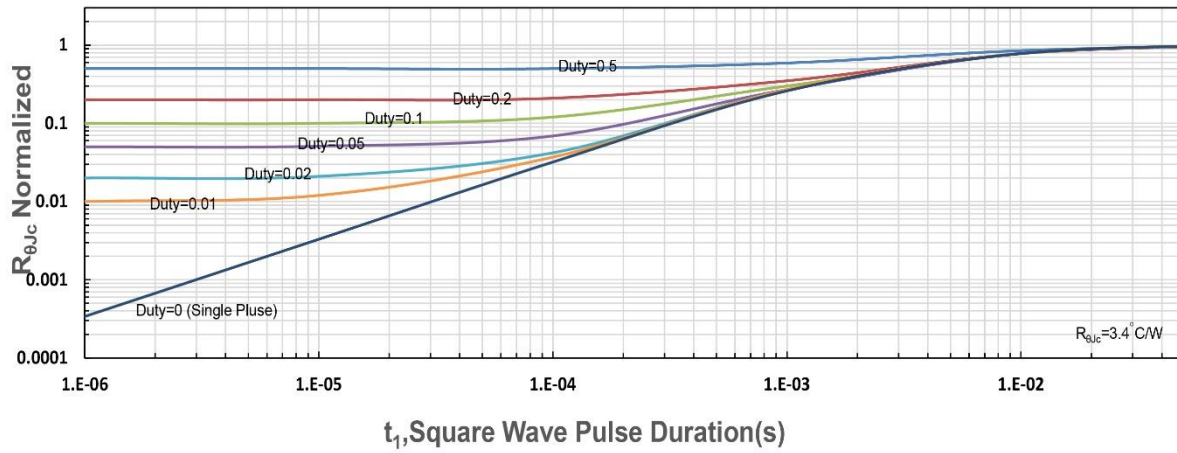


Figure 13.  $R_{\theta Jc}$  Transient Thermal Impedance