




# Power MOSFETS


## DATASHEET


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**LM30048NAI8A**

N-Channel  
Enhancement Mode MOSFET

 Leadpower-semiconductor Corp., Ltd

 sales@leadpower-semi.com

 (03) 6577339 FAX : (03) 6577229

 www.leadpower-semi.com

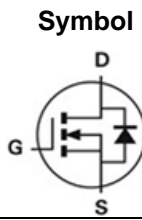
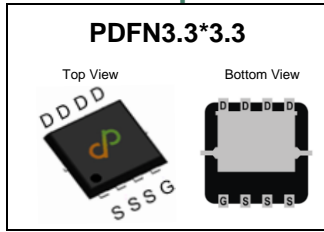


Quality Management Systems

ISO 9001:2015 Certificate

## N-Channel Enhancement Mode MOSFET

### Pin Description



### Product Summary

Symbol	N-Channel	Unit
V <sub>DSS</sub>	30	V
R <sub>DS(ON)-Max</sub>	4.8	mΩ
ID	64	A

### Feature

- Lower R<sub>DS(ON)</sub> to Minimize Conduction Losses
- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- 100% UIS and Rg Tested

### Applications

- Portable Equipment and Battery Powered systems.
- Power Management in Notebook Computer

### Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM30048NAI8A	PDFN3.3*3.3	Tape & Reel	5000 / Tape & Reel	30048 □□□□□□

### Absolute Maximum Ratings (T<sub>J</sub>=25°C Unless Otherwise Noted)

Symbol	Parameter	N-Channel	Unit
V <sub>DSS</sub>	Drain-Source Voltage	30	V
V <sub>GSS</sub>	Gate-Source Voltage	±20	
T <sub>J</sub>	Maximum Junction Temperature	150	°C
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
I <sub>DM</sub> <sup>①</sup>	Pulse Drain Current Tested	T <sub>c</sub> =25°C 71	A
I <sub>D</sub>	Continuous Drain Current	T <sub>c</sub> =25°C 64	A
		T <sub>c</sub> =100°C 40	
P <sub>D</sub>	Maximum Power Dissipation	T <sub>c</sub> =25°C 31	W
		T <sub>c</sub> =100°C 12.5	
I <sub>AS</sub> <sup>②</sup>	Avalanche Current, Single pulse	L=0.1mH 28	A
E <sub>AS</sub> <sup>②</sup>	Avalanche Energy, Single pulse	L=0.1mH 39	mJ

### Thermal Characteristics

Symbol	Parameter	Rating	Unit
R <sub>θJC</sub>	Thermal Resistance-Junction to Case	Steady State 4	°C/W
R <sub>θJA</sub> <sup>③</sup>	Thermal Resistance-Junction to Ambient	Steady State 60	°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<sup>2</sup> FR-4 board with 1oz.

## N-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	1.6	2.1	V
<b>I<sub>GSS</sub></b>	Gate Leakage Current	V <sub>GS</sub> =±20V, 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> =20A	-	4.1	4.8	mΩ
		V <sub>GS</sub> =4.5V, I <sub>DS</sub> =18A	-	5.3	6.9	
<b>g<sub>fs</sub></b>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>DS</sub> =20A	-	22	-	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	-	2.2	-	Ω
<b>C<sub>iss</sub></b>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =15V, Freq.=1MHz	-	1859	-	pF
<b>C<sub>oss</sub></b>	Output Capacitance					
<b>C<sub>rss</sub></b>	Reverse Transfer Capacitance					
<b>t<sub>d(ON)</sub></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	-	9.6	-	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> =25V, I <sub>D</sub> =14A	-	26	-	nC
<b>Q<sub>g</sub></b>	Total Gate Charge	V <sub>GS</sub> =10V, V <sub>DS</sub> =25V, I <sub>D</sub> =14A	-	48	-	
<b>Q<sub>gs</sub></b>	Gate-Source Charge		-	3.4	-	
<b>Q<sub>gd</sub></b>	Gate-Drain Charge		-	14	-	
<b>Source-Drain Characteristics</b>						
<b>V<sub>SD</sub><sup>④</sup></b>	Diode Forward Voltage	I <sub>SD</sub> =1A, V <sub>GS</sub> =0V	-	0.75	1.1	V
<b>t<sub>rr</sub></b>	Reverse Recovery Time	I <sub>F</sub> =2A, V <sub>R</sub> =0V	-	18.2	-	nS
<b>Q<sub>rr</sub></b>	Reverse Recovery Charge	dI <sub>F</sub> /dt=100A/μs	-	9.2	-	nC

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

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

## N-Channel Typical Characteristics

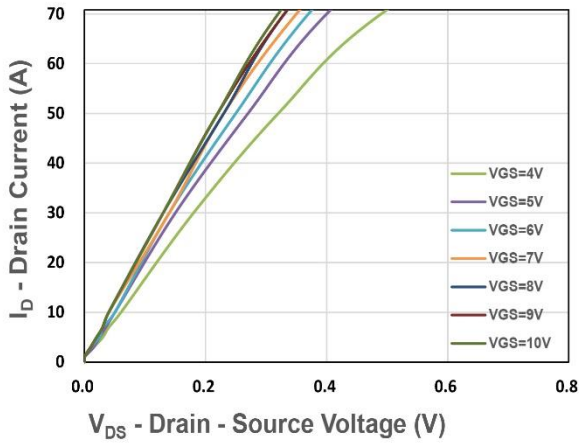


Figure 1. Output Characteristics

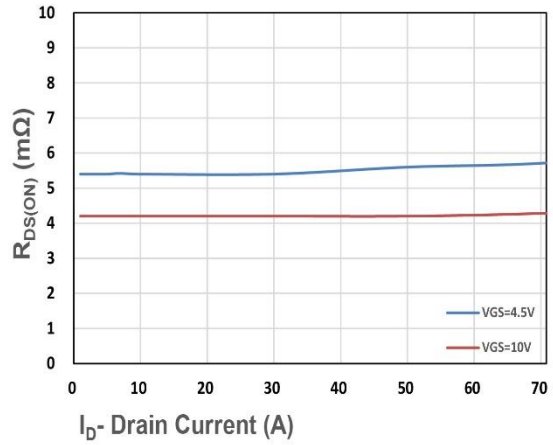


Figure 2. On-Resistance vs. ID

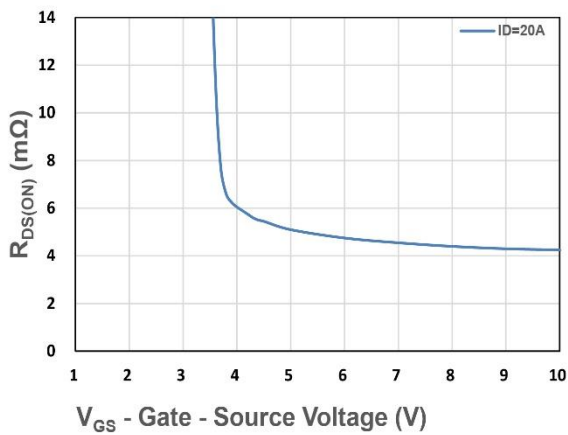


Figure 3. On-Resistance vs. VGS

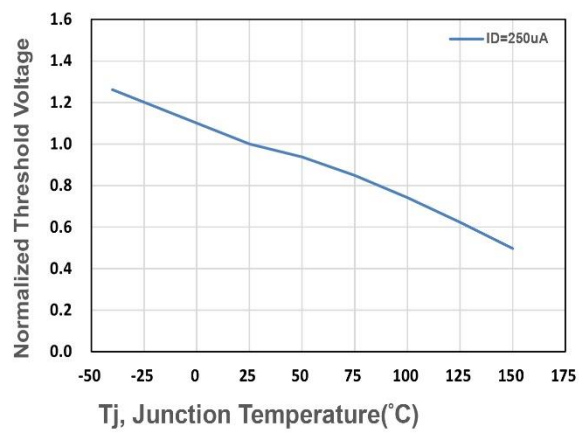


Figure 4. Gate Threshold Voltage

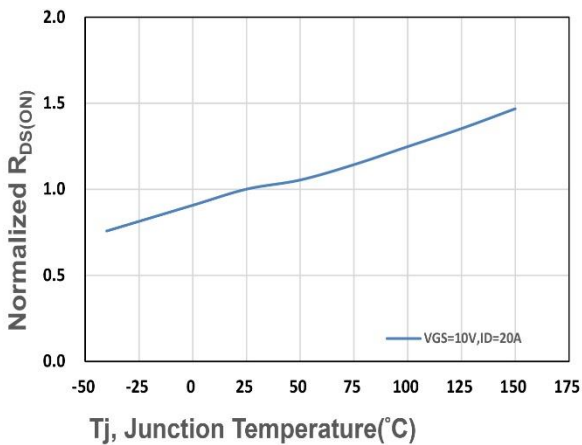


Figure 5. Drain-Source On Resistance

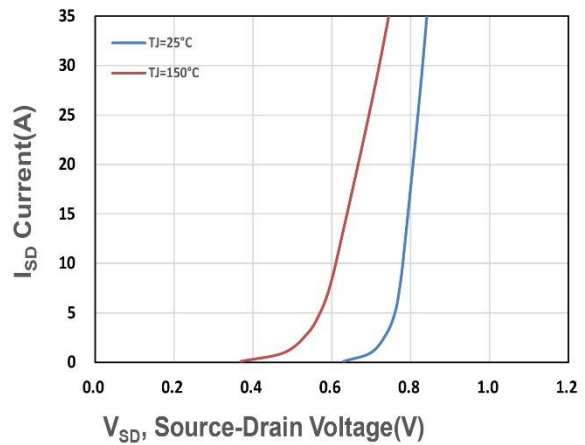
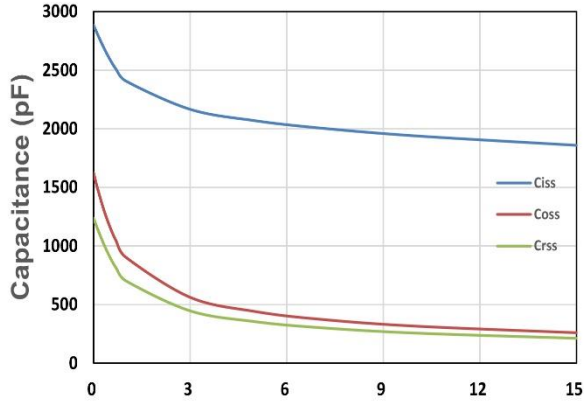
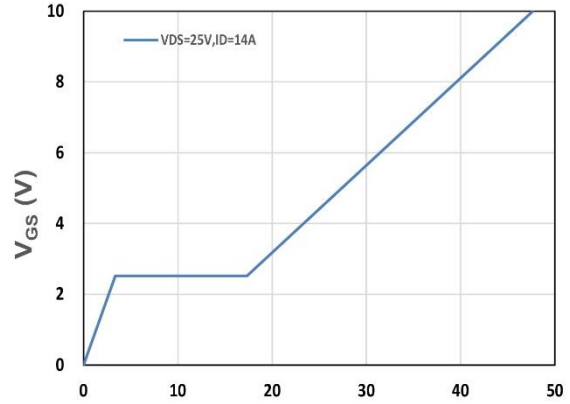


Figure 6. Source-Drain Diode Forward



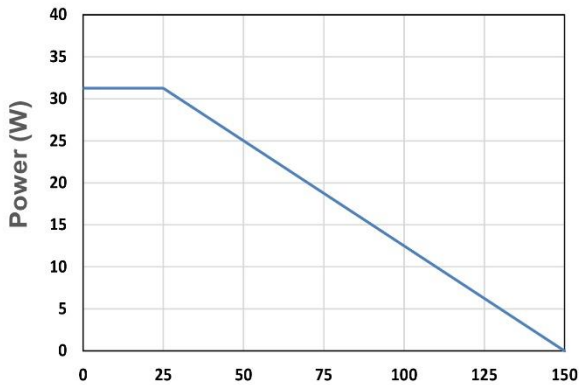
$V_{DS}$  - Drain - Source Voltage (V)

Figure 7. Capacitance



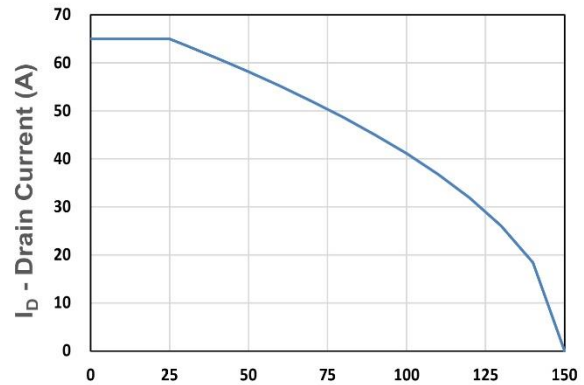
$Q_g$ , Total Gate Charge (nC)

Figure 8. Gate Charge Characteristics



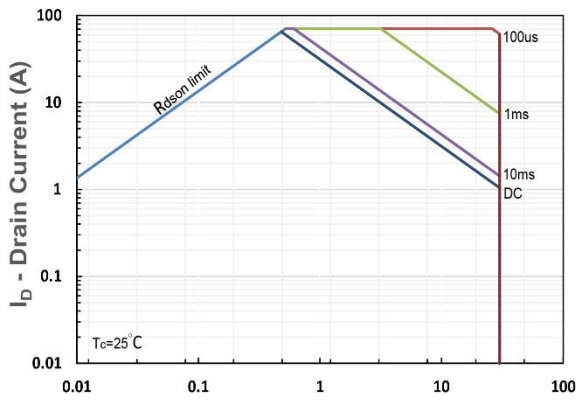
Case Temperature (°C)

Figure 9. Power Dissipation



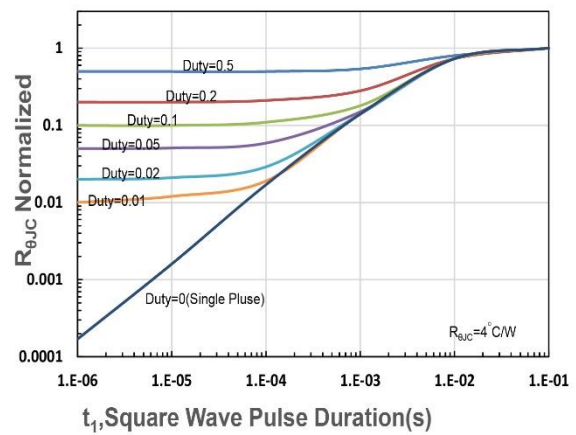
Case Temperature (°C)

Figure 10. Drain Current



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

Figure 11. Safe Operating Area



$t_1$ , Square Wave Pulse Duration (s)

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