



Power MOSFETS

DATASHEET

LM30049NAI8A

N-Channel
Enhancement Mode MOSFET

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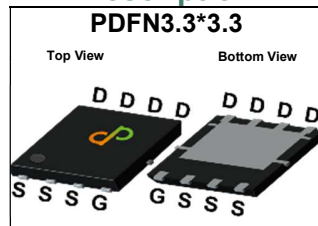


Quality Management Systems

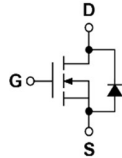
ISO 9001:2015 Certificate

N-Channel Enhancement Mode MOSFET

Pin Description



Symbol



Product Summary

Symbol	N-Channel	Unit
V_{DS}	30	V
$R_{DS(ON)-Max}$	4.2	mΩ
I_D	71	A

Feature

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

Applications

- Power Management in DC/DC Converters

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM30049NAI8A	PDFN3.3*3.3	Tape & Reel	5000 / Tape & Reel	30049 □□□□□□

Note : □□□□□□ = Lot Code

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

Symbol	Parameter	N-Channel	Unit
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	V
T_J	Maximum Junction Temperature	150	°C
T_{STG}	Storage Temperature Range	-55 to 150	°C
I_S	Diode Continuous Forward Current	$T_C=25^{\circ}C$ 28	A
I_{DM}	Pulse Drain Current Tested	$T_C=25^{\circ}C$ 216	A
I_D	Continuous Drain Current	$T_C=25^{\circ}C$ 71 ^① $T_C=100^{\circ}C$ 55	A
P_D	Maximum Power Dissipation	$T_C=25^{\circ}C$ 31 $T_C=100^{\circ}C$ 13	W
I_D	Continuous Drain Current	$T_A=25^{\circ}C$ 22 $T_A=70^{\circ}C$ 18	A
P_D	Maximum Power Dissipation	$T_A=25^{\circ}C$ 2.1 $T_A=70^{\circ}C$ 1.3	W
$I_{AS}^{②}$	Avalanche Current, Single pulse	L=0.1mH 31 L=0.5mH 21	A
$E_{AS}^{②}$	Avalanche Energy, Single pulse	L=0.1mH 48 L=0.5mH 110	mJ

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State 4	°C/W
$R_{\theta JA}^{③}$	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 1in² FR-4 board with 1oz

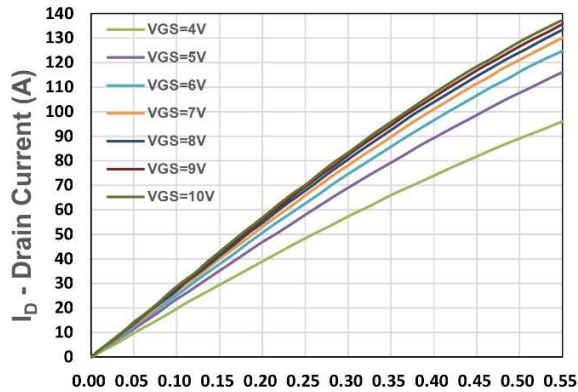
N-Channel Electrical Characteristics ($T_J=25^{\circ}\text{C}$ Unless Otherwise Noted)

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	1.6	2.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^④	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =19A	-	3.5	4.2	mΩ
		V _{GS} =4.5V, I _{DS} =12A		4.5	5.9	
g _{fs}	Forward Transconductance	V _{DS} =5V, I _{DS} =5A	-	10.8	-	S
Dynamic Characteristics ^⑤						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, Freq.=1MHz	-	1.1	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, Freq.=1MHz	-	2142	-	pF
C _{oss}	Output Capacitance		-	325	-	
C _{rss}	Reverse Transfer Capacitance		-	240	-	
t _{d(ON)}	Turn-on Delay Time	V _{GS} =10V, V _{DS} =15V, I _D =1A, R _{GEN} =3Ω	-	11	-	nS
t _r	Turn-on Rise Time		-	18	-	
t _{d(OFF)}	Turn-off Delay Time		-	45	-	
t _f	Turn-off Fall Time		-	32	-	
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =15V I _D =1A	-	20.9	-	nC
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =15V, I _D =1A	-	42.2	-	
Q _{gs}	Gate-Source Charge		-	6.7	-	
Q _{gd}	Gate-Drain Charge		-	7.5	-	
Source-Drain Characteristics						
V _{SD} ^④	Diode Forward Voltage	I _{SD} =19A, V _{GS} =0V	-	0.8	1.1	V
t _{rr}	Reverse Recovery Time	I _F =1A, V _R =15V	-	27.7	-	nS
Q _{rr}	Reverse Recovery Charge	dI _F /dt=100A/μs	-	17.5	-	nC

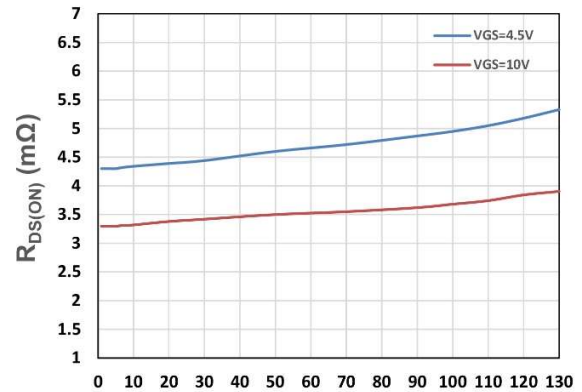
Note ④ : Pulse test (pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$).

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

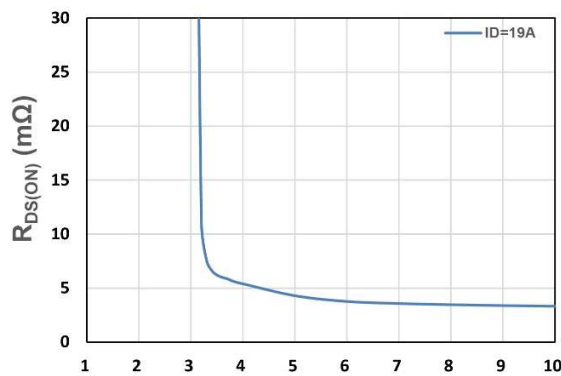
N-Channel Typical Characteristics



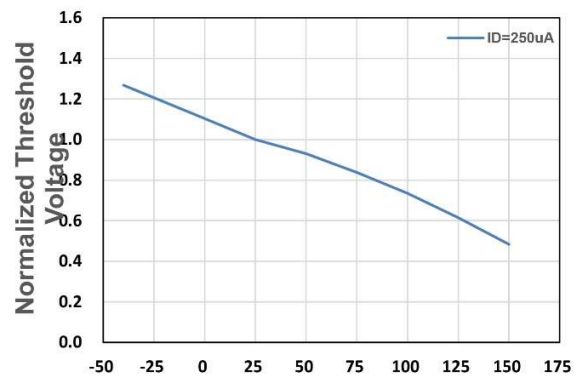
V_{DS} - Drain - Source Voltage (V)
Figure 1. Output Characteristics



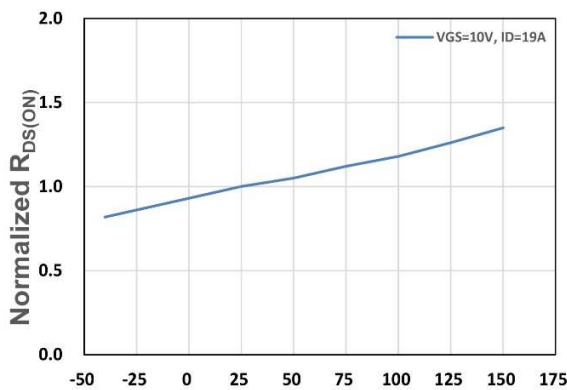
I_D - Drain Current (A)
Figure 2. On-Resistance vs. ID



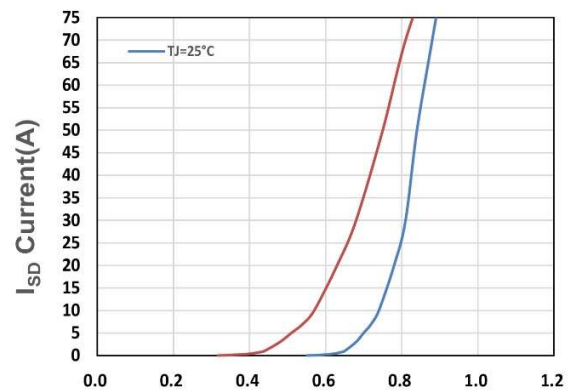
V_{GS} - Gate - Source Voltage (V)
Figure 3. On-Resistance vs. VGS



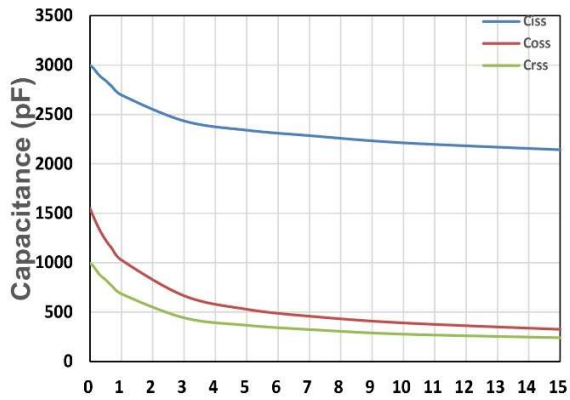
T_j , Junction Temperature(°C)
Figure 4. Gate Threshold Voltage



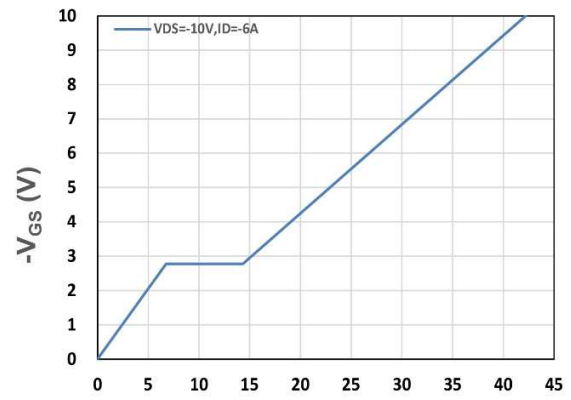
T_j , Junction Temperature(°C)
Figure 5. Drain-Source On Resistance



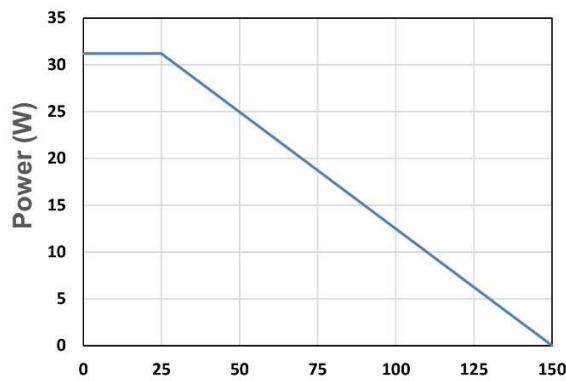
V_{SD} , Source-Drain Voltage(V)
Figure 6. Source-Drain Diode Forward



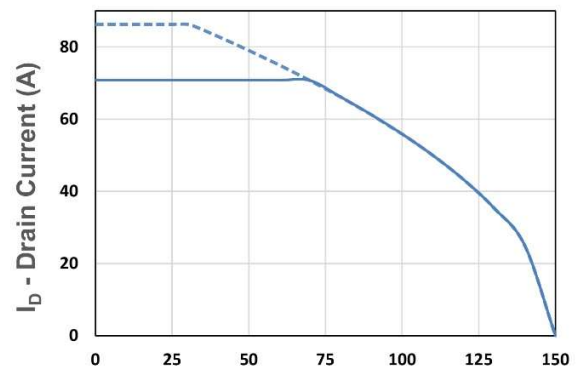
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



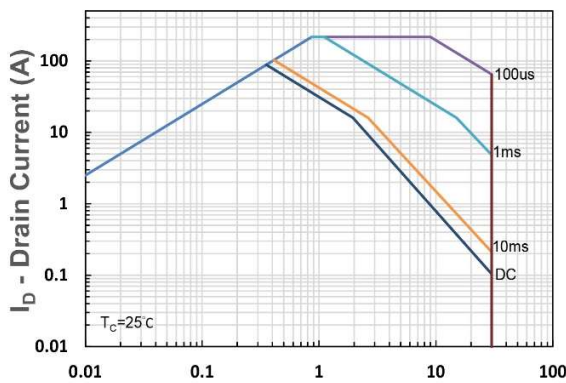
Q_g , Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



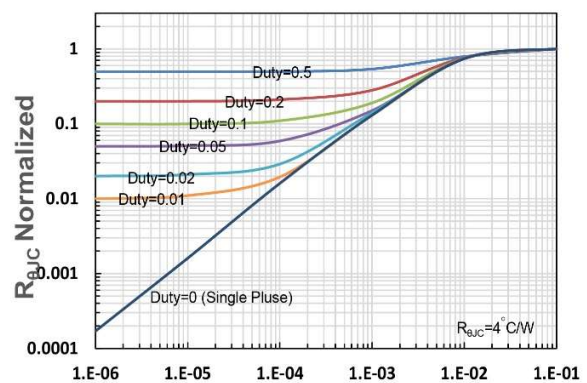
T_c - Case Temperature (°C)
Figure 9. Power Dissipation



T_c - 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