



Power MOSFETS

DATASHEET

LM40060NAI8A

N-Channel
Enhancement Mode MOSFET

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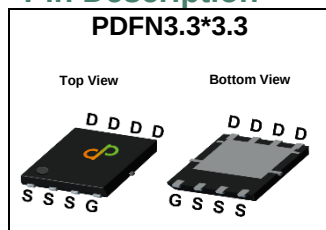


Quality Management Systems

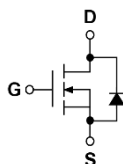
ISO 9001:2015 Certificate

N-Channel Enhancement Mode MOSFET

Pin Description



Symbol



Product Summary

Symbol	N-Channel	Unit
V_{DSS}	40	V
$R_{DS(ON)-Max}$	5.3	mΩ
ID	62	A

Feature

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

Applications

- DC/DC Converters
- PD Vbus application

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM40060NAI8A	PDFN3.3*3.3	Tape & Reel	5000 / Tape & Reel	40060 □□□□□□

Note : □□□□□□ = Lot Code

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

Symbol	Parameter		N-Channel	Unit
V_{DSS}	Drain-Source Voltage		40	V
V_{GSS}	Gate-Source Voltage		± 20	
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	$T_c=25^\circ\text{C}$	71	A
I_D	Continuous Drain Current	$T_c=25^\circ\text{C}$	62	A
		$T_c=100^\circ\text{C}$	39	
P_D	Maximum Power Dissipation	$T_c=25^\circ\text{C}$	30	W
		$T_c=100^\circ\text{C}$	12	
$I_{AS}^{②}$	Avalanche Current, Single pulse	$L=0.1\text{mH}$	16	A
$E_{AS}^{②}$	Avalanche Energy, Single pulse	$L=0.1\text{mH}$	13	mJ

Thermal Characteristics

Symbol	Parameter		Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	4.2	$^\circ\text{C/W}$
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	Steady State	60	$^\circ\text{C/W}$

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.

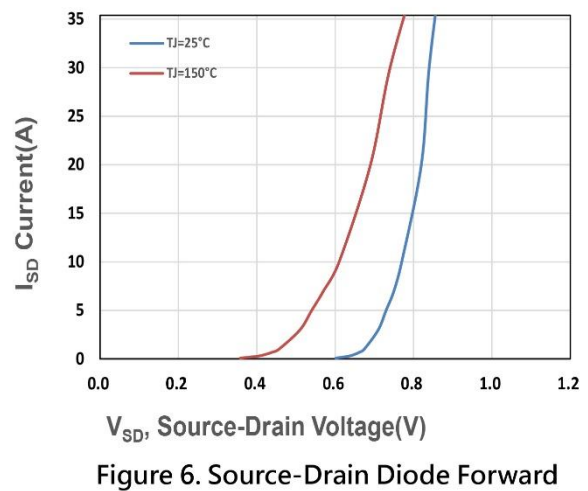
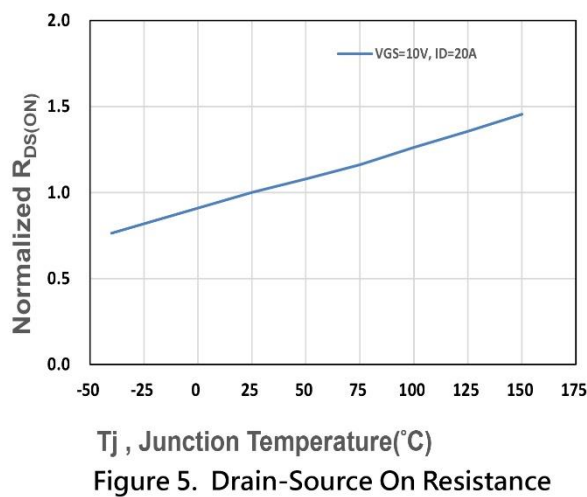
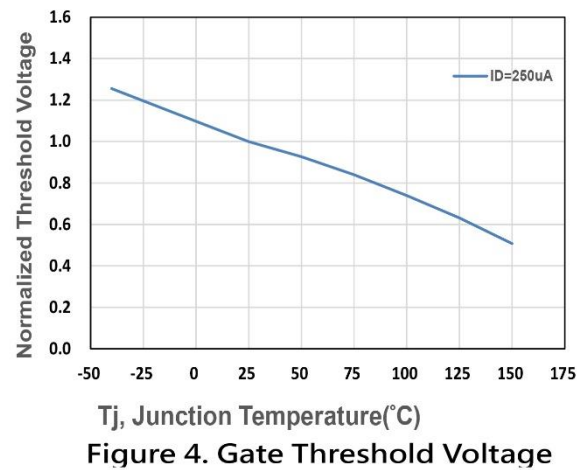
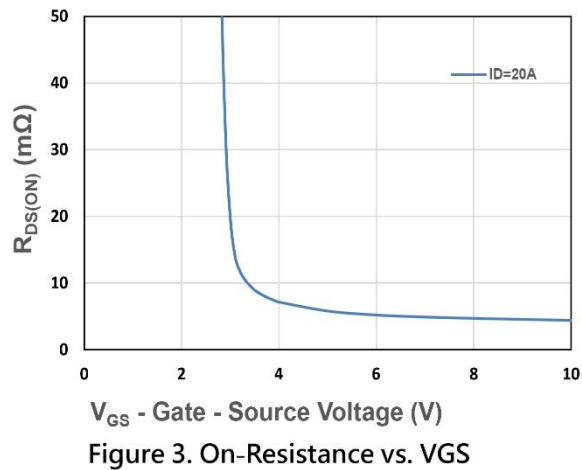
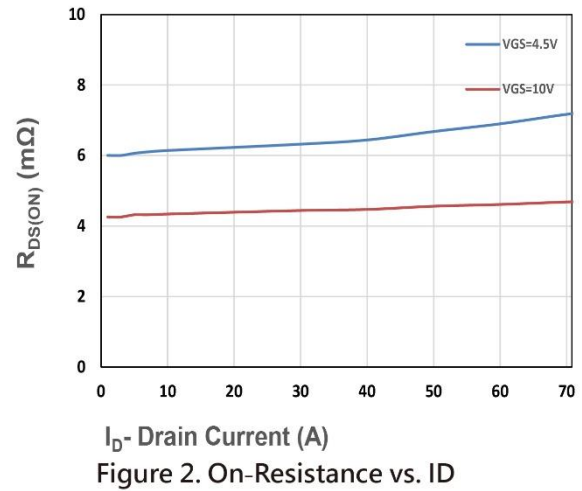
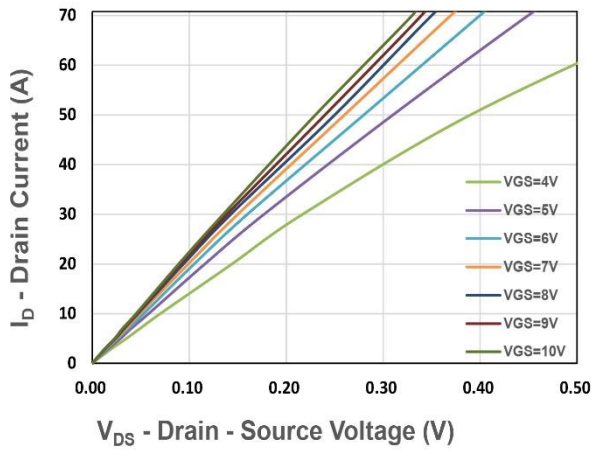
N-Channel Electrical Characteristics ($T_J=25^{\circ}\text{C}$ Unless Otherwise Noted)

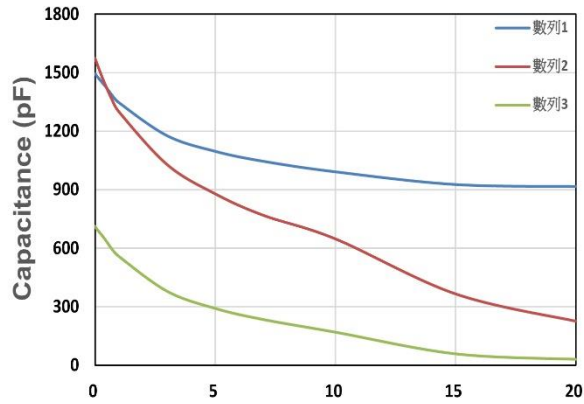
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Electrical Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250uA	40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =32V, V _{GS} =0V	-	-	1	uA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250uA	1	1.6	2.2	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} =20A	-	4.4	5.3	mΩ
		V _{GS} =4.5V, I _{DS} =10A	-	6.2	8	
gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =10A	-	12	-	S
Dynamic Characteristics ⑥						
R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V, Freq.=1MHz	-	2.3	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =20V, Freq.=1MHz	-	927	-	pF
C _{oss}	Output Capacitance		-	366	-	
C _{rss}	Reverse Transfer Capacitance		-	58	-	
td(ON)	Turn-on Delay Time	V _{GS} =10V,V _{DS} =25V, Id=1A,RGEN=1Ω	-	8.5	-	nS
tr	Turn-on Rise Time		-	5.5	-	
td(OFF)	Turn-off Delay Time		-	26.9	-	
tf	Turn-off Fall Time		-	40.5	-	
Qg	Total Gate Charge	V _{GS} =4.5V,V _{DS} =20V Id=20A	-	11.6	-	nC
Qg	Total Gate Charge	V _{GS} =10V,V _{DS} =20V, Id=20A	-	21.7	-	
Qgs	Gate-Source Charge		-	3.2	-	
Qgd	Gate-Drain Charge		-	6	-	
Source-Drain Characteristics						
VSD④	Diode Forward Voltage	ISD=10A, VGS=0V	-	0.75	1.1	V
trr	Reverse Recovery Time	IF=10A, VR=20V	-	29.5	-	nS
Qrr	Reverse Recovery Charge	dIF/dt=100A/μs	-	14.1	-	nC

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

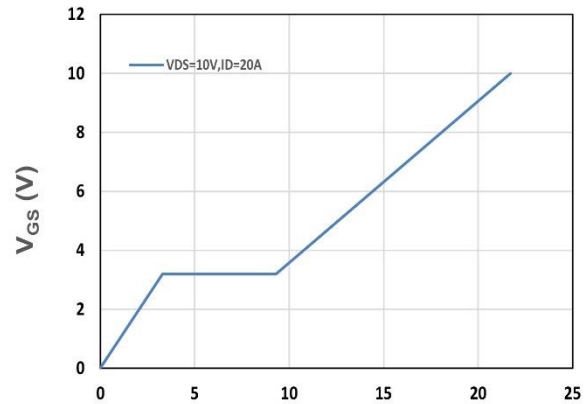
Note ⑤ : Guaranteed by design, not subject to production testing.

N-Channel Typical Characteristics





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



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

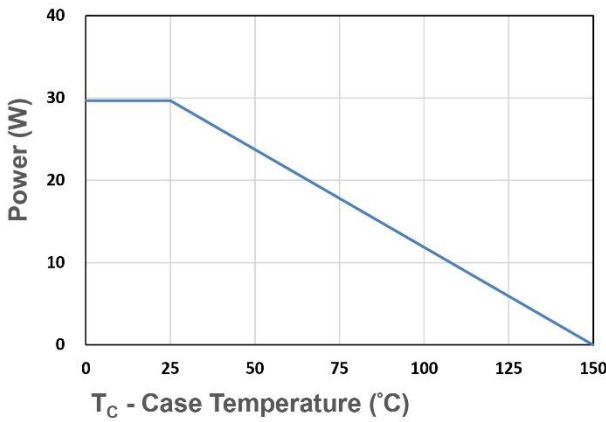


Figure 9. Power Dissipation

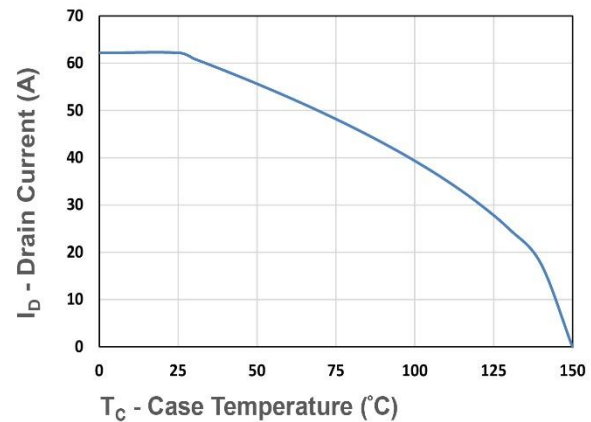
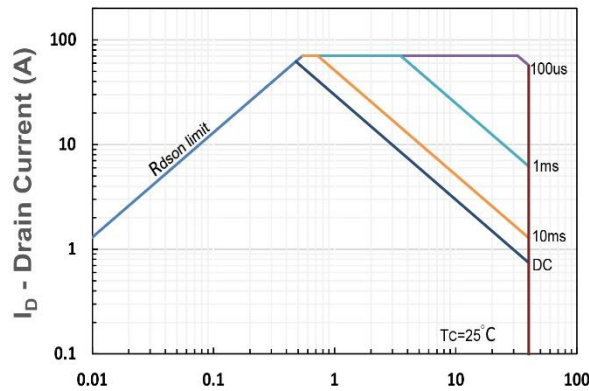
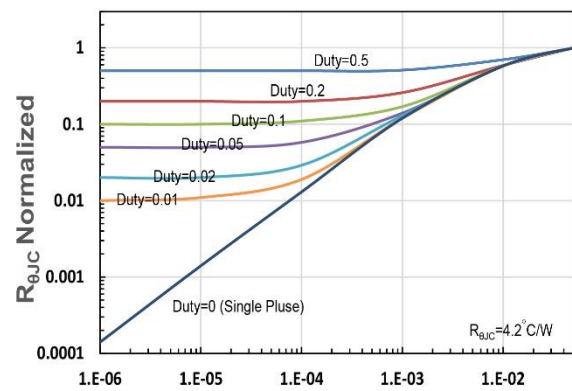


Figure 10. Drain Current



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