



Power MOSFETS

DATASHEET

LM1A160NAI8A

N-Channel
Enhancement Mode MOSFET

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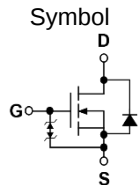
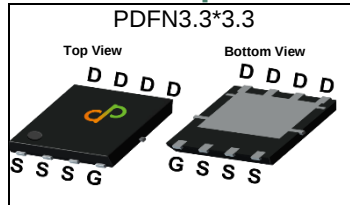


Quality Management Systems

ISO 9001:2015 Certificate

N-Channel Enhancement Mode MOSFET

Pin Description



Ordering Information

Symbol	N-Channel	Unit
V_{DSS}	100	V
$R_{DS(ON)-Max}$	16	mΩ
I_D	31	A

Feature

- Optimized high performance of $R_{DS(on)}$ and Q_g
- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- 100% UIS and R_g Tested

Applications

- Motor drivers
- DC DC converter

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM1A160NAI8A	PDFN3.3*3.3	Tape & Reel	5000 / Tape & Reel	1A160 □□□□□□

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		100	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	$T_c=25^{\circ}\text{C}$	31	A
		$T_c=100^{\circ}\text{C}$	20	
P_D	Maximum Power Dissipation	$T_c=25^{\circ}\text{C}$	31	W
		$T_c=100^{\circ}\text{C}$	13	
$I_{AS}^{②}$	Avalanche Current, Single pulse	$L=0.1\text{mH}$	10	A
$E_{AS}^{②}$	Avalanche Energy, Single pulse	$L=0.1\text{mH}$	5	mJ

Thermal Characteristics

Symbol	Parameter		Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	4	$^{\circ}\text{C/W}$
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	Steady State	80	$^{\circ}\text{C/W}$

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.

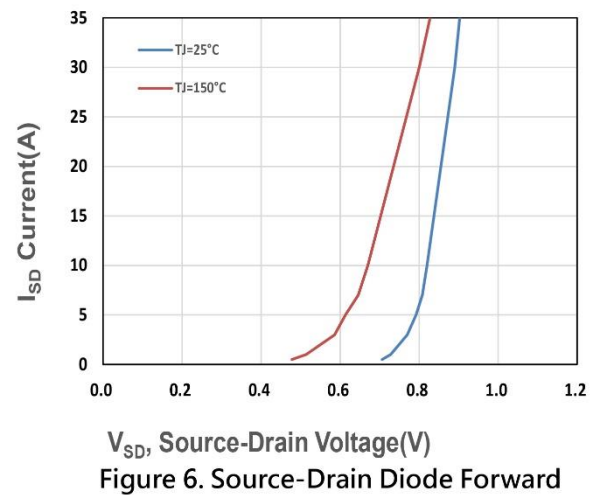
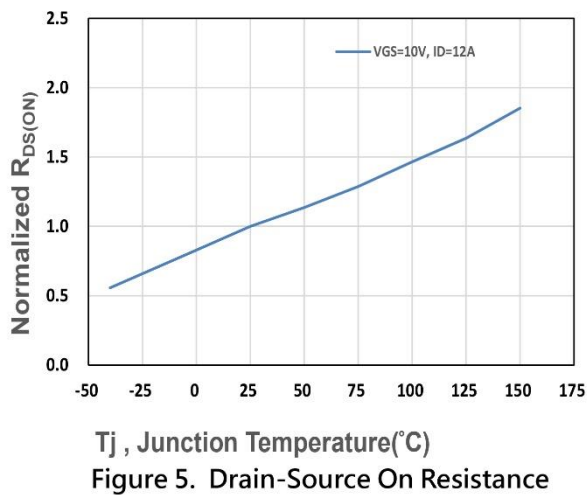
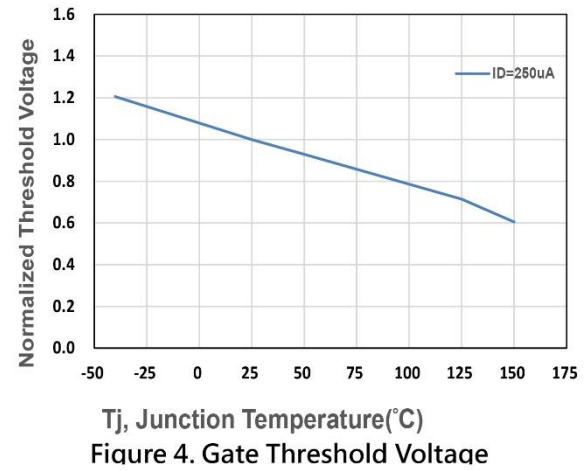
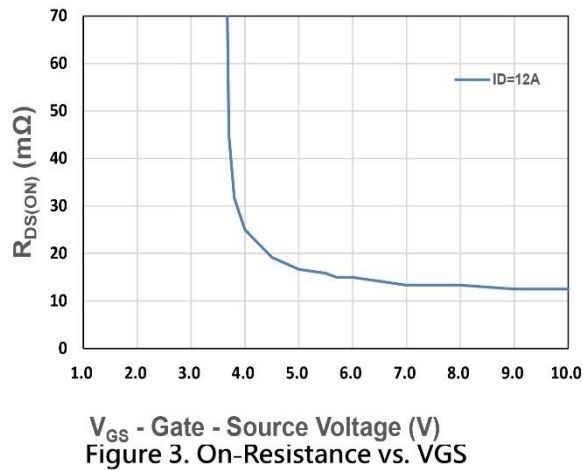
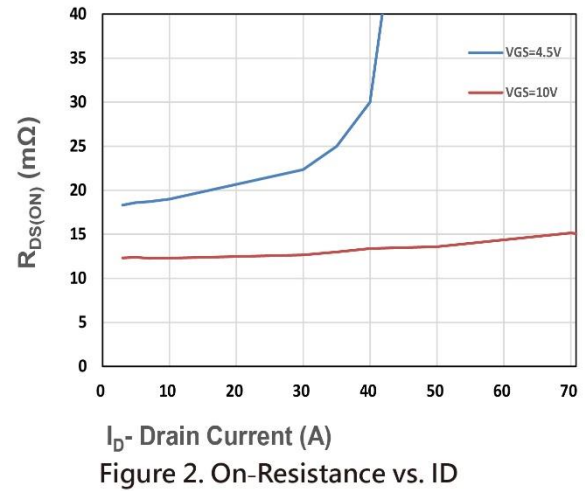
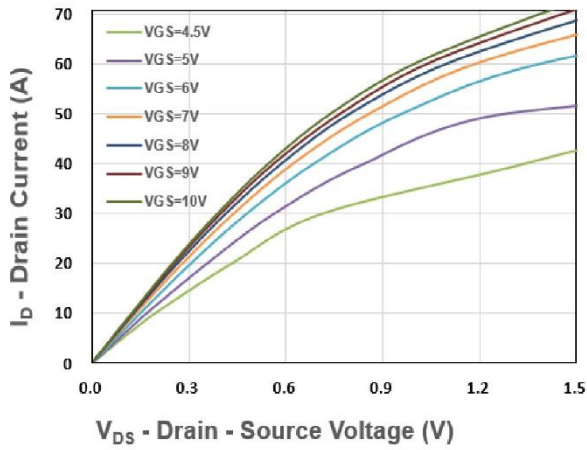
N-Channel Electrical Characteristics ($T_J=25^{\circ}\text{C}$ Unless Otherwise Noted)

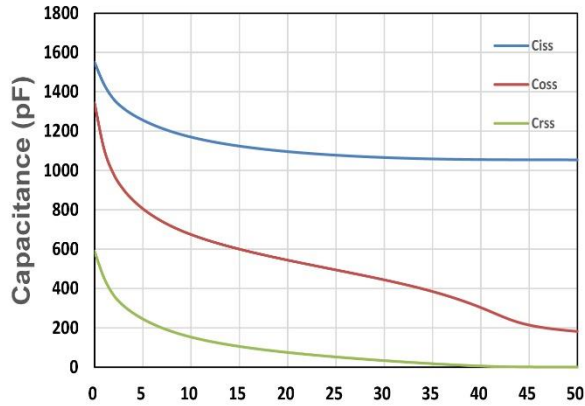
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Electrical Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250uA	100	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =80V, V _{GS} =0V	-	-	1	uA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250uA	1	2	3	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} =12A	-	13	16	mΩ
		V _{GS} =4.5V, I _{DS} =8A	-	19	25	
gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =20A	-	22.8	-	S
Dynamic Characteristics ⑥						
R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V, Freq.=1MHz	-	3	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =50V, Freq.=1MHz	-	1054	-	pF
C _{oss}	Output Capacitance		-	180	-	
C _{rss}	Reverse Transfer Capacitance		-	6	-	
td(ON)	Turn-on Delay Time	V _{GS} =10V,V _{DS} =50V, Id=1A,RGEN=3Ω	-	5.9	-	nS
tr	Turn-on Rise Time		-	14	-	
td(OFF)	Turn-off Delay Time		-	15	-	
tf	Turn-off Fall Time		-	25	-	
Qg	Total Gate Charge	V _{GS} =4.5V,V _{DS} =50V Id=12A	-	12.8	-	nC
Qg	Total Gate Charge	V _{GS} =10V,V _{DS} =50V, Id=12A	-	22.3	-	
Qgs	Gate-Source Charge		-	3.1	-	
Qgd	Gate-Drain Charge		-	7.5	-	
Source-Drain Characteristics						
VSD④	Diode Forward Voltage	ISD=12A, VGS=0V	-	0.85	1.1	V
trr	Reverse Recovery Time	IF=20A, VR=50V	-	39	-	nS
Qrr	Reverse Recovery Charge	dIF/dt=100A/μs	-	58.5	-	nC

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

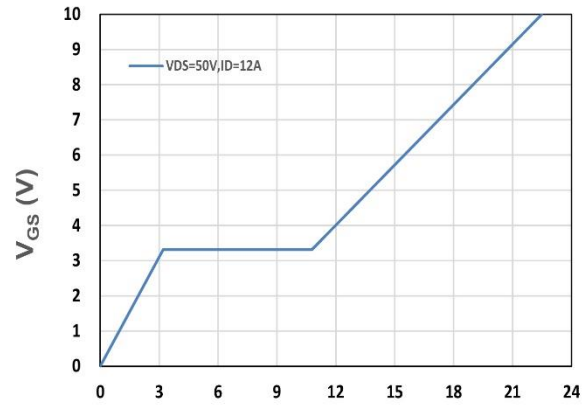
Note ⑤ : Guaranteed by design, not subject to production testing.

N-Channel Typical Characteristics





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



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

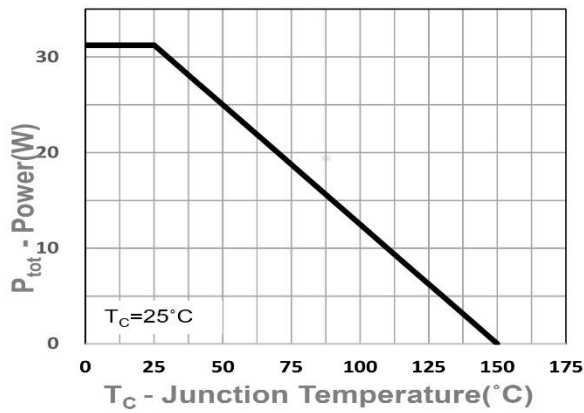


Figure 9. Power Dissipation

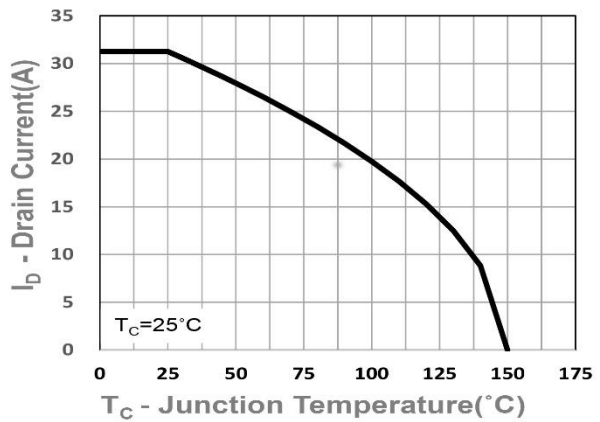


Figure 10. Drain Current

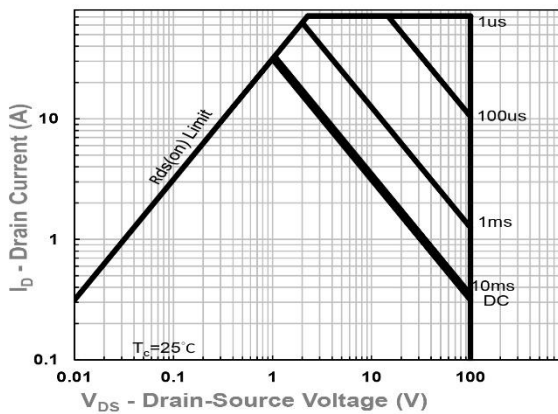


Figure 11. Safe Operating Area

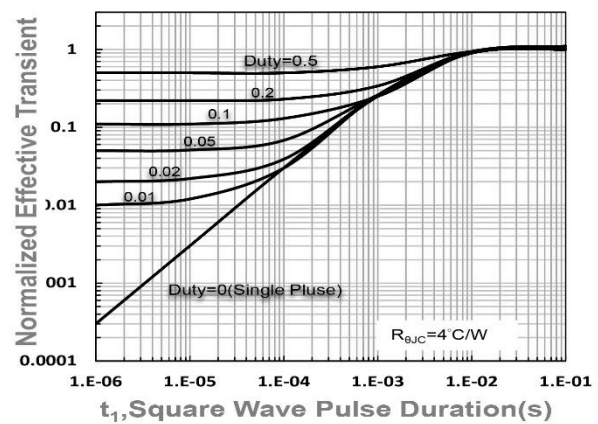


Figure 12. $R_{\theta JC}$ Transient Thermal Impedance