



Power MOSFETS

DATASHEET

LM80080NAI8A

N-Channel
Enhancement Mode MOSFET

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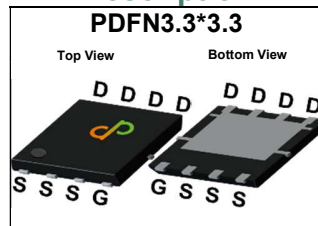


Quality Management Systems

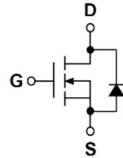
ISO 9001:2015 Certificate

N-Channel Enhancement Mode MOSFET

Pin Description



Symbol



Product Summary

Symbol	N-Channel	Unit
V_{DS}	80	V
$R_{DS(ON)-Max}$	7.7	mΩ
ID	68	A

Feature

- Advanced trench cell design
- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- 100% UIS and Rg Tested

Applications

- Motor drivers
- DC-DC Converter

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM80080NAI8A	PDFN3.3*3.3	Tape & Reel	5000 / Tape & Reel	80080 □□□□□□

Note : □□□□□□ = Lot Code

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

Symbol	Parameter	N-Channel	Unit
V_{DS}	Drain-Source Voltage	80	V
V_{GS}	Gate-Source Voltage	±20	V
T_J	Maximum Junction Temperature	150	°C
T_{STG}	Storage Temperature Range	-55 to 150	°C
$I_{DM}^{①}$	Pulse Drain Current Tested	$T_C=25^{\circ}C$ 171	A
I_D	Continuous Drain Current	$T_C=25^{\circ}C$ 68 $T_C=100^{\circ}C$ 43	A
P_D	Maximum Power Dissipation	$T_C=25^{\circ}C$ 35.7 $T_C=100^{\circ}C$ 14.3	W
I_D	Continuous Drain Current	$T_A=25^{\circ}C$ 14.7 $T_A=70^{\circ}C$ 11.8	A
P_D	Maximum Power Dissipation	$T_A=25^{\circ}C$ 1.7 $T_A=70^{\circ}C$ 1.1	W
$I_{AS}^{②}$	Avalanche Current, Single pulse	L=0.1mH 25 L=0.5mH 15	A
$E_{AS}^{②}$	Avalanche Energy, Single pulse	L=0.1mH 31 L=0.5mH 56	mJ

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State 3.5	°C/W
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	Steady State 75	°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 1in² FR-4 board with 1oz.

N-Channel Electrical Characteristics (T_J=25°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	80	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =64V, 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} =20A	-	6.4	7.7	mΩ
		V _{GS} =4.5V, I _{DS} =10A	-	10	13	
gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =10A	-	27	-	S
Dynamic Characteristics ⑤						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, Freq.=1MHz	-	1.2	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =40V, Freq.=1MHz	-	1692	-	pF
C _{oss}	Output Capacitance		-	479	-	
C _{rss}	Reverse Transfer Capacitance		-	42	-	
td(ON)	Turn-on Delay Time	V _{GS} =10V, V _{DS} =40V, I _D =1A, R _{GEN} =6Ω	-	8	-	nS
t _r	Turn-on Rise Time		-	15.5	-	
t _{d(OFF)}	Turn-off Delay Time		-	28.3	-	
t _f	Turn-off Fall Time		-	62	-	
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =40V I _D =20A	-	20	-	nC
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =50V, I _D =20A	-	35	-	
Q _{gs}	Gate-Source Charge		-	8	-	
Q _{gd}	Gate-Drain Charge		-	9.3	-	
Source-Drain Characteristics						
V _{SD} ④	Diode Forward Voltage	I _{SD} =10A, V _{GS} =0V	-	0.8	1.1	V
t _{rr}	Reverse Recovery Time	I _F =10A, V _R =40V	-	33	-	nS
Q _{rr}	Reverse Recovery Charge	dI _F /dt=100A/μs	-	30	-	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

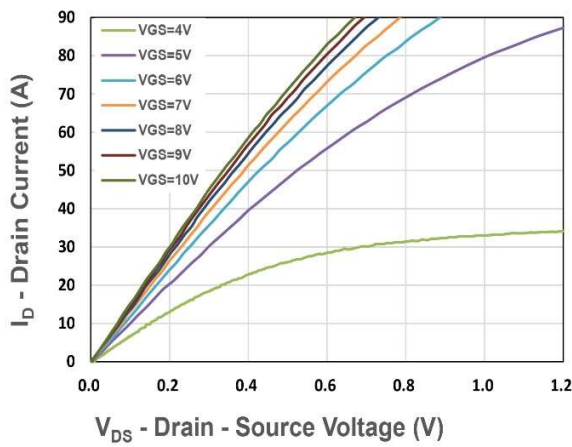


Figure 1. Output Characteristics

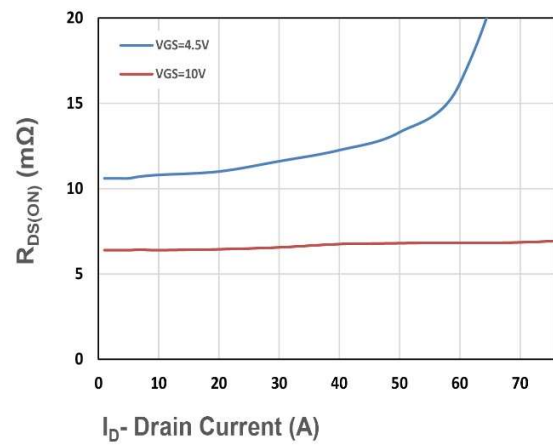


Figure 2. On-Resistance vs. ID

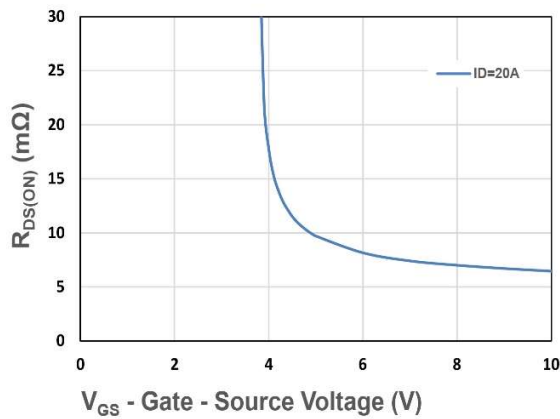


Figure 3. On-Resistance vs. VGS

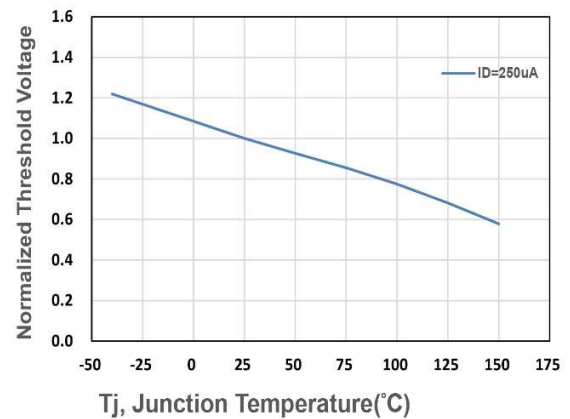


Figure 4. Gate Threshold Voltage

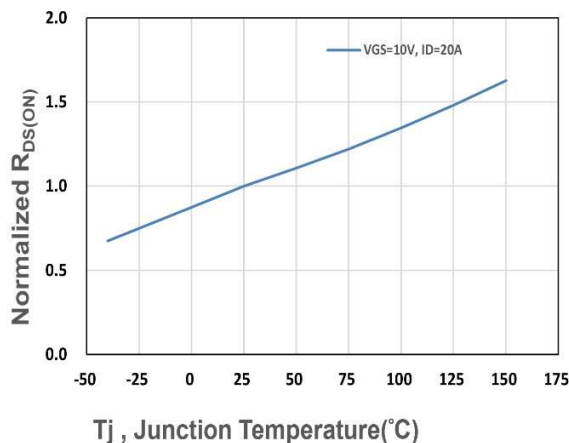


Figure 5. Drain-Source On Resistance

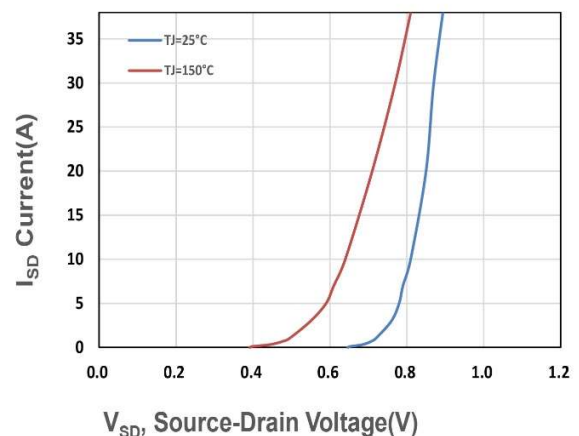
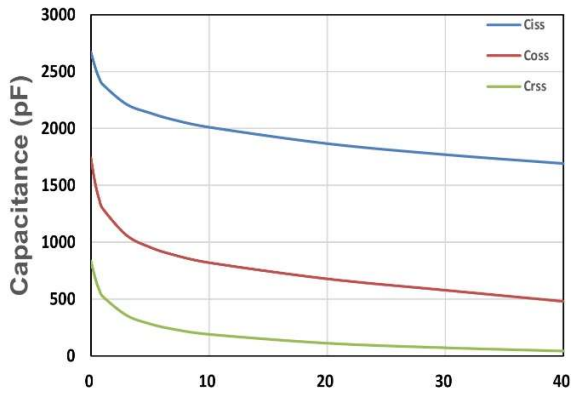
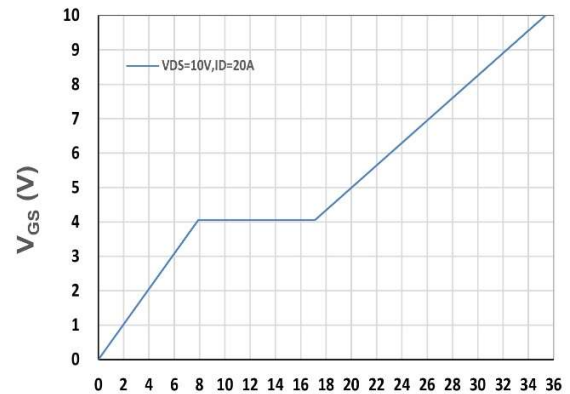


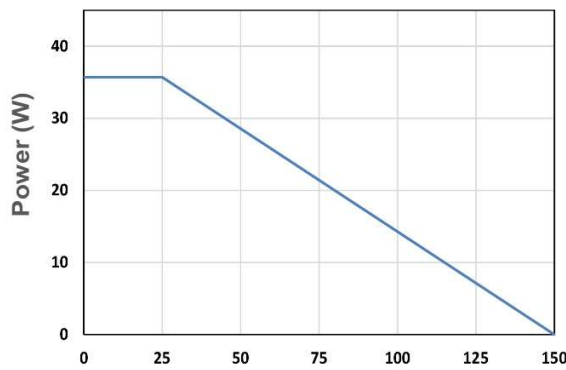
Figure 6. Source-Drain Diode Forward



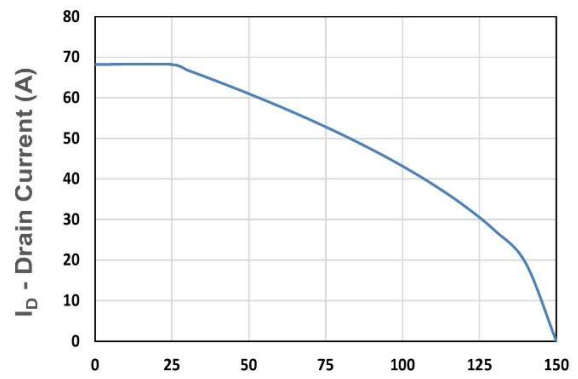
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



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



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



T_c - Case Temperature (°C)
Figure 10. Drain Current

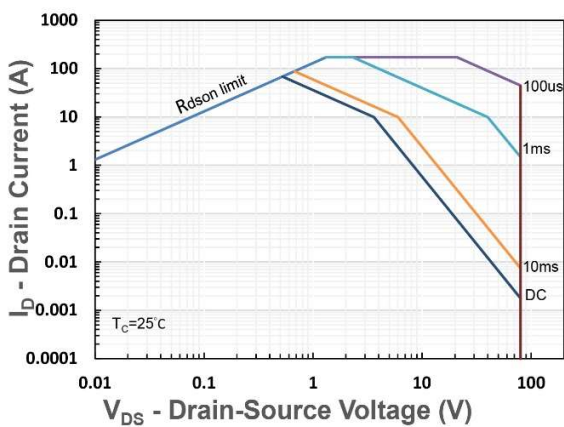


Figure 11. Safe Operating Area

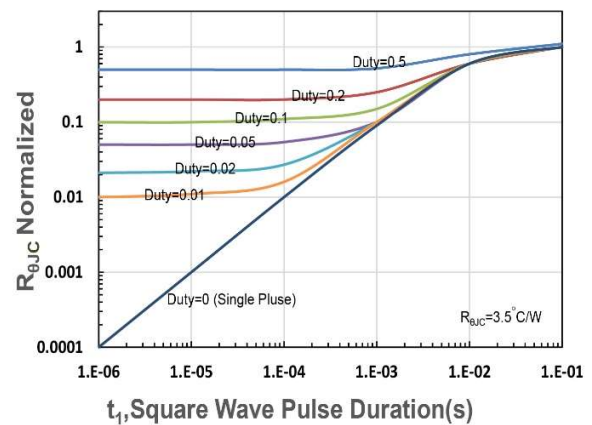


Figure 12. $R_{\theta JC}$ Transient Thermal Impedance