



Power MOSFETS

DATASHEET

LM1F098NHL8A

N-Channel
Enhancement Mode MOSFET



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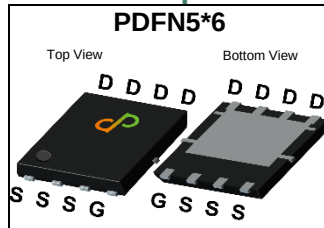


Quality Management Systems

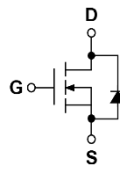
ISO 9001:2015 Certificate

N-Channel Enhancement Mode MOSFET

Pin Description



Symbol



Product Summary

Symbol	N-Channel	Unit
V_{DSS}	150	V
$R_{DS(ON)-Max}$	9.8	m Ω
ID	108	A

Feature

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

Applications

- Synchronous Rectification in SMPS
- Hard Switching and High Speed Circuit
- DC/DC in Telecoms and Industrial

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM1F098NHL8A	PDFN5*6	Tape & Reel	5000 / Tape & Reel	1F098 □□□□□□

Note : □□□□□□ = Lot Code

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

Symbol	Parameter	N-Channel	Unit
V_{DSS}	Drain-Source Voltage	150	V
V_{GSS}	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	$T_C=25^\circ\text{C}$ 103	A
$I_{DM}^{①}$	Pulse Drain Current Tested	$T_C=25^\circ\text{C}$ 270	A
I_D	Continuous Drain Current	$T_C=25^\circ\text{C}$ 108 $T_C=100^\circ\text{C}$ 68	A
P_D	Maximum Power Dissipation	$T_C=25^\circ\text{C}$ 114 $T_C=100^\circ\text{C}$ 46	W
I_D	Continuous Drain Current	$T_A=25^\circ\text{C}$ 14 $T_A=70^\circ\text{C}$ 11.2	A
P_D	Maximum Power Dissipation	$T_A=25^\circ\text{C}$ 1.9 $T_A=70^\circ\text{C}$ 1.2	W
$I_{AS}^{②}$	Avalanche Current, Single pulse	$L=0.4\text{mH}$ 40	A
$E_{AS}^{②}$	Avalanche Energy, Single pulse	$L=0.4\text{mH}$ 320	mJ

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State 1.1	°C/W
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	Steady State 65	°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	150	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =120V, V _{GS} =0V	-	-	1	uA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250uA	2	3	4	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	-	8.2	9.8	mΩ
gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =20A	-	76	-	S
Dynamic Characteristics ⑥						
R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V, Freq.=1MHz	-	1.1	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =75V, Freq.=1MHz	-	4800	-	pF
C _{oss}	Output Capacitance		-	366	-	
C _{rss}	Reverse Transfer Capacitance		-	12.7	-	
td(ON)	Turn-on Delay Time	V _{GS} =10V,V _{DS} =75V, I _D =20A,R _{GEN} =10Ω	-	21	-	nS
tr	Turn-on Rise Time		-	11	-	
td(OFF)	Turn-off Delay Time		-	32	-	
tf	Turn-off Fall Time		-	13.2	-	
Qg	Total Gate Charge	V _{GS} =10V,V _{DS} =75V, I _D =20A	-	57	-	nC
Qgs	Gate-Source Charge		-	21	-	
Qgd	Gate-Drain Charge		-	5.5	-	
Source-Drain Characteristics						
VSD④	Diode Forward Voltage	ISD=20A, VGS=0V	-	0.8	1.2	V
trr	Reverse Recovery Time	IF=20A, VR=75V	-	88	-	nS
Qrr	Reverse Recovery Charge	dIF/dt=100A/μs	-	176	-	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

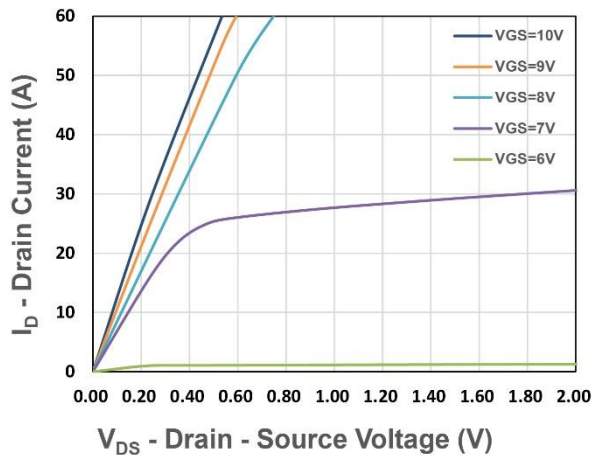


Figure 1. Output Characteristics

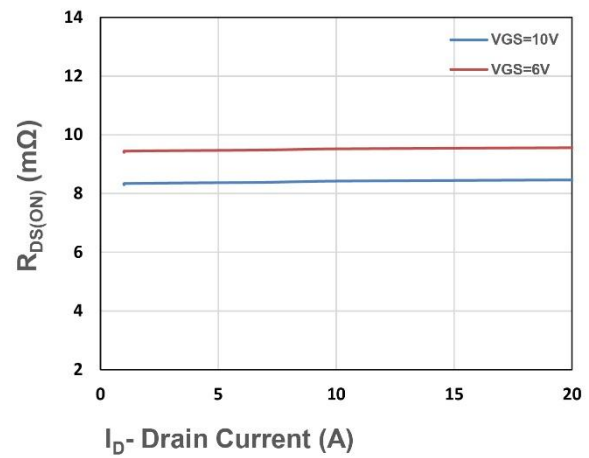


Figure 2. On-Resistance vs. I_D

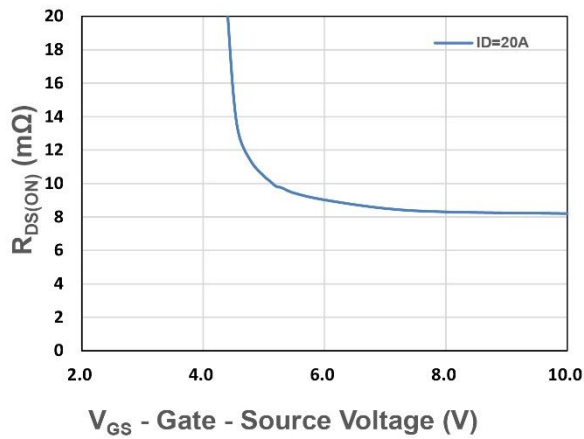


Figure 3. On-Resistance vs. V_{GS}

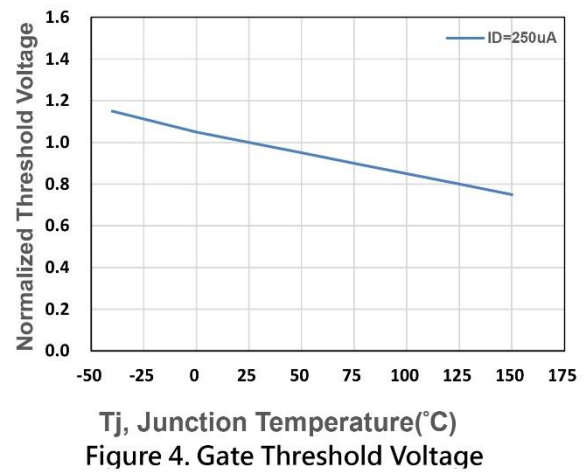


Figure 4. Gate Threshold Voltage

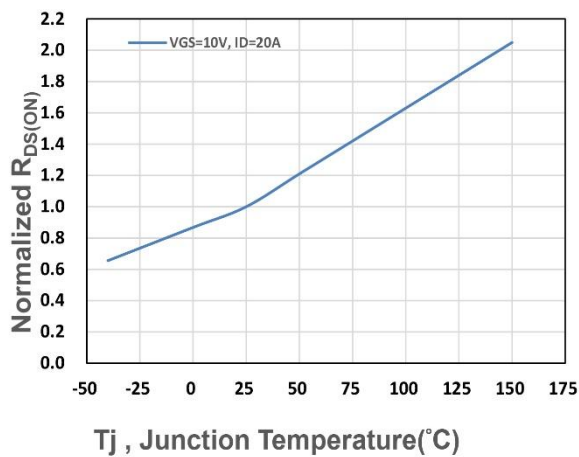


Figure 5. Drain-Source On Resistance

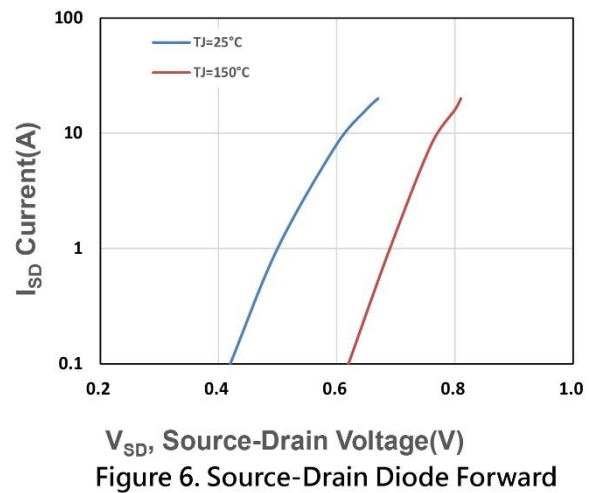
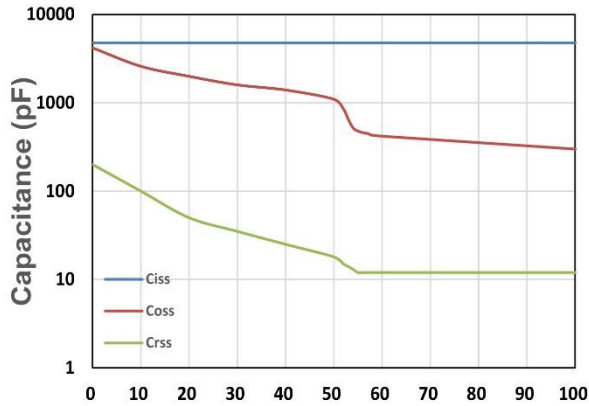
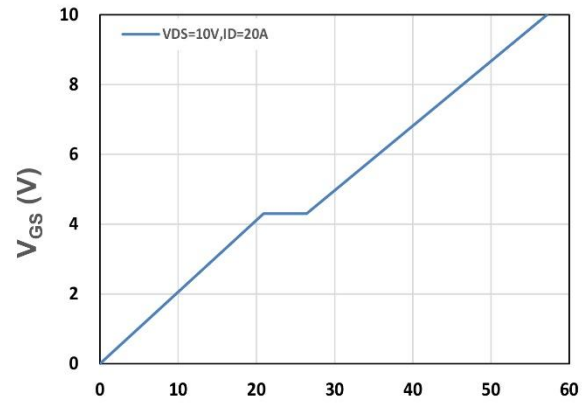


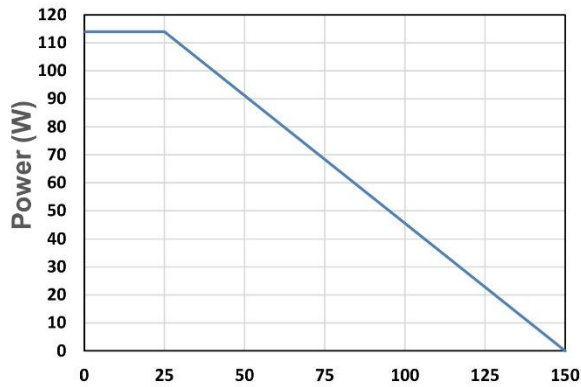
Figure 6. Source-Drain Diode Forward



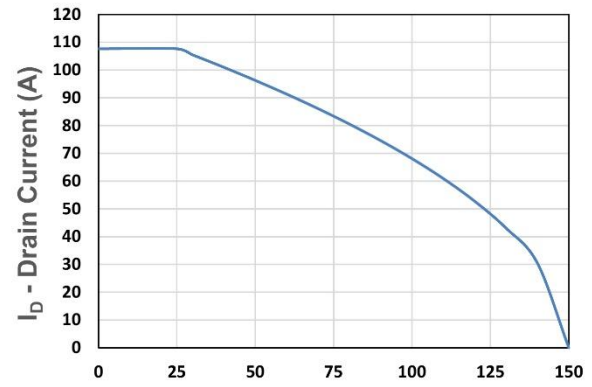
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



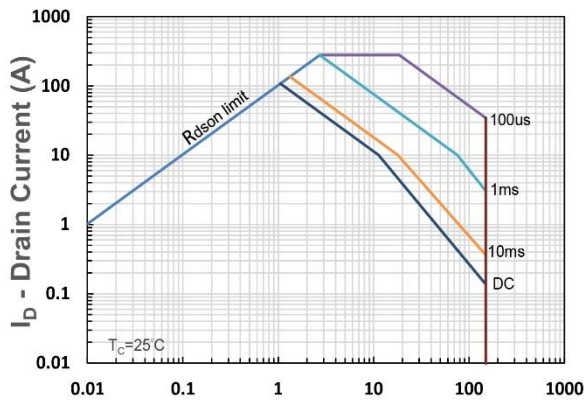
Q_g , Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



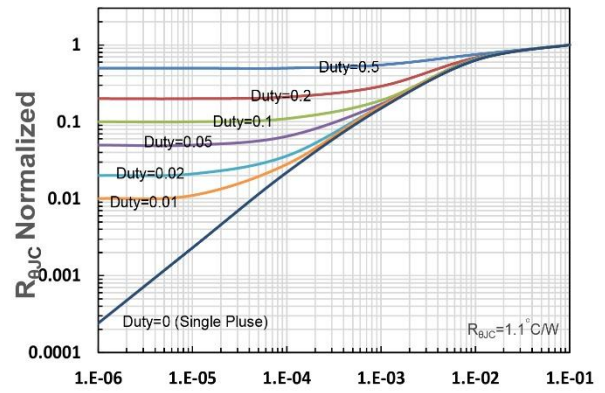
T_c - Case Temperature (°C)
Figure 9. Power Dissipation



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



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