




Power MOSFETS

DATASHEET

LM40150NAK8A

N-Channel
Enhancement Mode MOSFET

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Quality Management Systems

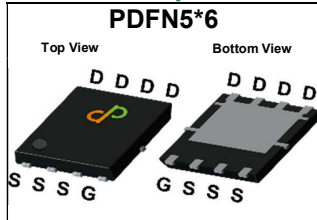
ISO 9001:2015 Certificate

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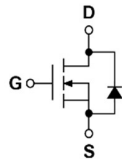


N-Channel Enhancement Mode MOSFET

Pin Description



Symbol



Product Summary

Symbol	N-Channel	Unit
V _{DSS}	40	V
R _{DS(ON)-Max}	16	mΩ
I _D	32	A

Feature

- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- 100% UIS Tested

Applications

- Portable Equipment
- Power Management in Notebook Computer

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM40150NAK8A	PDFN5*6	Tape & Reel	5000 / Tape & Reel	40150 □□□□□□

Note : □□□□□□ = Lot Code

Absolute Maximum Ratings (T_J=25°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	°C	
T _{STG}	Storage Temperature Range	-55 to 150	°C	
I _{DM} ^①	Pulse Drain Current Tested	T _c =25°C	71	A
I _D	Continuous Drain Current	T _c =25°C	32	A
		T _c =100°C	21	
P _D	Maximum Power Dissipation	T _c =25°C	32	W
		T _c =100°C	13	
I _{AS} ^②	Avalanche Current, Single pulse	L=0.1mH	19	A
E _{AS} ^③	Avalanche Energy, Single pulse	L=0.1mH	18	mJ

Thermal Characteristics

Symbol	Parameter	Rating	Unit	
R _{θJC}	Thermal Resistance-Junction to Case	Steady State	3.9	°C/W
R _{θJA} ^③	Thermal Resistance-Junction to Ambient	Steady State	75	°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°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	1.2	1.7	2.1	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	-	12.5	16	mΩ
		V _{GS} =4.5V, I _{DS} =15A	-	16	21	
gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =10A	-	12	-	S
Dynamic Characteristics ^⑤						
R_G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, Freq.=1MHz	-	3.5	-	Ω
C_{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =20V, Freq.=1MHz	-	1052	-	pF
C_{oss}	Output Capacitance		-	88	-	
C_{rss}	Reverse Transfer Capacitance		-	67	-	
td(ON)	Turn-on Delay Time	V _{GS} =10V, V _{DS} =20V, I _D =1A, R _{GEN} =6Ω	-	5.8	-	nS
t_r	Turn-on Rise Time		-	21.3	-	
t_{d(OFF)}	Turn-off Delay Time		-	40	-	
t_f	Turn-off Fall Time		-	19.1	-	
Q_g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =20V, I _D =20A	-	12.5	-	nC
Q_g	Total Gate Charge	V _{GS} =10V, V _{DS} =20V, I _D =20A	-	25	-	
Q_{gs}	Gate-Source Charge		-	1.5	-	
Q_{gd}	Gate-Drain Charge		-	6.7	-	
Source-Drain Characteristics						
V_{SD} ^④	Diode Forward Voltage	I _{SD} =10A, V _{GS} =0V	-	0.75	1.1	V
t_{rr}	Reverse Recovery Time	I _F =10A, V _R =20V	-	12.5	-	nS
Q_{rr}	Reverse Recovery Charge	dI _F /dt=100A/μs	-	6.5	-	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

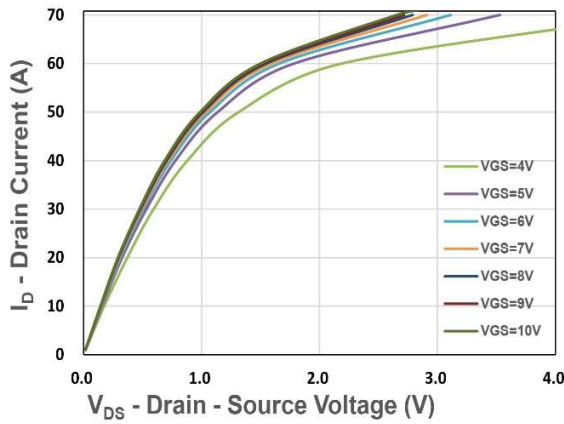


Figure 1. Output Characteristics

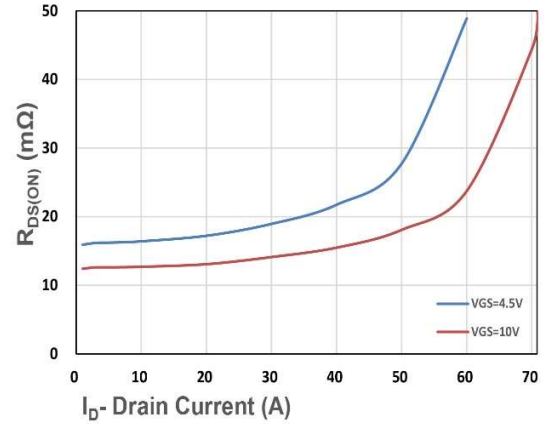


Figure 2. On-Resistance vs. ID

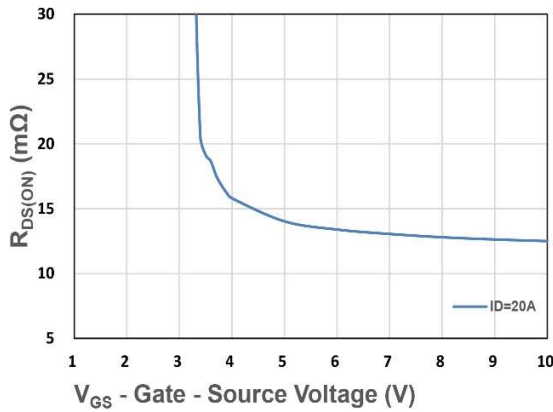


Figure 3. On-Resistance vs. VGS

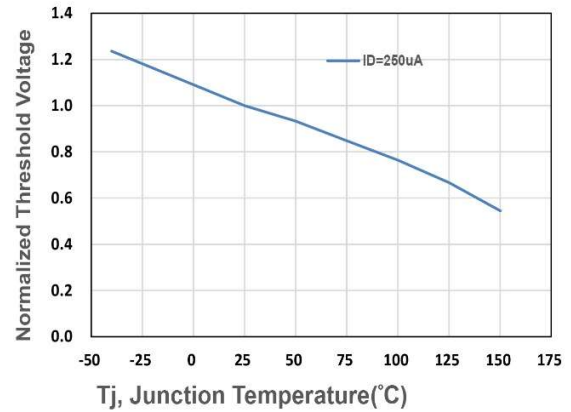


Figure 4. Gate Threshold Voltage

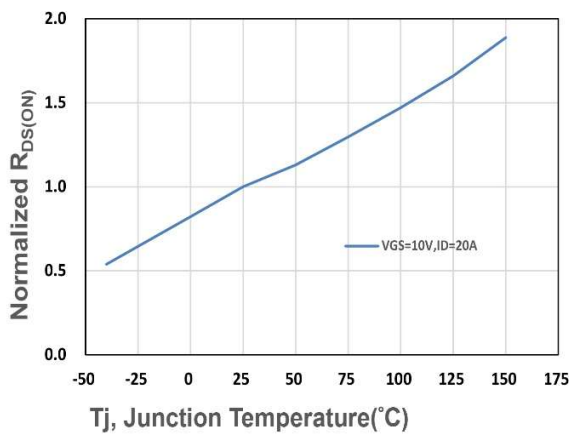


Figure 5. Drain-Source On Resistance

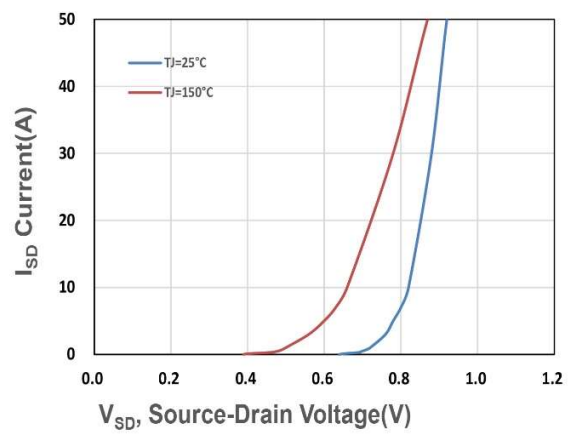


Figure 6. Source-Drain Diode Forward

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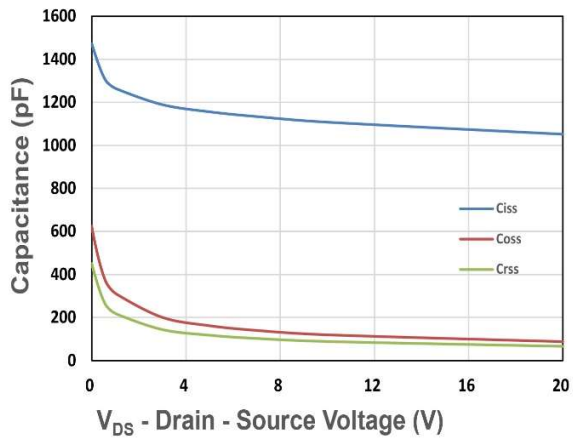


Figure 7. Capacitance

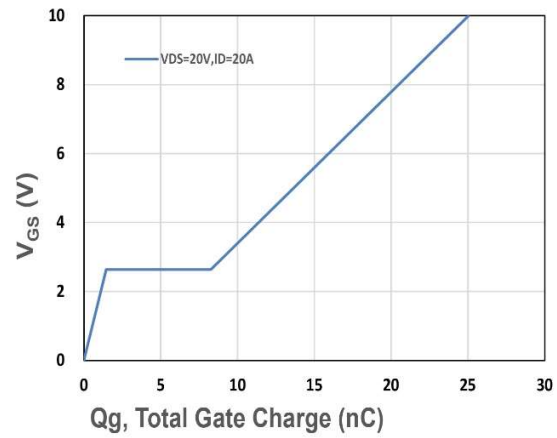


Figure 8. Gate Charge Characteristics

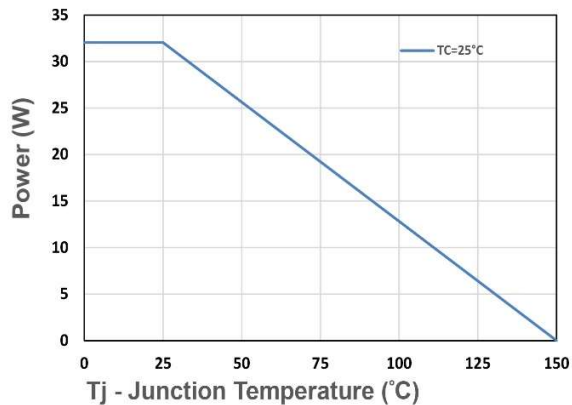


Figure 9. Power Dissipation

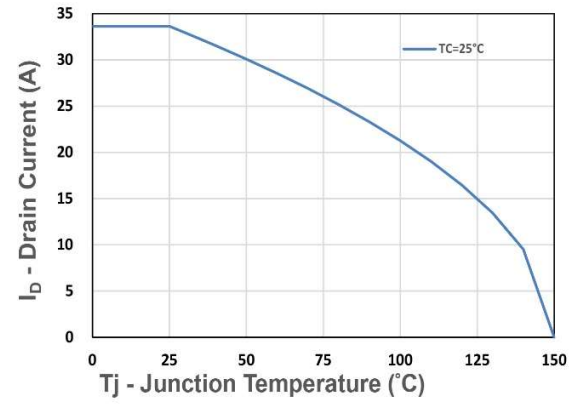


Figure 10. Drain Current

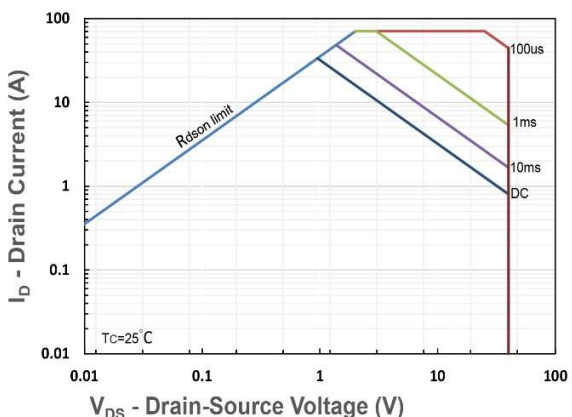


Figure 11. Safe Operating Area

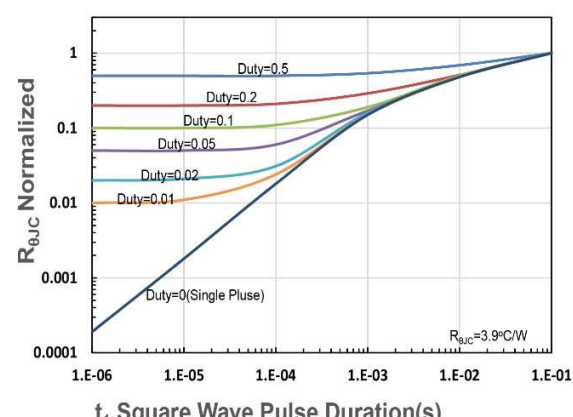


Figure 12. $R_{\theta JC}$ Transient Thermal Impedance