




Power MOSFETS


DATASHEET

LM60120NAK8A

N-Channel
Enhancement Mode MOSFET

 Leadpower-semiconductor Corp., Ltd

 sales@leadpower-semi.com

 (03) 6577339 FAX : (03) 6577229

 www.leadpower-semi.com

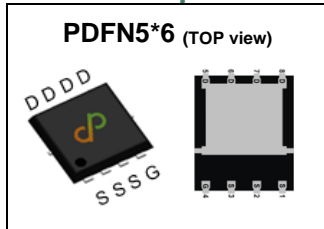


Quality Management Systems

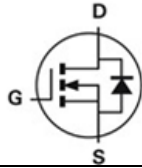
ISO 9001:2015 Certificate

N-Channel Enhancement Mode MOSFET

Pin Description



Symbol



Product Summary

Symbol	N-Channel	Unit
V _{DSS}	60	V
R _{DS(ON)-Max}	11	mΩ
ID	47	A

Feature

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

Applications

- Secondary Side Synchronous Rectification
- DC-DC Converter

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM60120NAK8A	PDFN5*6	Tape & Reel	5000 / Tape & Reel	60120 □□□□□□

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

Symbol	Parameter	N-Channel	Unit	
V _{DSS}	Drain-Source Voltage	60	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	47	A
		T _c =100°C	30	
P _D	Maximum Power Dissipation	T _c =25°C	37	W
		T _c =100°C	15	
I _{AS} ^②	Avalanche Current, Single pulse	L=0.1mH	15	A
E _{AS} ^②	Avalanche Energy, Single pulse	L=0.1mH	11	mJ

Thermal Characteristics

Symbol	Parameter	Rating	Unit	
R _{θJC}	Thermal Resistance-Junction to Case	Steady State	3.4	°C/W
R _{θJA} ^③	Thermal Resistance-Junction to Ambient	Steady State	60	°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.

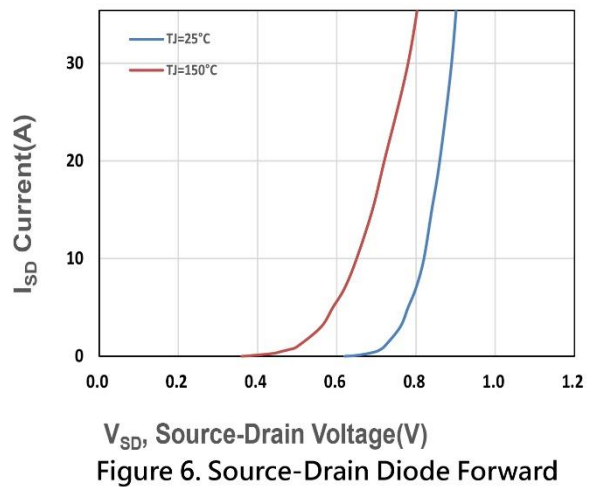
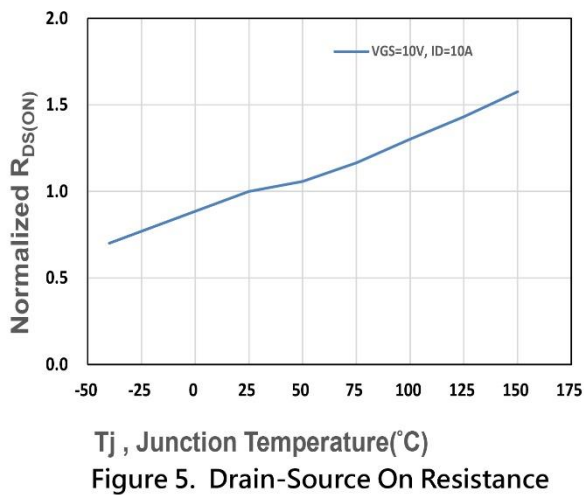
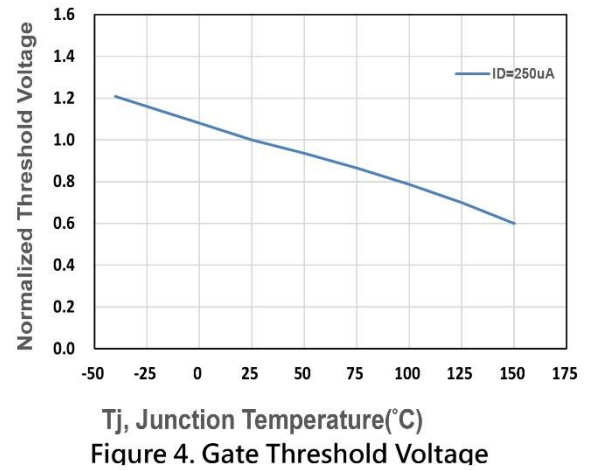
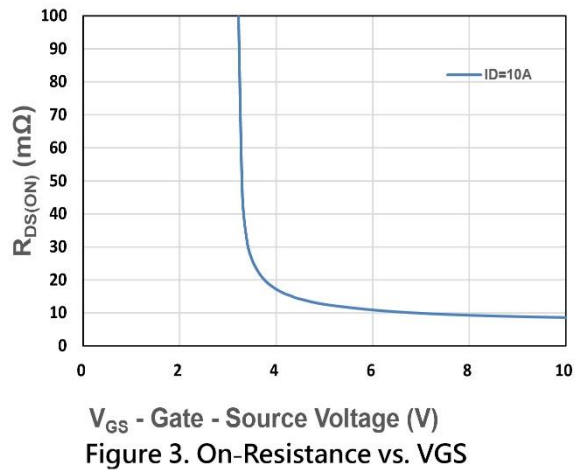
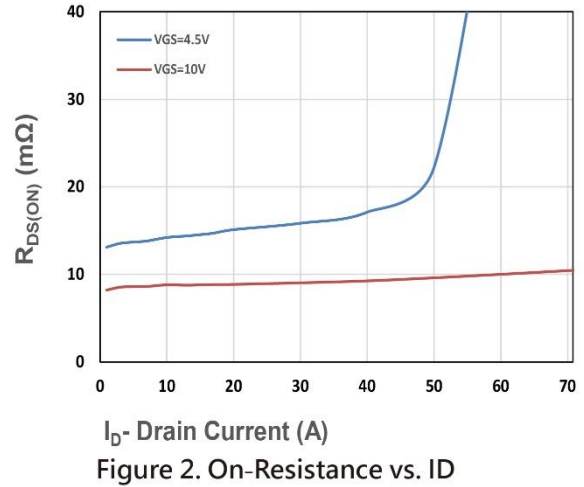
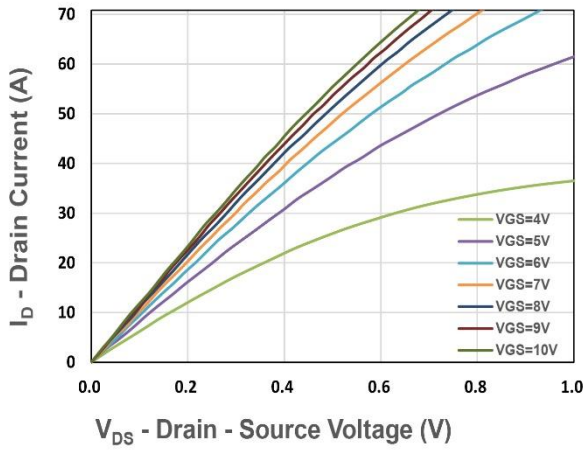
N-Channel Electrical Characteristics (T_J=25°C Unless Otherwise Noted)

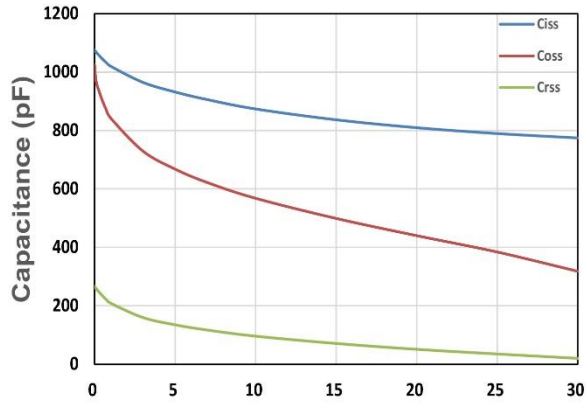
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Electrical Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250uA	60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V _{DS} =48V, V _{GS} =0V	-	-	1	uA
V_{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250uA	1.2	1.8	2.5	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} =10A	-	8.8	11	mΩ
		V _{GS} =4.5V, I _{DS} =5A	-	14	18	
gfs	Forward Transconductance	V _{DS} =10V, I _{DS} =5A	-	2.6	-	S
Dynamic Characteristics[®]						
R_G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, Freq.=1MHz	-	1.8	-	Ω
C_{ISS}	Input Capacitance	V _{GS} =0V, V _{DS} =30V, Freq.=1MHz	-	775	-	pF
C_{OSS}	Output Capacitance					
C_{rSS}	Reverse Transfer Capacitance					
td(ON)	Turn-on Delay Time	V _{GS} =10V, V _{DS} =30V, I _D =1A, R _{GEN} =6Ω	-	7	-	nS
t_r	Turn-on Rise Time					
t_{d(OFF)}	Turn-off Delay Time					
t_f	Turn-off Fall Time					
Q_g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =30V, I _D =10A	-	8.5	-	nC
Q_g	Total Gate Charge	V _{GS} =10V, V _{DS} =30V, I _D =10A	-	16.54	-	
Q_{gs}	Gate-Source Charge		-	3.52	-	
Q_{gd}	Gate-Drain Charge		-	3.78	-	
Source-Drain Characteristics						
V_{SD}^④	Diode Forward Voltage	I _{SD} =5A, V _{GS} =0V	-	0.8	1.1	V
t_{rr}	Reverse Recovery Time	I _F =5A, V _R =30V	-	33.1	-	nS
Q_{rr}	Reverse Recovery Charge	dI _F /dt=100A/μs	-	18.9	-	nC

Note ④ : Pulse test (pulse width≤300us, duty cycle≤2%).

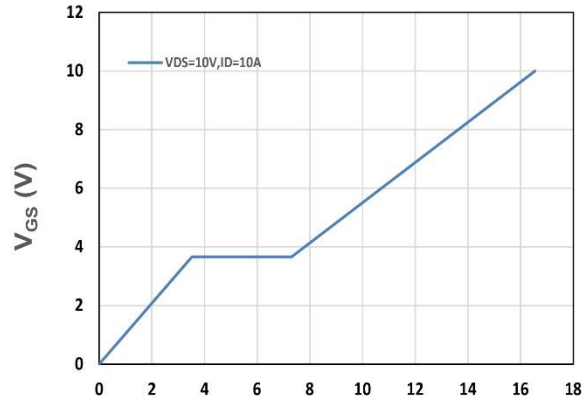
Note ⑤ : Guaranteed by design, not subject to production testing.

N-Channel Typical Characteristics

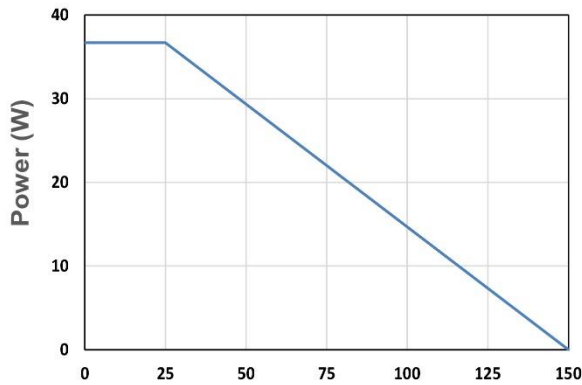




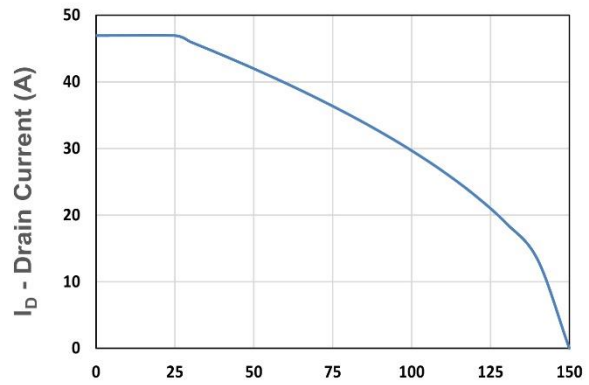
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



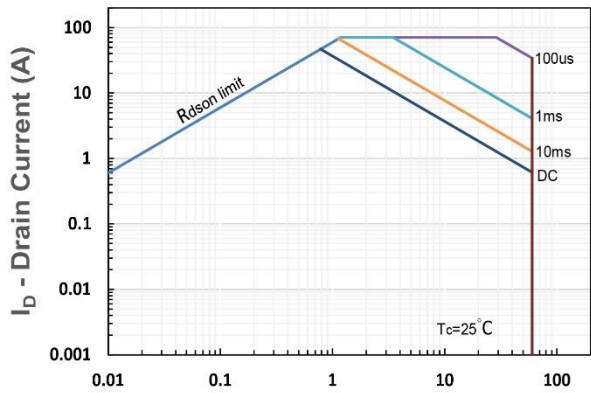
Q_g , Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



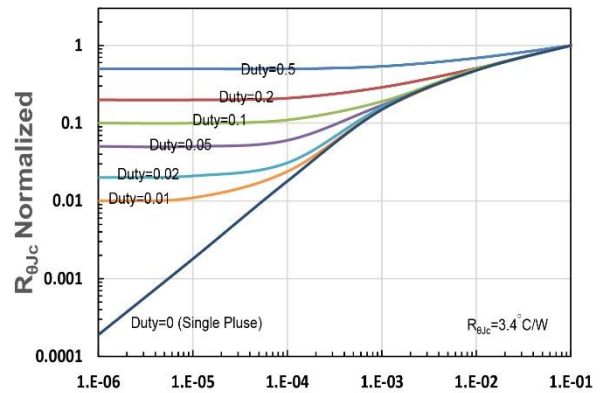
T_c - Case Temperature ($^{\circ}C$)
Figure 9. Power Dissipation



T_c - Case Temperature ($^{\circ}C$)
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