



Power MOSFETS

DATASHEET

LM30040NAK8A

N-Channel
Enhancement Mode MOSFET

 Leadpower-semiconductor Corp., Ltd

 sales@leadpower-semi.com

 (03) 6577339 FAX : (03) 6577229

 www.leadpower-semi.com

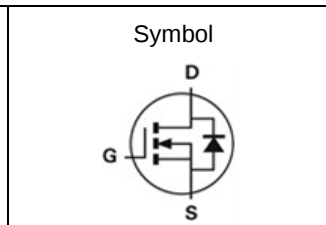
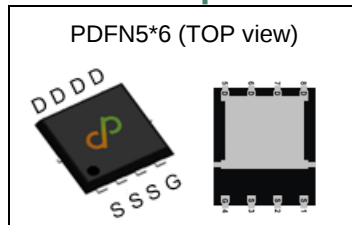


Quality Management Systems

ISO 9001:2015 Certificate

N-Channel Enhancement Mode MOSFET

Pin Description



Ordering Information

Symbol	N-Channel	Unit
V_{DSS}	30	V
$R_{DS(ON)-Max}$	4	m Ω
I_D	70	A

Feature

- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- Lower Q_g and Q_{gd} for high-speed switching
- Lower $R_{DS(ON)}$ to Minimize Conduction Losses
- 100% UIS and Rg Tested

Applications

- Power Management in DC/DC Converters
- Power Load Switch
- Notebook Battery Management

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM30040NAK8A	PDFN5*6	Tape & Reel	5000 / Tape & Reel	30040 □□□□□□

Absolute Maximum Ratings ($T_J=25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter		N-Channel	Unit
V_{DSS}	Drain-Source Voltage		30	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	$T_c=25^\circ\text{C}$	70	A
$I_D^{②}$	Continuous Drain Current	$T_c=25^\circ\text{C}$	70	A
		$T_c=100^\circ\text{C}$	50	
$P_D^{②}$	Maximum Power Dissipation	$T_c=25^\circ\text{C}$	46	W
		$T_c=100^\circ\text{C}$	18	
$I_{AS}^{③}$	Avalanche Current, Single pulse	$L=0.1\text{mH}$	31	A
$E_{AS}^{③}$	Avalanche Energy, Single pulse	$L=0.1\text{mH}$	48	mJ

Thermal Characteristics

Symbol	Parameter		Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	2.7	$^\circ\text{C/W}$
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	Steady State	50	$^\circ\text{C/W}$

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.

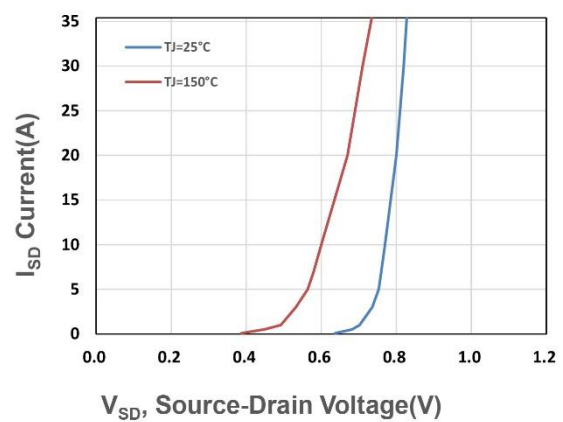
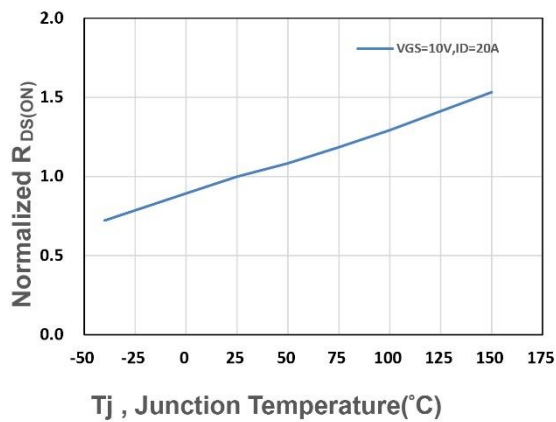
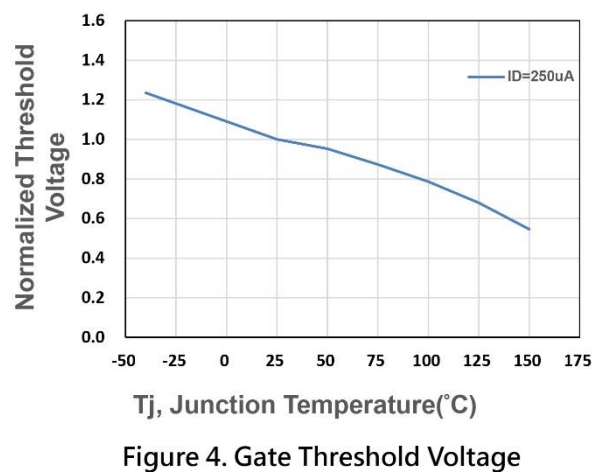
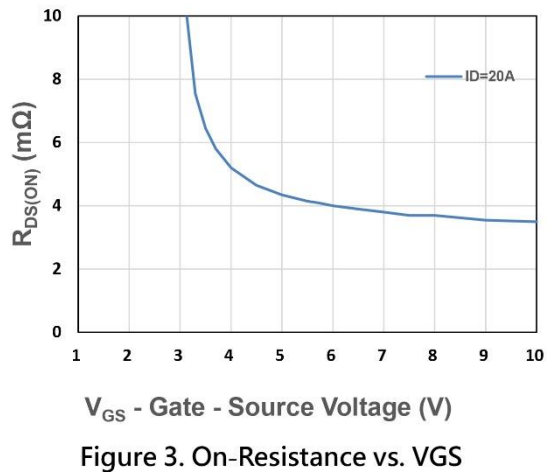
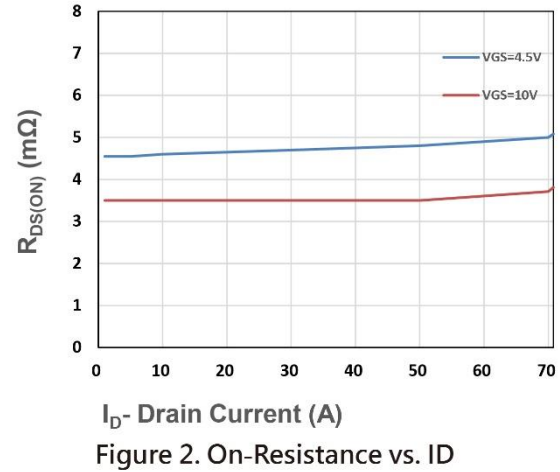
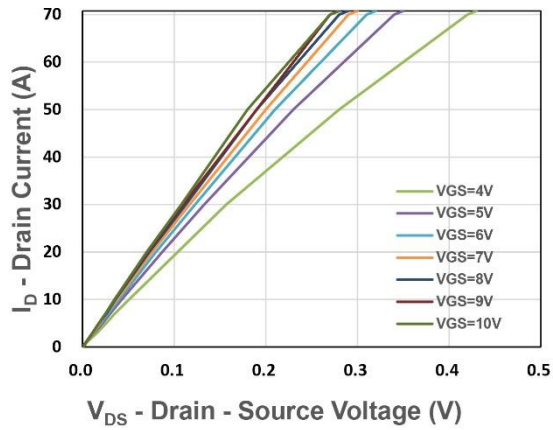
N-Channel Electrical Characteristics ($T_J=25^{\circ}\text{C}$ Unless Otherwise Noted)

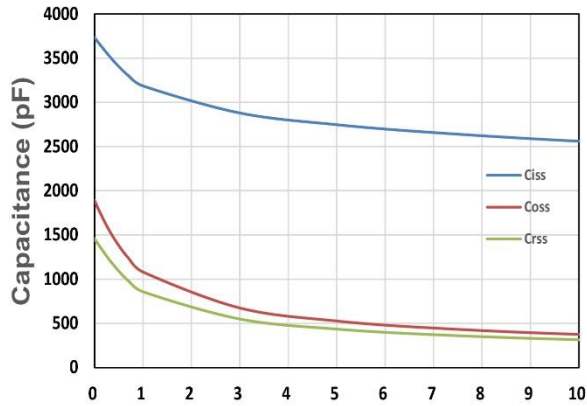
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Electrical Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250uA	30	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =24V, V _{GS} =0V	-	-	1	uA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250uA	1	1.5	2	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	-	3.4	4	mΩ
		V _{GS} =4.5V, I _{DS} =10A	-	4.5	6	
g _{fs}	Forward Transconductance	V _{DS} =5V, I _{DS} =20A	-	25.2	-	S
Dynamic Characteristics [®]						
R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V, Freq.=1MHz	-	1	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, Freq.=1MHz	-	2435	-	pF
C _{oss}	Output Capacitance		-	308	-	
C _{rss}	Reverse Transfer Capacitance		-	259	-	
td(ON)	Turn-on Delay Time	V _{GS} =10V,V _{DS} =15V, I _D =1A,R _{GEN} =3Ω	-	10.3	-	nS
t _r	Turn-on Rise Time		-	17.6	-	
t _{d(OFF)}	Turn-off Delay Time		-	43.2	-	
t _f	Turn-off Fall Time		-	31.7	-	
Q _g	Total Gate Charge	V _{GS} =4.5V,V _{DS} =15V I _D =20A	-	33	-	nC
Q _g	Total Gate Charge	V _{GS} =10V,V _{DS} =15V, I _D =20A	-	62	-	
Q _{gs}	Gate-Source Charge		-	10.19	-	
Q _{gd}	Gate-Drain Charge		-	16.01	-	
Source-Drain Characteristics						
V _{SD} ^④	Diode Forward Voltage	I _{SD} =1A, V _{GS} =0V	-	0.7	1.1	V
t _{rr}	Reverse Recovery Time	I _F =1A, V _{GS} =0	-	20	-	nS
Q _{rr}	Reverse Recovery Charge	dI _F /dt=100A/μs	-	12	-	nC

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

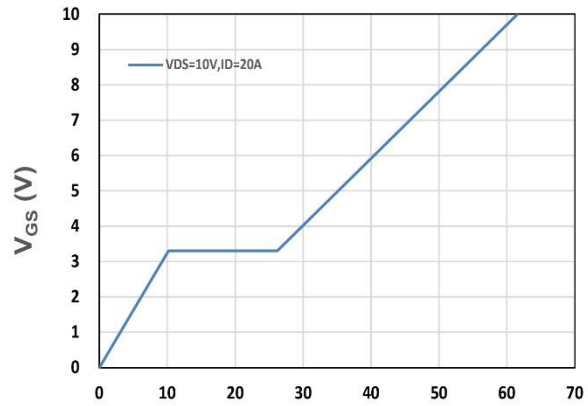
Note ⑤ : Guaranteed by design, not subject to production testing.

N-Channel Typical Characteristics

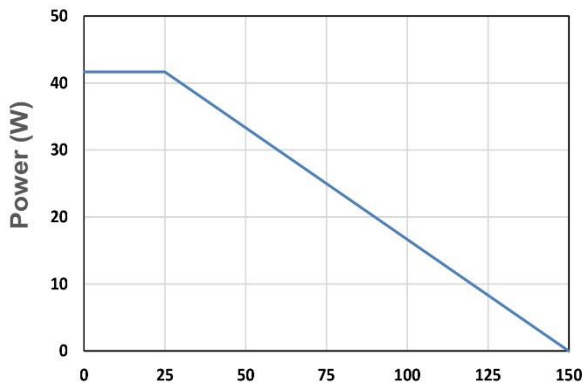




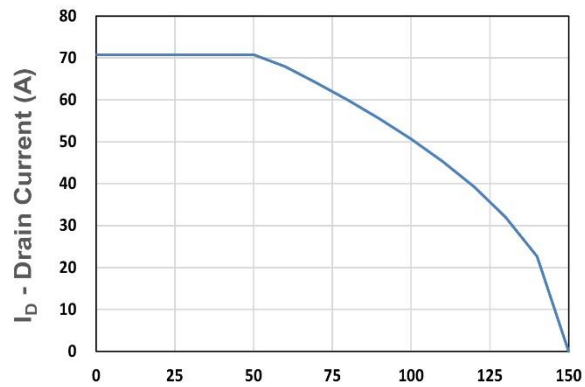
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



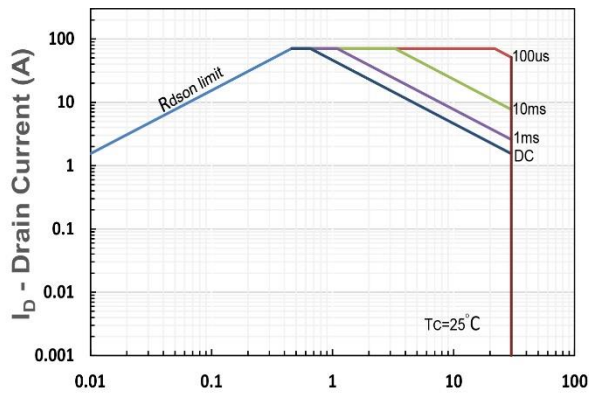
Q_g , Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



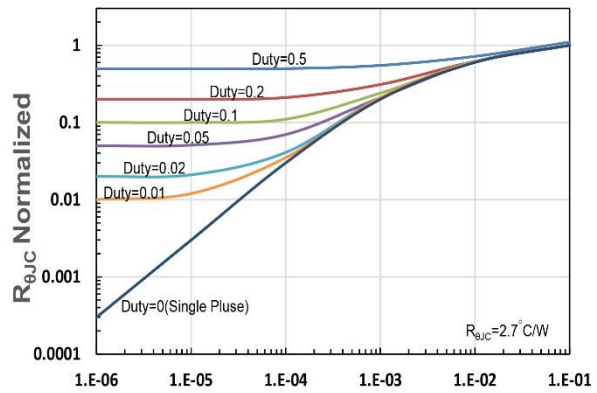
T_C - Case Temperature (°C)
Figure 9. Power Dissipation



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