



Power MOSFETS

DATASHEET

LM60065NAK8A

N-Channel
Enhancement Mode MOSFET

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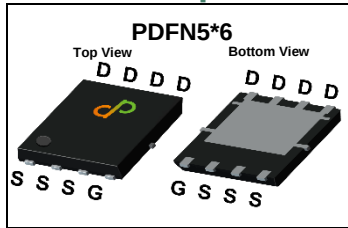


Quality Management Systems

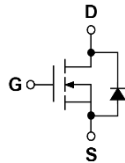
ISO 9001:2015 Certificate

N-Channel Enhancement Mode MOSFET

Pin Description



Symbol



Ordering Information

Symbol	N-Channel	Unit
V_{DSS}	60	V
$R_{DS(ON)-Max}$	6	mΩ
I_D	71	A

Feature

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

Applications

- Portable Equipment
- Battery Powered System

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM60065NAK8A	PDFN5*6	Tape & Reel	5000 / Tape & Reel	60065 □□□□□□

Note : □□□□□□ = Lot Code

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	$T_c=25^{\circ}C$	71	A
I_D	Continuous Drain Current	$T_c=25^{\circ}C$	71 ^①	A
		$T_c=100^{\circ}C$	46	
P_D	Maximum Power Dissipation	$T_c=25^{\circ}C$	50	W
		$T_c=100^{\circ}C$	20	
$I_{AS}^{②}$	Avalanche Current, Single pulse	L=0.1mH	21	A
$E_{AS}^{②}$	Avalanche Energy, Single pulse	L=0.1mH	22	mJ

Thermal Characteristics

Symbol	Parameter		Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	2.5	°C/W
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	Steady State	50	°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	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	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	-	5	6	mΩ
		V _{GS} =4.5V, I _{DS} =10A	-	8	10	
gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =20A	-	31	-	S
Dynamic Characteristics ⑥						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, Freq.=1MHz	-	2.1	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =30V, Freq.=1MHz	-	2083	-	pF
C _{oss}	Output Capacitance		-	793	-	
C _{rss}	Reverse Transfer Capacitance		-	16.5	-	
td(ON)	Turn-on Delay Time	V _{GS} =10V, V _{DS} =30V, Id=1A, RGEN=3Ω	-	9.5	-	nS
tr	Turn-on Rise Time		-	26	-	
td(OFF)	Turn-off Delay Time		-	29	-	
tf	Turn-off Fall Time		-	19.5	-	
Qg	Total Gate Charge	V _{GS} =4.5V, V _{DS} =30V Id=20A	-	19.8	-	nC
Qg	Total Gate Charge	V _{GS} =10V, V _{DS} =30V, Id=20A	-	37.4	-	
Qgs	Gate-Source Charge		-	6.5	-	
Qgd	Gate-Drain Charge		-	10	-	
Source-Drain Characteristics						
VSD ④	Diode Forward Voltage	ISD=1A, VGS=0V	-	0.8	1.1	V
ttr	Reverse Recovery Time	IF=20A, VR=30V	-	40	-	nS
Qrr	Reverse Recovery Charge	dIF/dt=100A/μs	-	48.7	-	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

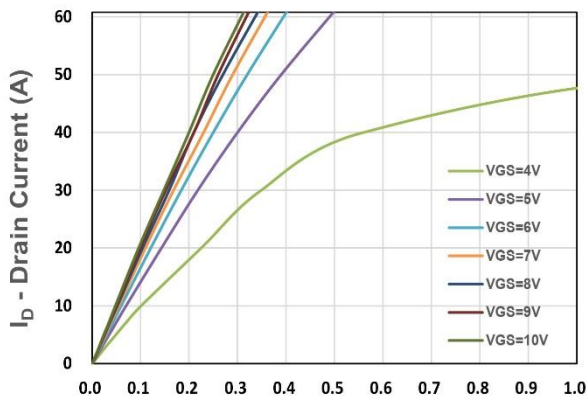


Figure 1. Output Characteristics

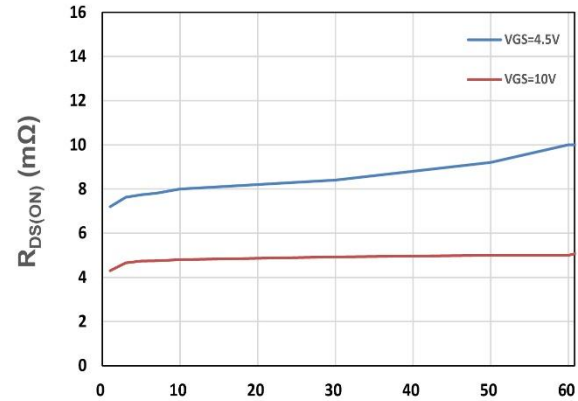


Figure 2. On-Resistance vs. I_D

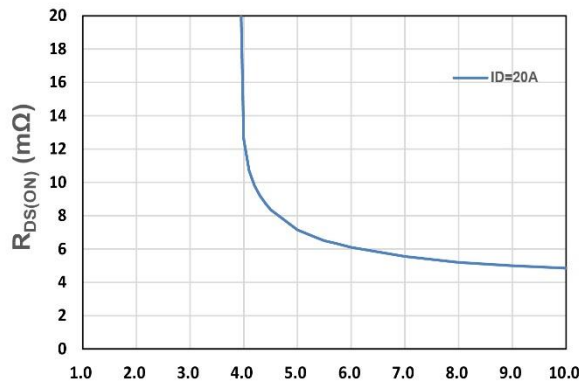


Figure 3. On-Resistance vs. V_{GS}

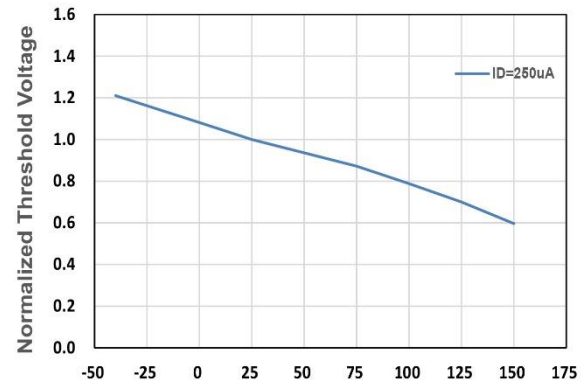


Figure 4. Gate Threshold Voltage

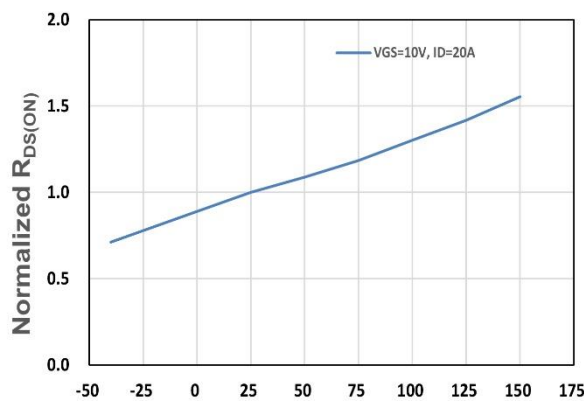


Figure 5. Drain-Source On Resistance

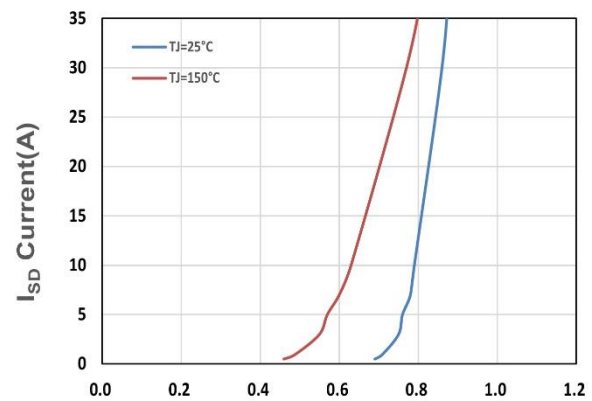
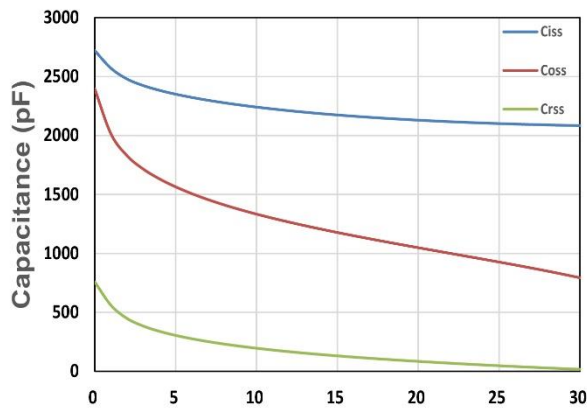
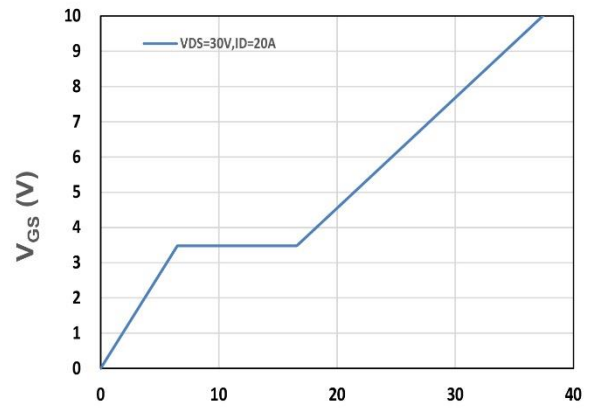


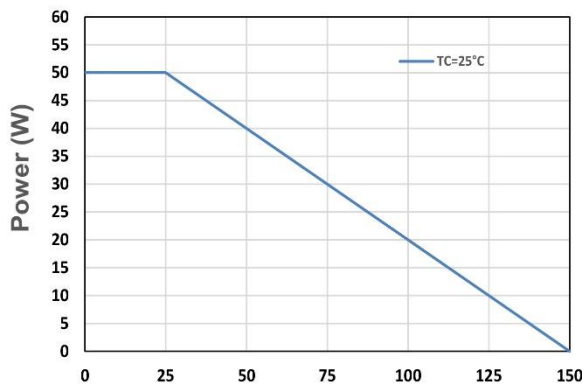
Figure 6. Source-Drain Diode Forward



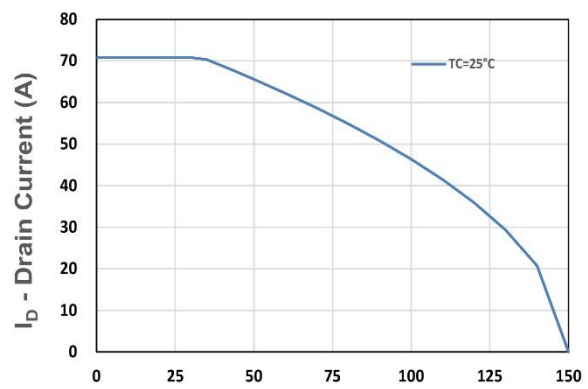
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



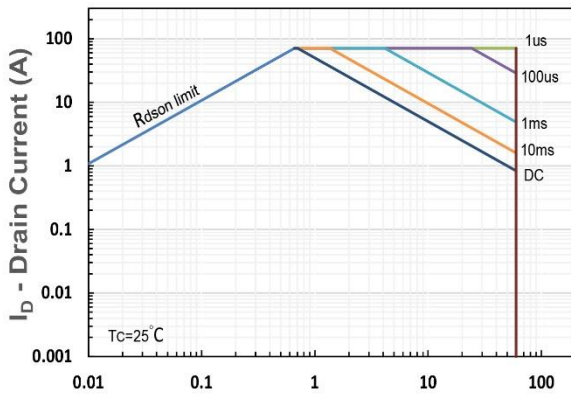
Q_g , Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



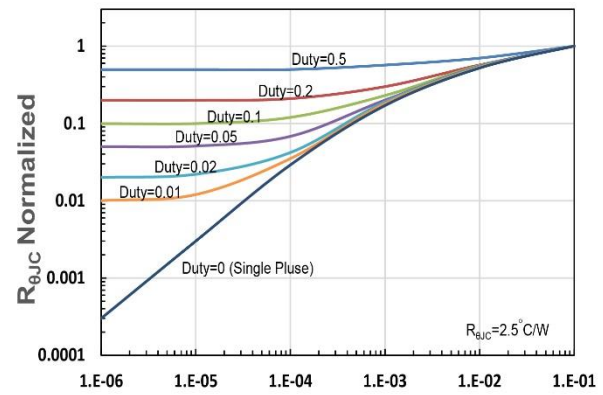
T_j - Junction Temperature (°C)
Figure 9. Power Dissipation



T_j - Junction 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