



Power MOSFETS

DATASHEET

LM25008NAK8A

N-Channel
Enhancement Mode MOSFET



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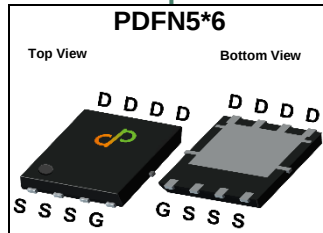


Quality Management Systems

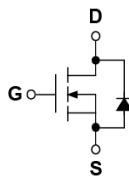
ISO 9001:2015 Certificate

N-Channel Enhancement Mode MOSFET

Pin Description



Symbol



Product Summary

Symbol	N-Channel	Unit
V_{DSS}	25	V
$R_{DS(ON)-Max}$	0.8	mΩ
ID	284	A

Feature

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

Applications

- Power Load Switch
- Motor Control

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM25008NAK8A	PDFN5*6	Tape & Reel	5000 / Tape & Reel	25008 □□□□□□

Note: □□□□□□ = Lot code

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

Symbol	Parameter	N-Channel	Unit
V_{DSS}	Drain-Source Voltage	25	V
V_{GSS}	Gate-Source Voltage	±16	V
T_J	Maximum Junction Temperature	175	°C
T_{STG}	Storage Temperature Range	-55 to 175	°C
I_S	Diode Continuous Forward Current	$T_C=25^\circ\text{C}$ 52	A
$I_{DM}^{(1)}$	Pulse Drain Current Tested	$T_C=25^\circ\text{C}$ 710	A
I_D	Continuous Drain Current	$T_C=25^\circ\text{C}$ 284 $T_C=100^\circ\text{C}$ 201	A
P_D	Maximum Power Dissipation	$T_C=25^\circ\text{C}$ 115 $T_C=100^\circ\text{C}$ 58	W
$I_D^{(2)}$	Continuous Drain Current	$T_A=25^\circ\text{C}$ 46 $T_A=70^\circ\text{C}$ 38	A
$P_D^{(2)}$	Maximum Power Dissipation	$T_A=25^\circ\text{C}$ 3.0 $T_A=70^\circ\text{C}$ 2.1	W
$I_{AS}^{(3)}$	Avalanche Current, Single pulse	$L=0.5\text{mH}$ 40	A
$E_{AS}^{(3)}$	Avalanche Energy, Single pulse	$L=0.5\text{mH}$ 400	mJ

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R\theta_{JC}$	Thermal Resistance-Junction to Case	Steady State 1.3	°C/W
$R\theta_{JA}^{(2)}$	Thermal Resistance-Junction to Ambient	Steady State 50	°C/W

Note ① : Max. current is limited by junction temperature.

Note ② : Surface Mounted on 1in² FR-4 board with 1oz.

Note ③ : UIS tested and pulse width are limited by maximum junction temperature 175°C.

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	25	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =20V, 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} =±16V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ④	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =50A	-	0.6	0.8	mΩ
		V _{GS} =4.5V, I _{DS} =25A	-	0.85	1.1	
gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =50A	-	64	-	S
Dynamic Characteristics ⑥						
R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V, Freq.=1MHz	-	4	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =12.5V, Freq.=1MHz	-	6931	-	pF
C _{oss}	Output Capacitance		-	1204	-	
C _{rss}	Reverse Transfer Capacitance		-	851	-	
td(ON)	Turn-on Delay Time	V _{GS} =10V,V _{DS} =12.5V, Id=1A,RGEN=1Ω	-	15	-	nS
tr	Turn-on Rise Time		-	14	-	
td(OFF)	Turn-off Delay Time		-	141	-	
tf	Turn-off Fall Time		-	39	-	
Qg	Total Gate Charge	V _{GS} =4.5V,V _{DS} =12.5V Id=50A	-	85	-	nC
Qg	Total Gate Charge	V _{GS} =10V,V _{DS} =12.5V, Id=50A	-	184	-	
Qgs	Gate-Source Charge		-	26	-	
Qgd	Gate-Drain Charge		-	26	-	
Source-Drain Characteristics						
VSD④	Diode Forward Voltage	ISD=25A, VGS=0V	-	0.7	1.1	V
trr	Reverse Recovery Time	IF=25A, VR=15V	-	38	-	nS
Qrr	Reverse Recovery Charge	dIF/dt=100A/μs	-	44	-	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

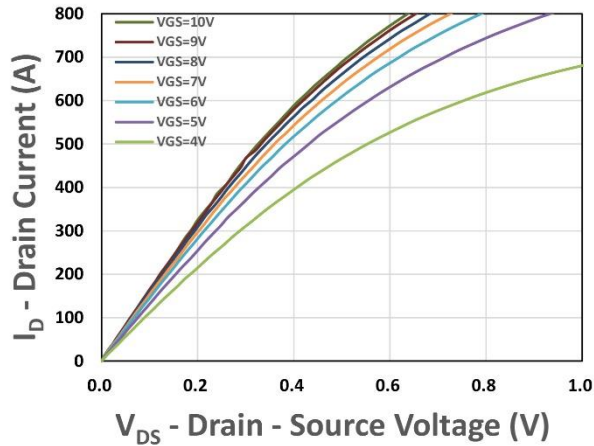


Figure 1. Output Characteristics

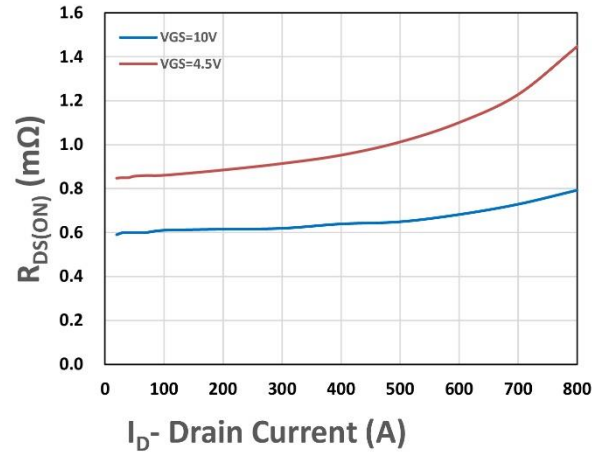


Figure 2. On-Resistance vs. ID

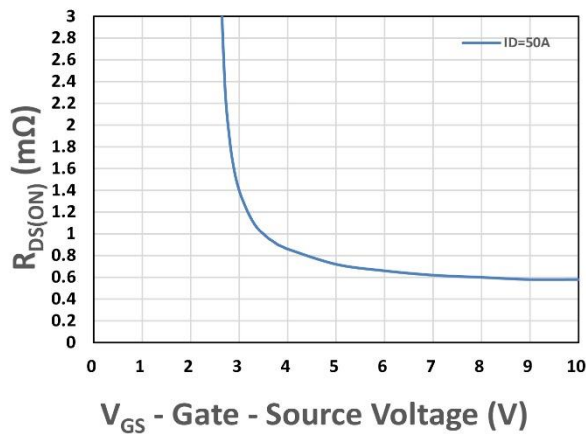


Figure 3. On-Resistance vs. VGS

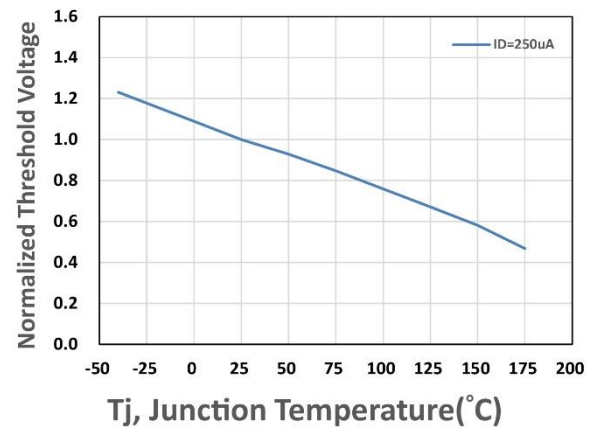


Figure 4. Gate Threshold Voltage

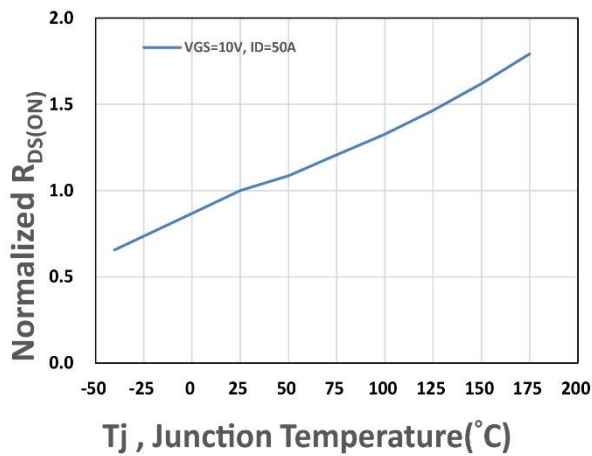


Figure 5. Drain-Source On Resistance

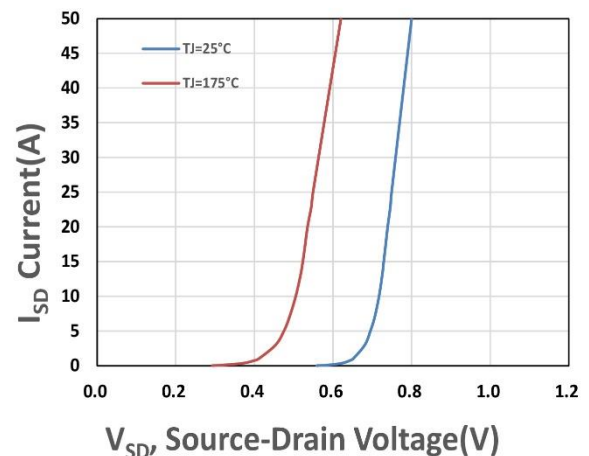
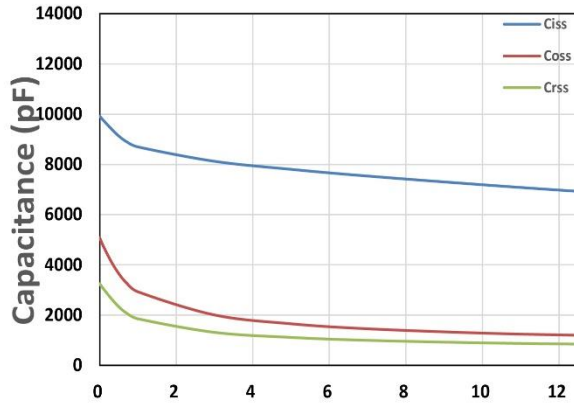
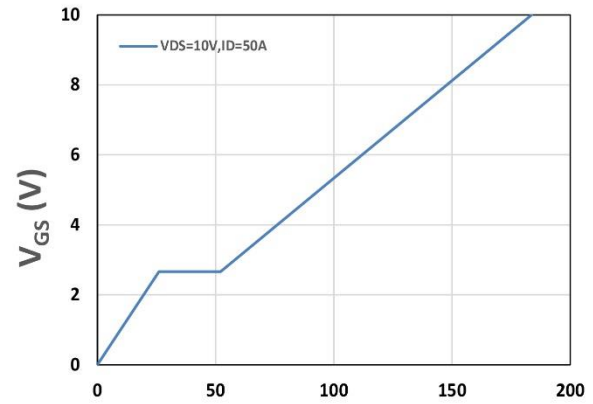


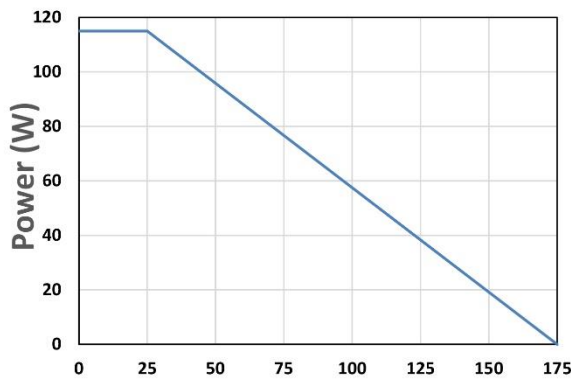
Figure 6. Source-Drain Diode Forward



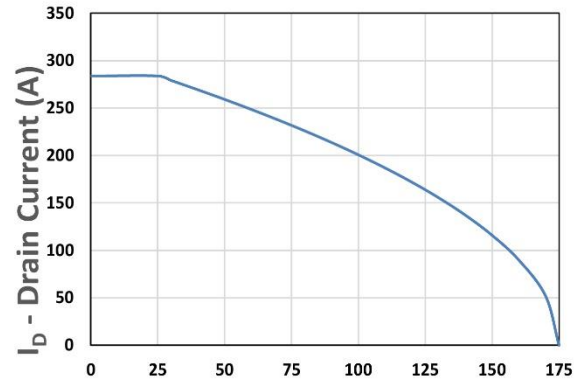
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



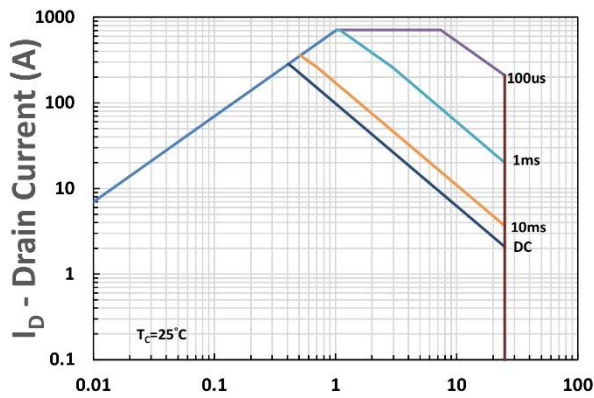
Q_g , Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



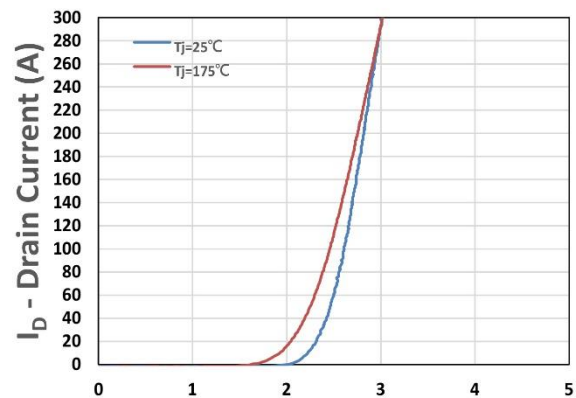
T_c -Case Temperature ($^{\circ}\text{C}$)
Figure 9. Power Dissipation



T_c -Case Temperature ($^{\circ}\text{C}$)
Figure 10. Drain Current



V_{DS} - Drain-Source Voltage (V)
Figure 11. Safe Operating Area



V_{GS} - Gate - Source Voltage (V)
Figure 12. Transfer Characteristics

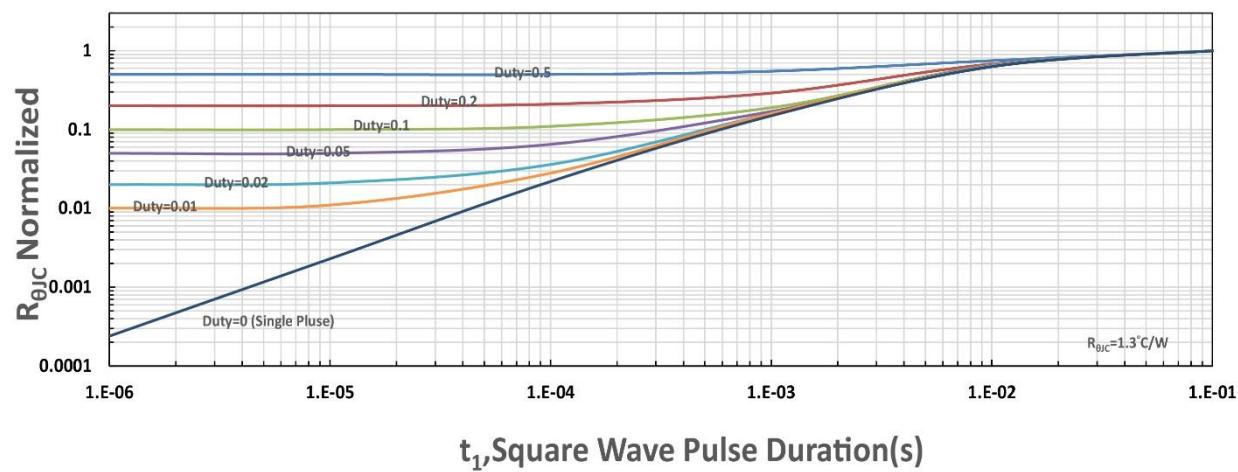


Figure 13. $R_{\theta JC}$ Transient Thermal Impedance