Power MOSFETS

DATASHEET

LM60025NAP3A

N-Channel

Enhancement Mode MOSFET

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Quality Management Systems

ISO 9001:2015 Certificate

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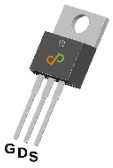
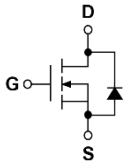
N-Channel Enhancement Mode MOSFET

Pin Description

TO-220-3L(TOP view)	Symbol
	

Product Summary

Symbol	N-Channel	Unit
V_{DSS}	60	V
$R_{DS(ON)-Max}$	3	mΩ
ID	204	A

Feature

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

Applications

- Switching and Synchronous Rectification
- BLDC

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM60025NAP3A	TO-220-3L	Tube	50 / Tube	60025 □□□□□□

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_S	Diode Continuous Forward Current	T_C=25°C	114	A
I_{DM}①	Pulse Drain Current Tested	T_C=25°C	400	A
I_D	Continuous Drain Current	T_C=25°C	204①	A
		T_C=100°C	129	
P_D	Maximum Power Dissipation	T_C=25°C	125	W
		T_C=100°C	50	
I_D	Continuous Drain Current	T_A=25°C	26	A
		T_A=70°C	21	
P_D	Maximum Power Dissipation	T_A=25°C	2.0	W
		T_A=70°C	1.3	
I_{AS}②	Avalanche Current, Single pulse	L=0.1mH	51	A
		L=0.5mH	27	
E_{AS}②	Avalanche Energy, Single pulse	L=0.1mH	130	mJ
		L=0.5mH	182	

Thermal Characteristics

Symbol	Parameter		Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	1	°C/W
$R_{\theta JA}$③	Thermal Resistance-Junction to Ambient	Steady State	62.5	°C/W

Note ①：Max. current is limited by junction temperature

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°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	1.7	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}=20A	-	2.5	3.0	mΩ
		V_{GS}=4.5V, I_{DS}=10A		3.5	4.6	
gfs	Forward Transconductance	V_{DS}=5V, I_{DS}=10A	-	36	-	S
Dynamic Characteristics ⑤						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V, Freq.=1MHz	-	0.76	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=30V, Freq.=1MHz	-	5155	-	pF
C_{oss}	Output Capacitance		-	1331	-	
C_{rss}	Reverse Transfer Capacitance		-	195	-	
$td_{(ON)}$	Turn-on Delay Time	V_{GS}=10V,V_{DS}=25V, I_D=1A,R_{GEN}=3Ω	-	16	-	nS
t_r	Turn-on Rise Time		-	5.6	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	54	-	
t_f	Turn-off Fall Time		-	102	-	
Q_g	Total Gate Charge	V_{GS}=4.5V,V_{DS}=30V I_D=20A	-	45	-	nC
Q_g	Total Gate Charge	V_{GS}=10V,V_{DS}=30V, I_D=20A	-	93.7	-	
Q_{gs}	Gate-Source Charge		-	20.4	-	
Q_{gd}	Gate-Drain Charge		-	20.5	-	
Source-Drain Characteristics						
V_{SD}④	Diode Forward Voltage	I_{SD}=10A, V_{GS}=0V	-	0.8	1.1	V
t_{rr}	Reverse Recovery Time	I_F=10A, V_R=48V dI$_F$/dt=100A/μs	-	45	-	nS
Q_{rr}	Reverse Recovery Charge		-	43	-	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

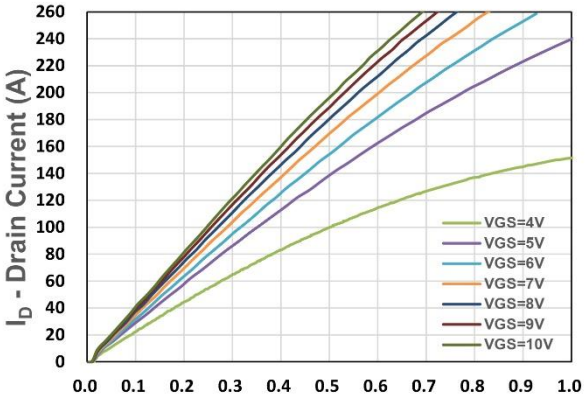


Figure 1. Output Characteristics

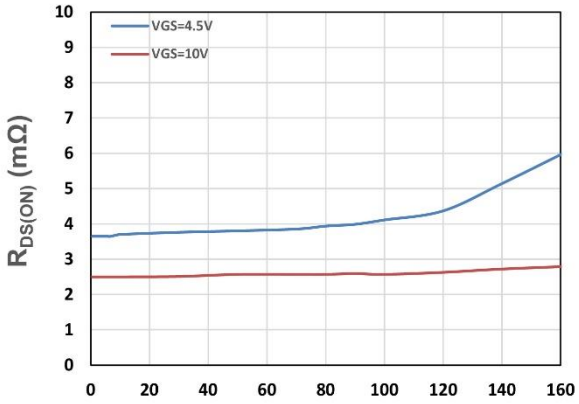


Figure 2. On-Resistance vs. ID

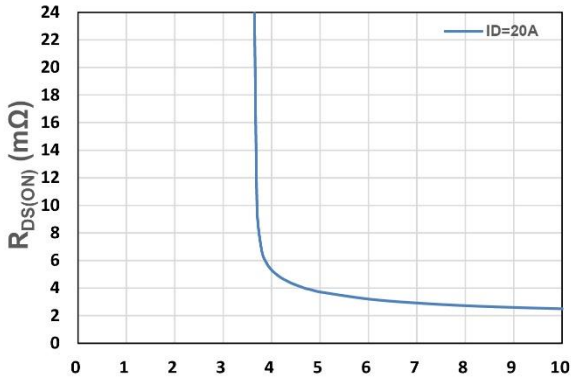


Figure 3. On-Resistance vs. VGS

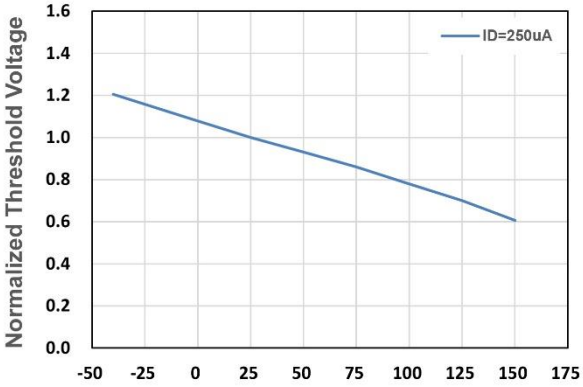


Figure 4. Gate Threshold Voltage

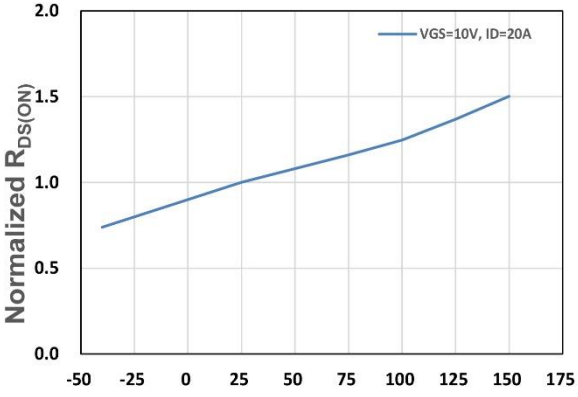


Figure 5. Drain-Source On Resistance

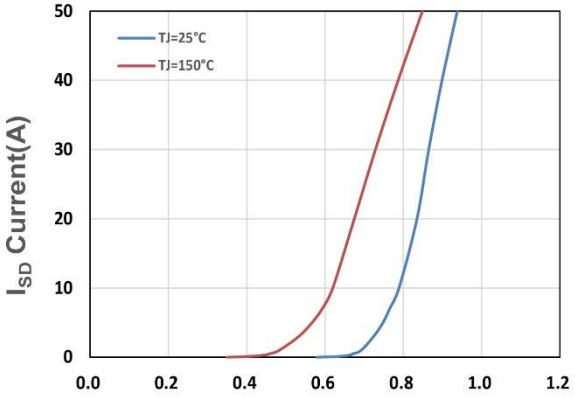
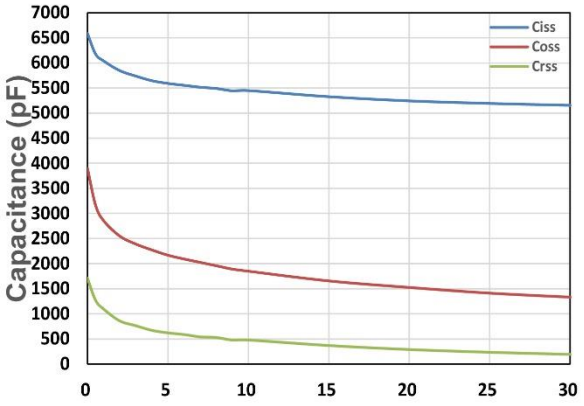
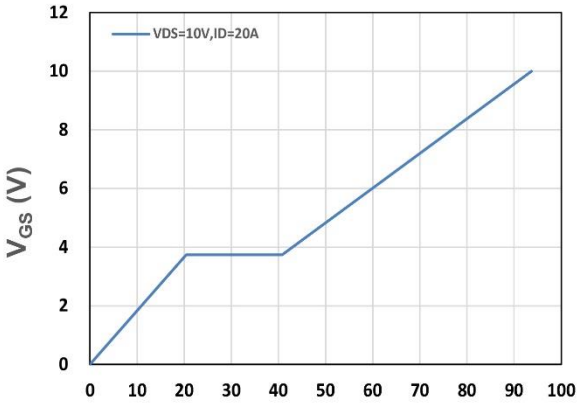


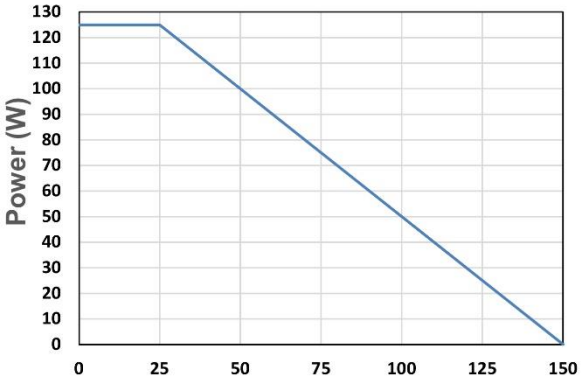
Figure 6. Source-Drain Diode Forward



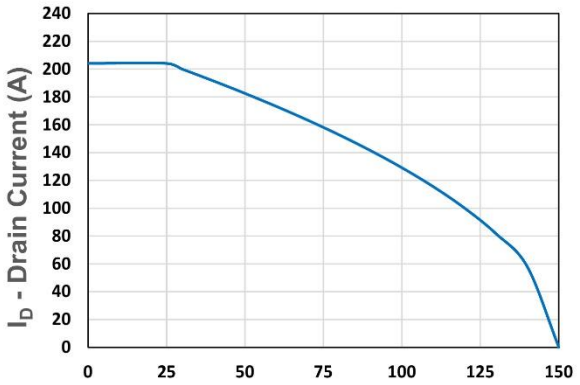
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



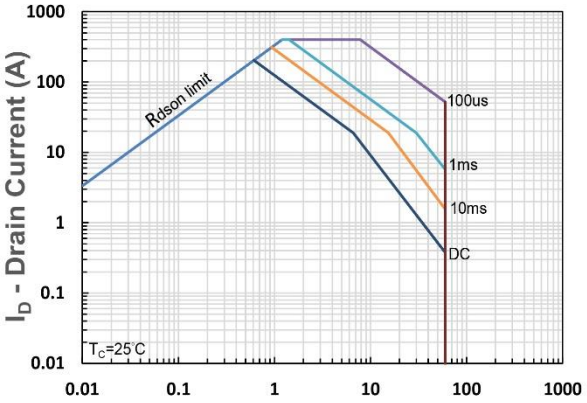
Qg, Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



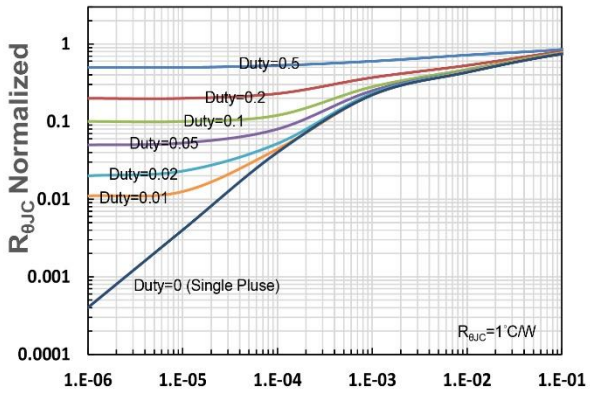
Tc - Case Temperature (˚C)
Figure 9. Power Dissipation



Tc - 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. RθJC Transient Thermal Impedance