



Power MOSFETS

DATASHEET

LM20600NL3A

N-Channel
Enhancement Mode MOSFET

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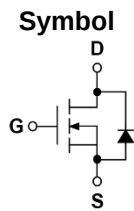
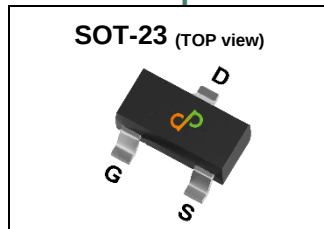


Quality Management Systems

ISO 9001:2015 Certificate

N-Channel Enhancement Mode MOSFET

Pin Description



Product Summary

Symbol	N-Channel	Unit
V_{DSS}	20	V
$R_{DS(ON)-Max}$	60	m Ω
ID	3.2	A

Feature

- Lower Qg and Qgd for high-speed switching
- Reliable and Rugged
- ROHS Compliant & Halogen-Free

Applications

- Portable Equipment
- Load Switch

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM20600NLI3A	SOT-23	Tape & Reel	3000 / Tape & Reel	05□□

Note : □□ = Lot Code

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

Symbol	Parameter		N-Channel	Unit
V _{DSS}	Drain-Source Voltage		20	V
V _{GSS}	Gate-Source Voltage		±12	
T _J	Maximum Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-55 to 150	°C
I _{DM} ^①	Pulse Drain Current Tested	T _A =25°C	8	A
I _D	Continuous Drain Current	T _A =25°C	3.2	A
		T _A =70°C	2.5	
P _D	Maximum Power Dissipation	T _A =25°C	0.9	W
		T _A =70°C	0.6	
I _{AS} ^②	Avalanche Current, Single pulse	L=0.1mH	12	A
E _{AS} ^②	Avalanche Energy, Single pulse	L=0.1mH	7.2	mJ

Thermal Characteristics

Symbol	Parameter		Rating	Unit
$R_{\theta JA}^{\textcircled{3}}$	Thermal Resistance-Junction to Ambient	$t \leq 10\text{sec}$	100	$^{\circ}\text{C/W}$
		Steady State	140	$^{\circ}\text{C/W}$

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 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	20	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =16V, V _{GS} =0V	-	-	1	uA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250uA	0.5	0.7	1	V
I _{GSS}	Gate Leakage Current	V _{GS} =±12V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ④	Drain-Source On-state Resistance	V _{GS} =4.5V, I _{DS} =3A	-	50	60	mΩ
		V _{GS} =2.5V, I _{DS} =2A	-	66	86	
gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =3A	-	7	-	S
Dynamic Characteristics ⑥						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, Freq.=1MHz	-	1.3	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =10V, Freq.=1MHz	-	123	-	pF
C _{oss}	Output Capacitance		-	30	-	
C _{rss}	Reverse Transfer Capacitance		-	26	-	
td(ON)	Turn-on Delay Time	V _{GS} =10V, V _{DS} =10V, I _D =1A, R _{GEN} =6Ω	-	3.2	-	nS
t _r	Turn-on Rise Time		-	2.6	-	
t _{d(OFF)}	Turn-off Delay Time		-	10	-	
t _f	Turn-off Fall Time		-	5	-	
Q _g	Total Gate Charge	V _{GS} =2.5V, V _{DS} =10V I _D =3A	-	1.8	-	nC
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =10V, I _D =3A	-	3.0	-	
Q _{gs}	Gate-Source Charge		-	0.5	-	
Q _{gd}	Gate-Drain Charge		-	0.9	-	
Source-Drain Characteristics						
V _{SD} ④	Diode Forward Voltage	I _{SD} =3A, V _{GS} =0V	-	0.8	1.1	V
t _{rr}	Reverse Recovery Time	I _F =3A, V _R =0V	-	11.6	-	nS
Q _{rr}	Reverse Recovery Charge	dI _F /dt=100A/μs	-	3.6	-	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

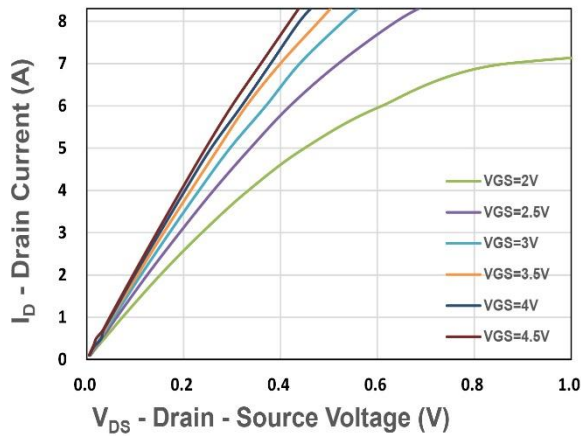


Figure 1. Output Characteristics

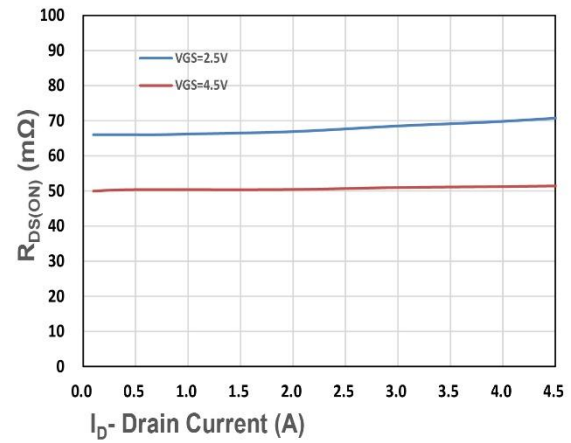


Figure 2. On-Resistance vs. I_D

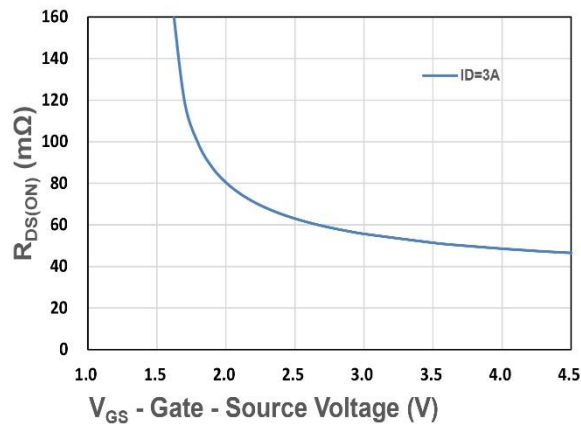


Figure 3. On-Resistance vs. V_{GS}

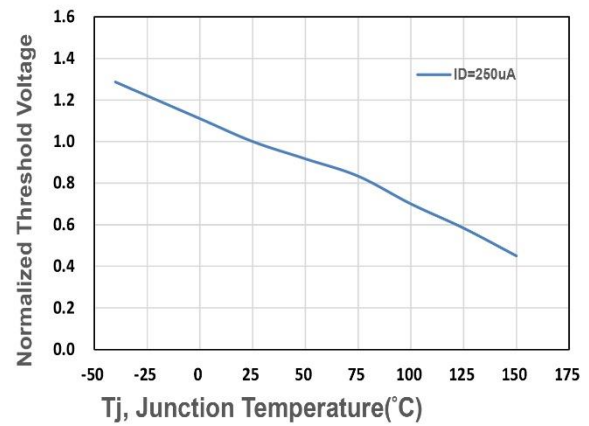


Figure 4. Gate Threshold Voltage

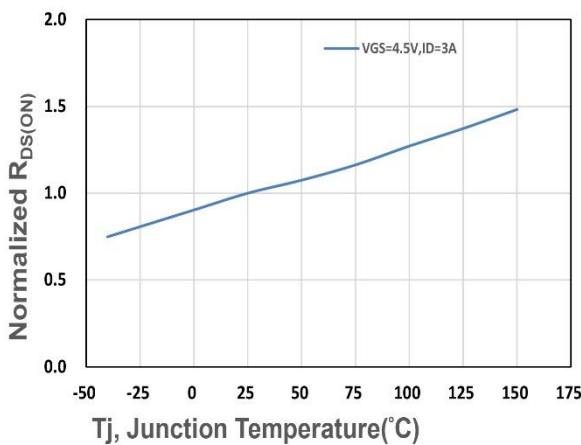


Figure 5. Drain-Source On Resistance

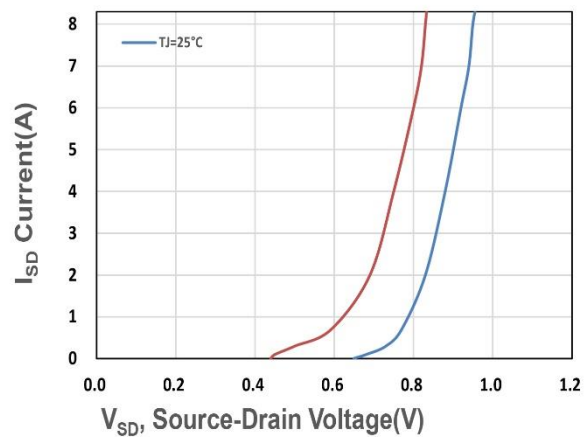


Figure 6. Source-Drain Diode Forward

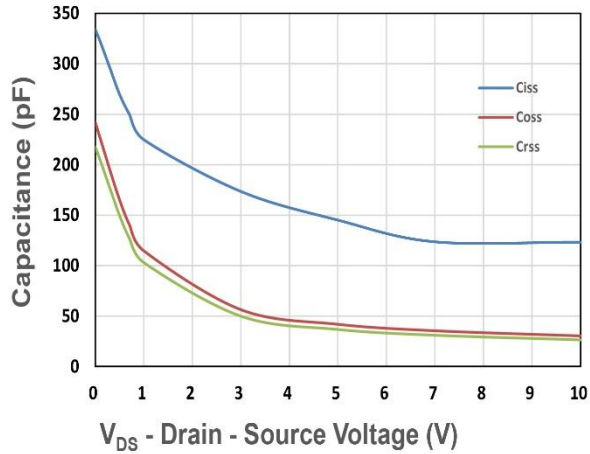


Figure 7. Capacitance

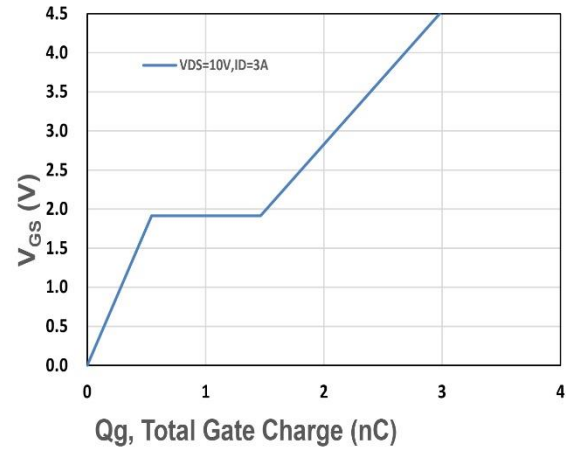


Figure 8. Gate Charge Characteristics

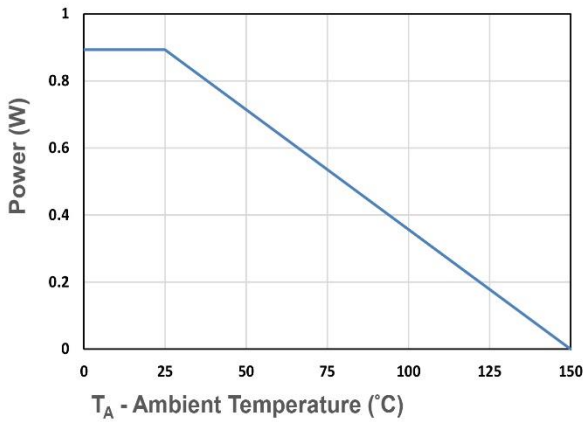


Figure 9. Power Dissipation

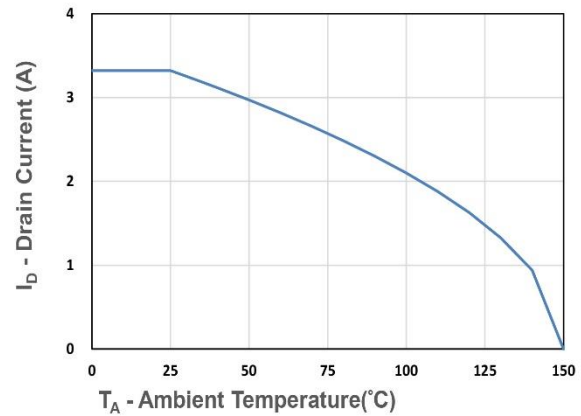


Figure 10. Drain Current

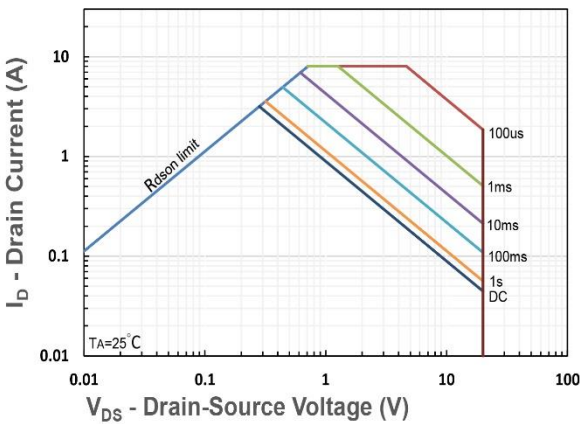


Figure 11. Safe Operating Area

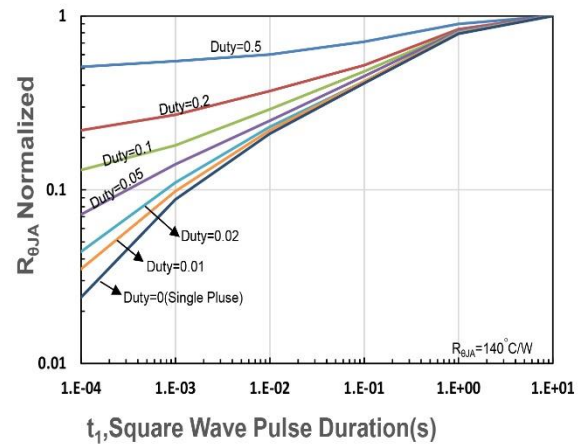


Figure 12. $R_{\theta JA}$ Transient Thermal Impedance