





Power MOSFETS

DATASHEET

LM20080NGN3A

N-Channel
Enhancement Mode MOSFET

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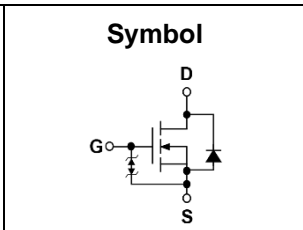
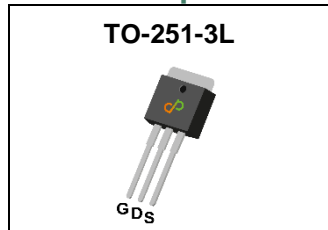


Quality Management Systems

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}	7.2	mΩ
ID	61	A

Feature

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

Applications

- DC/DC Converters in Computing, Servers, and POL
- Battery protection switch

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM20080BNGN3A	TO-251-3L	Tube	75 / Tube	20080 □□□□□□

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	V
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 33	A
I _{DM} ^①	Pulse Drain Current Tested	T _C =25°C 176	A
I _D	Continuous Drain Current	T _C =25°C 61 T _C =100°C 45	A
P _D	Maximum Power Dissipation	T _C =25°C 36 T _C =100°C 14	W
I _D	Continuous Drain Current	T _A =25°C 16.6 T _A =70°C 13.3	A
P _D	Maximum Power Dissipation	T _A =25°C 2.0 T _A =70°C 1.3	W
I _{AS} ^②	Avalanche Current, Single pulse	L=0.1mH 22 L=0.5mH 12	A
E _{AS} ^②	Avalanche Energy, Single pulse	L=0.1mH 24 L=0.5mH 36	mJ

Thermal Characteristics

Symbol	Parameter	Rating	Unit
R _{θJC}	Thermal Resistance-Junction to Case	Steady State 3.5	°C/W
R _{θJA} ^③	Thermal Resistance-Junction to Ambient	Steady State 63	°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

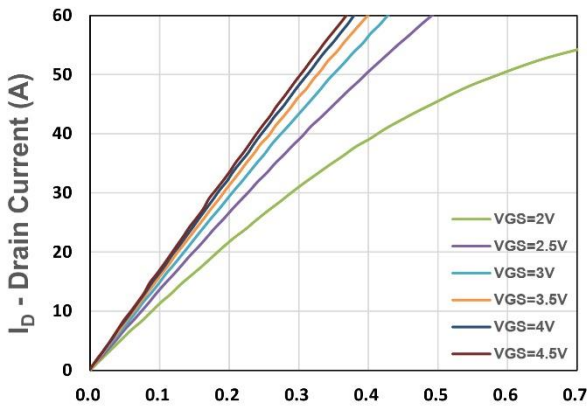
N-Channel Electrical Characteristics (T_J=25°C Unless Otherwise Noted)

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	0.75	1.0	V
I_{GSS}	Gate Leakage Current	V _{GS} =±12V, V _{DS} =0V	-	-	±10	uA
R_{DS(ON)}^④	Drain-Source On-state Resistance	V _{GS} =4.5V, I _{DS} =5.5A	-	6	7.2	mΩ
		V _{GS} =2.5V, I _{DS} =5.5A	-	8	10.5	
g_{fs}	Forward Transconductance	V _{DS} =5V, I _{DS} =5.5A	-	17.6	-	S
Dynamic Characteristics[®]						
R_G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, Freq.=1MHz	-	2.2	-	Ω
C_{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =10V, Freq.=1MHz	-	1436	-	pF
C_{oss}	Output Capacitance					
C_{rss}	Reverse Transfer Capacitance					
t_{d(ON)}	Turn-on Delay Time	V _{GS} =4.5V, V _{DS} =7V, I _D =1A, R _{GEN} =1Ω	-	4.8	-	nS
t_r	Turn-on Rise Time					
t_{d(OFF)}	Turn-off Delay Time					
t_f	Turn-off Fall Time					
Q_g	Total Gate Charge	V _{GS} =2.5V, V _{DS} =10V, I _D =5.5A	-	9.9	-	nC
Q_g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =10V, I _D =5.5A	-	16.9	-	
Q_{gs}	Gate-Source Charge		-	3.26	-	
Q_{gd}	Gate-Drain Charge		-	3.74	-	
Source-Drain Characteristics						
V_{SD}^④	Diode Forward Voltage	I _{SD} =5.5A, V _{GS} =0V	-	0.7	1.1	V
t_{rr}	Reverse Recovery Time	I _F =2.8A, V _R =20V	-	17.6	-	nS
Q_{rr}	Reverse Recovery Charge	dI _F /dt=100A/μs	-	6.4	-	nC

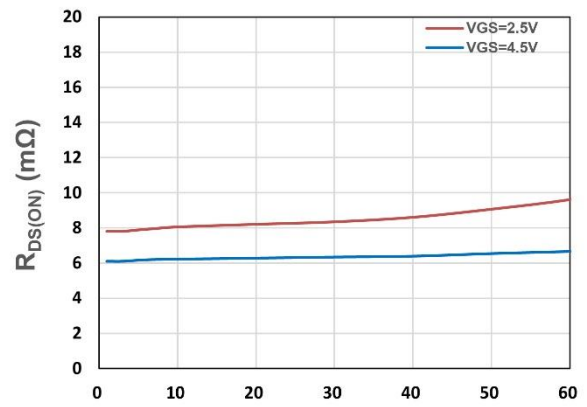
Note ④ : Pulse test (pulse width≤300us, duty cycle≤2%).

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

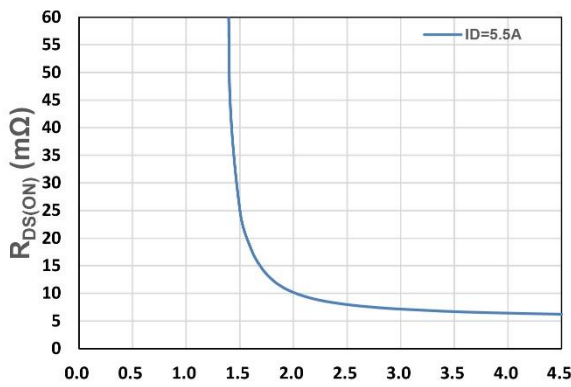
N-Channel Typical Characteristics



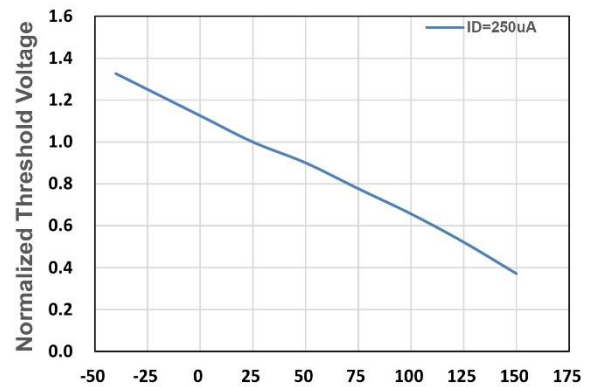
V_{DS} - Drain - Source Voltage (V)
Figure 1. Output Characteristics



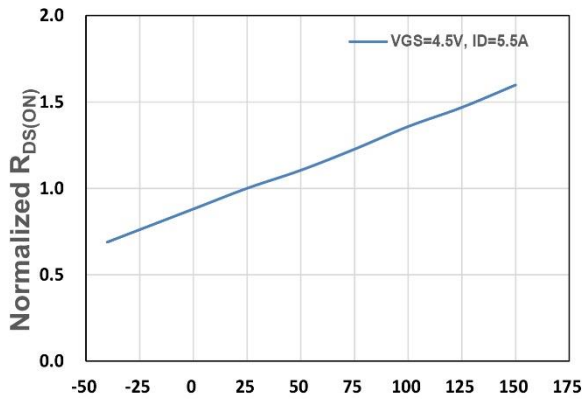
I_D - Drain Current (A)
Figure 2. On-Resistance vs. I_D



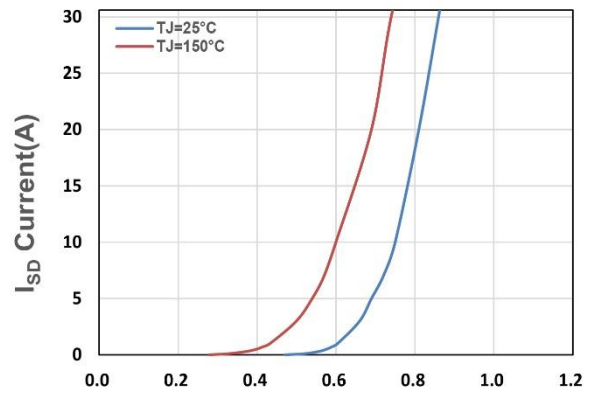
V_{GS} - Gate - Source Voltage (V)
Figure 3. On-Resistance vs. V_{GS}



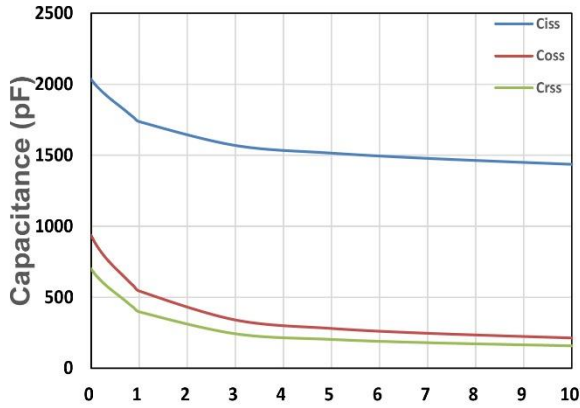
T_j , Junction Temperature($^{\circ}C$)
Figure 4. Gate Threshold Voltage



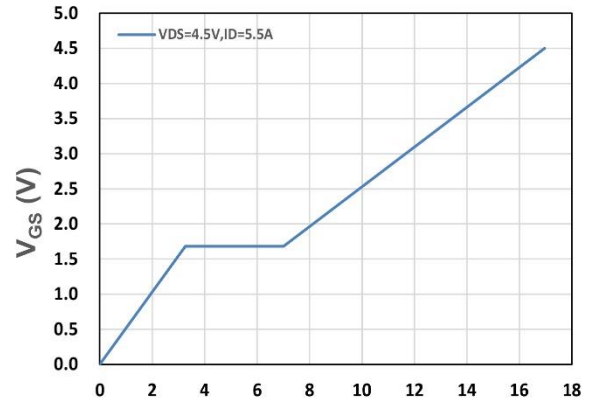
T_j , Junction Temperature($^{\circ}C$)
Figure 5. Drain-Source On Resistance



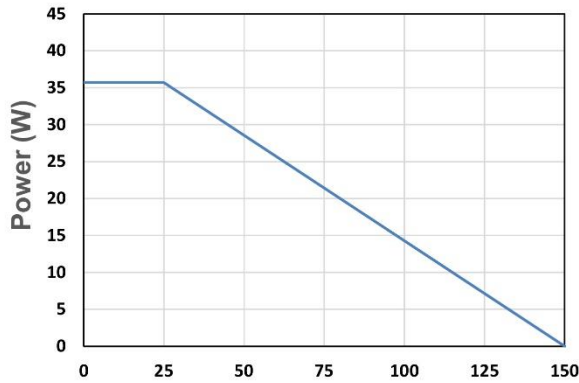
V_{SD} , Source-Drain Voltage(V)
Figure 6. Source-Drain Diode Forward



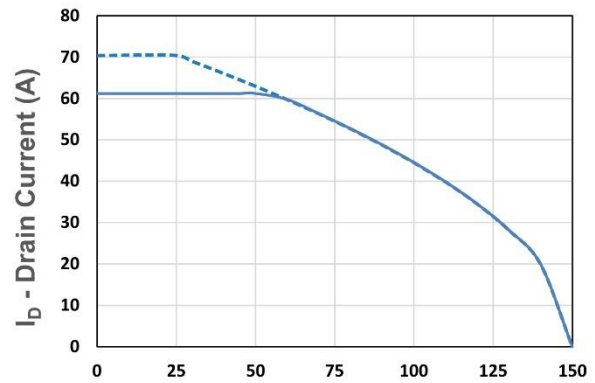
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



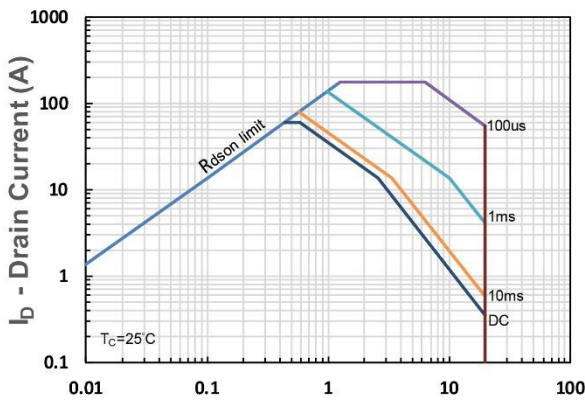
Q_g , Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



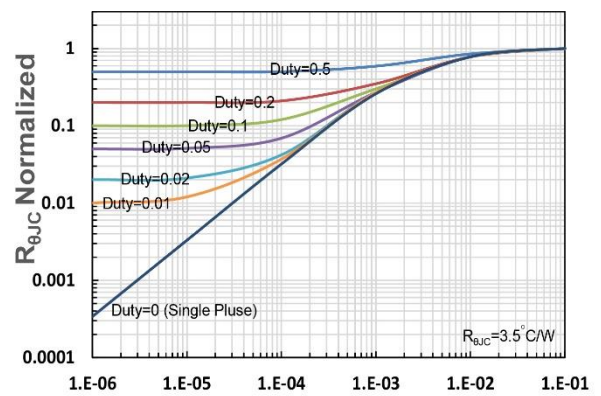
T_c - Case Temperature ($^{\circ}C$)
Figure 9. Power Dissipation



T_c - Case Temperature ($^{\circ}C$)
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