





Power MOSFETS

DATASHEET

LM1A160NAQ8A

N-Channel
Enhancement Mode MOSFET

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Quality Management Systems

ISO 9001:2015 Certificate

N-Channel Enhancement Mode MOSFET

Pin Description

		Symbol N-Channel Unit
		V_{DSS} 100 V
		$R_{DS(ON)-Max}$ 15.6 mΩ
		I_D 7.5 A

Ordering Information

Feature

- Optimized high performance of R_{dson} and Q_g
- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- 100% UIS Tested

Applications

- Motor drivers
- DC DC converter

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM1A160NAQ8A	SOP-8L	Tape & Reel	3000 / Tape & Reel	1A160 □□□□□□

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

Symbol	Parameter	N-Channel	Unit
V_{DSS}	Drain-Source Voltage	100	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	$T_A=25^{\circ}C$ 18.6	A
I_D	Continuous Drain Current	$T_A=25^{\circ}C$ 7.5	A
		$T_A=70^{\circ}C$ 6	
P_D	Maximum Power Dissipation	$T_A=25^{\circ}C$ 1.6	W
		$T_A=70^{\circ}C$ 1.0	
$I_{AS}^{②}$	Avalanche Current, Single pulse	L=0.1mH 9	A
		L=0.5mH 5	
$E_{AS}^{②}$	Avalanche Energy, Single pulse	L=0.1mH 4	mJ
		L=0.5mH 6.25	

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	Steady State 78	°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°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	100	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V _{DS} =80V, 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} =8A	-	13	15.6	mΩ
		V _{GS} =4.5V, I _{DS} =6A	-	20	26	
gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =8A	-	15.5	-	S
Dynamic Characteristics[®]						
R_G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, Freq.=1MHz	-	3	-	Ω
C_{ISS}	Input Capacitance	V _{GS} =0V, V _{DS} =50V, Freq.=1MHz	-	1058	-	pF
C_{OSS}	Output Capacitance					
C_{rss}	Reverse Transfer Capacitance					
td(ON)	Turn-on Delay Time	V _{GS} =10V, V _{DS} =50V, I _D =1A, R _{GEN} =3Ω	-	6	-	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} =4.5V, V _{DS} =50V, I _D =12A	-	12.8	-	nC
Q_g	Total Gate Charge	V _{GS} =10V, V _{DS} =50V, I _D =12A	-	22.5	-	
Q_{gs}	Gate-Source Charge		-	3.2	-	
Q_{gd}	Gate-Drain Charge		-	7.7	-	
Source-Drain Characteristics						
V_{SD}^④	Diode Forward Voltage	I _{SD} =8A, V _{GS} =0V	-	0.8	1.1	V
t_{rr}	Reverse Recovery Time	I _F =20A, V _R =50V	-	40	-	nS
Q_{rr}	Reverse Recovery Charge	dI _F /dt=100A/μs	-	58.7	-	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

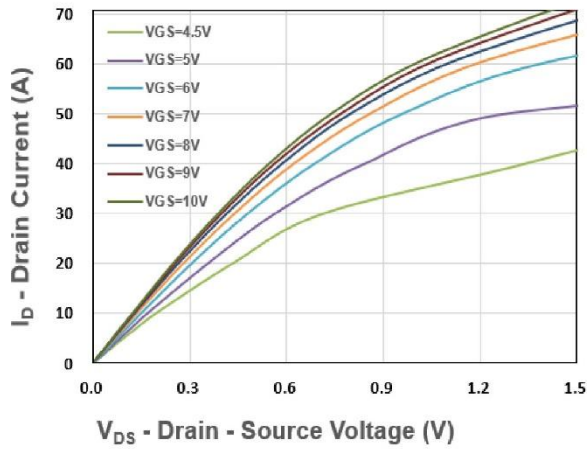


Figure 1. Output Characteristics

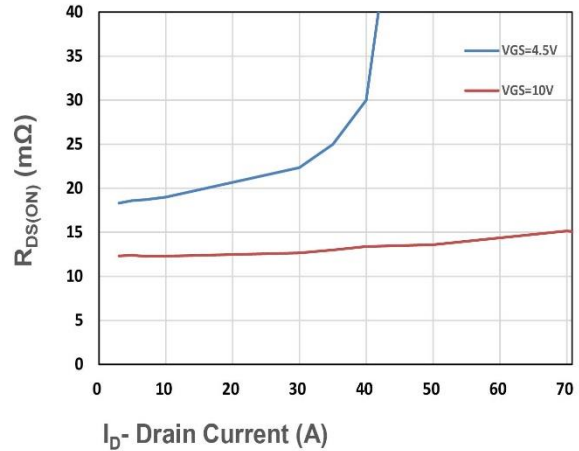


Figure 2. On-Resistance vs. I_D

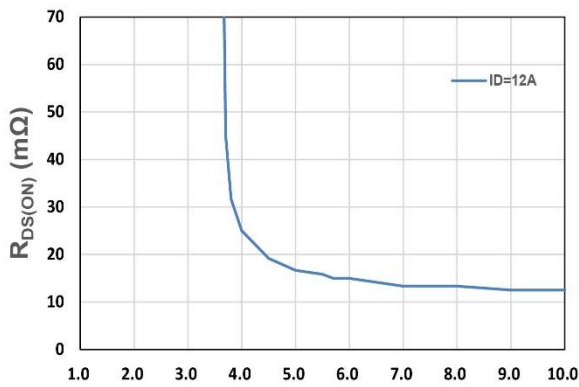


Figure 3. On-Resistance vs. V_{GS}

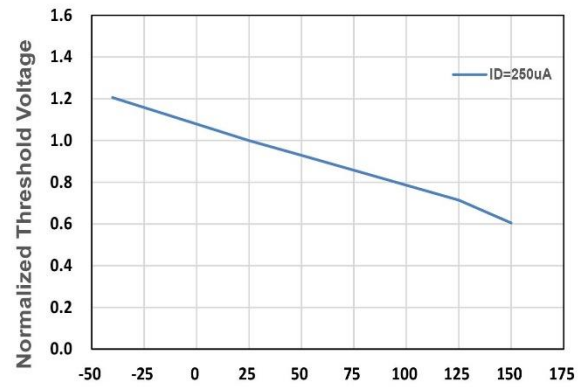


Figure 4. Gate Threshold Voltage

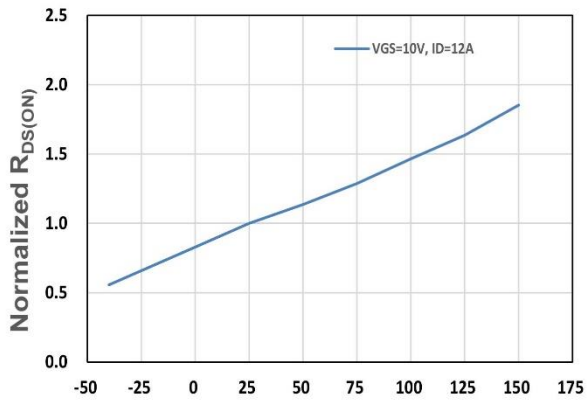


Figure 5. Drain-Source On Resistance

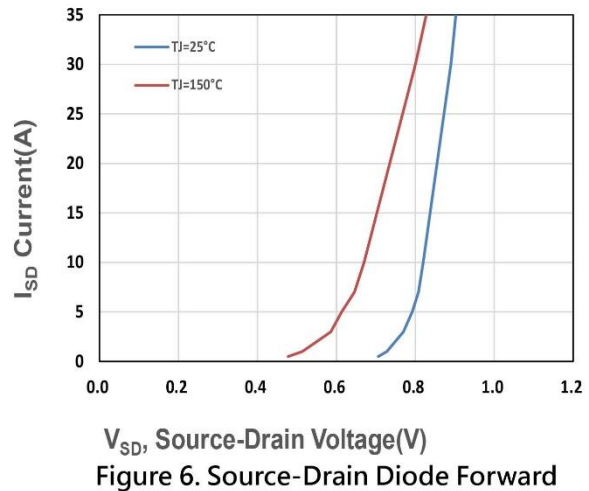
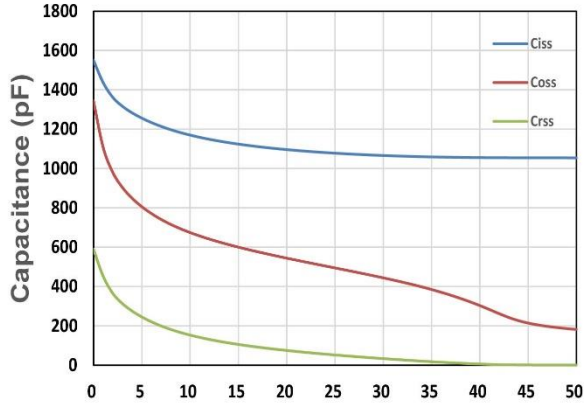
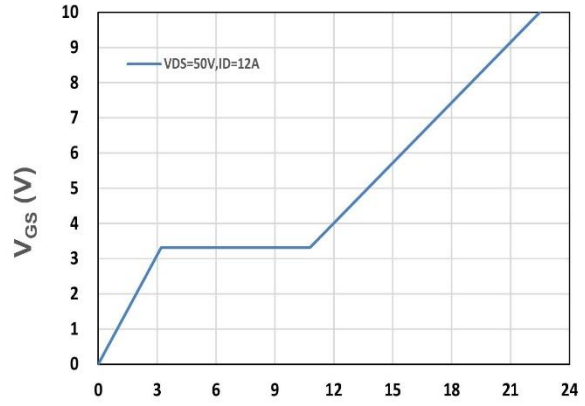


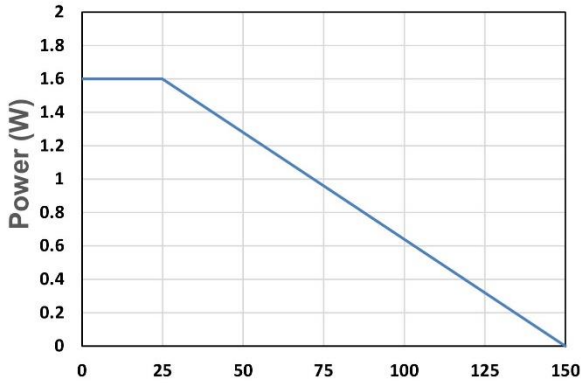
Figure 6. Source-Drain Diode Forward



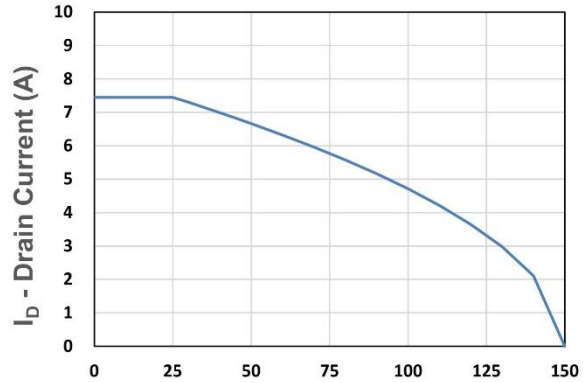
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



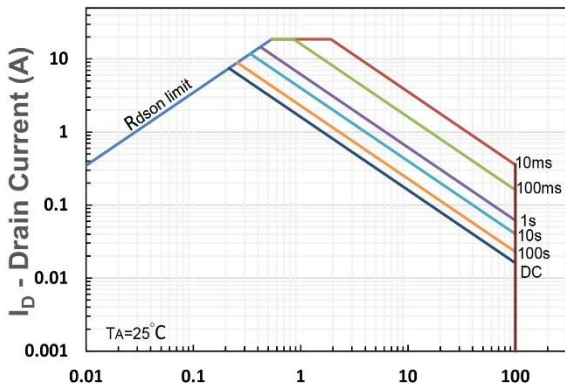
Q_g , Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



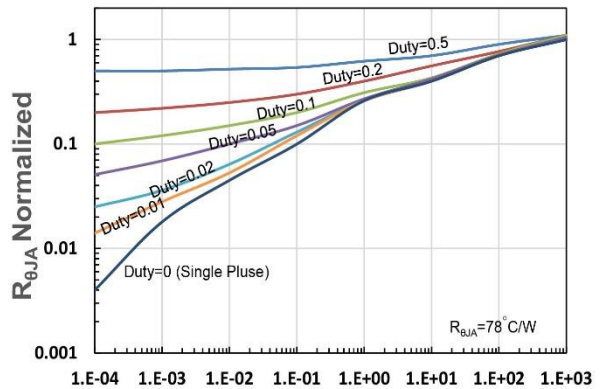
T_j - Ambient Temperature (°C)
Figure 9. Power Dissipation



T_j - Ambient 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. $R_{\theta JA}$ Transient Thermal Impedance