





Power MOSFETS


DATASHEET


LM1A092NAO2A

N-Channel
Enhancement Mode MOSFET

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Quality Management Systems

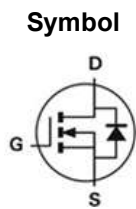
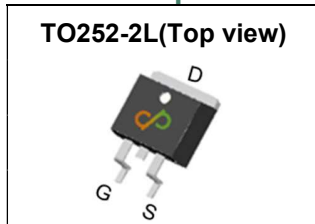
ISO 9001:2015 Certificate

LM1A092NAO2A



N-Channel Enhancement Mode MOSFET

Pin Description



Product Summary

Symbol	N-Channel	Unit
V_{DSS}	100	V
$R_{DS(ON)-Max}$	9.7	m Ω
I_D	78	A

Feature

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

Applications

- Power Management in DC/DC Converters
- USB Power Delivery (USB PD)

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM1A092NAO2A	TO252-2L	Tape & Reel	3000 / Tape & Reel	1A092 □□□□□□

Note : □□□□□□ = Lot Code

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	V
T_J	Maximum Junction Temperature	150	°C
T_{STG}	Storage Temperature Range	-55 to 150	°C
I_S	Diode Continuous Forward Current	$T_C=25^\circ C$	54
$I_{DM}^{(1)}$	Pulse Drain Current Tested	$T_C=25^\circ C$	313
I_D	Continuous Drain Current	$T_C=25^\circ C$	78
		$T_C=100^\circ C$	50
P_D	Maximum Power Dissipation	$T_C=25^\circ C$	60
		$T_C=100^\circ C$	24
I_D	Continuous Drain Current	$T_A=25^\circ C$	14.6
		$T_A=70^\circ C$	11.7
P_D	Maximum Power Dissipation	$T_A=25^\circ C$	2.1
		$T_A=70^\circ C$	1.3
$I_{AS}^{(2)}$	Avalanche Current, Single pulse	L=0.1mH	27
		L=0.5mH	16
$E_{AS}^{(2)}$	Avalanche Energy, Single pulse	L=0.1mH	36
		L=0.5mH	64

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	2.1
$R_{\theta JA}^{(3)}$	Thermal Resistance-Junction to Ambient	Steady State	60

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

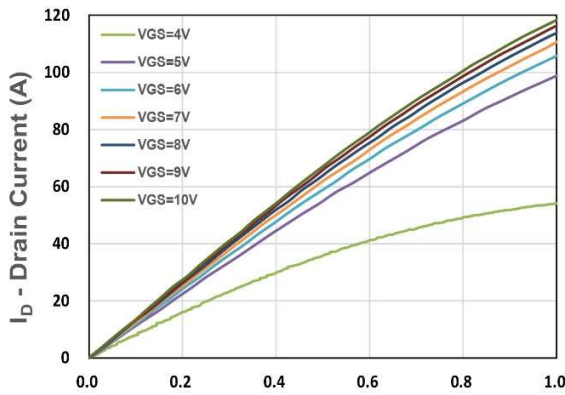
N-Channel Electrical Characteristics (T_J=25°C Unless Otherwise Noted)

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} =20A	-	8.1	9.7	mΩ
		V _{GS} =4.5V, I _{DS} =20A	-	11	14	
gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =10A	-	23	-	S
Dynamic Characteristics ^⑤						
R_G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, Freq.=1MHz	-	1	-	Ω
C_{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =50V, Freq.=1MHz	-	1916	-	pF
C_{oss}	Output Capacitance		-	504	-	
C_{rss}	Reverse Transfer Capacitance		-	35	-	
td(ON)	Turn-on Delay Time	V _{GS} =10V, V _{DS} =50V, I _D =1A, R _{GEN} =6Ω	-	9.1	-	nS
t_r	Turn-on Rise Time		-	17.5	-	
t_{d(OFF)}	Turn-off Delay Time		-	32.2	-	
t_f	Turn-off Fall Time		-	72	-	
Q_g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =50V I _D =20A	-	22	-	nC
Q_g	Total Gate Charge	V _{GS} =10V, V _{DS} =50V, I _D =20A	-	41	-	
Q_{gs}	Gate-Source Charge		-	9	-	
Q_{gd}	Gate-Drain Charge		-	10.5	-	
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 =50V	-	37.2	-	nS
Q_{rr}	Reverse Recovery Charge	dI _F /dt=100A/μs	-	35	-	nC

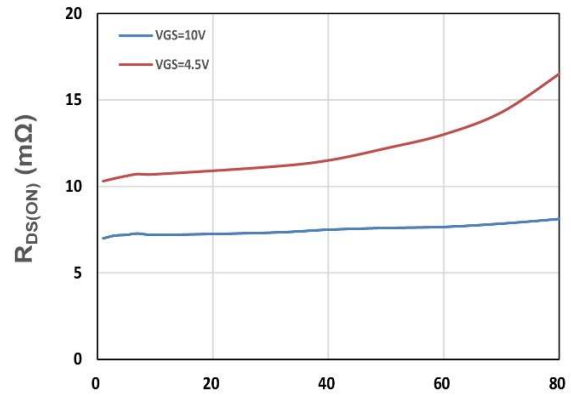
Note ④ : Pulse test (pulse width≤300us, duty cycle≤2%).

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

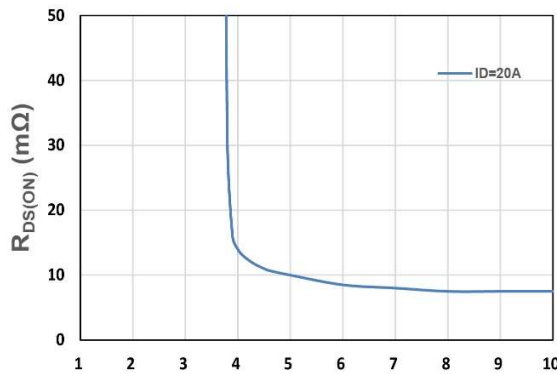
N-Channel Typical Characteristics



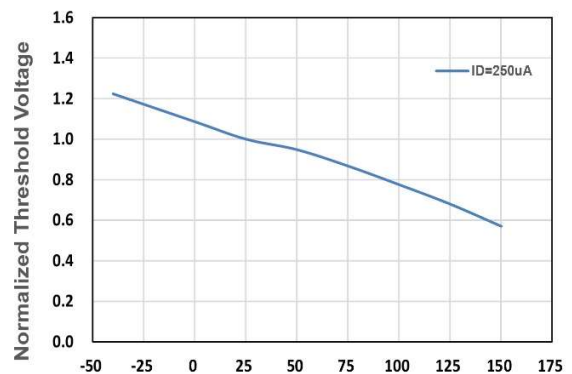
V_{DS} - Drain - Source Voltage (V)
Figure 1. Output Characteristics



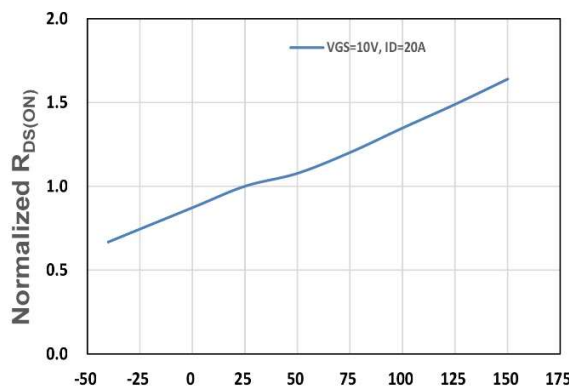
I_D - Drain Current (A)
Figure 2. On-Resistance vs. ID



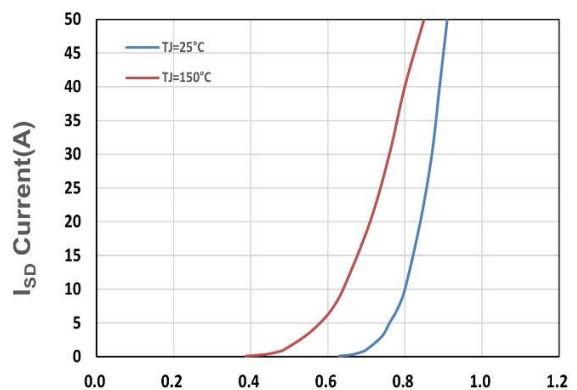
V_{GS} - Gate - Source Voltage (V)
Figure 3. On-Resistance vs. VGS



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

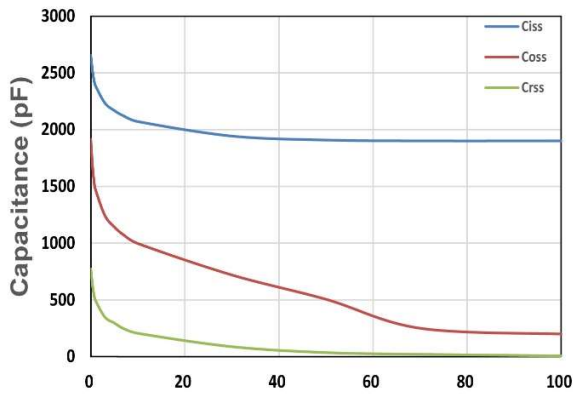


T_j , Junction Temperature($^{\circ}C$)
Figure 5. Drain-Source On Resistance

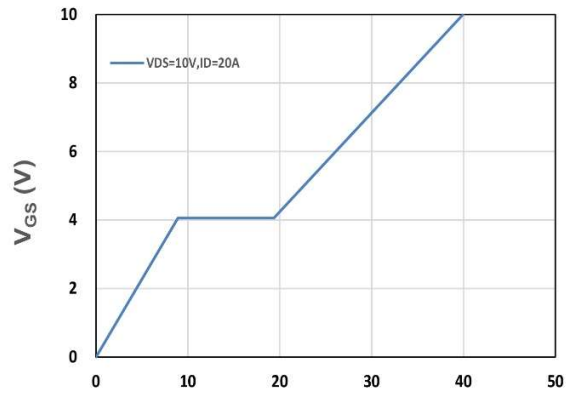


V_{SD} , Source-Drain Voltage(V)
Figure 6. Source-Drain Diode Forward

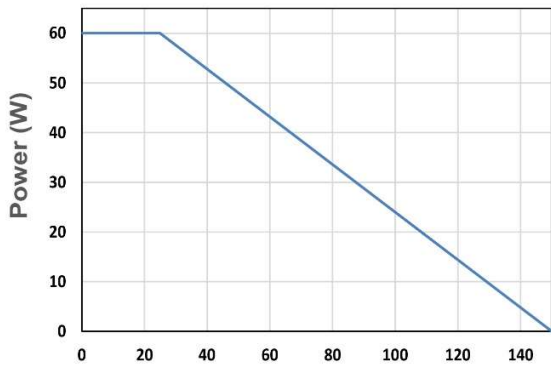
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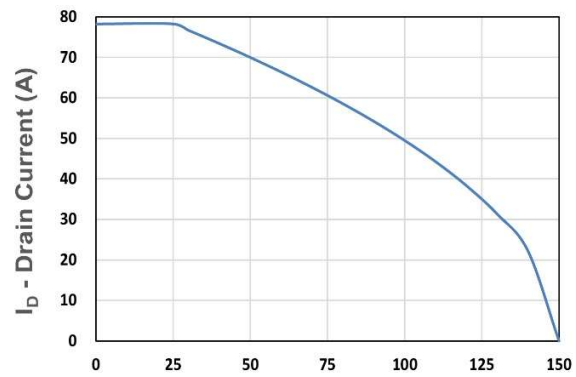
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



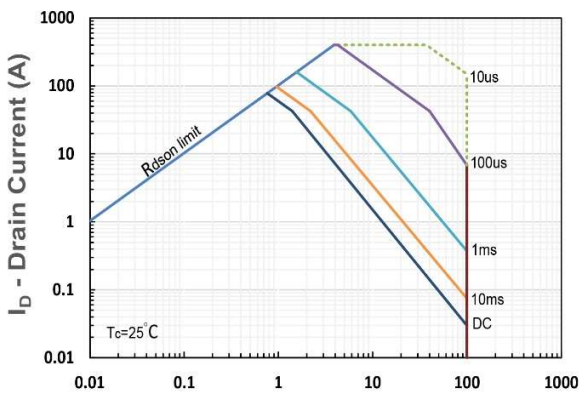
Q_g , Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



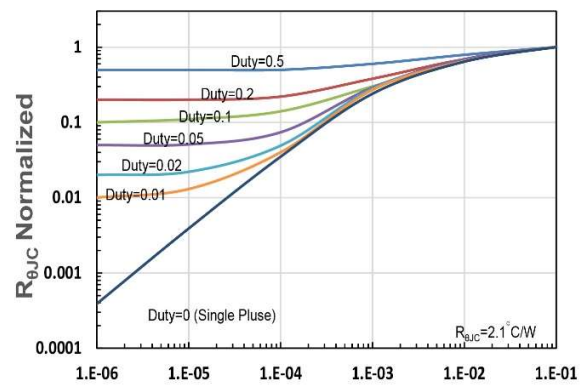
T_c - Junction Temperature (°C)
Figure 9. Power Dissipation



T_c - Junction 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. $R_{\theta JC}$ Transient Thermal Impedance