



Power MOSFETS

DATASHEET

LM30054NAO2A

N-Channel
Enhancement Mode MOSFET

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Quality Management Systems

ISO 9001:2015 Certificate


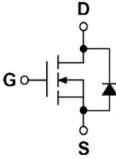
LM30054NAO2A



N-Channel Enhancement Mode MOSFET

Pin Description

Product Summary

TO-252-2L(TOP view) 	Symbol 	Symbol	N-Channel	Unit
		V_{DSS}	30	V
		$R_{DS(ON)-Max}$	5.4	m Ω
		I_D	82	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
LM30054NAO2A	TO-252-2L	Tape & Reel	3000 / Tape & Reel	30054 □□□□□□

Note : □□□□□□ = Lot Code

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

Symbol	Parameter	N-Channel	Unit	
V_{DSS}	Drain-Source Voltage	30	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	$T_C=25^\circ C$	46	A
$I_{DM}^{①}$	Pulse Drain Current Tested	$T_C=25^\circ C$	102	A
I_D	Continuous Drain Current	$T_C=25^\circ C$	82	A
		$T_C=100^\circ C$	52	
P_D	Maximum Power Dissipation	$T_C=25^\circ C$	50	W
		$T_C=100^\circ C$	20	
I_D	Continuous Drain Current	$T_A=25^\circ C$	16.6	A
		$T_A=70^\circ C$	13.3	
P_D	Maximum Power Dissipation	$T_A=25^\circ C$	2.1	W
		$T_A=70^\circ C$	1.3	
$I_{AS}^{②}$	Avalanche Current, Single pulse	L=0.1mH	30	A
$E_{AS}^{②}$	Avalanche Energy, Single pulse	L=0.1mH	45	mJ

Thermal Characteristics

Symbol	Parameter	Rating	Unit	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	2.5	°C/W
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	Steady State	60	°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	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V _{DS} =24V, V _{GS} =0V	-	-	1	uA
V_{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250uA	1.1	1.6	2.2	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} =25A	-	4.5	5.4	mΩ
		V _{GS} =4.5V, I _{DS} =15A	-	5.6	7.3	
gfs	Forward Transconductance	V _{DS} =10V, I _{DS} =10A	-	14	-	S
Dynamic Characteristics ^⑤						
R_G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, Freq.=1MHz	-	2	-	Ω
C_{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, Freq.=1MHz	-	1842	-	pF
C_{oss}	Output Capacitance		-	258	-	
C_{rss}	Reverse Transfer Capacitance		-	211	-	
td(ON)	Turn-on Delay Time	V _{GS} =10V, V _{DS} =15V, I _D =1A, R _{GEN} =6Ω	-	10.4	-	nS
t_r	Turn-on Rise Time		-	23.5	-	
t_{d(OFF)}	Turn-off Delay Time		-	63	-	
t_f	Turn-off Fall Time		-	23.2	-	
Q_g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =25V, I _D =25A	-	25	-	nC
Q_g	Total Gate Charge	V _{GS} =10V, V _{DS} =25V, I _D =25A	-	48	-	
Q_{gs}	Gate-Source Charge		-	4.7	-	
Q_{gd}	Gate-Drain Charge		-	14	-	
Source-Drain Characteristics						
V_{SD} ^④	Diode Forward Voltage	I _{SD} =20A, V _{GS} =0V	-	0.8	1.1	V
t_{rr}	Reverse Recovery Time	I _F =20A, V _R =0V	-	15	-	nS
Q_{rr}	Reverse Recovery Charge	dI _F /dt=100A/μs	-	8.2	-	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

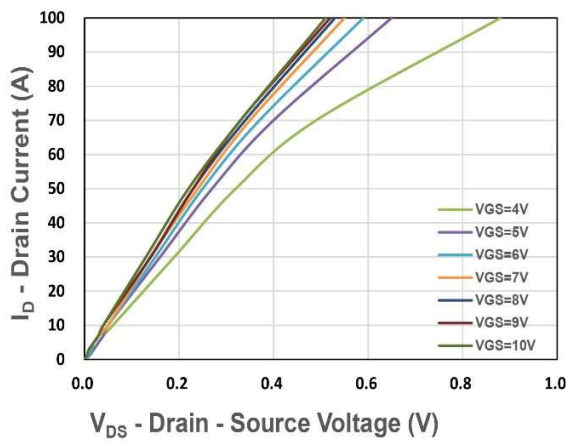


Figure 1. Output Characteristics

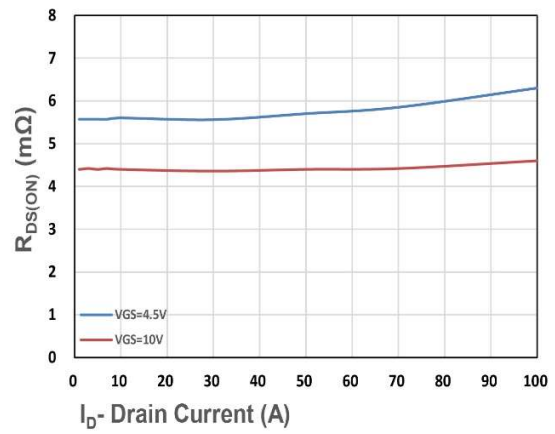


Figure 2. On-Resistance vs. I_D

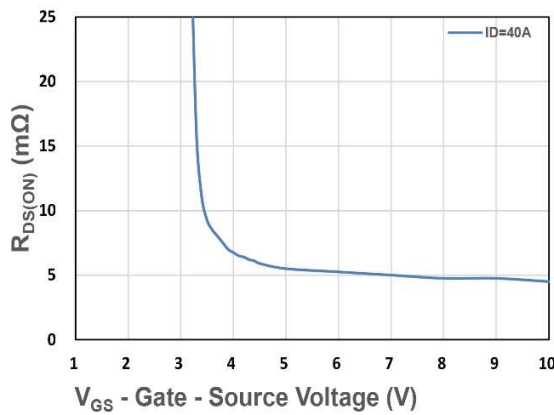


Figure 3. On-Resistance vs. V_{GS}

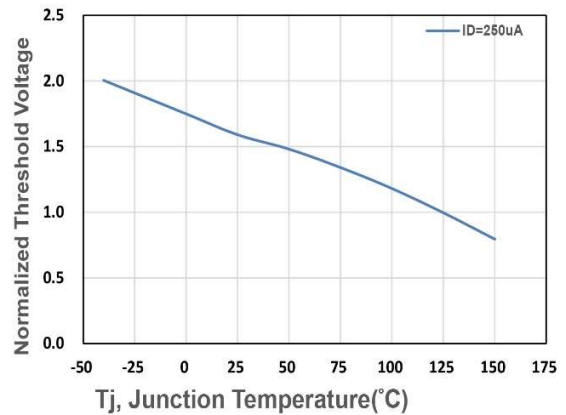


Figure 4. Gate Threshold Voltage

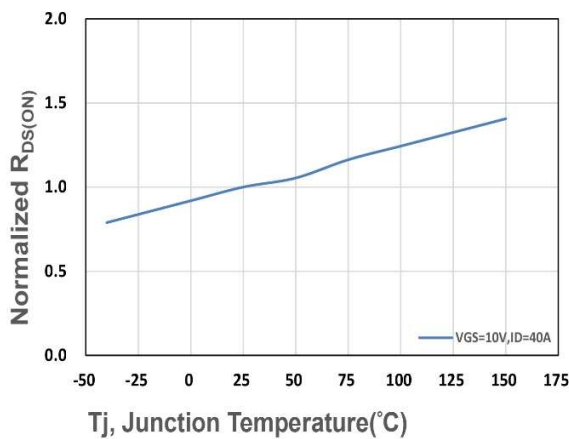


Figure 5. Drain-Source On Resistance

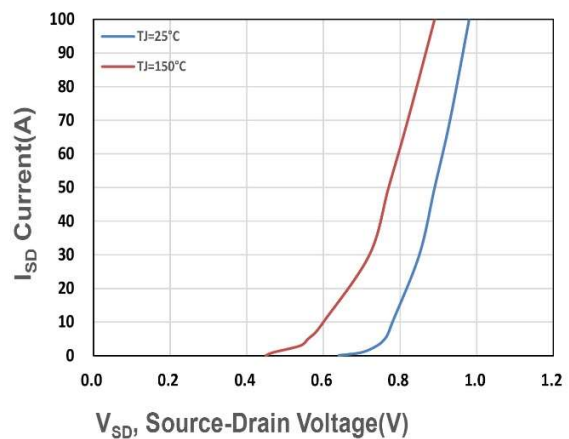
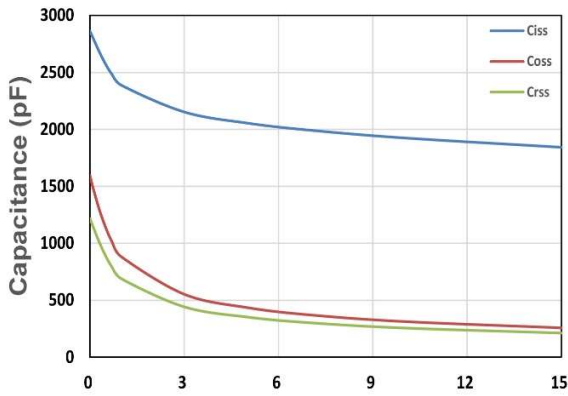
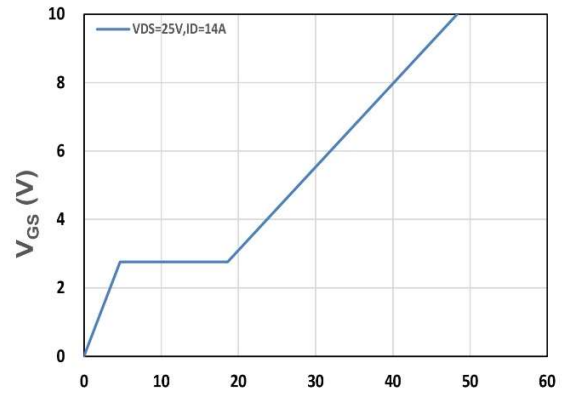


Figure 6. Source-Drain Diode Forward



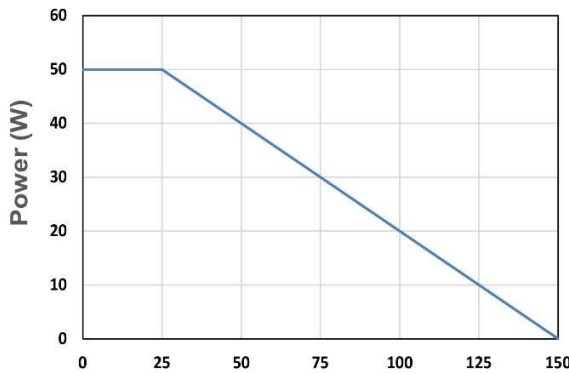
V_{DS} - Drain - Source Voltage (V)

Figure 7. Capacitance



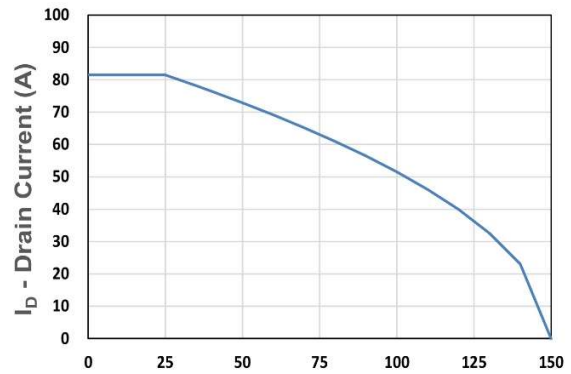
Q_g , Total Gate Charge (nC)

Figure 8. Gate Charge Characteristics



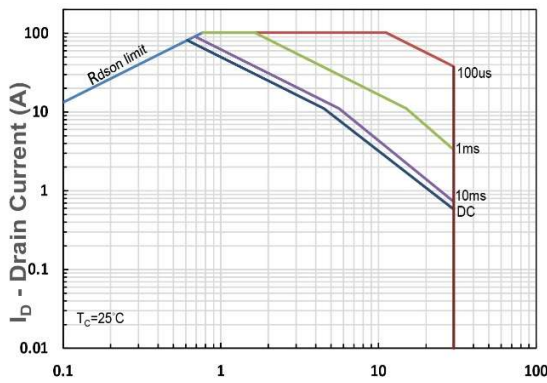
T_c - Case Temperature (°C)

Figure 9. Power Dissipation



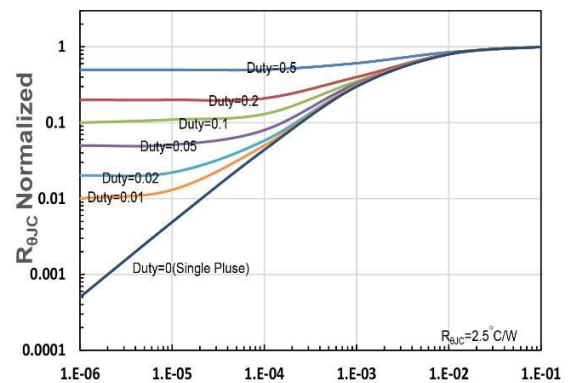
T_c - Case Temperature (°C)

Figure 10. Drain Current



V_{DS} - Drain-Source Voltage (V)

Figure 11. Safe Operating Area



t_1 , Square Wave Pulse Duration (s)

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