



Power MOSFETS

PRELIMINARY DATASHEET

LM30420NAI3A

N-Channel
Enhancement Mode MOSFET



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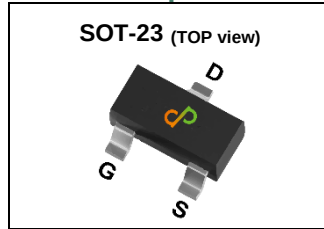


Quality Management Systems

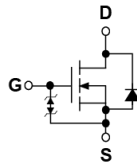
ISO 9001:2015 Certificate

N-Channel Enhancement Mode MOSFET

Pin Description



Symbol



Product Summary

Symbol	N-Channel	Unit
V_{DSS}	30	V
$R_{DS(ON)-Max}$	42	m Ω
I_D	3.3	A

Feature

- Low Gate Charge
- Pb-free lead plating and halogen-free

Applications

- Fast Switching Characteristic

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM30420NAI3A	SOT-23	Tape & Reel	3000 / Tape & Reel	30420 □□□□□□

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	$T_A=25^\circ\text{C}$	0.6	A
$I_{DM}^{①}$	Pulse Drain Current Tested	$T_A=25^\circ\text{C}$	13.2	A
$I_D^{②}$	Continuous Drain Current	$T_A=25^\circ\text{C}$	3.3	A
		$T_A=70^\circ\text{C}$	2.6	

Thermal Characteristics

Symbol	Parameter		Rating	Unit
$R\theta_{JA}^{②}$	Thermal Resistance-Junction to Ambient	Steady State	158	°C/W

Note ① : Max. current is limited by junction temperature.

Note ② : Surface Mounted on 1in² FR-4 board with 2oz.

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	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	-	2.5	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 _D =3A	-	31	42	mΩ
		V _{GS} =4.5V, I _D =2A		47	66	
gfs	Forward Transconductance	V _{DS} =10V, I _D =3A	-	3	-	S
Dynamic Characteristics ^⑤						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, Freq.=1MHz	-	1.5	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, Freq.=1MHz	-	260	-	pF
C _{oss}	Output Capacitance		-	42	-	
C _{rss}	Reverse Transfer Capacitance		-	40	-	
td(ON)	Turn-on Delay Time	V _{GS} =10V, V _{DS} =15V, I _D =1A, R _{GS} =6Ω	-	4.3	-	nS
tr	Turn-on Rise Time		-	17	-	
td(OFF)	Turn-off Delay Time		-	19	-	
tf	Turn-off Fall Time		-	5.8	-	
Qg	Total Gate Charge	V _{GS} =4.5V, V _{DS} =15V I _D =3A	-	3.7	-	nC
Qg	Total Gate Charge	V _{GS} =10V, V _{DS} =15V, I _D =3A	-	7.3	-	
Qgs	Gate-Source Charge		-	1.2	-	
Qgd	Gate-Drain Charge		-	1.8	-	
Source-Drain Characteristics						
VSD ^④	Diode Forward Voltage	IS=3A, VGS=0V	-	0.86	1.2	V
trr	Reverse Recovery Time	IF=3A,	-	5	-	nS
Qrr	Reverse Recovery Charge	dIF/dt=100A/μs	-	2.5	-	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

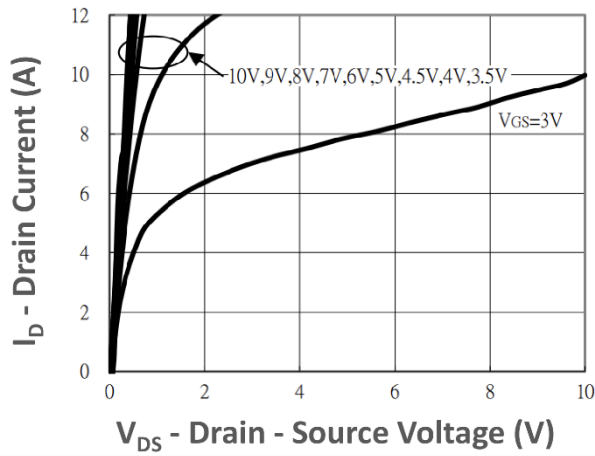


Figure 1. Output Characteristics

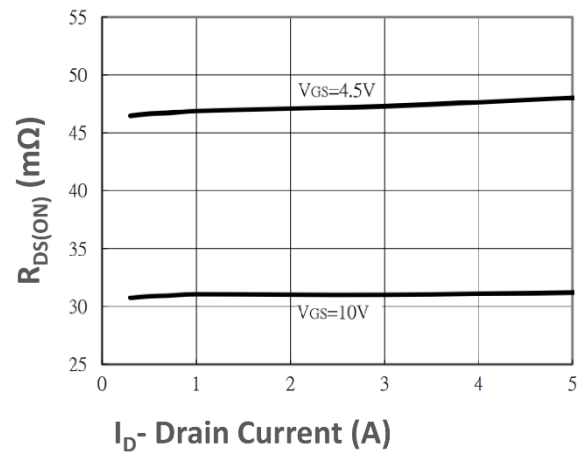


Figure 2. On-Resistance vs. I_D

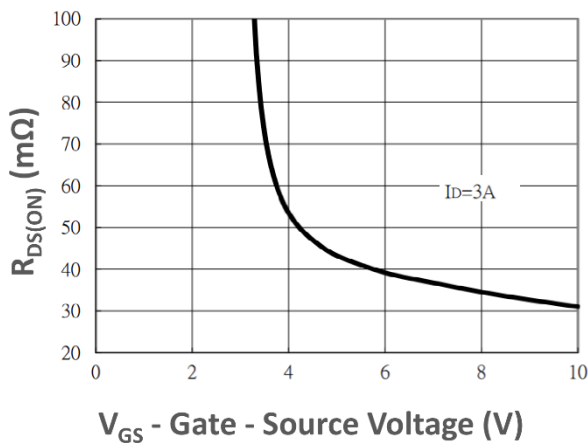


Figure 3. On-Resistance vs. V_{GS}

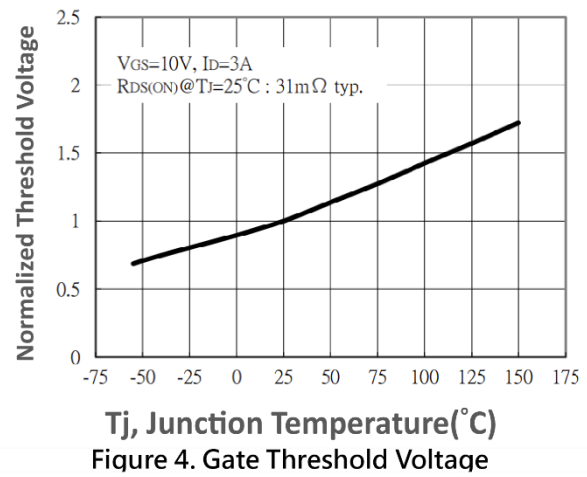


Figure 4. Gate Threshold Voltage

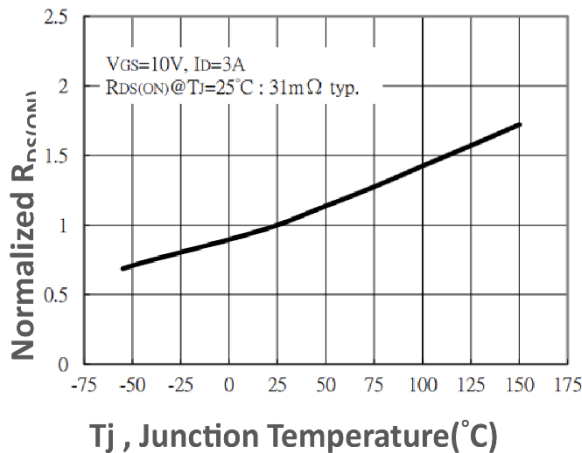


Figure 5. Drain-Source On Resistance

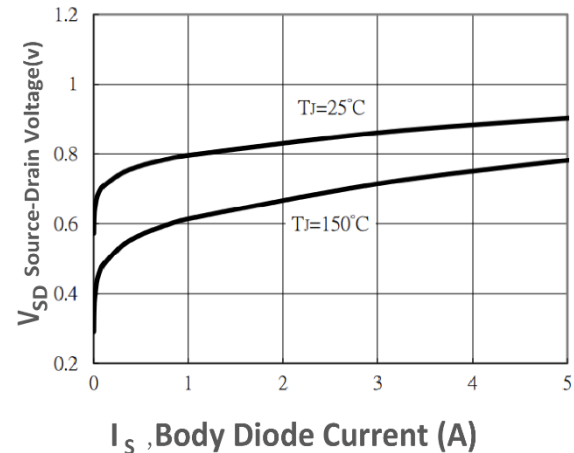
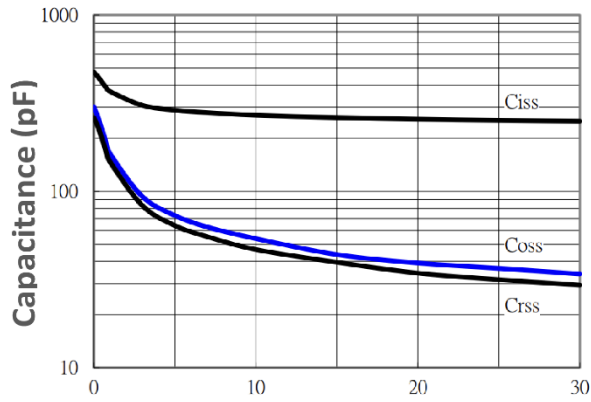
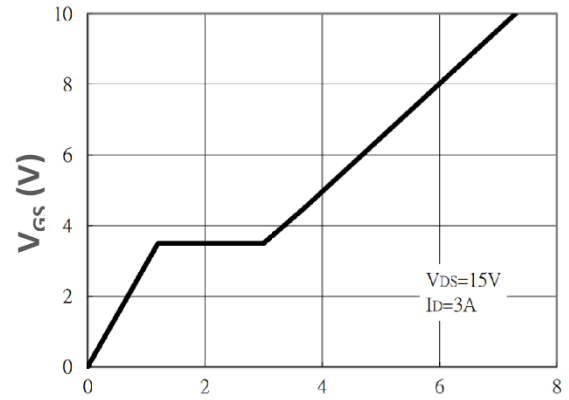


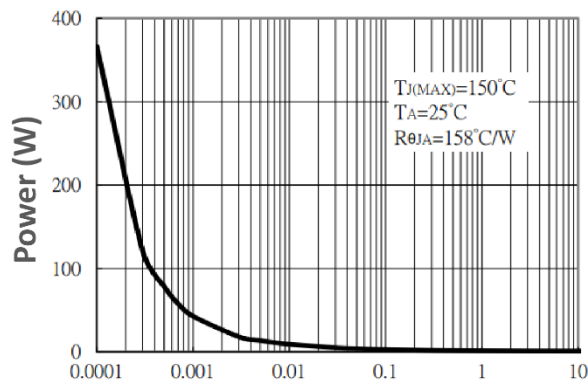
Figure 6. Source-Drain Diode Forward



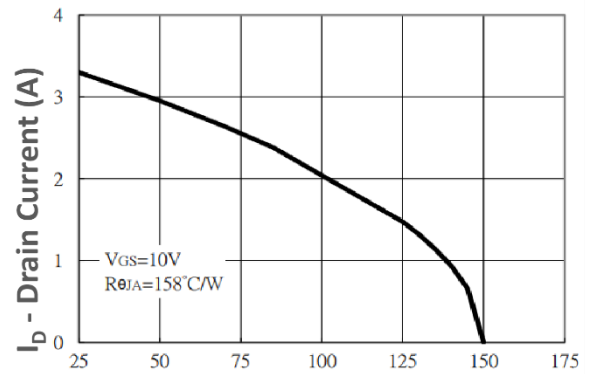
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



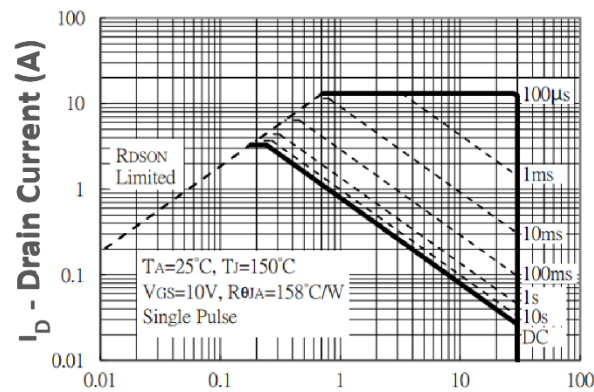
Q_g , Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



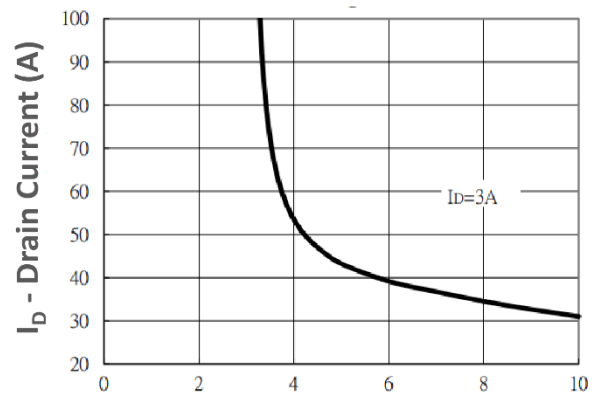
Single Pulse Power Rating, Junction to Ambient
Figure 9. Power Width(s)



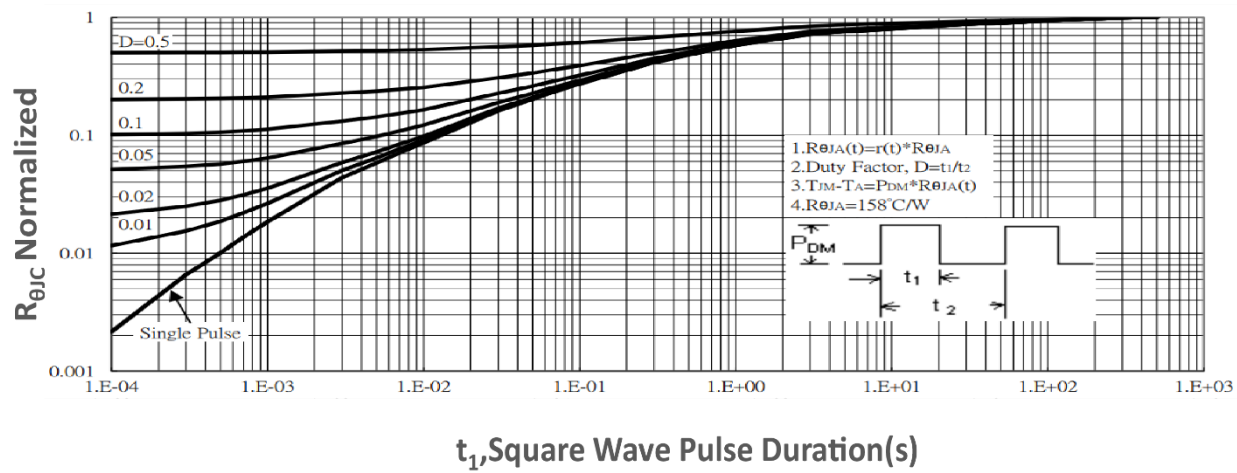
T_c - Case Temperature ($^{\circ}\text{C}$)
Figure 10. Drain Current



V_{DS} - Drain-Source Voltage (V)
Figure 11. Safe Operating Area



V_{GS} - Gate - Source Voltage (V)
Figure 12. Transfer Characteristics

Figure 13. $R_{\theta JC}$ Transient Thermal Impedance