



Power MOSFETS

DATASHEET

LM1A055NAP3A

N-Channel
Enhancement Mode MOSFET

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Quality Management Systems

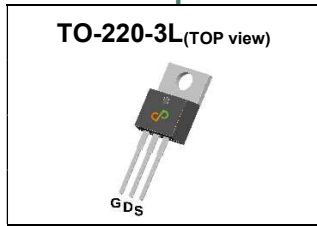
ISO 9001:2015 Certificate

LM1A055NAP3A

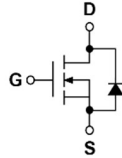


N-Channel Enhancement Mode MOSFET

Pin Description



Symbol



Product Summary

Symbol	N-Channel	Unit
V_{DSS}	100	V
$R_{DS(ON)-Max}$	6	mΩ
I_D	122	A

Feature

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

Applications

- Secondary Side Synchronous Rectification
- DC-DC Converter
- Motor Control

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM1A055NAP3A	TO-220-3L	Tube	50 / Tube	1A055 □□□□□□

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
$I_{DM}^{①}$	Pulse Drain Current Tested	T _C =25°C 360	A
I_D	Continuous Drain Current	T _C =25°C 122 ^①	A
		T _C =100°C 91	
P_D	Maximum Power Dissipation	T _C =25°C 125	W
		T _C =100°C 50	
I_D	Continuous Drain Current	T _A =25°C 18.3	A
		T _A =70°C 14.6	
P_D	Maximum Power Dissipation	T _A =25°C 2.0	W
		T _A =70°C 1.3	
$I_{AS}^{②}$	Avalanche Current, Single pulse	L=0.1mH 38	A
		L=0.5mH 24	
$E_{AS}^{③}$	Avalanche Energy, Single pulse	L=0.1mH 72	mJ
		L=0.5mH 144	

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{θJC}$	Thermal Resistance-Junction to Case	Steady State 1	°C/W
$R_{θJA}^{③}$	Thermal Resistance-Junction to Ambient	Steady State 62.5	°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} =20A	-	5	6	mΩ
		V _{GS} =4.5V, I _{DS} =10A	-	6.7	8.7	
gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =10A	-	30.2	-	S
Dynamic Characteristics ^⑤						
R_G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, Freq.=1MHz	-	0.52	-	Ω
C_{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =50V, Freq.=1MHz	-	3358	-	pF
C_{oss}	Output Capacitance		-	924	-	
C_{rss}	Reverse Transfer Capacitance		-	42.2	-	
td(ON)	Turn-on Delay Time	V _{GS} =10V, V _{DS} =25V, I _D =1A, R _{GEN} =3Ω	-	13.3	-	nS
t_r	Turn-on Rise Time		-	4.2	-	
t_{d(OFF)}	Turn-off Delay Time		-	2.9	-	
t_f	Turn-off Fall Time		-	101.4	-	
Q_g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =50V, I _D =20A	-	32.9	-	nC
Q_g	Total Gate Charge	V _{GS} =10V, V _{DS} =50V, I _D =20A	-	64.3	-	
Q_{gs}	Gate-Source Charge		-	15.2	-	
Q_{gd}	Gate-Drain Charge		-	14.6	-	
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 =20A, V _R =50V	-	47.7	-	nS
Q_{rr}	Reverse Recovery Charge	dI _F /dt=100A/μs	-	59.5	-	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

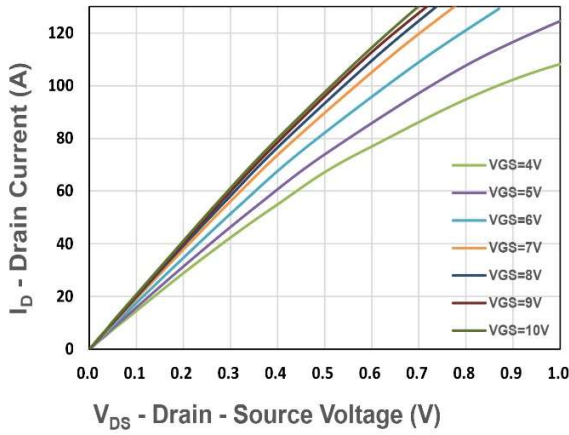


Figure 1. Output Characteristics

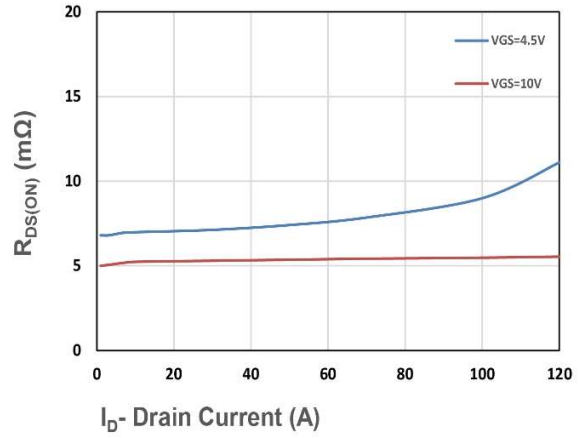


Figure 2. On-Resistance vs. ID

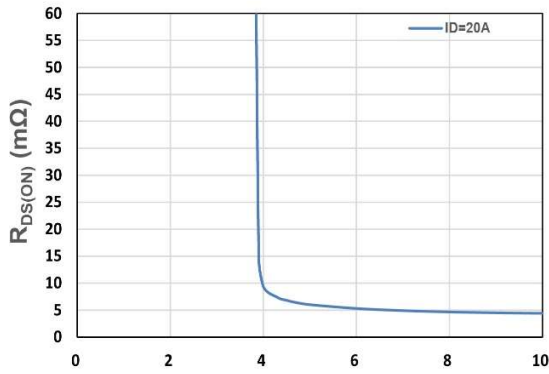


Figure 3. On-Resistance vs. VGS

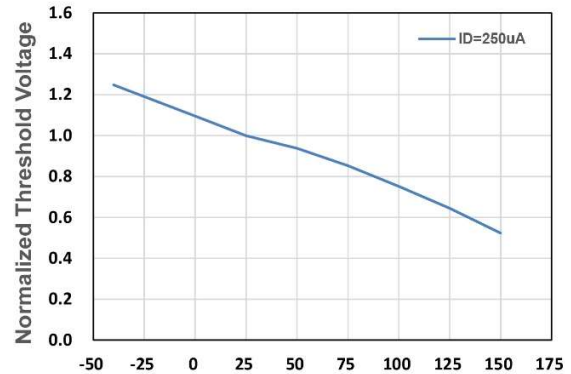


Figure 4. Gate Threshold Voltage

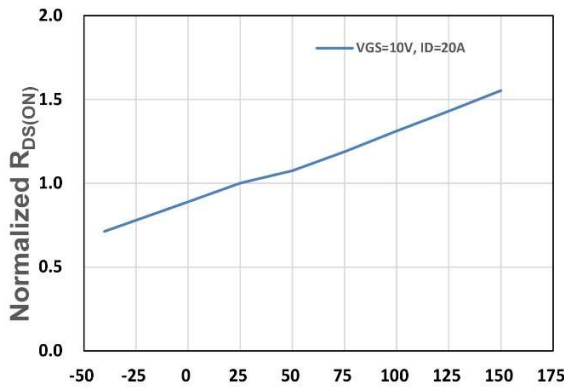


Figure 5. Drain-Source On Resistance

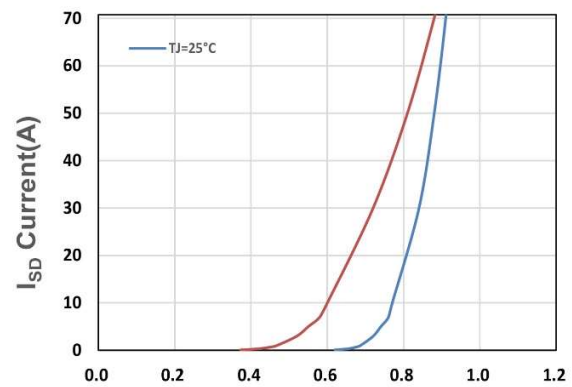
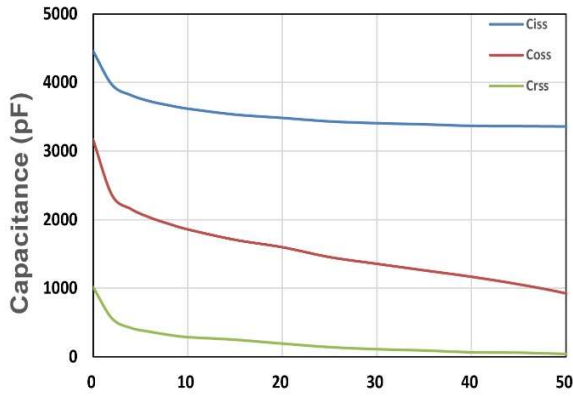
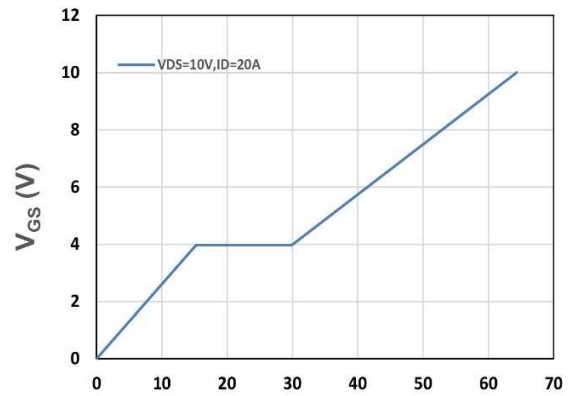


Figure 6. Source-Drain Diode Forward



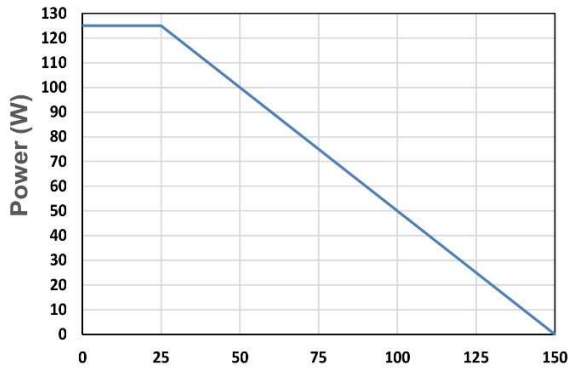
V_{DS} - Drain - Source Voltage (V)

Figure 7. Capacitance



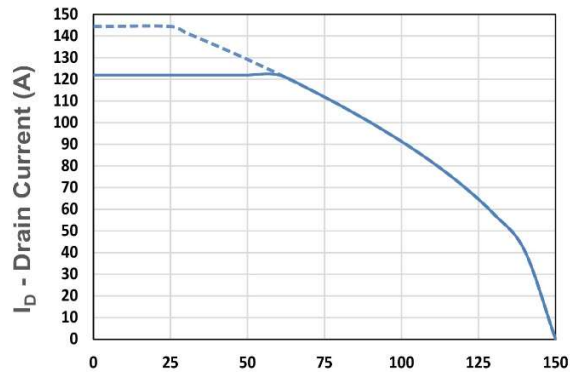
Q_g , Total Gate Charge (nC)

Figure 8. Gate Charge Characteristics



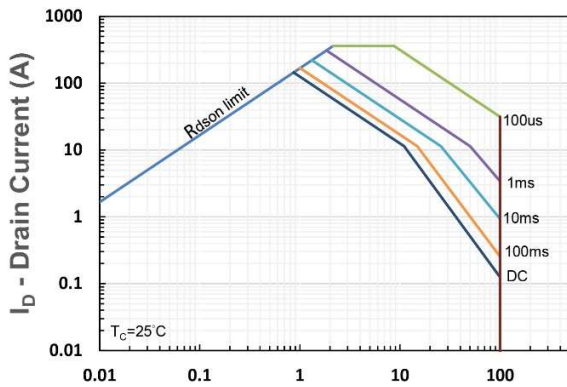
T_c - Case Temperature ($^{\circ}C$)

Figure 9. Power Dissipation



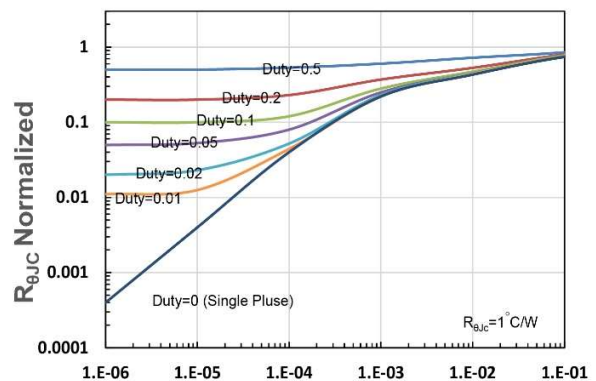
T_c - Case Temperature ($^{\circ}C$)

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