





Power MOSFETS


DATASHEET

LM60A05NAI3A

N-Channel
Enhancement Mode MOSFET

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Quality Management Systems

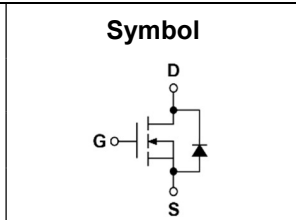
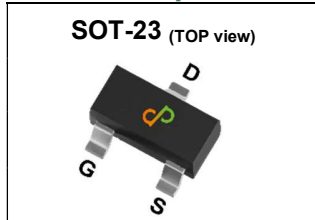
ISO 9001:2015 Certificate

LM60A05NAI3A



N-Channel Enhancement Mode MOSFET

Pin Description



Product Summary

Symbol	N-Channel	Unit
V _{DSS}	60	V
R _{DS(ON)-Max}	105	mΩ
I _D	2.3	A

Feature

- Fast switching speed
- Reliable and Rugged
- ROHS Compliant & Halogen-Free

Applications

- Portable Equipment
- Battery Powered System

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM60A05NAI3A	SOT-23	Tape & Reel	3000 / Tape & Reel	23□□□

Note : □□□ = Lot Code

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

Symbol	Parameter	N-Channel	Unit	
V _{DSS}	Drain-Source Voltage	60	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°C	5.7	A
I _D	Continuous Drain Current	T _A =25°C	2.3	A
		T _A =70°C	1.8	
P _D	Maximum Power Dissipation	T _A =25°C	1.1	W
		T _A =70°C	0.7	
I _{AS} ^②	Avalanche Current, Single pulse	L=0.1mH	8.5	A
E _{AS} ^②	Avalanche Energy, Single pulse	L=0.1mH	3.6	mJ

Thermal Characteristics

Symbol	Parameter	Rating	Unit	
R _{θJA} ^③	Thermal Resistance-Junction to Ambient	Steady State	110	°C/W

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

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.

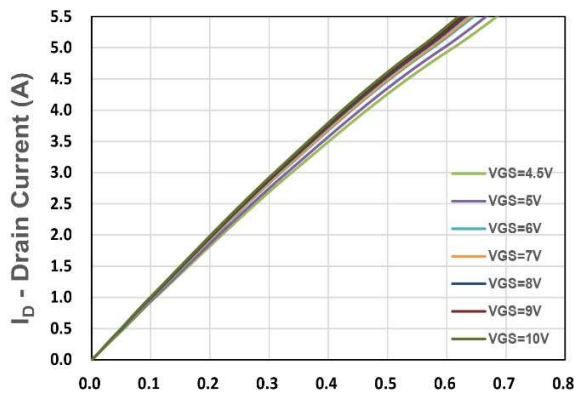
N-Channel Electrical Characteristics (T_J=25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Electrical Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250uA	60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V _{DS} =48V, 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} =2.5A	-	88	105	mΩ
		V _{GS} =4.5V, I _{DS} =2A	-	96	125	
gfs	Forward Transconductance	V _{DS} =10V, I _{DS} =1.25A	-	5.4	-	S
Dynamic Characteristics ^⑤						
R_G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, Freq.=1MHz	-	3.5	-	Ω
C_{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =30V, Freq.=1MHz	-	350	-	pF
C_{oss}	Output Capacitance					
C_{rss}	Reverse Transfer Capacitance					
td(ON)	Turn-on Delay Time	V _{GS} =10V, V _{DS} =30V, I _D =1A, R _{GEN} =6Ω	-	4.3	-	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} =30V, I _D =2.5A	-	4	-	nC
Q_g	Total Gate Charge	V _{GS} =10V, V _{DS} =30V, I _D =2.5A	-	8.52	-	
Q_{gs}	Gate-Source Charge		-	1.93	-	
Q_{gd}	Gate-Drain Charge		-	1.85	-	
Source-Drain Characteristics						
V_{SD} ^④	Diode Forward Voltage	I _{SD} =1.5A, V _{GS} =0V	-	0.8	1.1	V
t_{rr}	Reverse Recovery Time	I _F =1.5A, V _R =30V	-	14.5	-	nS
Q_{rr}	Reverse Recovery Charge	dI _F /dt=100A/μs	-	9.3	-	nC

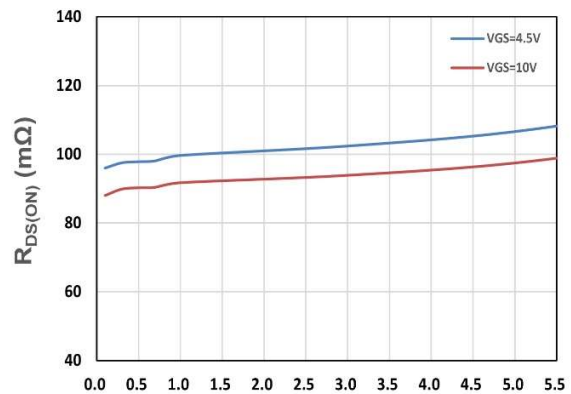
Note ④ : Pulse test (pulse width≤300us, duty cycle≤2%).

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

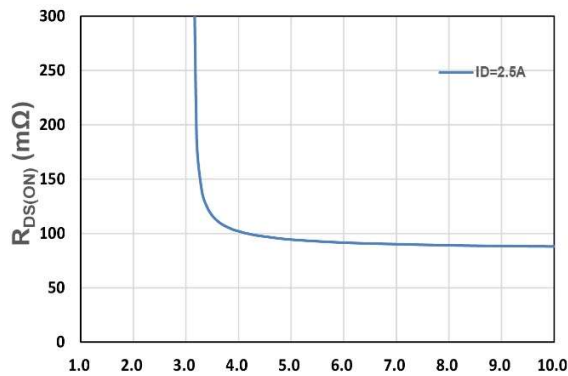
N-Channel Typical Characteristics



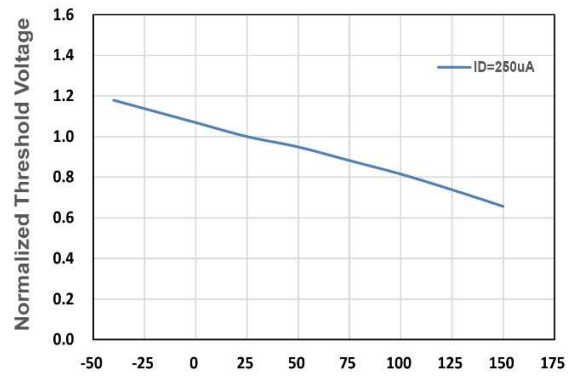
V_{DS} - Drain - Source Voltage (V)
Figure 1. Output Characteristics



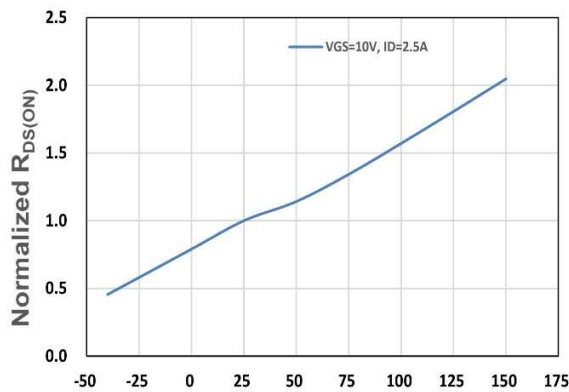
I_D - Drain Current (A)
Figure 2. On-Resistance vs. ID



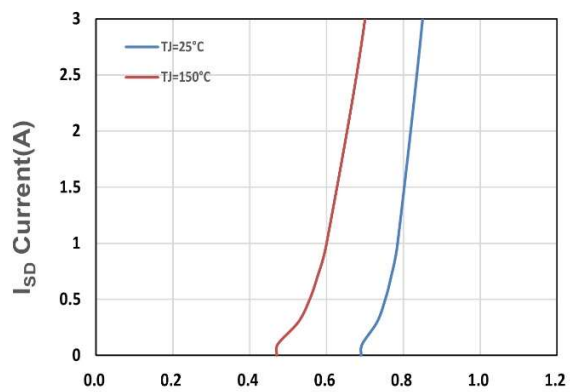
V_{GS} - Gate - Source Voltage (V)
Figure 3. On-Resistance vs. VGS



T_j , Junction Temperature(°C)
Figure 4. Gate Threshold Voltage

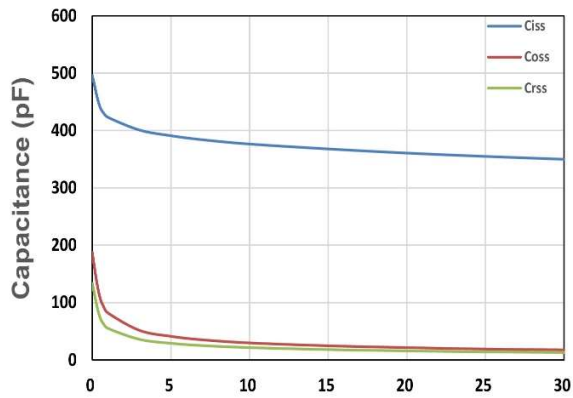


T_j , Junction Temperature(°C)
Figure 5. Drain-Source On Resistance

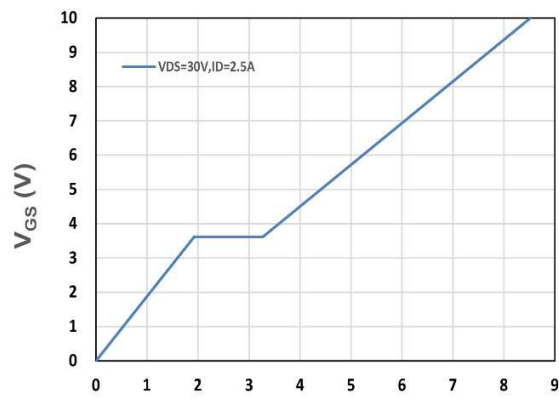


V_{SD} , Source-Drain Voltage(V)
Figure 6. Source-Drain Diode Forward

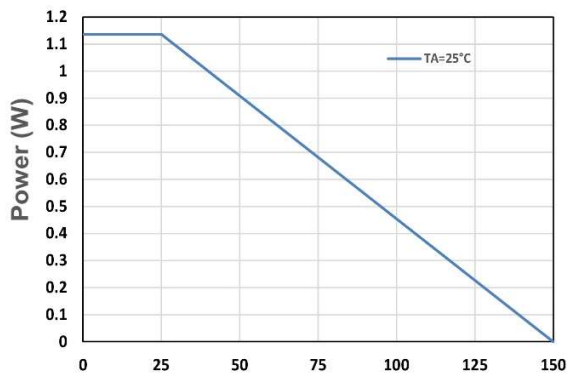
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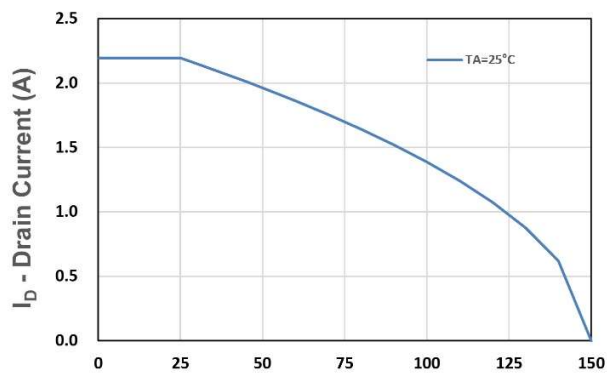
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



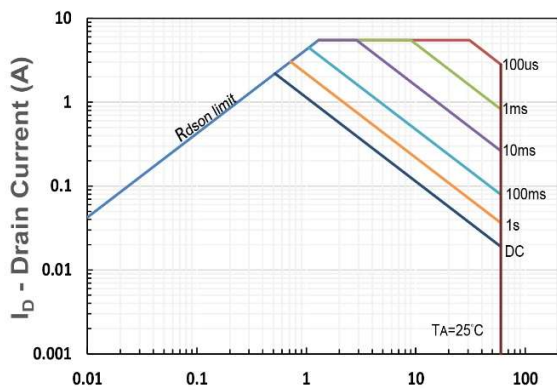
Q_g , Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



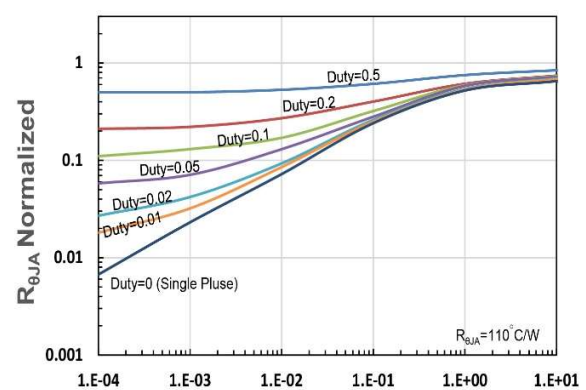
T_j - Junction Temperature (°C)
Figure 9. Power Dissipation



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