





Power MOSFETS


DATASHEET

LM45010NAM8A

N-Channel
Enhancement Mode MOSFET

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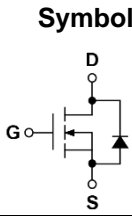
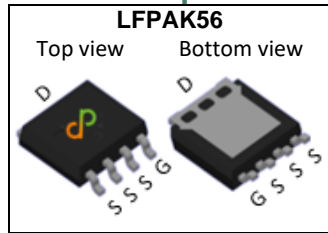


Quality Management Systems

ISO 9001:2015 Certificate

N-Channel Enhancement Mode MOSFET

Pin Description



Product Summary

Symbol	N-Channel	Unit
V_{DSS}	40	V
$R_{DS(ON)-Max}$	0.7	m Ω
ID	358	A

Feature

- Fast switching speed
- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- 100% UIS and Rg Tested
- Moisture Sensitivity Level MSL1

Applications

- DC-to-DC converters
- Switch Mode Power Supply
- Brushless DC motor control

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM45010NAM8A	LFPACK56	Tape & Reel	4000 / Tape & Reel	45010 □□□□□□

Note : □□□□□□ = Lot Code

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

Symbol	Parameter	N-Channel	Unit
V_{DSS}	Drain-Source Voltage	40	V
V_{GSS}	Gate-Source Voltage	±20	
T_J	Maximum Junction Temperature	175	°C
T_{STG}	Storage Temperature Range	-55 to 175	°C
I_S	Diode Continuous Forward Current	$T_C=25^\circ C$ 108	A
$I_{SP}^{(1)}$	Diode Pulse Current	$T_C=25^\circ C$ 400	A
$I_{DM}^{(1)}$	Pulse Drain Current Tested	$T_C=25^\circ C$ 895	A
I_D	Continuous Drain Current	$T_C=25^\circ C$ 358	A
		$T_C=100^\circ C$ 253	
P_D	Maximum Power Dissipation	$T_C=25^\circ C$ 167	W
		$T_C=100^\circ C$ 83	
I_D	Continuous Drain Current	$T_A=25^\circ C$ 51	A
		$T_A=70^\circ C$ 42	
P_D	Maximum Power Dissipation	$T_A=25^\circ C$ 3.3	W
		$T_A=70^\circ C$ 2.3	
$I_{AS}^{(2)}$	Avalanche Current, Single pulse	L=0.1mH 66	A
		L=0.5mH 36	
$E_{AS}^{(2)}$	Avalanche Energy, Single pulse	L=0.1mH 218	mJ
		L=0.5mH 324	

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	0.9 °C/W
$R_{\theta JA}^{(3)}$	Thermal Resistance-Junction to Ambient	Steady State	45 °C/W

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

Note ② : UIS tested and pulse width are limited by maximum junction temperature 175°C

Note ③ : Surface Mounted on 1in² FR-4 board with 1oz

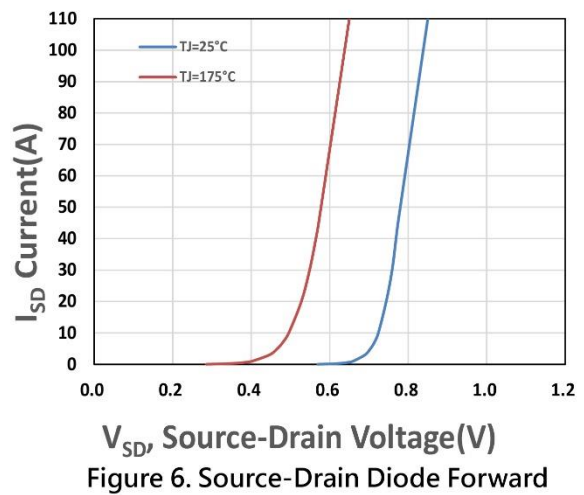
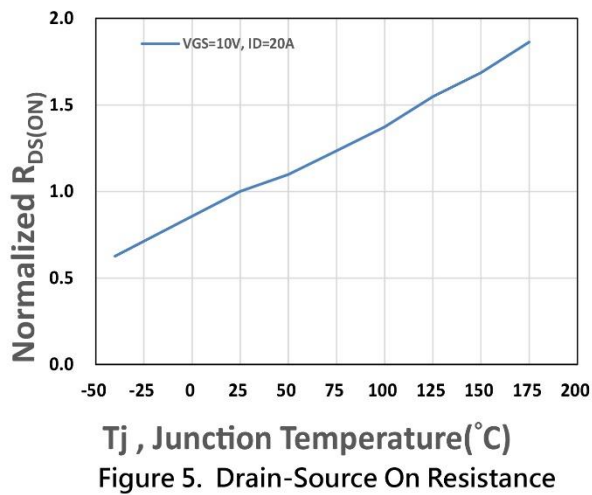
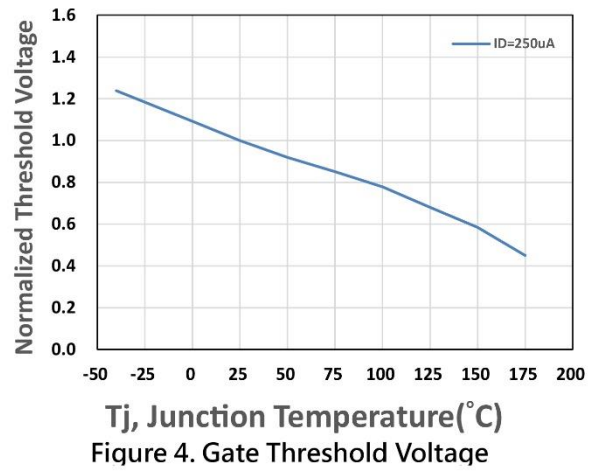
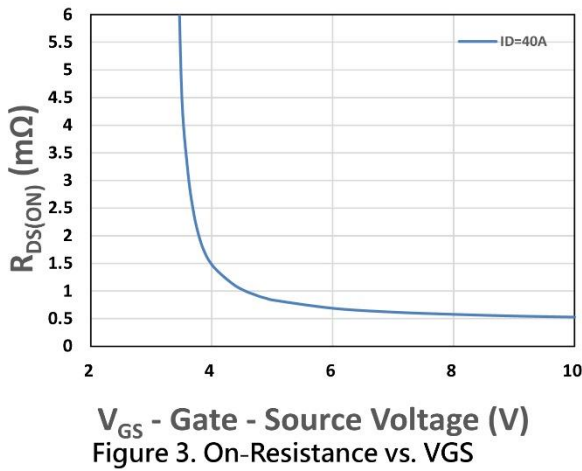
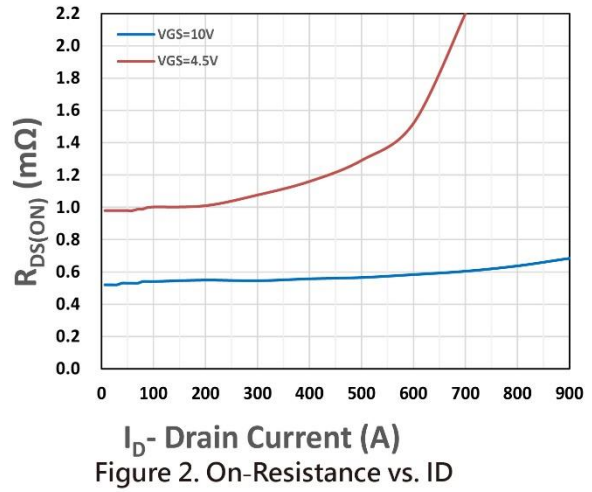
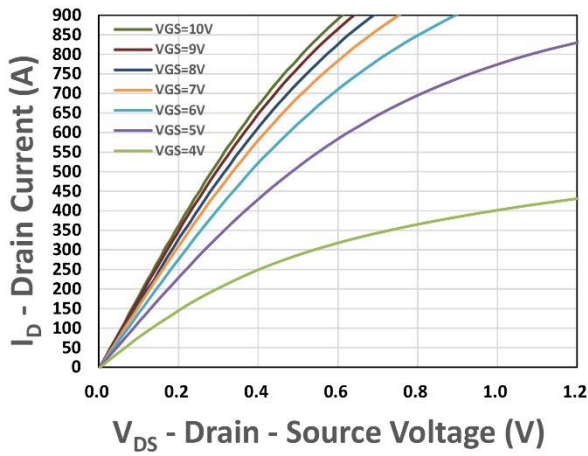
N-Channel Electrical Characteristics (T_J=25°C Unless Otherwise Noted)

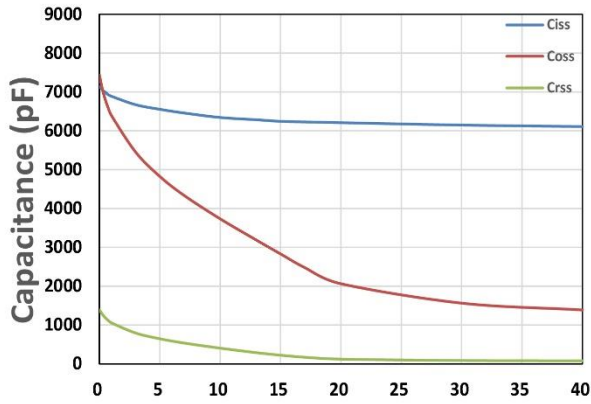
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Electrical Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250uA	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V _{DS} =36V, V _{GS} =0V	-	-	1	uA
V_{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250uA	1	1.7	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} =40A	-	0.55	0.7	mΩ
		V _{GS} =4.5V, I _{DS} =10A	-	1.0	1.35	
gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =10A	-	52	-	S
Dynamic Characteristics[®]						
R_G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, Freq.=1MHz	-	0.5	-	Ω
C_{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =20V, Freq.=1MHz	-	6210	-	pF
C_{oss}	Output Capacitance					
C_{rss}	Reverse Transfer Capacitance					
td(ON)	Turn-on Delay Time	V _{GS} =10V, V _{DS} =20V, I _D =1A, R _{GEN} =1Ω	-	17	-	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} =20V, I _D =20A	-	44	-	nC
Q_g	Total Gate Charge	V _{GS} =10V, V _{DS} =20V, I _D =20A	-	87	-	nC
Q_{gs}	Gate-Source Charge					
Q_{gd}	Gate-Drain Charge					
Source-Drain Characteristics						
V_{SD}^④	Diode Forward Voltage	I _{SD} =10A, V _{GS} =0V	-	0.75	1.1	V
t_{rr}	Reverse Recovery Time	I _F =10A, V _R =20V	-	62	-	nS
Q_{rr}	Reverse Recovery Charge	diF/dt=100A/μs	-	92	-	nC

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

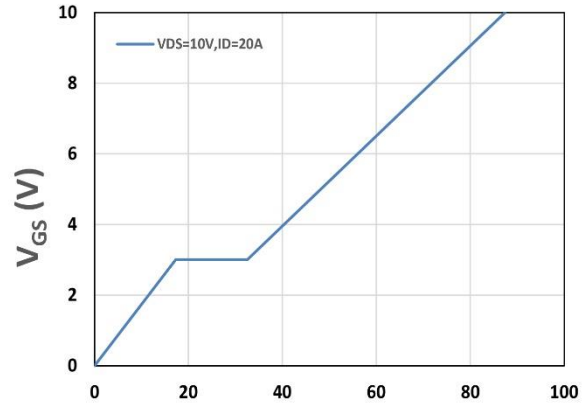
Note ⑤ : Guaranteed by design, not subject to production testing.

N-Channel Typical Characteristics

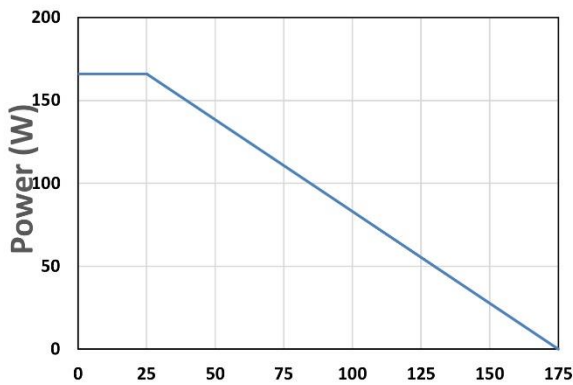




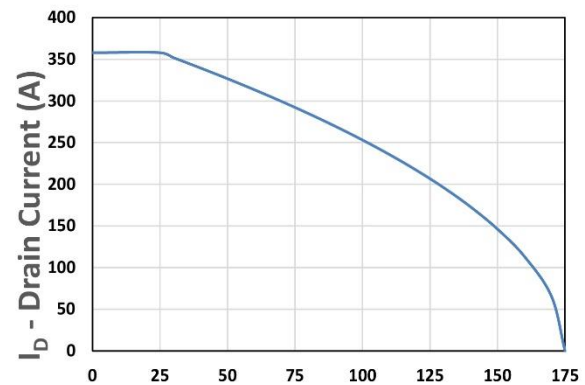
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



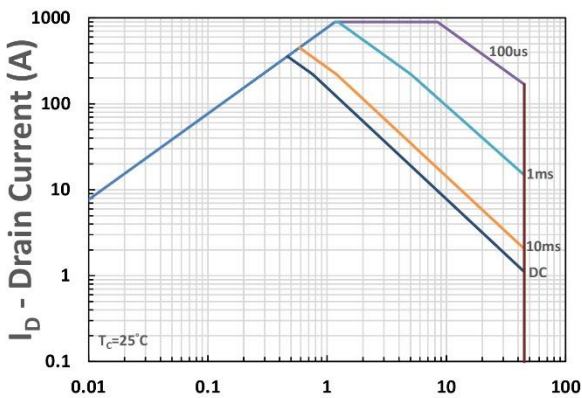
Q_g , Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



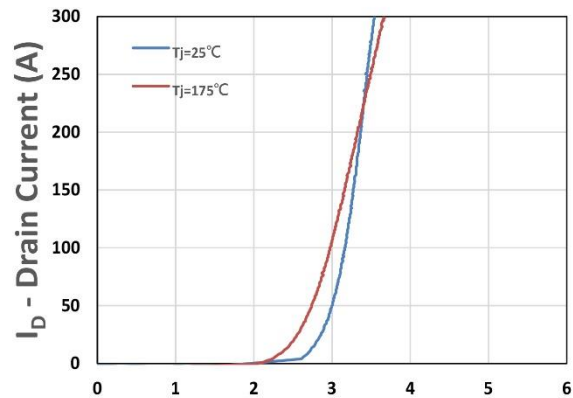
T_c -Case Temperature ($^{\circ}C$)
Figure 9. Power Dissipation



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



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



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

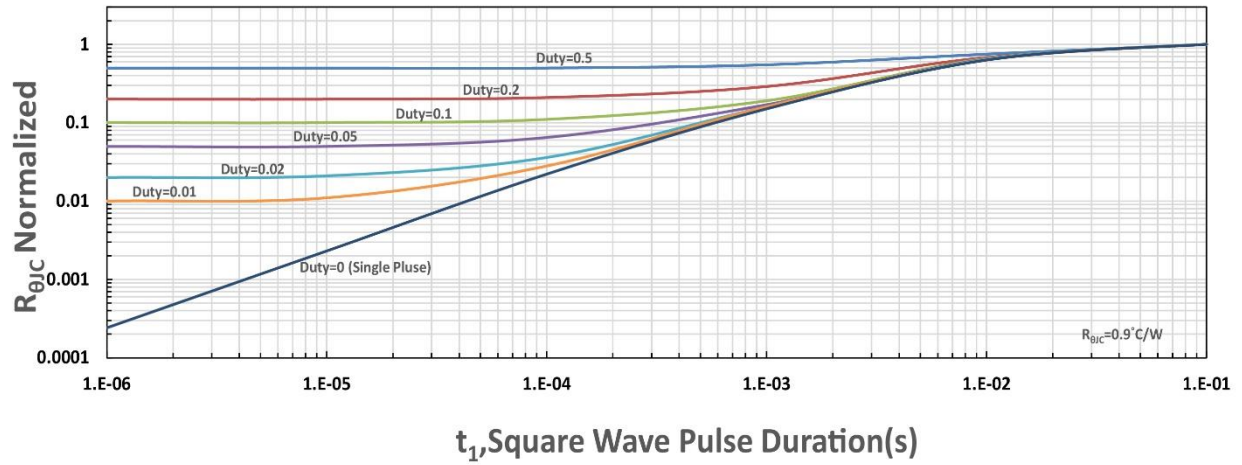


Figure 13. $R_{\theta JC}$ Transient Thermal Impedance