





Power MOSFETS

DATASHEET

LM1A013NHX8A

N-Channel
Enhancement Mode MOSFET

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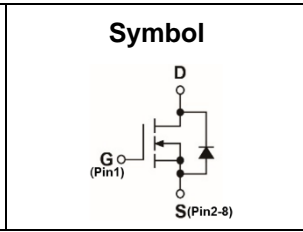
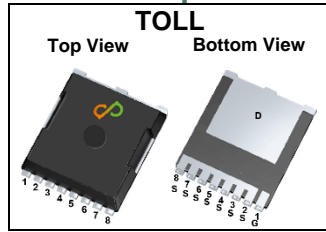


Quality Management Systems

ISO 9001:2015 Certificate

N-Channel Enhancement Mode MOSFET

Pin Description



Product Summary

Symbol	N-Channel	Unit
V_{DSS}	100	V
$R_{DS(ON)-Max}$	1.3	m Ω
ID	434	A

Feature

- Surface-mounted package
- Advanced trench cell design
- 100% UIS and Rg Tested

Applications

- Battery Management System
- Machine tool
- High power inverter system

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM1A013NHX8A	TOLL	Tape & Reel	2000 / Tape & Reel	1A013 □□□□□□

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		
T_J	Maximum Junction Temperature	175	°C	
T_{STG}	Storage Temperature Range	-55 to 175	°C	
I_S	Diode Continuous Forward Current	$T_C=25^\circ C$	171	A
I_{DM}	Pulse Drain Current Tested	$T_C=25^\circ C$	1086 ^①	A
I_D	Continuous Drain Current	$T_C=25^\circ C$	434	A
		$T_C=100^\circ C$	307	
P_D	Maximum Power Dissipation	$T_C=25^\circ C$	375	W
		$T_C=100^\circ C$	188	
$I_D^{②}$	Continuous Drain Current	$T_A=25^\circ C$	43	A
		$T_A=70^\circ C$	36	
$P_D^{②}$	Maximum Power Dissipation	$T_A=25^\circ C$	3.8	W
		$T_A=70^\circ C$	2.6	
$I_{AS}^{③}$	Avalanche Current, Single pulse	L=0.1mH	100	A
		L=0.5mH	55	
$E_{AS}^{③}$	Avalanche Energy, Single pulse	L=0.1mH	500	mJ
		L=0.5mH	750	

Thermal Characteristics

Symbol	Parameter	Rating	Unit	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	0.4	°C/W
$R_{\theta JA}^{②}$	Thermal Resistance-Junction to Ambient	Steady State	40	°C/W

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

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

Note ③ : UIS tested and pulse width are limited by maximum junction temperature 175°C

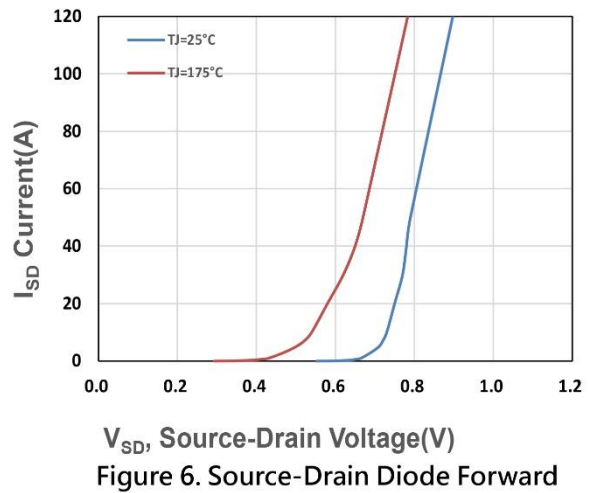
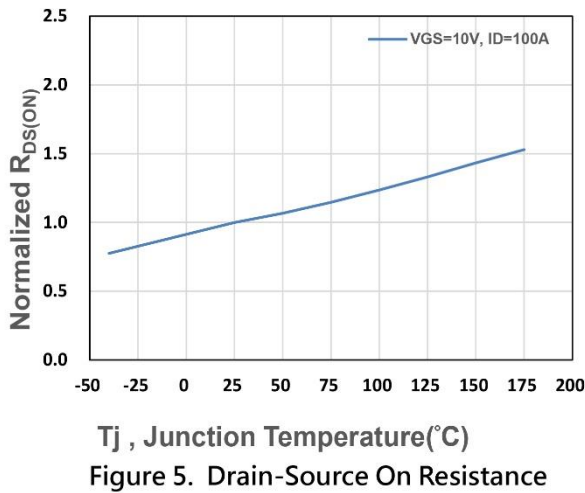
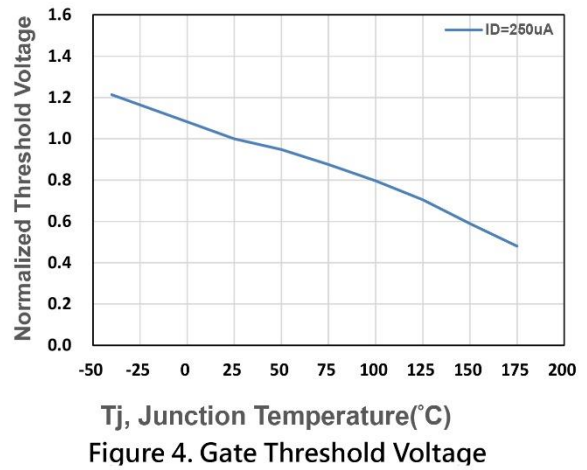
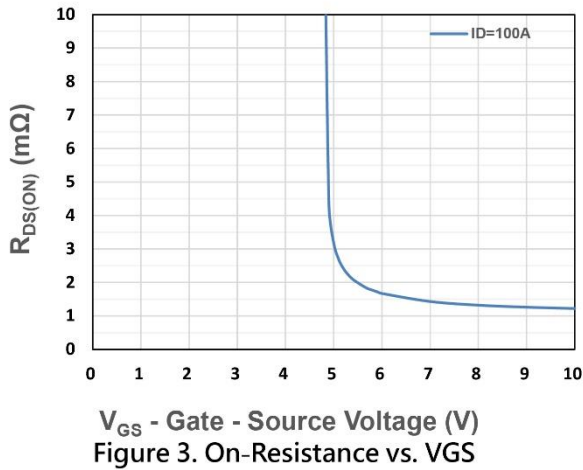
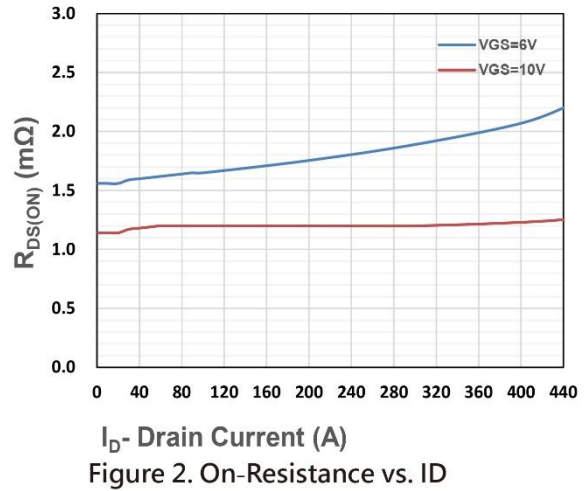
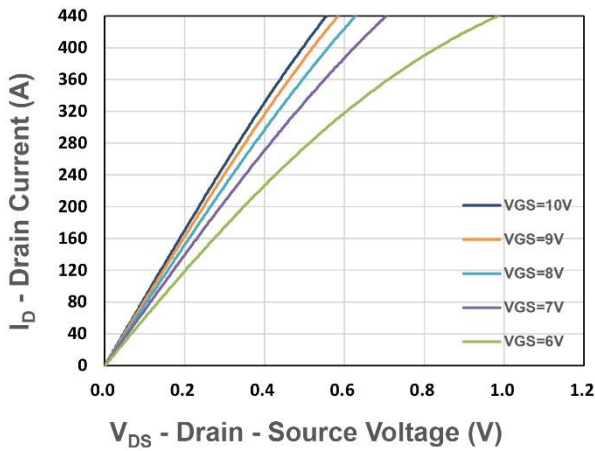
N-Channel Electrical Characteristics (T_J=25°C Unless Otherwise Noted)

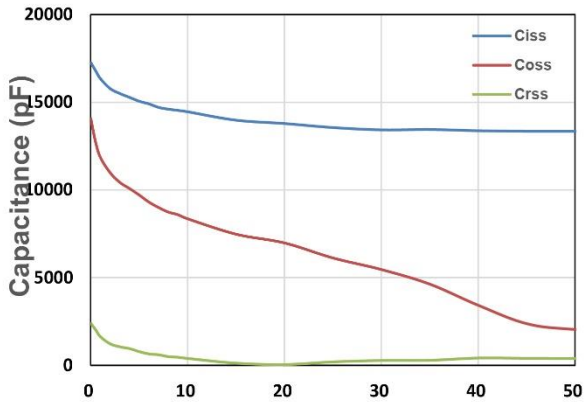
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Electrical Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250uA	100	-	-	V
I_{DSS}	Drain Leakage Current	V _{DS} =80V, V _{GS} =0V	-	-	1	uA
V_{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250uA	2	-	4	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} =30A	-	1.05	1.3	mΩ
gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =50A	-	108	-	S
Dynamic Characteristics ⑤						
R_G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, Freq.=1MHz	-	1.7	-	Ω
C_{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =50V, Freq.=1MHz	-	13000	-	pF
C_{oss}	Output Capacitance		-	2147	-	
C_{rss}	Reverse Transfer Capacitance		-	398	-	
td(ON)	Turn-on Delay Time	V _{GEN} =10V, V _{DS} =50V, I _{DS} =1A, R _{GEN} =1Ω	-	27.7	-	nS
t_r	Turn-on Rise Time		-	21.5	-	
t_{d(OFF)}	Turn-off Delay Time		-	89.6	-	
t_f	Turn-off Fall Time		-	96.8	-	
Q_g	Total Gate Charge	V _{GS} =10V, V _{DS} =50V, I _D =100A	-	231	-	nC
Q_{gs}	Gate-Source Charge		-	70.2	-	
Q_{gd}	Gate-Drain Charge		-	65.7	-	
Source-Drain Characteristics						
V_{SD}④	Diode Forward Voltage	I _{SD} =30A, V _{GS} =0V	-	0.75	1.1	V
t_{rr}	Reverse Recovery Time	I _{DS} =30A, V _{GS} =0V	-	120	-	nS
Q_{rr}	Reverse Recovery Charge	dI _{SD} /dt=100A/μs	-	400	-	nC

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

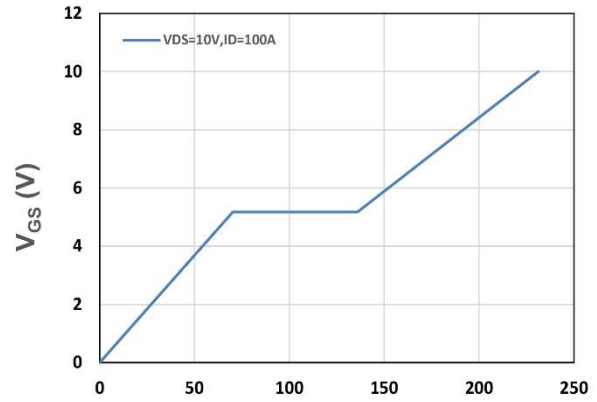
Note ⑤ : Guaranteed by design, not subject to production testing.

N-Channel Typical Characteristics

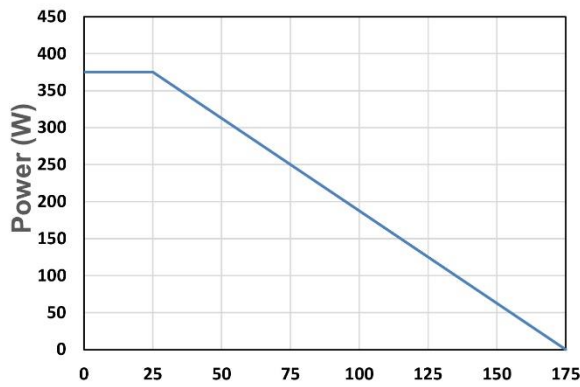




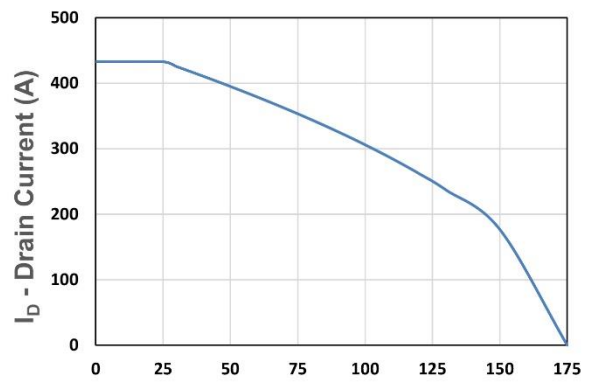
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



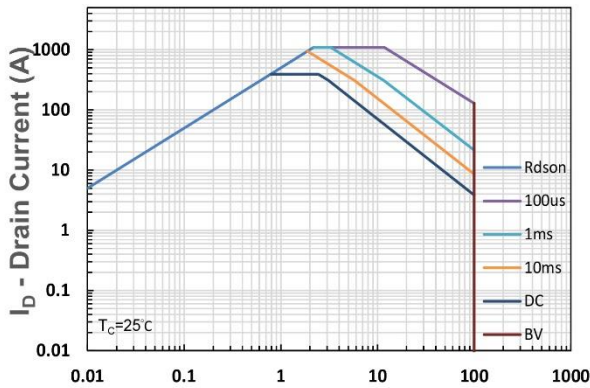
Q_g , Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



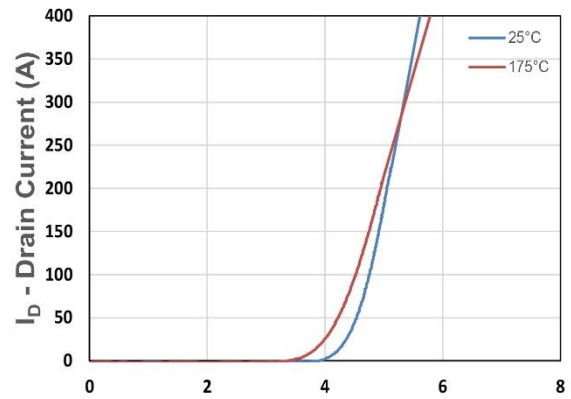
T_c - Case Temperature (°C)
Figure 9. Power Dissipation



T_c - Case Temperature (°C)
Figure 10. Drain Current



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



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

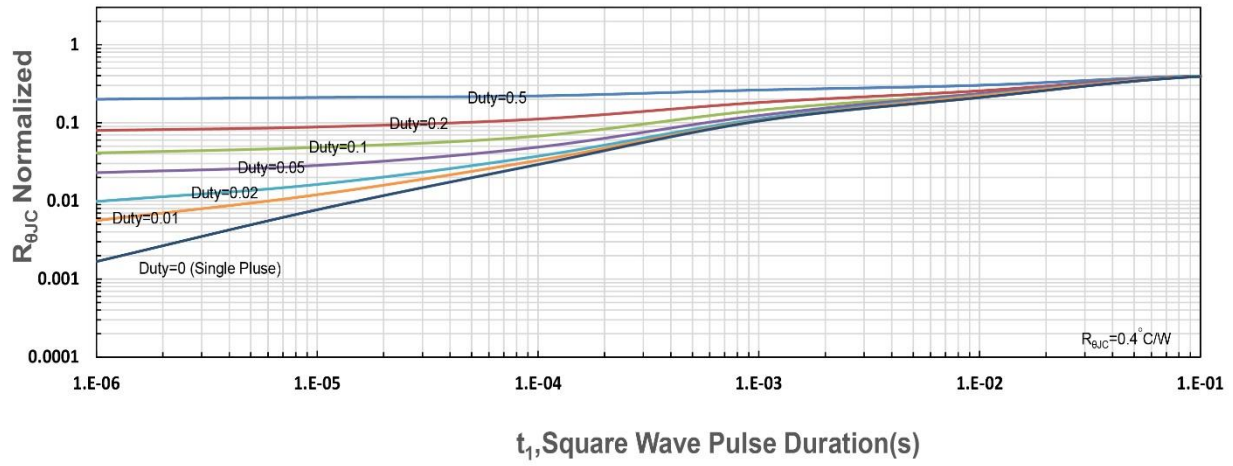


Figure 13. $R_{\theta JC}$ Transient Thermal Impedance