Power MOSFETS

DATASHEET

LM60010NHX8A

N-Channel

Enhancement Mode MOSFET

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Quality Management Systems

ISO 9001:2015 Certificate

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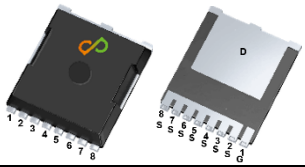
N-Channel Enhancement Mode MOSFET

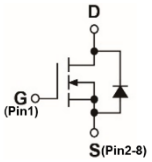
Pin Description

TOLL

Top View Bottom View



Symbol



Product Summary

Symbol	N-Channel	Unit
V_{DSS}	60	V
$R_{DS(ON)-Max}$	1.1	mΩ
ID	429	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
LM60010NHX8A	TOLL	Tape & Reel	2000 / Tape & Reel	60010 □□□□□□

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		175	°C
T_{STG}	Storage Temperature Range		-55 to 175	°C
I_S	Diode Continuous Forward Current	T_C=25°C	213	A
I_{DM}	Pulse Drain Current Tested	T_C=25°C	1073	A
I_D①	Continuous Drain Current	T_C=25°C	429	A
		T_C=100°C	304	
P_D	Maximum Power Dissipation	T_C=25°C	375	W
		T_C=100°C	188	
I_D②	Continuous Drain Current	T_A=25°C	43	A
		T_A=70°C	36	
P_D②	Maximum Power Dissipation	T_A=25°C	3.8	W
		T_A=70°C	2.6	
I_{AS}③	Avalanche Current, Single pulse	L=0.5mH	55	A
E_{AS}③	Avalanche Energy, Single pulse	L=0.5mH	756	mJ

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 1in^2 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	60	-	-	V
I_{DSS}	Drain Leakage Current	V_{DS}=48V, 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	-	0.86	1.1	mΩ
gfs	Forward Transconductance	V_{DS}=5V, I_{DS}=50A	-	89	-	S
Dynamic Characteristics ⑤						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V, Freq.=1MHz	-	0.7	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=30V, Freq.=1MHz	-	12250	-	pF
C_{oss}	Output Capacitance		-	3452	-	
C_{rss}	Reverse Transfer Capacitance		-	78	-	
$td_{(ON)}$	Turn-on Delay Time	V_{GEN}=10V,V_{DS}=30V, I_{DS}=1A,R_{GEN}=1Ω	-	46	-	nS
t_r	Turn-on Rise Time		-	28	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	74	-	
t_f	Turn-off Fall Time		-	108	-	
Q_g	Total Gate Charge	V_{GS}=10V,V_{DS}=30V, I_D=30A	-	203	-	nC
Q_{gs}	Gate-Source Charge		-	62	-	
Q_{gd}	Gate-Drain Charge		-	50	-	
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}=15A, V_{GS}=0V dI$_{SD}$/dt=100A/μs	-	74	-	nS
Q_{rr}	Reverse Recovery Charge		-	119	-	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

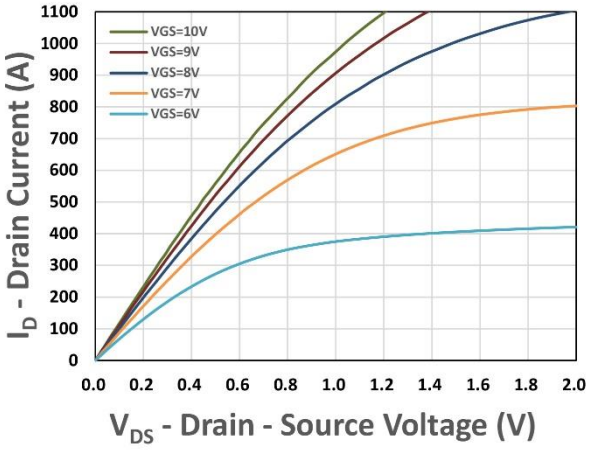


Figure 1. Output Characteristics

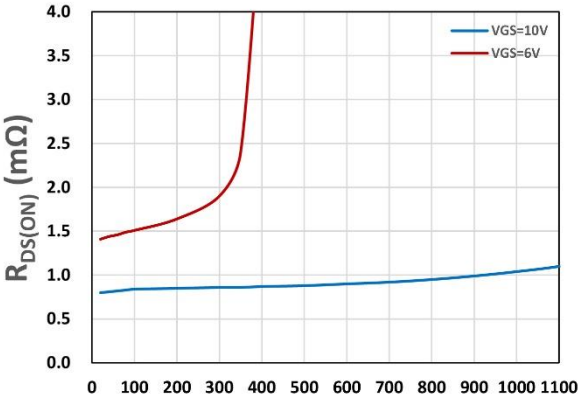


Figure 2. On-Resistance vs. ID

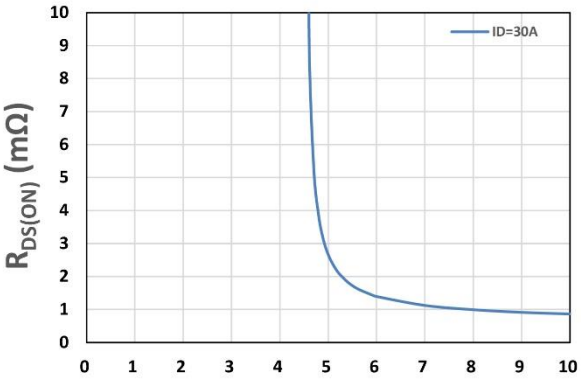


Figure 3. On-Resistance vs. VGS

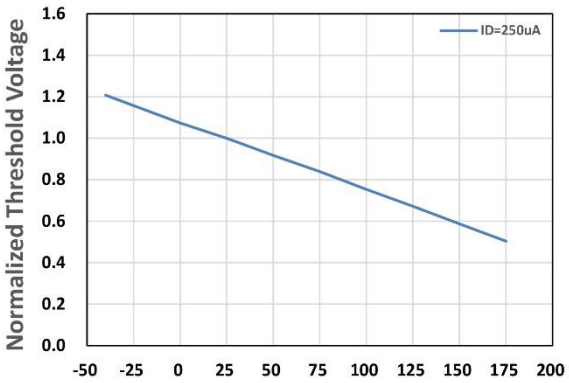


Figure 4. Gate Threshold Voltage

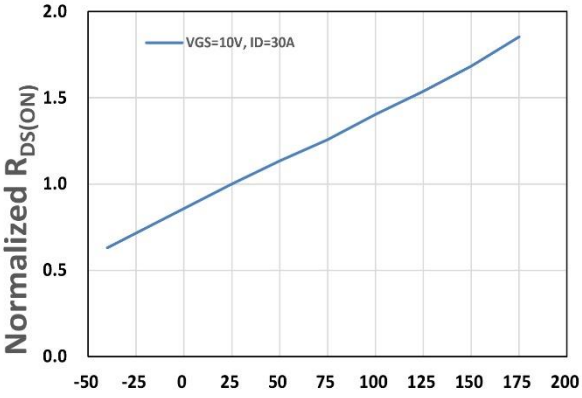


Figure 5. Drain-Source On Resistance

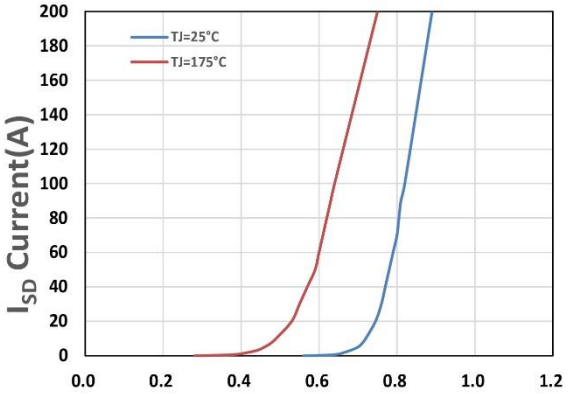
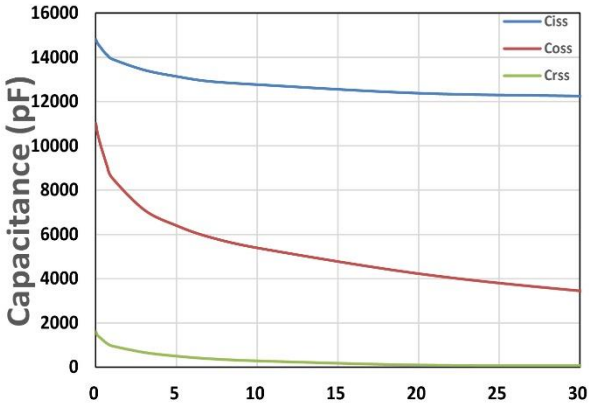
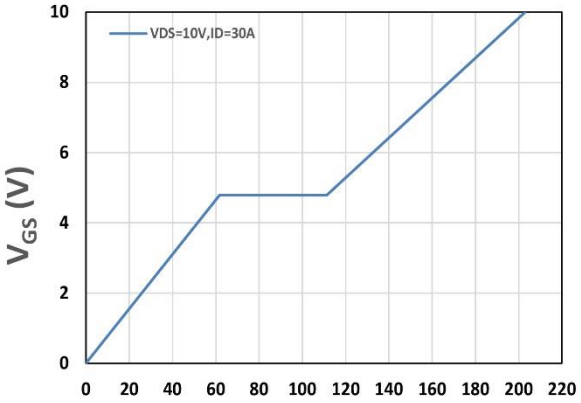


Figure 6. Source-Drain Diode Forward



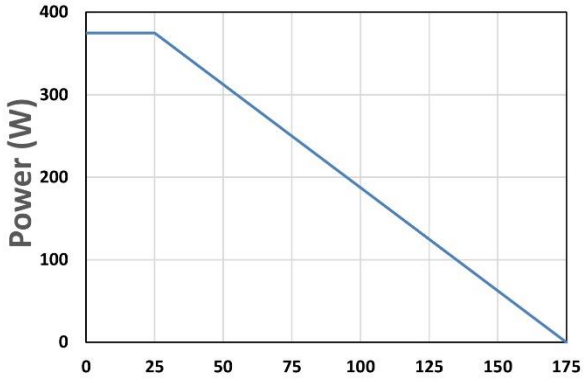
V_{DS} - Drain - Source Voltage (V)

Figure 7. Capacitance



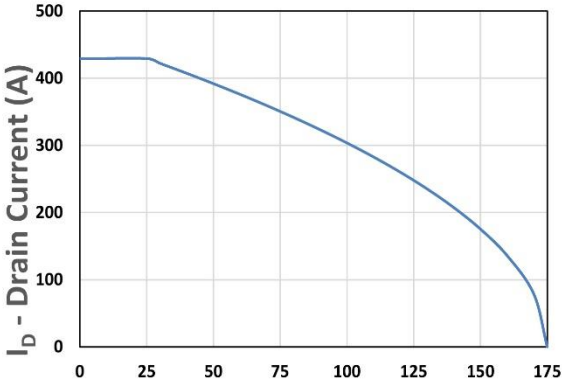
Qg, Total Gate Charge (nC)

Figure 8. Gate Charge Characteristics



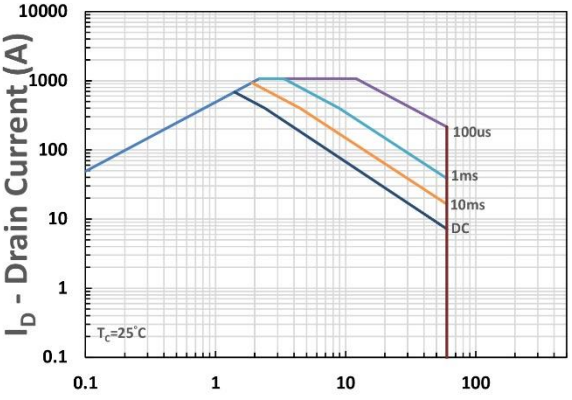
Tc-Case Temperature (˚C)

Figure 9. Power Dissipation



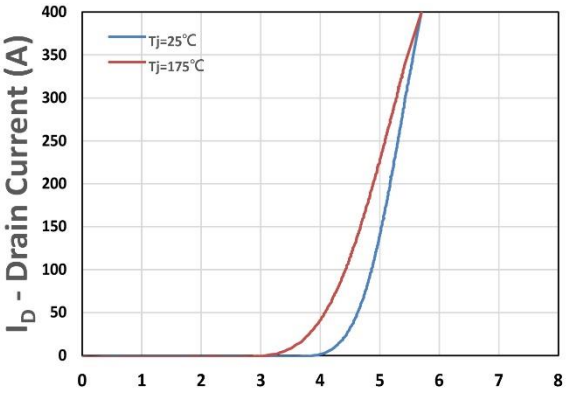
Tc-Case Temperature (˚C)

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

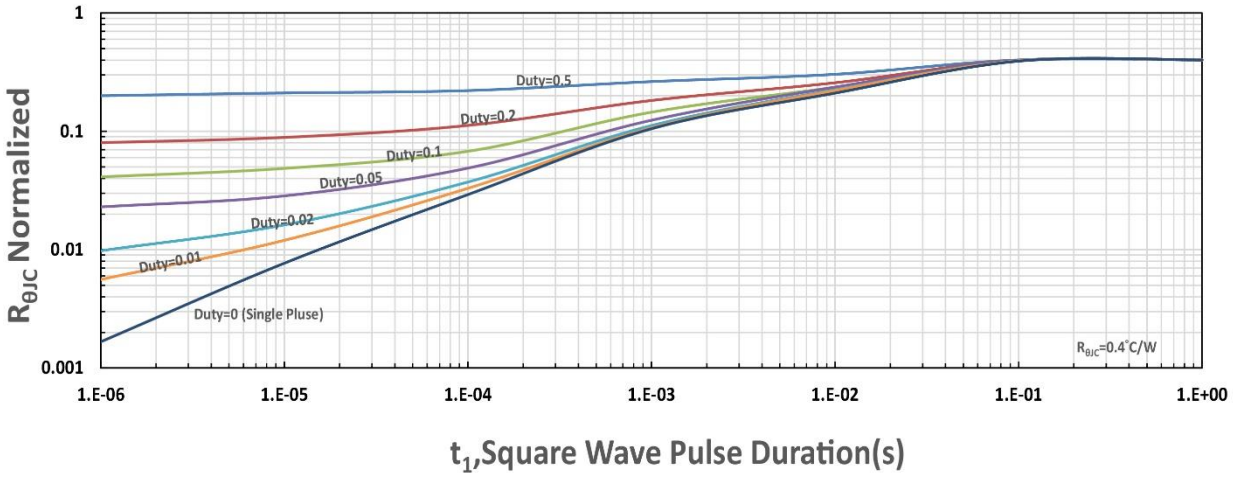


Figure 13. RθJC Transient Thermal Impedance