Power MOSFETS

DATASHEET

LM1F650NAQ8A

N-Channel

Enhancement Mode MOSFET

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Quality Management Systems

ISO 9001:2015 Certificate

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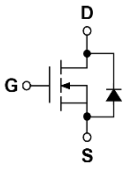
Pin Description

SOP-8L (TOP view)	Symbol
	

Product Summary

Symbol	N-Channel	Unit
V_{DSS}	150	V
$R_{DS(ON)-Max}$	65	mΩ
ID	3.3	A

Feature

- High Speed Power Switching
- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- 100% UIS Tested

Applications

- Synchronous Rectification in SMPS
- Hard Switching
- Telecoms and Industrial

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM1F650NAQ8A	SOP-8L	Tape & Reel	3000 / Tape & Reel	1F650 □□□□□□

Note：□□□□□□ = Lot Code

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

Symbol	Parameter		N-Channel	Unit
V_{DSS}	Drain-Source Voltage		150	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	8.3	A
I_D	Continuous Drain Current	T_A=25°C	3.3	A
		T_A=100°C	2.6	
P_D	Maximum Power Dissipation	T_A=25°C	1.5	W
		T_A=100°C	0.9	
I_{AS}②	Avalanche Current, Single pulse	L=0.1mH	6	A
E_{AS}②	Avalanche Energy, Single pulse	L=0.1mH	1.8	mJ

Thermal Characteristics

Symbol	Parameter		Rating	Unit
$R_{\theta JA}$③	Thermal Resistance-Junction to Ambient	Steady State	85	°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 1in^2 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	150	-	-	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}=4A	-	54	65	mΩ
		V_{GS}=4.5V, I_{DS}=3A	-	62	82	
gfs	Forward Transconductance	V_{DS}=5V, I_{DS}=2A	-	5.9	-	S
Dynamic Characteristics ⑤						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V, Freq.=1MHz	-	2	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=75V, Freq.=1MHz	-	643	-	pF
C_{oss}	Output Capacitance		-	50	-	
C_{rss}	Reverse Transfer Capacitance		-	15	-	
$td_{(ON)}$	Turn-on Delay Time	V_{GS}=10V,V_{DS}=75V, I_D=1A,R_{GEN}=1Ω	-	6.2	-	nS
t_r	Turn-on Rise Time		-	2.3	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	13.3	-	
t_f	Turn-off Fall Time		-	30.3	-	
Q_g	Total Gate Charge	V_{GS}=4.5V,V_{DS}=75V I_D=4A	-	5.3	-	nC
Q_g	Total Gate Charge	V_{GS}=10V,V_{DS}=75V, I_D=4A	-	10	-	
Q_{gs}	Gate-Source Charge		-	2.8	-	
Q_{gd}	Gate-Drain Charge		-	1.05	-	
Source-Drain Characteristics						
V_{SD}④	Diode Forward Voltage	I_{SD}=2A, V_{GS}=0V	-	0.8	1.1	V
t_{rr}	Reverse Recovery Time	I_F=2A, V_R=75V dI$_F$/dt=100A/μs	-	42.5	-	nS
Q_{rr}	Reverse Recovery Charge		-	49.5	-	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

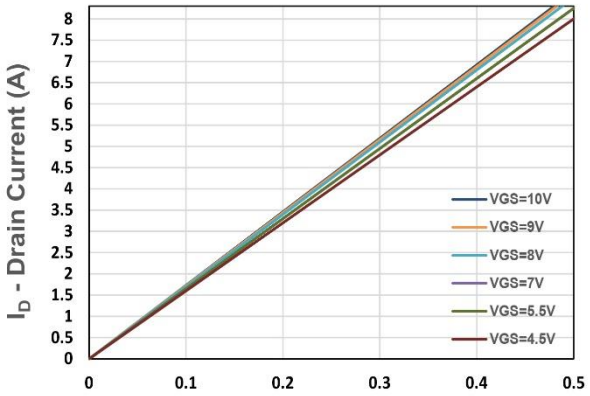


Figure 1. Output Characteristics

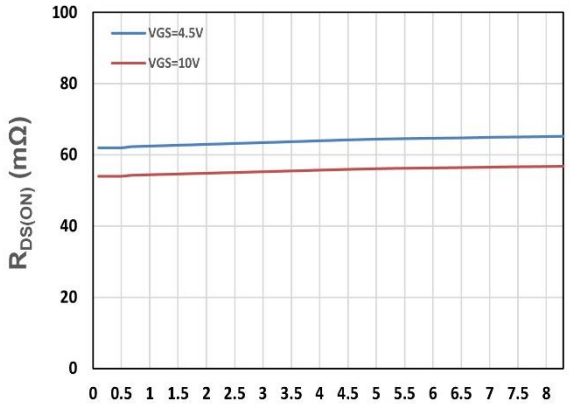


Figure 2. On-Resistance vs. ID

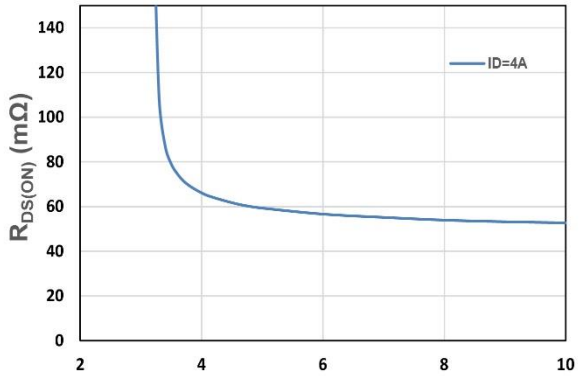


Figure 3. On-Resistance vs. VGS

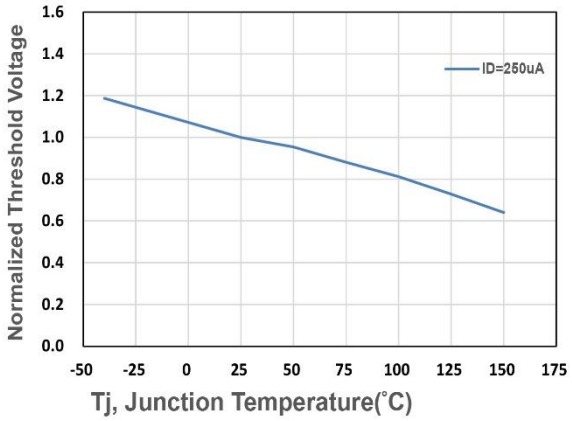


Figure 4. Gate Threshold Voltage

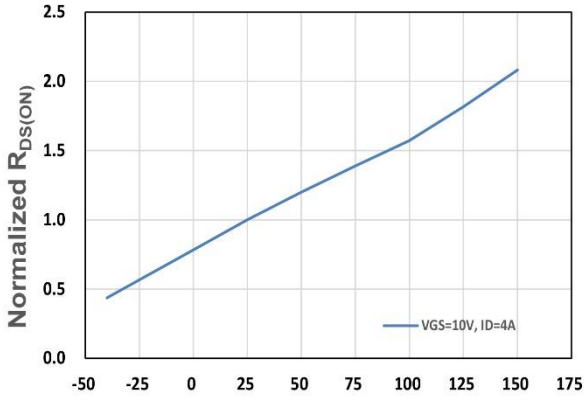


Figure 5. Drain-Source On Resistance

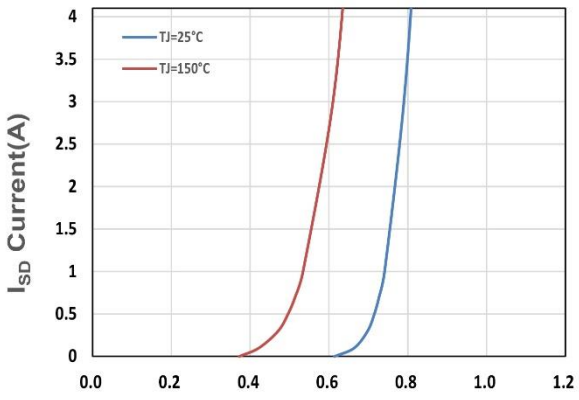
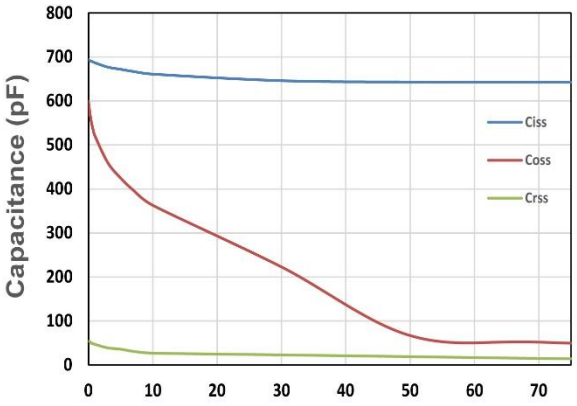
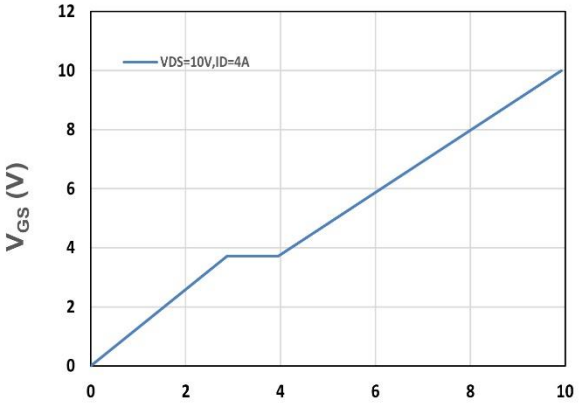


Figure 6. Source-Drain Diode Forward



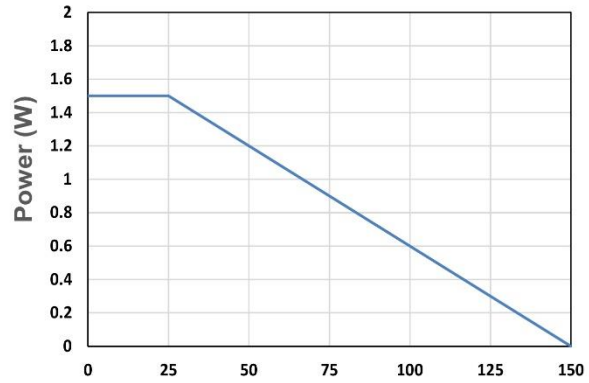
V_{DS} - Drain - Source Voltage (V)

Figure 7. Capacitance



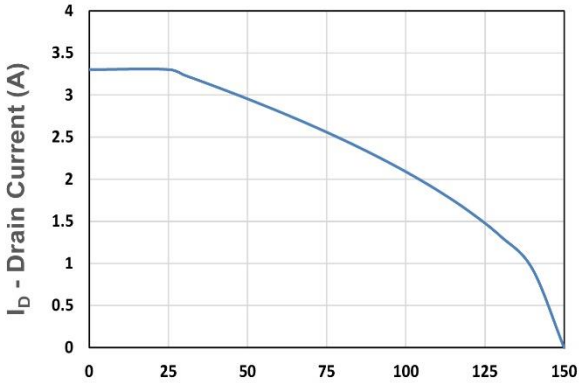
Qg, Total Gate Charge (nC)

Figure 8. Gate Charge Characteristics



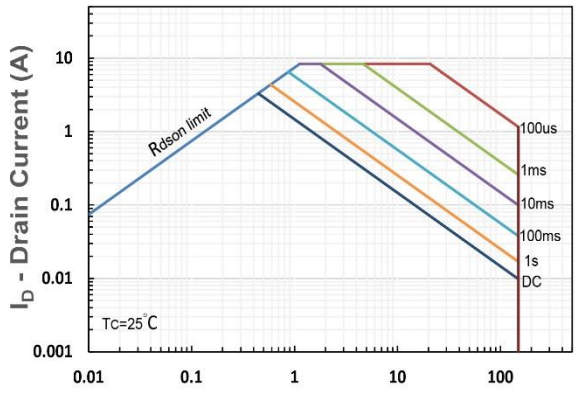
T_A - Ambient Temperature (°C)

Figure 9. Power Dissipation



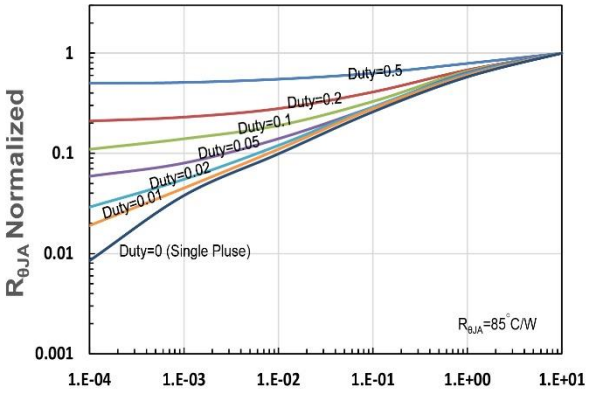
T_A - Ambient Temperature (°C)

Figure 10. Drain Current



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

Figure 11. Safe Operating Area



t_1,Square Wave Pulse Duration(s)

Figure 12. RθJA Transient Thermal Impedance