





Power MOSFETS


DATASHEET

LM40130PAQ8A

P-Channel
Enhancement Mode MOSFET

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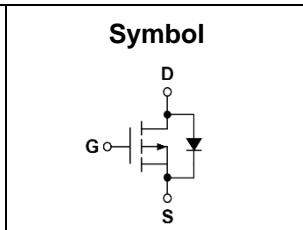


Quality Management Systems

ISO 9001:2015 Certificate

P-Channel Enhancement Mode MOSFET

Pin Description



Product Summary

Symbol	P-Channel	Unit
V_{DSS}	-40	V
$R_{DS(ON)-Max}$	13	m Ω
ID	-9.1	A

Feature

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

Applications

- Power Management in DC/DC Converters

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM40130PAQ8A	SOP-8L	Tape & Reel	3000 / Tape & Reel	40130 □□□□□□

Note : □□□□□□ = Lot Code

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

Symbol	Parameter	P-Channel	Unit	
V_{DSS}	Drain-Source Voltage	-40	V	
V_{GSS}	Gate-Source Voltage	±20		
T_J	Maximum Junction Temperature	150	°C	
T_{STG}	Storage Temperature Range	-55 to 150	°C	
I_S	Diode Continuous Forward Current	$T_A=25^\circ C$	-0.9	A
$I_{DM}^{①}$	Pulse Drain Current Tested	$T_A=25^\circ C$	-23	A
I_D	Continuous Drain Current	$T_A=25^\circ C$	-9.1	A
		$T_A=70^\circ C$	-7.3	
P_D	Maximum Power Dissipation	$T_A=25^\circ C$	1.6	W
		$T_A=70^\circ C$	1.0	
$I_{AS}^{②}$	Avalanche Current, Single pulse	L=0.1mH	-34	A
		L=0.5mH	-20	
$E_{AS}^{②}$	Avalanche Energy, Single pulse	L=0.1mH	58	mJ
		L=0.5mH	100	

Thermal Characteristics

Symbol	Parameter	Rating	Unit	
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	t ≤ 10s	32	°C/W
		Steady State	78	°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

P-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} =-32V, V _{GS} =0V	-	-	-1	uA
V_{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =-250uA	-1	-1.5	-2.5	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} =-20A	-	11	13	mΩ
		V _{GS} =-4.5V, I _{DS} =-10A	-	15	20	
g_{fs}	Forward Transconductance	V _{DS} =-5V, I _{DS} =-10A	-	25	-	S
Dynamic Characteristics[®]						
R_G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, Freq.=1MHz	-	9.5	-	Ω
C_{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-20V, Freq.=1MHz	-	2640	-	pF
C_{oss}	Output Capacitance					
C_{rss}	Reverse Transfer Capacitance					
t_{d(ON)}	Turn-on Delay Time	V _{GS} =-10V, V _{DS} =-20V, I _D =-1A, R _{GEN} =1Ω	-	12.3	-	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} =-20V, I _D =-20A	-	25.5	-	nC
Q_g	Total Gate Charge	V _{GS} =-10V, V _{DS} =-20V, I _D =-20A	-	51.5	-	
Q_{gs}	Gate-Source Charge		-	10.3	-	
Q_{gd}	Gate-Drain Charge		-	9.7	-	
Source-Drain Characteristics						
V_{SD}^④	Diode Forward Voltage	I _{SD} =-10A, V _{GS} =0V	-	-0.8	-1.1	V
t_{rr}	Reverse Recovery Time	I _F =-10A, V _R =-32V	-	18.6	-	nS
Q_{rr}	Reverse Recovery Charge	dI _F /dt=100A/μs	-	11.4	-	nC

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

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

P-Channel Typical Characteristics

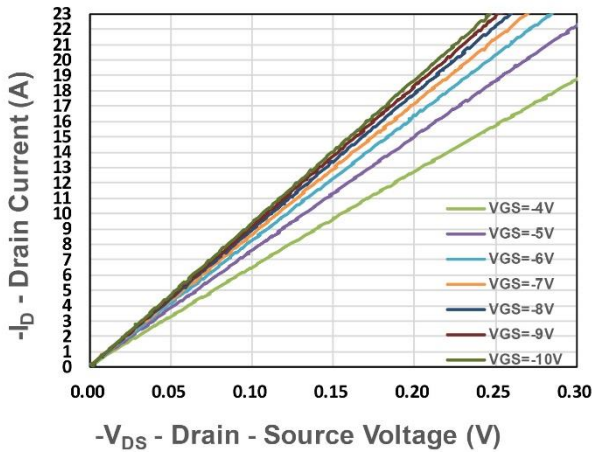


Figure 1. Output Characteristics

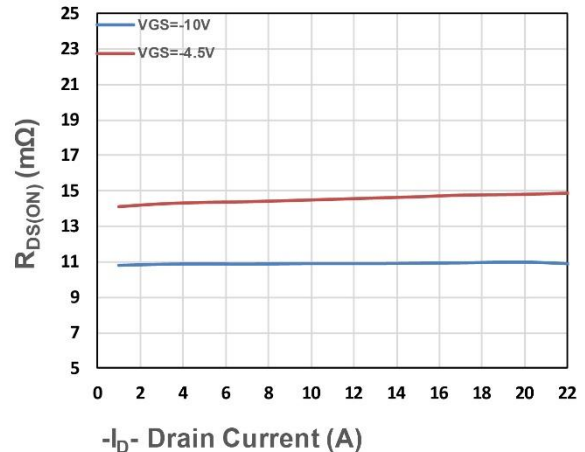


Figure 2. On-Resistance vs. ID

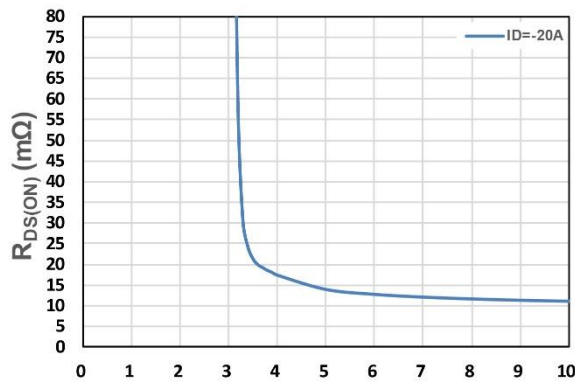


Figure 3. On-Resistance vs. VGS

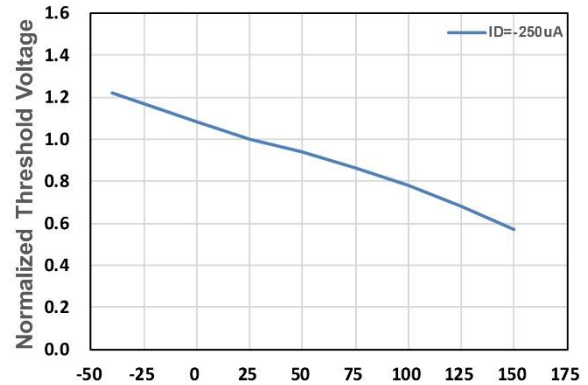


Figure 4. Gate Threshold Voltage

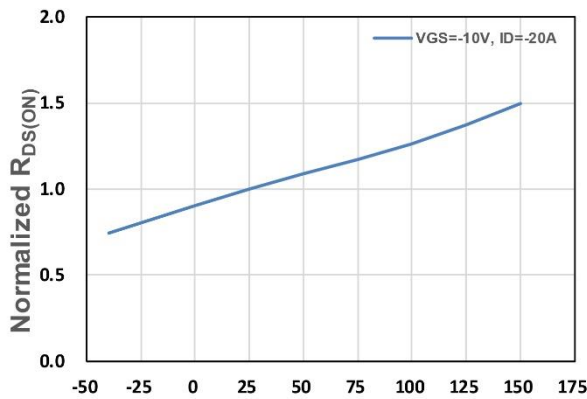


Figure 5. Drain-Source On Resistance

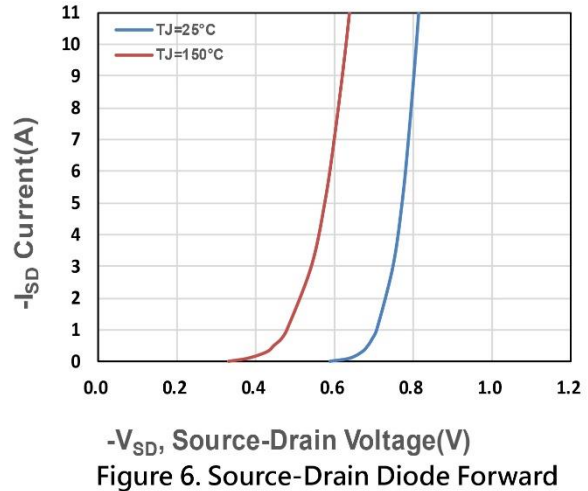
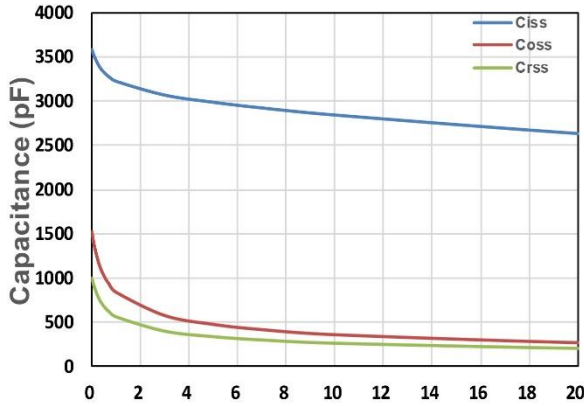
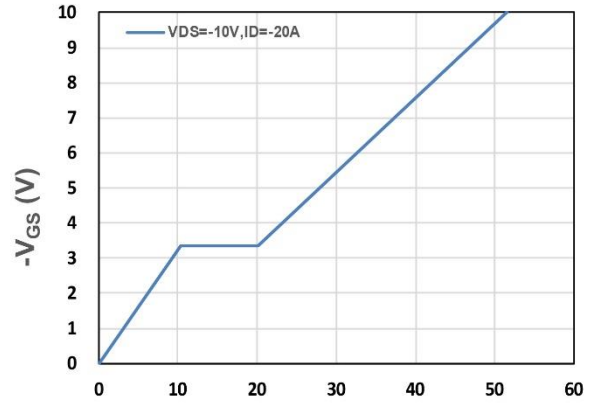


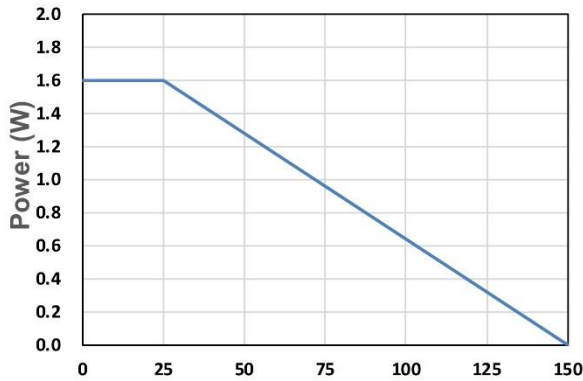
Figure 6. Source-Drain Diode Forward



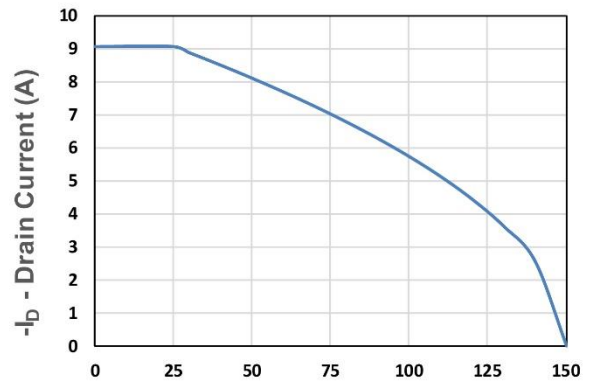
$-V_{DS}$ - Drain - Source Voltage (V)
Figure 7. Capacitance



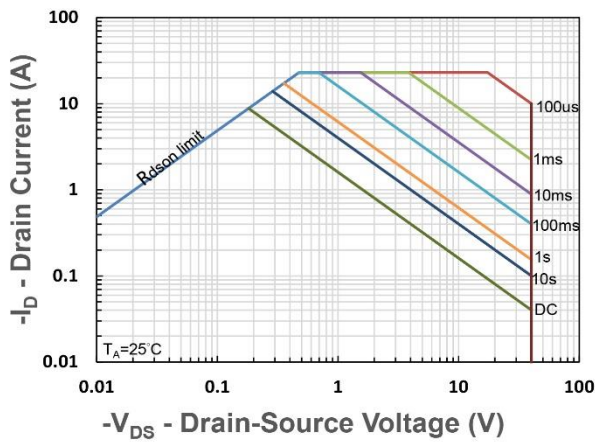
Q_g , Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



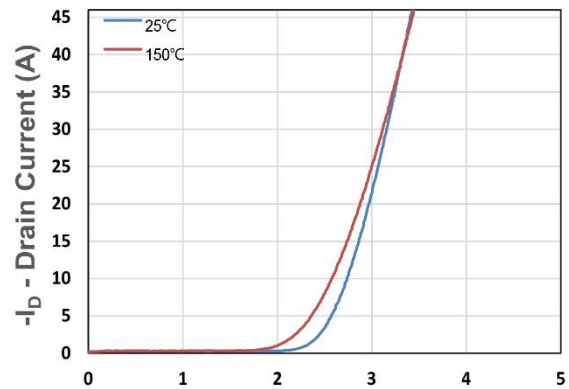
T_A - Ambient Temperature (°C)
Figure 9. Power Dissipation



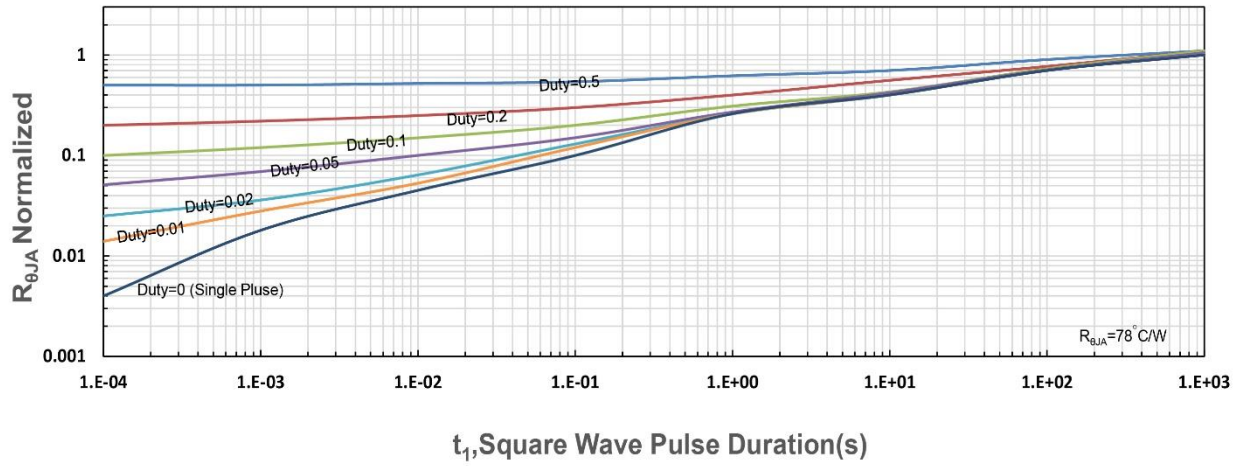
T_A - Ambient Temperature (°C)
Figure 10. Drain Current



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



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



t_1 , Square Wave Pulse Duration(s)
Figure 13. $R_{\theta JA}$ Transient Thermal Impedance