Power MOSFETS

DATASHEET

LM20400PLI3A

P-Channel
Enhancement Mode MOSFET

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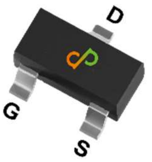
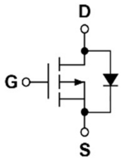
Quality Management Systems

ISO 9001:2015 Certificate

LM20400PLI3A

P-Channel Enhancement Mode MOSFET

Pin Description

SOT-23 (TOP view)	Symbol
	

Ordering Information

Symbol	P-Channel	Unit
V_{DSS}	-20	V
$R_{DS(ON)\text{-}Max}$	43	mΩ
I_D	-4.3	A

Feature

- Fast switching speed
- Reliable and Rugged
- ROHS Compliant & Halogen-Free

Applications

- Portable Equipment
- Battery Powered System

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM20400PLI3A	SOT-23	Tape & Reel	3000 / Tape & Reel	08□□□

Note : □□□ = Lot Code

Absolute Maximum Ratings (T$_J$=25°C Unless Otherwise Noted)

Symbol	Parameter		P-Channel	Unit
V_{DSS}	Drain-Source Voltage		-20	V
V_{GSS}	Gate-Source Voltage		±8	
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	-10.8	A
I_D	Continuous Drain Current	T_A=25°C	-4.3	A
		T_A=70°C	-3.5	
P_D	Maximum Power Dissipation	T_A=25°C	1.1	W
		T_A=70°C	0.7	
I_{AS}②	Avalanche Current, Single pulse	L=0.1mH	-11	A
E_{AS}②	Avalanche Energy, Single pulse	L=0.1mH	6	mJ

Thermal Characteristics

Symbol	Parameter		Rating	Unit
$R_{\theta JA}$③	Thermal Resistance-Junction to Ambient	Steady State	110	°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.

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	-20	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-16V, V_{GS}=0V	-	-	-1	uA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=-250uA	-0.35	-0.6	-0.85	V
I_{GSS}	Gate Leakage Current	V_{GS}=±8V, V_{DS}=0V	-	-	±100	nA
$R_{DS(ON)}$④	Drain-Source On-state Resistance	V_{GS}=-4.5V, I_{DS}=-4A	-	36	43	mΩ
		V_{GS}=-2.5V, I_{DS}=-4A		45	59	
		V_{GS}=-1.8V, I_{DS}=-2A	-	56	84	
gfs	Forward Transconductance	V_{DS}=-5V, I_{DS}=-2.8A	-	11.6	-	S
Dynamic Characteristics ⑤						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V, Freq.=1MHz	-	16	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=-10V, Freq.=1MHz	-	933	-	pF
C_{oss}	Output Capacitance		-	96	-	
C_{rss}	Reverse Transfer Capacitance		-	83	-	
$td_{(ON)}$	Turn-on Delay Time	V_{GS}=-4.5V,V_{DS}=-10V, I_D=-1A,R_{GEN}=6Ω	-	7.2	-	nS
t_r	Turn-on Rise Time		-	13.4	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	26	-	
t_f	Turn-off Fall Time		-	17	-	
Q_g	Total Gate Charge	V_{GS}=-4.5V,V_{DS}=-10V, I_D=-5A	-	6.8	-	nC
Qgs	Gate-Source Charge		-	0.8	-	
Qgd	Gate-Drain Charge		-	2.5	-	
Source-Drain Characteristics						
V_{SD}④	Diode Forward Voltage	I_{SD}=-1.2A, V_{GS}=0V	-	-0.65	-1.1	V
t_{rr}	Reverse Recovery Time	I_F=-5A, V_R=-10V dI_F/dt=100A/μs	-	18	-	nS
Q_{rr}	Reverse Recovery Charge		-	7	-	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

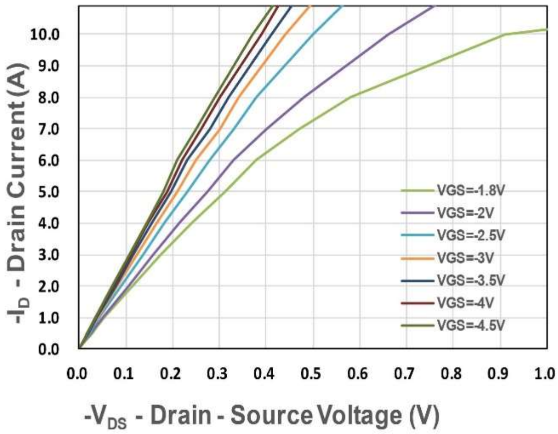


Figure 1. Output Characteristics

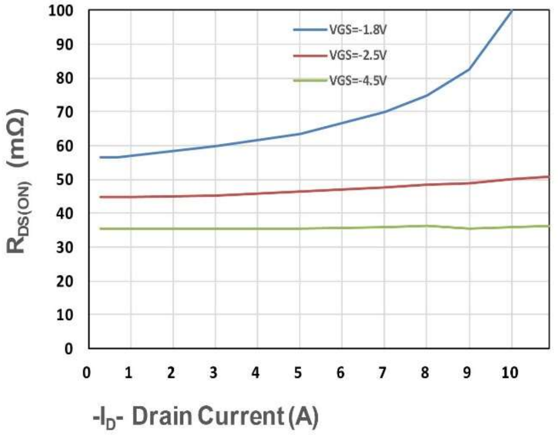


Figure 2. On-Resistance vs. ID

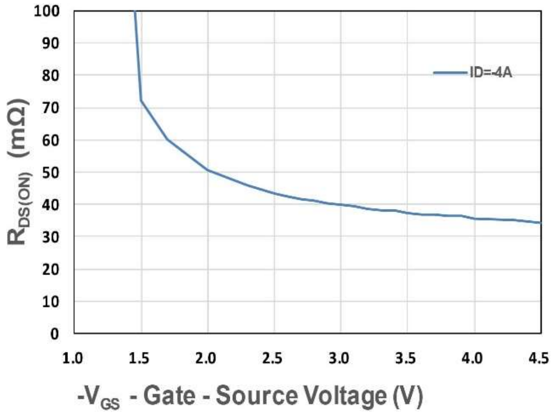


Figure 3. On-Resistance vs. VGS

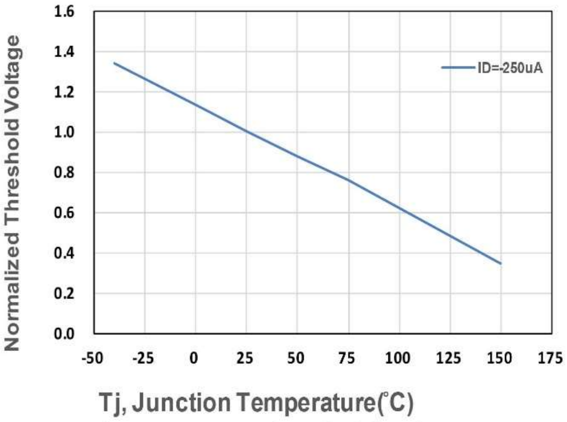


Figure 4. Gate Threshold Voltage

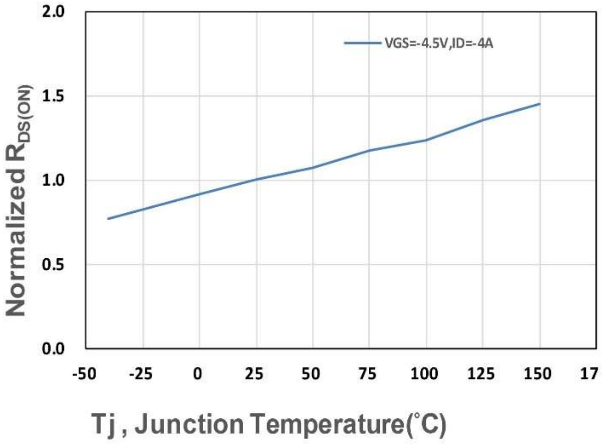


Figure 5. Drain-Source On Resistance

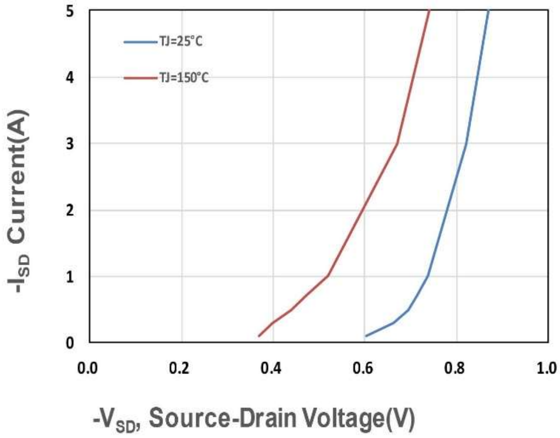


Figure 6. Source-Drain Diode Forward

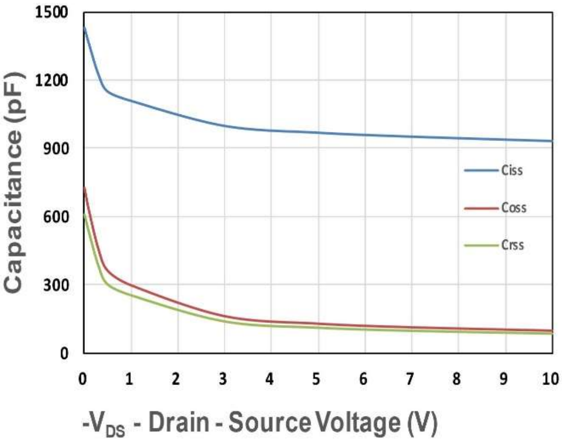


Figure 7. Capacitance

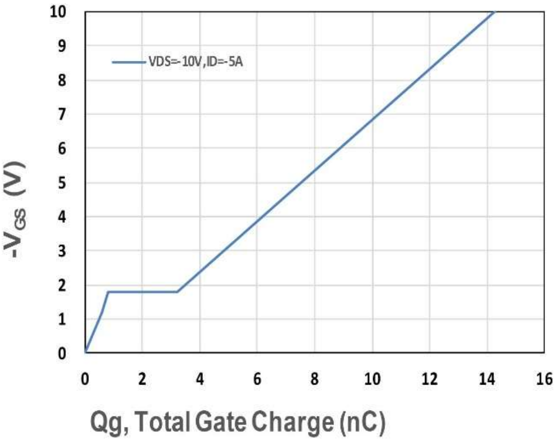


Figure 8. Gate Charge Characteristics

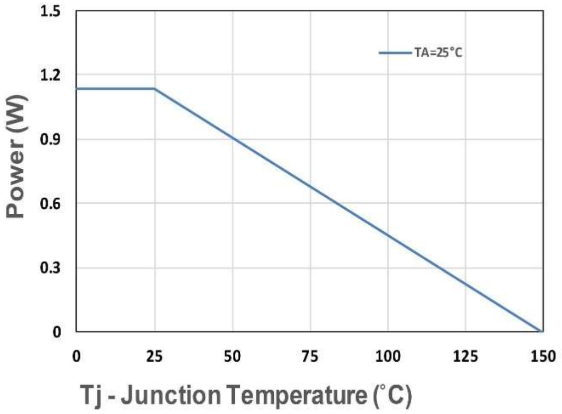


Figure 9. Power Dissipation

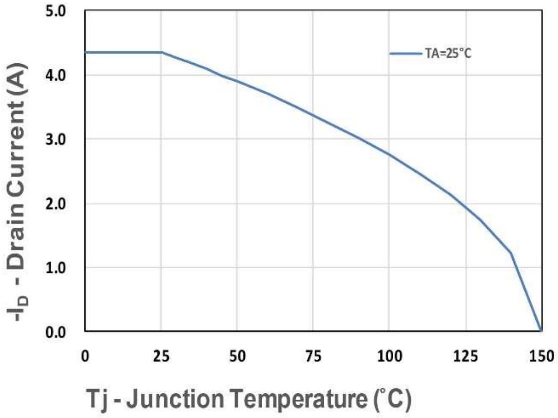


Figure 10. Drain Current

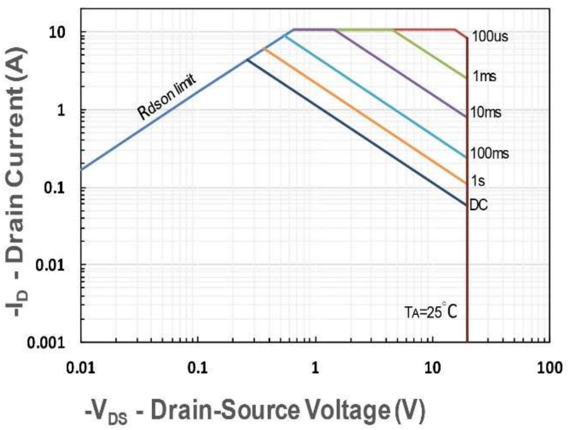


Figure 11. Safe Operating Area

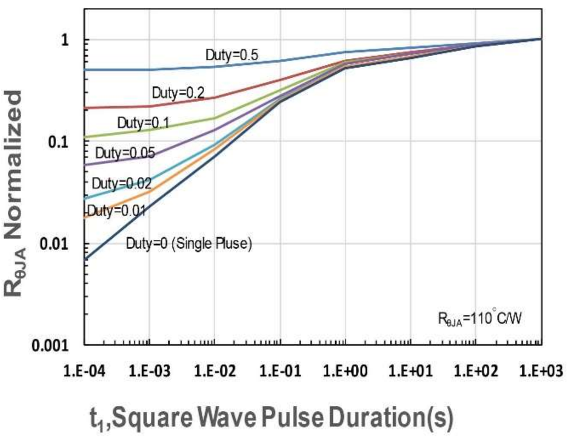


Figure 12. RθJA Transient Thermal Impedance