LPM3401 - -20V/4.2A
P-Channel Enhancement Mode Field Effect Transistor

General Description

The LPM3401 is the P-channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology.

This high density process is especially tailored to minimize on-state resistance.

These devices are particularly suited for low voltage application, notebook computer power management and other battery powered circuits where high-side switching.

Features

- -20V/-4.2A,$R_{DC(ON)}$≤54mΩ(typ.)@V_{GS}=-2.5V
- -20V/-3.0A,$R_{DC(ON)}$≤60mΩ(typ.)@V_{GS}=-4.5V
- Super high density cell design for extremely low $R_{DC(ON)}$
- SOT23 Package

Ordering Information

LPM3401 □ □ □

- F: Pb-Free
- Package Type B3: SOT23

Applications

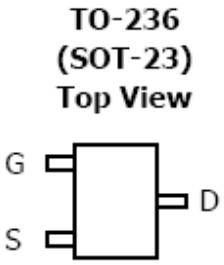
- Portable Media Players
- Cellular and Smart mobile phone
- LCD
- DSC Sensor
- Wireless Card

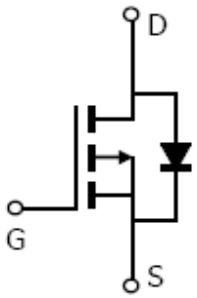
Marking Information

Device	Marking	Package	Shipping
LPM3401B3F	A1XXX	SOT23-3	3K/REEL

XXX : The production cycle and the batch.

Pin Configurations





SOT23L(Top View)

Functional Pin Description

Absolute Maximum Ratings T_A=25°C unless otherwise noted				
Parameter		**Symbol**	**Maximum**	**Units**
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	±8	V
Continuous Drain Current [A]	T_A=25°C	I_D	-4.0	A
	T_A=70°C		-3.5	
Pulsed Drain Current [B]		I_{DM}	-30	
Power Dissipation [A]	T_A=25°C	P_D	1.4	W
	T_A=70°C		0.9	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=-250μA, V_{GS}=0V	-20			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-16V, V_{GS}=0V			-1	μA
		T_J=55°C			-5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}=±4.5V			±1	μA
		V_{DS}=0V, V_{GS}=±8V			±10	μA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=-250μA	-0.3	-0.55	-1	
$I_{D(ON)}$	On state drain current	V_{GS}=-4.5V, V_{DS}=-5V	-25			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-4.5V, I_D=-4A		35	43	mΩ
		T_J=125°C		48	60	
		V_{GS}=-2.5V, I_D=-4A		45	54	mΩ
		V_{GS}=-1.8V, I_D=-2A		56	73	mΩ
		V_{GS}=-1.5V, I_D=-1A		70		mΩ
g_{FS}	Forward Transconductance	V_{DS}=-5V, I_D=-4A	8	16		S
V_{SD}	Diode Forward Voltage	I_S=-1A,V_{GS}=0V		-0.78	-1	V
I_S	Maximum Body-Diode Continuous Current				-2.2	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=-10V, f=1MHz		1450		pF
C_{oss}	Output Capacitance			205		pF
C_{rss}	Reverse Transfer Capacitance			160		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		6.5		Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	V_{GS}=-4.5V, V_{DS}=-10V, I_D=-4A		17.2		nC
Q_{gs}	Gate Source Charge			1.3		nC
Q_{gd}	Gate Drain Charge			4.5		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=-4.5V, V_{DS}=-10V, R_L=2.5Ω, R_{GEN}=3Ω		9.5		ns
t_r	Turn-On Rise Time			17		ns
$t_{D(off)}$	Turn-Off DelayTime			94		ns
t_f	Turn-Off Fall Time			35		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=-4A, dI/dt=100A/μs		31		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=-4A, dI/dt=100A/μs		13.8		nC

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

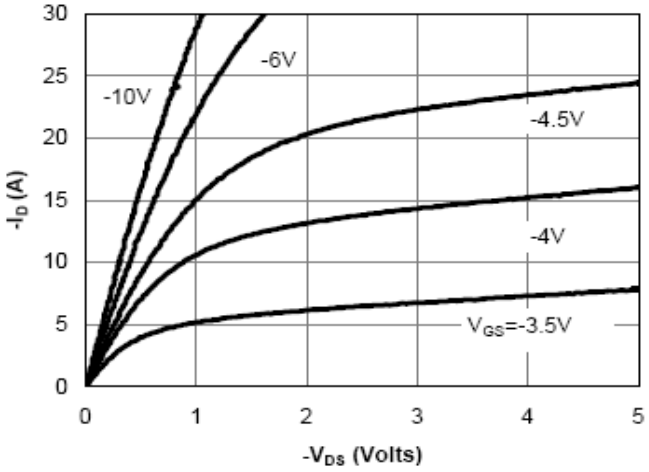


Fig 1: On-Region Characteristics (Note E)

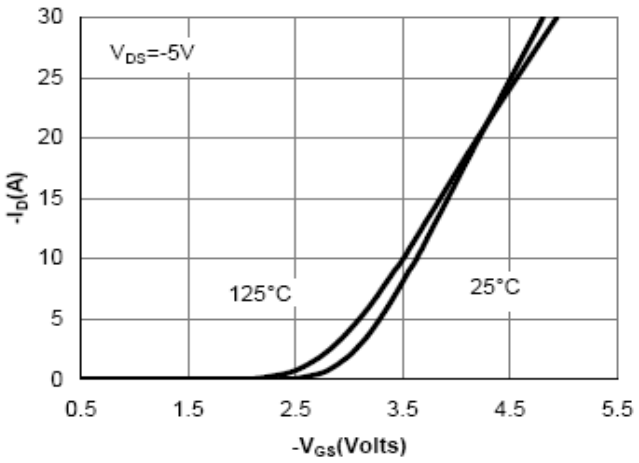


Figure 2: Transfer Characteristics (Note E)

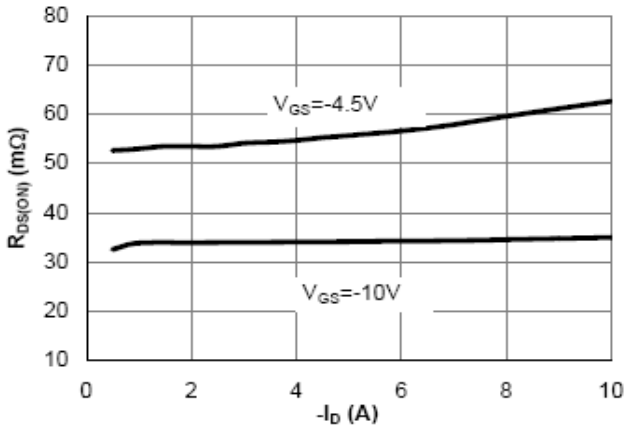


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

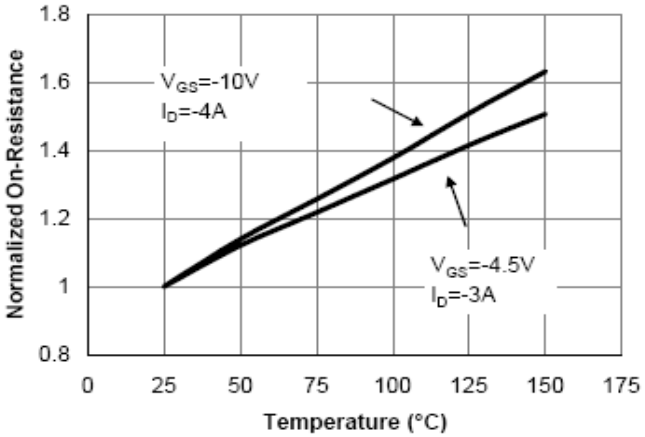


Figure 4: On-Resistance vs. Junction Temperature (Note E)

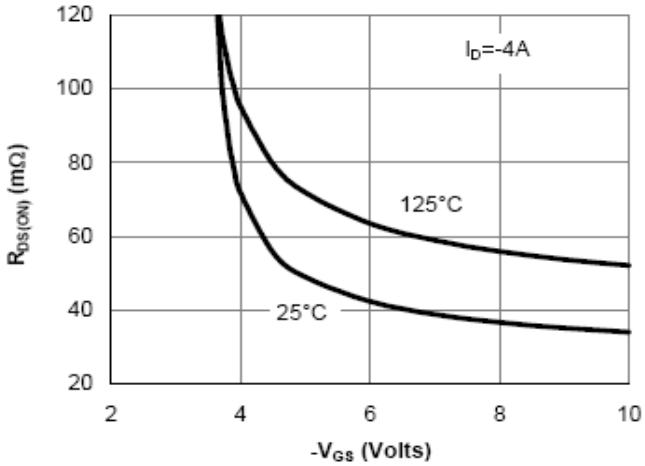


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

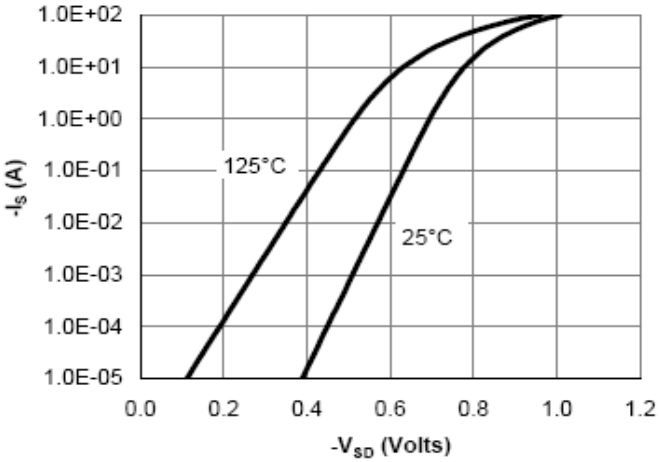


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

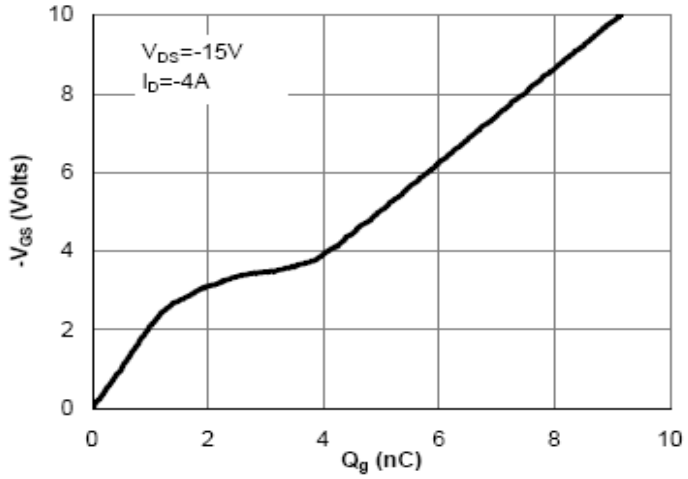


Figure 7: Gate-Charge Characteristics

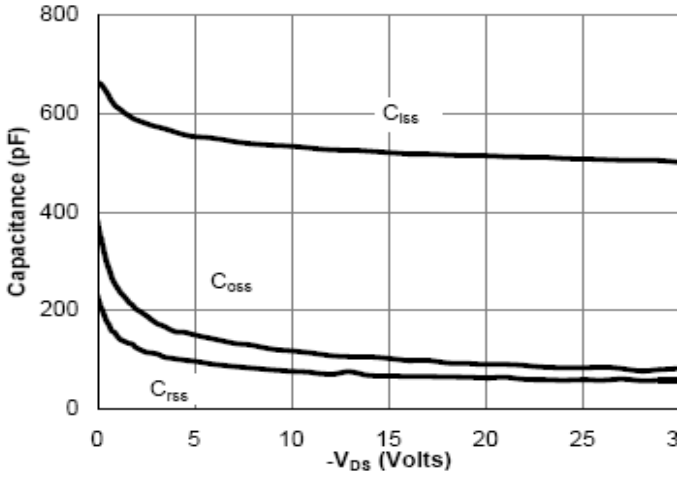


Figure 8: Capacitance Characteristics

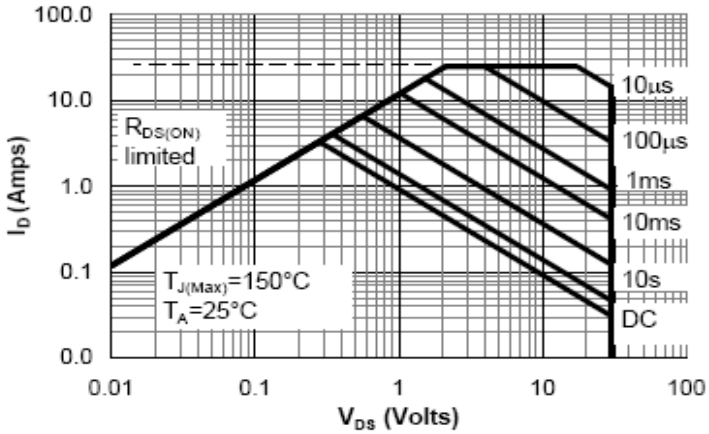


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

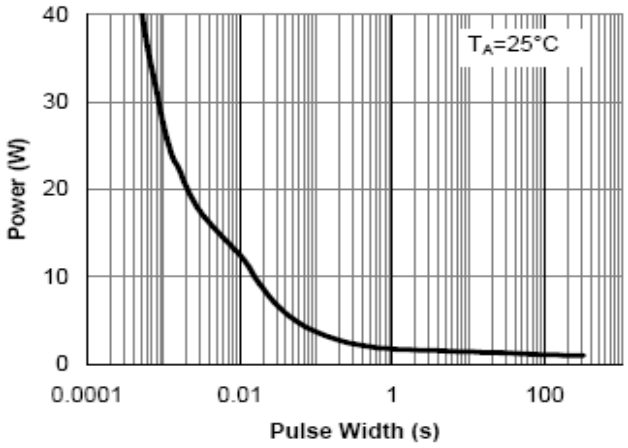


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

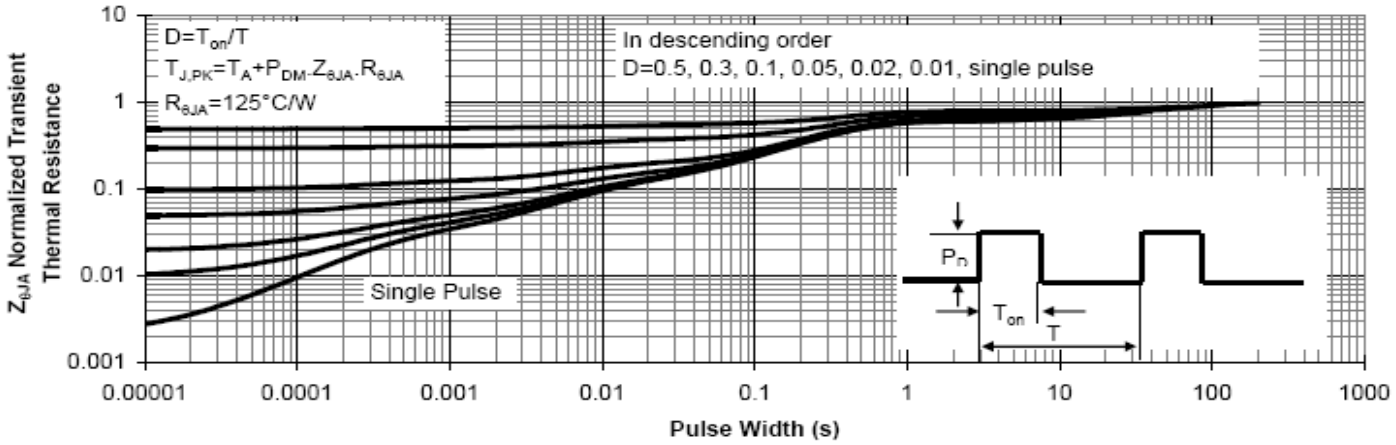
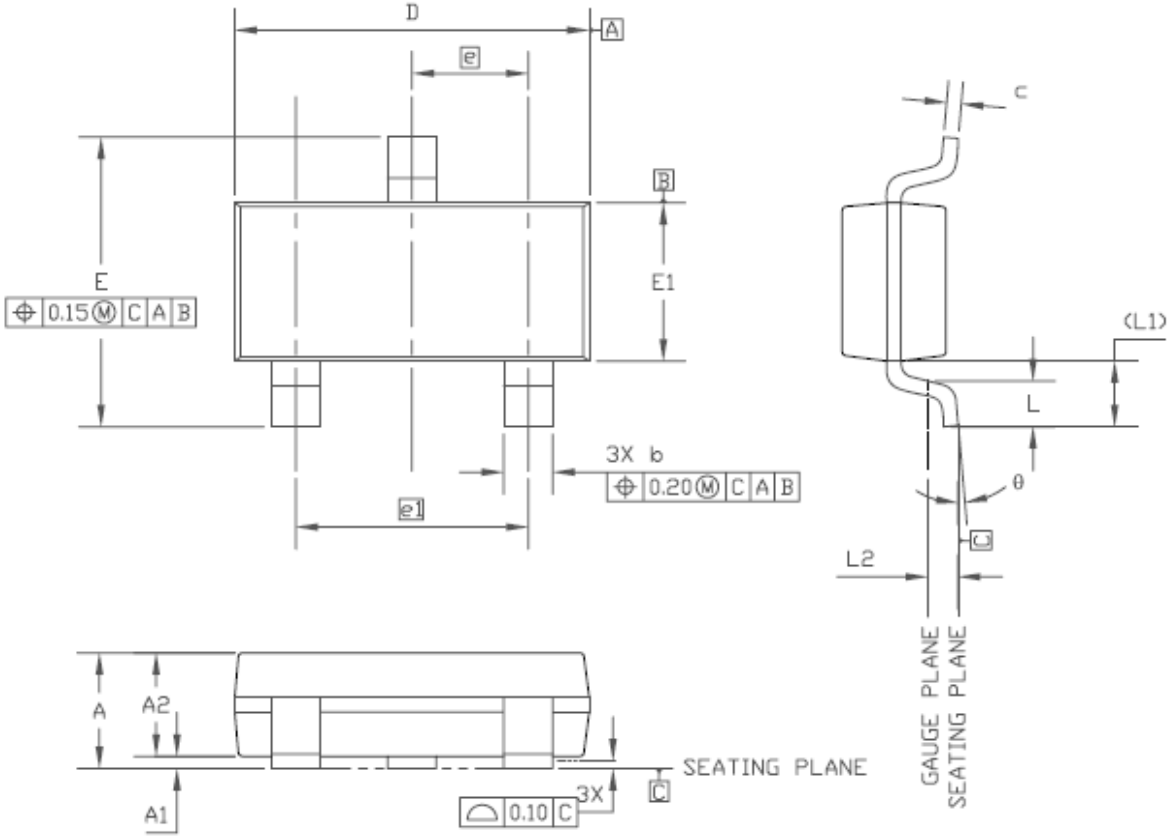


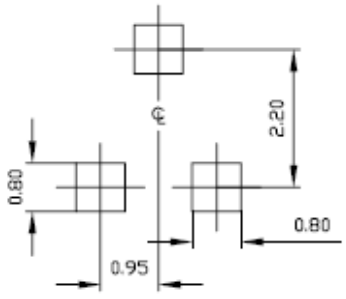
Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

Packaging Information

SOT−23 STANDARD PACKAGE OUTLINE



RECOMMENDED LAND PATTERN



UNIT: mm

SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.75	—	1.17	0.030	—	0.046
A1	0.05	—	0.15	0.002	—	0.006
A2	0.70	0.85	1.02	0.028	0.033	0.040
b	0.30	—	0.50	0.012	—	0.020
c	0.08	—	0.20	0.003	—	0.008
D	2.80	2.90	3.04	0.110	0.114	0.120
E	2.10	—	2.64	0.083	—	0.104
E1	1.20	1.30	1.40	0.047	0.051	0.055
e	0.95 BSC			0.037 BSC		
e1	1.90 BSC			0.075 BSC		
L	0.40	0.50	0.60	0.016	0.020	0.024
L1	0.54 REF			0.021REF		
L2	0.25			0.010		
θ1	0°	—	8°	0°	—	8°