

LMP3131RF 30V P-Channel MOSFET
Features

- -30V/-5.5A, $R_{DS(ON)} < 32m\Omega @ V_{GS} = -10V$
- Fast switching
- Suit for -4.5V Gate Drive Applications
- Green Device Available
- SOT-23 package design

Product Description

These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance,

provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

These devices are well suited for high efficiency fast switching applications.

Applications

- Notebook
- Load Switch
- Battery Protection
- Hand-held Instruments

Pin Configuration

LMP3131RF (SOT-23-6L)

PIN	Description
1	Drain
2	Drain
3	Gate
4	Source
5	Drain
6	Drain

Ordering Information

Ordering Information					
Part Number	P/N	PKG code	Pb Free code	Package	Quantity
LMP3131RF	LMP3131	R	F	SOT-23-6L	3000

Marking Information

Marking Information		
Part Marking	Part Number	LFC code
31XWM	31	XWM

Absolute Maximum Ratings

 (T_C=25°C Unless otherwise noted)

Symbol	Parameter	Typical	Unit
V _{DS}	Drain-Source Voltage	-30	V
V _{GS}	Gate-Source Voltage	±20	V
I _D	Continuous Drain Current	T _A =25°C	-5.5
		T _A =70°C	-4.4
I _{DM}	Pulsed Drain Current ¹	-22	A
EAS	Single Pulse Avalanche Energy ²	39.2	mJ
IAS	Single Pulse Avalanche Current ²	-28	A
P _D	Power Dissipation (T _A =25°C)	1.56	W
T _J	Operating Junction Temperature Range	-55 to +150	°C
T _{STG}	Storage Temperature Range	-55 to +150	°C
R _{θJA}	Thermal Resistance-Junction to Ambient	80	°C/W

Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.

Electrical Characteristics

 (T_C=25°C Unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	-30			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	-1.3	-1.7	-2.3	V
I _{GSS}	Gate-Source Leakage Current	V _{DS} =0V, V _{GS} =±20V			±100	nA
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-30V, V _{GS} =0V T _J =25°C			-1	uA
		V _{DS} =-24V, V _{GS} =0V, T _J =125°C			-10	
I _S	Continuous Source Current	V _G =V _D =0V, Force Current			-5.5	A
I _{SM}	Pulsed Source Current				-11	
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} =10V, I _D =-4A		27	32	mΩ
		V _{GS} =4.5V, I _D =-3A,		42	46	
g _{FS}	Forward Transconductance	V _{DS} =-10V, I _D =-3A		5		S
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =-1A			-1	V
Dynamic						
Q _g	Total Gate Charge ^{2,3}	V _{DS} =-15V, V _{GS} =-4.5V, I _D =-5A		8	15	nC
Q _{gs}	Gate-Source Charge ^{2,3}			3.3	6	
Q _{gd}	Gate-Drain Charge ^{2,3}			2.3	5	
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz		757	1280	pF
C _{oss}	Output Capacitance			122	210	
C _{rss}	Reverse Transfer Capacitance			88	175	
t _{d(on)}	Turn-On Time ^{2,3}	V _{DD} =15V, I _D =-1A, V _{GS} =-10V, R _G =6Ω		4.6	9	ns
t _r	Rise Time ^{2,3}			14	26	
t _{d(off)}	Turn-Off Time ^{2,3}			34	58	
t _f	Fall Time ^{2,3}			18	35	

Note :

2. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
3. Essentially independent of operating temperature.

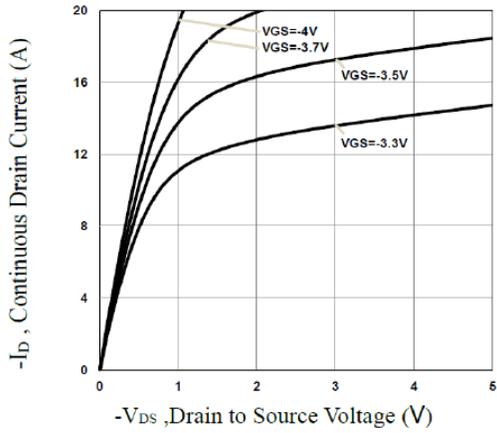
Typical Performance Characteristics


Fig.1 Typical Output Characteristics

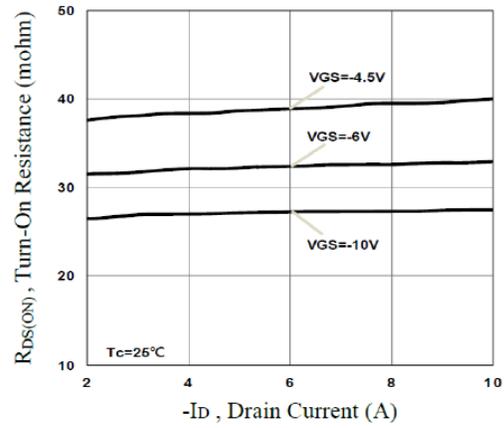
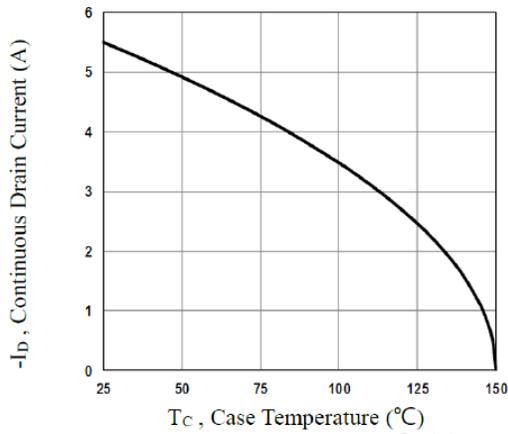
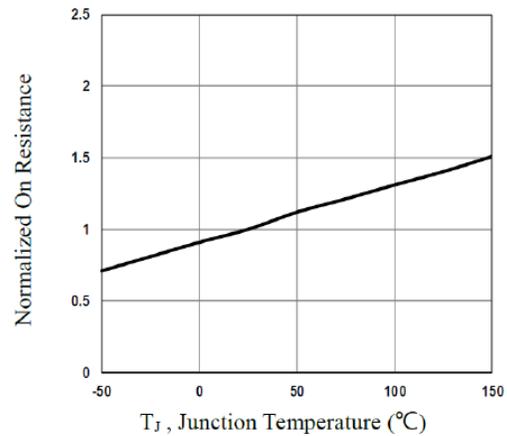
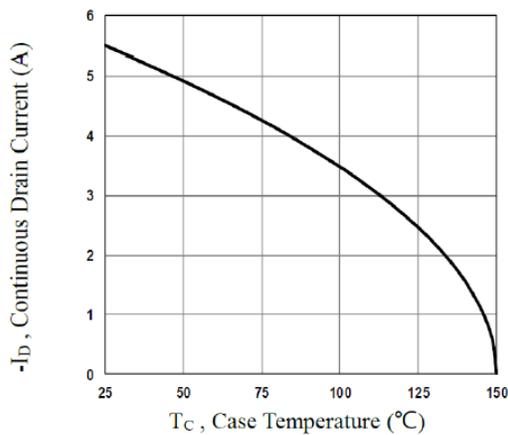
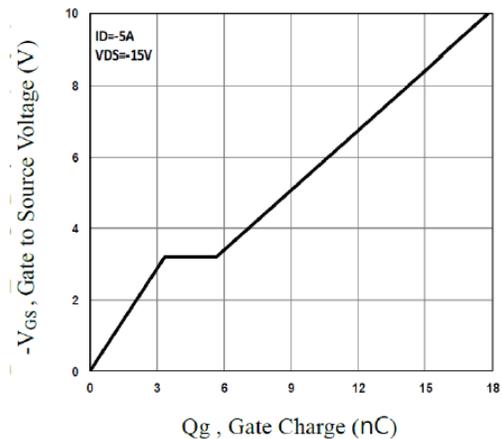
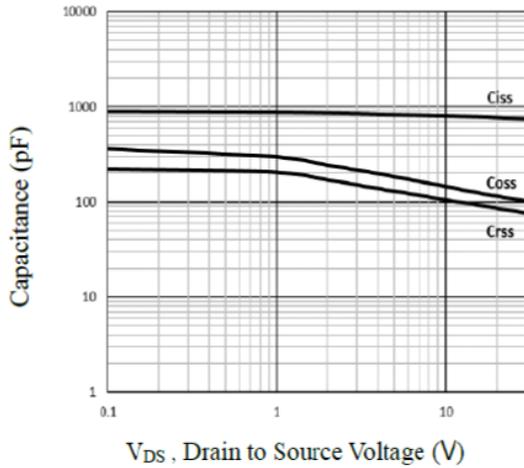
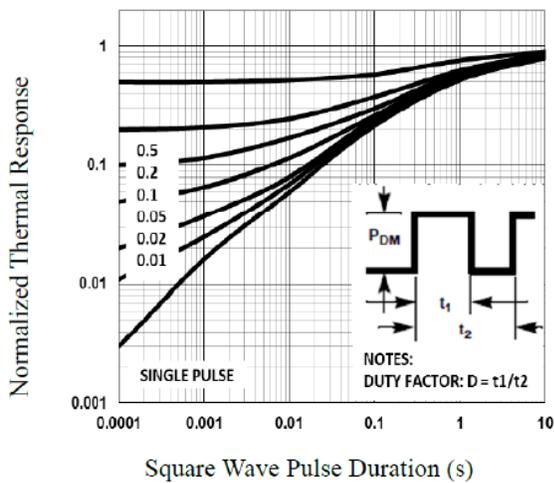
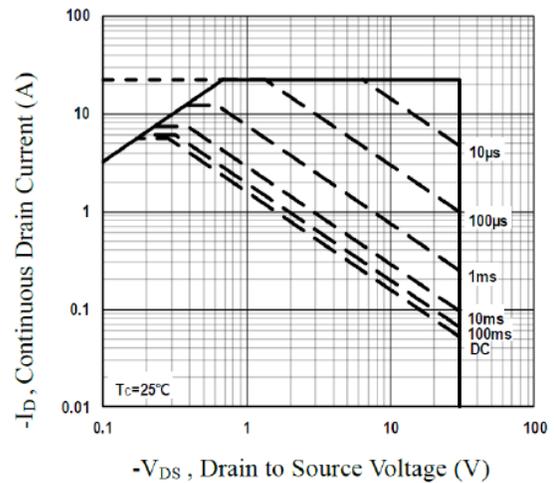
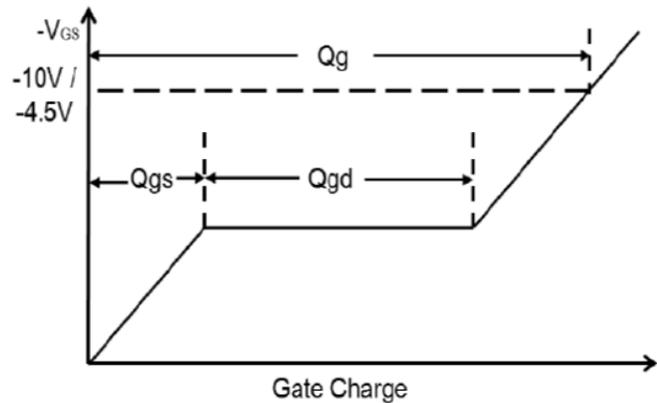
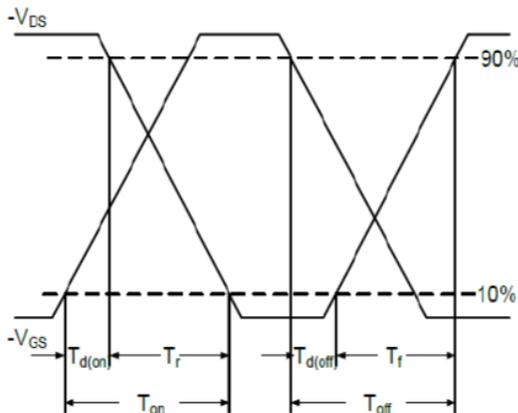
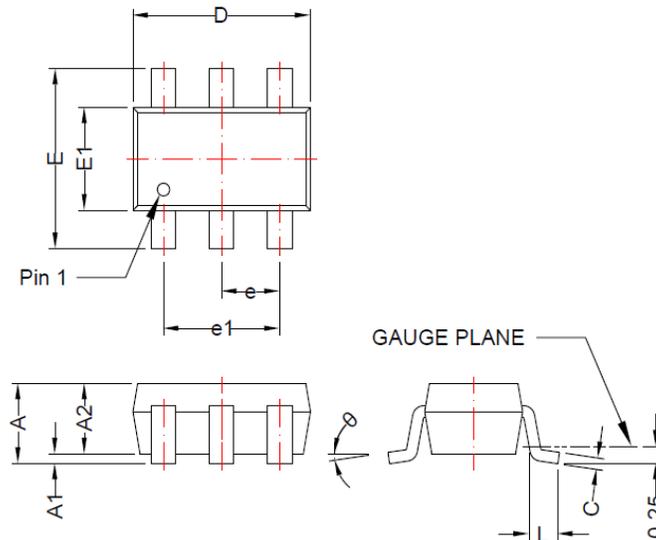

 Fig.2 Turn-On Resistance vs I_D

 Fig.3 Continuous Drain Current vs T_C

 Fig.4 Normalized $R_{DS(ON)}$ vs T_J

 Fig.5 Normalized V_{th} vs T_J


Fig.6 Gate Charge Characteristics

Typical Performance Characteristics(continue)

Fig.7 Capacitance Characteristics

Fig.8 Normalized Transient Impedance

Fig.9 Maximum Safe Operation Area


Package Dimension:
SOT-23-6L


DIMENSION D DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.25mm PER INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25mm PER SIDE.

Dimensions				
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.90	1.45	0.035	0.057
A1	0.00	0.15	0.000	0.006
A2	0.90	1.30	0.035	0.051
b	0.30	0.50	0.012	0.020
c	0.08	0.26	0.003	0.010
D	2.70	3.10	0.106	0.122
E	2.20	3.00	0.087	0.118
E1	1.30	1.75	0.051	0.069
e	0.95 BSC		0.037 BSC	
e1	1.90 BSC		0.075 BSC	
L	0.3	0.6	0.012	0.024
θ	0°	8°	0°	8°

NOTICE:

LFC Semiconductor assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all LFC Semiconductor products described or contained herein. LFC Semiconductor products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner.

Applications shown on the herein document are examples of standard use and operation. Customers are responsible in comprehending the suitable use in particular applications. LFC Semiconductor makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Information furnished is believed to be accurate and reliable. However LFC Semiconductor assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties, which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of LFC Semiconductor. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information without express written approval of LFC Semiconductor.