

# GSM3131JZF

## 30V P-Channel MOSFETs

### 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.

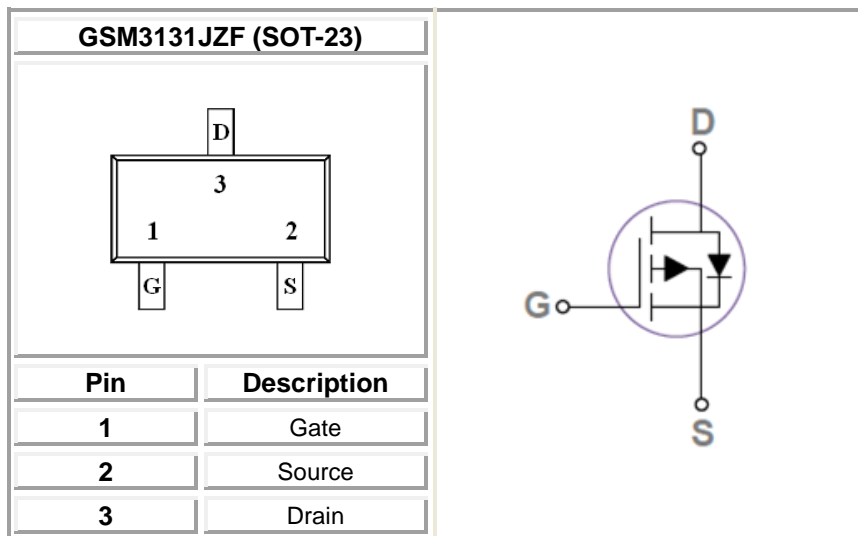
### Features

- -30V, -5A,  $R_{DS(ON)}=32m\Omega@V_{GS}=10V$
- Fast switching
- Suit for -4.5V Gate Drive Applications
- Green Device Available

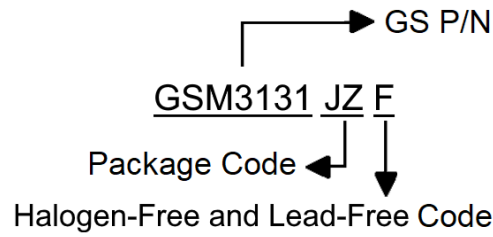
### Applications

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

### Packages & Pin Assignments

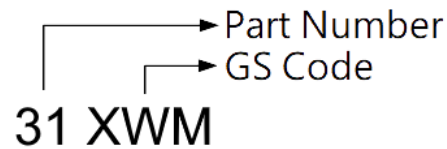


## Ordering Information



Part Number	Package	Part Marking	Quantity
GSM3131JZF	SOT-23	31XWM	3000pcs

## Marking Information



## Absolute Maximum Ratings

$T_C=25^{\circ}\text{C}$  Unless otherwise noted

Symbol	Parameter	Typical	Unit
$V_{DS}$	Drain-Source Voltage	-30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Continuous Drain Current	$T_A=25^{\circ}\text{C}$	-5
		$T_A=70^{\circ}\text{C}$	-4
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	-20	A
EAS	Single Pulse Avalanche Energy <sup>2</sup>	39.2	mJ
IAS	Single Pulse Avalanche Current <sup>2</sup>	-28	A
$P_D$	Power Dissipation ( $T_A=25^{\circ}\text{C}$ )	1.56	W
$T_J$	Operating Junction Temperature Range	-55 to +150	$^{\circ}\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to +150	$^{\circ}\text{C}$
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	80	$^{\circ}\text{C}/\text{W}$

Note :

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

## Electrical Characteristics

T<sub>J</sub>=25°C Unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	-30			V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	-1.3	-1.7	-2.3	V
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V			±100	nA
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V T <sub>J</sub> =25°C			-1	uA
		V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C			-10	
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current			-5	A
I <sub>SM</sub>	Pulsed Source Current				-10.2	
R <sub>DS(on)</sub>	Drain-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =-4A		27	32	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =-3A,		42	46	
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =-10V, I <sub>D</sub> =-3A		5		S
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =-1A			-1	V
<b>Dynamic</b>						
Q <sub>g</sub>	Total Gate Charge <sup>2,3</sup>	V <sub>DS</sub> =-15V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-5A		8	15	nC
Q <sub>gs</sub>	Gate-Source Charge <sup>2,3</sup>			3.3	6	
Q <sub>gd</sub>	Gate-Drain Charge <sup>2,3</sup>			2.3	5	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz		757	1280	pF
C <sub>oss</sub>	Output Capacitance			122	210	
C <sub>rss</sub>	Reverse Transfer Capacitance			88	175	
t <sub>d(on)</sub>	Turn-On Time <sup>2,3</sup>	V <sub>DD</sub> =15V, I <sub>D</sub> =-1A, V <sub>GS</sub> =-10V, R <sub>G</sub> =6Ω		4.6	9	ns
t <sub>r</sub>	Rise Time <sup>2,3</sup>			14	26	
t <sub>d(off)</sub>	Turn-Off Time <sup>2,3</sup>			34	58	
t <sub>f</sub>	Fall Time <sup>2,3</sup>			18	35	

Note :

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

## Typical Performance Characteristics

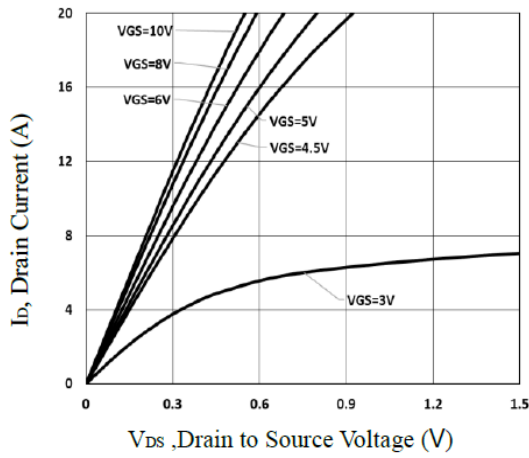


Fig.1 Typical Output Characteristics

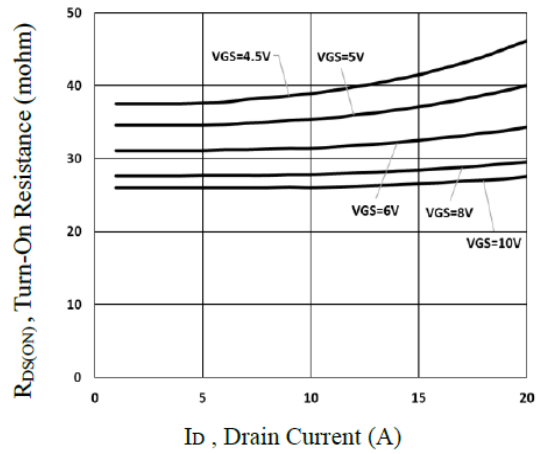


Fig.2 Turn-On Resistance vs  $I_D$

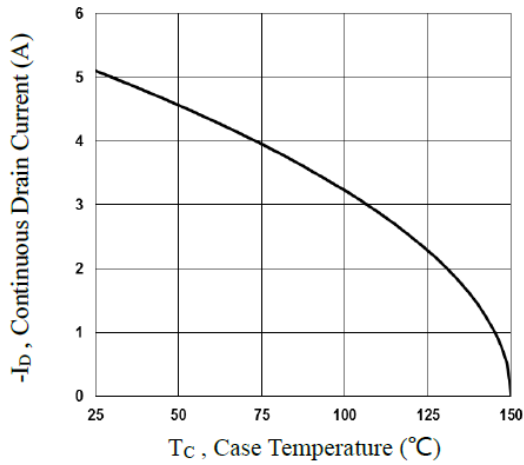


Fig.3 Continuous Drain Current vs  $T_C$

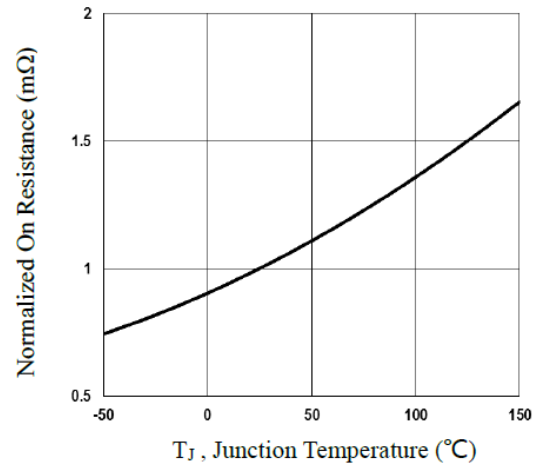


Fig.4 Normalized  $R_{DS(ON)}$  vs  $T_J$

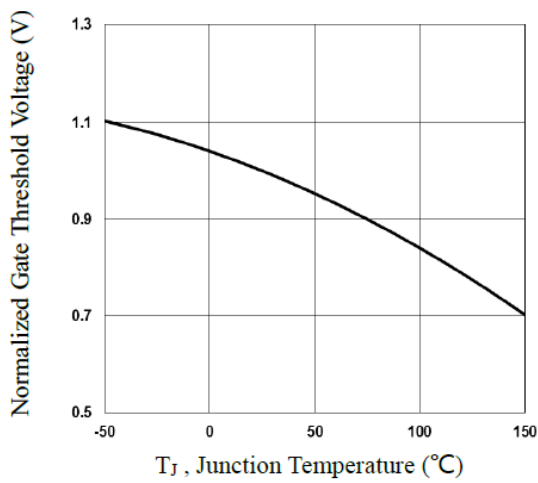


Fig.5 Normalized  $V_{th}$  vs  $T_J$

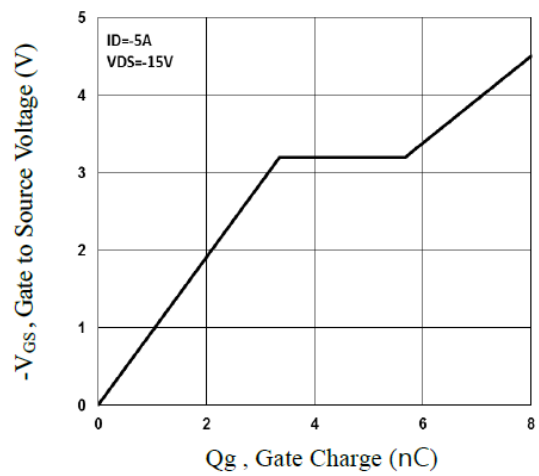


Fig.6 Gate Charge Characteristics

## Typical Performance Characteristics (Continue)

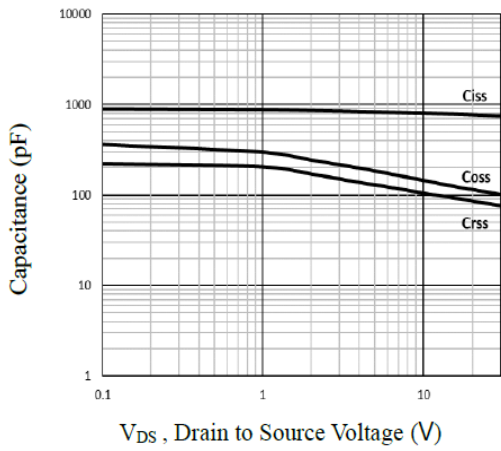


Fig.7 Capacitance Characteristics

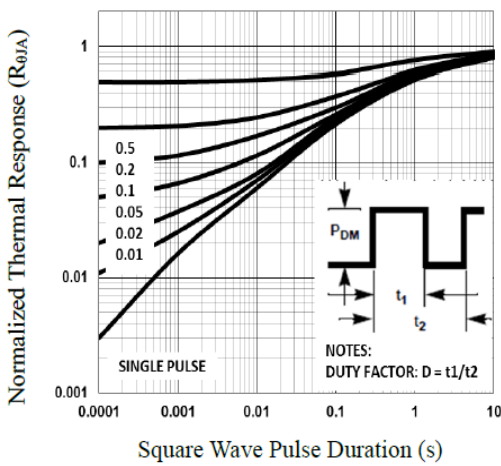


Fig.8 Normalized Transient Impedance

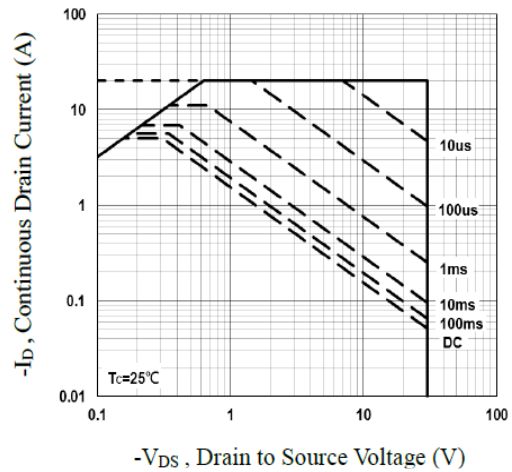


Fig.9 Maximum Safe Operation Area

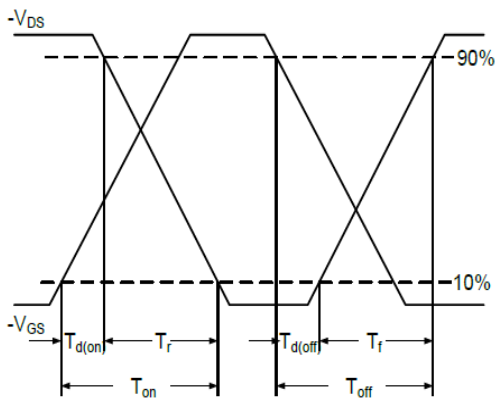


Fig.10 Switching Time Waveform

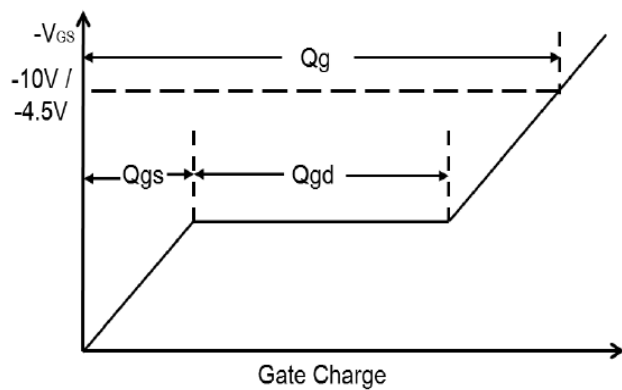
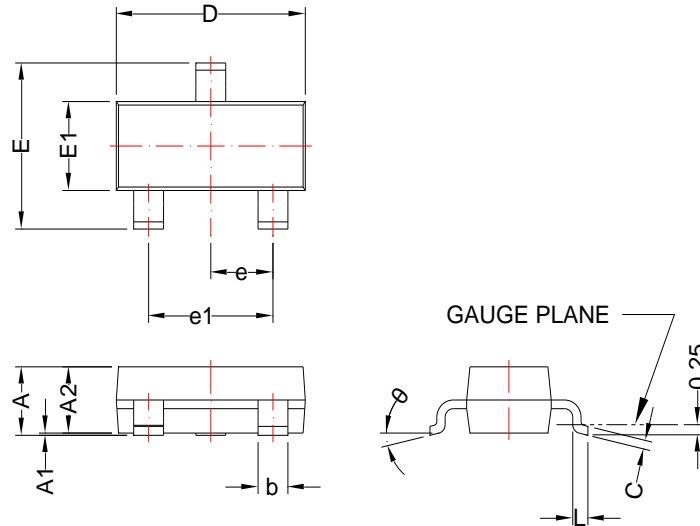


Fig.11 Gate Charge Waveform

## Package Dimension

### SOT-23



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
<b>A</b>	0.75	1.17	0.030	0.046
<b>A1</b>	0.01	0.15	0.000	0.006
<b>A2</b>	0.70	1.02	0.028	0.040
<b>b</b>	0.30	0.50	0.012	0.020
<b>c</b>	0.08	0.20	0.003	0.008
<b>D</b>	2.80	3.04	0.110	0.120
<b>E</b>	2.10	2.64	0.083	0.104
<b>E1</b>	1.20	1.40	0.047	0.055
<b>e</b>	0.95 BSC		0.037 BSC	
<b>e1</b>	1.90 BSC		0.075 BSC	
<b>L</b>	0.3	0.6	0.012	0.024
<b>θ</b>	0°	8°	0°	8°





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