

GSM3909

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.

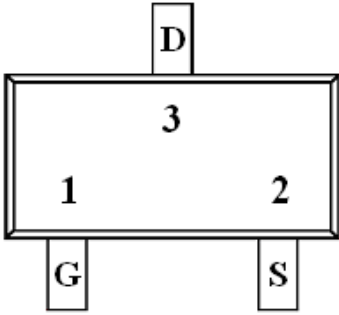
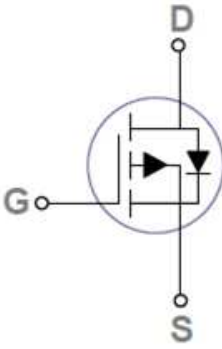
Features

- -30V, -5.1A, $R_{DS(ON)}=32m\Omega@V_{GS}=10V$
- Fast switching
- Suit for -4.5V Gate Drive Applications
- Green Device Available

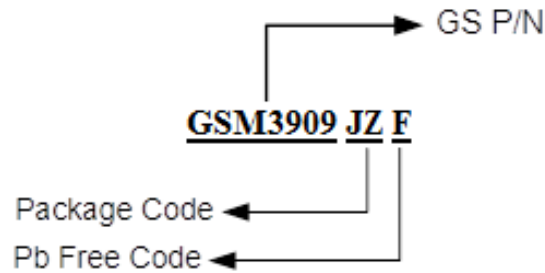
Applications

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

Packages & Pin Assignments

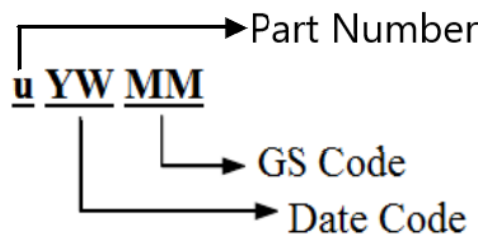
GSM3909JZF (SOT-23)	
 <p>Top View</p>	
	
Pin	Description
1	Gate
2	Source
3	Drain

Ordering Information



Part Number	Package	Part Marking	Quantity
GSM3909JZF	SOT-23	uYMMM	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	± 20	V
I_D	Continuous Drain Current	$T_C=25^{\circ}\text{C}$	-5.1
		$T_C=100^{\circ}\text{C}$	-3.2
I_{DM}	Pulsed Drain Current ¹	-20.4	A
EAS	Single Pulse Avalanche Energy ²	39.2	mJ
IAS	Single Pulse Avalanche Current ²	28	A
P_D	Power Dissipation ($T_C=25^{\circ}\text{C}$)	1.56	W
	Power Dissipation (Derate above 25°C)	0.012	W/ $^{\circ}\text{C}$
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	125	$^{\circ}\text{C}/\text{W}$
$R_{\theta JC}$	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_J=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
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =1mA	---	-0.03	---	V/°C
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	-1.2	-1.6	-2.2	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	4	---	mV/°C
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	---	---	-5.1	A
I _{SM}	Pulsed Source Current		---	---	-10.2	
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} =10V, I _D =-4A	---	27	32	mΩ
		V _{GS} =4.5V, I _D =-2A,	---	38	46	
g _{FS}	Forward Transconductance	V _{DS} =-10V, I _D =-3A	---	9	---	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 :

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

Typical Performance Characteristics

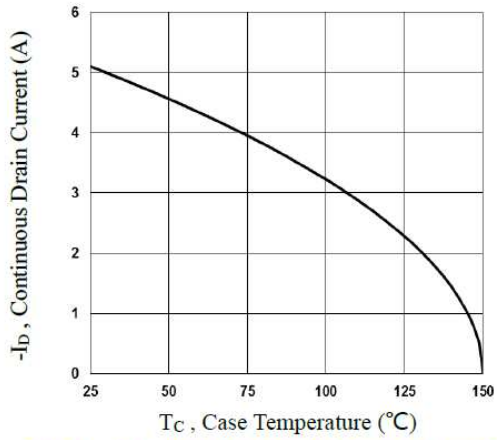


Fig.1 Continuous Drain Current vs. T_c

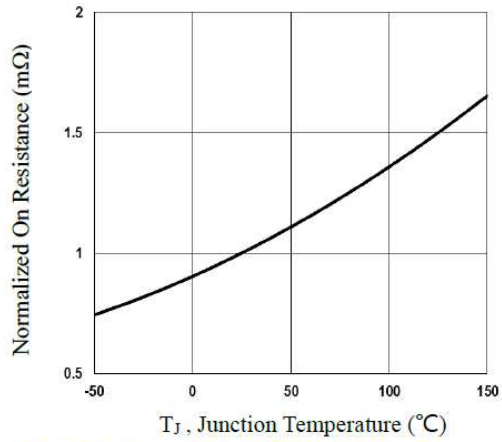


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

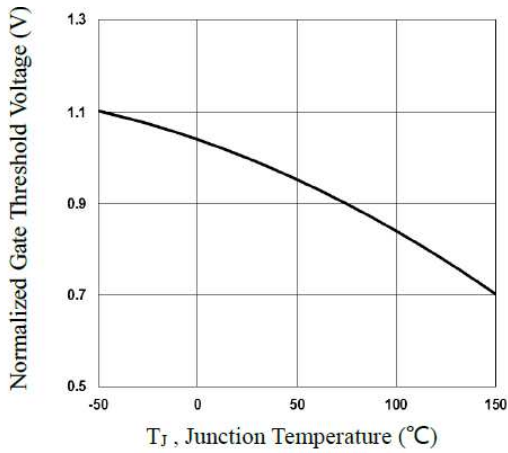


Fig.3 Normalized V_{th} vs. T_j

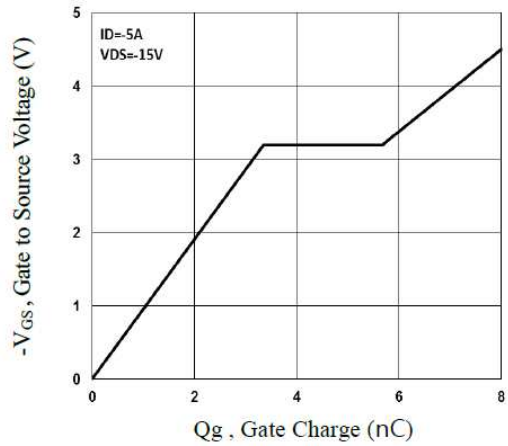


Fig.4 Gate Charge Waveform

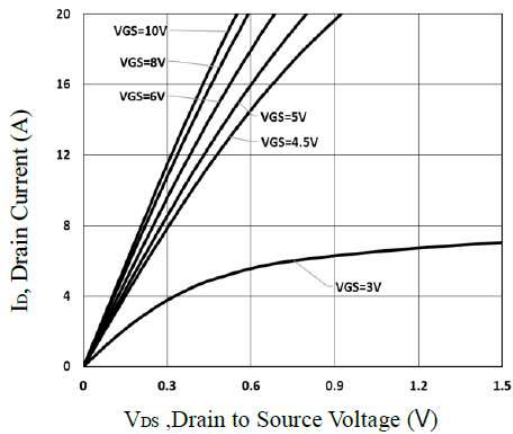


Fig.5 Typical Output Characteristics

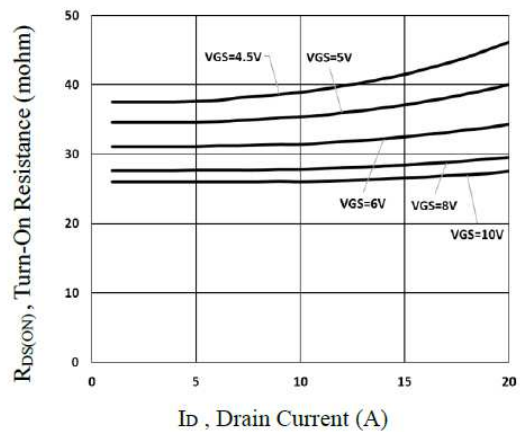


Fig.6 Turn-On Resistance vs. I_d

Typical Performance Characteristics (Continue)

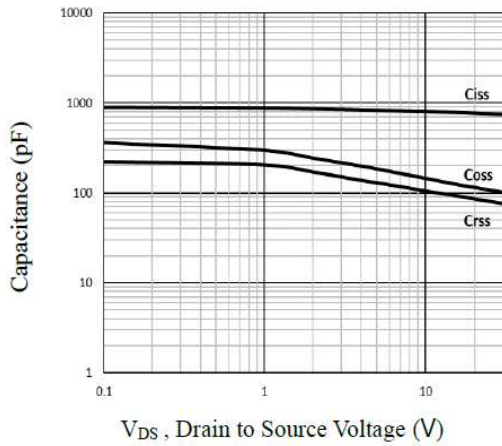


Fig.7 Capacitance Characteristics

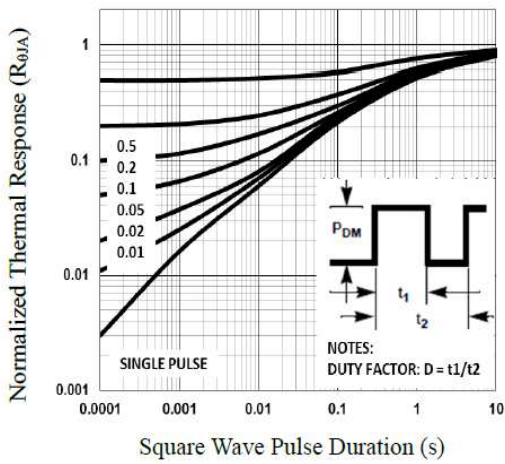


Fig.8 Normalized Transient Impedance

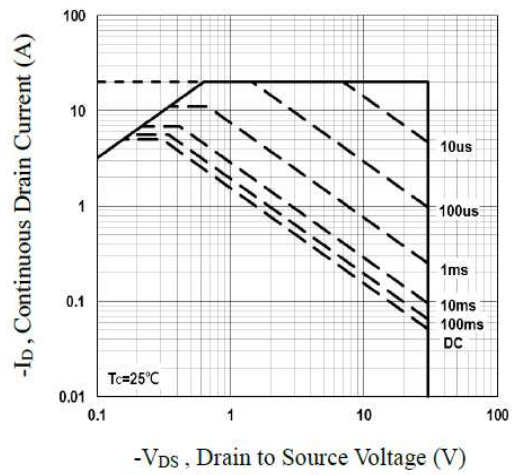


Fig.9 Maximum Safe Operation Area

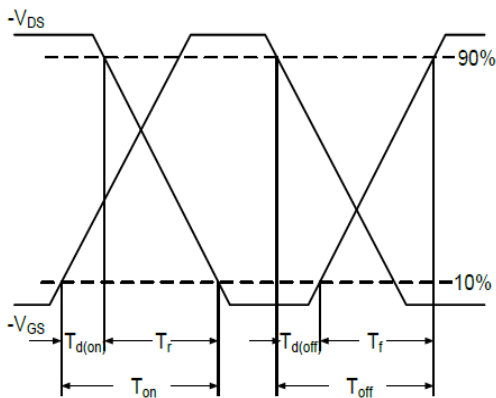


Fig.10 Switching Time Waveform

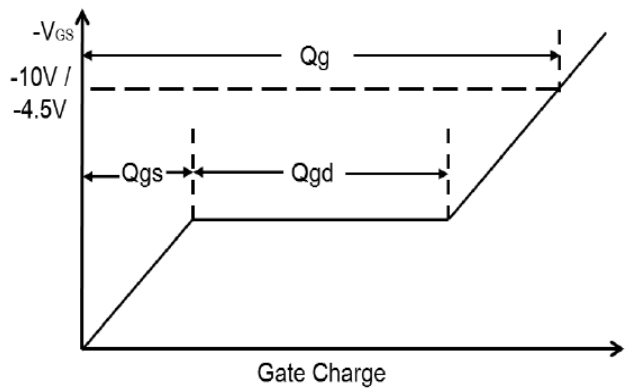
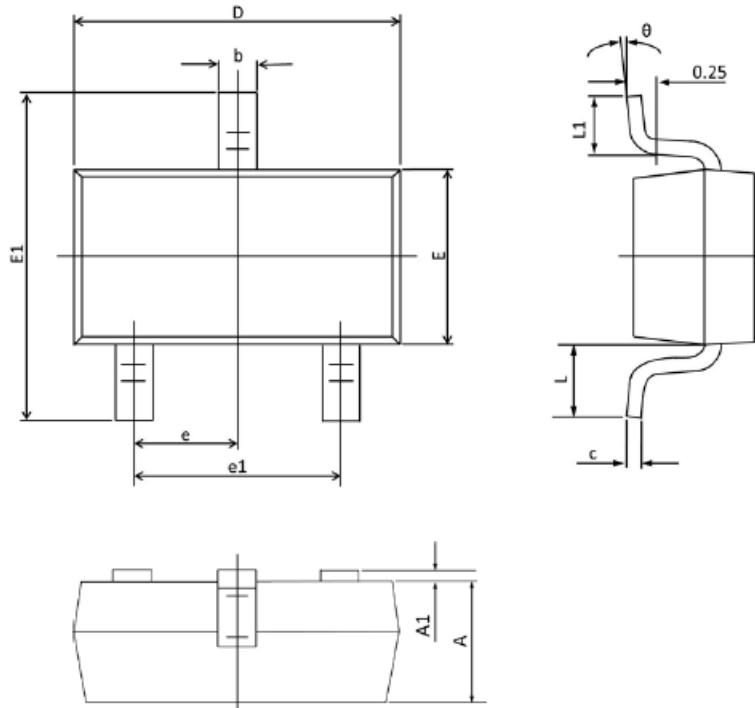


Fig.11 Gate Charge Waveform

Package Dimension

SOT-23









Dimensions				
SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	0.9	1.105	0.035	0.041
A1	0	0.1	0	0.004
b	0.3	0.5	0.012	0.02
c	0.08	0.15	0.003	0.006
D	2.8	3.0	0.11	0.118
E	1.2	1.4	0.047	0.055
E1	2.25	2.55	0.089	0.1
e	0.95 TYP.		0.037 TYP.	
e1	1.8	2.0	0.071	0.079
L	0.55 REF.		0.022 REF.	
L1	0.3	0.5	0.012	0.02
θ	0°	8°	0°	8°

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