

GSM6909

60V 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.

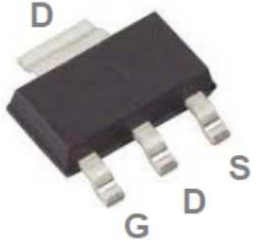
Features

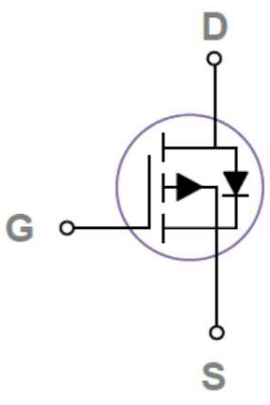
- -60V, -3.2A, $R_{DS(ON)}=105m\Omega@V_{GS}=-10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS guaranteed
- Green Device Available
- SOT-223 package design

Applications

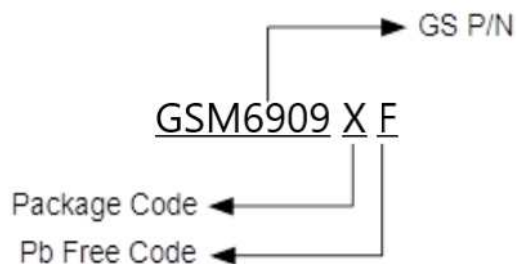
- Motor Drive
- Power Tools
- LED Lighting

Packages & Pin Assignments

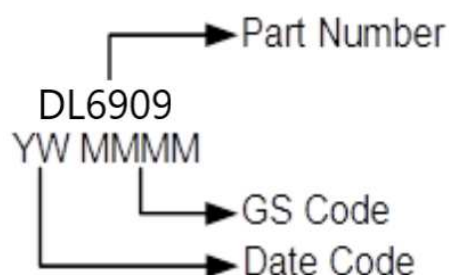
GSM6909XF (SOT-223)	
	
Symbol	Description
G	Gate
D	Drain
S	Source



Ordering Information



Marking Information



Part Number	Package	Quantity
GSM6909XF	SOT-223	2500pcs

Absolute Maximum Ratings

T_C=25°C Unless otherwise noted

Symbol	Parameter	Typical	Unit
V _{DS}	Drain-Source Voltage	-60	V
V _{GS}	Gate -Source Voltage	±20	V
I _D	Continuous Drain Current	T _A =25°C	-3.2
		T _A =70°C	-2.56
I _{DM}	Pulsed Drain Current ¹	-12.8	A
EAS	Single Pulse Avalanche Energy ²	25	mJ
IAS	Single Pulse Avalanche Current ²	-18	A
P _D	Power Dissipation (T _A =25°C)	2.02	W
	Power Dissipation (Derate above 25°C)	0.02	W/°C
T _J	Operating Junction Temperature Range	-50 to +150	°C
T _{STG}	Storage Temperature Range	-50 to +150	°C
R _{θJA}	Thermal Resistance-Junction to Ambient	62	°C/W
R _{θJC}	Thermal Resistance-Junction to Case	23	°C/W

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 =-250μA	-60			V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =-1mA		-0.05		V/°C
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-1.0	-1.6	-2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		3			mV/°C
I _{GSS}	Gate-Source Leakage Current	V _{DS} =0V, V _{GS} =±20V			±100	nA
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-60V, V _{GS} =0V			-1	μA
		V _{DS} =-48V, V _{GS} =0V, T _J =125°C			-10	
I _S	Continuous Source Current	V _G =V _D =0V, Force Current			-3.2	A
I _{SM}	Pulsed Source Current				-6.4	
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} =-10V, I _D =-3A		87	105	mΩ
		V _{GS} =-4.5V, I _D =-2A		107	140	
g _{FS}	Forward Transconductance	V _{DS} =-10V, I _D =-3A		5.5		S
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =-1A			1	V
Dynamic						
Q _g	Total Gate Charge ^{3,4}	V _{DS} =-30V, V _{GS} =10V, I _D =-2A		10	15	nC
Q _{gs}	Gate-Source Charge ^{3,4}			1.6	3.2	
Q _{gd}	Gate-Drain Charge ^{3,4}			3	6	
C _{iss}	Input Capacitance	V _{DS} =-30V, V _{GS} =0V, f=1MHz		785	1300	pF
C _{oss}	Output Capacitance			175	300	
C _{rss}	Reverse Transfer Capacitance			112	220	
t _{d(on)}	Turn-On Time ^{3,4}	V _{DD} =-30V, I _D =-1A, V _{GS} =10V, R _G =6Ω		8	16	ns
t _r				15.4	30	
t _{d(off)}	Turn-Off Time ^{3,4}			42.8	80	
t _f				8.4	16	
R _g	Gate Resistance		V _{DS} =0V, V _{GS} =0V, f=1MHz		36	

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, I_{AS}=-18A., R_G=25 , Starting T_J=25°C.
3. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
4. Essentially independent of operating temperature.

Typical Performance Characteristics

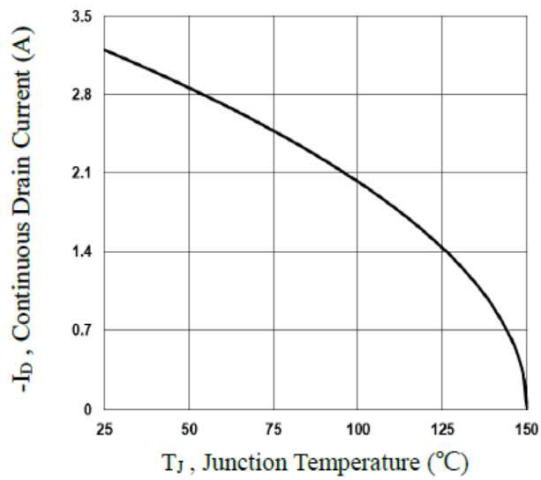


Fig.1 Continuous Drain Current vs. T_J

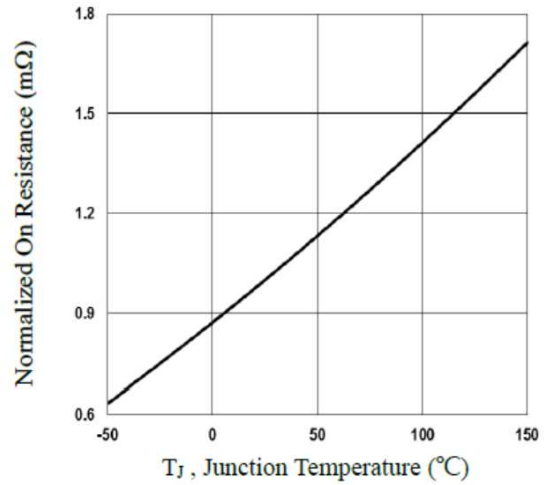


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

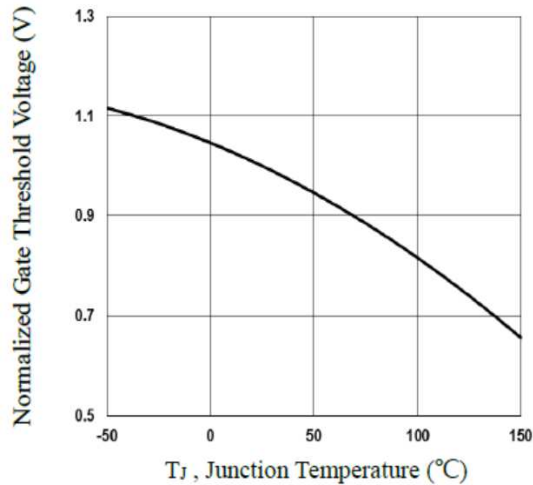


Fig.3 Normalized V_{th} vs. T_J

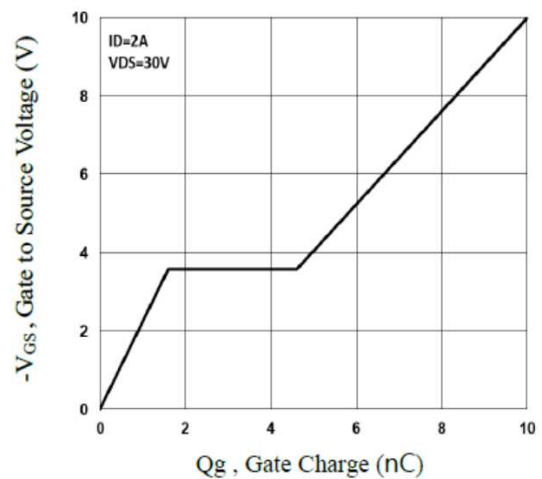


Fig.4 Gate Charge Waveform

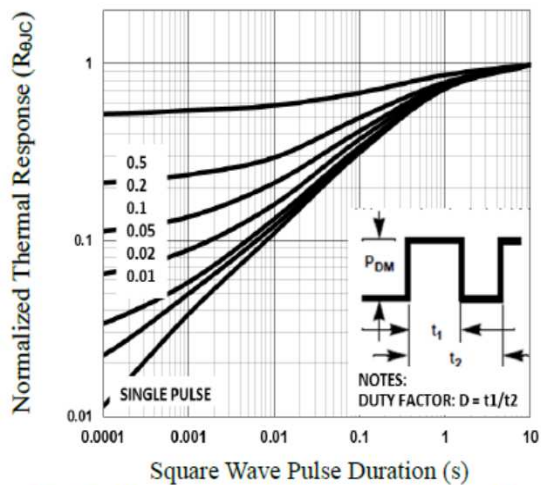


Fig.5 Normalized Transient Impedance

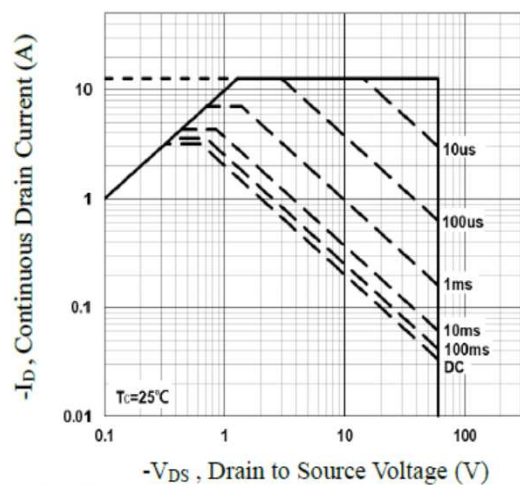


Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics (Continue)

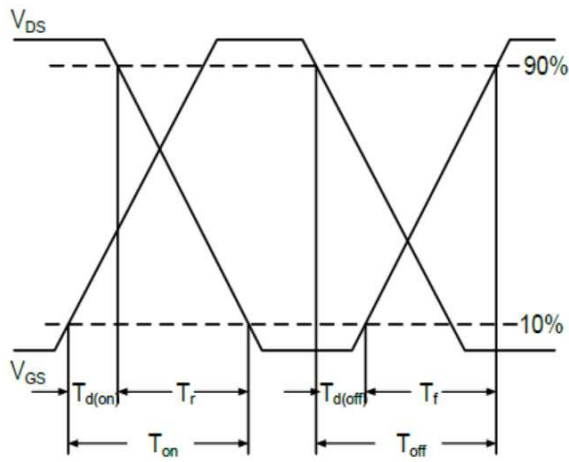


Fig.7 Switching Time Waveform

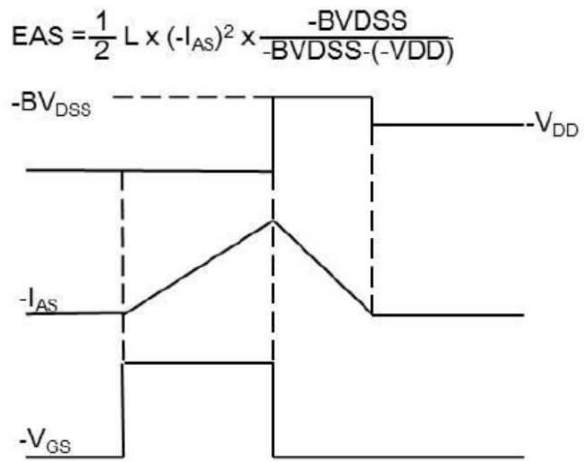
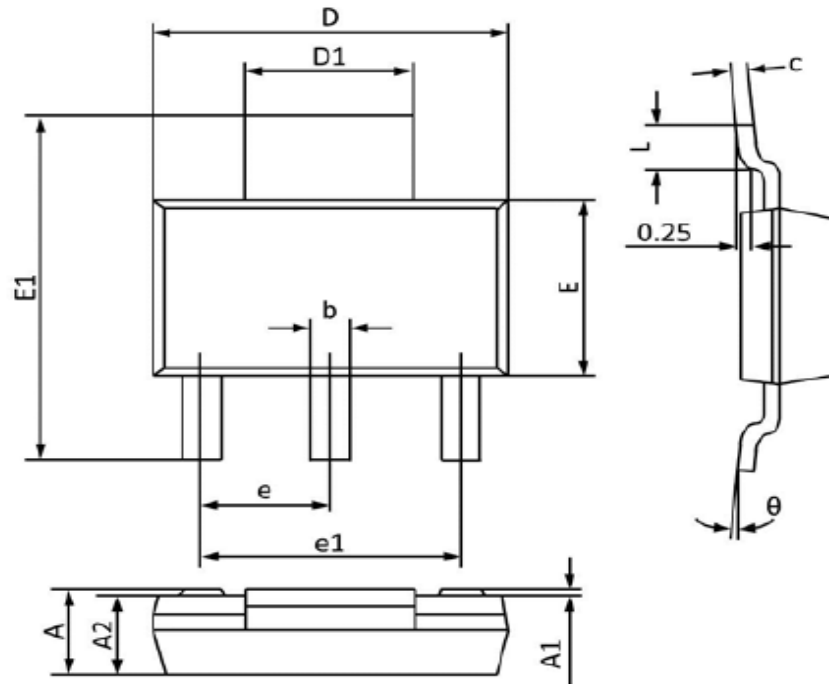


Fig.8 EAS Waveform

Package Dimension

SOT-223







Dimensions



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	1.520	1.800	0.060	0.071
A1	0.000	0.100	0.000	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.820	0.026	0.032
c	0.250	0.350	0.010	0.014
D	6.200	6.400	0.244	0.252
D1	2.900	3.100	0.114	0.122
E	3.300	3.700	0.130	0.146
E1	6.830	7.070	0.269	0.278
e	2.300 (BSC)		0.091 (BSC)	
e1	4.500	4.700	0.177	0.185
L	0.900	1.150	0.035	0.045
θ	0°	10°	0°	10°

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CONTACT US

GS Headquarter	
	4F.,No.43-1,Lane11,Sec.6,Minquan E.Rd Neihu District Taipei City 114, Taiwan (R.O.C)
	886-2-2657-9980
	886-2-2657-3630
	sales_twn@gs-power.com

RD Division	
	824 Bolton Drive Milpitas. CA. 95035
	1-408-457-0587