

GSM2309S

20V P-Channel Enhancement Mode MOSFET

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.

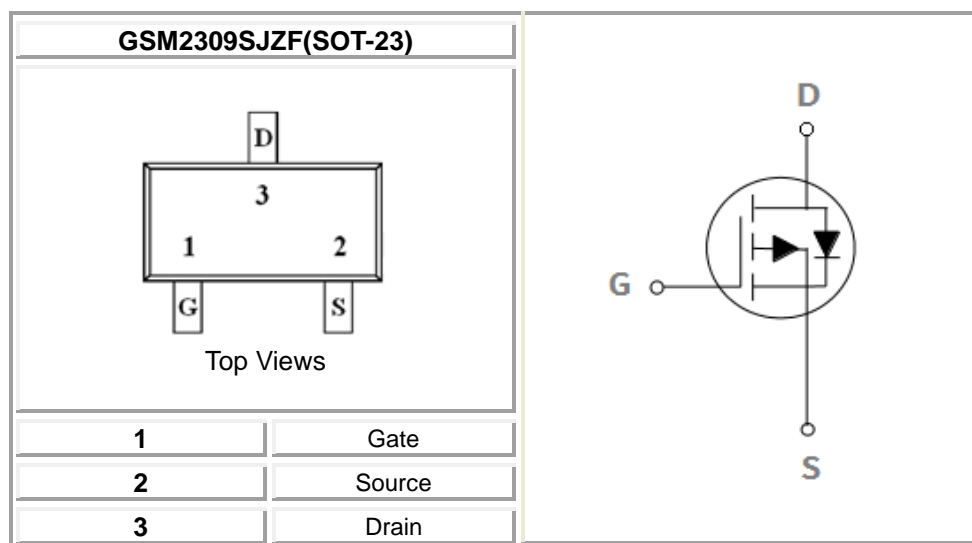
Features

- -20V/-5.8A, $R_{DS(ON)}=33m\Omega@V_{GS}=-4.5V$
- Improved dv/dt capability
- Fast switching
- Green Device Available
- Suit for -1.8V Gate Drive Applications

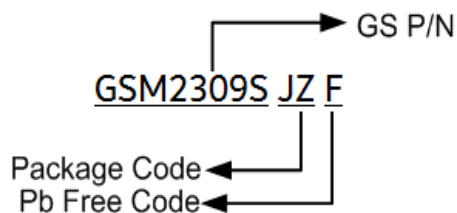
Applications

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

Packages & Pin Assignments

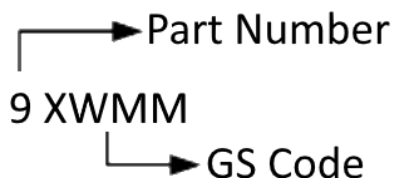


Ordering Information



Part Number	Package	Quantity Reel
GSM2309SJZF	SOT-23	3000 PCS

Marking Information



Part Number	Package	Part Marking
GSM2309SJZF	SOT-23	9XWMM

Absolute Maximum Ratings

(T_c=25°C unless otherwise noted)

Symbol	Parameter	Typical	Unit	
V _{DSS}	Drain-Source Voltage	-20	V	
V _{GSS}	Gate -Source Voltage	±10	V	
I _D	Continuous Drain Current(T _J =150°C)	T _c =25°C	-5.8	A
		T _c =100°C	-3.7	
I _{DM}	Pulsed Drain Current ¹	-23.2	A	
P _D	Power Dissipation	T _c =25°C	1.56	W
	Power Dissipation	Derate above T _c =25°C	0.012	W/°C
T _J	Operating Junction Temperature	-55 to 150	°C	
T _{STG}	Storage Temperature Range	-55 to 150	°C	
Symbol	Parameter	Max	Unit	
R _{θJA}	Thermal Resistance-Junction to Ambient	80	°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 =-250uA	-20			V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C □ I _D =-1mA		-0.02		V/°C
I _{GSS}	Gate-Source Leakage Current	V _{DS} =0V, V _{GS} =±10V			±100	nA
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-20V, V _{GS} =0V T _J =25°C			-1	uA
		V _{DS} =-16V, V _{GS} =0V T _J =125°C			-10	
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} = -4.5V, I _D =-4A		28	33	mΩ
		V _{GS} = -2.5V, I _D =-3A		37	45	
		V _{GS} = -1.8V, I _D =-2A		49	65	
g _{FS}	Forward Transconductance	V _{DS} =-10V, I _D =-3A		8.4		S
V _{GS(th)}	Gate Threshold Voltage		-0.3	-0.6	-1	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient	V _{GS} =V _{DS} , I _D =-250uA		2		mV/°C
Dynamic						
Q _g	Total Gate Charge ^{2,3}			16.1	25	nC
Q _{gs}	Gate-Source Charge ^{2,3}	V _{DS} =-10V, V _{GS} =-4.5V, I _D =-4.0A		1.8	3	
Q _{gd}	Gate-Drain Charge ^{2,3}			3.8	7	
C _{iss}	Input Capacitance			1440	2100	pF
C _{oss}	Output Capacitance	V _{DS} =-15V, V _{GS} =-0V, f=1MHz		155	230	
C _{rss}	Reverse Transfer Capacitance			115	170	
t _{d(on)}	Turn-On Delay Time ^{2,3}			8.2	16	nS
t _r	Rise Time ^{2,3}	V _{DD} =-10V, V _{GS} =-4.5V, R _G =25Ω, I _D =-1A		30	57	
t _{d(off)}	Turn-Off Delay Time ^{2,3}			71.1	135	
t _f	Fall Time ^{2,3}			19.8	38	
I _S	Continuous Source Current	V _G =V _D =0V,			-5.8	A
I _{SM}	Pulsed Source Current	Force Current			-23.2	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =-1A, T _J =25°C			-1	V

Note :

- 1.Repetitive Rating : Pulsed width limited by maximum junction temperature.
- 2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
- 3.Essentially independent of operating temperature.

Typical Performance Characteristics

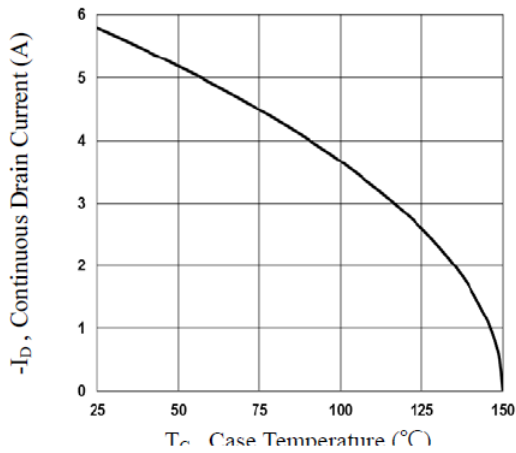


Fig.1 Continuous Drain Current vs. T_c

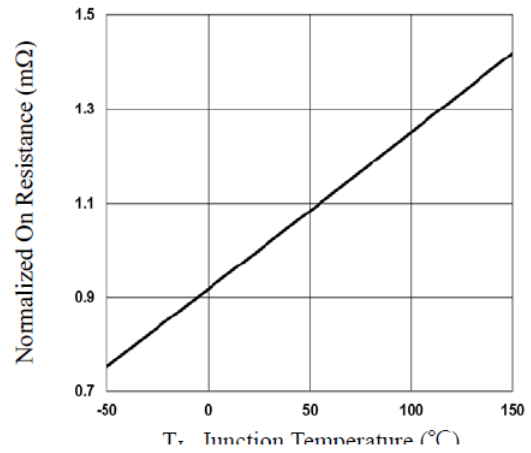


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

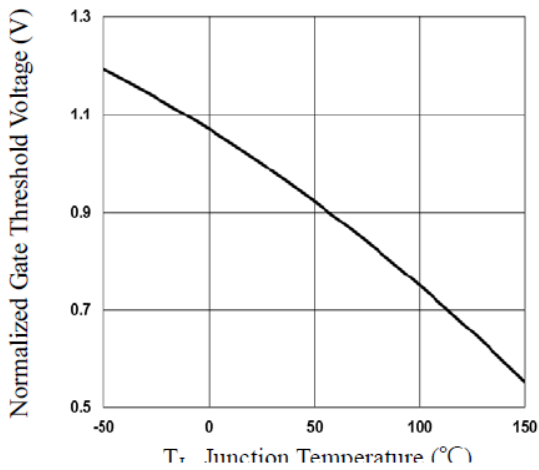


Fig.3 Normalized V_{th} vs. T_j

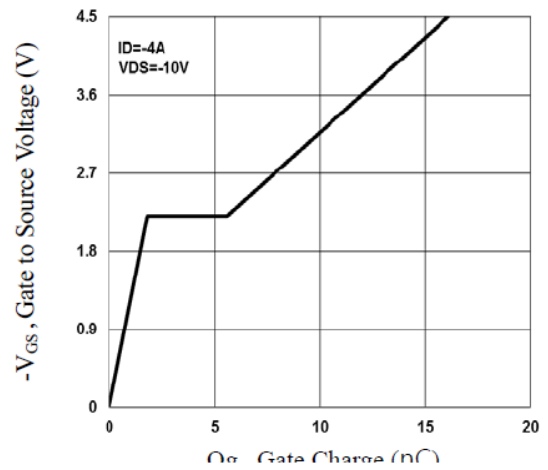


Fig.4 Gate Charge Waveform

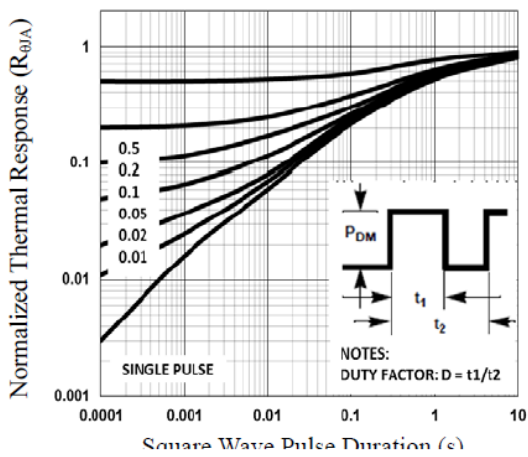


Fig.5 Normalized Transient Impedance

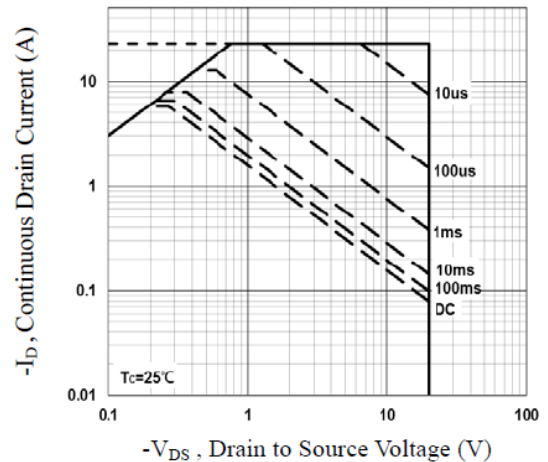


Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics (continue)

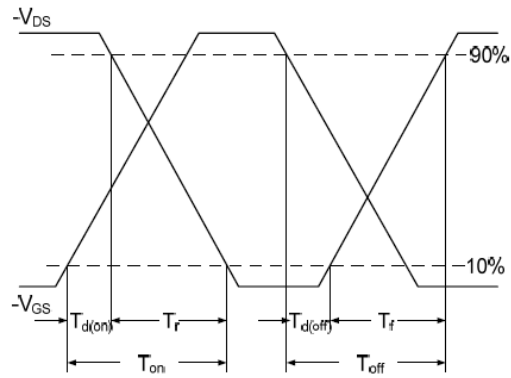


Fig.7 Switching Time Waveform

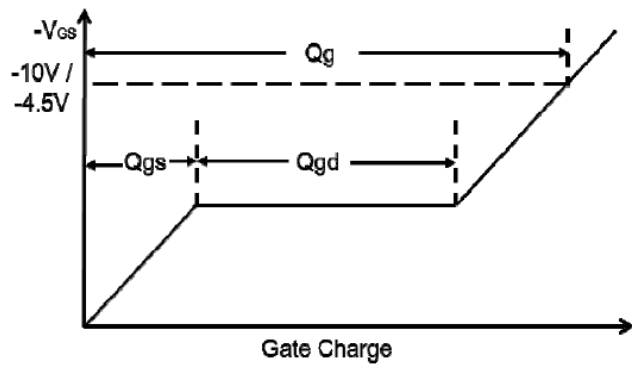
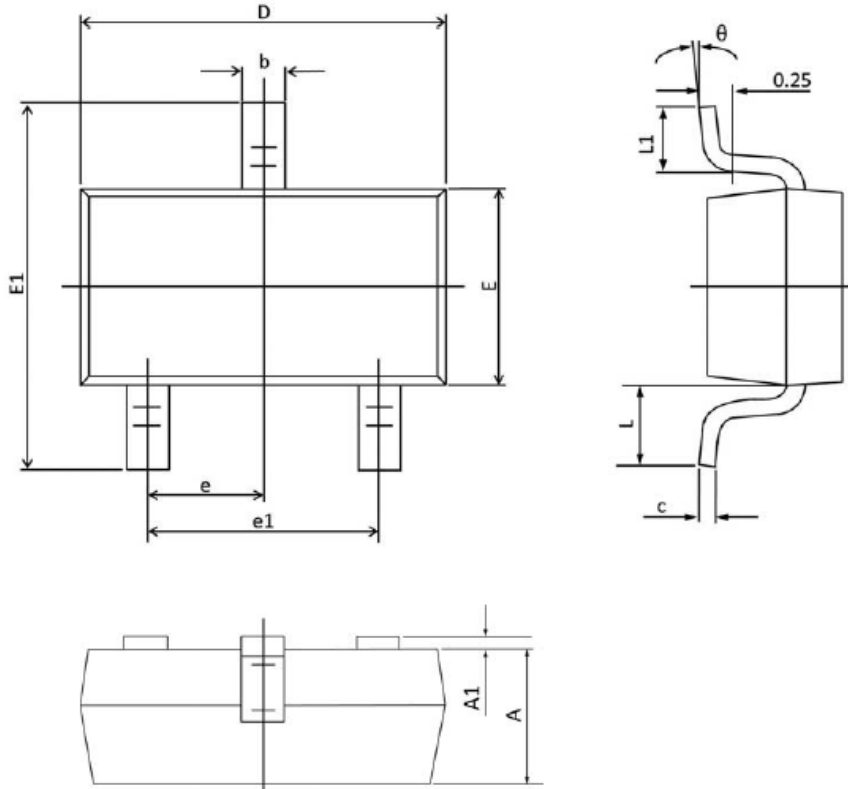


Fig.8 Gate Charge Waveform

Package Dimension

SOT-23









Dimensions				
SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	0.9	1.0	0.035	0.039
A1	0	0.1	0	0.004
b	0.3	0.5	0.012	0.02
c	0.09	0.11	0.003	0.004
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	1°	7°	1°	7°

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