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.

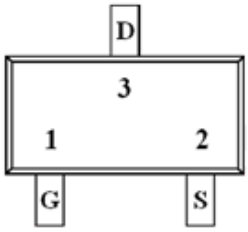
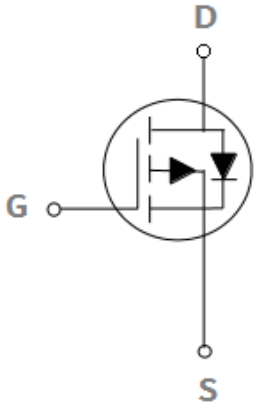
Features

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

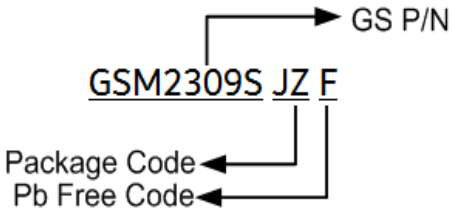
Applications

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

Packages & Pin Assignments

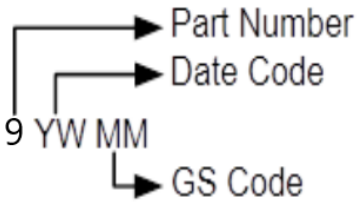
GSM2309SJZF(SOT-23)	
 Top Views	
1	Gate
2	Source
3	Drain

Ordering Information



Part Number	Package	Quantity Reel
GSM2309SJZF	SOT-23	3000 PCS

Marking Information



Part Number	Package	Part Marking
GSM2309SJZF	SOT-23	9YWMM

Absolute Maximum Ratings

(Tc=25ºC 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℃)	T_C=25ºC	-5.8	A
		T_C=100ºC	-3.7	
I_{DM}	Pulsed Drain Current[1]		-23.2	A
P_D	Power Dissipation	T_C =25ºC	1.56	W
	Power Dissipation	Derate above T_C =25ºC	0.012	W/℃
T_J	Operating Junction Temperature		-55 to 150	ºC
T_{STG}	Storage Temperature Range		-55 to 150	ºC
Symbol	**Parameter**		**Max**	**Unit**
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		80	ºC/ W

Electrical Characteristics

(T_J=25ºC 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
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , ID=-1mA		-0.02		V/℃
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℃			-1	uA
		V_{DS}=-16V, V_{GS}=0V T_J=125℃			-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	V_{GS}=V_{DS} , I_D =-250uA	-0.3	-0.6	-1	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient			2		mV/℃
Dynamic						
Q_g	Total Gate Charge[2,3]	V_{DS}=-10V, V_{GS}=-4.5V, I_D=-4.0A		16.1	25	nC
Q_{gs}	Gate-Source Charge[2,3]			1.8	3	
Q_{gd}	Gate-Drain Charge[2,3]			3.8	7	
C_{iss}	Input Capacitance	V_{DS}=-15V, V_{GS}=-0V, f=1MHz		1440	2100	pF
C_{oss}	Output Capacitance			155	230	
C_{rss}	Reverse Transfer Capacitance			115	170	
$t_{d(on)}$	Turn-On Delay Time[2,3]	V_{DD}=-10V, V_{GS}=-4.5V, R_G=25Ω, I_D=-1A		8.2	16	nS
t_r	Rise Time[2,3]			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, Force Current			-5.8	A
I_{SM}	Pulsed Source Current				-23.2	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=-1A , T_J=25℃			-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

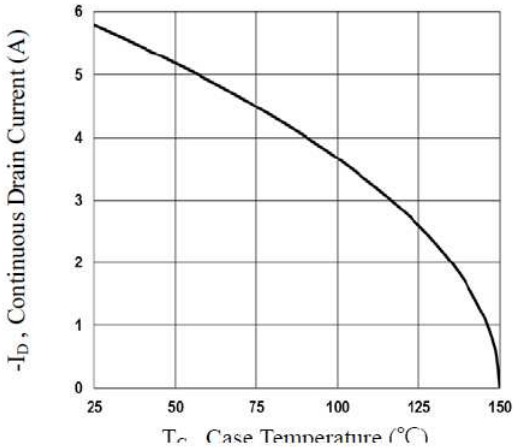


Fig.1 Continuous Drain Current vs. T_C

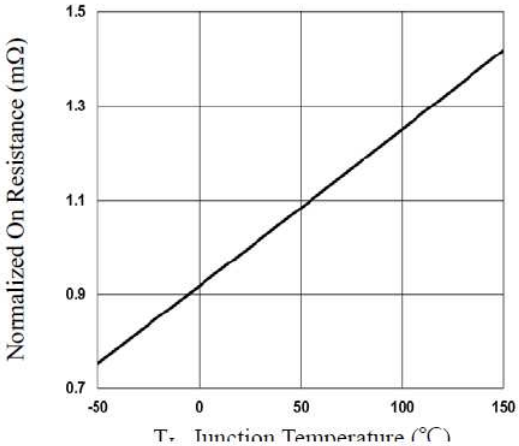


Fig.2 Normalized RDSON vs. T_J

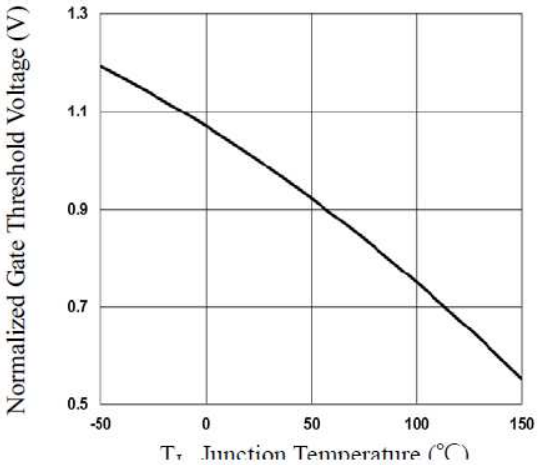


Fig.3 Normalized V_{th} vs. T_J

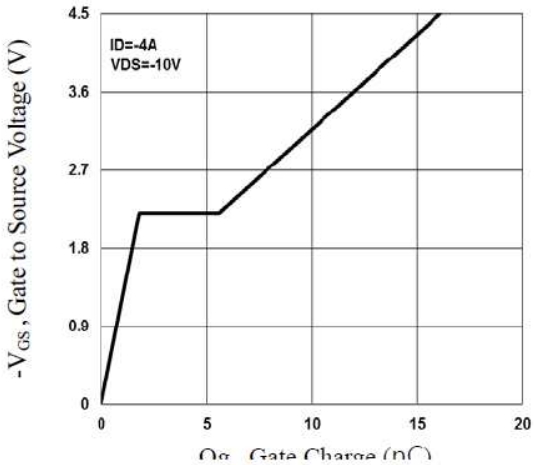


Fig.4 Gate Charge Waveform

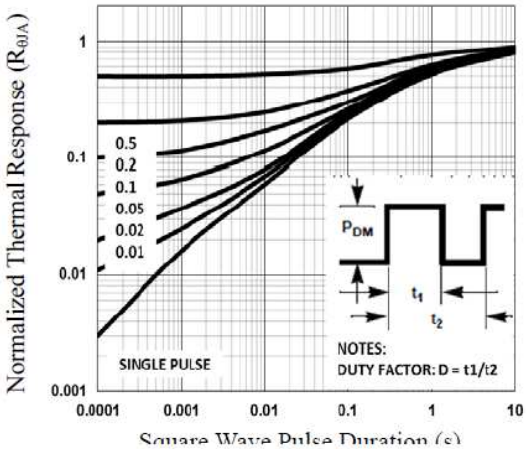


Fig.5 Normalized Transient Impedance

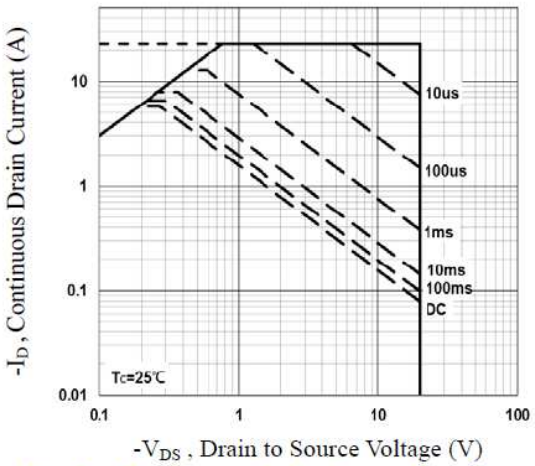


Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics (continue)

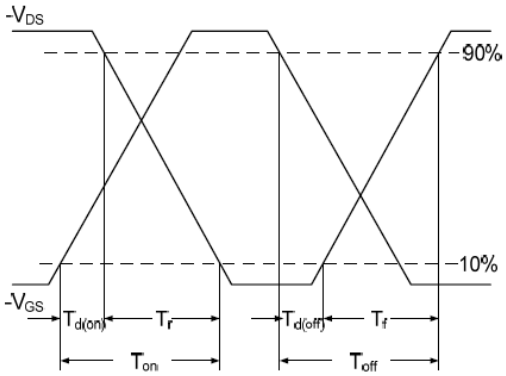


Fig.7 Switching Time Waveform

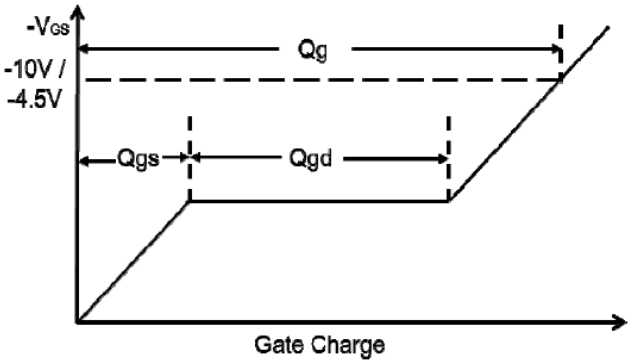
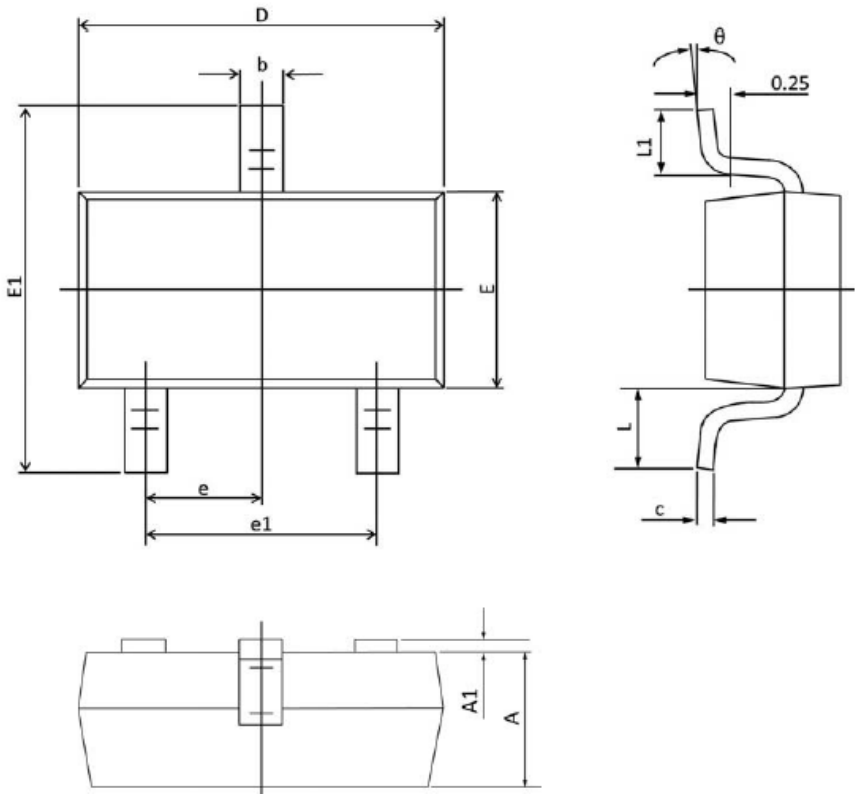


Fig.8 Gate Charge Waveform

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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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