GSM3901X

30V P-Channel 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

- -30V,-100A,RDS(ON) =3.3mΩ@VGS = -10V
- Fast switching
- Green Device Available
- Suit for -4.5V Gate Drive Applications

Applications

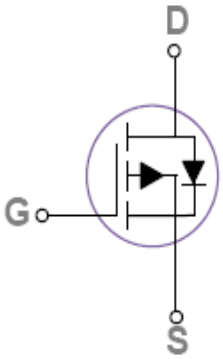
- Motor Driver Application
- POL Applications
- Load Switch
- LED Application

Packages & Pin Assignments

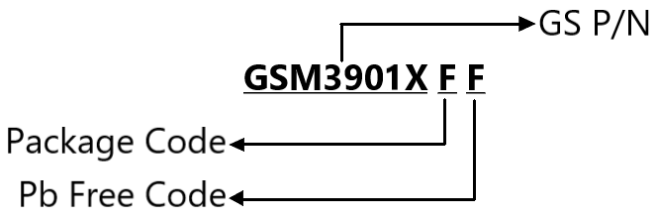
GSM3901XFF (DFN5X6-8L)

Top View

Pin No	Symbol	Description
1,2,3	S	Source
4	G	Gate
5,6,7,8	D	Drain

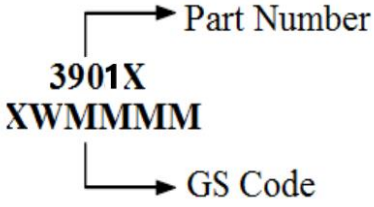


Ordering Information



Part Number	Package	Quantity
GSM3901XFF	DFN5X6-8L	3000pcs

Marking Information



Absolute Maximum Ratings

T_C=25ºC 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℃	-100	A
		T_C=100℃	-63.2	
I_{DM}	Pulsed Drain Current[1]		-400	A
EAS	Single Pulse Avalanche Energy[2]		320	mJ
IAS	Single Pulse Avalanched Current[2]		80	A
P_D	Power Dissipation (T_C=25ºC)		138	W
	Power Dissipation-Derate above 25℃		1.11	W/℃
T_J	Operating Junction Temperature Range		-55 to +150	℃
T_{STG}	Storage Temperature Range		-55 to +150	℃
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		62	℃/W
$R_{\theta JC}$	Thermal Resistance-Junction to Case		0.9	℃/W

Electrical Characteristics

T_J=25℃ 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
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250uA	-1.2	-1.6	-2.2	
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			-1	uA
		V_{DS}=-24V, V_{GS}=0V T_J=125℃			-10	
I_S	Continuous Source Current	V_G=V_D=0V, Force Current			-100	A
I_{SM}	Pulsed Source Current				-200	A
$R_{DS(on)}$	Drain-Source On-Resistance	V_{GS} =-10V, I_D=-30A		2.6	3.3	mΩ
		V_{GS} =-4.5V, I_D=-20A		3.8	5	
g_{FS}	Forward Transconductance	V_{DS}=-10V, I_D=-3A		20		S
V_{SD}	Diode Forward Voltage	I_S=-1A, V_{GS}=0V			-1	V
t_{rr}	Reverse Recovery Time	V_{GS}=0V,I_S=-20A , dI/dt=100A/μs, T_J=25℃		52		ns
Q_{rr}	Reverse Recovery Charge			53		nC

Electrical Characteristics (Continue)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Dynamic						
Q_g	Total Gate Charge[3,4]	V_{DS}=-24V, V_{GS}=-10V, I_D=-10A		146	210	nC
Q_{gs}	Gate-Source Charge[3,4]			22	44	
Q_{gd}	Gate-Drain Charge[3,4]			32	64	
C_{iss}	Input Capacitance	V_{DS}=-25V,V_{GS}=0V, f=1MHz		7930	12000	pF
C_{oss}	Output Capacitance			983	1300	
C_{rss}	Reverse Transfer Capacitance			505	750	
$t_{d(on)}$	Turn-On Time[3,4]	V_{DD}=-15V, I_D=-10A, V_{GS}=-10V, R_G=5Ω		17	34	ns
t_r	Rise Time[3,4]			61	120	
$t_{d(off)}$	Turn-Off Time[3,4]			200	400	
t_f	Fall Time[3,4]			113	220	

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=80A.,R_G=25W,Starting T_J=25℃.
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

Typical Performance Characteristics

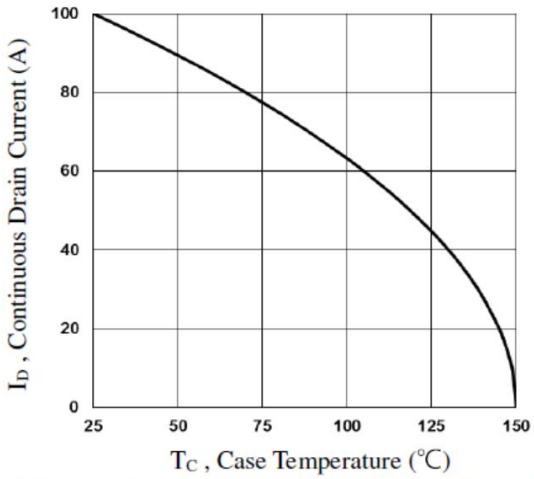


Fig.1 Continuous Drain Current vs. T_C

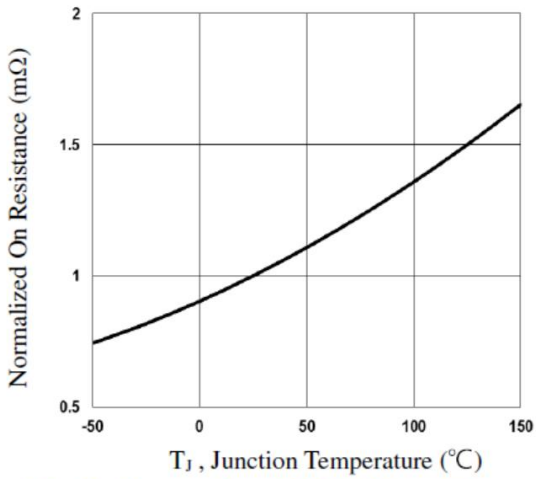


Fig.2 Normalized RDSON vs. T_J

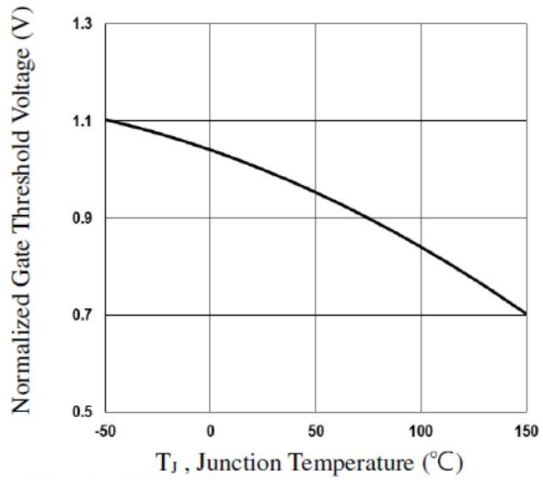


Fig.3 Normalized V_{th} vs. T_J

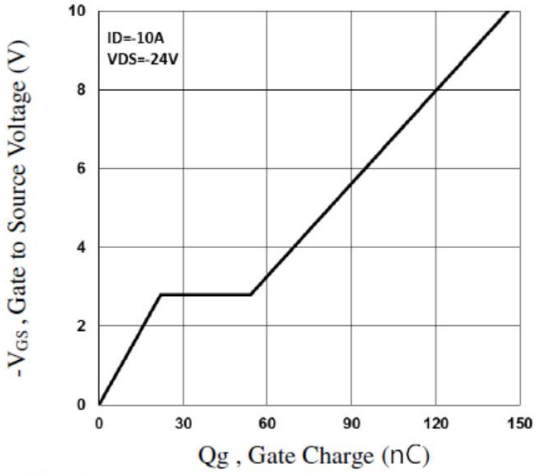


Fig.4 Gate Charge Waveform

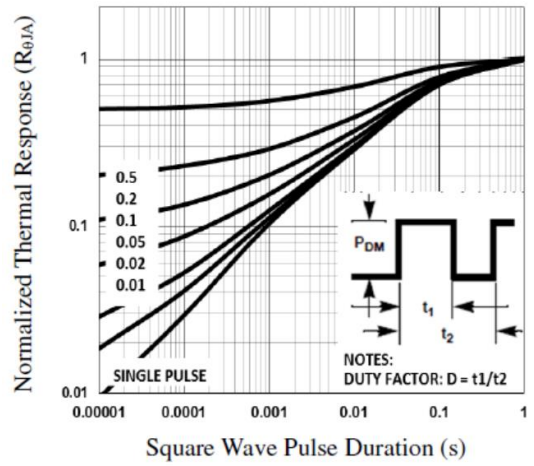


Fig.5 Normalized Transient Impedance

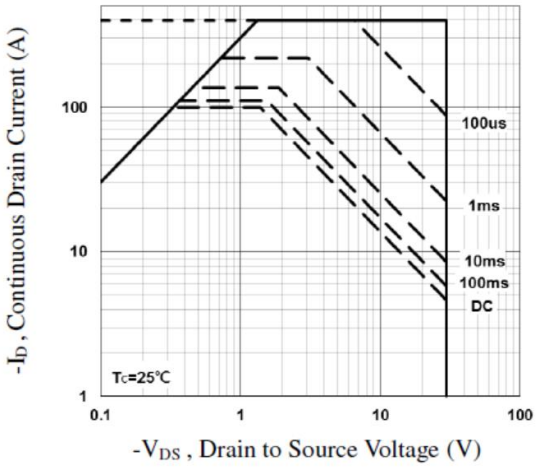


Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics (Continue)

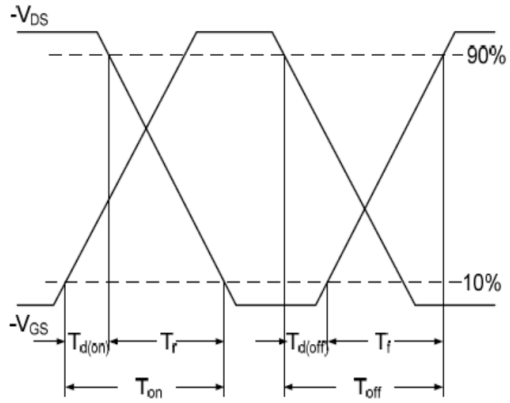


Fig.7 Switching Time Waveform

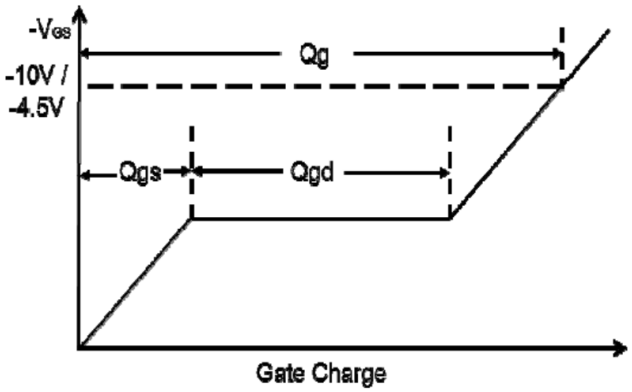
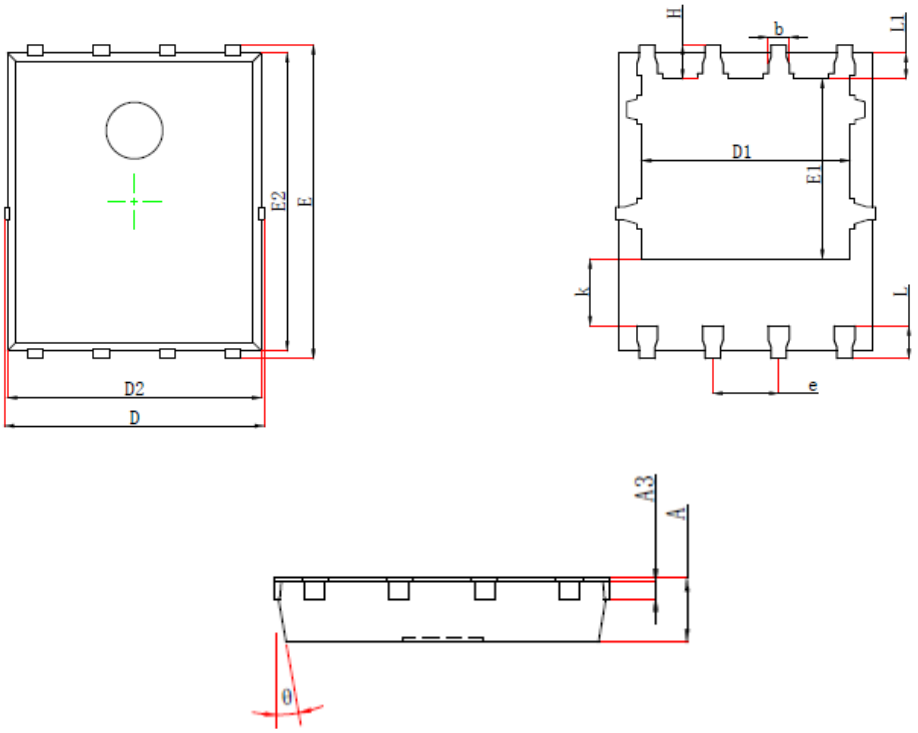


Fig.8 Gate Charge Waveform

Package Dimension

DFN5X6-8L



Dimensions				
SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	0.900	1.000	0.035	0.039
A3	0.254REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	3.910	4.110	0.154	0.162
E1	3.375	3.575	0.133	0.141
D2	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270TYP.		0.050TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	10°	12°	10°	12°

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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