GSM3903X

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.

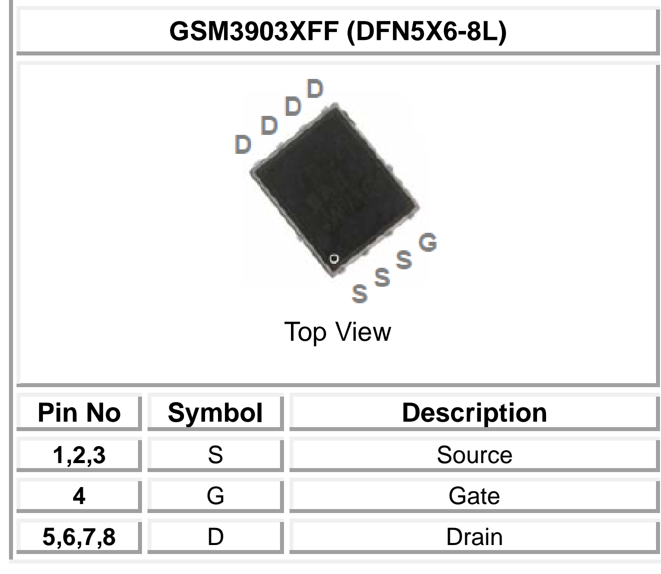
Features

- RDS(ON) < 8.5mΩ @VGS = -10V, ID= -10A
- Fast switching
- Green Device Available
- Suit for -4.5V Gate Drive Applications

Applications

- MB / VGA / Vcore
- POL Applications
- Load Switch
- LED Application

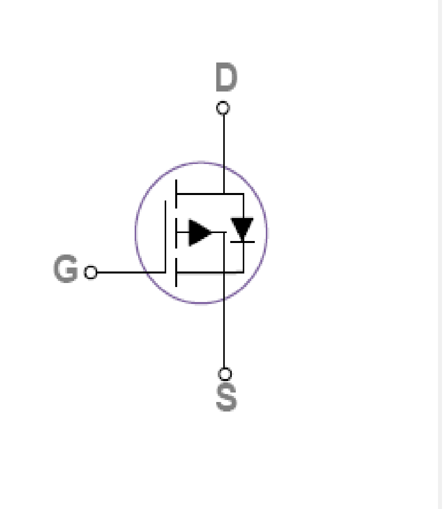
Packages & Pin Assignments



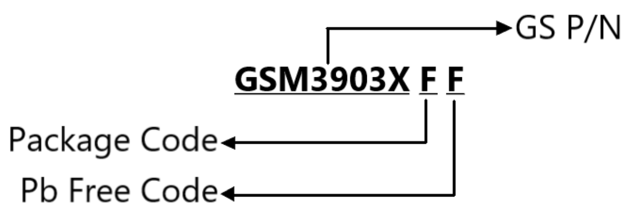
GSM3903XFF (DFN5X6-8L)

Top View

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

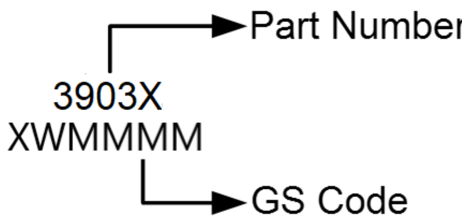


Ordering Information



Part Number	Package	Quantity
GSM3903XFF	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℃	-60	A
		T_C=100℃	-38	
I_{DM}	Pulsed Drain Current[1]		-240	A
P_D	Power Dissipation (T_C=25ºC)		62.5	W
	Power Dissipation-Derate above 25℃		0.77	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		2.0	℃/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	-2.5	V
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			-60	A
I_{SM}	Pulsed Source Current				-120	A
$R_{DS(on)}$	Drain-Source On-Resistance	V_{GS} =-10V, I_D=-10A		7.1	8.5	mΩ
		V_{GS} =-4.5V, I_D=-8A		11.5	14	
g_{FS}	Forward Transconductance	V_{DS}=-10V, I_D=-10A		14		S
V_{SD}	Diode Forward Voltage	I_S=-1A, V_{GS}=0V			-1	V

Electrical Characteristics **(Continue)**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Dynamic						
Q_g	Total Gate Charge[2,3]	V_{DS}=-15V, V_{GS}=-4.5V, I_D=-10A		35	56	nC
Q_{gs}	Gate-Source Charge[2,3]			10.8	16	
Q_{gd}	Gate-Drain Charge[2,3]			10.6	16	
C_{iss}	Input Capacitance	V_{DS}=-15V,V_{GS}=0V, f=1MHz		3300	4800	pF
C_{oss}	Output Capacitance			410	700	
C_{rss}	Reverse Transfer Capacitance			280	500	
$t_{d(on)}$	Turn-On Time[2,3]	V_{DD}=-15V, I_D=-1A, V_{GS}=-10V, R_G=6Ω		24.5	38	ns
t_r	Rise Time[2,3]			10.5	16	
$t_{d(off)}$	Turn-Off Time[2,3]			156.8	230	
t_f	Fall Time[2,3]			50	75	
R_g	Gate resistance	V_{DS}=0V, V_{GS}=0V, f=1MHz		8.5	12	Ω

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

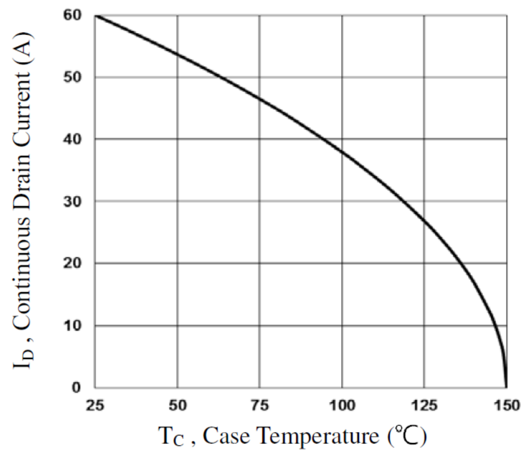


Fig.1 Continuous Drain Current vs. T_C

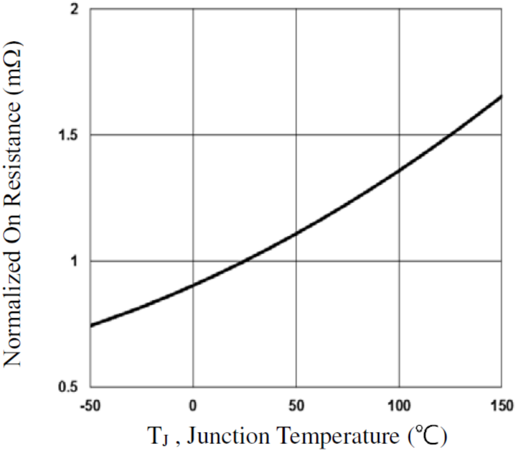


Fig.2 Normalized RDSON vs. T_J

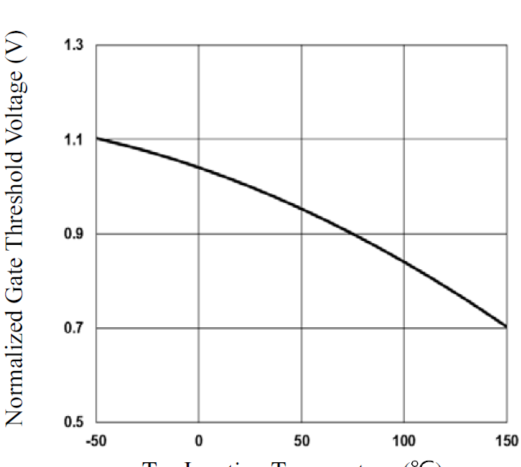


Fig.3 Normalized V_{th} vs. T_J

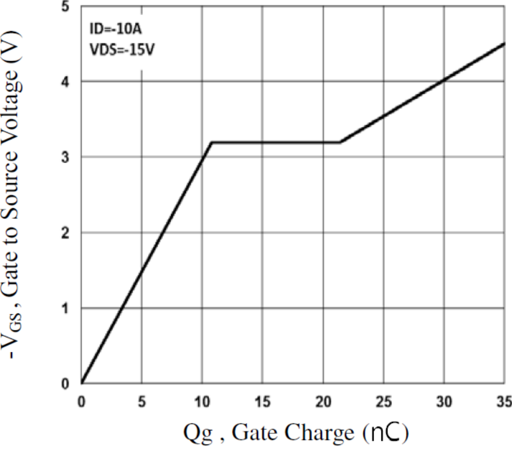


Fig.4 Gate Charge Waveform

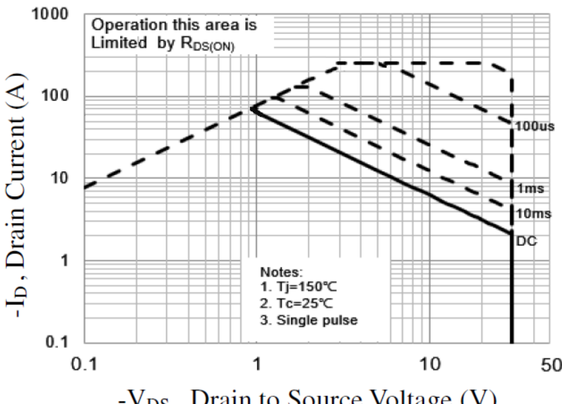


Fig.5 Normalized Transient Impedance

Typical Performance Characteristics (Continue)

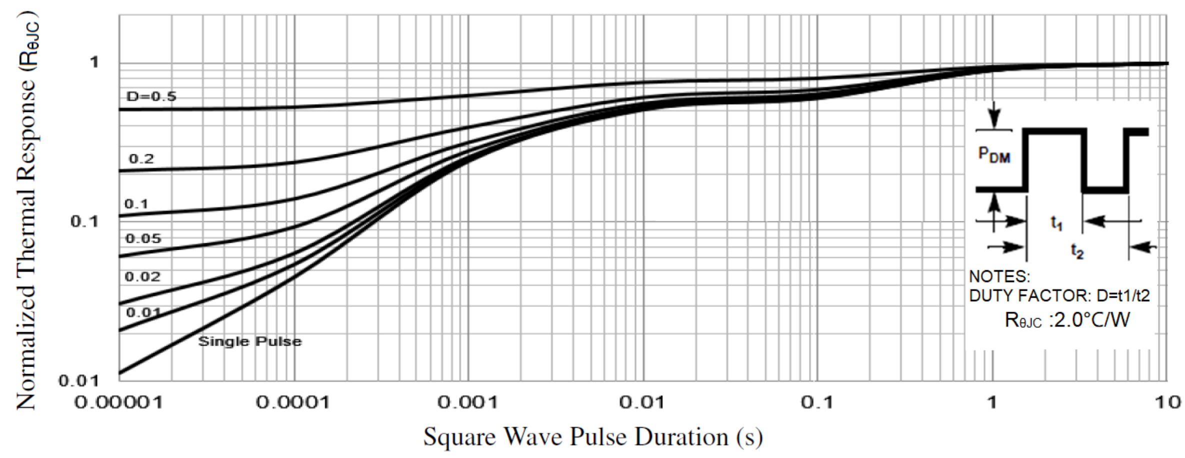


Fig.6 Normalized Transient Impedance

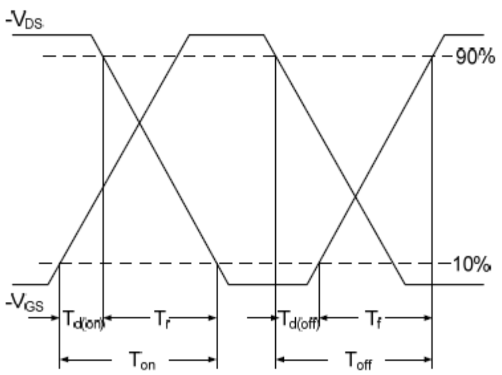


Fig.7 Switching Time Waveform

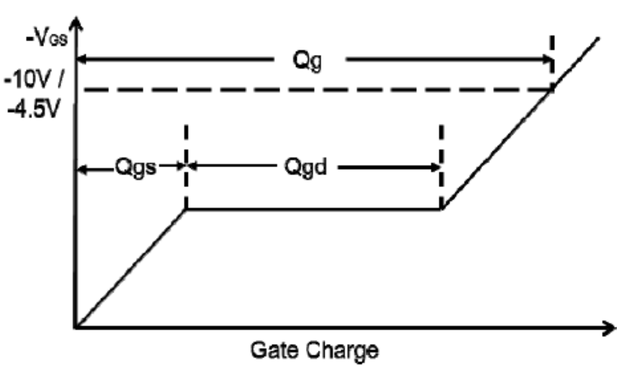
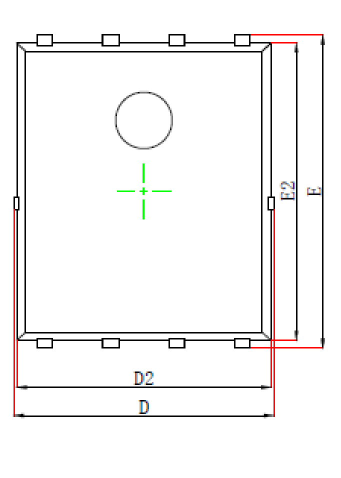
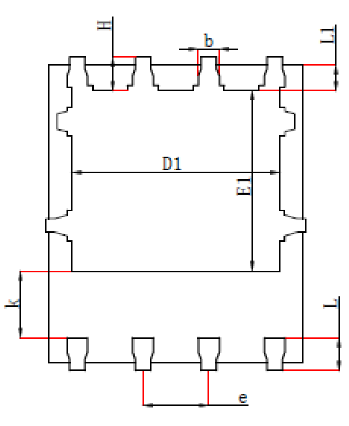


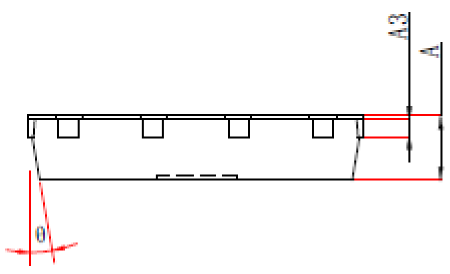
Fig.8 Gate Charge Waveform

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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