

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.

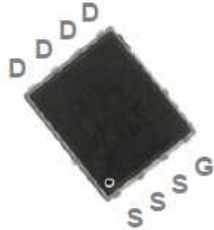
Features

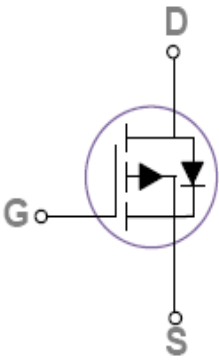
- -30V, -60A, $R_{DS(ON)} = 8.5\text{m}\Omega @ V_{GS} = -10\text{V}$
- Fast switching
- Green Device Available
- Suit for -4.5V Gate Drive Applications

Applications

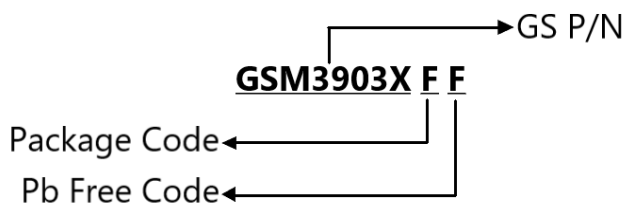
- MB / VGA / Vcore
- POL Applications
- Load Switch
- LED Application

Packages & Pin Assignments

GSM3903XFF (DFN5X6-8L)		
 <p>Top View</p>		
Pin No	Symbol	Description
1,2,3	S	Source
4	G	Gate
5,6,7,8	D	Drain

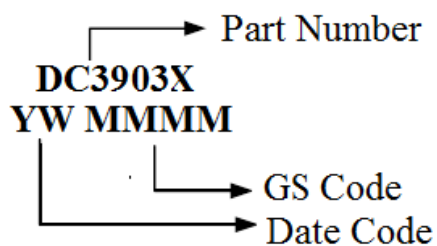


Ordering Information



Part Number	Package	Quantity
GSM3903XFF	DFN5X6-8L	3000pcs

Marking Information



Absolute Maximum Ratings

$T_C=25^{\circ}\text{C}$ 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	$T_C=25^{\circ}\text{C}$	-60
		$T_C=100^{\circ}\text{C}$	-38
I_{DM}	Pulsed Drain Current ¹	-240	A
P_D	Power Dissipation ($T_C=25^{\circ}\text{C}$)	96	W
	Power Dissipation-Derate above 25°C	0.77	W/ $^{\circ}\text{C}$
T_J	Operating Junction Temperature Range	-55 to +150	$^{\circ}\text{C}$
T_{STG}	Storage Temperature Range	-55 to +150	$^{\circ}\text{C}$
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	62	$^{\circ}\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance-Junction to Case	1.3	$^{\circ}\text{C}/\text{W}$

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	-30			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250uA	-1.2	-1.6	-2.5	
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	
		V _{DS} =-24V, V _{GS} =0V T _J =125°C			-10	uA
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

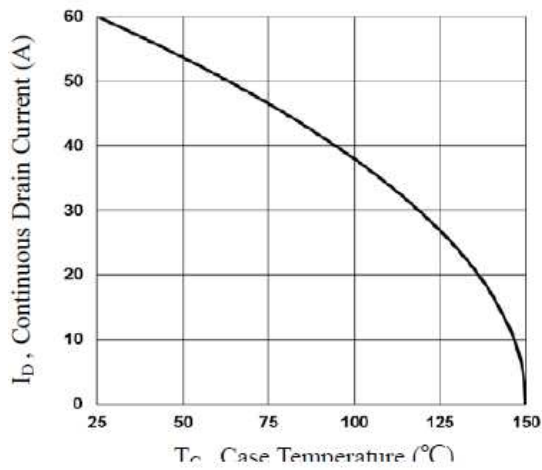


Fig.1 Continuous Drain Current vs. T_C

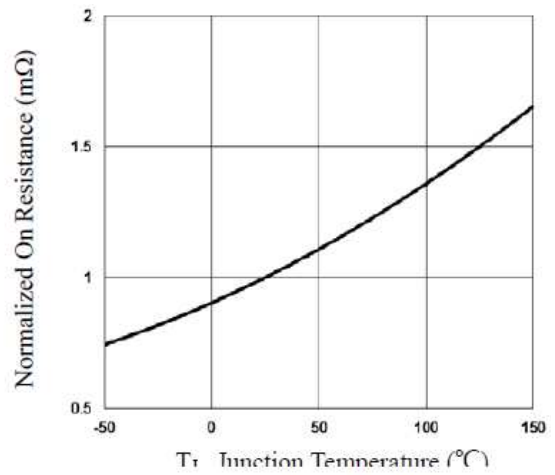


Fig.2 Normalized RDSON vs. T_J

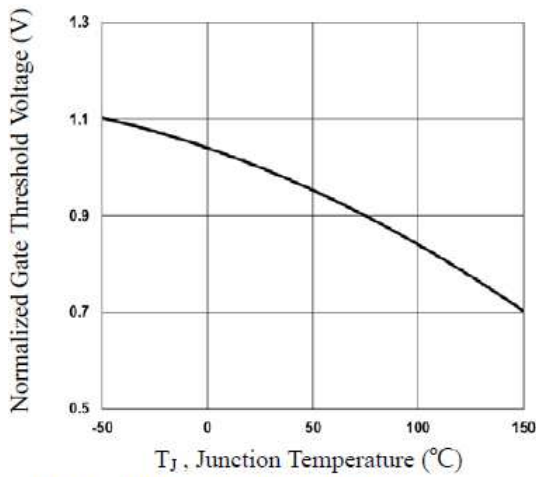


Fig.3 Normalized V_{th} vs. T_J

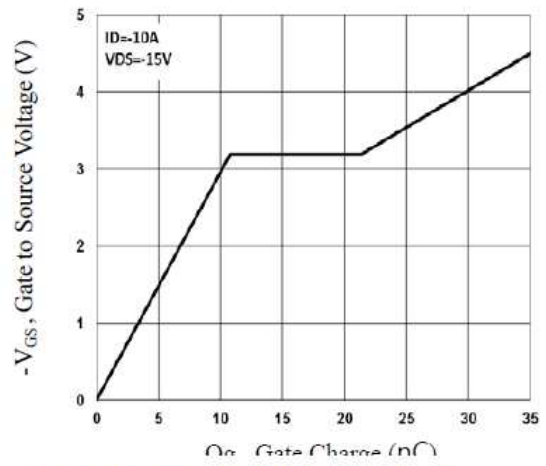


Fig.4 Gate Charge Waveform

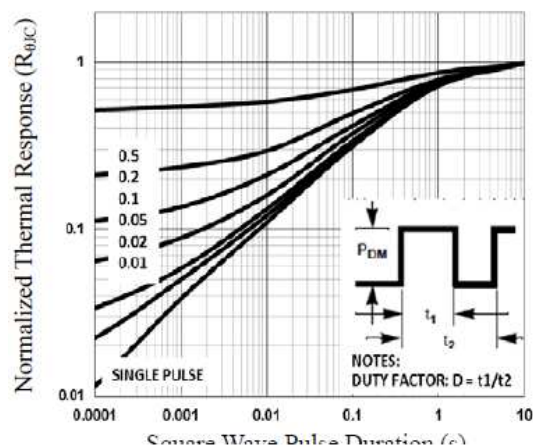


Fig.5 Normalized Transient Impedance

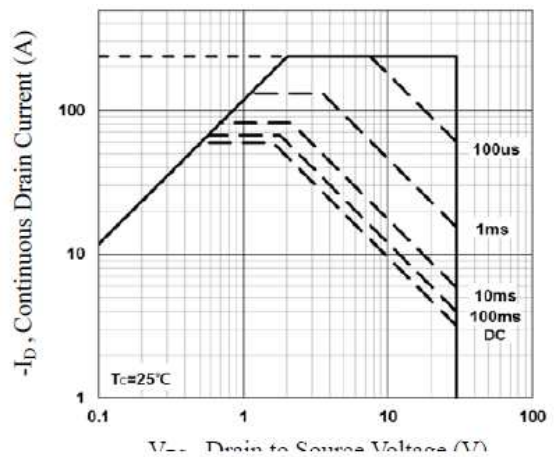


Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics (Continue)

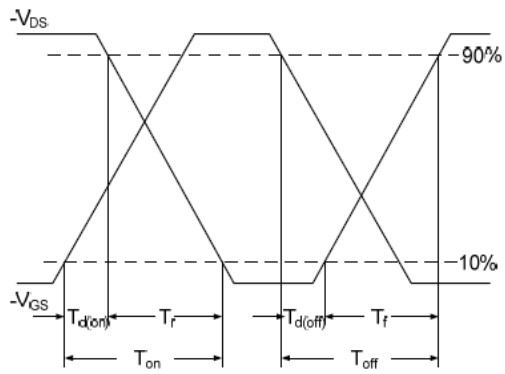


Fig.7 Switching Time Waveform

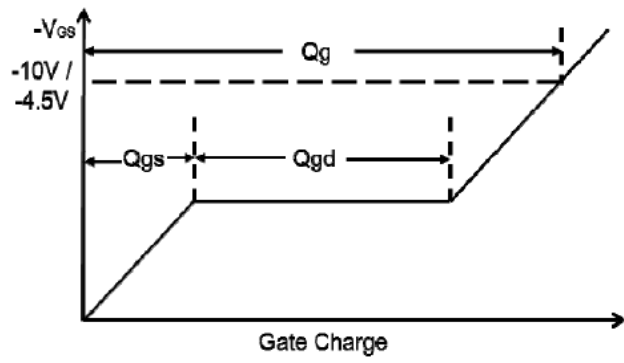
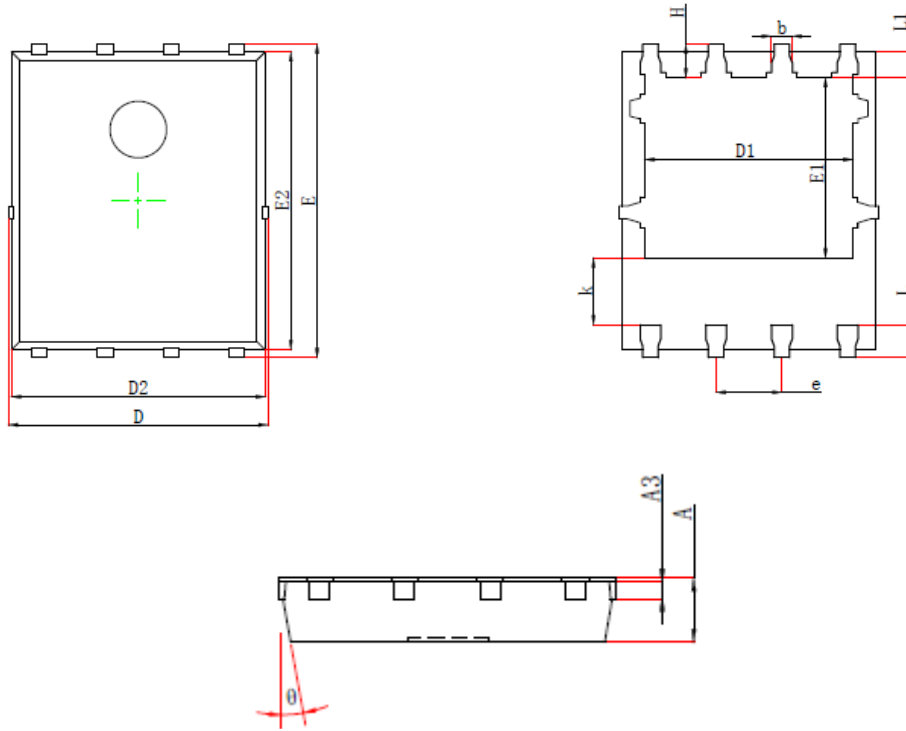


Fig.8 Gate Charge Waveform

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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