GSM3910X

30V N-Channel MOSFETs

Product Description

These N-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

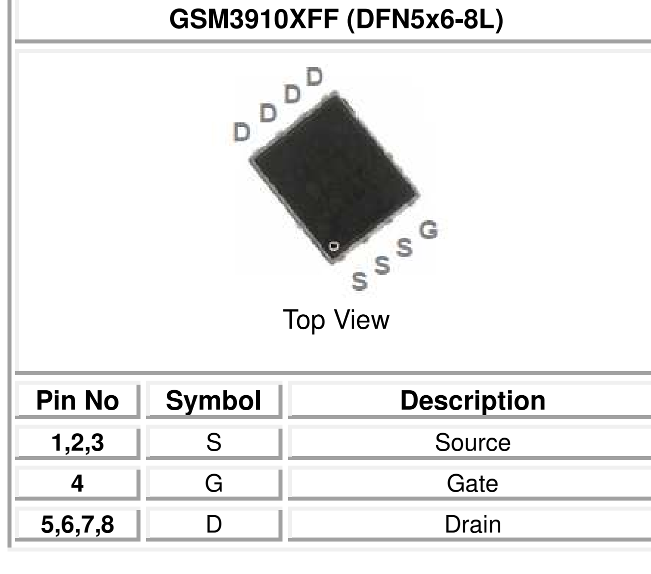
- 30V, 48A, $R_{DS(ON)}$=12mΩ@V_{GS}=10V
- Improved dv/dt capability
- Fast switching
- 100% EAS guaranteed
- Green Device Available

Applications

- MB / VGA / Vcore
- POL Applications
- SMPS 2nd SR

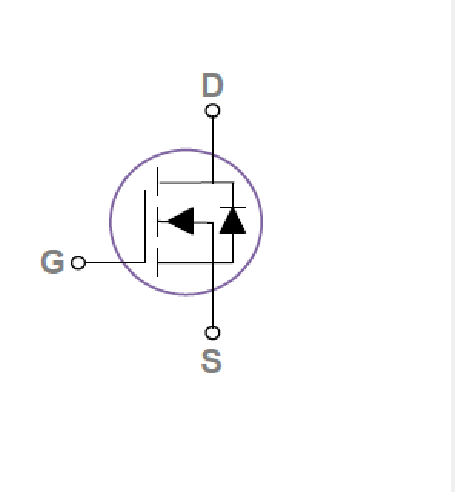
Packages & Pin Assignments

GSM3910XFF (DFN5x6-8L)

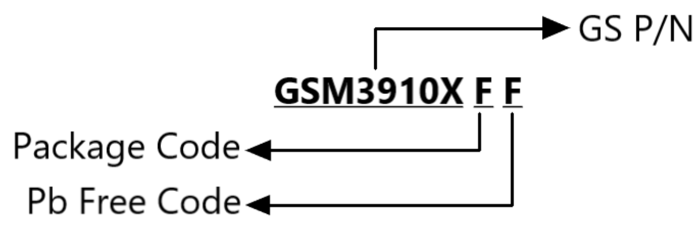


Top View

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

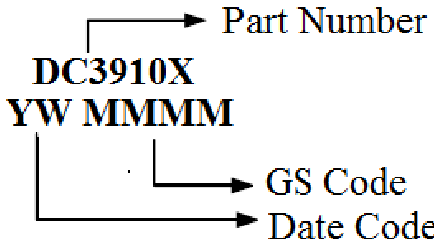


Ordering Information



Part Number	Package	Quantity
GSM3910XFF	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℃	48	A
		T_C=100℃	30	
I_{DM}	Pulsed Drain Current[1]		192	A
EAS	Single Pulse Avalanche Energy[2]		34	mJ
IAS	Single Pulse Avalanche Current[2]		26	A
P_D	Power Dissipation (T_C=25℃)		43	W
	Power Dissipation (Derate above 25℃)		0.34	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		2.9	℃/W

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. VDD=25V, VGS=10V, L=0.1mH, IAS=26A., RG=25Ω, Starting TJ=25˚C.

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
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃, I_D=1mA		0.024		V/℃
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	1.2	1.6	2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient	V_{DS}=V_{GS}, I_D=250uA		-3.8		mV/℃
I_{GSS}	Gate Leakage Current	V_{DS}=0V, V_{GS}=±20V			±100	nA
I_{DSS}	Drain-Source Leakage Current	V_{DS}=30V, V_{GS}=0V T_J=25℃			1	μA
		V_{DS}=30V, V_{GS}=0V, T_J=125℃			10	μA
I_S	Continuous Source Current	V_G=V_D=0V, Force Current			48	A
I_{SM}	Pulsed Source Current[3]	V_G=V_D=0V, Force Current			56	A
$R_{DS(on)}$	Drain-Source On-Resistance[3]	V_{GS}=10V, I_D=10A		9.6	12	mΩ
		V_{GS}=10V, I_D=10A, T_J=125℃		13.6		mΩ
		V_{GS}=4.5V, I_D=5A		12.5	16	mΩ
g_{FS}	Forward Transconductance	V_{DS}=10V, I_D=3A		8.3		S
V_{SD}	Diode Forward Voltage[3]	V_{GS}=0V, I_S=1A			1	V
t_{rr}	Reverse Recovery Time	V_{GS}=10V, I_S=10A, di/dt=100A/μs		121		nS
Q_{rr}	Reverse Recovery Charge	V_{GS}=10V, I_S=10A, di/dt=100A/μs		83		nC
Dynamic						
Q_g	Total Gate Charge[3,4]	V_{DS}=15V, V_{GS}=10V, I_D=5A		10.7	22	nC
Q_{gs}	Gate-Source Charge[3,4]	V_{DS}=15V, V_{GS}=10V, I_D=5A		1.7	3.4	nC
Q_{gd}	Gate-Drain Charge[3,4]	V_{DS}=15V, V_{GS}=10V, I_D=5A		2.5	5	nC
C_{iss}	Input Capacitance	V_{DS}=15V,V_{GS}=0V, f=1MHz		670	1340	pF
C_{oss}	Output Capacitance	V_{DS}=15V,V_{GS}=0V, f=1MHz		115	230	pF
C_{rss}	Reverse Transfer Capacitance	V_{DS}=15V,V_{GS}=0V, f=1MHz		85	170	pF
$t_{d(on)}$	Turn-On Time[3,4]	V_{DD}=15V, I_D=1A, V_{GS}=10V, R_G=6Ω		3.8	7	ns
t_r	Rise Time[3,4]	V_{DD}=15V, I_D=1A, V_{GS}=10V, R_G=6Ω		10	19	ns
$t_{d(off)}$	Turn-Off Time[3,4]	V_{DD}=15V, I_D=1A, V_{GS}=10V, R_G=6Ω		22	42	ns
t_f	Fall Time[3,4]	V_{DD}=15V, I_D=1A, V_{GS}=10V, R_G=6Ω		6.6	13	ns
Rg	Gate Resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		2.8	5.6	Ω

Note :

3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

Typical Performance Characteristics

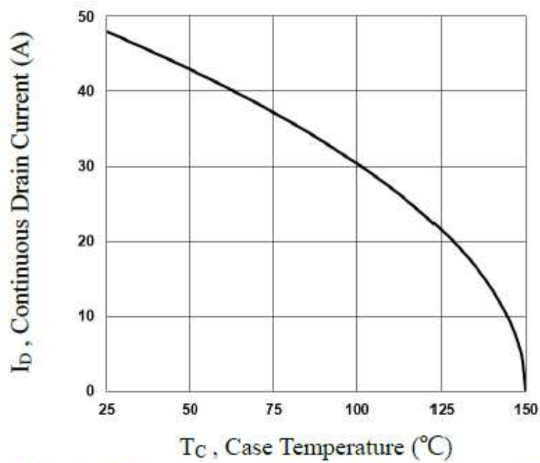


Fig.1 Continuous Drain Current vs. T_C

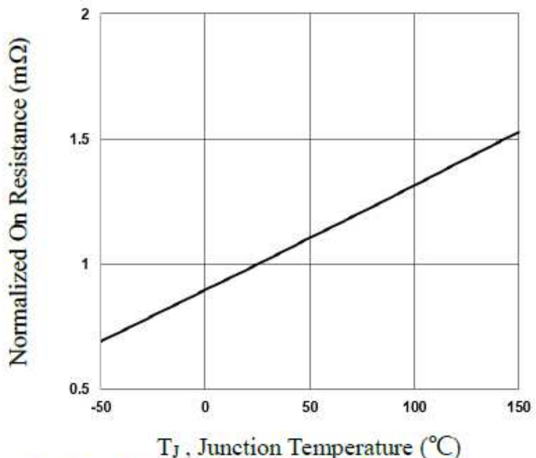


Fig.2 Normalized RDSON vs. T_J

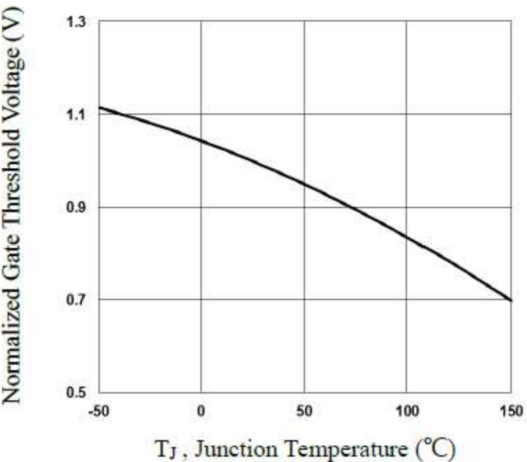


Fig.3 Normalized V_{th} vs. T_J

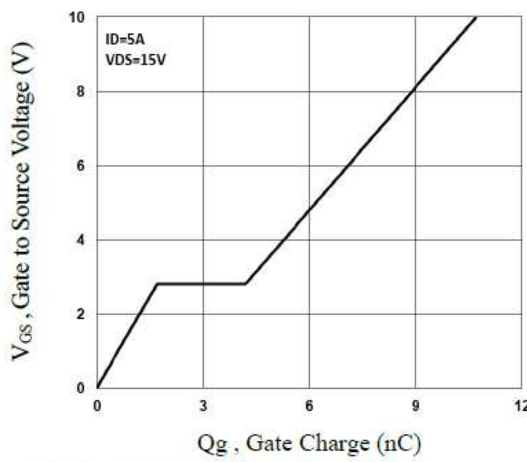


Fig.4 Gate Charge Waveform

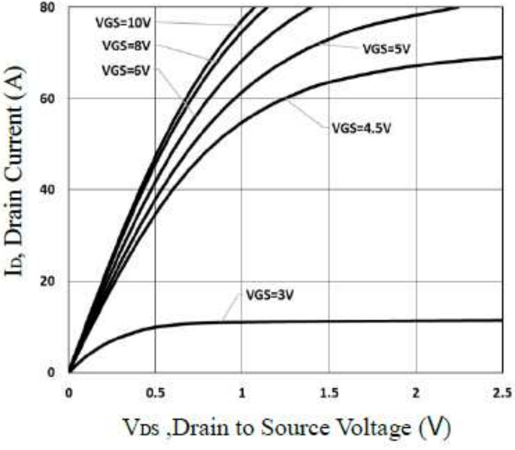


Fig.5 Typical Output Characteristics

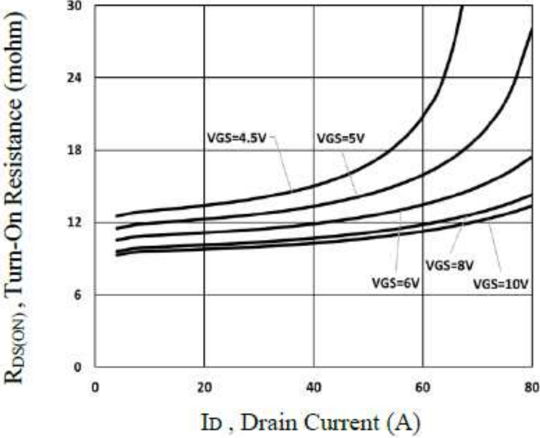


Fig.6 Turn-On Resistance vs. I_D

Typical Performance Characteristics (Continue)

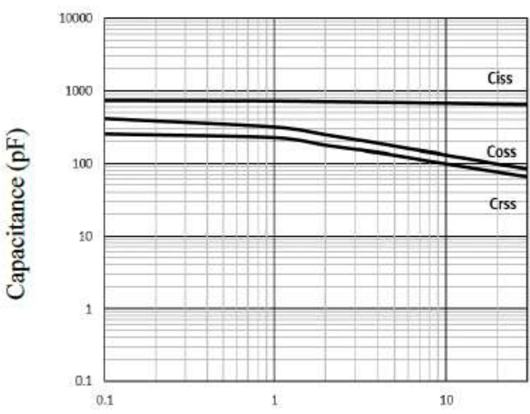


Fig.7 Capacitance Characteristics

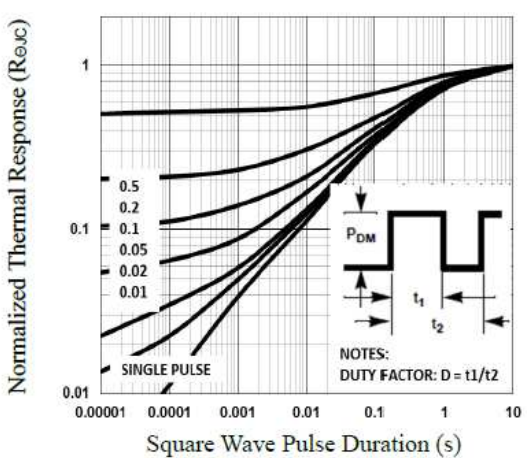


Fig.8 Normalized Transient Response

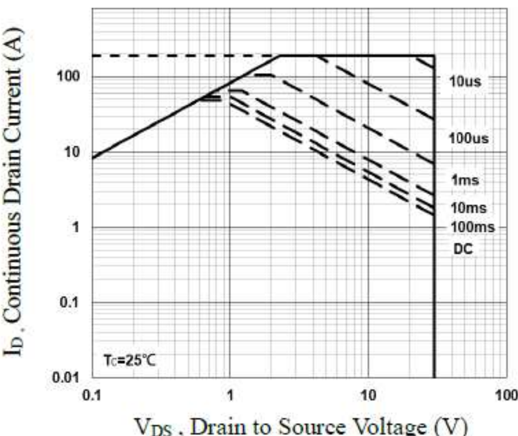


Fig.9 Maximum Safe Operation Area

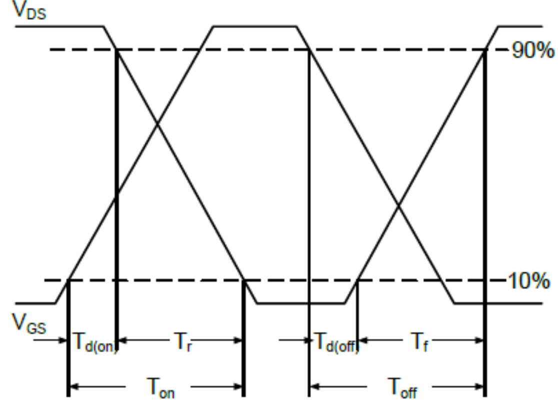


Fig.10 Switching Time Waveform

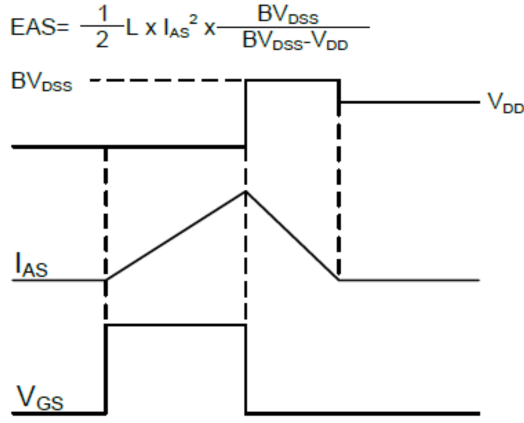
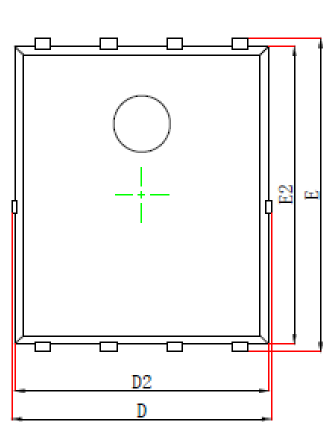


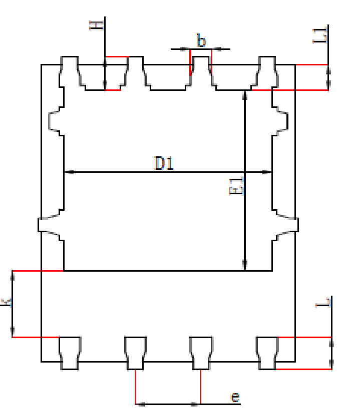
Fig.11 EAS Waveform

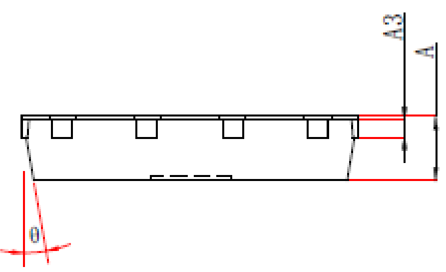
GSM3910X

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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