

# GSM3915X

## 30V P-Channel MOSFETs

### 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.

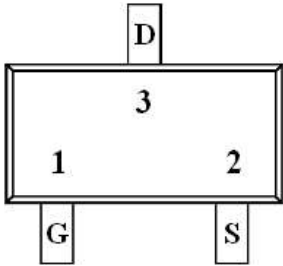
### Features

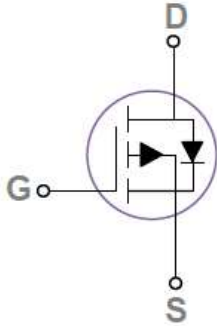
- -30V,-1.4A,  $R_{DS(ON)} = 90m\Omega @ V_{GS} = -10V$
- Fast switching
- Green Device Available
- Suit for -4.5V Gate Drive Applications

### Applications

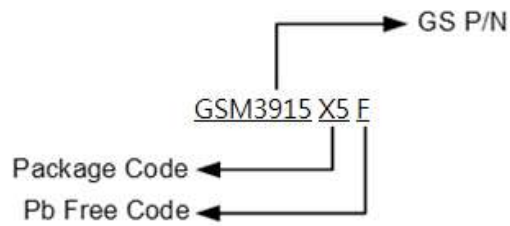
- Notebook
- Load Switch
- Battery Protection
- Hand-held Instruments

### Packages & Pin Assignments

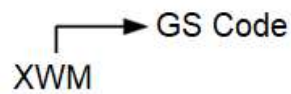
GSM3915X5F (SOT-323)	
	
Pin	Description
1	Gate
2	Source
3	Drain



## Ordering Information



## Marking Information



Part Number	Package	Part Marking	Quantity
GSM3915X5F	SOT-323	XWM	3000pcs

## Absolute Maximum Ratings

T<sub>c</sub>=25°C Unless otherwise noted

Symbol	Parameter	Typical	Unit	
V <sub>DS</sub>	Drain-Source Voltage	-30	V	
V <sub>GS</sub>	Gate-Source Voltage	±20	V	
I <sub>D</sub>	Continuous Drain Current	T <sub>A</sub> =25°C	-1.4	
		T <sub>A</sub> =70°C	-1.1	
I <sub>DM</sub>	Pulsed Drain Current <sub>1</sub>	5.6	A	
P <sub>D</sub>	Power Dissipation (T <sub>A</sub> =25°C)	0.278	W	
	Power Dissipation (Derate above 25°C)	0.002	W/°C	
T <sub>J</sub>	Operating Junction Temperature Range	-55 to +150	°C	
T <sub>STG</sub>	Storage Temperature Range	-55 to +150	°C	
Symbol	Parameter	Typical	Max	Unit
R <sub>θJA</sub>	Thermal Resistance-Junction to Ambient		450	°C/W

## Electrical Characteristics

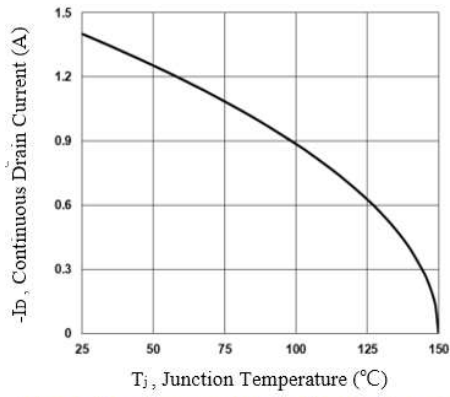
T<sub>J</sub>=25°C Unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA	-30			V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BV <sub>DSS</sub> Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =-1mA		-0.02		V/°C
V <sub>GS(th)</sub>	Gate Threshold Voltage		-1.2	-1.6	-2.2	V
ΔV <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA		-2.8		mV/°C
I <sub>GSS</sub>	Gate Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V			±100	nA
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C			-1	uA
		V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C			-10	
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current			-1.4	A
I <sub>SM</sub>	Pulsed Source Current				-2.8	
R <sub>DS(on)</sub>	Drain-Source On-Resistance	V <sub>GS</sub> =-10V, I <sub>D</sub> =-1A		75	90	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-0.8A		110	140	
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =-10V, I <sub>D</sub> =-1A		3		S
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =1A T <sub>J</sub> =25°C			-1	V
<b>Dynamic</b>						
Q <sub>g</sub>	Total Gate Charge <sup>2,3</sup>	V <sub>DS</sub> =-24V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-1A		2.5	5	nC
Q <sub>gs</sub>	Gate-Source Charge <sup>2,3</sup>			0.1	0.3	
Q <sub>gd</sub>	Gate-Drain Charge <sup>2,3</sup>			1.8	3.6	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, f=1MHz		226	450	pF
C <sub>oss</sub>	Output Capacitance			39	78	
C <sub>rss</sub>	Reverse Transfer Capacitance			29	58	
t <sub>d(on)</sub>	Turn-On Time	V <sub>DD</sub> =-15V, I <sub>D</sub> =-1A, V <sub>GS</sub> =-10V, R <sub>G</sub> =6Ω		6.1	12	ns
t <sub>r</sub>				8.7	17	
t <sub>d(off)</sub>	Turn-Off Time			33.2	66	
t <sub>f</sub>				3.7	7	

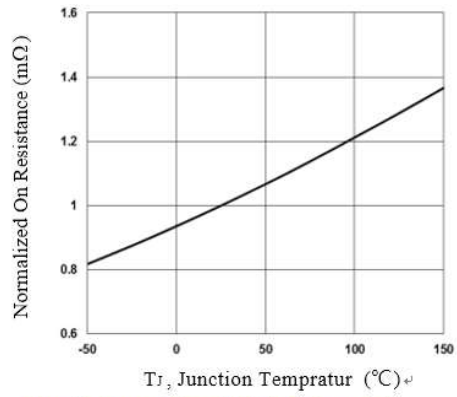
Note :

- 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.

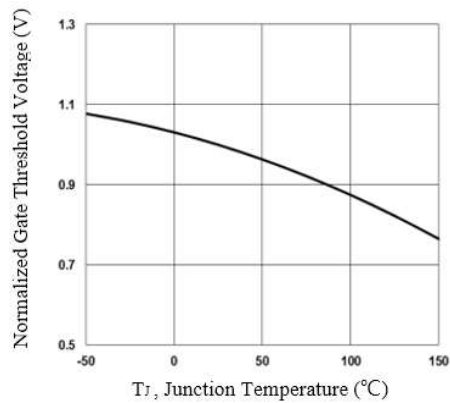
## Typical Performance Characteristics



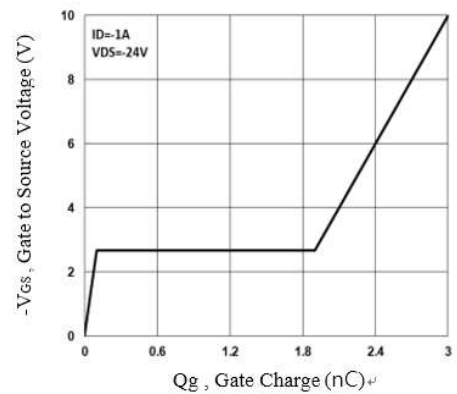
**Fig.1 Continuous Drain Current vs.  $T_j$**



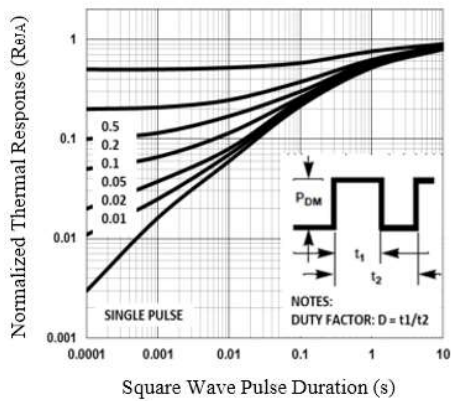
**Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_j$**



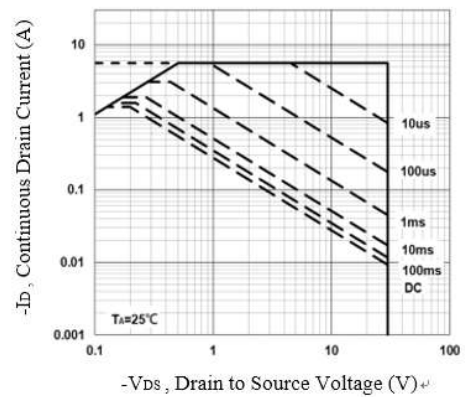
**Fig.3 Normalized  $V_{th}$  vs.  $T_j$**



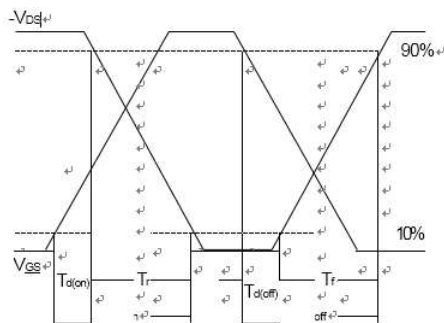
**Fig.4 Gate Charge Waveform**



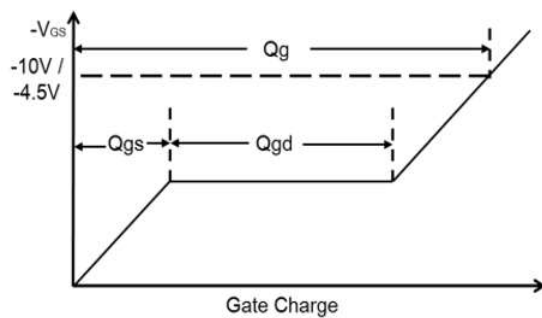
**Fig.5 Normalized Transient Impedance**



**Fig.6 Maximum Safe Operation Area**



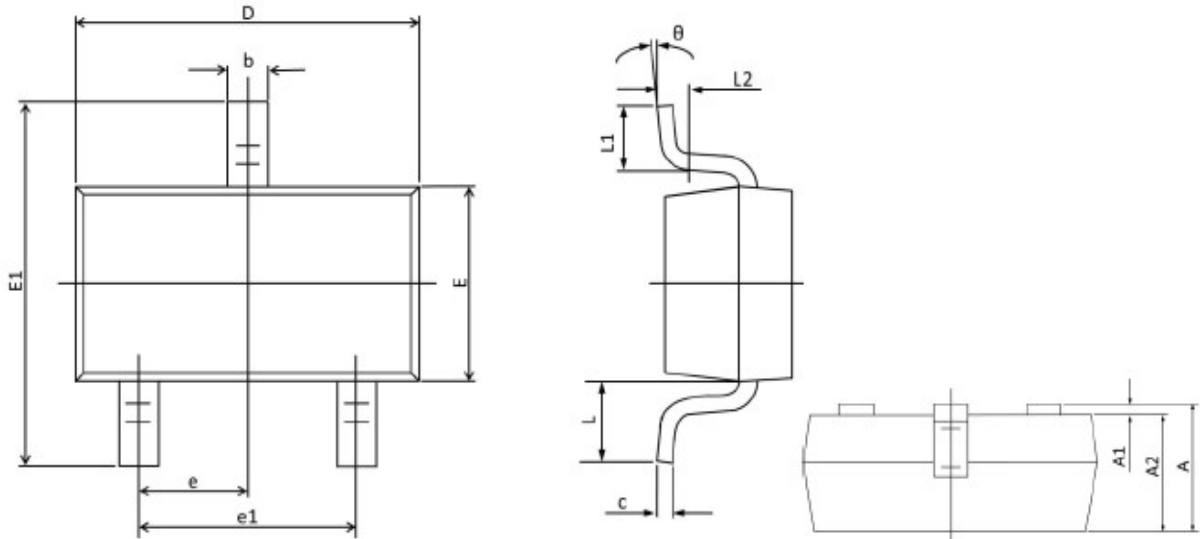
**Fig.7 Switching Time Waveform**



**Fig.8 Gate Charge Waveform**

## Package Dimension

### SOT-323








Dimensions				
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.800	1.100	0.031	0.043
A1	0.000	0.100	0.000	0.004
A2	0.800	1.000	0.031	0.039
b	0.200	0.400	0.008	0.016
c	0.080	0.250	0.003	0.010
D	1.800	2.200	0.071	0.087
E	1.150	1.350	0.045	0.053
E1	1.800	2.450	0.071	0.096
e	0.650 (BSC)		0.026 (BSC)	
e1	1.200	1.40	0.047	0.055
L	0.525 (REF)		0.021 (REF)	
L1	0.150	0.460	0.006	0.018
L2	0.000	0.200	0.000	0.008
theta	0°	8°	0°	8°

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