

# 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.


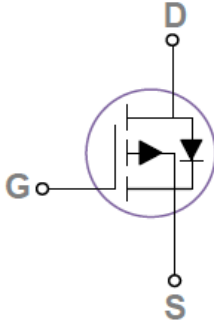
### Features

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

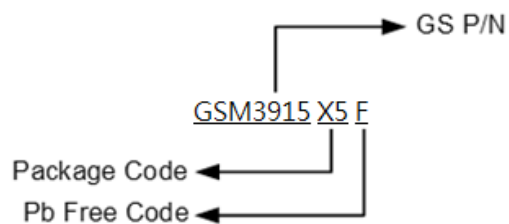
### Applications

- 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

YWM → Date Code

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

## 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	$\pm 20$	V	
$I_D$	Continuous Drain Current	$T_A=25^{\circ}\text{C}$	-1.4	
		$T_A=70^{\circ}\text{C}$	-1.1	
$I_{DM}$	Pulsed Drain Current <sub>1</sub>	5.6	A	
$P_D$	Power Dissipation ( $T_A=25^{\circ}\text{C}$ )	0.278	W	
	Power Dissipation (Derate above $25^{\circ}\text{C}$ )	0.002	W/ $^{\circ}\text{C}$	
$T_J$	Operating Junction Temperature Range	-55 to +150	$^{\circ}\text{C}$	
$T_{STG}$	Storage Temperature Range	-55 to +150	$^{\circ}\text{C}$	
Symbol	Parameter	Typical	Max	Unit
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		450	$^{\circ}\text{C}/\text{W}$

## Electrical Characteristics

$T_J=25^{\circ}\text{C}$  Unless otherwise noted

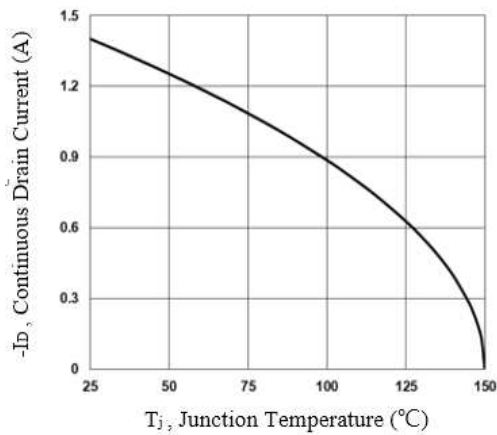
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static</b>						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0\text{V}, I_D=-250\mu\text{A}$	-30			V
$\Delta BV_{DSS}/\Delta T_J$	$BV_{DSS}$ Temperature Coefficient	Reference to $25^{\circ}\text{C}$ , $I_D=-1\text{mA}$		-0.02		V/ $^{\circ}\text{C}$
$V_{GS(th)}$	Gate Threshold Voltage		-1.2	-1.6	-2.2	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient	$V_{DS}=V_{GS}, I_D=-250\mu\text{A}$		-2.8		mV/ $^{\circ}\text{C}$
$I_{GSS}$	Gate Leakage Current	$V_{DS}=0\text{V}, V_{GS}=\pm 20\text{V}$			$\pm 100$	nA
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=-30\text{V}, V_{GS}=0\text{V}, T_J=25^{\circ}\text{C}$			-1	$\mu\text{A}$
		$V_{DS}=-24\text{V}, V_{GS}=0\text{V}, T_J=125^{\circ}\text{C}$			-10	
$I_S$	Continuous Source Current	$V_G=V_D=0\text{V}$ , Force Current			-1.4	A
$I_{SM}$	Pulsed Source Current				-2.8	
$R_{DS(on)}$	Drain-Source On-Resistance	$V_{GS}=-10\text{V}, I_D=-1\text{A}$		75	90	m $\Omega$
		$V_{GS}=-4.5\text{V}, I_D=-0.8\text{A}$		110	140	
$g_{FS}$	Forward Transconductance	$V_{DS}=-10\text{V}, I_D=-1\text{A}$		3		S
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0\text{V}, I_S=1\text{A}$ $T_J=25^{\circ}\text{C}$			-1	V

Dynamic					
$Q_g$	Total Gate Charge <sup>2,3</sup>	$V_{DS}=-24V, V_{GS}=-4.5V, I_D=-1A$	2.5	5	nC
$Q_{gs}$	Gate-Source Charge <sup>2,3</sup>		0.1	0.3	
$Q_{gd}$	Gate-Drain Charge <sup>2,3</sup>		1.8	3.6	
$C_{iss}$	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V, f=1MHz$	226	450	pF
$C_{oss}$	Output Capacitance		39	78	
$C_{rss}$	Reverse Transfer Capacitance		29	58	
$t_{d(on)}$	Turn-On Time	$V_{DD}=-15V, I_D=-1A, V_{GS}=-10V, R_G=6\Omega$	6.1	12	ns
$t_r$			8.7	17	
$t_{d(off)}$	Turn-Off Time		33.2	66	
$t_f$		3.7	7		

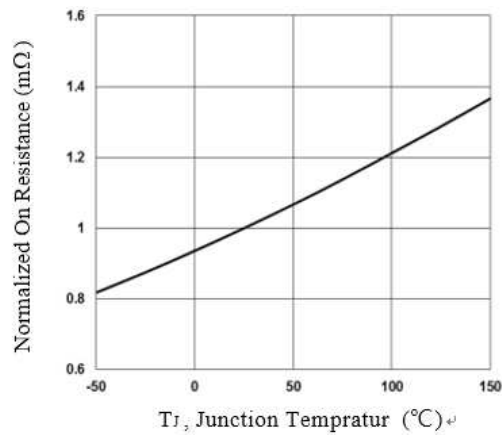
Note :

- 1.Repetitive Rating : Pulsed width limited by maximum junction temperature.
- 2.The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$ .
- 3.Essentially independent of operating temperature.

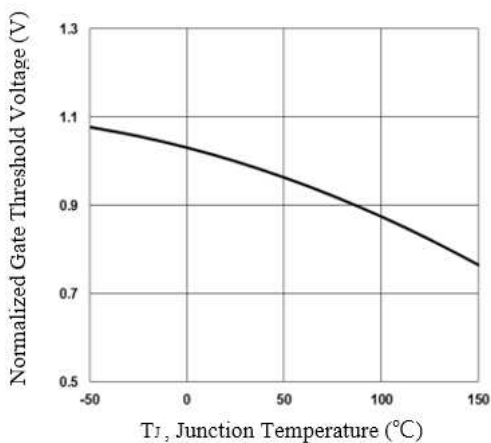
## Typical Performance Characteristics



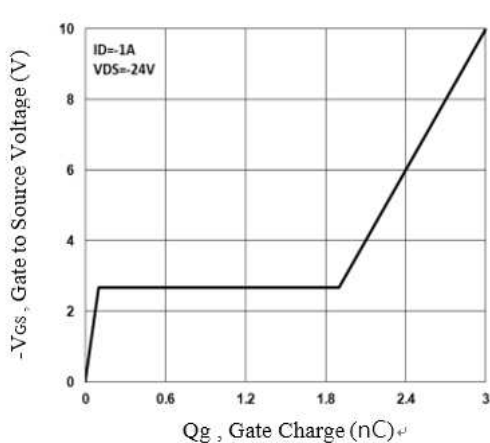
**Fig.1 Continuous Drain Current vs. T<sub>J</sub>**



**Fig.2 Normlized RDSON vs. T<sub>J</sub>**

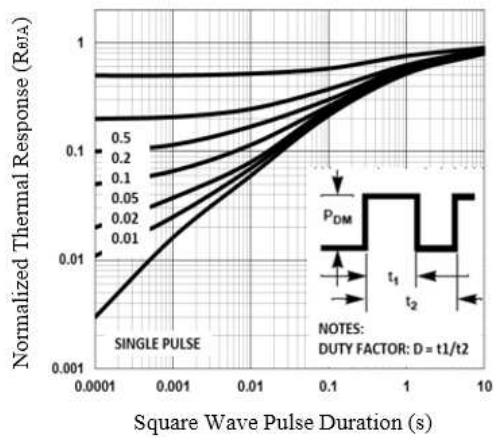


**Fig.3 Normalized V<sub>th</sub> vs. T<sub>J</sub>**

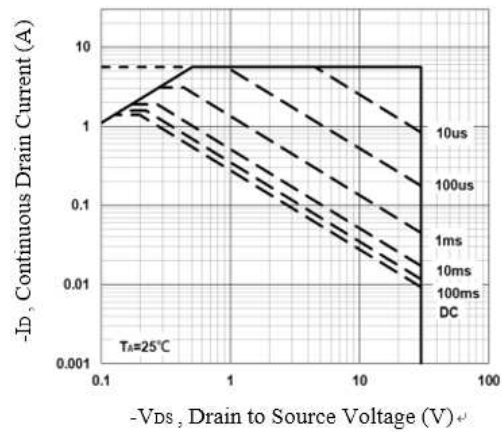


**Fig.4 Gate Charge Waveform**

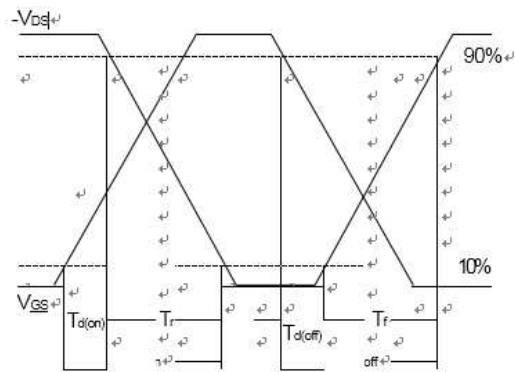
## Typical Performance Characteristics (Continue)



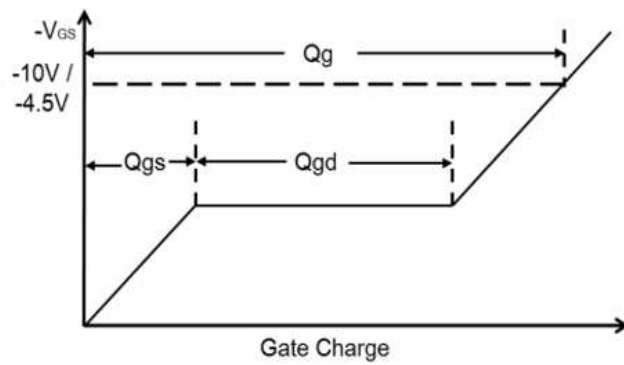
**Fig.5 Normalized Transient Impedance**



**Fig.6 Maximum Safe Operation Area**



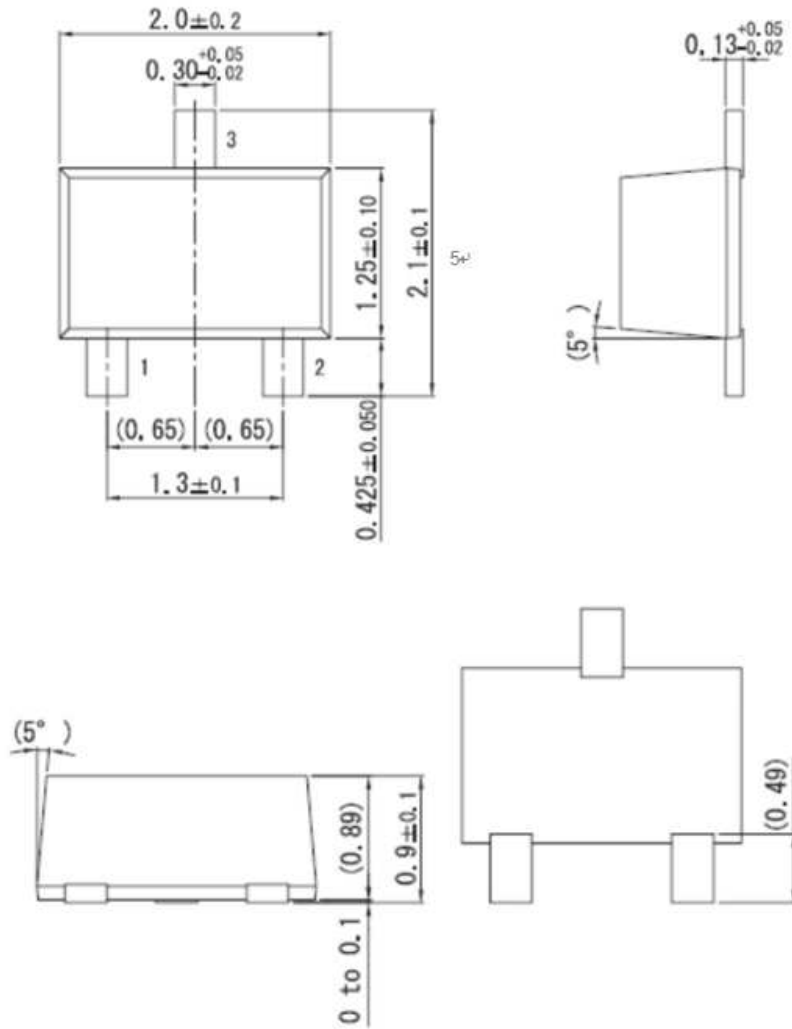
**Fig.7 Switching Time Waveform**



**Fig.8 Gate Charge Waveform**

## Package Dimension





### SOT-323





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