

# GSMDS3912

## 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.

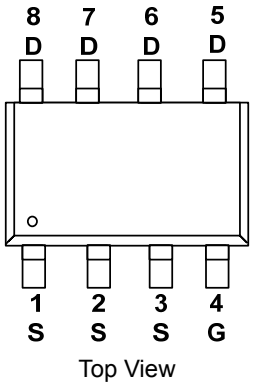
### Features

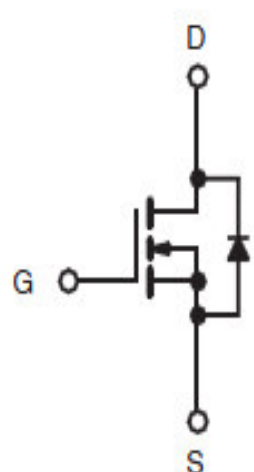
- 30V, 9.0A,  $R_{DS(ON)}=18m\Omega@V_{GS}=10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available
- SOP-8 package design

### Applications

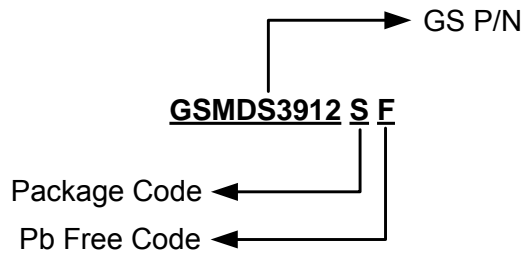
- MB / VGA / Vcore
- POL Applications
- SMPS 2nd SR

### Packages & Pin Assignments

GSMDS3912SF (SOP-8)	
 <p>Top View</p>	
Pin	Description
1	Source
2	Source
3	Source
4	Gate
5	Drain
6	Drain
7	Drain
8	Drain

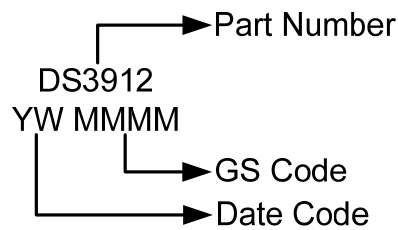


## Ordering Information



Part Number	Package	Quantity Reel
GSMDS3912SF	SOP-8	4000 PCS

## Marking Information



## Absolute Maximum Ratings

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

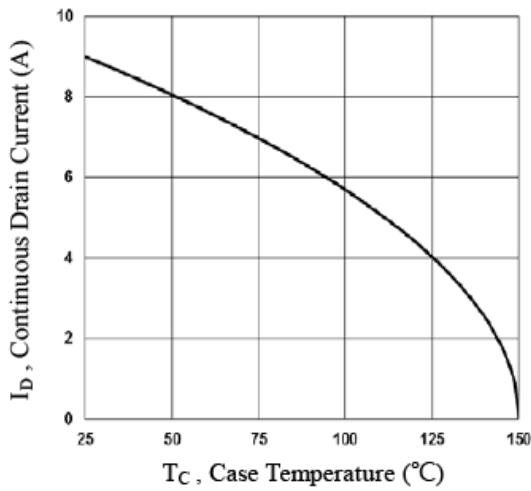
Symbol	Parameter	Typical	Unit
V <sub>DS</sub>	Drain-Source Voltage	30	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub>	Continuous Drain Current	T <sub>A</sub> =25°C	9
		T <sub>A</sub> =100°C	5.7
I <sub>DM</sub>	Pulsed Drain Current	36	A
EAS	Single Pulse Avalanche Energy	32	mJ
IAS	Single Pulse Avalanche Current	8	A
P <sub>D</sub>	Power Dissipation (T <sub>A</sub> =25°C)	2.5	W
	Power Dissipation (Derate above 25°C)	0.02	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
R <sub>θJA</sub>	Thermal Resistance-Junction to Ambient	50	°C/W

## Electrical Characteristics

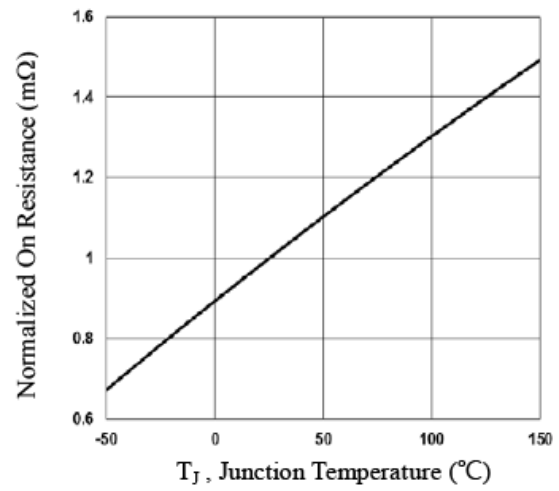
T<sub>A</sub>=25°C Unless otherwise noted

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		0.04		V/°C
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	1.2	1.6	2.0	V
ΔV <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient			-4		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			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			9	A
I <sub>SM</sub>	Pulsed Source Current				36	
R <sub>DS(on)</sub>	Drain-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =8A		16	18	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =5A		23	28	
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =5A		4		S
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =1A			1	V
<b>Dynamic</b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =15V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =8A		4.1	6	nC
Q <sub>gs</sub>	Gate-Source Charge			1	1.4	
Q <sub>gd</sub>	Gate-Drain Charge			2.1	4	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz		345	500	pF
C <sub>oss</sub>	Output Capacitance			55	80	
C <sub>rss</sub>	Reverse Transfer Capacitance			32	45	
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		2.8	5	ns
t <sub>r</sub>				7.2	14	
t <sub>d(off)</sub>	Turn-Off Time			15.8	30	
t <sub>f</sub>				4.6	9	
R <sub>g</sub>	Gate Resistance		V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz		3.2	

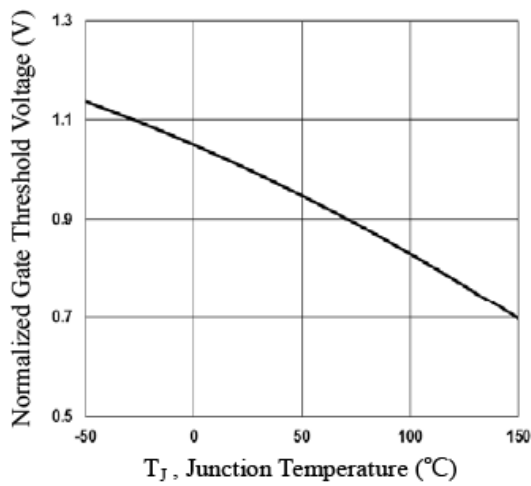
## Typical Performance Characteristics



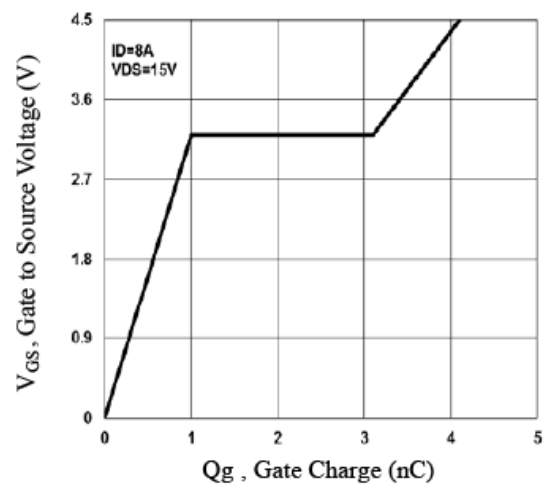
**Fig.1** Continuous Drain Current vs.  $T_c$



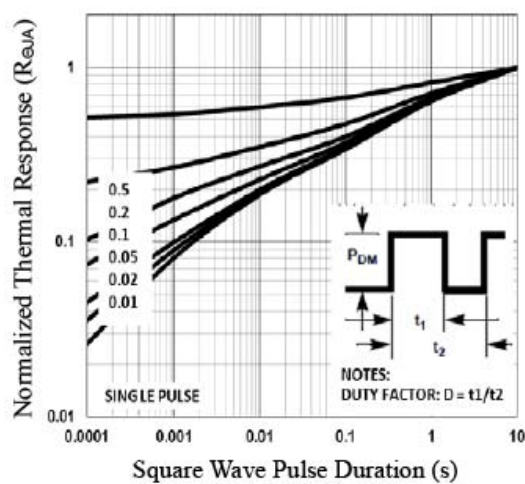
**Fig.2** Normalized  $R_{DS(on)}$  vs.  $T_j$



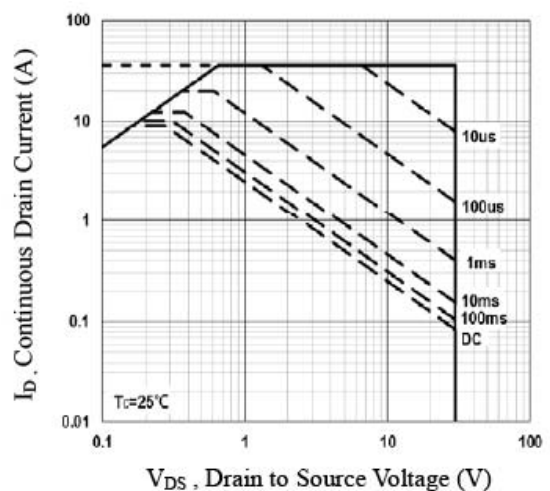
**Fig.3** Normalized  $V_{th}$  vs.  $T_j$



**Fig.4** Gate Charge Waveform



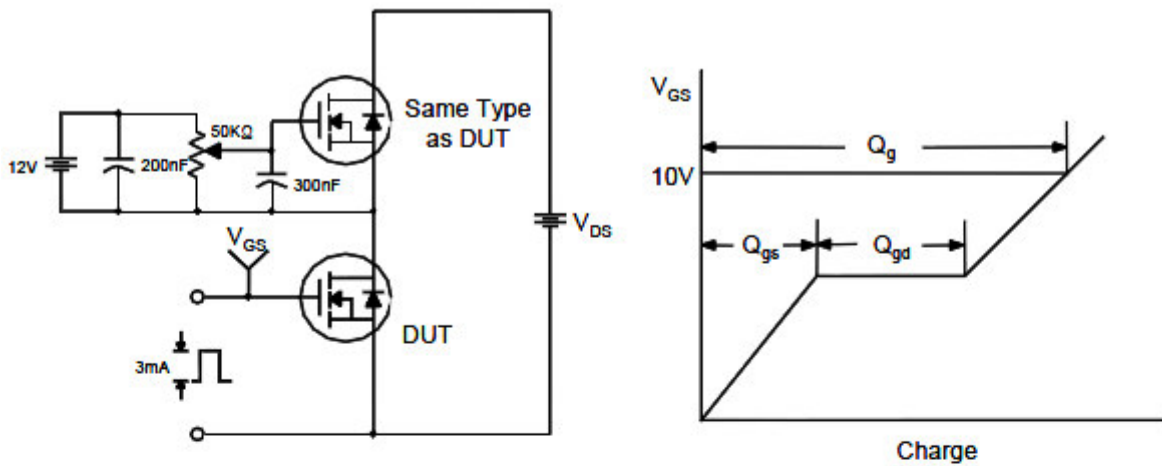
**Fig.5** Normalized Transient Response



**Fig.6** Maximum Safe Operation Area

## Typical Performance Characteristics (Continue)

### Gate Charge Test Circuit & Waveform



### Resistive Switching Test Circuit & Waveforms

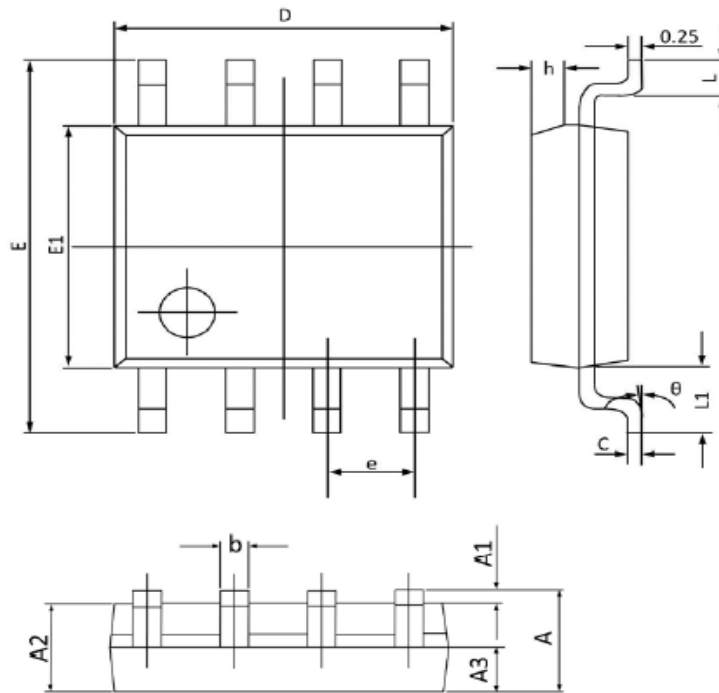


### Unclamped Inductive Switching Test Circuit & Waveforms



## Package Dimension

### SOP-8



Dimensions				
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.068
A1	0.100	0.250	0.004	0.009
A2	1.300	1.500	0.052	0.059
A3	0.600	0.700	0.024	0.027
b	0.390	0.480	0.016	0.018
c	0.210	0.260	0.009	0.010
D	4.700	5.100	0.186	0.200
E	5.800	6.200	0.229	0.244
E1	3.700	4.100	0.146	0.161
e	1.270 (BSC)		0.050 (BSC)	
h	0.250	0.500	0.010	0.019
L	0.500	0.800	0.019	0.031
L1	1.050 (BSC)		0.041 (BSC)	
θ	0°	8°	0°	8°

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