

# GSMDS2603

## 20V 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.

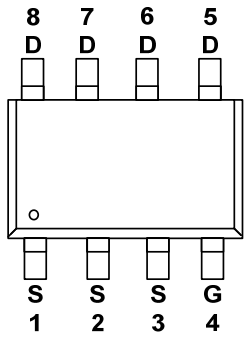
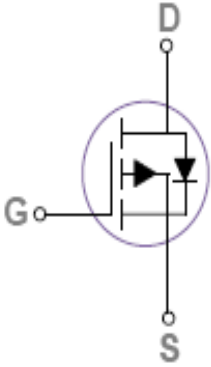
### Features

- -20V, -14A,  $R_{DS(ON)}=8.5m\Omega@V_{GS}=-4.5V$
- Improved dv/dt capability
- Fast switching
- Suit for -1.8V Gate Drive Applications
- Green Device Available
- SOP-8 package design

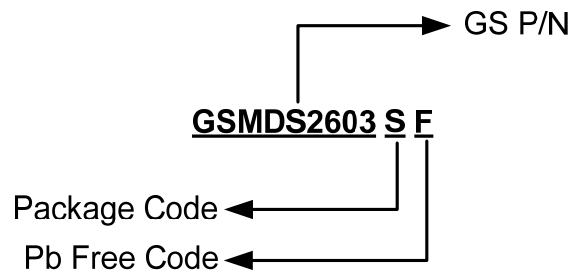
### Applications

- Notebook
- Load Switch
- Networking
- Hand-Held Instruments

### Packages & Pin Assignments

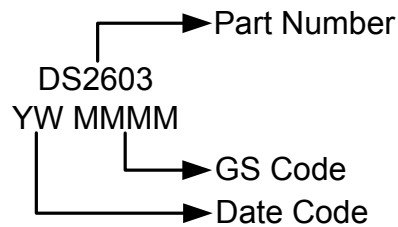
GSMDS2603SF (SOP-8)			
			
			
Pin	Description	Pin	Description
1	Source	5	Drain
2	Source	6	Drain
3	Source	7	Drain
4	Gate	8	Drain

## Ordering Information



Part Number	Package	Quantity Reel
GSMD52603SF	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	-20	V
V <sub>GS</sub>	Gate-Source Voltage	±12	V
I <sub>D</sub>	Continuous Drain Current	T <sub>C</sub> =25°C	-14
		T <sub>C</sub> =100°C	-8.8
I <sub>DM</sub>	Pulsed <sup>1</sup> Drain Current	-56	A
P <sub>D</sub>	Power Dissipation (T <sub>C</sub> =25°C)	2	W
	Power Dissipation (Derate above 25°C)	0.016	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	62	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction to Case	17	°C/W

## Electrical Characteristics

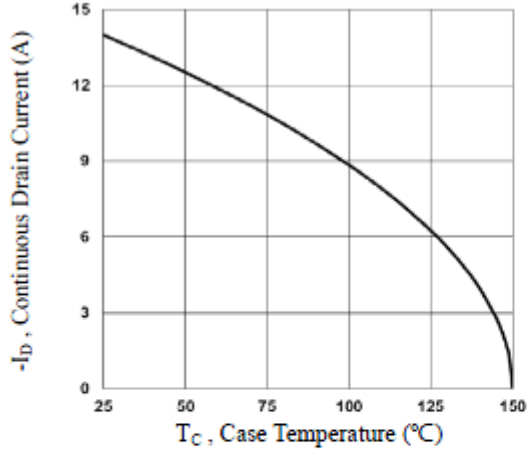
T<sub>A</sub>=25°C Unless otherwise noted

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	-20			V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BV <sub>DSS</sub> Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =-1mA		-0.01		V/°C
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA	-0.3	-0.6	-1.0	V
I <sub>GSS</sub>	Gate Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±12V			±100	nA
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V T <sub>J</sub> =25°C			-1	uA
		V <sub>DS</sub> =-16V, 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			-14	A
I <sub>SM</sub>	Pulsed Source Current				-28	
R <sub>DS(on)</sub>	Drain-Source On-Resistance	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-8A		6.5	8.5	mΩ
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-5A		9	12	
		V <sub>GS</sub> =-1.8V, I <sub>D</sub> =-3A		12	17	
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =-10V, I <sub>D</sub> =-5A		20		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> =-10V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-5A		44.4	80	nC
Q <sub>gs</sub>	Gate-Source Charge <sup>2, 3</sup>			7.2	14	
Q <sub>gd</sub>	Gate-Drain Charge <sup>2, 3</sup>			10.2	20	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, f=1MHz		4060	8000	pF
C <sub>oss</sub>	Output Capacitance			520	1000	
C <sub>rss</sub>	Reverse Transfer Capacitance			400	800	
t <sub>d(on)</sub>	Turn-On Time <sup>2, 3</sup>	V <sub>DD</sub> =-10V, I <sub>D</sub> =-1A, V <sub>GS</sub> =-4.5V, R <sub>G</sub> =25Ω		13.2	26	ns
t <sub>r</sub>				68	120	
t <sub>d(off)</sub>	Turn-Off Time <sup>2, 3</sup>			160	320	
t <sub>f</sub>				154	300	

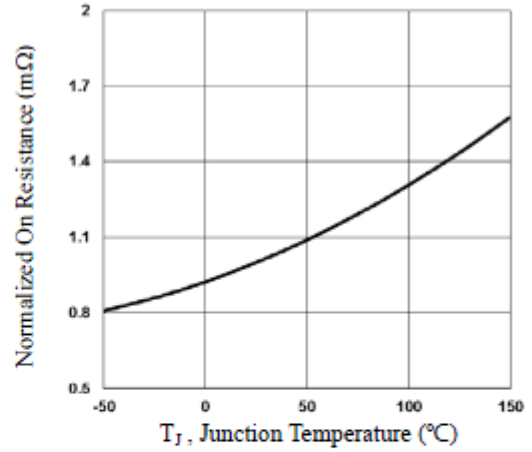
Note :

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.

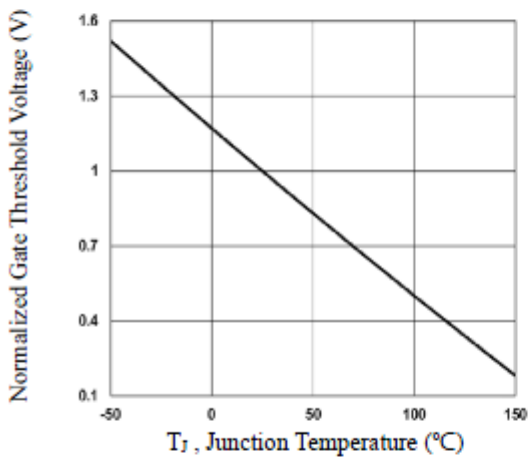
## Typical Performance Characteristics



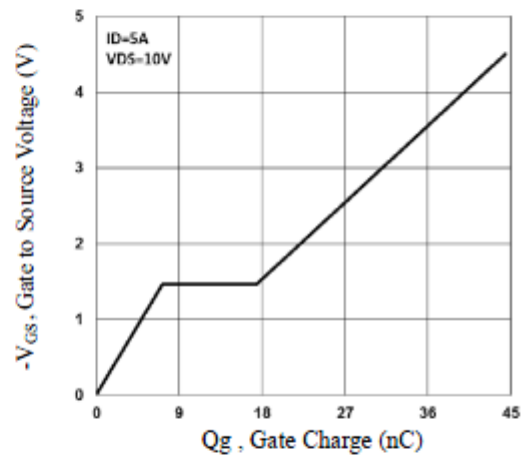
**Fig.1 Continuous Drain Current vs.  $T_c$**



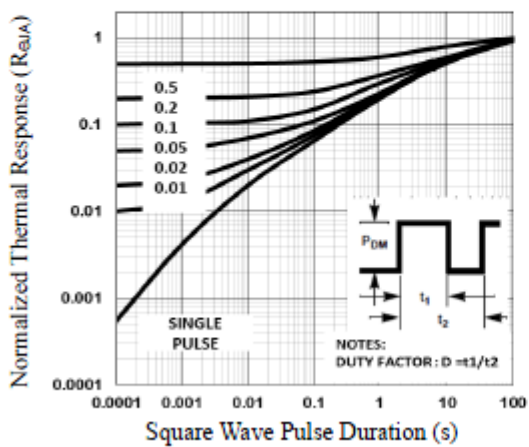
**Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_j$**



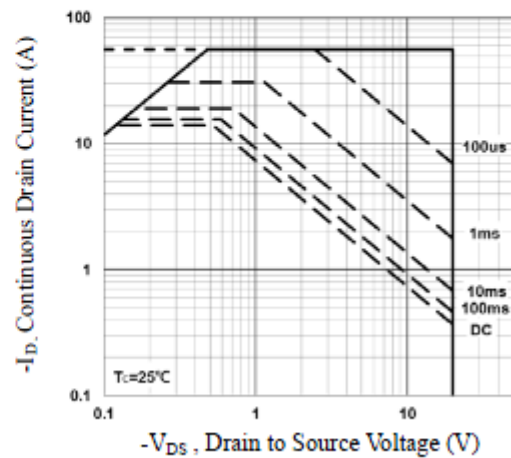
**Fig.3 Normalized  $V_{th}$  vs.  $T_j$**



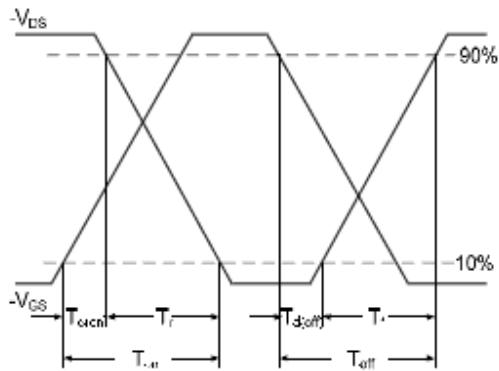
**Fig.4 Gate Charge Waveform**



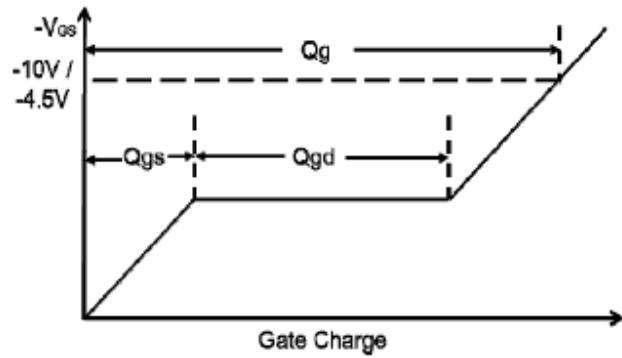
**Fig.5 Normalized Transient Response**



**Fig.6 Maximum Safe Operation Area**



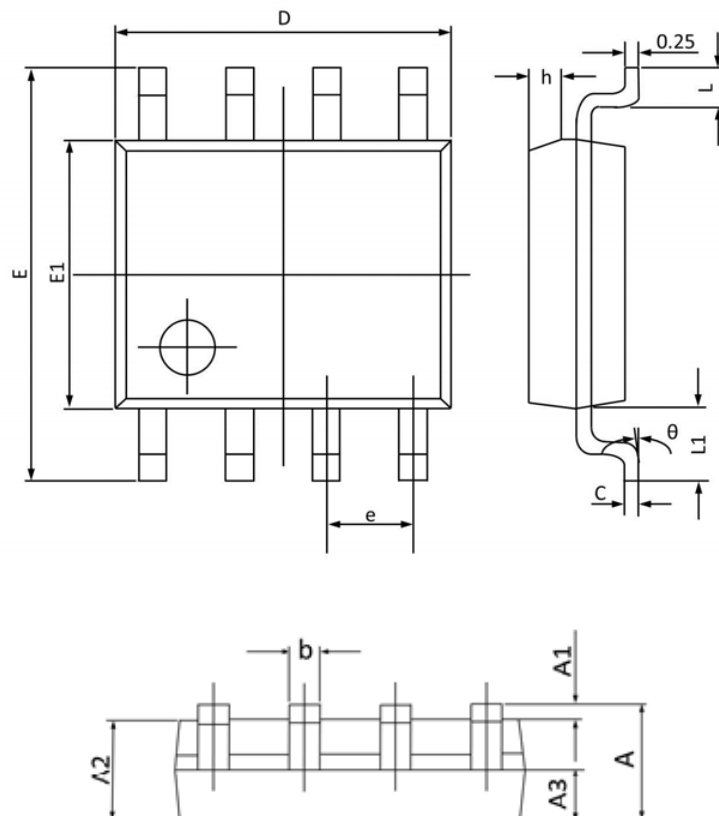
**Fig.7 Switching Time Waveform**



**Fig.8 Gate Charge Waveform**

**Package Dimension**

**SOP-8**










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



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