

# GSMDC4903Z

## 40V 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.

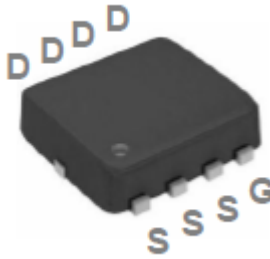
### Features

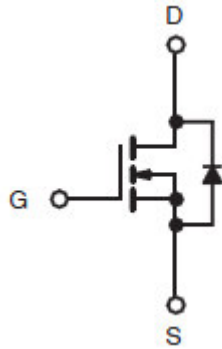
- -40V, -38 A,  $R_{DS(ON)}=14\text{ m}\Omega@V_{GS}=-10\text{V}$
- Improved dv/dt capability
- Fast switching
- 100% EAS guaranteed
- Green Device Available
- DFN3X3-8L package design

### Applications

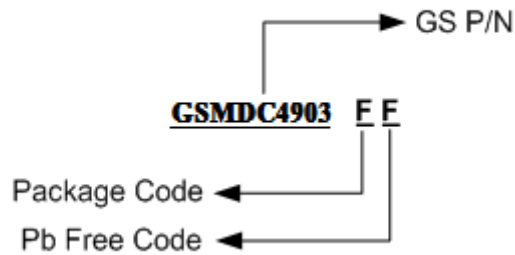
- MB / VGA / Vcore
- Load Switch
- LED applications
- POL Applications

### Packages & Pin Assignments

GSMDC4903ZFF (DFN3X3-8L)	
 <p>Bottom View</p>	
Pin	Description
1	Source
2	Source
3	Source
4	Gate
5	Drain
6	Drain
7	Drain
8	Drain

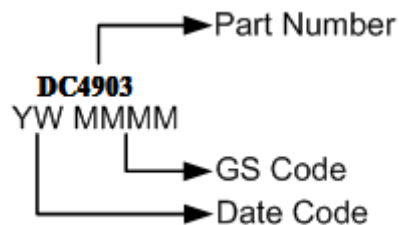


## Ordering Information



Part Number	Package	Quantity
GSMDC4903ZFF	DFN3X3-8L	3000 PCS

## Marking Information



## Absolute Maximum Ratings

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

Symbol	Parameter	Typical	Unit
$V_{DS}$	Drain-Source Voltage	-40	V
$V_{GS}$	Gate –Source Voltage	$\pm 20$	V
$I_D$	Continuous Drain Current	$T_C=25^\circ\text{C}$	-38
		$T_C=100^\circ\text{C}$	-24
$I_{DM}$	Pulsed Drain Current (Note 1)	-152	A
EAS	Single Pulse Avalanche Energy (Note 2)	130	mJ
IAS	Single Pulse Avalanche Current (Note 2)	51	A
$P_D$	Power Dissipation ( $T_C=25^\circ\text{C}$ )	52	W
	Power Dissipation (Derate above $25^\circ\text{C}$ )	0.42	W/ $^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-55 to +150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to +150	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	62	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance-Junction to Case	2.4	$^\circ\text{C/W}$

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2.  $V_{DD}=25\text{V}, V_{GS}=10\text{V}, L=0.1\text{mH}, I_{AS}=51\text{A}, R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$

## Electrical Characteristics

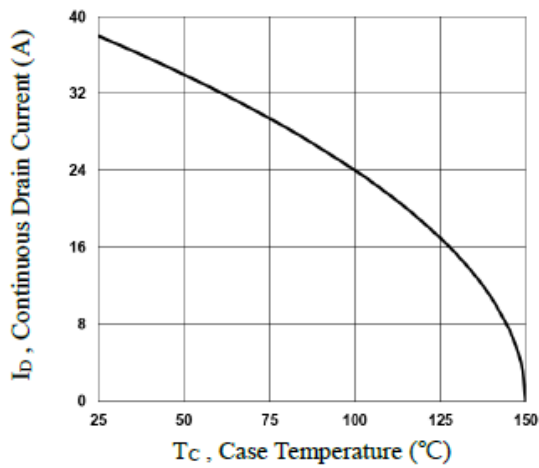
T<sub>J</sub>=25°C Unless otherwise noted

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	-40			V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA	-1.0	-1.6	-2.5	V
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> =-40V, V <sub>GS</sub> =0V			-1	uA
		V <sub>DS</sub> =-32V, 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			-38	A
I <sub>SM</sub>	Pulsed Source Current				-76	
R <sub>DS(on)</sub>	Drain-Source On-Resistance	V <sub>GS</sub> =-10V, I <sub>D</sub> =-15A		11.3	14	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-8A		15.6	21	
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =-10V, I <sub>D</sub> =-4A		11		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 (Note 3,4)	V <sub>DS</sub> =-32V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-10A		22.2	40	nC
Q <sub>gs</sub>	Gate-Source Charge (Note 3,4)			8.2	16	
Q <sub>gd</sub>	Gate-Drain Charge (Note 3,4)			8.8	16	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-25V, V <sub>GS</sub> =0V, f=1MHz		2757	4000	pF
C <sub>oss</sub>	Output Capacitance			240	360	
C <sub>rss</sub>	Reverse Transfer Capacitance			46	90	
t <sub>d(on)</sub>	Turn-On Time (Note 3,4)	V <sub>DD</sub> =-20V, I <sub>D</sub> =-1A, V <sub>GS</sub> =-10V, R <sub>G</sub> =6Ω		23	40	ns
t <sub>r</sub>				10	20	
t <sub>d(off)</sub>	Turn-Off Time (Note 3,4)			135	250	
t <sub>f</sub>				46	90	

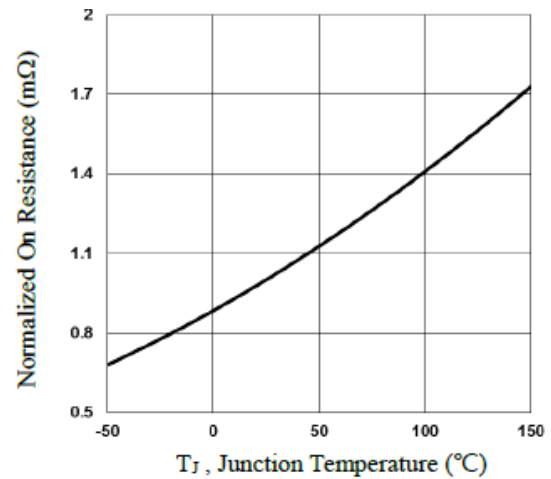
Note 3: The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%

Note 4: Essentially independent of operating temperature.

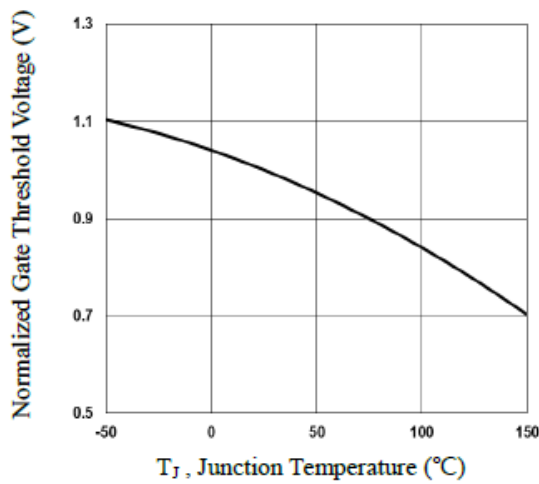
## Typical Performance Characteristics



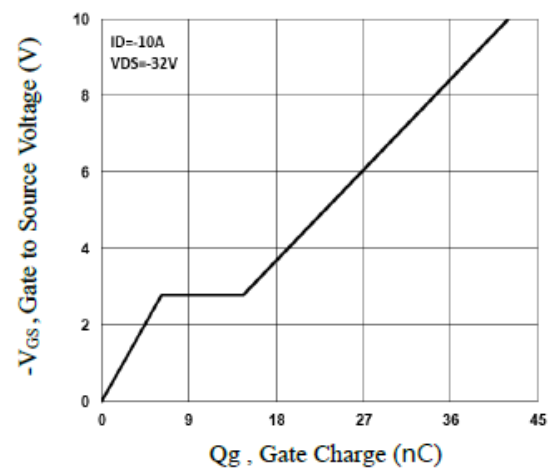
**Fig.1 Continuous Drain Current vs. Tc**



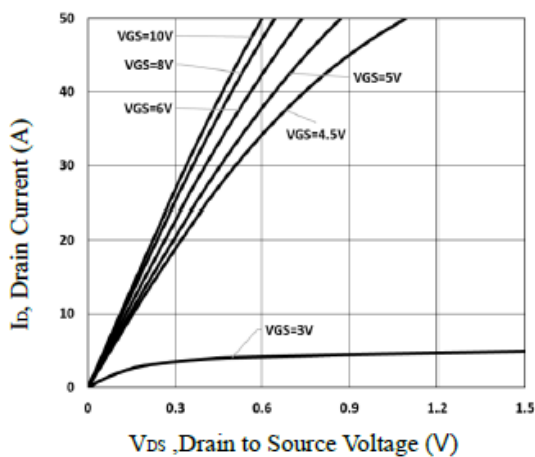
**Fig.2 Normalized RDSON vs. Tj**



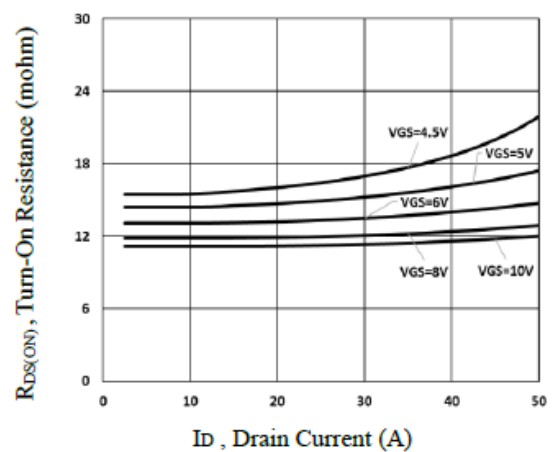
**Fig.3 Normalized Vth vs. Tj**



**Fig.4 Gate Charge Waveform**

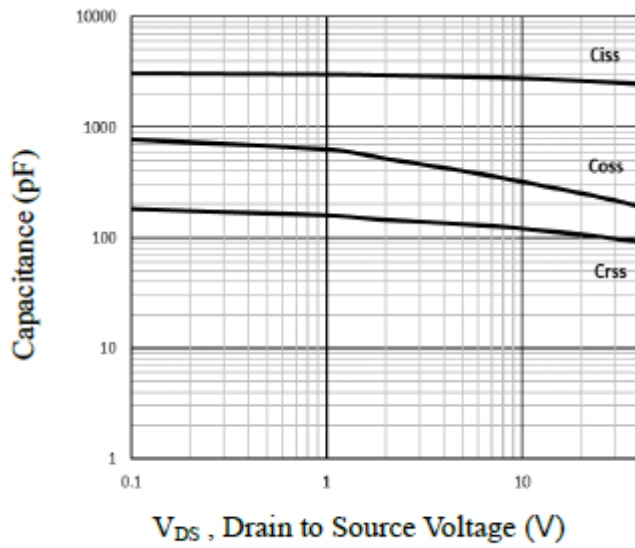


**Fig.5 Typical Output Characteristics**

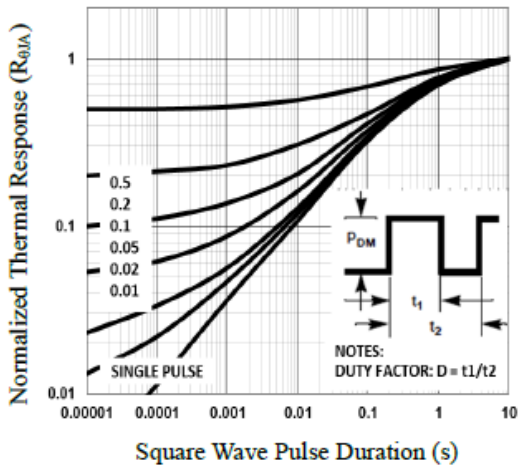


**Fig.6 Turn-On Resistance vs. Id**

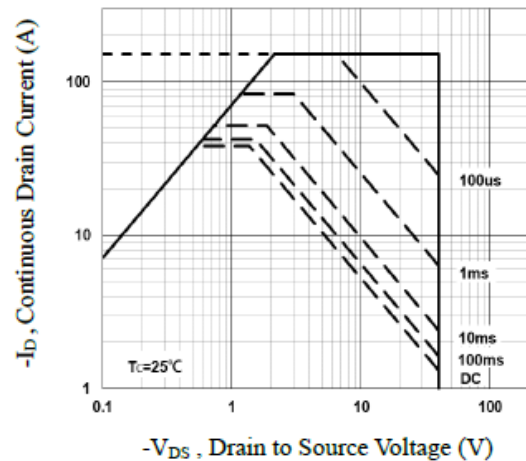
## Typical Performance Characteristics



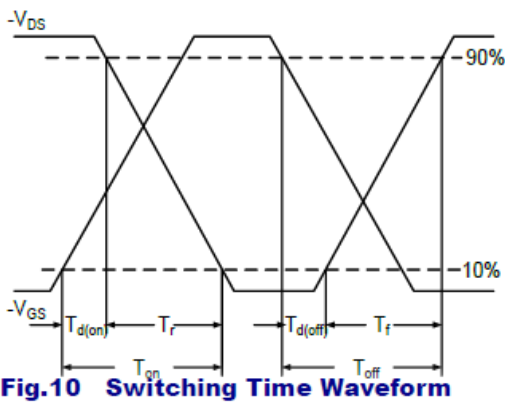
**Fig.7 Capacitance Characteristics**



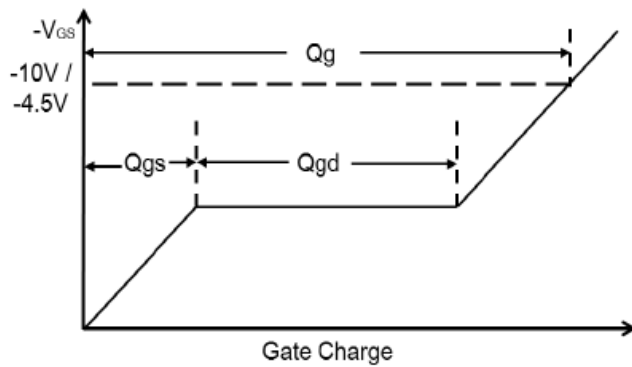
**Fig.8 Normalized Transient Impedance**



**Fig.9 Maximum Safe Operation Area**



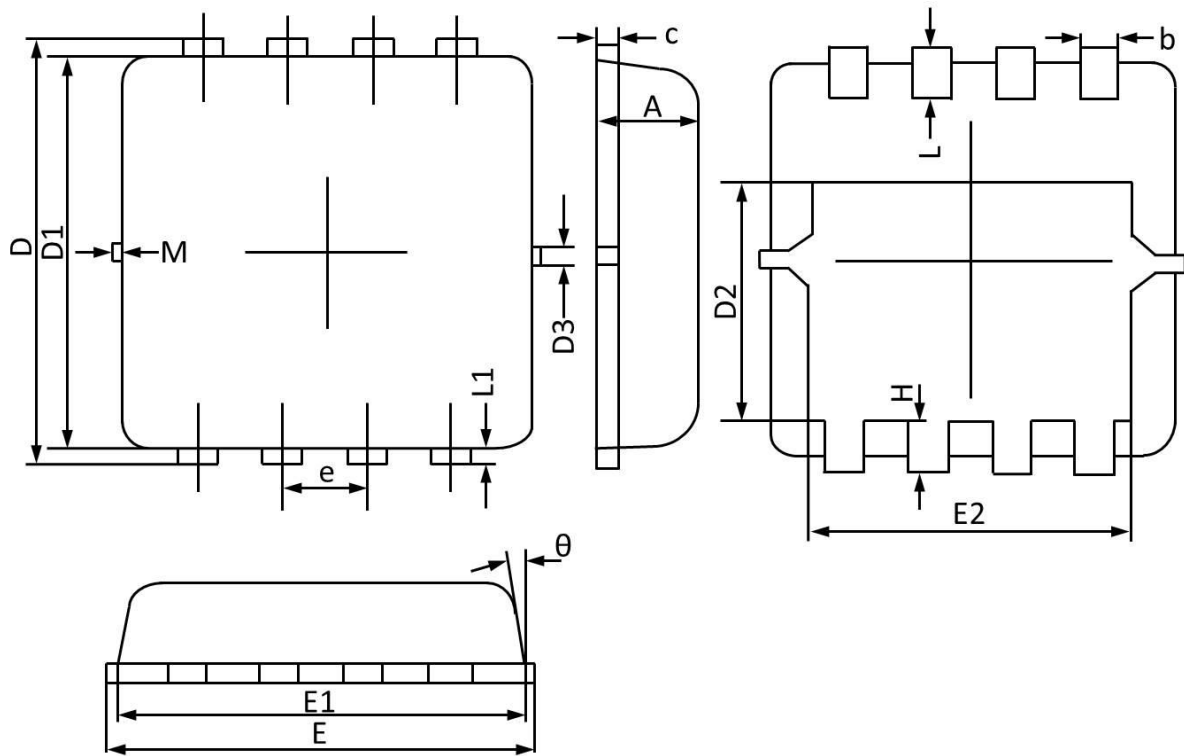
**Fig.10 Switching Time Waveform**



**Fig.11 Gate Charge Waveform**

## Package Dimension

### DFN3X3-8L







Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.700	0.800	0.028	0.031
b	0.250	0.350	0.010	0.013
c	0.100	0.250	0.004	0.009
D	3.250	3.450	0.128	0.135
D1	3.000	3.200	0.119	0.125
D2	1.780	1.980	0.070	0.077
D3	0.130 REF		0.005 REF	
E	3.200	3.400	0.126	0.133
E1	3.000	3.200	0.119	0.125
E2	2.390	2.590	0.094	0.102
e	0.650 BSC		0.026 BSC	
H	0.300	0.500	0.011	0.019
L	0.300	0.500	0.011	0.019
L1	0.130 REF		0.005 REF	
$\theta$	0°	12°	0°	12°
M	0.150 REF		0.006 REF	



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