

# GSMDC4906X

## 40V 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

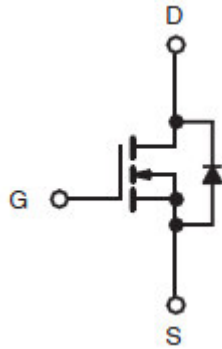
- 40V, 70 A,  $R_{DS(ON)}=8.5\text{ m}\Omega@V_{GS}=10\text{V}$
- Improved dv/dt capability
- Fast switching
- 100% EAS guaranteed
- Green Device Available
- DFN3X3-8L package design

### Applications

- Notebook
- Load Switch
- LED applications
- Hand-Held Device

### Packages & Pin Assignments

GSMDC4906XFF (DFN5X6-8L)	
 <p>Bottom View</p>	
Pin	Description
1	Source
2	Source
3	Source
4	Gate
5	Drain
6	Drain
7	Drain
8	Drain



## Ordering Information

**GSMDC4906X FF**

Package Code ←  
 Pb Free Code ←

Part Number	Package	Quantity
GSMDC4906XFF	DFN5X6-8L	3000 PCS

## Marking Information

**DC4906X**  
**XWMMMM**

Part Number →  
 GS Code →

## 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	$T_C=25^{\circ}\text{C}$	70
		$T_C=100^{\circ}\text{C}$	44
$I_{DM}$	Pulsed Drain Current (Note 1)	280	A
EAS	Single Pulse Avalanche Energy(Note 2)	76	mJ
IAS	Single Pulse Avalanche Current(Note 2)	39	A
$P_D$	Power Dissipation ( $T_C=25^{\circ}\text{C}$ )	72.3	W
	Power Dissipation (Derate above $25^{\circ}\text{C}$ )	0.58	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	$^{\circ}\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance-Junction to Case	1.73	$^{\circ}\text{C}/\text{W}$

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2.  $V_{DD}=25\text{V}, V_{GS}=10\text{V}, L=0.1\text{mH}, I_{AS}=39\text{A}, R_G=25\Omega, \text{Starting } T_J=25^{\circ}\text{C}$

## Electrical Characteristics

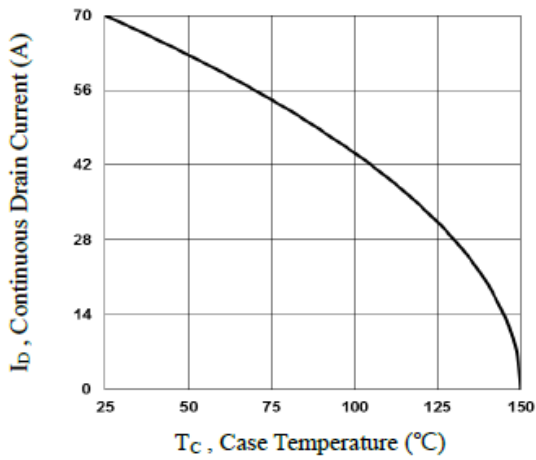
T<sub>J</sub>=25°C Unless otherwise noted

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
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BV <sub>DSS</sub> Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =1mA		0.03		V/°C
V <sub>GS(th)</sub>	Gate Threshold Voltage		1.2	1.6	2.5	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		-5		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> =40V, V <sub>GS</sub> =0V			1	uA
		V <sub>DS</sub> =32V, V <sub>GS</sub> =0V, T <sub>J</sub> =85°C			10	
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current			70	A
I <sub>SM</sub>	Pulsed Source Current				140	
R <sub>DS(on)</sub>	Drain-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =15A		6.5	8.5	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =8A		9	12	
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =2A		13		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> =20V, V <sub>GS</sub> =10V, I <sub>D</sub> =10A		19.7	30	nC
Q <sub>gs</sub>	Gate-Source Charge (Note 3,4)			2.8	4.2	
Q <sub>gd</sub>	Gate-Drain Charge (Note 3,4)			5.1	7.6	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz		1278	2200	pF
C <sub>oss</sub>	Output Capacitance			135	250	
C <sub>rss</sub>	Reverse Transfer Capacitance			87	170	
t <sub>d(on)</sub>	Turn-On Time (Note 3,4)	V <sub>DD</sub> =15V, I <sub>D</sub> =1A, V <sub>GS</sub> =10V, R <sub>G</sub> =3.3Ω		13.2	25	ns
t <sub>r</sub>				2.2	5	
t <sub>d(off)</sub>	Turn-Off Time (Note 3,4)			72	130	
t <sub>f</sub>				4.5	10	
R <sub>g</sub>	Gate Resistance		V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz		2.2	

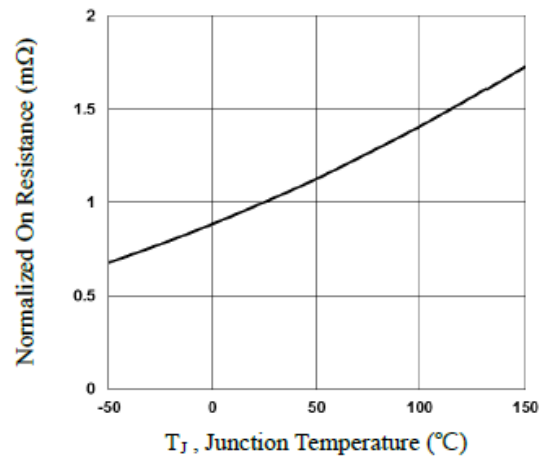
Note 3: The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.

Note 4: Essentially independent of operating temperature.

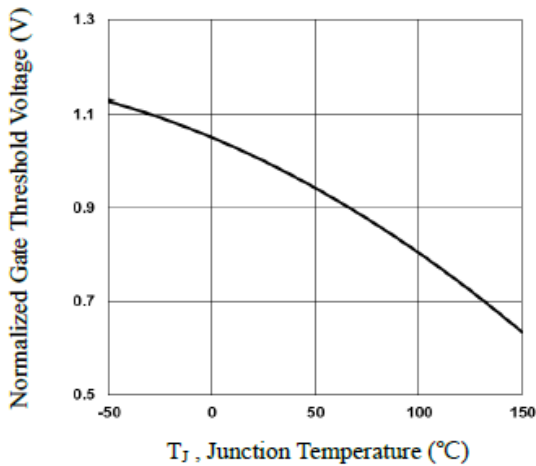
## Typical Performance Characteristics



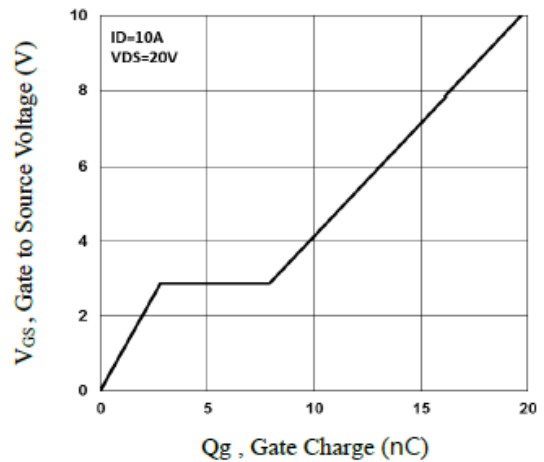
**Fig.1 Continuous Drain Current vs. T<sub>c</sub>**



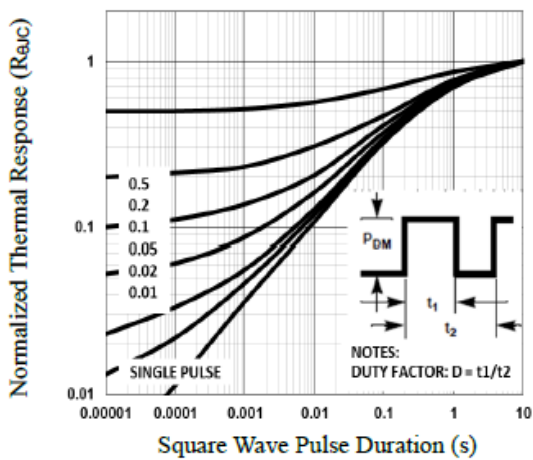
**Fig.2 Normalized R<sub>DS(on)</sub> vs. T<sub>j</sub>**



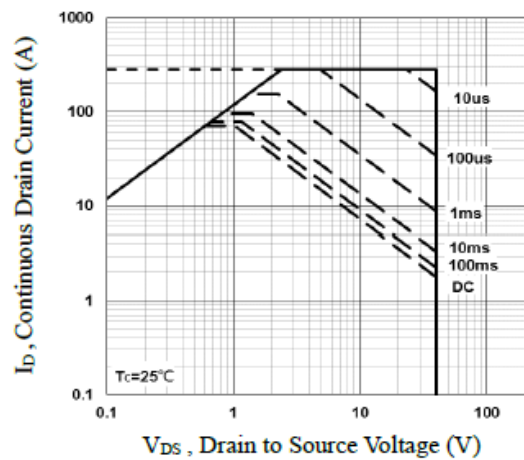
**Fig.3 Normalized V<sub>th</sub> vs. T<sub>j</sub>**



**Fig.4 Gate Charge Waveform**



**Fig.5 Normalized Transient Impedance**



**Fig.6 Maximum Safe Operation Area**

Typical Performance Characteristics (Continue)

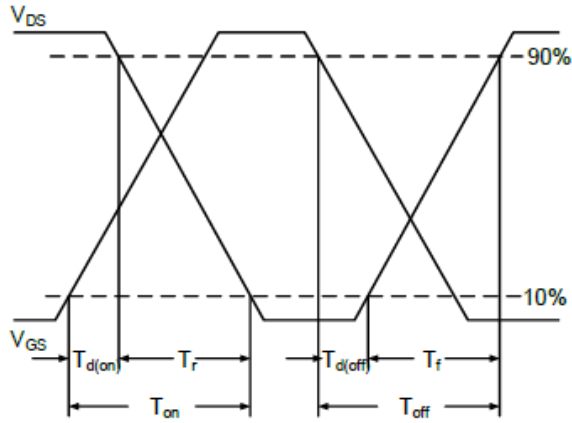


Fig.7 Switching Time Waveform

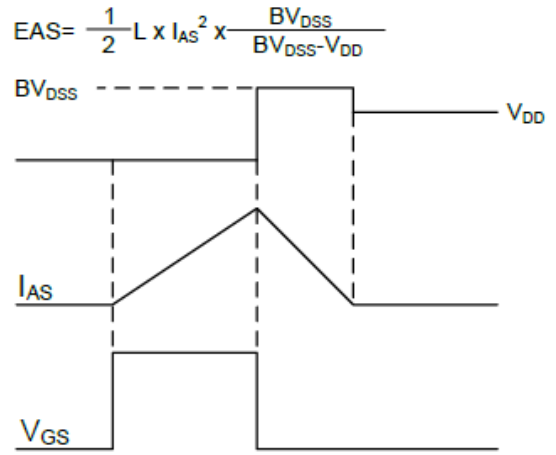
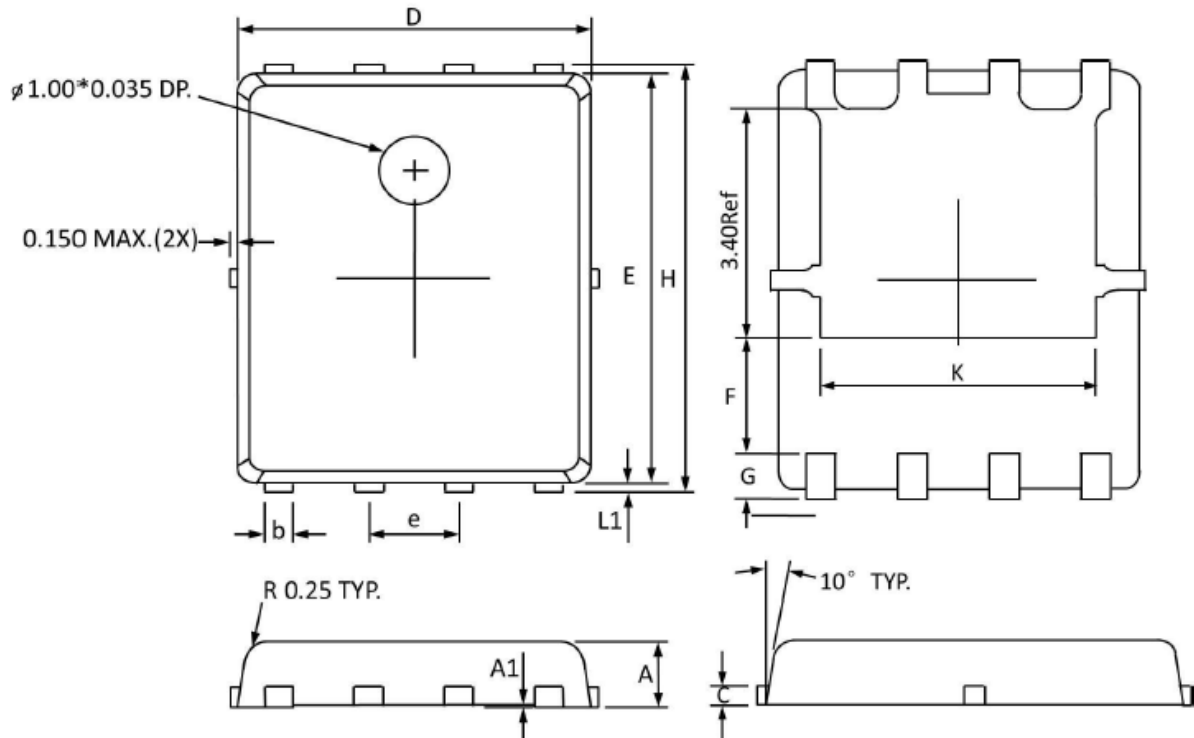


Fig.8 EAS Waveform

## Package Dimension

### DFN5X6-8L







Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.800	1.000	0.032	0.039
A1	0.000	0.005	0.000	0.000
b	0.350	0.490	0.014	0.019
C	0.254 Ref		0.254 Ref	
D	4.900	5.100	0.193	0.200
E	5.700	5.900	0.225	0.232
e	1.27 BSC		1.27 BSC	
F	1.400 Ref		1.400 Ref	
G	0.600 Ref		0.600 Ref	
H	5.950	6.200	0.235	0.244
L1	0.100	0.180	0.004	0.007
K	4.000 Ref		4.000 Ref	



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