

GSMDC6906X

60V 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.

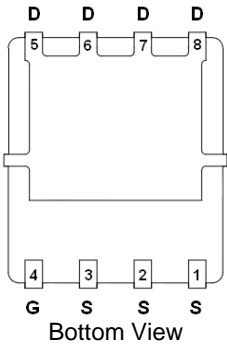
Features

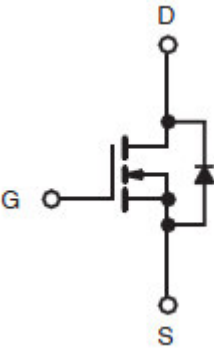
- 60V, 44A, $R_{DS(ON)}=23m\Omega@V_{GS}=10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS guaranteed
- Green Device Available
- DFN5X6-8L package design

Applications

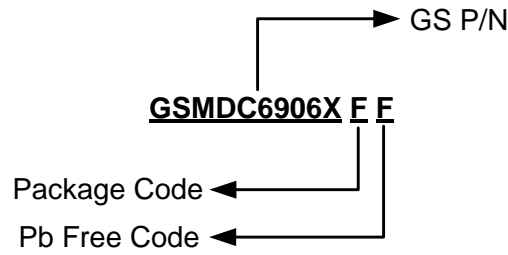
- Motor Drive
- Power Tools
- LED Lighting

Packages & Pin Assignments

GSMDC6906XFF (DFN5X6-8L)	
 <p>Bottom View</p>	
Pin	Description
1	Source
2	Source
3	Source
4	Gate
5	Drain
6	Drain
7	Drain
8	Drain

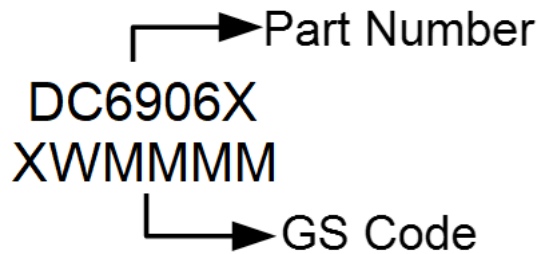


Ordering Information



Part Number	Package
GSMDC6906XFF	DFN5X6-8L

Marking Information



Absolute Maximum Ratings

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

Symbol	Parameter	Typical	Unit
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_A=25^\circ\text{C}$	44
		$T_A=100^\circ\text{C}$	28
I_{DM}	Pulsed Drain Current	176	A
EAS	Single Pulse Avalanche Energy	42	mJ
IAS	Single Pulse Avalanche Current	29	A
P_D	Power Dissipation ($T_A=25^\circ\text{C}$)	83	W
	Power Dissipation (Derate above 25°C)	0.66	W/ $^\circ\text{C}$
T_J	Operating Junction Temperature Range	-50 to +150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-50 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	1.5	$^\circ\text{C}/\text{W}$

Electrical Characteristics

T_A=25°C Unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	60			V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =1mA		0.07		V/°C
V _{GS(th)}	Gate Threshold Voltage		1.2	1.8	2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient	V _{DS} =V _{GS} , I _D =250uA		-5		mV/°C
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} =±20V			±100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =60V, V _{GS} =0V			1	uA
		V _{DS} =48V, V _{GS} =0V, T _J =125°C			10	
I _S	Continuous Source Current	V _G =V _D =0V, Force Current			44	A
I _{SM}	Pulsed Source Current				176	
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} =10V, I _D =20A		20	23	mΩ
		V _{GS} =4.5V, I _D =12A		23	28	
g _{FS}	Forward Transconductance	V _{DS} =10V, I _D =10A		9		S
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =1A			1	V
t _{rr}	Reverse Recovery Time	V _{GS} =0V, I _S =1A, di/dt=100A/us		19.6		ns
Q _{rr}	Reverse Recovery Charge			14.2		nC
Dynamic						
Q _g	Total Gate Charge	V _{DS} =30V, V _{GS} =10V, I _D =15A		28	42	nC
Q _{gs}	Gate-Source Charge			3.5	7	
Q _{gd}	Gate-Drain Charge			6.5	10	
C _{iss}	Input Capacitance	V _{DS} =20V, V _{GS} =0V, f=1MHz		1680	2440	pF
C _{oss}	Output Capacitance			115	170	
C _{rss}	Reverse Transfer Capacitance			85	125	
t _{d(on)}	Turn-On Time	V _{DD} =30V, I _D =1A, V _{GS} =10V, R _G =6Ω		7.2	14	ns
t _r				38	72	
t _{d(off)}	Turn-Off Time			34	65	
t _f				8.2	16	
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz		2.2	4.4	Ω

Typical Performance Characteristics

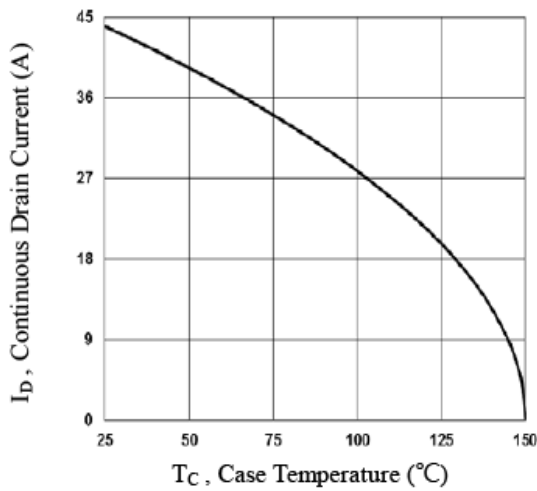


Fig.1 Continuous Drain Current vs. T_c

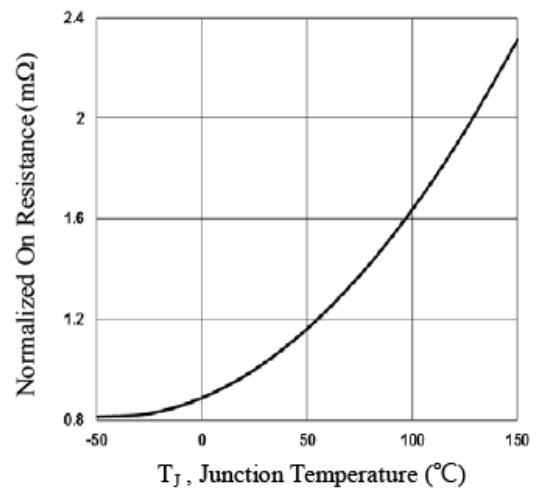


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

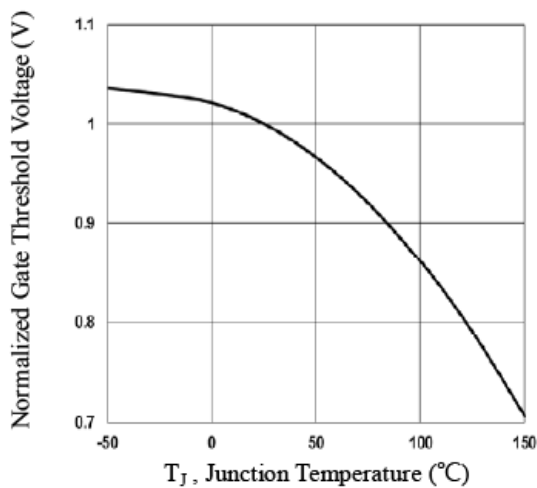


Fig.3 Normalized V_{th} vs. T_j

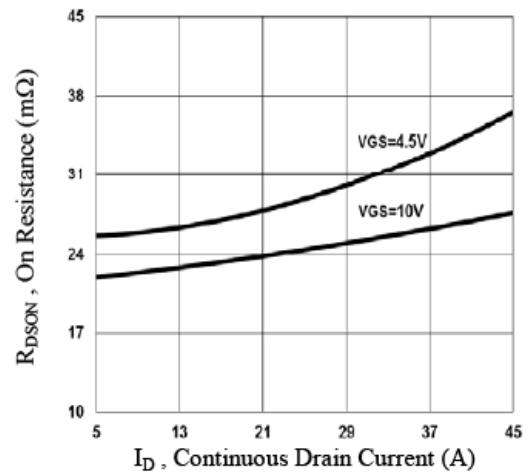


Fig.4 $R_{DS(on)}$ vs. Continuous Drain Current

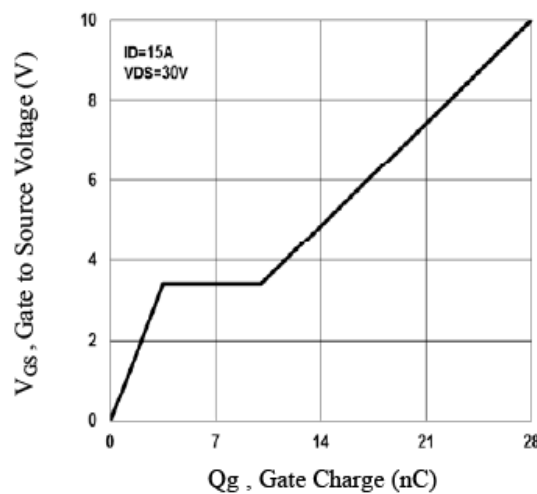


Fig.5 Gate Charge Waveform

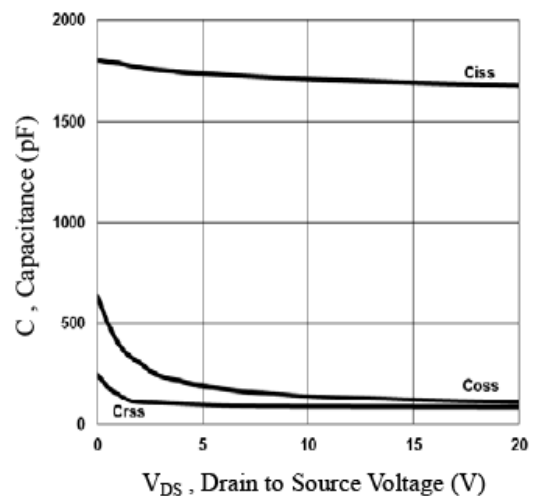


Fig.6 Capacitance Characteristics

Typical Performance Characteristics (Continue)

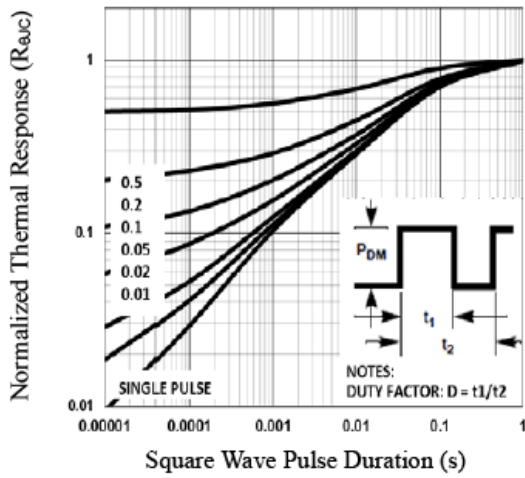


Fig.7 Normalized Transient Impedance

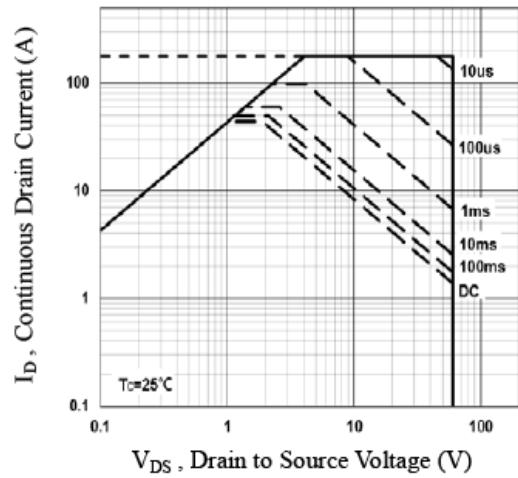
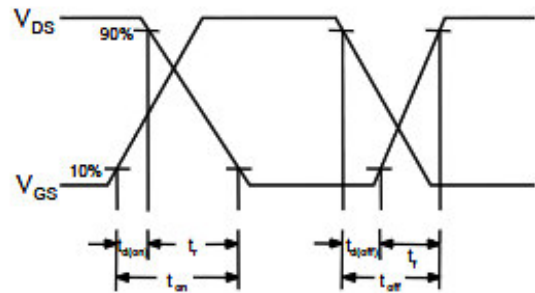
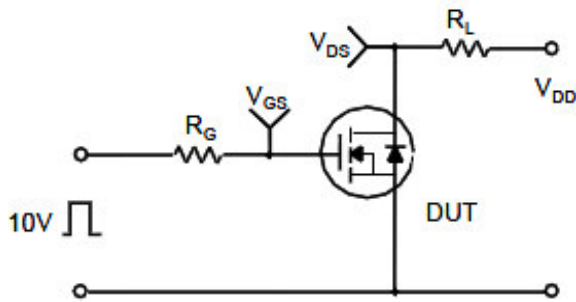
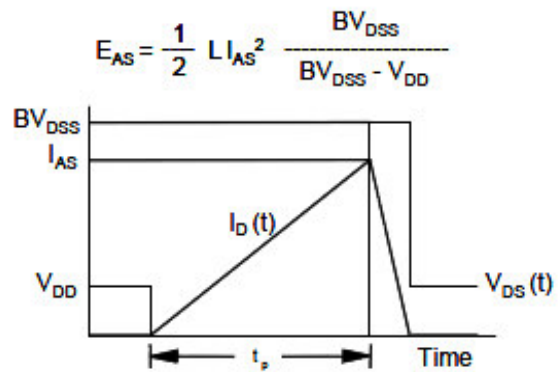
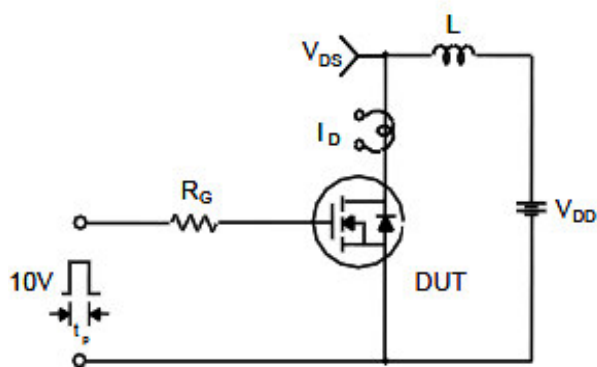


Fig.8 Maximum Safe Operation Area

Resistive Switching Test Circuit & Waveforms

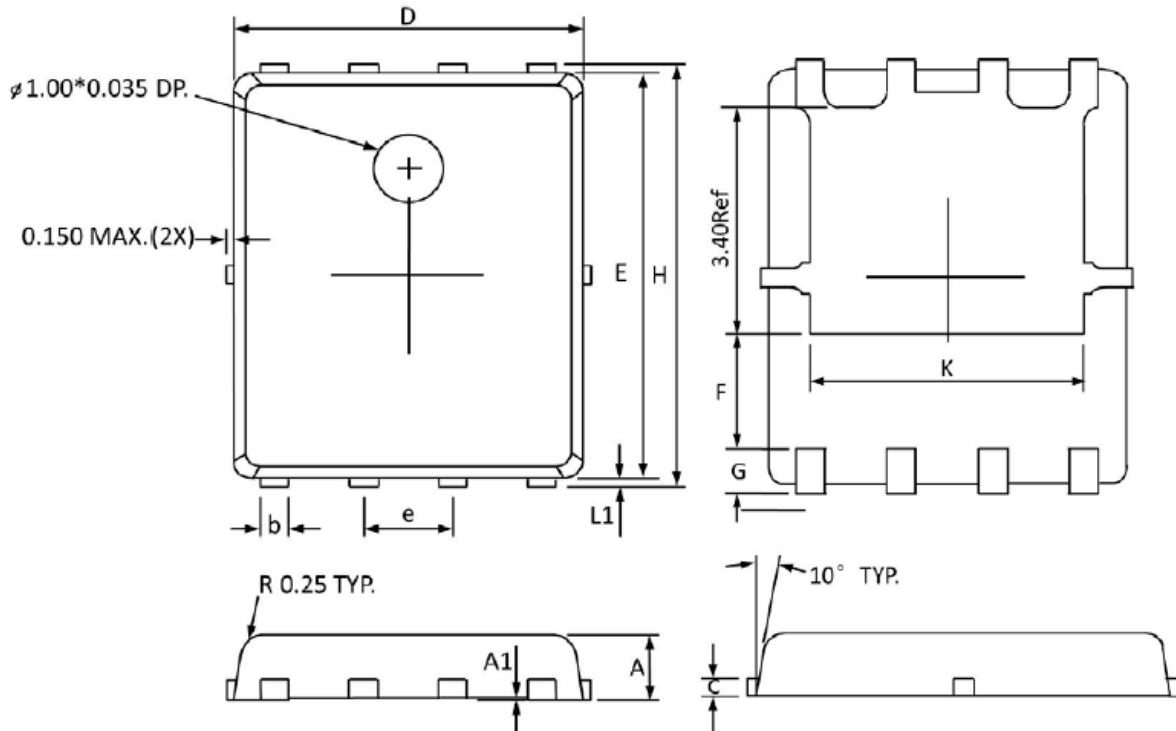


Unclamped Inductive Switching Test Circuit & Waveforms



Package Dimension

DFN5X6-8L







Dimensions



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.800	1.000	0.032	0.039
A1	0.000	0.005	0.000	0.001
b	0.350	0.490	0.014	0.019
C	0.254 (REF)		0.010 (REF)	
D	4.900	5.100	0.193	0.200
E	5.700	5.900	0.225	0.232
e	1.270 (BSC)		0.050 (BSC)	
F	1.400 (REF)		0.055 (REF)	
G	0.600 (REF)		0.024 (REF)	
H	5.950	6.200	0.235	0.244
L1	0.100	0.180	0.004	0.007
K	4.000 (REF)		0.157 (REF)	

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