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

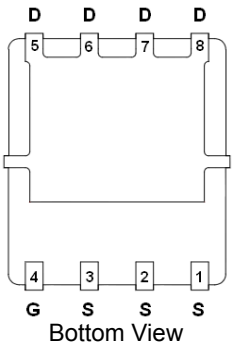
- 60V, 44A, $R_{DS(ON)}$=23mΩ@V_{GS}=10V
- Improved dv/dt capability
- Fast switching
- 100% EAS guaranteed
- Green Device Available
- DFN5X6-8L package design

Applications

- Motor Drive
- Power Tools
- LED Lighting

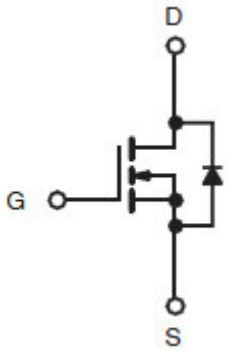
Packages & Pin Assignments

GSMDC6906XFF (DFN5X6-8L)

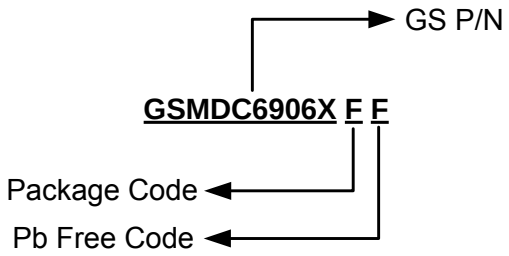


Bottom View

Pin	Description
1	Source
2	Source
3	Source
4	Gate
5	Drain
6	Drain
7	Drain
8	Drain

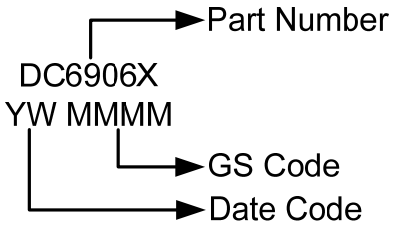


Ordering Information



Part Number	Package
GSMDC6906XFF	DFN5X6-8L

Marking Information



Absolute Maximum Ratings

T_A=25ºC 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℃	44	A
		T_A=100℃	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℃)		83	W
	Power Dissipation (Derate above 25℃)		0.66	W/℃
T_J	Operating Junction Temperature Range		-50 to +150	℃
T_{STG}	Storage Temperature Range		-50 to +150	℃
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		62	℃/W
$R_{\theta JC}$	Thermal Resistance-Junction to Case		1.5	℃/W

Electrical Characteristics

T_A=25℃ 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
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃, I_D=1mA		0.07		V/℃
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250uA	1.2	1.8	2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient			-5		mV/℃
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℃			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

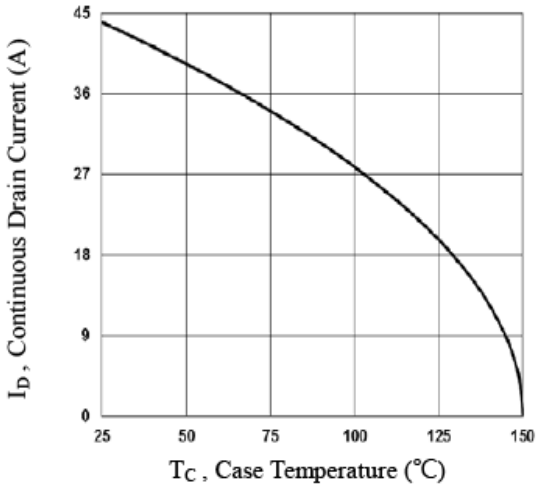


Fig.1 Continuous Drain Current vs. T_c

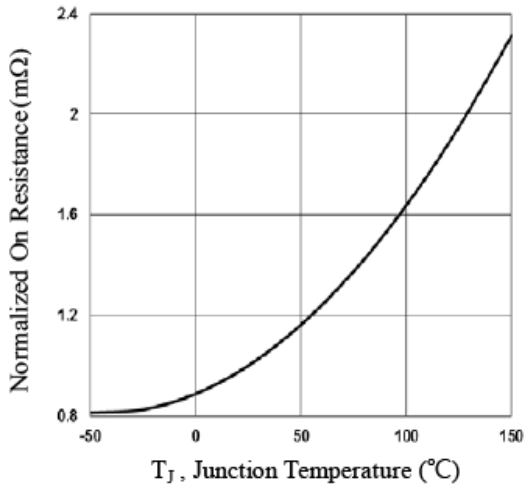


Fig.2 Normalized RDSON vs. T_J

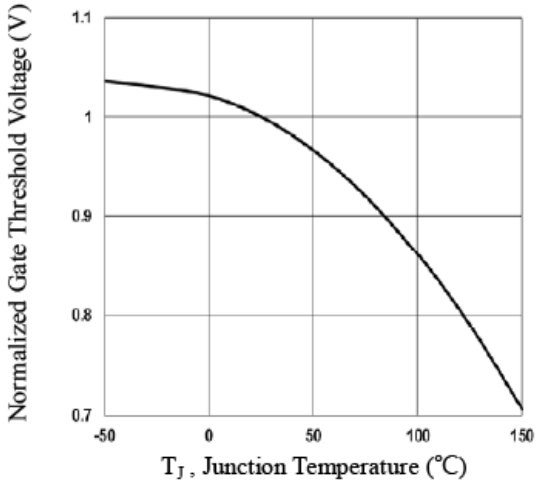


Fig.3 Normalized V_{th} vs. T_J

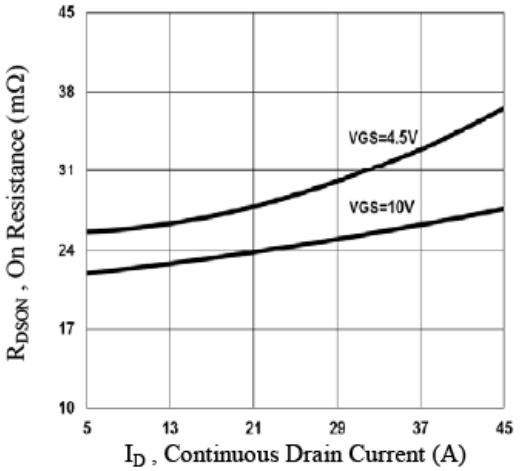


Fig.4 RDSON vs. Continuous Drain Current

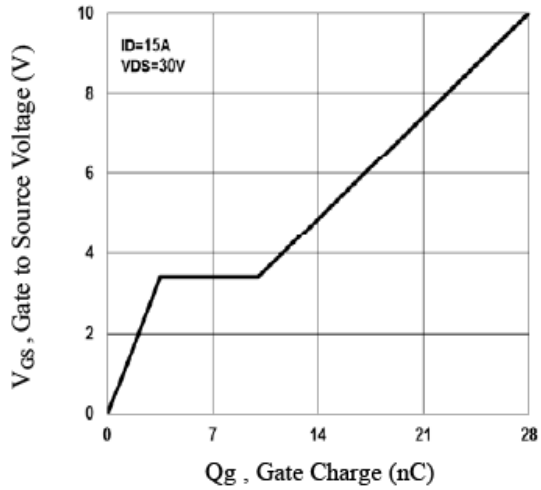


Fig.5 Gate Charge Waveform

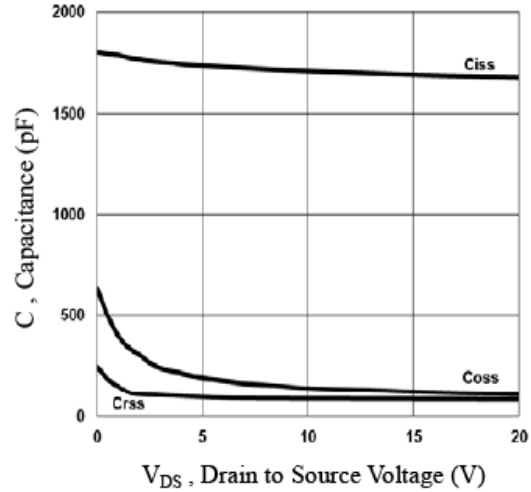


Fig.6 Capacitance Characteristics

Typical Performance Characteristics (Continue)

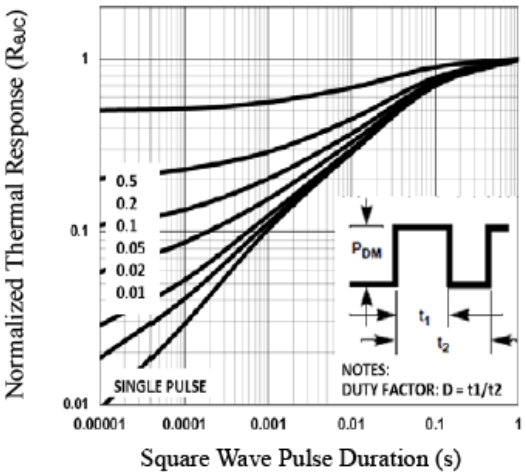


Fig.7 Normalized Transient Impedance

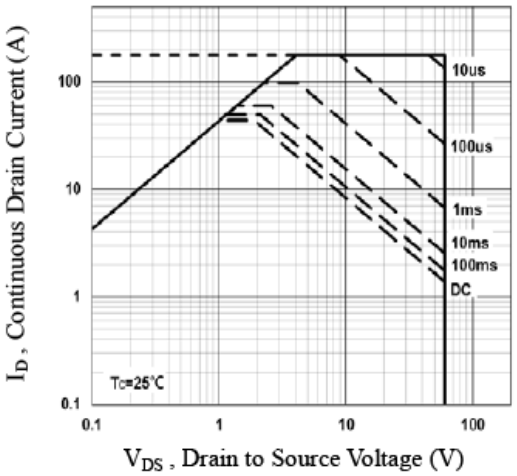
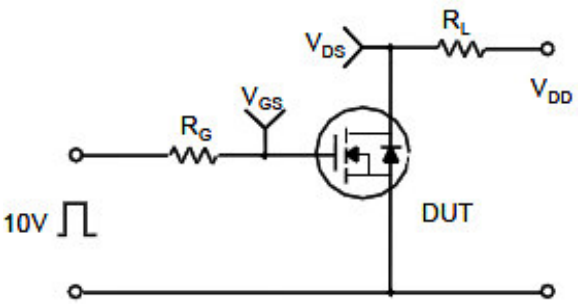
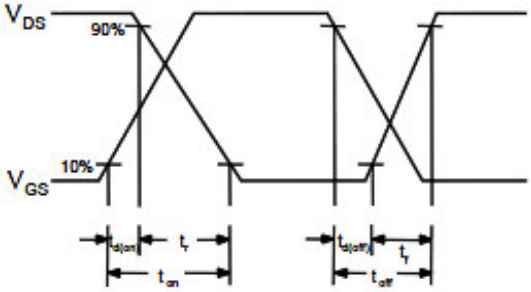


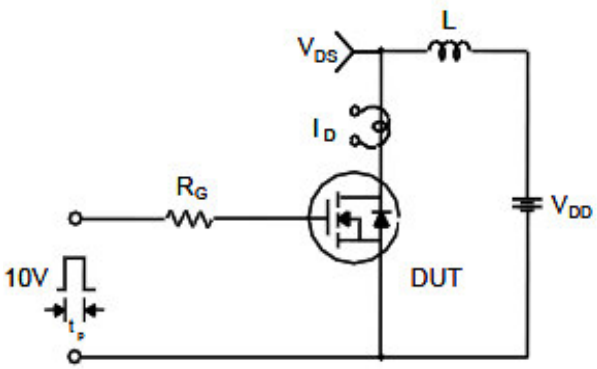
Fig.8 Maximum Safe Operation Area

Resistive Switching Test Circuit & Waveforms

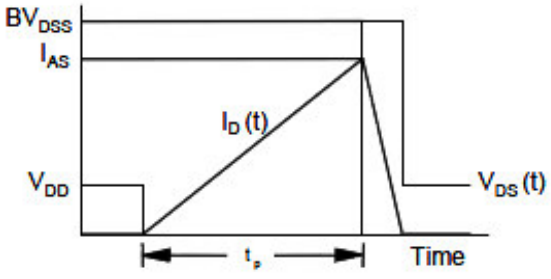




Unclamped Inductive Switching Test Circuit & Waveforms

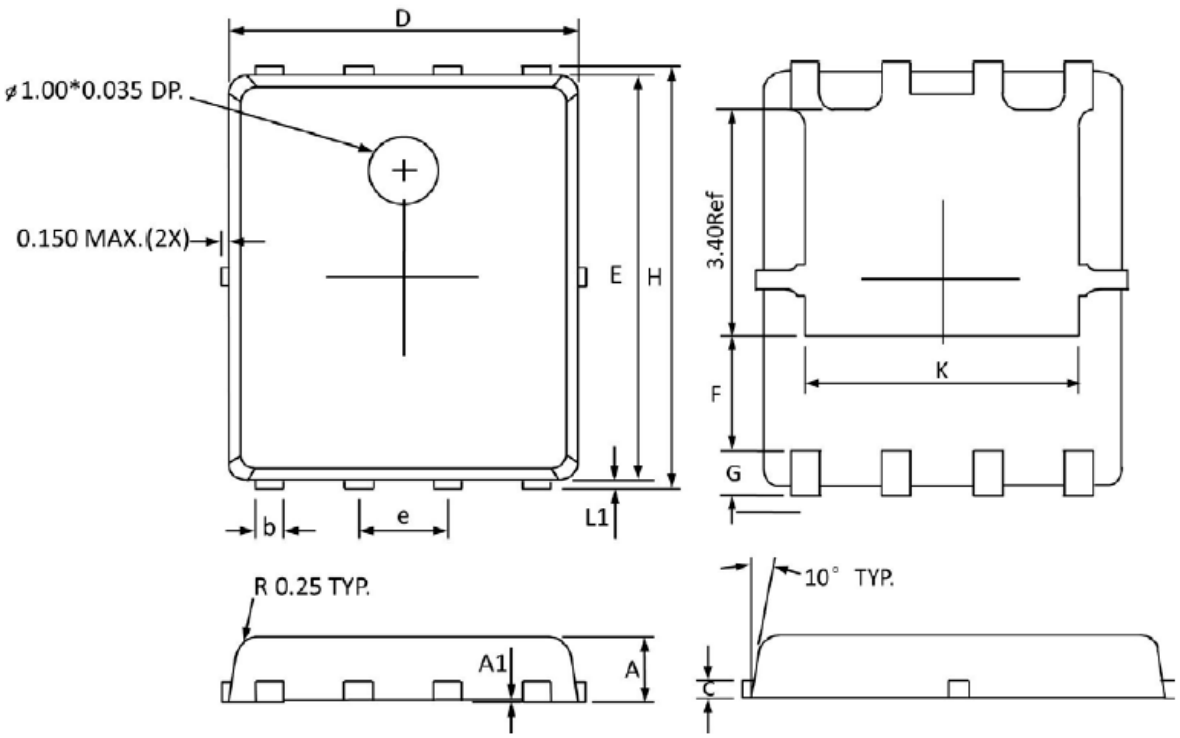


$$E_{AS} = \frac{1}{2} L I_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$



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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