

GSMDC3906X

30V 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.

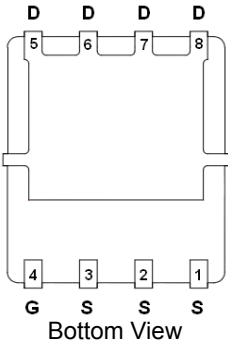
Features

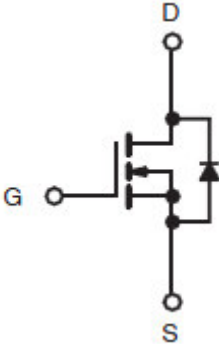
- 30V, 80A, $R_{DS(ON)}=5.5m\Omega@V_{GS}=10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS guaranteed
- Green Device Available
- DFN5X6-8L package design

Applications

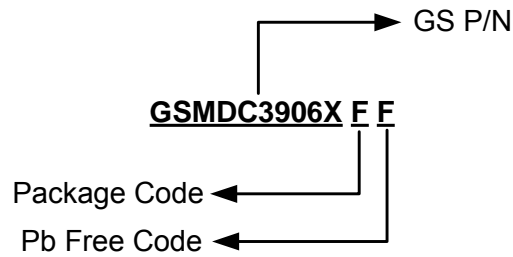
- MB / VGA / Vcore
- POL Applications
- SMPS 2nd SR

Packages & Pin Assignments

GSMDC3906XFF (DFN5X6-8L)	
	
Pin	Description
1	Source
2	Source
3	Source
4	Gate
5	Drain
6	Drain
7	Drain
8	Drain

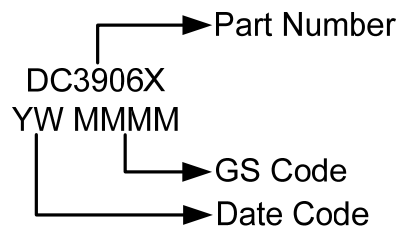


Ordering Information



Part Number	Package
GSMDC3906XFF	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	30	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_A=25^{\circ}\text{C}$	80
		$T_A=100^{\circ}\text{C}$	51
I_{DM}	Pulsed Drain Current	320	A
EAS	Single Pulse Avalanche Energy	88	mJ
IAS	Single Pulse Avalanche Current	42	A
P_D	Power Dissipation ($T_A=25^{\circ}\text{C}$)	74	W
	Power Dissipation (Derate above 25°C)	0.59	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	1.7	$^{\circ}\text{C}/\text{W}$

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	30			V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =1mA		0.04		V/°C
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	1.0	1.6	2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient			-4		mV/°C
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} =±20V			±100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30V, V _{GS} =0V			1	uA
		V _{DS} =24V, V _{GS} =0V, T _J =125°C			10	
I _S	Continuous Source Current	V _G =V _D =0V, Force Current			80	A
I _{SM}	Pulsed Source Current				320	
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} =10V, I _D =20A		4.6	5.5	mΩ
		V _{GS} =4.5V, I _D =10A		6.5	8.5	
g _{FS}	Forward Transconductance	V _{DS} =10V, I _D =10A		18		S
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =1A			1	V
EAS	Single Pulse Avalanche Energy	V _{DD} =25V, L=0.1mH, IAS=20A	20			mJ
Dynamic						
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =4.5V, I _D =20A		11.1		nC
Q _{gs}	Gate-Source Charge			1.85		
Q _{gd}	Gate-Drain Charge			6.8		
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz		1160		pF
C _{oss}	Output Capacitance			200		
C _{rss}	Reverse Transfer Capacitance			180		
t _{d(on)}	Turn-On Time	V _{DD} =15V, I _D =15A, V _{GS} =10V, R _G =3.3Ω		7.5		ns
t _r				14.5		
t _{d(off)}	Turn-Off Time			35.2		
t _f				9.6		
R _g	Gate Resistance		V _{DS} =0V, V _{GS} =0V, f=1MHz		2.5	

Typical Performance Characteristics

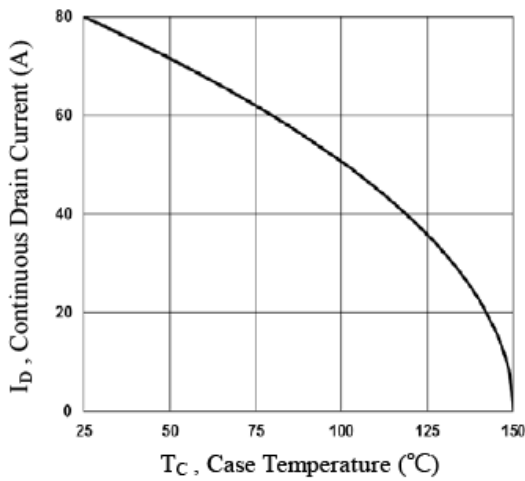


Fig.1 Continuous Drain Current vs. T_C

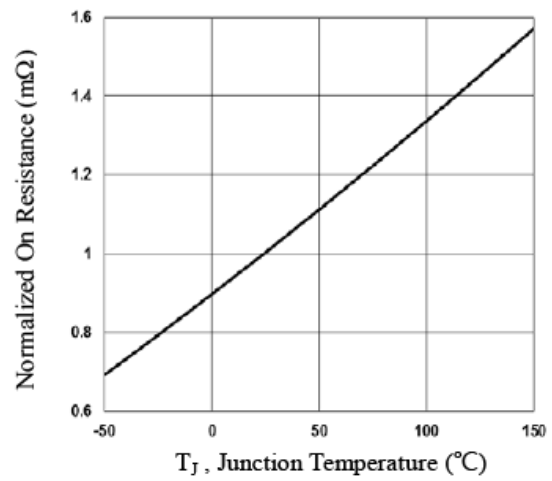


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

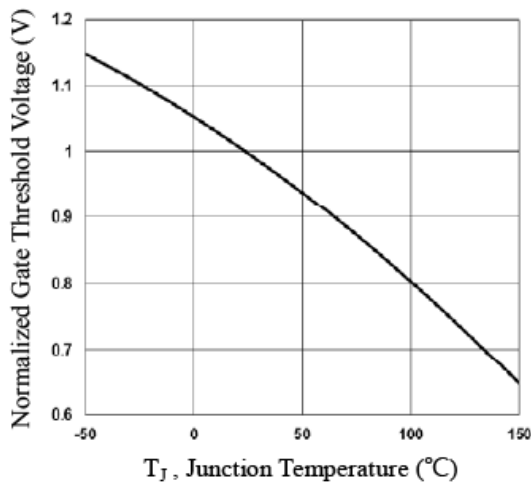


Fig.3 Normalized V_{th} vs. T_J

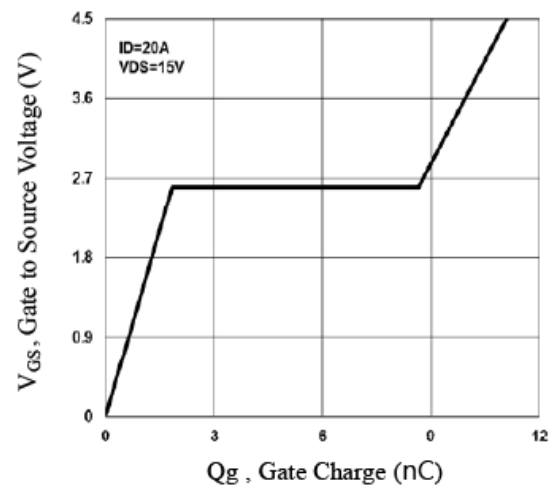


Fig.4 Gate Charge Waveform

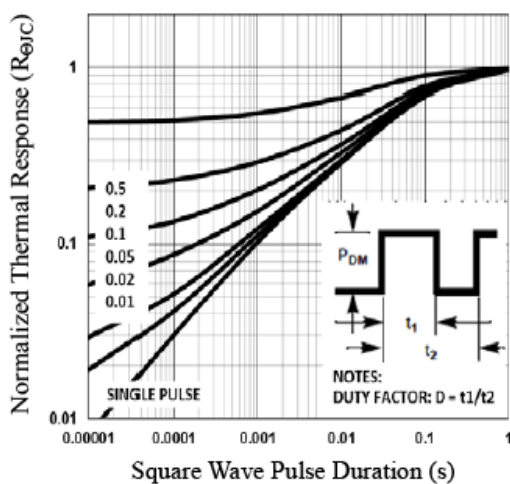


Fig.5 Normalized Transient Impedance

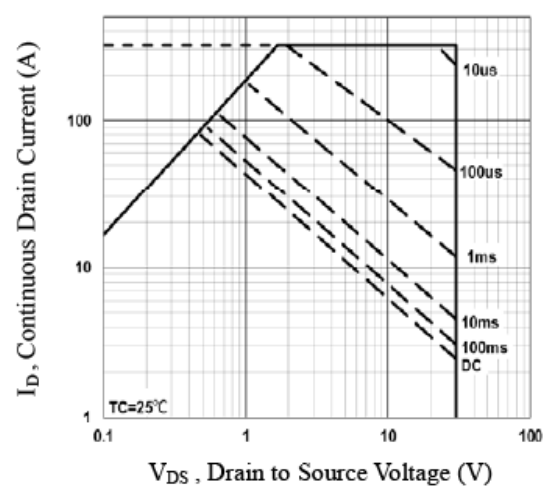
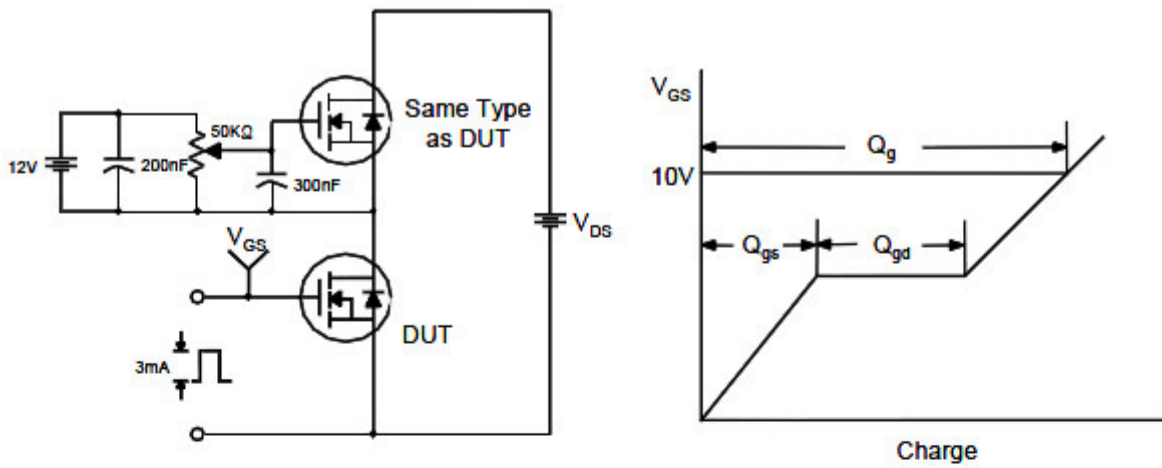


Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics (Continue)

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

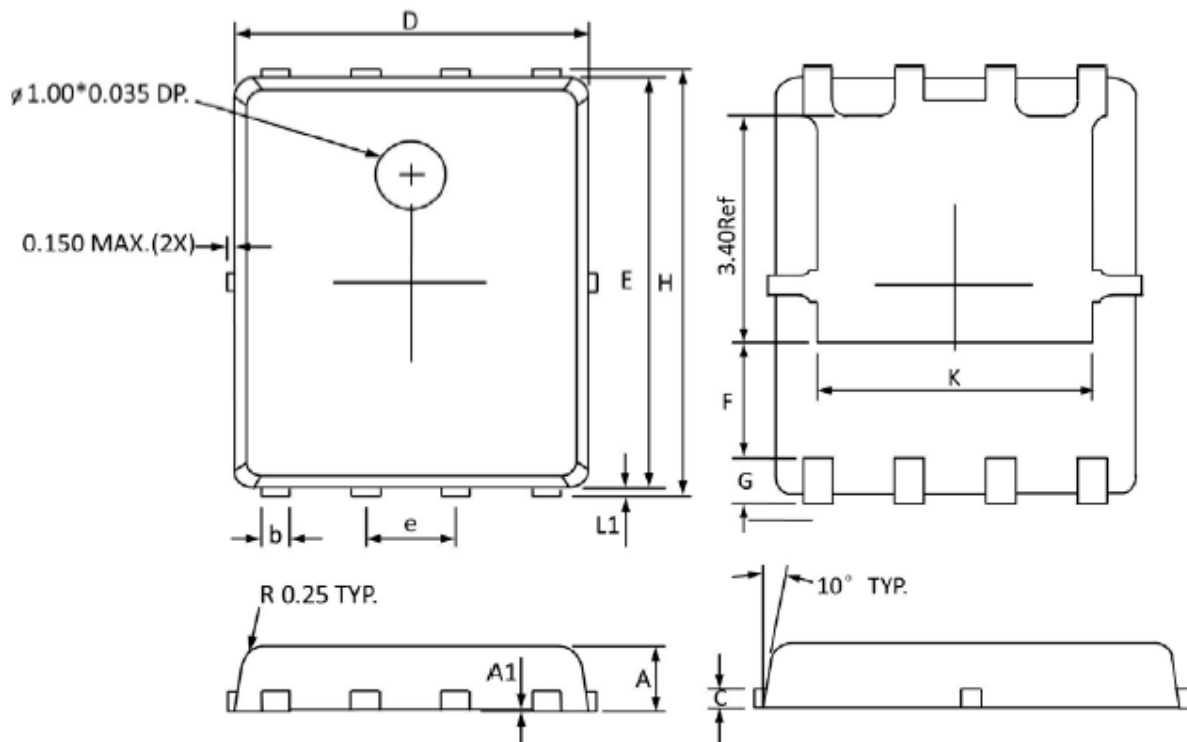


Unclamped Inductive Switching Test Circuit & Waveforms



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	0.000
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	1.27 (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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