GSMDS3906

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

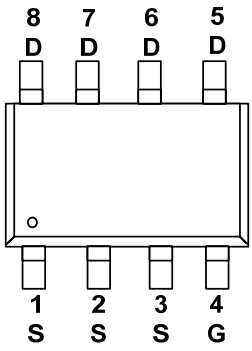
- 30V, 20A, $R_{DS(ON)}$=6mΩ@V_{GS}=10V
- Improved dv/dt capability
- Fast switching
- Green Device Available
- SOP-8 package design

Applications

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

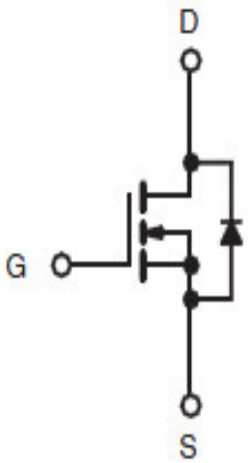
Packages & Pin Assignments

GSMDS3906SF (SOP-8)

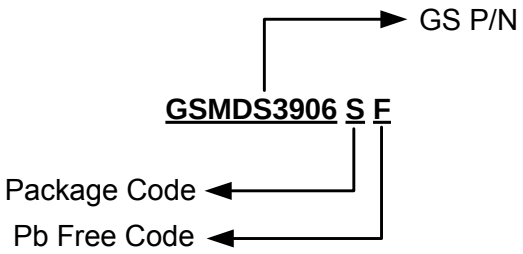


Top View

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

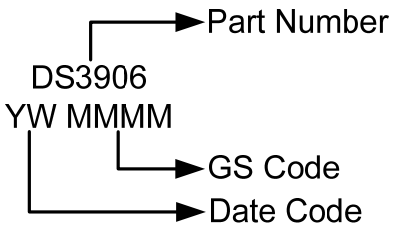


Ordering Information



Part Number	Package	Quantity Reel
GSMDS3906SF	SOP-8	4000 PCS

Marking Information



Absolute Maximum Ratings

T_C=25ºC 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_C=25℃	20	A
		T_C=100℃	12.6	
I_{DM}	Pulsed Drain Current		80	A
P_D	Power Dissipation (T_C=25℃)		5.4	W
	Power Dissipation (Derate above 25℃)		0.043	W/℃
T_J	Operating Junction Temperature Range		-55 to +150	℃
T_{STG}	Storage Temperature Range		-55 to +150	℃
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		85	℃/W
$R_{\theta JC}$	Thermal Resistance-Junction to Case		23	℃/W

Note 1: Repetitive Rating: Pulsed width limited by maximum junction temperature.

Electrical Characteristics

T_J=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	30			V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃, I_D=1mA		0.04		V/℃
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250uA	1.2	1.6	2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient			-4		mV/℃
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℃			10	
I_S	Continuous Source Current	V_G=V_D=0V, Force Current			20	A
I_{SM}	Pulsed Source Current				40	
$R_{DS(on)}$	Drain-Source On-Resistance	V_{GS}=10V,I_D=10A		5	6	mΩ
		V_{GS}=4.5V,I_D=5A		6.5	9	
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
Dynamic						
Q_g	Total Gate Charge	V_{DS}=15V,V_{GS}=4.5V, I_D=20A		11.1	22	nC
Q_{gs}	Gate-Source Charge			1.85	3.7	
Q_{gd}	Gate-Drain Charge			6.8	13	
C_{iss}	Input Capacitance	V_{DS}=25V,V_{GS}=0V, f=1MHz		1160	1900	pF
C_{oss}	Output Capacitance			200	400	
C_{rss}	Reverse Transfer Capacitance			180	360	
$t_{d(on)}$	Turn-On Time	V_{DD}=15V,I_D=15A, V_{GS}=10V,R_G=3.3Ω		7.5	15	ns
t_r				14.5	28	
$t_{d(off)}$	Turn-Off Time			35.2	60	
t_f				9.6	19	
R_g	Gate Resistance	V_{DS}=0V,V_{GS}=0V, f=1MHz		2.5	5	Ω

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

Note 3: Essentially independent of operating temperature.

Typical Performance Characteristics

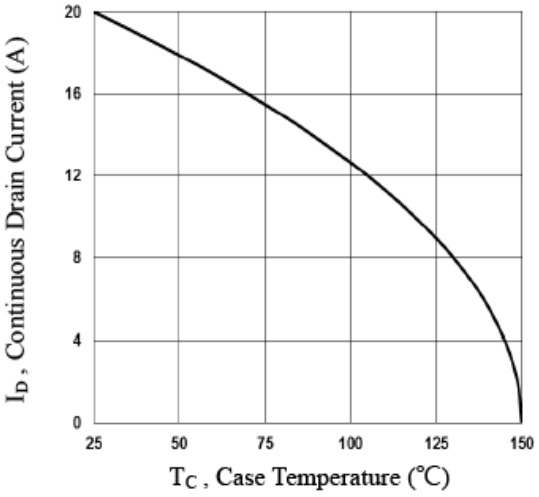


Fig.1 Continuous Drain Current vs. T_c

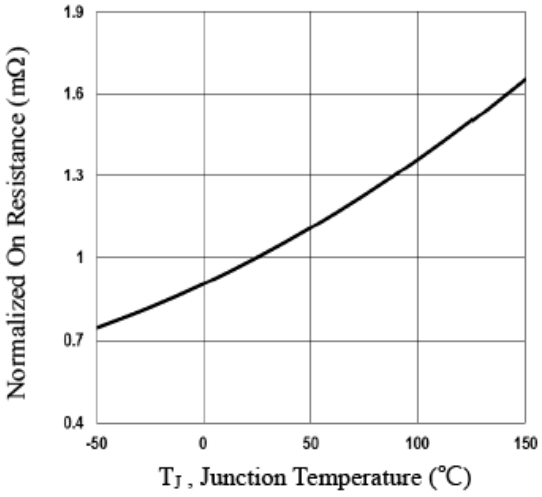


Fig.2 Normalized RDSON vs. T_J

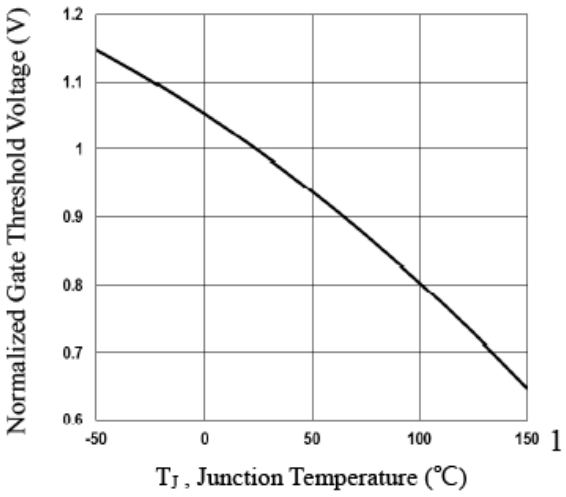


Fig.3 Normalized V_{th} vs. T_J

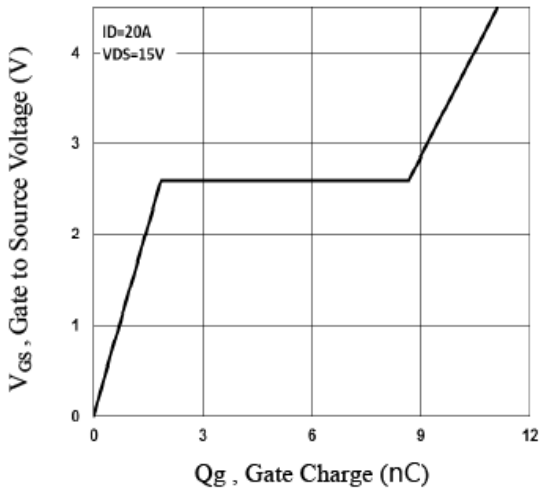


Fig.4 Gate Charge Waveform

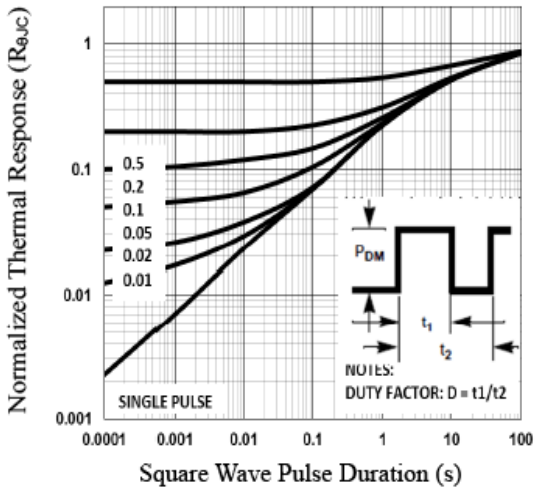


Fig.5 Normalized Transient Impedance

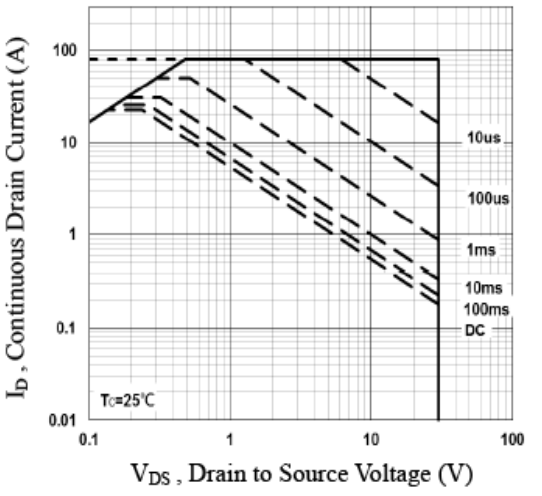
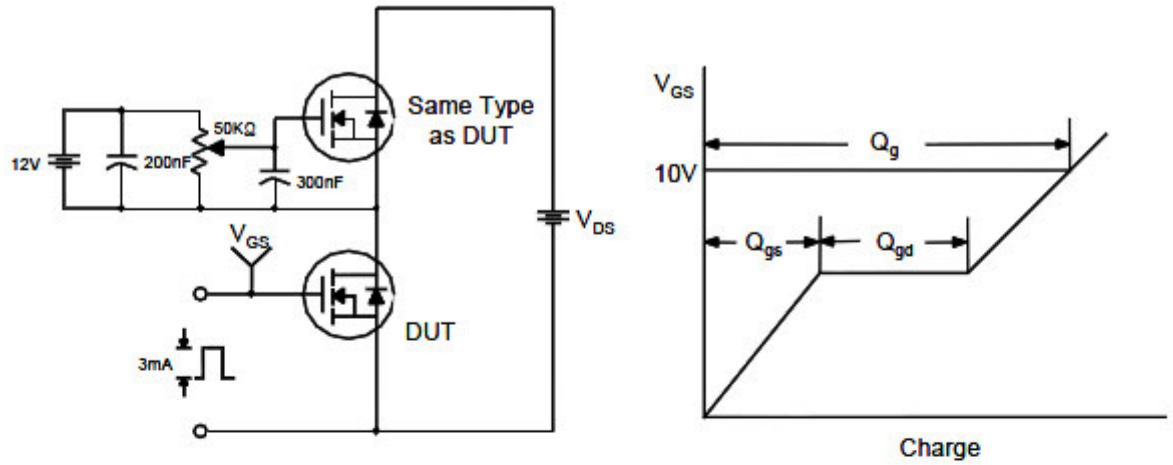


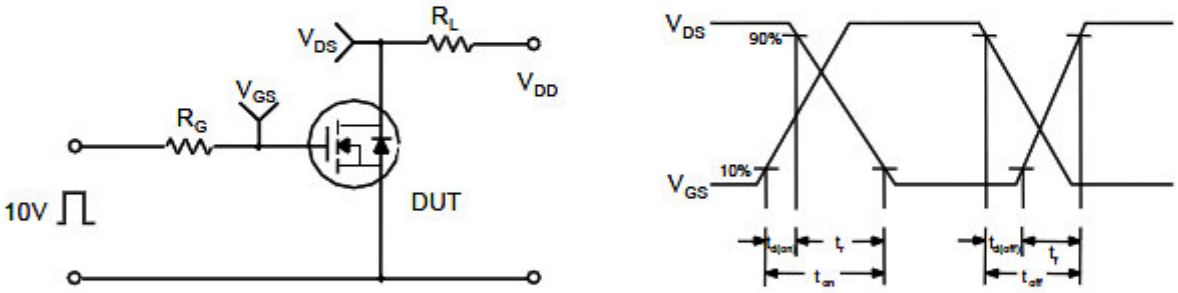
Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics (Continue)

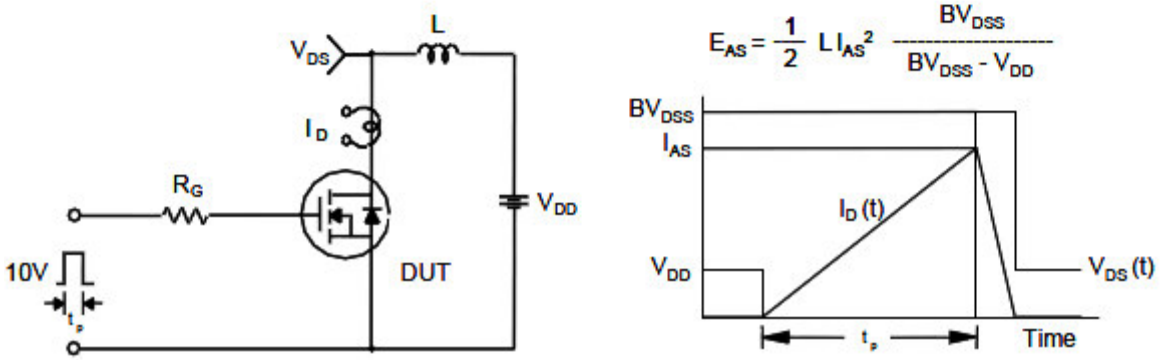
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

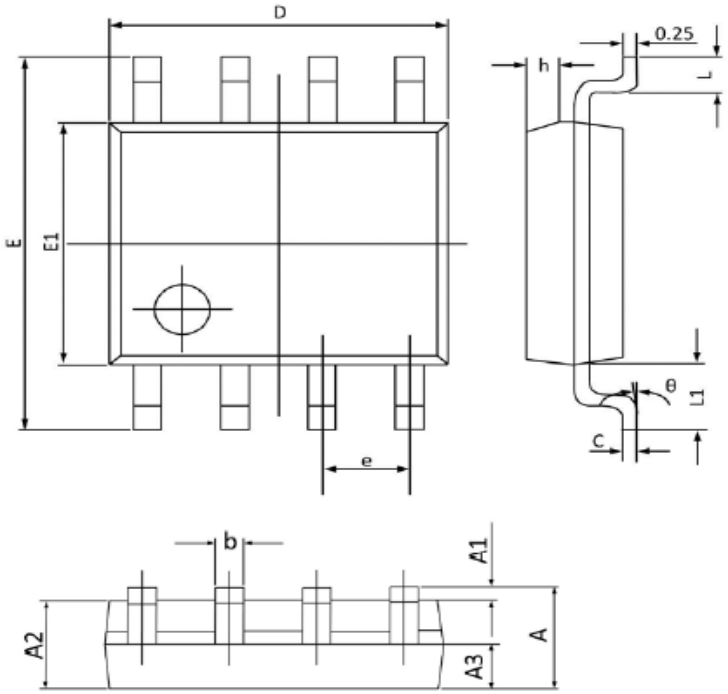


Unclamped Inductive Switching Test Circuit & Waveforms



Package Dimension

SOP-8



Dimensions				
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.068
A1	0.100	0.250	0.004	0.009
A2	1.300	1.500	0.052	0.059
A3	0.600	0.700	0.024	0.027
b	0.390	0.480	0.016	0.018
c	0.210	0.260	0.009	0.010
D	4.700	5.100	0.186	0.200
E	5.800	6.200	0.229	0.244
E1	3.700	4.100	0.146	0.161
e	1.270 (BSC)		0.050 (BSC)	
h	0.250	0.500	0.010	0.019
L	0.500	0.800	0.019	0.031
L1	1.050 (BSC)		0.041 (BSC)	
θ	0°	8°	0°	8°

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