

GSMD3906

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.

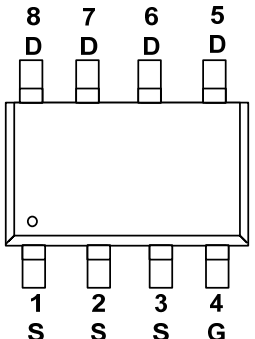
Features

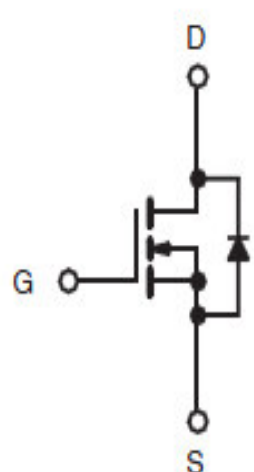
- 30V, 20A, $R_{DS(ON)}=6m\Omega@V_{GS}=10V$
- Improved dv/dt capability
- Fast switching
- Green Device Available
- SOP-8 package design

Applications

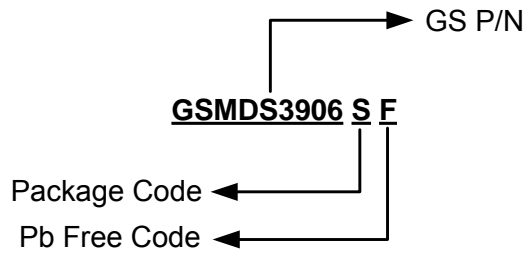
- Notebook
- Load Switch
- LED Applications
- Hand-Held Device

Packages & Pin Assignments

GSMD3906SF (SOP-8)	
 <p>Top View</p>	
Pin	Description
1	Source
2	Source
3	Source
4	Gate
5	Drain
6	Drain
7	Drain
8	Drain

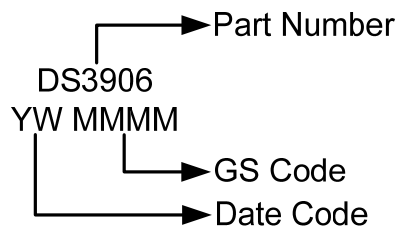


Ordering Information



Part Number	Package	Quantity Reel
GSMDS3906SF	SOP-8	4000 PCS

Marking Information



Absolute Maximum Ratings

$T_C=25^\circ\text{C}$ 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	$T_C=25^\circ\text{C}$	20
		$T_C=100^\circ\text{C}$	12.6
I_{DM}	Pulsed Drain Current	80	A
P_D	Power Dissipation ($T_C=25^\circ\text{C}$)	5.4	W
	Power Dissipation (Derate above 25°C)	0.043	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	85	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance-Junction to Case	23	$^\circ\text{C}/\text{W}$

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

Electrical Characteristics

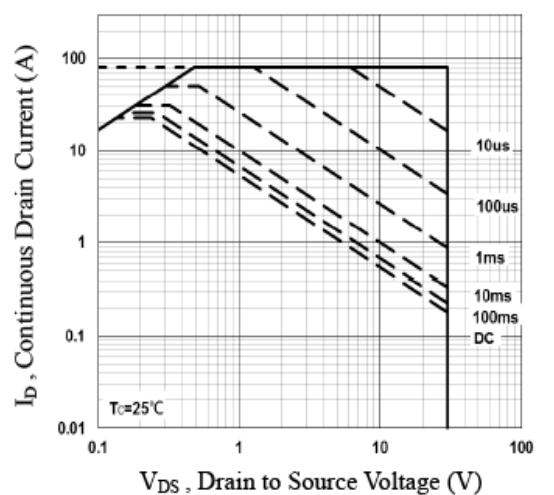
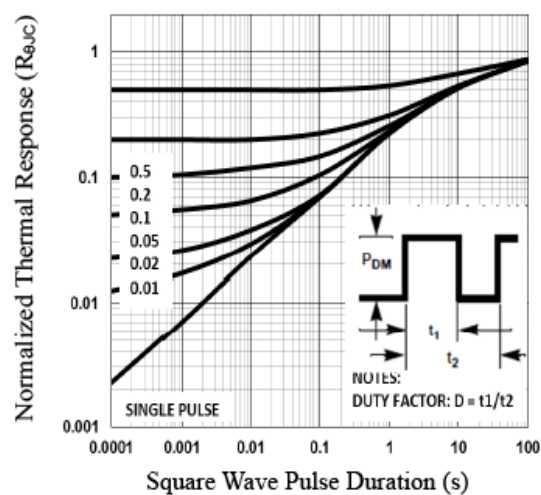
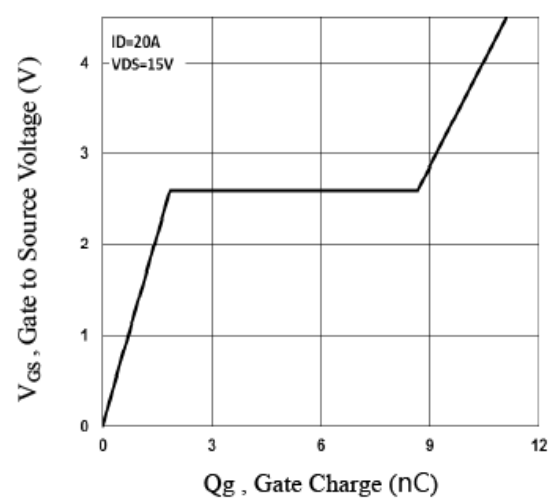
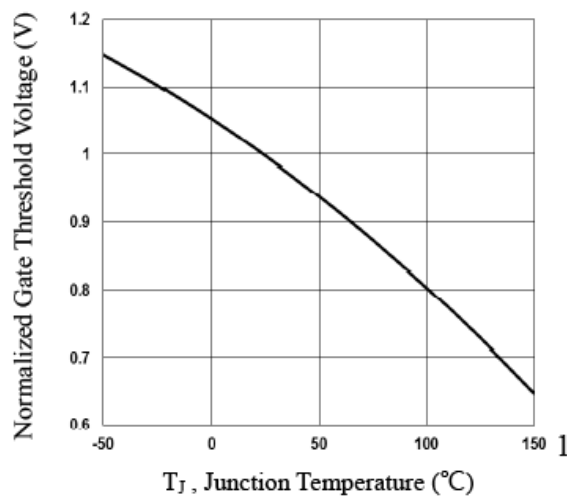
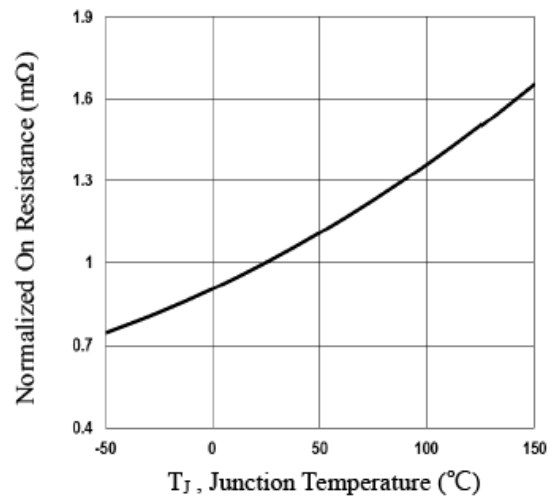
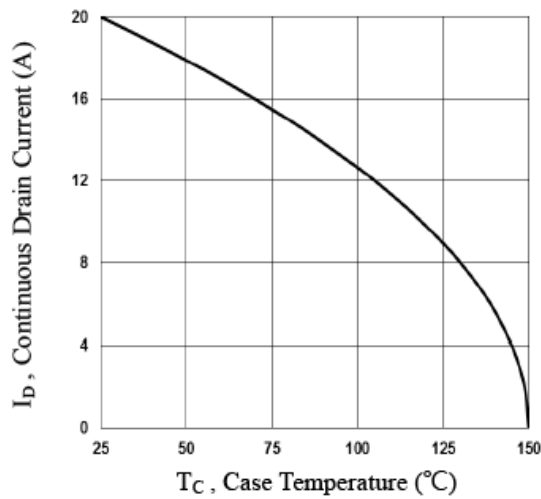
$T_J=25^\circ\text{C}$ Unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30			V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=1\text{mA}$		0.04		$V/^\circ\text{C}$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	1.6	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient			-4		$\text{mV}/^\circ\text{C}$
I_{GSS}	Gate Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=30V, V_{GS}=0V$			1	μA
		$V_{DS}=24V, V_{GS}=0V$, $T_J=125^\circ\text{C}$			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	m Ω
		$V_{GS}=4.5V, I_D=5A$		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	$V_{DS}=25V, V_{GS}=0V$, $f=1\text{MHz}$		1160	1900	pF
C_{oss}	Output Capacitance			200	400	
C_{rss}	Reverse Transfer Capacitance			180	360	
$t_{d(on)}$	Turn-On Time	$V_{DD}=15V, I_D=15A$, $V_{GS}=10V, R_G=3.3\Omega$		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		$V_{DS}=0V, V_{GS}=0V$, $f=1\text{MHz}$		2.5	

Note 2: The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

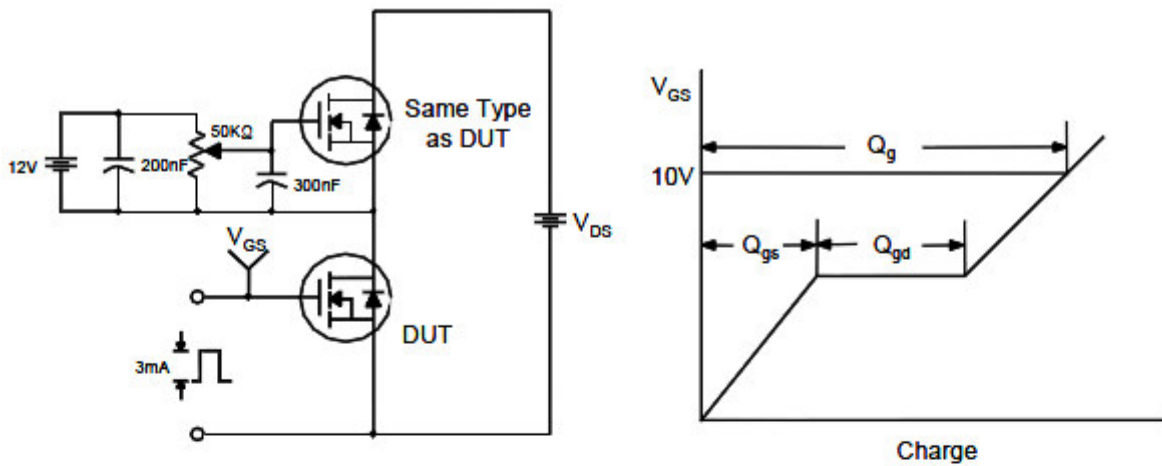
Note 3: Essentially independent of operating temperature.

Typical Performance Characteristics

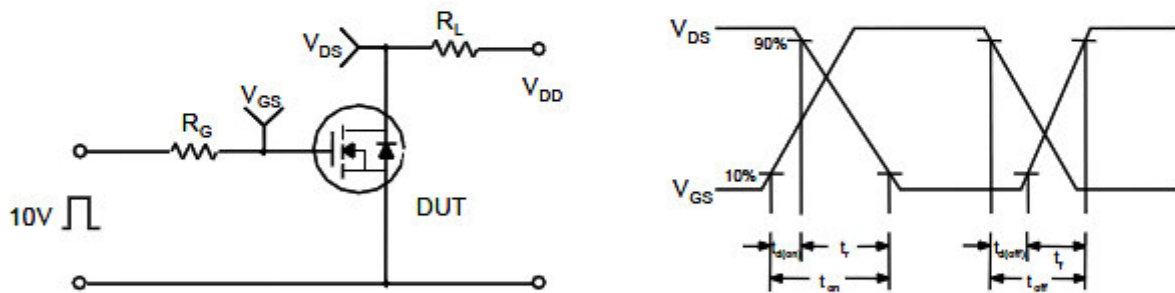


Typical Performance Characteristics (Continue)

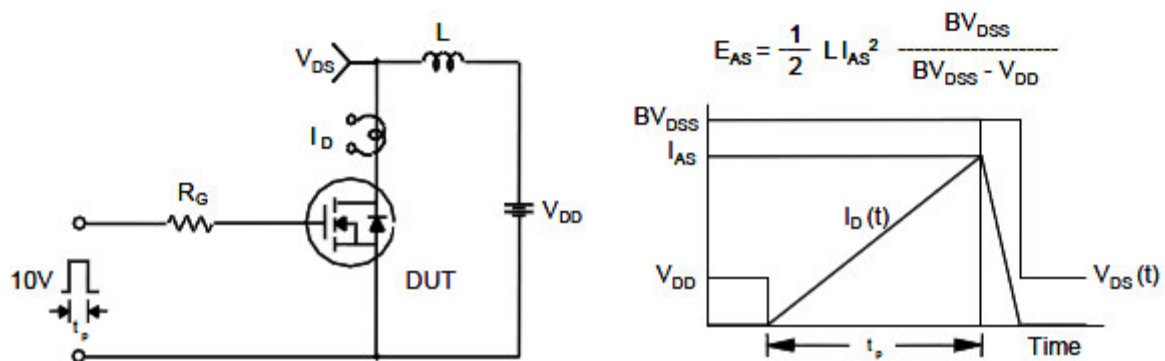
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

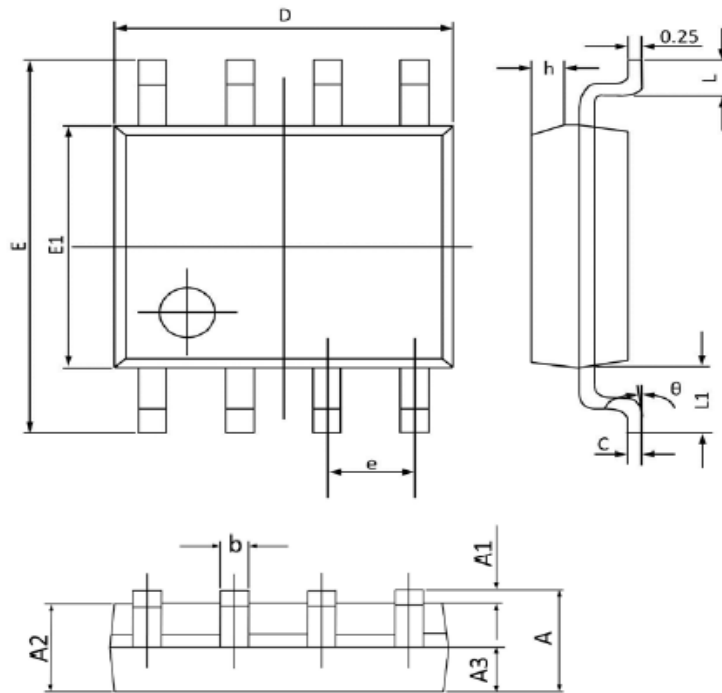


Unclamped Inductive Switching Test Circuit & Waveforms



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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