

GSMDS6904

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, 10A, $R_{DS(ON)}=12m\Omega@V_{GS}=10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available
- SOP-8 package design

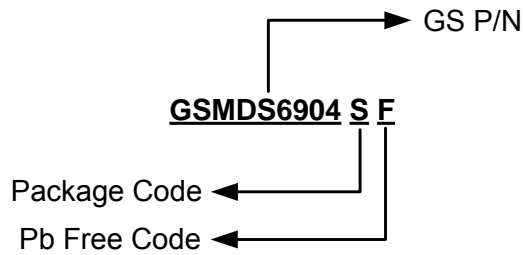
Applications

- Motor Drive
- Power Tools
- LED Lighting

Packages & Pin Assignments

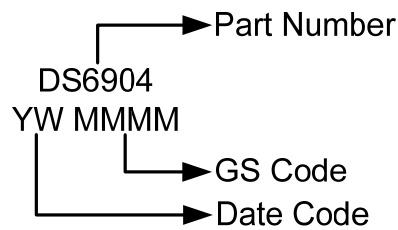
GSMDS6904SF (SOP-8)	
Top View	
Pin	Description
1	Source
2	Source
3	Source
4	Gate
5	Drain
6	Drain
7	Drain
8	Drain

Ordering Information



Part Number	Package	Quantity Reel
GSMDS6904SF	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	60	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_C=25^{\circ}\text{C}$	10
		$T_C=100^{\circ}\text{C}$	6.3
I_{DM}	Pulsed Drain Current (*1)	40	A
EAS	Single Pulse Avalanche Energy (*2)	61	mJ
IAS	Single Pulse Avalanche Current (*2)	35	A
P_D	Power Dissipation ($T_C=25^{\circ}\text{C}$)	2.5	W
	Power Dissipation (Derate above 25°C)	0.02	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	50	$^{\circ}\text{C}/\text{W}$

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

Note 2: $V_{DD}=25\text{V}$, $V_{GS}=10\text{V}$, $L=0.1\text{mH}$, $I_{AS}=35\text{A}$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$.

Electrical Characteristics

T_J=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	V _{DS} =V _{GS} , I _D =250uA	1.2	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} =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			10	A
I _{SM}	Pulsed Source Current (*3)				40	
R _{DS(on)}	Drain-Source On-Resistance (*3)	V _{GS} =10V, I _D =10A		10	12	mΩ
		V _{GS} =4.5V, I _D =6A		12	15	
g _{FS}	Forward Transconductance	V _{DS} =10V, I _D =6A		11.7		S
V _{SD}	Diode Forward Voltage (*3)	V _{GS} =0V, I _S =1A			1	V
Dynamic						
Q _g	Total Gate Charge (*3,4)	V _{DS} =30V, V _{GS} =10V, I _D =10A		39.2	59	nC
Q _{gs}	Gate-Source Charge (*3,4)			5.9	9	
Q _{gd}	Gate-Drain Charge (*3,4)			8.8	14	
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz		2100	3050	pF
C _{oss}	Output Capacitance			165	240	
C _{rss}	Reverse Transfer Capacitance			80	120	
t _{d(on)}	Turn-On Time (*3,4)	V _{DD} =30V, I _D =1A, V _{GS} =10V, R _G =6Ω		9.6	18	ns
t _r				28.2	54	
t _{d(off)}	Turn-Off Time (*3,4)			45.3	86	
t _f				10.9	21	
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz		1.6	3.2	Ω

Note 3: The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.

Note 4: Essentially independent of operating temperature.

Typical Performance Characteristics

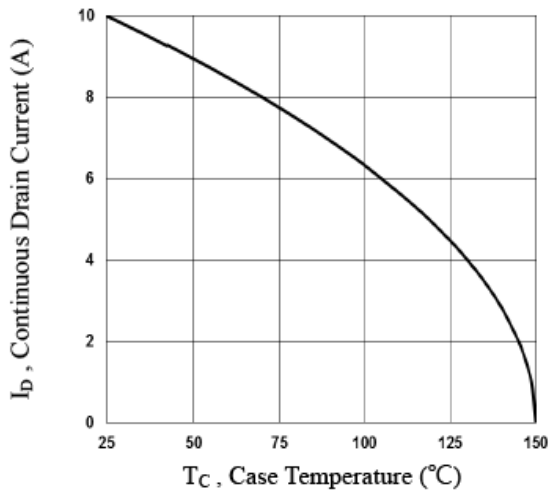


Fig.1 Continuous Drain Current vs. T_c

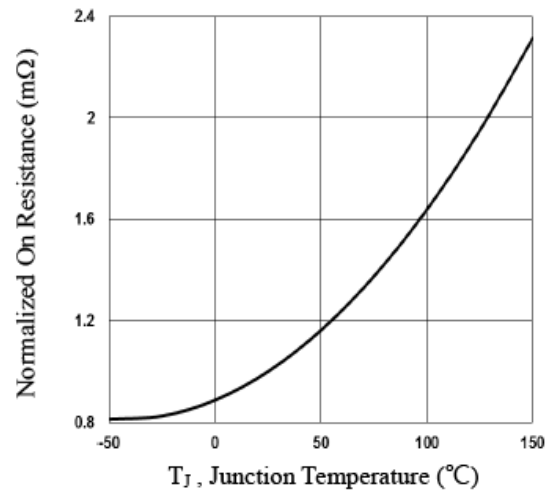


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

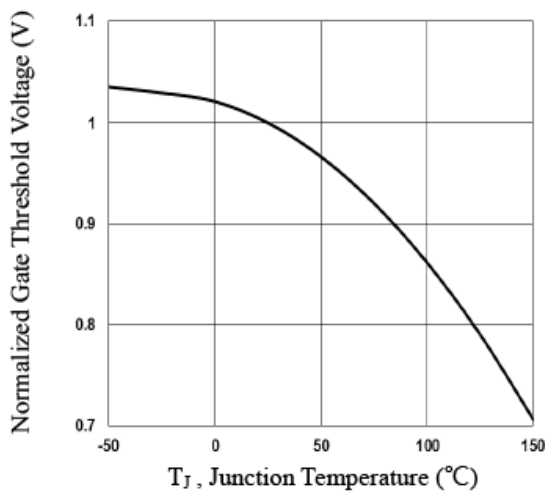


Fig.3 Normalized V_{th} vs. T_j

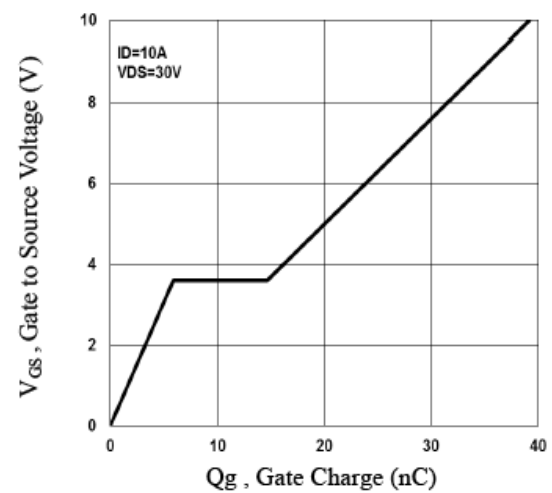


Fig.4 Gate Charge Waveform

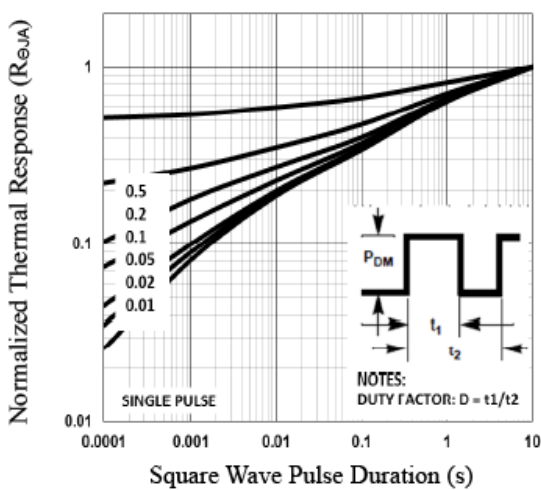


Fig.5 Normalized Transient Response

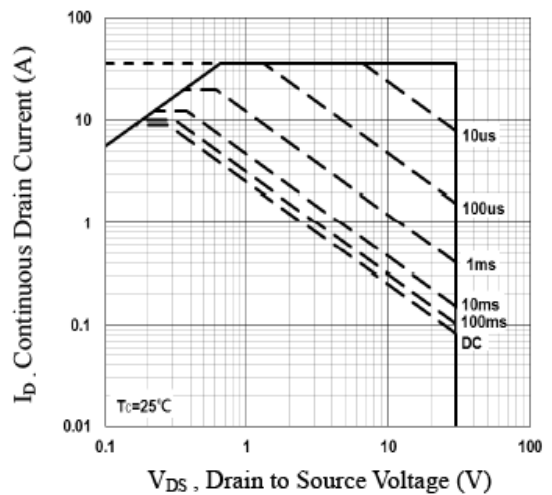
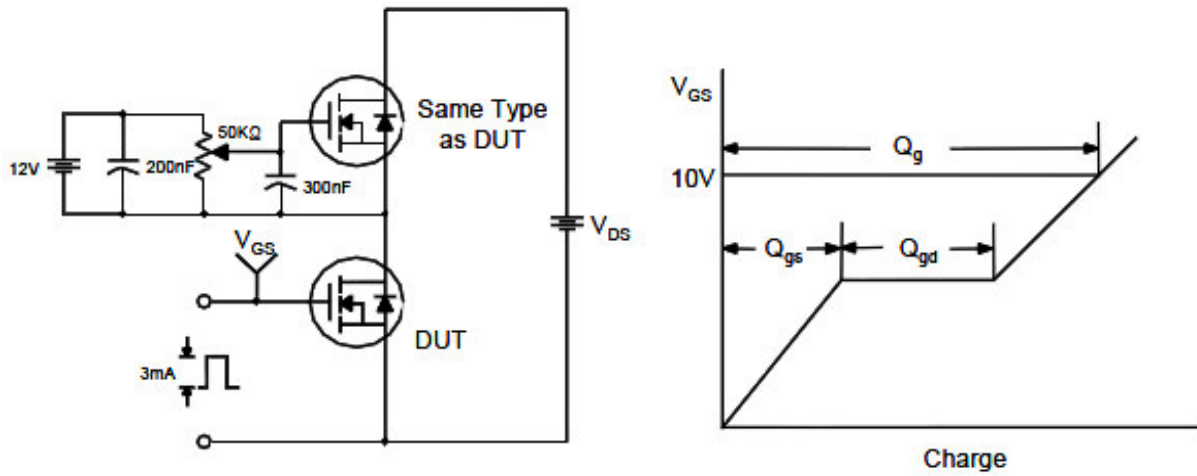


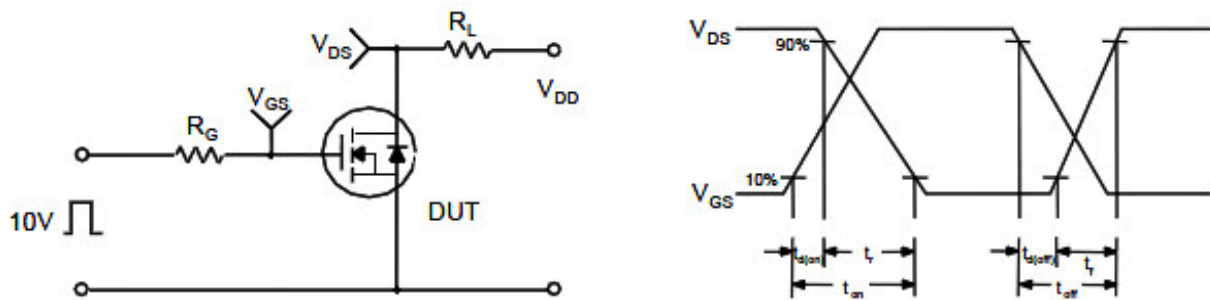
Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics (Continue)

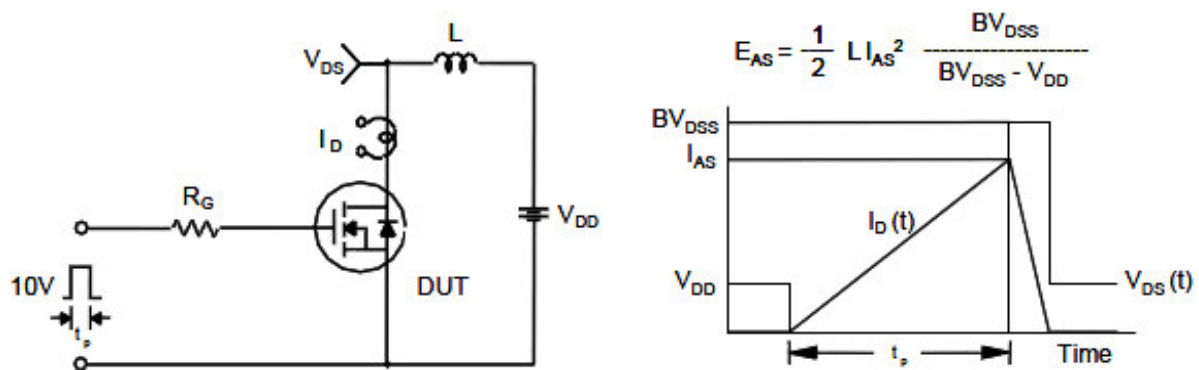
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

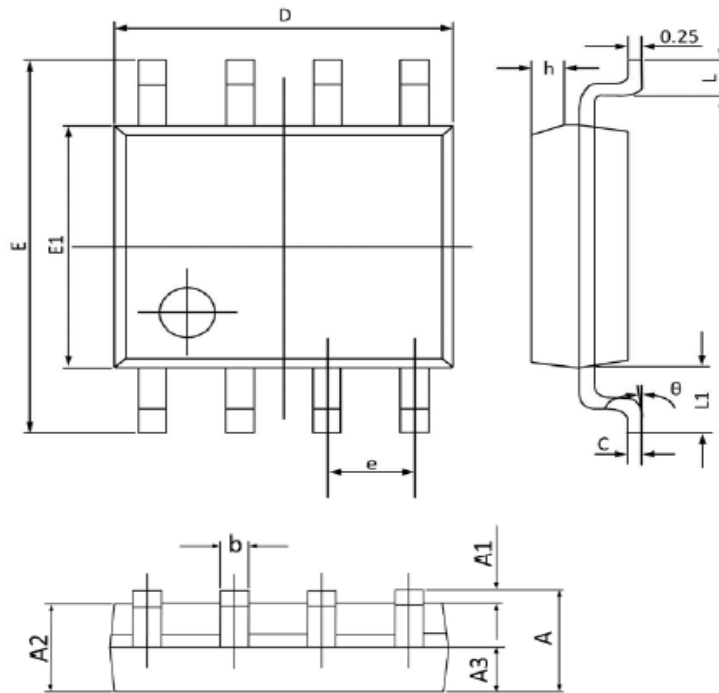


Unclamped Inductive Switching Test Circuit & Waveforms



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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