

GSMD53904

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, 30A, $R_{DS(ON)}=4.2m\Omega@V_{GS}=10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS guaranteed
- Green Device Available
- SOP-8 package design

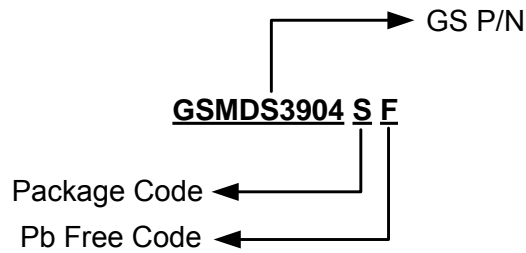
Applications

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

Packages & Pin Assignments

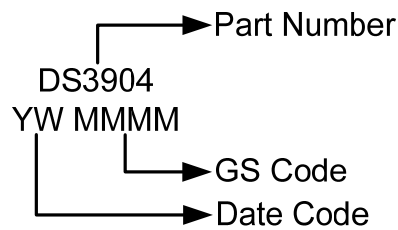
GSMD53904SF (SOP-8)	
<p style="text-align: center;">Top View</p>	
Pin	Description
1	Source
2	Source
3	Source
4	Gate
5	Drain
6	Drain
7	Drain
8	Drain

Ordering Information



Part Number	Package	Quantity Reel
GSMDS3904SF	SOP-8	4000 PCS

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	$T_A=25^{\circ}\text{C}$	30
		$T_A=100^{\circ}\text{C}$	19
I_{DM}	Pulsed Drain Current	120	A
EAS	Single Pulse Avalanche Energy	125	mJ
IAS	Single Pulse Avalanche Current	50	A
P_D	Power Dissipation ($T_A=25^{\circ}\text{C}$)	7	W
	Power Dissipation (Derate above 25°C)	0.056	W/ $^{\circ}\text{C}$
T_J	Operating Junction Temperature Range	-55 to +175	$^{\circ}\text{C}$
T_{STG}	Storage Temperature Range	-55 to +175	$^{\circ}\text{C}$
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	62	$^{\circ}\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance-Junction to Case	18	$^{\circ}\text{C}/\text{W}$

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		0.03		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			-5		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			30	A
I _{SM}	Pulsed Source Current				120	
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} =10V, I _D =12A		3.8	4.2	mΩ
		V _{GS} =4.5V, I _D =6A		5.2	6	
g _{FS}	Forward Transconductance	V _{DS} =10V, I _D =6A		12		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=10A	31			mJ
Dynamic						
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =4.5V, I _D =12A		24	34	nC
Q _{gs}	Gate-Source Charge			4.2	6	
Q _{gd}	Gate-Drain Charge			13	18	
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz		2200	3190	pF
C _{oss}	Output Capacitance			280	405	
C _{rss}	Reverse Transfer Capacitance			177	255	
t _{d(on)}	Turn-On Time	V _{DD} =15V, I _D =15A, V _{GS} =10V, R _G =3.3Ω		12.6	24	ns
t _r				19.5	37	
t _{d(off)}	Turn-Off Time			42.8	81	
t _f				13.2	25	
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz		2	4	Ω

Typical Performance Characteristics

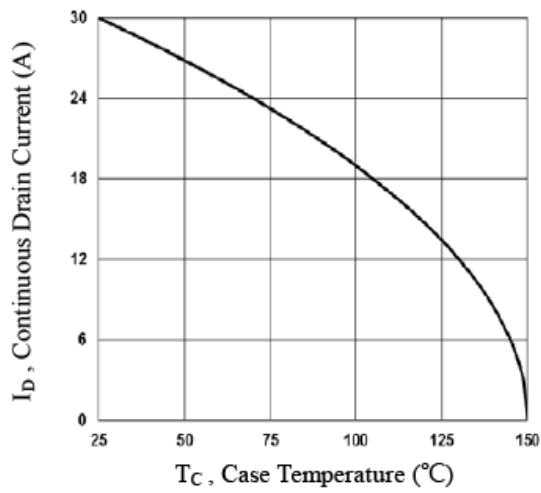


Fig.1 Continuous Drain Current vs. T_c

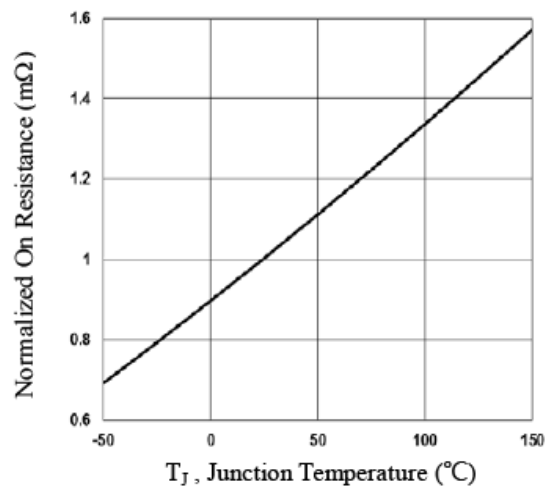


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

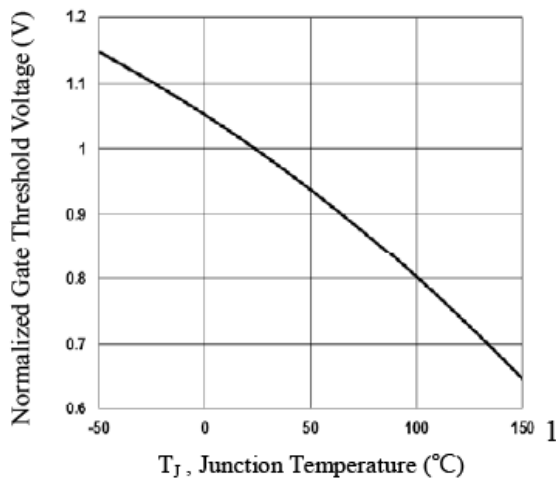


Fig.3 Normalized V_{th} vs. T_j

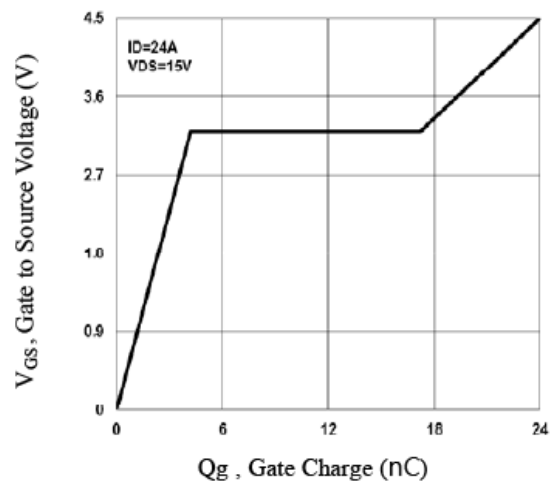


Fig.4 Gate Charge Waveform

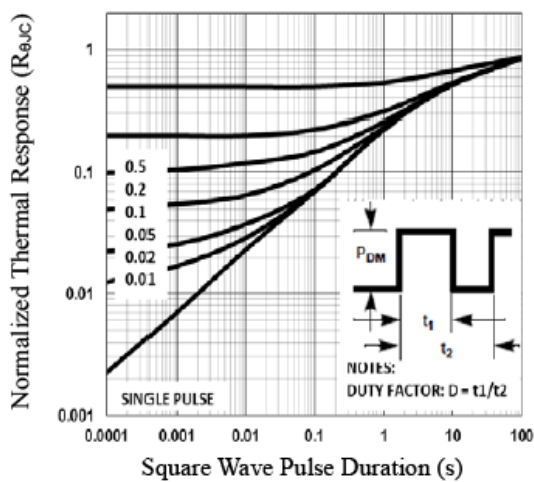


Fig.5 Normalized Transient Impedance

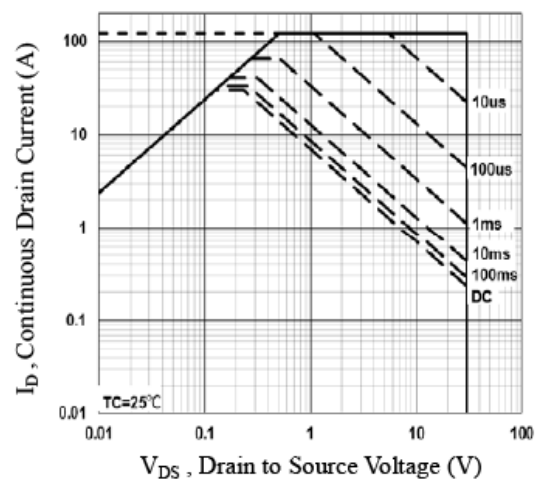
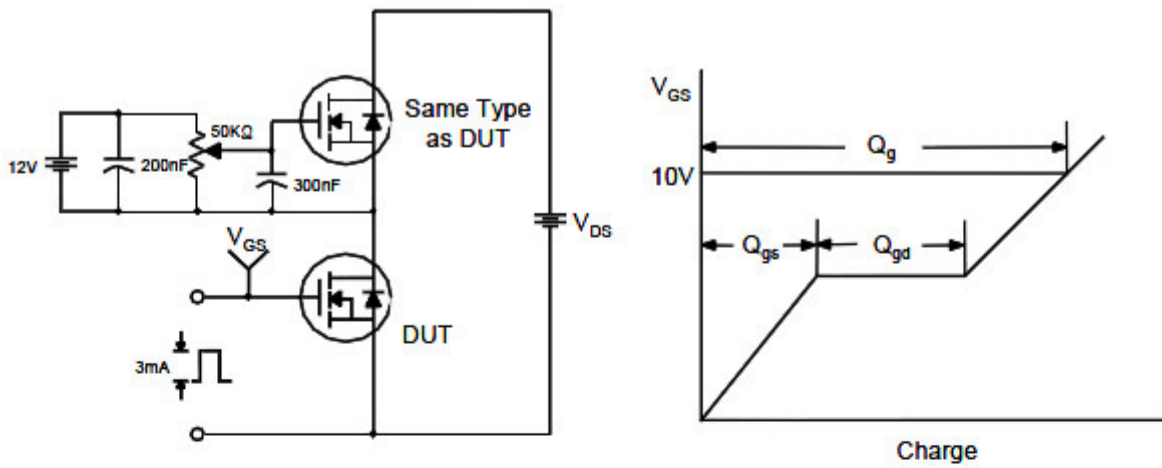


Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics (Continue)

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

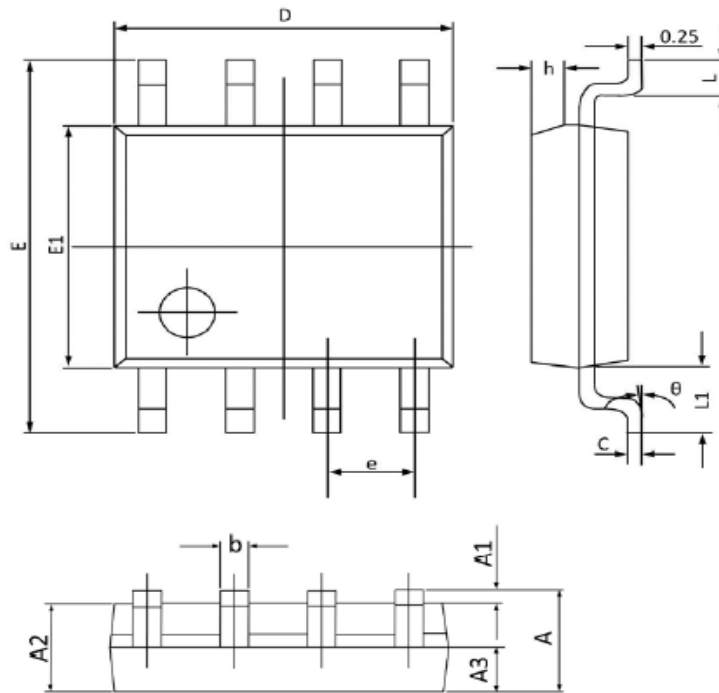


Unclamped Inductive Switching Test Circuit & Waveforms



Package Dimension

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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