

GSMD53903

30V P-Channel MOSFETs

Product Description

These P-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, -13A, $R_{DS(ON)}=9.5m\Omega@V_{GS}=-10V$
- Fast switching
- Suit for -4.5V Gate Drive Applications
- Green Device Available
- SOP-8 package design

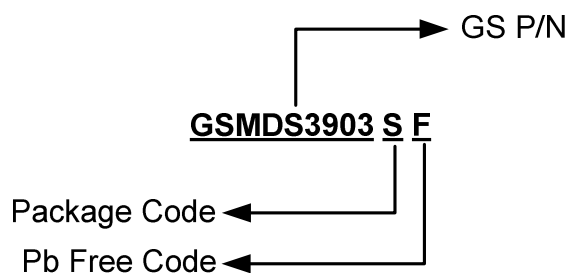
Applications

- MB / VGA / Vcore
- POL Applications
- Load Switch
- LED Application

Packages & Pin Assignments

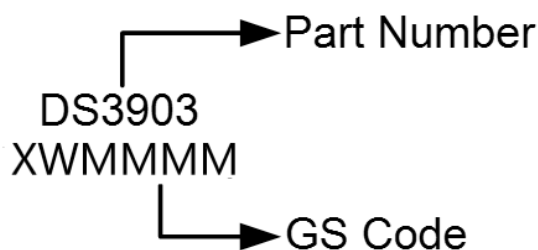
GSMD53903SF (SOP-8)			
Pin	Description	Pin	Description
1	Source	5	Drain
2	Source	6	Drain
3	Source	7	Drain
4	Gate	8	Drain

Ordering Information



Part Number	Package	Quantity Reel
GSMDS3903SF	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	$T_A=25^\circ\text{C}$	-13
		$T_A=100^\circ\text{C}$	-7.8
I_{DM}	Pulsed Drain Current	-52	A
P_D	Power Dissipation ($T_A=25^\circ\text{C}$)	4.2	W
	Power Dissipation (Derate above 25°C)	0.034	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	60	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance-Junction to Case	30	$^\circ\text{C}/\text{W}$

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 =-250μA	-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		-1.2	-1.6	-2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient	V _{DS} =V _{GS} , I _D =-250μA		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	μA
		V _{DS} =-24V, V _{GS} =0V, T _J =125°C			-10	
I _S	Continuous Source Current	V _G =V _D =0V, Force Current			-13	A
I _{SM}	Pulsed Source Current				-26	
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} = -10V, I _D = -10A		7.5	9.5	mΩ
		V _{GS} = -4.5V, I _D = -8A		12	15	
g _{FS}	Forward Transconductance	V _{DS} = -10V, I _D = -10A		13		S
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =-1A			-1	V
Dynamic						
Q _g	Total Gate Charge			35	55	nC
Q _{gs}	Gate-Source Charge	V _{DS} = -15V, V _{GS} = -4.5V, I _D = -10A		10.8	16	
Q _{gd}	Gate-Drain Charge			10.6	16	
C _{iss}	Input Capacitance	V _{DS} = -15V, V _{GS} = 0V, f = 1MHz		3300	5000	pF
C _{oss}	Output Capacitance			410	700	
C _{rss}	Reverse Transfer Capacitance			280	500	
t _{d(on)}	Turn-On Time	V _{DD} = -15V, I _D = -1A, V _{GS} = -10V, R _G = 6Ω		24.5	38	ns
t _r				10.5	16	
t _{d(off)}	Turn-Off Time			156.8	230	
t _f				50	75	
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz		8.5	12	Ω

Typical Performance Characteristics

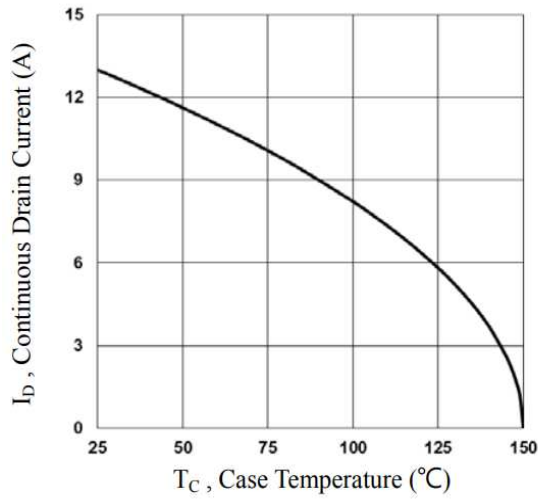


Fig.1 Continuous Drain Current vs. T_C

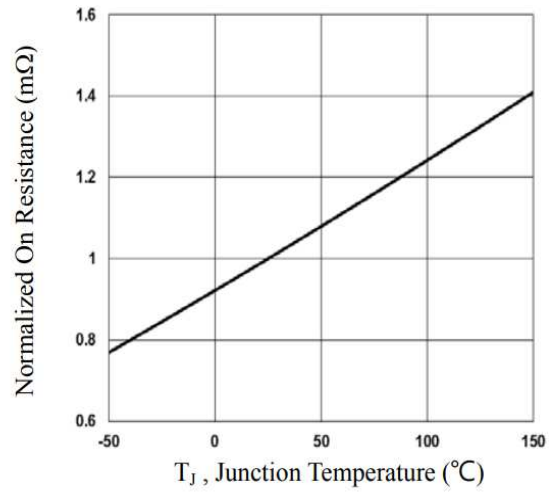


Fig.2 Normalized RDSON vs. T_J

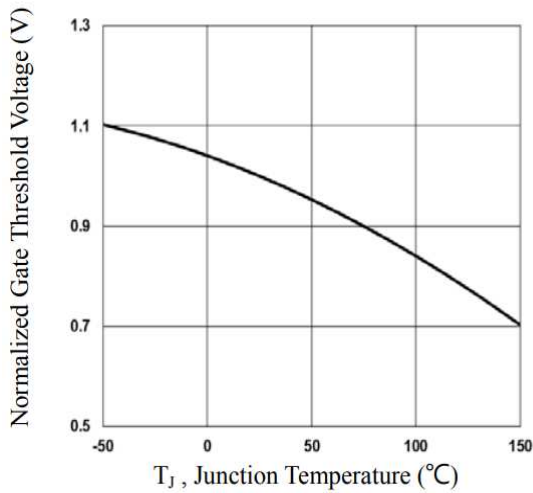


Fig.3 Normalized V_{th} vs. T_J

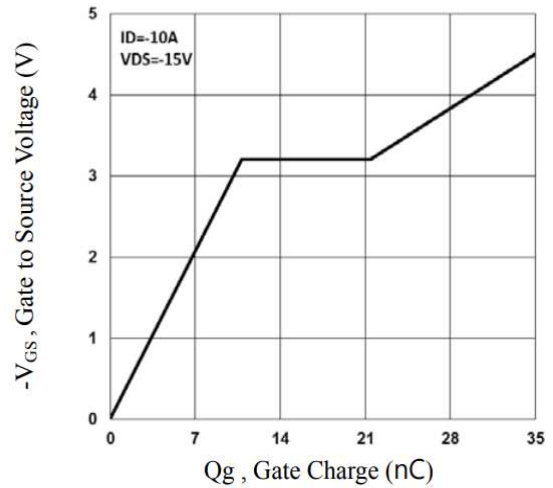


Fig.4 Gate Charge Waveform

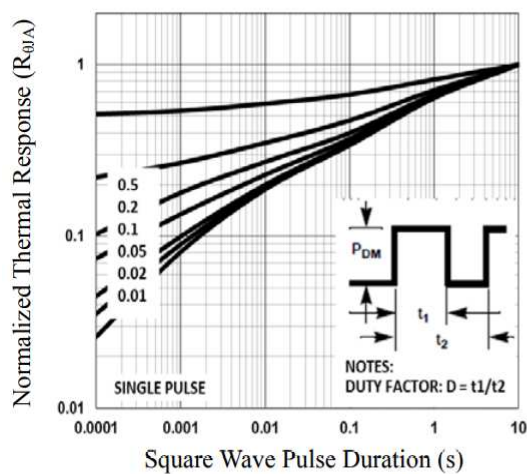


Fig.5 Normalized Transient Impedance

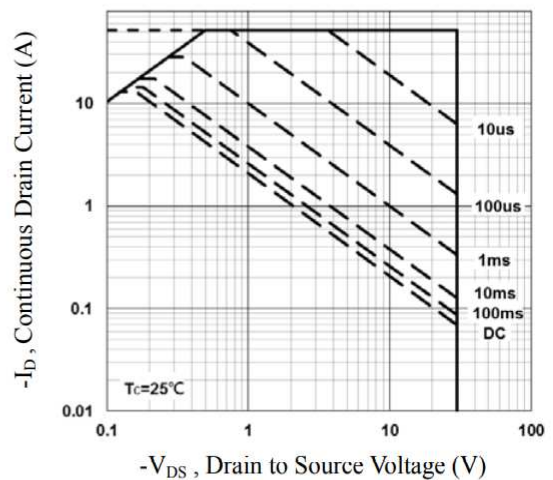
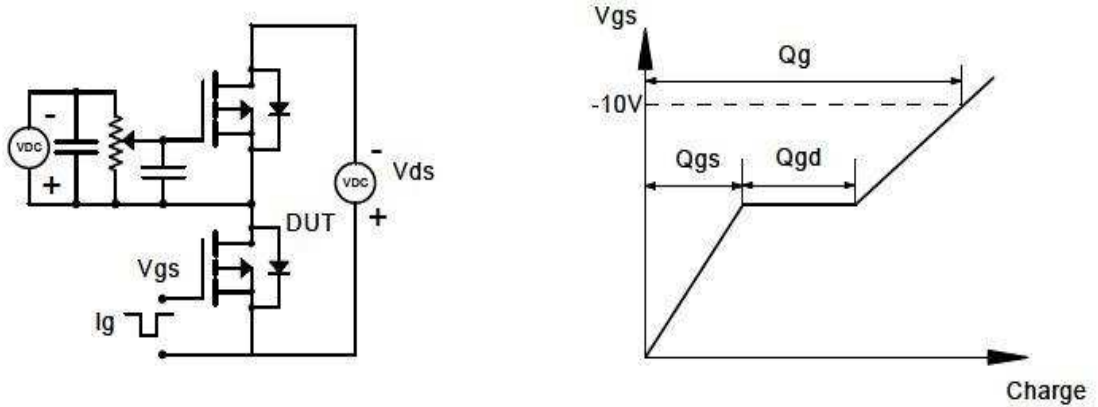


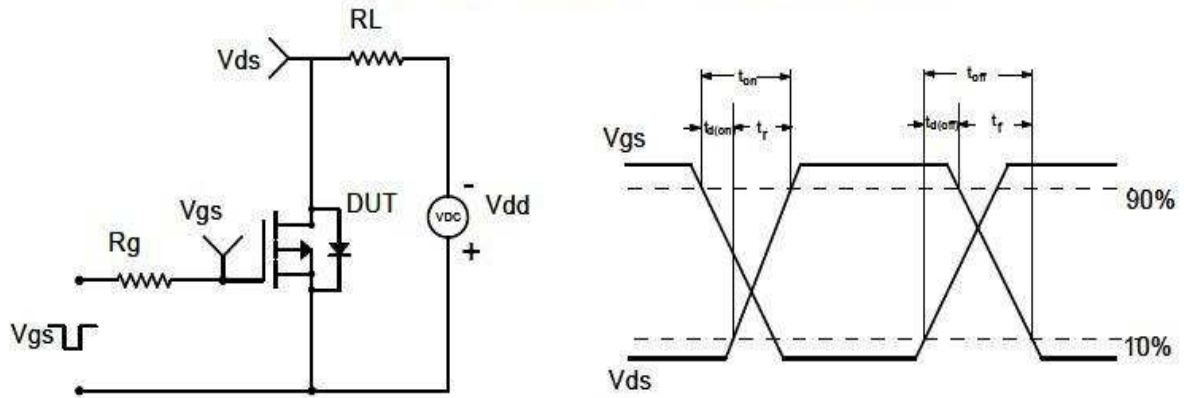
Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics (Continue)

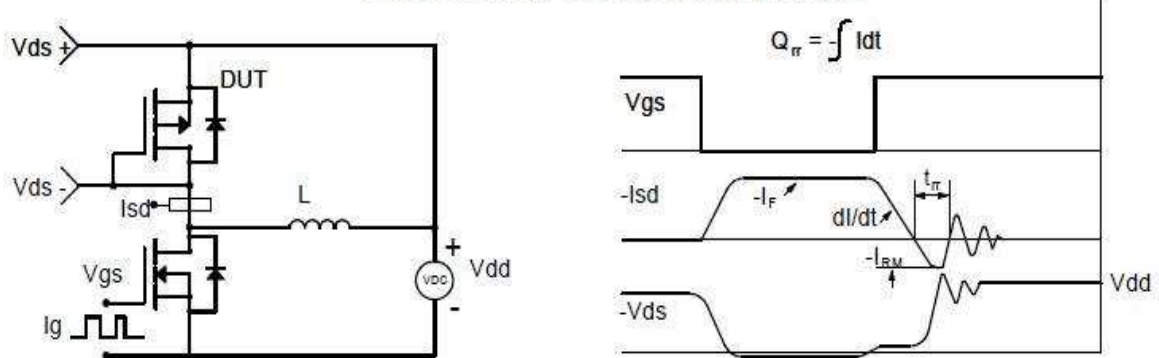
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

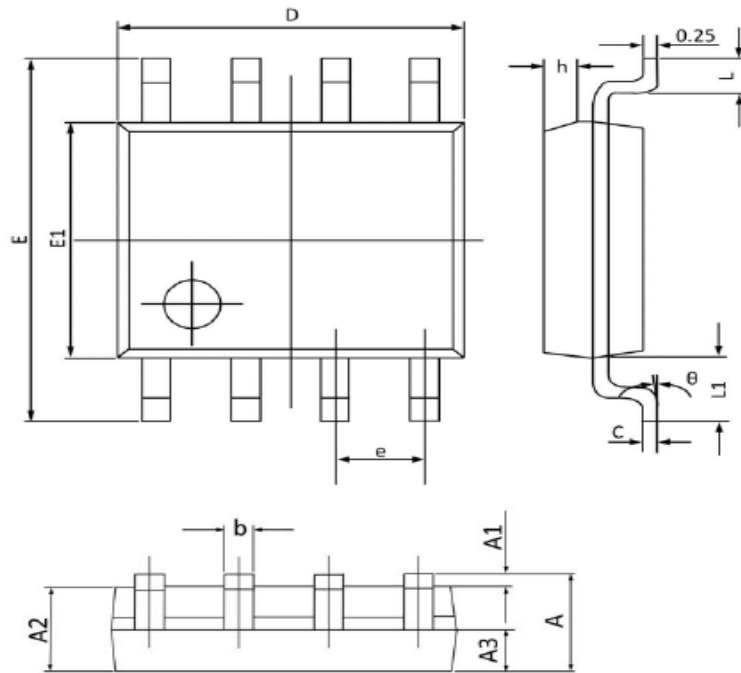


Diode Recovery Test Circuit & Waveforms



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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