

GSM4909D

40V P-Channel MOSFET

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.

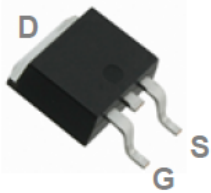
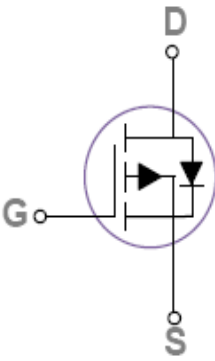
Features

- -40V, -16A, $R_{DS(ON)} = 45m\Omega @ V_{GS} = -10V$
- Fast switching
- Green Device Available
- Improved dv/dt capability

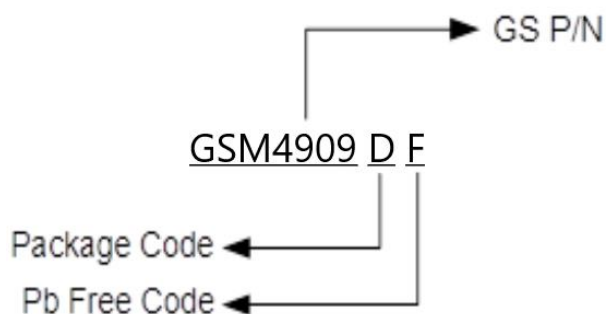
Applications

- Motor Drive
- Power Tools
- LED Lighting

Packages & Pin Assignments

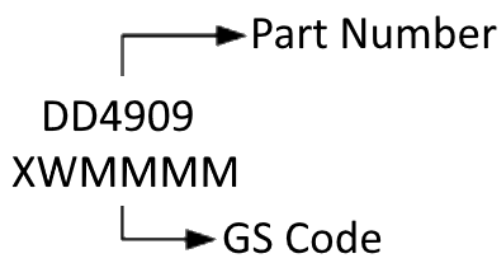
GSM4909DF (TO-252-2L)	
 <p>Top View</p>	
Description	
Gate	
Drain	
Source	

Ordering Information



Part Number	Package	Quantity
GSM4909DF	TO-252-2L	2500pcs

Marking Information



Absolute Maximum Ratings

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

Symbol	Parameter	Typical	Unit
V_{DS}	Drain-Source Voltage	-40	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_C=25^{\circ}\text{C}$	-16
		$T_C=100^{\circ}\text{C}$	-10
I_{DM}	Pulsed Drain Current ¹	-64	A
EAS	Single Pulse Avalanche Energy ²	31	mJ
IAS	Single Pulse Avalanche Current ²	25	A
P_D	Power Dissipation	32.9	W
	Power Dissipation-Derate above 25°C	0.26	W/ $^{\circ}\text{C}$
T_J	Operating Junction Temperature Range	-50 to +150	$^{\circ}\text{C}$
T_{STG}	Storage Temperature Range	-50 to +150	$^{\circ}\text{C}$
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	62	$^{\circ}\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance-Junction to Case	3.8	$^{\circ}\text{C}/\text{W}$

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	-40			V
$\frac{\Delta V_{(BR)DSS}}{\Delta T_J}$	V _{(BR)DSS} Temperature Coefficient	Reference to 25°C, I _D =-1mA		-0.05		V/°C
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250uA	-1.2	-1.6	-2.5	V
$\Delta V_{GS(th)}$	V _{GS(th)} Temperature Coefficient			5		mV/°C
I _{GSS}	Gate-Source Leakage Current	V _{DS} =0V, V _{GS} =±20V			±100	nA
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-40V, V _{GS} =0V			-1	uA
		V _{DS} =-32V, V _{GS} =0V T _J =125°C			-10	
I _S	Continuous Source Current	V _G =V _D =0V, Force Current			-16	A
I _{SM}	Pulsed Source Current				-32	A
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} =-10V, I _D =-10A		37	45	mΩ
		V _{GS} =-4.5V, I _D =-6A		57	68	
g _{FS}	Forward Transconductance	V _{DS} =-10V, I _D =-5A		7		S
V _{SD}	Diode Forward Voltage	I _S =-1A, V _{GS} =0V			-1	V
Dynamic						
Q _g	Total Gate Charge ^{3,4}	V _{DS} =-20V, V _{GS} =-4.5V, I _D =-5A		8.2	16	nC
Q _{gs}	Gate-Source Charge ^{3,4}			3.0	6	
Q _{gd}	Gate-Drain Charge ^{3,4}			2.5	5	
C _{iss}	Input Capacitance	V _{DS} =-25V, V _{GS} =0V, f=1MHz		825	1480	pF
C _{oss}	Output Capacitance			68	130	
C _{rss}	Reverse Transfer Capacitance			50	100	
t _{d(on)}	Turn-On Time ^{3,4}	V _{DD} =-20V, I _D =-1A, V _{GS} =-10V, R _G =6Ω		6.3	12	ns
t _r	Rise Time ^{3,4}			7.2	14	
t _{d(off)}	Turn-Off Time ^{3,4}			46	80	
t _f	Fall Time ^{3,4}			14	27	

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=25A., Starting T_J=25°C
3. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
4. Essentially independent of operating temperature.

Typical Performance Characteristics

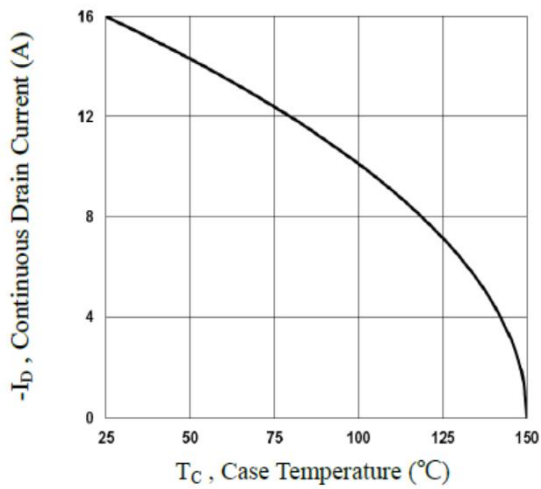


Fig.1 Continuous Drain Current vs. T_C

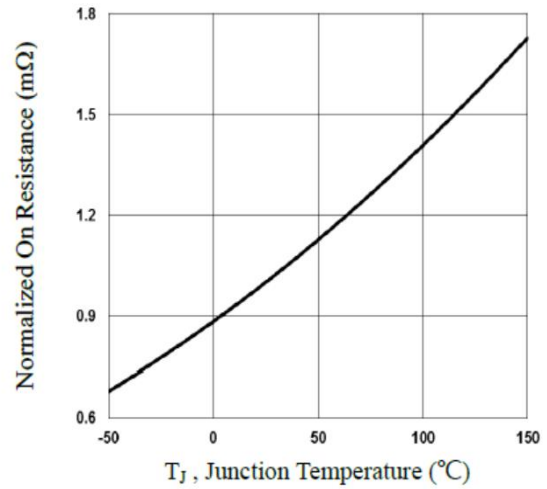


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

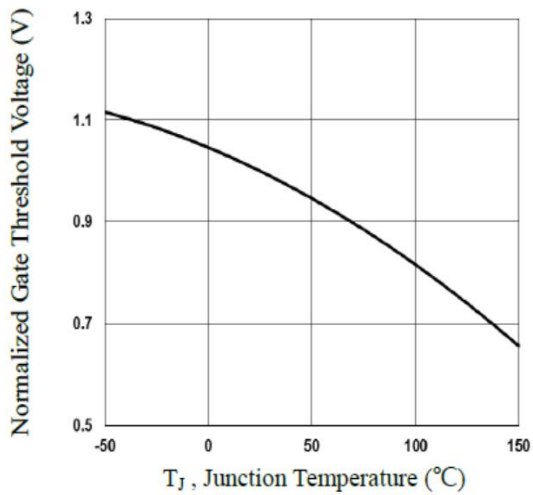


Fig.3 Normalized V_{th} vs. T_J

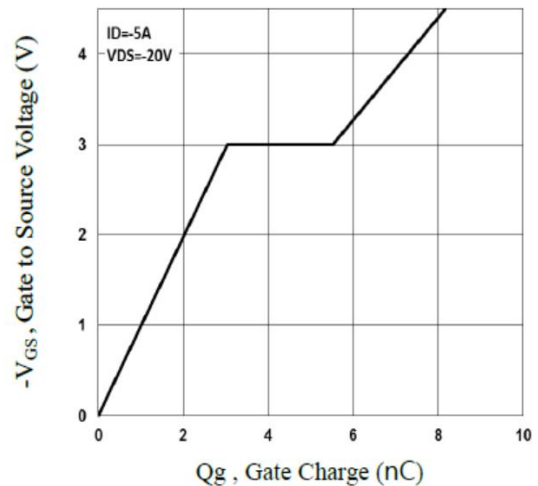


Fig.4 Gate Charge Waveform

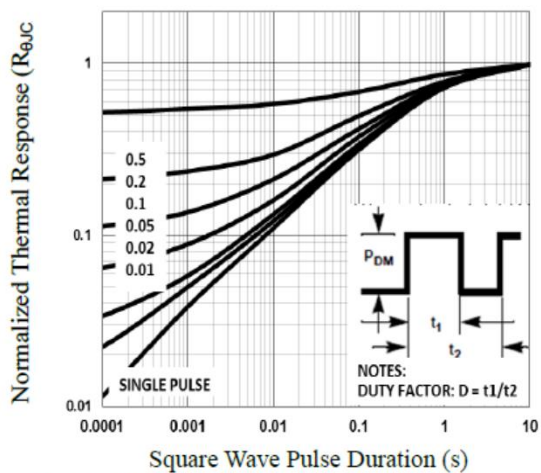


Fig.5 Normalized Transient Impedance

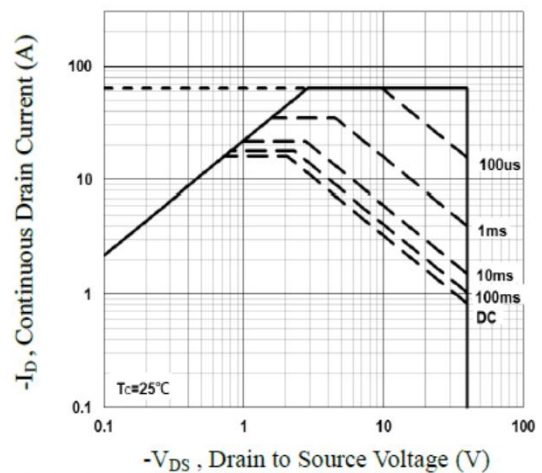


Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics (Continue)

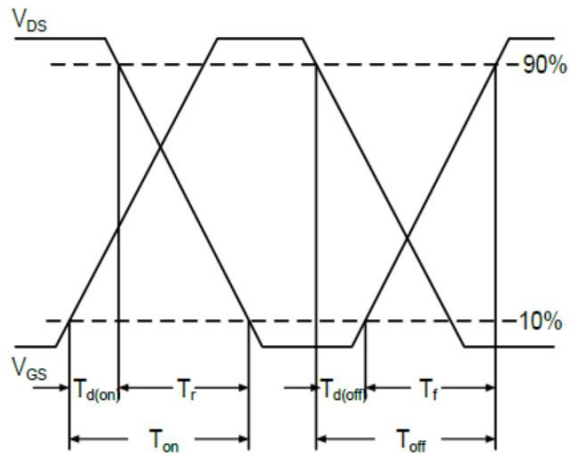


Fig.7 Switching Time Waveform

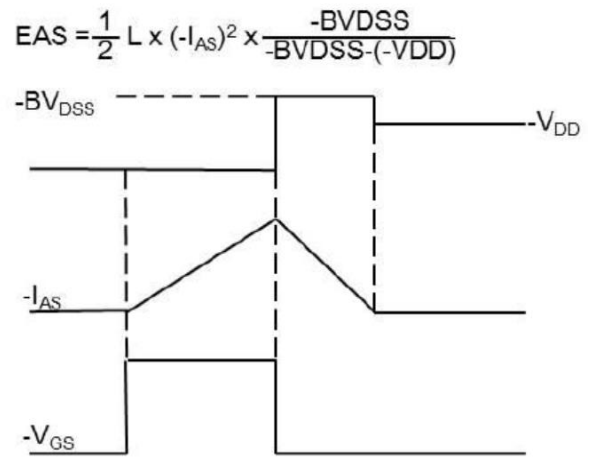
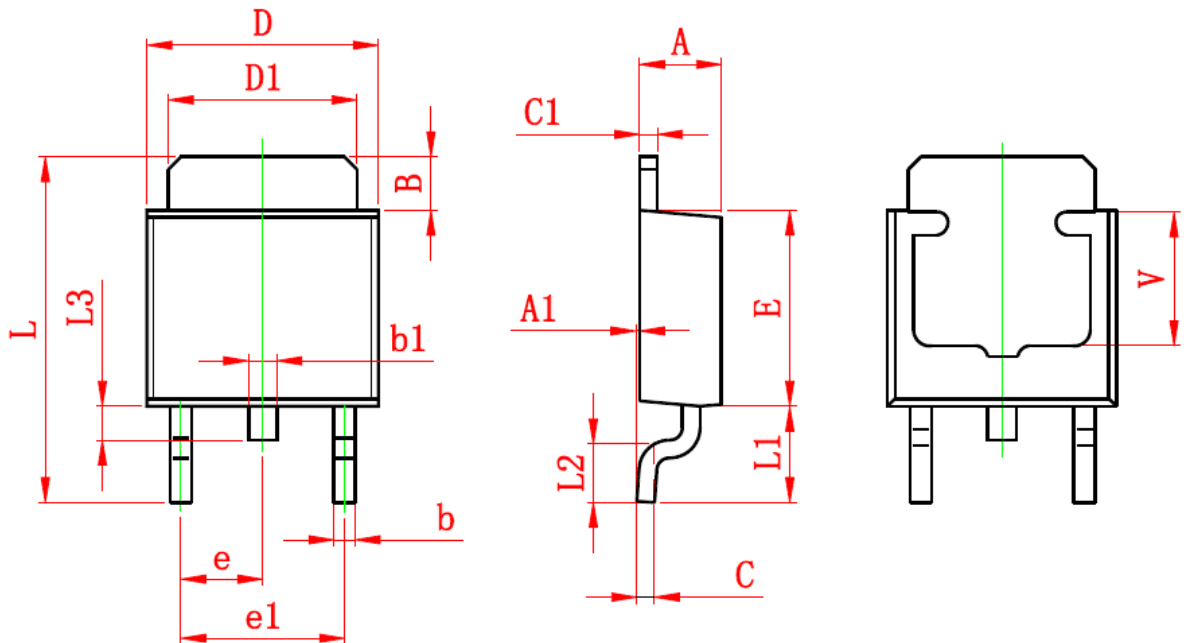


Fig.8 EAS Waveform

Package Dimension

TO-252-2L









Dimensions				
SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
B	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
C	0.430	0.580	0.017	0.023
C1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300 TYP.		0.091 TYP.	
e1	4.500	4.700	0.177	0.185
L	9.500	9.900	0.374	0.390
L1	2.550	2.900	0.100	0.114
L2	1.400	1.780	0.055	0.070
L3	0.600	0.900	0.024	0.035
V	3.800 REF.		0.150 REF.	

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