GSM3909VP

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, -5.1A, $R_{DS(ON)}$=32mΩ@V_{GS}=-10V
- Improved dv/dt capability
- Fast switching
- Suit for -4.5V Gate Drive Applications
- Green Device Available
- SOT-23-6L package design

Applications

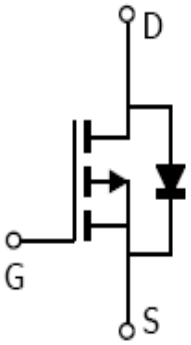
- Notebook
- Load Switch
- Battery Protection
- Hand-Held Instruments

Packages & Pin Assignments

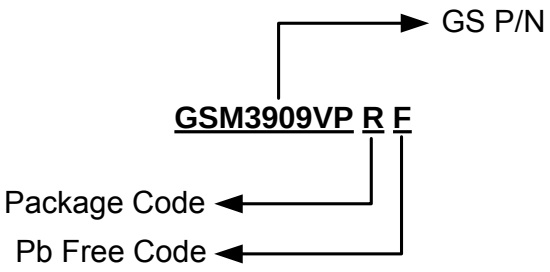
GSM3909VPRF (SOT-23-6L)

Top Views

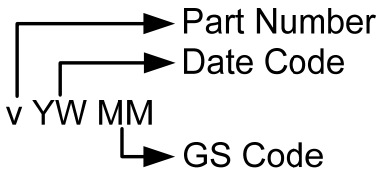
Pin	Description
1	Drain
2	Drain
3	Gate
4	Source
5	Drain
6	Drain



Ordering Information



Marking Information



Part Number	Package	Part Marking	Quantity
GSM3909VPRF	SOT-23-6L	vYWMM	3000pcs

Absolute Maximum Ratings

T_A=25ºC 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℃	-5.1	A
		T_A=100℃	-3.2	
I_{DM}	Pulsed Drain Current		-20.4	A
EAS	Single Pulse Avalanche Energy		39.2	mJ
IAS	Single Pulse Avalanche Current		-28	A
P_D	Power Dissipation (T_A=25℃)		1.56	W
	Power Dissipation (Derate above 25℃)		0.012	W/℃
T_J	Operating Junction Temperature Range		-55 to +150	℃
T_{STG}	Storage Temperature Range		-55 to +150	℃
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		80	℃/W

Electrical Characteristics

T_A=25℃ 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
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃, I_D=-1mA		-0.03		V/℃
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=-250uA	-1.2	-1.6	-2.2	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient			4		mV/℃
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℃			-10	
I_S	Continuous Source Current	V_G=V_D=0V, Force Current			-5.1	A
I_{SM}	Pulsed Source Current				-10.2	
$R_{DS(on)}$	Drain-Source On-Resistance	V_{GS}=-10V,I_D=-4A		27	32	mΩ
		V_{GS}=-4.5V,I_D=-2A		38	46	
g_{FS}	Forward Transconductance	V_{DS}=-10V,I_D=-3A		9		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=-5A		8	15	nC
Q_{gs}	Gate-Source Charge			3.3	6	
Q_{gd}	Gate-Drain Charge			2.3	5	
C_{iss}	Input Capacitance	V_{DS}=-15V,V_{GS}=0V, f=1MHz		757	1280	pF
C_{oss}	Output Capacitance			122	210	
C_{rss}	Reverse Transfer Capacitance			88	175	
$t_{d(on)}$	Turn-On Time	V_{DD}=-15V,I_D=-1A, V_{GS}=-10V,R_G=6Ω		4.6	9	ns
t_r				14	26	
$t_{d(off)}$	Turn-Off Time			34	58	
t_f				18	35	

Typical Performance Characteristics

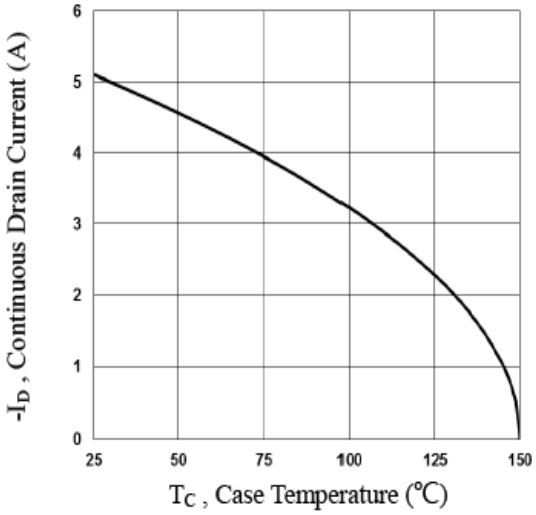


Fig.1 Continuous Drain Current vs. T_c

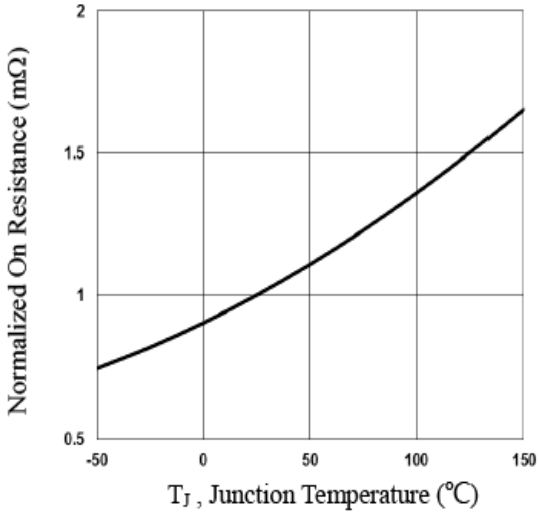


Fig.2 Normalized RDSON vs. T_J

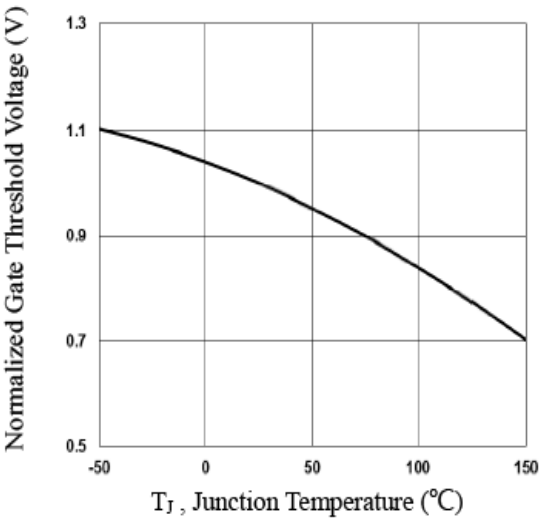


Fig.3 Normalized V_{th} vs. T_J

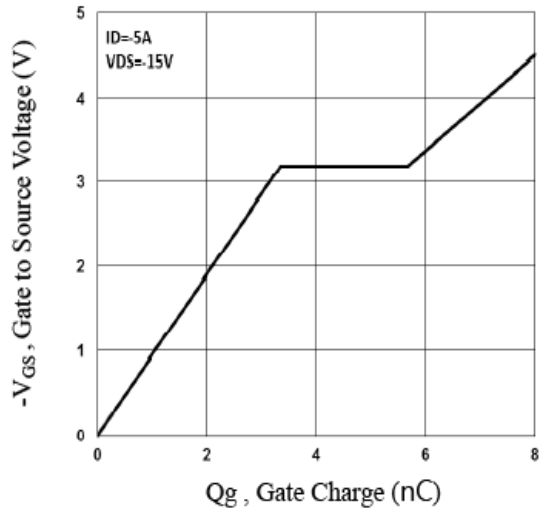


Fig.4 Gate Charge Waveform

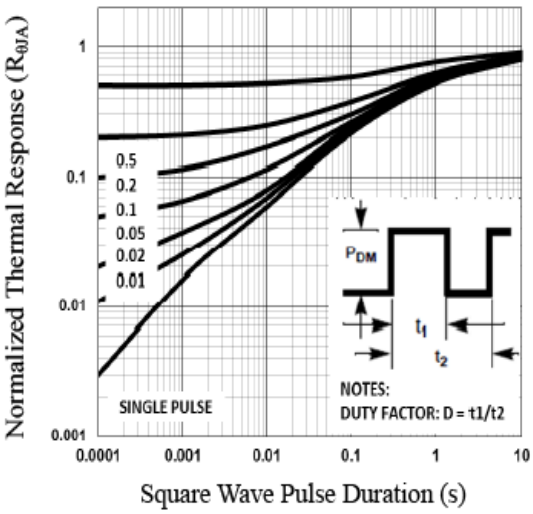


Fig.5 Normalized Transient Impedance

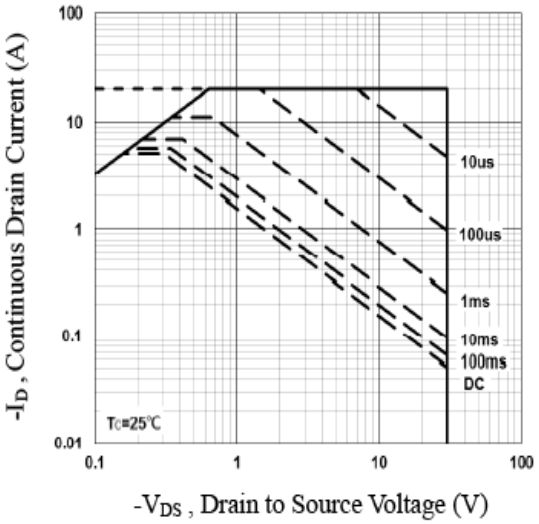
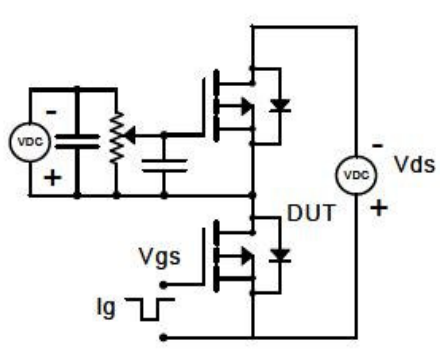
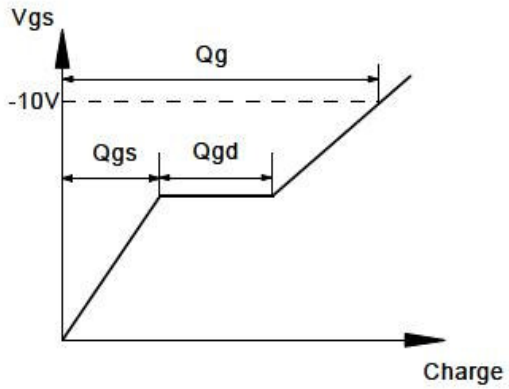


Fig.6 Maximum Safe Operation Area

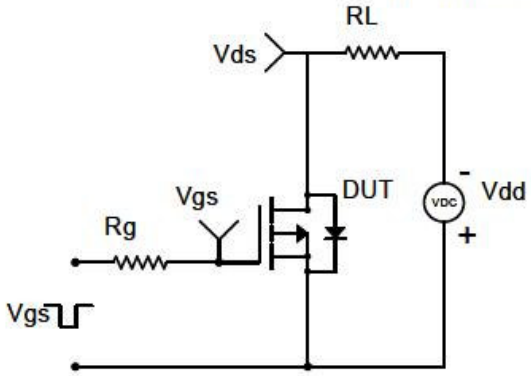
Typical Performance Characteristics (Continue)

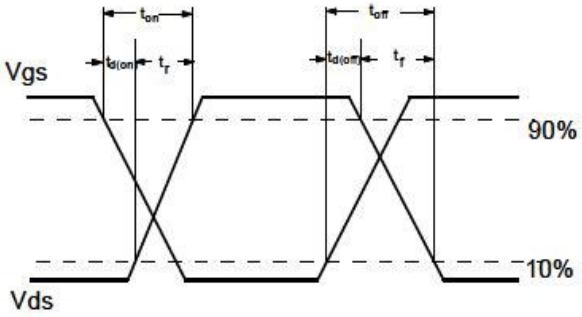
Gate Charge Test Circuit & Waveform



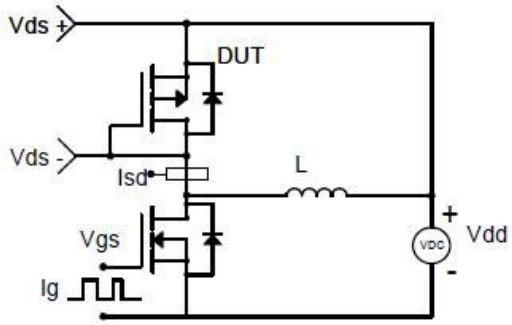


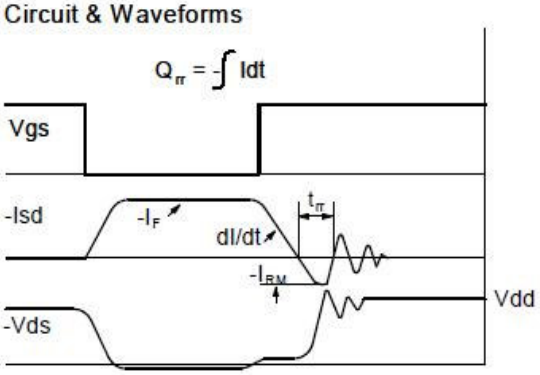
Resistive Switching Test Circuit & Waveforms





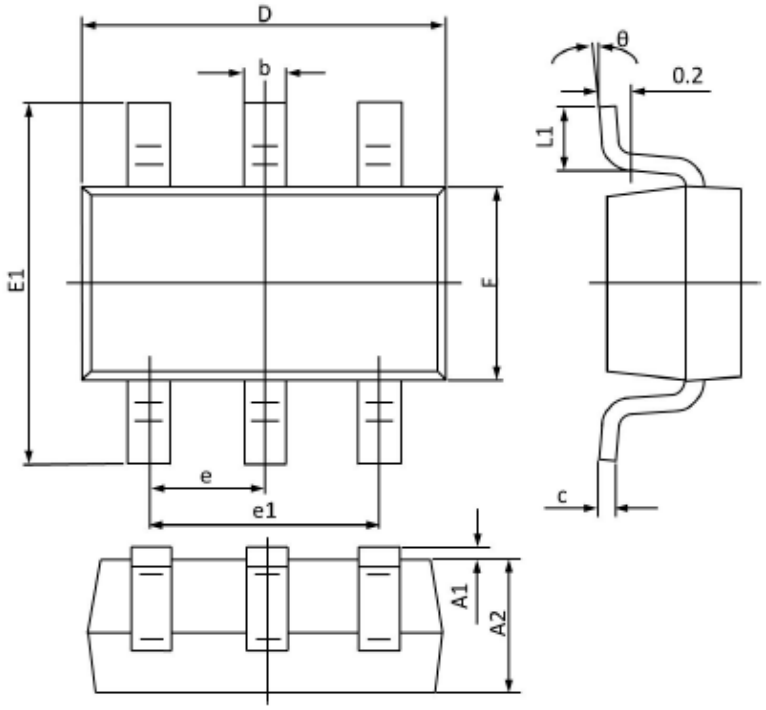
Diode Recovery Test Circuit & Waveforms





Package Dimension

SOT-23-6L



Dimensions				
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A1	0.000	0.100	0.000	0.004
A2	1.050	1.300	0.041	0.051
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.700	3.100	0.106	0.122
E	1.400	1.800	0.055	0.071
E1	2.600	3.000	0.102	0.118
e	0.950 (BSC)		0.037 (BSC)	
e1	1.900 (TYP)		0.075 (TYP)	
L1	0.300	0.600	0.012	0.024
θ	0°	10°	0°	10°

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