

GSMDL6912

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.

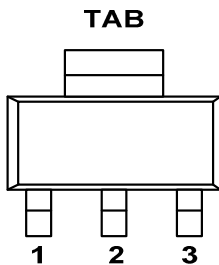
Features

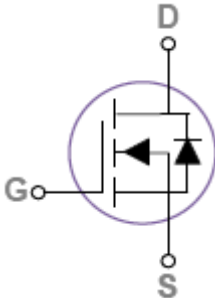
- 60V, 5A, $R_{DS(ON)}=75m\Omega@V_{GS}=10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS guaranteed
- Green Device Available
- SOT-223 package design

Applications

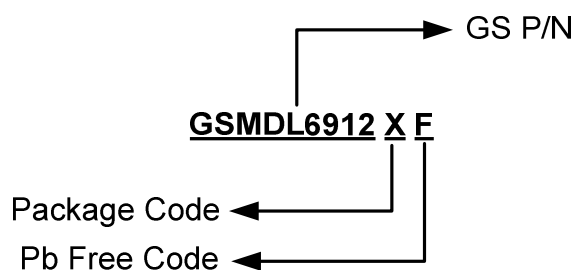
- Motor Drive
- Power Tools
- LED Lighting

Packages & Pin Assignments

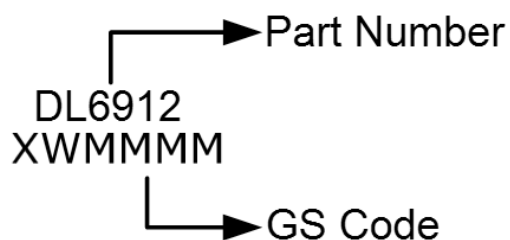
GSMDL6912XF (SOT-223)	
	
Pin	Description
1	Gate
2	Drain
3	Source



Ordering Information



Marking Information



Part Number	Package	Quantity
GSMDL6912XF	SOT-223	2500pcs

Absolute Maximum Ratings

T_C=25°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 _A =25°C	5
		T _A =70°C	4
I _{DM}	Pulsed Drain Current ¹	20	A
EAS	Single Pulse Avalanche Energy ²	8	mJ
IAS	Single Pulse Avalanche Current ²	12.8	A
P _D	Power Dissipation (T _A =25°C)	1.79	W
	Power Dissipation (Derate above 25°C)	0.014	W/°C
T _J	Operating Junction Temperature Range	-50 to +150	°C
T _{STG}	Storage Temperature Range	-50 to +150	°C
R _{θJA}	Thermal Resistance-Junction to Ambient	70	°C/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	60			V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =1mA		0.05		V/°C
V _{GS(th)}	Gate Threshold Voltage		1.2	1.8	2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient	V _{DS} =V _{GS} , I _D =250uA		-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} =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			5	A
I _{SM}	Pulsed Source Current				20	
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} =10V, I _D =5A		60	75	mΩ
		V _{GS} =4.5V, I _D =3A		70	90	
g _{FS}	Forward Transconductance	V _{DS} =10V, I _D =3A		7		S
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =1A			1	V
t _{rr}	Reverse Recovery Time ²	V _R =50V, I _S =3A, di/dt=100A/us		25		ns
Q _{rr}	Reverse Recovery Charge ²			15		nC
Dynamic						
Q _g	Total Gate Charge ^{2,3}	V _{DS} =30V, V _{GS} =10V, I _D =3A		4.6	8	nC
Q _{gs}	Gate-Source Charge ^{2,3}			0.4	3	
Q _{gd}	Gate-Drain Charge ^{2,3}			2	4	
C _{iss}	Input Capacitance	V _{DS} =30V, V _{GS} =0V, f=1MHz		360	540	pF
C _{oss}	Output Capacitance			30	45	
C _{rss}	Reverse Transfer Capacitance			20	30	
t _{d(on)}	Turn-On Time ^{2,3}	V _{DD} =30V, I _D =3A, V _{GS} =10V, R _G =6Ω		2.9	6	ns
t _r				9.5	18	
t _{d(off)}	Turn-Off Time ^{2,3}			18.4	35	
t _f				5.3	10	
R _g	Gate Resistance		V _{DS} =0V, V _{GS} =0V, f=1MHz		2	

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

2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=12.8A., R_G=25Ω, 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

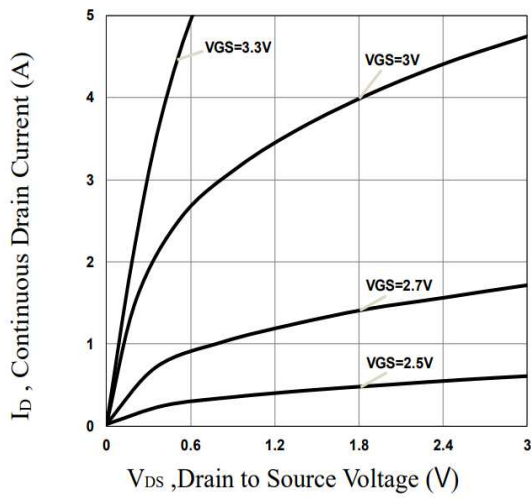


Fig.1 Typical Output Characteristics

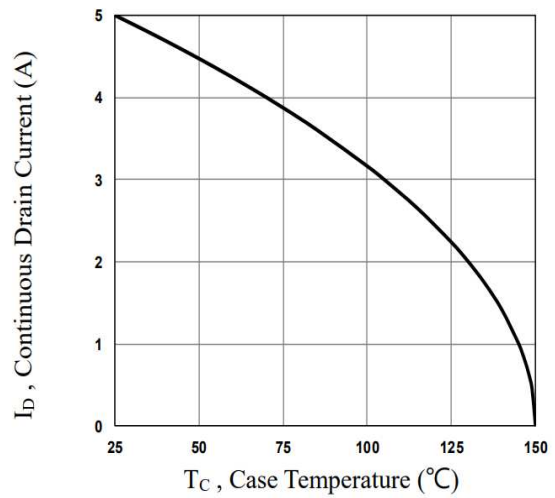


Fig.2 Continuous Drain Current vs. T_c

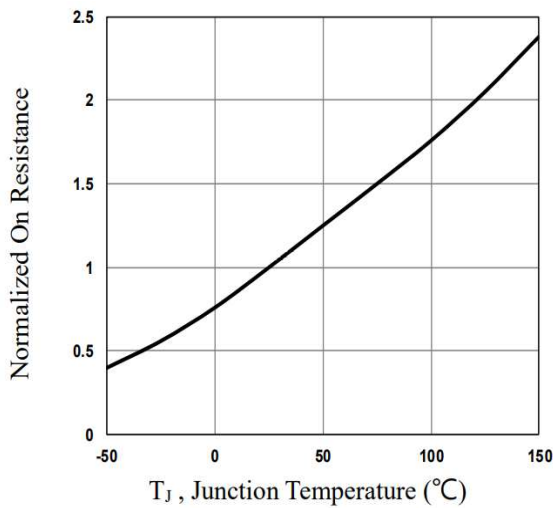


Fig.3 Normalized $R_{DS(on)}$ vs. T_j

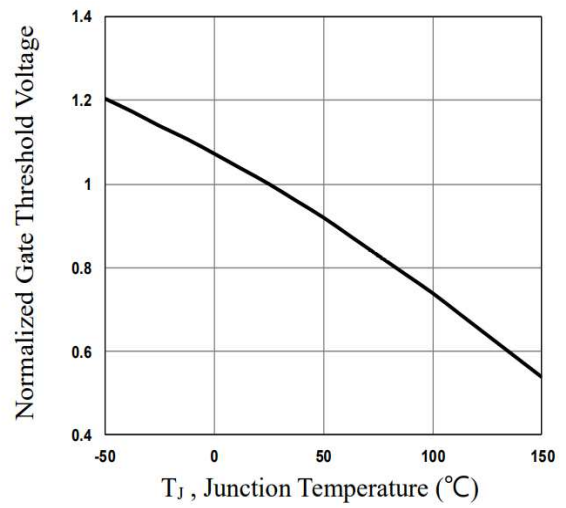


Fig.4 Normalized V_{th} vs. T_j

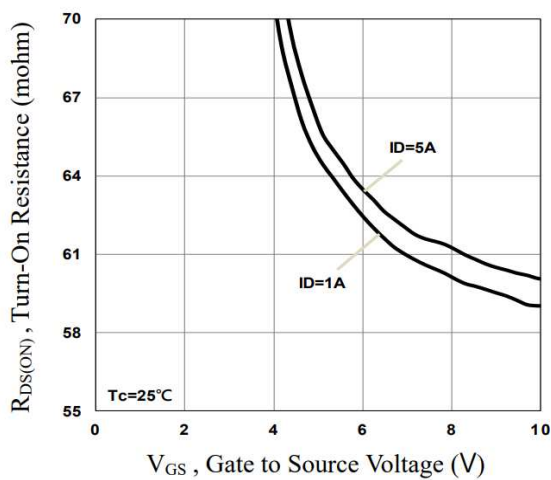


Fig.5 Turn-On Resistance vs. V_{GS}

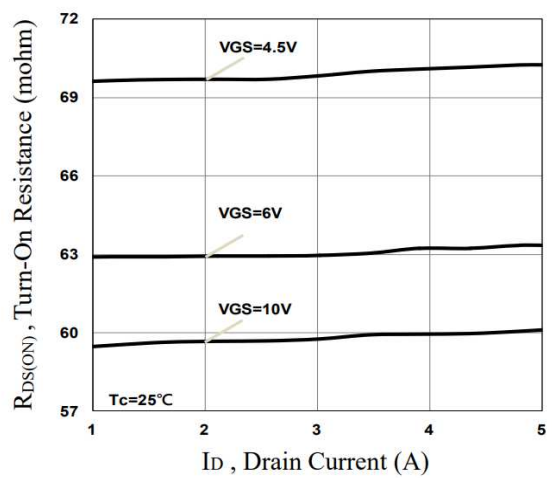


Fig.6 Turn-On Resistance vs. I_D

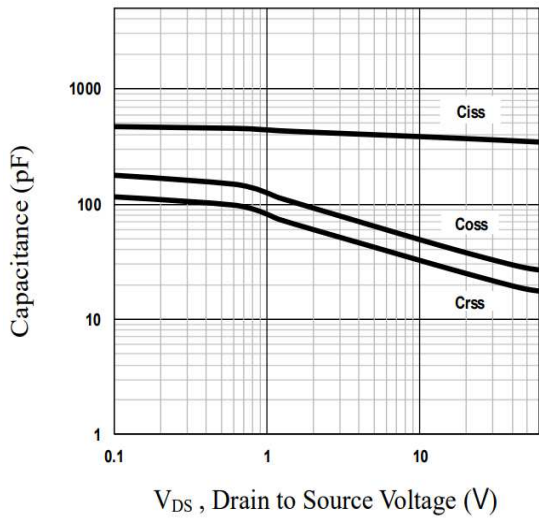


Fig.7 Capacitance Characteristics

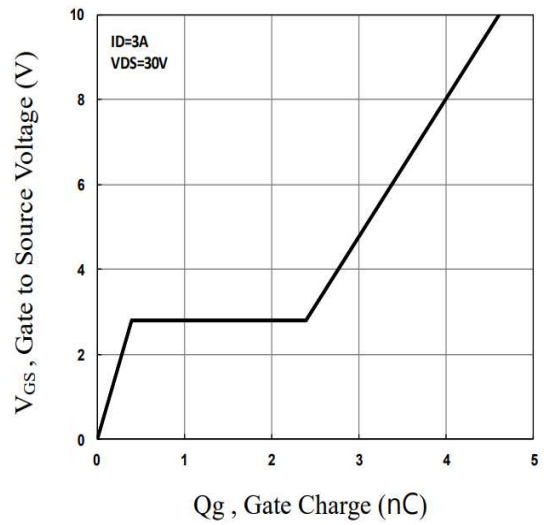


Fig.8 Gate Charge Characteristics

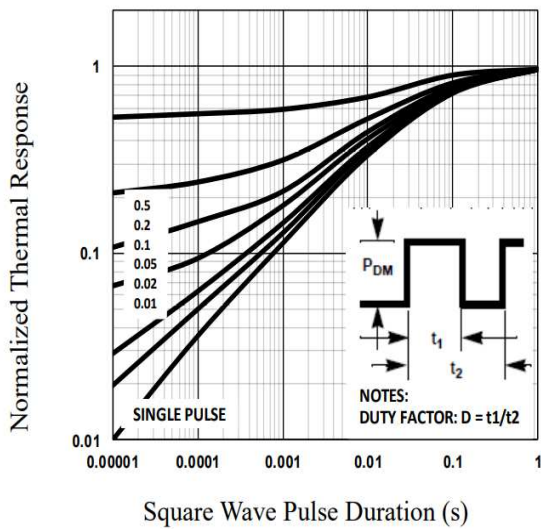


Fig.9 Normalized Transient Impedance

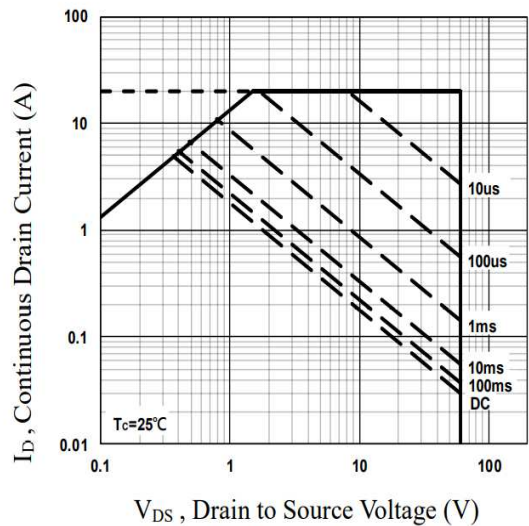
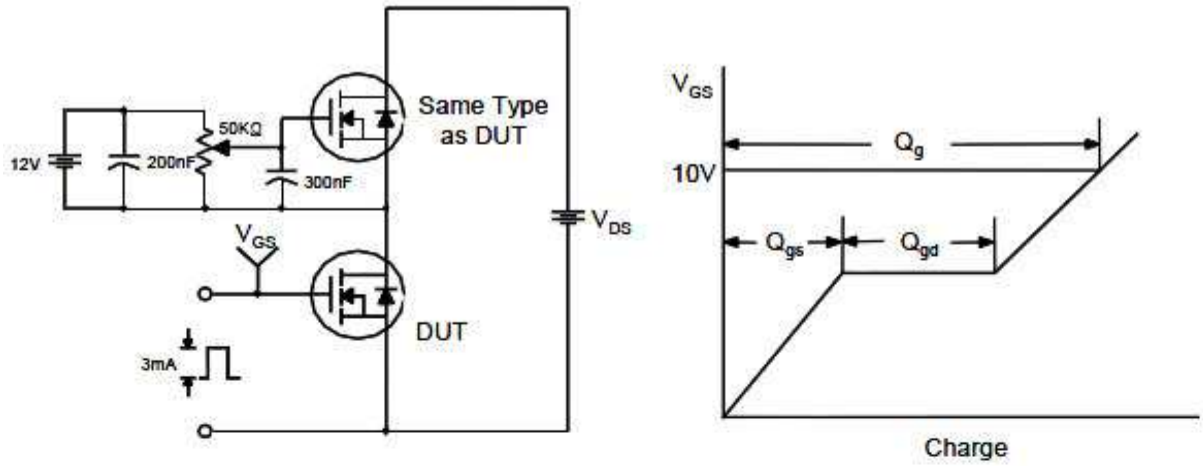


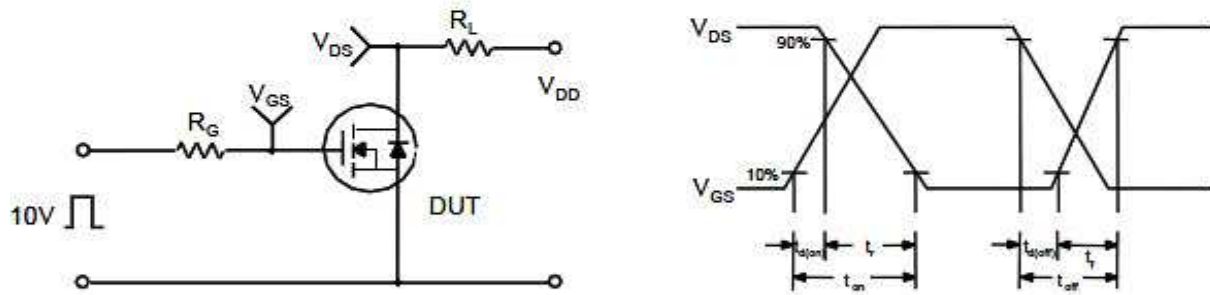
Fig.10 Maximum Safe Operation Area

Typical Performance Characteristics (Continue)

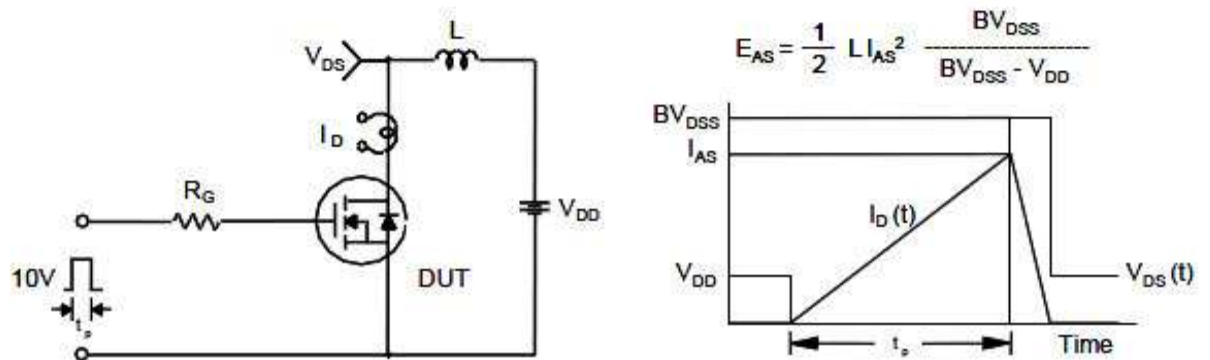
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

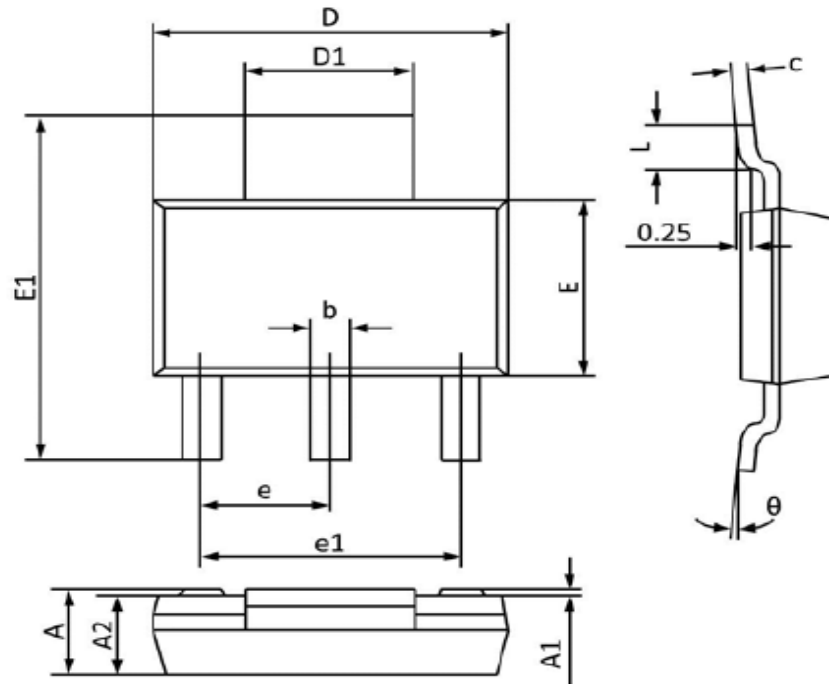


Unclamped Inductive Switching Test Circuit & Waveforms



Package Dimension

SOT-223







Dimensions



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	1.520	1.800	0.060	0.071
A1	0.000	0.100	0.000	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.820	0.026	0.032
c	0.250	0.350	0.010	0.014
D	6.200	6.400	0.244	0.252
D1	2.900	3.100	0.114	0.122
E	3.300	3.700	0.130	0.146
E1	6.830	7.070	0.269	0.278
e	2.300 (BSC)		0.091 (BSC)	
e1	4.500	4.700	0.177	0.185
L	0.900	1.150	0.035	0.045
θ	0°	10°	0°	10°

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