

GSMDC6906Z

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.

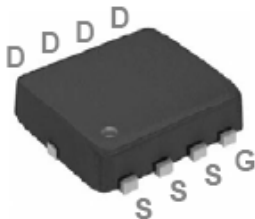
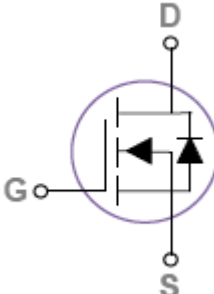
Features

- 60V, 33A, $R_{DS(ON)}=21m\Omega@V_{GS}=10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS guaranteed
- Green Device Available
- DFN3X3-8L package design

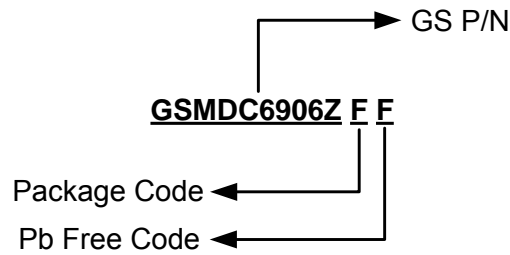
Applications

- Motor Drive
- Power Tools
- LED Lighting

Packages & Pin Assignments

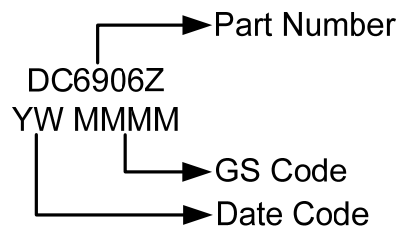
GSMDC6906ZFF (DFN3X3-8L)	
 <p>Top View</p>	
	
Pin	Description
1	Source
2	Source
3	Source
4	Gate
5	Drain
6	Drain
7	Drain
8	Drain

Ordering Information



Part Number	Package	Quantity
GSMDC6906ZFF	DFN3X3-8L	3000 PCS

Marking Information



Absolute Maximum Ratings

$T_C=25^{\circ}\text{C}$ 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	$T_C=25^{\circ}\text{C}$	33
		$T_C=100^{\circ}\text{C}$	20
I_{DM}	Pulsed Drain Current (Note 1)	132	A
EAS	Single Pulse Avalanche Energy (Note 2)	42	mJ
IAS	Single Pulse Avalanche Current (Note 2)	29	A
P_D	Power Dissipation ($T_C=25^{\circ}\text{C}$)	44.6	W
	Power Dissipation (Derate above 25°C)	0.36	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	2.8	$^{\circ}\text{C}/\text{W}$

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

Note 2: $V_{DD}=25\text{V}$, $V_{GS}=10\text{V}$, $L=0.1\text{mH}$, $I_{AS}=29\text{A}$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$.

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		0.07		V/°C
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	1.2	1.8	2.2	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} =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			33	A
I _{SM}	Pulsed Source Current				66	
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} =10V, I _D =15A		17	21	mΩ
		V _{GS} =4.5V, I _D =8A		20	24	
g _{FS}	Forward Transconductance	V _{DS} =10V, I _D =10A		9		S
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =1A			1	V
t _{rr}	Reverse Recovery Time (Note 3,4)	V _{GS} =0V, I _S =1A, di/dt=100A/us		19.6		ns
Q _{rr}	Reverse Recovery Charge (Note 3,4)			14.2		nC
Dynamic						
Q _g	Total Gate Charge (Note 3,4)	V _{DS} =30V, V _{GS} =10V, I _D =15A		28	42	nC
Q _{gs}	Gate-Source Charge (Note 3,4)			3.5	7	
Q _{gd}	Gate-Drain Charge (Note 3,4)			6.5	10	
C _{iss}	Input Capacitance	V _{DS} =20V, V _{GS} =0V, f=1MHz		1680	2440	pF
C _{oss}	Output Capacitance			115	170	
C _{rss}	Reverse Transfer Capacitance			85	125	
t _{d(on)}	Turn-On Time (Note 3,4)	V _{DD} =30V, I _D =1A, V _{GS} =10V, R _G =6Ω		7.2	14	ns
t _r				38	72	
t _{d(off)}	Turn-Off Time (Note 3,4)			34	65	
t _f				8.2	16	
R _g	Gate Resistance		V _{DS} =0V, V _{GS} =0V, f=1MHz		2.2	

Note 3: The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.

Note 4: Essentially independent of operating temperature.

Typical Performance Characteristics

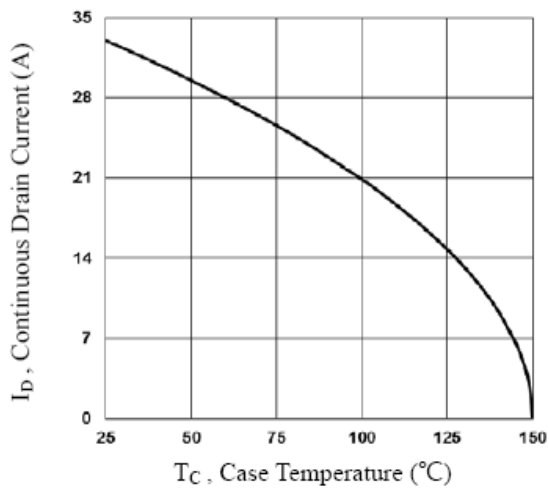


Fig.1 Continuous Drain Current vs. T_c

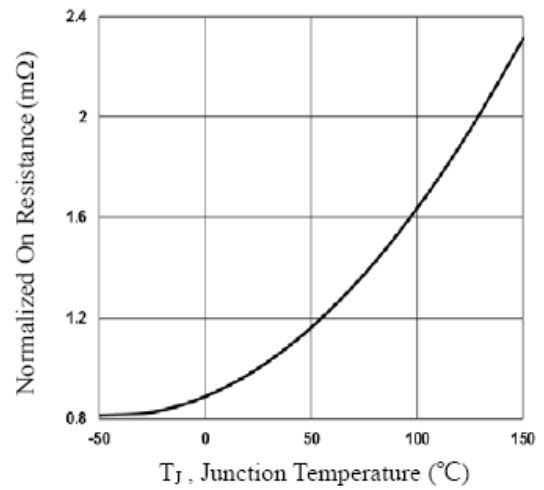


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

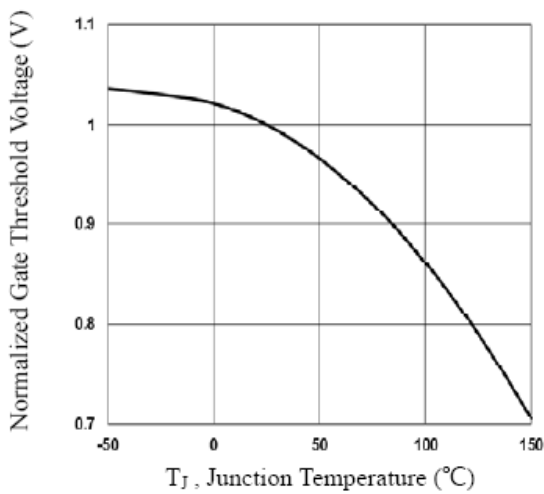


Fig.3 Normalized V_{th} vs. T_j

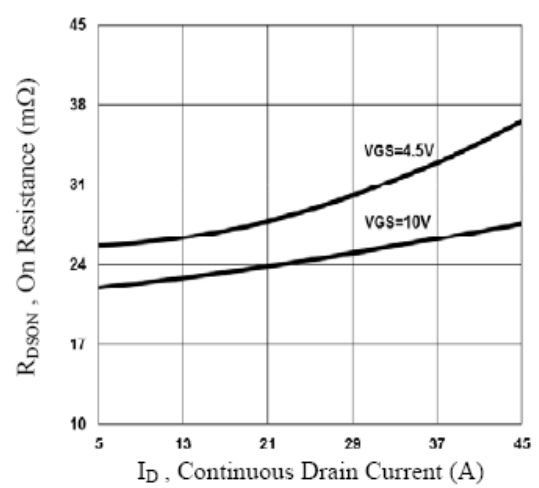


Fig.4 $R_{DS(on)}$ vs. Continuous Drain Current

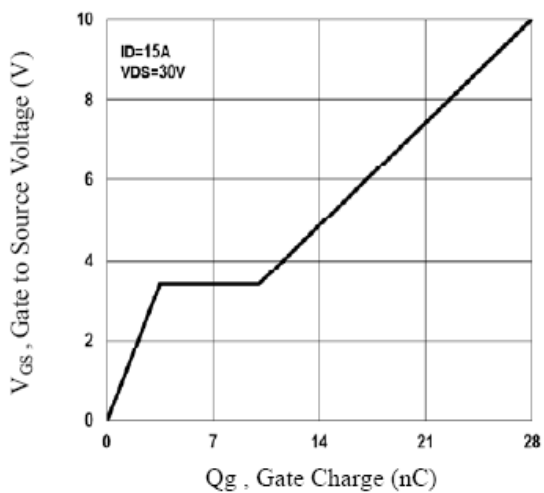


Fig.5 Gate Charge Waveform

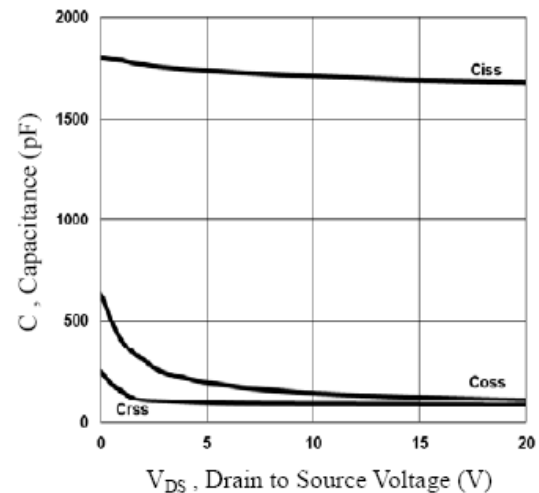


Fig.6 Capacitance Characteristics

Typical Performance Characteristics (Continue)

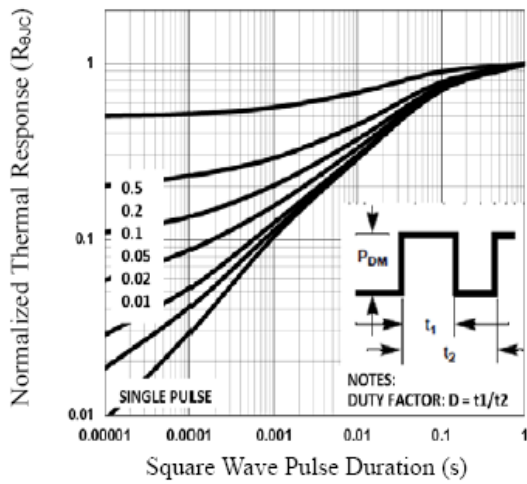


Fig.7 Normalized Transient Impedance

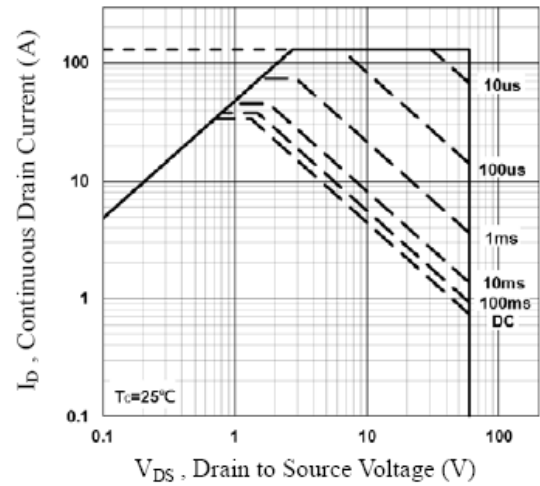
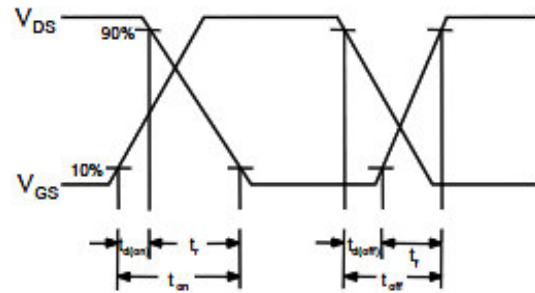
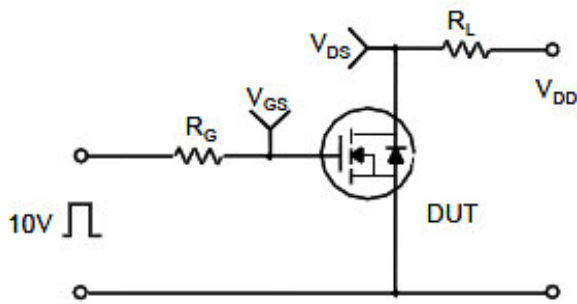
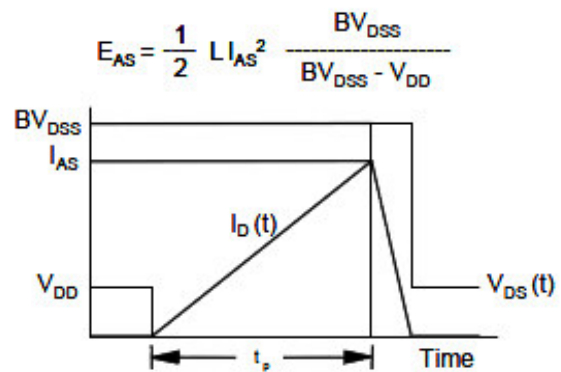
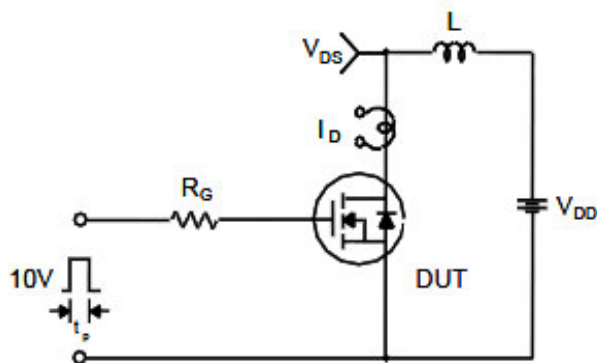


Fig.8 Maximum Safe Operation Area

Resistive Switching Test Circuit & Waveforms

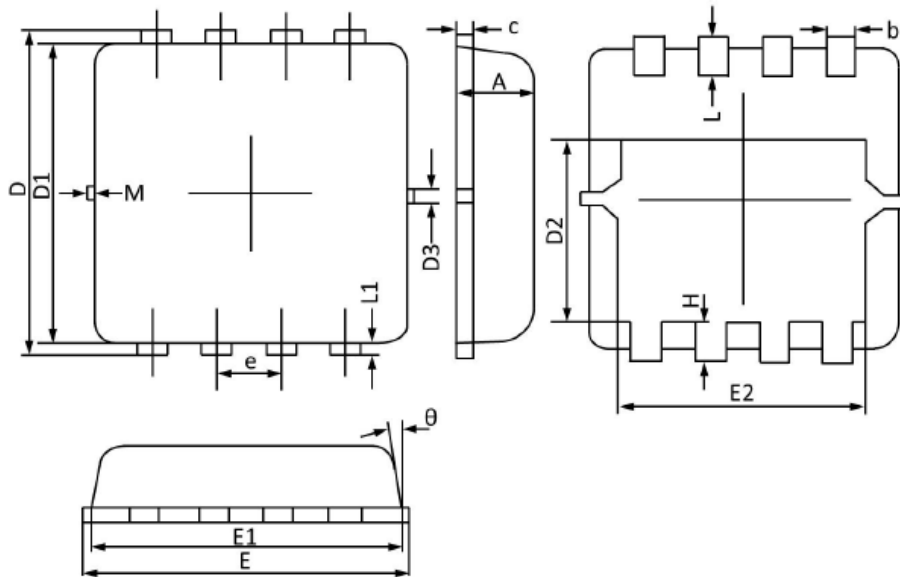


Unclamped Inductive Switching Test Circuit & Waveforms



Package Dimension

DFN3X3-8L







Dimensions




Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.700	0.800	0.028	0.031
b	0.250	0.350	0.010	0.013
c	0.100	0.250	0.004	0.009
D	3.250	3.450	0.128	0.135
D1	3.000	3.200	0.119	0.125
D2	1.780	1.980	0.070	0.077
D3	0.130 (REF)		0.005 (REF)	
E	3.200	3.400	0.126	0.133
E1	3.000	3.200	0.119	0.125
E2	2.390	2.590	0.094	0.102
e	0.650 (BSC)		0.026 (BSC)	
H	0.300	0.500	0.011	0.019
L	0.300	0.500	0.011	0.019
L1	0.130 (REF)		0.005 (REF)	
θ	0°	12°	0°	12°
M	0.150 (REF)		0.006 (REF)	



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CONTACT US

GS Headquarter	
	4F.,No.43-1,Lane11,Sec.6,Minquan E.Rd Neihu District Taipei City 114, Taiwan (R.O.C)
	886-2-2657-9980
	886-2-2657-3630
	sales_twn@gs-power.com

Shenzhen Branch(China)	
	1113 B Building, Happiness Washington, Baoan Nan Road, Luohu District, Shenzhen City, China
	0755-22208941
	sales_cn@gs-power.com

RD Division	
	824 Bolton Drive Milpitas. CA. 95035
	1-408-457-0587