

GSM6904Z

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

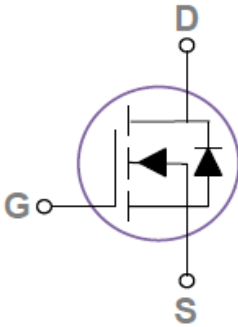
- 60V, 42A, $R_{DS(ON)}=12m\Omega@V_{GS}=10V$
- Improved dv/dt capability
- Fast switching
- Green Device Available
- 100% EAS Guaranteed

Applications

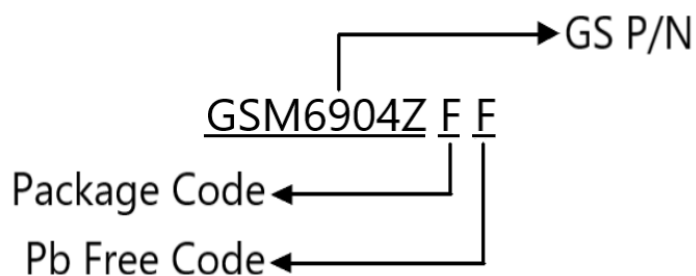
- Motor Drive
- LED Lighting
- Power Tools

Packages & Pin Assignments

GSM6904ZFF (DFN3X3-8L)		
 <p>Top View</p>		
Pin No	Symbol	Description
1,2,3	S	Source
4	G	Gate
5,6,7,8	D	Drain

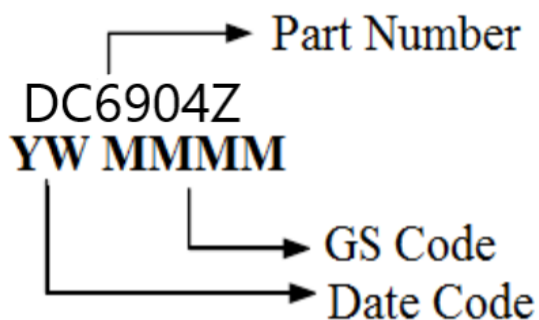


Ordering Information



Part Number	Package	Quantity
GSM6904ZFF	DFN3x3-8L	5000pcs

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	$T_C=25^{\circ}\text{C}$	42
		$T_C=100^{\circ}\text{C}$	26
I_{DM}	Pulsed Drain Current ¹	168	A
EAS	Single Pulse Avalanche Energy ²	61	mJ
IAS	Single Pulse Avalanche Current ²	35	A
P_D	Power Dissipation ($T_C=25^{\circ}\text{C}$)	52	W
	Power Dissipation (Derate above 25°C)	0.42	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	62	$^{\circ}\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance-Junction to Case	2.4	$^{\circ}\text{C}/\text{W}$

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	60			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	V _{DS} =V _{GS} , I _D =250uA	1.2	1.6	2.2	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient			-4		mV/°C
I _{GSS}	Gate-Source Leakage Current	V _{DS} =0V, V _{GS} =±20V			±100	nA
I _{DSS}	Drain-Source Leakage Current	V _{DS} =60V, V _{GS} =0V T _J =25°C			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			42	A
I _{SM}	Pulsed Source Current				84	
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} =10V, I _D =10A		10	12	mΩ
		V _{GS} =4.5V, I _D =8A,		12	15	
g _{FS}	Forward Transconductance	V _{DS} =10V, I _D =6A		11.7		S
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =1A			1	V
Dynamic						
Q _g	Total Gate Charge ^{3,4}	V _{DS} =30V, V _{GS} =10V, I _D =10A		39.2	59	nC
Q _{gs}	Gate-Source Charge ^{3,4}			5.9	9	
Q _{gd}	Gate-Drain Charge ^{3,4}			8.8	14	
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz		2100	3050	pF
C _{oss}	Output Capacitance			165	240	
C _{rss}	Reverse Transfer Capacitance			80	120	
t _{d(on)}	Turn-On Time ^{3,4}	V _{DD} =15V, I _D =1A, V _{GS} =10V, R _G =6Ω		9.6	18	ns
t _r	Rise Time ^{3,4}			28.2	54	
t _{d(off)}	Turn-Off Time ^{3,4}			45.3	86	
t _f	Fall Time ^{3,4}			10.9	21	
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz		1.6	3.2	Ω

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=35A., R_G=25 Ω, 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

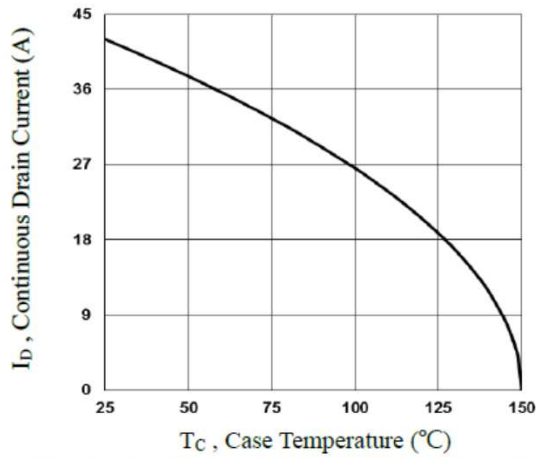


Fig.1 Continuous Drain Current vs. T_c

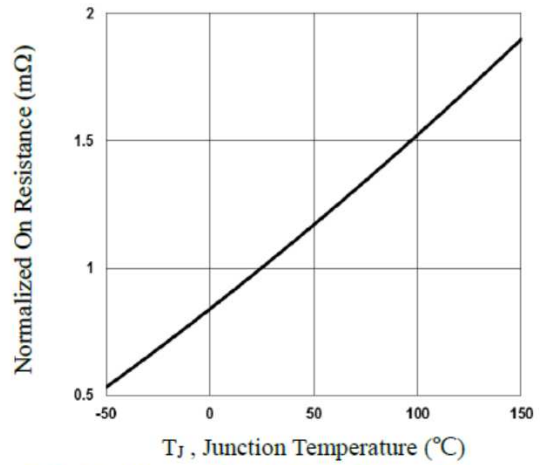


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

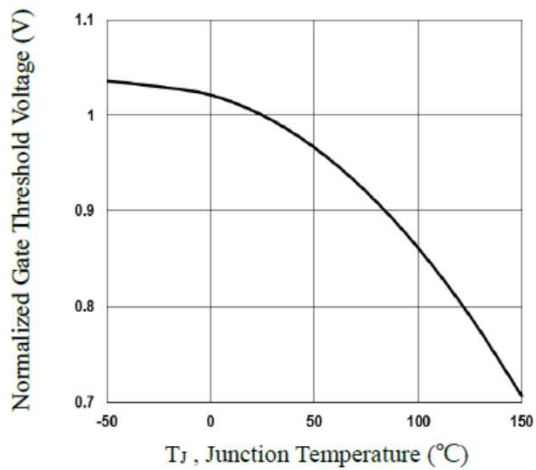


Fig.3 Normalized V_{th} vs. T_j

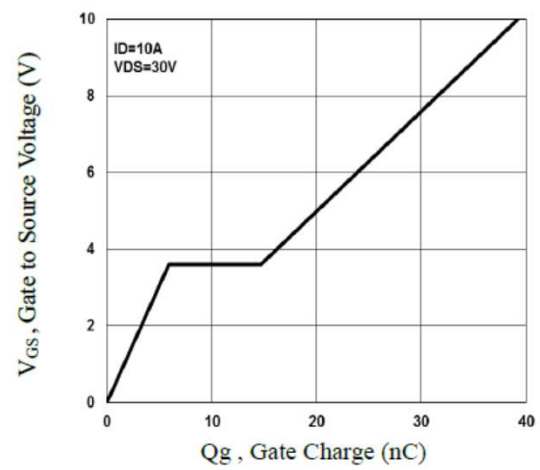


Fig.4 Gate Charge Waveform

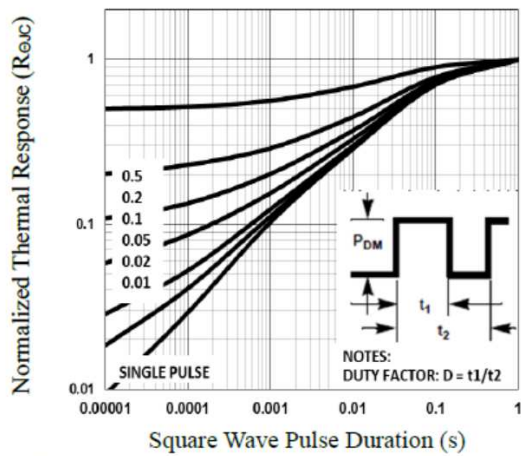


Fig.5 Normalized Transient Response

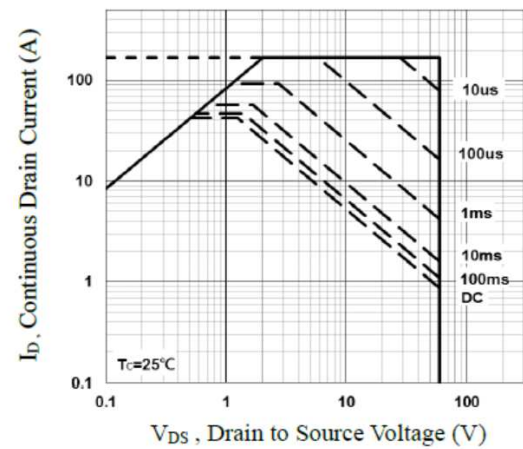


Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics (Continue)

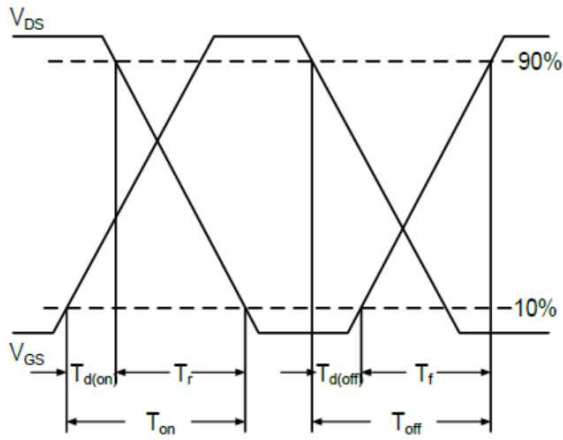


Fig.7 Switching Time Waveform

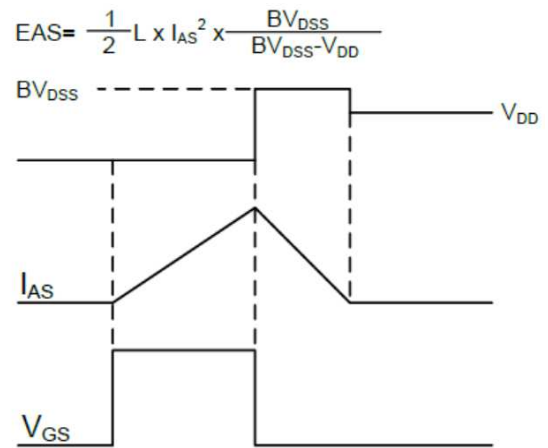
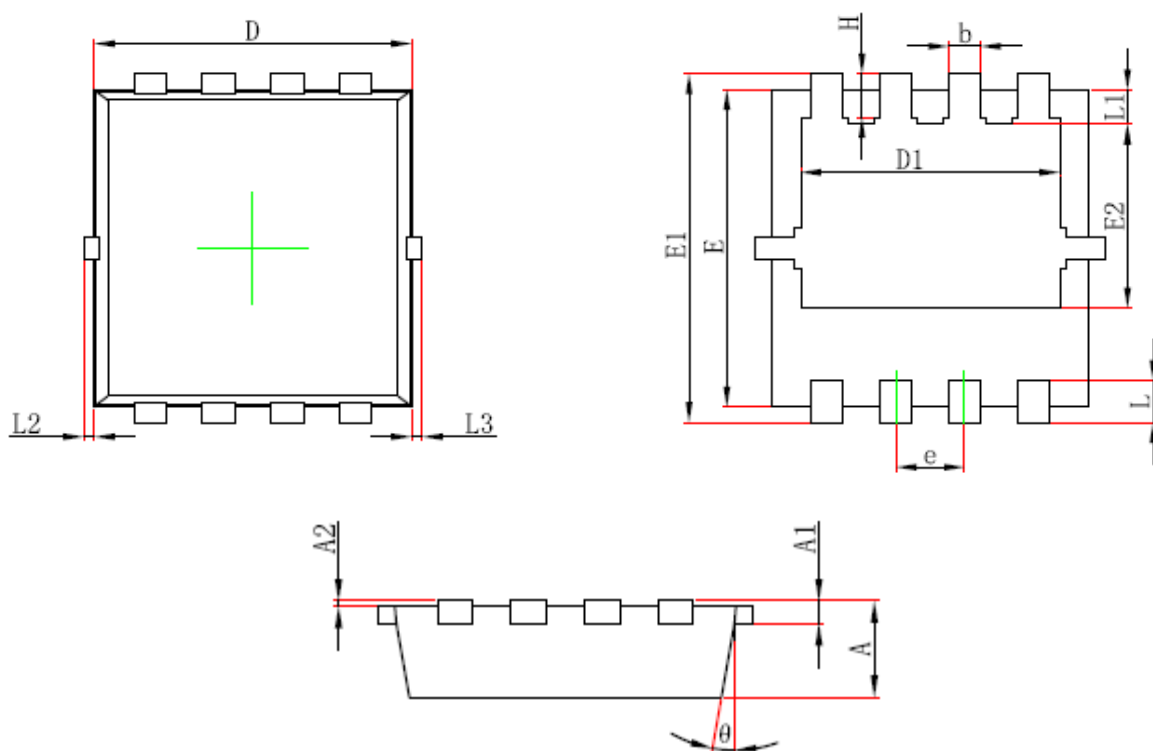


Fig.8 EAS Waveform

Package Dimension

DFN3X3-8L







Dimensions



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.650	0.850	0.026	0.033
A1	0.152 REF.		0.006 REF.	
A2	0~0.05		0~0.002	
D	2.900	3.100	0.114	0.122
D1	2.300	2.600	0.091	0.102
E	2.900	3.100	0.114	0.122
E1	3.150	3.450	0.124	0.136
E2	1.535	1.935	0.060	0.076
b	0.200	0.400	0.008	0.016
e	0.550	0.750	0.022	0.030
L	0.300	0.500	0.012	0.020
L1	0.180	0.480	0.007	0.019
L2	0~0.100		0~0.004	
L3	0~0.100		0~0.004	
H	0.315	0.515	0.012	0.020
θ	9°	13	9°	13°

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