

GSMDC3904Z

30V 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.

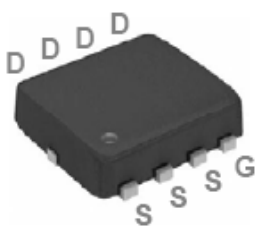
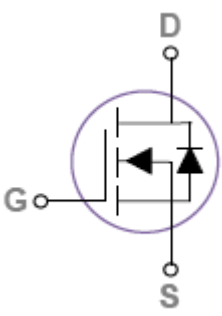
Features

- 30V, 80A, $R_{DS(ON)}=3.8m\Omega@V_{GS}=10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS guaranteed
- Green Device Available
- DFN3X3-8L package design

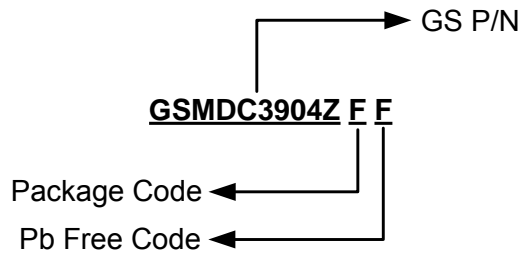
Applications

- MB / VGA / Vcore
- POL Applications
- SMPS 2nd SR

Packages & Pin Assignments

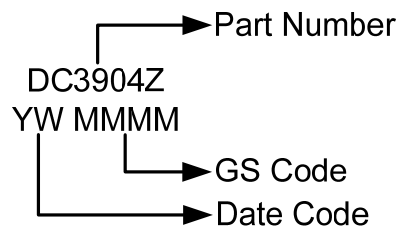
GSMDC3904ZFF (DFN3X3-8L)	
 <p>Top View</p>	
	
Pin	Description
1	Source
2	Source
3	Source
4	Gate
5	Drain
6	Drain
7	Drain
8	Drain

Ordering Information



Part Number	Package
GSMDC3904ZFF	DFN3X3-8L

Marking Information



Absolute Maximum Ratings

T_A=25°C 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°C	80
		T _A =100°C	51
I _{DM}	Pulsed Drain Current	320	A
EAS	Single Pulse Avalanche Energy	125	mJ
IAS	Single Pulse Avalanche Current	50	A
P _D	Power Dissipation (T _A =25°C)	66	W
	Power Dissipation (Derate above 25°C)	0.53	W/°C
T _J	Operating Junction Temperature Range	-55 to +175	°C
T _{STG}	Storage Temperature Range	-55 to +175	°C
R _{θJA}	Thermal Resistance-Junction to Ambient	62	°C/W
R _{θJC}	Thermal Resistance-Junction to Case	2	°C/W

Electrical Characteristics

T_A=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	30			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	2.5	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} =30V, V _{GS} =0V			1	uA
		V _{DS} =24V, V _{GS} =0V, T _J =125°C			10	
I _S	Continuous Source Current	V _G =V _D =0V, Force Current			80	A
I _{SM}	Pulsed Source Current				320	
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} =10V, I _D =24A		2.9	3.8	mΩ
		V _{GS} =4.5V, I _D =12A		4.3	5.5	
g _{FS}	Forward Transconductance	V _{DS} =10V, I _D =10A		28		S
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =1A			1	V
EAS	Single Pulse Avalanche Energy	V _{DD} =25V, L=0.1mH, IAS=24A	31			mJ
Dynamic						
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =4.5V, I _D =24A		24	34	nC
Q _{gs}	Gate-Source Charge			4.2	6	
Q _{gd}	Gate-Drain Charge			13	18	
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz		2200	3190	pF
C _{oss}	Output Capacitance			280	405	
C _{rss}	Reverse Transfer Capacitance			177	255	
t _{d(on)}	Turn-On Time	V _{DD} =15V, I _D =15A, V _{GS} =10V, R _G =3.3Ω		12.6	24	ns
t _r				19.5	37	
t _{d(off)}	Turn-Off Time			42.8	81	
t _f				13.2	25	
R _g	Gate Resistance		V _{GS} =0V, V _{DS} =0V, f=1MHz		2	

Typical Performance Characteristics

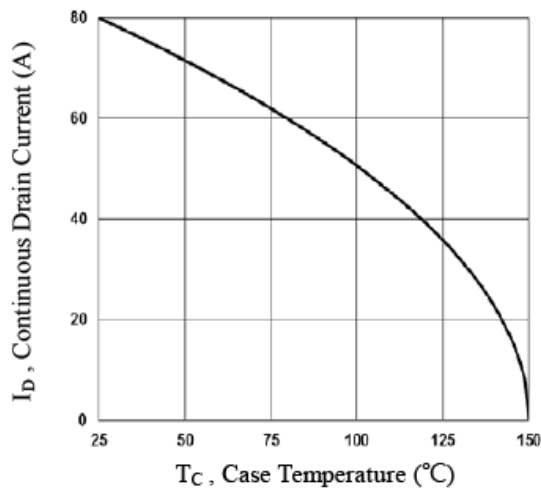


Fig.1 Continuous Drain Current vs. T_C

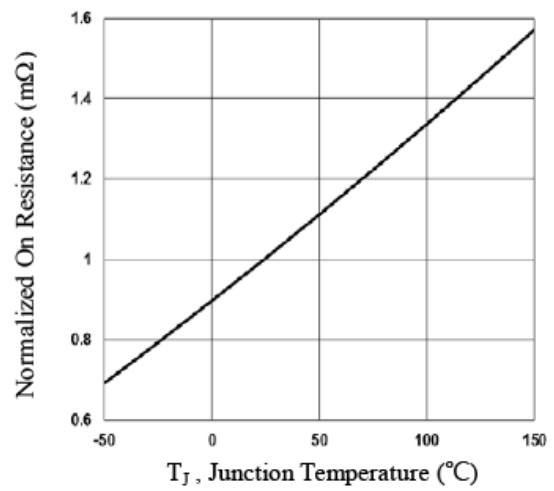


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

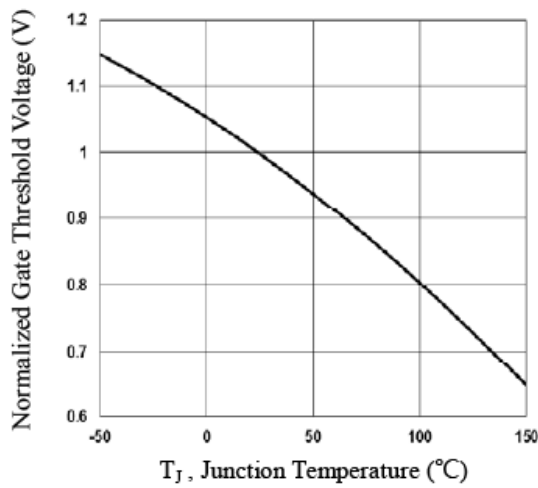


Fig.3 Normalized V_{th} vs. T_J

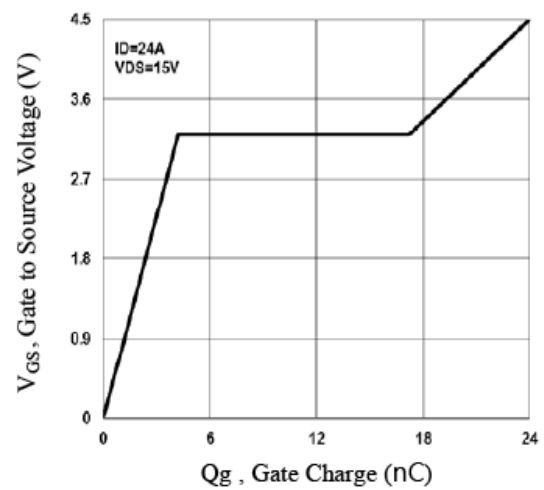


Fig.4 Gate Charge Waveform

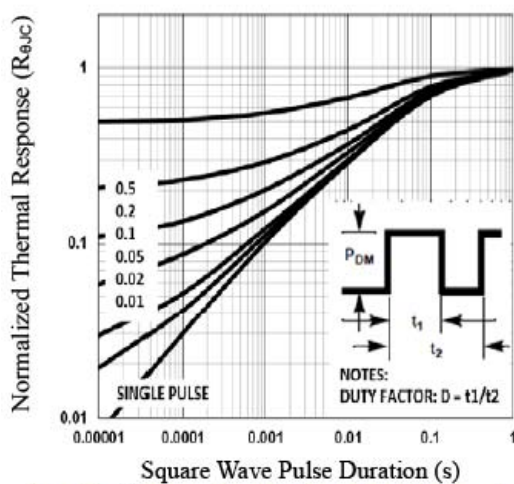


Fig.5 Normalized Transient Impedance

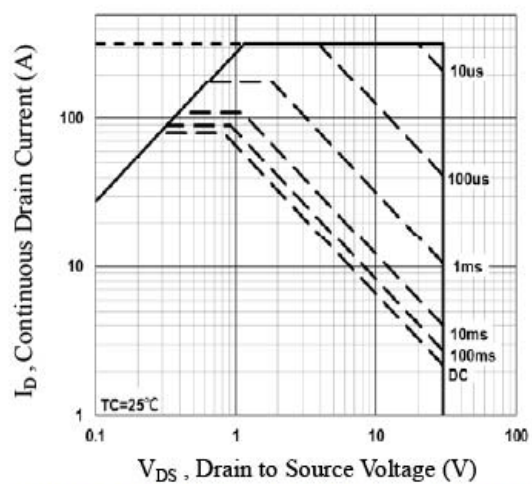
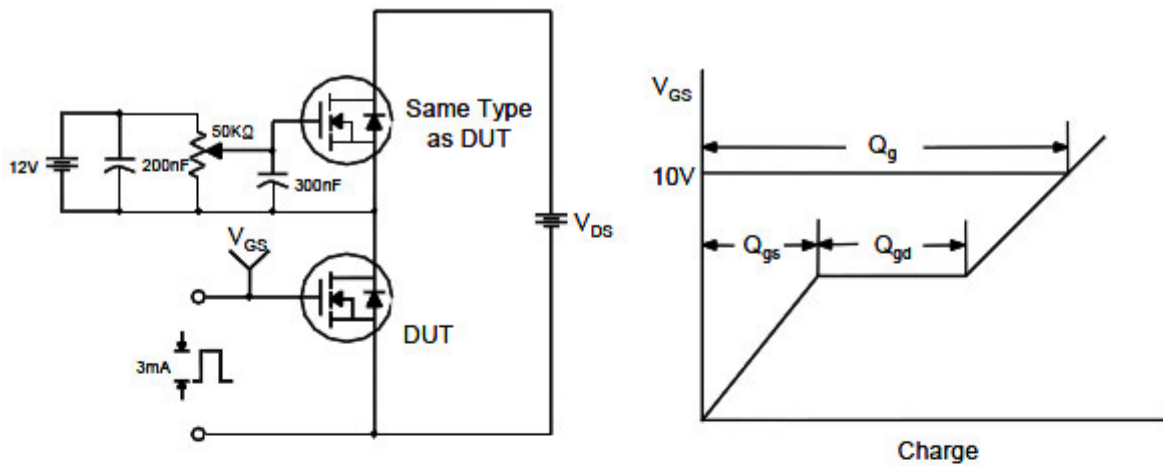


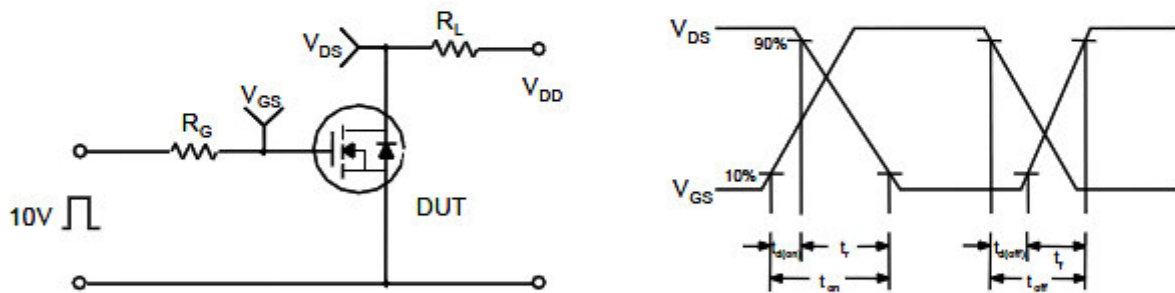
Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics (Continue)

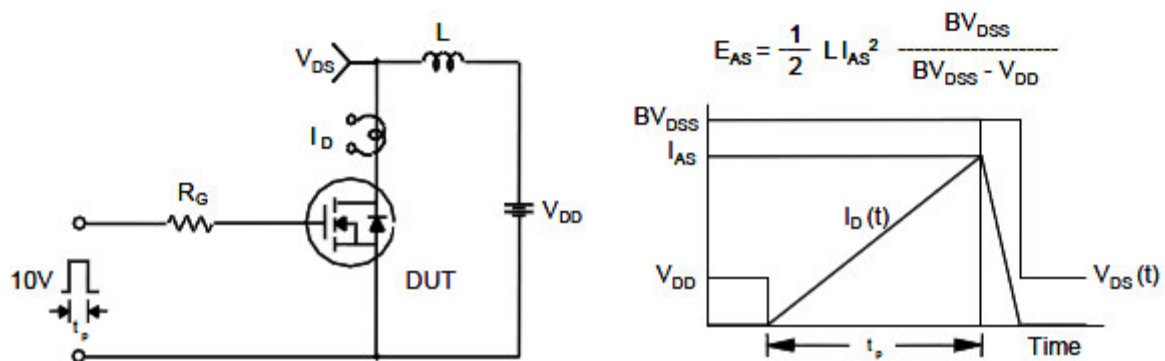
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

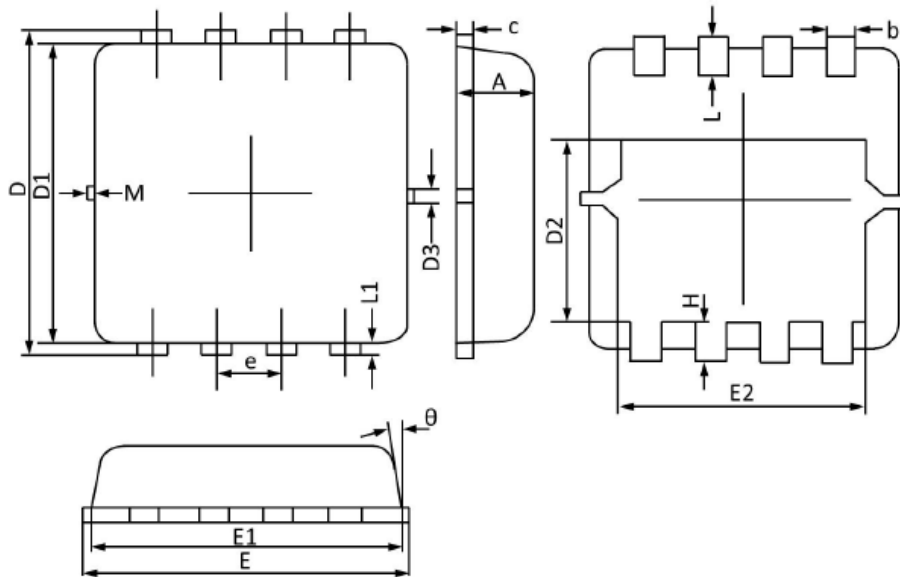


Unclamped Inductive Switching Test Circuit & Waveforms



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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