

GSMDC3908X

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.

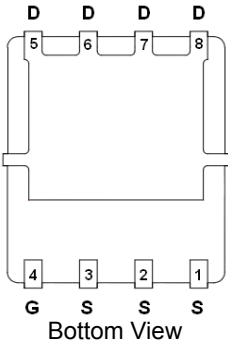
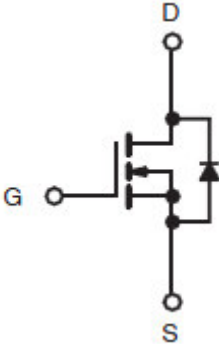
Features

- 30V, 60A, $R_{DS(ON)}=8.5m\Omega@V_{GS}=10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS guaranteed
- Green Device Available
- DFN5X6-8L package design

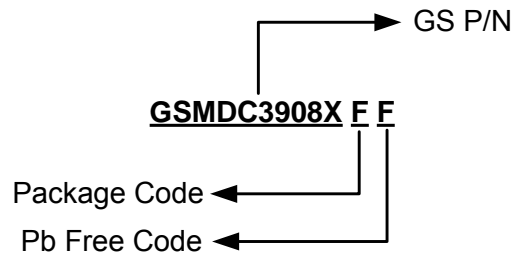
Applications

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

Packages & Pin Assignments

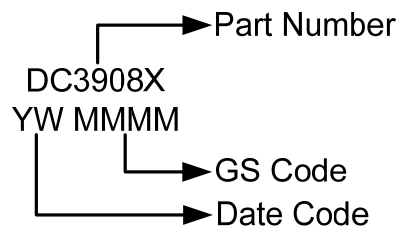
GSMDC3908XFF (DFN5X6-8L)	
 <p>Bottom View</p>	
	
Pin	Description
1	Source
2	Source
3	Source
4	Gate
5	Drain
6	Drain
7	Drain
8	Drain

Ordering Information



Part Number	Package
GSMDC3908XFF	DFN5X6-8L

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	60
		T _A =100°C	38
I _{DM}	Pulsed Drain Current	240	A
EAS	Single Pulse Avalanche Energy	45	mJ
IAS	Single Pulse Avalanche Current	30	A
P _D	Power Dissipation (T _A =25°C)	54	W
	Power Dissipation (Derate above 25°C)	0.43	W/°C
T _J	Operating Junction Temperature Range	-55 to +150	°C
T _{STG}	Storage Temperature Range	-55 to +150	°C
R _{θJA}	Thermal Resistance-Junction to Ambient	62	°C/W
R _{θJC}	Thermal Resistance-Junction to Case	2.3	°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 =250μA	30			V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =1mA		0.04		V/°C
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.2	1.6	2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient			-4		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	μA
		V _{DS} =24V, V _{GS} =0V, T _J =125°C			10	
I _S	Continuous Source Current	V _G =V _D =0V, Force Current			60	A
I _{SM}	Pulsed Source Current				240	
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} =10V, I _D =16A		6.2	8.5	mΩ
		V _{GS} =4.5V, I _D =8A		8.9	13	
g _{FS}	Forward Transconductance	V _{DS} =10V, I _D =8A		9.5		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=15A	12			mJ
Dynamic						
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =4.5V, I _D =20A		7.5	12	nC
Q _{gs}	Gate-Source Charge			1.3	2.6	
Q _{gd}	Gate-Drain Charge			4.5	8	
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz		680	1000	pF
C _{oss}	Output Capacitance			150	220	
C _{rss}	Reverse Transfer Capacitance			70	105	
t _{d(on)}	Turn-On Time	V _{DD} =15V, I _D =15A, V _{GS} =10V, R _G =3.3Ω		4.8	9	ns
t _r				12.5	24	
t _{d(off)}	Turn-Off Time			27.6	52	
t _f				8.2	16	
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz		2.7	5.4	Ω

Typical Performance Characteristics

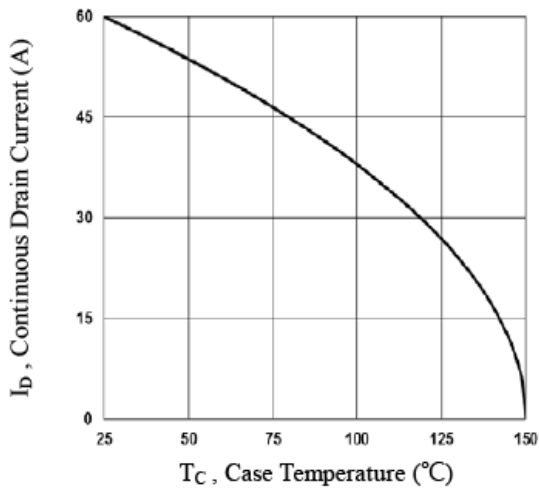


Fig.1 Continuous Drain Current vs. T_c

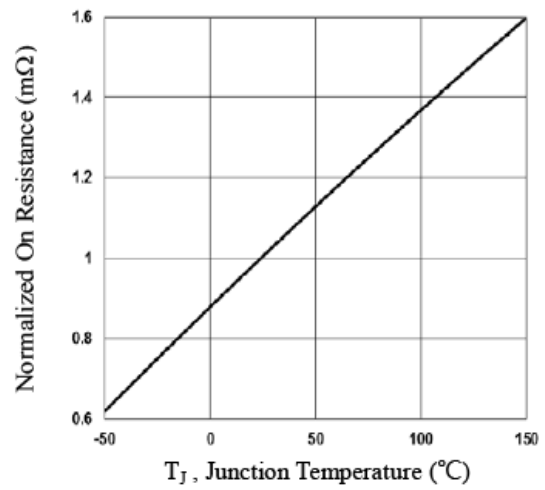


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

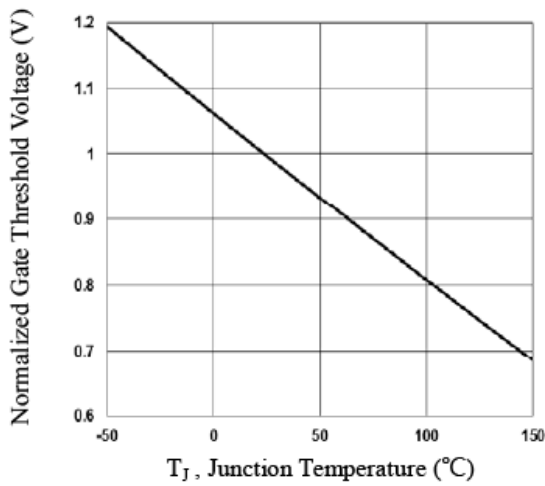


Fig.3 Normalized V_{th} vs. T_j

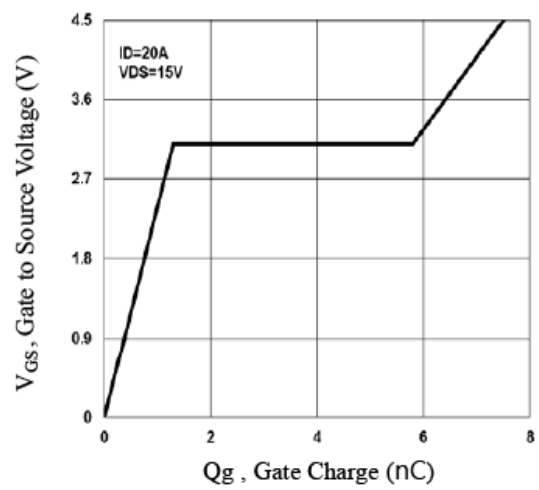


Fig.4 Gate Charge Waveform

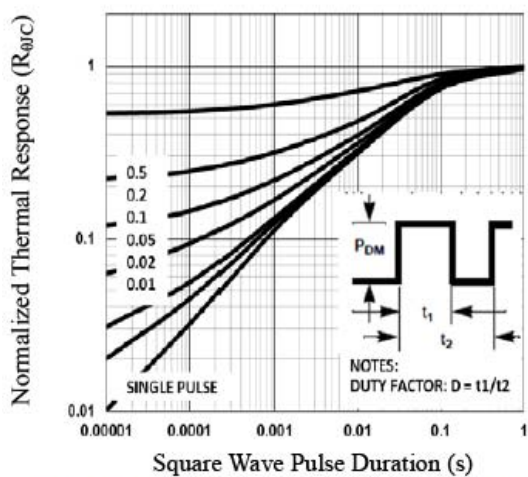


Fig.5 Normalized Transient Impedance

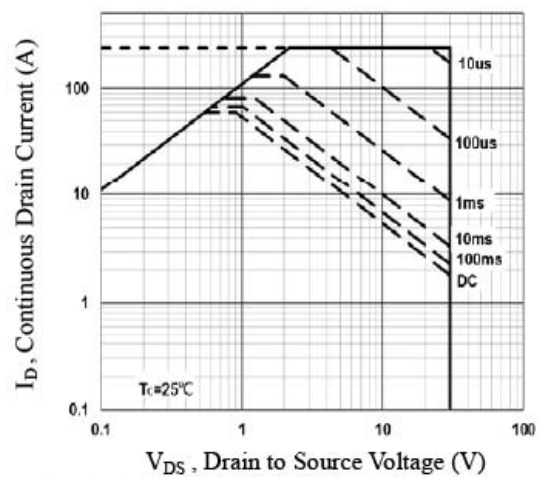
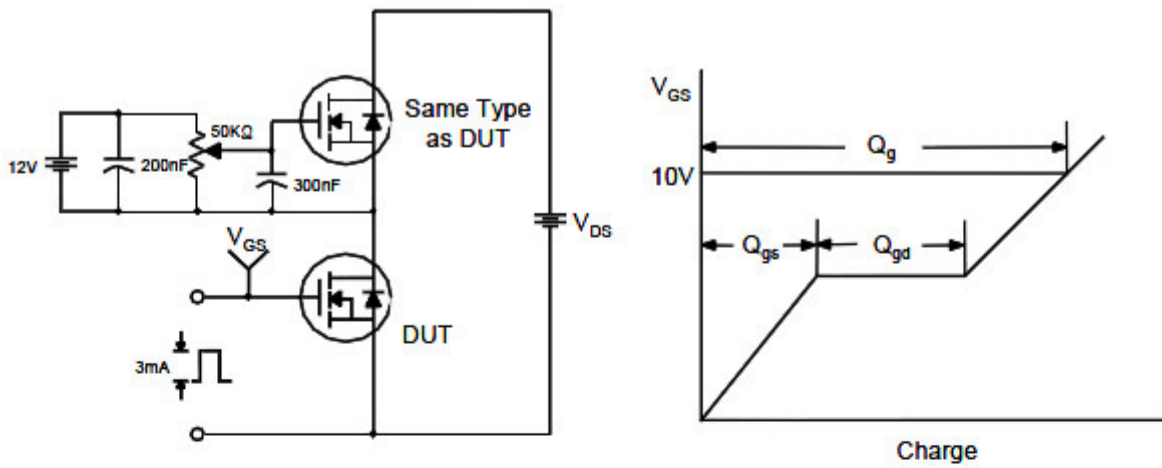


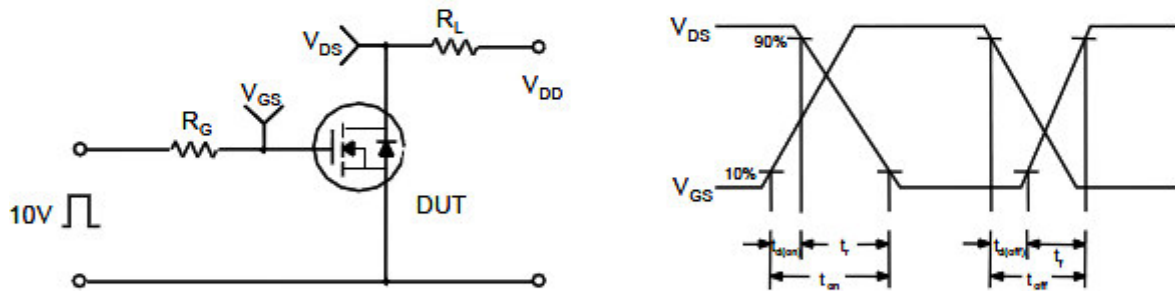
Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics (Continue)

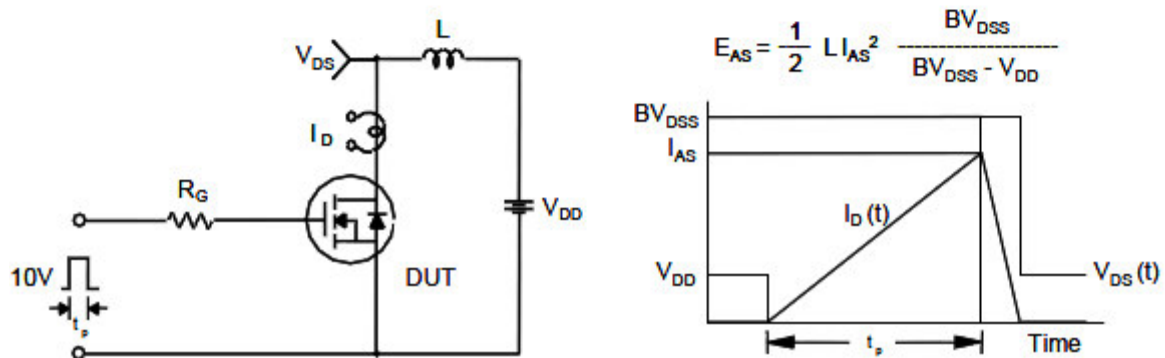
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

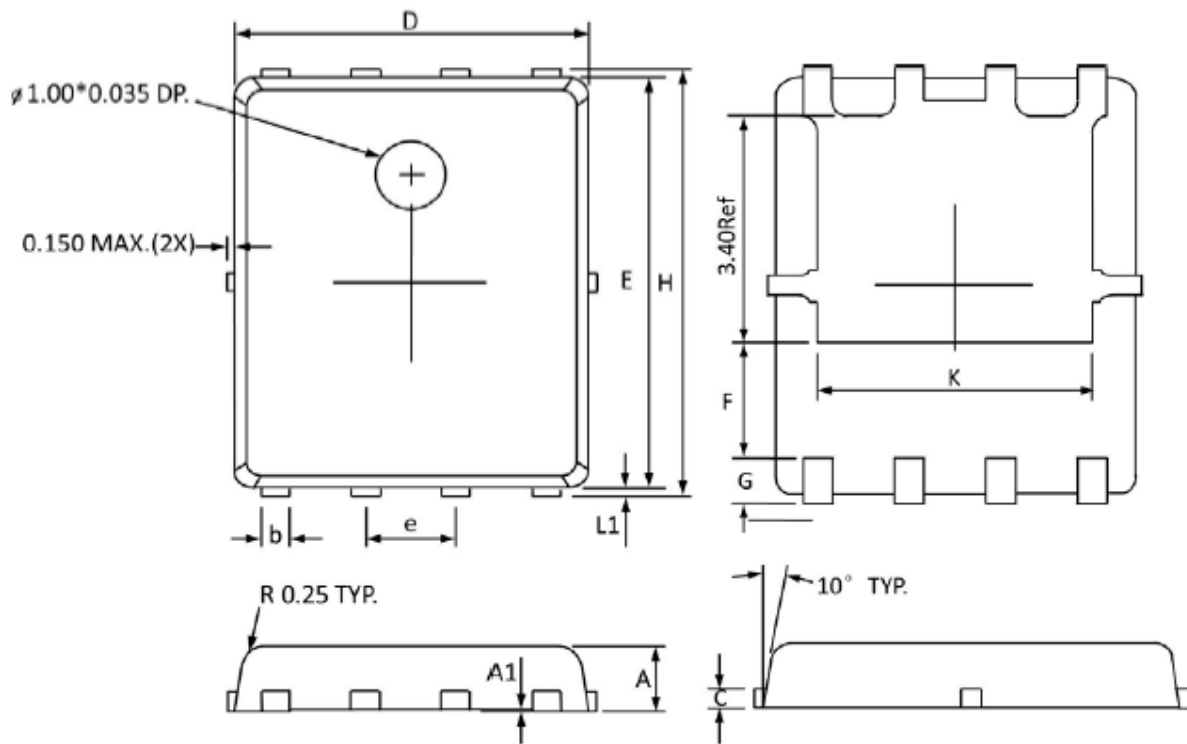


Unclamped Inductive Switching Test Circuit & Waveforms



Package Dimension

DFN5X6-8L



Dimensions				
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.800	1.000	0.032	0.039
A1	0.000	0.005	0.000	0.000
b	0.350	0.490	0.014	0.019
C	0.254 (REF)		0.010 (REF)	
D	4.900	5.100	0.193	0.200
E	5.700	5.900	0.225	0.232
e	1.27 (BSC)		0.050 (BSC)	
F	1.400 (REF)		0.055 (REF)	
G	0.600 (REF)		0.024 (REF)	
H	5.950	6.200	0.235	0.244
L1	0.100	0.180	0.004	0.007
K	4.000 (REF)		0.157 (REF)	

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