

GSMDC6904X

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.

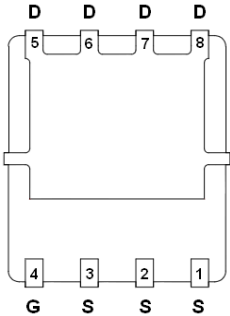
Features

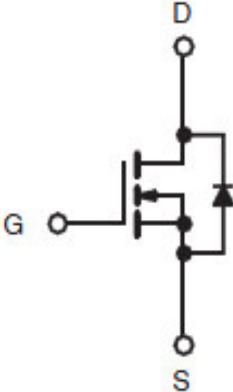
- 60V, 50A, $R_{DS(ON)}=12m\Omega@V_{GS}=10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS guaranteed
- Green Device Available
- DFN5X6-8L package design

Applications

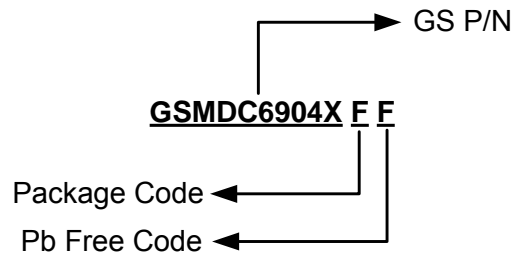
- Motor Drive
- Power Tools
- LED Lighting

Packages & Pin Assignments

GSMDC6904XFF (DFN5X6-8L)	
 <p style="text-align: center;">Bottom View</p>	
Pin	Description
1	Source
2	Source
3	Source
4	Gate
5	Drain
6	Drain
7	Drain
8	Drain

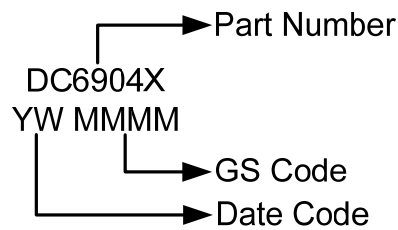


Ordering Information



Part Number	Package
GSMDC6904XFF	DFN5X6-8L

Marking Information



Absolute Maximum Ratings

$T_A=25^{\circ}\text{C}$ 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	$T_A=25^{\circ}\text{C}$	50
		$T_A=100^{\circ}\text{C}$	31
I_{DM}	Pulsed Drain Current	200	A
EAS	Single Pulse Avalanche Energy	61	mJ
IAS	Single Pulse Avalanche Current	35	A
P_D	Power Dissipation ($T_A=25^{\circ}\text{C}$)	96	W
	Power Dissipation (Derate above 25°C)	0.77	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	1.3	$^{\circ}\text{C}/\text{W}$

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	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	2.5	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} =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			55	A
I _{SM}	Pulsed Source Current				220	
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	V _{DS} =30V, V _{GS} =10V, I _D =10A		39.2	59	nC
Q _{gs}	Gate-Source Charge			5.9	9	
Q _{gd}	Gate-Drain Charge			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	V _{DD} =15V, I _D =1A, V _{GS} =10V, R _G =6Ω		9.6	18	ns
t _r				28.2	54	
t _{d(off)}	Turn-Off Time			45.3	86	
t _f				10.9	21	
R _g	Gate Resistance		V _{DS} =0V, V _{GS} =0V, f=1MHz		1.6	

Typical Performance Characteristics

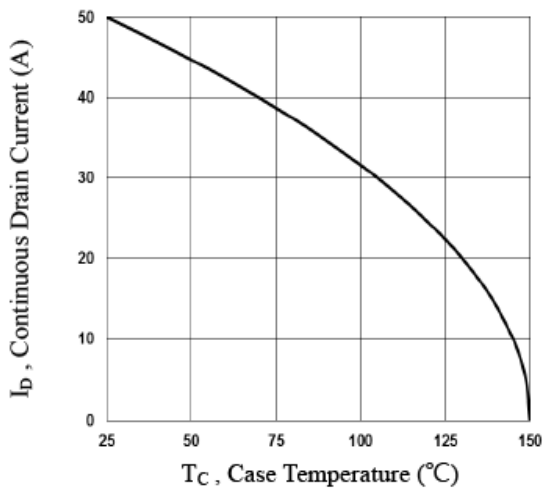


Fig.1 Continuous Drain Current vs. T_c

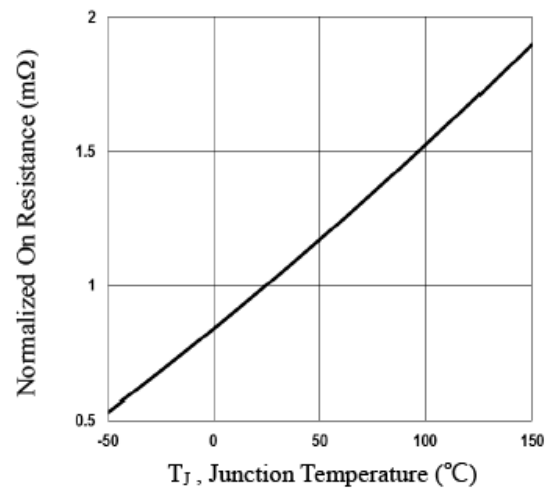


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

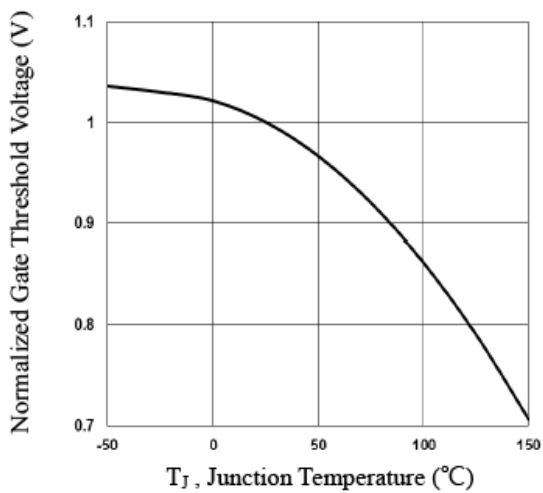


Fig.3 Normalized V_{th} vs. T_j

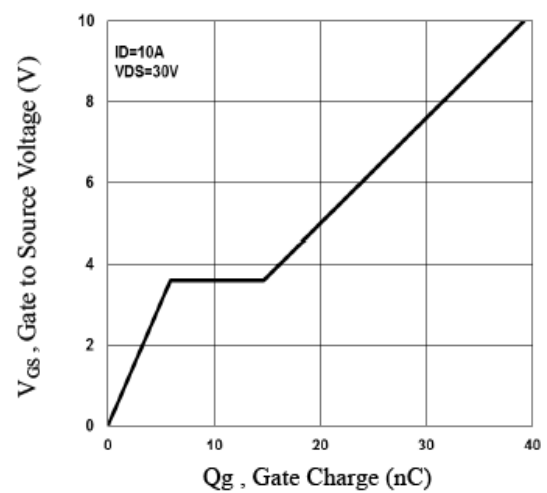


Fig.4 Gate Charge Waveform

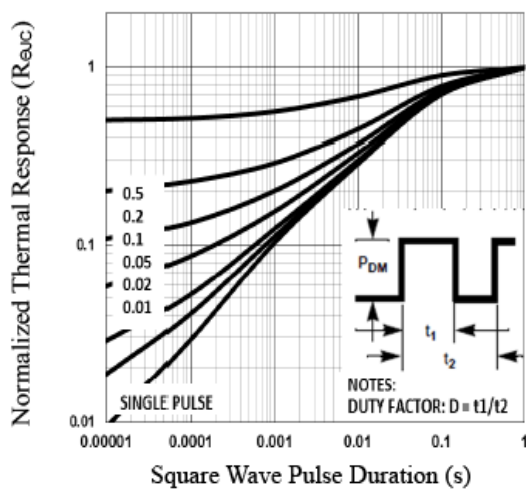


Fig.5 Normalized Transient Response

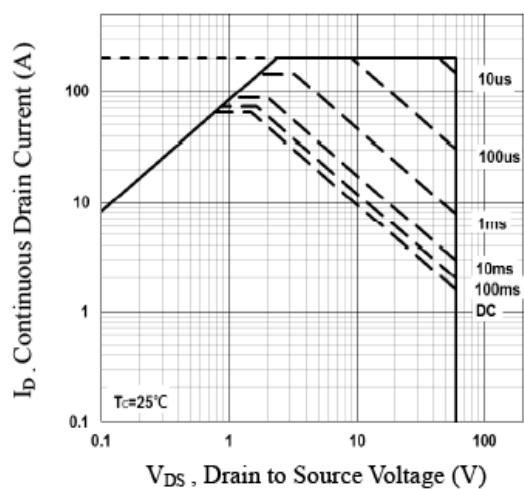
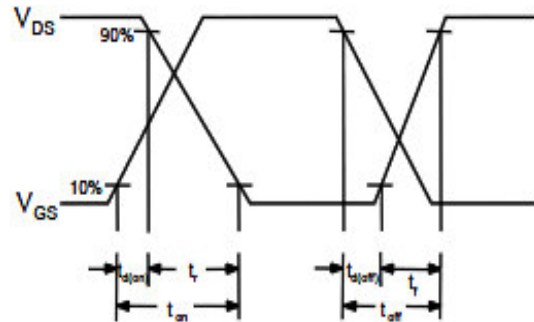
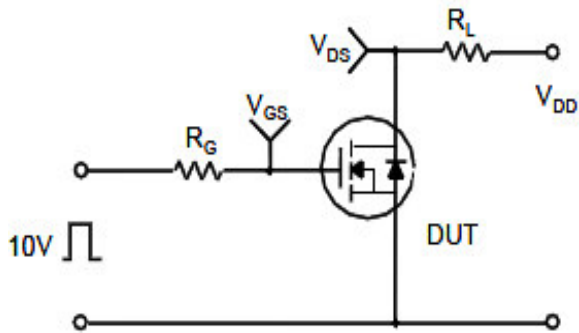


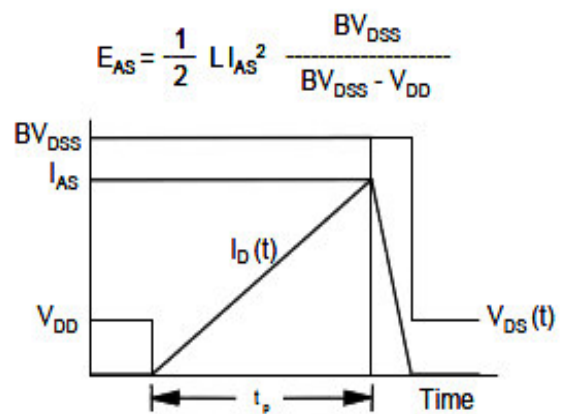
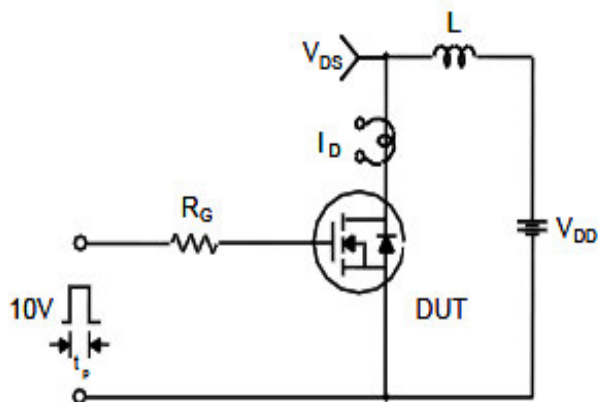
Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics (Continue)

Resistive Switching Test Circuit & Waveforms

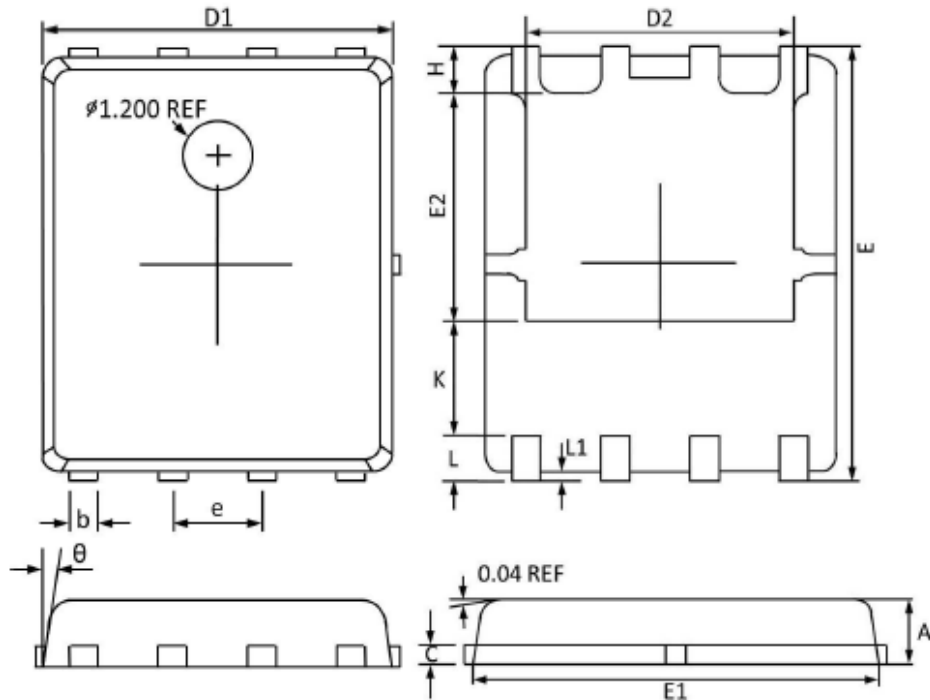


Unclamped Inductive Switching Test Circuit & Waveforms



Package Dimension

DFN5X6-8L







Dimensions




Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.800	1.100	0.031	0.043
b	0.330	0.510	0.013	0.020
C	0.200	0.300	0.008	0.012
D1	4.800	5.100	0.189	0.201
D2	3.610	4.100	0.142	0.161
E	5.900	6.200	0.232	0.244
E1	5.700	5.900	0.224	0.232
E2	3.350	3.780	0.132	0.149
e	1.27 (BSC)		0.05 (BSC)	
H	0.410	0.700	0.016	0.028
K	1.100	1.500	0.043	0.059
L	0.510	0.710	0.020	0.028
L1	0.060	0.200	0.002	0.008
θ	0°	12°	0°	12°



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