

GSMC3944X

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, 75A, $R_{DS(ON)}=2.4m\Omega@V_{GS}=10V$
- Improved dv/dt capability
- Fast switching
- V_{GS} Guarantee $\pm 20V$
- Green Device Available
- DFN5X6-8L package design

Applications

- Server Power
- DC-DC Load Switch
- Motor Driver Applications
- BMS Application

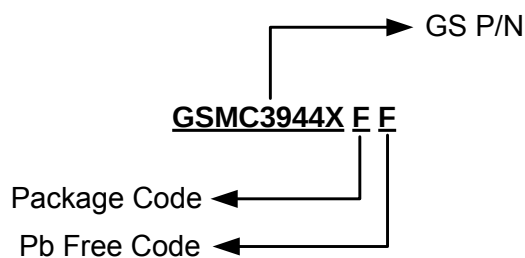
Packages & Pin Assignments

GSMC3944XFF (DFN5X6-8L)

Bottom View

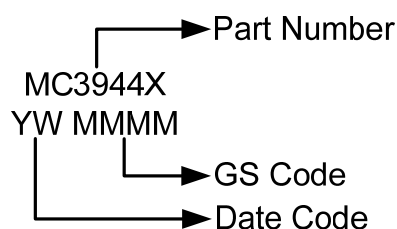
Pin	Description
1	Source
2	Source
3	Source
4	Gate
5	Drain
6	Drain
7	Drain
8	Drain

Ordering Information



Part Number	Package	Quantity Reel
GSMC3944XFF	DFN5X6-8L	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	30	V
V_{GS}	Gate –Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_C=25^{\circ}\text{C}$	A
		$T_C=100^{\circ}\text{C}$	
I_{DM}	Pulsed Drain Current	300	A
EAS	Single Pulse Avalanche Energy	140	mJ
IAS	Single Pulse Avalanche Current	53	A
P_D	Power Dissipation ($T_C=25^{\circ}\text{C}$)	50	W
	Power Dissipation (Derate above 25°C)	0.4	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	50	$^{\circ}\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance-Junction to Case	2.5	$^{\circ}\text{C}/\text{W}$

Electrical Characteristics

T_J=25°C Unless otherwise noted

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		0.07		V/°C
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} ,I _D =250uA	1	1.7	3	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient			-3.9		mV/ °C
I _{GSS}	Gate Leakage Current	V _{DS} =0V,V _{GS} =±20V			±100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =24V,V _{GS} =0V			1	uA
		V _{DS} =20V,V _{GS} =0V, T _J =125°C			25	
I _S	Continuous Source Current	V _G =V _D =0V, Force Current			75	A
I _{SM}	Pulsed Source Current				300	
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} =10V,I _D =30A		1.7	2.4	mΩ
		V _{GS} =4.5V,I _D =25A		2.2	3.2	
g _{FS}	Forward Transconductance	V _{DS} =10V,I _S =20A		32		S
V _{SD}	Diode Forward Voltage	V _{GS} =0V,I _S =1A			1	V
t _{rr}	Reverse Recovery Time	V _{GS} =0V,I _S =1A, di/dt=100A/us		35		ns
Q _{rr}	Reverse Recovery Charge			15		nC
Dynamic						
Q _g	Total Gate Charge	V _{DS} =15V,V _{GS} =10V, I _D =30A		80	120	nC
Q _{gs}	Gate-Source Charge			19	29	
Q _{gd}	Gate-Drain Charge			38	57	
C _{iss}	Input Capacitance	V _{DS} =15V,V _{GS} =0V, f=1MHz		7032	10200	pF
C _{oss}	Output Capacitance			898	1310	
C _{rss}	Reverse Transfer Capacitance			843	1230	
t _{d(on)}	Turn-On Time	V _{DD} =15V,I _D =1A, V _{GS} =10V,R _G =1Ω		20	38	ns
t _r				36	68	
t _{d(off)}	Turn-Off Time			80	152	
t _f				33	63	
R _g	Gate Resistance	V _{DS} =0V,V _{GS} =0V, f=1MHz		1.2	2.4	Ω

Typical Performance Characteristics

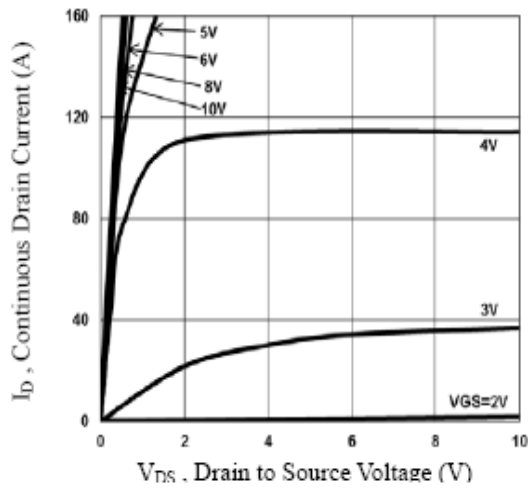


Fig.1 Output Characteristics

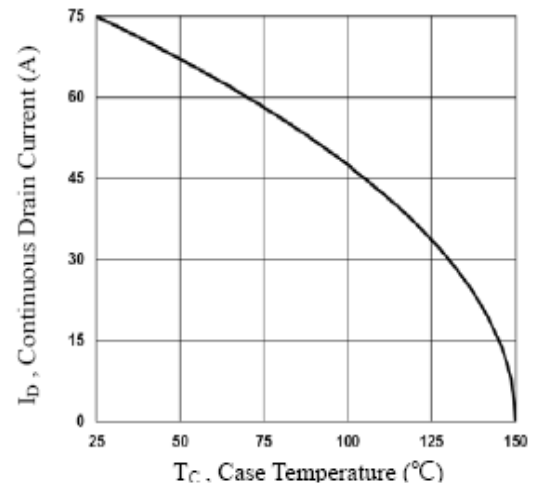


Fig.2 Continuous Drain Current vs. T_C

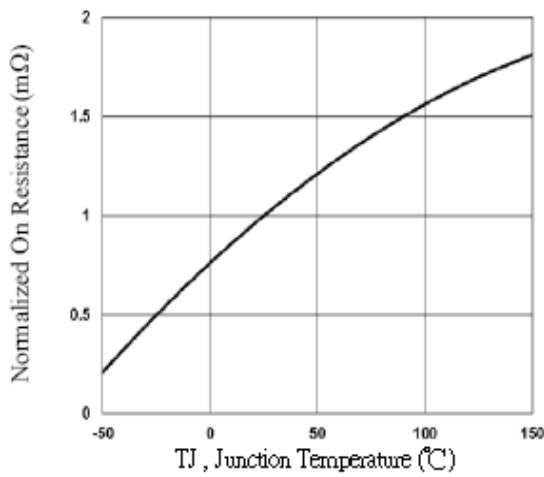


Fig.3 Normalized $R_{DS(on)}$ vs. T_J

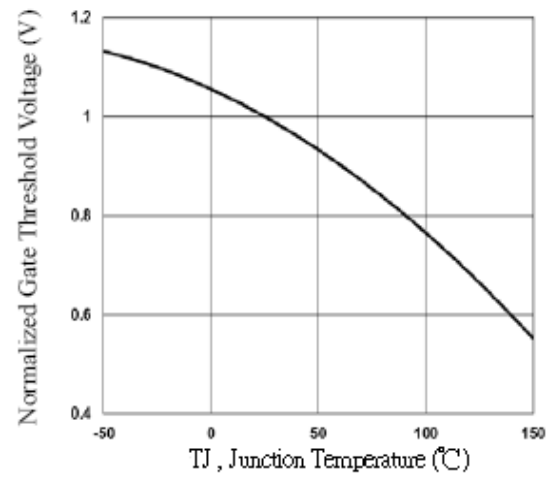


Fig.4 Normalized V_{th} vs. T_J

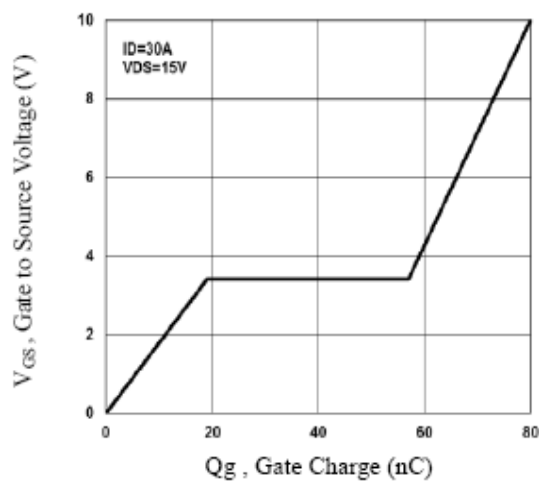


Fig.5 Gate Charge Waveform

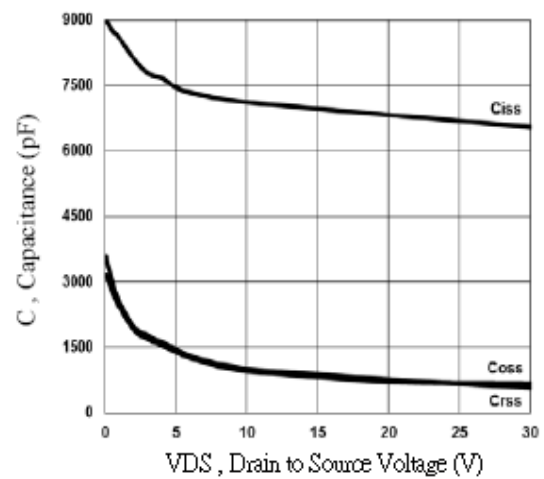


Fig.6 Capacitance Characteristics

Typical Performance Characteristics (Continue)

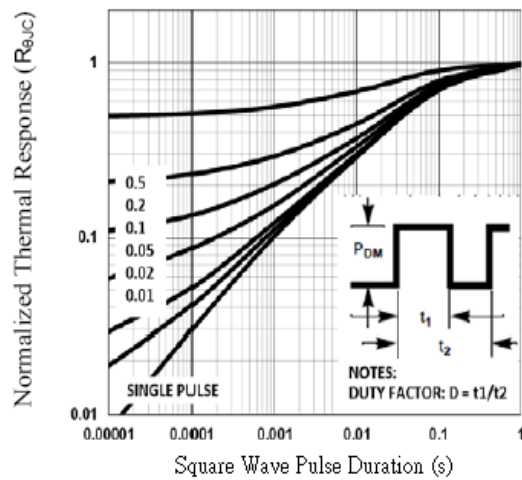


Fig.7 Normalized Transient Impedance

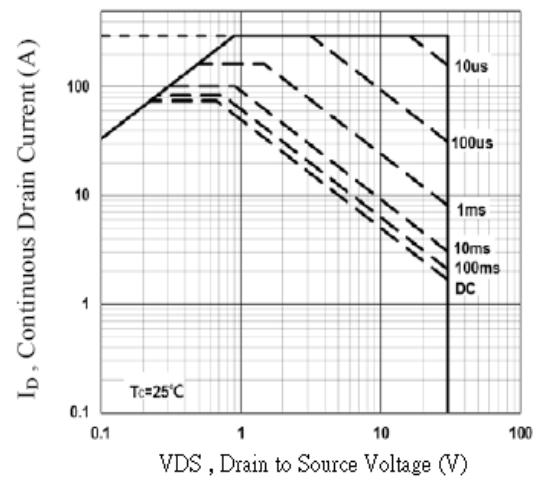
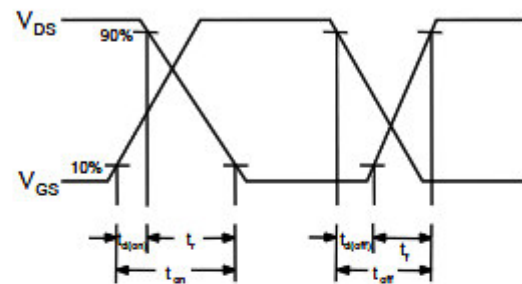
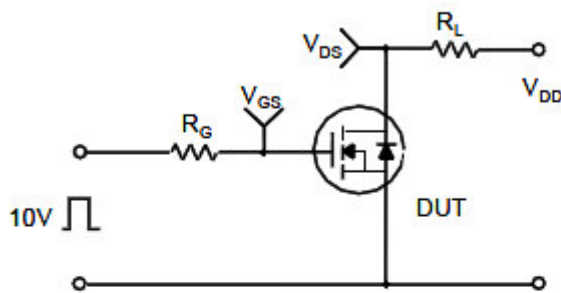
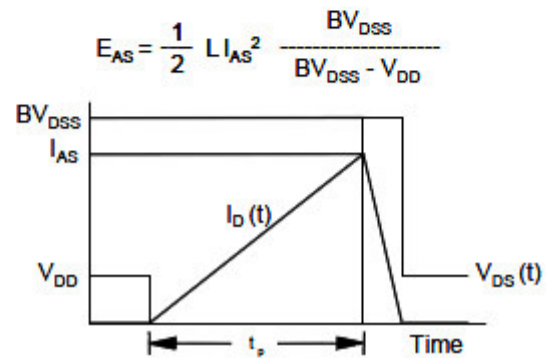
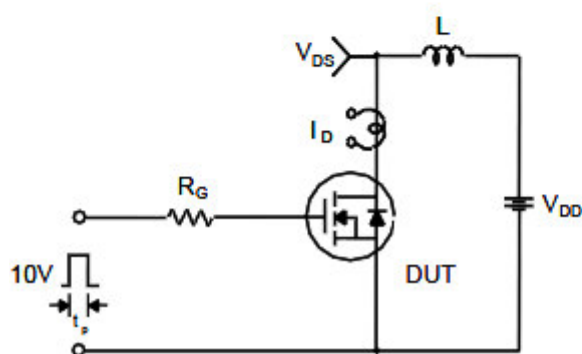


Fig.8 Maximum Safe Operation Area

Resistive Switching Test Circuit & Waveforms

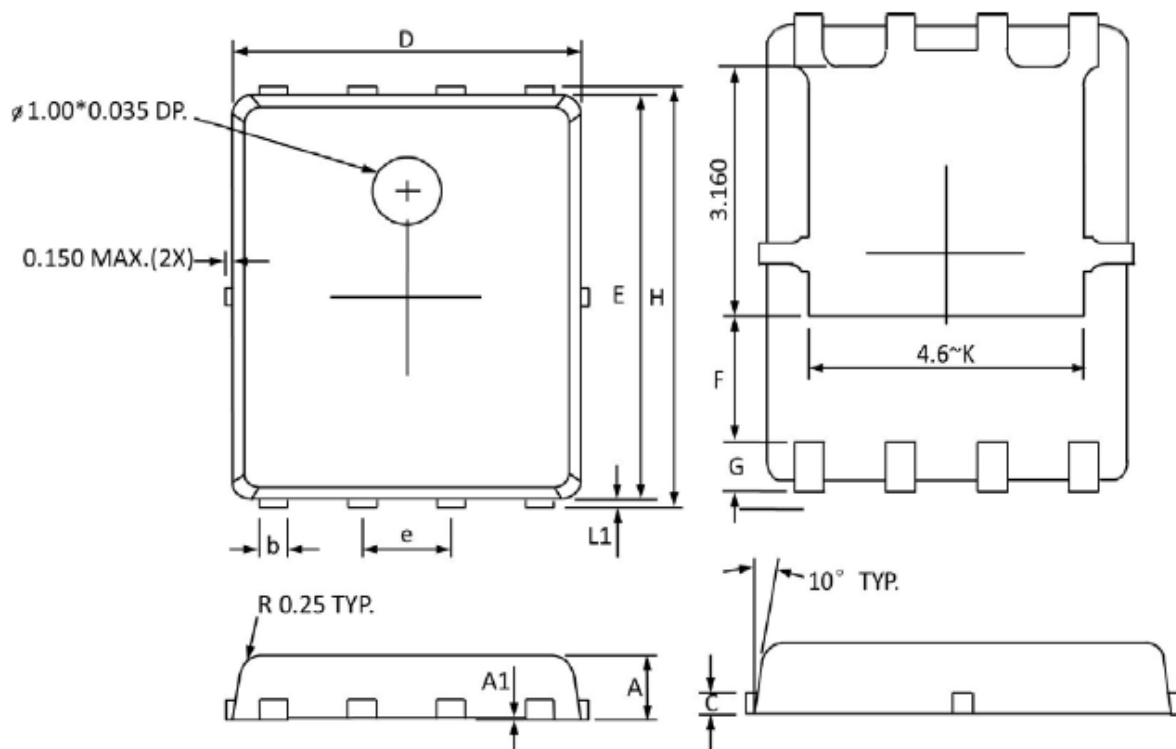


Unclamped Inductive Switching Test Circuit & Waveforms



Package Dimension

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)		0.254 (REF)	
D	4.900	5.100	0.193	0.200
E	5.700	5.900	0.225	0.232
e	1.27 (BSC)		1.27 (BSC)	
F	1.600 (REF)		1.600 (REF)	
G	0.600 (REF)		0.600 (REF)	
H	5.950	6.200	0.235	0.244
L1	0.100	0.180	0.004	0.007
K	3.200 (REF)		3.200 (REF)	

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