

# GSMDC3094X

## 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.

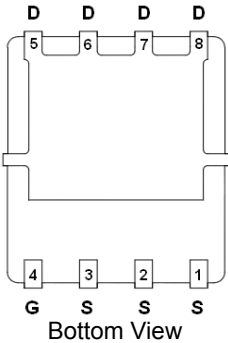
### Features

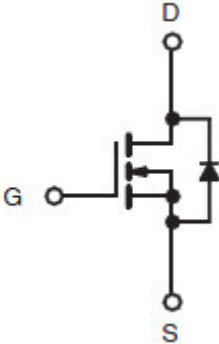
- 30V, 95A,  $R_{DS(ON)}=3.6m\Omega@V_{GS}=10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS guaranteed
- Green Device Available
- DFN5X6-8L package design

### Applications

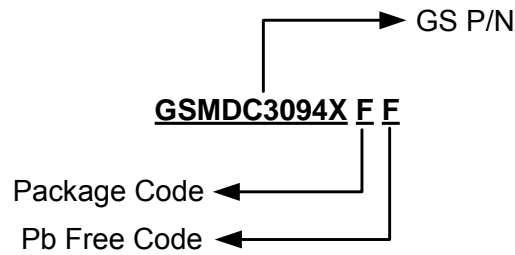
- MB / VGA / Vcore
- POL Applications
- SMPS 2nd SR

### Packages & Pin Assignments

GSMDC3094XFF (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

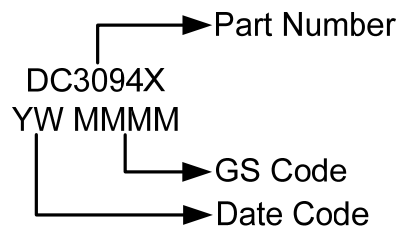


## Ordering Information



Part Number	Package	Quantity Reel
GSMDC3094XFF	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	$\pm 20$	V
$I_D$	Continuous Drain Current	$T_C=25^{\circ}\text{C}$	95
		$T_C=100^{\circ}\text{C}$	60
$I_{DM}$	Pulsed Drain Current	380	A
EAS	Single Pulse Avalanche Energy	125	mJ
IAS	Single Pulse Avalanche Current	50	A
$P_D$	Power Dissipation ( $T_A=25^{\circ}\text{C}$ )	2.0	W
	Power Dissipation ( $T_C=25^{\circ}\text{C}$ )	96	W
	Power Dissipation (Derate above $25^{\circ}\text{C}$ )	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	$^{\circ}\text{C}/\text{W}$

Note 1: Repetitive Rating: Pulsed width limited by maximum junction temperature.

Note 2:  $V_{DD}=25\text{V}$ ,  $V_{GS}=10\text{V}$ ,  $L=0.1\text{mH}$ ,  $I_{AS}=50\text{A}$ ,  $R_G=25\Omega$ , Starting  $T_J=25^{\circ}\text{C}$ .

## Electrical Characteristics

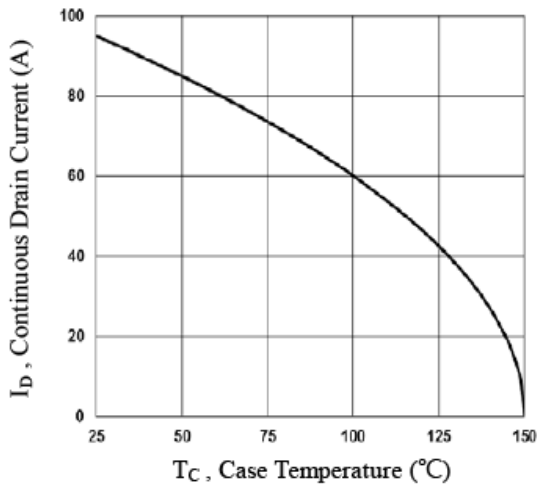
$T_J=25^{\circ}\text{C}$  Unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static</b>						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30			V
$\Delta BV_{DSS}/\Delta T_J$	$BV_{DSS}$ Temperature Coefficient	Reference to $25^{\circ}\text{C}$ , $I_D=1\text{mA}$		0.03		$V/^{\circ}\text{C}$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	1.6	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient			-5		$\text{mV}/^{\circ}\text{C}$
$I_{GSS}$	Gate Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=30V, V_{GS}=0V$			1	$\mu A$
		$V_{DS}=24V, V_{GS}=0V$ , $T_J=125^{\circ}\text{C}$			10	
$I_S$	Continuous Source Current	$V_G=V_D=0V$ , Force Current			95	A
$I_{SM}$	Pulsed Source Current				380	
$R_{DS(on)}$	Drain-Source On-Resistance	$V_{GS}=10V, I_D=24A$		2.7	3.6	m $\Omega$
		$V_{GS}=4.5V, I_D=12A$		4.1	5.5	
$g_{FS}$	Forward Transconductance	$V_{DS}=10V, I_D=10A$		15.5		S
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0V, I_S=1A$			1	V
EAS	Single Pulse Avalanche Energy	$V_{DD}=25V, L=0.1\text{mH}$ , $I_{AS}=24A$	31			mJ
<b>Dynamic</b>						
$Q_g$	Total Gate Charge	$V_{DS}=15V, V_{GS}=4.5V$ , $I_D=24A$		24	36	nC
$Q_{gs}$	Gate-Source Charge			4.2	8	
$Q_{gd}$	Gate-Drain Charge			13	20	
$C_{iss}$	Input Capacitance	$V_{DS}=25V, V_{GS}=0V$ , $f=1\text{MHz}$		2200	3300	pF
$C_{oss}$	Output Capacitance			280	405	
$C_{rss}$	Reverse Transfer Capacitance			177	255	
$t_{d(on)}$	Turn-On Time	$V_{DD}=15V, I_D=15A$ , $V_{GS}=10V, R_G=3.3\Omega$		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		$V_{DS}=0V, V_{GS}=0V$ , $f=1\text{MHz}$		2	

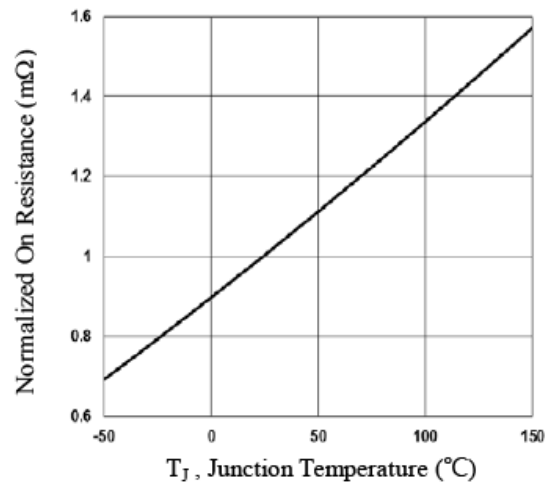
Note 3: The data tested by pulsed, pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .

Note 4: Essentially independent of operating temperature.

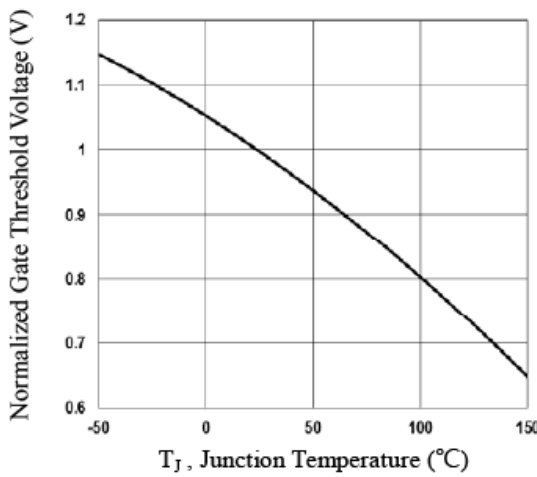
## Typical Performance Characteristics



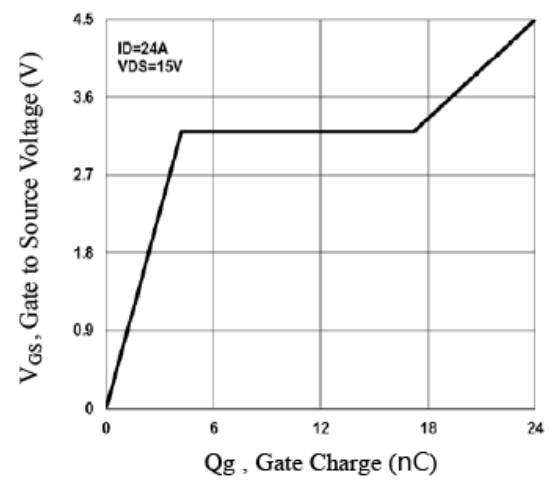
**Fig.1** Continuous Drain Current vs.  $T_c$



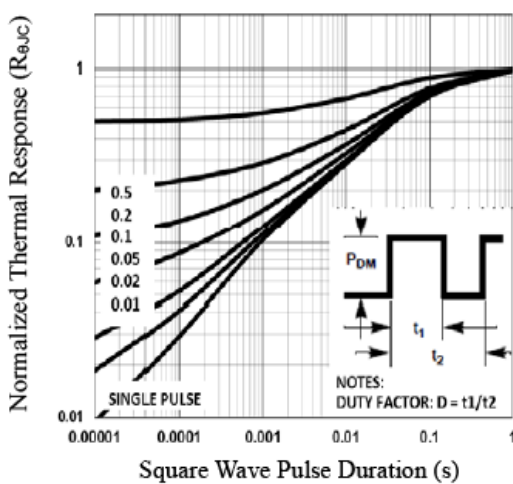
**Fig.2** Normalized RDSON vs.  $T_j$



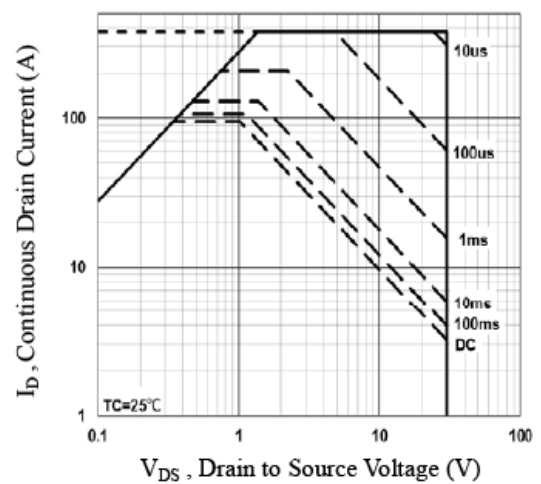
**Fig.3** Normalized  $V_{th}$  vs.  $T_j$



**Fig.4** Gate Charge Waveform



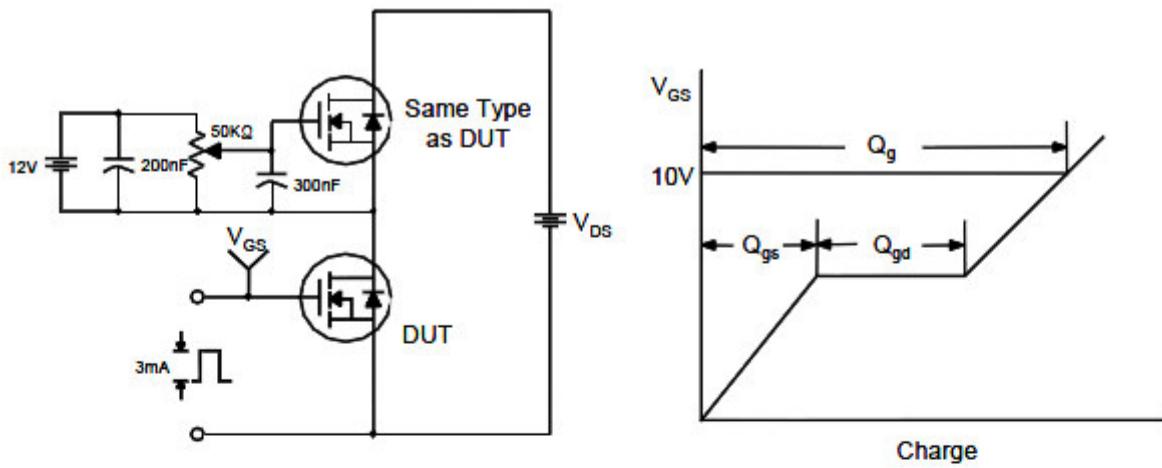
**Fig.5** Normalized Transient Impedance



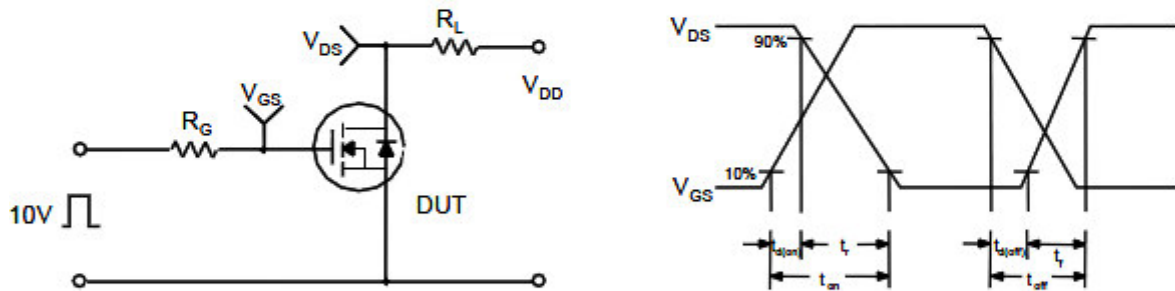
**Fig.6** Maximum Safe Operation Area

## Typical Performance Characteristics (Continue)

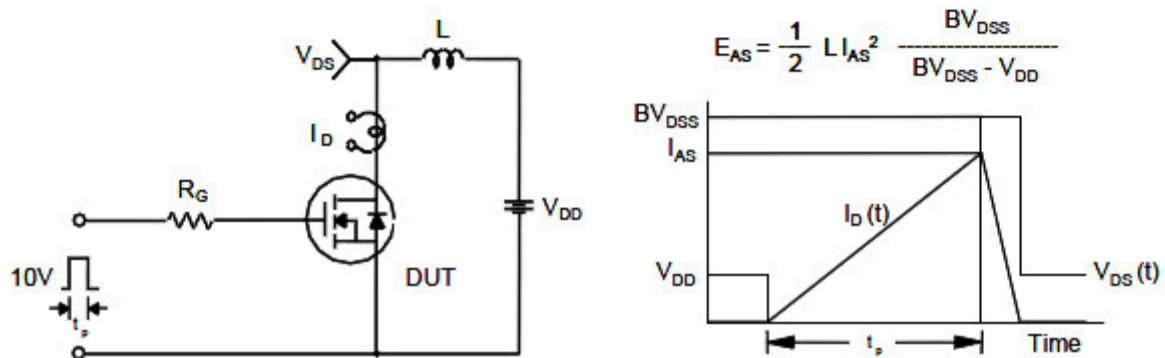
### Gate Charge Test Circuit & Waveform



### Resistive Switching Test Circuit & Waveforms

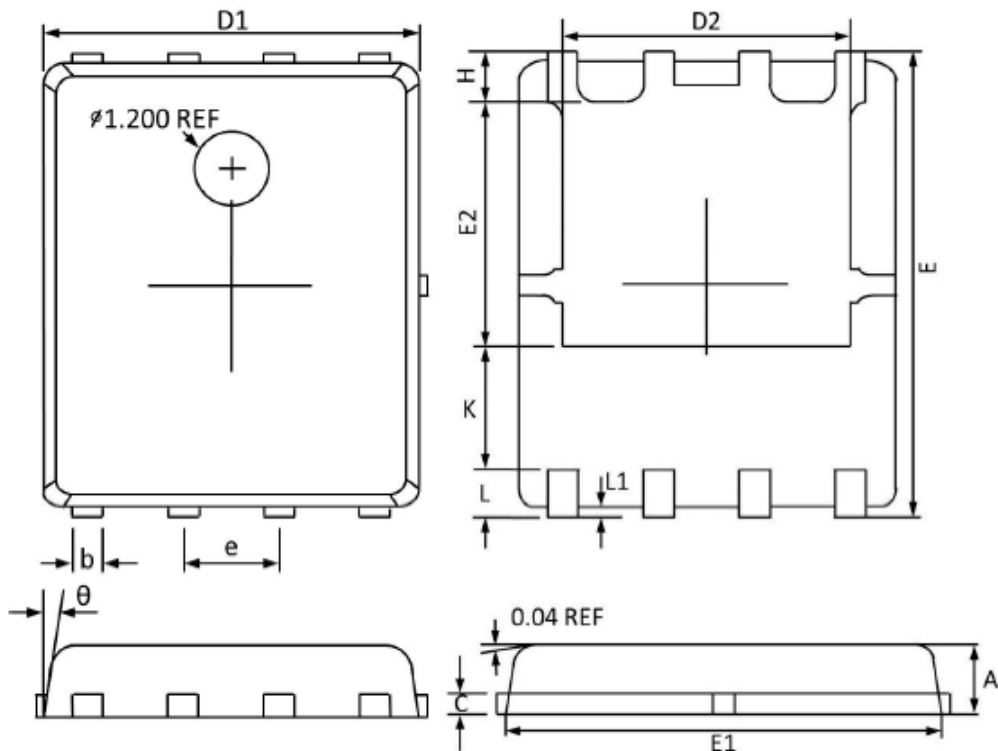


### Unclamped Inductive Switching Test Circuit & Waveforms



## Package Dimension

### DFN5X6-8L



#### Dimensions

Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.036	0.043
b	0.330	0.510	0.013	0.020
c	0.200	0.300	0.008	0.011
D1	4.800	5.000	0.189	0.196
D2	3.610	3.960	0.143	0.155
E	5.900	6.100	0.225	0.232
e	1.270 (BSC)		0.050 (BSC)	
H	0.410	0.610	0.017	0.024
K	1.100 (REF)		0.043 (REF)	
L	0.510	0.710	0.020	0.027
L1	0.060	0.200	0.003	0.007
$\theta$	0°	12°	0°	12°

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