GSMDC3960X

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

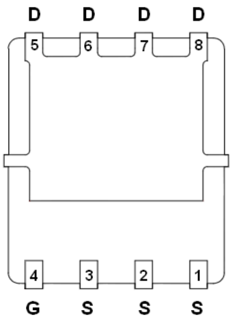
- 30V, 115A, $R_{DS(ON)}$=2.4mΩ@V_{GS}=10V
- Improved dv/dt capability
- Fast switching
- 100% EAS guaranteed
- Green Device Available
- DFN5X6-8L package design

Applications

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

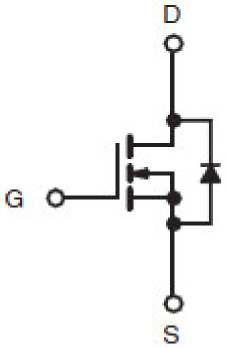
Packages & Pin Assignments

GSMDC3960XFF (DFN5X6-8L)

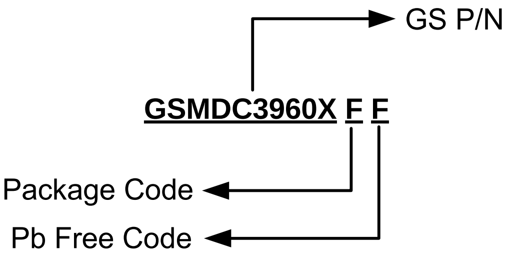


Bottom View

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

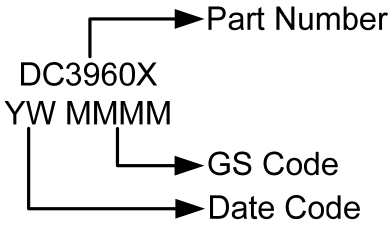


Ordering Information



Part Number	Package
GSMDC3960XFF	DFN5X6-8L

Marking Information



Absolute Maximum Ratings

T_A=25ºC 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℃	115	A
		T_A=100℃	72	
I_{DM}	Pulsed Drain Current		460	A
EAS	Single Pulse Avalanche Energy		180	mJ
IAS	Single Pulse Avalanche Current		60	A
P_D	Power Dissipation (T_A=25℃)		135	W
	Power Dissipation (Derate above 25℃)		1.08	W/℃
T_J	Operating Junction Temperature Range		-55 to +150	℃
T_{STG}	Storage Temperature Range		-55 to +150	℃
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		62	℃/W
$R_{\theta JC}$	Thermal Resistance-Junction to Case		0.92	℃/W

Electrical Characteristics

T_A=25℃ 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
△BV_{DSS}/△T_J	BV_{DSS} Temperature Coefficient	Reference to 25℃, I_D=1mA		0.03		V/℃
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250uA	1.2	1.6	2.5	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient			-5		mV/℃
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℃			10	
I_S	Continuous Source Current	V_G=V_D=0V, Force Current			176	A
I_{SM}	Pulsed Source Current				352	
$R_{DS(on)}$	Drain-Source On-Resistance	V_{GS}=10V,I_D=30A		1.9	2.4	mΩ
		V_{GS}=4.5V,I_D=15A		2.5	3.3	
g_{FS}	Forward Transconductance	V_{DS}=10V,I_D=2A		16.5		S
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_S=1A			1	V
t_{rr}	Reverse Recovery Time	V_{DS}=30V,I_S=1A, di/dt=100A/us		49	85	ns
Q_{rr}	Reverse Recovery Charge			18	35	nC
Dynamic						
Q_g	Total Gate Charge	V_{DS}=15V,V_{GS}=4.5V, I_D=24A		40	75	nC
Q_{gs}	Gate-Source Charge			6	12	
Q_{gd}	Gate-Drain Charge			19	35	
C_{iss}	Input Capacitance	V_{DS}=25V,V_{GS}=0V, f=1MHz		4800	8000	pF
C_{oss}	Output Capacitance			735	1300	
C_{rss}	Reverse Transfer Capacitance			420	800	
$t_{d(on)}$	Turn-On Time	V_{DD}=15V,I_D=1A, V_{GS}=10V,R_G=1Ω		20	40	ns
t_r				32	60	
$t_{d(off)}$	Turn-Off Time			75	130	
t_f				28	55	
R_g	Gate Resistance	V_{DS}=0V,V_{GS}=0V, f=1MHz		1.6	3.5	Ω

Typical Performance Characteristics

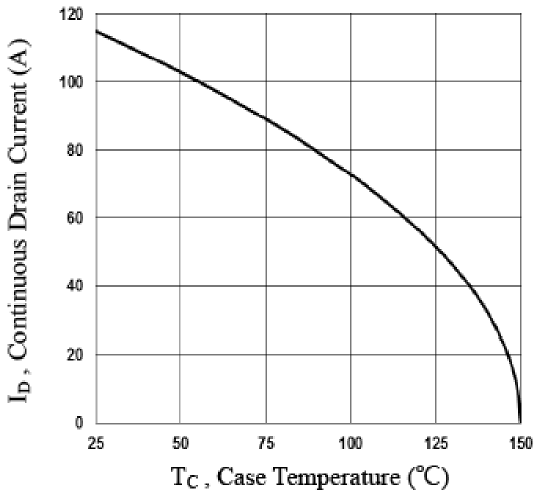


Fig.1 Continuous Drain Current vs. T_c

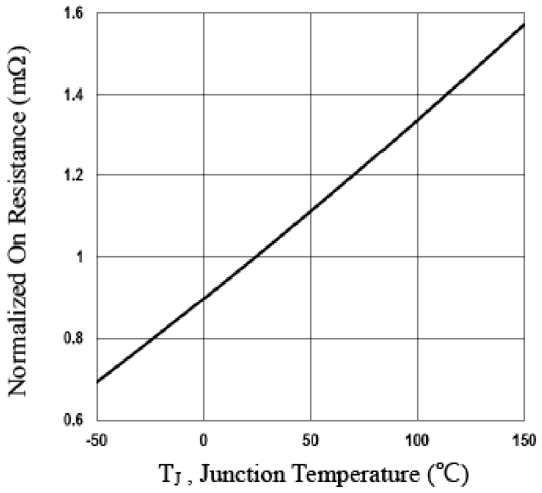


Fig.2 Normalized RDSON vs. T_J

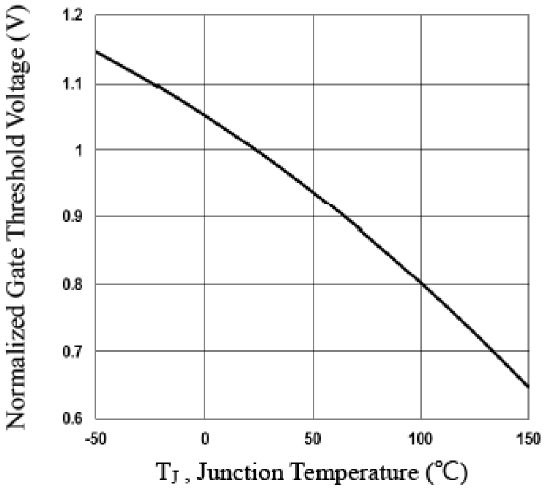


Fig.3 Normalized V_{th} vs. T_J

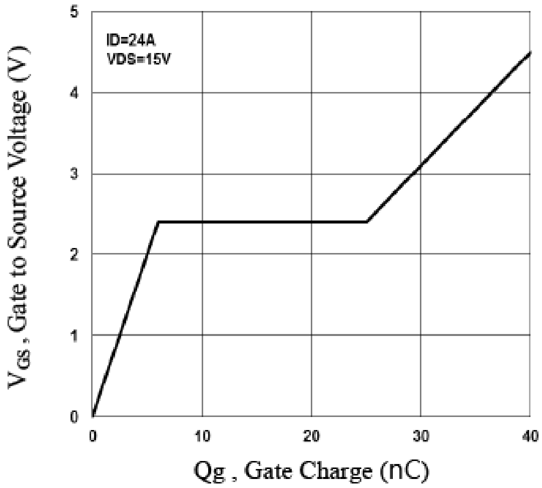


Fig.4 Gate Charge Waveform

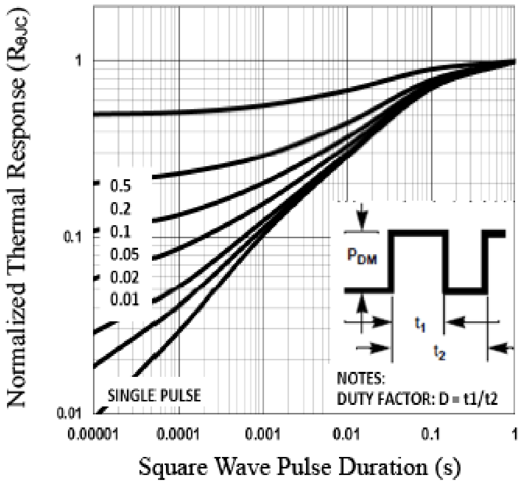


Fig.5 Normalized Transient Impedance

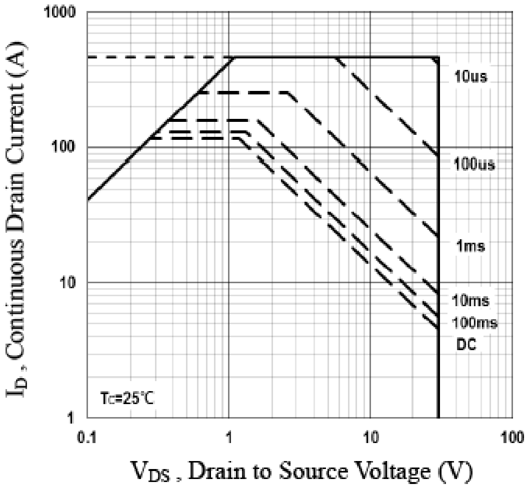
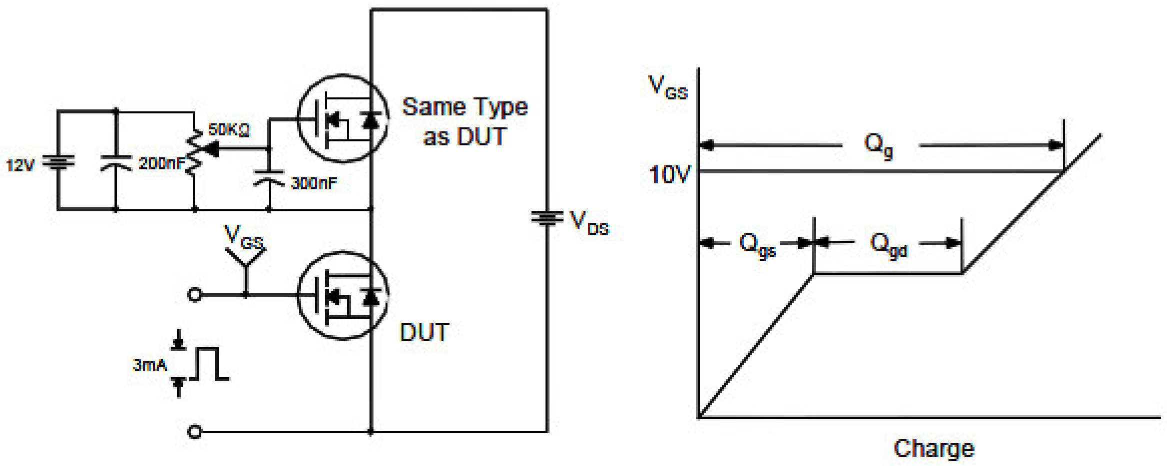


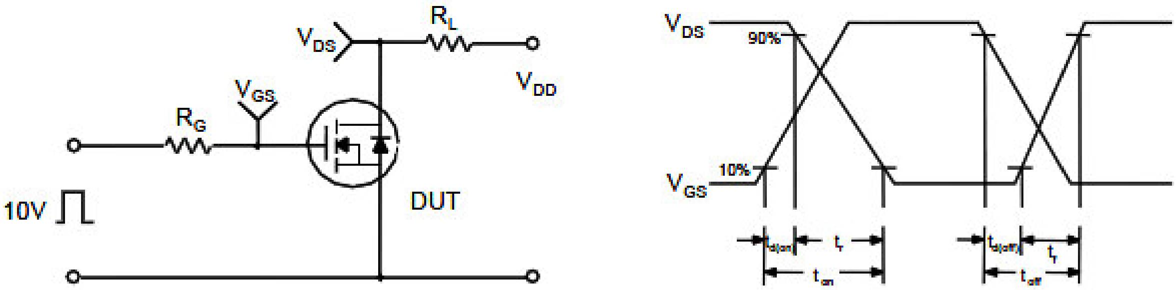
Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics **(Continue)**

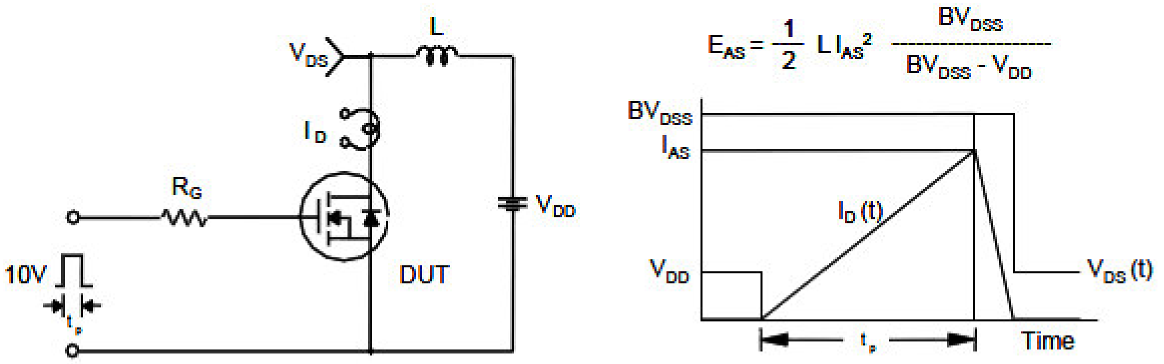
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

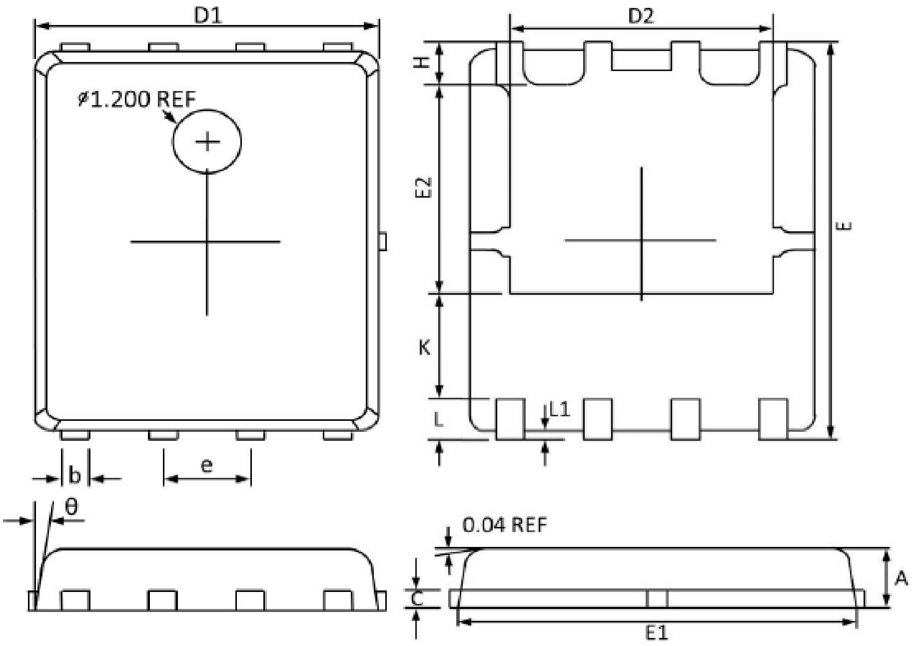


Unclamped Inductive Switching Test Circuit & Waveforms



Package Dimension

DFN5X6-8L



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	5.100	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	1.270 (BSC)		0.050 (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°

Table title: **Dimensions**

NOTICE

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