

GSMDC4959X

40V P-Channel MOSFETs

Product Description

These P-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

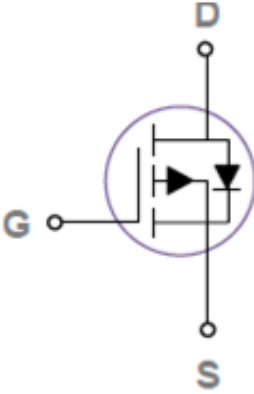
- -40V, -85A, $R_{DS(ON)}=5.8m\Omega@V_{GS}=-10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS guaranteed
- Green Device Available
- DFN5X6-8L package design

Applications

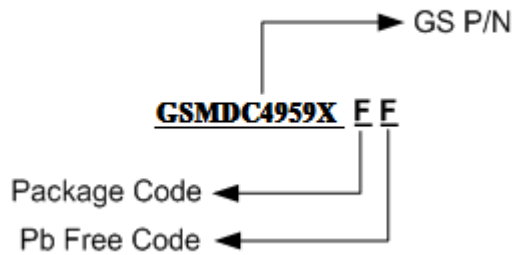
- Motor Drive
- Power Tools
- LED Lighting

Packages & Pin Assignments

GSMDC4959XFF (DFN5X6-8L)	
 <p>Bottom View</p>	
Pin	Description
1	Source
2	Source
3	Source
4	Gate
5	Drain
6	Drain
7	Drain
8	Drain

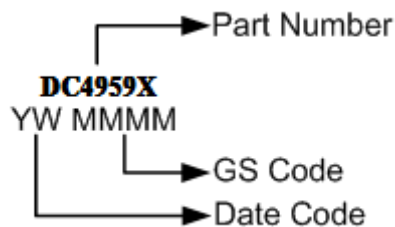


Ordering Information



Part Number	Package	Quantity
GSMDC4959XFF	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	-40	V
V_{GS}	Gate –Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_C=25^\circ\text{C}$	-85
		$T_C=100^\circ\text{C}$	-53.7
I_{DM}	Pulsed Drain Current (Note 1)	-340	A
EAS	Single Pulse Avalanche Energy (Note 2)	245	mJ
IAS	Single Pulse Avalanche Current (Note 2)	-70	A
P_D	Power Dissipation ($T_C=25^\circ\text{C}$)	135	W
	Power Dissipation (Derate above 25°C)	1.09	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	0.92	$^\circ\text{C}/\text{W}$

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

Note 2: $V_{DD}=-25\text{V}$, $V_{GS}=-10\text{V}$, $L=0.1\text{mH}$, $I_{AS}=-70\text{A}$, Starting $T_J=25^\circ\text{C}$.

Electrical Characteristics

T_J=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	-40			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		-1.2	-1.6	-2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient	V _{DS} =V _{GS} , I _D =-250uA		5.38		mV/°C
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} =±20V			±100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-40V, V _{GS} =0V			-1	uA
		V _{DS} =-32V, V _{GS} =0V, T _J =125°C			-10	
I _S	Continuous Source Current	V _G =V _D =0V, Force Current			-85	A
I _{SM}	Pulsed Source Current				-170	
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} =-10V, I _D =-25A		4.7	5.8	mΩ
		V _{GS} =-4.5V, I _D =-12A		6.4	8.5	
g _{Fs}	Forward Transconductance	V _{DS} =-10V, I _D =-3A		15		S
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =-1A			-1	V
Dynamic						
Q _g	Total Gate Charge (Note 3,4)	V _{DS} =-32V, V _{GS} =-10V, I _D =-10A		106	160	nC
Q _{gs}	Gate-Source Charge (Note 3,4)			13.1	20	
Q _{gd}	Gate-Drain Charge (Note 3,4)			24.9	38	
C _{iss}	Input Capacitance	V _{DS} =-25V, V _{GS} =0V, f=1MHz		5720	8580	pF
C _{oss}	Output Capacitance			527	790	
C _{rss}	Reverse Transfer Capacitance			352	528	
t _{d(on)}	Turn-On Time (Note 3,4)	V _{DD} =-32V, I _D =-1A, V _{GS} =-10V, R _G =6Ω		41.6	82	ns
t _r				12.7	26	
t _{d(off)}	Turn-Off Time (Note 3,4)			308	600	
t _f				70	140	
R _g	Gate Resistance		V _{DS} =0V, V _{GS} =0V, f=1MHz		4.2	

Note 3: The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.

Note 4: Essentially independent of operating temperature.

Typical Performance Characteristics

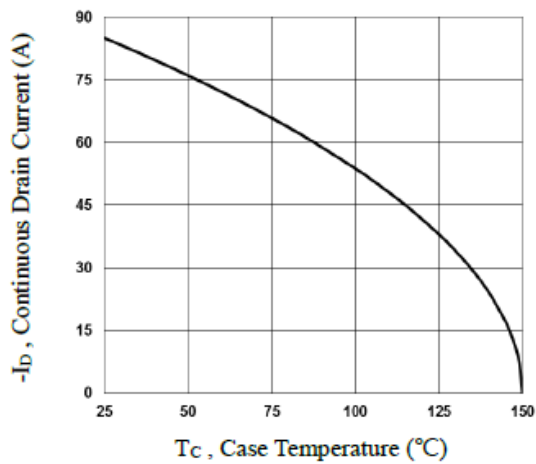


Fig.1 Continuous Drain Current vs. T_c

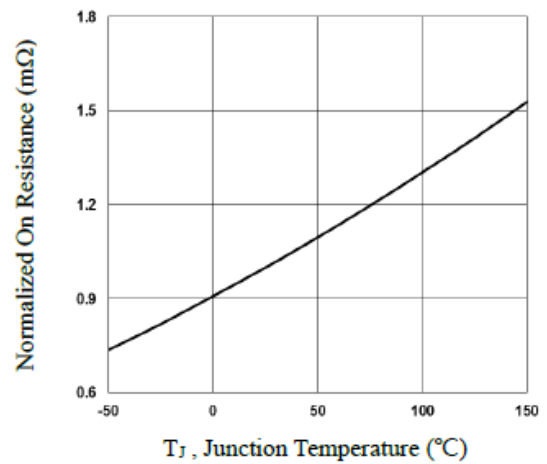


Fig.2 Normalized R_{DS(on)} vs. T_j

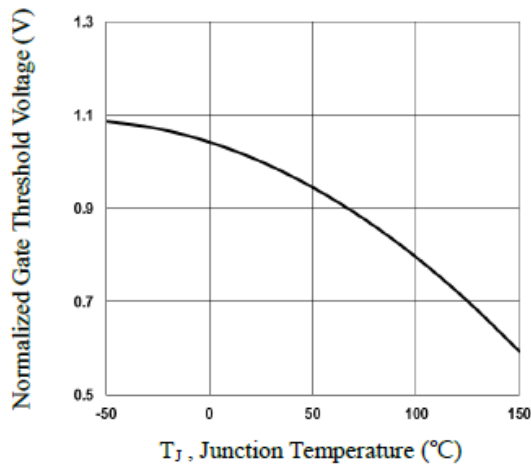


Fig.3 Normalized V_{th} vs. T_j

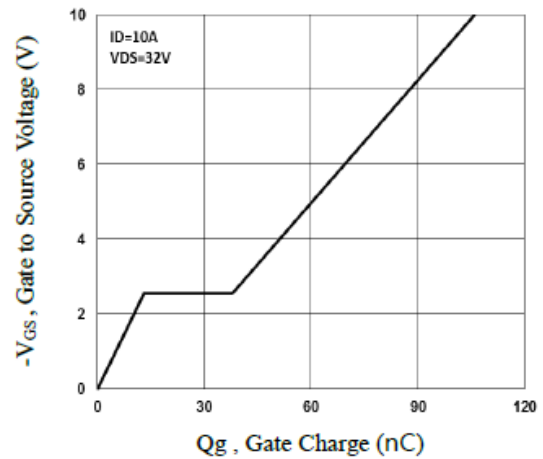


Fig.4 Gate Charge Waveform

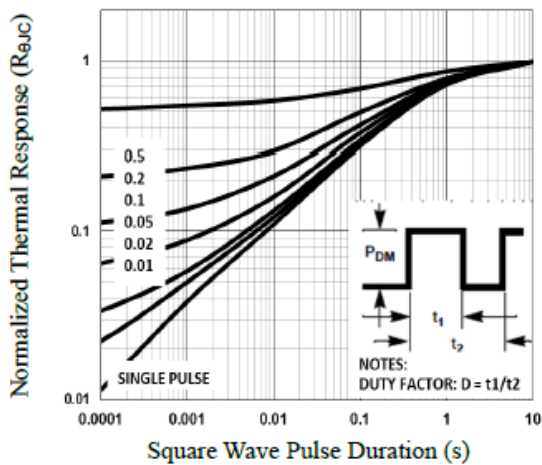


Fig.5 Normalized Transient Impedance

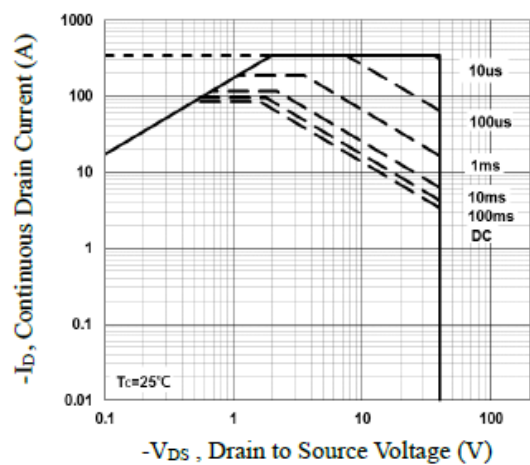


Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics

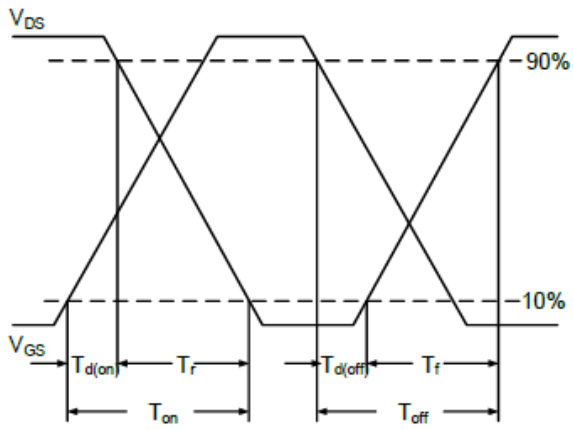


Fig.7 Switching Time Waveform

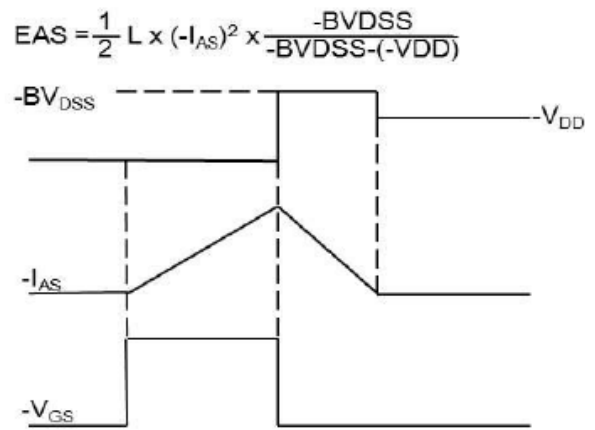
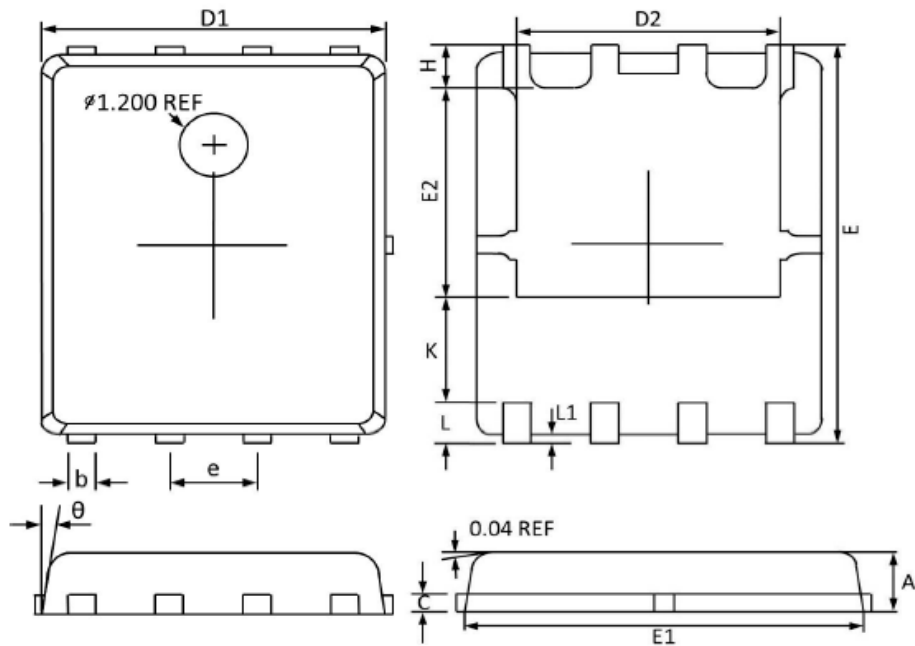


Fig.8 EAS Waveform

Package Dimension

DFN5X6-8L









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

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