GSM4943D

40V P-Channel MOSFET

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

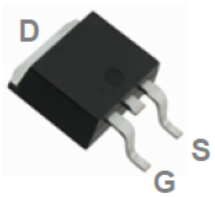
- -40V, -22A, RDS(ON) =40mΩ@VGS = -10V
- Fast switching
- Green Device Available
- Improved dv/dt capability
- 100% EAS Guaranteed

Applications

- Motor Drive
- Power Tools
- LED Lighting

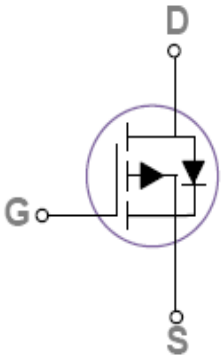
Packages & Pin Assignments

GSM4943DF (TO-252-2L)

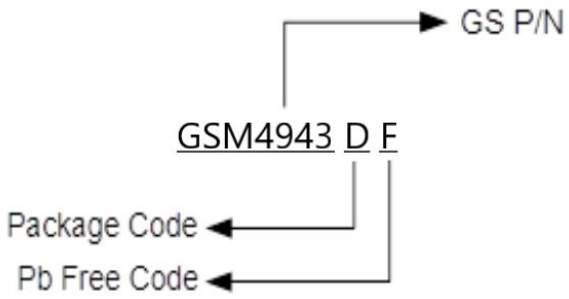


Top View

Description
Gate
Drain
Source

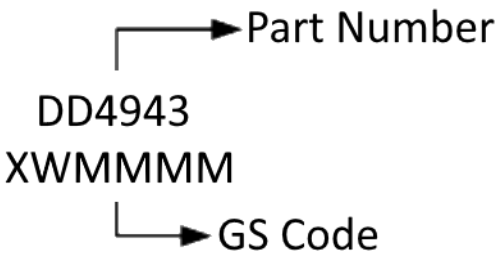


Ordering Information



Part Number	Package	Quantity
GSM4943DF	TO-252-2L	2500pcs

Marking Information



Absolute Maximum Ratings

T_C=25ºC 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℃	-22	A
		T_C=100℃	-13.9	
I_{DM}	Pulsed Drain Current[1]		-88	A
EAS	Single Pulse Avalanche Energy[2]		40.9	mJ
IAS	Single Pulse Avalanche Current[2]		-28.6	A
P_D	Power Dissipation (T_C=25℃)		34.7	W
	Power Dissipation-Derate above 25℃		0.28	W/℃
T_J	Operating Junction Temperature Range		-50 to +150	℃
T_{STG}	Storage Temperature Range		-50 to +150	℃
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		62	℃/W
$R_{\theta JC}$	Thermal Resistance-Junction to Case		3.6	℃/W

Electrical Characteristics

T_J=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	-40			V
$\triangle V_{(BR)DSS}$ / $\triangle T_J$	$V_{(BR)DSS}$ Temperature Coefficient	Reference to 25℃, I_D=-1mA		-0.02		V/℃
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250uA	-1.2	-1.6	-2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient			4.18		mV/℃
I_{GSS}	Gate-Source Leakage Current	V_{DS}=0V, V_{GS}=±20V			±100	nA
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-40V, V_{GS}=0V			-1	uA
		V_{DS}=-32V, V_{GS}=0V T_J=125℃			-10	
I_S	Continuous Source Current	V_G=V_D=0V, Force Current			-22	A
I_{SM}	Pulsed Source Current				-44	A
$R_{DS(on)}$	Drain-Source On-Resistance	V_{GS} =-10V, I_D=-10A		32	40	mΩ
		V_{GS} =-4.5V, I_D=-5A		50	65	
g_{FS}	Forward Transconductance	V_{DS}=-10V, I_D=-5A		7		S
V_{SD}	Diode Forward Voltage	I_S=-1A, V_{GS}=0V			-1	V

Electrical Characteristics (Continue)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Dynamic						
Q_g	Total Gate Charge[3,4]	V_{DS}=-20V, V_{GS}=-4.5V, I_D=-5A		7.6	15	nC
Q_{gs}	Gate-Source Charge[3,4]			2.3	4.5	
Q_{gd}	Gate-Drain Charge[3,4]			3.1	6	
C_{iss}	Input Capacitance	V_{DS}=-25V,V_{GS}=0V, f=1MHz		1076	2150	pF
C_{oss}	Output Capacitance			83	160	
C_{rss}	Reverse Transfer Capacitance			64	120	
$t_{d(on)}$	Turn-On Time[3,4]	V_{DD}=-20V, I_D=-1A, V_{GS}=-10V, R_G=6Ω		12	24	ns
t_r	Rise Time[3,4]			13.2	26	
$t_{d(off)}$	Turn-Off Time[3,4]			46.8	90	
t_f	Fall Time[3,4]			20.4	40	
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz		16		Ω

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=28.6A., R_G=25Ω, Starting TJ=25℃
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

Typical Performance Characteristics

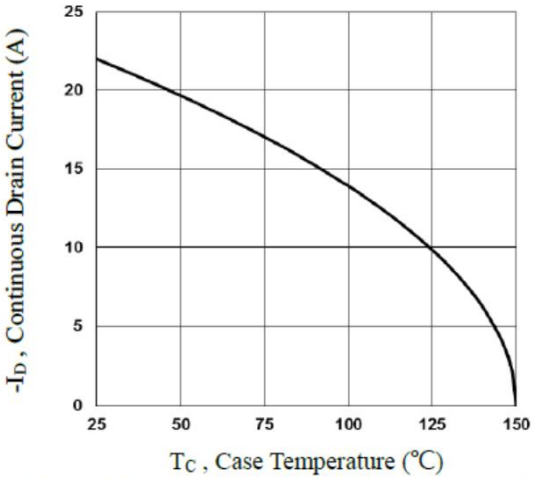


Fig.1 Continuous Drain Current vs. T_c

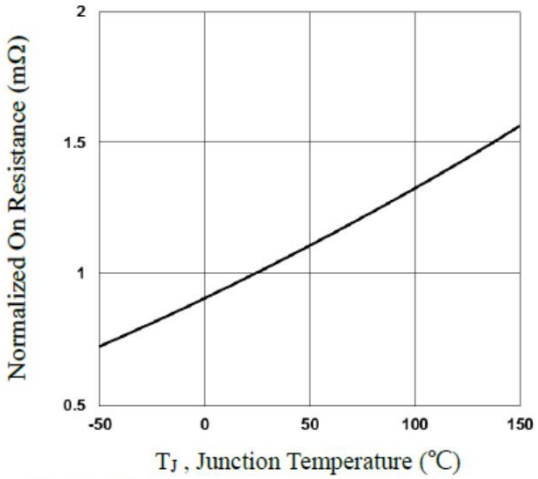


Fig.2 Normalized RDSON vs. T_J

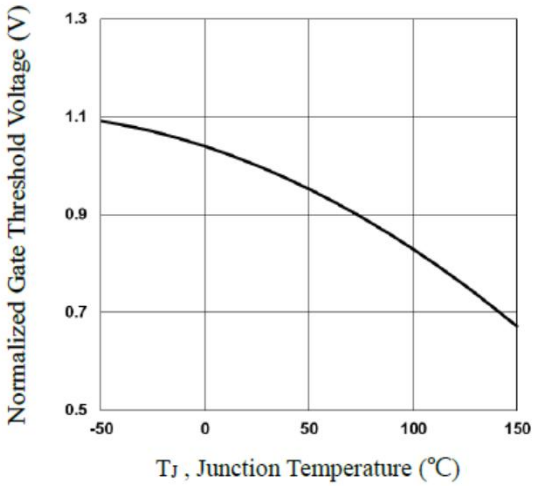


Fig.3 Normalized V_{th} vs. T_J

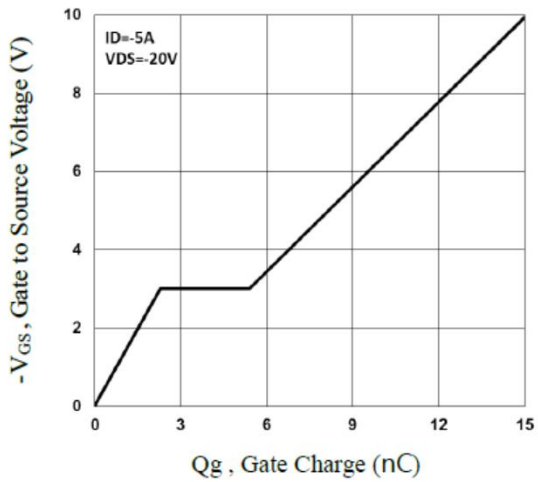


Fig.4 Gate Charge Waveform

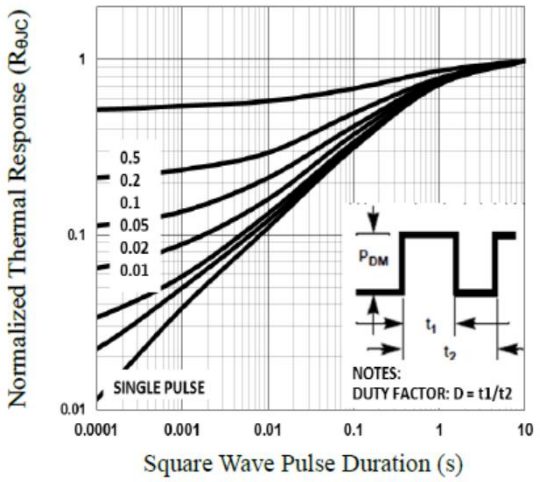


Fig.5 Normalized Transient Impedance

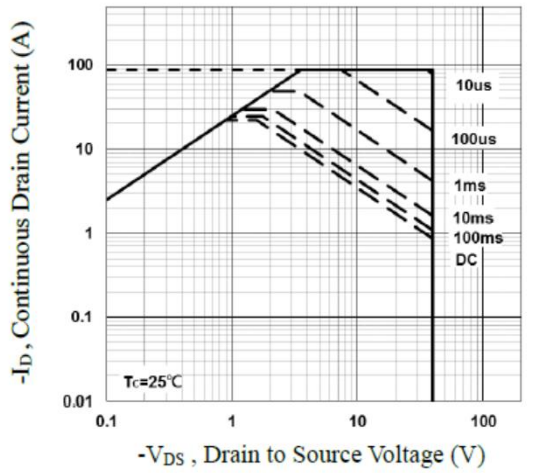


Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics (Continue)

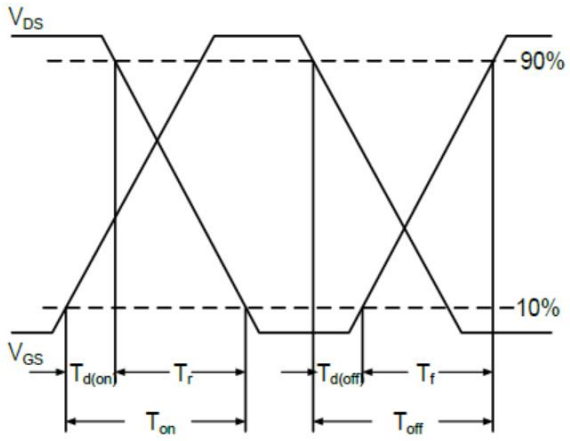


Fig.7 Switching Time Waveform

$$EAS = \frac{1}{2} L \times (-I_{AS})^2 \times \frac{-BVDSS}{-BVDSS-(-VDD)}$$

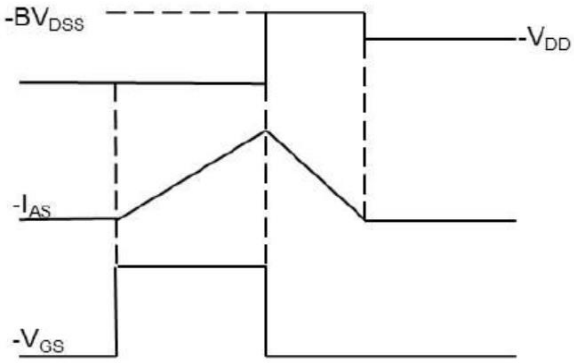
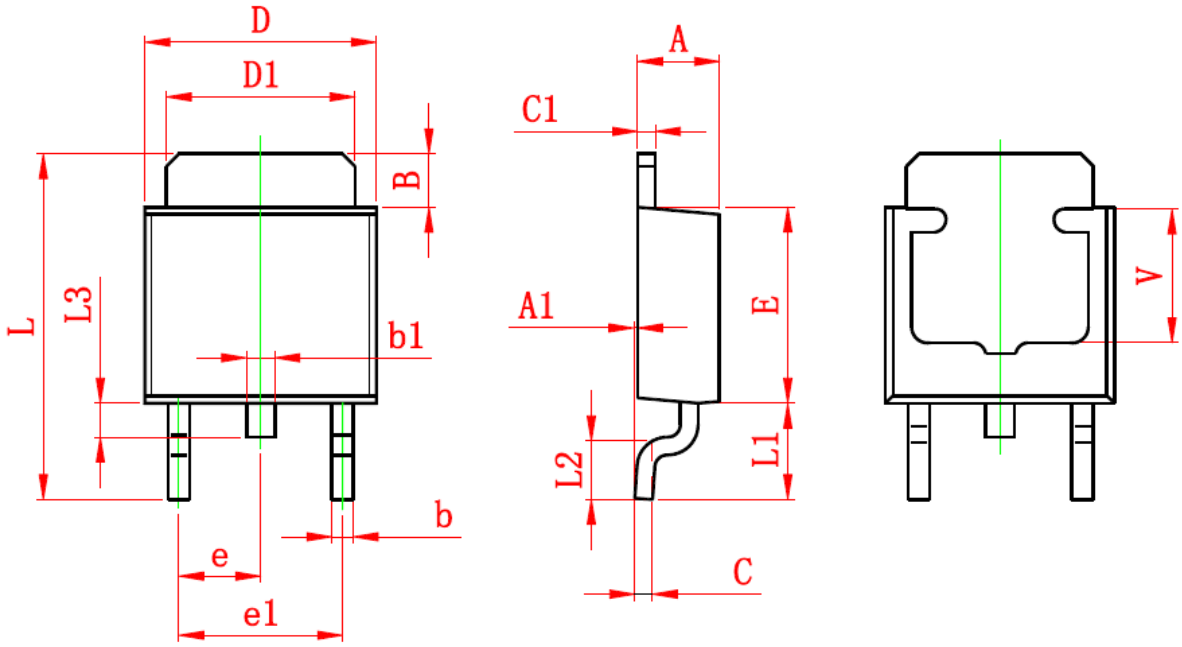


Fig.8 EAS Waveform

Package Dimension

TO-252-2L



Dimensions				
SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
B	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
C	0.430	0.580	0.017	0.023
C1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300 TYP.		0.091 TYP.	
e1	4.500	4.700	0.177	0.185
L	9.500	9.900	0.374	0.390
L1	2.550	2.900	0.100	0.114
L2	1.400	1.780	0.055	0.070
L3	0.600	0.900	0.024	0.035
V	3.800 REF.		0.150 REF.	

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