GSMDD4963

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

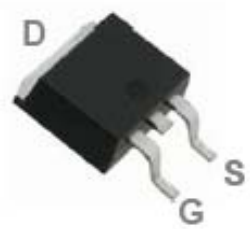
- -40V, -45A, $R_{DS(ON)}$=17mΩ@V_{GS}=10V
- Improved dv/dt capability
- Fast switching
- Green Device Available
- TO-252-2L package design

Applications

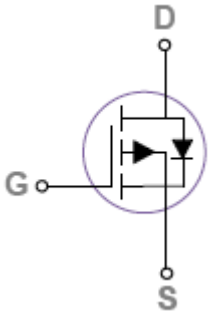
- Motor Drive
- POL Applications
- LED Lighting

Packages & Pin Assignments

GSMDD4963DF (TO-252-2L)

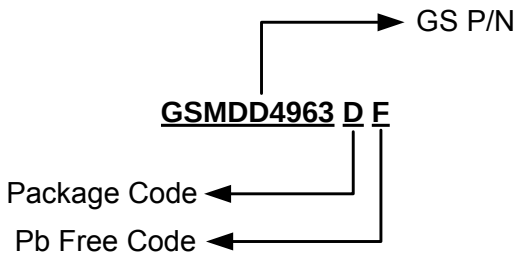


Top View



Description
Gate
Source
Drain

Ordering Information



Part Number	Package	Quantity Reel
GSMDD4963DF	TO-252-2L	2500 PCS

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_A=25℃	-45	A
		T_C=100℃	-28	
I_{DM}	Pulsed Drain Current (Note 1)		-180	A
EAS	Single Pulse Avalanche Energy (Note 2)		100	mJ
IAS	Single Pulse Avalanche Current (Note 2)		-45	A
P_D	Power Dissipation (T_C=25℃)		62.5	W
	Power Dissipation (Derate above 25℃)		0.5	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		2	℃/W

Note 1: Repetitive Rating: Pulsed width limited by maximum junction temperature.
Note 2: V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, IAS=-45A, Starting T_J=25℃.

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
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃, I_D=-1mA		-0.05		V/℃
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=-250uA	-1.2	-1.6	-2.5	V
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 T_J=25℃			1	uA
		V_{DS}=-32V,V_{GS}=0V, T_J=125℃			10	
I_S	Continuous Source Current	V_G=V_D=0V, Force Current			-45	A
I_{SM}	Pulsed Source Current (Note 3)				-90	
$R_{DS(on)}$	Drain-Source On-Resistance	V_{GS}=-10V,I_D=-15A		15	17	mΩ
		V_{GS}=-4.5V,I_D=-10A		22	25	mΩ
g_{FS}	Forward Transconductance	V_{DS}=-10V,I_D=-3A		13		S
V_{SD}	Diode Forward Voltage (Note 3)	V_{GS}=0V,I_S=-1A			-1	V
Dynamic						
Q_g	Total Gate Charge (Note 3,4)	V_{DS}=-20V,V_{GS}=-4.5V, I_D=5A		19	38	nC
Q_{gs}	Gate-Source Charge (Note 3,4)			6.2	12	
Q_{gd}	Gate-Drain Charge (Note 3,4)			5.2	10	
C_{iss}	Input Capacitance	V_{DS}=-25V,V_{GS}=0V, f=1MHz		2260	3300	pF
C_{oss}	Output Capacitance			170	250	
C_{rss}	Reverse Transfer Capacitance			130	190	
$t_{d(on)}$	Turn-On Time (Note 3,4)	V_{DD}=-20V,I_D=-1A, V_{GS}=-10V,R_G=6Ω		18.2	36	ns
t_r				4.2	8.5	
$t_{d(off)}$	Turn-Off Time (Note 3,4)			72	140	
t_f				9.8	20	
R_g	Gate Resistance	V_{DS}=0V,V_{GS}=0V, f=1MHz		7.5	15	Ω

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

Note 4: Essentially independent of operating temperature.

Typical Performance Characteristics

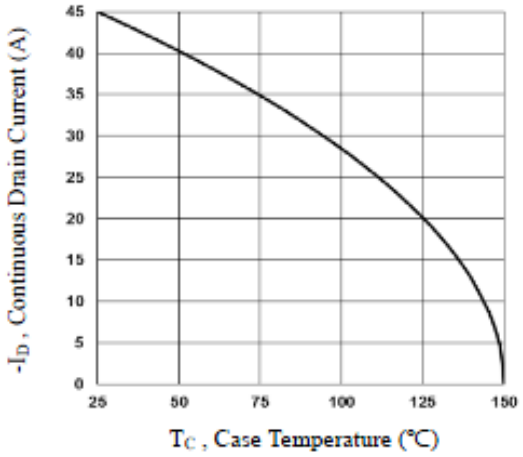


Fig.1 Continuous Drain Current vs. T_c

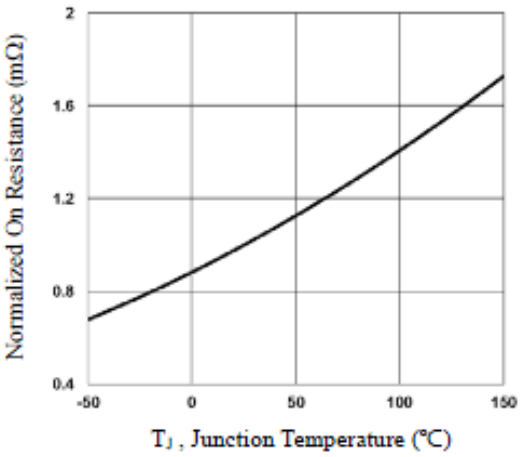


Fig.2 Normalized RDSON vs. T_J

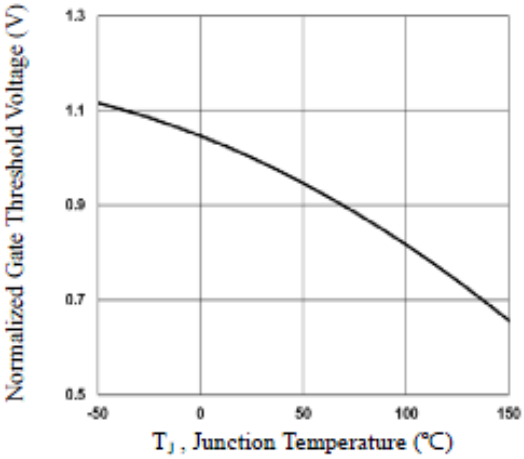


Fig.3 Normalized V_{th} vs. T_J

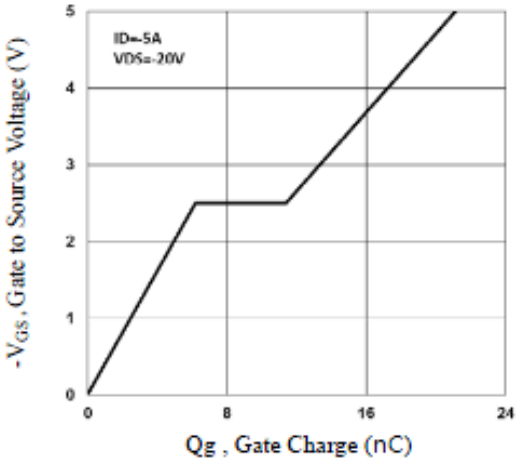


Fig.4 Gate Charge Waveform

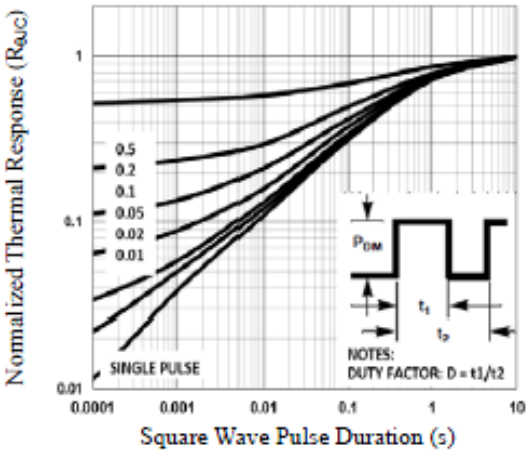


Fig.5 Normalized Transient Impedance

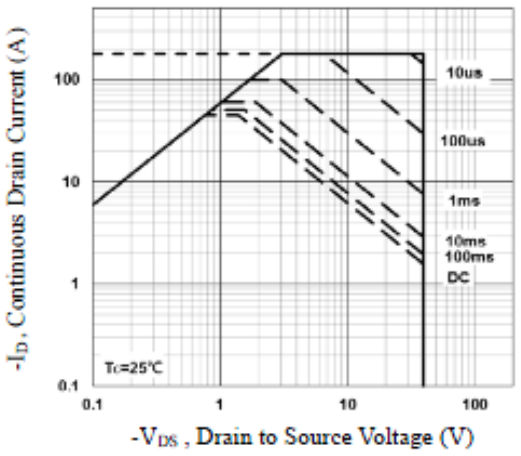
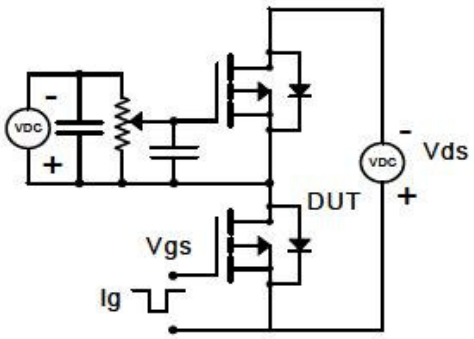
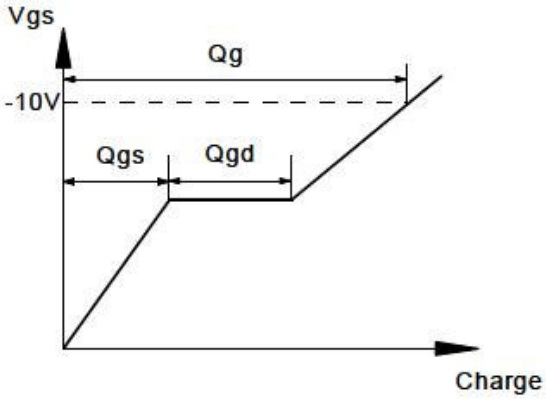


Fig.6 Maximum Safe Operation Area

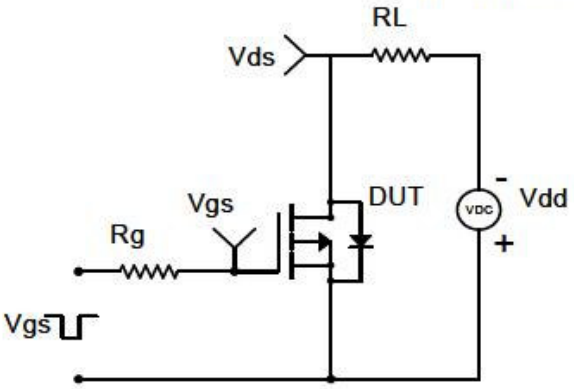
Typical Performance Characteristics (Continue)

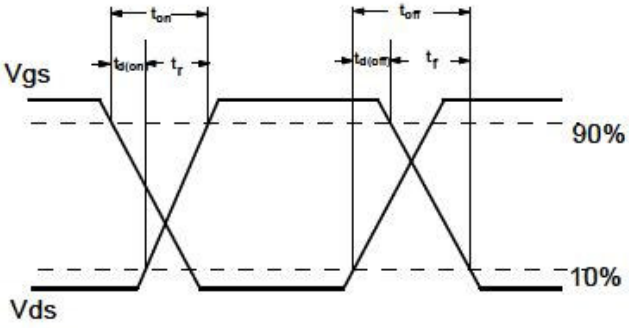
Gate Charge Test Circuit & Waveform



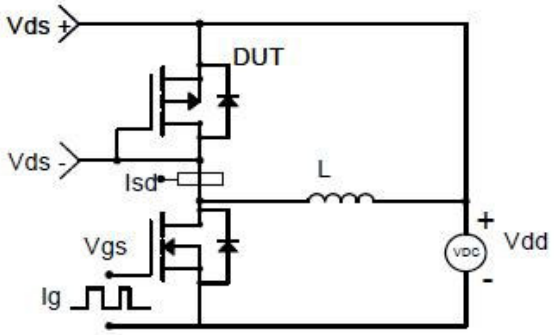


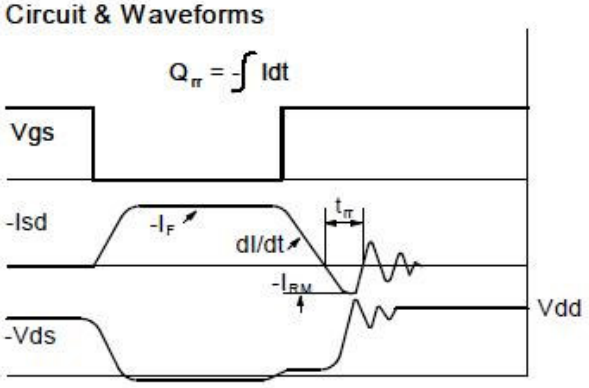
Resistive Switching Test Circuit & Waveforms





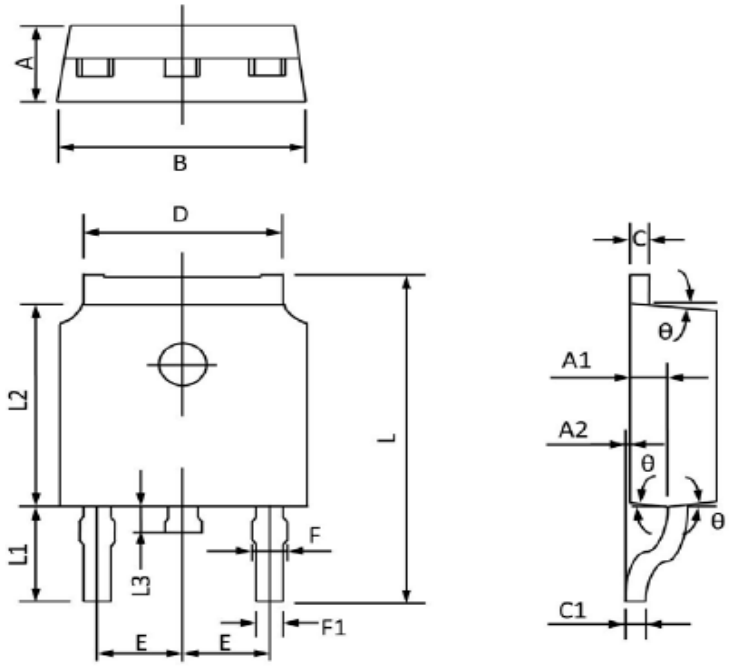
Diode Recovery Test Circuit & Waveforms



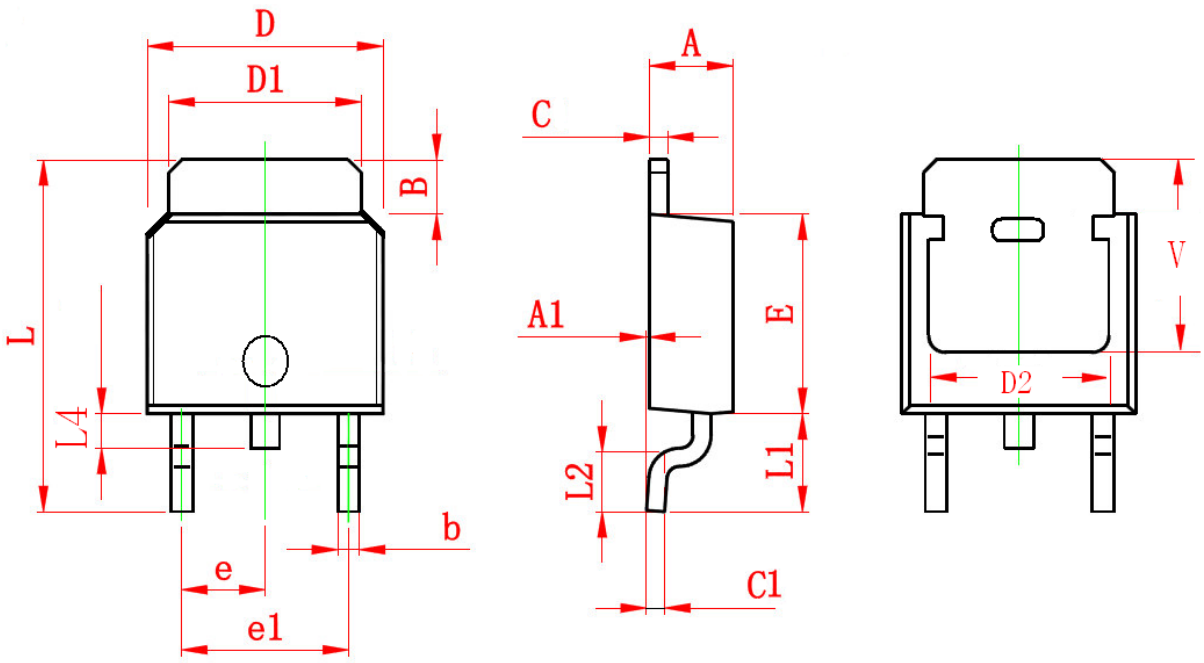


Package Dimension

TO-252-2L



Dimensions				
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	2.20	2.40	0.087	0.094
A1	0.91	1.11	0.036	0.044
A2	0.00	0.15	0.000	0.006
B	6.50	6.70	0.256	0.264
C	0.46	0.58	0.018	0.030
C1	0.46	0.58	0.018	0.030
D	5.10	5.46	0.201	0.215
E	2.186	2.386	0.086	0.094
F	0.74	0.94	0.029	0.037
F1	0.66	0.86	0.026	0.034
L	9.80	10.40	0.386	0.409
L1	2.9 (REF)		0.114 (REF)	
L2	6.00	6.20	0.236	0.244
L3	0.60	1.00	0.024	0.039
θ	3°	9°	3°	9°



Dimensions				
SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	2.200	2.400	0.087	0.094
A1	0.000	0.13	0.000	0.0051
B	0.89	1.27	0.035	0.05
b	0.64	0.88	0.0252	0.0346
C	0.430	0.58	0.017	0.023
C1	0.430	0.60	0.017	0.0236
D	6.350	6.730	0.250	0.265
D1	5.200	5.460	0.205	0.215
E	6.000	6.220	0.236	0.244
e	2.300 TYP		0.091 TYP	
e1	4.500	4.700	0.177	0.185
L	9.400	10.400	0.37	0.409
L1	2.743 REF		0.108 REF	
L2	1.400	1.780	0.055	0.070
L4	0.600	1.01	0.024	0.0398
V	5.350 REF		0.211 REF	
D2	4.830 REF		0.190 REF	

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