

GSMDP4960

40V 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.


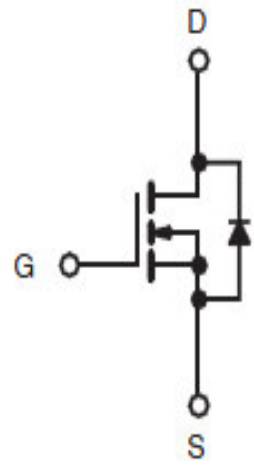
Features

- 40V, 150A, $R_{DS(ON)}=3.8m\Omega@V_{GS}=10V$
- Improved dv/dt capability
- Fast switching
- Green Device Available
- TO-220 package design

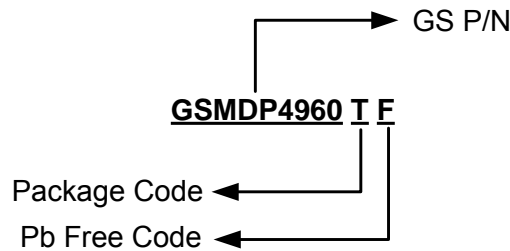
Applications

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

Packages & Pin Assignments

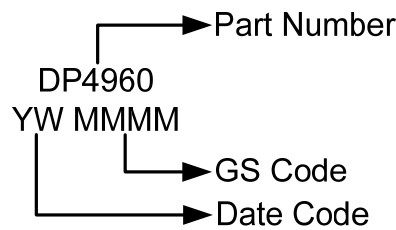
GSMDP4960TF (TO-220)	
 <p>Top View</p>	
	
Pin	Description
1	Gate
2	Drain
3	Source

Ordering Information



Part Number	Package	Quantity Tube
GSMDP4960TF	TO-220	50 PCS

Marking Information



Absolute Maximum Ratings

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_C=25^\circ\text{C}$	150
		$T_C=100^\circ\text{C}$	95
I_{DM}	Pulsed Drain Current (Note 1)	600	A
EAS	Single Pulse Avalanche Energy (Note 2)	312	mJ
IAS	Single Pulse Avalanche Current (Note 2)	79	A
P_D	Power Dissipation ($T_C=25^\circ\text{C}$)	166	W
	Power Dissipation (Derate above 25°C)	1.33	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	0.75	$^\circ\text{C}/\text{W}$

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

Note 2: $V_{DD}=25\text{V}$, $V_{GS}=10\text{V}$, $L=0.1\text{mH}$, $I_{AS}=79\text{A}$, 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
Static						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	40			V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°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	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=40V, V_{GS}=0V$			1	μA
		$V_{DS}=32V, V_{GS}=0V$, $T_J=125^{\circ}\text{C}$			10	
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current			150	A
I_{SM}	Pulsed Source Current (Note 3)				300	
$R_{DS(on)}$	Drain-Source On-Resistance (Note 3)	$V_{GS}=10V, I_D=25A$		3.1	3.8	$\text{m}\Omega$
		$V_{GS}=4.5V, I_D=12A$		4.0	5.0	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS}=10V, I_D=2A$		16		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)	$V_{DS}=20V, V_{GS}=4.5V$, $I_D=10A$		44.4	80	nC
Q_{gs}	Gate-Source Charge (Note 3,4)			9.6	18	
Q_{gd}	Gate-Drain Charge (Note 3,4)			16	30	
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V$, $f=1\text{MHz}$		4940	7800	pF
C_{oss}	Output Capacitance			425	800	
C_{rss}	Reverse Transfer Capacitance			170	330	
$t_{d(on)}$	Turn-On Time (Note 3,4)	$V_{DD}=20V, I_D=1A$, $V_{GS}=10V, R_G=6\Omega$		28	50	ns
t_r				3.2	6.5	
$t_{d(off)}$	Turn-Off Time (Note 3,4)			89	160	
t_f				14	28	
R_g	Gate Resistance		$V_{DS}=0V, V_{GS}=0V$, $f=1\text{MHz}$		1.4	

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

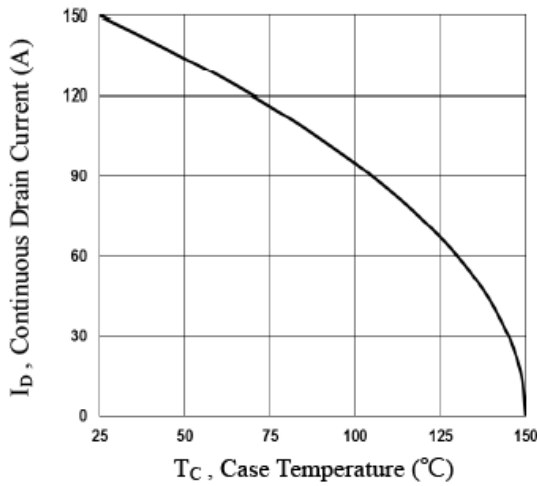


Fig.1 Continuous Drain Current vs. T_C

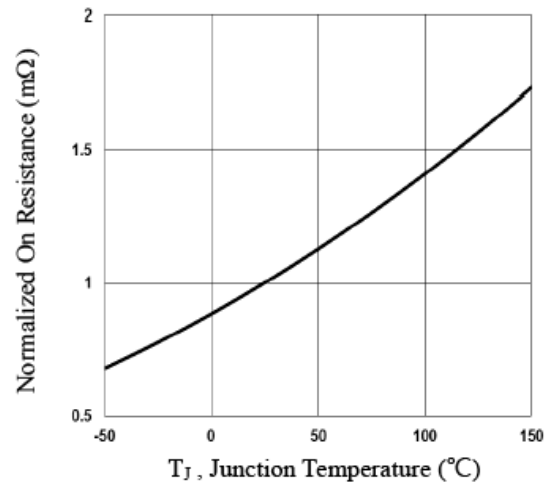


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

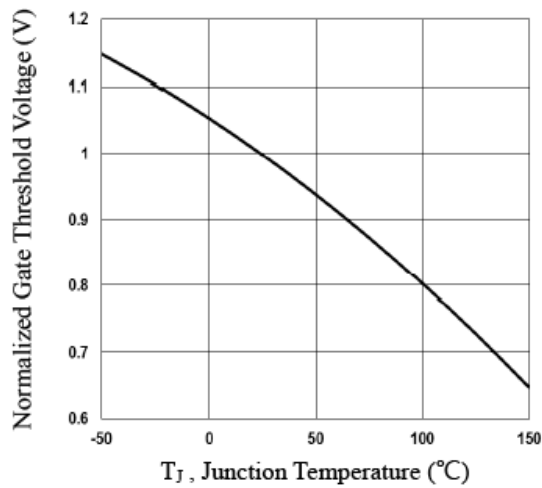


Fig.3 Normalized V_{th} vs. T_J

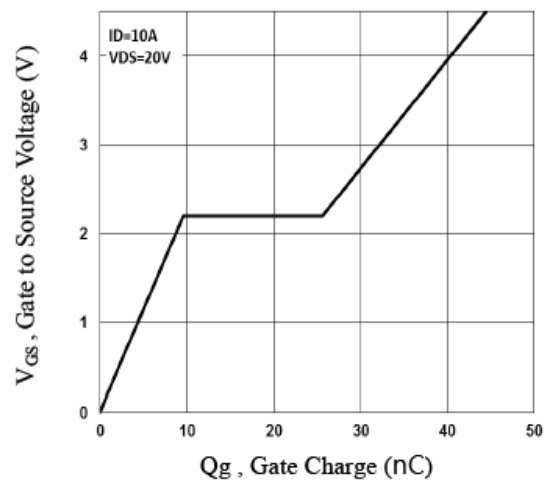


Fig.4 Gate Charge Waveform

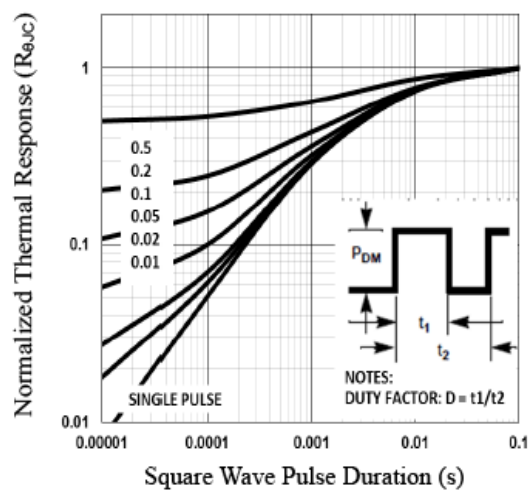


Fig.5 Normalized Transient Impedance

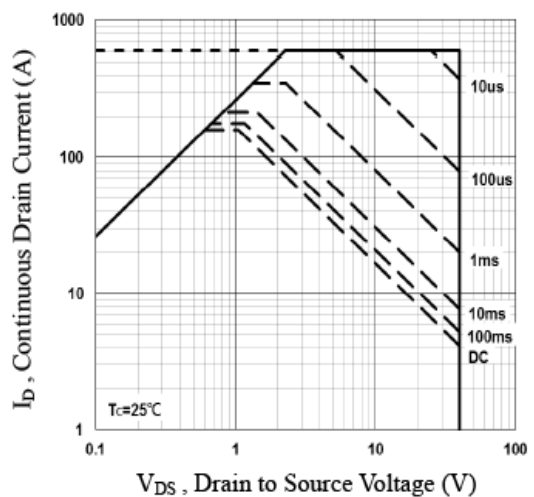
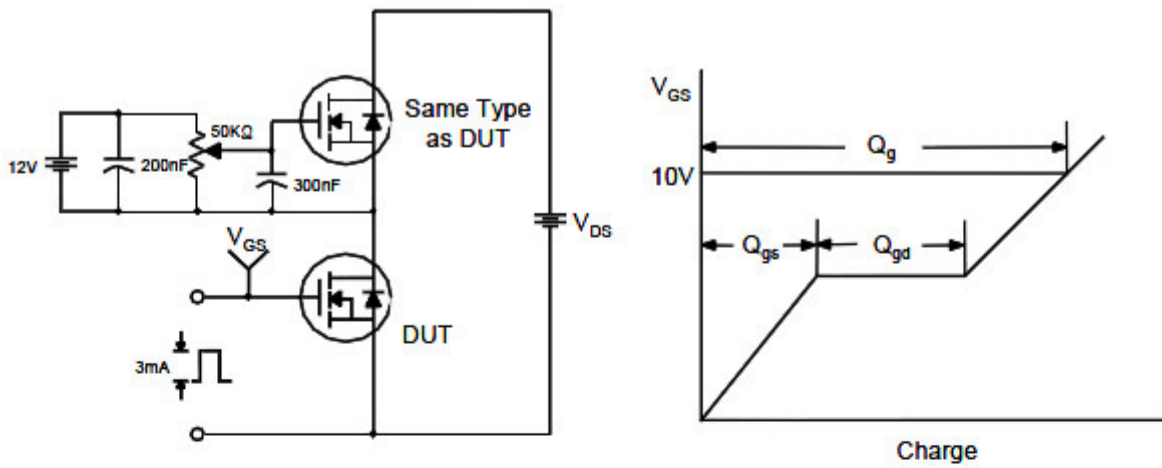


Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics (Continue)

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

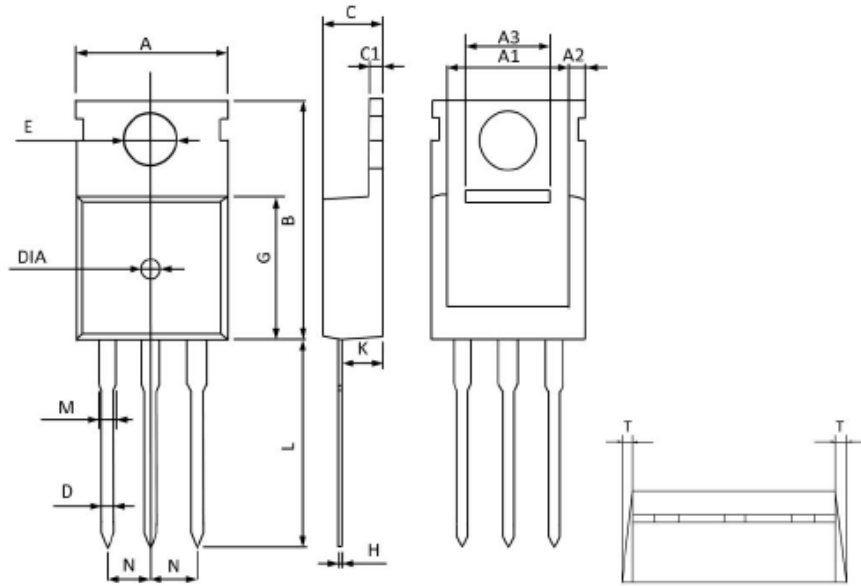


Unclamped Inductive Switching Test Circuit & Waveforms



Package Dimension

TO-220










Dimensions				
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	9.70	10.30	0.382	0.406
A1	8.44	8.84	0.332	0.348
A2	1.05	1.25	0.041	0.049
A3	5.10	5.30	0.201	0.209
B	15.40	16.20	0.606	0.638
C	4.28	4.68	0.169	0.184
C1	1.10	1.50	0.043	0.059
D	0.60	1.00	0.024	0.039
E	3.40	3.80	0.134	0.150
G	8.70	9.30	0.343	0.366
H	0.40	0.60	0.016	0.024
K	2.10	2.70	0.083	0.106
L	12.80	13.60	0.504	0.535
M	1.10	1.50	0.043	0.059
N	2.49	2.59	0.098	0.102
T	W0.35		W0.014	
DIA	Deep0.2(TYP)	Φ 1.5(TYP)	Deep0.008(TYP)	Φ 0.059(TYP)



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