100V P-Channel MOSFETs

PDD0905
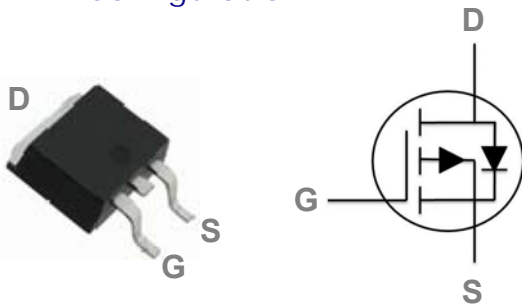
General Description

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.

BVDSS	RDSON	ID
-100V	210mΩ	-10A

Features

- *-100V,-10A, RDS(ON) 210mΩ@VGS = -10V*
- *Improved dv/dt capability*
- *Fast switching*
- *Green Device Available*

TO252 Pin Configuration

Applications

- *Networking*
- *Load Switch*
- *LED applications*

Absolute Maximum Ratings (Tc=25℃ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-100	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current – Continuous (T_C=25℃)	-10	A
	Drain Current – Continuous (T_C=100℃)	-6.5	A
I_{DM}	Drain Current – Pulsed[1]	-40	A
P_D	Power Dissipation (T_C=25℃)	54	W
	Power Dissipation – Derate above 25℃	0.43	W/℃
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	2.3	℃/W
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62	℃/W

Electrical Characteristics (T$_J$=25 ℃, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV$_{DSS}$	Drain-Source Breakdown Voltage	V$_{GS}$=0V , I$_D$=-250uA	-100	---	---	V
△BV$_{DSS}$/△T$_J$	BV$_{DSS}$ Temperature Coefficient	Reference to 25℃ , I$_D$=-1mA	---	---	---	V/℃
I$_{DSS}$	Drain-Source Leakage Current	V$_{DS}$=-100V , V$_{GS}$=0V , T$_J$=25℃	---	---	-1	uA
		V$_{DS}$=-80V , V$_{GS}$=0V , T$_J$=125℃	---	---	-10	uA
I$_{GSS}$	Gate-Source Leakage Current	V$_{GS}$=±20V , V$_{DS}$=0V	---	---	±100	nA

On Characteristics

R$_{DS(ON)}$	Static Drain-Source On-Resistance	V$_{GS}$=-10V , I$_D$=-5A	---	170	210	mΩ
		V$_{GS}$=-4.5V , I$_D$=-2A	---	190	230	mΩ
V$_{GS(th)}$	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$ =-250uA	-1	---	-3	V
gfs	Forward Transconductance	V$_{DS}$=10V , I$_D$=-3A	---	7	---	S

Dynamic and switching Characteristics

Q$_g$	Total Gate Charge	V$_{DS}$=-80V , V$_{GS}$=-10V , I$_D$=-5A	---	20	40	nC
Q$_{gs}$	Gate-Source Charge		---	3.5	7	
Q$_{gd}$	Gate-Drain Charge		---	4.6	9	
T$_{d(on)}$	Turn-On Delay Time	V$_{DD}$=-50V , V$_{GS}$=-10V , R$_G$=25Ω I$_D$=-5A	---	18	36	ns
T$_r$	Rise Time		---	8	16	
T$_{d(off)}$	Turn-Off Delay Time		---	100	200	
T$_f$	Fall Time		---	30	60	
C$_{iss}$	Input Capacitance	V$_{DS}$=-25V , V$_{GS}$=0V , F=1MHz	---	1419	2500	pF
C$_{oss}$	Output Capacitance		---	89	170	
C$_{rss}$	Reverse Transfer Capacitance		---	45	90	
R$_g$	Gate resistance	V$_{GS}$=0V, V$_{DS}$=0V, F=1MHz	---	16	---	Ω

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I$_S$	Continuous Source Current	V$_G$=V$_D$=0V , Force Current	---	---	-10	A
I$_{SM}$	Pulsed Source Current		---	---	-20	A
V$_{SD}$	Diode Forward Voltage	V$_{GS}$=0V , I$_S$=-1A , T$_J$=25℃	---	---	-1.2	V
t$_{rr}$	Reverse Recovery Time[2]	V$_{GS}$=0V,I$_S$=-5A , dI/dt=100A/μs	---	26.6	---	ns
Q$_{rr}$	Reverse Recovery Charge[2]	T$_J$=25℃	---	24.2	---	uC

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
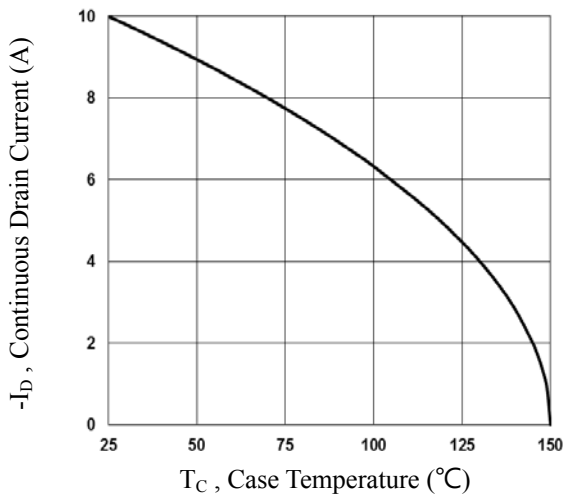3. Essentially independent of operating temperature.
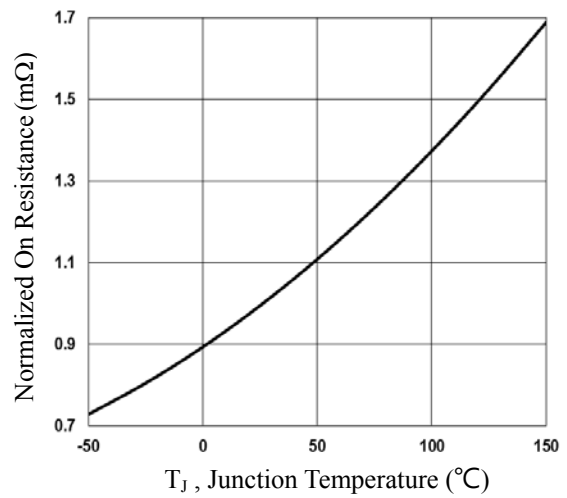
Fig.1 Continuous Drain Current vs. T$_C$

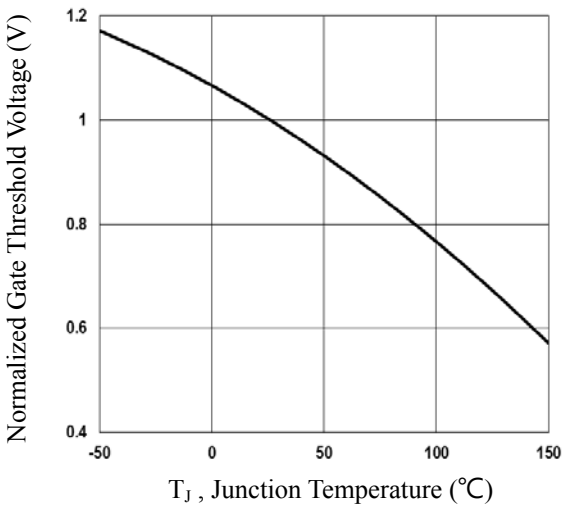Fig.2 Normalized RDSON vs. T$_J$

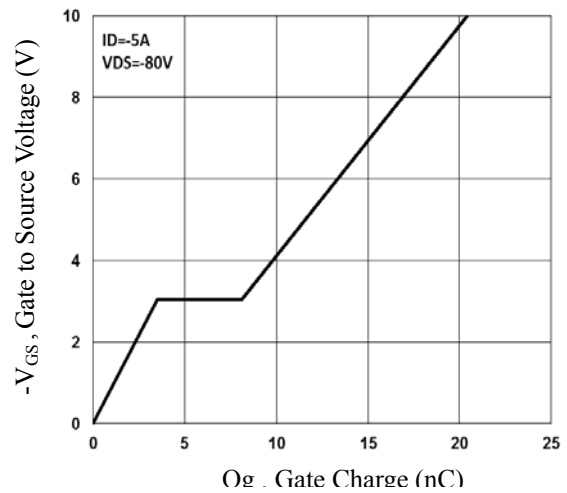

Fig.3 Normalized V$_{th}$ vs. T$_J$
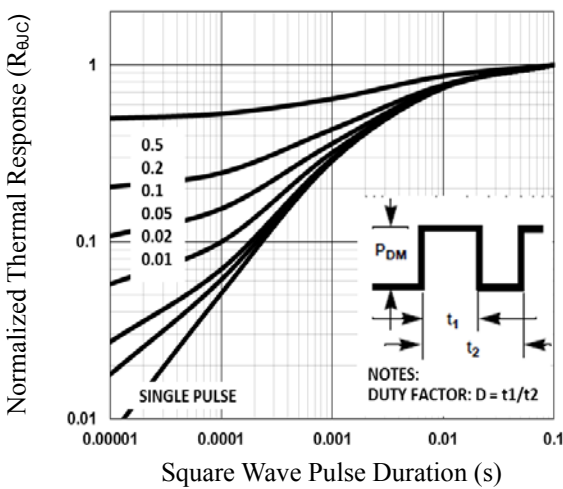

Fig.4 Gate Charge Waveform
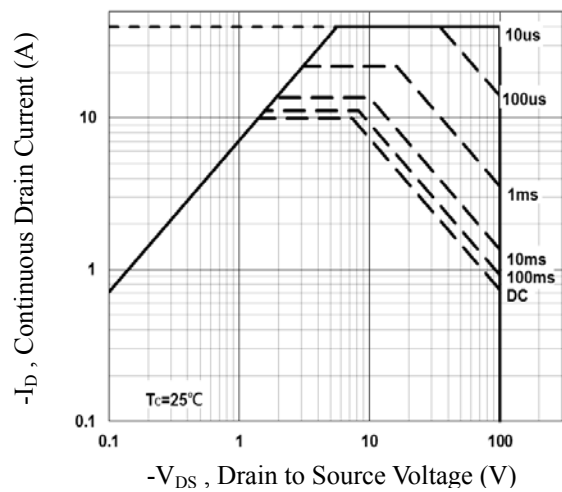

Fig.5 Normalized Transient Impedance

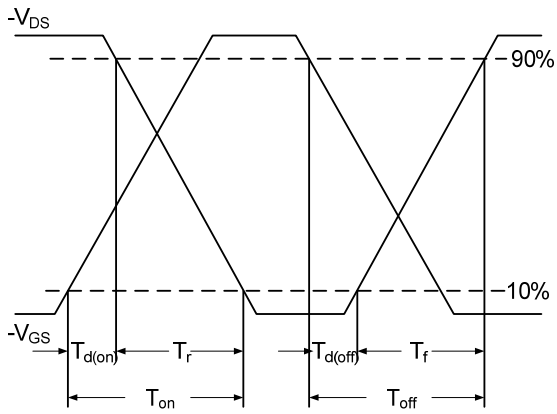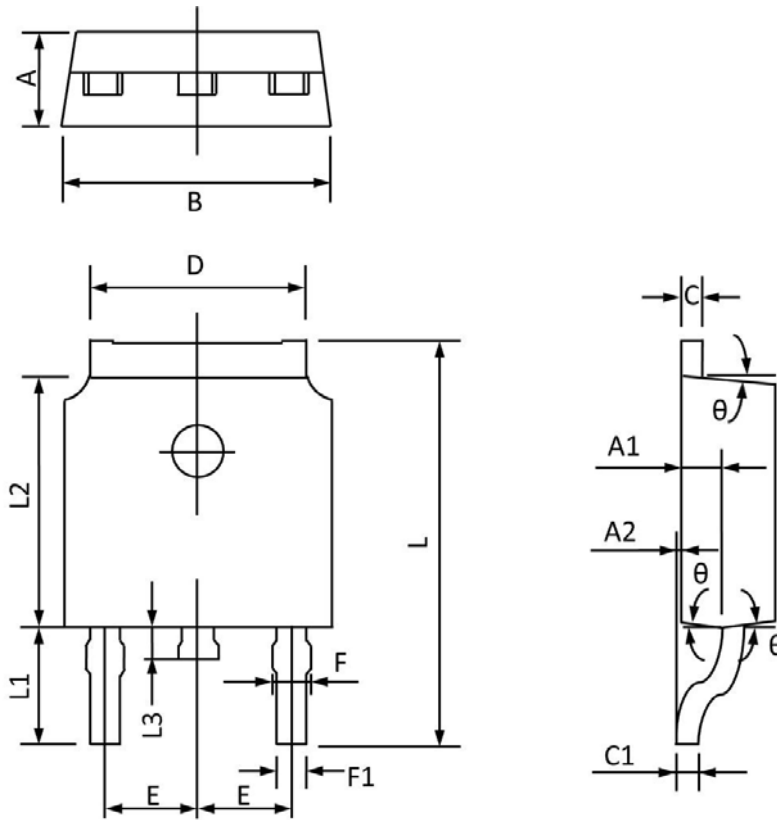Fig.6 Maximum Safe Operation Area

Fig.7   Switching Time Waveform

Fig.8   Gate Charge Waveform

TO252 PACKAGE INFORMATION

Symbol	Dimensions In Millimeters		Dimensions In 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	0.580	0.018	0.230
C1	0.46	0.580	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	0.660	0.860	0.026	0.034
L	9.80	10.40	0.386	0.409
L1	2.9REF		0.114REF	
L2	6.00	6.20	0.236	0.244
L3	0.60	1.00	0.024	0.039
θ	3˚	9˚	3˚	9˚