30V P-Channel MOSFETs

PDS3905
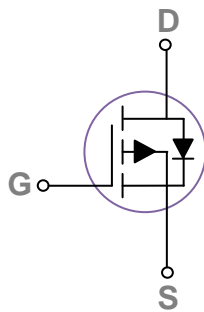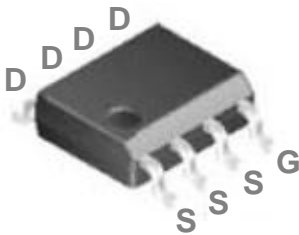
General Description

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
-30V	15.5mΩ	-10A

Features

- *-30V,-10A, RDS(ON) =18mΩ@VGS = -10V*
- *Fast switching*
- *Green Device Available*
- *Suit for -4.5V Gate Drive Applications*

Applications

- *MB / VGA / Vcore*
- *POL Applications*
- *Load Switch*
- *LED Application*

SOP8 Pin Configuration

Absolute Maximum Ratings Tc=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current – Continuous (T_C=25℃)	-10	A
	Drain Current – Continuous (T_C=100℃)	-6.3	A
I_{DM}	Drain Current – Pulsed[1]	-40	A
P_D	Power Dissipation (T_C=25℃)	2.5	W
	Power Dissipation – Derate above 25℃	0.02	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
$R_{θJA}$	Thermal Resistance Junction to ambient	---	50	℃/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	-30	---	---	V
△BV$_{DSS}$/△T$_J$	BV$_{DSS}$ Temperature Coefficient	Reference to 25℃ , I$_D$=-1mA	---	-0.03	---	V/℃
I$_{DSS}$	Drain-Source Leakage Current	V$_{DS}$=-30V , V$_{GS}$=0V , T$_J$=25℃	---	---	-1	uA
		V$_{DS}$=-24V , 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$_D$=-8A	---	12.4	15.5	mΩ
		V$_{GS}$=-4.5V , I$_D$=-6A	---	19.2	25	mΩ
V$_{GS(th)}$	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$ =-250uA	-1.0	-1.6	-2.5	V
△V$_{GS(th)}$	V$_{GS(th)}$ Temperature Coefficient		---	4	---	mV/℃
gfs	Forward Transconductance	V$_{DS}$=-10V , I$_D$=-8A	---	10.5	---	S

Dynamic and switching Characteristics

Q$_g$	Total Gate Charge[2,3]	V$_{DS}$=-15V , V$_{GS}$=-4.5V , I$_D$=-8A	---	14.6	21	nC
Q$_{gs}$	Gate-Source Charge[2,3]		---	4.1	6	
Q$_{gd}$	Gate-Drain Charge[2,3]		---	6.3	9	
T$_{d(on)}$	Turn-On Delay Time[2,3]	V$_{DD}$=-15V , V$_{GS}$=-10V , R$_G$=6Ω I$_D$=-1A	---	9	17	ns
T$_r$	Rise Time[2,3]		---	21.8	41	
T$_{d(off)}$	Turn-Off Delay Time[2,3]		---	59.8	114	
T$_f$	Fall Time[2,3]		---	14.4	27	
C$_{iss}$	Input Capacitance	V$_{DS}$=-15V , V$_{GS}$=0V , F=1MHz	---	1730	2510	pF
C$_{oss}$	Output Capacitance		---	180	260	
C$_{rss}$	Reverse Transfer Capacitance		---	125	180	

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		---	---	-40	A
V$_{SD}$	Diode Forward Voltage	V$_{GS}$=0V , I$_S$=-1A , T$_J$=25℃	---	---	-1	V

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.

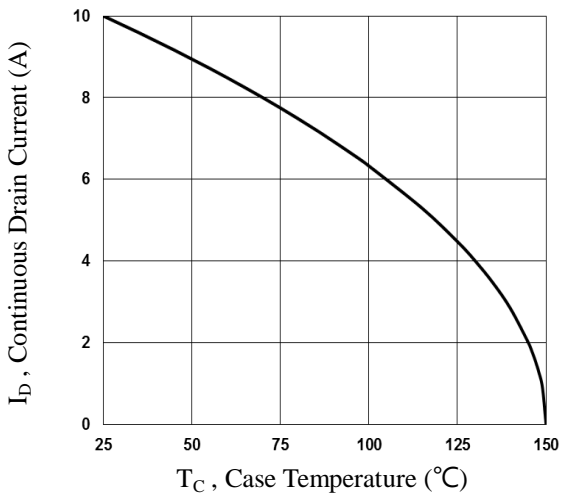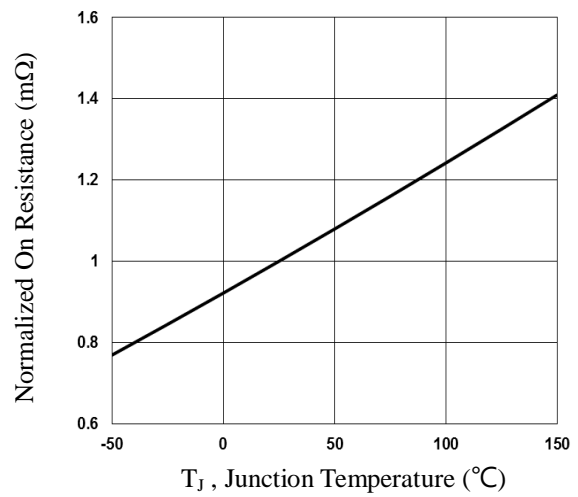Fig.1   **Continuous Drain Current vs. T_C**
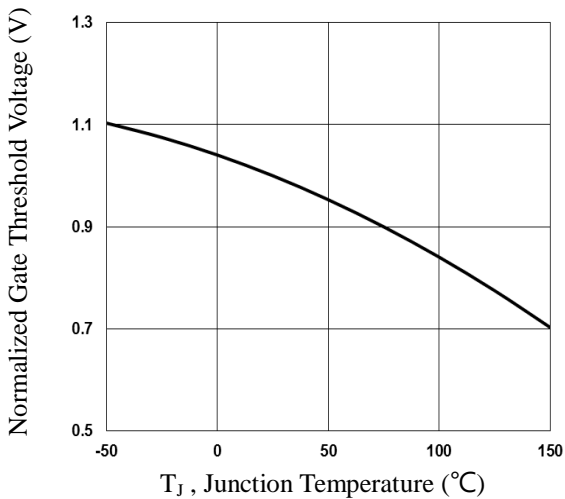
Fig.2   **Normalized RDSON vs. T_J**

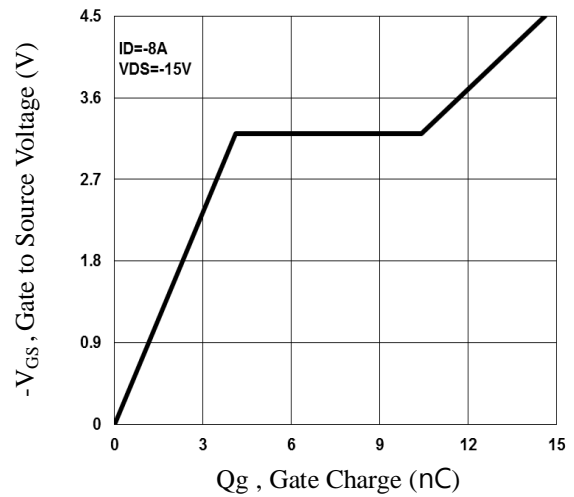Fig.3   **Normalized V_{th} vs. T_J**

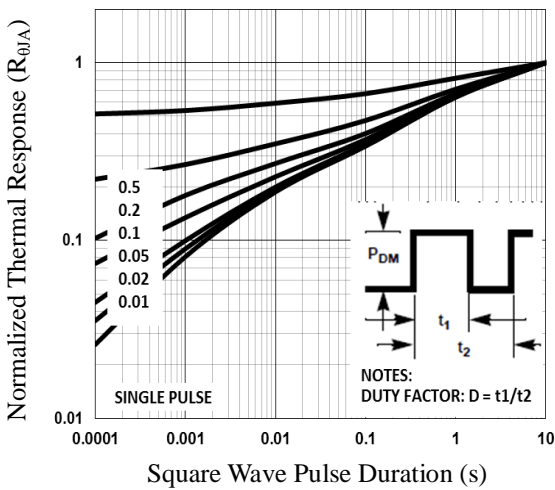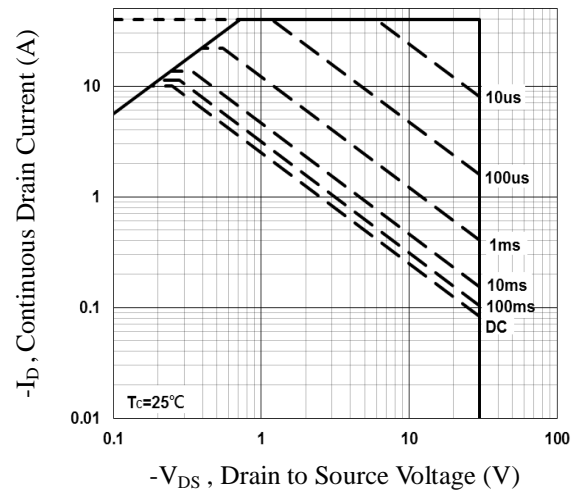Fig.4   **Gate Charge Waveform**

Fig.5   **Normalized Transient Impedance**
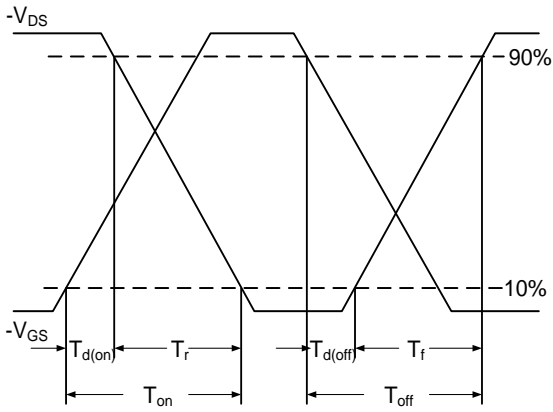
Fig.6   **Maximum Safe Operation Area**

Fig.7 Switching Time Waveform
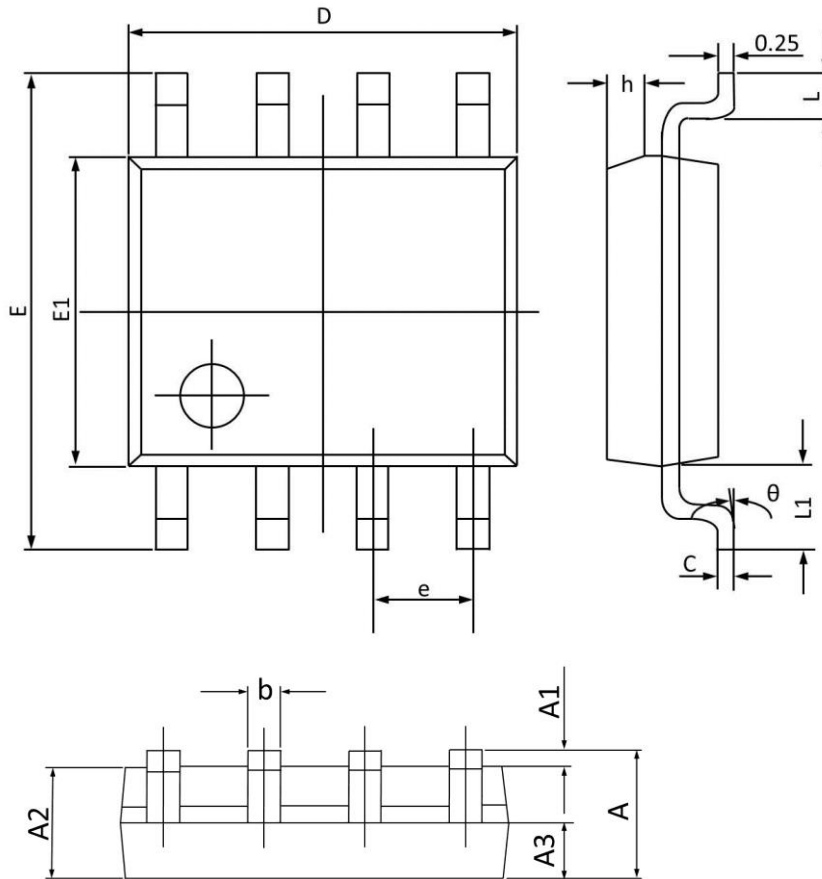

Fig.8 Gate Charge Waveform

SOP8 PACKAGE INFORMATION

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.068
A1	0.100	0.250	0.004	0.009
A2	1.300	1.500	0.052	0.059
A3	0.600	0.700	0.024	0.027
b	0.390	0.480	0.016	0.018
c	0.210	0.260	0.009	0.010
D	4.700	5.100	0.186	0.200
E	5.800	6.200	0.229	0.244
E1	3.700	4.100	0.146	0.161
e	1.270(BSC)		0.050(BSC)	
h	0.250	0.500	0.010	0.019
L	0.500	0.800	0.019	0.031
L1	1.050(BSC)		0.041(BSC)	
θ	0°	8°	0°	8°