PDN3611S

30V P-Channel MOSFETs
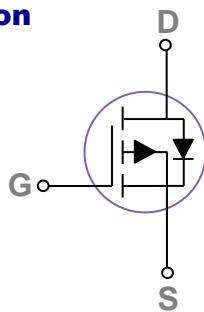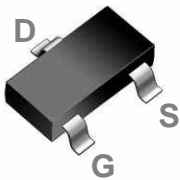
General Description

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	65mΩ	-4.1A

Features

- *-30V,-4.1A, RDS(ON) =65mΩ@VGS = -10V*
- *Fast switching*
- *Green Device Available*
- *Suit for -2.5V Gate Drive Applications*

Applications

- *Notebook*
- *Load Switch*
- *Battery Protection*
- *Hand-Held Instruments*

SOT23-3S 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	±12	V
I_D	Drain Current – Continuous (T_A=25℃)	-4.1	A
	Drain Current – Continuous (T_A=70℃)	-3.3	A
I_{DM}	Drain Current – Pulsed[1]	-16.4	A
P_D	Power Dissipation (T_A=25℃)	1.56	W
	Power Dissipation – Derate above 25℃	0.012	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	---	80	℃/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$_{GS}$=±12V , V$_{DS}$=0V	---	---	±100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R$_{DS(ON)}$	Static Drain-Source On-Resistance	V$_{GS}$=-10V , I$_D$=-4A	---	55	65	mΩ
		V$_{GS}$=-4.5V , I$_D$=-3A	---	65	75	mΩ
		V$_{GS}$=-2.5V , I$_D$=-2A	---	85	100	mΩ
V$_{GS(th)}$	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$ =-250uA	-0.4	-0.7	-0.9	V
△V$_{GS(th)}$	V$_{GS(th)}$ Temperature Coefficient		---	3	---	mV/℃
gfs	Forward Transconductance	V$_{DS}$=-10V , I$_D$=-3A	---	5.4	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q$_g$	Total Gate Charge[2,3]	V$_{DS}$=-15V , V$_{GS}$=-4.5V , I$_D$=-4A	---	8	11	nC
Q$_{gs}$	Gate-Source Charge[2,3]		---	1.9	3	
Q$_{gd}$	Gate-Drain Charge[2,3]		---	1.4	3	
T$_{d(on)}$	Turn-On Delay Time[2,3]	V$_{DD}$=-15V , V$_{GS}$=-10V , R$_G$=6Ω I$_D$=-1A	---	5.4	10	ns
T$_r$	Rise Time[2,3]		---	19.4	37	
T$_{d(off)}$	Turn-Off Delay Time[2,3]		---	45.9	87	
T$_f$	Fall Time[2,3]		---	12.4	24	
C$_{iss}$	Input Capacitance	V$_{DS}$=-15V , V$_{GS}$=0V , F=1MHz	---	810	1175	pF
C$_{oss}$	Output Capacitance		---	85	125	
C$_{rss}$	Reverse Transfer Capacitance		---	50	75	

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	---	---	-4.1	A
I$_{SM}$	Pulsed Source Current		---	---	-16.4	A
V$_{SD}$	Diode Forward Voltage	V$_{GS}$=0V , I$_S$=-1A , T$_J$=25℃	---	---	-1	V
t$_{rr}$	Reverse Recovery Time	V$_R$=-30V, I$_S$=-2A	---	115	---	ns
Q$_{rr}$	Reverse Recovery Charge	di/dt=100A/μs, T$_J$=25℃	---	150	---	nC

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
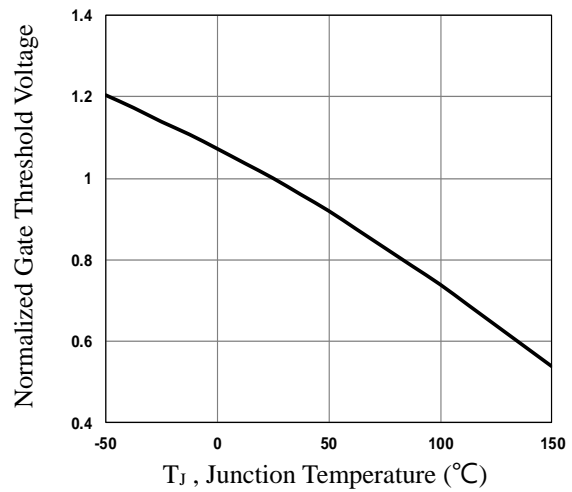3. Essentially independent of operating temperature.
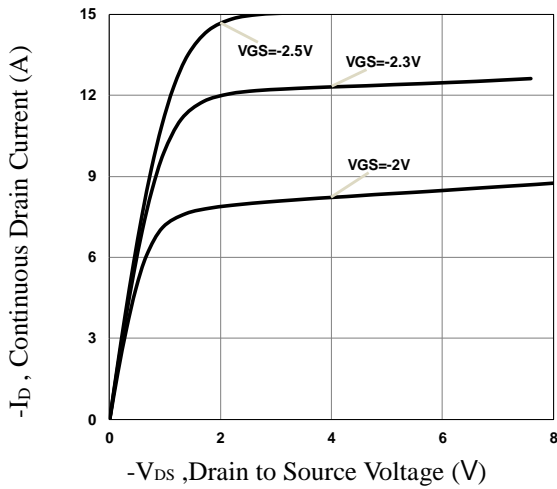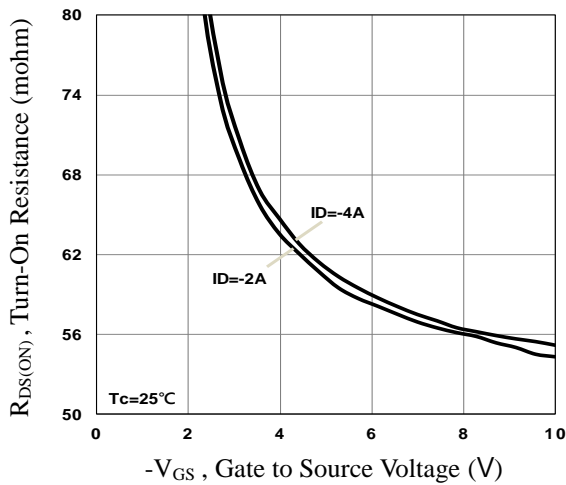
Fig.1   Typical Output Characteristics
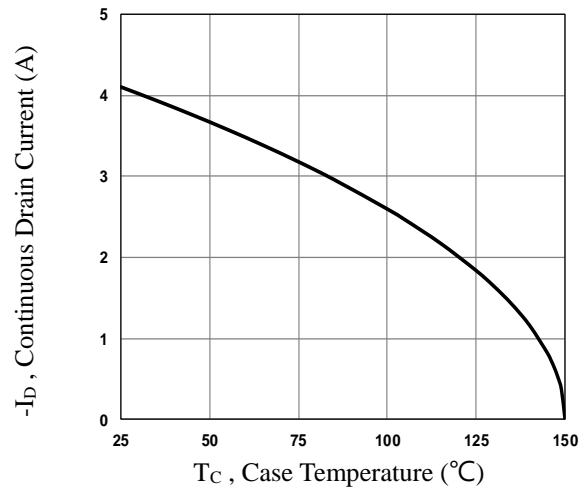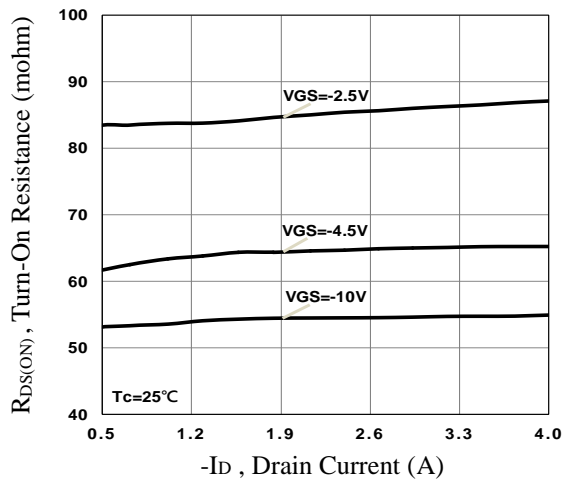

Fig.2   Continuous Drain Current vs. T$_C$
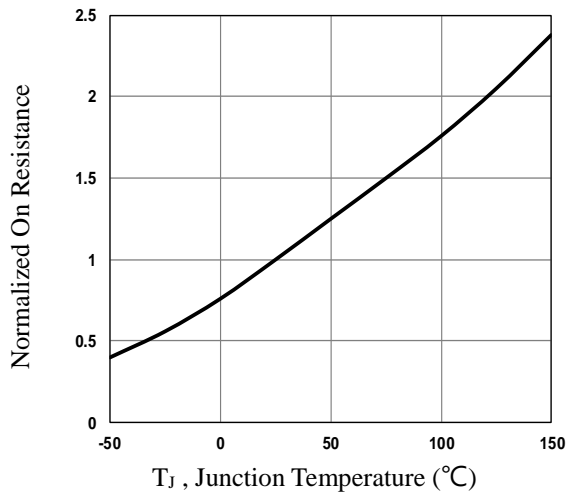
Fig.3   Normalized RDSON vs. T$_J$
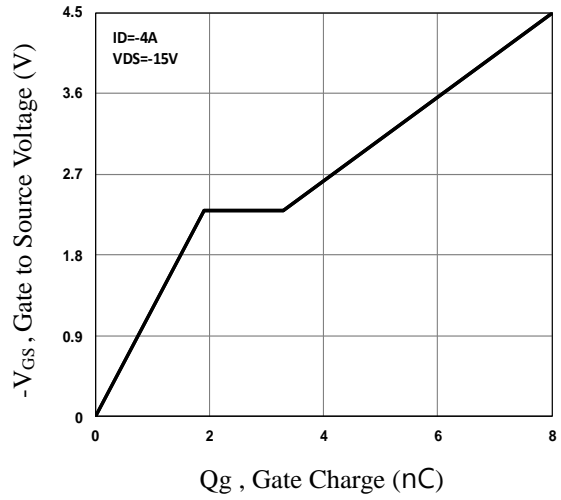

Fig.4   Normalized V$_{th}$ vs. T$_J$

Fig.5   Turn-On Resistance vs. V$_{GS}$
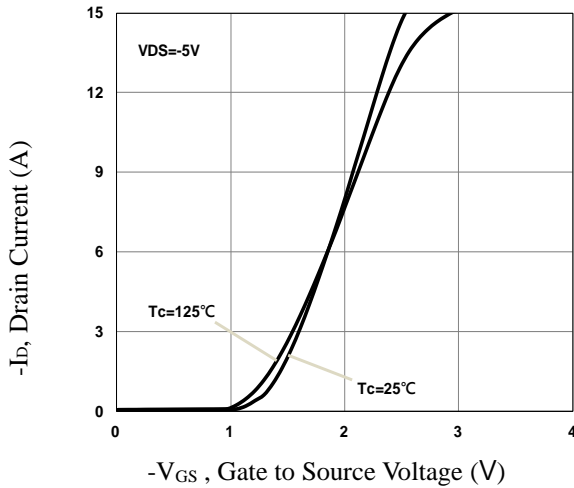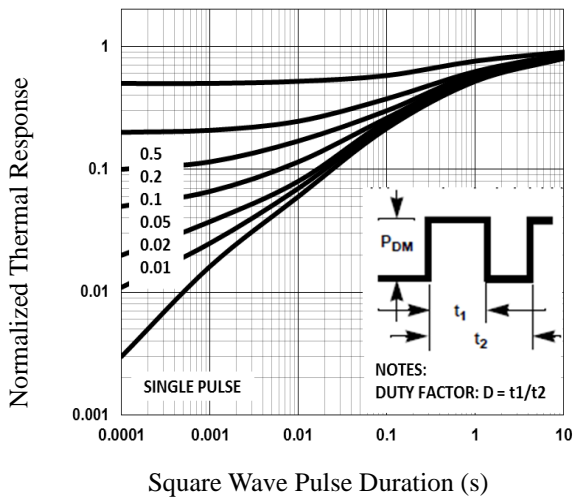

Fig.6   Turn-On Resistance vs. I$_D$
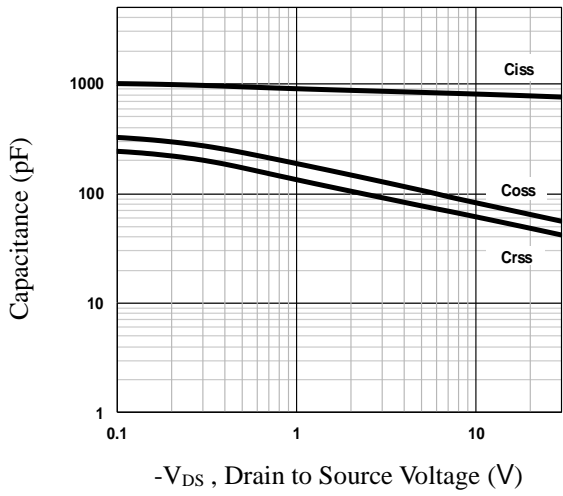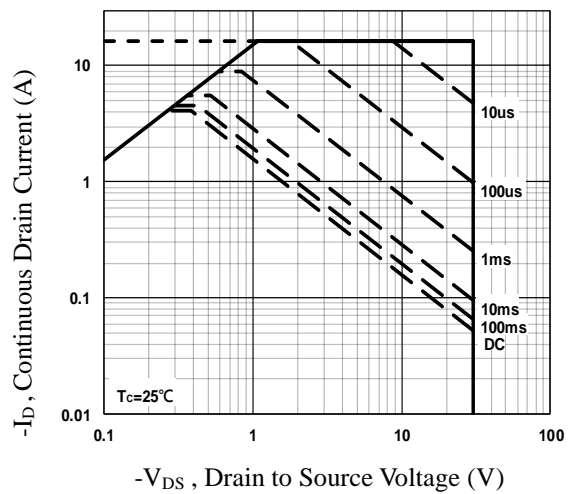
Fig.7   Capacitance Characteristics

Fig.8   Gate Charge Characteristics
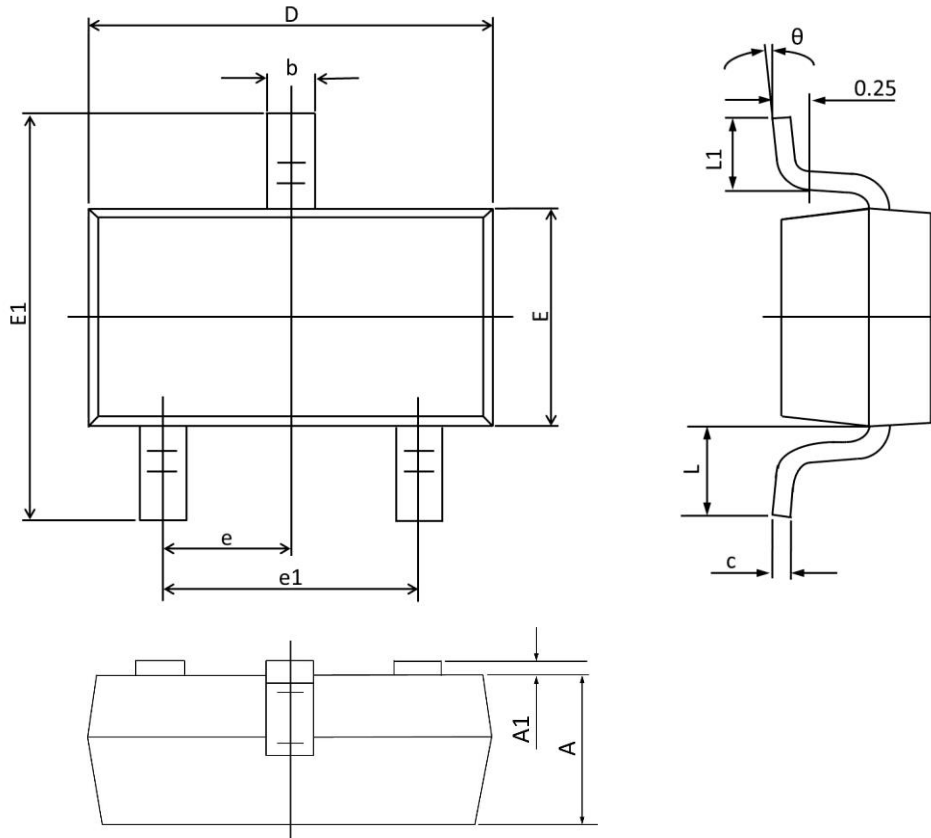

Fig.9   Transfer Characteristics

Fig.10   Normalized Transient Impedance

Fig.11   Maximum Safe Operation Area

SOT23-3S PACKAGE INFORMATION

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.001	0.100	0.000	0.004
b	0.300	0.500	0.012	0.020
c	0.080	0.180	0.003	0.008
D	2.700	3.100	0.106	0.122
E	1.100	1.500	0.043	0.059
E1	2.100	2.640	0.080	0.104
e	0.950 TYP.		0.037 TYP.	
e1	1.780	2.040	0.070	0.080
L	0.550 REF.		0.022 REF.	
L1	0.100	0.500	0.004	0.020
θ	1°	10°	1°	10°