POTENS

30V N-Channel MOSFETs
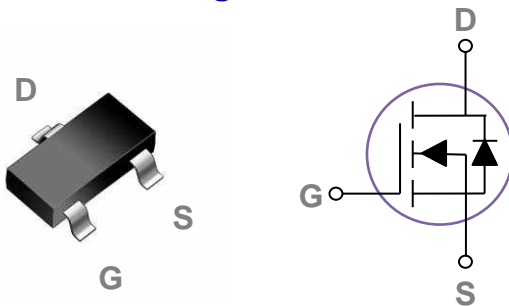
PDN3616S

General 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.

BVDSS	RDSON	ID
30V	41mΩ	5A

Features

- *30V,5A, RDS(ON) =41mΩ@VGS = 10V*
- *Improved dv/dt capability*
- *Fast switching*
- *100% EAS Guaranteed*
- *Green Device Available*

Applications

- *MB / VGA / Vcore*
- *Load Switch*
- *Hand-Held Instrument*

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℃)	5	A
	Drain Current – Continuous (T_A=70℃)	4	A
I_{DM}	Drain Current – Pulsed[1]	20	A
EAS	Single Pulse Avalanche Energy[2]	9	mJ
IAS	Single Pulse Avalanche Current[2]	13.4	A
P_D	Power Dissipation (T_A=25℃)	1.56	W
	Power Dissipation – Derate above 25℃	12.5	mW/℃
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=250µA	30	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=30V , V_{GS}=0V , T_J=25℃	---	---	1	µA
		V_{DS}=24V , V_{GS}=0V , T_J=100℃	---	---	10	µA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±12V , V_{DS}=0V	---	---	±100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=2A	---	34	41	mΩ
		V_{GS}=4.5V , I_D=1A	---	41	50	mΩ
		V_{GS}=2.5V , I_D=0.8A	---	62	85	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250µA	0.5	0.8	1.2	V

Dynamic and switching Characteristics

Q_g	Total Gate Charge[3,4]		---	3.5	6	
Q_{gs}	Gate-Source Charge[3,4]	V_{DS}=15V , V_{GS}=10V , I_D=2.5A	---	0.1	0.2	nC
Q_{gd}	Gate-Drain Charge[3,4]		---	1	1.5	
$T_{d(on)}$	Turn-On Delay Time[3,4]		---	6	9	
T_r	Rise Time[3,4]	V_{DS}=15V , V_{GS}=10V , R_G=6Ω	---	9	13	ns
$T_{d(off)}$	Turn-Off Delay Time[3,4]	I_D=2.5A	---	33	50	
T_f	Fall Time[3,4]		---	4	6	
C_{iss}	Input Capacitance		---	240	360	
C_{oss}	Output Capacitance	V_{DS}=15, V_{GS}=0V , F=1MHz	---	40	60	pF
C_{rss}	Reverse Transfer Capacitance		---	30	45	
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz	---	1	---	Ω

Drain-Source Diode Characteristics and Maximum Ratings

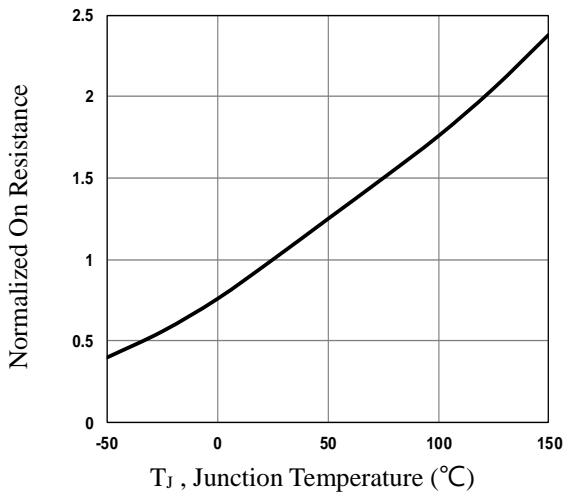| Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	5	A
I_{SM}	Pulsed Source Current		---	---	10	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1	V
t_{rr}	Reverse Recovery Time	V_R=30V, I_S=2.5A	---	150	---	ns
Q_{rr}	Reverse Recovery Charge	di/dt=100A/µs, T_J=25℃	---	270	---	nC

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=13.4A.,R_G=25Ω,Starting T_J=25℃.
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.
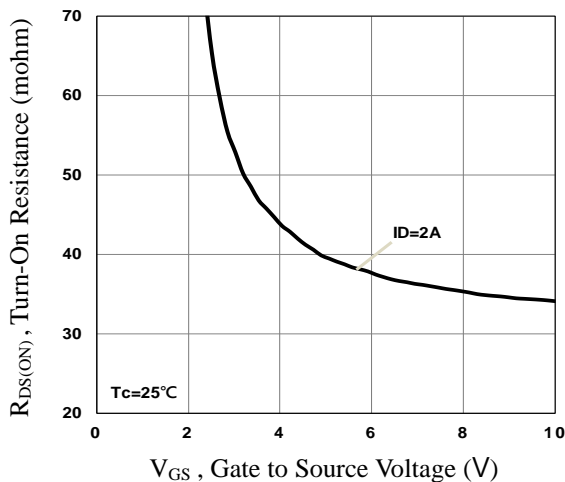
Fig.1   Typical Output Characteristics
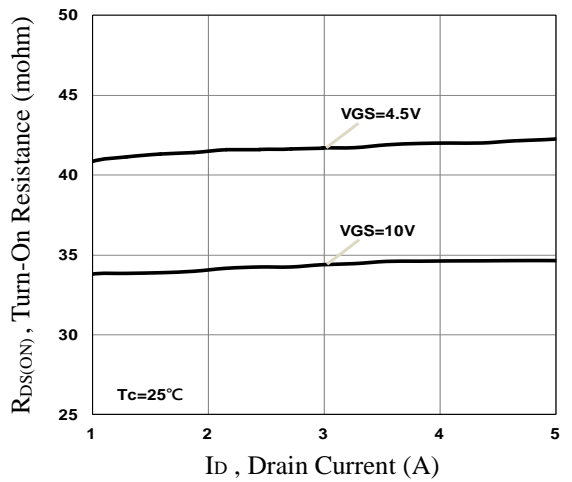
Fig.2   Continuous Drain Current vs. T_C

Fig.3   Normalized RDSON vs. T_J

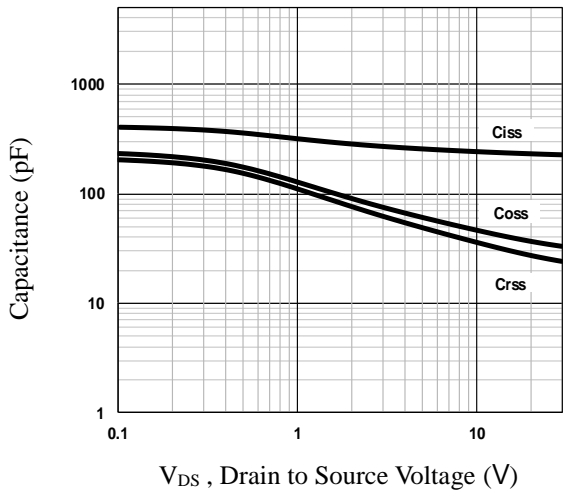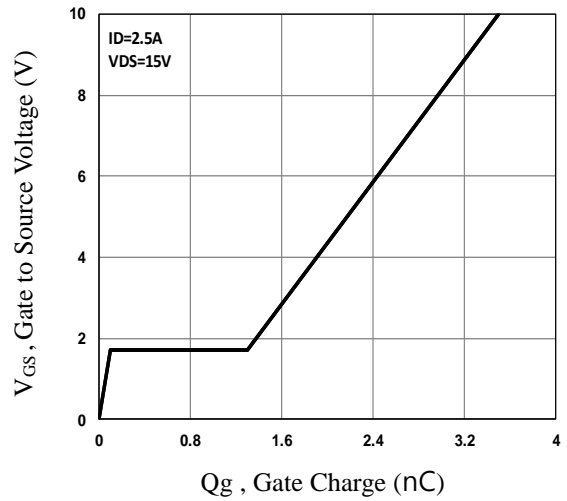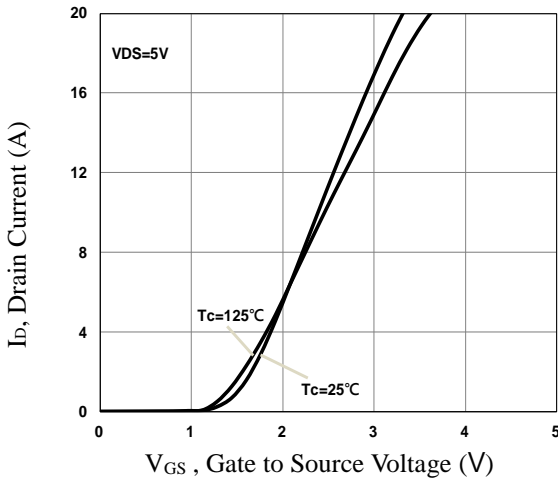**Fig.4   Normalized V_th vs. T_J**

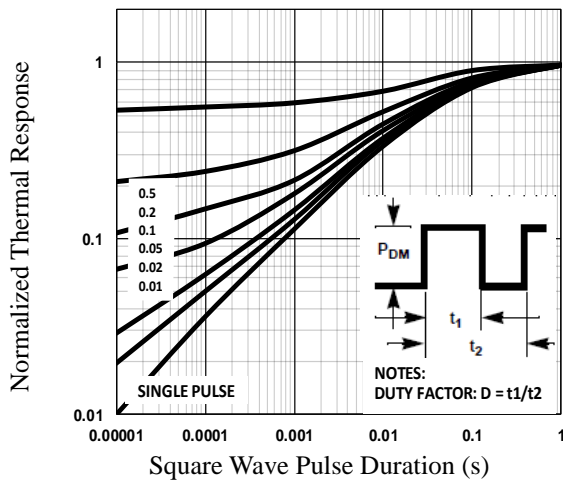**Fig.5   Turn-On Resistance vs. V_GS**

Fig.6   Turn-On Resistance vs. I_D

Fig.7　Capacitance Characteristics
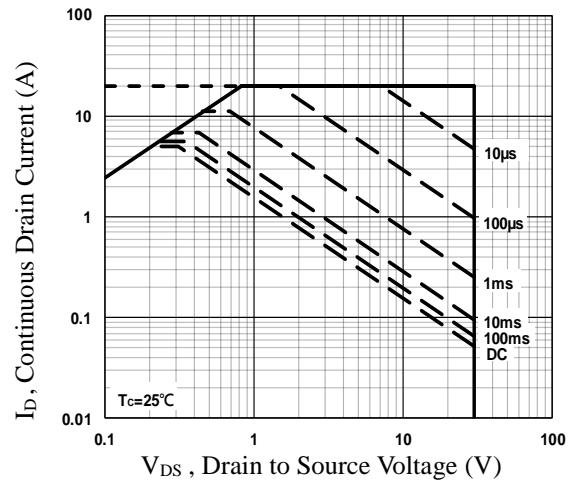

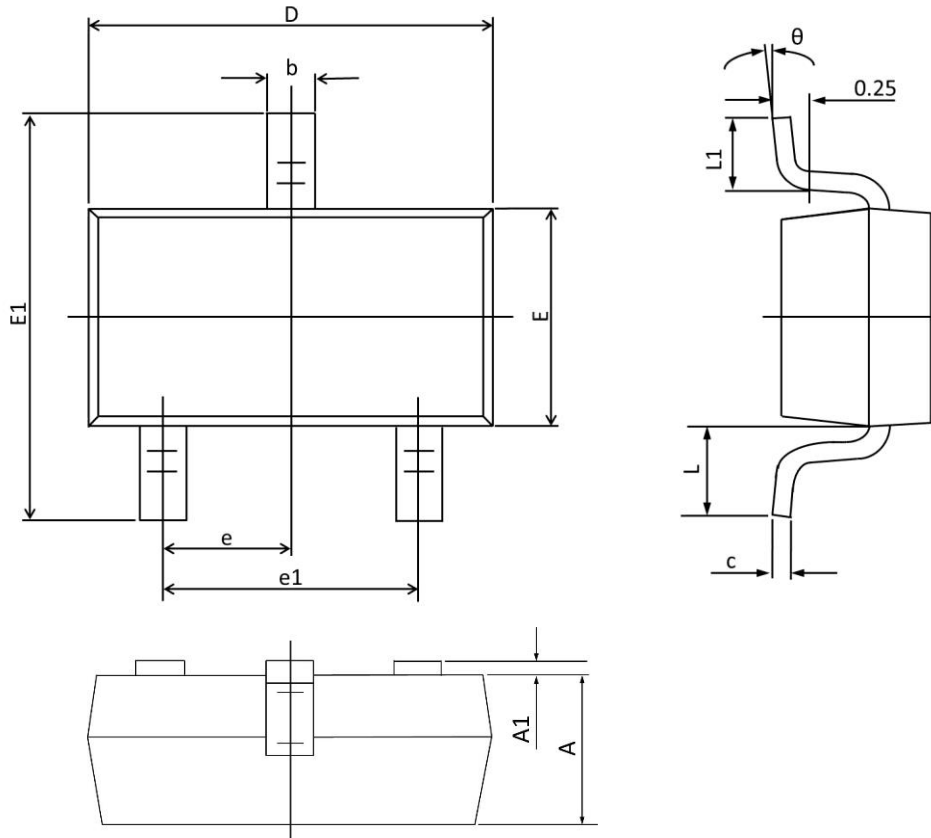Fig.8　Gate Charge Characteristics

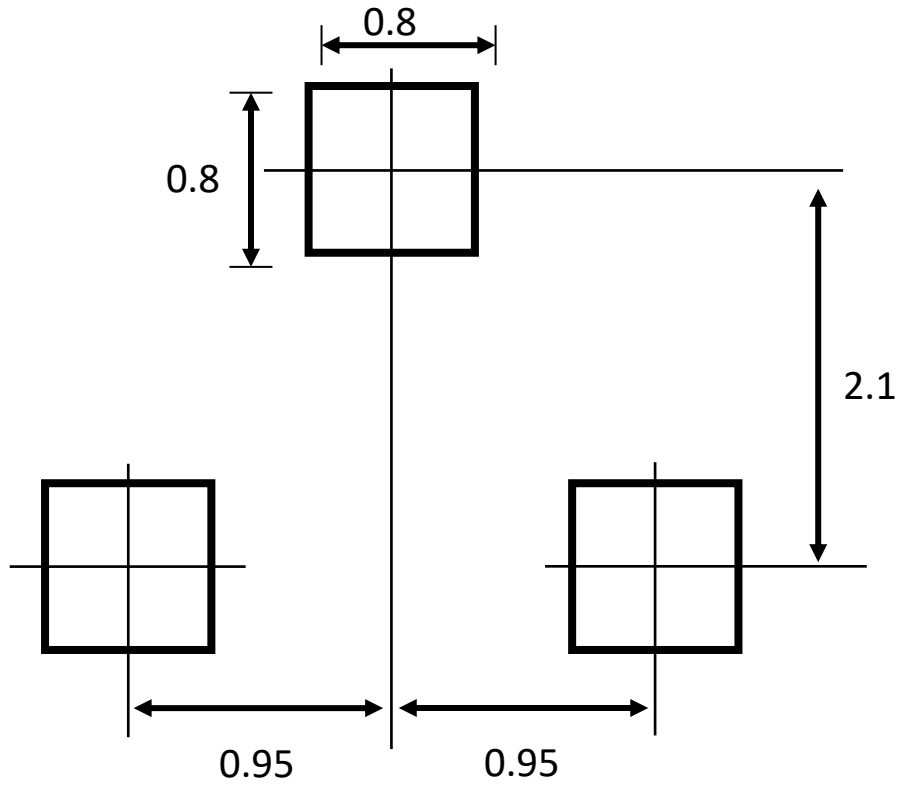Fig.9　Transfer Characteristics

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°

SOT23-3S RECOMMENDED LAND PATTERN

unit : mm