PDN3616S

30V N-Channel MOSFETs

| BVDSS	RDSON	ID
30V	41mΩ	5A

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.

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
$R_{\theta JA}$	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
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=100℃	---	---	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=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 =250uA	0.5	0.8	1.2	V

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge[3],[4]	V_{DS}=15V , V_{GS}=10V , I_D=2.5A	---	3.5	6	nC
Q_{gs}	Gate-Source Charge[3],[4]		---	0.1	0.2	
Q_{gd}	Gate-Drain Charge[3],[4]		---	1	1.5	
$T_{d(on)}$	Turn-On Delay Time[3],[4]	V_{DS}=15V , V_{GS}=10V , R_G=6Ω I_D=2.5A	---	6	9	ns
T_r	Rise Time[3],[4]		---	9	13	
$T_{d(off)}$	Turn-Off Delay Time[3],[4]		---	33	50	
T_f	Fall Time[3],[4]		---	4	6	
C_{iss}	Input Capacitance	V_{DS}=15, V_{GS}=0V , F=1MHz	---	240	360	pF
C_{oss}	Output Capacitance		---	40	60	
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.
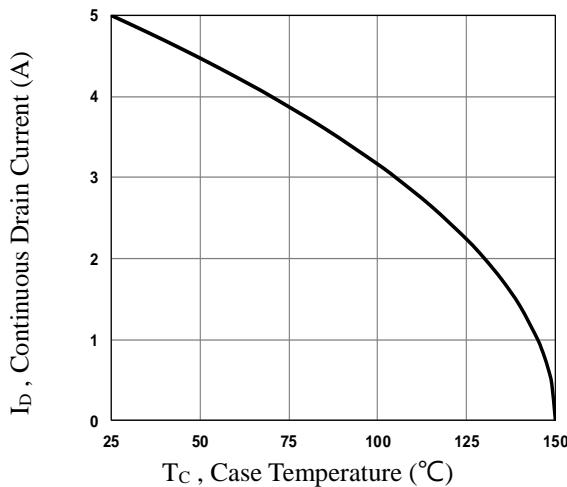
Fig.1   Continuous Drain Current vs. T꜀
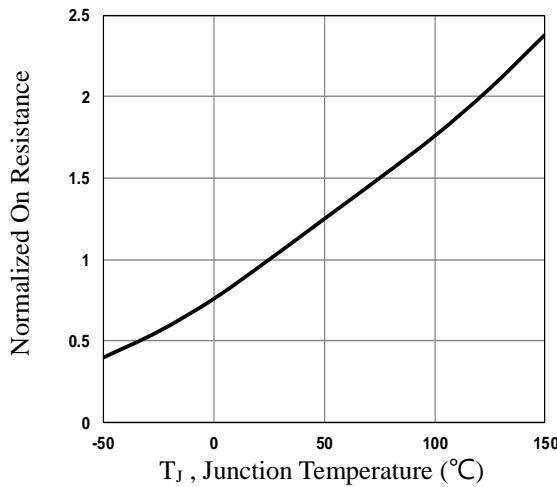

Fig.2   Normalized RDSON vs. T_J
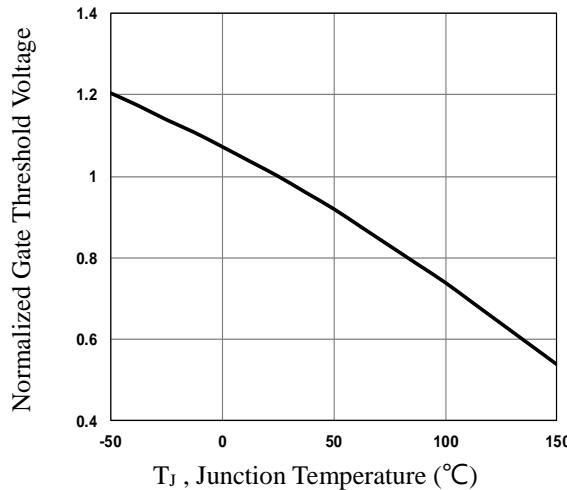
Fig.3   Normalized V_{th} vs. T_J
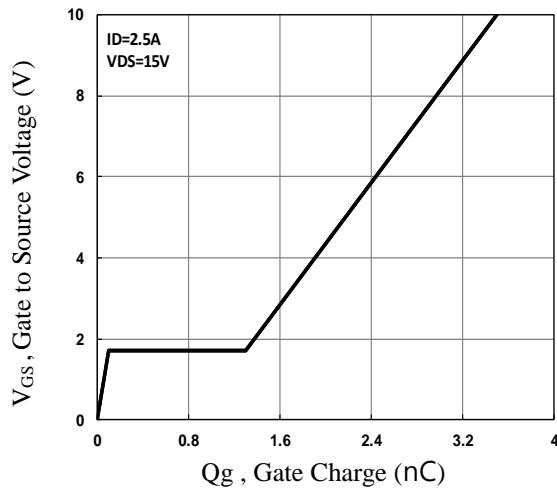
Fig.4   Gate Charge Waveform
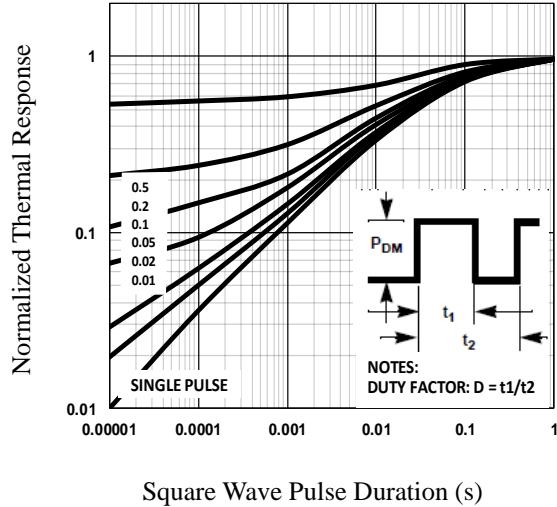
Square Wave Pulse Duration (s)
Fig.5   Normalized Transient Impedance
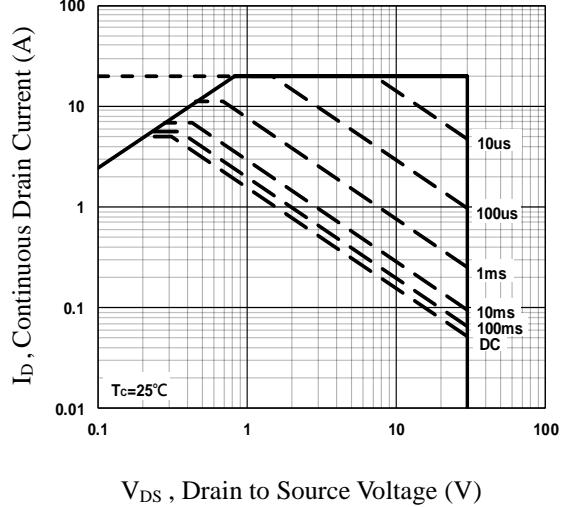
V_{DS} , Drain to Source Voltage (V)
Fig.6   Maximum Safe Operation Area
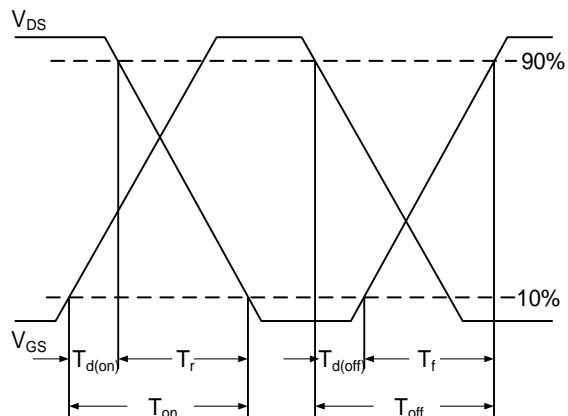
Fig.7   Switching Time Waveform
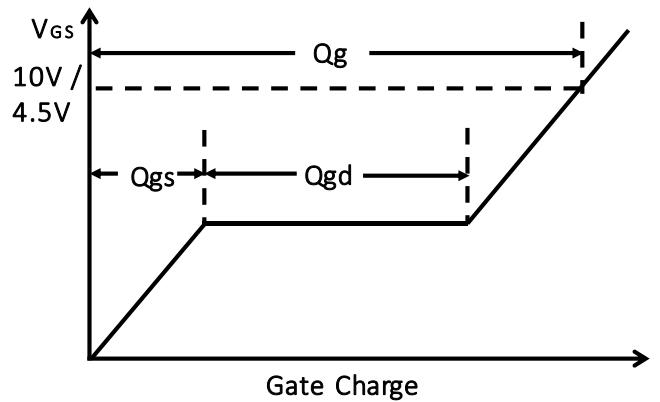
Fig.8   Gate Charge Waveform

SOT23-3S PACKAGE INFORMATION
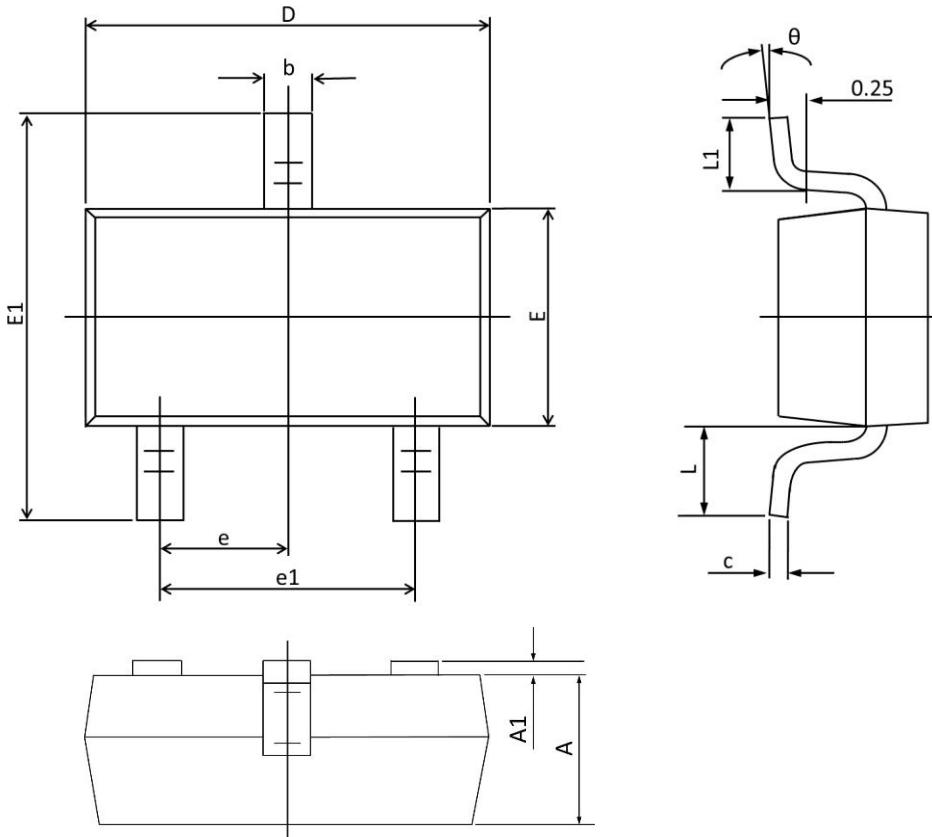
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.001	0.100	0.000	0.004
b	0.300	0.500	0.012	0.020
c	0.080	0.180	0.003	0.008
D	2.700	3.100	0.106	0.122
E	1.100	1.500	0.043	0.059
E1	2.100	2.640	0.080	0.104
e	0.950 TYP.		0.037 TYP.	
e1	1.780	2.040	0.070	0.080
L	0.550 REF.		0.022 REF.	
L1	0.100	0.500	0.004	0.020
θ	1°	10°	1°	10°