PDES3991

30V P-Channel MOSFETs

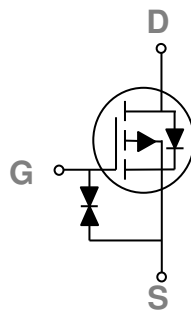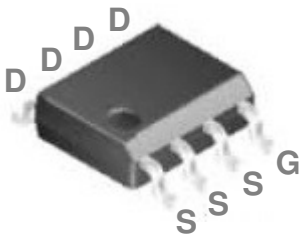| BVDSS	RDSON	ID
-30V	32mΩ	-7A

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.

Features

- *-30V, -7A, RDS(ON) =32mΩ@VGS = -10V*
- *Fast switching*
- *ESD Protection Diode Embedded*
- *Green Device Available*
- *Suit for -4.5V Gate Drive Applications*

Applications

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

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℃)	-7	A
	Drain Current – Continuous (T$_C$=100℃)	-4.4	A
I_{DM}	Drain Current – Pulsed[1]	-28	A
P_D	Power Dissipation (T$_C$=25℃)	3.2	W
	Power Dissipation – Derate above 25℃	0.026	W/℃
T_{STG}	Storage Temperature Range	-50 to 150	℃
T_J	Operating Junction Temperature Range	-50 to 150	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
R$_{θJA}$	Thermal Resistance Junction to ambient	---	60	℃/W
R$_{θJC}$	Thermal Resistance Junction to Case	---	38	℃/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=85℃	---	---	-10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±20	uA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-10V , I_D=-2.5A	---	27	32	mΩ
		V_{GS}=-4.5V , I_D=-2A	---	42	52	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-1.2	-1.6	-2.5	V
gfs	Forward Transconductance	V_{DS}=-10V , I_D=-5A	---	5	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[2,3]		---	9.1	14	
Q_{gs}	Gate-Source Charge[2,3]	V_{DS}=-15V , V_{GS}=-10V , I_D=-3A	---	1.2	1.8	nC
Q_{gd}	Gate-Drain Charge[2,3]		---	2.2	3.3	
$T_{d(on)}$	Turn-On Delay Time[2,3]		---	9.2	18	
T_r	Rise Time[2,3]	V_{DD}=-15V , V_{GS}=-10V , R_G=6Ω	---	28	56	ns
$T_{d(off)}$	Turn-Off Delay Time[2,3]	I_D=-1A	---	68	136	
T_f	Fall Time[2,3]		---	36	72	
C_{iss}	Input Capacitance		---	410	820	
C_{oss}	Output Capacitance	V_{DS}=-15V , V_{GS}=0V , F=1MHz	---	120	240	pF
C_{rss}	Reverse Transfer Capacitance		---	58	116	

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	---	---	-7	A
I_{SM}	Pulsed Source Current		---	---	-14	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1	V
T_{rr}	Reverse Recovery Time	VGS=0V, IS=6.5A ,	---	185	---	ns
Q_{rr}	Reverse Recovery Charge	di/dt=100A/μs , TJ=25℃	---	465	---	nC

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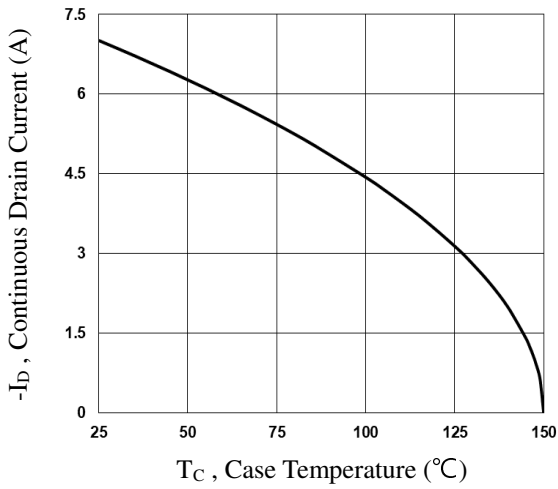3. Essentially independent of operating temperature.
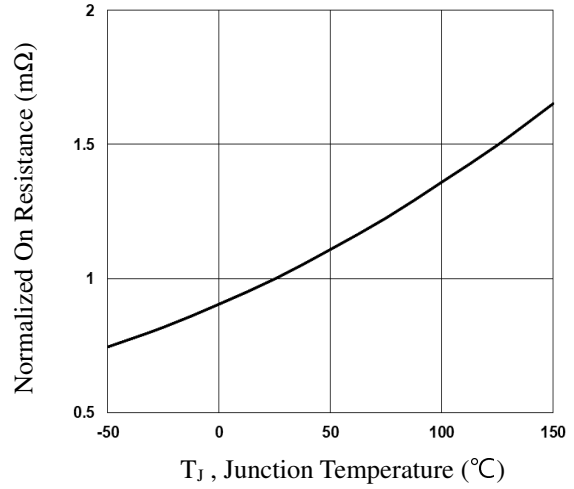
Fig.1 Continuous Drain Current vs. T_C
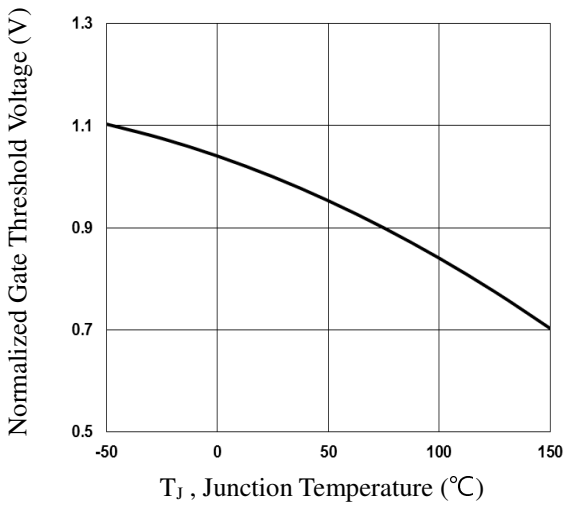

Fig.2 Normalized RDSON vs. T_J

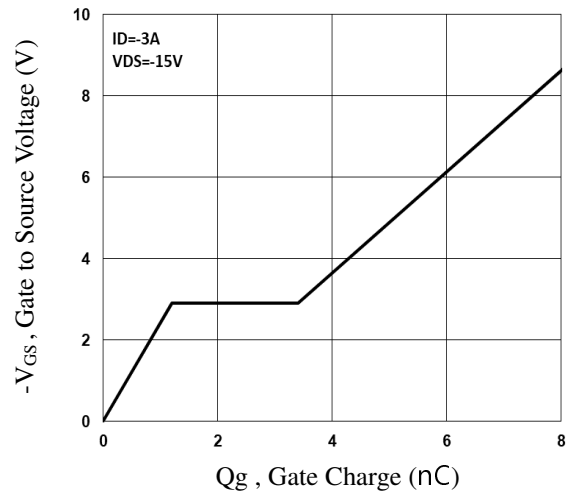Fig.3 Normalized Vth vs. T_J

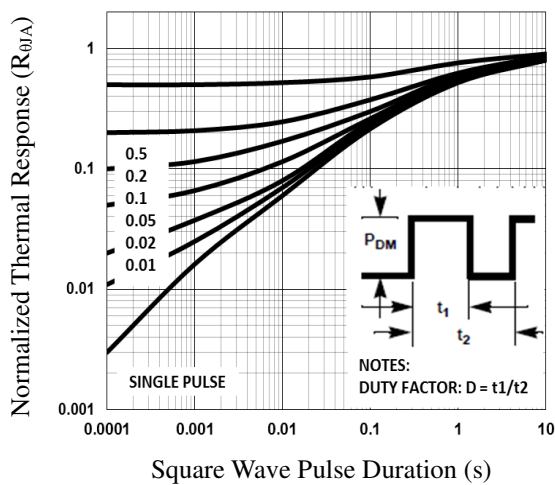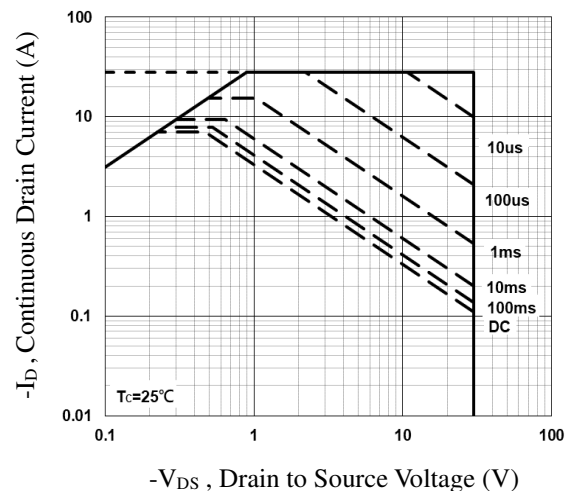Fig.4 Gate Charge Waveform

Fig.5 Normalized Transient Impedance

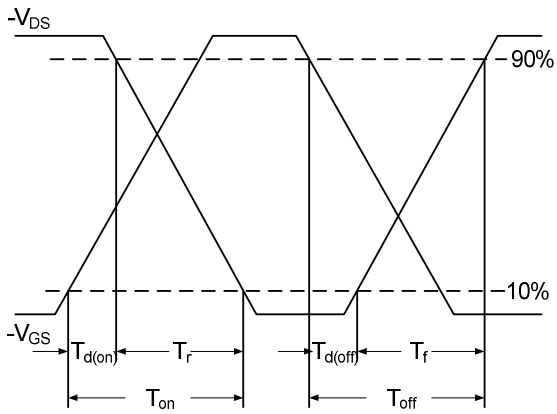Fig.6 Maximum Safe Operation Area

Fig.7   Switching Time Waveform

Fig.8   Gate Charge Waveform
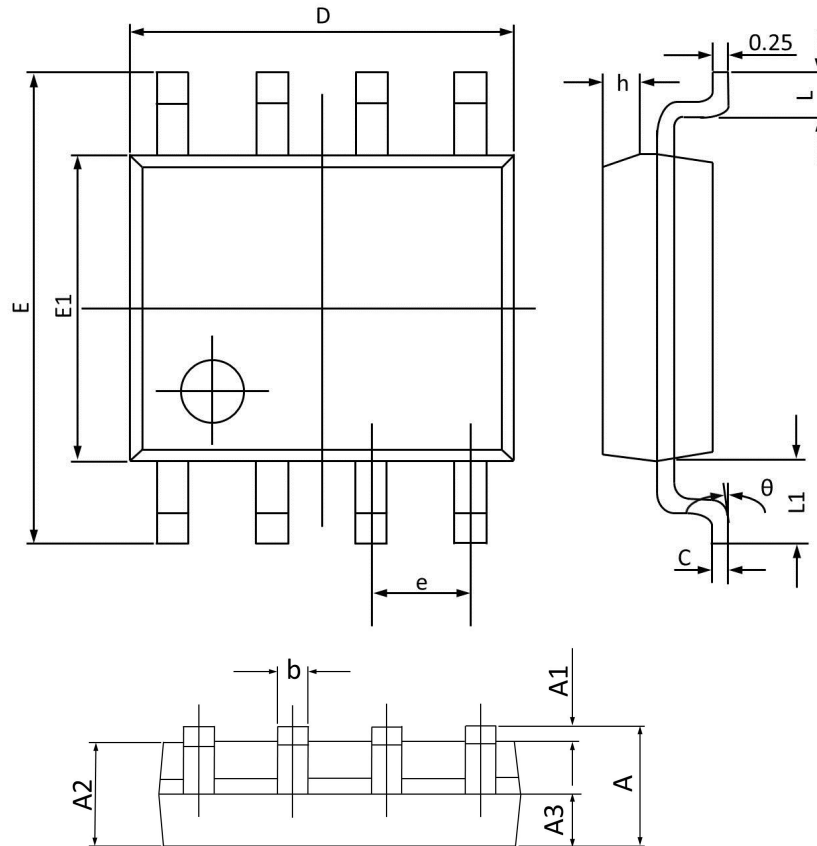
SOP8 PACKAGE INFORMATION

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.250	1.650	0.049	0.065
A3	0.500	0.700	0.020	0.028
b	0.380	0.510	0.015	0.020
c	0.170	0.260	0.007	0.010
D	4.700	5.100	0.185	0.201
E	5.800	6.200	0.228	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	0.400	0.800	0.019	0.031
L1	1.050(BSC)		0.041(BSC)	
θ	0°	8°	0°	8°