30V P-Channel MOSFETs

PDS3959

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	4.8mΩ	-24A

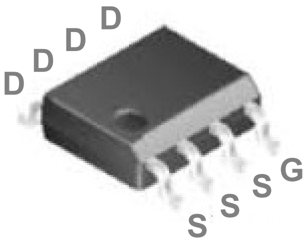
Features

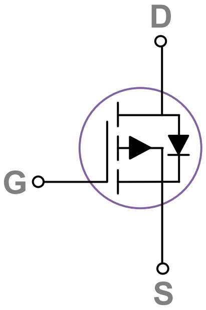
- *-30V,-24A, RDS(ON) =4.8mΩ@VGS = -10V*
- *Fast switching*
- *Green Device Available*
- *Suit for -4.5V Gate Drive Applications*

Applications

- *Motor Driver Applications*
- *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°C)	-24	A
	Drain Current – Continuous (T_C=100°C)	-	A
I_{DM}	Drain Current – Pulsed[1]	-96	A
P_D	Power Dissipation (T_C=25°C)	2.1	W
	Power Dissipation – Derate above 25°C	0.017	W/°C
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	60	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	24	°C/W

Electrical Characteristics (**T_J=25 °C, 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
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , I_D=-1mA	---	-0.03	---	V/°C
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-30V , V_{GS}=0V , T_J=25°C	---	---	-1	uA
		V_{DS}=-24V , V_{GS}=0V , T_J=125°C	---	---	-10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , 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=-17.5A	---	3.8	4.8	mΩ
		V_{GS}=-4.5V , I_D=-10A	---	5.8	7.8	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-1.2	-1.6	-2.2	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	4	---	mV/°C
gfs	Forward Transconductance	V_{DS}=-10V , I_D=-5A	---	25	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge[2,3]	V_{DS}=-15V , V_{GS}=-10V , I_D=-10A	---	108	150	nC
Q_{gs}	Gate-Source Charge[2,3]		---	15	25	
Q_{gd}	Gate-Drain Charge[2,3]		---	17.4	30	
$T_{d(on)}$	Turn-On Delay Time[2,3]	V_{DD}=-15V , V_{GS}=-10V , R_G=6Ω I_D=-1A	---	28	56	ns
T_r	Rise Time[2,3]		---	16	32	
$T_{d(off)}$	Turn-Off Delay Time[2,3]		---	178	340	
T_f	Fall Time[2,3]		---	72	140	
C_{iss}	Input Capacitance	V_{DS}=-25V , V_{GS}=0V , F=1MHz	---	6220	9000	pF
C_{oss}	Output Capacitance		---	782	1100	
C_{rss}	Reverse Transfer Capacitance		---	412	600	

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	---	---	-24	A
I_{SM}	Pulsed Source Current		---	---	-48	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=-1A , T_J=25°C	---	---	-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.

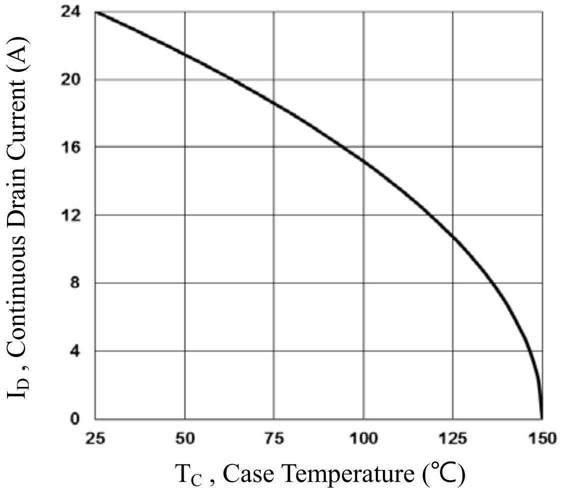


Fig.1 Continuous Drain Current vs. T_C

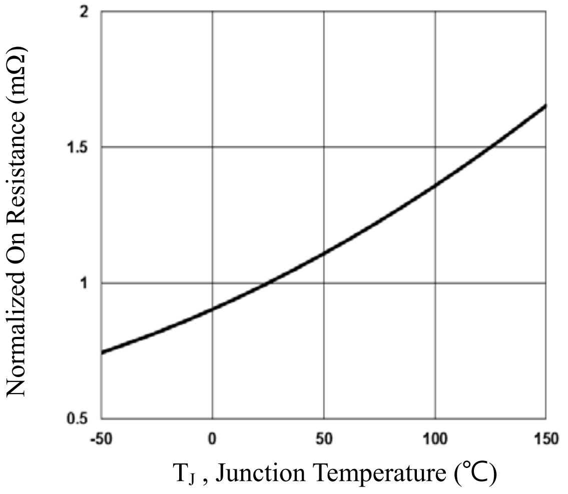


Fig.2 Normalized RDSON vs. T_J

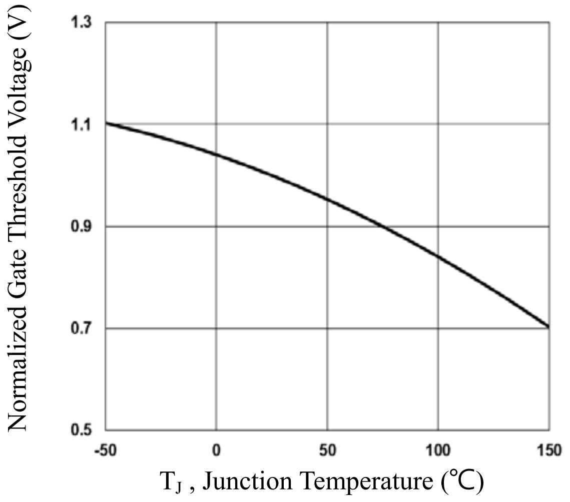


Fig.3 Normalized V_{th} vs. T_J

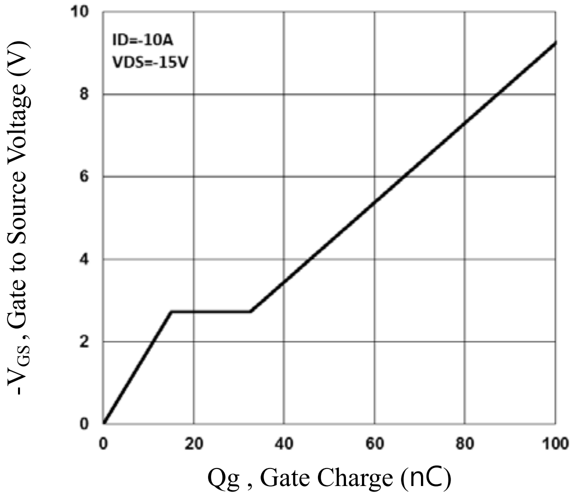


Fig.4 Gate Charge Waveform

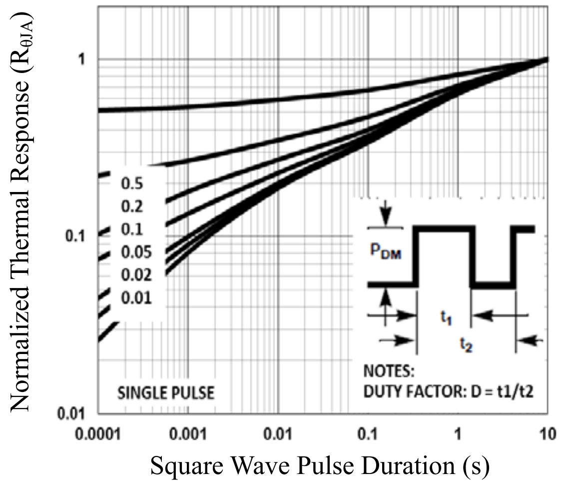


Fig.5 Normalized Transient Impedance

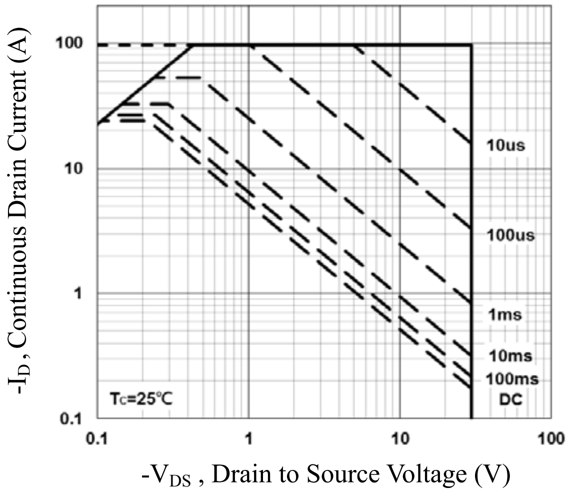


Fig.6 Maximum Safe Operation Area

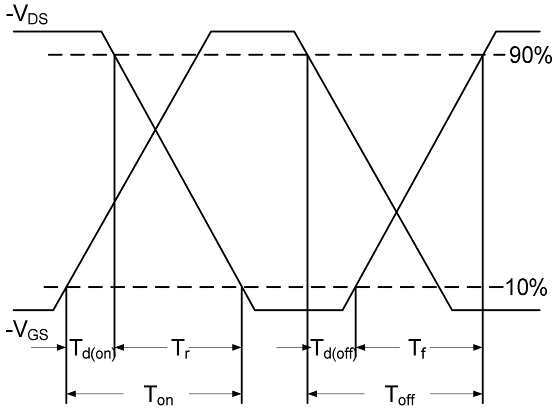


Fig.7 Switching Time Waveform

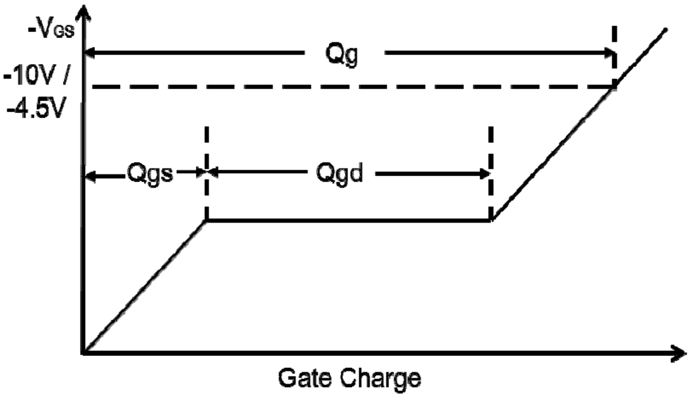
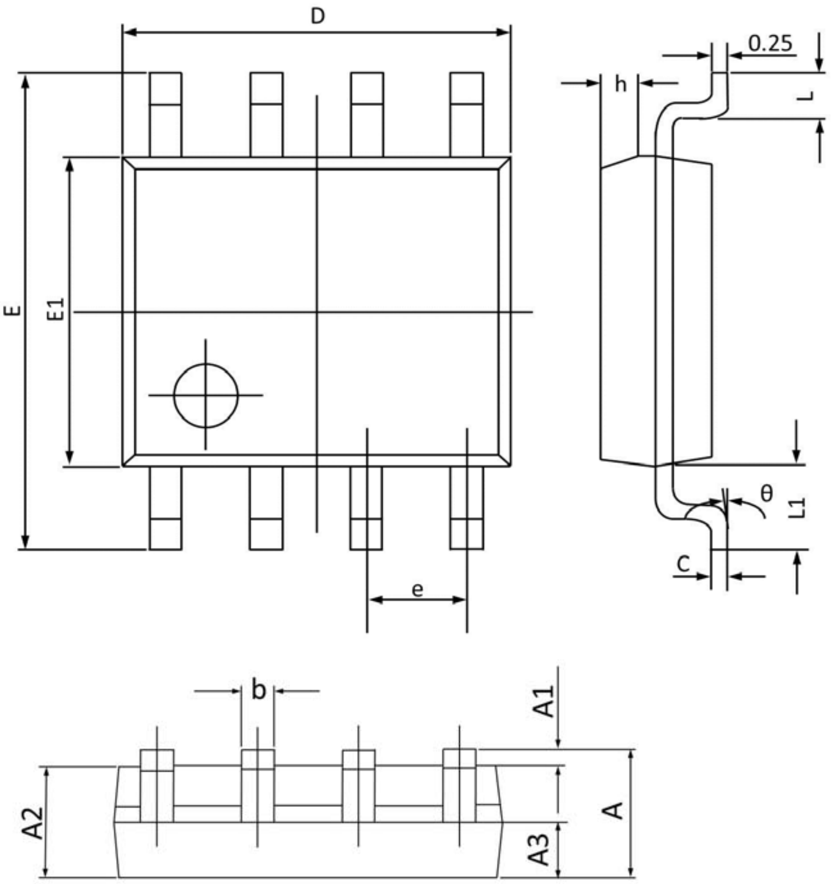


Fig.8 Gate Charge Waveform

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°