30V P-Channel MOSFETs

# PDEU3619W

## General Description

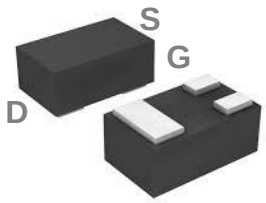
*These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.*

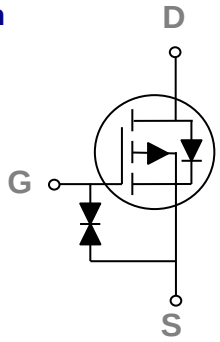
| BVDSS | RDSON | ID |
|---|---|---|
| -30V | 1100mΩ | -400mA |

## Features

- *-30V,-400mA, RDS(ON) =1100mΩ@VGS = -4.5V*
- *Fast switching*
- *Green Device Available*

## SOT883 Pin Configuration




## Applications

- *Notebook*
- *Smartphone*
- *Battery Protection*
- *Hand-held Instruments*

## Absolute Maximum Ratings $T_A$=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℃) | -400 | mA |
| | Drain Current – Continuous ($T_A$=70℃) | -302 | mA |
| $I_{DM}$ | Drain Current – Pulsed[1] | -1600 | mA |
| $P_D$ | Power Dissipation ($T_A$=25℃) | 155 | mW |
| | Power Dissipation – Derate above 25℃ | 1.25 | 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 | --- | 800 | ℃/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 , $T_J$=125℃ | --- | --- | -10 | uA |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±12V , $V_{DS}$=0V | --- | --- | ±25 | uA |

### On Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}$=-4.5V , $I_D$=-0.2A | --- | 780 | 1100 | mΩ |
| | | $V_{GS}$=-2.5V , $I_D$=-0.1A | --- | 1160 | 1600 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =-250uA | -0.5 | -0.75 | -1.2 | V |

### Dynamic and switching Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| $Q_g$ | Total Gate Charge[2,3] | $V_{DS}$=-15V , $V_{GS}$=-4.5V , $I_D$=-0.3A | --- | 3.12 | 6.2 | nC |
| $Q_{gs}$ | Gate-Source Charge[2,3] | | --- | 1.3 | 2.6 | |
| $Q_{gd}$ | Gate-Drain Charge[2,3] | | --- | 0.5 | 1 | |
| $T_{d(on)}$ | Turn-On Delay Time[2,3] | $V_{DD}$=-15V , $V_{GS}$=-4.5V , $R_G$=6Ω $I_D$=-0.3A | --- | 7.4 | 15 | ns |
| $T_r$ | Rise Time[2,3] | | --- | 21.5 | 43 | |
| $T_{d(off)}$ | Turn-Off Delay Time[2,3] | | --- | 46.9 | 92 | |
| $T_f$ | Fall Time[2,3] | | --- | 14.4 | 29 | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=-15V , $V_{GS}$=0V , F=1MHz | --- | 73.4 | 146 | pF |
| $C_{oss}$ | Output Capacitance | | --- | 19.1 | 38 | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 12.1 | 25 | |

### 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 | --- | --- | -400 | mA |
| $I_{SM}$ | Pulsed Source Current | | --- | --- | -800 | mA |
| $V_{SD}$ | Diode Forward Voltage | $V_{GS}$=0V , $I_S$=-0.3A , $T_J$=25℃ | --- | --- | -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.

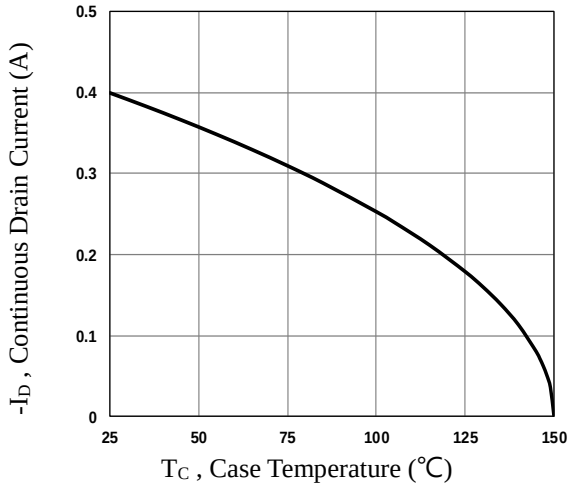



**Fig.1 Continuous Drain Current vs. $T_C$**

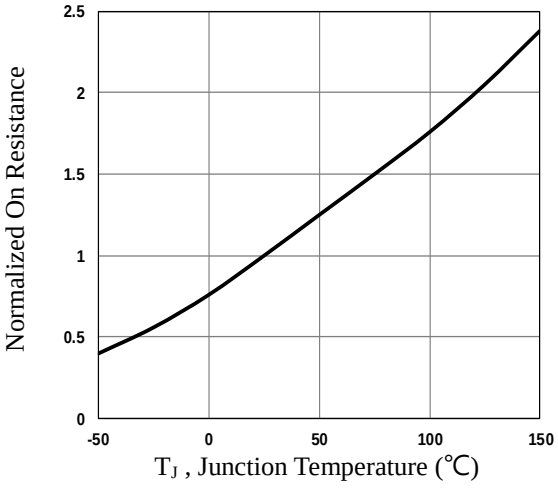



**Fig.2 Normalized RDSON vs. $T_J$**

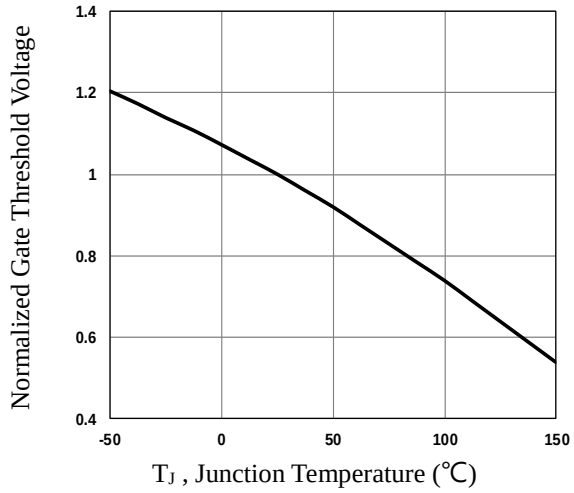



**Fig.3 Normalized $V_{th}$ vs. $T_J$**

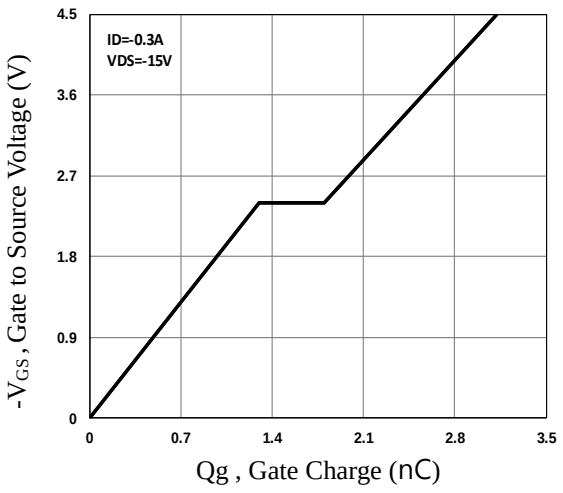



**Fig.4 Gate Charge Waveform**

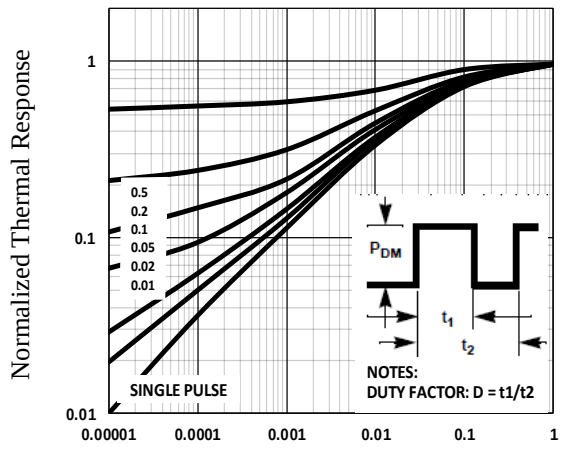



**Fig.5 Normalized Transient Impedance**

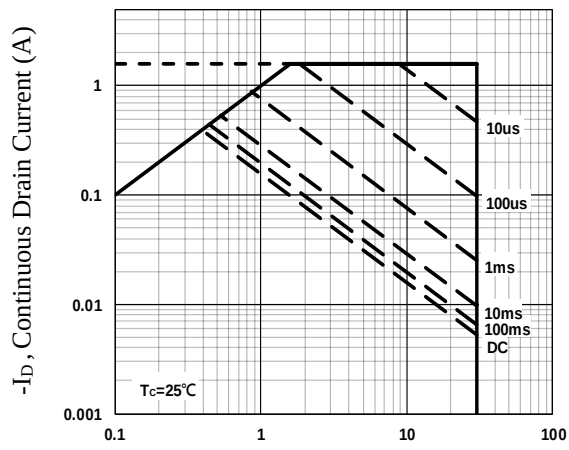



**Fig.6 Maximum Safe Operation Area**

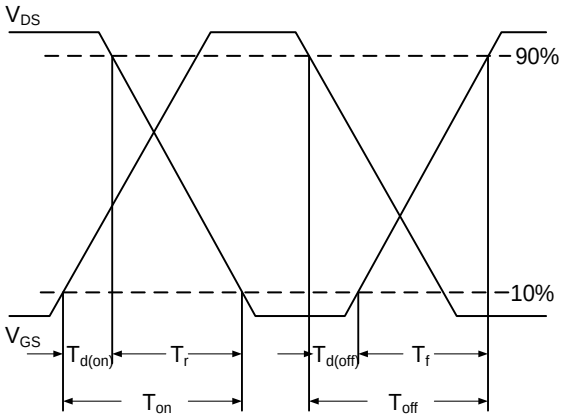



**Fig.7 Switching Time Waveform**

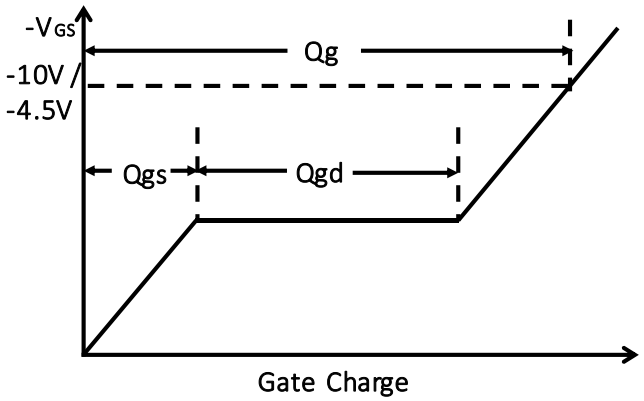
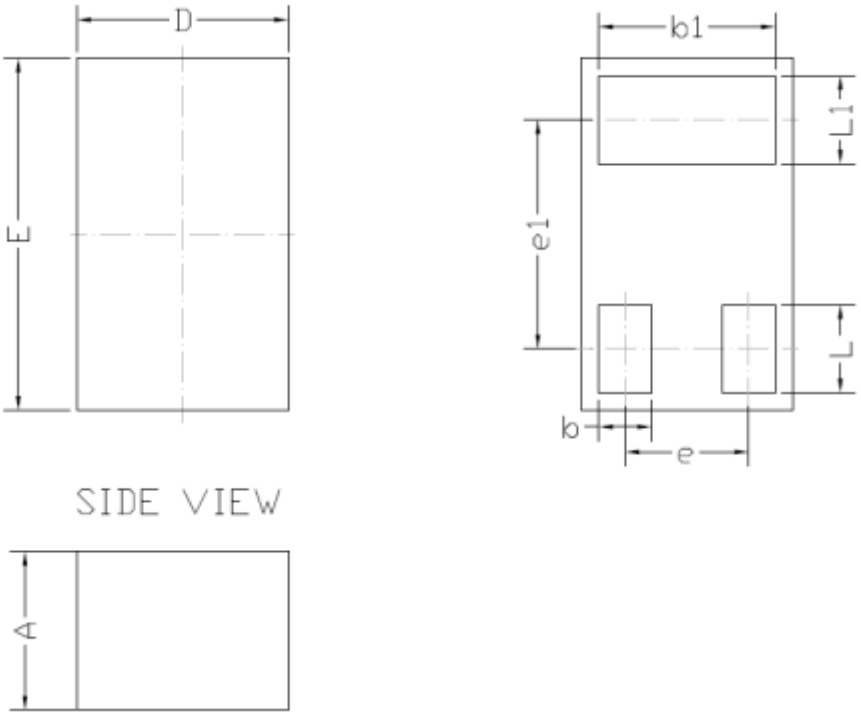



**Fig.8 Gate Charge Waveform**

# SOT883 PACKAGE INFORMATION




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | MAX | MIN | MAX | MIN |
| A | 0.500 | 0.350 | 0.020 | 0.013 |
| D | 0.650 | 0.550 | 0.026 | 0.021 |
| E | 1.050 | 0.950 | 0.041 | 0.037 |
| e | 0.350 BSC | | 0.014 BSC | |
| e1 | 0.650 BSC | | 0.026 BSC | |
| b | 0.200 | 0.100 | 0.008 | 0.004 |
| b1 | 0.550 | 0.450 | 0.022 | 0.018 |
| L | 0.300 | 0.200 | 0.012 | 0.008 |
| L1 | 0.300 | 0.200 | 0.012 | 0.008 |