## 20V Dual N-Channel MOSFETs

# PDEW2206

## General Description

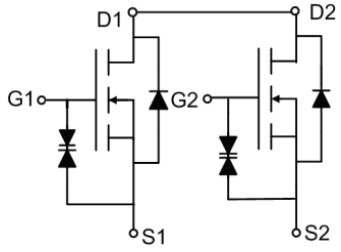
*These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

| BVDSS | RDSON | ID |
|---|---|---|
| 20V | 9mΩ | 10A |

## Features

- *20V, 10A, RDS(ON)=9mΩ@VGS=4.5V*
- *Improved dv/dt capability*
- *Fast switching*
- *Green Device Available*
- *Suit for 1.8V Gate Drive Applications*

## TSSOP8 Dual Pin Configuration


## Applications

- *Notebook*
- *Load Switch*
- *LED applications*

## Absolute Maximum Ratings Tc=25℃ unless otherwise noted

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 20 | V |
| $V_{GS}$ | Gate-Source Voltage | ±10 | V |
| $I_D$ | Drain Current – Continuous ($T_C$=25˚C) | 10 | A |
| | Drain Current – Continuous ($T_C$=100˚C) | 6.3 | A |
| $I_{DM}$ | Drain Current – Pulsed[1] | 40 | A |
| $P_D$ | Power Dissipation ($T_C$=25˚C) | 1.25 | W |
| | Power Dissipation – Derate above 25˚C | 0.01 | 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 | --- | 100 | ˚C/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 | 20 | --- | --- | V |
| $\triangle BV_{DSS}/\triangle T_J$ | $BV_{DSS}$ Temperature Coefficient | Reference to 25℃ , $I_D$=1mA | --- | 0.01 | --- | V/℃ |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=20V , $V_{GS}$=0V , $T_J$=25℃ | --- | --- | 1 | uA |
| | | $V_{DS}$=16V , $V_{GS}$=0V , $T_J$=125℃ | --- | --- | 10 | uA |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±10V , $V_{DS}$=0V | --- | --- | ±100 | nA |

### On Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}$=4.5V , $I_D$=6A | --- | --- | 9 | mΩ |
| | | $V_{GS}$=2.5V , $I_D$=4A | --- | --- | 10 | |
| | | $V_{GS}$=1.8V , $I_D$=2A | --- | --- | 11.5 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =250uA | 0.3 | 0.6 | 1 | V |
| $\triangle V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient | | --- | 2 | --- | mV/℃ |
| gfs | Forward Transconductance | $V_{DS}$=10V , $I_S$=5A | --- | 20 | --- | S |

### Dynamic and switching Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| $Q_g$ | Total Gate Charge[2,3] | $V_{DS}$=10V , $V_{GS}$=4.5V , $I_D$=6A | --- | 29.8 | 45 | nC |
| $Q_{gs}$ | Gate-Source Charge[2,3] | | --- | 2.7 | 6 | |
| $Q_{gd}$ | Gate-Drain Charge[2,3] | | --- | 9 | 14 | |
| $T_{d(on)}$ | Turn-On Delay Time[2,3] | $V_{DD}$=10V , $V_{GS}$=4.5V , $R_G$=25Ω $I_D$=1A | --- | 13.5 | 26 | nS |
| $T_r$ | Rise Time[2,3] | | --- | 29 | 55 | |
| $T_{d(off)}$ | Turn-Off Delay Time[2,3] | | --- | 66.9 | 127 | |
| $T_f$ | Fall Time[2,3] | | --- | 19.2 | 36 | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=10V , $V_{GS}$=0V , F=1MHz | --- | 1920 | 2790 | pF |
| $C_{oss}$ | Output Capacitance | | --- | 280 | 410 | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 180 | 270 | |

### 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 | --- | --- | 10 | A |
| $I_{SM}$ | Pulsed Source Current | | --- | --- | 40 | A |
| $V_{SD}$ | Diode Forward Voltage | $V_{GS}$=0V , $I_S$=1A , $T_J$=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.

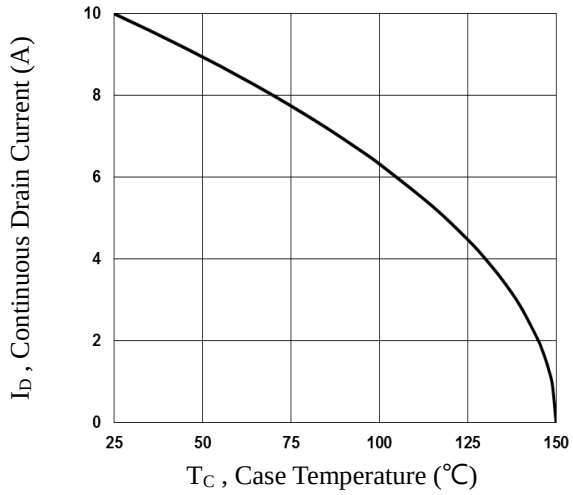



**Fig.1 Continuous Drain Current vs. $T_C$**

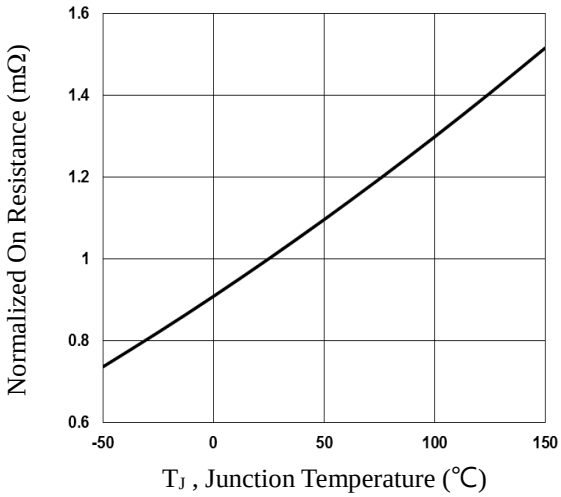



**Fig.2 Normalized RDSON vs. $T_J$**

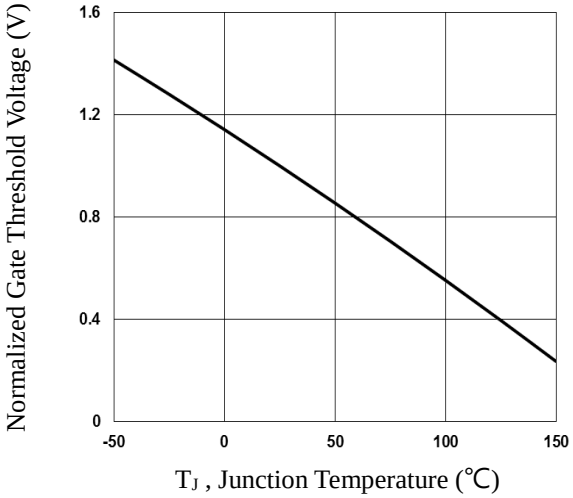



**Fig.3 Normalized $V_{th}$ vs. $T_J$**

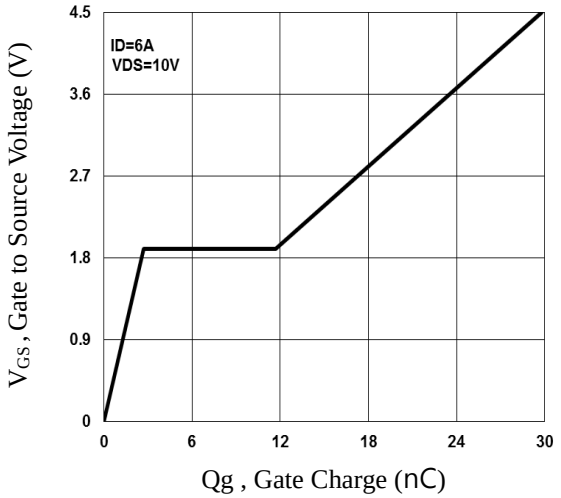



**Fig.4 Gate Charge Waveform**

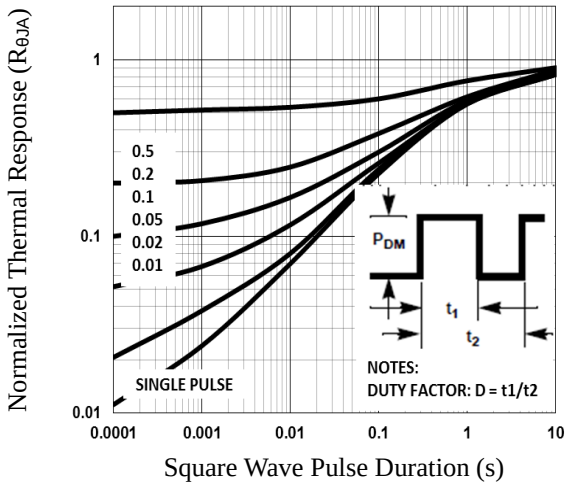



**Fig.5 Normalized Transient Impedance**

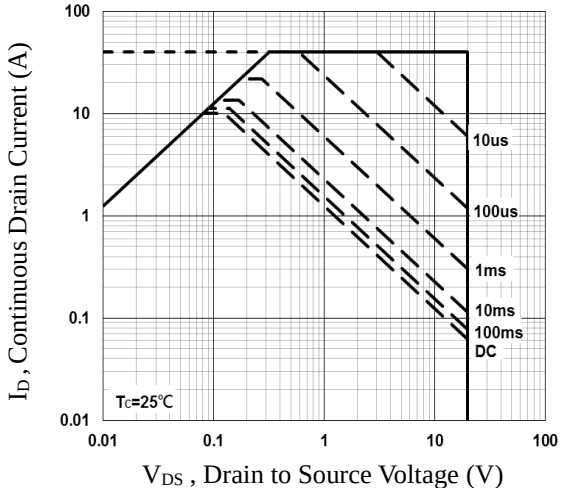



**Fig.6 Maximum Safe Operation Area**

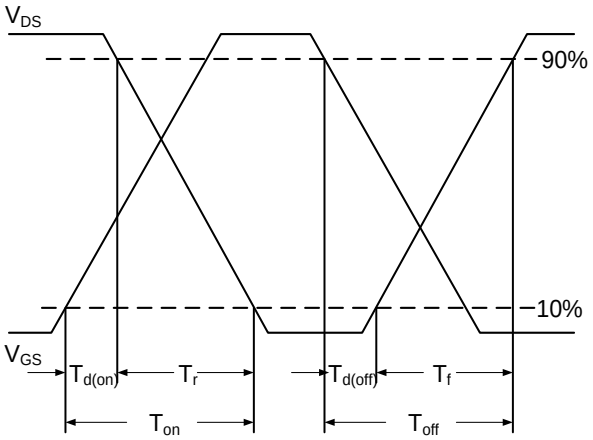



**Fig.7 Switching Time Waveform**

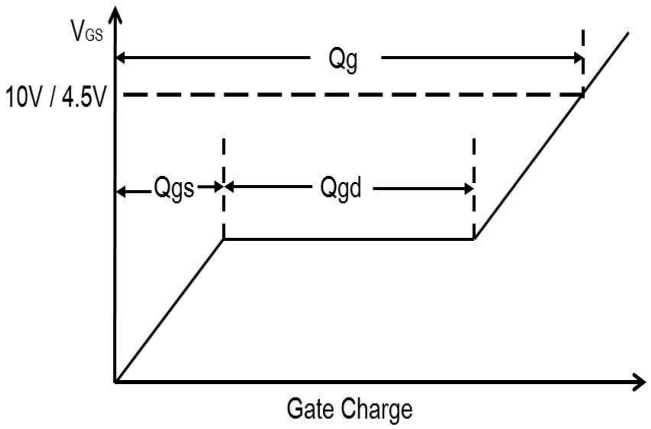
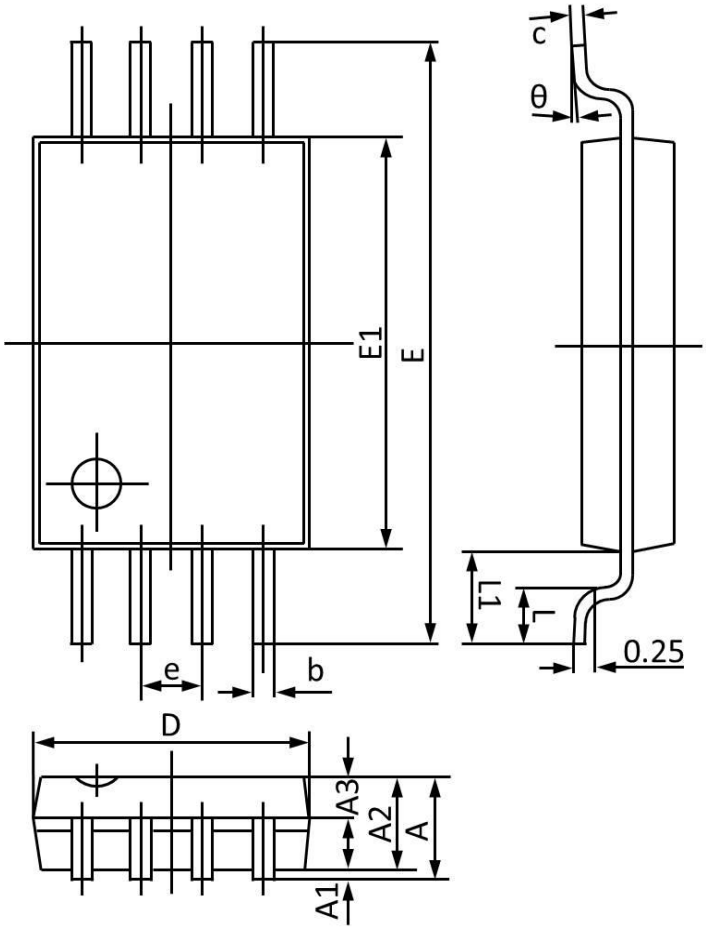



**Fig.8 Gate Charge Waveform**

# TSSOP8 PACKAGE INFORMATION




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 1.100 | 1.200 | 0.044 | 0.047 |
| A1 | 0.050 | 0.150 | 0.002 | 0.006 |
| A2 | 0.900 | 1.050 | 0.036 | 0.041 |
| A3 | 0.390 | 0.490 | 0.016 | 0.019 |
| b | 0.210 | 0.300 | 0.009 | 0.011 |
| c | 0.130 | 0.190 | 0.006 | 0.007 |
| D | 2.900 | 3.100 | 0.114 | 0.122 |
| E | 6.200 | 6.600 | 0.244 | 0.260 |
| E1 | 4.300 | 4.500 | 0.169 | 0.177 |
| e | 0.650(BSC) | | 0.025(BSC) | |
| L | 0.450 | 0.750 | 0.018 | 0.029 |
| L1 | 1.000(BSC) | | 0.039(BSC) | |
| $\theta$ | 0° | 8° | 0° | 8° |