WANSEMI
万代半导体

*WP2301AS3*

# Enhancement Mode P-Channel Power MOSFET

**SOT23-3/PMOS/-20V/±12V/-0.7V/-2.8A/70mΩ**

**Rev1.5**

# -20V, 70mΩ, -2.8A, P-Channel MOSFET

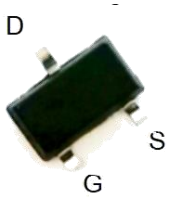
## 1.Features

- Advanced Trench Technology
- Surface mount package

| $V_{DS}$ | $R_{DS(on)}$ Typ. | $I_D$. |
|---|---|---|
| -20V | 70mΩ @ -4.5V | -2.8A |
| | 100mΩ @ -2.5V | |

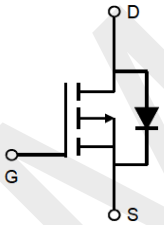
## 2.Applications

- Power Management
- Load Switching




SOT23-3

Pin Description




Schematic Diagram

## 3.Package Marking and Ordering Information

| Part no. | Marking | Package | PCS/Reel | PCS/CTN. |
|---|---|---|---|---|
| WP2301AS3 | A1SHB | SOT23-3 | 3,000 | 180,000 |

## 4.Absolute Max Ratings at Ta=25℃ (Note1)

| Parameter | Symbol | Maximum | Units |
|---|---|---|---|
| Drain to Source Voltage | $V_{DSS}$ | -20 | V |
| Gate to Source Voltage | $V_{GSS}$ | ±12 | V |
| Drain Current (DC) | $I_D$ | -2.8 | A |
| Drain Current (Pulse), PW≤300μs | $I_{DP}$ | -11.2 | A |
| Total Dissipation | $P_D$ | 1.2 | W |
| Junction Temperature | $T_j$ | 150 | ℃ |
| Storage Temperature | $T_{stg}$ | -55 to +150 | ℃ |

Note 1: Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

## 5.Thermal Resistance Ratings (Note 2)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 100 | ℃/W |

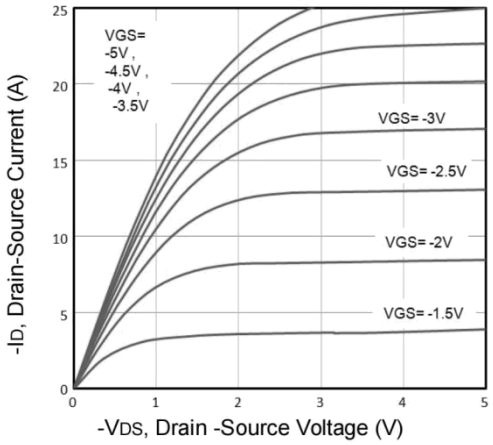
Note 2: When mounted on 1 inch square copper board t ≤ 10sec The value in any given application depends on the user's specific board design.

## 6.Electrical Characteristics at Ta=25℃ (Note 3)

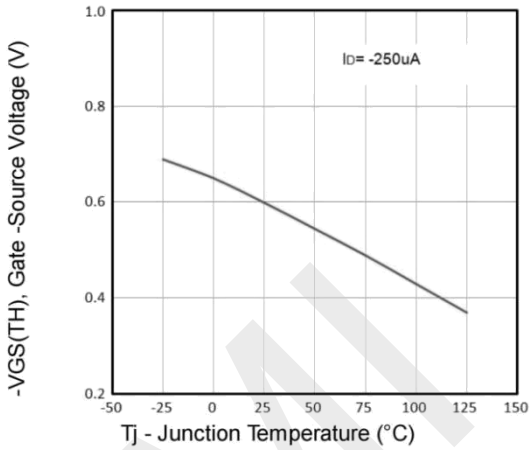
| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Drain to Source Breakdown Voltage | $V_{(BR)DSS}$ | $I_D$ = -250μA, $V_{GS}$ = 0V | -20 | -24 | - | V |
| Zero-Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = -20V, $V_{GS}$ = 0V | - | - | -1 | μA |
| Gate to Source Leakage Current | $I_{GSS}$ | $V_{GS}$ = ±12V, $V_{DS}$ = 0V | - | - | ±100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_{DS}$=-250μA | -0.4 | -0.7 | -1.0 | V |
| Static Drain to Source On-State Resistance | $R_{DS(on)}$ | $I_D$ =-2.8A, $V_{GS}$ =-4.5V | - | 70 | 90 | mΩ |
| | | $I_D$ =-2A, $V_{GS}$ = -2.5V | - | 100 | 130 | mΩ |
| Input Capacitance | $C_{iss}$ | $V_{GS}$=0V, $V_{DS}$=-10V, Frequency=1.0MHz | - | 330 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 50 | - | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 45 | - | pF |
| Turn-ON Delay Time | $t_{d(on)}$ | $V_{DD}$ =-10V, $I_D$ =-2.8A, $R_G$ = 3.3Ω, $V_{GS}$ = -4.5V | - | 11 | - | ns |
| Rise Time | $t_r$ | | - | 12 | - | ns |
| Turn-OFF Delay Time | $t_{d(off)}$ | | - | 18 | - | ns |
| Fall Time | $t_f$ | | - | 30 | - | ns |
| Total Gate Charge | $Q_g$ | $V_{DS}$ = -10V, $V_{GS}$ = -4.5V, $I_D$ = -2.8A | - | 6.5 | - | nC |
| | $Q_{gs}$ | | - | 1 | - | nC |
| | $Q_{gd}$ | | - | 1.2 | - | nC |
| Diode Forward Voltage | $V_{FSD}$ | $I_{SD}$ = -2.8A, $V_{GS}$ = 0 | - | -0.9 | -1.2 | V |

Note 3：Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

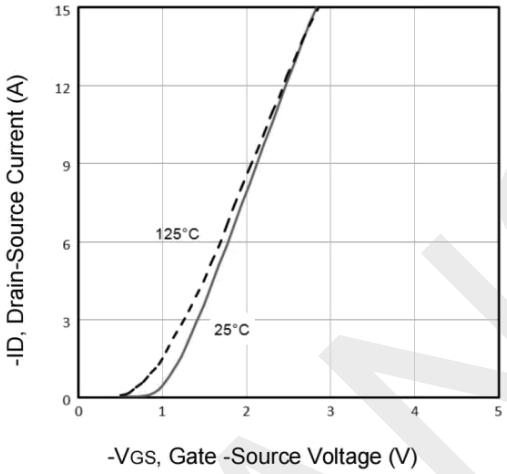
## 7.Typical Electrical and Thermal Characteristics



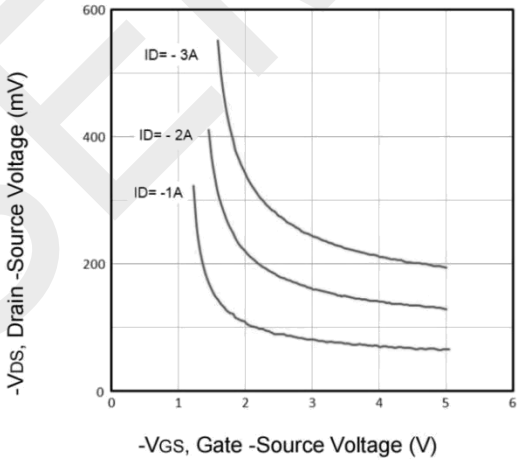

**Typical Output Characteristics**



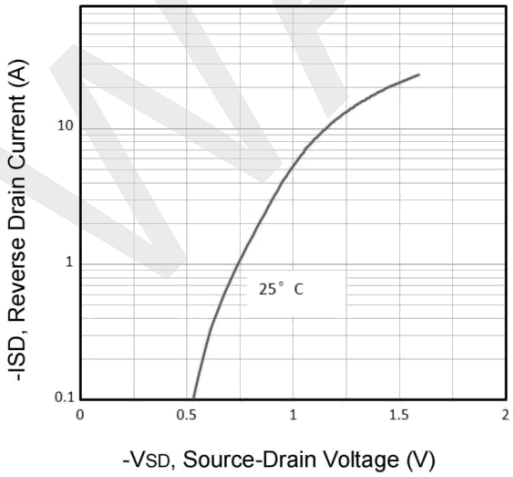

**Normalized Threshold Voltage Vs. Temperature**



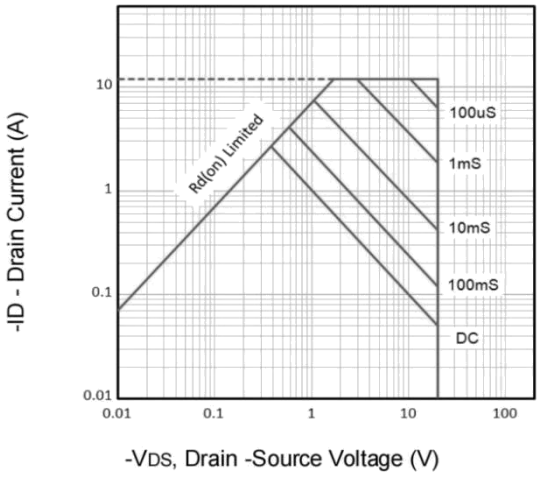

**Typical Transfer Characteristics**



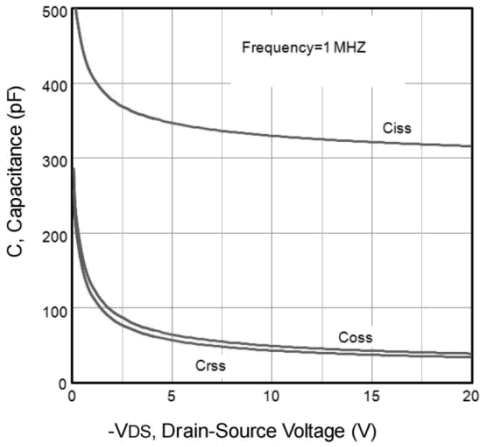

**Drain -Source Voltage vs Gate -Source Voltage**



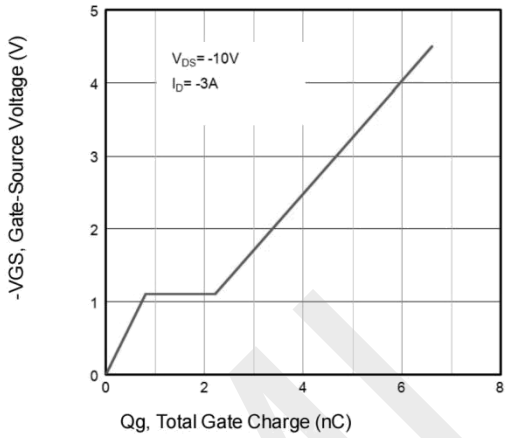

**Typical Source-Drain Diode Forward Voltage**



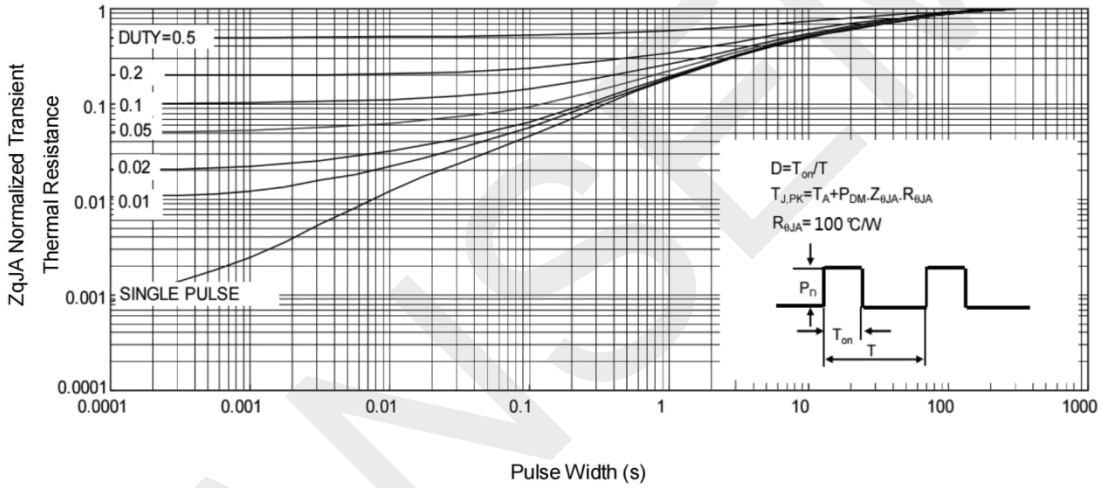

**Maximum Safe Operating Area**




**Typical Capacitance Vs. Drain-Source Voltage**

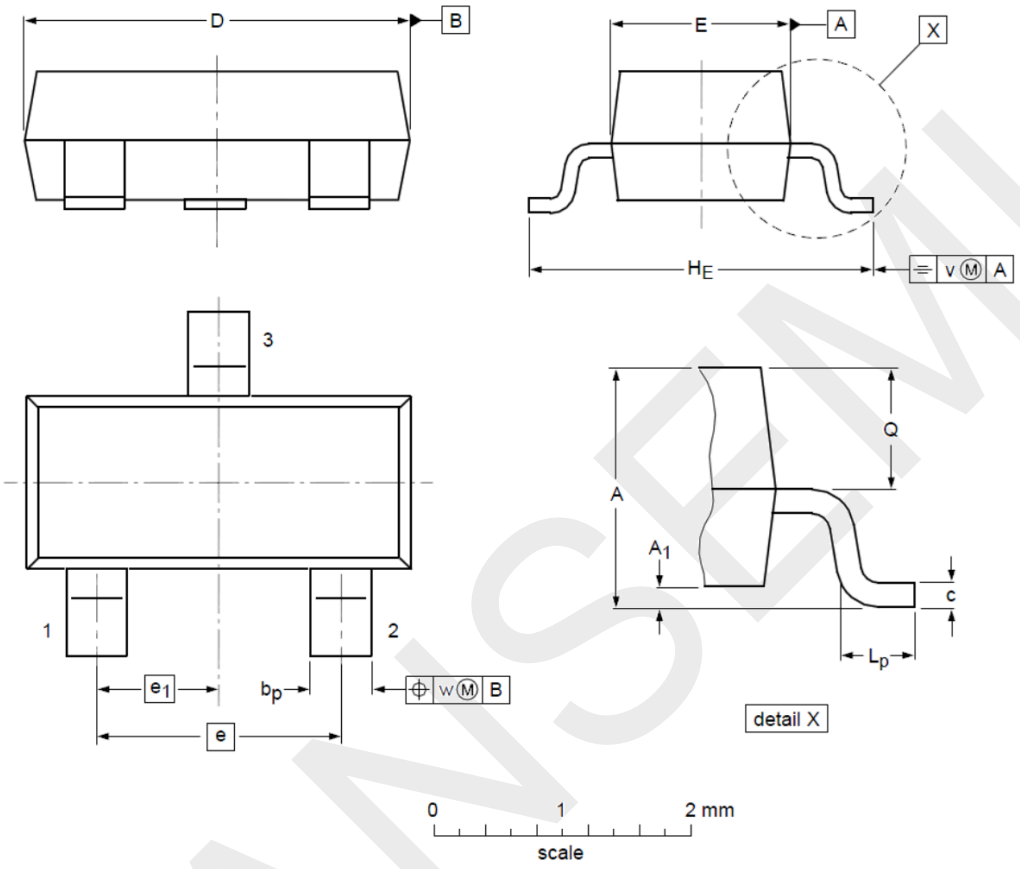



**Typical Gate Charge Vs. Gate-Source Voltage**




**Normalized Maximum Transient Thermal Impedance**

## 8.Package Dimensions




**DIMENSIONS** ( unit : mm )

| Symbol | Min | Typ | Max | Symbol | Min | Typ | Max |
|---|---|---|---|---|---|---|---|
| **A** | 1.00 | 1.17 | 1.30 | **$A_1$** | 0.01 | 0.05 | 0.10 |
| **$b_p$** | 0.35 | 0.39 | 0.50 | **c** | 0.10 | 0.20 | 0.26 |
| **D** | 2.70 | 2.90 | 3.10 | **E** | 1.30 | 1.58 | 1.70 |
| **e** | -- | 1.90 | -- | **$e_1$** | -- | 0.95 | -- |
| **$H_E$** | 2.50 | 2.78 | 3.00 | **$L_p$** | 0.20 | 0.32 | 0.60 |
| **Q** | 0.23 | 0.27 | 0.33 | **v** | -- | 0.20 | -- |
| **w** | -- | 0.20 | -- | | | | |

## 9.Important Notice

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