



**WANSEMI**  
万芯半导体

**WP8205AA**

# **Enhancement Mode N-Channel Power MOSFET**

**SOT23-6/NMOS/20V/±12V/0.7V/4A/23mΩ**

**Rev1.7**

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## 20V, 23mΩ, 4A, N-Channel MOSFET

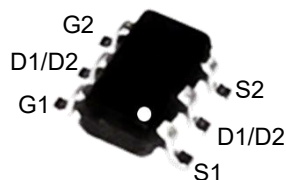
### 1.Features

- ◆ High Power and current handling capability
- ◆ Lead free product is acquired
- ◆ Surface Mount Package

| V <sub>DS</sub> Typ. | R <sub>DS(on)</sub> Typ. | I <sub>D</sub> Max. |
|----------------------|--------------------------|---------------------|
| 20V                  | 23mΩ @ 4.5V              | 4A                  |
|                      | 26mΩ @ 2.5V              |                     |

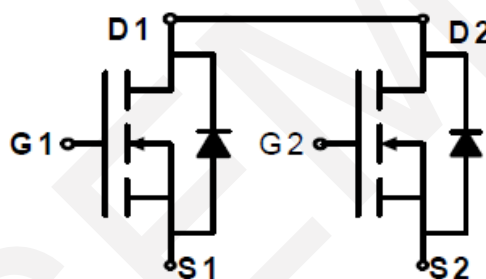
### 2.Applications

- ◆ Battery Protection
- ◆ Battery Powered Systems
- ◆ Power Management in Notebook Computer
- ◆ Portable Equipment



Pin Description

SOT23-6



Schematic Diagram

### 3.Package Marking and Ordering Information

| Part no. | Marking | Package | PCS/Reel | PCS/CTN. |
|----------|---------|---------|----------|----------|
| WP8205AA | 8205A   | SOT23-6 | 3,000    | 180,000  |

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

| Parameter                                                            | Symbol                            | Maximum     | Units |
|----------------------------------------------------------------------|-----------------------------------|-------------|-------|
| Drain to Source Voltage                                              | V <sub>DSS</sub>                  | 20          | V     |
| Gate to Source Voltage                                               | V <sub>GSS</sub>                  | ±12         | V     |
| Drain Current-Continuous                                             | I <sub>D</sub>                    | 4           | A     |
| Drain Current (Pulse)                                                | I <sub>DM</sub>                   | 20          | A     |
| Maximum Power Dissipation                                            | P <sub>D</sub>                    | 1.9         | W     |
| Operating Junction and Storage Temperature Range                     | T <sub>j</sub> , T <sub>stg</sub> | -55 to +150 | °C    |
| Lead Temperature for Soldering Purposes<br>(1/8" from case for 10 s) | T <sub>L</sub>                    | 260         | °C    |

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. Electrical Characteristics at Ta=25°C (Note 2)**

| Parameter                           | Symbol        | Test Conditions                                                  | Min. | Typ. | Max.      | Units      |
|-------------------------------------|---------------|------------------------------------------------------------------|------|------|-----------|------------|
| Drain to Source Breakdown Voltage   | $V_{(BR)DSS}$ | $I_D = 250\mu A, V_{GS} = 0V$                                    | 19.1 | 20   | -         | V          |
| Zero-Gate Voltage Drain Current     | $I_{DSS}$     | $V_{DS} = 18V, V_{GS} = 0V$                                      | -    | -    | 1         | $\mu A$    |
| Gate-Body Leakage Current           | $I_{GSS}$     | $V_{GS} = \pm 12V, V_{DS} = 0V$                                  | -    | -    | $\pm 100$ | nA         |
| Gate Threshold Voltage              | $V_{GS(th)}$  | $V_{DS}=V_{GS}, I_{DS}=250\mu A$                                 | 0.4  | 0.7  | 1.0       | V          |
| Drain to Source On-State Resistance | $R_{DS(on)}$  | $I_D = 4A, V_{GS} = 4.5V$                                        | -    | 23   | 27        | m $\Omega$ |
|                                     |               | $I_D = 2A, V_{GS} = 2.5V$                                        | -    | 26   | 33        | m $\Omega$ |
| Input Capacitance                   | $C_{iss}$     | $V_{GS}=0V,$<br>$V_{DS}=10V,$<br>Frequency=1.0MHz                | -    | 370  | -         | pF         |
| Output Capacitance                  | $C_{oss}$     |                                                                  | -    | 89   | -         | pF         |
| Reverse Transfer Capacitance        | $C_{rss}$     |                                                                  | -    | 10   | -         | pF         |
| Turn-ON Delay Time                  | $t_{d(on)}$   | $V_{DD} = 10V, I_D = 3A,$<br>$V_{GS} = 4.5V, R_{GEN} = 10\Omega$ | -    | 200  | -         | ns         |
| Turn-ON Rise Time                   | $t_r$         |                                                                  | -    | 236  | -         | ns         |
| Turn-OFF Delay Time                 | $t_{d(off)}$  |                                                                  | -    | 36   | -         | ns         |
| Turn-ON Fall Time                   | $t_f$         |                                                                  | -    | 165  | -         | ns         |
| Total Gate Charge                   | $Q_g$         | $V_{DS} = 10V,$<br>$V_{GS} = 4.5V,$<br>$I_D = 1A$                | -    | 7.5  | -         | nC         |
| Gate-Source Charge                  | $Q_{gs}$      |                                                                  | -    | 3.0  | -         | nC         |
| Gate-Drain Charge                   | $Q_{gd}$      |                                                                  | -    | 1.5  | -         | nC         |
| Diode Forward Voltage               | $V_{SD}$      | $I_S = 4A, V_{GS} = 0V$                                          | 0.4  | 0.8  | 1.4       | V          |

Note 2: 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.

## 6. Typical electrical and thermal characteristics

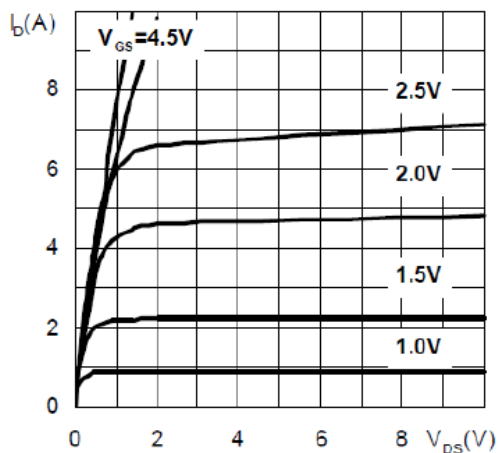


Figure 1 Output Characteristics

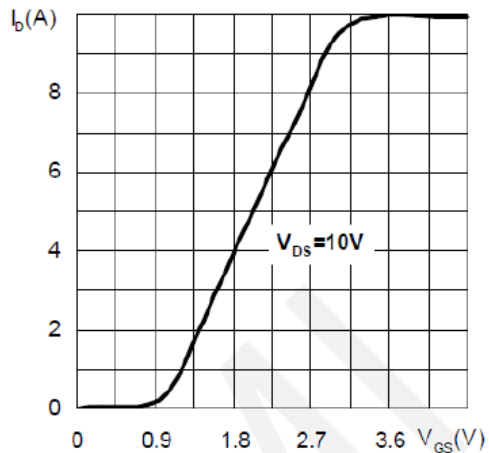


Figure 2 Transfer Characteristics

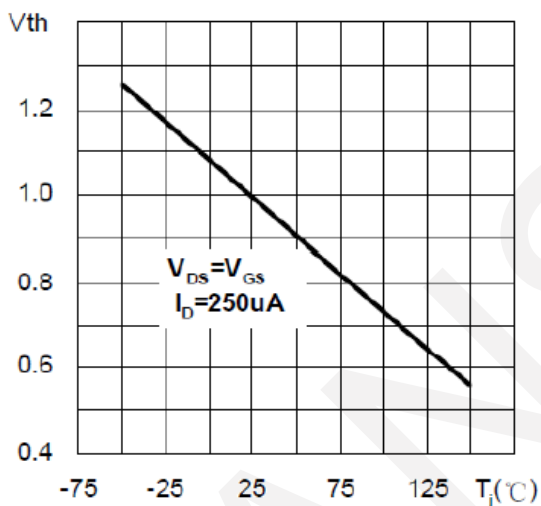


Figure 3 Threshold Voltage vs. Temperature

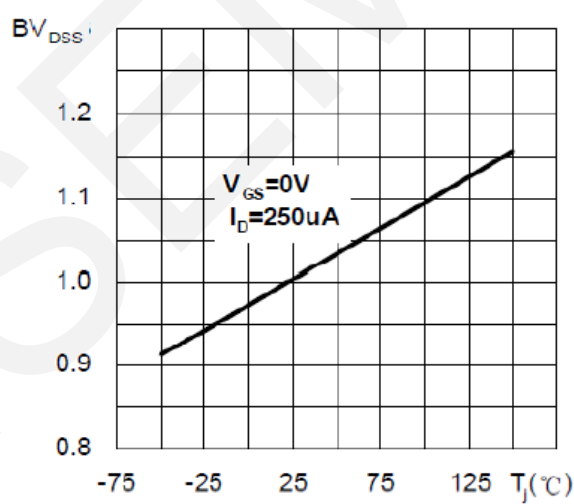


Figure 4 BVDSS vs. Temperature

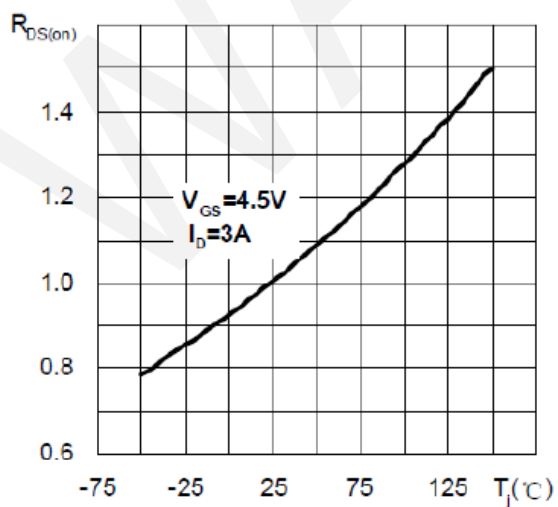


Figure 5 Rds(on) vs. Temperature

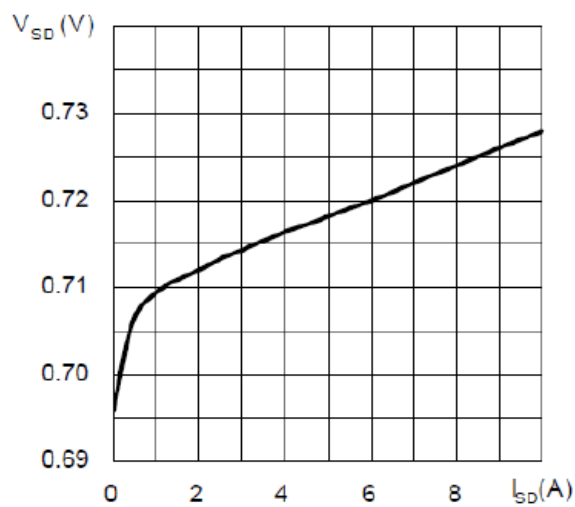


Figure 6 Source to Drain vs. Temperature

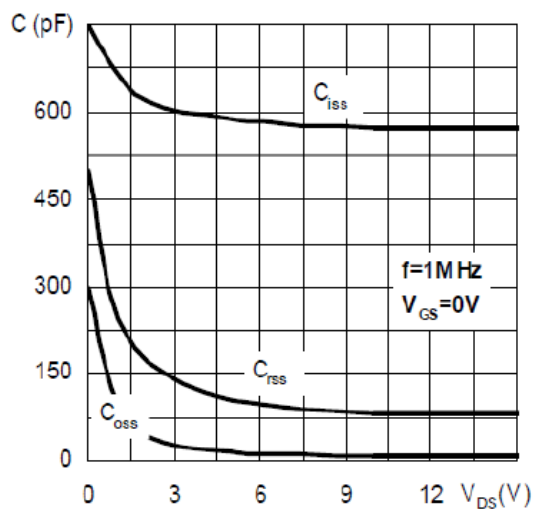


Figure 7 Capacitance

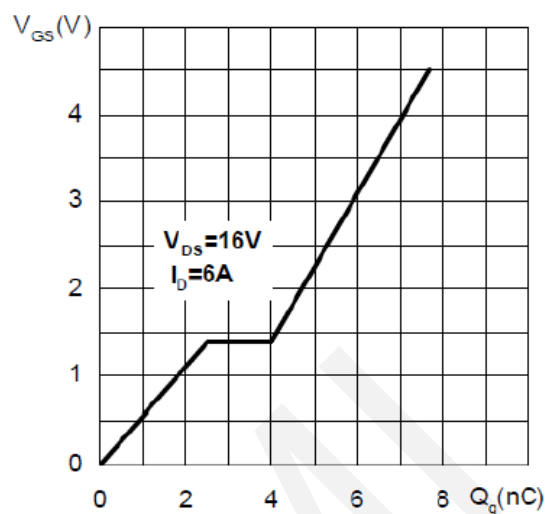


Figure 8 Gate Charge

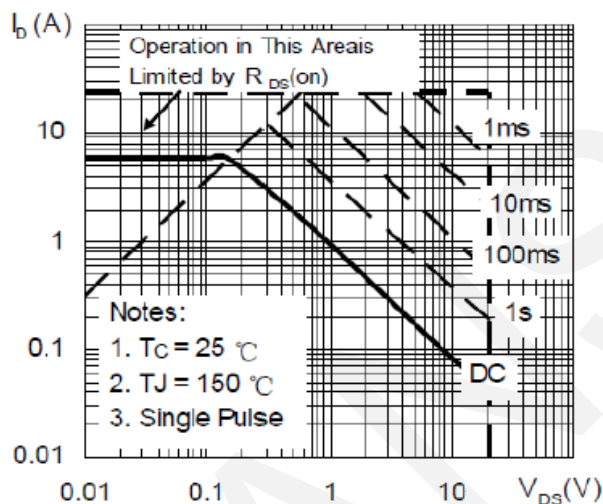


Figure 9 Safe Operating Area

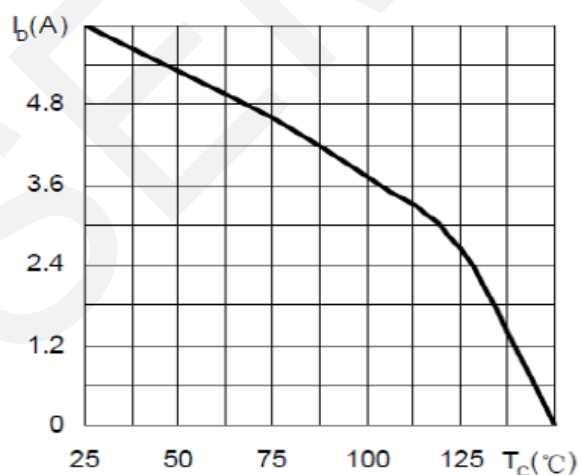


Figure 10 Maximum Drain Current vs. Case Temperature

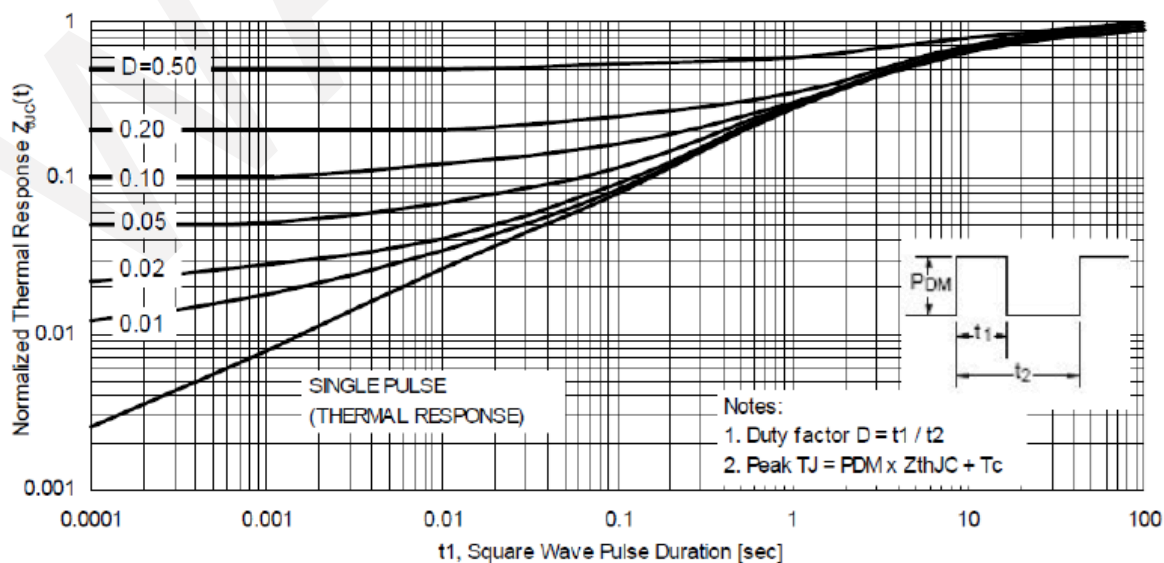
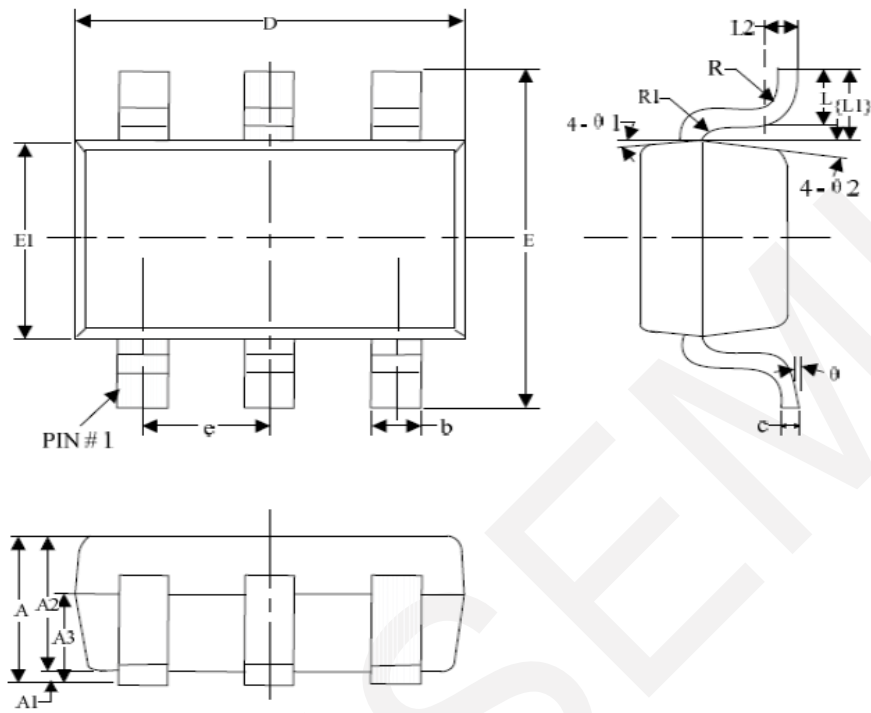


Figure 11 Maximum Transient Thermal Impedance  
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## 7.Package Dimensions

### SOT23-6



Dimensions (unit: mm)

| SYMBOL | MIN  | NOM  | MAX  | SYMBOL | MIN     | NOM  | MAX  |
|--------|------|------|------|--------|---------|------|------|
| A      | -    | -    | 1.30 | e      | 0.85    | 0.95 | 1.05 |
| A1     | 0    | -    | 0.15 | L      | 0.35    | 0.45 | 0.60 |
| A2     | 0.90 | 1.10 | 1.30 | L1     | 0.59REF |      |      |
| A3     | 0.60 | 0.65 | 0.70 | L2     | 0.25BSC |      |      |
| b      | 0.39 | -    | 0.49 | R      | 0.05    | -    | -    |
| c      | 0.12 | -    | 0.19 | R1     | 0.05    | -    | 0.02 |
| D      | 2.85 | 2.95 | 3.15 | θ      | 0°      | -    | 8°   |
| E      | 2.60 | 2.80 | 3.00 | θ1     | 3°      | 5°   | 7°   |
| E1     | 1.55 | 1.65 | 1.75 | θ2     | 6°      | 8°   | 10°  |

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