



WANSEMI
万芯半导体

WP2300

Enhancement Mode N-Channel Power MOSFET

SOT23-3/NMOS/20V/ ± 12 V/0.8V/4A/21m Ω

Rev1.1

20V, 21mΩ, 4A, Single N-Channel

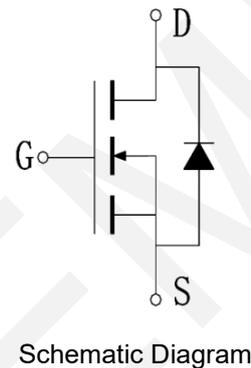
1.Features

- ◆ 20V MOSFET technology
- ◆ Low on-state resistance
- ◆ Fast switching
- ◆ $V_{GS} \pm 12V$

| V_{DS} | $R_{DS(on)}$ Typ. | I_D Max. |
|----------|-------------------|------------|
| 20V | 21mΩ @ 4.5V | 4A |
| | 33mΩ @ 2.5V | |

2.Applications

- ◆ Power Switching Application
- ◆ Load Switching



3.Package Marking and Ordering Information

| Part no. | Marking | Package | PCS/Tube | PCS/CTN. |
|----------|---------|---------|----------|----------|
| WP2300 | 2300 | SOT23-3 | 3,000 | 180,000 |

4.Absolute Max Ratings at $T_a=25^\circ C$ (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 | 4 | A |
| Drain Current (Pulse), $PW \leq 300\mu s$ | I_{DP} | 10.8 | A |
| Total Dissipation | P_D | 0.9 | W |
| Junction Temperature | T_j | 150 | $^\circ C$ |
| Storage Temperature | T_{stg} | -55 to +150 | $^\circ C$ |

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. Thermal Resistance Ratings

| Parameter | Symbol | Value | Unit |
|------------------------------|-----------------|-------|-----------------------------|
| Junction to Ambient (Note 2) | $R_{\theta JA}$ | 125 | $^{\circ}\text{C}/\text{W}$ |

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

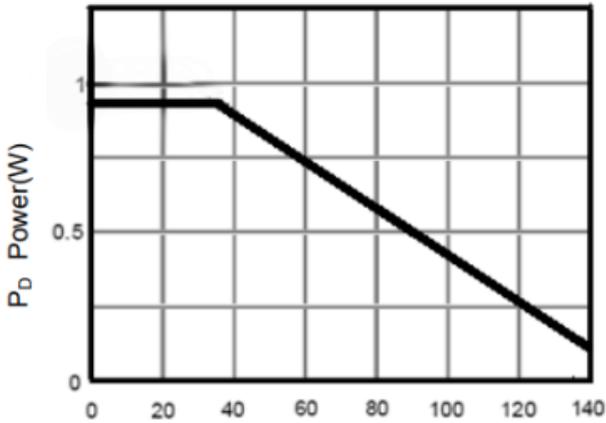
6. Electrical Characteristics at $T_a=25^{\circ}\text{C}$ (Note 3)

| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|--|---------------|---|------|------|-----------|------------------|
| Drain to Source Breakdown Voltage | $V_{(BR)DSS}$ | $I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$ | 20 | 22 | - | V |
| Zero-Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$ | - | - | 1 | μA |
| Gate to Source Leakage Current | I_{GSS1} | $V_{GS} = \pm 12\text{V}, V_{SS} = 0\text{V}$ | - | - | ± 100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_{DS}=250\mu\text{A}$ | 0.4 | 0.8 | 1 | V |
| Static Drain to Source On-State Resistance | $R_{DS(on)}$ | $I_D = 4\text{A}, V_{GS} = 4.5\text{V}$ | - | 21 | 28 | $\text{m}\Omega$ |
| | | $I_D = 2\text{A}, V_{GS} = 2.5\text{V}$ | - | 33 | 38 | $\text{m}\Omega$ |
| Input Capacitance | C_{iss} | $V_{GS}=0\text{V},$ $V_{DS}=10\text{V},$ Frequency=1.0MHz | - | 300 | - | pF |
| Output Capacitance | C_{oss} | | - | 120 | - | pF |
| Reverse Transfer Capacitance | C_{rss} | | - | 80 | - | pF |
| Turn-ON Delay Time | $t_{d(on)}$ | $V_{DD} = 10\text{V}, I_D = 2.9\text{A},$ $V_{GEN} = 4.5\text{V}, R_G = 6\Omega$ | - | 10 | - | ns |
| Rise Time | t_r | | - | 50 | - | ns |
| Turn-OFF Delay Time | $t_{d(off)}$ | | - | 17 | - | ns |
| Fall Time | t_f | | - | 10 | - | ns |
| Total Gate Charge | Q_g | $V_{DS} = 10\text{V},$ $V_{GS} = 4.5\text{V},$ $I_{DS} = 2.9\text{A}$ | - | 4 | - | nC |
| | Q_{gs} | | - | 0.65 | - | nC |
| | Q_{gd} | | - | 1.2 | - | nC |
| Diode Forward Voltage | V_{FSD} | $I_S = 2.9\text{A}, V_{GS} = 0\text{V}$ | - | - | 1.2 | V |

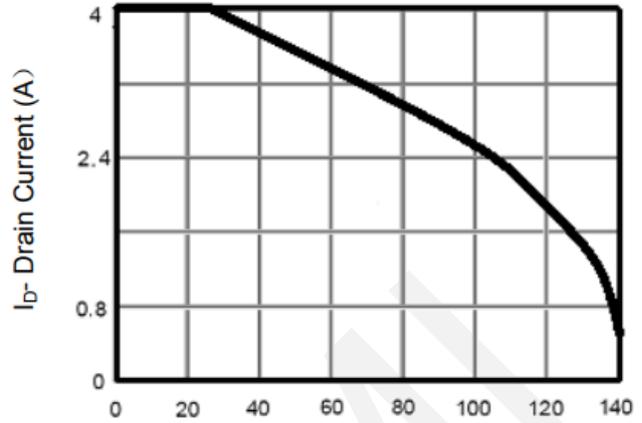
Note 3: Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.



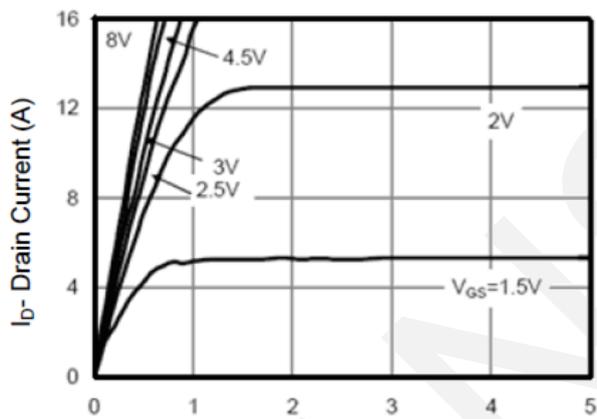
7. Typical electrical and thermal characteristics



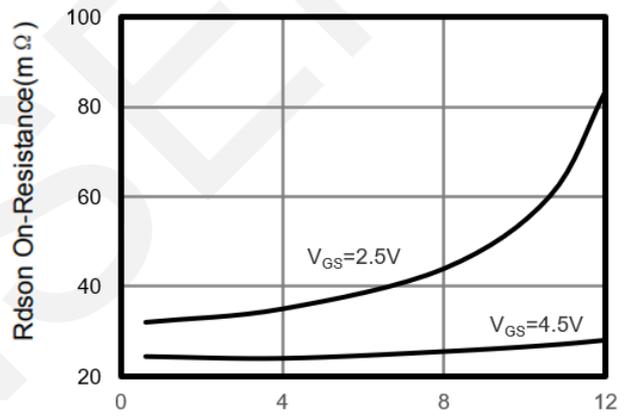
T_J-Junction Temperature(°C)
Power Dissipation



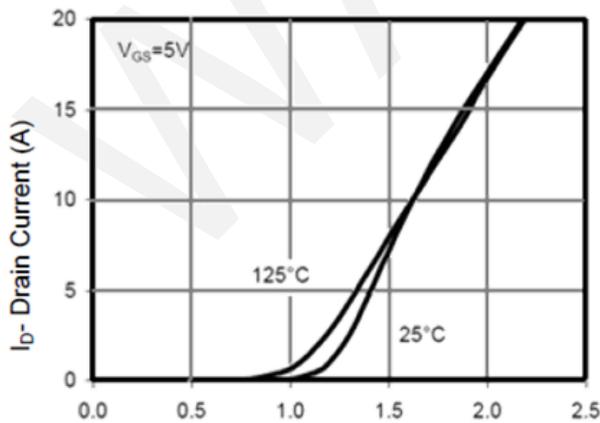
T_J-Junction Temperature(°C)
Drain Current



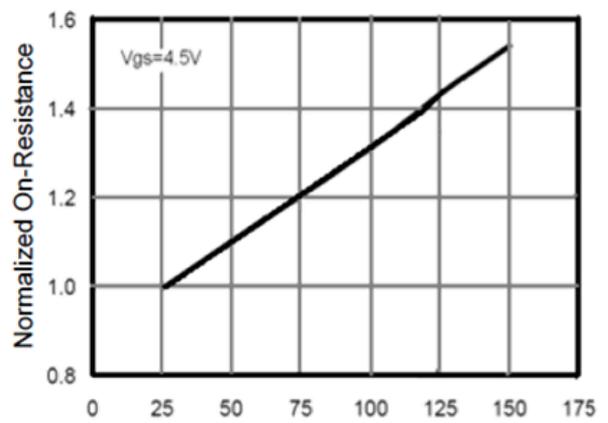
V_{DS} Drain-Source Voltage (V)
Output Characteristics



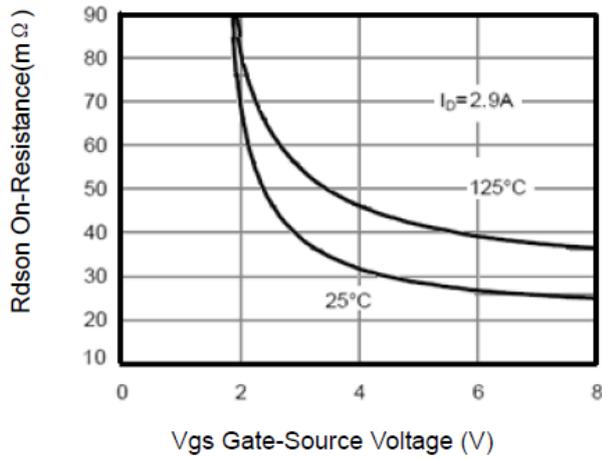
I_D- Drain Current (A)
Drain-Source On-Resistance



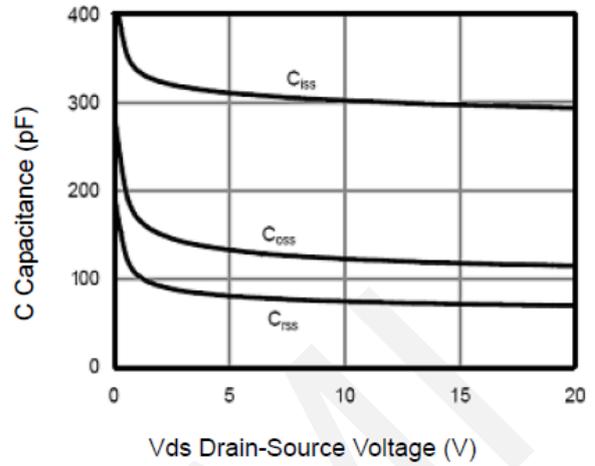
V_{GS} Gate-Source Voltage (V)
Transfer Characteristics



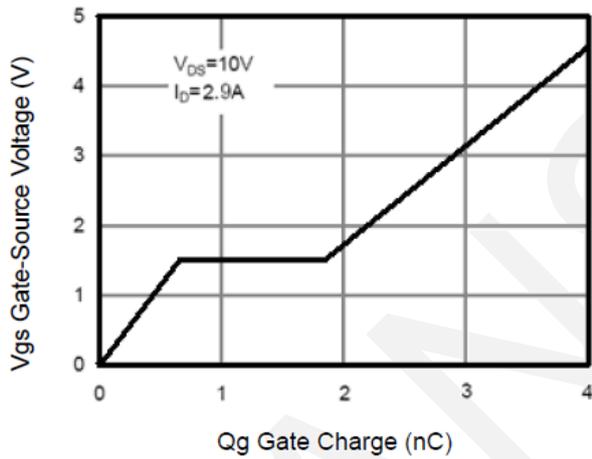
T_J-Junction Temperature(°C)
Drain-Source On-Resistance



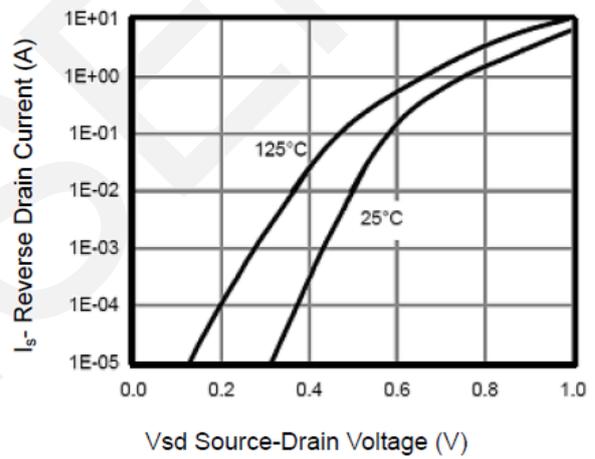
Rdson vs Vgs



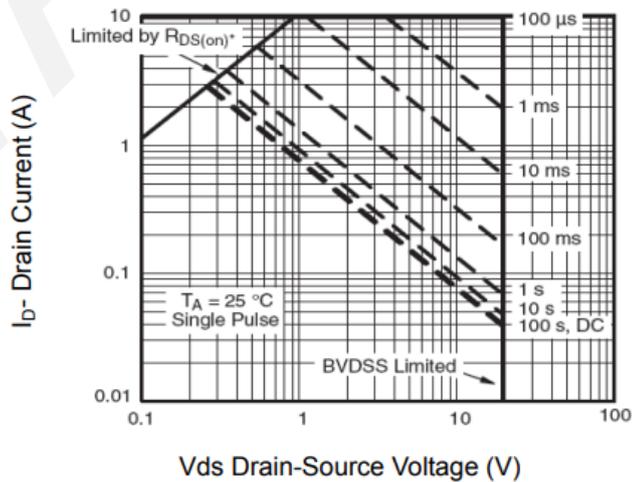
Capacitance vs Vds



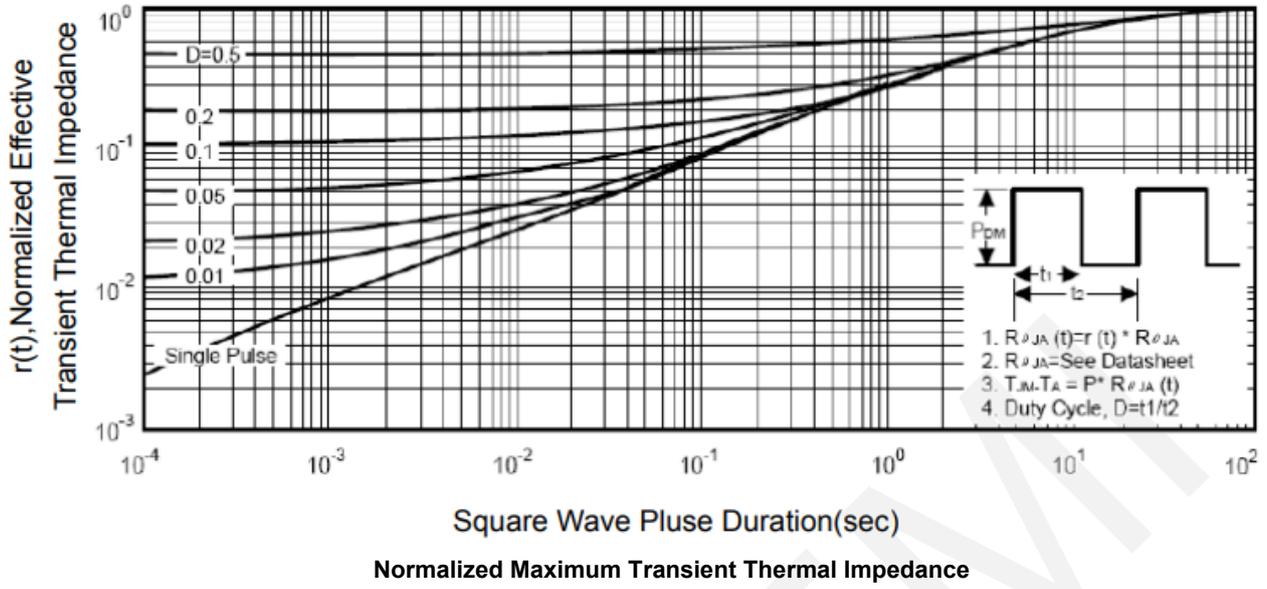
Gate Charge



Source- Drain Diode Forward

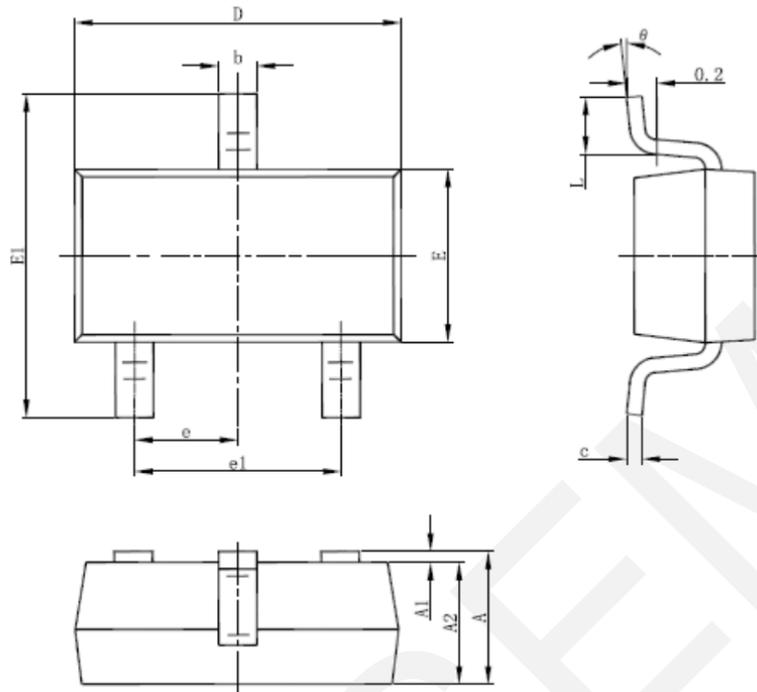


Safe Operation Area





8.Package Dimensions



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 1.050 | 1.250 | 0.041 | 0.049 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.050 | 1.150 | 0.041 | 0.045 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.100 | 0.200 | 0.004 | 0.008 |
| D | 2.820 | 3.020 | 0.111 | 0.119 |
| E | 1.500 | 1.700 | 0.059 | 0.067 |
| E1 | 2.650 | 2.950 | 0.104 | 0.116 |
| e | 0.950(BSC) | | 0.037(BSC) | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.300 | 0.600 | 0.012 | 0.024 |
| θ | 0° | 8° | 0° | 8° |

9. Important Notice

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