

• General Description

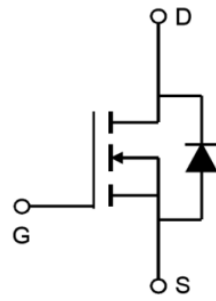
AP2300A-SI combines advanced MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is most suitable to load-switch or PWM applications.

• Applications

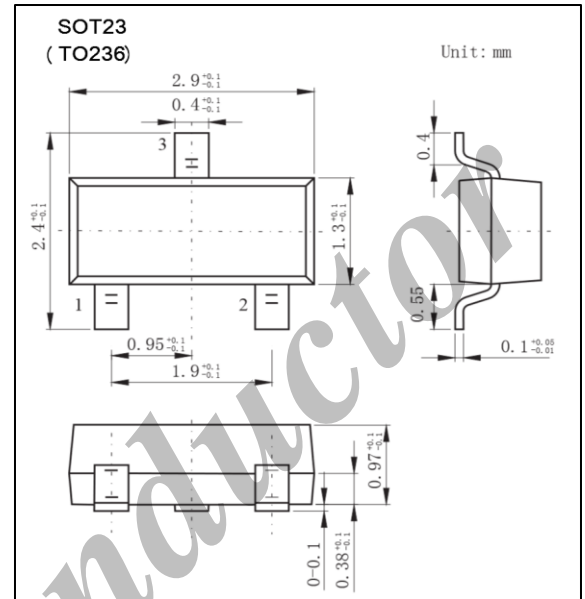
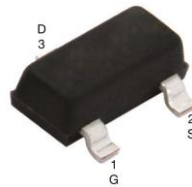
- DC/DC converter for portable devices
- Load switch

• Product Summary

| | |
|------------------------------------|-----------------|
| V_{DS} | 30V |
| I_D (at $V_{GS} = 10V$) | 4.0A |
| $R_{DS(ON)}$ (at $V_{GS} = 10V$) | < 55m Ω |
| $R_{DS(ON)}$ (at $V_{GS} = 4.5V$) | < 70m Ω |
| $R_{DS(ON)}$ (at $V_{GS} = 2.5V$) | < 110m Ω |



Top View



• Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

| Parameter | Symbol | Rating | Unit |
|------------------------------------------|-----------------|------------|--------------------|
| Drain-Source Voltage | V_{DS} | 30 | V |
| Gate-Source Voltage | V_{GS} | ± 12 | V |
| Continuous Drain Current | I_D | $T_A=25$ | 4.0 |
| | | $T_A=70$ | 3.4 |
| Pulsed Drain Current * | I_{DM} | 15 | A |
| Power Dissipation | P_D | $T_A=25$ | 1.4 |
| | | $T_A=70$ | 1 |
| Thermal Resistance, Junction- to-Ambient | $R_{\theta JA}$ | 125 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction- to-Case | $R_{\theta JC}$ | 80 | $^\circ\text{C/W}$ |
| Junction and Storage Temperature Range | T_J, T_{STG} | -55 to 150 | $^\circ\text{C}$ |

* Repetitive rating, pulse width limited by junction temperature.

• **Electrical Characteristics Ta = 25°C**

| Parameter | Symbol | Test conditions | Min | Typ | Max | Unit |
|---------------------------------------|--------------|-----------------------------------------------------------|--------------------------------|------|-----------|------------|
| Drain-Source Breakdown Voltage | V_{DSS} | $I_D=250\mu A, V_{GS}=0V$ | 30 | | | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=24V, V_{GS}=0V$ | | | 1 | μA |
| | | $V_{DS}=24V, V_{GS}=0V, T_J=55^\circ C$ | | | 5 | |
| Gate-Body leakage current | I_{GSS} | $V_{DS}=0V, V_{GS}=\pm 12V$ | | | ± 100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 0.6 | 1 | 1.4 | V |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}=10V, I_D=4A$ | | 45 | 55 | m Ω |
| | | $V_{GS}=10V, I_D=4A, T_J=125^\circ C$ | | 66 | 80 | |
| | | $V_{GS}=4.5V, I_D=3A$ | | 55 | 70 | |
| | | $V_{GS}=2.5V, I_D=2A$ | | 83 | 110 | |
| On state drain current | $I_{D(on)}$ | $V_{GS}=4.5V, V_{DS}=5V$ | 10 | | | A |
| Forward Transconductance | g_{FS} | $V_{DS}=5V, I_D=4A$ | | 8 | | S |
| Input Capacitance | C_{iss} | $V_{GS}=0V, V_{DS}=15V, f=1MHz$ | | 390 | | pF |
| Output Capacitance | C_{oss} | | | 54.5 | | pF |
| Reverse Transfer Capacitance | C_{rss} | | | 41 | | pF |
| Gate resistance | R_g | | $V_{GS}=0V, V_{DS}=0V, f=1MHz$ | | 3 | |
| Total Gate Charge | Q_g | $V_{GS}=4.5V, V_{DS}=15V, I_D=4A$ | | 4.34 | | nC |
| Gate Source Charge | Q_{gs} | | | 0.6 | | nC |
| Gate Drain Charge | Q_{gd} | | | 1.38 | | nC |
| Turn-On Delay Time | $t_{D(on)}$ | | | | 3.3 | |
| Turn-On Rise Time | t_r | $V_{GS}=10V, V_{DS}=15V, R_L=3.75\Omega, R_{GEN}=6\Omega$ | | 1 | | ns |
| Turn-Off Delay Time | $t_{D(off)}$ | | | 21.7 | | ns |
| Turn-Off Fall Time | t_f | | | 2.1 | | ns |
| Body Diode Reverse Recovery Time | t_{rr} | | $I_F=4A, d_i/d_t=100A/\mu s$ | | 12 | |
| Body Diode Reverse Recovery Charge | Q_{rr} | $I_F=4A, d_i/d_t=100A/\mu s$ | | 6.3 | | nC |
| Maximum Body-Diode Continuous Current | I_S | | | | 2.5 | A |
| Diode Forward Voltage | V_{SD} | $I_S=1A, V_{GS}=0V$ | | 0.8 | 1 | V |

• **Ordering Information**

| Ordering Part Number | Package | MOQ |
|----------------------|---------------|------------------|
| AP2300A-SI | SOT23 (T0236) | 3,000 pcs / reel |

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• Typical Characteristics

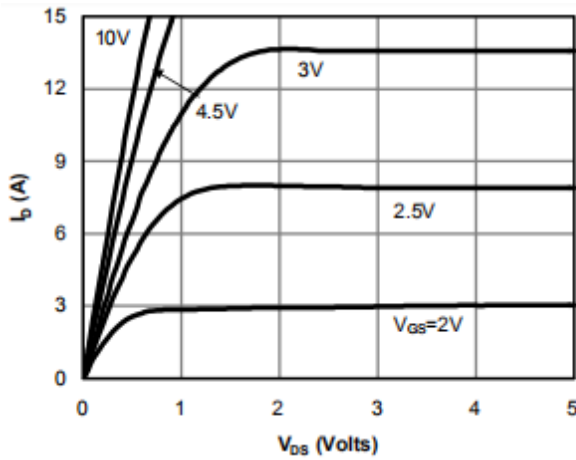


Fig 1: On-Region Characteristics

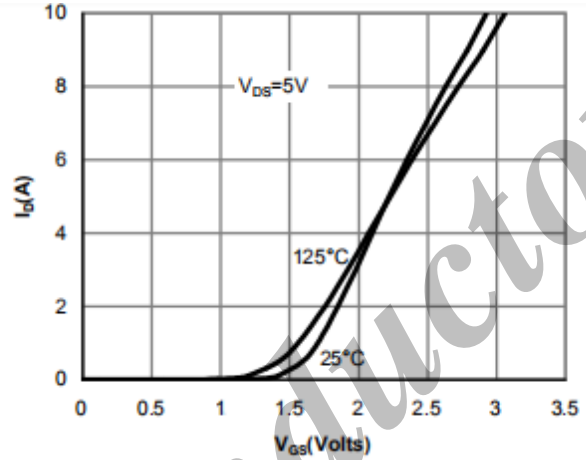


Figure 2: Transfer Characteristics

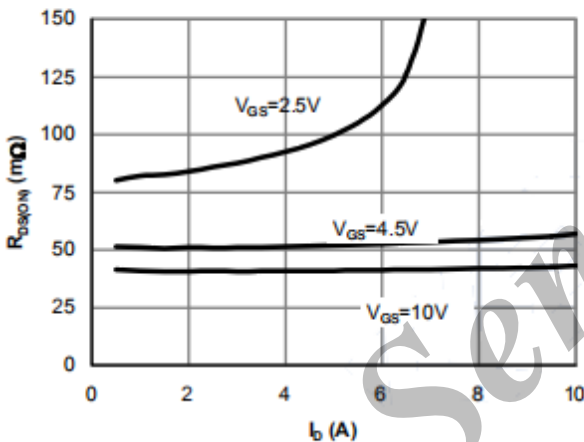


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

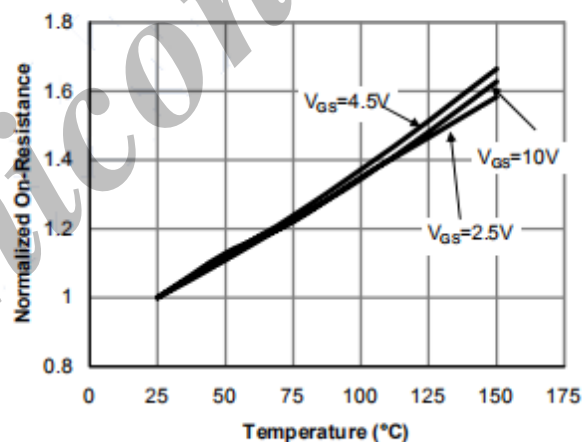


Figure 4: On-Resistance vs. Junction Temperature

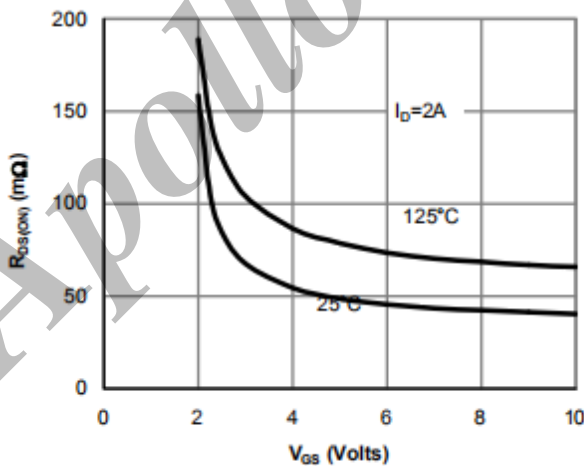


Figure 5: On-Resistance vs. Gate-Source Voltage

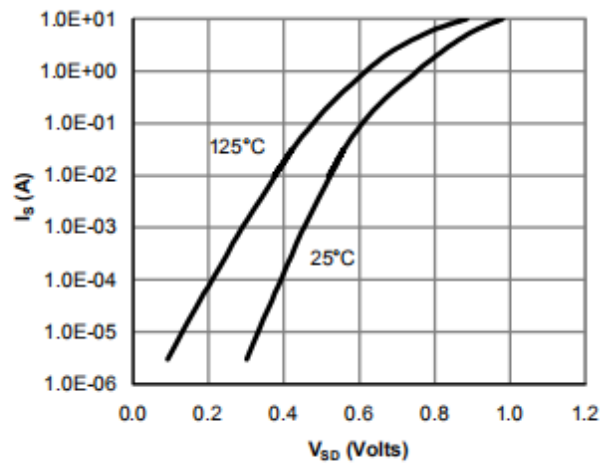


Figure 6: Body-Diode Characteristics

• Typical Characteristics

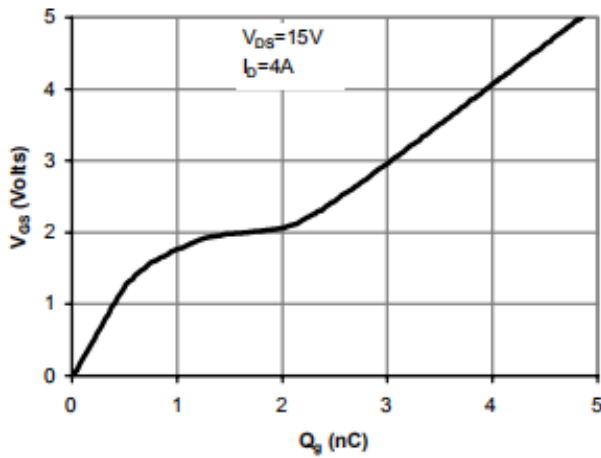


Figure 7: Gate-Charge Characteristics

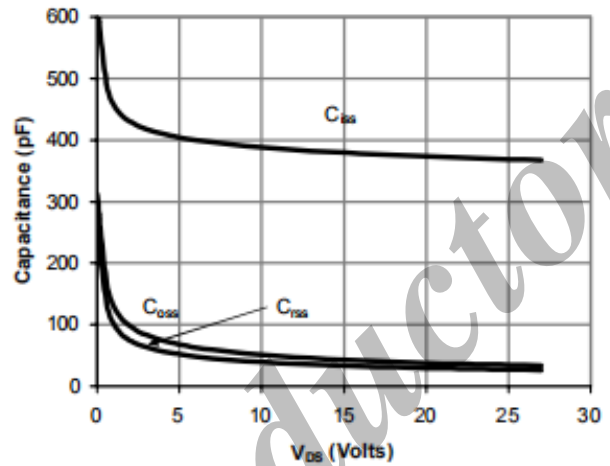


Figure 8: Capacitance Characteristics

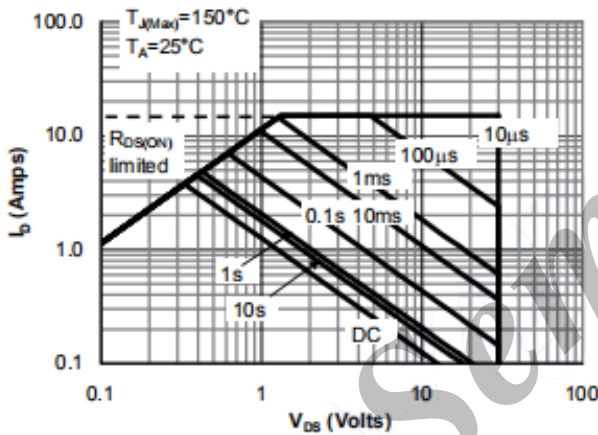


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

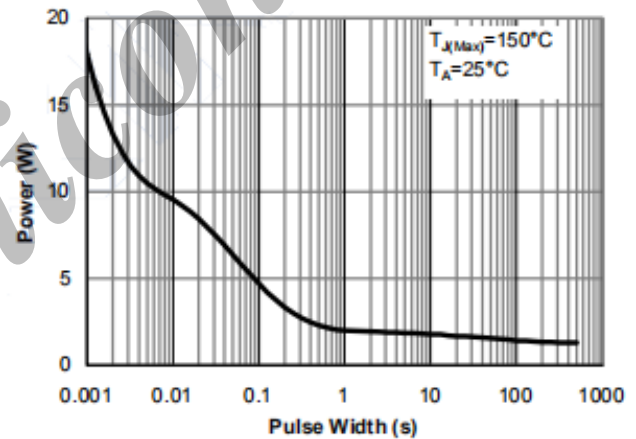


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

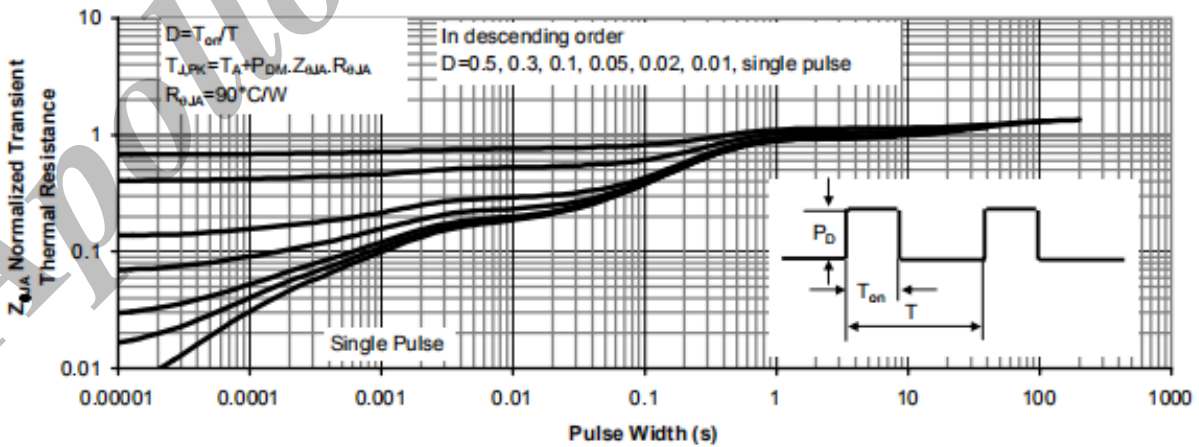


Figure 11: Normalized Maximum Transient Thermal Impedance

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