# AP004SN900MTA

N-Channel Enhancement Mode MOSFET

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)MAX}$ | $I_D$ |
|---|---|---|
| 900V | 3.5Ω@10V | 4A |

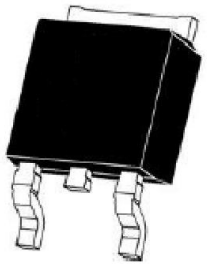
## Feature

- Self-aligned planar technology
- Low conduction loss

## Application

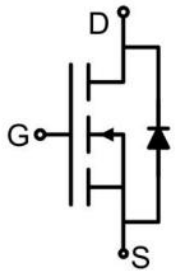
- Uninterruptible power supply (UPS)
- Power factor correction (PFC)

## Package

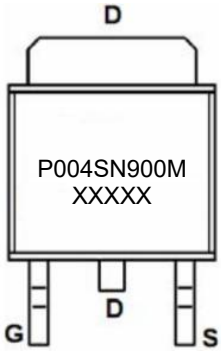


TO-252AB

## Circuit diagram




## Marking



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## Absolute maximum ratings ($T_C$=25℃ unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage ($V_{GS}$=0V) | $V_{DS}$ | 900 | V |
| Gate-Source Voltage | $V_{GS}$ | ±30 | V |
| Continuous Drain Current[1] ($V_{GS}$=10V) | $I_D$ | 4 | A |
| Continuous Drain Current[1] ($V_{GS}$=10V, $T_C$=100℃) | $I_D$ | 2.1 | A |
| Pulsed Drain Current[2] | $I_{DM}$ | 16 | A |
| Single Pulse Avalanche Energy[3] | $E_{AS}$ | 125 | mJ |
| Power Dissipation[4] | $P_D$ | 25 | W |
| Thermal Resistance Junction-to-Case | $R_{\theta JC}$ | 5 | ℃/W |
| Operating Junction Temperature | $T_J$ | -55 ~ +150 | ℃ |
| Storage Temperature Range | $T_{STG}$ | -55 ~ +150 | ℃ |

## Electrical characteristics ($T_J$=25℃ unless otherwise noted)

| Parameter | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}$ =0V, $I_D$ =250μA | 900 | | | V |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$ =900V, $V_{GS}$ =0V | | | 1 | μA |
| Gate-body leakage current | $I_{GSS}$ | $V_{DS}$ =0V, $V_{GS}$ =±30V | | | ±100 | nA |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}$ =$V_{GS}$, $I_D$ =250μA | 2 | 3 | 4.5 | V |
| Drain-source on-resistance | $R_{DS(on)}$ | $V_{GS}$ =10V, $I_D$ =2A | | 3 | 3.5 | Ω |
| **Dynamic characteristics[5]** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ =25V, $V_{GS}$ =0V, f =1MHz | | 674 | | pF |
| Output Capacitance | $C_{oss}$ | | | 71 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 13 | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$ =450V, $V_{GS}$ =10V, $I_D$ =4A | | 27 | | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 3.5 | | |
| Gate-Drain Charge | $Q_{gd}$ | | | 14 | | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DS}$=720V, $I_D$=4A , $R_G$=25Ω | | 37 | | nS |
| Turn-on rise time | $t_r$ | | | 15 | | |
| Turn-off delay time | $t_{d(off)}$ | | | 144 | | |
| Turn-off fall time | $t_f$ | | | 36 | | |
| **Source-Drain Diode characteristics** | | | | | | |
| Diode Forward Current | $I_S$ | | | | 4 | A |
| Diode Forward voltage | $V_{SD}$ | $V_{GS}$ =0V, $I_S$ =2A | | | 1.4 | V |
| Reverse Recovery Time | $T_{rr}$ | $V_{GS}$ =0V, $I_S$ =4A<br>di/dt =100A/μs | | 1018 | | nS |
| Reverse Recovery Charge | $Q_{rr}$ | | | 2.2 | | μC |

Notes:

1) The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2) The test condition is Pulse Test: Pulse width ≤300μs, Duty Cycle ≤1%.
3) The EAS data shows Max. rating . L=10mH, $I_{AS}$=6A, $V_{DD}$=50V, $R_G$=25Ω, Starting $T_J$= 25℃.
4) The power dissipation is limited by 150℃ junction temperature.
5) Guaranteed by design, not subject to production.

## Typical Characteristics

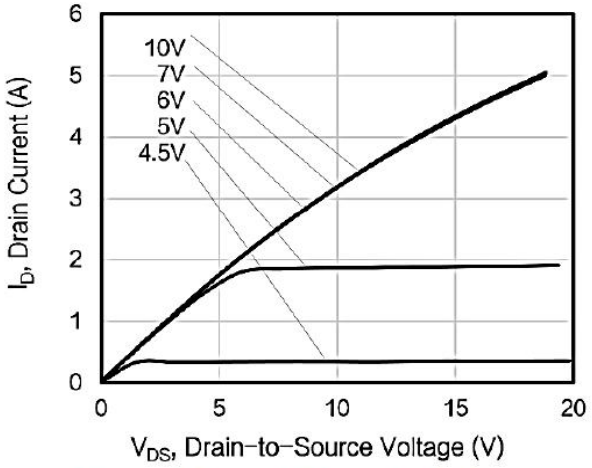



**Figure 1. Output Characteristics**

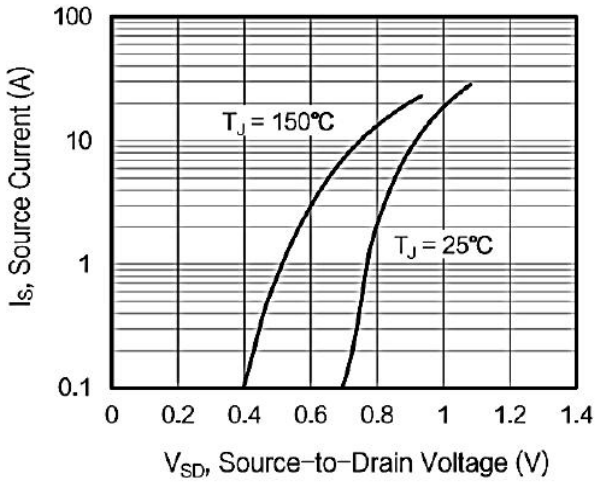



**Figure 2. Body Diode Forward Voltage**

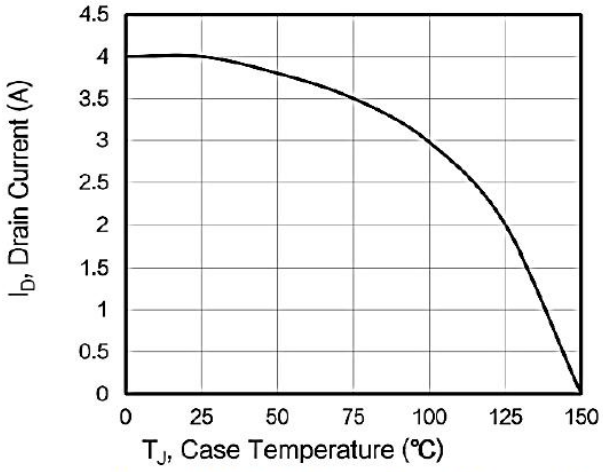



**Figure3. Drain Current vs. Temperature**

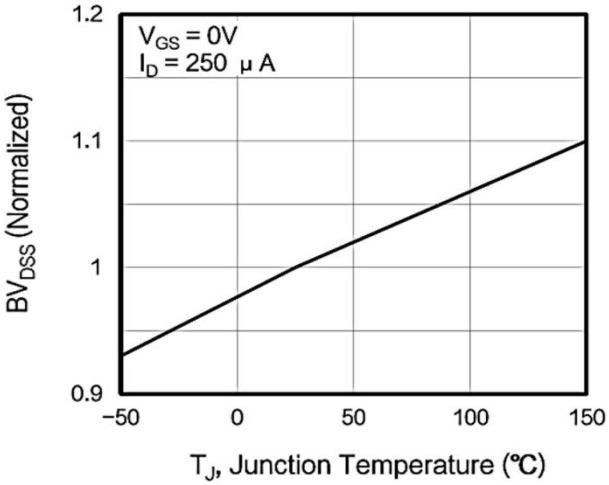



**Figure4. BVDSS Variation vs. Temperature**

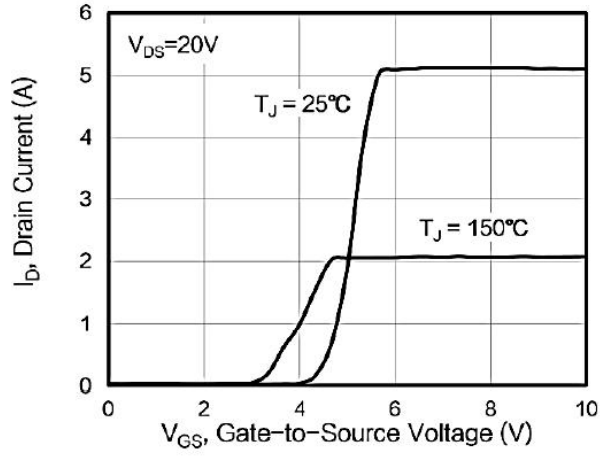



**Figure 5. Transfer Characteristics**

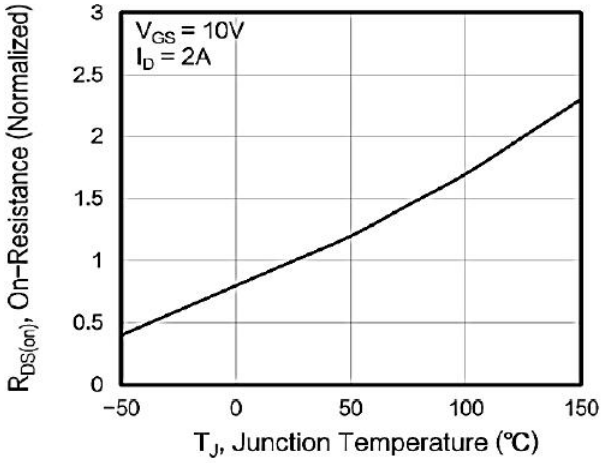



**Figure 6. On-Resistance vs. Temperature**

## Typical Characteristics

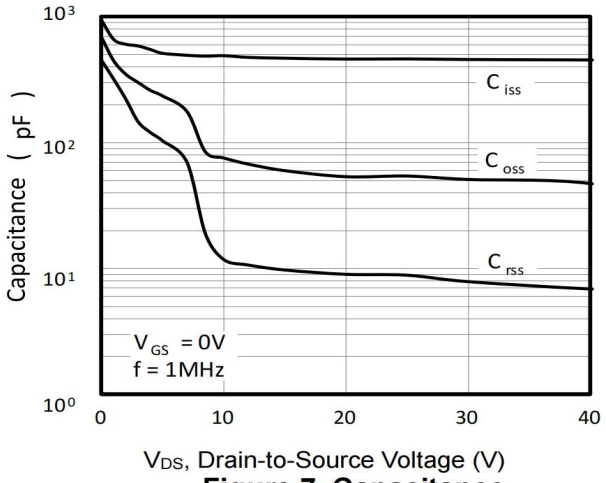



**Figure 7. Capacitance**

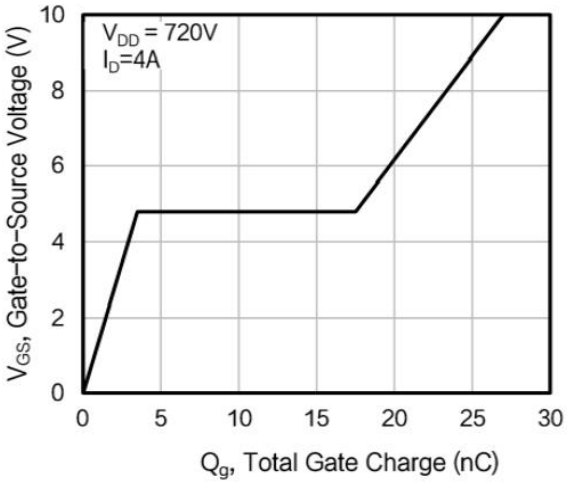



**Figure 8. Gate Charge**

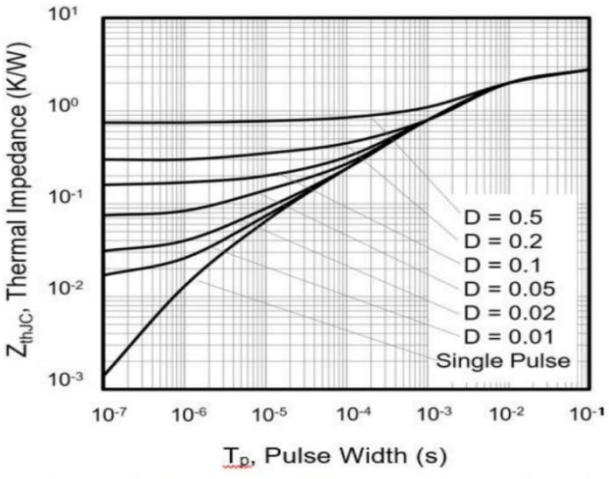
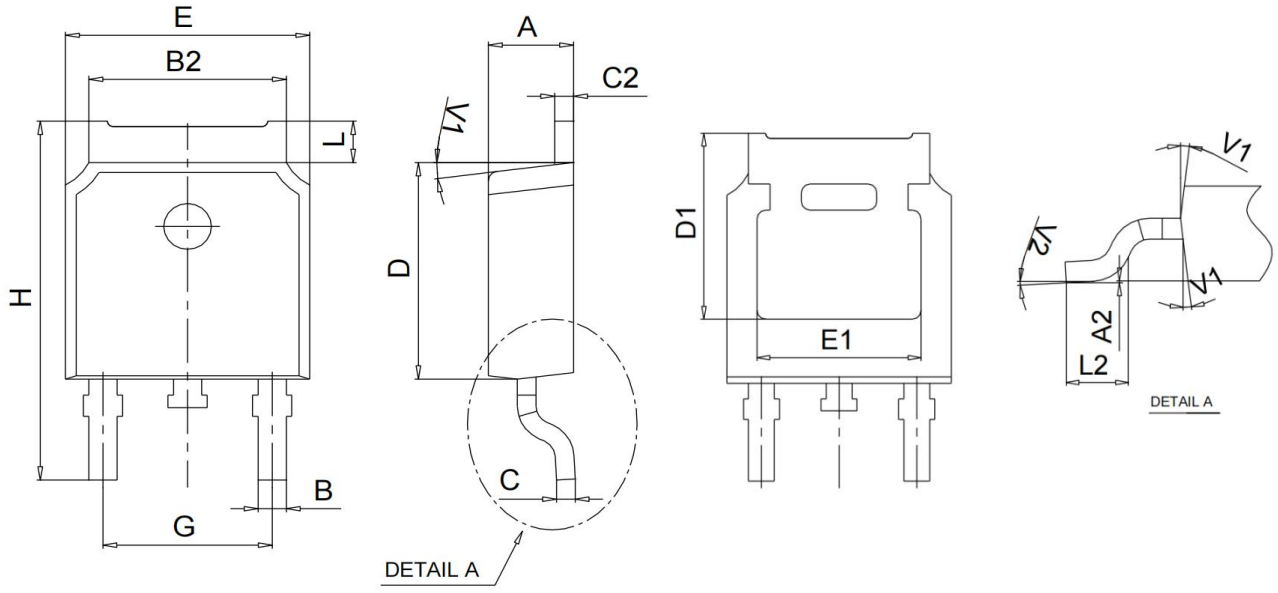



**Figure 9. Transient Thermal Impedance**

## TO-252AB Package Information




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 2.100 | 2.500 | 0.083 | 0.098 |
| A2 | 0.000 | 0.100 | 0.000 | 0.004 |
| B | 0.660 | 0.860 | 0.026 | 0.034 |
| B2 | 5.180 | 5.480 | 0.202 | 0.216 |
| C | 0.400 | 0.600 | 0.016 | 0.024 |
| C2 | 0.440 | 0.580 | 0.017 | 0.023 |
| D | 5.900 | 6.300 | 0.232 | 0.248 |
| D1 | 5.300 REF. | | 0.209 REF. | |
| E | 6.400 | 6.800 | 0.252 | 0.268 |
| E1 | 4.630 | - | 0.182 | - |
| G | 4.470 | 4.670 | 0.176 | 0.184 |
| H | 9.500 | 10.700 | 0.374 | 0.421 |
| L | 1.090 | 1.210 | 0.043 | 0.048 |
| L2 | 1.350 | 1.650 | 0.053 | 0.065 |
| V1 | 7° BSC. | | 7° BSC. | |
| V2 | 0° | 6° | 0° | 8° |