



SANYO Semiconductors

## DATA SHEET

# TND311S

ExPD (Excellent Power Device)  
 General Purpose Driver for PDP Sustain Pulse Drive, Motor Drive,  
 Switching Power Supply, and DC / DC Converter Applications

## Features

- Dual inverter.
- Monolithic structure (High voltage CMOS process adopted).
- Withstand voltage of 25V is assured.
- Wide range of operating voltage : 4.5V to 25V.
- Peak output current : 2A.
- Fast switching time (25ns typical at 1000pF load).
- Fully compatible input to TTL / CMOS. ( $V_{IH}$ =not more than 2.6V, at  $V_{DD}$ =4.5 to 25V)
- Built-in input pull-down resistance.

## Specifications

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

| Parameter                   | Symbol    | Conditions | Ratings                 | Unit             |
|-----------------------------|-----------|------------|-------------------------|------------------|
| Supply Voltage              | $V_{DD}$  |            | 0 to 25                 | V                |
| Input Voltage               | $V_{IN}$  |            | GND-0.3 to $V_{DD}+0.3$ | V                |
| Allowable Power Dissipation | PD max    |            | 0.3                     | W                |
| Junction Temperature        | $T_J$     |            | -55 to +150             | $^\circ\text{C}$ |
| Storage Temperature         | $T_{stg}$ |            | -55 to +150             | $^\circ\text{C}$ |

### Recommended Operating Conditions at $T_a=25^\circ\text{C}$

| Parameter                | Symbol    | Conditions | Ratings     | Unit             |
|--------------------------|-----------|------------|-------------|------------------|
| Operating Supply Voltage | $V_{DD}$  |            | 4.5 to 25   | V                |
| Operating Temperature    | $T_{opr}$ |            | -40 to +125 | $^\circ\text{C}$ |

### Electrical Characteristics (AC Characteristics) at $T_a=25^\circ\text{C}$ , $V_{DD}=18\text{V}$ , $V_{IN}=5\text{V}$

| Parameter          | Symbol   | Conditions          | Ratings |     |     | Unit |
|--------------------|----------|---------------------|---------|-----|-----|------|
|                    |          |                     | min     | typ | max |      |
| Turn-On Rise Time  | $t_r$    | $C_L=1000\text{pF}$ |         | 20  | 35  | ns   |
| Turn-Off Fall Time | $t_f$    | $C_L=1000\text{pF}$ |         | 25  | 40  | ns   |
| Delay Time         | $t_{D1}$ | $C_L=1000\text{pF}$ |         | 25  | 40  | ns   |
|                    | $t_{D2}$ | $C_L=1000\text{pF}$ |         | 45  | 60  | ns   |

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**SANYO Semiconductor Co., Ltd.**

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# TND311S

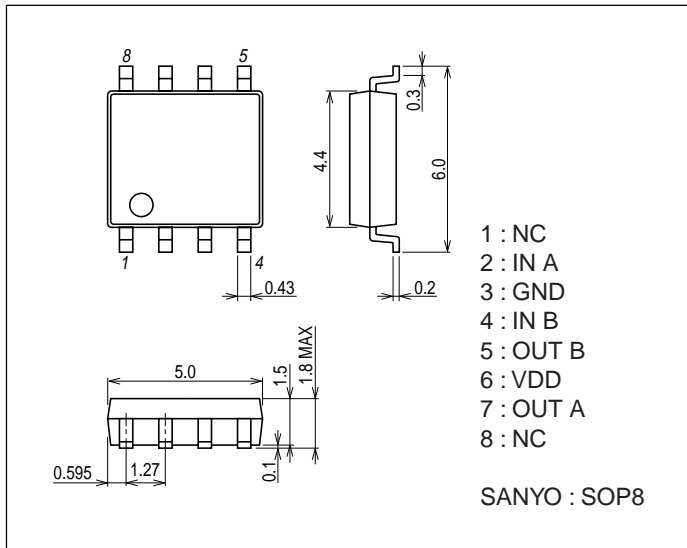
## Electrical Characteristics (DC Characteristics) at $T_a=25^{\circ}\text{C}$ , $V_{DD}=4.5$ to $25\text{V}$

| Parameter                                | Symbol     | Conditions   | Ratings      |     |     | Unit          |          |
|--|------------|--|--------------|-----|-----|---------------|----------|
|  |            |  | min          | typ | max |               |          |
| Logic "1" Input Voltage                  | $V_{IH}$   |  | 2.6          |     |     | V             |          |
| Logic "0" Input Voltage                  | $V_{IL}$   |  |              |     | 0.8 | V             |          |
| Logic "1" Input Bias Current             | $I_{IN+}$  | $V_{IN}=V_{DD}=25\text{V}$   |              | 20  | 55  | $\mu\text{A}$ |          |
| Logic "0" Input Bias Current             | $I_{IN-}$  | $V_{IN}=0\text{V}$ or $V_{DD}$                                       | -1           |     | 1   | $\mu\text{A}$ |          |
| High Level Output Voltage                | $V_{OH}$   | $I_O=0\text{A}$  | $V_{DD}-0.1$ |     |     | V             |          |
| Low Level Output Voltage                 | $V_{OL}$   | $I_O=0\text{A}$  |              |     | 0.1 | V             |          |
| $V_{DD}$ Supply Current                  | $I_{supp}$ | $V_{DD}=10\text{V}$ , $V_{IN}=3\text{V}$ , (both inputs)             |              | 1.0 | 4.5 | $\text{mA}$   |          |
|  |            | $V_{DD}=10\text{V}$ , $V_{IN}=0\text{V}$ , (both inputs)             |              |     | 0.2 | $\text{mA}$   |          |
| Output High Short Circuit Pulsed Current | $I_{O+}$   | $V_{DD}=18\text{V}$ , $PW \leq 10\mu\text{s}$ , $V_{OUT}=0\text{V}$  |              | 2.0 |     | A             |          |
| Output Low Short Circuit Pulsed Current  | $I_{O-}$   | $V_{DD}=18\text{V}$ , $PW \leq 10\mu\text{s}$ , $V_{OUT}=18\text{V}$ |              | 2.0 |     | A             |          |
| Output On Resistance                     | $R_{OUT}$  | $V_{DD}=18\text{V}$ , $I_{load}=10\text{mA}$ , $V_{OUT}=\text{"H"}$  |              |     | 4   | 6             | $\Omega$ |
|  |            | $V_{DD}=18\text{V}$ , $I_{load}=10\text{mA}$ , $V_{OUT}=\text{"L"}$  |              |     | 3   | 5             | $\Omega$ |

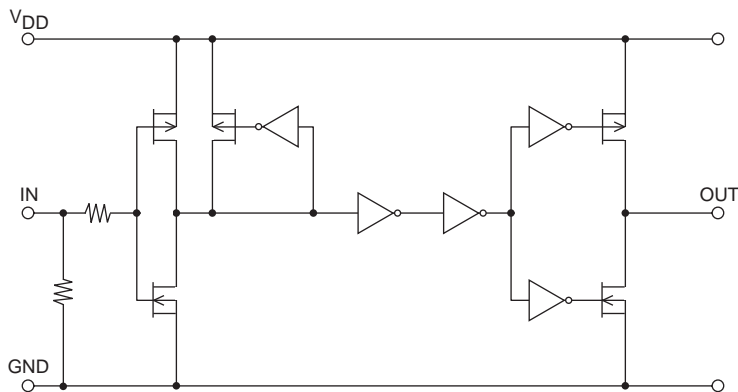
## Package Dimensions

unit : mm (typ)

7005-007

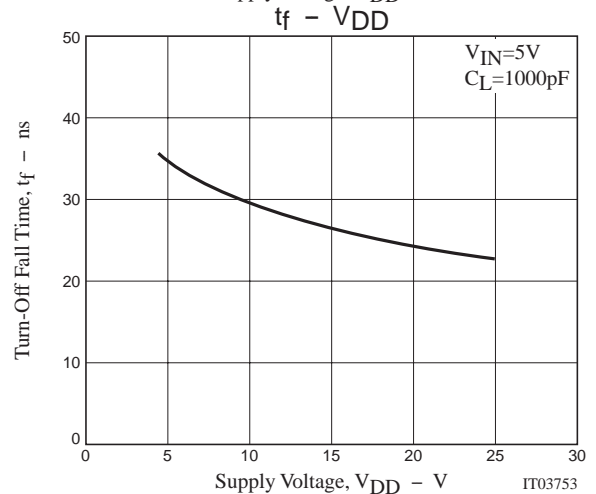
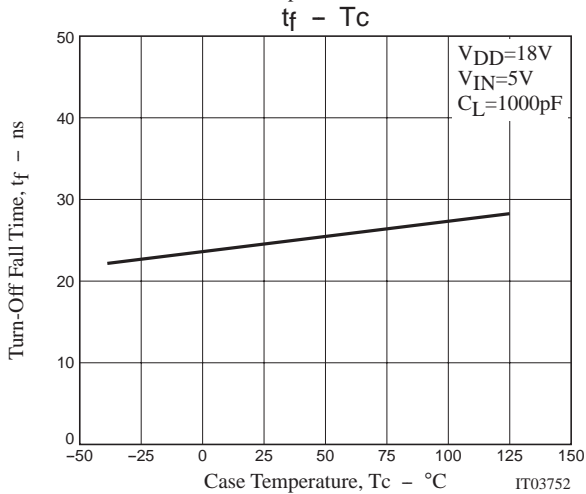
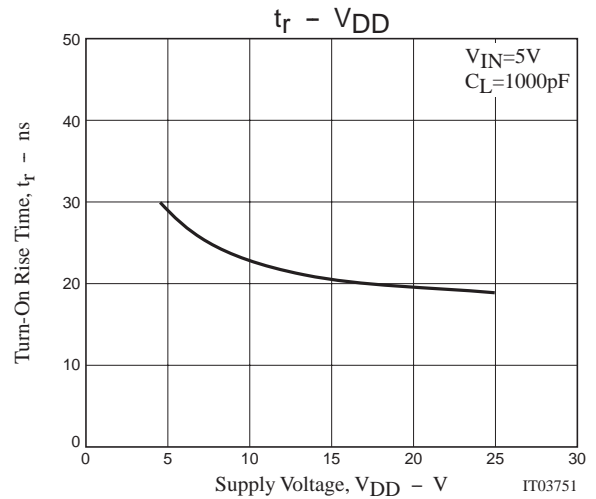
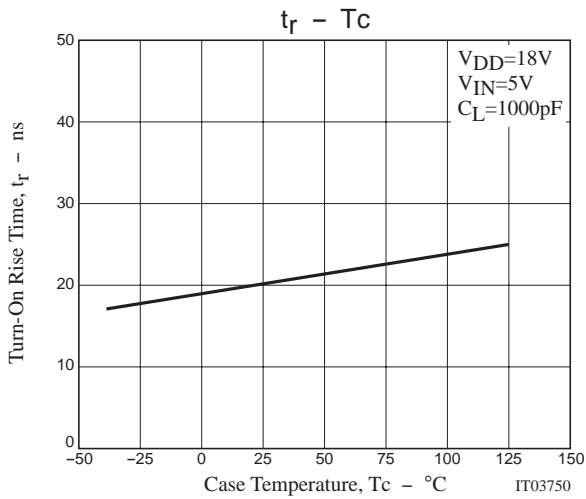
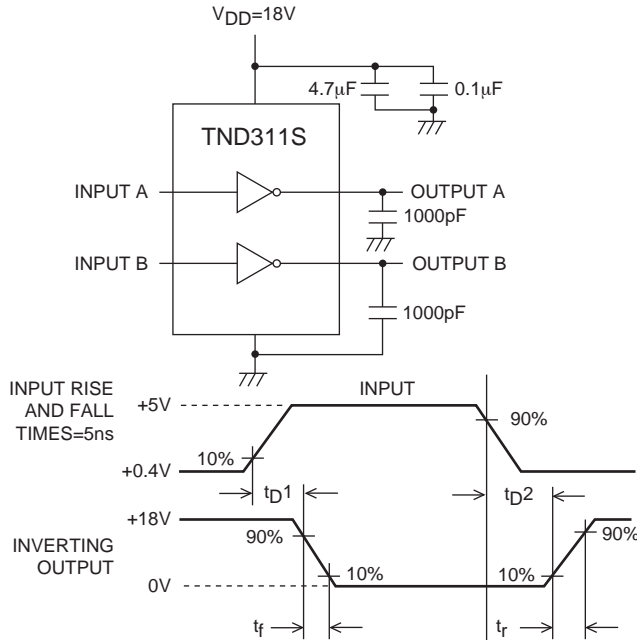


## Block Diagram

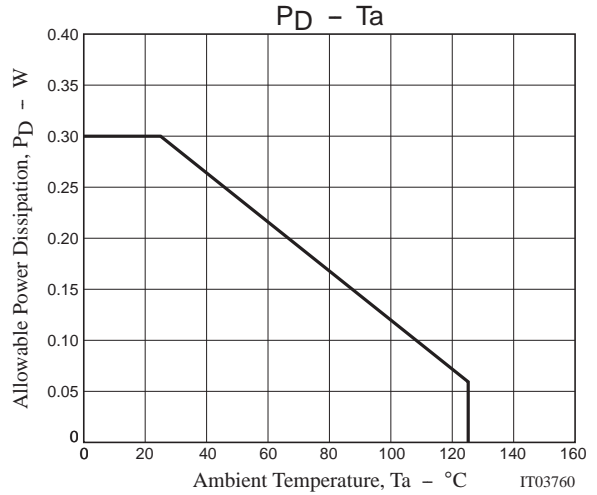
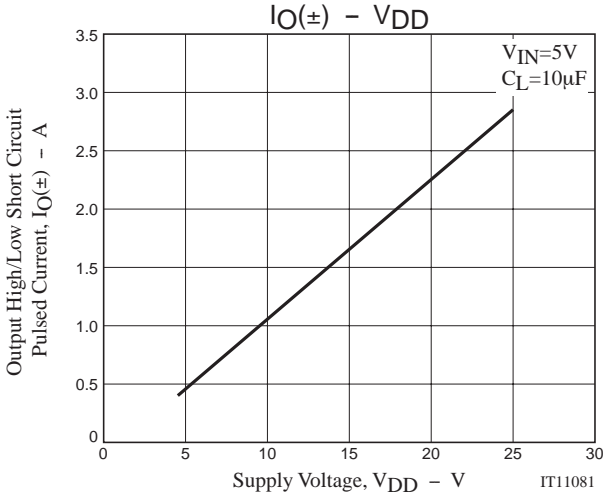
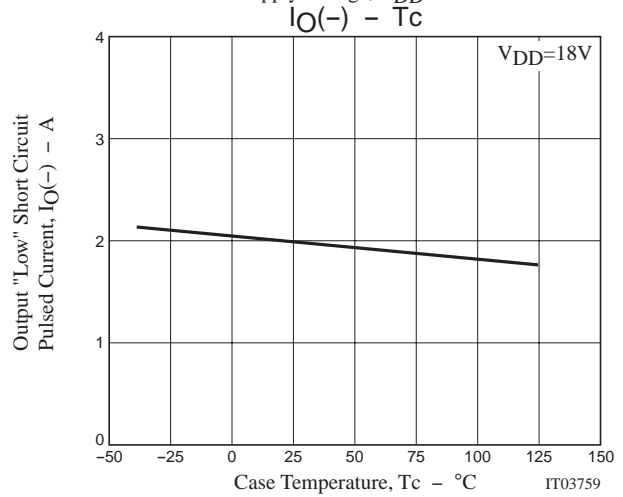
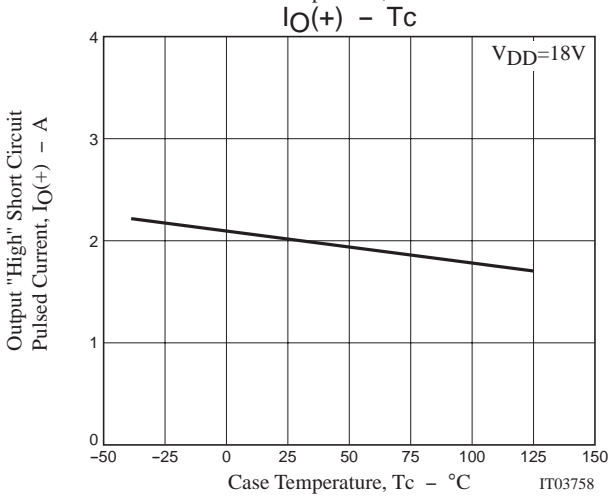
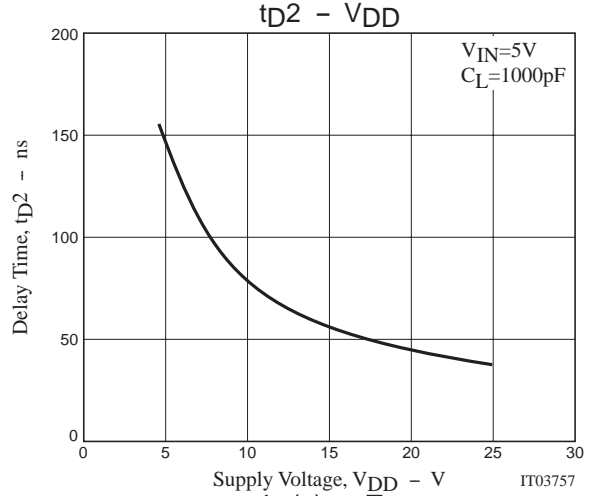
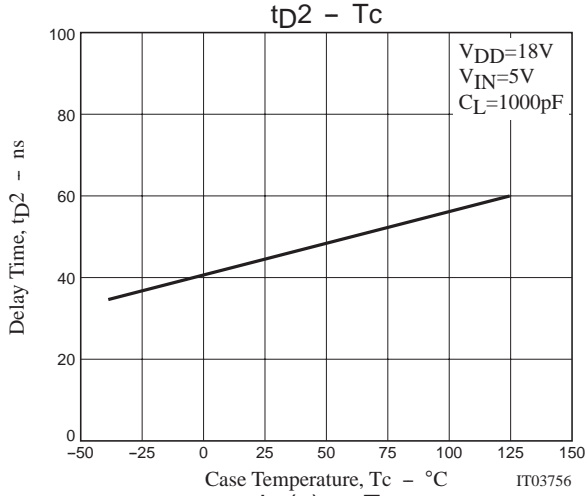
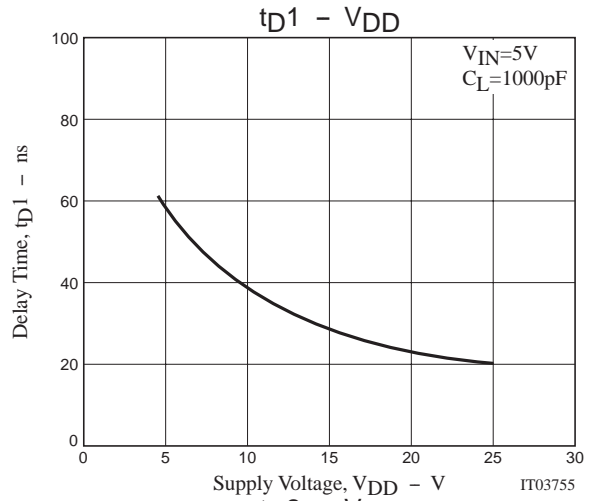
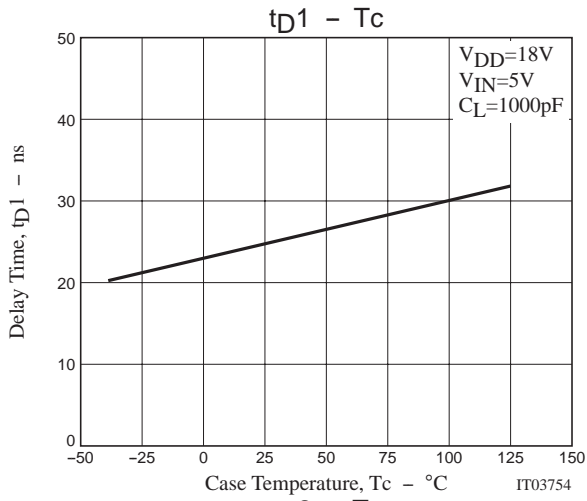


# TND311S

## Switching Time Measuring Circuit



# TND311S



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