

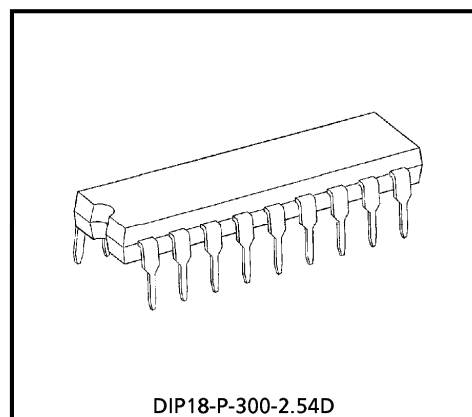
TD6337P

10BIT SERIAL-INPUT / PARALLEL OUTPUT DRIVER

The TD6337P is an IC built using a Bi-CMOS process characterized by high output withstand voltage. It contains a serial-input, 10-stage parallel-output shift register and latches as well as a bipolar 10-stage parallel output driver. It also has a serial output which facilitates output expansion.

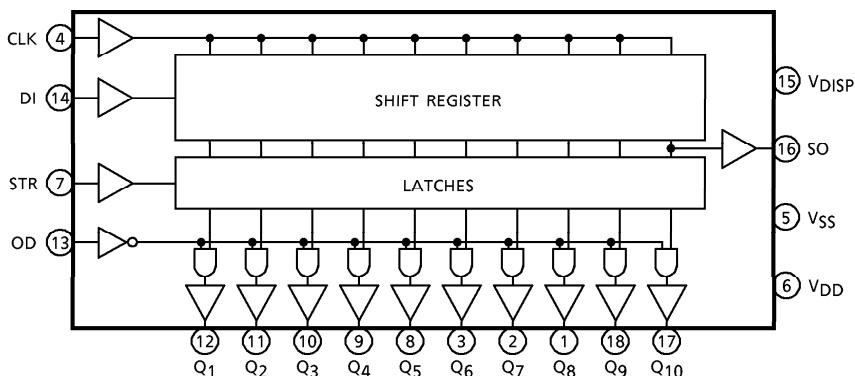
FEATURES

- Serial input and 10-stage parallel/serial output
- Serial output allows cascade expansion.
- DISABLE input for output control
- High output withstand voltage : $\geq 60V$
- Wide operating temperature range : $T_a = -40$ to $85^\circ C$

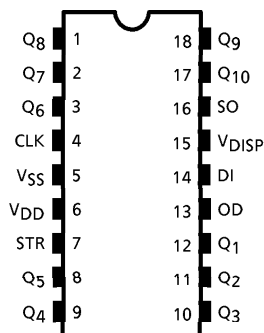


Weight : 1.4g (Typ.)

BLOCK DIAGRAM



PIN LAYOUT



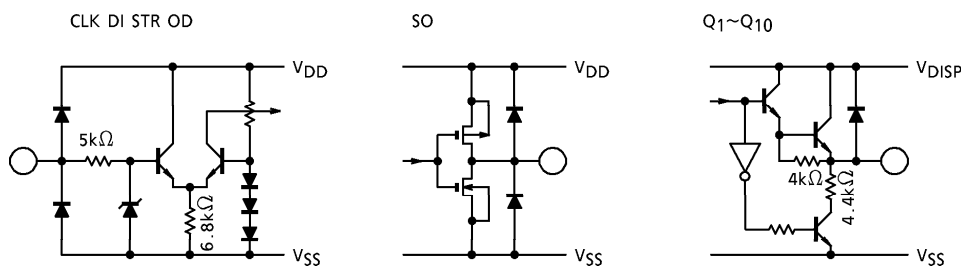
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PIN DESCRIPTION

| PIN No. | SYMBOL | DESCRIPTION |
|-------------------------------|-----------------------------------|---|
| 12 to 8 3 to 1 18 to 17 | Q ₁ to Q ₁₀ | Parallel output pins which supply shift register output when the strobe input (STR) is high and the output disable input (OD) is low. |
| 4 | CLK | Clock input pin for shift register. The shift register becomes active on the leading edge of the clock. |
| 5 | V _{SS} | Grounded. |
| 6 | V _{DD} | Power supply pin |
| 7 | STR | When this signal is low, data is held ; when it is high, data is rewritten. |
| 13 | OD | Output disable input pin. When this signal is low, data is output ; when it is high, all outputs are set low. |
| 14 | DI | Serial data input pin |
| 15 | V _{DISP} | Power supply pin for parallel output |

I/O CIRCUIT DIAGRAM



OUTLINE OF FUNCTIONS

The circuit consists of a 10-stage D-type flip-flop and ten latches and buffers connected to the outputs of the flip-flop.

Suppose that data is fed to the serial data input (DI) pin and clock pulses are supplied to the clock input (CLK) pin. When the clock changes from low to high, the data enters the shift register, and the data in the shift register shifts at the same time.

Shift register data is output at the parallel output pins when the strobe input (STR) is high and the output disable input (OD) is low.

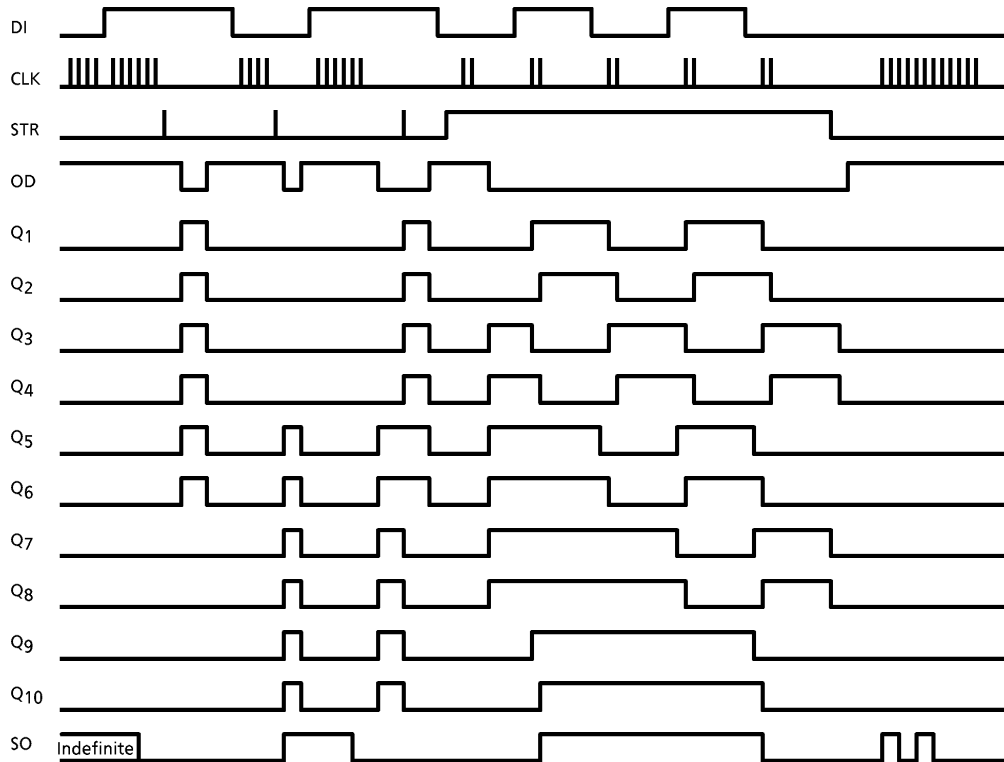
When the strobe input is set low, the contents of the latches are held regardless of the contents of the shift register.

The serial data output (SO) pin supplies a signal with the same polarity as the parallel outputs.

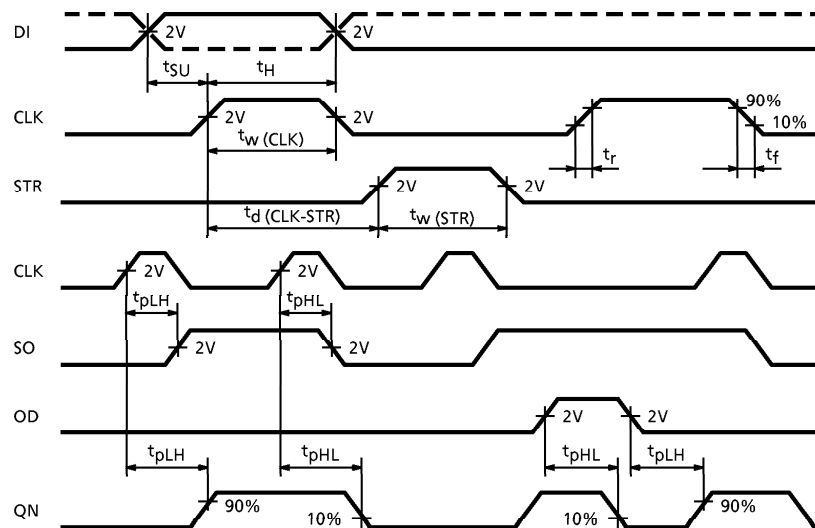
When multiple TD6337Ps are used for output expansion, the serial data output (SO) of one TD6337P is connected to the serial data input (DI) of the next-stage TD6337P.

When the output disable input (OD) is set high, the outputs Q₁ to Q₁₀ become low. At the time of power-on, set the OD input high so that the outputs Q₁ to Q₁₀ will be kept low until input data is set to determine the internal logic state.

TIMING CHART



VOLTAGE WAVEFORM



MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC | | SYMBOL | RATING | UNIT |
|-----------------------|--------|-------------------|----------------------------------|------|
| Display Voltage | | V _{DISP} | 65 | V |
| Supply Voltage | | V _{DD} | - 0.3 to 15 | V |
| Output Voltage | Note 1 | V _{OUT} | - 0.3 to V _{DD} + 0.3 | V |
| | Note 2 | | - 0.3 to V _{DISP} + 0.3 | |
| Output Current | Note 3 | I _{OUT} | - 40 | mA |
| Input Voltage | | V _{IN} | - 0.3 to V _{DD} + 0.3 | V |
| Power Dissipation | | P _D | 1.25 | W |
| Operating Temperature | | T _{opr} | - 40 to 85 | °C |
| Storage Temperature | | T _{stg} | - 55 to 150 | °C |

- Note 1. SO output
 2. Q₁ to Q₁₀ : Output off
 3. Q₁ to Q₁₀ : Output on

RECOMMENDED CONDITIONS

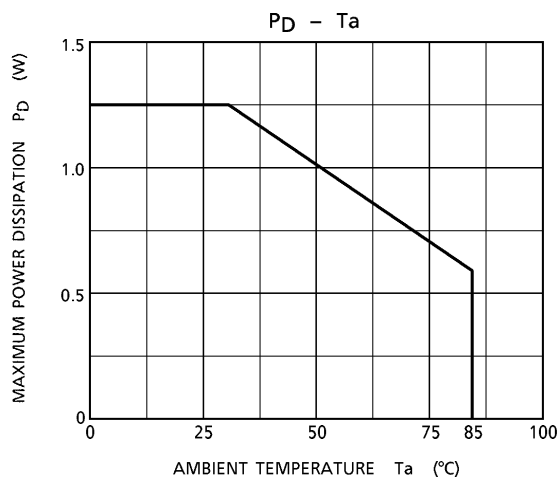
| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|----------------|------------------|--|------|------|------|------|
| Supply Voltage | V _{DD} | — | 4 | 5 | 6 | V |
| Output Voltage | V _O | Q ₁ to Q ₁₀ : Output off | — | — | 55 | V |
| Output Current | I _{OUT} | Current per circuit Q ₁ to Q ₁₀ : Output on at the same time | — | — | 25 | mA |

DC ELECTRICAL CHARACTERISTICS (Ta = - 40 to 85°C, V_{DD} = 5V, V_{DISP} = 55V)

| CHARACTERISTIC | | SYMBOL | TEST CIR- CUIT | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---------------------|------|-------------------|-------------------|------------------------------|-------|------|------|------|
| Input Voltage | High | V _{IH} | — | — | 3.4 | — | — | V |
| | Low | V _{IL} | — | — | — | — | 1.1 | |
| Input Current | High | I _{IH} | — | V _{IH} = 3.4V | — | — | 20 | μA |
| | Low | I _{IL} | — | V _{IL} = 1.1V | — | — | 5 | |
| Output Voltage | High | V _{OH} | — | I _{OH} = 20 μA, SO | 4.3 | — | — | V |
| | Low | V _{OL} | — | I _{IL} = 20 μA, SO | — | — | 0.7 | |
| Output Current | High | I _{OH} | — | V _{OH} = 4.5V, SO | - 100 | — | — | μA |
| | Low | I _{OL} | — | V _{OL} = 0.5V, SO | 300 | — | — | |
| Output Voltage | High | V _{OH} | — | I _{OH} = - 25mA, QN | 52.5 | — | — | V |
| | Low | V _{OL} | — | I _{OL} = 20 μA, QN | — | — | 1.5 | |
| Current Consumption | | I _{DISP} | — | All output circuits off | — | — | 6.0 | mA |
| | | I _{DD} | — | | — | — | 10.0 | |

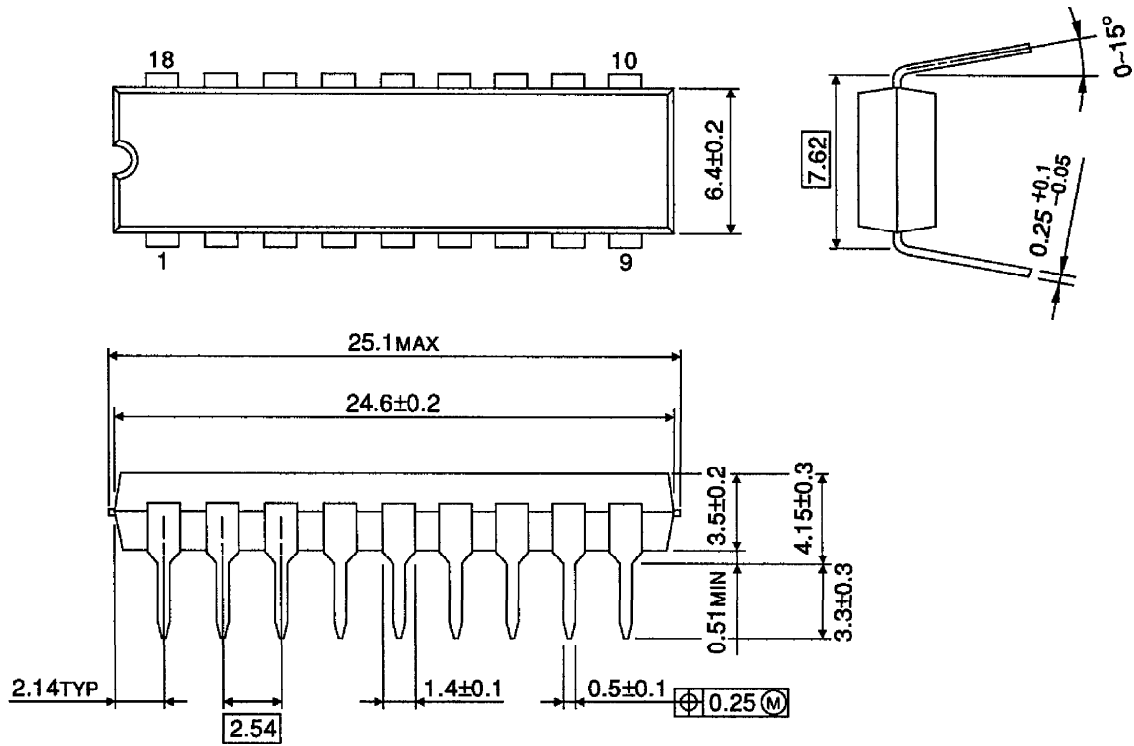
AC ELECTRICAL CHARACTERISTICS ($T_a = -40$ to 85°C , $V_{DD} = 4$ to 6V , $V_{DISP} = 55\text{V}$)

| CHARACTERISTIC | SYMBOL | TEST CIR-CUIT | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|-----------------------|-----------------------|---------------|--|------|------|------|---------------|
| Clock Pulse Frequency | $f(\text{CLK})$ | — | Input duty : 40 to 60% | — | — | 800 | kHz |
| Clock Pulse Width | $t_w(\text{CLK})$ | — | — | 500 | — | — | ns |
| Strobe Pulse Width | $t_w(\text{STR})$ | — | — | 600 | — | — | ns |
| Data Setup Time | t_{SU} | — | — | 150 | — | — | ns |
| Data Hold Time | t_H | — | — | 400 | — | — | ns |
| Clock Latch Time | $t_d(\text{CLK-STR})$ | — | — | 1.5 | — | — | μs |
| Clock Pulse Rise Time | $t_r(\text{CLK})$ | — | — | — | — | 500 | ns |
| Clock Pulse Fall Time | $t_f(\text{CLK})$ | — | — | — | — | 500 | ns |
| Transfer Delay Time | t_{pLH} | — | From input CLK to output SO $R_L(\text{SO}) = \infty, C_L = 15\text{pF}$ | — | — | 2.0 | μs |
| | t_{pHL} | | | — | — | 2.0 | |
| | t_{pLH} | — | From input CLK to output QN $R_L(\text{QN}) = 2\text{k}\Omega, C_L = 15\text{pF}$ | — | — | 3.0 | |
| | t_{pHL} | | | — | — | 5.0 | |
| | t_{pLH} | — | From input OD to output QN $R_L(\text{QN}) = 2\text{k}\Omega, C_L = 15\text{pF}$ | — | — | 4.0 | |
| | t_{pHL} | | | — | — | 2.0 | |



OUTLINE DRAWING
DIP18-P-300-2.54D

Unit : mm



Weight : 1.4g (Typ.)