

Serial Shift Register

256-Bit

The TRW TDC1006 is a positive-edge-triggered serial shift register which operates at 25MHz. This device is cascadable in the number of words and the word size.

Complementary TTL outputs Q and \bar{Q} are provided. Two data inputs, D0 and D1, are controlled by a data select input, DS. This provides on-chip recirculate gating when the true output is hard-wired to one of the inputs.

Features

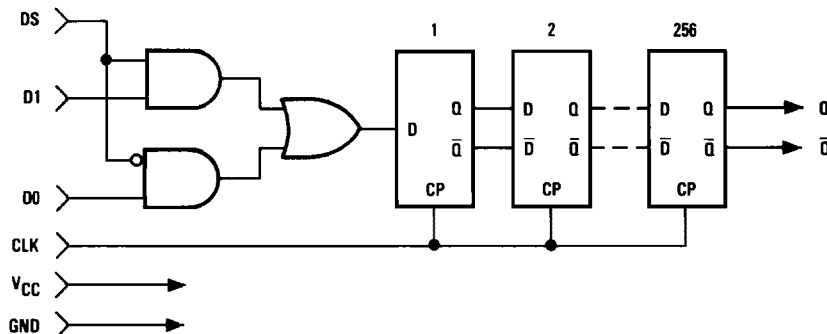
- 25MHz Guaranteed Clock Frequency
- Fully TTL Compatible
- True and Complementary Outputs

- Proven High-Reliability Radiation Hard Bipolar Process
- Single +5V Power Supply
- Available In A 16 Pin CERDIP
- Horizontal And Vertical Cascadability

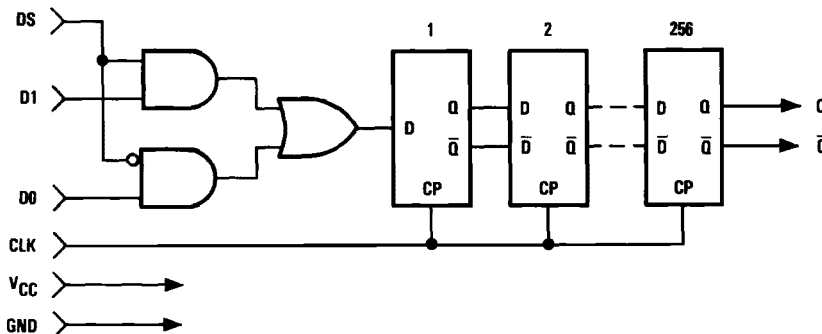
Applications

- High-Speed Data Acquisition
- First-In First-Out Data Buffers
- Coefficient Storage For FIR Filters
- Digital Delay Lines
- Local Storage Registers

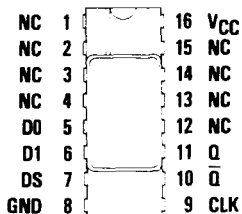
Functional Block Diagram



Functional Block Diagram



Pin Assignments



16 Pin CERDIP – B9 Package

Functional Description

General Information

The TDC1006 is a 256-bit positive-edge-triggered serial shift register. One of two data inputs (D0 and D1) is selected by

the Data Select control DS. Complementary outputs Q and \bar{Q} are available.

Power

The TDC1006 operates from a single +5 Volt power supply.

| Name | Function | Value | J9 Package |
|-----------------|-------------------------|-------|------------|
| V _{CC} | Positive Supply Voltage | +5.0V | Pin 16 |
| GND | Ground | 0.0V | Pin 8 |

Data Inputs

The TDC1006 is a single 256-bit shift register with two data inputs D0 and D1.

| Name | Function | Value | J9 Package |
|------|--------------|-------|------------|
| D0 | Data Input 0 | TTL | Pin 5 |
| D1 | Data Input 1 | TTL | Pin 6 |

Data Select

The TDC1006 has one data select control (DS) to select between inputs D0 and D1. Input D1 is selected when DS is HIGH, D0 is selected when DS is LOW.

| Name | Function | Value | J9 Package |
|------|-------------|-------|------------|
| DS | Data Select | TTL | Pin 7 |

Data Outputs

Complementary outputs Q and \bar{Q} are provided for the TDC1006.

| Name | Function | Value | J9 Package |
|-----------|----------------------|-------|------------|
| Q | Data Output | TTL | Pin 11 |
| \bar{Q} | Data Output Inverted | TTL | Pin 10 |

Clocks

The TDC1006 has one clock signal, CLK.

| Name | Function | Value | J9 Package |
|------|----------|-------|------------|
| CLK | Clock | TTL | Pin 9 |

No Connects

There are several pins on the TDC1006 which are not connected internally. These pins may be left unconnected.

| Name | Function | Value | J9 Package |
|------|------------|-------|-----------------|
| NC | No Connect | Open | Pins 1-4, 12-15 |



Figure 1. Timing Diagram

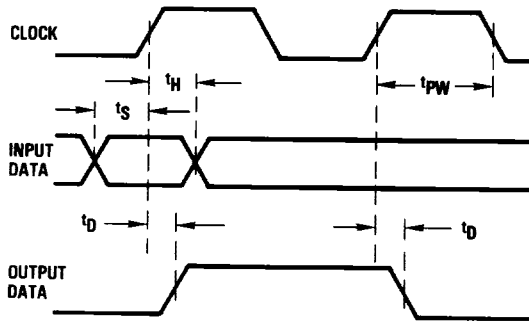


Figure 2. Equivalent Input/Output Schematics

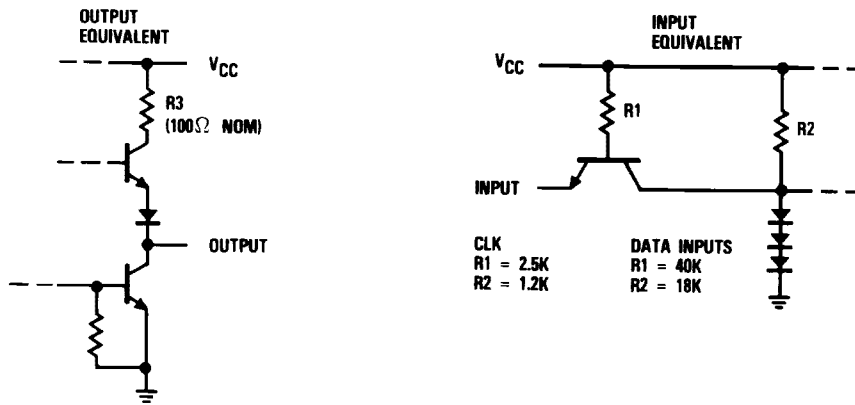
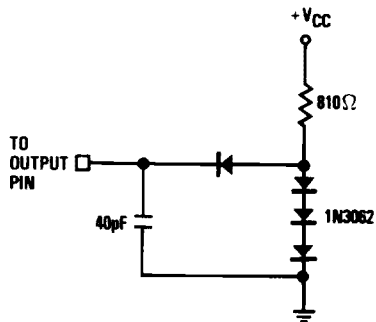


Figure 3. Test Load



Absolute maximum ratings (beyond which the device may be damaged) ¹

| | |
|--|-------------------------------|
| Supply Voltage | -0.5 to +7.0 V |
| Input Voltage | 0 to +5.5V |
| Output | |
| Applied voltage (measured to GND) | 0 to +5.5V ² |
| Applied current, externally forced | -1.0 to +6.0mA ^{3,4} |
| Short circuit duration (single output in high state to ground) | 1 sec |
| Temperature | |
| Operating, ambient | -55 to +150°C |
| junction | +175°C |
| Lead, soldering (10 sec.) | +300°C |
| Storage | -65 to +160°C |

Notes:

1. Absolute maximum ratings are limiting values applied individually while all other parameters are within specified operating conditions. Functional operation under any of these conditions is NOT implied.
2. Applied voltage must be current limited to specified range.
3. Forcing voltage must be limited to specified range.
4. Current is specified as conventional current flowing into the device.

Operating conditions

| Parameter | | Temperature Range | | | | | | Units |
|-----------------|--------------------------------|-------------------|-----|------|----------|-----|------|-------|
| | | Standard | | | Extended | | | |
| | | Min | Nom | Max | Min | Nom | Max | |
| V _{CC} | Supply Voltage | 4.75 | 5.0 | 5.25 | 4.5 | 5.0 | 5.5 | V |
| t _{PW} | Clock Pulse Width | 15 | | | 15 | | | ns |
| t _S | Input Register Setup Time | 7 | | | 7 | | | ns |
| t _H | Input Register Hold Time | 10 | | | 10 | | | ns |
| V _{IL} | Input Voltage, Logic LOW | | | 0.8 | | | 0.8 | V |
| V _{IH} | Input Voltage, Logic HIGH | 2.0 | | | 2.0 | | | V |
| I _{OL} | Output Current, Logic LOW | | | 4.0 | | | 4.0 | mA |
| I _{OH} | Output Current, Logic HIGH | | | -400 | | | -400 | μA |
| T _A | Ambient Temperature, Still Air | 0 | | 70 | | | | °C |
| T _C | Case Temperature | | | | -55 | | 125 | °C |



Electrical characteristics within specified operating conditions

| Parameter | Test Conditions | Temperature Range | | | | Units |
|---|---|-------------------|------|----------|------|---------------------------|
| | | Standard | | Extended | | |
| | | Min | Max | Min | Max | |
| I_{CC} Supply Current | $V_{CC} = \text{Max}$ | | 135 | | 155 | mA |
| V_{OL} Output Voltage, Logic LOW | $V_{CC} = \text{Min}, I_{OL} = \text{Max}$ | | 0.5 | | 0.5 | V |
| V_{OH} Output Voltage, Logic HIGH | $V_{CC} = \text{Min}, I_{OH} = \text{Max}$ | 2.4 | | 2.4 | | V |
| I_{IL} Input Current, Logic LOW ¹ | $V_{CC} = \text{Max}, V_{IL} = 0.4\text{V}$ | | -0.5 | | -0.8 | mA/Load |
| I_{IH} Input Current, Logic HIGH ¹ | $V_{CC} = \text{Max}, V_{IH} = 2.4\text{V}$ | | 20 | | 50 | $\mu\text{A}/\text{Load}$ |

Note: 1. CLK: Sixteen equivalent loads.

Switching characteristics within specified operating conditions

| Parameter | Test Conditions | Temperature Range | | | | Units |
|-----------------------|-----------------|-------------------|-----|----------|-----|-------|
| | | Standard | | Extended | | |
| | | Min | Max | Min | Max | |
| F_C Clock Frequency | See Figure 1 | 25 | | 24 | | MHz |
| t_D Output Delay | See Figure 1 | | 32 | | 35 | ns |

Ordering Information

| Product Number | Temperature Range | Screening | Package | Package Marking |
|----------------|--|------------------|---------------|-----------------|
| TDC1006B9C | STD - $T_A = 0^\circ\text{C}$ to 70°C | Commercial | 16 Pin CERDIP | 1006B9C |
| TDC1006B9A | EXT - $T_C = -55^\circ\text{C}$ to 125°C | High Reliability | 16 Pin CERDIP | 1006B9A |

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