

# HD14021B

查询HD14021供应商

捷多邦, 专业PCB打样工厂, 24小时加急

出货

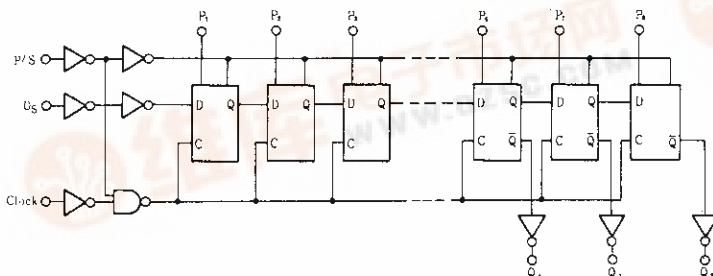
## 8-bit Static Shift Register

The HD14021B 8-bit Static shift register finds primary use in parallel-to serial data conversion, asynchronous parallel input, serial output data queueing; and other general purpose register applications requiring low power and/or high noise immunity.

### FEATURES

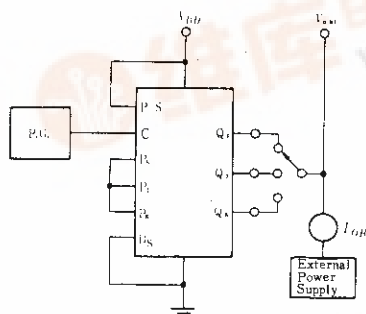
- Quiescent Current = 5nA/pkg typ. @5V
- Asynchronous Parallel Input/Serial Output
- Full Static Operation from DC to 7MHz
- Supply Voltage Range = 3 to 18V
- Capable of Driving One Low-power Schottky TTL Load Over the Rated Temperature Range

### LOGIC DIAGRAM

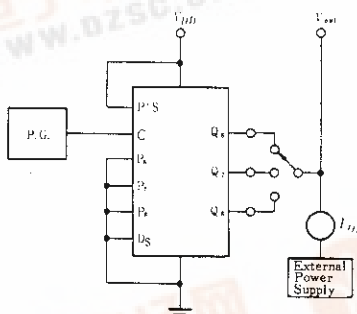


### DC CHARACTERISTIC TEST CIRCUIT

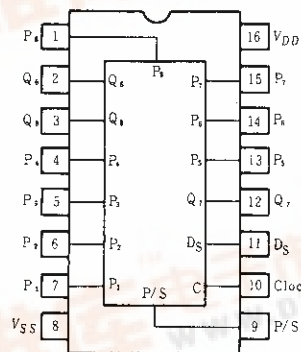
●  $I_{OH}$



●  $I_{OL}$



### PIN ARRANGEMENT



(Top View)

### TRUTH TABLE

#### Serial Operation

| t   | Clock | D <sub>s</sub> | P/S |
|-----|-------|----------------|-----|
| n   | —     | 0              | 0   |
| n+1 | —     | 1              | 0   |
| n+2 | —     | 0              | 0   |
| n+3 | —     | 1              | 0   |
|     | —     | x              | 0   |

| Q <sub>6</sub><br>t = n + 6 | Q <sub>7</sub><br>t = n + 7 | Q <sub>8</sub><br>t = n + 8 |
|-----------------------------|-----------------------------|-----------------------------|
| 0                           | ?                           | ?                           |
| 1                           | 0                           | ?                           |
| 0                           | 1                           | 0                           |
| 1                           | 0                           | 1                           |
| Q <sub>6</sub>              | Q <sub>7</sub>              | Q <sub>8</sub>              |

#### Parallel Operation

| Clock | D <sub>s</sub> | P/S | D <sub>m</sub> | Q <sub>m</sub> * |
|-------|----------------|-----|----------------|------------------|
| —     | x              | 1   | 0              | 0                |
| —     | x              | 1   | 1              | 1                |

注) \*: Q<sub>6</sub>, Q<sub>7</sub>, & Q<sub>8</sub> are available externally  
x : Don't Care

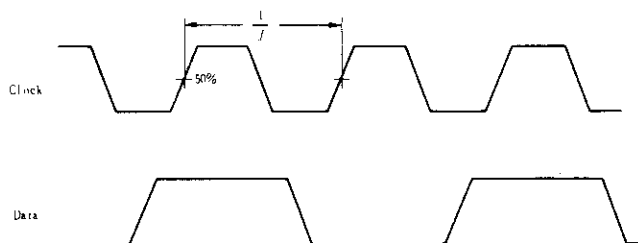
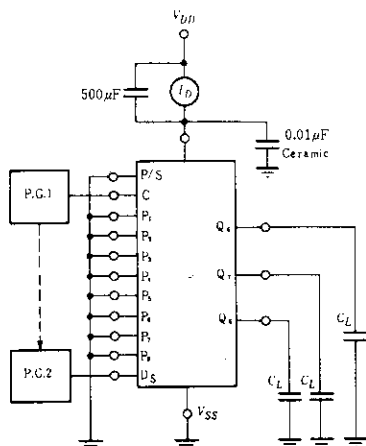
# ELECTRICAL CHARACTERISTICS

| Characteristic        | Symbol   | $V_{DD}(V)$ | Test Conditions             | -40°C |           | 25°C  |              |           | 85°C  |           | Unit    |
|-----------------------|----------|-------------|-----------------------------|-------|-----------|-------|--------------|-----------|-------|-----------|---------|
|                       |          |             |                             | min   | max       | min   | typ          | max       | min   | max       |         |
| Output Voltage        | $V_{OL}$ | 5.0         | $V_{in}=V_{DD}$ or 0        | —     | 0.05      | —     | 0            | 0.05      | —     | 0.05      | V       |
|                       |          | 10          |                             | —     | 0.05      | —     | 0            | 0.05      | —     | 0.05      |         |
|                       |          | 15          |                             | —     | 0.05      | —     | 0            | 0.05      | —     | 0.05      |         |
|                       | $V_{OH}$ | 5.0         | $V_{in}=0$ or $V_{DD}$      | 4.95  | —         | 4.95  | 5.0          | —         | 4.95  | —         | V       |
|                       |          | 10          |                             | 9.95  | —         | 9.95  | 10           | —         | 9.95  | —         |         |
|                       |          | 15          |                             | 14.95 | —         | 14.95 | 15           | —         | 14.95 | —         |         |
| Input Voltage         | $V_{IL}$ | 5.0         | $V_{out}=4.5$ or $0.5V$     | —     | 1.5       | —     | 2.25         | 1.5       | —     | 1.5       | V       |
|                       |          | 10          | $V_{out}=9.0$ or $1.0V$     | —     | 3.0       | —     | 4.50         | 3.0       | —     | 3.0       |         |
|                       |          | 15          | $V_{out}=13.5$ or $1.5V$    | —     | 4.0       | —     | 6.75         | 4.0       | —     | 4.0       |         |
|                       | $V_{IH}$ | 5.0         | $V_{out}=0.5$ or $4.5V$     | 3.5   | —         | 3.5   | 2.75         | —         | 3.5   | —         | V       |
|                       |          | 10          | $V_{out}=1.0$ or $9.0V$     | 7.0   | —         | 7.0   | 5.50         | —         | 7.0   | —         |         |
|                       |          | 15          | $V_{out}=1.5$ or $13.5V$    | 11.0  | —         | 11.0  | 8.25         | —         | 11.0  | —         |         |
| Output Drive Current  | $I_{OH}$ | 5.0         | $V_{OH}=2.5V$               | -1.0  | —         | -0.8  | -1.7         | —         | -0.6  | —         | mA      |
|                       |          | 5.0         | $V_{OH}=4.6V$               | -0.2  | —         | -0.16 | -0.36        | —         | -0.12 | —         |         |
|                       |          | 10          | $V_{OH}=9.5V$               | -0.5  | —         | -0.4  | -0.9         | —         | -0.3  | —         |         |
|                       |          | 15          | $V_{OH}=13.5V$              | -1.4  | —         | -1.2  | -3.5         | —         | -1.0  | —         |         |
|                       | $I_{OL}$ | 5.0         | $V_{OL}=0.4V$               | 0.52  | —         | 0.44  | 0.88         | —         | 0.36  | —         | mA      |
|                       |          | 10          | $V_{OL}=0.5V$               | 1.3   | —         | 1.1   | 2.25         | —         | 0.9   | —         |         |
|                       |          | 15          | $V_{OL}=1.5V$               | 3.6   | —         | 3.0   | 8.8          | —         | 2.4   | —         |         |
| Input Current         | $I_{in}$ | 15          |                             | —     | $\pm 0.3$ | —     | $\pm 0.0001$ | $\pm 0.3$ | —     | $\pm 1.0$ | $\mu A$ |
| Input Capacitance     | $C_{in}$ |             | $V_{in}=0$                  | —     | —         | —     | 5.0          | 7.5       | —     | —         | pF      |
| Quiescent Current     | $I_{DD}$ | 5.0         | Zero Signal,<br>per Package | —     | 20        | —     | 0.005        | 20        | —     | 150       | $\mu A$ |
|                       |          | 10          |                             | —     | 40        | —     | 0.010        | 40        | —     | 300       |         |
|                       |          | 15          |                             | —     | 80        | —     | 0.015        | 80        | —     | 600       |         |
| Total Supply Current* | $I_T$    | 5.0         | Dynamic + $I_{DD}$ ,        | —     | —         | —     | 0.76         | —         | —     | —         | $\mu A$ |
|                       |          | 10          | per Gate                    | —     | —         | —     | 1.51         | —         | —     | —         |         |
|                       |          | 15          | $C_L=50pF$ , $f=1kHz$       | —     | —         | —     | 2.27         | —         | —     | —         |         |

\* To calculate total supply current at frequency other than 1kHz.

@  $V_{DD}=5.0V$   $I_T=(0.75\mu A/kHz)f+I_{DD}$ . @  $V_{DD}=10V$   $I_T=(1.50\mu A/kHz)f+I_{DD}$ . @  $V_{DD}=15V$   $I_T=(2.25\mu A/kHz)f+I_{DD}$

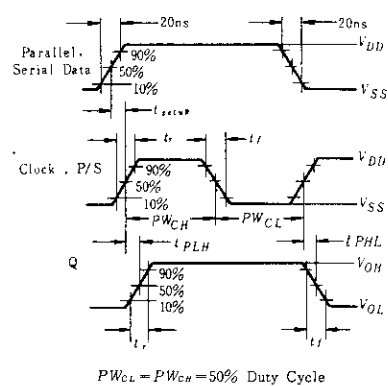
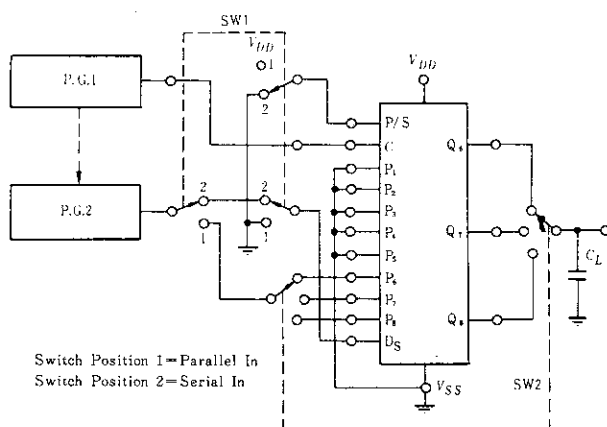
# POWER DISSIPATION TEST CIRCUIT AND WAVEFORM

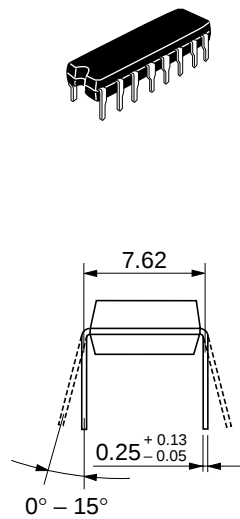
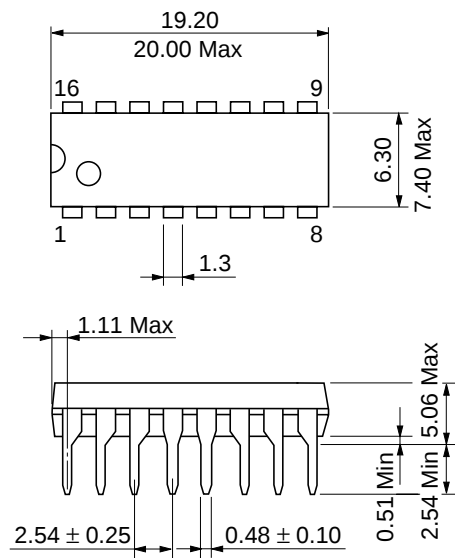


# **SWITCHING CHARACTERISTICS** ( $C_L=50\text{pF}$ , $T_a=25^\circ\text{C}$ )

| Characteristic                      | Symbol                   | $V_{DD}$ (V) | min | typ | max  | Unit |
|-------------------------------------|--------------------------|--------------|-----|-----|------|------|
| Output Rise Time                    | $t_r$                    | 5.0          | —   | 180 | 400  | ns   |
|                                     |                          | 10           | —   | 90  | 200  |      |
|                                     |                          | 15           | —   | 65  | 160  |      |
| Output Fall Time                    | $t_f$                    | 5.0          | —   | 100 | 200  | ns   |
|                                     |                          | 10           | —   | 50  | 100  |      |
|                                     |                          | 15           | —   | 37  | 80   |      |
| Propagation Delay Time              | $t_{PLH}$ ,<br>$t_{PHL}$ | 5.0          | —   | 400 | 1000 | ns   |
|                                     |                          | 10           | —   | 170 | 400  |      |
|                                     |                          | 15           | —   | 115 | 265  |      |
| Clock Pulse Width                   | $PW_C$                   | 5.0          | 500 | 150 | —    | ns   |
|                                     |                          | 10           | 200 | 75  | —    |      |
|                                     |                          | 15           | 150 | 40  | —    |      |
| Clock Frequency                     | $f_C$                    | 5.0          | —   | 3.0 | 1.0  | MHz  |
|                                     |                          | 10           | —   | 6.0 | 2.5  |      |
|                                     |                          | 15           | —   | 8.0 | 3.0  |      |
| Parallel/Serial Control Pulse Width | $PW(P/S)$                | 5.0          | 500 | 150 | —    | ns   |
|                                     |                          | 10           | 200 | 75  | —    |      |
|                                     |                          | 15           | 150 | 40  | —    |      |
| Setup Time                          | $t_{setup}$              | 5.0          | 500 | 150 | —    | ns   |
|                                     |                          | 10           | 100 | 50  | —    |      |
|                                     |                          | 15           | 80  | 30  | —    |      |
| Input Clock Rise Time               | $t_{rc}$                 | 5.0          | —   | —   | 15   | ns   |
|                                     |                          | 10           | —   | —   | 15   |      |
|                                     |                          | 15           | —   | —   | 15   |      |

## **SWITCHING TIME TEST CIRCUIT**





Unit: mm

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