

KK4006B

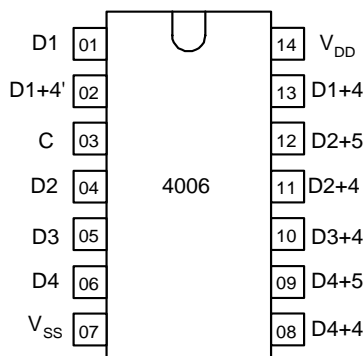
CMOS 18-Stage Static Shift Register

The RCA-4006B types are composed of 4 separate shift register sections: two sections of four stages and two sections of five stages with an output tap at the fourth stage. Each section has an independent single-rail data path.

- Standardized, symmetrical output characteristics
- Operating Voltage Range: 3.0 to 18 V
- 100% tested for quiescent current at 20 V
- Maximum input current of 1 μ A at 18 V over full package-temperature range; 100 nA at 18 V and 25°C
- Noise margin (full package temperature range):
 - 1.0 V at $V_{DD}=5.0$ V
 - 2.0 V at $V_{DD}=10.0$ V
 - 2.5 V at $V_{DD}=15.0$ V



PIN ASSIGNMENT



FUNCTION TABLE

| Inputs | | | Outputs | |
|-----------|----|-------|-------------|---------|
| C | D1 | D2-D4 | D1+4...D4+4 | D1+4' |
| \lceil | L | L | L | Storage |
| \lceil | H | H | H | Storage |
| \lceil | X | X | Storage | D1 |
| \rfloor | L | X | Storage | L |
| \rfloor | H | X | Storage | H |
| \rfloor | X | X | D1...D4 | Storage |

X = don't care

TERMINAL ASSIGNMENT

| Pin.No | Symbol | Description |
|--------|----------|-----------------------|
| 01 | D1 | Input Data |
| 02 | D1+4' | Output Data |
| 03 | C | Clock Data |
| 04 | D2 | Input Data |
| 05 | D3 | Input Data |
| 06 | D4 | Input Data |
| 07 | V_{SS} | Ground |
| 08 | D4+4 | Output Data |
| 09 | D4+5 | Output Data |
| 10 | D3+4 | Output Data |
| 11 | D2+4 | Output Data |
| 12 | D2+5 | Output Data |
| 13 | D1+4 | Output Data |
| 14 | V_{DD} | Positive Power Supply |

MAXIMUM RATINGS*

| Symbol | Parameter | Value | Unit |
|------------------|---|------------------------------|------|
| V _{DD} | DC Supply Voltage (Referenced to GND) | -0.5 to +20 | V |
| V _{IN} | DC Input Voltage (Referenced to GND) | -0.5 to V _{DD} +0.5 | V |
| I _{IN} | DC Input Current, per Pin | ±10 | mA |
| P _D | Power Dissipation in Still Air, Plastic DIP, SOIC Package | 500** | mW |
| P _{tot} | Power Dissipation per Output Transistor | 100 | mW |
| T _{stg} | Storage Temperature | -65 to +150 | °C |
| T _L | Lead Temperature, 1 mm from Case for 10 Seconds (Plastic DIP or SOIC Package) | 260 | °C |

*Maximum Ratings are those values beyond which damage to the device may occur. Functional operation should be restricted to the Recommended Operating Conditions.

**Derating: - Plastic DIP from -55 to +100°C
 - SOIC Package from -55 to +65°C
 - Plastic DIP: - 12 mW/°C from +100 to +125°C
 - SOIC Package: - 7 mW/°C from +65 to +125°C

RECOMMENDED OPERATING CONDITIONS

| Symbol | Parameter | Min | Max | Unit |
|-----------------|--|-----|-----------------|------|
| V _{CC} | DC Supply Voltage (Referenced to GND) | 3.0 | 18 | V |
| V _{IN} | DC Input Voltage (Referenced to GND) | 0 | V _{CC} | V |
| T _A | Operating Temperature, All Package Types | -55 | +125 | °C |

This device contains protection circuitry to guard against damage due to high static voltages or electric fields. However, precautions must be taken to avoid applications of any voltage higher than maximum rated voltages to this high-impedance circuit. For proper operation V_{IN} should be constrained to the range GND ≤ V_{IN} ≤ V_{CC}.

Unused inputs must always be tied to an appropriate logic voltage level (e.g., either V_{SS} or V_{DD}). Unused outputs must be left open.

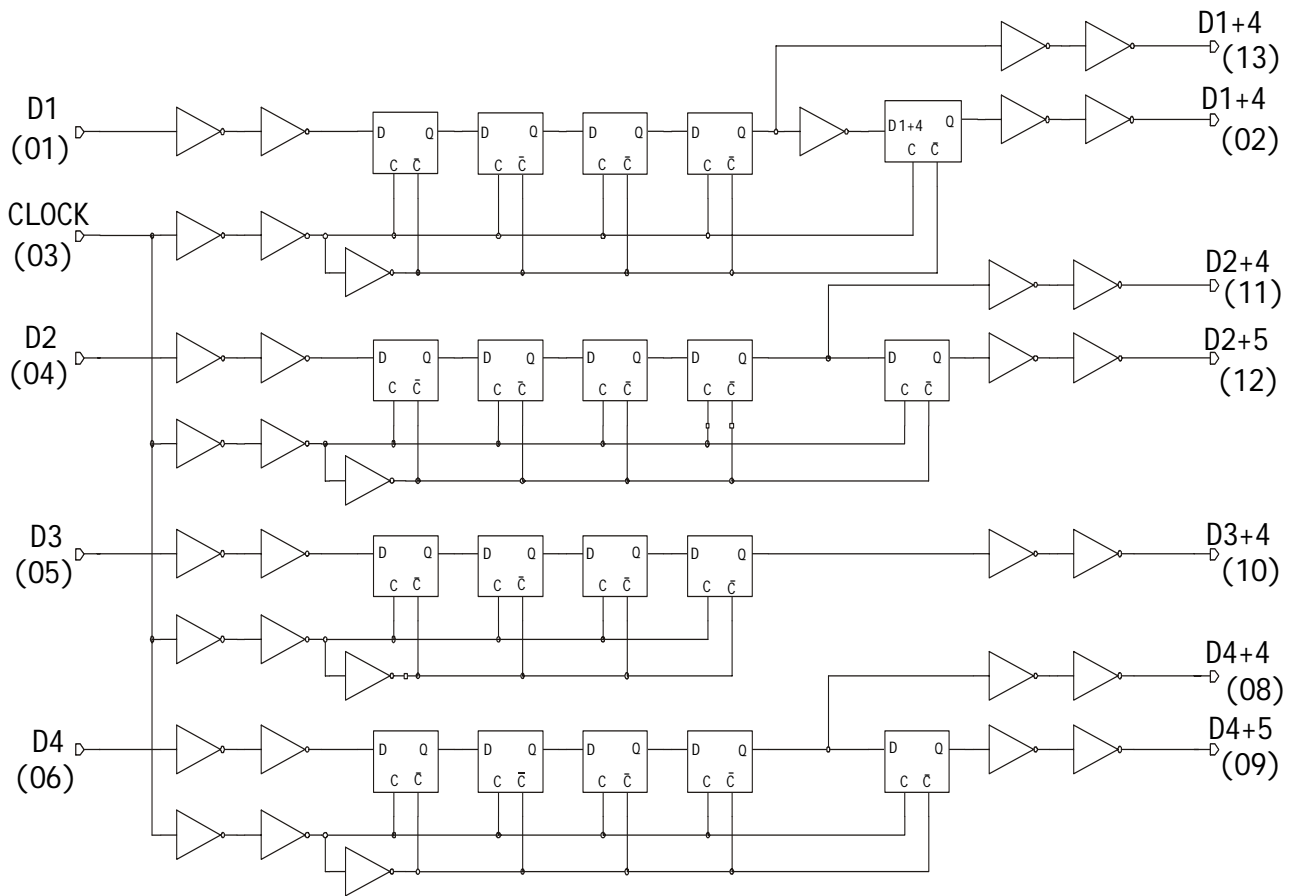
DC ELECTRICAL CHARACTERISTICS

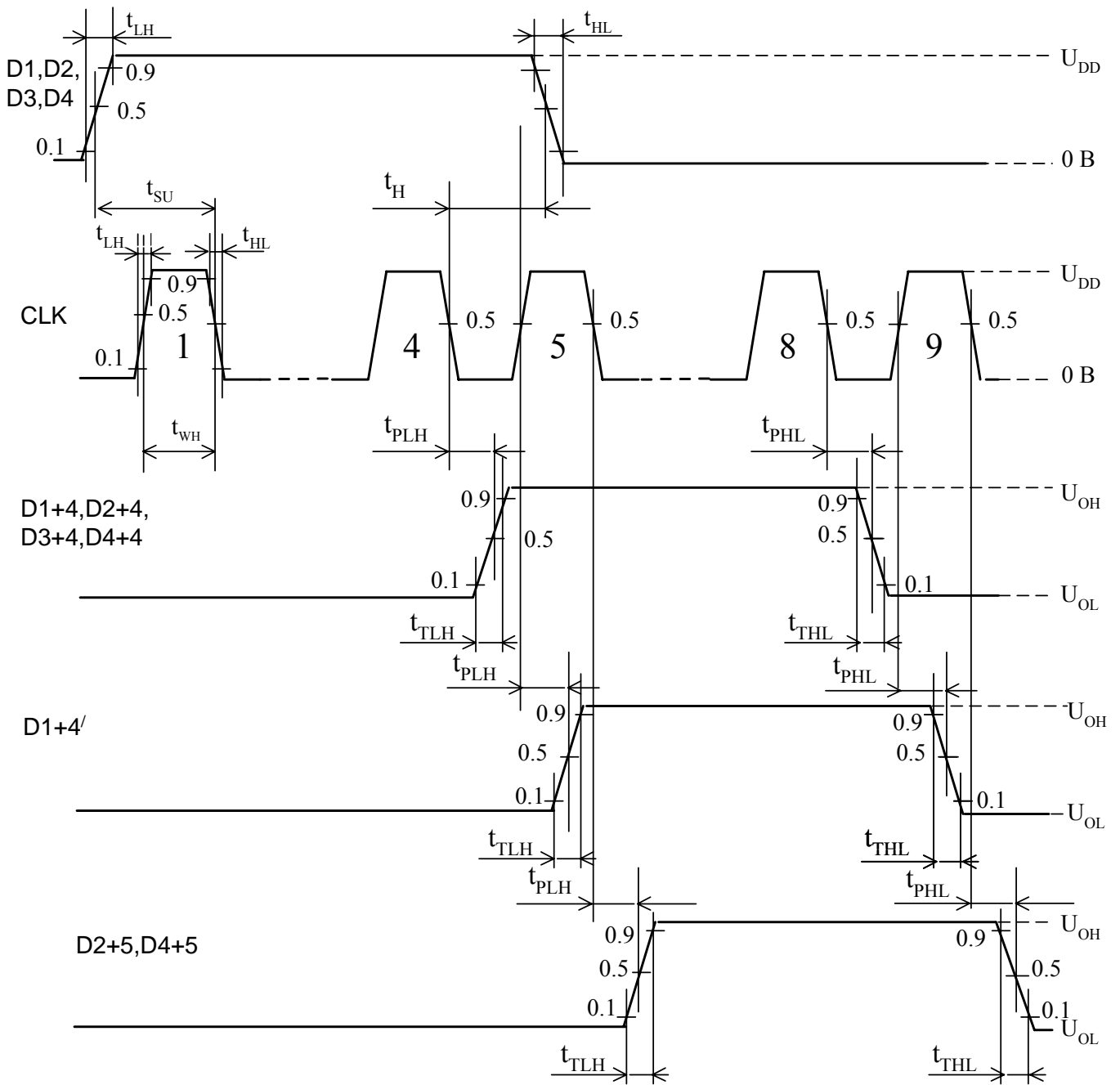
| Symbol | Parameter | Test Conditions | V _{DD} , V | Guaranteed Limit | | | | | | Unit |
|-----------------|--|--|------------------------|------------------|------|-------|------|-------|------|------|
| | | | | 55°C | | 125°C | | 25°C | | |
| | | | | min | max | min | max | min | max | |
| V _{IH} | Minimum High-Level Input Voltage | V _O = 0.5 V or V _{DD} -0.5 V | 5.0 | 3.5 | - | 3.5 | - | 3.5 | - | V |
| | | V _O = 1.0 V or V _{DD} -1.0 V | 10 | 7.0 | - | 7.0 | - | 7.0 | - | |
| | | V _O = 1.5 V or V _{DD} -1.5 V | 15 | 11 | - | 11 | - | 11 | - | |
| V _{IL} | Maximum Low - Level Input Voltage | V _O = 0.5 V or V _{DD} -0.5 V | 5.0 | - | 1.5 | - | 1.5 | - | 1.5 | V |
| | | V _O = 1.0 V or V _{DD} -1.0 V | 10 | - | 3.0 | - | 3.0 | - | 3.0 | |
| | | V _O = 1.5 V or V _{DD} -1.5 V | 15 | - | 4.0 | - | 4.0 | - | 4.0 | |
| V _{OH} | Minimum High-Level Output Voltage | V _I = V _{SS} или V _{DD} | 5.0 | 4.95 | - | 4.95 | - | 4.95 | - | V |
| | | | 10 | 9.95 | - | 9.95 | - | 9.95 | - | |
| | | | 15 | 14.95 | - | 14.95 | - | 14.95 | - | |
| V _{OL} | Maximum Low-Level Output Voltage | V _I = V _{SS} или V _{DD} | 5.0 | - | 0.05 | - | 0.05 | - | 0.05 | V |
| | | | 10 | - | 0.05 | - | 0.05 | - | 0.05 | |
| | | | 15 | - | 0.05 | - | 0.05 | - | 0.05 | |
| I _{IL} | Maximum Input Current | V _I = V _{SS} | 18 | - | -0.1 | - | -1.0 | - | -0.1 | μA |
| I _{IH} | Maximum Input Leakage Current | V _I = V _{DD} | 18 | - | +0.1 | - | +1.0 | - | +0.1 | μA |
| I _{DD} | Maximum Quiescent Supply Current (per Package) | V _I = V _{SS} or V _{DD} | 5.0 | - | 5.0 | - | 150 | - | 5.0 | μA |
| | | | 10 | - | 10.0 | - | 300 | - | 10 | |
| | | | 15 | - | 20.0 | - | 600 | - | 20 | |
| | | | 20 | - | 100 | - | 3000 | - | 100 | |
| I _{OL} | Minimum Output Low (Sink) Current | V _I = V _{SS} or V _{DD} | 5.0 | 0.64 | - | 0.36 | - | 0.51 | - | mA |
| | | V _{OL} = 0.4 V | | | | | | | | |
| | | V _{OL} = 0.5 V | | | | | | | | |
| | | V _{OL} = 1.5 V | | | | | | | | |
| I _{OH} | Minimum Output High (Source) Current | V _I = V _{SS} or V _{DD} | 5.0 | -2.0 | - | -1.15 | - | -1.6 | - | mA |
| | | V _{OH} = 2.5 V | | | | | | | | |
| | | V _{OH} = 4.6 V | | | | | | | | |
| | | V _{OH} = 13.5 V | | | | | | | | |
| C _{IN} | Maximum Input Capacitance | | - | - | - | - | - | - | 7.5 | pF |

TIMING REQUIREMENTS ($C_L=50$ пФ, $R_L = 200$ кОм, $t_{LH} = t_{HL} \leq 20$ нс)

| Symbol | Parameter | U _{DD} , V | Guaranteed Limit | | | | | | Unit |
|--|---|------------------------|------------------|-----|-------|------|------|-----|------|
| | | | 55°C | | 125°C | | 25°C | | |
| | | | min | max | min | max | min | max | |
| t _{PHL} , t _{PLH} | Propagation Delay Time | 5.0 | - | 400 | - | 800 | - | 400 | ns |
| | | 10 | | 200 | | 400 | | 200 | |
| | | 15 | | 160 | | 320 | | 160 | |
| t _{THL} , t _{TLH} | Transition Time | 5.0 | - | 200 | - | 400 | - | 200 | ns |
| | | 10 | | 100 | | 200 | | 100 | |
| | | 15 | | 80 | | 160 | | 80 | |
| t _{SU} | Minimum Data Setup Time | 5.0 | 100 | - | 200 | - | 100 | - | ns |
| | | 10 | 50 | | 100 | | 50 | | |
| | | 15 | 40 | | 80 | | 40 | | |
| t _H | Minimum Hold Time, Clock to Data | 5.0 | 150 | - | 300 | - | 150 | - | ns |
| | | 10 | 80 | | 160 | | 80 | | |
| | | 15 | 60 | | 120 | | 60 | | |
| t _w | Minimum Clock Pulse Width | 5.0 | 200 | - | 400 | - | 200 | - | nc |
| | | 10 | 90 | | 180 | | 90 | | |
| | | 15 | 60 | | 120 | | 60 | | |
| f _C | Maximum Clock Input Frequency | 5.0 | | 2.5 | | 1.25 | | 2.5 | MHz |
| | | 10 | | 5.0 | | 2.5 | | 5.0 | |
| | | 15 | | 7.0 | | 3.5 | | 7.0 | |
| t _{r(CL)} , t _{f(CL)} | Maximum Clock Input Rise or Fall Time | 5.0 | | 15 | | 15 | | 15 | μs |
| | | 10 | | 15 | | 15 | | 15 | |
| | | 15 | | 15 | | 15 | | 15 | |

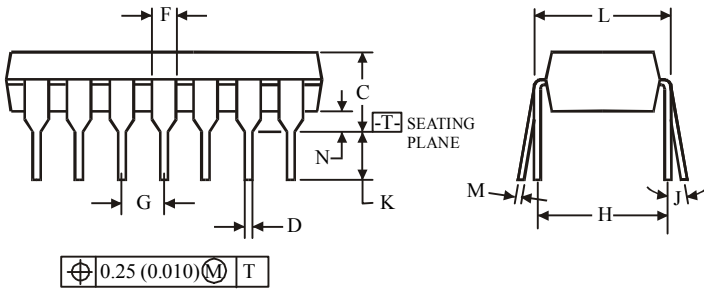
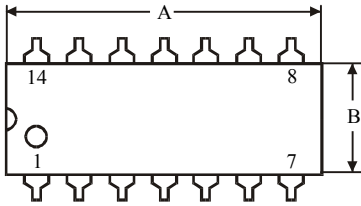
LOGIS DIAGRAM WITH DETAIL OF LATCH





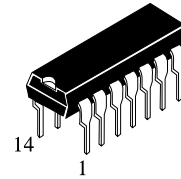
SWITCHING WAVEFORMS

N SUFFIX PLASTIC DIP (MS - 001AA)



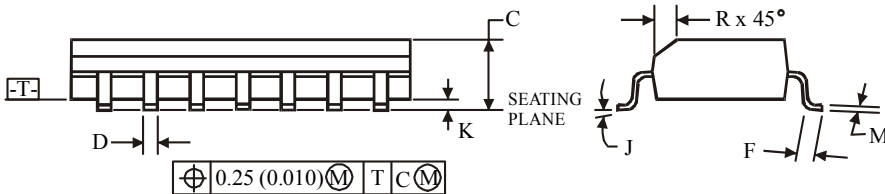
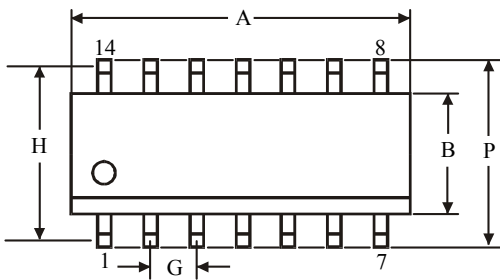
NOTES:

- Dimensions "A", "B" do not include mold flash or protrusions. Maximum mold flash or protrusions 0.25 mm (0.010) per side.



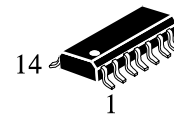
| Symbol | Dimensions, mm | |
|--------|----------------|-------|
| | MIN | MAX |
| A | 18.67 | 19.69 |
| B | 6.10 | 7.11 |
| C | | 5.33 |
| D | 0.36 | 0.56 |
| F | 1.14 | 1.78 |
| G | 2.54 | |
| H | 7.62 | |
| J | 0° | 10° |
| K | 2.92 | 3.81 |
| L | 7.62 | 8.26 |
| M | 0.20 | 0.36 |
| N | 0.38 | |

D SUFFIX SOIC (MS - 012AB)



NOTES:

- Dimensions A and B do not include mold flash or protrusion.
- Maximum mold flash or protrusion 0.15 mm (0.006) per side for A; for B - 0.25 mm (0.010) per side.



| Symbol. | Dimensions, mm | |
|---------|----------------|------|
| | MIN | MAX |
| A | 8.55 | 8.75 |
| B | 3.80 | 4.00 |
| C | 1.35 | 1.75 |
| D | 0.33 | 0.51 |
| F | 0.40 | 1.27 |
| G | 1.27 | |
| H | 5.72 | |
| J | 0° | 8° |
| K | 0.10 | 0.25 |
| M | 0.19 | 0.25 |
| P | 5.80 | 6.20 |
| R | 0.25 | 0.50 |