



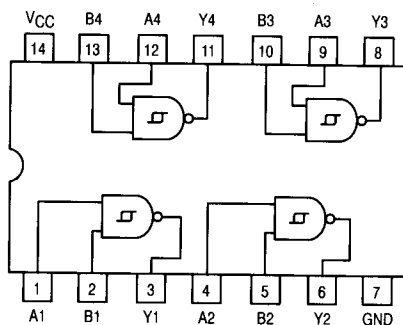
## Quad 2-Input Schmitt-Trigger Positive NAND Gate

ELECTRICALLY TESTED PER:  
MIL-M-38510/31303

The 54LS132 contains four 2-input NAND Gates which accept standard TTL input signals and provide standard TTL output levels. They are capable of transforming slowly changing input signals into sharply defined, jitter-free output signals. Additionally, they have greater noise margin than conventional NAND Gates.

Each circuit contains a 2-input Schmitt trigger followed by a darlington level shifter and a phase splitter driving a TTL totem pole output. The Schmitt trigger uses positive feedback to effectively speed-up slow input transitions, and provide different input threshold voltages for positive and negative-going transitions. This hysteresis between the positive-going and negative-going input thresholds is determined internally by resistor ratios and is essentially insensitive to temperature and supply voltage variations. As long as one input remains at a more positive voltage than  $V_{T+}$  (MAX).

LOGIC DIAGRAM



## Military 54LS132



### AVAILABLE AS:

- 1) JAN: JM38510/31303BXA
- 2) SMD: N/A
- 3) 883: 54LS132/BXAJC

X = CASE OUTLINE AS FOLLOWS:  
PACKAGE: CERDIP: C  
CERFLAT: D  
LCC: 2

THE LETTER "M" APPEARS  
BEFORE THE / ON LCC.

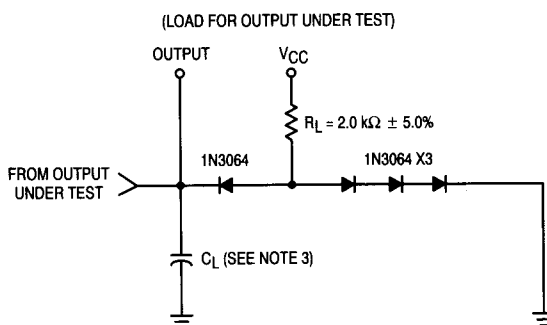
### PIN ASSIGNMENTS

| FUNCT. | DIL<br>632-08 | FLATS<br>717-04 | LCC<br>756A-02 | BURN-IN<br>(COND. A) |
|--------|---------------|-----------------|----------------|----------------------|
| A1     | 1             | 1               | 2              | VCC                  |
| B1     | 2             | 2               | 3              | GND                  |
| Y1     | 3             | 3               | 4              | VCC                  |
| A2     | 4             | 4               | 6              | VCC                  |
| B2     | 5             | 5               | 8              | GND                  |
| Y2     | 6             | 6               | 9              | VCC                  |
| GND    | 7             | 7               | 10             | GND                  |
| Y3     | 8             | 8               | 12             | VCC                  |
| A2     | 9             | 9               | 13             | VCC                  |
| B3     | 10            | 10              | 14             | GND                  |
| Y4     | 11            | 11              | 16             | VCC                  |
| A4     | 12            | 12              | 18             | VCC                  |
| B4     | 13            | 13              | 19             | GND                  |
| VCC    | 14            | 14              | 20             | VCC                  |

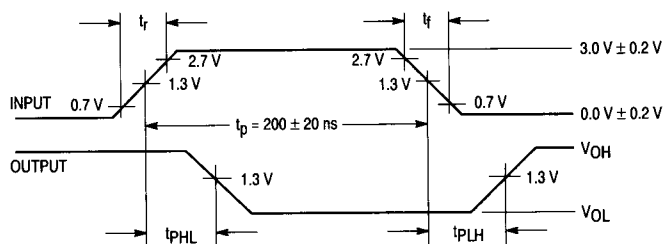
BURN-IN CONDITIONS:  
 $V_{CC} = 5.0 \text{ V MIN}/6.0 \text{ V MAX}$

# 54LS132

## AC TEST CIRCUIT



## WAVEFORMS



### NOTES:

1. The pulse generator has the following characteristics:  
 $t_r \leq 15 \text{ ns}$ ,  $t_f \leq 6.0 \text{ ns}$ ,  $\text{PRR} \leq 1.0 \text{ MHz}$ , and  $Z_{OUT} = 50 \Omega$ .
2. All diodes are 1N3064 or equivalent.
3.  $C_L = 50 \text{ pF} \pm 10\%$ , including scope probe and jig capacitance.
4.  $R_L = 2.0 \text{ k}\Omega \pm 5.0\%$ .
5. Voltage measurements are to be made with respect to network ground terminal.

## 54LS132

| Symbol           | Parameter                       | Limits     |       |             |       |             |       | Unit | Test Condition<br>(Unless Otherwise Specified)                                                                           |
|------------------|---------------------------------|------------|-------|-------------|-------|-------------|-------|------|--------------------------------------------------------------------------------------------------------------------------|
|                  | Static<br>Parameters:           | + 25°C     |       | + 125°C     |       | – 55°C      |       |      |                                                                                                                          |
|                  |                                 | Subgroup 1 |       | Subgroup 2  |       | Subgroup 3  |       |      |                                                                                                                          |
|                  |                                 | Min        | Max   | Min         | Max   | Min         | Max   |      |                                                                                                                          |
| V <sub>OH1</sub> | Logical “1”<br>Output Voltage   | 2.5        |       | 2.5         |       | 2.5         |       | V    | V <sub>CC</sub> = 4.5 V, I <sub>OH</sub> = –0.4 mA,<br>V <sub>IL</sub> = 0.5 V, V <sub>IN</sub> = 1.9 V on other inputs. |
| V <sub>OL1</sub> | Logical “0”<br>Output Voltage   |            | 0.4   |             | 0.4   |             | 0.4   | V    | V <sub>CC</sub> = 4.5 V, I <sub>OL</sub> = 4.0 mA,<br>V <sub>IH</sub> = 1.9 V on both inputs.                            |
| V <sub>OH2</sub> | Logical “1”<br>Output Voltage   | 2.5        |       | 2.5         |       | 2.5         |       | V    | V <sub>CC</sub> = 5.0 V, I <sub>OH</sub> = –0.4 mA,<br>V <sub>IL</sub> = 1.9 V, other input = (See Note 2).              |
| V <sub>OL2</sub> | Logical “0”<br>Output Voltage   |            | 0.4   |             | 0.4   |             | 0.4   | V    | V <sub>CC</sub> = 5.0 V, I <sub>OL</sub> = 4.0 mA,<br>V <sub>IN</sub> = (See Note 3).                                    |
| V <sub>IC</sub>  | Input Clamping<br>Voltage       |            | –1.5  |             |       |             |       | V    | V <sub>CC</sub> = 4.5 V, I <sub>IN</sub> = –18 mA,<br>other inputs are open.                                             |
| I <sub>IH</sub>  | Logical “1”<br>Input Current    |            | 20    |             | 20    |             | 20    | μA   | V <sub>CC</sub> = 5.5 V, V <sub>IH</sub> = 2.7 V,<br>other input = 0 V.                                                  |
| I <sub>IHH</sub> | Logical “1”<br>Input Current    |            | 100   |             | 100   |             | 100   | μA   | V <sub>CC</sub> = 5.5 V, V <sub>IHH</sub> = 5.5 V,<br>other input = 0 V.                                                 |
| I <sub>IL</sub>  | Logical “0”<br>Input Current    | –0.12      | –0.36 | –0.12       | –0.36 | –0.12       | –0.36 | mA   | V <sub>CC</sub> = 5.5 V, V <sub>IL</sub> = 0.4 V,<br>other input = 5.5 V.                                                |
| I <sub>OS</sub>  | Output Short<br>Circuit Current | –15        | –100  | –15         | –100  | –15         | –100  | mA   | V <sub>CC</sub> = 5.5 V, V <sub>IN</sub> = 0 V (both inputs),<br>V <sub>OUT</sub> = 0 V.                                 |
| I <sub>CCH</sub> | Power Supply<br>Current         |            | 11    |             | 11    |             | 11    | mA   | V <sub>CC</sub> = 5.5 V, V <sub>IN</sub> = 0 V (both inputs).                                                            |
| I <sub>CCL</sub> | Power Supply<br>Current         |            | 14    |             | 14    |             | 14    | mA   | V <sub>CC</sub> = 5.5 V, V <sub>IN</sub> = 5.5 V (both inputs).                                                          |
| V <sub>IH</sub>  | Logical “1”<br>Input Voltage    | 1.9        |       | 1.9         |       | 1.9         |       | V    | V <sub>CC</sub> = 4.5 V.                                                                                                 |
| V <sub>IL</sub>  | Logical “0”<br>Input Voltage    |            | 0.5   |             | 0.5   |             | 0.5   | V    | V <sub>CC</sub> = 4.5 V.                                                                                                 |
|                  | Functional Tests                | Subgroup 7 |       | Subgroup 8A |       | Subgroup 8B |       |      | per Truth Table with V <sub>CC</sub> = 5.0 V,<br>V <sub>INL</sub> = 0.4 V, and V <sub>INH</sub> = 2.5 V.                 |
|                  |                                 |            |       |             |       |             |       |      |                                                                                                                          |

| Symbol                               | Parameter                                            | Limits     |          |             |          |             |          | Unit | Test Condition<br>(Unless Otherwise Specified)                                                                                                         |
|--------------------------------------|------------------------------------------------------|------------|----------|-------------|----------|-------------|----------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                      | Switching<br>Parameters:                             | + 25°C     |          | + 125°C     |          | – 55°C      |          |      |                                                                                                                                                        |
|                                      |                                                      | Subgroup 9 |          | Subgroup 10 |          | Subgroup 11 |          |      |                                                                                                                                                        |
|                                      |                                                      | Min        | Max      | Min         | Max      | Min         | Max      |      |                                                                                                                                                        |
| t <sub>PHL</sub><br>t <sub>PHL</sub> | Propagation Delay<br>/Data-Output<br>Output High-Low | 5.0<br>—   | 32<br>22 | 5.0<br>—    | 52<br>47 | 5.0<br>—    | 52<br>47 | ns   | V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = 2.0 kΩ.<br>V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 15 pF, R <sub>L</sub> = 2.0 kΩ. |
| t <sub>PLH</sub><br>t <sub>PLH</sub> | Propagation Delay<br>/Data-Output<br>Output Low-High | 5.0<br>—   | 32<br>22 | 5.0<br>—    | 52<br>47 | 5.0<br>—    | 52<br>47 | ns   | V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = 2.0 kΩ.<br>V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 15 pF, R <sub>L</sub> = 2.0 kΩ. |

## NOTES:

1. The limits specified for C<sub>L</sub> = 15 pF are guaranteed but not tested.
2. Momentary 0.5 V, then 1.4 V without overshoot during test.
3. Momentary 1.9 V, then 1.0 V without undershoot during test.