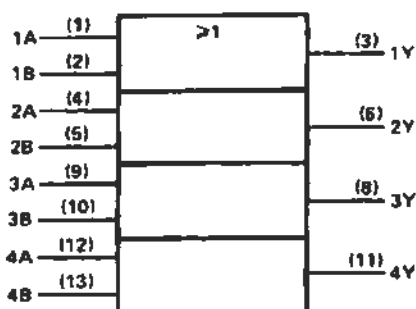


The XD74LS32 and XL74LS32 are characterized for operation over the full military range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The XD74LS32 and XL74LS32 are characterized for operation from  $-30^{\circ}$  to  $80^{\circ}\text{C}$ .

FUNCTION TABLE (each gate)

| INPUTS |   | OUTPUT |
|--------|---|--------|
| A      | B | Y      |
| H      | X | H      |
| X      | H | H      |
| L      | L | L      |

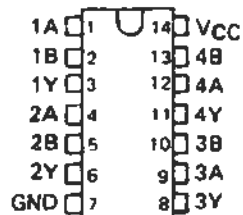
logic symbol†



XD74LS32 . . . J OR W PACKAGE

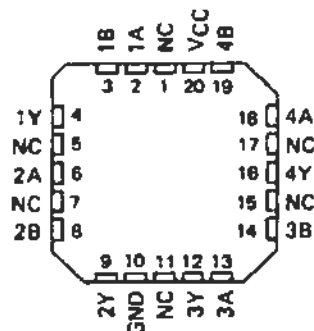
XL74LS32 . . . J OR W PACKAGE

(TOP VIEW)



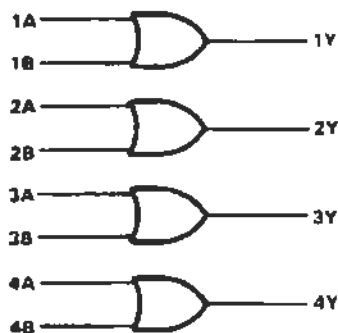
XD74LS32, XL74LS32 . . . FK PACKAGE

(TOP VIEW)



NC - No internal connection

logic diagram

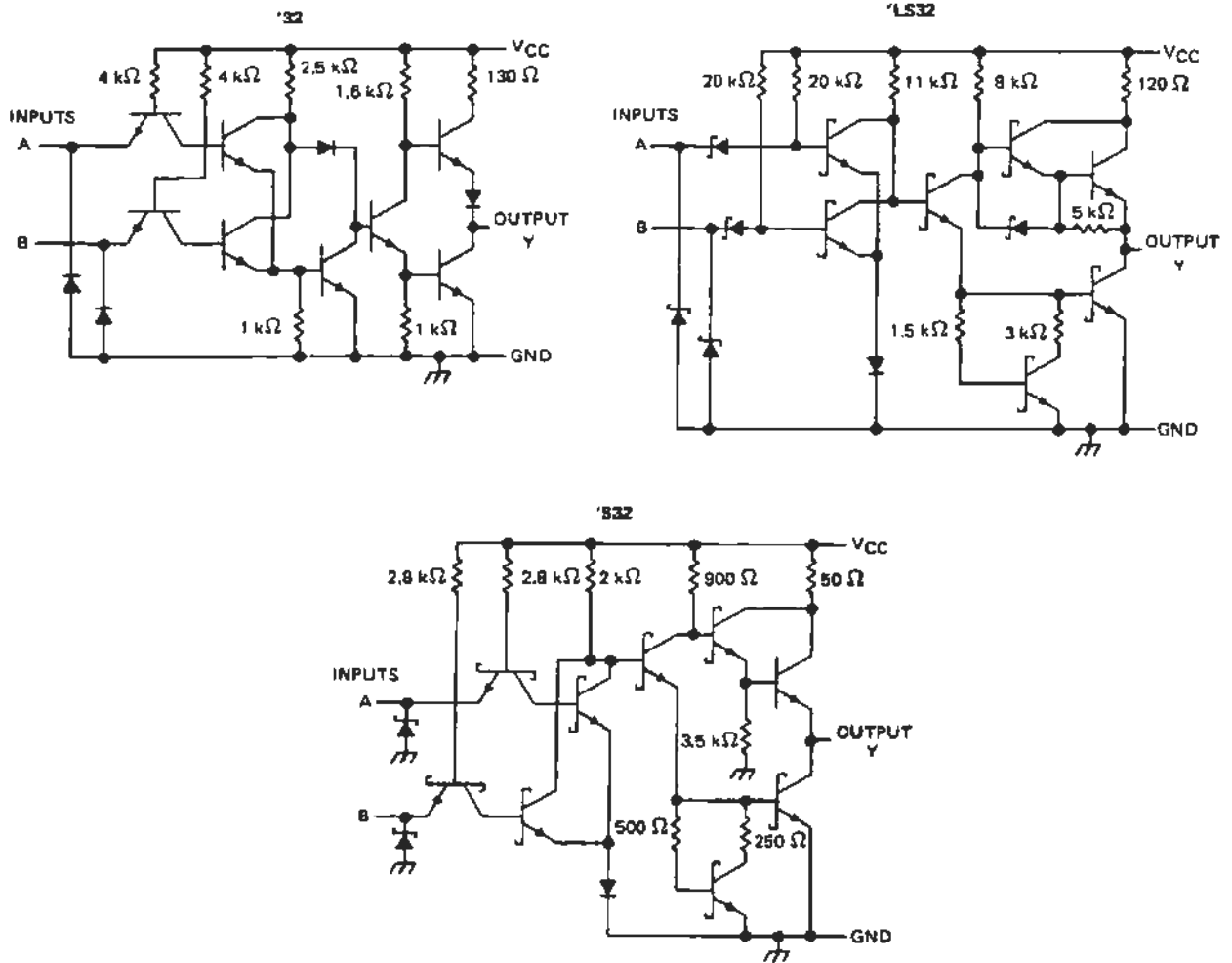


positive logic

$$Y = A + B \text{ or } Y = \overline{\overline{A} \cdot \overline{B}}$$

# X074LS32 DIP14 / XL74LS32 SOP14

schematics (each gate)



Resistor values shown are nominal.

absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

|                                      |                |
|--------------------------------------|----------------|
| Supply voltage, VCC (see Note 1)     | 7 V            |
| Input voltage: '32, 'S32             | 5.5 V          |
| 'LS32                                | 7 V            |
| Operating free-air temperature: XD74 | -55°C to 125°C |
| XL74                                 | -30°C to 80°C  |
| Storage temperature range            | -65°C to 150°C |

NOTE 1: Voltage values are with respect to network ground terminal.

# XD74LS32 DIP14 / XL74LS32 SOP14

## recommended operating conditions

|                                               | XD74LS32 |     |      | XL74LS32 |     |      | UNIT |
|-----------------------------------------------|----------|-----|------|----------|-----|------|------|
|                                               | MIN      | NOM | MAX  | MIN      | NOM | MAX  |      |
| V <sub>CC</sub> Supply voltage                | 4.5      | 5   | 5.5  | 4.75     | 5   | 5.25 | V    |
| V <sub>IH</sub> High-level input voltage      | 2        |     |      | 2        |     |      | V    |
| V <sub>IL</sub> Low-level input voltage       |          |     | 0.8  |          |     | 0.8  | V    |
| I <sub>OH</sub> High-level output current     |          |     | -0.8 |          |     | -0.8 | mA   |
| I <sub>OL</sub> Low-level output current      |          |     | 16   |          |     | 16   | mA   |
| T <sub>A</sub> Operating free-air temperature | -55      |     | 125  | -30      |     | 80   | °C   |

## electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

| PARAMETER         | TEST CONDITIONS†                                                        | XD74LS32 |      |      | XL74LS32 |      |      | UNIT |
|-------------------|-------------------------------------------------------------------------|----------|------|------|----------|------|------|------|
|                   |                                                                         | MIN      | TYP‡ | MAX  | MIN      | TYP‡ | MAX  |      |
| V <sub>IK</sub>   | V <sub>CC</sub> = MIN, I <sub>I</sub> = -12 mA                          |          |      | -1.5 |          |      | -1.5 | V    |
| V <sub>OH</sub>   | V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, I <sub>OH</sub> = -0.8 mA | 2.4      | 3.4  |      | 2.4      | 3.4  |      | V    |
| V <sub>OL</sub>   | V <sub>CC</sub> = MIN, V <sub>IL</sub> = 0.8 V, I <sub>OL</sub> = 16 mA |          | 0.2  | 0.4  |          | 0.2  | 0.4  | V    |
| I <sub>I</sub>    | V <sub>CC</sub> = MAX, V <sub>I</sub> = 5.5 V                           |          |      | 1    |          |      | 1    | mA   |
| I <sub>IH</sub>   | V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.4 V                           |          |      | 40   |          |      | 40   | µA   |
| I <sub>IL</sub>   | V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V                           |          |      | -1.6 |          |      | -1.6 | mA   |
| I <sub>OS</sub> § | V <sub>CC</sub> = MAX                                                   | -20      |      | -55  | -18      |      | -55  | mA   |
| I <sub>CCH</sub>  | V <sub>CC</sub> = MAX, See Note 2                                       |          | 15   | 22   |          | 15   | 22   | mA   |
| I <sub>CCL</sub>  | V <sub>CC</sub> = MAX, V <sub>I</sub> = 0 V                             |          | 23   | 38   |          | 23   | 38   | mA   |

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

§ Not more than one output should be shorted at a time.

NOTE 2: One input at 4.5 V, all others at GND.

## switching characteristics, V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C (see note 3)

| PARAMETER        | FROM (INPUT) | TO (OUTPUT) | TEST CONDITIONS                                | MIN | TYP | MAX | UNIT |
|------------------|--------------|-------------|------------------------------------------------|-----|-----|-----|------|
| t <sub>PLH</sub> | A or B       | Y           | R <sub>L</sub> = 400 Ω, C <sub>L</sub> = 15 pF |     | 10  | 15  | ns   |
| t <sub>PHL</sub> |              |             |                                                |     | 14  | 22  | ns   |

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.

# XD74LS32 DIP14 / XL74LS32 SOP14

## recommended operating conditions

|                                               | XD74LS32 |     |      | XL74LS32 |     |      | UNIT |
|-----------------------------------------------|----------|-----|------|----------|-----|------|------|
|                                               | MIN      | NOM | MAX  | MIN      | NOM | MAX  |      |
| V <sub>CC</sub> Supply voltage                | 4.5      | 5   | 5.5  | 4.75     | 5   | 5.25 | V    |
| V <sub>IH</sub> High-level input voltage      | 2        |     |      | 2        |     |      | V    |
| V <sub>IL</sub> Low-level input voltage       |          |     | 0.7  |          |     | 0.8  | V    |
| I <sub>OH</sub> High-level output current     |          |     | -0.4 |          |     | -0.4 | mA   |
| I <sub>OL</sub> Low-level output current      |          |     | 4    |          |     | 8    | mA   |
| T <sub>A</sub> Operating free-air temperature | -55      |     | 125  | -30      |     | 80   | °C   |

## electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

| PARAMETER         | TEST CONDITIONS †                                                       |  | XD74LS32 |       |      | XL74LS32 |       |      | UNIT |
|-------------------|-------------------------------------------------------------------------|--|----------|-------|------|----------|-------|------|------|
|                   |                                                                         |  | MIN      | TYP ‡ | MAX  | MIN      | TYP ‡ | MAX  |      |
| V <sub>IK</sub>   | V <sub>CC</sub> = MIN, I <sub>I</sub> = -18 mA                          |  |          |       | -1.5 |          |       | -1.5 | V    |
| V <sub>OH</sub>   | V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, I <sub>OH</sub> = -0.4 mA |  | 2.5      | 3.4   |      | 2.7      | 3.4   |      | V    |
| V <sub>OL</sub>   | V <sub>CC</sub> = MIN, V <sub>IL</sub> = MAX, I <sub>OL</sub> = 4 mA    |  | 0.25     | 0.4   |      | 0.25     | 0.4   |      | V    |
|                   | V <sub>CC</sub> = MIN, V <sub>IL</sub> = MAX, I <sub>OL</sub> = 8 mA    |  |          |       |      | 0.35     | 0.5   |      |      |
| I <sub>I</sub>    | V <sub>CC</sub> = MAX, V <sub>I</sub> = 7 V                             |  |          |       | 0.1  |          |       | 0.1  | mA   |
| I <sub>IH</sub>   | V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.7 V                           |  |          |       | 20   |          |       | 20   | µA   |
| I <sub>IL</sub>   | V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V                           |  |          |       | -0.4 |          |       | -0.4 | mA   |
| I <sub>OS</sub> § | V <sub>CC</sub> = MAX                                                   |  | -20      |       | -100 | -20      |       | -100 | mA   |
| I <sub>CCH</sub>  | V <sub>CC</sub> = MAX, See Note 2                                       |  |          | 3.1   | 6.2  |          | 3.1   | 6.2  | mA   |
| I <sub>CCL</sub>  | V <sub>CC</sub> = MAX, V <sub>I</sub> = 0 V                             |  |          | 4.9   | 9.8  |          | 4.9   | 9.8  | mA   |

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

§ Not more than one output should be shorted at a time and the duration of the short circuit should not exceed one second.

NOTE 2: One input at 4.5 V, all others at GND.

## switching characteristics, V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C (see note 3)

| PARAMETER        | FROM (INPUT) | TO (OUTPUT) | TEST CONDITIONS        |                        | MIN | TYP | MAX | UNIT |
|------------------|--------------|-------------|------------------------|------------------------|-----|-----|-----|------|
| t <sub>PLH</sub> | A or B       | Y           | R <sub>L</sub> = 2 kΩ, | C <sub>L</sub> = 15 pF |     | 14  | 22  | ns   |
| t <sub>PHL</sub> |              |             |                        |                        |     | 14  | 22  | ns   |

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.

# XD74LS32 DIP14 / XL74LS32 SOP14

## recommended operating conditions

|                 |                                | XD74LS32 |     |     | XL74LS32 |     |      | UNIT |
|-----------------|--------------------------------|----------|-----|-----|----------|-----|------|------|
|                 |                                | MIN      | NOM | MAX | MIN      | NOM | MAX  |      |
| V <sub>CC</sub> | Supply voltage                 | 4.5      | 5   | 5.5 | 4.75     | 5   | 5.25 | V    |
| V <sub>IH</sub> | High-level input voltage       | 2        |     |     | 2        |     |      | V    |
| V <sub>IL</sub> | Low-level input voltage        |          |     | 0.8 |          |     | 0.8  | V    |
| I <sub>OH</sub> | High-level output current      |          |     | -1  |          |     | -1   | mA   |
| I <sub>OL</sub> | Low-level output current       |          |     | 20  |          |     | 20   | mA   |
| T <sub>A</sub>  | Operating free-air temperature | -55      |     | 125 | -30      |     | 80   | °C   |

## electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

| PARAMETER         | TEST CONDITIONS †                                                       | XD74LS32 |       |      | XL74LS32 |       |      | UNIT |
|-------------------|-------------------------------------------------------------------------|----------|-------|------|----------|-------|------|------|
|                   |                                                                         | MIN      | TYP ‡ | MAX  | MIN      | TYP ‡ | MAX  |      |
| V <sub>IK</sub>   | V <sub>CC</sub> = MIN, I <sub>I</sub> = -18 mA                          |          |       | -1.2 |          |       | -1.2 | V    |
| V <sub>OH</sub>   | V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, I <sub>OH</sub> = -1 mA   | 2.5      | 3.4   |      | 2.7      | 3.4   |      | V    |
| V <sub>OL</sub>   | V <sub>CC</sub> = MIN, V <sub>IL</sub> = 0.8 V, I <sub>OL</sub> = 20 mA |          |       | 0.5  |          |       | 0.5  | V    |
| I <sub>I</sub>    | V <sub>CC</sub> = MAX, V <sub>I</sub> = 5.5 V                           |          |       | 1    |          |       | 1    | mA   |
| I <sub>IH</sub>   | V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.7 V                           |          |       | 50   |          |       | 50   | µA   |
| I <sub>IL</sub>   | V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.5 V                           |          |       | -2   |          |       | -2   | mA   |
| I <sub>OS</sub> § | V <sub>CC</sub> = MAX                                                   | -40      |       | -100 | -40      |       | -100 | mA   |
| I <sub>CCH</sub>  | V <sub>CC</sub> = MAX, See Note 2                                       |          | 18    | 32   |          | 18    | 32   | mA   |
| I <sub>CCL</sub>  | V <sub>CC</sub> = MAX, V <sub>I</sub> = 0 V                             |          | 38    | 68   |          | 38    | 68   | mA   |

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

§ Not more than one output should be shorted at a time and the duration of the short-circuit should not exceed one second.

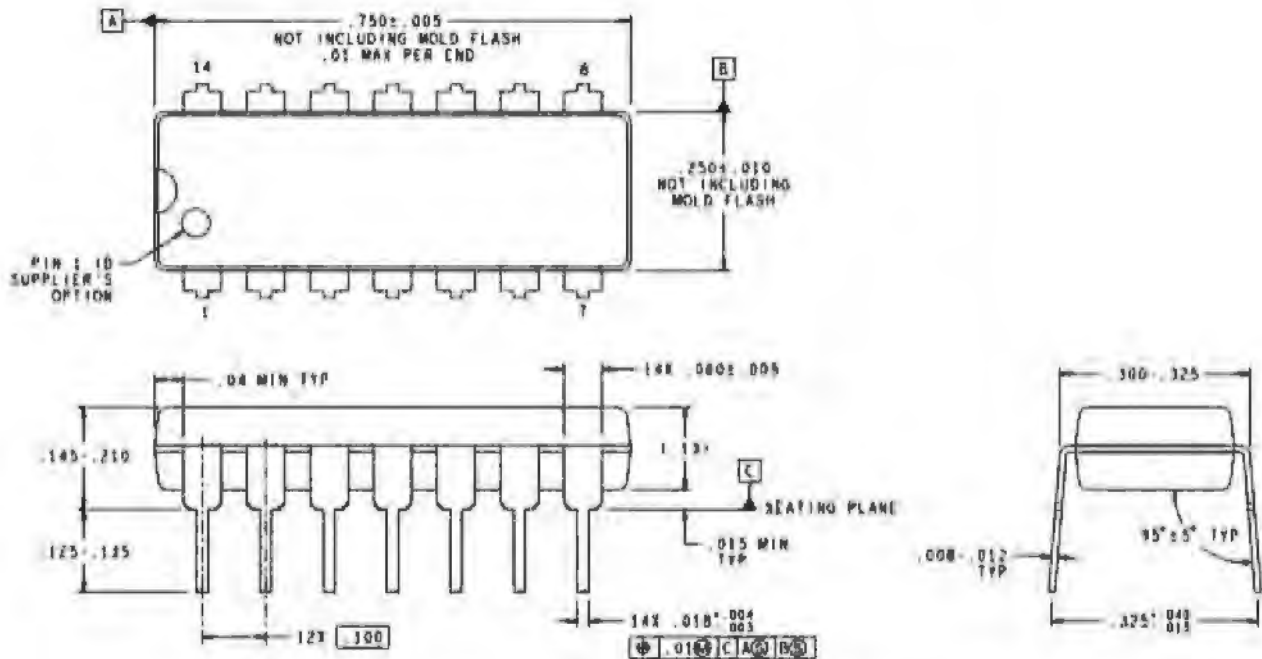
NOTE 2: One input at 4.5 V, all others at GND.

## switching characteristics, V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C (see note 3)

| PARAMETER        | FROM (INPUT) | TO (OUTPUT) | TEST CONDITIONS                                | MIN | TYP | MAX | UNIT |
|------------------|--------------|-------------|------------------------------------------------|-----|-----|-----|------|
| t <sub>PLH</sub> | A or B       | Y           | R <sub>L</sub> = 280 Ω, C <sub>L</sub> = 15 pF |     | 4   | 7   | ns   |
| t <sub>PHL</sub> |              |             |                                                |     | 4   | 7   | ns   |
| t <sub>PLH</sub> | A or B       | Y           | R <sub>L</sub> = 280 Ω, C <sub>L</sub> = 50 pF |     | 5   |     | ns   |
| t <sub>PHL</sub> |              |             |                                                |     | 5   |     | ns   |

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.

## DIP14



**DIMENSIONS ARE IN INCHES**  
DIMENSIONS IN ( ) FOR REFERENCE ONLY

