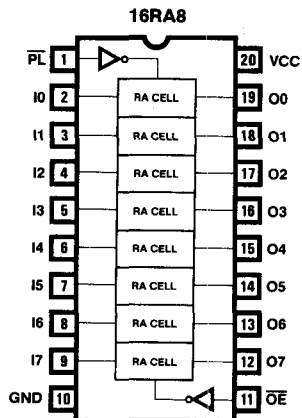
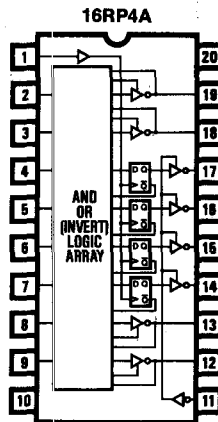
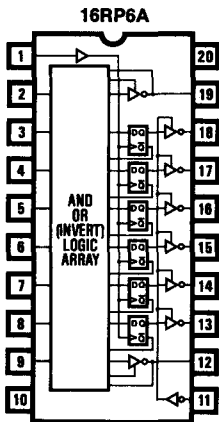
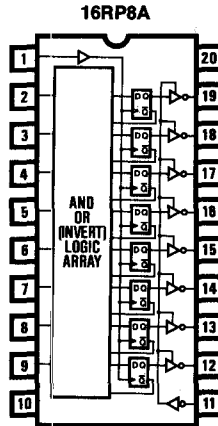
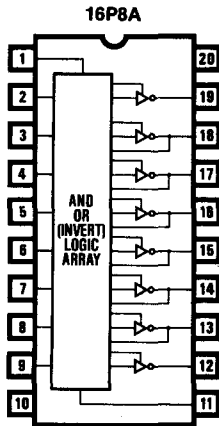


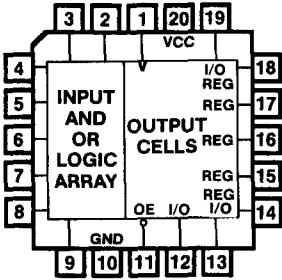
## 20-Pin PAL/HAL Devices



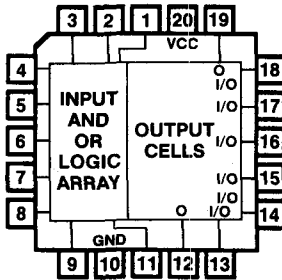
5

## 20-Pin PAL/ HAL Devices-PLCC

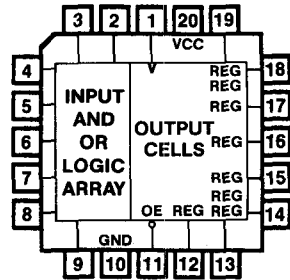
16R4/B/B-2/B-4  
A/A-2/A-4



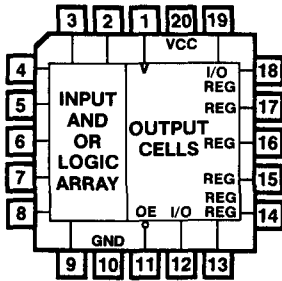
16P8A



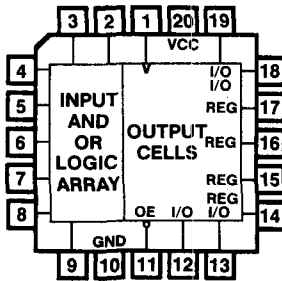
16RP8A



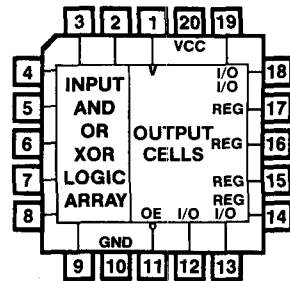
16RP6A



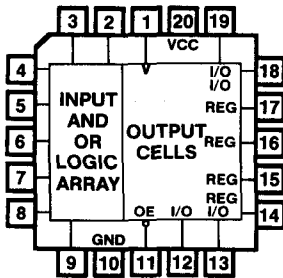
16RP4A



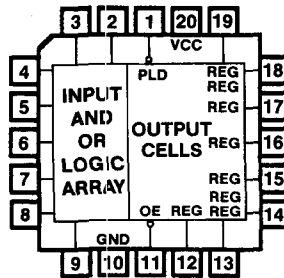
16X4



16A4



16RA8



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# PAL Devices Series 20PA with Programmable Output Polarity

## Operating Conditions

| SYMBOL          | PARAMETER                                  |                            | COMMERCIAL           |     |      | UNIT |
|-----------------|--|----------------------------|----------------------|-----|------|------|
|                 |  |                            | MIN                  | TYP | MAX  |      |
| V <sub>CC</sub> | Supply voltage                             |                            | 4.75                 | 5   | 5.25 | V    |
| t <sub>w</sub>  | Width of clock                             | Low                        | 20                   | 14  |      | ns   |
|                 |  | High                       | 10                   | 6   |      |      |
| t <sub>su</sub> | Setup time from input or feedback to clock | 16RP8A<br>16RP6A<br>16RP4A | Polarity fuse intact | 25  | 15   | ns   |
|                 |  |                            | Polarity fuse blown  | 30  | 20   |      |
| t <sub>h</sub>  | Hold time                                  |                            | 0                    | -10 |      | ns   |
| T <sub>A</sub>  | Operating free-air temperature             |                            | 0                    |     | 75   | °C   |
| T <sub>C</sub>  | Operating case temperature                 |                            |                      |     |      | °C   |

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## Electrical Characteristics Over Operating Conditions

| SYMBOL             | PARAMETER                    | TEST CONDITION        |                           | COMMERCIAL |       |      | UNIT |
|--------------------|------------------------------|-----------------------|---------------------------|------------|-------|------|------|
|                    |                              |                       |                           | MIN        | TYP   | MAX  |      |
| V <sub>IL</sub> *  | Low-level input voltage      |                       |                           |            | 0.8   |      | V    |
| V <sub>IH</sub> *  | High-level input voltage     |                       |                           | 2          |       |      | V    |
| V <sub>IC</sub>    | Input clamp voltage          | V <sub>CC</sub> = MIN | I <sub>I</sub> = -18 mA   | -0.8       | -1.5  |      | V    |
| I <sub>IL</sub> †  | Low-level input current      | V <sub>CC</sub> = MAX | V <sub>I</sub> = 0.4 V    | -0.02      | -0.25 |      | mA   |
| I <sub>IH</sub> †  | High-level input current     | V <sub>CC</sub> = MAX | V <sub>I</sub> = 2.4 V    |            |       | 25   | μA   |
| I <sub>I</sub>     | Maximum input current        | V <sub>CC</sub> = MAX | V <sub>I</sub> = 5.5 V    |            |       | 1    | mA   |
| V <sub>OL</sub>    | Low-level output voltage     | V <sub>CC</sub> = MIN | I <sub>OL</sub> = 24 mA   | 0.3        | 0.5   |      | V    |
| V <sub>OH</sub>    | High-level output voltage    | V <sub>CC</sub> = MIN | I <sub>OH</sub> = -3.2 mA | 2.4        | 2.8   |      | V    |
| I <sub>OZL</sub> † | Off-state output current     | V <sub>CC</sub> = MAX | V <sub>O</sub> = 0.4 V    |            |       | -100 | μA   |
| I <sub>OZH</sub> † |                              |                       | V <sub>O</sub> = 2.4 V    |            |       | 100  | μA   |
| I <sub>OS</sub> ** | Output short-circuit current | V <sub>CC</sub> = 5 V | V <sub>O</sub> = 0 V      | -30        | -70   | -130 | mA   |
| I <sub>CC</sub>    | Supply current               | V <sub>CC</sub> = MAX |                           | 120        | 180   |      | mA   |

## Switching Characteristics Over Operating Conditions

| SYMBOL           | PARAMETER  |                           | TEST CONDITIONS                                   | COMMERCIAL |      |     | UNIT |
|------------------|--|---------------------------|---|------------|------|-----|------|
|                  |  |                           |   | MIN        | TYP  | MAX |      |
| t <sub>PD</sub>  | Input or feedback to output<br>16P8A, 16RP6A, 16RP4A | Polarity fuse intact      | R <sub>1</sub> = 200 Ω<br>R <sub>2</sub> = 390 KΩ |            | 15   | 25  | ns   |
|                  |  | Polarity fuse blown       |   |            | 20   | 30  |      |
| t <sub>CLK</sub> | Clock to output or feedback                          |                           |   |            | 10   | 15  | ns   |
| t <sub>PZX</sub> | Pin 11 to output enable except 16P8A                 |                           |   |            | 10   | 20  | ns   |
| t <sub>PXZ</sub> | Pin 11 to output disable except 16P8A                |                           |   |            | 11   | 20  | ns   |
| t <sub>PZX</sub> | Input to output enable                               | 16RP6A, 16RP4A, and 16P8A |   |            | 10   | 25  | ns   |
| t <sub>PXZ</sub> | Input to output disable                              | 16RP6A, 16RP4A, and 16P8A |   |            | 13   | 25  | ns   |
| f <sub>MAX</sub> | Maximum frequency<br>16RP8A, 16RP6A, 16RP4A          | Polarity fuse intact      |   |            | 28.5 | 40  | MHz  |
|                  |  | Polarity fuse blown       |   |            | 25   | 33  |      |