



CYPRESS  
SEMICONDUCTOR

PAL® C20 Series

# Reprogrammable CMOS PALC 16L8, 16R8, 16R6, 16R4

## Features

- CMOS EPROM technology for reprogrammability
- High performance at quarter power
  - $t_{PD} = 25 \text{ ns}$
  - $t_S = 20 \text{ ns}$
  - $t_{CO} = 15 \text{ ns}$
  - $I_{CC} = 45 \text{ mA}$
- High performance at military temperature
  - $t_{PD} = 20 \text{ ns}$
  - $t_S = 20 \text{ ns}$
  - $t_{CO} = 15 \text{ ns}$
  - $I_{CC} = 70 \text{ mA}$
- Commercial and military temperature range

- High reliability
  - Proven EPROM technology
  - $>1500\text{V}$  input protection from electrostatic discharge
  - 100% AC and DC tested
  - 10% power supply tolerances
  - High noise immunity
  - Security feature prevents pattern duplication
  - 100% programming and functional testing

## Functional Description

Cypress PALC Series 20 devices are high-speed electrically programmable and UV-erasable logic devices produced in a proprietary N-well CMOS EPROM process. These devices utilize a sum-of-products (AND-OR) structure providing users with the ability to program custom logic functions serving unique requirements.

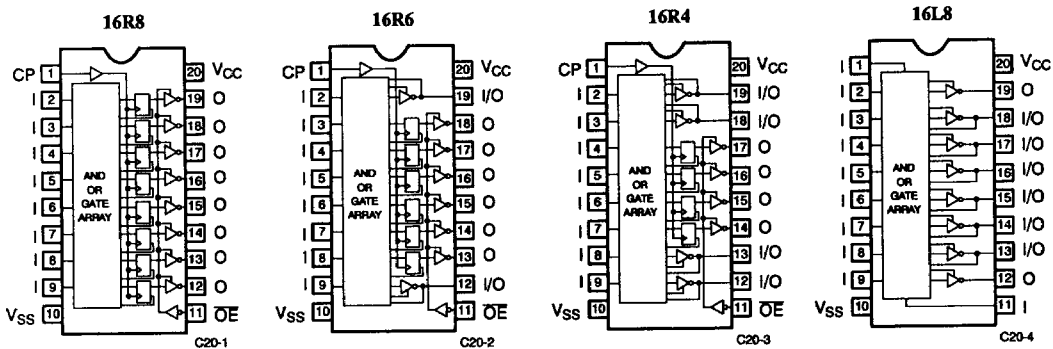
PALs are offered in 20-pin plastic and ceramic DIP, plastic SOJ, and ceramic LCC packages. The ceramic package can be equipped with an erasure window; when exposed to UV light, the PAL is erased and can then be reprogrammed.

Before programming, AND gates or product terms are connected via EPROM cells to both true and complement inputs. Programming an EPROM cell disconnects an input term from a product term. Selective programming of these cells allows a specific logic function to be implemented in a PALC device. PALC devices are supplied in four functional configurations designated 16R8, 16R6, 16R4, and 16L8. These eight devices have potentially 16 inputs and 8 outputs configurable by the user. Output configurations of 8 registers, 8 combinatorial, 6 registers and 2 combinatorial as well as 4 registers and 4 combinatorial are provided by the type

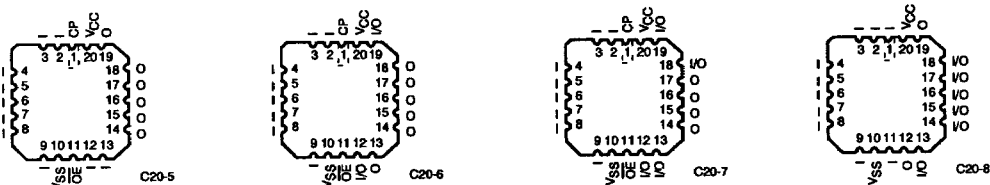
4

PLDS

## Logic Symbols and DIP and SOJ Pinouts



## LCC Pinouts



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**Functional Description (continued)**

four functional variations of the product family. All combinatorial outputs on the 16R6 and 16R4 as well as 6 of the combinatorial outputs on the 16L8 may be used as optional inputs. All registered outputs have the  $\bar{Q}$  bar side of the register fed back into the main array. The registers are automatically initialized upon power-up to Q output LOW and  $\bar{Q}$  output HIGH. All unused inputs should be tied to ground.

All PALC devices feature a security function that provides the user with protection for the implementation of proprietary logic. When invoked, the contents of the normal array may no longer be accessed in the verify mode. Because EPROM technology is used as a storage mechanism, the content of the array is not visible under a microscope.

Cypress PALC products are produced in an advanced 1.2-micron N-well CMOS EPROM technology. The use of this proven

EPROM technology is the basis for a superior product with inherent advantages in reliability, testability, programming, and functional yield. EPROM technology has the inherent advantage that all programmable elements may be programmed, tested, and erased during the manufacturing process. This also allows the device to be 100% functionally tested during manufacturing. An ability to preload the registers of registered devices during the testing operation makes the testing easier and more efficient. Combining these inherent and designed-in features provides an extremely high degree of functionality, programmability and assured AC performance, and testing becomes an easy task.

The register preload allows the user to initialize the registered devices to a known state prior to testing the device, significantly simplifying and shortening the testing procedure.

**Commercial and Industrial Selection Guide**

| Generic Part Number | Logic                    | Output Enable | Outputs                            | I <sub>CC</sub> (mA) |           | t <sub>PD</sub> (ns) |     | t <sub>S</sub> (ns) |     | t <sub>CO</sub> (ns) |     |
|---------------------|--------------------------|---------------|------------------------------------|----------------------|-----------|----------------------|-----|---------------------|-----|----------------------|-----|
|                     |                          |               |                                    | L                    | Com'l/Ind | -25                  | -35 | -25                 | -35 | -25                  | -35 |
| 16L8                | (8) 7-wide AND-OR-Invert | Programmable  | (6) Bidirectional<br>(2) Dedicated | 45                   | 70        | 25                   | 35  | —                   | —   | —                    | —   |
| 16R8                | (8) 8-wide AND-OR        | Dedicated     | Registered Inverting               | 45                   | 70        | —                    | —   | 20                  | 30  | 15                   | 25  |
| 16R6                | (6) 8-wide AND-OR        | Dedicated     | Registered Inverting               | 45                   | 70        | 25                   | 35  | 20                  | 30  | 15                   | 25  |
|                     | (2) 7-wide AND-OR-Invert | Programmable  | Bidirectional                      |                      |           |                      |     |                     |     |                      |     |
| 16R4                | (4) 8-wide AND-OR        | Dedicated     | Registered Inverting               | 45                   | 70        | 25                   | 35  | 20                  | 30  | 15                   | 25  |
|                     | (4) 7-wide AND-OR-Invert | Programmable  | Bidirectional                      |                      |           |                      |     |                     |     |                      |     |

**Military Selection Guide**

| Generic Part Number | Logic                    | Output Enable | Outputs                            | I <sub>CC</sub> (mA) | t <sub>PD</sub> (ns) |     |     | t <sub>S</sub> (ns) |     |     | t <sub>CO</sub> (ns) |     |     |
|---------------------|--------------------------|---------------|------------------------------------|----------------------|----------------------|-----|-----|---------------------|-----|-----|----------------------|-----|-----|
|                     |                          |               |                                    |                      | -20                  | -30 | -40 | -20                 | -30 | -40 | -20                  | -30 | -40 |
| 16L8                | (8) 7-wide AND-OR-Invert | Programmable  | (6) Bidirectional<br>(2) Dedicated | 70                   | 20                   | 30  | 40  | —                   | —   | —   | —                    | —   | —   |
| 16R8                | (8) 8-wide AND-OR        | Dedicated     | Registered Inverting               | 70                   | —                    | —   | —   | 20                  | 25  | 35  | 15                   | 20  | 25  |
| 16R6                | (6) 8-wide AND-OR        | Dedicated     | Registered Inverting               | 70                   | 20                   | 30  | 40  | 20                  | 25  | 35  | 15                   | 20  | 25  |
|                     | (2) 7-wide AND-OR-Invert | Programmable  | Bidirectional                      |                      |                      |     |     |                     |     |     |                      |     |     |
| 16R4                | (4) 8-wide AND-OR        | Dedicated     | Registered Inverting               | 70                   | 20                   | 30  | 40  | 20                  | 25  | 35  | 15                   | 20  | 25  |
|                     | (4) 7-wide AND-OR-Invert | Programmable  | Bidirectional                      |                      |                      |     |     |                     |     |     |                      |     |     |

**Maximum Ratings**

(Above which the useful life may be impaired. For user guidelines, not tested.)

|   |                  |
|---|------------------|
| Storage Temperature                                   | - 65°C to +150°C |
| Ambient Temperature with Power Applied                | - 55°C to +125°C |
| Supply Voltage to Ground Potential (Pin 20 to Pin 10) | - 0.5V to +7.0V  |
| DC Voltage Applied to Outputs in High Z State         | - 0.5V to +7.0V  |
| DC Input Voltage                                      | - 3.0V to +7.0V  |
| Output Current into Outputs (LOW)                     | 24 mA            |
| DC Programming Voltage                                | 14.0V            |

|   |                           |
|---|---------------------------|
| UV Exposure   | 7258 Wsec/cm <sup>2</sup> |
| Static Discharge Voltage (per MIL-STD-883, Method 3015) | > 2001 V                  |
| Latch-Up Current  | > 200 mA                  |

**Operating Range**

| Range                   | Ambient Temperature | V <sub>CC</sub> |
|-------------------------|---------------------|-----------------|
| Commercial              | 0°C to +75°C        | 5V ±10%         |
| Military <sup>[1]</sup> | - 55°C to +125°C    | 5V ±10%         |
| Industrial              | - 40°C to +85°C     |                 |

**Electrical Characteristics Over the Operating Range (Unless Otherwise Noted)<sup>[2]</sup>**

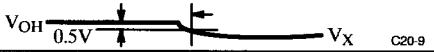
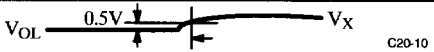
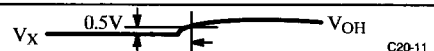
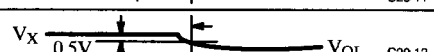
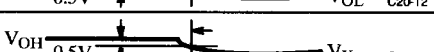
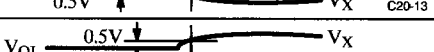
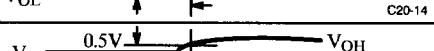
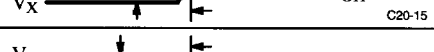
| Parameters      | Description                  | Test Conditions  |  |                       | Min.  | Max.  | Units |
|-----------------|------------------------------|--|--|-----------------------|-------|-------|-------|
|                 |                              | V <sub>CC</sub> = Min., V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>     | I <sub>OH</sub> = - 3.2 mA<br>I <sub>OH</sub> = - 2 mA | Com'l/Ind<br>Military |       |       |       |
| V <sub>OH</sub> | Output HIGH Voltage          | V <sub>CC</sub> = Min., V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>     | I <sub>OH</sub> = - 3.2 mA                             | Com'l/Ind             | 2.4   |       | V     |
|                 |                              |  | I <sub>OH</sub> = - 2 mA                               | Military              |       |       |       |
| V <sub>OL</sub> | Output LOW Voltage           | V <sub>CC</sub> = Min., V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>     | I <sub>OL</sub> = 24 mA                                | Com'l/Ind             |       | 0.4   | V     |
|                 |                              |  | I <sub>OL</sub> = 12 mA                                | Military              |       |       |       |
| V <sub>IH</sub> | Input HIGH Level             | Guaranteed Input Logical HIGH <sup>[3]</sup> Voltage for All Inputs              |  |                       | 2.0   |       | V     |
| V <sub>IL</sub> | Input LOW Level              | Guaranteed Input Logical LOW <sup>[2]</sup> Voltage for All Inputs               |  |                       |       | 0.8   | V     |
| I <sub>IX</sub> | Input Leakage Current        | V <sub>SS</sub> ≤ V <sub>IN</sub> ≤ V <sub>CC</sub>                              |  |                       | - 10  | 10    | µA    |
| V <sub>PP</sub> | Programming Voltage          | I <sub>PP</sub> = 50 mA Max.   |  |                       | 13.0  | 14.0  | V     |
| I <sub>SC</sub> | Output Short Circuit Current | V <sub>CC</sub> = Max., V <sub>OUT</sub> = 0.5V <sup>[4]</sup>                   |  |                       |       | - 300 | mA    |
| I <sub>CC</sub> | Power Supply Current         | All Inputs = GND, V <sub>CC</sub> = Max., I <sub>OUT</sub> = 0 mA <sup>[5]</sup> | "L"  |                       |       | 45    | mA    |
|                 |                              |  | Com'l/Ind  |                       |       | 70    | mA    |
|                 |                              |  | Military   |                       |       | 70    | mA    |
| I <sub>OZ</sub> | Output Leakage Current       | V <sub>CC</sub> = Max., V <sub>SS</sub> ≤ V <sub>OUT</sub> ≤ V <sub>CC</sub>     |  |                       | - 100 | 100   | µA    |

**Notes:**

1. t<sub>A</sub> is the "instant on" case temperature.
2. See the last page of this specification for Group A subgroup testing information.
3. These are absolute values with respect to device ground. All overshoots due to system or tester noise are included.
4. Not more than one output should be tested at a time. Duration of the short circuit should not be more than one second. V<sub>OUT</sub> = 0.5V has been chosen to avoid test problems caused by tester ground degradation.
5. I<sub>CC(AC)</sub> = (0.6 mA/MHz) × (Operating Frequency in MHz) + I<sub>CC(DC)</sub>; I<sub>CC(DC)</sub> is measured with an unprogrammed device.

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PLDS

**Electrical Characteristics** Over the Operating Range (Unless Otherwise Noted)<sup>[2]</sup> (continued)

| Parameter            | V <sub>X</sub>   | Output Waveform—Measurement Level  |
|----------------------|------------------|--|
| t <sub>PXZ</sub> (-) | 1.5V             |  C20-9  |
| t <sub>PXZ</sub> (+) | 2.6V             |  C20-10 |
| t <sub>PZX</sub> (+) | V <sub>thc</sub> |  C20-11 |
| t <sub>PZX</sub> (-) | V <sub>thc</sub> |  C20-12 |
| t <sub>ER</sub> (-)  | 1.5V             |  C20-13 |
| t <sub>ER</sub> (+)  | 2.6V             |  C20-14 |
| t <sub>EA</sub> (+)  | V <sub>thc</sub> |  C20-15 |
| t <sub>EA</sub> (-)  | V <sub>thc</sub> |  C20-16 |

**Capacitance<sup>[6]</sup>**

| Parameters       | Description        | Test Conditions                             | Max. | Units |
|------------------|--------------------|---|------|-------|
| C <sub>IN</sub>  | Input Capacitance  | T <sub>A</sub> = 25°C, f = 1 MHz            | 10   | pF    |
| C <sub>OUT</sub> | Output Capacitance | V <sub>IN</sub> = 0, V <sub>CC</sub> = 5.0V | 10   | pF    |

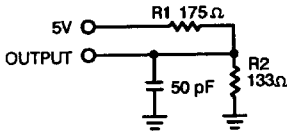
**Switching Characteristics** Over Operating Range<sup>[2, 7, 8]</sup>

| Parameter        | Description   | Commercial/Industrial |      |      |      | Military |      |      |      |      | Units |      |
|------------------|---|-----------------------|------|------|------|----------|------|------|------|------|-------|------|
|                  |   | -25                   |      | -35  |      | -20      |      | -30  |      | -40  |       |      |
|                  |   | Min.                  | Max. | Min. | Max. | Min.     | Max. | Min. | Max. | Min. |       | Max. |
| t <sub>PD</sub>  | Input or Feedback to Non-Registered Output 16L8, 16R6, 16R4 |                       | 25   |      | 35   |          | 20   |      | 30   |      | 40    | ns   |
| t <sub>EA</sub>  | Input to Output Enable 16L8, 16R6, 16R4                     |                       | 25   |      | 35   |          | 20   |      | 30   |      | 40    | ns   |
| t <sub>ER</sub>  | Input to Output Disable Delay 16L8, 16R6, 16R4              |                       | 25   |      | 35   |          | 20   |      | 30   |      | 40    | ns   |
| t <sub>PZX</sub> | Pin 11 to Output Enable 16R8, 16R6, 16R4                    |                       | 20   |      | 25   |          | 20   |      | 25   |      | 25    | ns   |
| t <sub>PXZ</sub> | Pin 11 to Output Disable 16R8, 16R6, 16R4                   |                       | 20   |      | 25   |          | 20   |      | 25   |      | 25    | ns   |
| t <sub>CO</sub>  | Clock to Output 16R8, 16R6, 16R4                            |                       | 15   |      | 25   |          | 15   |      | 20   |      | 25    | ns   |
| t <sub>S</sub>   | Input or Feedback Set-Up Time 16R8, 16R6, 16R4              | 20                    |      | 30   |      | 20       |      | 25   |      | 35   |       | ns   |
| t <sub>H</sub>   | Hold Time 16R8, 16R6, 16R4                                  | 0                     |      | 0    |      | 0        |      | 0    |      | 0    |       | ns   |
| t <sub>P</sub>   | Clock Period  | 35                    |      | 55   |      | 35       |      | 45   |      | 60   |       | ns   |
| t <sub>W</sub>   | Clock Width   | 15                    |      | 20   |      | 12       |      | 20   |      | 25   |       | ns   |
| f <sub>MAX</sub> | Maximum Frequency   |                       | 28.5 |      | 18   |          | 28.5 |      | 22   |      | 16.5  | MHz  |

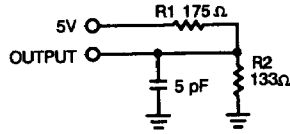
**Notes:**

- Tested initially and after any design or process changes that may affect these parameters.
- Part (a) of AC Test Loads and Waveforms is used for all parameters except t<sub>EA</sub>, t<sub>ER</sub>, t<sub>PZX</sub> and t<sub>PXZ</sub>. Part (b) of AC Test Loads and Waveforms is used for t<sub>EA</sub>, t<sub>ER</sub>, t<sub>PZX</sub> and t<sub>PXZ</sub>.
- The parameters t<sub>ER</sub> and t<sub>PXZ</sub> are measured as the delay from the input disable logic threshold transition to V<sub>OH</sub> - 0.5V for an enabled HIGH output or V<sub>OL</sub> + 0.5V for an enabled LOW output. Please see Electrical Characteristics for waveforms and measurement reference levels.

AC Test Loads and Waveforms



(a) Commercial



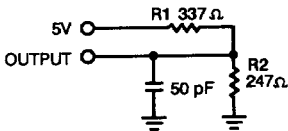
(b) Commercial

C20-17

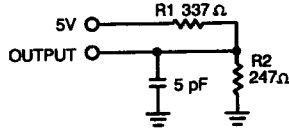
Equivalent to:  
THEVENIN EQUIVALENT COMMERCIAL



C20-18



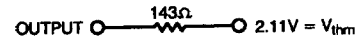
(c) Military



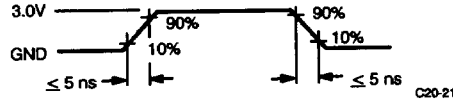
(d) Military

C20-20

Equivalent to:  
THEVENIN EQUIVALENT MILITARY



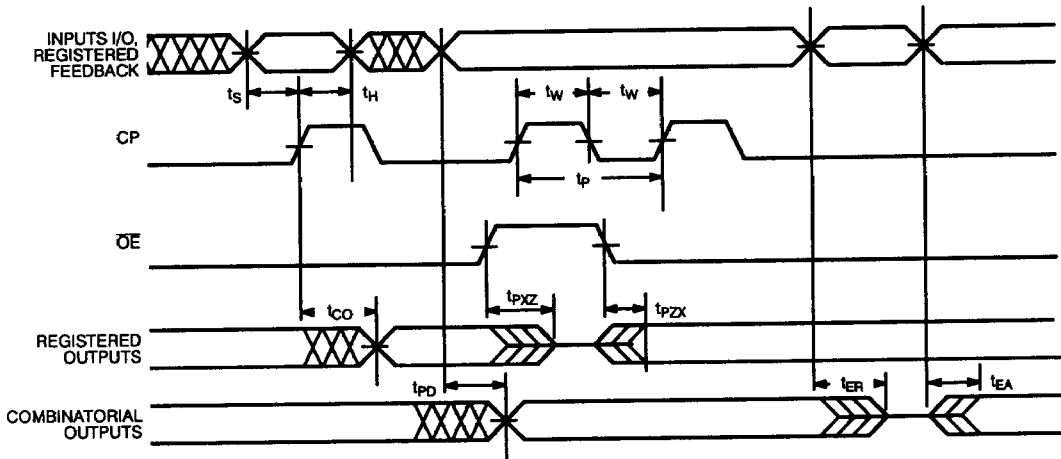
C20-19



(e)

C20-21

Switching Waveforms



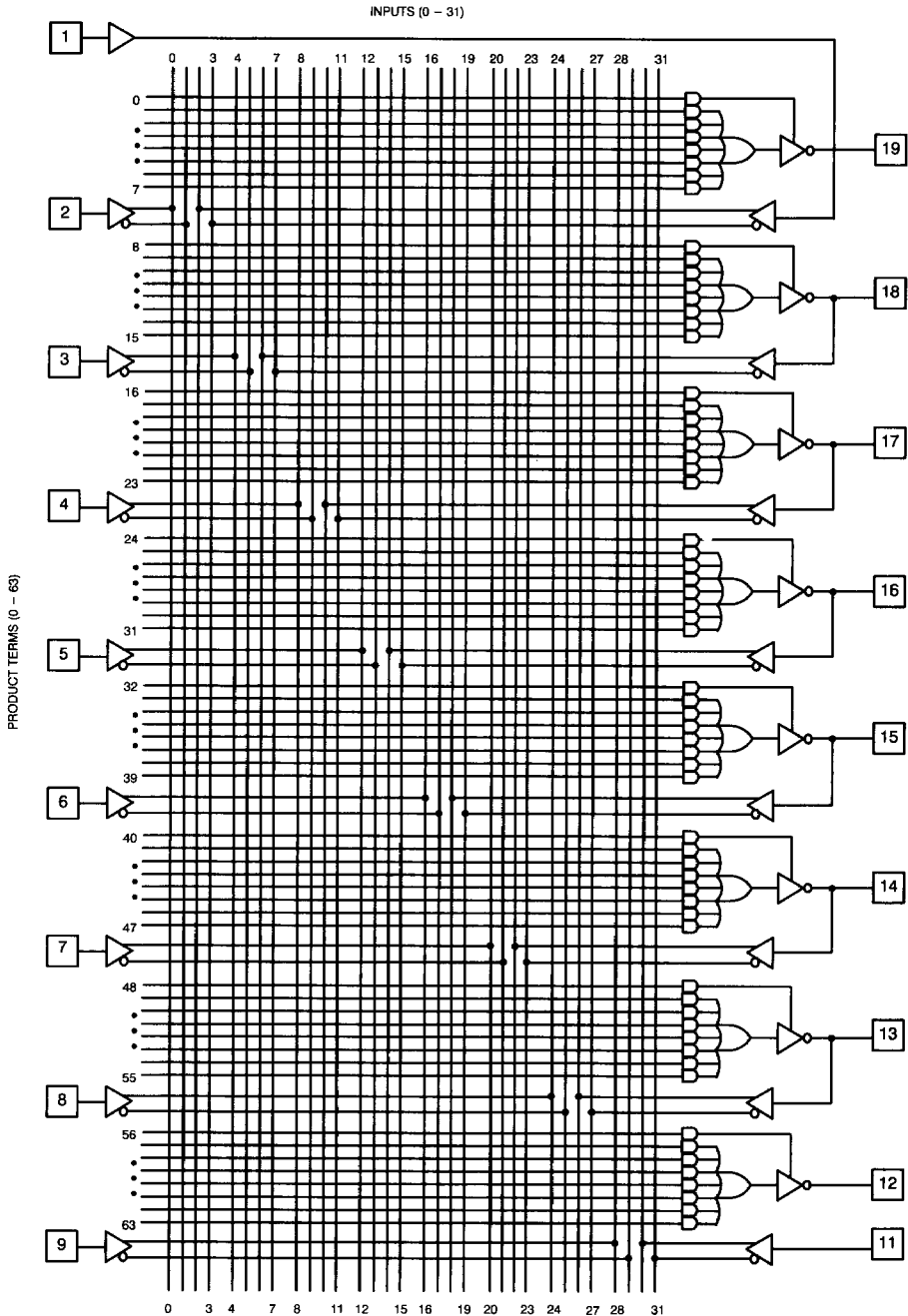
C20-22

Erasure Characteristics

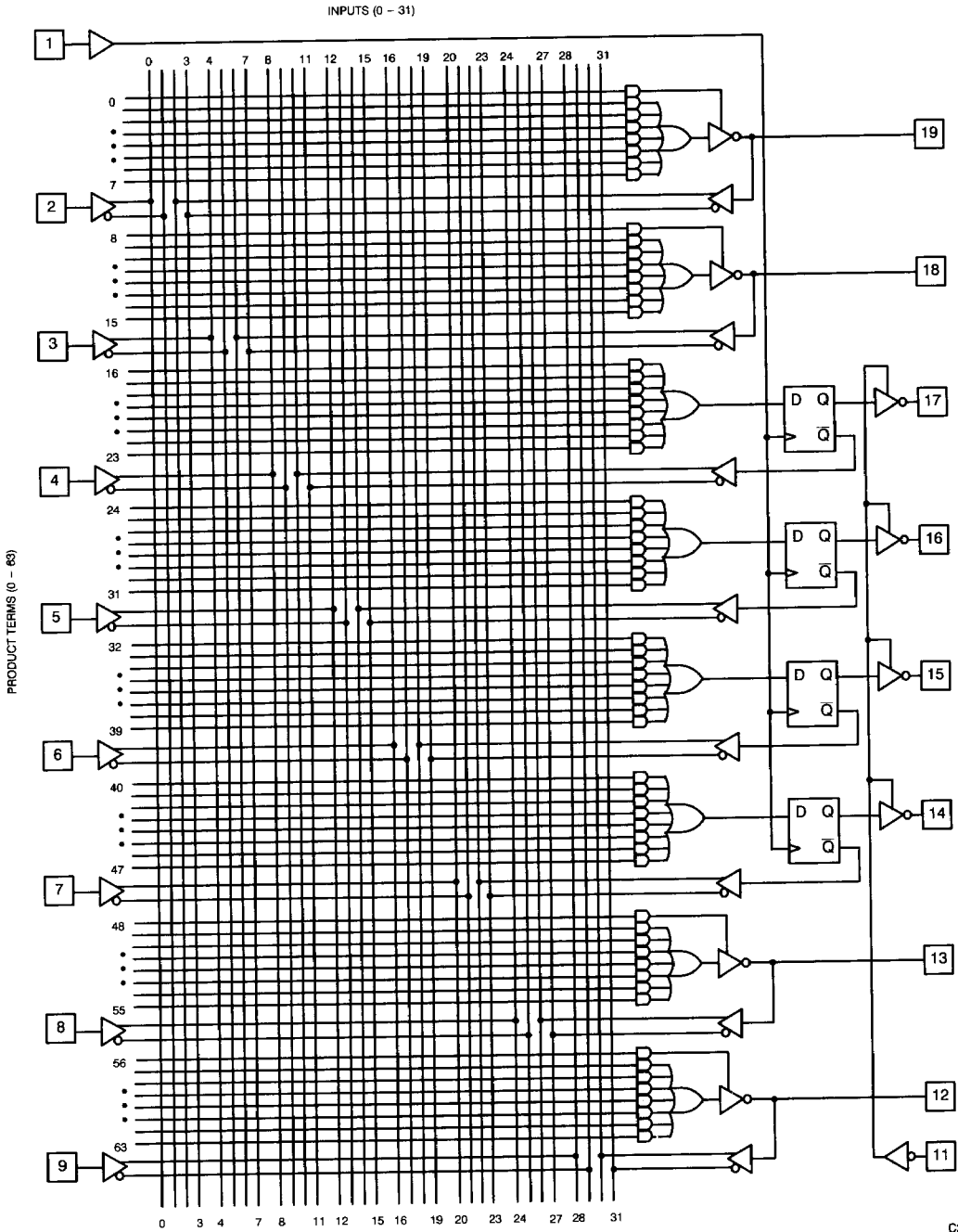
Wavelengths of light less than 4000 Angstroms begin to erase the PALC device. In addition, high ambient light levels can create hole-electron pairs that may cause "blank" check failures or "verify errors" when programming windowed parts. This phenomenon can be avoided by using an opaque label over the window during programming in high ambient light environments.

The recommended dose for erasure is ultraviolet light with a wavelength of 2537 Angstroms for a minimum dose (UV intensity multiplied by exposure time) of 25 Wsec/cm<sup>2</sup>. For an ultraviolet lamp with a 12 mW/cm<sup>2</sup> power rating, the exposure would be approximately 35 minutes. The PALC device needs to be placed within 1 inch of the lamp during erasure. Permanent damage may result if the device is exposed to high-intensity UV light for an extended period of time. 7258 Wsec/cm<sup>2</sup> is the recommended maximum dosage.

Logic Diagram PALC16L8

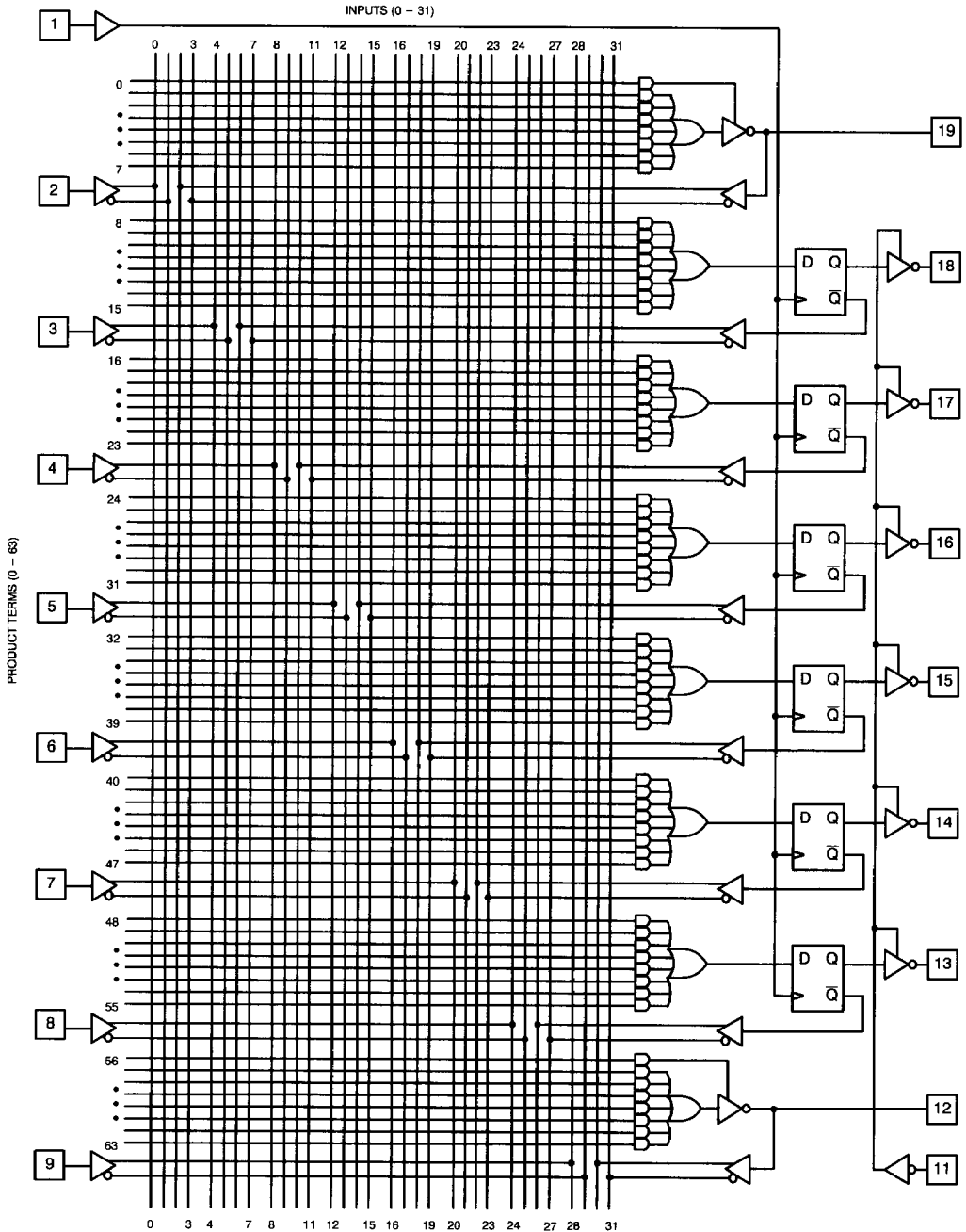


Logic Diagram PALC16R4



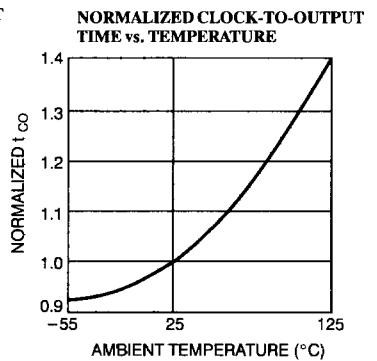
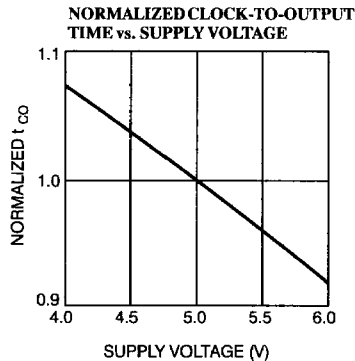
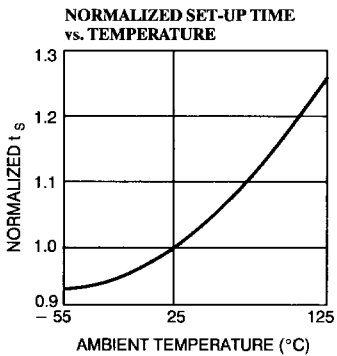
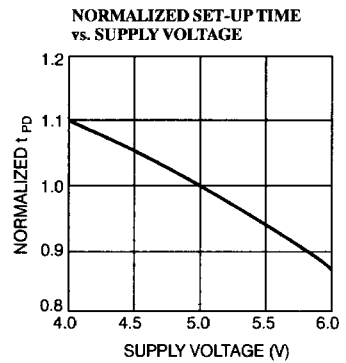
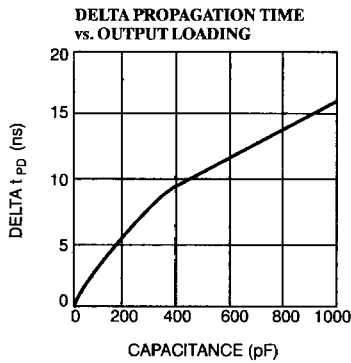
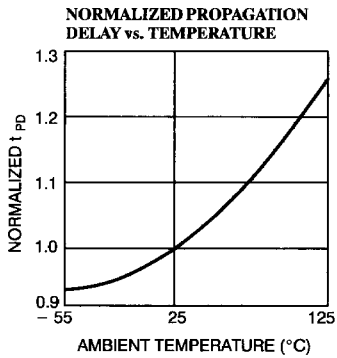
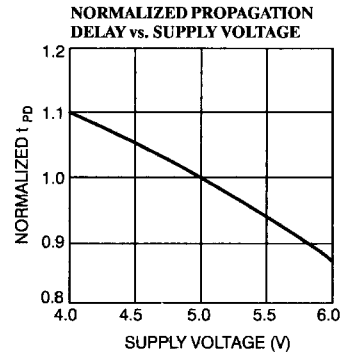
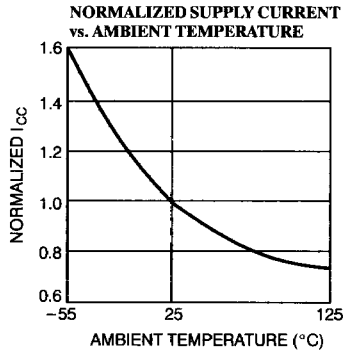
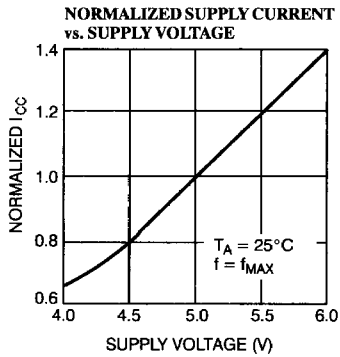
4  
PLDs

Logic Diagram PALC16R6

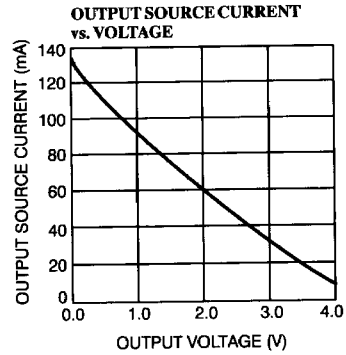
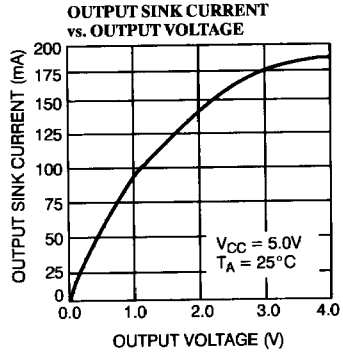
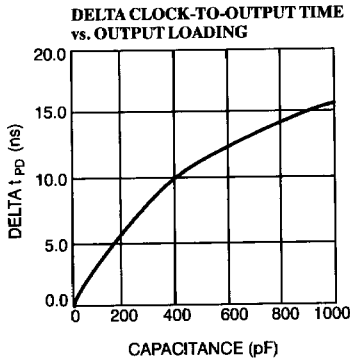




Typical DC and AC Characteristics



Typical DC and AC Characteristics (continued)



Ordering Information

| $t_{PD}$ (ns) | $t_s$ (ns) | $t_{CO}$ (ns) | $I_{CC}$ (mA) | Ordering Code    | Package Type | Operating Range |
|---------------|------------|---------------|---------------|------------------|--------------|-----------------|
| 20            | —          | —             | 70            | PALC16L8-20DMB   | D6           | Military        |
|               |            |               |               | PALC16L8-20KMB   | K71          |                 |
|               |            |               |               | PALC16L8-20LMB   | L61          |                 |
|               |            |               |               | PALC16L8-20QMB   | Q61          |                 |
|               |            |               |               | PALC16L8-20WMB   | W6           |                 |
| 25            | —          | —             | 45            | PALC16L8L-25LC   | L61          | Commercial      |
|               |            |               |               | PALC16L8L-25PC   | P5           |                 |
|               |            |               |               | PALC16L8L-25VC   | V5           |                 |
|               |            |               |               | PALC16L8L-25WC   | W6           |                 |
|               |            |               | 70            | PALC16L8-25LC    | L61          |                 |
|               |            |               |               | PALC16L8-25PC/PI | P5           |                 |
|               |            |               |               | PALC16L8-25VC/VI | V5           |                 |
|               |            |               |               | PALC16L8-25WC/WI | W61          |                 |
| 30            | —          | —             | 70            | PALC16L8-30DMB   | D6           | Military        |
|               |            |               |               | PALC16L8-30KMB   | K71          |                 |
|               |            |               |               | PALC16L8-30LMB   | L61          |                 |
|               |            |               |               | PALC16L8-30QMB   | Q61          |                 |
|               |            |               |               | PALC16L8-30WMB   | W6           |                 |
| 35            | —          | —             | 45            | PALC16L8L-35LC   | L61          | Commercial      |
|               |            |               |               | PALC16L8L-35PC   | P5           |                 |
|               |            |               |               | PALC16L8L-35VC   | V5           |                 |
|               |            |               |               | PALC16L8L-35WC   | W6           |                 |
|               |            |               | 70            | PALC16L8-35LC    | L61          |                 |
|               |            |               |               | PALC16L8-35PC/PI | P5           |                 |
|               |            |               |               | PALC16L8-35VC/VI | V5           |                 |
|               |            |               |               | PALC16L8-35WC/WI | W61          |                 |
| 40            | —          | —             | 70            | PALC16L8-40DMB   | D6           | Military        |
|               |            |               |               | PALC16L8-40KMB   | K71          |                 |
|               |            |               |               | PALC16L8-40LMB   | L61          |                 |
|               |            |               |               | PALC16L8-40QMB   | Q61          |                 |
|               |            |               |               | PALC16L8-40WMB   | W6           |                 |

4  
PLDS

**Ordering Information** (continued)

| <b>t<sub>PD</sub></b><br>(ns) | <b>t<sub>S</sub></b><br>(ns) | <b>t<sub>CO</sub></b><br>(ns) | <b>I<sub>CC</sub></b><br>(mA) | <b>Ordering Code</b> | <b>Package Type</b> | <b>Operating Range</b> |
|-------------------------------|------------------------------|-------------------------------|-------------------------------|----------------------|---------------------|------------------------|
| 20                            | 20                           | 15                            | 70                            | PALC16R4-20DMB       | D6                  | Military               |
|                               |                              |                               |                               | PALC16R4-20KMB       | K71                 |                        |
|                               |                              |                               |                               | PALC16R4-20LMB       | L61                 |                        |
|                               |                              |                               |                               | PALC16R4-20QMB       | Q61                 |                        |
|                               |                              |                               |                               | PALC16R4-20WMB       | W6                  |                        |
| 25                            | 20                           | 15                            | 45                            | PALC16R4L-25LC       | L61                 | Commercial             |
|                               |                              |                               |                               | PALC16R4L-25PC       | P5                  |                        |
|                               |                              |                               |                               | PALC16R4L-25VC       | V5                  |                        |
|                               |                              |                               |                               | PALC16R4L-25WC       | W6                  |                        |
|                               |                              | 70                            | PALC16R4-25LC                 | L61                  |                     |                        |
|                               |                              |                               | PALC16R4-25PC/PI              | P5                   |                     |                        |
|                               |                              |                               | PALC16R4-25VC/VI              | V5                   |                     |                        |
|                               |                              |                               | PALC16R4-25WC/WI              | W6                   |                     |                        |
| 30                            | 25                           | 20                            | 70                            | PALC16R4-30DMB       | D6                  | Military               |
|                               |                              |                               |                               | PALC16R4-30KMB       | K71                 |                        |
|                               |                              |                               |                               | PALC16R4-30LMB       | L61                 |                        |
|                               |                              |                               |                               | PALC16R4-30QMB       | Q61                 |                        |
|                               |                              |                               |                               | PALC16R4-30WMB       | W6                  |                        |
| 35                            | 30                           | 25                            | 45                            | PALC16R4L-35LC       | L61                 | Commercial             |
|                               |                              |                               |                               | PALC16R4L-35PC       | P5                  |                        |
|                               |                              |                               |                               | PALC16R4L-35VC       | V5                  |                        |
|                               |                              |                               |                               | PALC16R4L-35WC       | W6                  |                        |
|                               |                              | 70                            | PALC16R4-35LC                 | L61                  |                     |                        |
|                               |                              |                               | PALC16R4-35PC/PI              | P5                   |                     |                        |
|                               |                              |                               | PALC16R4-35VC/VI              | V5                   |                     |                        |
|                               |                              |                               | PALC16R4-35WC/WI              | W6                   |                     |                        |
| 40                            | 35                           | 25                            | 70                            | PALC16R4-40DMB       | D6                  | Military               |
|                               |                              |                               |                               | PALC16R4-40KMB       | K71                 |                        |
|                               |                              |                               |                               | PALC16R4-40LMB       | L61                 |                        |
|                               |                              |                               |                               | PALC16R4-40QMB       | Q61                 |                        |
|                               |                              |                               |                               | PALC16R4-40WMB       | W6                  |                        |

**Ordering Information** (continued)

| t <sub>PD</sub><br>(ns) | t <sub>S</sub><br>(ns) | t <sub>CO</sub><br>(ns) | I <sub>CC</sub><br>(mA) | Ordering Code  | Package Type | Operating Range |
|-------------------------|------------------------|-------------------------|-------------------------|----------------|--------------|-----------------|
| 20                      | 20                     | 15                      | 70                      | PALC16R6-20DMB | D6           | Military        |
|                         |                        |                         |                         | PALC16R6-20KMB | K71          |                 |
|                         |                        |                         |                         | PALC16R6-20LMB | L61          |                 |
|                         |                        |                         |                         | PALC16R6-20QMB | Q61          |                 |
|                         |                        |                         |                         | PALC16R6-20WMB | W6           |                 |
| 25                      | 20                     | 15                      | 45                      | PALC16R6L-25LC | L61          | Commercial      |
|                         |                        |                         |                         | PALC16R6L-25PC | P5           |                 |
|                         |                        |                         |                         | PALC16R6L-25VC | V5           |                 |
|                         |                        |                         |                         | PALC16R6L-25WC | W6           |                 |
|                         |                        | 70                      | PALC16R6-25LC           | L61            |              |                 |
|                         |                        |                         | PALC16R6-25PC/PI        | P5             |              |                 |
|                         |                        |                         | PALC16R6-25VC/VI        | V5             |              |                 |
|                         |                        |                         | PALC16R6-25WC/WI        | W6             |              |                 |
| 30                      | 25                     | 20                      | 70                      | PALC16R6-30DMB | D6           | Military        |
|                         |                        |                         |                         | PALC16R6-30KMB | K71          |                 |
|                         |                        |                         |                         | PALC16R6-30LMB | L61          |                 |
|                         |                        |                         |                         | PALC16R6-30QMB | Q61          |                 |
|                         |                        |                         |                         | PALC16R6-30WMB | W6           |                 |
| 35                      | 30                     | 25                      | 45                      | PALC16R6L-35LC | L61          | Commercial      |
|                         |                        |                         |                         | PALC16R6L-35PC | P5           |                 |
|                         |                        |                         |                         | PALC16R6L-35VC | V5           |                 |
|                         |                        |                         |                         | PALC16R6L-35WC | W6           |                 |
|                         |                        | 70                      | PALC16R6-35LC           | L61            |              |                 |
|                         |                        |                         | PALC16R6-35PC/PI        | P5             |              |                 |
|                         |                        |                         | PALC16R6-35VC/VI        | V5             |              |                 |
|                         |                        |                         | PALC16R6-35WC/WI        | W6             |              |                 |
| 40                      | 35                     | 25                      | 70                      | PALC16R6-40DMB | D6           | Military        |
|                         |                        |                         |                         | PALC16R6-40KMB | K71          |                 |
|                         |                        |                         |                         | PALC16R6-40LMB | L61          |                 |
|                         |                        |                         |                         | PALC16R6-40QMB | Q61          |                 |
|                         |                        |                         |                         | PALC16R6-40WMB | W6           |                 |

**4**  
PLDs

**Ordering Information (continued)**

| $t_{PD}$<br>(ns) | $t_S$<br>(ns) | $t_{CO}$<br>(ns) | $I_{CC}$<br>(mA) | Ordering Code  | Package Type | Operating Range |
|------------------|---------------|------------------|------------------|----------------|--------------|-----------------|
| —                | 20            | 15               | 70               | PALC16R8–20DMB | D6           | Military        |
|                  |               |                  |                  | PALC16R8–20KMB | K71          |                 |
|                  |               |                  |                  | PALC16R8–20LMB | L61          |                 |
|                  |               |                  |                  | PALC16R8–20QMB | Q61          |                 |
|                  |               |                  |                  | PALC16R8–20WMB | W6           |                 |
| —                | 20            | 15               | 45               | PALC16R8L–25LC | L61          | Commercial      |
|                  |               |                  |                  | PALC16R8L–25PC | P5           |                 |
|                  |               |                  |                  | PALC16R8L–25VC | V5           |                 |
|                  |               |                  |                  | PALC16R8L–25WC | W6           |                 |
|                  |               | 70               | PALC16R8–25LC    | L61            |              |                 |
|                  |               |                  | PALC16R8–25PC/PI | P5             |              |                 |
|                  |               |                  | PALC16R8–25VC/VI | V5             |              |                 |
|                  |               |                  | PALC16R8–25WC/WI | W6             |              |                 |
| —                | 25            | 20               | 70               | PALC16R8–30DMB | D6           | Military        |
|                  |               |                  |                  | PALC16R8–30KMB | K71          |                 |
|                  |               |                  |                  | PALC16R8–30LMB | L61          |                 |
|                  |               |                  |                  | PALC16R8–30QMB | Q61          |                 |
|                  |               |                  |                  | PALC16R8–30WMB | W6           |                 |
| —                | 30            | 25               | 45               | PALC16R8L–35LC | L61          | Commercial      |
|                  |               |                  |                  | PALC16R8L–35PC | P5           |                 |
|                  |               |                  |                  | PALC16R8L–35VC | V5           |                 |
|                  |               |                  |                  | PALC16R8L–35WC | W6           |                 |
|                  |               | 70               | PALC16R8–35LC    | L61            |              |                 |
|                  |               |                  | PALC16R8–35PC/PI | P5             |              |                 |
|                  |               |                  | PALC16R8–35VC/VC | V5             |              |                 |
|                  |               |                  | PALC16R8–35WC/WC | W6             |              |                 |
| —                | 35            | 25               | 70               | PALC16R8–40DMB | D6           | Military        |
|                  |               |                  |                  | PALC16R8–40KMB | K71          |                 |
|                  |               |                  |                  | PALC16R8–40LMB | L61          |                 |
|                  |               |                  |                  | PALC16R8–40QMB | Q61          |                 |
|                  |               |                  |                  | PALC16R8–40WMB | W6           |                 |

**MILITARY SPECIFICATIONS  
Group A Subgroup Testing**

**DC Characteristics**

| Parameters      | Subgroups |
|-----------------|-----------|
| V <sub>OH</sub> | 1, 2, 3   |
| V <sub>OL</sub> | 1, 2, 3   |
| V <sub>IH</sub> | 1, 2, 3   |
| V <sub>IL</sub> | 1, 2, 3   |
| I <sub>EX</sub> | 1, 2, 3   |
| V <sub>PP</sub> | 1, 2, 3   |
| I <sub>CC</sub> | 1, 2, 3   |
| I <sub>OZ</sub> | 1, 2, 3   |

**Switching Characteristics**

| Parameters       | Subgroups |
|------------------|-----------|
| t <sub>PD</sub>  | 9, 10, 11 |
| t <sub>PZX</sub> | 9, 10, 11 |
| t <sub>CO</sub>  | 9, 10, 11 |
| t <sub>S</sub>   | 9, 10, 11 |
| t <sub>H</sub>   | 9, 10, 11 |

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