# CY7C266

# 8Kx8 Power-Switched and Reprogrammable PROM

## Features

- **CMOS for optimum speed/power**
- **Windowed for reprogrammability**
- **High speed**
  - **—20 ns (commercial)**
  - **—25 ns (military)**
- **Low power**
  - **—660 mW (commercial)**
  - **—770 mW (military)**
- **Super low standby power**
  - **— Less than 85 mW when deselected**
- **EPROM technology 100% programmable**
- **5V ±10% $V_{CC}$, commercial andmilitary**
- **TTL-compatible I/O**
- **Direct replacement for 27C64 EPROMs**

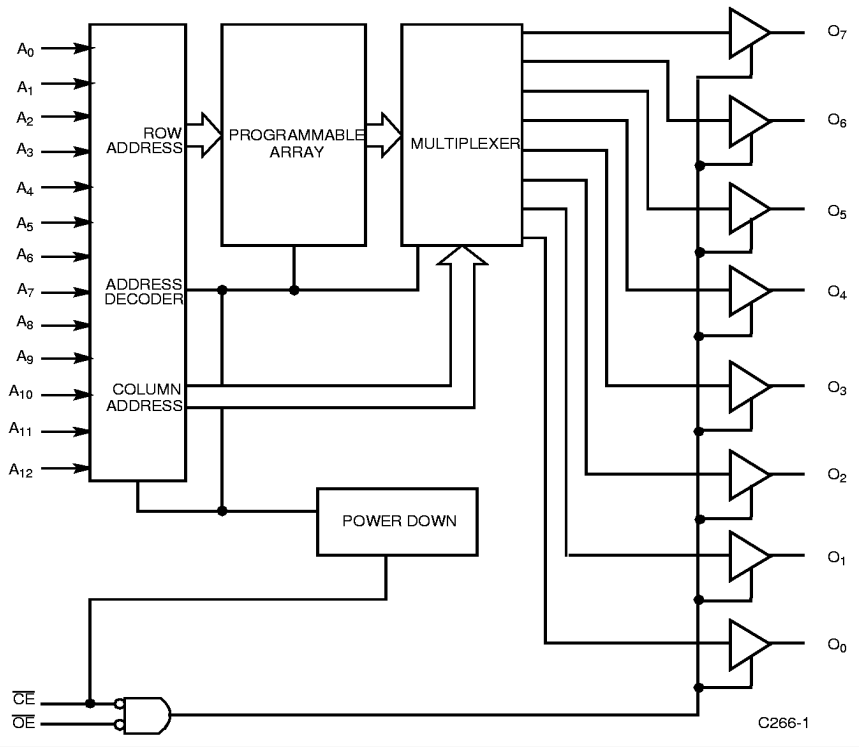
## Functional Description

The CY7C266 is a high-performance 8192 word by 8 bit CMOS PROM. When deselected, the CY7C266 automatically powers down into a low-power standby mode. It is packaged in a 600-mil-wide package. The reprogrammable packages are equipped with an erasure window; when exposed to UV light, these PROMs are erased and can then be reprogrammed. The memory cells utilize proven EPROM floating-gate technology and byte-wide intelligent programming algorithms.

The CY7C266 is a plug-in replacement for EPROM devices. The EPROM cell requires only 12.5V for the super voltage and low-current requirements allow for gang programming. The EPROM cells allow for each memory location to be tested 100%, as each location is written into, erased, and repeatedly exercised prior to encapsulation. Each PROM is also tested for AC performance to guarantee that after customer programming, tvhe product will meet DC and AC specification limits.

Reading is accomplished by placing an active LOW signal on $\overline{OE}$ and $\overline{CE}$. The contents of the memory location addressed by the address lines ($A_0$ through $A_{12}$) will become available on the output lines ($O_0$ through $O_7$).

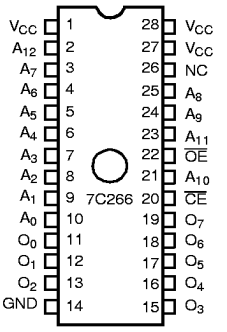
## Logic Block Diagram




C266-1

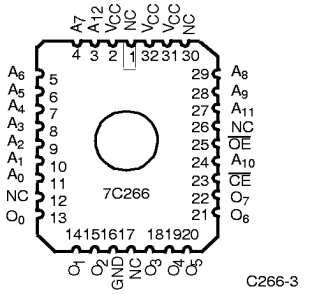
## Pin Configurations

CerDIP
Top View




C266-2

LCC
Top View




C266-3

## Selection Guide

| | | 7C266–20 | 7C266–25 | 7C266–35 | 7C266–45 |
|---|---|---|---|---|---|
| Maximum Access Time (ns) | | 20 | 25 | 35 | 45 |
| Maximum Operating Current (mA) | Commercial | 120 | 120 | 100 | 100 |
| | Military | | 140 | | 120 |
| Maximum Standby Current (mA) | Commercial | 15 | 15 | 15 | 15 |
| | Military | | 15 | | 15 |

## 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 28 to Pin 14) ..... –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

DC Program Voltage ..... 13.0V

Static Discharge Voltage ..... > 2001V (per MIL-STD-883, Method 3015)

Latch-Up Current ..... > 200 mA

UV Exposure ..... 7258 Wsec/cm$^2$

## Operating Range

| Range | Ambient Temperature | $V_{CC}$ |
|---|---|---|
| Commercial | 0°C to +70°C | 5V ± 10% |
| Industrial[1] | –40°C to +85°C | 5V ± 10% |
| Military[2] | –55°C to +125°C | 5V ± 10% |

**Notes:**
1. Contact a Cypress representative regarding industrial temperature range specification.
2. $T_A$ is the "instant on" case temperature.

## Electrical Characteristics Over the Operating Range[3,4]

| Parameter | Description | Test Conditions | | 7C266–20 Min. | 7C266–20 Max. | 7C266–25 Min. | 7C266–25 Max. | Unit |
|---|---|---|---|---|---|---|---|---|
| $V_{OH}$ | Output HIGH Voltage | $V_{CC}$ = Min., $I_{OH}$ = –2.0 mA | Com'l | 2.4 | | 2.4 | | V |
| | | | Mil | | | 2.4 | | |
| $V_{OL}$ | Output LOW Voltage | $V_{CC}$ = Min., $I_{OL}$ = 8.0 mA | Com'l | | 0.4 | | 0.4 | V |
| | | $V_{CC}$ = Min., $I_{OL}$ = 6.0 mA | Mil | | | | 0.4 | |
| $V_{IH}$ | Input HIGH Voltage | | | 2.0 | | 2.0 | | V |
| $V_{IL}$ | Input LOW Voltage | | | | 0.8 | | 0.8 | V |
| $I_{IX}$ | Input Current | GND ≤ $V_{IN}$ ≤ $V_{CC}$ | | –10 | +10 | –10 | +10 | µA |
| $V_{CD}$ | Input Diode Clamp Voltage | | | Note 5 | | | | |
| $I_{OZ}$ | Output Leakage Current | $V_{OL}$ ≤ $V_{OUT}$ ≤ $V_{OH}$, Output Disabled | | –40 | +40 | –40 | +40 | µA |
| $I_{OS}$ | Output Short Circuit Current[5] | $V_{CC}$ = Max., $V_{OUT}$ = GND | | –20 | –90 | –20 | –90 | mA |
| $I_{CC}$ | Power Supply Current | $V_{CC}$ = Max., $V_{IN}$ = 2.0V, $I_{OUT}$ = 0 mA | Com'l | | 120 | | 120 | mA |
| | | | Mil | | | | 140 | |
| $I_{SB}$ | Standby Supply Current | Chip Enable Inactive, $\overline{CE}$ ≥ $V_{IH}$, $I_{OUT}$ = 0 mA | Com'l | | 15 | | 15 | mA |
| | | | Mil | | | | 15 | |

**Notes:**
3. See the last page of this specification for Group A subgroup testing information.
4. See the "Introduction to CMOS PROMs" section of the Cypress Data Book for general information on testing.
5. For test purposes, not more than one output at a time should be shorted. Short circuit test duration should not exceed 30 seconds.

## Electrical Characteristics Over the Operating Range[3,4] (Continued)

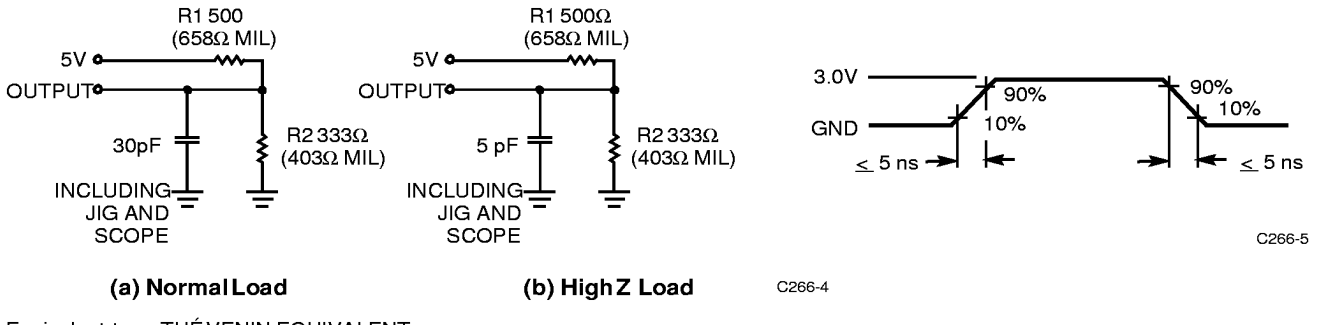
| Parameter | Description | Test Conditions | | 7C266–35 | | 7C266–45 | | Unit |
|---|---|---|---|---|---|---|---|---|
| | | | | Min. | Max. | Min. | Max. | |
| $V_{OH}$ | Output HIGH Voltage | $V_{CC}$ = Min., $I_{OH}$ = –4.0 mA | | 2.4 | | 2.4 | | V |
| $V_{OL}$ | Output LOW Voltage | $V_{CC}$ = Min., $I_{OL}$ = 16.0 mA | | | 0.4 | | 0.4 | V |
| $V_{IH}$ | Input HIGH Voltage | | | 2.0 | | 2.0 | | V |
| $V_{IL}$ | Input LOW Voltage | | | | 0.8 | | 0.8 | V |
| $I_{IX}$ | Input Current | GND ≤ $V_{IN}$ ≤ $V_{CC}$ | | –10 | +10 | –10 | +10 | µA |
| $V_{CD}$ | Input Diode Clamp Voltage | | | Note 5 | | | | |
| $I_{OZ}$ | Output Leakage Current | $V_{OL}$ ≤ $V_{OUT}$ ≤ $V_{OH}$, Output Disabled | | –10 | +10 | –10 | +10 | µA |
| $I_{OS}$ | Output Short Circuit Current[5] | $V_{CC}$ = Max., $V_{OUT}$ = GND | | –20 | –90 | –20 | –90 | mA |
| $I_{CC}$ | Power Supply Current | $V_{CC}$ = Max., $V_{IN}$ = 2.0V, $I_{OUT}$ = 0 mA | Com'l | | 100 | | 100 | mA |
| | | | Mil | | | | 120 | |
| $I_{SB}$ | Standby Supply Current | Chip Enable Inactive, $\overline{CE}$ ≥ $V_{IH}$, $I_{OUT}$ = 0 mA | Com'l | | 15 | | 15 | mA |
| | | | Mil | | | | 15 | |

## Capacitance[4]

| Parameter | Description | Test Conditions | Max. | Unit |
|---|---|---|---|---|
| $C_{IN}$ | Input Capacitance | $T_A$ = 25°C, f = 1 MHz, $V_{CC}$ = 5.0V | 10 | pF |
| $C_{OUT}$ | Output Capacitance | | 10 | pF |

## AC Test Loads and Waveforms

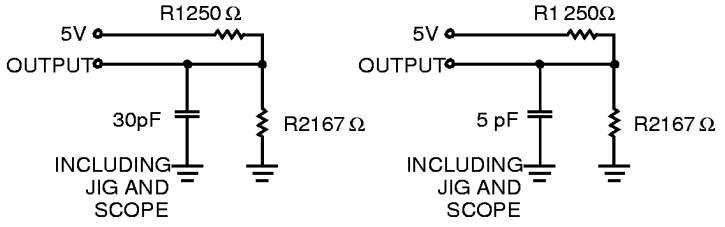
**Test Load for – 20 through – 25 speeds**




**(a) Normal Load** **(b) High Z Load** C266-4

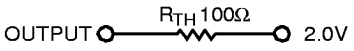
Equivalent to: THÉVENIN EQUIVALENT


**Test Load for –35 through –55 speeds**




**(c) Normal Load** **(d) High Z Load** C266-6

Equivalent to: THÉVENIN EQUIVALENT




## Switching Characteristics Over the Operating Range[2,3,4]

| Parameter | Description | 7C266–20 | | 7C266–25 | | 7C266–35 | | 7C266–45 | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | |
| $t_{AA}$ | Address to Output Valid | | 20 | | 25 | | 35 | | 45 | ns |
| $t_{HZCE}$ | Chip Enable Inactive to High Z | | 25 | | 30 | | 40 | | 45 | ns |
| $t_{HZOE}$ | Output Enable Inactive to High Z | | 12 | | 12 | | 20 | | 20 | ns |
| $t_{AOE}$ | Output Enable Active to Output Valid | | 12 | | 12 | | 20 | | 20 | ns |
| $t_{ACE}$ | Chip Enable Active to Output Valid | | 25 | | 30 | | 40 | | 45 | ns |
| $t_{OHA}$ | Data Hold from Address Change | 3 | | 3 | | 3 | | 3 | | ns |
| $t_{PU}$ | Chip Enable Active to Power-Up | | 25 | | 30 | | 40 | | 45 | ns |
| $t_{PD}$ | Chip Enable Inactive to Power-Down | | 25 | | 30 | | 40 | | 45 | ns |

## Erasure Characteristics

Wavelengths of light less than 4000 angstroms begin to erase the devices in the windowed package. For this reason, an opaque label should be placed over the window if the EPROM is exposed to sunlight or fluorescent lighting for extended periods of time.

The recommended dose of ultraviolet light for erasure is a wavelength of 2537 angstroms for a minimum dose (UV intensity multiplied by exposure time) of 25 Wsec/cm2. For an ultraviolet lamp with a 12 mW/cm$^2$ power rating, the exposure time would

be approximately 35 minutes. The CY7C266 needs to be within 1 inch of the lamp during erasure. Permanent damage may result if the EPROM is exposed to high-intensity UV light for an extended period of time.

7258 Wsec/cm2 is the recommended maximum dosage.

## Programming Modes

Programming support is available from Cypress as well as from a number of third party software vendors. For detailed programming information, including a listing of software packages, please see the PROM Programming Information located at the end of this section. Programming algorithms can be obtained from any Cypress representative.

**Table 1. Mode Selection**

| | | Pin Function[6, 7] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Normal Operation | $A_8$ | $A_9$ | $A_{10}$ | $A_{11}$ | $A_{12}$ | CE | OE | $D_7 - D_0$ |
| Mode | Program | VFY | PGM | LAT | NA | NA | CE | $V_{PP}$ | $D_7 - D_0$ |
| Read | | $A_8$ | $A_9$ | $A_{10}$ | $A_{11}$ | $A_{12}$ | $V_{IL}$ | $V_{IL}$ | $O_7 - O_0$ |
| Standby | | X | X | X | X | X | $V_{IH}$ | X | Three-Stated |
| Output Disable | | $A_8$ | $A_9$ | $A_{10}$ | $A_{11}$ | $A_{12}$ | $V_{IL}$ | $V_{IH}$ | Three-Stated |
| Program | | $V_{IHP}$ | $V_{ILP}$ | $V_{ILP}$ | $V_{ILP}$ | $V_{ILP}$ | $V_{ILP}$ | $V_{PP}$ | $D_7 - D_0$ |
| Program Verify | | $V_{ILP}$ | $V_{IHP}$ | $V_{ILP}$ | $V_{ILP}$ | $V_{ILP}$ | $V_{ILP}$ | $V_{PP}$ | $O_7 - O_0$ |
| Program Inhibit | | $V_{IHP}$ | $V_{IHP}$ | $V_{ILP}$ | $V_{ILP}$ | $V_{ILP}$ | $V_{ILP}$ | $V_{PP}$ | Three-Stated |
| Blank Check | | $V_{ILP}$ | $V_{IHP}$ | $V_{ILP}$ | $V_{ILP}$ | $V_{ILP}$ | $V_{ILP}$ | $V_{PP}$ | $O_7 - O_0$ |

**Notes:**
6. X = "don't care" but must not exceed $V_{CC}$ + 5%.
7. Address $A_8 - A_{12}$ must be latched through lines $A_0 - A_4$ in Programming modes.

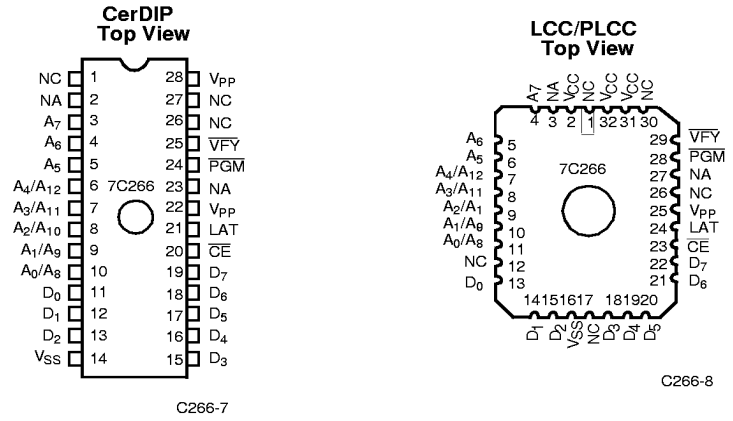
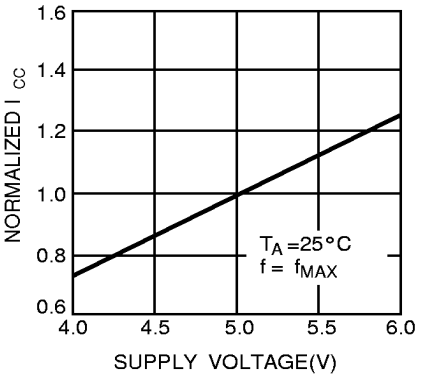


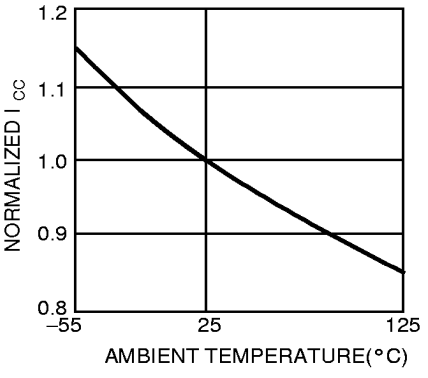

**Figure 1. Programming Pinout**

## Typical DC and AC Characteristics

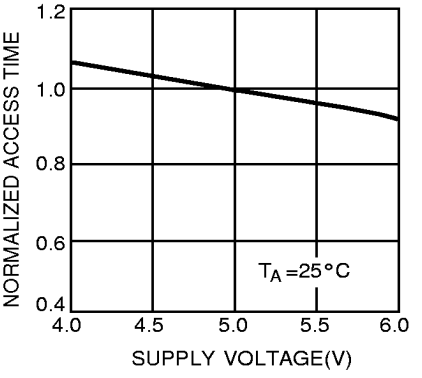
**NORMALIZED SUPPLY CURRENT vs. SUPPLY VOLTAGE**



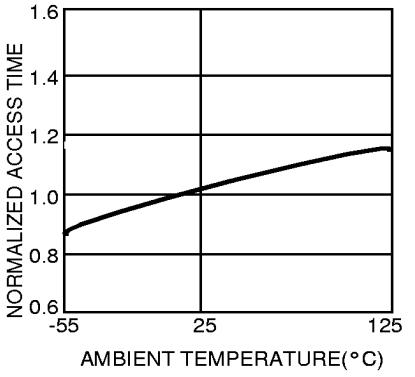

**NORMALIZED SUPPLY CURRENT vs. AMBIENT TEMPERATURE**



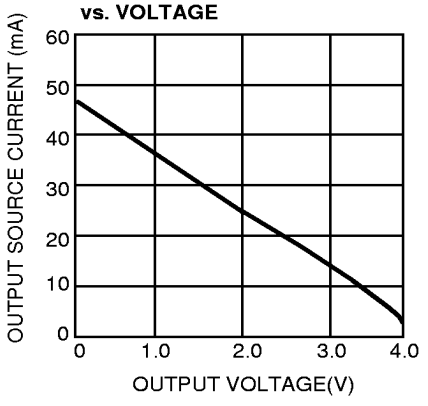

**NORMALIZED ACCESS TIME vs. SUPPLY VOLTAGE**



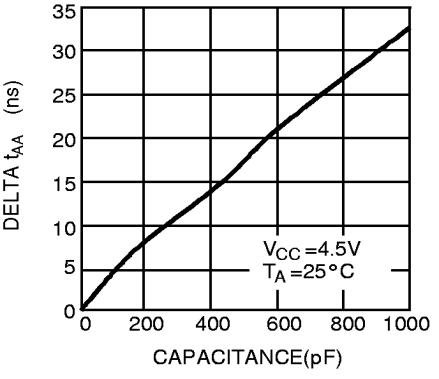

**NORMALIZED ACCESS TIME vs. TEMPERATURE**



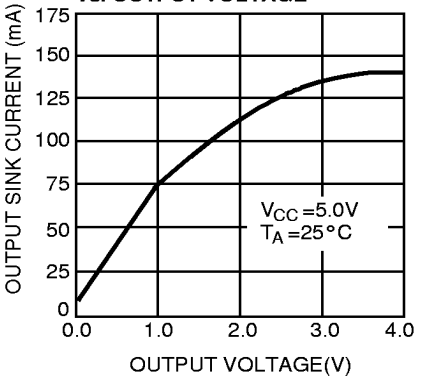

**OUTPUT SOURCE CURRENT vs. VOLTAGE**



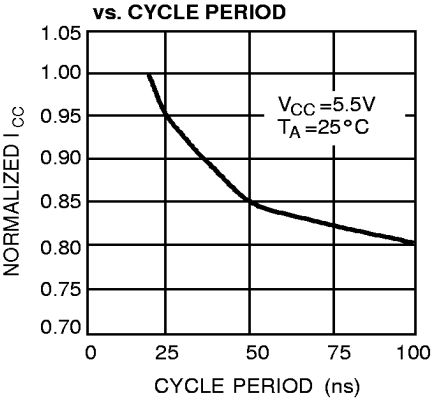

**TYPICAL ACCESS TIME CHANGE vs. OUTPUT LOADING**




**OUTPUT SINK CURRENT vs. OUTPUT VOLTAGE**




**NORMALIZED SUPPLY CURRENT vs. CYCLE PERIOD**



## Ordering Information[8]

| Speed (ns) | Ordering Code | Package Name | Package Type | Operating Range |
|---|---|---|---|---|
| 20 | CY7C266–20PC | P15 | 28-Lead (600-Mil) Molded DIP | Commercial |
| | CY7C266–20WC | W16 | 28-Lead (600-Mil) Windowed CerDIP | |
| 25 | CY7C266–25PC | P15 | 28-Lead (600-Mil) Molded DIP | Commercial |
| | CY7C266–25WC | W16 | 28-Lead (600-Mil) Windowed CerDIP | |
| | CY7C266–25DMB | D16 | 28-Lead (600-Mil) CerDIP | Military |
| | CY7C266–25LMB | L55 | 32-Pin Rectangular Leadless Chip Carrier | |
| | CY7C266–25QMB | Q55 | 32-Pin Windowed Rectangular Leadless Chip Carrier | |
| | CY7C266–25WMB | W16 | 28-Lead (600-Mil) Windowed CerDIP | |
| 35 | CY7C266–35PC | P15 | 28-Lead (600-Mil) Molded DIP | Commercial |
| | CY7C266–35WC | W16 | 28-Lead (600-Mil) Windowed CerDIP | |
| 45 | CY7C266–45PC | P15 | 28-Lead (600-Mil) Molded DIP | Commercial |
| | CY7C266–45WC | W16 | 28-Lead (600-Mil) Windowed CerDIP | |
| | CY7C266–45DMB | D16 | 28-Lead (600-Mil) CerDIP | Military |
| | CY7C266–45LMB | L55 | 32-Pin Rectangular Leadless Chip Carrier | |
| | CY7C266–45QMB | Q55 | 32-Pin Windowed Rectangular Leadless Chip Carrier | |
| | CY7C266–45WMB | W16 | 28-Lead (600-Mil) Windowed CerDIP | |

**Note:**
8. Most of these products are available in industrial temperature range. Contact a Cypress representative for specifications and product availability.

## MILITARY SPECIFICATIONS
## Group A Subgroup Testing

### DC Characteristics

| Parameter | Subgroups |
|---|---|
| $V_{OH}$ | 1, 2, 3 |
| $V_{OL}$ | 1, 2, 3 |
| $V_{IH}$ | 1, 2, 3 |
| $V_{IL}$ | 1, 2, 3 |
| $I_{IX}$ | 1, 2, 3 |
| $I_{OZ}$ | 1, 2, 3 |

### DC Characteristics

| Parameter | Subgroups |
|---|---|
| $I_{CC}$ | 1, 2, 3 |
| $I_{SB}$ | 1, 2, 3 |

### Switching Characteristics

| Parameter | Subgroups |
|---|---|
| $t_{AA}$ | 7, 8, 9, 10, 11 |
| $t_{AOE}$ | 7, 8, 9, 10, 11 |
| $t_{ACE}$ | 7, 8, 9, 10, 11 |

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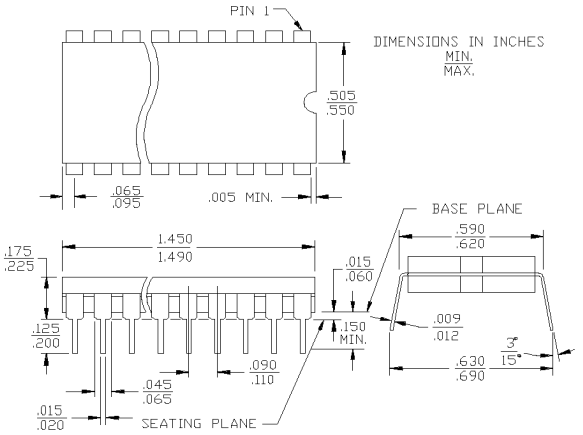
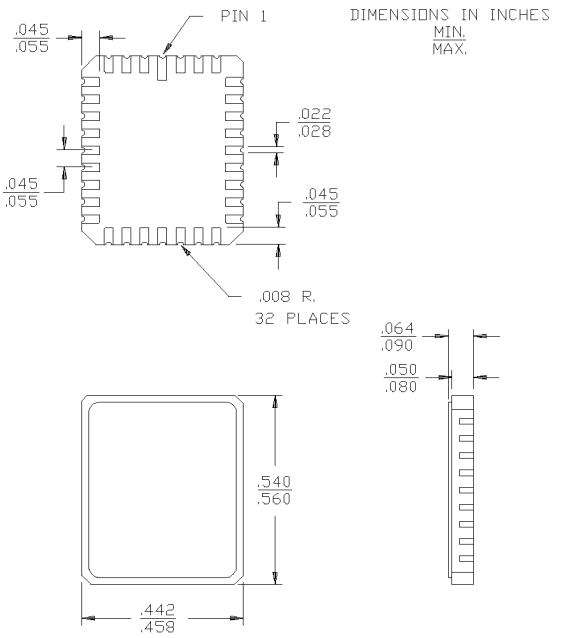
## Package Diagrams

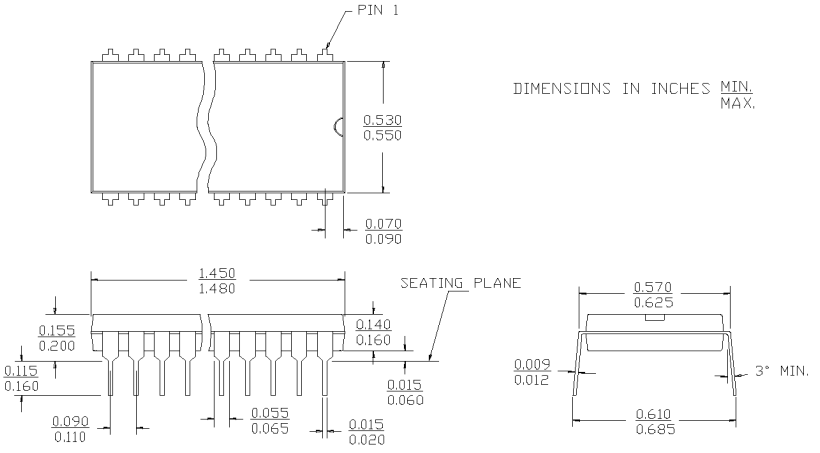
**28–Lead (600–Mil) CerDIP D16**
MIL–STD–1835 D– 10Config.A




**32–Pin Rectangular Leadless Chip Carrier L55**
MIL–STD–1835 C–12

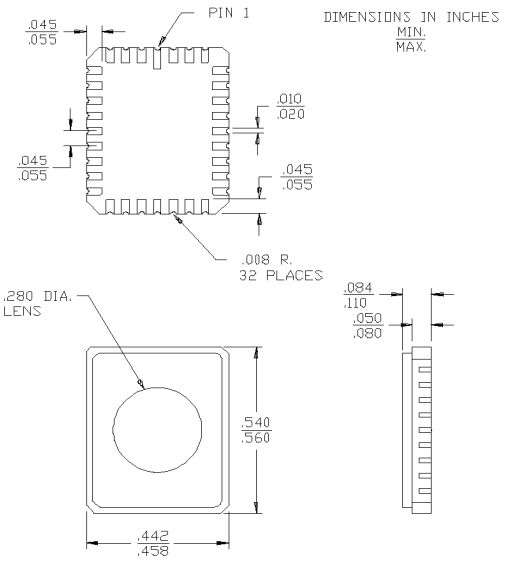



**28–Lead (600–Mil) Molded DIP P15**



## Package Diagrams (continued)

**32–PinWindowed Rectangular Leadless Chip Carrier Q55**
MIL–STD–1835 C–12




**28–Lead (600–Mil) Windowed CerDIP W16**
MIL–STD–1835 D– 10Config.A