

## 8Kx8 Power-Switched and Reprogrammable PROM

### Features

- CMOS for optimum speed/power
- Windowed for reprogrammability
- High speed
  - 20 ns (Commercial)
- Low power
  - 660 mW (Commercial)
- Super low standby power
  - Less than 85 mW when deselected
- EPROM technology 100% programmable
- 5V ±10% V<sub>CC</sub>, commercial and military
- TTL-compatible I/O
- Direct replacement for 27C64 EPROMs

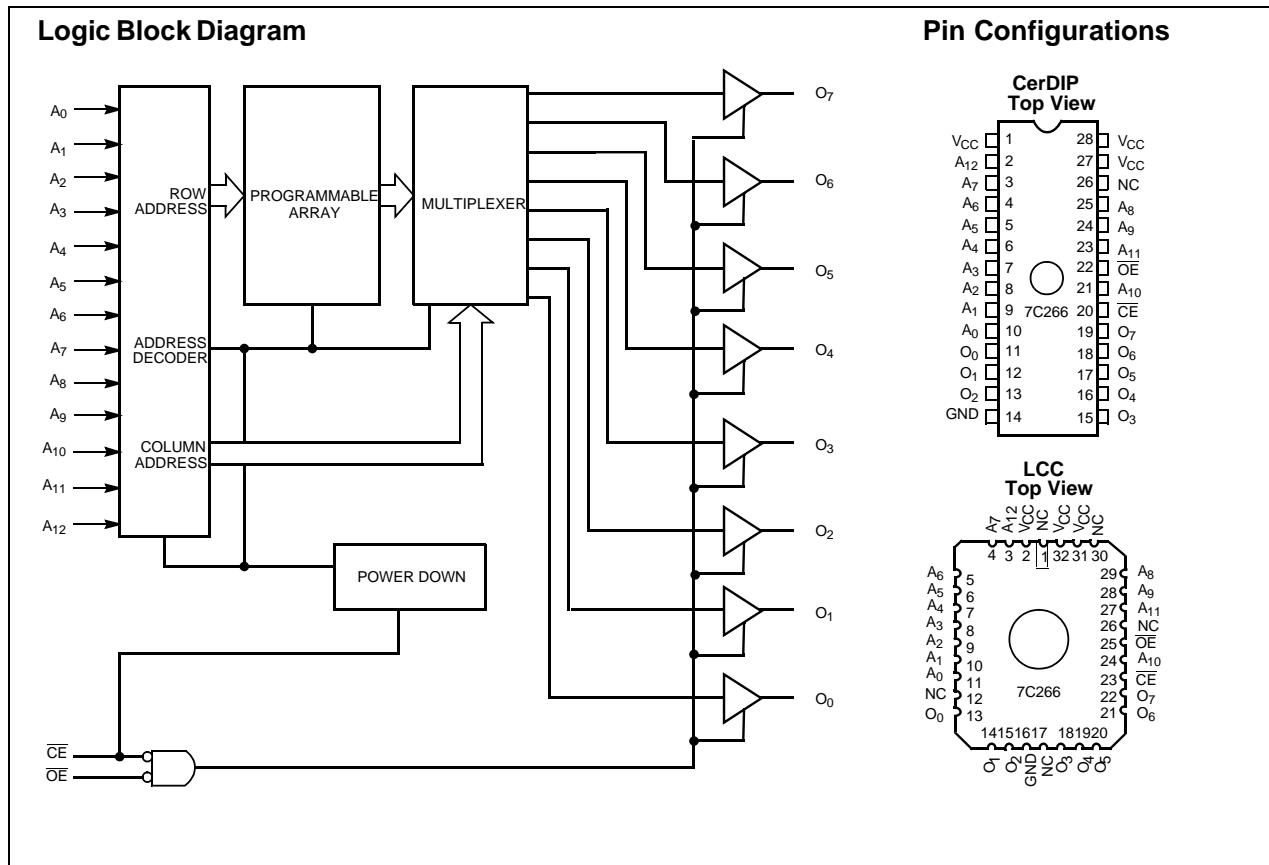
### Functional Description

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, the product will meet DC and AC specification limits.

Reading is accomplished by placing an active LOW signal on OE and CE. The contents of the memory location addressed by the address lines (A<sub>0</sub> through A<sub>12</sub>) will become available on the output lines (O<sub>0</sub> through O<sub>7</sub>).



**Selection Guide**

|                           |            | 7C266-20 | 7C266-25 | 7C266-45 | Unit |
|---------------------------|------------|----------|----------|----------|------|
| Maximum Access Time       |            | 20       | 25       | 45       | ns   |
| Maximum Operating Current | Commercial | 120      | 120      | 100      | mA   |
| Maximum Standby Current   | Commercial | 15       | 15       | 15       | mA   |

**Maximum Ratings<sup>[1]</sup>**

(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 <sup>2</sup>              |

**Operating Range**

| Range      | Ambient Temperature | V <sub>CC</sub> |
|------------|---------------------|-----------------|
| Commercial | 0°C to +70°C        | 5V ± 10%        |

**Electrical Characteristics Over the Operating Range<sup>[2]</sup>**

| Parameter       | Description                                 | Test Conditions   | 7C266-20 |      | 7C266-25 |      | Unit |
|-----------------|---|---|----------|------|----------|------|------|
|                 |   |   | Min.     | Max. | Min.     | Max. |      |
| V <sub>OH</sub> | Output HIGH Voltage                         | V <sub>CC</sub> = Min., I <sub>OH</sub> = -2.0 mA                       | 2.4      |      | 2.4      |      | V    |
| V <sub>OL</sub> | Output LOW Voltage                          | V <sub>CC</sub> = Min., I <sub>OL</sub> = 8.0 mA                        |          | 0.4  |          | 0.4  | V    |
| V <sub>IH</sub> | Input HIGH Voltage                          |   | 2.0      |      | 2.0      |      | V    |
| V <sub>IL</sub> | Input LOW Voltage                           |   |          | 0.8  |          | 0.8  | V    |
| I <sub>Ix</sub> | Input Current                               | GND ≤ V <sub>IN</sub> ≤ V <sub>CC</sub>                                 | -10      | +10  | -10      | +10  | μA   |
| V <sub>CD</sub> | Input Diode Clamp Voltage                   |   | Note 3   |      |          |      |      |
| I <sub>OZ</sub> | Output Leakage Current                      | V <sub>OL</sub> ≤ V <sub>OUT</sub> ≤ V <sub>OH</sub> , Output Disabled  | -40      | +40  | -40      | +40  | μA   |
| I <sub>OS</sub> | Output Short Circuit Current <sup>[3]</sup> | V <sub>CC</sub> = Max., V <sub>OUT</sub> = GND                          | -20      | -90  | -20      | -90  | mA   |
| I <sub>CC</sub> | Power Supply Current                        | V <sub>CC</sub> = Max., V <sub>IN</sub> = 2.0V, I <sub>OUT</sub> = 0 mA |          | 120  |          | 120  | mA   |
| I <sub>SB</sub> | Standby Supply Current                      | Chip Enable Inactive, CE ≥ V <sub>IH</sub> , I <sub>OUT</sub> = 0 mA    |          | 15   |          | 15   | mA   |

**Notes**

1. The voltage on any input or I/O pin cannot exceed the power pin during power-up.
2. See the "Introduction to CMOS PROMs" section of the Cypress Data Book for general information on testing.
3. 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<sup>[2]</sup> (continued)

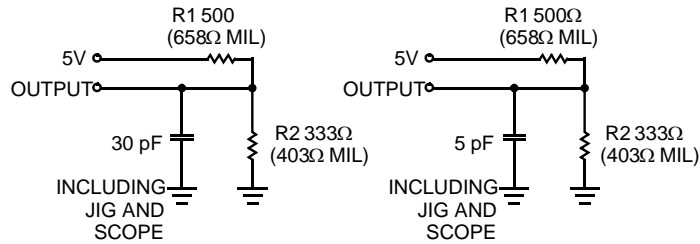
| Parameter       | Description                                 | Test Conditions  | 7C266-45 |      | Unit |
|-----------------|---|--|----------|------|------|
|                 |   |  | Min.     | Max. |      |
| V <sub>OH</sub> | Output HIGH Voltage                         | V <sub>CC</sub> = Min., I <sub>OH</sub> = -4.0 mA                          | 2.4      |      | V    |
| V <sub>OL</sub> | Output LOW Voltage                          | V <sub>CC</sub> = Min., I <sub>OL</sub> = 16.0 mA                          |          | 0.4  | V    |
| V <sub>IH</sub> | Input HIGH Voltage                          |  | 2.0      |      | V    |
| V <sub>IL</sub> | Input LOW Voltage                           |  |          | 0.8  | V    |
| I <sub>Ix</sub> | Input Current                               | GND ≤ V <sub>IN</sub> ≤ V <sub>CC</sub>                                    | -10      | +10  | mA   |
| V <sub>CD</sub> | Input Diode Clamp Voltage                   |  | Note 3   |      |      |
| I <sub>OZ</sub> | Output Leakage Current                      | V <sub>OL</sub> ≤ V <sub>OUT</sub> ≤ V <sub>OH</sub> ,<br>Output Disabled  | -10      | +10  | mA   |
| I <sub>OS</sub> | Output Short Circuit Current <sup>[3]</sup> | V <sub>CC</sub> = Max., V <sub>OUT</sub> = GND                             | -20      | -90  | mA   |
| I <sub>CC</sub> | Power Supply Current                        | V <sub>CC</sub> = Max., V <sub>IN</sub> = 2.0V,<br>I <sub>OUT</sub> = 0 mA | Com'l    | 100  | mA   |
| I <sub>SB</sub> | Standby Supply Current                      | Chip Enable Inactive,<br>CE ≥ V <sub>IH</sub> , I <sub>OUT</sub> = 0 mA    | Com'l    | 15   | mA   |

**Capacitance**<sup>[2]</sup>

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

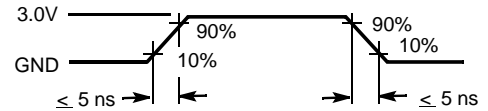
### AC Test Loads and Waveforms

#### Test Load for -20 through -25 speeds



(a) Normal Load

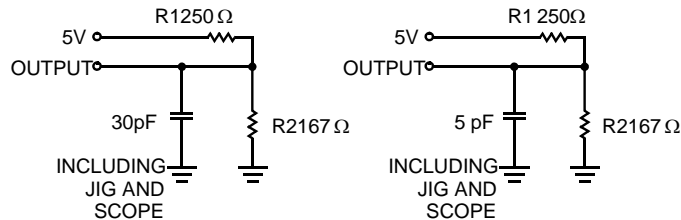
(b) High Z Load



Equivalent to: THE VENIN EQUIVALENT



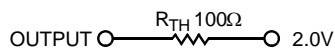
#### Test Load for -35 through -45 speeds



(c) Normal Load

(d) High Z Load

Equivalent to: THE VENIN EQUIVALENT



### Switching Characteristics Over the Operating Range<sup>[2]</sup>

| Parameter         | Description                          | 7C266-20 |      | 7C266-25 |      | 7C266-45 |      | Unit |
|-------------------|--------------------------------------|----------|------|----------|------|----------|------|------|
|                   |                                      | Min.     | Max. | Min.     | Max. | Min.     | Max. |      |
| t <sub>AA</sub>   | Address to Output Valid              |          | 20   |          | 25   |          | 45   | ns   |
| t <sub>HZCE</sub> | Chip Enable Inactive to High Z       |          | 25   |          | 30   |          | 45   | ns   |
| t <sub>HZOE</sub> | Output Enable Inactive to High Z     |          | 12   |          | 12   |          | 20   | ns   |
| t <sub>AOE</sub>  | Output Enable Active to Output Valid |          | 12   |          | 12   |          | 20   | ns   |
| t <sub>ACE</sub>  | Chip Enable Active to Output Valid   |          | 25   |          | 30   |          | 45   | ns   |
| t <sub>OHA</sub>  | Data Hold from Address Change        | 3        |      | 3        |      | 3        |      | ns   |
| t <sub>PU</sub>   | Chip Enable Active to Power-up       |          | 25   |          | 30   |          | 45   | ns   |
| t <sub>PD</sub>   | Chip Enable Inactive to Power-down   |          | 25   |          | 30   |          | 45   | ns   |

### Erase 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/cm<sup>2</sup>. For an ultraviolet lamp with a 12 mW/cm<sup>2</sup> 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/cm<sup>2</sup> is the recommended maximum dosage.

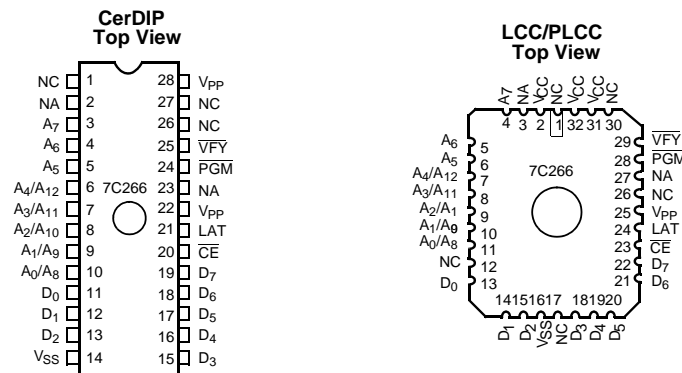
### Programming Modes

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

| Mode            | Pin Function <sup>[4, 5]</sup> |                  |                  |                  |                  |                  |                  |                 |                                |
|-----------------|--------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|-----------------|--------------------------------|
|                 | Normal Operation               | A <sub>8</sub>   | A <sub>9</sub>   | A <sub>10</sub>  | A <sub>11</sub>  | A <sub>12</sub>  | CE               | OE              | D <sub>7</sub> -D <sub>0</sub> |
|                 | Program                        | VFY              | PGM              | LAT              | NA               | NA               | CE               | V <sub>PP</sub> | D <sub>7</sub> -D <sub>0</sub> |
| Read            |                                | A <sub>8</sub>   | A <sub>9</sub>   | A <sub>10</sub>  | A <sub>11</sub>  | A <sub>12</sub>  | V <sub>IL</sub>  | V <sub>IL</sub> | O <sub>7</sub> -O <sub>0</sub> |
| Standby         |                                | X                | X                | X                | X                | X                | V <sub>IH</sub>  | X               | Three-States                   |
| Output Disable  |                                | A <sub>8</sub>   | A <sub>9</sub>   | A <sub>10</sub>  | A <sub>11</sub>  | A <sub>12</sub>  | V <sub>IL</sub>  | V <sub>IH</sub> | Three-States                   |
| Program         |                                | V <sub>IHP</sub> | V <sub>ILP</sub> | V <sub>ILP</sub> | V <sub>ILP</sub> | V <sub>ILP</sub> | V <sub>ILP</sub> | V <sub>PP</sub> | D <sub>7</sub> -D <sub>0</sub> |
| Program Verify  |                                | V <sub>ILP</sub> | V <sub>IHP</sub> | V <sub>ILP</sub> | V <sub>ILP</sub> | V <sub>ILP</sub> | V <sub>ILP</sub> | V <sub>PP</sub> | O <sub>7</sub> -O <sub>0</sub> |
| Program Inhibit |                                | V <sub>IHP</sub> | V <sub>IHP</sub> | V <sub>ILP</sub> | V <sub>ILP</sub> | V <sub>ILP</sub> | V <sub>ILP</sub> | V <sub>PP</sub> | Three-States                   |
| Blank Check     |                                | V <sub>ILP</sub> | V <sub>IHP</sub> | V <sub>ILP</sub> | V <sub>ILP</sub> | V <sub>ILP</sub> | V <sub>ILP</sub> | V <sub>PP</sub> | O <sub>7</sub> -O <sub>0</sub> |

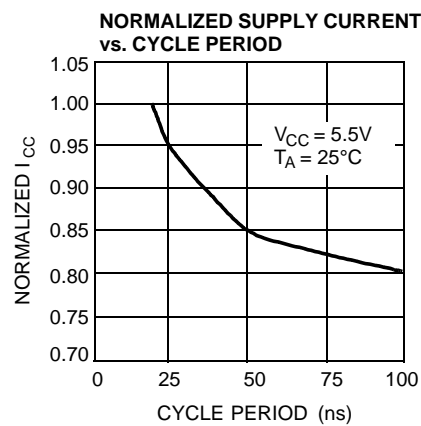
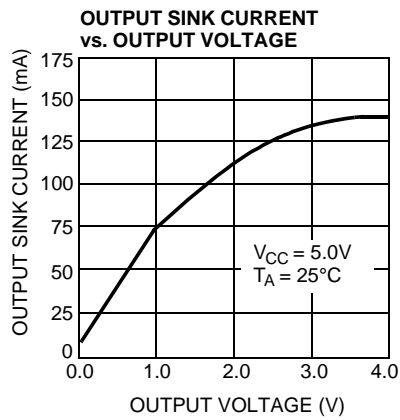
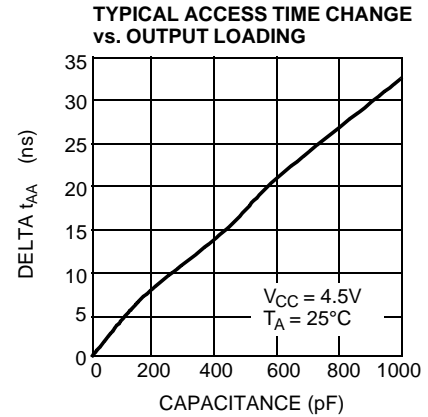
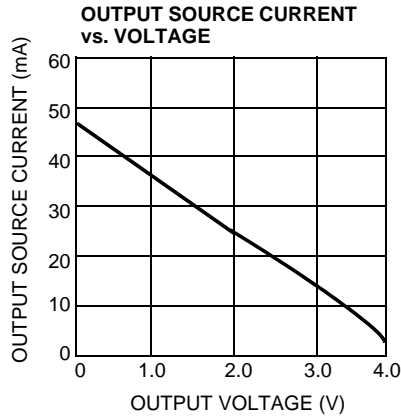
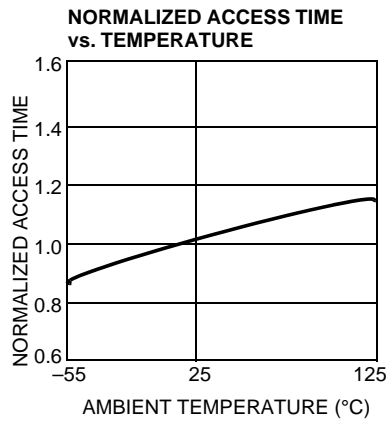
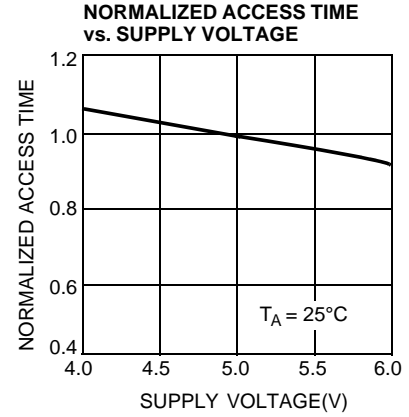
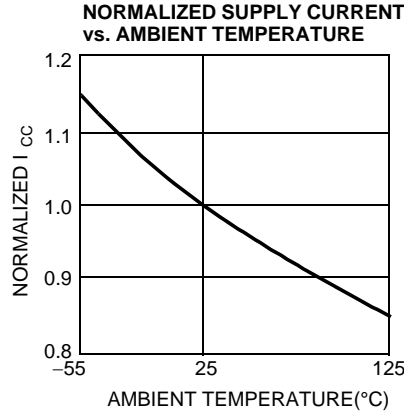
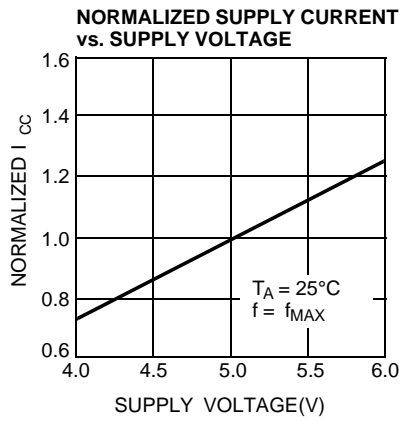
Figure 1. Programming Pinout



**Notes**

- 4. X = "don't care" but must not exceed V<sub>CC</sub> + 5%.
- 5. Address A<sub>8</sub>-A<sub>12</sub> must be latched through lines A<sub>0</sub>-A<sub>4</sub> in Programming modes.

Typical DC and AC Characteristics

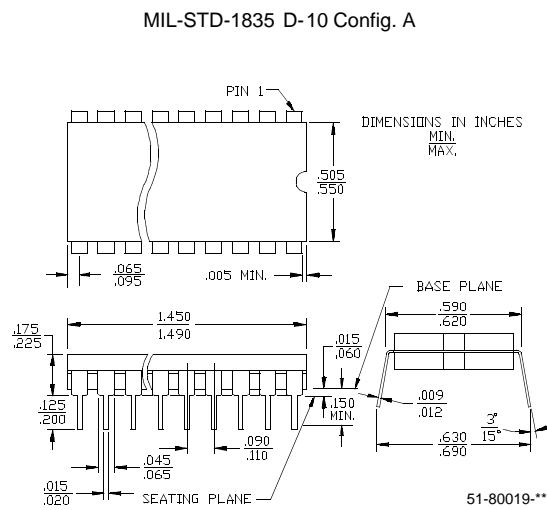


Ordering Information

| Speed (ns) | Ordering Code | Package Name | Package Type                        | Operating Range |
|------------|---------------|--------------|-------------------------------------|-----------------|
| 20         | CY7C266-20JC  | J64          | 28-Lead Plastic Leaded Chip Carrier | Commercial      |
|            | CY7C266-20WC  | W16          | 28-Lead (600-Mil) Windowed CerDIP   |                 |

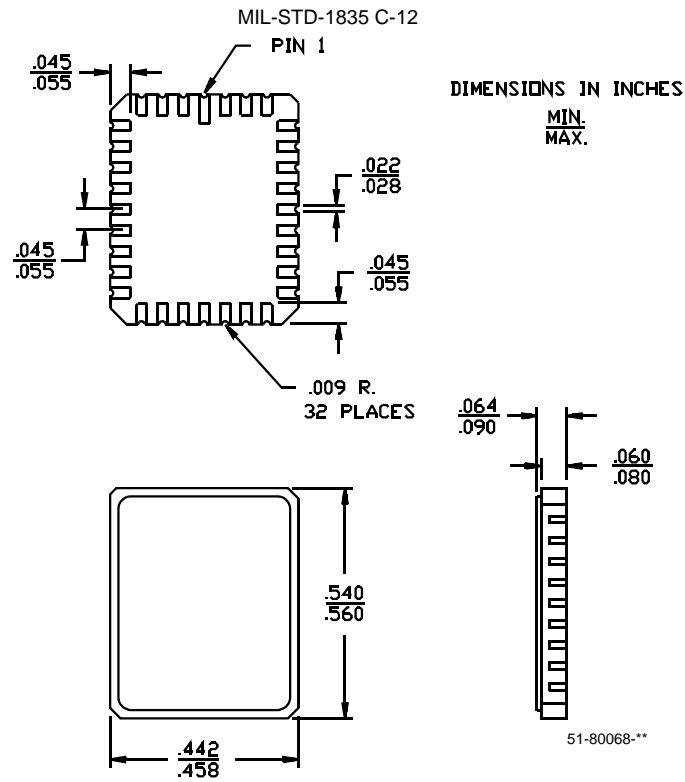
Package Diagrams

Figure 2. 28-Lead(600-Mil) CerDIP D16



Package Diagrams (continued)

Figure 3. 32-Pin Rectangular Leadless Chip Carrier L55





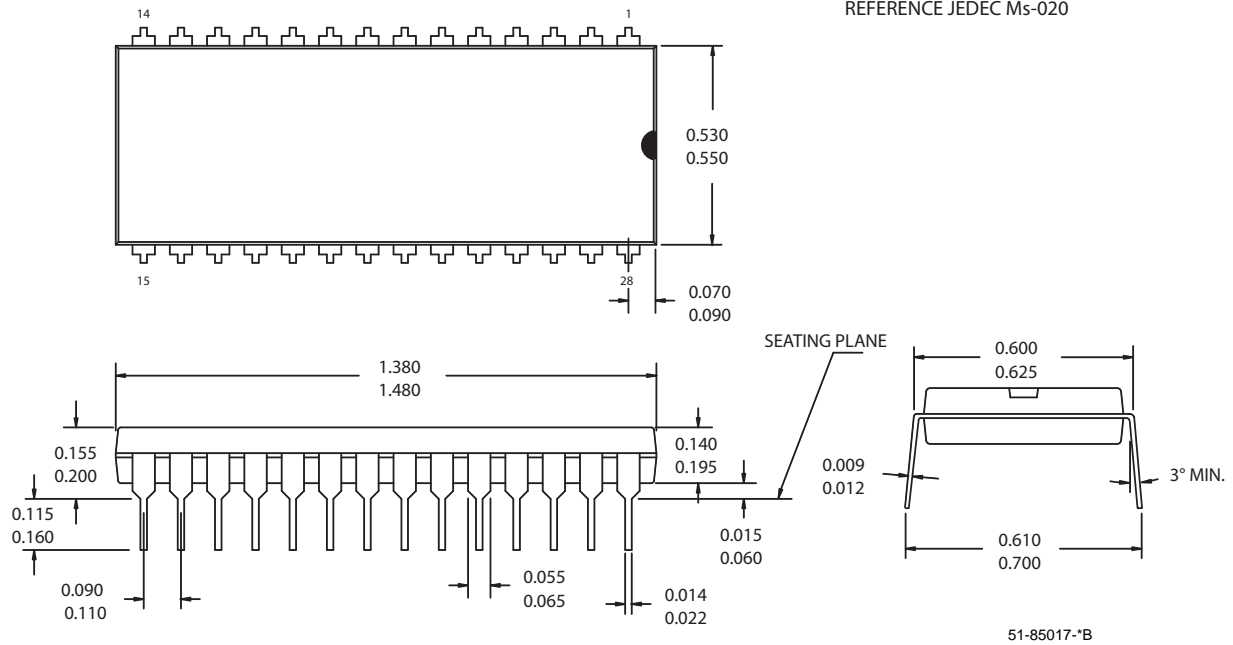
Package Diagrams (continued)

Figure 4. 28LD(600 MIL) PDIP Package Outline

DIMENSIONS IN INCHES

MIN.  
MAX.

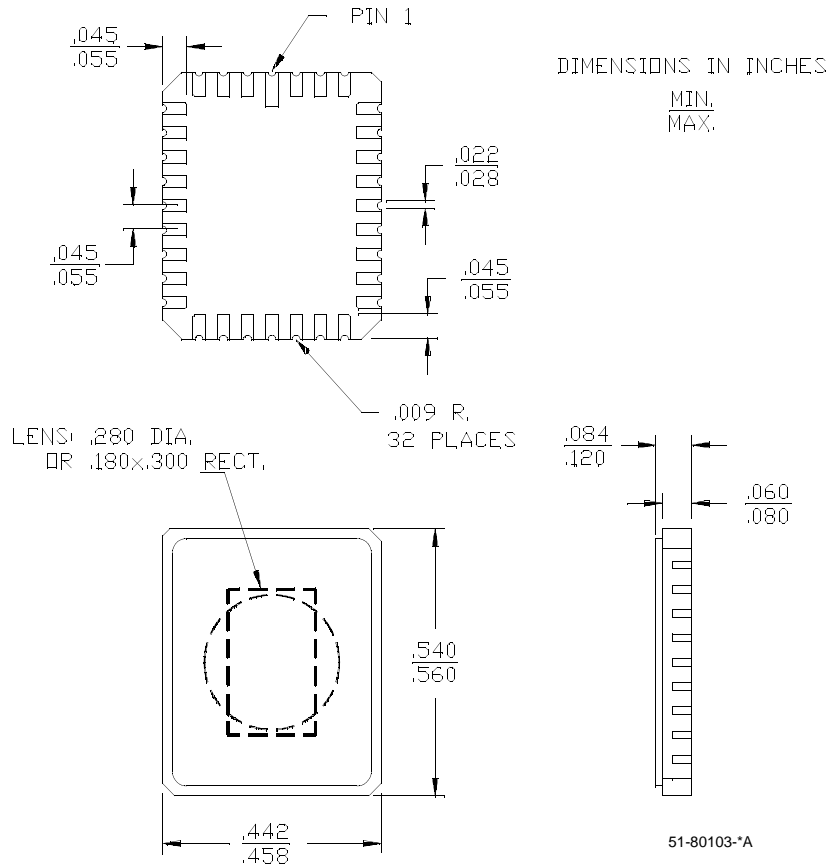
REFERENCE JEDEC Ms-020



Package Diagrams (continued)

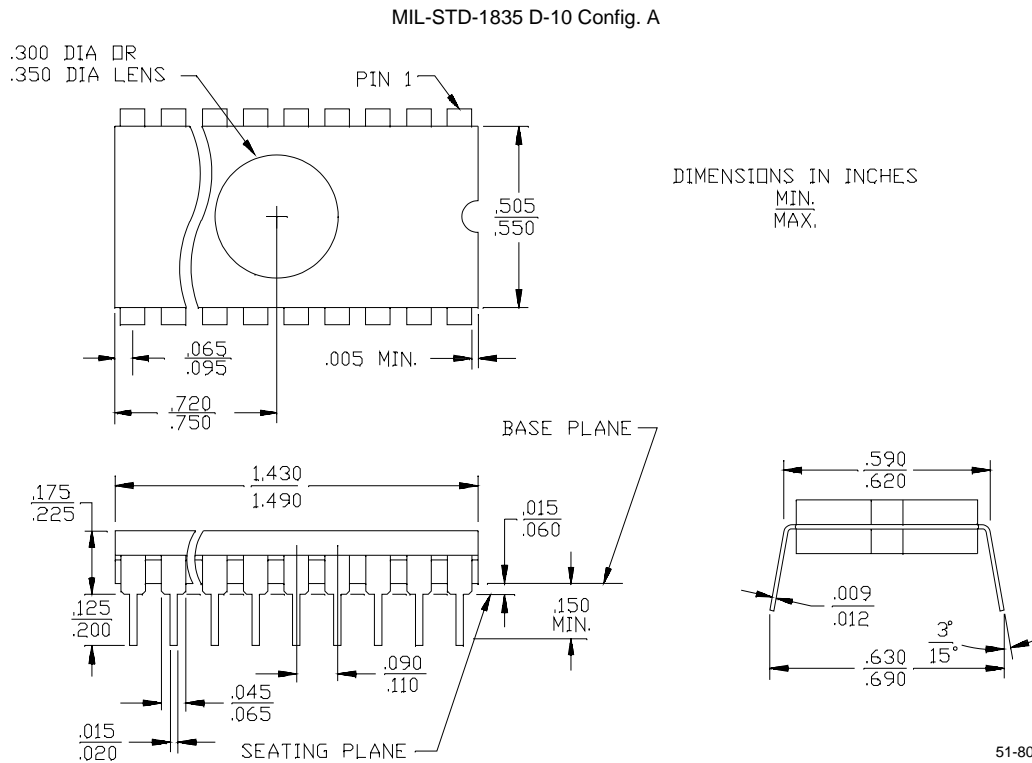
Figure 5. 32-Pin Windowed Rectangular Leadless Chip Carrier Q55

MIL-STD-1835 C-12



Package Diagrams (continued)

Figure 6. 28-Lead (600-Mil) Windowed CerDIP W16



All product and company names mentioned in this document may be the trademarks of their respective holders.

**Document History Page**

| <b>Document Title: CY7C266 8K x 8 Power Switched and Reprogrammable PROM</b> |                |                   |                        |   |
|--|----------------|-------------------|------------------------|---|
| <b>Document Number: 38-04005</b>   |                |                   |                        |   |
| <b>REV.</b>  | <b>ECN NO.</b> | <b>Issue Date</b> | <b>Orig. of Change</b> | <b>Description of Change</b>                                    |
| **   | 113861         | 03/08/02          | DSG                    | Changed from Spec number: 38-00086 to 38-04005                  |
| *A   | 118897         | 10/09/02          | GBI                    | Updated ordering information                                    |
| *B   | 122246         | 12/27/02          | RBI                    | Added power up requirements to Operating Conditions Information |
| *C   | 499538         | See ECN           | PCI                    | Updated ordering information                                    |