

8K x 8 Registered PROM

Features

- CMOS for optimum speed/power
- High speed (Commercial)
 - 15 ns address set-up
 - 12 ns clock to output
- Low power
 - 660 mW (Commercial)
- On-chip edge-triggered registers
 - Ideal for pipelined microprogrammed systems
- EPROM technology
 - 100% programmable
 - Reprogrammable (CY7C265W)
- 5V $\pm 10\%$ V_{CC} , commercial and military
- Capable of withstanding >2001V static discharge
- Slim 28-pin, 300-mil plastic or hermetic DIP

Functional Description

The CY7C265 is a 8192 x 8 registered PROM. It is organized as 8,192 words by 8 bits wide, and has a pipeline output register. In addition, the device features a programmable initialize byte that may be loaded into the pipeline register with the initialize signal. The programmable initialize byte is the 8,193rd byte in the PROM and its value is programmed at the time of use.

Packaged in 28 pins, the PROM has 13 address signals (A_0 through A_{12}), 8 data out signals (O_0 through O_7), \bar{E}/I (enable or initialize), and CLOCK.

CLOCK functions as a pipeline clock, loading the contents of the addressed memory location into the pipeline register on each rising edge. The data will appear on the outputs if they

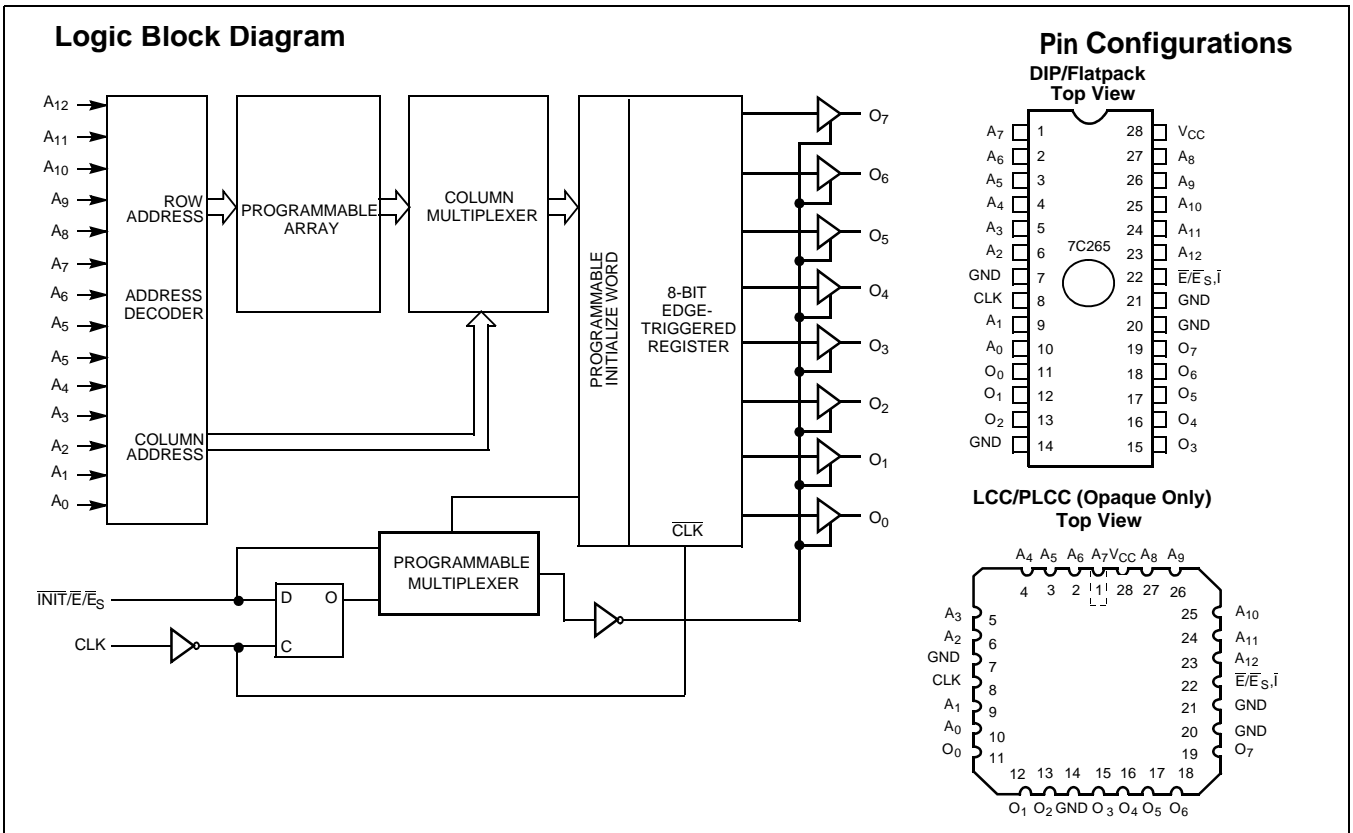
are enabled. One pin on the CY7C265 is programmed to perform either the enable or the initialize function.

If the asynchronous enable (\bar{E}) is being used, the outputs may be disabled at any time by switching the enable to a logic HIGH, and may be returned to the active state by switching the enable to a logic LOW.

If the synchronous enable (\bar{E}_S) is being used, the outputs will go to the OFF or high-impedance state upon the next positive clock edge after the synchronous enable input is switched to a HIGH level. If the synchronous enable pin is switched to a logic LOW, the subsequent positive clock edge will return the output to the active state. Following a positive clock edge, the address and synchronous enable inputs are free to change since no change in the output will occur until the next LOW-to-HIGH transition of the clock. This unique feature allows the CY7C265 decoders and sense amplifiers to access the next location while previously addressed data remains stable on the outputs.

If the \bar{E}/I pin is used for \bar{INIT} (asynchronous), then the outputs are permanently enabled. The initialize function is useful during power-up and time-out sequences, and can facilitate implementation of other sophisticated functions such as a built-in "jump start" address. When activated, the initialize control input causes the contents of a user programmed 8193rd 8-bit word to be loaded into the on-chip register. Each bit is programmable and the initialize function can be used to load any desired combination of 1's and 0's into the register. In the unprogrammed state, activating \bar{INIT} will generate a register clear (all outputs LOW). If all the bits of the initialize word are programmed to be a 1, activating \bar{INIT} performs a register preset (all outputs HIGH).

Applying a LOW to the \bar{INIT} input causes an immediate load of the programmed initialize word into the pipeline register and onto the outputs. The \bar{INIT} LOW disables clock and must return HIGH to enable clock independent of all other inputs, including the clock.



Selection Guides

| | | 7C265-15 | 7C265-25 | 7C265-40 | 7C265-50 | Unit |
|-----------------------------|-------|----------|----------|----------|----------|------|
| Minimum Address Set-Up Time | | 15 | 25 | 40 | 50 | ns |
| Maximum Clock to Output | | 12 | 15 | 20 | 25 | ns |
| Maximum Operating Current | Com'l | 120 | 120 | 100 | | mA |
| | Mil | | | | 120 | mA |

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.....-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
- UV Exposure 7258 Wsec/cm²
- Static Discharge Voltage..... >2001V (per MIL-STD-883, Method 3015)
- Latch-Up Current..... >200 mA

Operating Range

| Range | Ambient Temperature | V _{CC} |
|-------------------------|---------------------|-----------------|
| Commercial | 0°C to +70°C | 5V ±10% |
| Military ^[1] | -55°C to +125°C | 5V ±10% |

Note

1. T_A is the "instant on" case temperature.

Electrical Characteristics Over the Operating Range^[2]

| Parameter | Description | Test Conditions | 7C265-15, 25 | | 7C265-40 | | 7C265-50 | | Unit |
|--------------------------------|--|---|--------------|------|----------|------|----------|------|------|
| | | | Min. | Max. | Min. | Max. | Min. | Max. | |
| V _{OH} | Output HIGH Voltage | V _{CC} = Min., I _{OH} = -2.0 mA | 2.4 | | | | | | V |
| | | V _{CC} = Min., I _{OH} = -4.0 mA | | | 2.4 | | 2.4 | | |
| V _{OL} | Output LOW Voltage | V _{CC} = Min., I _{OL} = 8.0 mA | Com'l | 0.4 | | | | | V |
| | | V _{CC} = Min., I _{OL} = 12.0 mA | | | | | | | |
| | | V _{CC} = Min., I _{OL} = 6.0 mA | Mil | 0.4 | | | | | |
| | | V _{CC} = Min., I _{OL} = 8.0 mA | | | | | | | |
| V _{IH} | Input HIGH Voltage | | 2.0 | | 2.0 | | 2.0 | V | |
| V _{IL} | Input LOW Voltage | | | 0.8 | | 0.8 | | 0.8 | V |
| I _{IX} | Input Load Current | GND ≤ V _{IN} ≤ V _{CC} | -10 | +10 | -10 | +10 | -10 | +10 | μA |
| I _{OZ} | Output Leakage Current | GND ≤ V _{OUT} ≤ V _{CC} , Output Disabled | -40 | +40 | -40 | +40 | -40 | +40 | μA |
| I _{OS} ^[3] | Output Short Circuit Current | V _{CC} = Max., V _{OUT} = GND | | 90 | | 90 | | 90 | mA |
| I _{CC} | V _{CC} Operating Supply Current | V _{CC} = Max., I _{OUT} = 0 mA | Com'l | 120 | | 100 | | | mA |
| | | | | | | | | | |
| V _{PP} | Programming Supply Voltage | | 12 | 13 | 12 | 13 | 12 | 13 | V |
| I _{PP} | Programming Supply Current | | | 50 | | 50 | | 50 | mA |
| V _{IHP} | Input HIGH Programming Voltage | | 3.0 | | 3.0 | | 3.0 | | V |
| V _{ILP} | Input LOW Programming Voltage | | | 0.4 | | 0.4 | | 0.4 | V |

Capacitance^[4]

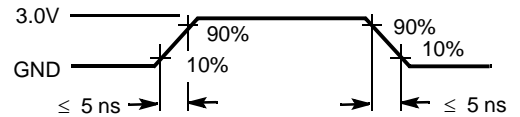
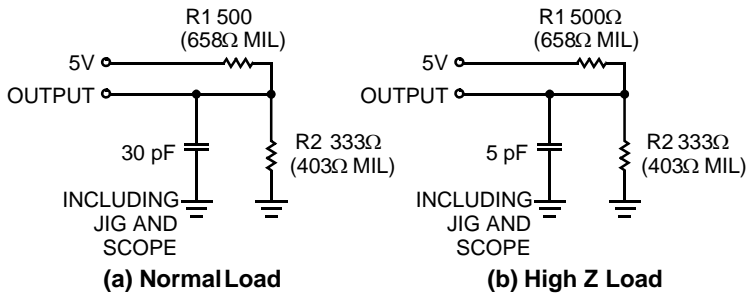
| Parameter | Description | Test Conditions | Max. | Unit |
|------------------|--------------------|---|------|------|
| C _{IN} | Input Capacitance | T _A = 25°C, f = 1 MHz, V _{CC} = 5.0V | 10 | pF |
| C _{OUT} | Output Capacitance | | 10 | pF |

Notes

- See the last page of this specification for Group A subgroup testing information.
- For test purposes, not more than one output at a time should be shorted. Short circuit test duration should not exceed 30 seconds.
- See Introduction to CMOS PROMs in this Data Book for general information on testing.

AC Test Loads and Waveforms

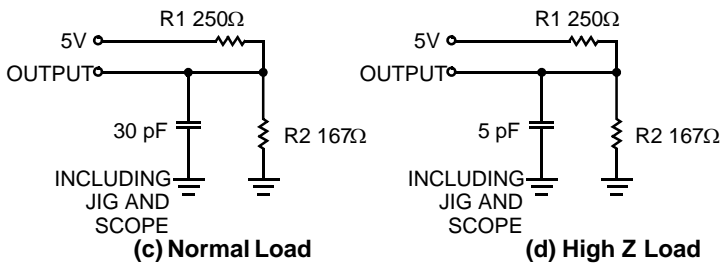
Test Load for -15 through -25 speeds



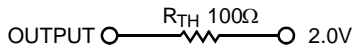
Equivalent to: THÉVENIN EQUIVALENT



Test Load for -40 through -50 speeds



Equivalent to: THÉVENIN EQUIVALENT



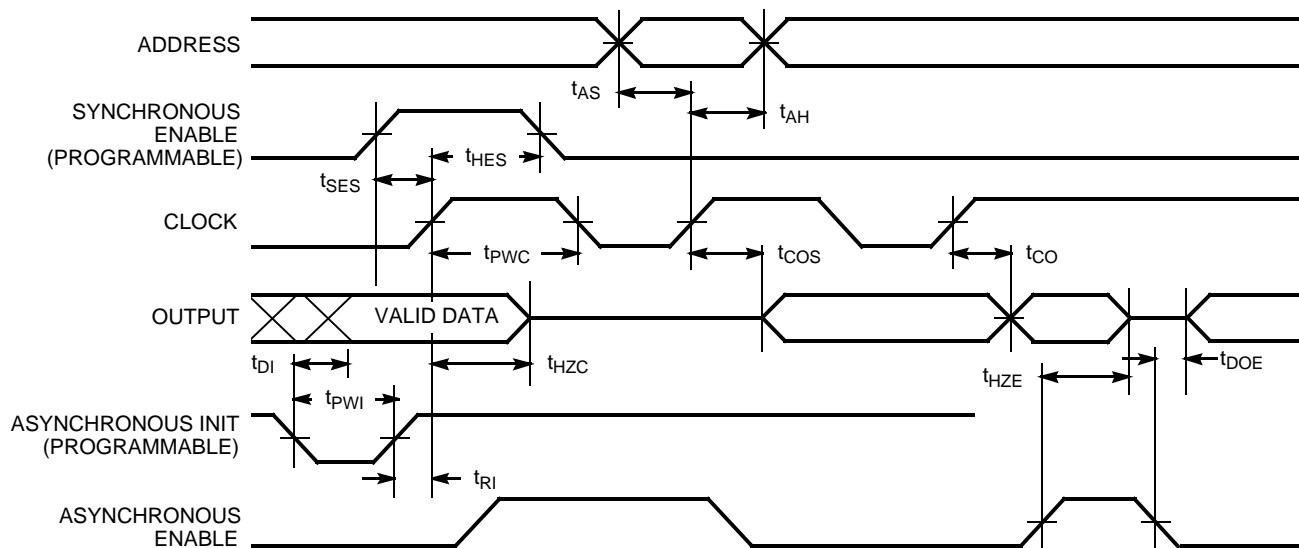
Switching Characteristics Over the Operating Range^[2, 4]

| Parameter | Description | 7C265-15 | | 7C265-25 | | 7C265-40 | | 7C265-50 | | Unit |
|------------------|--|----------|------|----------|------|----------|------|----------|------|------|
| | | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | |
| t _{AS} | Address Set-Up to Clock | 15 | | 25 | | 40 | | 50 | | ns |
| t _{HA} | Address Hold from Clock | 0 | | 0 | | 0 | | 0 | | ns |
| t _{CO} | Clock to Output Valid | | 12 | | 15 | | 20 | | 25 | ns |
| t _{PWC} | Clock Pulse Width | 12 | | 15 | | 15 | | 20 | | ns |
| t _{SES} | E _S Set-Up to Clock (Sync. Enable Only) | 12 | | 15 | | 15 | | 15 | | ns |
| t _{HES} | E _S Hold from Clock | 5 | | 5 | | 5 | | 5 | | ns |
| t _{DI} | INIT to Output Valid | | 15 | | 18 | | 25 | | 35 | ns |
| t _{RI} | INIT Recovery to Clock | 12 | | 15 | | 20 | | 25 | | ns |
| t _{PWI} | INIT Pulse Width | 12 | | 15 | | 25 | | 35 | | ns |
| t _{COS} | Output Valid from Clock (Sync. Mode) | | 12 | | 15 | | 20 | | 25 | ns |
| t _{HZC} | Output Inactive from Clock (Sync. Mode) | | 12 | | 15 | | 20 | | 25 | ns |
| t _{DOE} | Output Valid from E LOW (Async. Mode) | | 12 | | 15 | | 20 | | 25 | ns |

Switching Characteristics Over the Operating Range^[2, 4] (continued)

| Parameter | Description | 7C265-15 | | 7C265-25 | | 7C265-40 | | 7C265-50 | | Unit |
|------------------|---|----------|------|----------|------|----------|------|----------|------|------|
| | | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | |
| t _{HZE} | Output Inactive from E HIGH (Async. Mode) | | 12 | | 15 | | 20 | | 25 | ns |

Switching Waveform



Erasure Characteristics

Wavelengths of light less than 4000 angstroms begin to erase the 7C265 in the windowed package. For this reason, an opaque label should be placed over the window if the PROM 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 • exposure time) of 25 Wsec/cm². For an ultraviolet lamp with a 12 mW/cm² power rating the exposure time would be approximately 45 minutes. The 7C265 needs to be within one inch of the lamp during erasure. Permanent damage may result if the PROM is exposed to high-intensity UV light for an extended period of time. 7258 Wsec/cm² is the recommended maximum dosage.

Bit Map Data

| Programmer Address (Hex.) | | RAM Data |
|---------------------------|-----|----------|
| Decimal | Hex | Contents |

Bit Map Data

| | | |
|------|------|--------------|
| 0 | 0 | Data |
| . | . | . |
| 8191 | 1FFF | Data |
| 8192 | 2000 | INIT Byte |
| 8193 | 2001 | Control Byte |

Control Byte

- 00 Asynchronous output enable (default condition)
- 01 Synchronous output enable
- 02 Asynchronous initialize

Programming Modes

The 7C265 offers a limited selection of programmed architectures. Programming these features should be done with a single 10-ms-wide pulse in place of the intelligent algorithm, mainly because these features are verified operationally, not with the VFY pin. Architecture programming is implemented by applying the supervoltage to two additional pins during programming. In programming the 7C265 architecture, VPP is applied to pins 3, 9, and 22. The choice of a particular mode depends on the states of the other pins during programming, so it is important that the condition of the other pins be met as set forth in the mode table. The considerations that apply with

respect to power-up and power-down during intelligent programming also apply during architecture programming. Once the supervoltages have been established and the correct logic states exist on the other device pins,

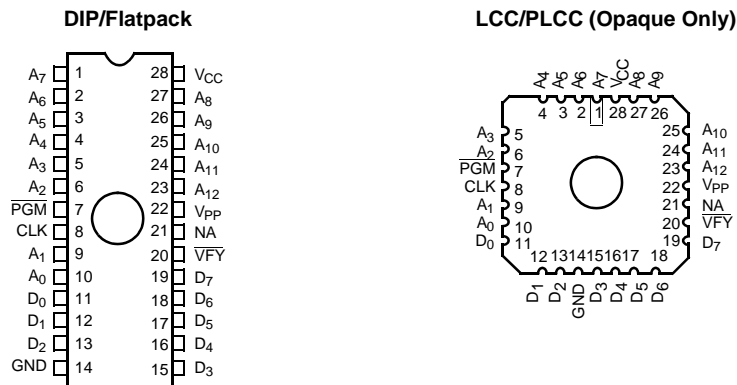
programming may begin. Programming is accomplished by pulling PGM from HIGH to LOW and then back to HIGH with a pulse width equal to 10 ms.

Table 1. Mode Selection

| Mode | Pin Function | | | | | | | |
|----------------------------------|------------------------|------------------|------------------|---------------------------------|------------------|-----------------|--------------------------------|------------------|
| | Read or Output Disable | A ₁₂ | A ₁₁ | A ₁₀ -A ₇ | A ₆ | A ₅ | A ₄ -A ₃ | A ₂ |
| | Other | A ₁₂ | A ₁₁ | A ₁₀ -A ₇ | A ₆ | A ₅ | A ₄ -A ₃ | A ₂ |
| Asynchronous Enable Read | | A ₁₂ | A ₁₁ | A ₁₀ -A ₇ | A ₆ | A ₅ | A ₄ -A ₃ | A ₂ |
| Synchronous Enable Read | | A ₁₂ | A ₁₁ | A ₁₀ -A ₇ | A ₆ | A ₅ | A ₄ -A ₃ | A ₂ |
| Asynchronous Initialization Read | | A ₁₂ | A ₁₁ | A ₁₀ -A ₇ | A ₆ | A ₅ | A ₄ -A ₃ | A ₂ |
| Program Memory | | A ₁₂ | A ₁₁ | A ₁₀ -A ₇ | A ₆ | A ₅ | A ₄ -A ₃ | A ₂ |
| Program Verify | | A ₁₂ | A ₁₁ | A ₁₀ -A ₇ | A ₆ | A ₅ | A ₄ -A ₃ | A ₂ |
| Program Inhibit | | A ₁₂ | A ₁₁ | A ₁₀ -A ₇ | A ₆ | A ₅ | A ₄ -A ₃ | A ₂ |
| Program Synchronous Enable | | V _{IHP} | V _{IHP} | A ₁₀ -A ₇ | V _{IHP} | V _{PP} | A ₄ -A ₃ | V _{IHP} |
| Program Initialize | | V _{ILP} | V _{IHP} | A ₁₀ -A ₇ | V _{IHP} | V _{PP} | A ₄ -A ₃ | V _{ILP} |
| Program Initial Byte | | A ₁₂ | V _{ILP} | A ₁₀ -A ₇ | V _{IHP} | V _{PP} | A ₄ -A ₃ | V _{ILP} |

| Mode | Pin Function | | | | | | | |
|----------------------------------|------------------------|-----------------|------------------|------------------|----------------------------------|------------------|--------------------|--------------------------------|
| | Read or Output Disable | A ₁ | A ₀ | GND | CLK | GND | \bar{E}, \bar{I} | O ₇ -O ₀ |
| | Other | A ₁ | A ₀ | PGM | CLK | V _{FY} | V _{PP} | D ₇ -D ₀ |
| Asynchronous Enable Read | | A ₁ | A ₀ | GND | V _{IL} | GND | V _{IL} | O ₇ -O ₀ |
| Synchronous Enable Read | | A ₁ | A ₀ | GND | V _{IL} /V _{IH} | GND | V _{IL} | O ₇ -O ₀ |
| Asynchronous Initialization Read | | A ₁ | A ₀ | GND | V _{IL} | GND | V _{IL} | O ₇ -O ₀ |
| Program Memory | | A ₁ | A ₀ | V _{ILP} | V _{ILP} | V _{IHP} | V _{PP} | D ₇ -D ₀ |
| Program Verify | | A ₁ | A ₀ | V _{IHP} | V _{ILP} | V _{ILP} | V _{PP} | O ₇ -O ₀ |
| Program Inhibit | | A ₁ | A ₀ | V _{IHP} | V _{ILP} | V _{IHP} | V _{PP} | High Z |
| Program Synchronous Enable | | V _{PP} | V _{ILP} | V _{ILP} | V _{ILP} | V _{IHP} | V _{PP} | D ₇ -D ₀ |
| Program Initialize | | V _{PP} | V _{ILP} | V _{ILP} | V _{ILP} | V _{IHP} | V _{PP} | D ₇ -D ₀ |
| Program Initial Byte | | V _{PP} | V _{IHP} | V _{ILP} | V _{ILP} | V _{IHP} | V _{PP} | D ₇ -D ₀ |

Figure 1. Programming Pinout

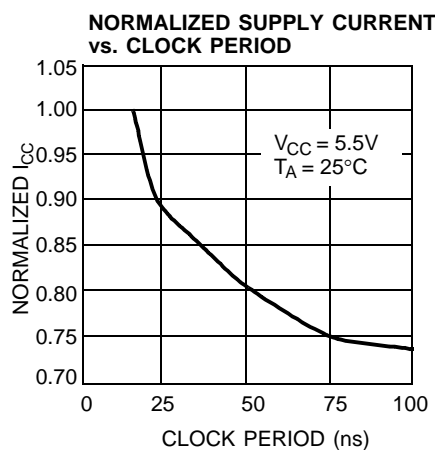
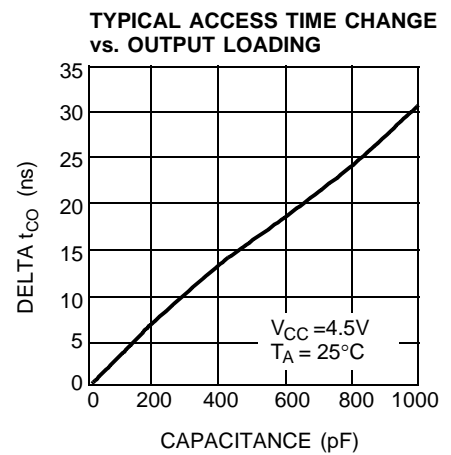
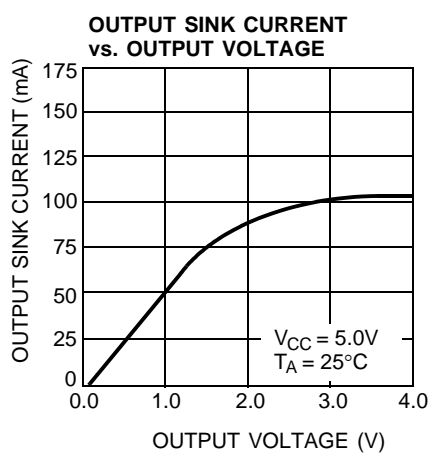
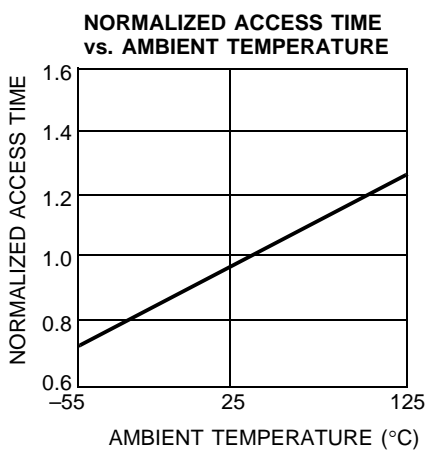
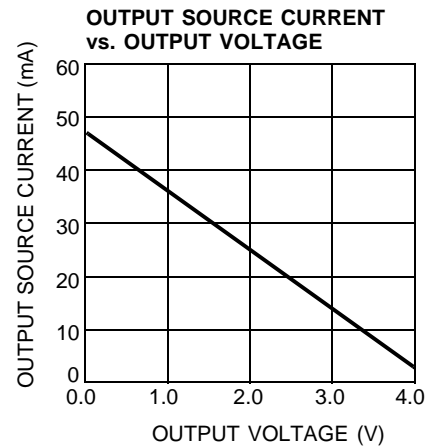
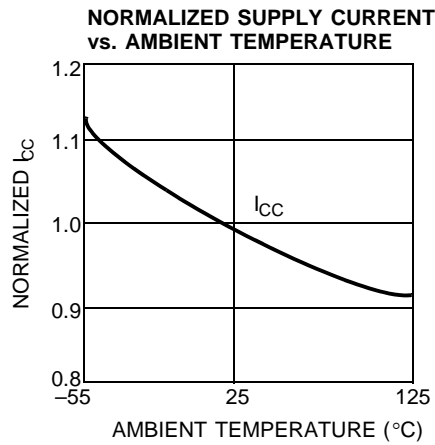
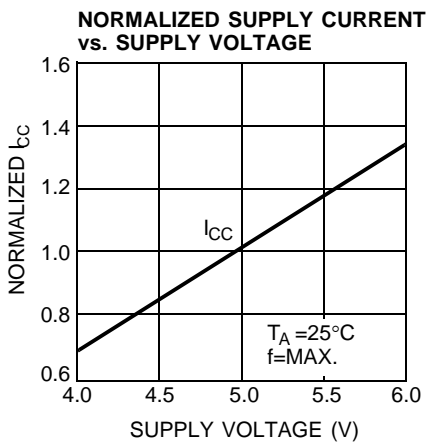


Programming Information

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.

Typical DC and AC Characteristics



Ordering Information

| Speed (ns) | I _{CC} (mA) | Ordering Code | Package Name | Package Type | Operating Range |
|------------|----------------------|---------------|--------------|-------------------------------------|-----------------|
| 15 | 120 | CY7C265-15JC | J64 | 28-Lead Plastic Leaded Chip Carrier | Commercial |
| | | CY7C265-15WC | W22 | 28-Lead (300-Mil) Windowed CerDIP | |
| 25 | 120 | CY7C265-25WC | W22 | 28-Lead (300-Mil) Windowed CerDIP | Commercial |
| 40 | 100 | CY7C265-40PC | P21 | 28-Lead (300-Mil) Molded DIP | Commercial |

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 |
| I _{CC} | 1, 2, 3 |

Switching Characteristics

| Parameter | Subgroups |
|------------------|-----------------|
| t _{AS} | 7, 8, 9, 10, 11 |
| t _{HA} | 7, 8, 9, 10, 11 |
| t _{CO} | 7, 8, 9, 10, 11 |
| t _{PW} | 7, 8, 9, 10, 11 |
| t _{SES} | 7, 8, 9, 10, 11 |
| t _{HES} | 7, 8, 9, 10, 11 |
| t _{COS} | 7, 8, 9, 10, 11 |

Package Diagrams

Figure 2. 28-Lead (300-Mil) CerDIP D22

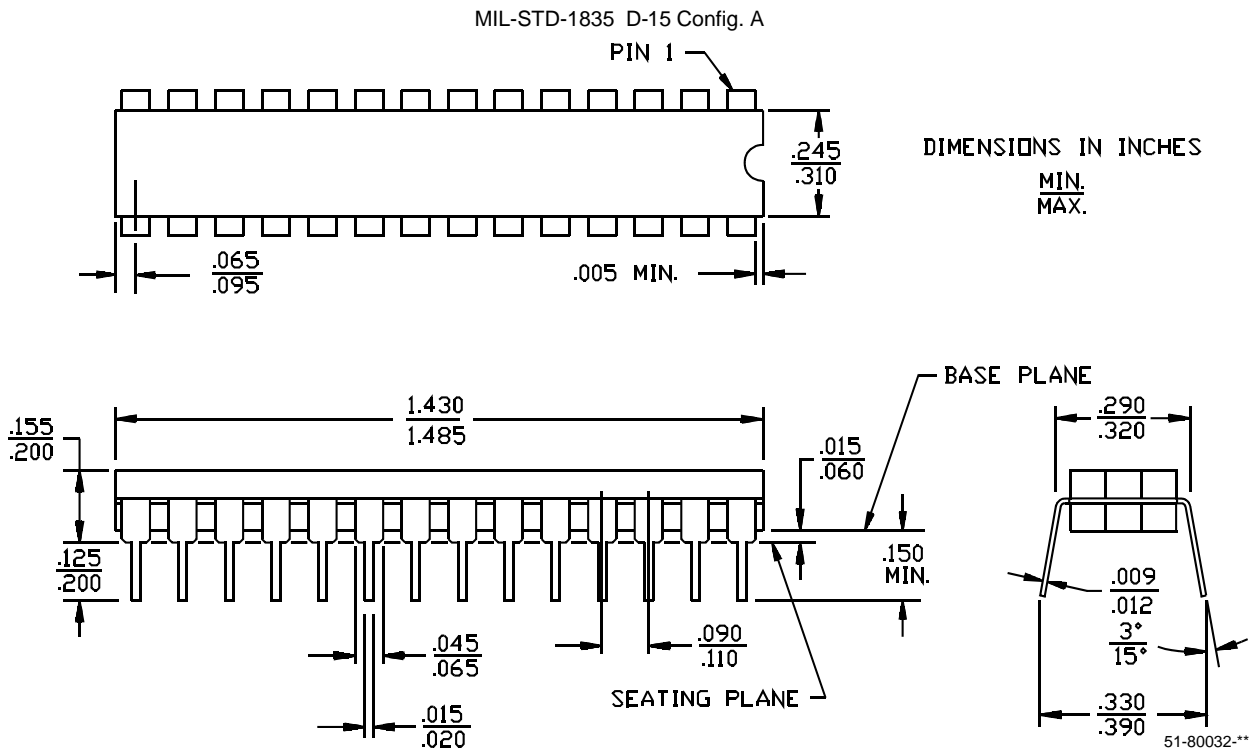
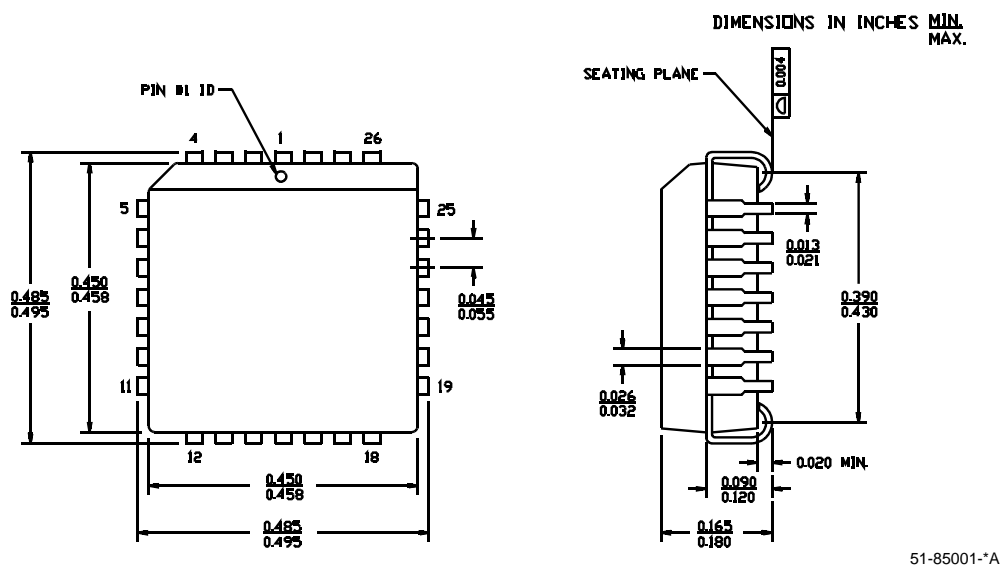


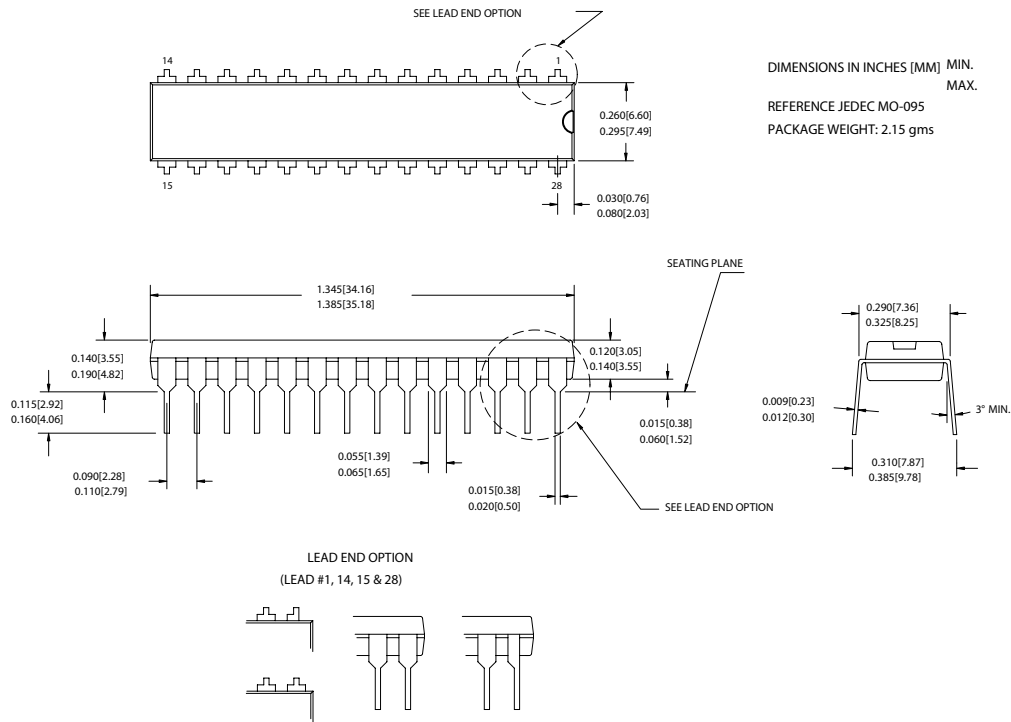
Figure 3. 28-Lead Plastic Leaded Chip Carrier J64



Package Diagrams (continued)

Figure 4. 28-Lead (300-Mil) Molded DIP P21

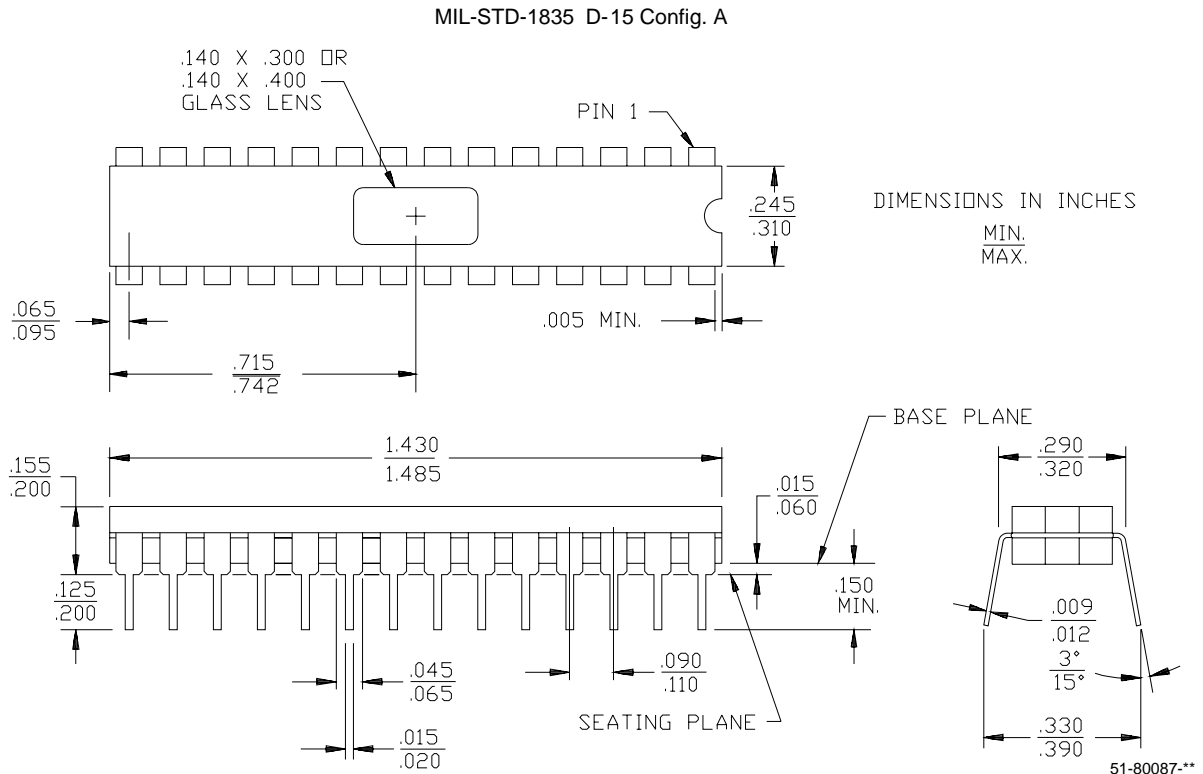
28-Lead (300-Mil) PDIP P21



51-85014-*D

Package Diagrams (continued)

Figure 5. 28-Lead (300-Mil) Windowed CerDIP W22



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Document History Page

| Document Title: CY7C265 8K x 8 Registered PROM Document Number: 38-04012 | | | | |
|---|----------------|-------------------|------------------------|--|
| REV. | ECN NO. | Issue Date | Orig. of Change | Description of Change |
| ** | 114139 | 03/18/02 | DSG | Changed from Spec number: 38-00084 to 38-04012 |
| *A | 118896 | 10/09/02 | GBI | Updated ordering information |
| *B | 499562 | See ECN | PCI | Updated ordering information |