CYPRESS SEMICONDUCTOR

CY7C285

64K x 8 Reprogrammable Fast Column Access PROM

Features

- **CMOS for optimum speed/power**
- **Windowed for reprogrammability**
- **Unique fast column access**
  - **— t_{AA} = 20 ns (commercial)**
  - **— t_{AA} = 25 ns (military)**
- **WAIT signal**
- **EPROM technology, 100% programmable**
- **5V ±10% V_{CC}, commercial and military**
- **TTL-compatible I/O**
- **Slim 300-mil package**
- **Capable of withstanding >2001V static discharge**

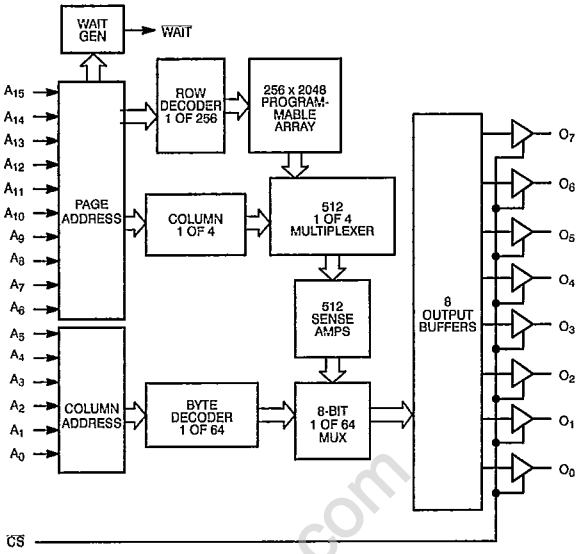
Functional Description

The CY7C285 is a high-performance 65,536 by 8-bit CMOS PROM. It is available in a 28-pin 300-mil package and features a unique fast column access feature that allow access times as fast as 20 ns for each byte in a 64-byte page. There are 1024 pages in the device. The access time when changing pages is 65 ns. In order to easily facilitate the use of the fast column access feature, a $\overline{WAIT}$ signal is generated to advise the processor of a page change.

The CY7C285 offers the advantage of low power, superior performance, and programming yield. The EPROM cell requires only 12.5V for the super voltage, allowing for each memory location to be 100% tested, with each location being 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 the CY7C285 is accomplished by placing an active LOW signal on the $\overline{CS}$ pin. The contents of the memory location addressed by the address lines (A_0 – A_{15}) will become available on the output lines (O_0 – O_7).

Logic Block Diagram



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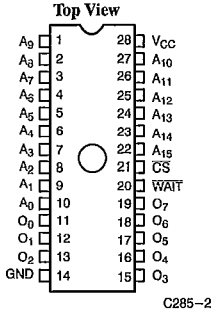
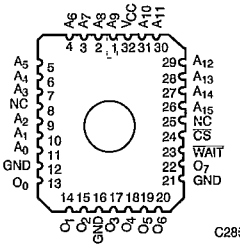
Pin Configurations

CerDIP
Top View



C285–2

LCC
Top View



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Selection Guide

Description		7C285–65	7C285–75	7C285–85
Maximum Access Time (ns)	Page Access Time	65	75	85
	Column Access Time	20	25	35
Maximum Operating Current (mA)	Commercial	180	180	180
	Military		200	200

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 (Pin 22) 13.0V

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

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%
Industrial[1]	− 40°C to +85°C	5V ± 10%
Military[2]	− 55°C to +125°C	5V ± 10%

Electrical Characteristics Over the Operating Range[3,4]

Parameter	Description	Test Conditions		7C285 Min.	7C285 Max.	Unit
V_{OH}	Output HIGH Voltage	V_{CC} = Min., I_{OH} = − 2.0 mA		2.4		V
V_{OL}	Output LOW Voltage	V_{CC} = Min., I_{OL} = 8.0 mA[5]			0.4	V
V_{IH}	Input HIGH Level	Guaranteed Input Logical HIGH Voltage for All Inputs		2.0	V_{CC}	V
V_{IL}	Input LOW Level	Guaranteed Input Logical LOW Voltage for All Inputs			0.8	V
V_{CD}	Input Diode Clamp Voltage			Note 4		V
I_{IX}	Input Load Current	GND ≤ V_{IN} ≤ V_{CC}		− 10	+10	µA
I_{OZ}	Output Leakage Current	GND ≤ V_{OUT} ≤ V_{CC}, Output Disabled		− 40	+40	µA
I_{OS}	Output Short Circuit Current[6]	V_{CC} = Max., V_{OUT} = GND		− 20	− 90	mA
I_{CC}	V_{CC} Operating Supply Current	V_{CC} = Max., I_{OUT} = 0 mA	Com'l		180	mA
			Mil		200	mA

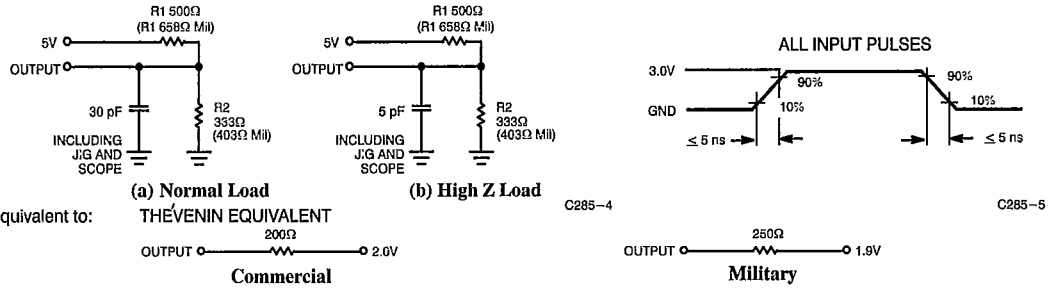
Capacitance[4]

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:

1. Contact a Cypress representative for industrial temperature range specification.
2. T_A is the "instant on" case temperature.
3. See the last page of this specification for Group A subgroup testing information.
4. See Introduction to CMOS PROMs in this Data Book for general information on testing.
5. I_{OL} = 6.0 mA for military.
6. For test purposes, not more than one output at a time should be shorted. Short circuit test duration should not exceed 30 seconds.

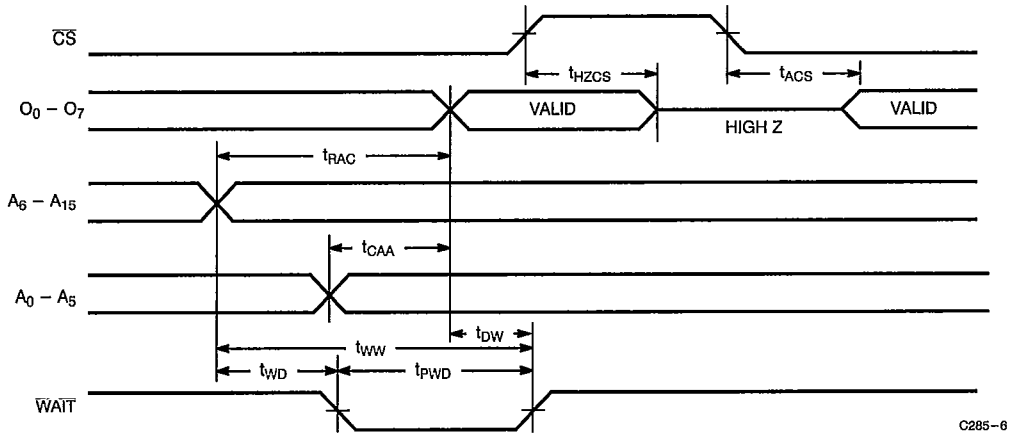
AC Test Loads and Waveform[4]



Switching Characteristics Over the Operating Range[3, 4]

Parameter	Description	7C285–65		7C285–75		7C285–85		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	
t_{RAC}	Slow Address Access Time (A_6 – A_{15})		65		75		85	ns
t_{CAA}	Fast Address Access Time (A_0 – A_5)		20		25		35	ns
t_{HZCS}	Output High Z from $\overline{CS}$		15		20		25	ns
t_{ACS}	Output Valid from $\overline{CS}$		15		20		25	ns
t_{WD}	$\overline{WAIT}$ Delay from First Slow Address Change		20		25		35	ns
t_{DW}	$\overline{WAIT}$ Hold from Data Valid	0		0		0		ns
t_{WW}	$\overline{WAIT}$ Recovery from Last Address Change		90		110		120	ns
t_{PWD}	$\overline{WAIT}$ Pulse Width	10		12		15		ns

Switching Waveform



Erasure Characteristics

Wavelengths of light less than 4000 angstroms begin to erase the 7C285 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 multiplied by exposure time) of 25 Wsec/cm^2. For an ultraviolet lamp with a 12 mW/cm^2 power rating, the exposure time would be approximately 35 minutes. The 7C285 needs to be within 1 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/cm^2 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.

Mode Selection

	Pin Number				
	22	23	21	20	19–15, 13–11
Mode: Read or Output Disable	**A_{15}**	**A_{14}**	**$\overline{CS}$**	**$\overline{WAIT}$**	**$O_7 - O_0$**
Read (within a page: $A_6 - A_{15}$ stable)	A_{15}	A_{14}	V_{IL}	V_{OH}	$O_7 - O_0$
Read (page break: $A_6 - A_{15}$ transition)	A_{15}	A_{14}	V_{IL}	Pulse LOW	$O_7 - O_0$
Output Disable	A_{15}	A_{14}	V_{IH}	Output	High Z
Mode: Other	**V_{PP}**	**LATCH**	**$\overline{PGM}$**	**$\overline{VFY}$**	**$D_7 - D_0$**
Program	V_{PP}	V_{ILP}	V_{ILP}	V_{IHP}	$D_7 - D_0$
Program Inhibit	V_{PP}	V_{ILP}	V_{IHP}	V_{IHP}	High Z
Program Verify	V_{PP}	V_{ILP}	V_{IHP}	V_{ILP}	$O_7 - O_0$
Blank Check	V_{PP}	V_{ILP}	V_{IHP}	V_{ILP}	Zeros

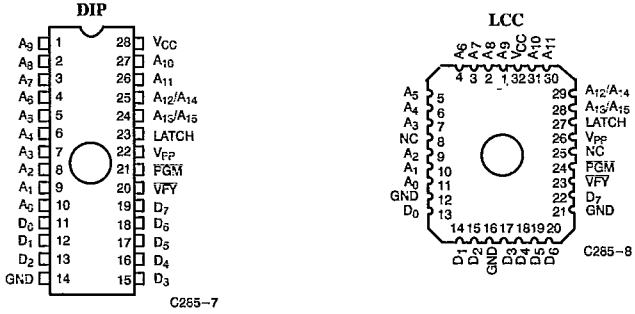


Figure 1. Programming Pinouts

Ordering Information[7]

Speed (ns)	Ordering Code	Package Name	Package Type	Operating Range
65	CY7C285–65PC	P21	28-Lead (300-Mil) Molded DIP	Commercial
	CY7C285–65WC	W22	28-Lead (300-Mil) Windowed CerDIP	
75	CY7C285–75PC	P21	28-Lead (300-Mil) Molded DIP	Commercial
	CY7C285–75WC	W22	28-Lead (300-Mil) Windowed CerDIP	
	CY7C285–75DMB	D22	28-Lead (300-Mil) CerDIP	Military
	CY7C285–75LMB	L55	32-Pin Rectangular Leadless Chip Carrier	
	CY7C285–75QMB	Q55	32-Pin Windowed Rectangular Leadless Chip Carrier	
	CY7C285–75WMB	W22	28-Lead (300-Mil) Windowed CerDIP	
85	CY7C285–85PC	P21	28-Lead (300-Mil) Molded DIP	Commercial
	CY7C285–85WC	W22	28-Lead (300-Mil) Windowed CerDIP	
	CY7C285–85DMB	D22	28-Lead (300-Mil) CerDIP	Military
	CY7C285–85LMB	L55	32-Pin Rectangular Leadless Chip Carrier	
	CY7C285–85QMB	Q55	32-Pin Windowed Rectangular Leadless Chip Carrier	
	CY7C285–85WMB	W22	28-Lead (300-Mil) Windowed CerDIP	

Note:
7. 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

Parameters	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_{AA}	7, 8, 9, 10, 11
t_{CAA}	7, 8, 9, 10, 11
t_{ACS}	7, 8, 9, 10, 11

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