

16K x 16 Reprogrammable PROM

Features

- 0.8-micron CMOS for optimum speed/power
- High speed (for commercial and military)
— 25-ns access time
- 16-bit-wide words
- Three programmable chip selects
- Programmable output enable
- 44-pin PLCC and 44-pin LCC packages
- 100% reprogrammable in windowed packages

- TTL-compatible I/O

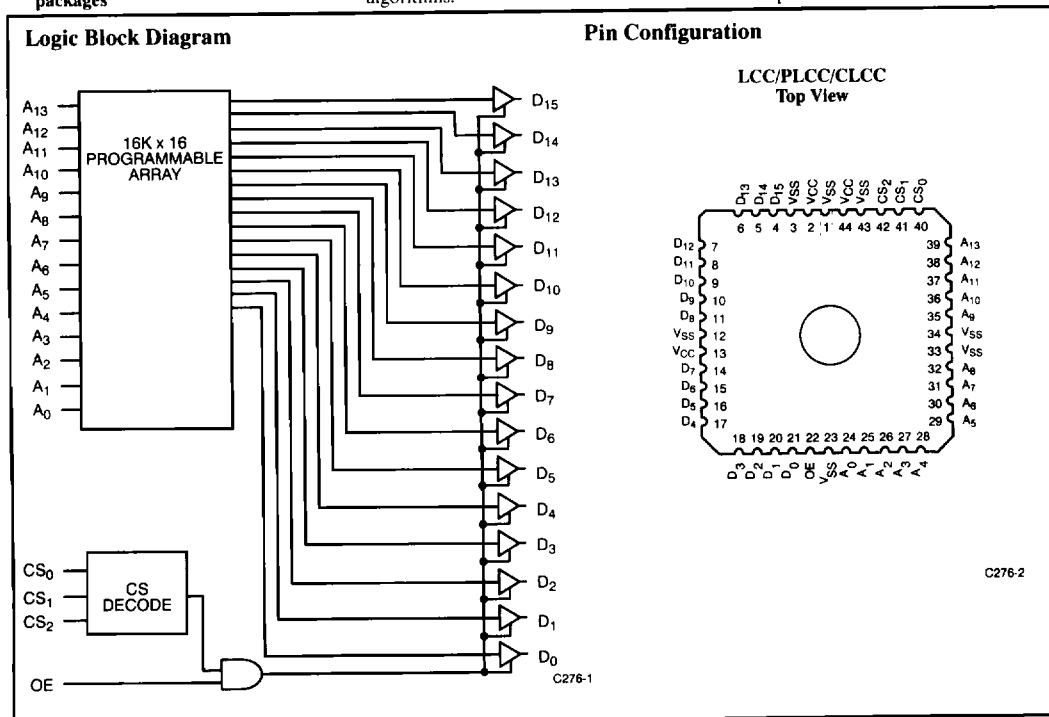
- Capable of withstanding greater than 2001V static discharge

Functional Description

The CY7C276 is a high-performance 16K-word by 16-bit CMOS PROM. It is available in a 44-pin PLCC/CLCC and a 44-pin LCC packages, and is 100% reprogrammable in windowed packages. The memory cells utilize proven EPROM floating gate technology and word-wide programming algorithms.

The CY7C276 allows the user to independently program the polarity of each chip select ($CS_2 - CS_0$). This provides on-chip decoding of up to eight banks of PROM. The polarity of the asynchronous output enable pin (OE) is also programmable.

In order to read the CY7C276, all three chip selects must be active and OE must be asserted. The contents of the memory location addressed by the address lines ($A_{13} - A_0$) will become available on the output lines ($D_{15} - D_0$). The data will remain on the outputs until the address changes or the outputs are disabled.


Selection Guide

		CY7C276-25	CY7C276-30	CY7C276-35
Maximum Access Time (ns)		25	30	35
Maximum Operating Current (mA)	Commercial	175	175	175
	Military	200	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	-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 Erasure	7258 Wsec/cm ²

Static Discharge Voltage (per MIL-STD-883, Method 3015)	> 2001V
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^[3, 4]

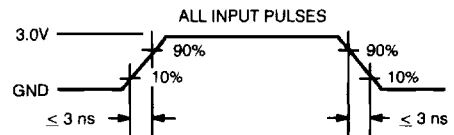
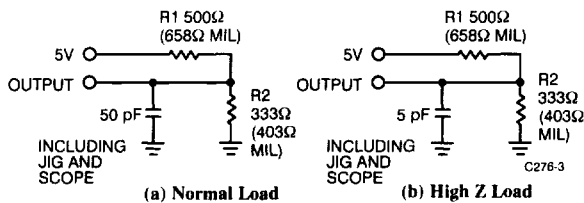
Parameter	Description	Test Conditions	CY7C276-25 CY7C276-30 CY7C276-35		Unit
			Min.	Max.	
V _{OH}	Output HIGH Voltage	V _{CC} = Min., I _{OH} = -2.0 mA	2.4		V
V _{OL}	Output LOW Voltage	V _{CC} = Min., I _{OL} = 8.0 mA (6.0 mA Mil)		0.4	V
V _{IH}	Input HIGH Level	Guaranteed Input Logical HIGH Voltage for All Inputs	2.0	V _{CC}	V
V _{IL}	Input LOW Level	Guaranteed Input Logical LOW Voltage for All Inputs	-3.0	0.8	V
I _{IX}	Input Leakage Current	GND ≤ V _{IN} ≤ V _{CC}	-10	+10	μA
V _{CD}	Input Clamp Diode Voltage		Note 3		μA
I _{OZ}	Output Leakage Current	V _{CC} = Max., V _{OL} ≤ V _{OUT} ≤ V _{OH} , Output Disabled	-40	+40	μA
I _{OS}	Output Short Circuit Current	V _{CC} = Max., V _{OUT} = 0.0V ^[5]	-20	-90	mA
I _{CC}	Power Supply Current	V _{CC} = Max., I _{OUT} = 0.0 mA	Com'l	175	mA
			Military	200	mA

Capacitance^[3]

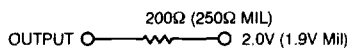
Parameter	Description	Test Conditions	Max.	Unit
C _{IN}	Input Capacitance	T _A = 25°C, f = 1 MHz, V _{CC} = 5.0V	10	pF
C _{OUT}	Output Capacitance		10	pF

Notes:

- Contact a Cypress representative for industrial temperature range specifications.
- T_A is the "instant on" case temperature
- See Introduction to CMOS PROMs in this Data Book for general information on testing.
- 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.

AC Test Loads and Waveforms


Equivalent to: THÉVENIN EQUIVALENT



C276-4

Switching Characteristics Over the Operating Range^{3, 4}

Parameter	Description	CY7C276-25		CY7C276-30		CY7C276-35		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	
t_{AA}	Address to Output Data Valid		25		30		35	ns
t_{CSOV}	CS Active to Output Valid		13		15		18	ns
t_{CSOZ}	CS Inactive to High Z Output		13		15		18	ns
t_{OEV}	OE Active to Output Valid		11		12		15	ns
$t_{O EZ}$	OE Inactive to High Z Output		11		12		15	ns

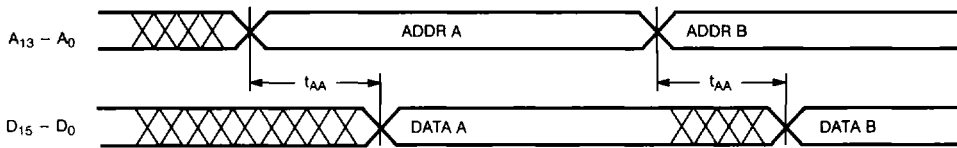
Erase Characteristics

The recommended dose of ultraviolet light for erasure is a wavelength of 2537 Å for a minimum dose (UV intensity multiplied by exposure time) of 25 Wsec/cm². For an ultraviolet lamp with a 12 mW/cm² power rating the exposure time would be approximately 35 minutes. The 7C276 needs to be within 1 inch of the lamp during erasure. Permanent damage may result if the EPROM is ex-

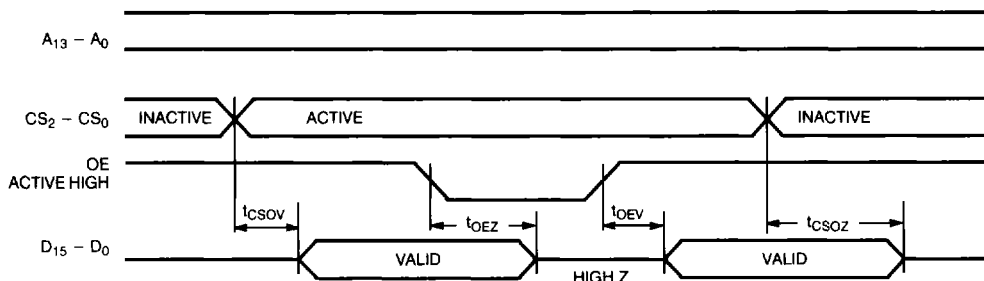
posed to high-intensity UV light for an extended period of time. 7258 Wsec/cm² is the recommended maximum dosage.

Wavelengths of light less than 4000 Å begin to erase the 7C276 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.

4

Switching Waveforms
Read Operation Timing Diagram⁶


C276-5

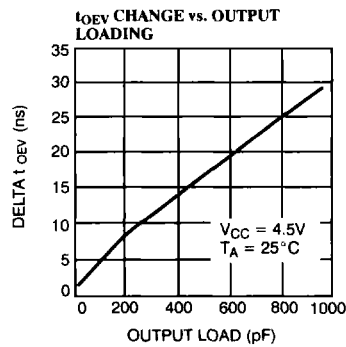
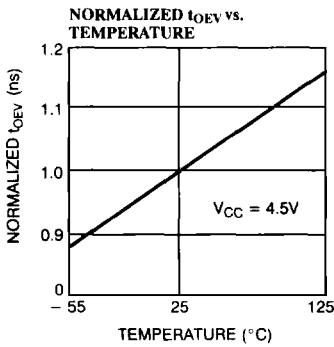
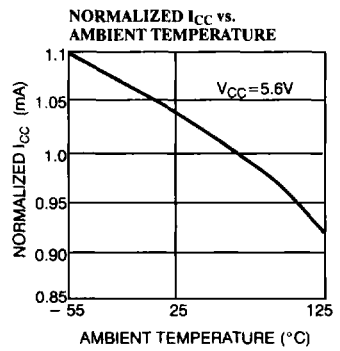
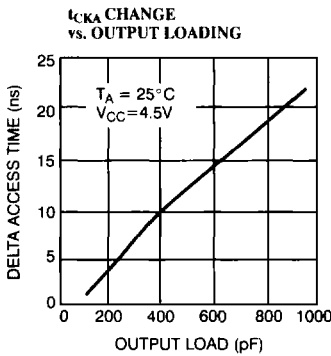
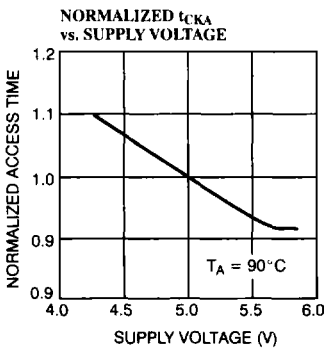
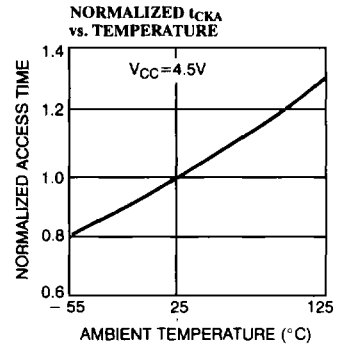
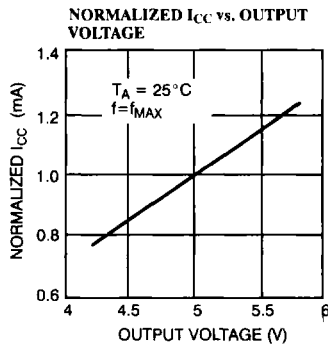
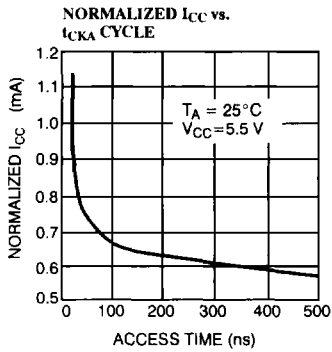
Chip Select and Output Enable Timing Diagrams


C276-6

Notes:

6. CS₂ - CS₀, OE assumed active.

Typical DC and AC Characteristics



Ordering Information^[7]

Speed (ns)	Ordering Code	Package Name	Package Type	Operating Range
25	CY7C276-25HC	H67	44-Pin Windowed Leaded Chip Carrier	Commercial
	CY7C276-25JC	J67	44-Lead Plastic Leaded Chip Carrier	
	CY7C276-25HMB	H67	44-Pin Windowed Leaded Chip Carrier	Military
	CY7C276-25QMB	Q67	44-Pin Windowed Leadless Chip Carrier	
30	CY7C276-30HC	H67	44-Pin Windowed Leaded Chip Carrier	Commercial
	CY7C276-30JC	J67	44-Lead Plastic Leaded Chip Carrier	
	CY7C276-30HMB	H67	44-Pin Windowed Leaded Chip Carrier	Military
	CY7C276-30QMB	Q67	44-Pin Windowed Leadless Chip Carrier	
35	CY7C276-35HC	H67	44-Pin Windowed Leaded Chip Carrier	Commercial
	CY7C276-35JC	J67	44-Lead Plastic Leaded Chip Carrier	
	CY7C276-35HMB	H67	44-Pin Windowed Leaded Chip Carrier	Military
	CY7C276-35QMB	Q67	44-Pin Windowed Leadless Chip Carrier	

Note:

7. Most of the above 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
I _{CC}	1, 2, 3

Switching Characteristics

Parameter	Subgroups
t _{AA}	7, 8, 9, 10, 11
t _{CSOV}	7, 8, 9, 10, 11
t _{OEV}	7, 8, 9, 10, 11

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