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**

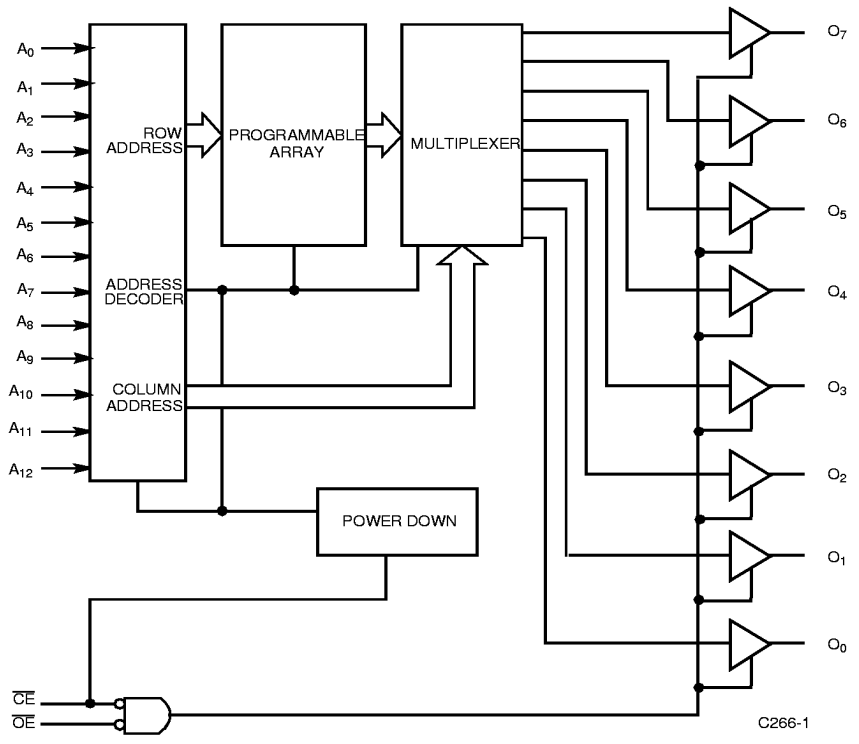
Functional Description

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).

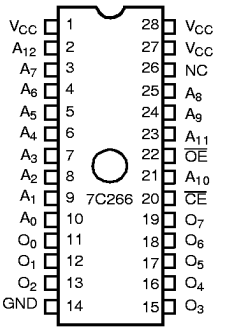
Logic Block Diagram



C266-1

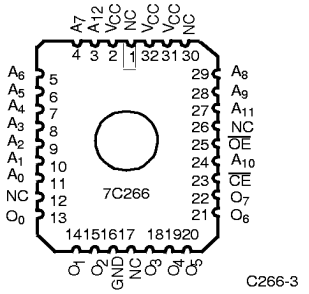
Pin Configurations

CerDIP
Top View



C266-2

LCC
Top View



C266-3

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August 1988 – Revised October 1995

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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.

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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

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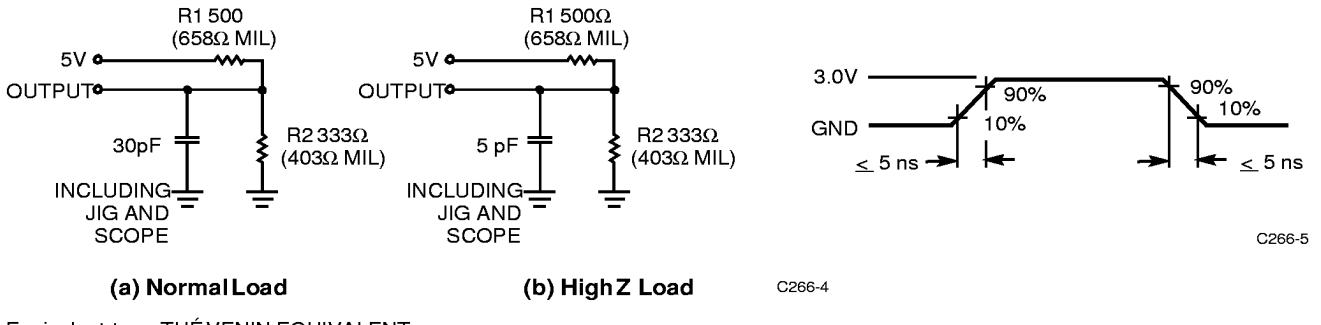
AC Test Loads and Waveforms

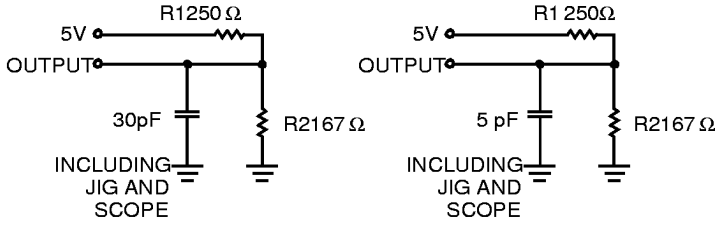
Test Load for – 20 through – 25 speeds



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

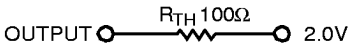
Equivalent to: THÉVENIN EQUIVALENT

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

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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

Mode		Pin Function[6, 7]							
	Normal Operation	A_8	A_9	A_{10}	A_{11}	A_{12}	CE	OE	$D_7 - D_0$
	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.

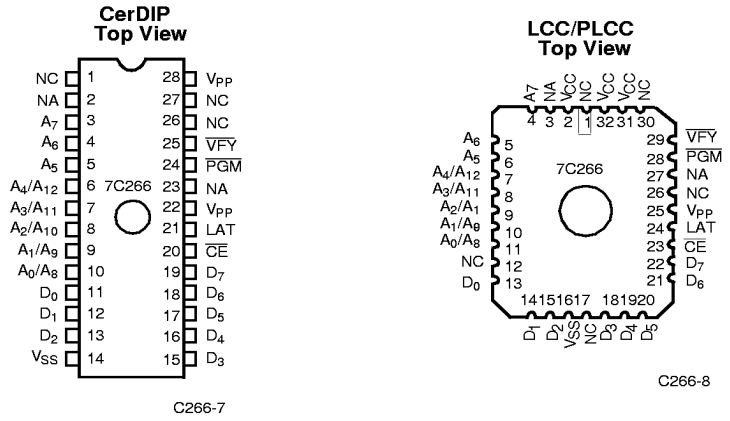

Figure 1. Programming Pinout

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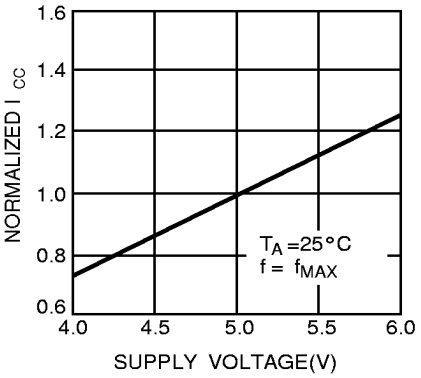
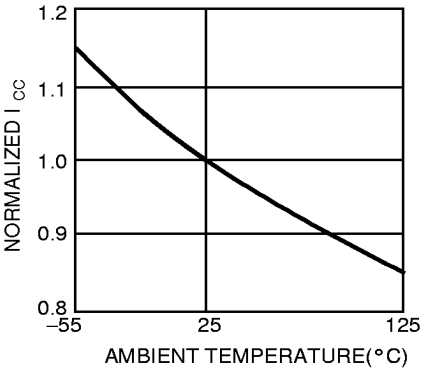
Typical DC and AC Characteristics

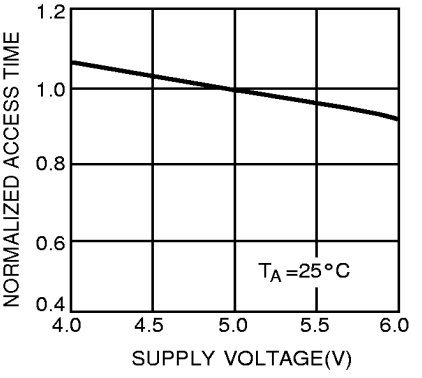
NORMALIZED SUPPLY CURRENT vs. SUPPLY VOLTAGE



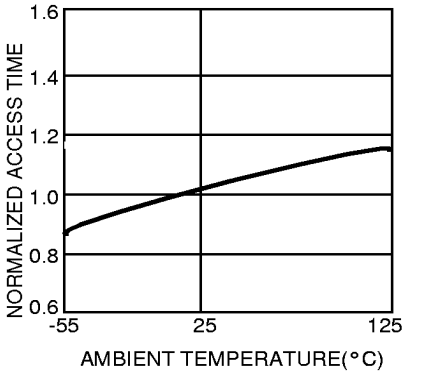
NORMALIZED SUPPLY CURRENT vs. AMBIENT TEMPERATURE



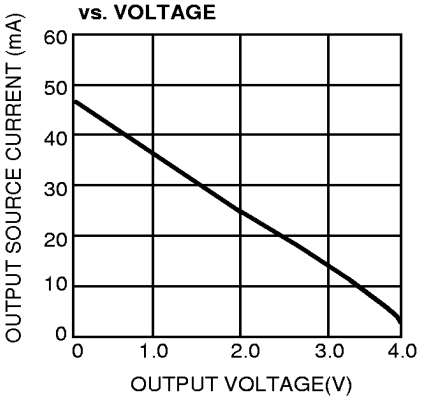
NORMALIZED ACCESS TIME vs. SUPPLY VOLTAGE



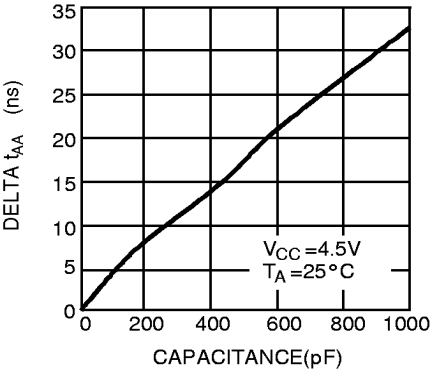
NORMALIZED ACCESS TIME vs. TEMPERATURE



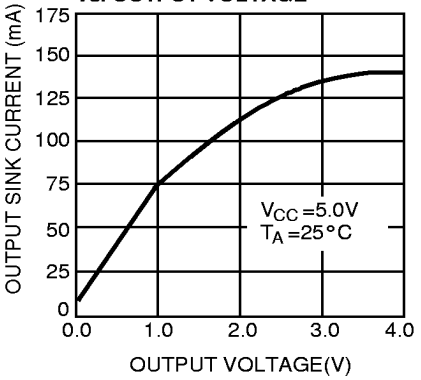
OUTPUT SOURCE CURRENT vs. VOLTAGE



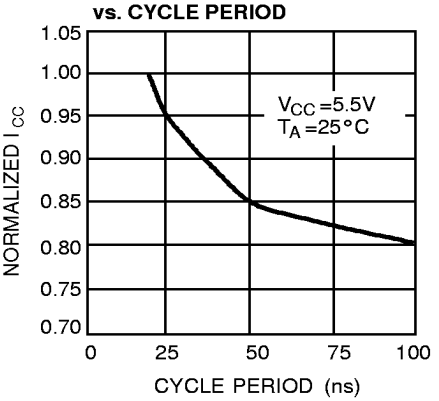
TYPICAL ACCESS TIME CHANGE vs. OUTPUT LOADING



OUTPUT SINK CURRENT vs. OUTPUT VOLTAGE



NORMALIZED SUPPLY CURRENT vs. CYCLE PERIOD



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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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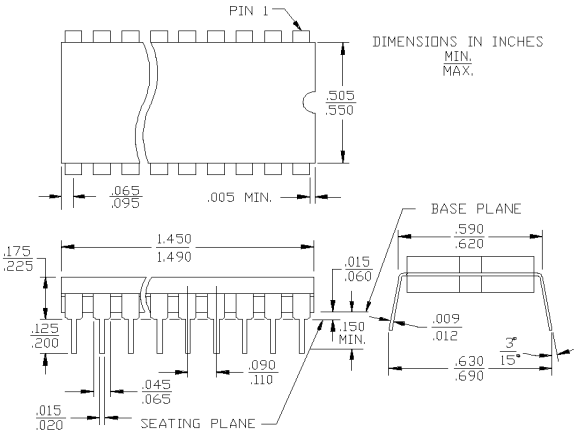
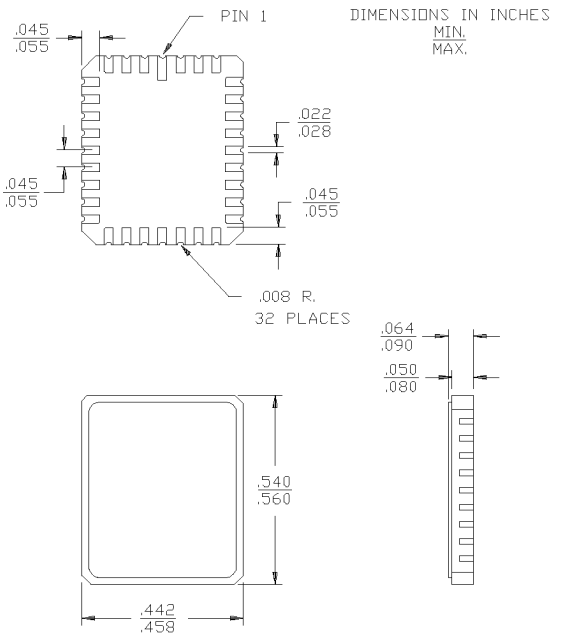
Package Diagrams

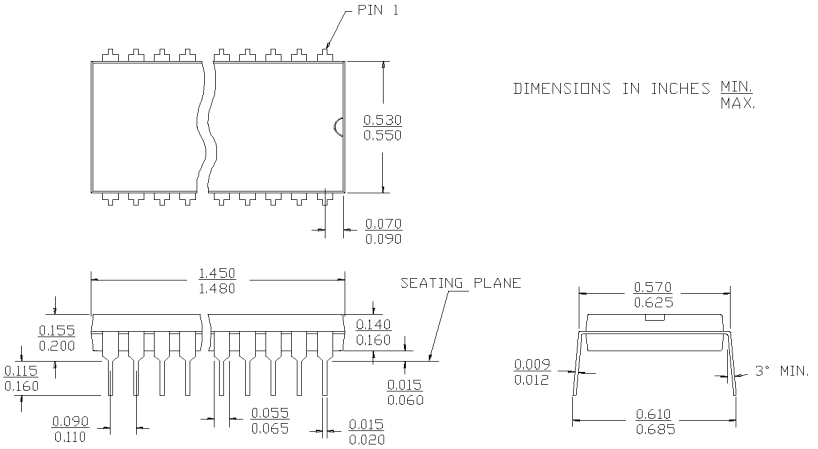
28–Lead (600–Mil) CerDIP D16
MIL–STD–1835 D– 10Config.A



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



28–Lead (600–Mil) Molded DIP P15



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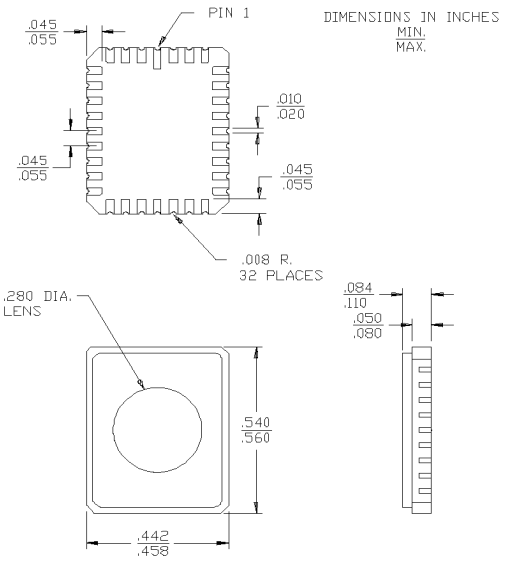
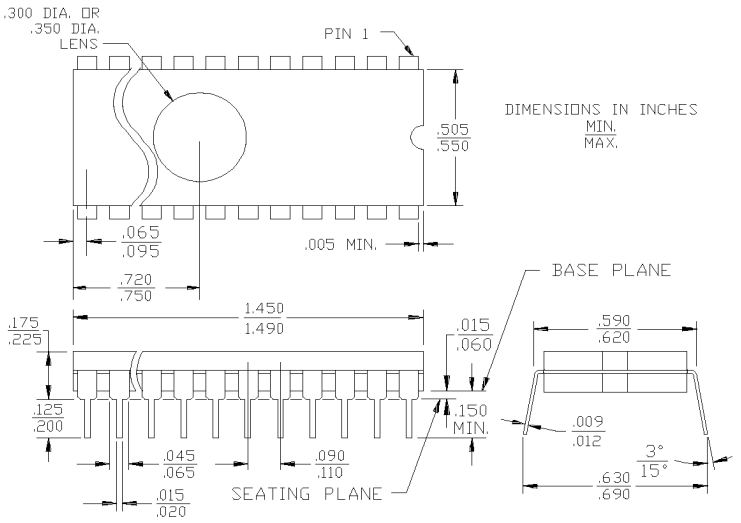
Package Diagrams (continued)

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



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