commodore
semiconductor group
MOS TECHNOLOGY, INC.

950 Rittenhouse Rd., Norristown, PA 19403 · Tel.: 215/666-7950 · TLX 846-100 MOSTECHGY VAFG

2332 STATIC READ ONLY MEMORY (4096x8)

DESCRIPTION

The 2332 high performance read only memory is organized 4096 words by 8 bits with access times of less than 350 ns. This ROM is designed to be compatible with all microprocessor and similar applications where high performance, large bit storage and simple interfacing are important design considerations. This device offers TTL input and output levels.

The 2332 operates totally asynchronously. No clock input is required. The two programmable chip select inputs allow four 32K ROMS to be OR-tied without external decoding.

Designed to replace two 2716 16K EPROMS, the 2332 can eliminate the need to redesign printed circuit boards for volume mask programmed ROMS after prototyping with EPROMS.
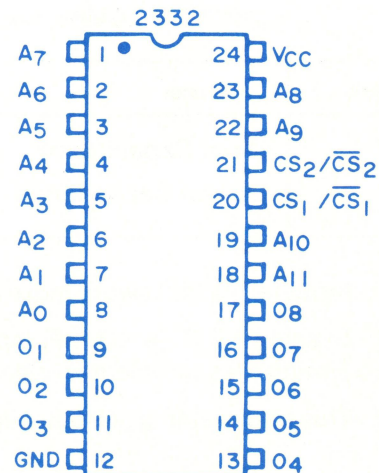
- 4096 x 8 Bit Organization
- Single +5 Volt Supply
- Access Time — 2332   450 ns
                2332A   350 ns
- Completely TTL Compatible
- Totally Static Operation

- Three-State Outputs for Wire-OR Expansion
- Two Programmable Chip Selects
- Pin Compatible with 2716 & 2732 EPROM
- Replacement for Two 2716s
- 2708/2716 EPROMS Accepted as Program Data Inputs
- 400mV Noise Immunity on Inputs

ORDERING INFORMATION:

Part Number*	Package Type	Access Time	Temperature Range
MPS2332	Molded	450 ns	0°C to +70°C
MPS2332A	Molded	350 ns	0°C to +70°C
MCS2332	Ceramic	450ns	0°C to +70°C
MCS2332A	Ceramic	350ns	0°C to +70°C

*Final Part Number will be assigned by manufacturer

PIN CONFIGURATION

```
              2332
      A7  ▢  1 •     24 ▢  VCC
      A6  ▢  2        23 ▢  A8
      A5  ▢  3        22 ▢  A9
      A4  ▢  4        21 ▢  CS2/CS̄2
      A3  ▢  5        20 ▢  CS1/CS̄1
      A2  ▢  6        19 ▢  A10
      A1  ▢  7        18 ▢  A11
      A0  ▢  8        17 ▢  O8
      O1  ▢  9        16 ▢  O7
      O2  ▢  10       15 ▢  O6
      O3  ▢  11       14 ▢  O5
     GND  ▢  12       13 ▢  O4
```

ABSOLUTE MAXIMUM RATINGS

Ambient Operating Temperature	0° to +70°C
Storage Temperature	−65°C to +150°C
Supply Voltage to Ground Potential	−0.5V to +7.0V
Applied Output Voltage	−0.5V to +7.0V
Applied Input Voltage	−0.5V to +7.0V
Power Dissipation	1.0W

COMMENT

Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

D.C. CHARACTERISTICS

$T_A = 0°C$ to $+70°C$, $V_{CC} = 5.0V \pm 5\%$ (unless otherwise specified)

Symbol	Parameter	Min.	Max.	Units	Test Conditions
I_{CC1}	Power Supply Current		125	mA	$V_{IN} = V_{CC}$, $V_O = $ Open, $T_A = 0°C$
I_{CC2}	Power Supply Current		120	mA	$V_{IN} = V_{CC}$, $V_O = $ Open, $T_A = 25°C$
I_O	Output Leakage Current		10	µA	Chip Deselected, $V_O = 0$ to V_{CC}
I_I	Input Load Current		10	µA	$V_{CC} = $ Max. $V_{IN} = 0$ to V_{CC}
V_{OL}	Output Low Voltage		0.4	Volts	$V_{CC} = $ Min. $I_{OL} = 2.1mA$
V_{OH}	Output High Voltage	2.4		Volts	$V_{CC} = $ Min. $I_{OH} = -400µA$
V_{IL}	Input Low Voltage	−0.5	0.8	Volts	See note 1
V_{IH}	Input High Voltage	2.0	$V_{CC}+1$	Volts	

A. C. CHARACTERISTICS

$T_A = 0°C$ to $+70°C$, $V_{CC} = 5.0V \pm 5\%$ (unless otherwise specified)

Symbol	Parameter	2332		2332A		Units	Test Conditions
		Min.	Max.	Min.	Max.		
t_{ACC}	Address Access Time		450		350	ns	
t_{CO}	Chip Select Delay		200		200	ns	See Note 2
t_{DF}	Chip Deselect Delay		175		175	ns	
t_{OH}	Previous Data Valid After Address Change Delay	40		40		ns	

CAPACITANCE

$T_A = 25°C$, $f = 1.0MHz$, See Note 3

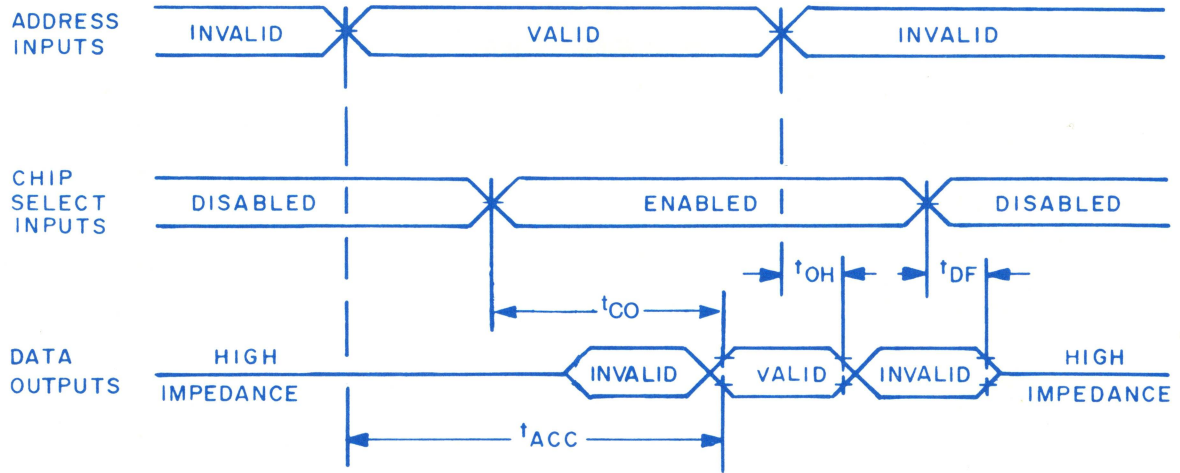| Symbol	Parameter	Min.	Max.	Units	Test Conditions
C_{IN}	Input Capacitance		8	pF	All Pins except Pin under
C_{OUT}	Output Capacitance		**10**	pF	Test Tied to AC Ground

Note 1: Input levels that swing more negative than −0.5V will be clamped and may cause damage to the device.

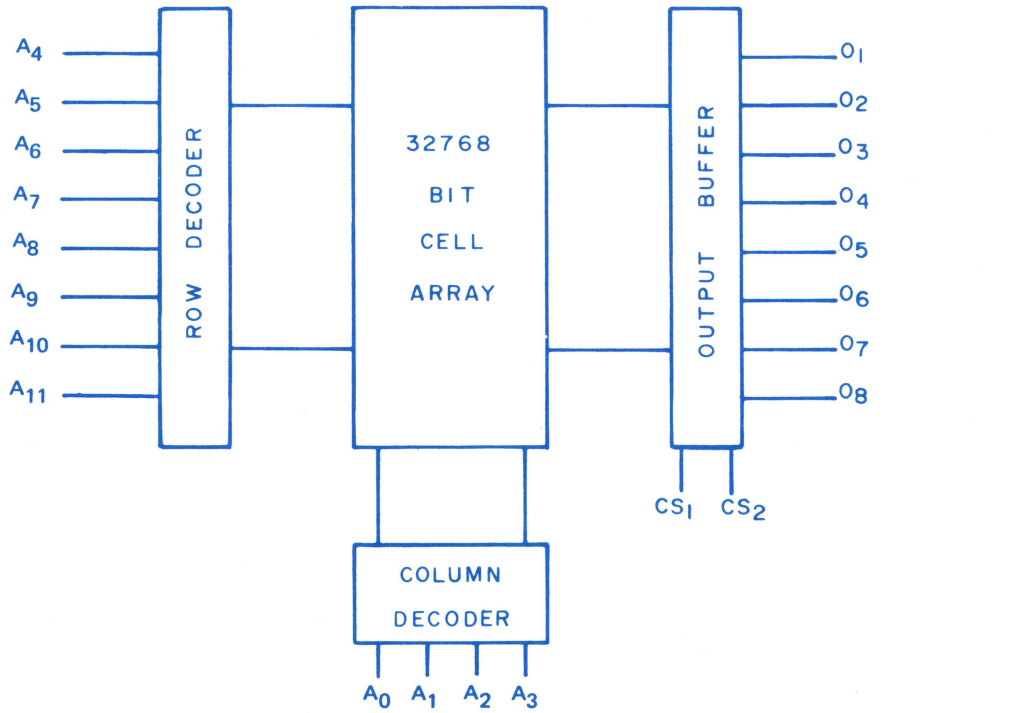Note 2: Loading 1 TTL + 100 pF, input transition time: 20 ns.
Timing measurement levels: input 1.5V, output 0.8V and 2.0V. $C_L = 100$ pF.

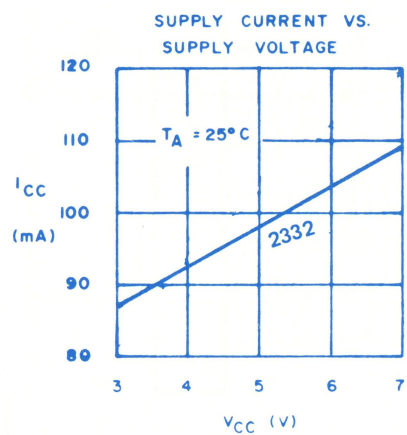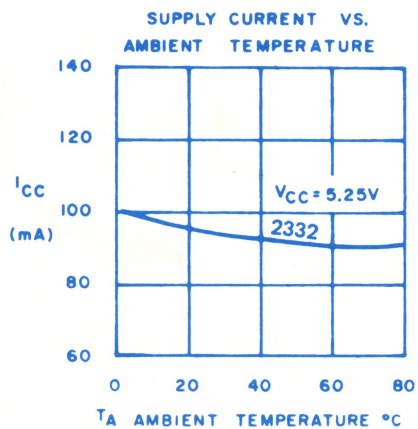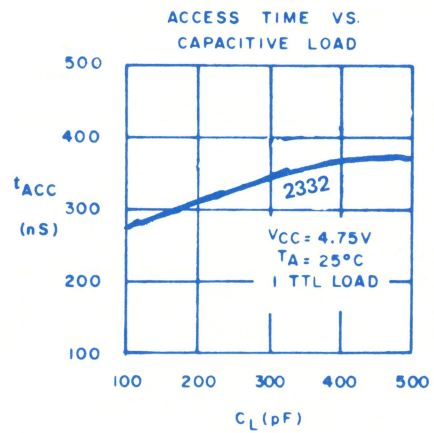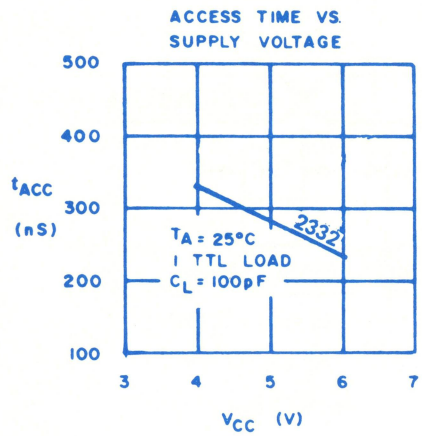Note 3: This parameter is periodically sampled and is not 100% tested.

TIMING DIAGRAM

ADDRESS INPUTS: INVALID | VALID | INVALID

CHIP SELECT INPUTS: DISABLED | ENABLED | DISABLED

DATA OUTPUTS: HIGH IMPEDANCE | INVALID | VALID | INVALID | HIGH IMPEDANCE

t_{OH} t_{DF} t_{CO} t_{ACC}

BLOCK DIAGRAM

A_4
A_5
A_6
A_7
A_8
A_9
A_{10}
A_{11}

ROW DECODER

32768 BIT CELL ARRAY

OUTPUT BUFFER

O_1
O_2
O_3
O_4
O_5
O_6
O_7
O_8

CS_1 CS_2

COLUMN DECODER

A_0 A_1 A_2 A_3

TYPICAL CHARACTERISTICS

ACCESS TIME VS. SUPPLY VOLTAGE

t_{ACC} (nS) vs V_{CC} (V)

$T_A = 25°C$
I TTL LOAD
$C_L = 100 pF$

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ACCESS TIME VS. CAPACITIVE LOAD

t_{ACC} (nS) vs C_L (pF)

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$V_{CC} = 4.75V$
$T_A = 25°C$
I TTL LOAD

SUPPLY CURRENT VS. AMBIENT TEMPERATURE

I_{CC} (mA) vs T_A AMBIENT TEMPERATURE °C

$V_{CC} = 5.25V$

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SUPPLY CURRENT VS. SUPPLY VOLTAGE

I_{CC} (mA) vs V_{CC} (V)

$T_A = 25°C$

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