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:

<table>
<thead>
<tr>
<th>Part Number*</th>
<th>Package Type</th>
<th>Access Time</th>
<th>Temperature Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPS2332</td>
<td>Molded</td>
<td>450 ns</td>
<td>0°C to +70°C</td>
</tr>
<tr>
<td>MPS2332A</td>
<td>Molded</td>
<td>350 ns</td>
<td>0°C to +70°C</td>
</tr>
<tr>
<td>MCS2332</td>
<td>Ceramic</td>
<td>450ns</td>
<td>0°C to +70°C</td>
</tr>
<tr>
<td>MCS2332A</td>
<td>Ceramic</td>
<td>350ns</td>
<td>0°C to +70°C</td>
</tr>
</tbody>
</table>

*Final Part Number will be assigned by manufacturer
### 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)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Min.</th>
<th>Max.</th>
<th>Units</th>
<th>Test Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>( I_{CC1} )</td>
<td>Power Supply Current</td>
<td>125</td>
<td>mA</td>
<td></td>
<td>( V_{IN} = V_{CC}, \ V_O = \text{Open}, \ T_A = 0°C )</td>
</tr>
<tr>
<td>( I_{CC2} )</td>
<td>Power Supply Current</td>
<td>120</td>
<td>mA</td>
<td></td>
<td>( V_{IN} = V_{CC}, \ V_O = \text{Open}, \ T_A = 25°C )</td>
</tr>
<tr>
<td>( I_{o} )</td>
<td>Output Leakage Current</td>
<td>10</td>
<td>( \mu )A</td>
<td></td>
<td>Chip Deselected, ( V_O = 0 ) to ( V_{CC} )</td>
</tr>
<tr>
<td>( I_{l} )</td>
<td>Input Load Current</td>
<td>10</td>
<td>( \mu )A</td>
<td></td>
<td>( V_{CC} = \text{Max.}, \ V_{IN} = 0 ) to ( V_{CC} )</td>
</tr>
<tr>
<td>( V_{OL} )</td>
<td>Output Low Voltage</td>
<td>2.4</td>
<td>Volts</td>
<td></td>
<td>( V_{CC} = \text{Min.}, \ I_{OL} = 2.1mA )</td>
</tr>
<tr>
<td>( V_{OH} )</td>
<td>Output High Voltage</td>
<td>0.4</td>
<td>Volts</td>
<td></td>
<td>( V_{CC} = \text{Min.}, \ I_{OH} = -400\mu A ) See note 1</td>
</tr>
<tr>
<td>( V_{IL} )</td>
<td>Input Low Voltage</td>
<td>-0.5</td>
<td>0.8</td>
<td>Volts</td>
<td></td>
</tr>
<tr>
<td>( V_{IH} )</td>
<td>Input High Voltage</td>
<td>2.0</td>
<td>( V_{CC}+1 )</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### A.C. CHARACTERISTICS

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

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>2332</th>
<th>2332A</th>
<th>Units</th>
<th>Test Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>( t_{ACC} )</td>
<td>Address Access Time</td>
<td>450</td>
<td>350</td>
<td>ns</td>
<td>See Note 2</td>
</tr>
<tr>
<td>( t_{CO} )</td>
<td>Chip Select Delay</td>
<td>200</td>
<td>200</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>( t_{DF} )</td>
<td>Chip Deselect Delay</td>
<td>175</td>
<td>175</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>( t_{OH} )</td>
<td>Previous Data Valid</td>
<td>40</td>
<td>40</td>
<td>ns</td>
<td></td>
</tr>
</tbody>
</table>

### CAPACITANCE

\( T_A = 25°C, \ f = 1.0MHz, \) See Note 3

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Min.</th>
<th>Max.</th>
<th>Units</th>
<th>Test Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>( C_{IN} )</td>
<td>Input Capacitance</td>
<td>8</td>
<td>pF</td>
<td></td>
<td>All Pins except Pin under Test Tied to AC Ground</td>
</tr>
<tr>
<td>( C_{OUT} )</td>
<td>Output Capacitance</td>
<td>10</td>
<td>pF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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

BLOCK DIAGRAM

ROW DECODER
A4
A5
A6
A7
A8
A9
A10
A11

32768 BIT CELL ARRAY

OUTPUT BUFFER
01
02
03
04
05
06
07
08

COLUMN DECODER
A0 A1 A2 A3

CS1 CS2
TYPICAL CHARACTERISTICS

ACCESS TIME VS. SUPPLY VOLTAGE

ACCESS TIME VS. CAPACITIVE LOAD

SUPPLY CURRENT VS. AMBIENT TEMPERATURE

SUPPLY CURRENT VS. SUPPLY VOLTAGE

MOS TECHNOLOGY, INC. reserves the right to make changes to any products herein to improve reliability, function or design. MOS TECHNOLOGY, INC. does not assume any liability arising out of the application or use of any product or circuit described herein; neither does it convey any license under its patent rights nor the rights of others.