



# G2332

## Microcircuits

### NMOS 4096 X 8 ROM

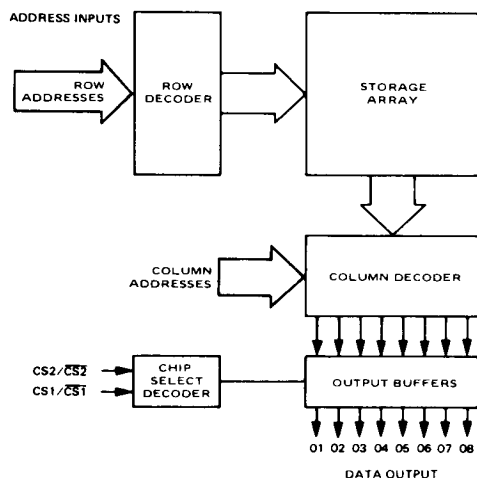
#### Features

- 4096 8-bit bytes (32K)
- Maximum Active Current: 100 mA
- Max. access time: 350 nS—G2332-3  
450 nS—G2332-4
- Output drive: one TTL load, plus 100 pF
- All input/outputs TTL compatible
- Two programmable Chip Select inputs
- Three-state outputs for memory expansion
- Single +5V power supply,  $\pm 5$  percent
- Standard 24-pin plastic or cerdip package

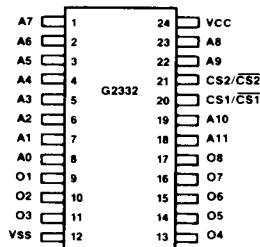
#### General Description

The GTE G2332 Read Only Memory is a 4096 word by 8 bit device with a maximum access time of 350 nanoseconds (G2332-3) or 450 nanoseconds (G2332-4). The G2332 ROM is a mask-programmable, byte-organized memory designed for use in bus-oriented applications with all 8-bit N-channel microprocessors. Dual Chip Select inputs provide convenient memory expansion—allowing up to four G2332 32K ROMs to be OR-tied without external coding. In addition, three-state output buffers allow simple parallel-busing for memory expansion. The G2332 is TTL compatible, requires only a single +5V power supply, requiring no external clocks and no refresh circuitry. Packaging is standard 24-pin plastic or cerdip.

#### Block Diagram



#### Pin Configuration



#### Pin Function

| Pin    | Description |
|--------|-------------|
| A0-A11 | Address     |
| O1-O7  | Outputs     |
| VCC    | +5V         |
| VSS    | Ground      |
| CS     | Chip Select |

#### Specifications

| Device    | Access Time | Max. Active Current | Package | Temp. Range |
|-----------|-------------|---------------------|---------|-------------|
| G2332-3CJ | 350 nS      | 100 mA              | Cerdip  | 0°C to 70°C |
| G2332-3CK | 350 nS      | 100 mA              | Plastic | 0°C to 70°C |
| G2332-4CJ | 450 nS      | 100 mA              | Cerdip  | 0°C to 70°C |
| G2332-4CK | 450 nS      | 100 mA              | Plastic | 0°C to 70°C |

**Absolute Maximum Ratings: (Note 1)**

| Parameter                              | Symbol          | Value          |
|----------------------------------------|-----------------|----------------|
| Voltage to Any Pin With Respect to VSS | V <sub>DC</sub> | 0.5V to 7.0V   |
| Current Into/From Output               | I <sub>DD</sub> | 50 mA          |
| Operation Ambient Temp. Range          | T <sub>A</sub>  | 0°C to 70°C    |
| Storage Temp. Range                    | T <sub>S</sub>  | -65°C to 150°C |

This device contains input protection against damage due to high static voltages or electric fields; however, precautions should be taken to avoid application of voltages higher than the maximum ratings.

**NOTES:**

- Exceeding these ratings may cause permanent damage, functional operation under these conditions is not implied.

**DC Electrical Characteristics: Full Operating Voltage and Temperature Range**

| Characteristic         | Symbol          | Min  | Max             | Unit | Conditions                                   |
|------------------------|-----------------|------|-----------------|------|----------------------------------------------|
| Input High Level       | V <sub>IH</sub> | 2.0  | V <sub>CC</sub> | V    |                                              |
| Input Low Level        | V <sub>IL</sub> | -0.5 | +0.8            | V    |                                              |
| Input Leakage Current  | I <sub>LI</sub> | -10  | +10             | μA   |                                              |
| Output Leakage Current | I <sub>LO</sub> | -10  | +10             | μA   | V <sub>O</sub> = 0.4 to V <sub>CC</sub>      |
| Output Voltage High    | V <sub>OH</sub> | 2.4  | —               | V    | I <sub>O</sub> = -0.2 mA                     |
| Output Voltage Low     | V <sub>OL</sub> | —    | 0.4             | V    | I <sub>O</sub> = 2.1 mA                      |
| Power Supply Current   | I <sub>CC</sub> | —    | 100             | mA   | V <sub>CC</sub> = 5.25, T <sub>A</sub> = 0°C |

**Read Cycle—AC Characteristics: Full Operating Voltage and Temperature Range**

| Parameter                       | Symbol           | G2332-3 |     | G2332-4 |     | Units |
|---------------------------------|------------------|---------|-----|---------|-----|-------|
|                                 |                  | Min     | Max | Min     | Max |       |
| Read Cycle Time                 | t <sub>CYC</sub> | 350     | —   | 450     | —   | nS    |
| Address Access Time             | t <sub>ACC</sub> | —       | 350 | —       | 450 | nS    |
| Chip Select Delay Time          | t <sub>CD</sub>  | —       | 120 | —       | 150 | nS    |
| Chip Deselect Delay Time        | t <sub>DF</sub>  | —       | 120 | —       | 150 | nS    |
| Data Valid After Address Change | t <sub>OH</sub>  | 20      | —   | 20      | —   | nS    |

**Capacitance**

| Parameter          | Symbol           | Typ | Max | Unit | Conditions          |
|--------------------|------------------|-----|-----|------|---------------------|
| Input Capacitance  | C <sub>IN</sub>  | 4   | 7   | pF   |                     |
| Output Capacitance | C <sub>OUT</sub> | 5   | 10  | pF   | V <sub>O</sub> = 0V |

**Timing Diagram**