

## MSM38256

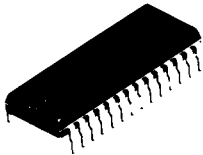
32768 WORD x 8 BIT MASK ROM (E3-S-029-32)

### GENERAL DESCRIPTION

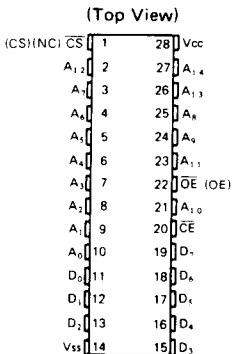
The MSM38256RS is an N-channel silicon gate MOS device ROM with a 32,768 word x 8 bit capacity. It operates on a 5V single power supply and the all inputs and outputs are TTL compatible. The adoption of an asynchronous system in the circuit requires no external clock assuring extremely easy operation. The availability of power down mode contributes to the low power dissipation which is as low as 30mA (max) when the chip is not selected. The application of a byte system and the pin compatibility with standard UV EPROMs make the device most suitable for use as a large-capacity fixed memory for microcomputers and data terminals. Since it provides CE, CS and OE signals, the connection of output terminals of other chips with the wired OR is possible ensuring an easy expand operation of memory and bus line control.

### FEATURES

- 32768 words x 8 bits
- 5V single power supply
- Access time: 250 ns MAX
- Input/output TTL compatible
- 3-state output
- Power down mode
- 28-pin DIP



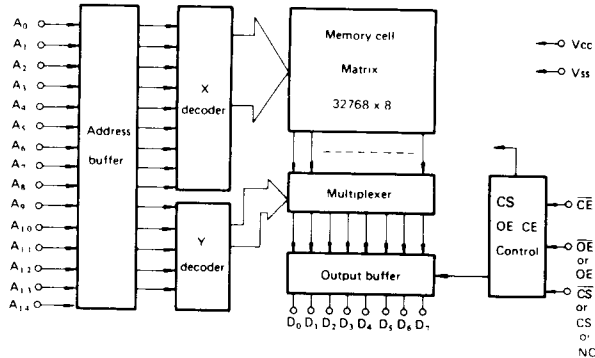
### PIN CONFIGURATION



$\overline{CS}$  : Chip Select  
 $\overline{OE}$  : Output enable  
 Vcc, Vss : Power supply voltage  
 A<sub>0</sub> ~ A<sub>14</sub> : Address input  
 D<sub>0</sub> ~ D<sub>7</sub> : Data output  
 $\overline{CE}$  : Chip enable

**Note:** The  $\overline{OE}$  active level and  $\overline{CS}$  active level are specified by customer.

### FUNCTIONAL BLOCK DIAGRAM



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## ABSOLUTE MAXIMUM RATINGS

(Ta = 25°C)

Rating	Symbol	Value	Unit	Conditions
Power Supply Voltage	V <sub>cc</sub>	-0.5 to 7	V	Respect to V <sub>SS</sub>
Input Voltage	V <sub>I</sub>	-0.5 to 7	V	
Output Voltage	V <sub>O</sub>	-0.5 to 7	V	
Power Dissipation	P <sub>D</sub>	1	W	Per package
Operating Temperature	T <sub>opr</sub>	0 to 70	°C	
Storage Temperature	T <sub>stg</sub>	-55 to 150	°C	

## OPERATING CONDITION AND DC CHARACTERISTICS

Parameter	Symbol	Measuring Condition	Rating			Unit
			Min.	Typ.	Max.	
Power Supply Voltage	V <sub>cc</sub>	—	4.5	5	5.5	V
	V <sub>ss</sub>	—	0	0	0	V
Input Signal Level	V <sub>IH</sub>	—	2	5	6	V
	V <sub>IL</sub>	—	-0.5	0	0.8	V
Output Signal Level	V <sub>OH</sub>	I <sub>OH</sub> = -400 μA	2.4	—	V <sub>cc</sub>	V
	V <sub>OL</sub>	I <sub>OL</sub> = 2.1 mA	—	—	0.4	V
Input Leakage Current	I <sub>LI</sub>	V <sub>I</sub> = 0V or V <sub>cc</sub>	-10	—	10	μA
Output Leakage Current	I <sub>LO</sub>	V <sub>O</sub> = 0V or V <sub>cc</sub> Chip not selected	-10	—	10	μA
Power Supply Current	I <sub>ccA</sub>	V <sub>cc</sub> = Max. I <sub>O</sub> = 0 mA	—	—	120	mA
	I <sub>ccs</sub>	V <sub>cc</sub> = Max. $\overline{CE}$ = V <sub>IH</sub> , I <sub>O</sub> = 0 mA	—	—	30	mA
Peak Power ON Current	I <sub>po</sub>	V <sub>cc</sub> = GND ~ V <sub>cc</sub> Min. $\overline{CE}$ = V <sub>cc</sub> or V <sub>IH</sub>	—	—	60	mA
Operating Temperature	T <sub>opr</sub>		0	—	70	°C

## AC CHARACTERISTICS

### TIMING CONDITIONS

Parameter	Conditions
Input Signal Level	V <sub>IH</sub> =2.4V, V <sub>IL</sub> =0.6V
Input Rising, Falling Time	tr=tf = 5 ns
Timing Measuring Point Voltage	Input Voltage=1.5V
	Output Voltage=0.8 & 2.0V
Loading Condition	C <sub>L</sub> =100 pF + 1 TTL

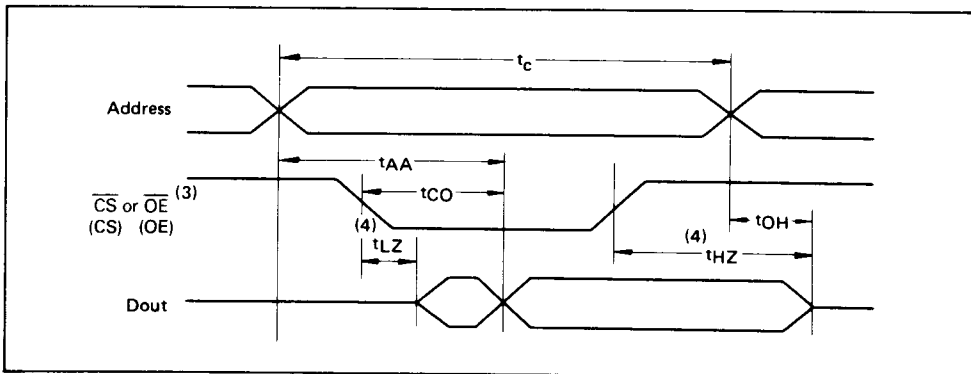
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## READ CYCLE

( $V_{CC} = 5V \pm 10\%$ ,  $V_{SS} = 0V$ ,  $T_a = 0^\circ C$  to  $+70^\circ C$ )

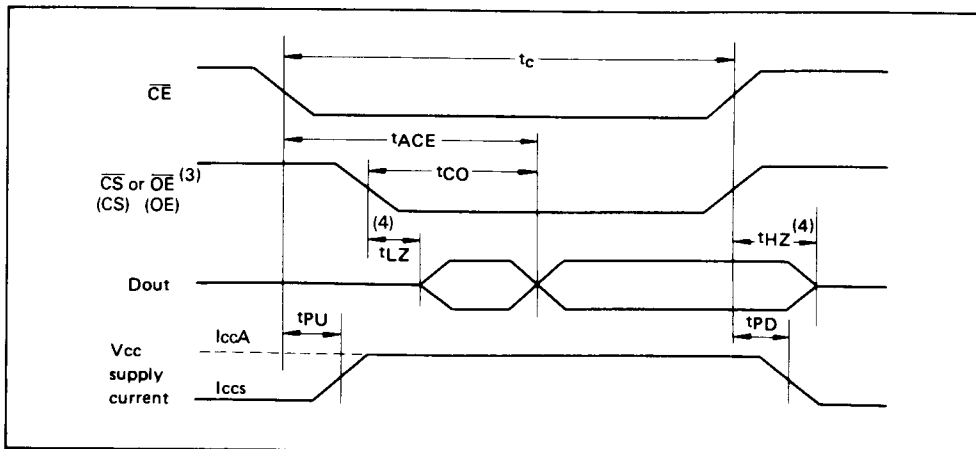
Parameter	Symbol	Specification Value			Unit	Remarks
		Min.	Typ.	Max.		
Cycle Time	$t_c$	250	—	—	ns	
Address Access Time	$t_{AA}$	—	—	250	ns	
Chip Enable Access Time	$t_{ACE}$	—	—	250	ns	
Output Delay Time	$t_{CO}$	—	—	100	ns	
Output Setting Time	$t_{LZ}$	10	—	—	ns	
Output Disable Time	$t_{HZ}$	10	—	100	ns	
Output Retaining Time	$t_{OH}$	10	—	—	ns	
Power Up Time	$t_{PU}$	0	—	—	ns	
Power Down Time	$t_{PD}$	—	—	100	ns	

### 1) READ CYCLE-1<sup>(1)</sup>



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### 2) READ CYCLE-2<sup>(2)</sup>



- Notes:
- (1)  $\overline{CE}$  is "L" level.
  - (2) The address is decided at the same time as or ahead of  $\overline{CE}$  "L" level.
  - (3)  $\overline{OE}$  and  $\overline{CS}$  are shown in the negative logic here, however the active level is freely selected.
  - (4)  $t_{LZ}$  is determined by the later  $\overline{CE}$  "L",  $\overline{OE}$  "L" or  $\overline{CS}$  "L".  
 $t_{Hz}$  is determined by the earlier  $\overline{CE}$  "H",  $\overline{OE}$  "H" or  $\overline{CS}$  "H".  
 $t_{Hz}$  shows time until floating therefore it is not determined by the output level.

## INPUT/OUTPUT CAPACITANCE

( $T_a = 25^\circ\text{C}$ ,  $f = 1\text{ MHz}$ )

Parameter	Symbol	Specification Value		Unit	Remarks
		Min.	Max.		
Input Capacitance	$C_I$	—	8	pF	$V_I=0V$
Output Capacitance	$C_O$	—	10	pF	$V_O=0V$