

## MSM27256AS

**32768 × 8 BIT UV ERASABLE ELECTRICALLY PROGRAMMABLE  
READ-ONLY MEMORY**

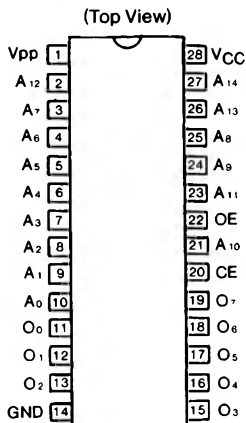
### GENERAL DESCRIPTION

The MSM27256 is a 32768 words × 8 bit ultraviolet erasable and electrically programmable read-only memory. Users can freely prepare the memory content, which can be easily changed, so the MSM27256 is ideal for microprocessor programs, etc. The MSM27256 is manufactured by the N channel double silicon gate MOS technology and is contained in the 28 pin package.

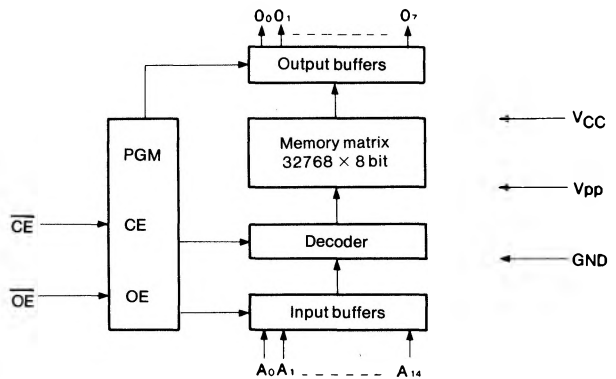
### FEATURES

- +5V single power supply
- 32768 words × 8 bit configuration
- Access time:
  - MAX150 ns (MSM27256-15)
  - MAX200 ns (MSM27256-20)
  - MAX250 ns (MSM27256-25)
- Power consumption:
  - MAX525 mW (during operation)
  - MAX184 mW (during stand-by)
- Perfect static operation
- INPUT/OUTPUT TTL level (three state output)

### PIN CONFIGURATION



### FUNCTIONAL BLOCK DIAGRAM



This specification may be changed without notification.

**FUNCTION TABLE**

Mode	Pins				
	$\overline{CE}$ (20)	$\overline{OE}$ (22)	V <sub>pp</sub> (1)	V <sub>CC</sub> (28)	Outputs
Read	V <sub>IL</sub>	V <sub>IL</sub>	+5V	+5V	Dout
Output Disable	V <sub>IL</sub>	V <sub>IH</sub>	+5V	+5V	High impedance
Stand-by	V <sub>IH</sub>	–	+5V	+5V	High impedance
Program	V <sub>IL</sub>	V <sub>IH</sub>	+12.5V	+6V	D <sub>IN</sub>
Program Verify	V <sub>IH</sub>	V <sub>IL</sub>	+12.5V	+6V	Dout
Program Inhibit	V <sub>IH</sub>	V <sub>IH</sub>	+12.5V	+6V	High impedance

–; Can be either V<sub>IL</sub> or V<sub>IH</sub>

**ABSOLUTE MAXIMUM RATINGS**

Temperature Under Bias	T <sub>a</sub> .....	–10°C ~ 80°C
Storage Temperature	T <sub>stg</sub> .....	–55°C ~ 125°C
All Input/Output Voltages	V <sub>IN</sub> , V <sub>OUT</sub> .....	–0.6V ~ 13.5V
V <sub>CC</sub> Supply Voltage	V <sub>CC</sub> .....	–0.3V ~ 7V
Program Voltage	V <sub>pp</sub> .....	–0.6V ~ 13.5V
Power Assembly Voltage	P <sub>D</sub> .....	1.5W

The voltage with respect to GND.

**ELECTRICAL CHARACTERISTICS**

< READ OPERATION >

**RECOMMENDED OPERATION CONDITION**

Parameter	Symbol	Limit			Operating Temperature	Remarks	Symbol
		Min.	Typ.	Max.			
V <sub>CC</sub> Power Supply Voltage	V <sub>CC</sub>	4.75	5.0	5.25	0°C ~ 70°C	V <sub>CC</sub> =5V±5% V <sub>pp</sub> =V <sub>CC</sub>	V
V <sub>pp</sub> Voltage	V <sub>pp</sub>	4.75	5.0	5.25			V
"H" Level Input Voltage	V <sub>IH</sub>	2.00	–	6.25			V
"L" Level Input Voltage	V <sub>IL</sub>	–0.1	–	0.8			V

The voltage with respect to GND

**DC CHARACTERISTICS**

( $V_{CC} = 5V \pm 5\%$ ,  $V_{pp} = V_{CC}$ ,  $T_a = 0^\circ C \sim 70^\circ C$ )

Parameter	Symbol	Conditions	Limits			Unit
			Min.	Typ.	Max.	
Input Leakage Current	$I_{LI}$	$V_{IN} = 5.25V$	–	–	10	$\mu A$
Output Leakage Current	$I_{LO}$	$V_{OUT} = 5.25V$	–	–	10	$\mu A$
$V_{CC}$ Power Current (Stand-by)	$I_{CC1}$	$\overline{CE} = V_{IH}$	–	–	35	mA
$V_{CC}$ Power Current (Operation)	$I_{CC2}$	$\overline{CE} = V_{IL}$	–	–	100	mA
Program Power Current	$I_{pp1}$	$V_{pp} = V_{CC}$	–	–	5	mA
Input Voltage "H" Level	$V_{IH}$	–	2.0	–	$V_{CC}+1$	V
Input Voltage "L" Level	$V_{IL}$	–	–0.1	–	0.8	V
Output Voltage "H" Level	$V_{OH}$	$I_{OH} = -400 \mu A$	2.4	–	–	V
Output Voltage "L" Level	$V_{OL}$	$I_{OL} = 2.1 mA$	–	–	0.45	V

**AC CHARACTERISTICS**

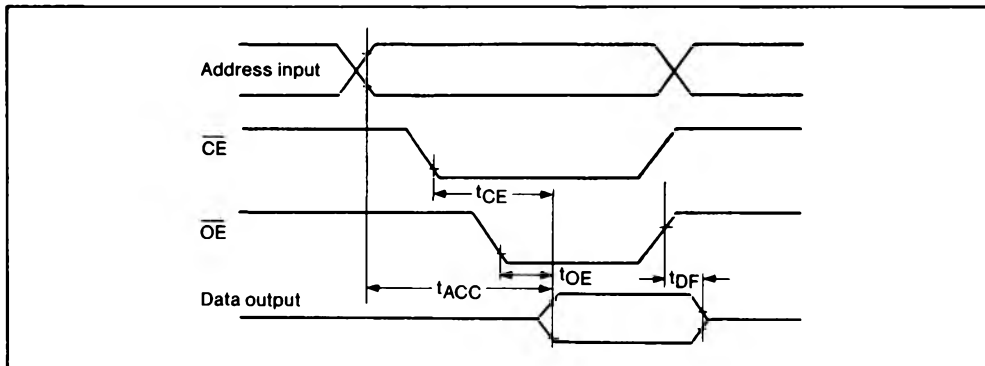
( $V_{CC} = 5V \pm 5\%$ ,  $V_{pp} = V_{CC}$ ,  $T_a = 0^\circ C \sim 70^\circ C$ )

Parameter	Symbol	Conditions	27256-15		27256-20		27256-25		Unit
			Min.	Max.	Min.	Max.	Min.	Max.	
Address Access Time	$t_{ACC}$	$\overline{CE} = \overline{OE} = V_{IL}$	–	150	–	200	–	250	ns
$\overline{CE}$ Access Time	$t_{CE}$	$\overline{OE} = V_{IL}$	–	150	–	200	–	250	ns
$\overline{OE}$ Access Time	$t_{OE}$	$\overline{CE} = V_{IL}$	–	70	–	75	–	100	ns
Output Disable Time	$t_{DF}$	$\overline{CE} = V_{IL}$	0	50	0	55	0	60	ns

Measurement condition

- Input pulse level ..... 0.45V and 2.4V
- Input timing reference level ..... 0.8V and 2.0V
- Output load ..... 1TTL GATE + 100pF
- Output timing reference level ..... 0.8V and 2.0V

**TIME CHART**



**DC CHARACTERISTICS**

( $V_{CC} = 6V \pm 0.25V$ ,  $V_{pp} = 12.5V \pm 0.5V$ ,  $T_a = 25^\circ C \pm 5^\circ C$ )

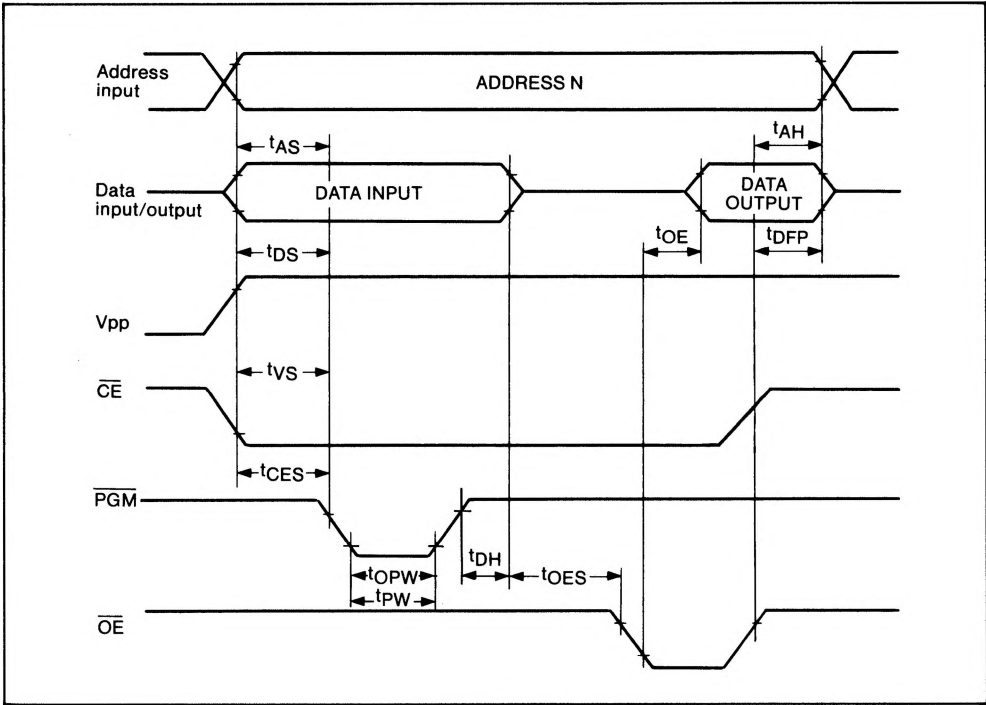
Parameter	Symbol	Conditions	Limits			Unit
			Min.	Typ.	Max.	
Input Leakage Current	$I_{LI}$	$V_{IN} = 5.25V$	–	–	10	$\mu A$
$V_{pp}$ Power Current	$I_{pp}$	$\overline{CE} = V_{IL}, \overline{OE} = V_{IH}$	–	–	50	mA
$V_{CC}$ Power Current	$I_{CC}$	–	–	–	100	mA
Input Voltage "H" Level	$V_{IH}$	–	2.0	–	$V_{CC}+1$	V
Input Voltage "L" Level	$V_{IL}$	–	–0.1	–	0.8	V
Output Voltage "H" Level	$V_{OH}$	$I_{OH} = -400 \mu A$	2.4	–	–	V
Output Voltage "L" Level	$V_{OL}$	$I_{OL} = 2.1 \text{ mA}$	–	–	0.45	V

**AC CHARACTERISTICS**

( $V_{CC} = 6V \pm 0.25V$ ,  $V_{pp} = 12.5V \pm 0.5V$ ,  $T_a = 25^\circ C \pm 5^\circ C$ )

Parameter	Symbol	Conditions	Limits			Unit
			Min.	Typ.	Max.	
Address Set-up Time	$t_{AS}$	–	2	–	–	$\mu S$
$\overline{OE}$ Set-up Time	$t_{OES}$	–	2	–	–	$\mu S$
Data Set-up Time	$t_{DS}$	–	2	–	–	$\mu S$
Address Hold Time	$t_{AH}$	–	0	–	–	$\mu S$
Data Hold Time	$t_{DH}$	–	2	–	–	$\mu S$
Output Enable to Output Float Delay	$t_{DFP}$	–	0	–	130	ns
$V_{pp}$ Power Set-up Time	$t_{VS}$	–	2	–	–	$\mu S$
$\overline{CE}$ Initial Program Pulse Width	$t_{PW}$	–	0.95	1.0	1.05	ms
$\overline{CE}$ Overprogram Pulse Width	$t_{OPW}$	–	2.85	–	78.75	ms
Data Valid from $\overline{OE}$	$t_{OE}$	–	–	–	150	ns

**TIME CHART**



**CAPACITANCE**

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit.
Input Capacitance	$C_{IN}$	$V_{IN} = 0V$	—	4	6	pF
Output Capacitance	$C_{OUT}$	$V_{OUT} = 0V$	—	8	12	pF