

OKI semiconductor

MSM27C256H

32,768-Word x 8-Bit UV EPROM

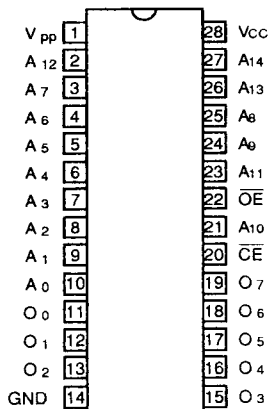
GENERAL DESCRIPTION

The MSM27C256H is a 32,768-word x 8-bit ultraviolet erasable and electrically programmable read-only memory. The MSM27C256H is manufactured by the CMOS double silicon gate technology and is contained in the 28-pin package.

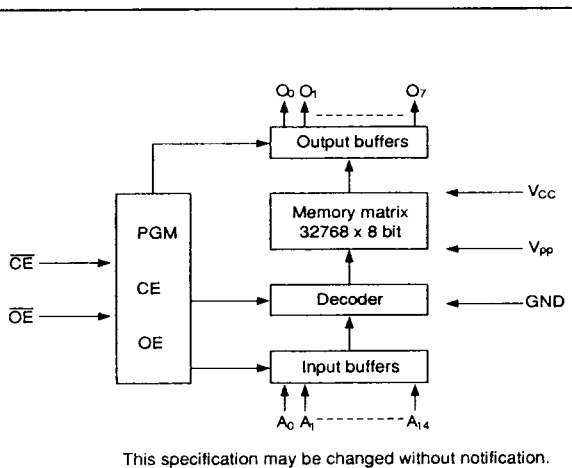
FEATURES

- +5V single power supply
- 32,768-word x 8-bit configuration
- Access time:
 - MAX 55 ns (MSM27C256H-55)
 - MAX 70 ns (MSM27C256H-70)
- Power consumption
 - MAX525 mW (during operation)
 - MAX184 mW (during standby)
- Completely static operation
- INPUT/OUTPUT TTL compatible (three state output)

PIN CONFIGURATION (TOP VIEW)



FUNCTIONAL BLOCK DIAGRAM



TRUTH TABLE

Mode	Pins	\overline{CE} (20)	\overline{OE} (22)	V_{pp} (1)	V_{CC} (28)	Outputs
Read		V_{IL}	V_{IL}	+5V	+5V	D_{OUT}
Output Disable		V_{IL}	V_{IH}	+5V	+5V	High impedance
Stand-by		V_{IH}	—	+5V	+5V	High impedance
Program		V_{IL}	V_{IH}	+12.5V	+6V	D_{IN}
Program Verify		V_{IH}	V_{IL}	+12.5V	+6V	D_{OUT}
Program Inhibit		V_{IH}	V_{IH}	+12.5V	+6V	High impedance

—: Can be either V_{IL} or V_{IH}

**ELECTRICAL CHARACTERISTICS
ABSOLUTE MAXIMUM RATINGS**

Rating	Symbol	Conditions	Value	Unit
Temperature Under Bias	T_a	—————	0 ~ 70	°C
Storage Temperature	T_{stg}	—————	-55 ~ 125	°C
Input Voltage	V_{IN}	—————	-0.6 ~ 13	V
Output Voltage	V_{OUT}	—————	-0.6 ~ $V_{CC}+0.5$	V
Supply Voltage	V_{CC}	—————	-0.6 ~ 7	V
Program Voltage	V_{pp}	—————	-0.6 ~ 14	V

The voltage referenced to GND.

Note: Permanent device damage may occur if ABSOLUTE MAXIMUM RATINGS are exceeded. Functional operation should be restricted to the conditions as detailed in the operational sections of this data sheet. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

**READ OPERATION
RECOMMENDED OPERATING CONDITIONS**

($T_a = 0 \sim 70^\circ\text{C}$)

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Supply Voltage	V_{CC}	$V_{CC} = 5V \pm 5\%$ $V_{pp} = V_{CC}$	4.75	5.0	5.25	V
V_{pp} Voltage	V_{pp}		4.75	5.0	5.25	V
"H" Level Input Voltage	V_{IH}		3.0	—	$V_{CC}+0.5$	V
"L" Level Input Voltage	V_{IL}		-0.1	—	0.3	V

The voltage referenced to GND.

DC CHARACTERISTICS

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

Parameter	Symbol	Conditions	MSM27C256			Unit	Notes
			Min.	Typ.	Max.		
Input Leakage Current	I_{LI}	$V_{IN} = 5.25V$	-	-	10	μA	
Output Leakage Current	I_{LO}	$V_{OUT} = 5.25V$	-	-	10	μA	
V_{CC} Power Current (Standby)	I_{CC1}	$\overline{CE} = V_{IH}$, $f = 10\text{ MHz}$	-	-	35	mA	
V_{CC} Power Current (Operation)	I_{CC2}	$\overline{OE} = V_{IL}$, $f = 10\text{ MHz}$	-	-	100	mA	
Program Power Current	I_{pp}	$V_{pp} = V_{CC}$	-	-	5	mA	
Input Voltage "H" Level	V_{IH}	-	2.0	-	$V_{CC} + 0.5$	V	
Input Voltage "L" Level	V_{IL}	-	-0.1	-	0.8	V	
Output Voltage "H" Level	V_{OH}	$I_{OH} = -4\text{ mA}$	2.4	-	-	V	
Output Voltage "L" Level	V_{OL}	$I_{OL} = 8\text{ mA}$	-	-	0.45	V	

AC CHARACTERISTICS

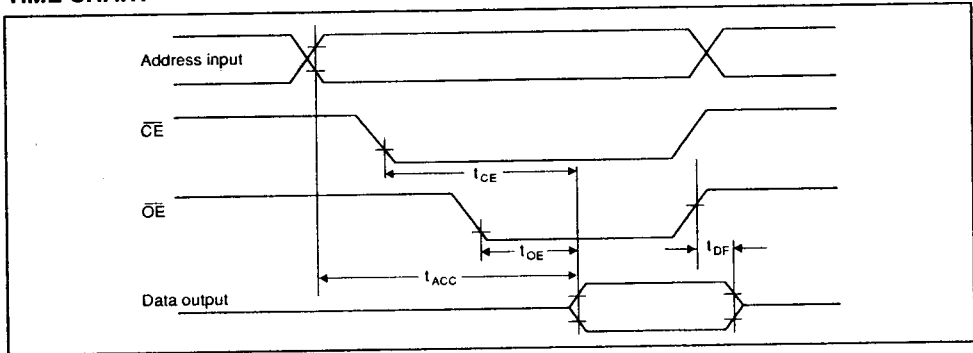
($V_{CC} = 5V \pm 5\%$, $V_{pp} = V_{CC}$, $T_a = 0 \sim 70^\circ C$)

Parameter	Symbol	Conditions	27C256H-55		27C256H-70		Unit	Notes
			Min.	Max.	Min.	Max.		
Address Access Time	t_{ACC}	$\overline{CE} = \overline{OE} = V_{IL}$	-	55	-	70	ns	
\overline{CE} Access Time	t_{CE}	$\overline{OE} = V_{IL}$	-	55	-	70	ns	
\overline{OE} Access Time	t_{OE}	$\overline{CE} = V_{IL}$	-	25	-	30	ns	
Output Disable Time	t_{DF}	$\overline{CE} = V_{IL}$	0	20	0	25	ns	

Measurement Conditions

- Input pulse level0V and 3.0V
- Input timing reference level0.8V and 2.0V
- Output load1 TTL GATE + 30 pF
- Output timing reference level0.8V and 2.0V

TIME CHART



**PROGRAMMING OPERATION
DC CHARACTERISTICS**

(V_{CC} = 5.75V ± 6.5V, V_{pp} = 12.5V ± 0.5V, T_a = 25°C ± 5°C)

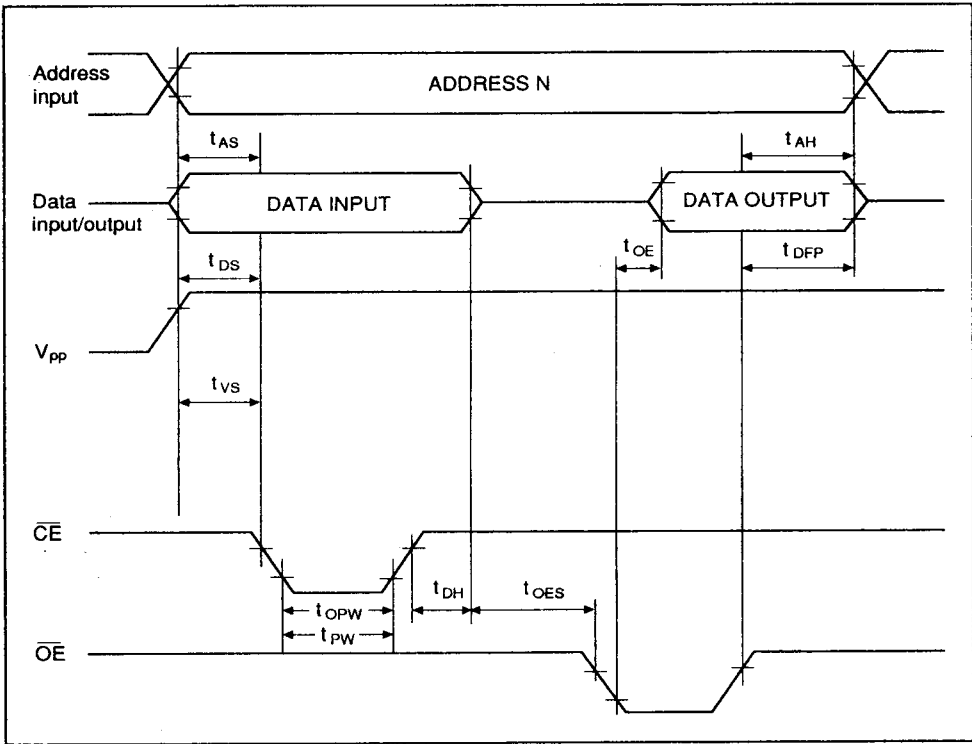
Parameter	Symbol	Conditions	MSM27C256H			Unit	Notes
			Min.	Typ.	Max.		
Input Leakage Current	I _{LI}	V _{IN} = 5.25V	-	-	10	μA	
V _{pp} Power Current	I _{pp2}	$\overline{CE} = V_{IL}, \overline{OE} = V_{IH}$	-	-	50	mA	
V _{CC} Power Current	I _{CC}	-	-	-	100	mA	
Input Voltage "H" Level	V _{IH}	-	2.0	-	V _{CC} +0.5	V	
Input Voltage "L" Level	V _{IL}	-	-0.1	-	0.8	V	
Output Voltage "H" Level	V _{OH}	I _{OH} = -4 mA	2.4	-	-	V	
Output Voltage "L" Level	V _{OL}	I _{OL} = 8 mA	-	-	0.45	V	

AC CHARACTERISTICS

(V_{CC} = 5.75V ~ 6.5V, V_{pp} = 12.5V ± 0.5V, T_a = 25°C ± 5°C)

Parameter	Symbol	Conditions	MSM27C256H			Unit	Notes
			Min.	Typ.	Max.		
Address Set-up Time	t _{AS}	-	2	-	-	μS	
\overline{OE} Set-up Time	t _{OES}	-	2	-	-	μS	
Data Set-up time	t _{DS}	-	2	-	-	μS	
Address Hold Time	t _{AH}	-	0	-	-	μS	
Data Hold Time	t _{DH}	-	2	-	-	μS	
Output Enable to Output Float Delay	t _{DFF}	-	0	-	130	ns	
V _{pp} Power Set-up Time	t _{VS}	-	2	-	-	μS	
\overline{CE} Initial Program Pulse Width	t _{PW}	V _{CC} = 6V±0.25V	0.95	1.0	1.05	mS	
\overline{CE} Program Pulse Width	t _{PW}	V _{CC} = 6.25V±0.25V	95	100	105	μS	
\overline{CE} Overprogram Pulse Width	t _{OPW}	V _{CC} = 6V±0.25V	2.85	-	78.75	ms	
Data Valid from \overline{OE}	t _{OE}	-	-	-	150	ns	

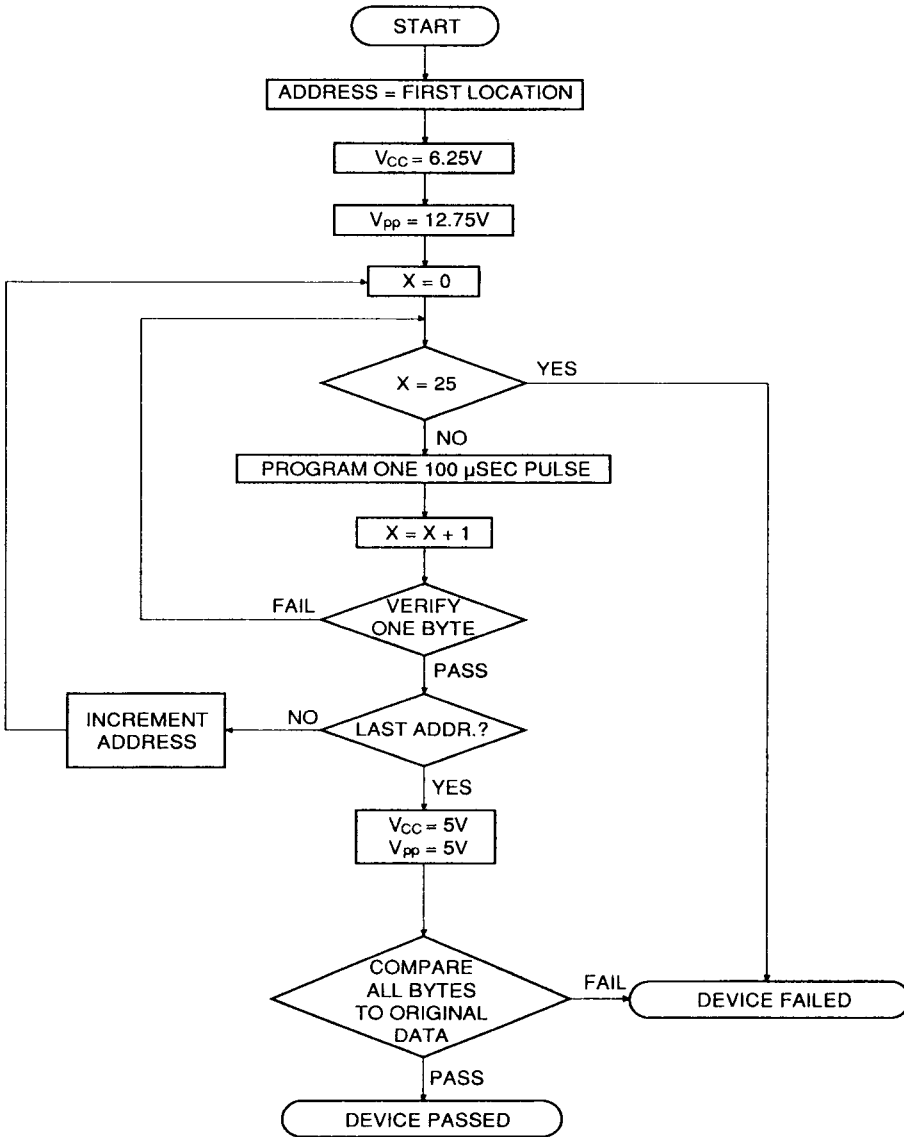
TIME CHART



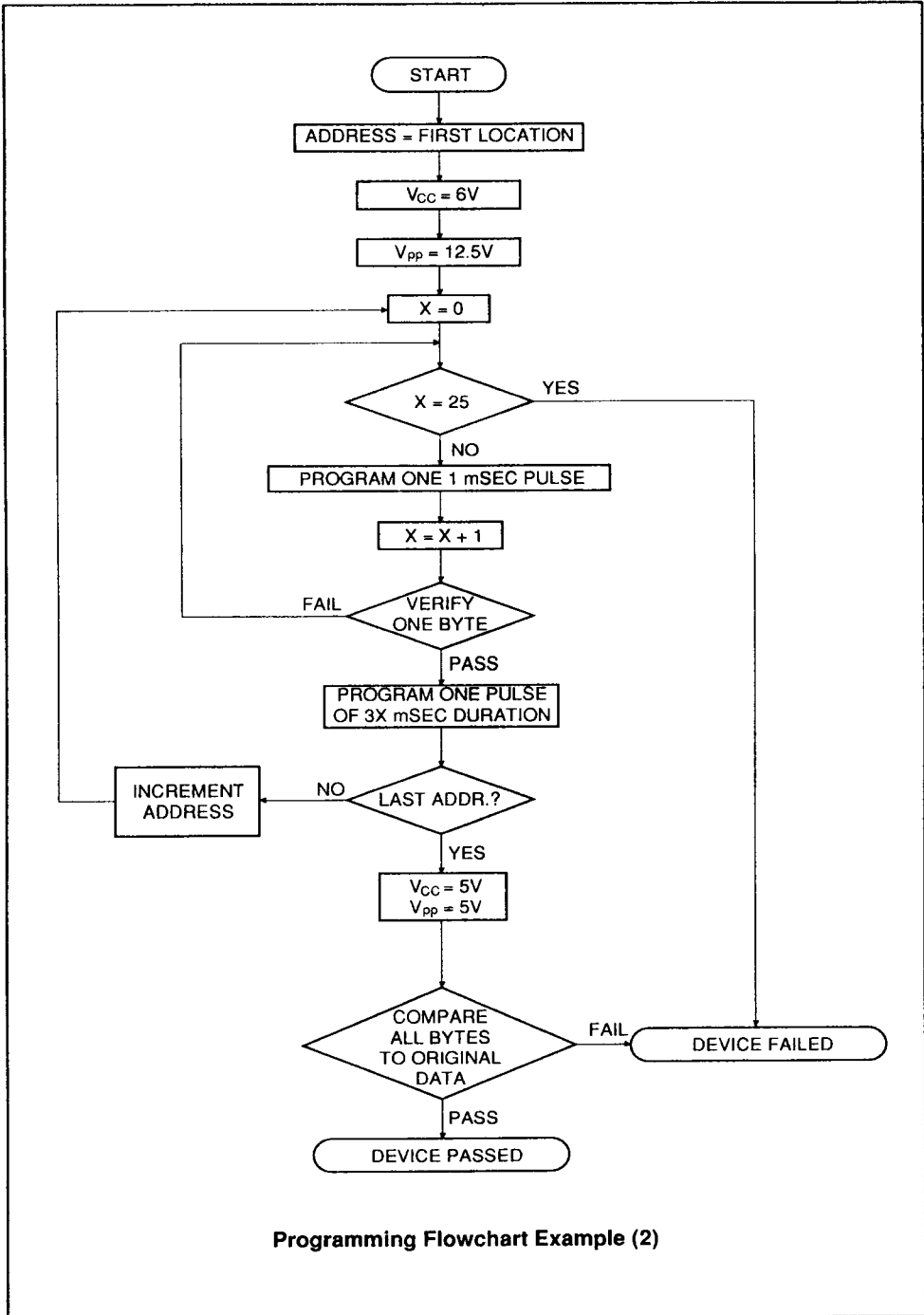
CAPACITANCE

(T_a = 25°C, f = 1 MHz, V_{cc} = 5V)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Capacitance	C _{IN}	V _{IN} = 0V	-	-	12	pF
Output Capacitance	C _{OUT}	V _{OUT} = 0V	-	-	15	pF



Programming Flowchart Example (1)



Programming Flowchart Example (2)