MSM27C1024

65536 × 16 BIT UV ERASABLE ELECTRICALLY PROGRAMMABLE READ-ONLY MEMORY

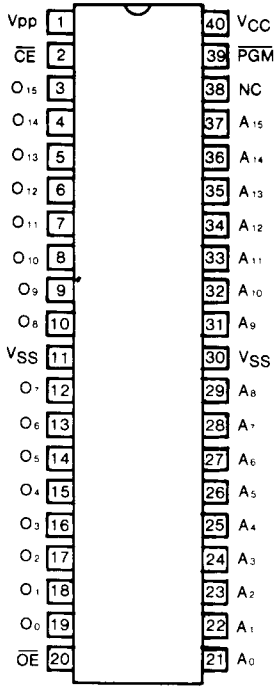
GENERAL DESCRIPTION

The MSM27C1024 is a 65536 words × 16 bit ultraviolet erasable and electrically programmable read-only memory. Users can freely prepare the memory content, which can be easily changed, so the MSM27C1024 is ideal for microprocessor programs, etc. The MSM27C1024 is manufactured by the CMOS double silicon gate technology and is contained in the 40 pin package.

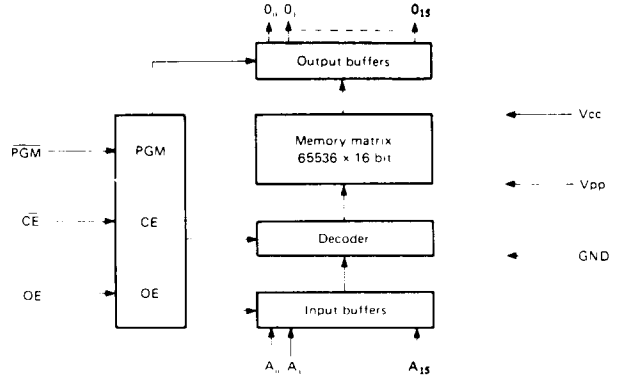
FEATURES

- +5V single power supply
- 65536 words × 16 bit configuration
- Access time:
  MAX120 ns (MSM27C1024-12)
  MAX150 ns (MSM27C1024-15)
  MAX200 ns (MSM27C1024-20)
- Power consumption:
  MAX 165 mW (during operation)
  MAX 5.5mW (during stand-by)
- Completely static operation
- INPUT/OUTPUT TTL compatible (three state output)

PIN CONFIGURATION



FUNCTIONAL BLOCK DIAGRAM



This specification may be changed without notification

FUNCTION TABLE

Mode \ Pins	$\overline{CE}$ (2)	$\overline{OE}$ (20)	$\overline{PGM}$ (39)	VPP (1)	VCC (40)	Outputs
Read	V_{IL}	V_{IL}	—	V_{CC}	+5V	D_{OUT}
Output Disable	V_{IL}	V_{IH}	—	V_{CC}	+5V	High impedance
Stand-by	V_{IH}	—	—	V_{CC}	+5V	High impedance
Program	V_{IL}	V_{IH}	V_{IL}	+12.75V	+6.25V	D_{IN}
Program Verify	V_{IL}	V_{IL}	V_{IH}	+12.75V	+6.25V	D_{OUT}
Program Inhibit	V_{IH}	—	—	+12.75V	+6.25V	High impedance

NOTES:
—; Can be either V_{IL} or V_{IH}

ABSOLUTE MAXIMUM RATINGS

Temperature Under Bias	Ta	0°C ~ 70°C
Storage Temperature	Tstg	−55°C ~ 125°C
All Input/Output Voltages	V_{IN}, V_{OUT}	V_{IN} = −0.6V ~ 13V, V_{OUT} = −0.6V ~ V_{CC} + 0.5V
V_{CC} Supply Voltage	V_{CC}	−0.6V ~ 7V
Program Voltage	Vpp	−0.6V ~ 14V

The voltage with respect to GND.

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ELECTRICAL CHARACTERISTICS

<READ OPERATION>

RECOMMENDED OPERATION CONDITION

Parameter	Symbol	Limit			Operating Temperature	Remarks	Symbol
		Min.	Typ.	Max.			
V_{CC} Power Supply Voltage	V_{CC}	4.5	5.0	5.5	0°C ~ 70°C	V_{CC}=5V±0.5V Vpp=V_{CC}	V
Vpp Voltage	Vpp	4.5	5.0	5.5			V
"H" Level Input Voltage	V_{IH}	2.00	–	V_{CC}+0.5			V
"L" Level Input Voltage	V_{IL}	−0.1	–	0.8			V

The voltage with respect to GND

DC CHARACTERISTICS

(V_{CC} = 5V±10%, Ta = 0°C ~ 70°C)

Parameter	Symbol	Conditions	Limits			Unit
			Min.	Typ.	Max.	
Input Leakage Current	I_{LI}	V_{IN} = 5.5V	–	–	10	μA
Output Leakage Current	I_{LO}	V_{OUT} = 5.5V	–	–	10	μA
V_{CC} Power Current (Stand-by)	I_{CC_1}	$\overline{CE}$ = V_{CC}	–	–	1	mA
V_{CC} Power Current (Operation)	I_{CC_2}	$\overline{CE}$ = V_{IL}	–	–	30	mA
Program Power Current	I_{PP_1}	Vpp = V_{CC}	–	–	10	μ
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} = −400 μA	2.4	–	–	V
Output Voltage "L" Level	V_{OL}	I_{OL} = 2.1 mA	–	–	0.45	V

AC CHARACTERISTICS

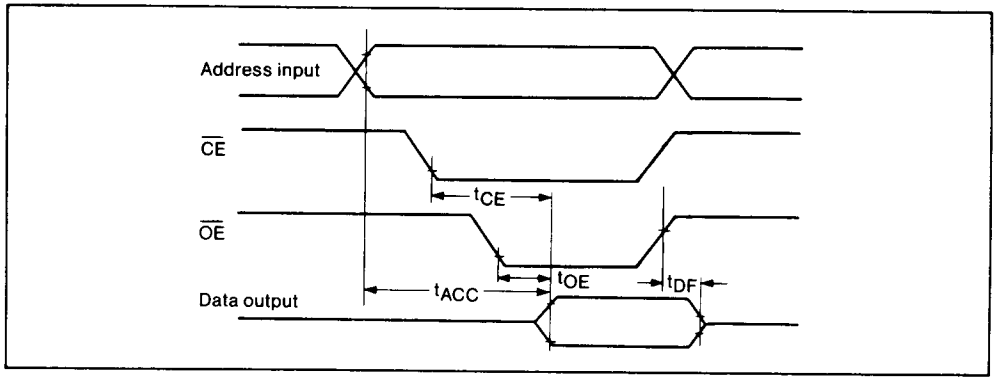
(V_{CC} = 5V±10%, Ta = 0°C ~ 70°C)

Parameter	Symbol	Conditions	27C1000-12		27C1000-15		27C1000-20		Unit
			Min.	Max.	Min.	Max.	Min.	Max.	
Address Access Time	t_{ACC}	$\overline{CE}$ = $\overline{OE}$ = V_{IL},	–	120	–	150	–	200	ns
$\overline{CE}$ Access Time	t_{CE}	$\overline{OE}$ = V_{IL},	–	120	–	150	–	200	ns
$\overline{OE}$ Access Time	t_{OE}	$\overline{CE}$ = V_{IL},	–	50	–	60	–	70	ns
Output Disable Time	t_{DF}	$\overline{CE}$ = V_{IL},	0	40	0	50	0	55	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


Address input
$\overline{CE}$
$\overline{OE}$
Data output
t_{CE}
t_{OE}
t_{DF}
t_{ACC}

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DC CHARACTERISTICS

(V_{CC} = 6.25V±0.25V, Vpp = 12.75V±0.25V, Ta = 25°C±5°C)

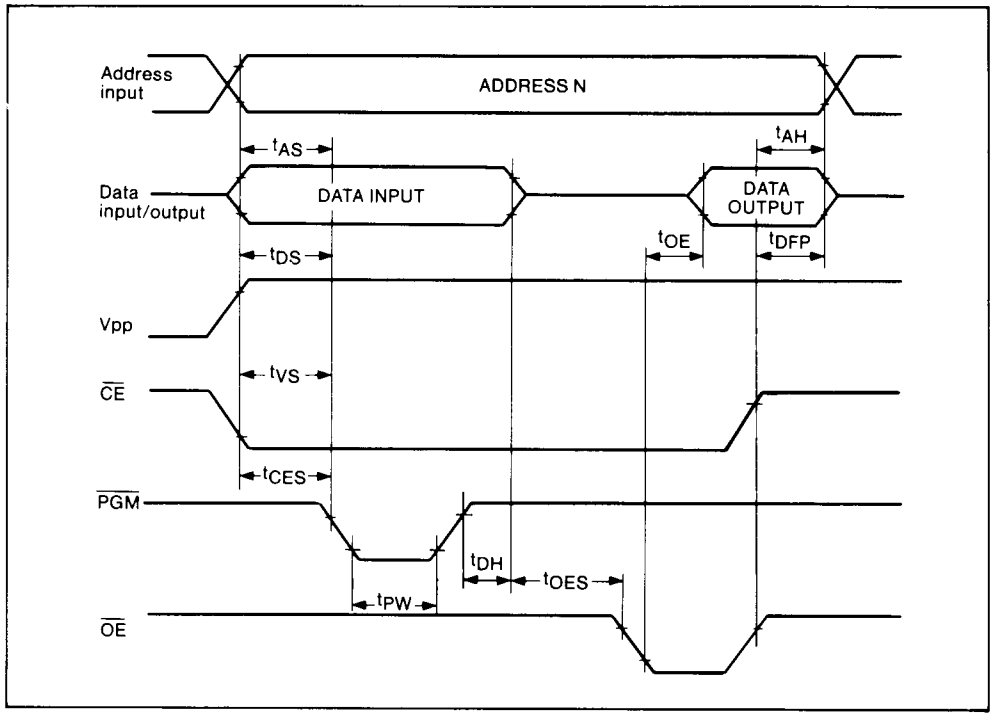
Parameter	Symbol	Conditions	Limits			Unit
			Min.	Typ.	Max.	
Input Leakage Current	I_{LI}	V_{IN} = 5.5V	–	–	10	μA
Vpp Power Current	I_{PP2}	$\overline{CE} = \overline{PGM} = V_{IL}$	–	–	50	mA
V_{CC} Power Current	I_{CC}	–	–	–	30	mA
Input Voltage "H" Level	V_{IH}	–	2.0	–	V_{CC}+0.5	V
Input Voltage "L" Level	V_{IL}	–	−0.1	–	0.8	V
Output Voltage "H" Level	V_{OH}	I_{OH} = −400 μA	2.4	–	–	V
Output Voltage "L" Level	V_{OL}	I_{OL} = 2.1 mA	–	–	0.45	V

AC CHARACTERISTICS

(V_{CC} = 6.25V±0.25V, Vpp = 12.75V±0.25V, Ta = 25°C±5°C)

Parameter	Symbol	Conditions	Limits			Unit
			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_{DFP}	–	0	–	130	ns
Vpp Power Set-up Time	t_{VS}	–	2	–	–	μs
$\overline{PGM}$ Program Pulse Width	t_{PW}	—	95	100	105	μs
$\overline{CE}$ Set-up Time	t_{CES}	–	2	–	–	μs
Data Valid from $\overline{OE}$	t_{OE}	–	–	–	150	ns

TIME CHART



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CAPACITANCE

(Ta = 25°C, f = 1 MHz, Vcc ≒ 5V)

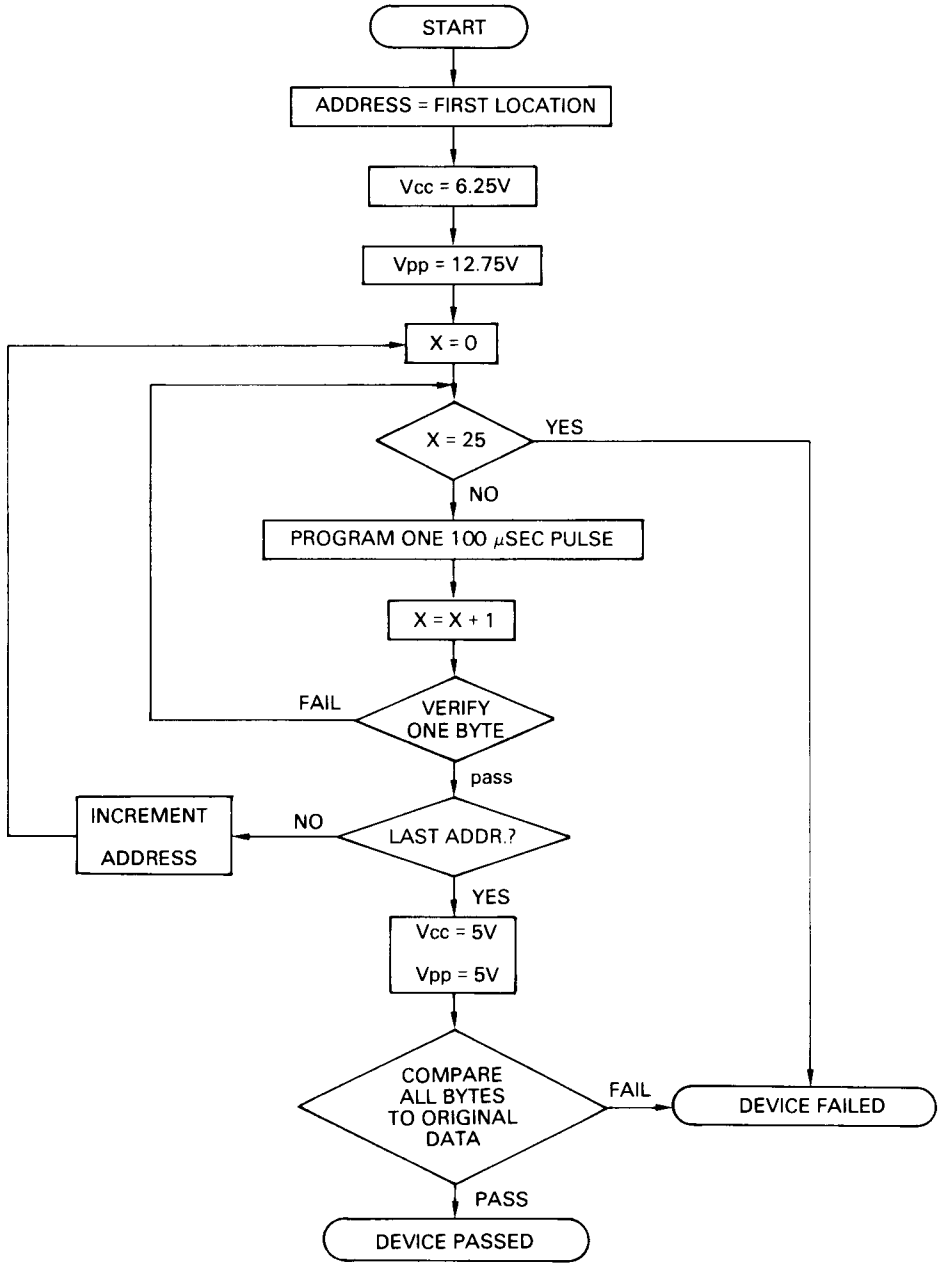
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit.
Input Capacitance	C_{IN}	V_{IN} = 0V	–	–	12	pF
Output Capacitance	C_{OUT}	V_{OUT} = 0V	–	–	15	pF

MSM27C1024 IDENTIFIER BYTES

Pins / Code	A_0 (21)	$D_{15} \sim D_8$ (3) ~ (10)	D_7 (12)	D_6 (13)	D_5 (14)	D_4 (15)	D_3 (16)	D_2 (17)	D_1 (18)	D_0 (19)	Hex Data
Manufacter Code	V_{IL}	0 ~ 0	1	0	1	0	1	1	1	0	00AE
Device Code	V_{IH}	0 ~ 0	0	0	0	0	0	1	1	1	0007

Notes: 1. $A_9 = 12.0 \pm 0.5V$

2. $A_1 \sim A_8$, $A_{10} \sim A_{15}$, $\overline{CE}$, $\overline{OE} = V_{IL}$, $\overline{PGM} = V_{IH}$ OR V_{IL}, $Vpp = V_{CC}$



Programming Flowchart Example (I)