

MSM27C131ZB

131,072-Word x 8-Bit Low-Voltage One Time PROM

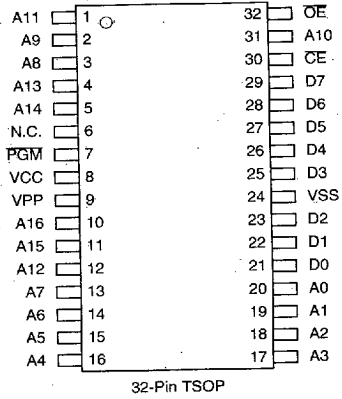
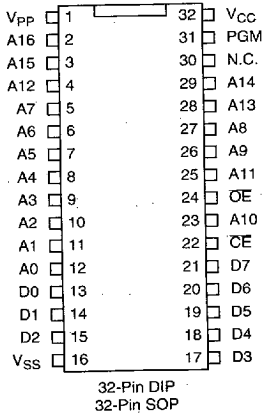
DESCRIPTION

The MSM27C131ZB is a 1 Mb electrically Programmable Read-Only Memory organized as 131,072 words x 8 bits. The MSM27C131ZB operates on a single 3.3 V power supply and is TTL compatible. Since the MSM27C131ZB operates asynchronously, external clocks are not required, making the MSM27C131ZB easy-to-use. The MSM27C131ZB is suitable as large-capacity fixed memory for microcomputers and data terminals. This device is manufactured using a CMOS double silicon gate technology and is offered in 32-pin DIP, 32-pin SOP, or 32-pin TSOP packages.

FEATURES

- 128K x 8 bits
- Single 3.3 V power supply
 - 5 Volt version available (MSM27C121ZB)
- 150 ns access time (max.)
- Input/Output TTL compatible
- Three-state output
- Packages
 - 32-Pin plastic DIP (DIP32-P-600)
 - 32-Pin plastic SOP (SOP32-P-525-K)
 - 32-Pin plastic TSOP (TSOP32-P-814-K)

PIN CONFIGURATION

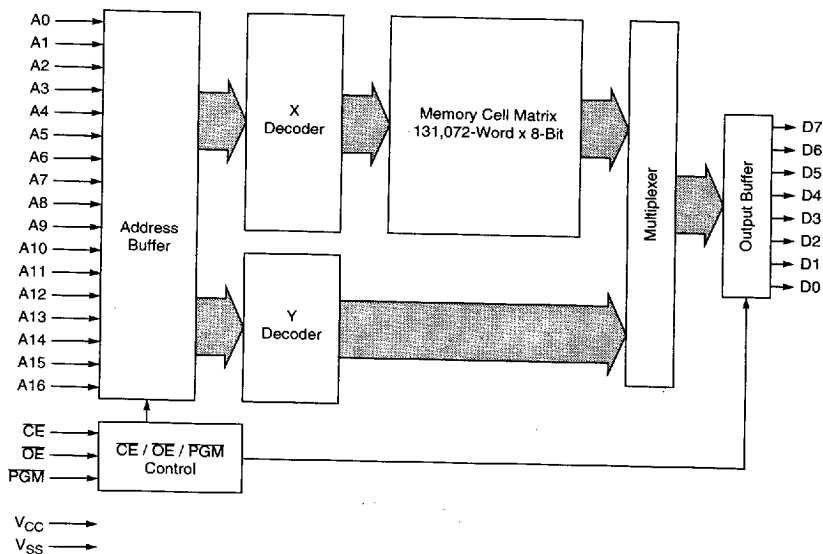


Pin Configuration

Pin Name	Function
A0 ~ A16	Address input
D0 ~ D7	Data output
CE	Chip enable
OE	Output enable
PGM	Program
VCC	Power supply voltage
VPP	Program power supply voltage

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BLOCK DIAGRAM



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Function Table

Mode	CE	OE	PGM	V _{PP}	V _{CC}	D0 - D7
Read	L	L				D _{OUT}
Output disable	L	H	[1]	[1]	3.0 V to 5.5 V	Hi-Z
Stand-by	H	[1]				Hi-Z
Program	L	H	L			D _{IN}
Program inhibit	H	[1]	[1]	12.75 V	6.25 V	Hi-Z
Program verify	L	L	H			D _{OUT}

1. Don't care

ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings ^[1]

Parameter	Symbol	Value	Unit
Operating temperature under bias	T_A	0 ~ +70	°C
Storage temperature	T_{STG}	-55 ~ +125	°C
Input voltage relative to V_{SS}	V_{IN}	-0.3 ~ $V_{CC} + 0.5$	V
Output voltage relative to V_{SS}	V_{OUT}	-0.3 ~ $V_{CC} + 0.5$	V
Power supply voltage relative to V_{SS}	V_{CC}	-0.3 ~ +7.0	V
Program power supply voltage relative to V_{SS}	V_{PP}	-0.3 ~ +14	V
Power dissipation per package	P_D	1.5	W

1. 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.

Recommended Operating Conditions ($V_{CC} = 3.3 \text{ V} \pm 5\%$, $T_a = 0 \text{ to } +70^\circ\text{C}$)

Parameter	Symbol	Rated Value			Unit
		Min	Typ	Max	
Power supply voltage	V_{CC}	3.0	-	5.5	V
Program power supply voltage	V_{PP}	-0.3	-	$V_{CC} + 0.5$	V
Input high voltage	V_{IH}	2.2	-	$V_{CC} + 0.5$	V
Input low voltage	V_{IL}	-0.3	-	0.6	V

Capacitance ($T_a = 25^\circ\text{C}$, $f = 1 \text{ MHz}$, $V_{CC} = 3.3 \text{ V}$)

Parameter	Symbol	Conditions	Rated Value			Unit
			Min	Typ	Max	
Input capacitance	C_I	$V_{IN} = 0 \text{ V}$	-	-	12	pF
Output capacitance	C_O	$V_{OUT} = 0 \text{ V}$	-	-	15	pF

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Read Operation

DC Characteristics ($V_{CC} = 3.3\text{ V} \pm 5\%$, $T_a = 0^\circ\text{C} \sim +70^\circ\text{C}$) [1]

Parameter	Symbol	Condition	Rated Value			Unit	
			Min	Typ	Max		
Input leakage current	I_{LI}	$V_{IN} = V_{CC} + 0.5\text{ V}$	-	-	10	μA	
Output leakage current	I_{LO}	$V_{OUT} = V_{CC} + 0.5\text{ V}$	-	-	10	μA	
Power supply current (Standby)	I_{CS1}	$\overline{CE} = V_{CC}$	-	-	10	μA	
	I_{CS2}	$\overline{CE} = V_{IH}$	-	-	300	μA	
Power supply current (Operation)	I_{CC}	$\overline{CE} = V_{IL}$	$t_C = 70\text{ ns}$	-	-	20	mA
		$\overline{OE} = V_{IH}$					
Program power current	I_{PP}	$V_{PP} = V_{CC}$	-	-	10	μA	
Input high voltage	V_{IH}		2.2	-	$V_{CC} + 0.5$	V	
Input low voltage	V_{IL}		-0.3	-	0.8	V	
Output high voltage	V_{OH1}	$I_{OH} = -100\text{ }\mu\text{A}$	$V_{CC} - 0.1$	-	-	V	
	V_{OH2}	$I_{OH} = -1\text{ mA}$	$V_{CC} - 0.4$	-	-	V	
Output low voltage	V_{OL1}	$I_{OL} = 100\text{ }\mu\text{A}$	-	-	0.1	V	
	V_{OL2}	$I_{OL} = 1\text{ mA}$	-	-	0.4	V	

1. The voltage referenced to GND.

AC Characteristics Read Cycle ($V_{CC} = 3.3\text{ V} \pm 5\%$, $T_a = 0^\circ\text{C} \sim +70^\circ\text{C}$) [1]

Parameter	Symbol	Conditions	Rated Value			Unit
			Min	Typ	Max	
Address access time	t_{ACC}	$\overline{CE} = \overline{OE} = V_{IL}$	-	-	150	ns
\overline{CE} access time	t_{CE}	$\overline{OE} = V_{IL}$	-	-	150	ns
\overline{OE} access time	t_{OE}	$\overline{CE} = V_{IL}$	-	-	80	ns
Output disable time	t_{DF1}	$\overline{OE} = V_{IL}$	0	-	75	ns
	t_{DF2}	$\overline{CE} = V_{IL}$	0	-	70	ns
Output hold time	t_{OH}	$\overline{CE} = \overline{OE} = V_{IL}$	0	-	-	ns

1. Input signal level: $V_{IH} = 3.0\text{ V}$, $V_{IL} = 0.0\text{ V}$. Input timing reference level: $V_{IH} = 2.0\text{ V}$, $V_{IL} = 0.8\text{ V}$.
Output load: 1TTL gate + 50pF. Output timing reference level: $V_{OH} = 2.0\text{ V}$, $V_{OL} = 0.8\text{ V}$.

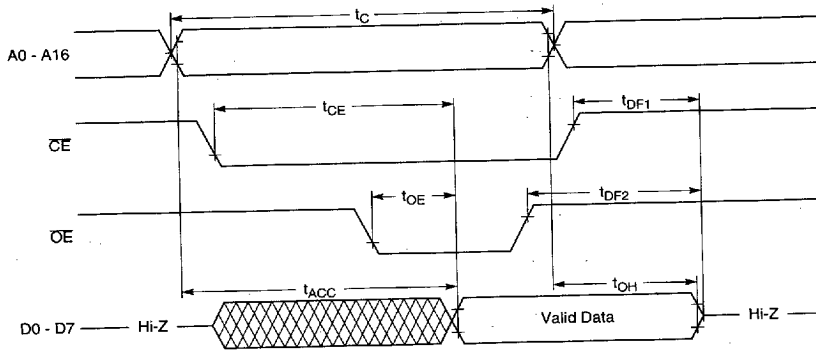


Figure 1. Read Cycle

Programming Operation

DC Characteristics ($T_a = 25^\circ\text{C} \pm 5^\circ\text{C}$) [1]

Parameter	Symbol	Condition	Rated Value			Unit
			Min	Typ	Max	
Input leakage current	I_{LI}	$V_{IN} = V_{CC} + 0.5\text{ V}$	-	-	10	μA
Program power supply current	I_{PP2}	$\overline{CE} = V_{IL}$	-	-	50	mA
Power supply current	I_{CC}		-	-	80	mA
Input high voltage	V_{IH}		2.2	-	$V_{CC} + 0.5$	V
Input low voltage	V_{IL}		-0.3	-	0.8	V
Output high voltage	V_{OH}	$I_{OH} = -400\ \mu\text{A}$	2.4	-	-	V
Output low voltage	V_{OL}	$I_{OL} = 2.1\ \text{mA}$	-	-	0.45	V
Program Voltage	V_{PP}		12.5	12.75	13	V
V_{CC} Voltage	V_{CC}		6	6.25	6.5	V

1. The voltage referenced to GND.

AC Characteristics Read Cycle ($T_a = 25^\circ\text{C} \pm 5^\circ\text{C}$)

Parameter	Symbol	Conditions	Rated Value			Unit
			Min	Typ	Max	
Address set-up time	t_{AS}		2	-	-	μs
CE set-up time	t_{CES}		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
V_{PP} power set-up time	t_{VS}		2	-	-	μs
CE set-up time	t_{CES}		2	-	-	μs
PGM program pulse width	t_{PW}		95	100	105	μs
Data valid from OE	t_{OE}			-	150	ns

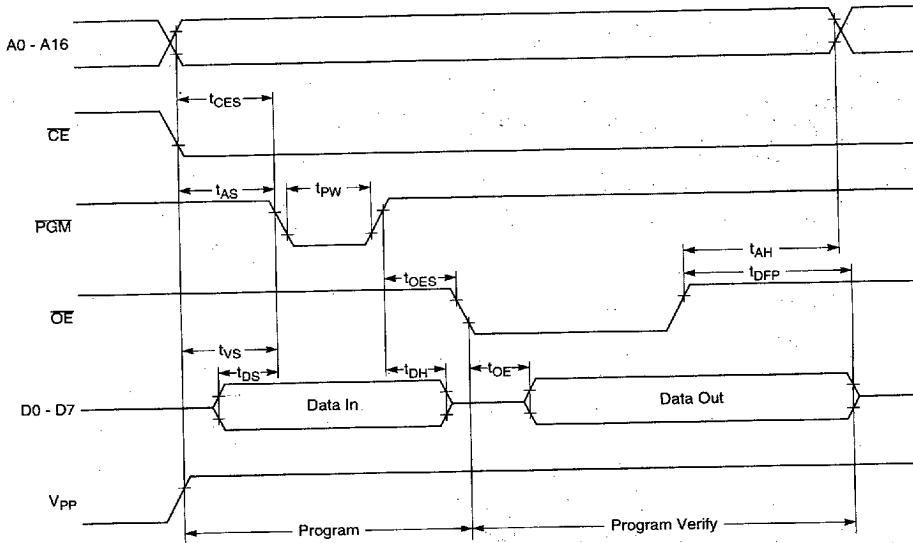


Figure 2. Programming Waveform

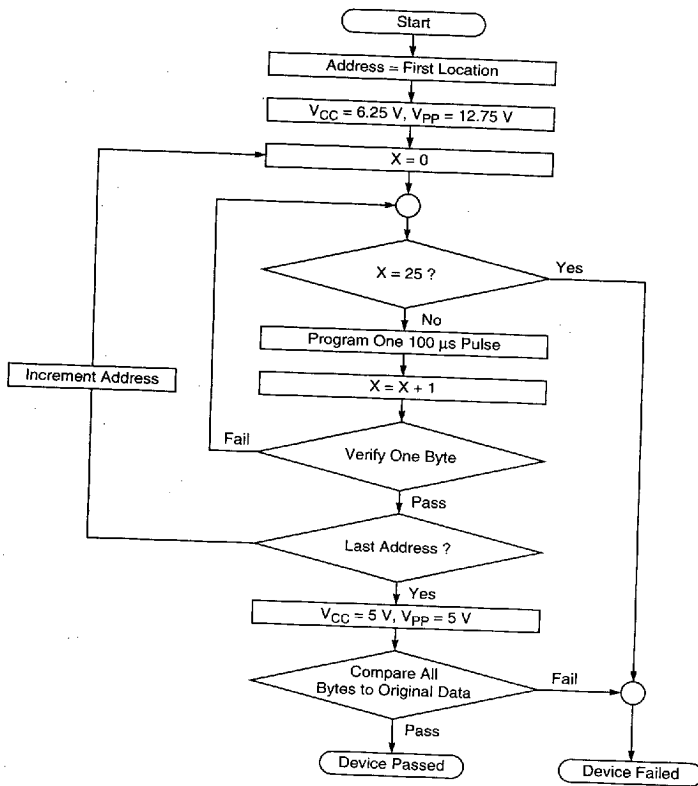


Figure 3. Programming Algorithm

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