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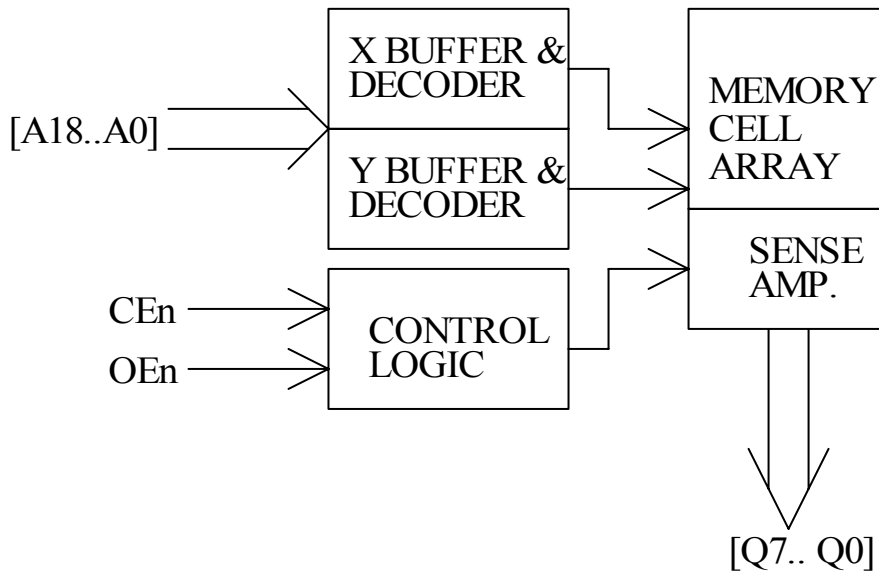
1 Function Description

The SF23C4000 is a fully static, 512K x 8 bit CMOS Mask Programmable ROM. This device operates in wide operating range. It requires no external clock for its operation and suitable for use with microprocessor program memory, and data memory (speech, graphic, etc).

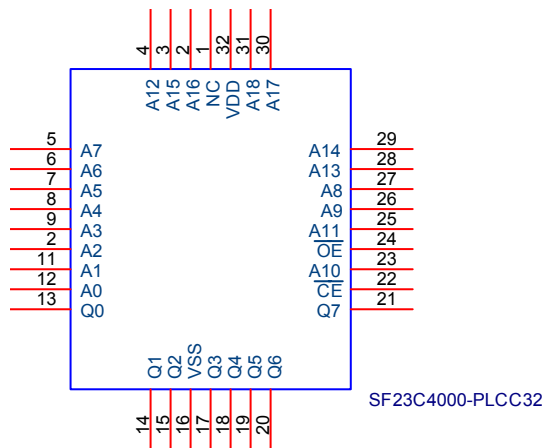
2 Features

- ✓ Voltage range 2.4V ~ 5.5V
- ✓ Organization
 - Memory Cell Array: 512K x 8
- ✓ Low Operation Current (Typical)
 - 10 μ A Standby mode Current
 - 10mA Active Read Current
- ✓ Fully static operation
- ✓ Three state outputs
- ✓ Package bare chip, PLCC32

3 Functional block diagram



4 Pin Description

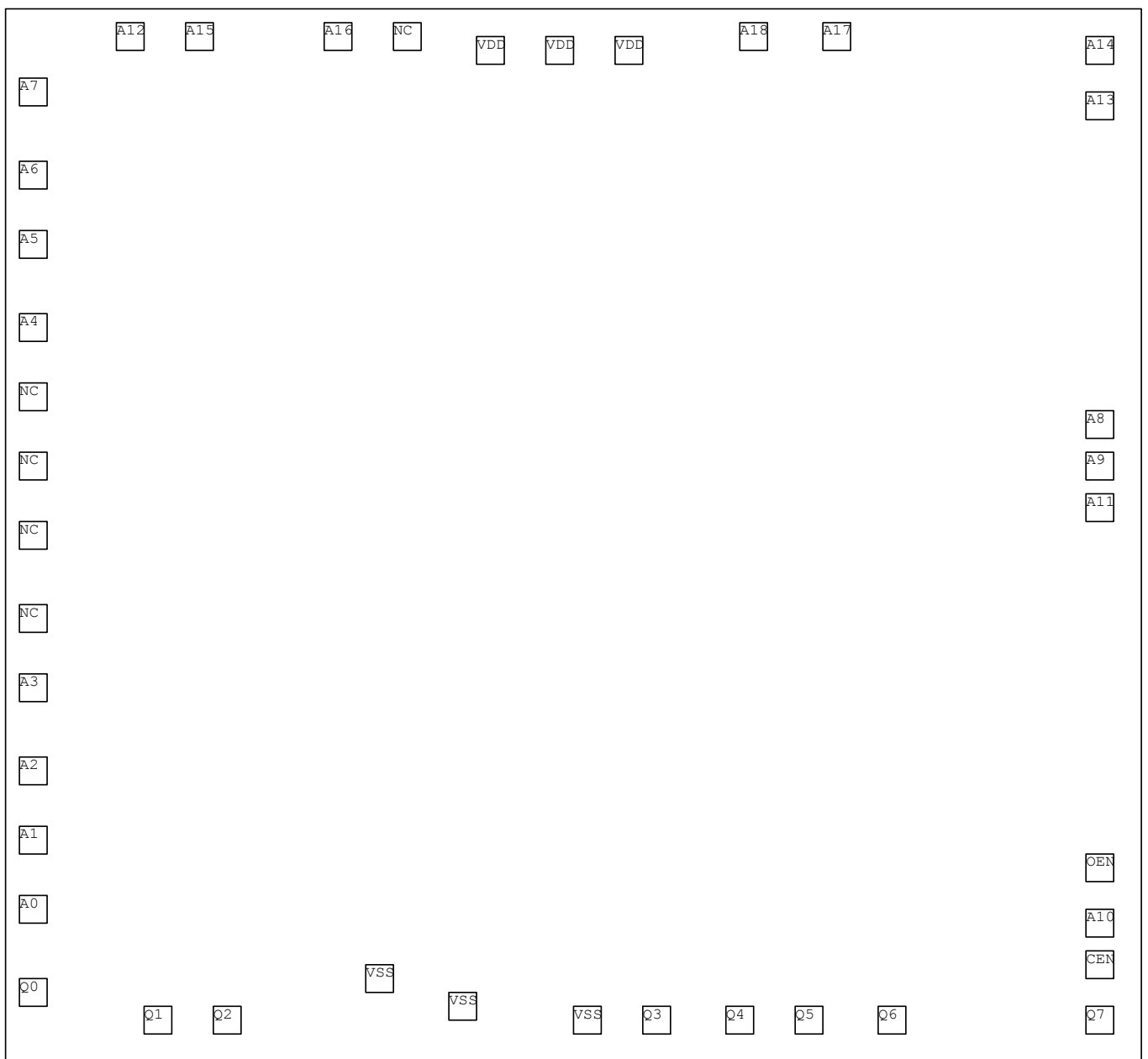


Symbol	Pin No.	I/O	Description
VDD	32	P	Positive power supply input pin.
VSS	16	P	Ground pin.
CEn	22	I	The CEn (Chip Enable) input is the device selection and power control for internal Mask ROM array. Whenever CEn goes high, the internal Mask ROM will enter standby (power saving) mode. Otherwise, it is in active mode and the contents of the ROM can be accessed.



OEn	24	I	OEn (Output Enable) is the output control which gates ROM array data onto the data output pins Q7 ~ Q0.
A18 ~ A0		I	Mask ROM Address input pins.
Q7 ~ Q0	21 ~ 17, 15 ~ 13	O	Mask ROM array Data outputs drive Q7 ~ Q0 pins during read operations (OEn low). The Q7 ~ Q0 pins stay in high-impedance when the chip is deselected (CEn high) or when the outputs are disabled (OEn high).

5 Pad Location





Pad No.	Pad Name	X Coord.	Y Coord.	Pad No.	Pad Name	X Coord.	Y Coord.
1	A7	108.33	2431.75	21	Q5	2058.62	109.14
2	A6	108.33	2244.31	22	Q6	2245.78	109.14
3	A5	108.33	2057.03	23	Q7	2745.87	105.79
4	A4	108.33	1869.59	24	CEN	2745.87	229.55
5	NC	108.33	1682.36	25	A10	2745.87	355.17
6	NC	108.33	1494.92	26	OEN	2745.87	480.32
7	NC	108.33	1307.74	27	A11	2759.48	1365.83
8	NC	108.33	1119.34	28	A9	2759.48	1491.74
9	A3	108.33	932.17	29	A8	2759.48	1617.63
10	A2	108.33	744.73	30	A13	2748.87	2427.92
11	A1	108.33	557.45	31	A14	2748.87	2555.13
12	A0	108.33	370.01	32	A17	2107.66	2566.92
13	Q0	108.33	182.72	33	A18	1920.22	2566.92
14	Q1	395.97	109.14	34	VDD	1578.76	2513.72
15	Q2	583.13	109.14	35	VDD	1404.34	2513.72
16	VSS	997.39	220.71	36	VDD	1229.92	2513.72
17	VSS	1242.34	140.91	37	NC	1029.23	2552.3
18	VSS	1521.38	108.09	38	A16	841.19	2552.3
19	Q3	1684.02	109.14	39	A15	495.57	2552.3
20	Q4	1871.18	109.14	40	A12	308.13	2552.3

6 Absolute Maximum Rating

Items	Symbol	Rating	Condition
Supply Voltage	V _{DD}	-0.3 to 6 V	
Input Voltage	V _{IN}	-0.3 to V _{DD} +0.3 V	
Operating Temperature	T _{OPR}	-0 to 70 °C	
Storage Temperature	T _{STR}	-55 to 125 °C	

7 AC Electrical Characteristics

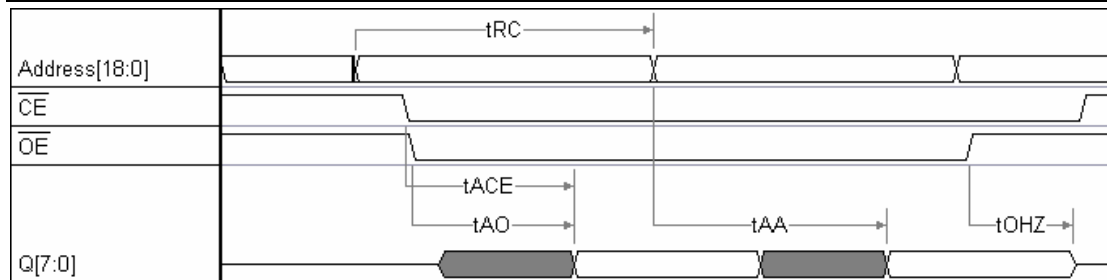
READ CYCLE

There are two ways of accessing the ROM data. The first one is to assert the valid address on the Address Bus, then assert CEn “low” to enable the ROM array. The access time in this mode is specified as t_{ACE}. The advantage of this access mode is that power consumption can be lowered. The second access mode keeps the CEn “low” while changes the addresses to access the contents of ROM data. The access time in



this way is specified as t_{AA} . In this device, the Address Access Time decrease monotonically with increasing voltage, and it is shorter than Chip Enable Access Time when the Operation Voltage is higher than 4.5 V. Therefore in V_{op} higher than 4.5 Volts, it is more advisable to use the Address Access Mode to achieve faster access to ROM data when the power consumption is not a concern.

Item	Symbol	2.4V	3.0V	3.3V	3.6V	4.5V	5.0V	5.5V	Unit	Remark
Chip Enable Access Time	t_{ACE}	280	190	170	150	150	190	210	ns	Min
Address Access Time	t_{AA}	240	210	210	210	200	190	180	ns	Min



8 DC Electrical Characteristics

($V_{SS} = 0V$, $V_{DD} = 5.0 V$, $T_{OPR} = 25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Min.	Typical	Max.	Unit	Condition
Supply Voltage	V_{DD}	2.4	-	5.5	V	
Operating Current	I_{DD}	-	10	-	mA	No load
Standby Current	I_{DD}	-	10	-	μA	No load
Input voltage	V_{IH} V_{IL}	2/3 0	- -	1 1/3	V_{DD}	$V_{DD} = 4V \sim 6V$
Input current leakage	I_{IL}	-	-	+/- 10	μA	
D Output High Voltage	V_{OH}	2.4	-	-	V	$I_{OH} = 14 mA$
D Output Low Voltage	V_{OL}	-	-	0.4	V	$I_{OL} = 3 mA$

9 Updated History

Version	Date	Update Description