



128K × 8 HIGH-SPEED CMOS STATIC RAM

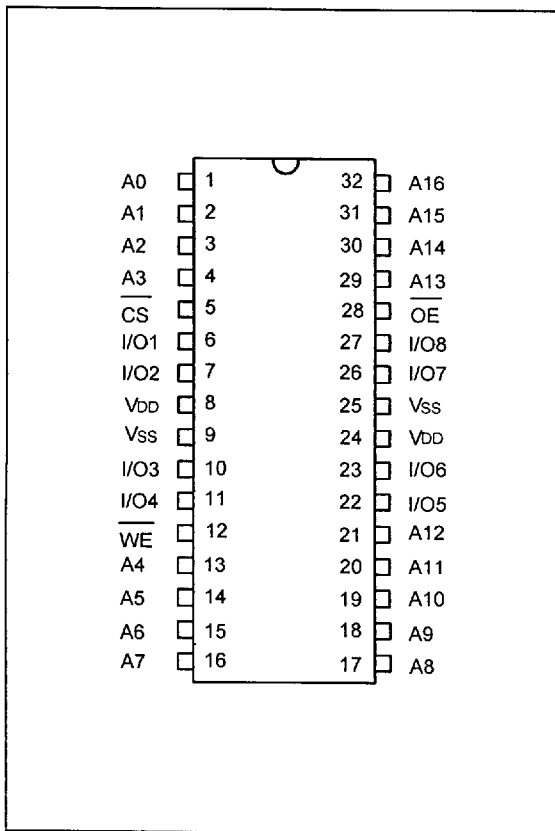
GENERAL DESCRIPTION

The W24011A is a high-speed, low-power CMOS static RAM organized as 131072 × 8 bits that operates on a single 5-volt power supply. This device is manufactured using Winbond's high performance CMOS technology.

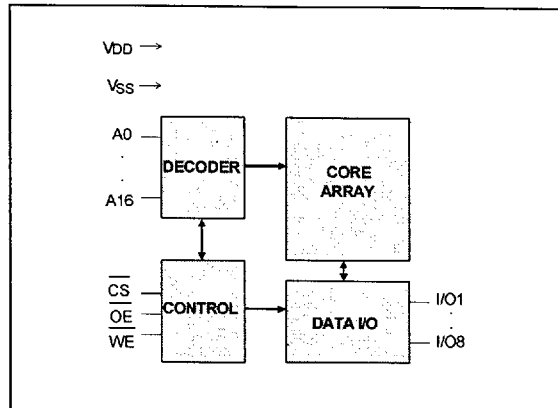
FEATURES

- High-speed access time: 12/15/20 nS (max.)
- Low-power consumption:
 - Active: 1.0W max.
- Single +5V power supply
- Center power/ground pin configuration
- Fully static operation
- All inputs and outputs directly TTL compatible
- Three-state outputs
- Available packages: 32-pin 300 mil and 400 mil SOJ

PIN CONFIGURATION



BLOCK DIAGRAM



PIN DESCRIPTION

SYMBOL	DESCRIPTION
A0-A16	Address Inputs
I/O1-I/O8	Data Inputs/Outputs
CS	Chip Select Inputs
WE	Write Enable Input
OE	Output Enable Input
VDD	Power Supply
VSS	Ground



TRUTH TABLE

CS	OE	WE	MODE	I/O1-I/O8	VDD CURRENT
H	X	X	Not Selected	High Z	ISB, ISB1
X	X	X	Not Selected	High Z	ISB, ISB1
L	H	H	Output Disable	High Z	IDD
L	L	H	Read	Data Out	IDD
L	X	L	Write	Data In	IDD

DC CHARACTERISTICS

Absolute Maximum Ratings

PARAMETER	RATING	UNIT
Supply Voltage to VSS Potential	-0.5 to +7.0	V
Input/Output to VSS Potential	-0.5 to VDD +0.5	V
Allowable Power Dissipation	1.5	W
Storage Temperature	-65 to +150	°C
Operating Temperature	0 to +70	°C

Note: Exposure to conditions beyond those listed under Absolute Maximum Ratings may adversely affect the life and reliability of the device.

Operating Characteristics

(VDD = 5V ±10%, VSS = 0V, TA = 0 to 70° C)

PARAMETER	SYM.	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT	
Input Low Voltage	VIL	-	-0.5	-	0.8	V	
Input High Voltage	VIH	-	+2.2	-	VDD +0.5	V	
Input Leakage Current	ILI	VIN = VSS to VDD	-10	-	+10	μA	
Output Leakage Current	ILO	VIO = VSS to VDD CS = VIH (min.) or OE = VIH (min.) or WE = VIL (max.)	-10	-	+10	μA	
Output Low Voltage	VOL	IOL = +8.0 mA	-	-	0.4	V	
Output High Voltage	VOH	IOH = -4.0 mA	2.4	-	-	V	
Operating Power	IDD	CS = VIL (max.)	12	-	-	200	mA
Supply Current		I/O = 0 mA, Cycle = min. Duty = 100%	15	-	-	200	mA
			20	-	-	170	mA
Standby Power	ISB	CS = VIH (min.)	-	-	30	mA	
Supply Current	ISB1	CS ≥ VDD -0.2V	-	-	10	mA	

Note: Typical characteristics are at VDD = 5V, TA = 25° C.

CAPACITANCE



(V_{DD} = 5V, T_A = 25° C, f = 1 MHz)

PARAMETER	SYM.	CONDITIONS	MAX.	UNIT
Input Capacitance	C _{IN}	V _{IN} = 0V	8	pF
Input/Output Capacitance	C _{I/O}	V _{OUT} = 0V	10	pF

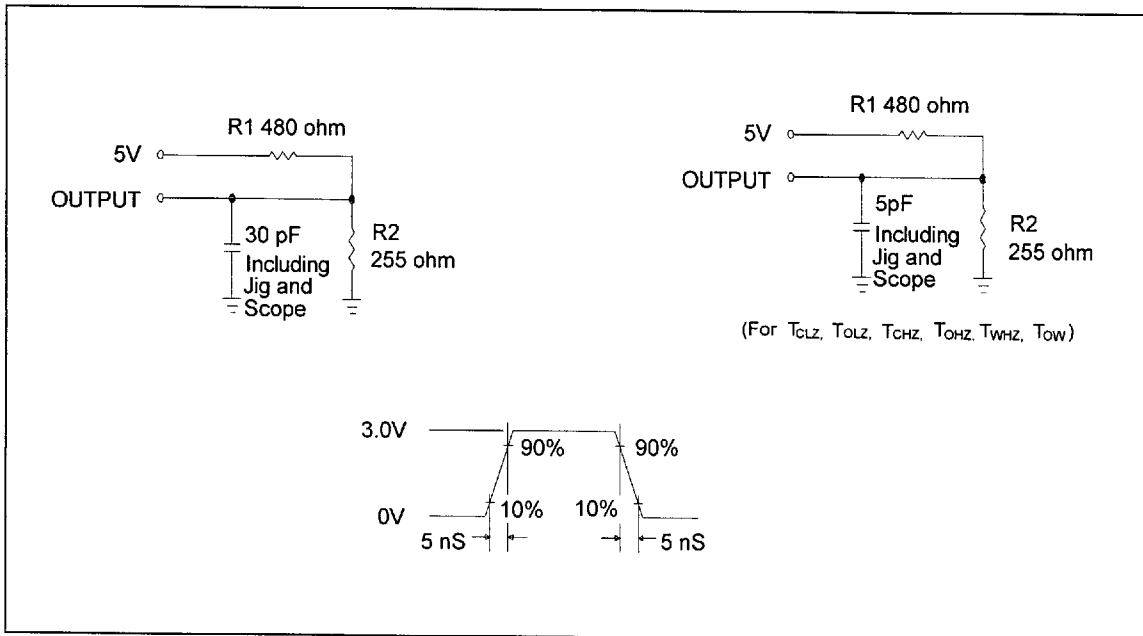
Note: These parameters are sampled but not 100% tested.

AC CHARACTERISTICS

AC Test Conditions

PARAMETER	CONDITIONS
Input Pulse Levels	0V to 3V
Input Rise and Fall Times	5 nS
Input and Output Timing Reference Level	1.5V
Output Load	C _L = 30 pF, I _{OH} /I _{OL} = -4 mA/8 mA

AC Test Loads and Waveform



W24011A



AC Characteristics, continued

(VDD = 5V ±10%, VSS = 0V, TA = 0 to 70° C)

Read Cycle

PARAMETER	SYM.	W24011A-12		W24011A-15		W24011A-20		UNIT
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
Read Cycle Time	TRC	12	-	15	-	20	-	nS
Address Access Time	TAA	-	12	-	15	-	20	nS
Chip Select Access Time	TACS	-	12	-	15	-	20	nS
Output Enable to Output Valid	TAOE	-	6	-	7	-	10	nS
Chip Selection to Output in Low Z	TCLZ	3	-	3	-	3	-	nS
Output Enable to Output in Low Z	TOLZ*	0	-	0	-	0	-	nS
Chip Deselection to Output in High Z	TCHZ	-	6	-	7	-	10	nS
Output Disable to Output in High Z	TOHZ*	-	6	-	7	-	10	nS
Output Hold from Address Change	TOH	3	-	3	-	3	-	nS

* These parameters are sampled but not 100% tested.

Write Cycle

PARAMETER		SYM.	W24011A-12		W24011A-15		W24011A-20		UNIT
			MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
Write Cycle Time		TWC	12	-	15	-	20	-	nS
Chip Selection to End of Write		TCW	10	-	13	-	17	-	nS
Address Valid to End of Write		TAW	10	-	13	-	17	-	nS
Address Setup Time		TAS	0	-	0	-	0	-	nS
Write Pulse Width		TWP	10	-	10	-	12	-	nS
Write Recovery Time	CS, WE	TWR	0	-	0	-	0	-	nS
Data Valid to End of Write		TDW	7	-	9	-	10	-	nS
Data Hold from End of Write		TdH	0	-	0	-	0	-	nS
Write to Output in High Z		TWHZ*	-	7	-	8	-	10	nS
Output Disable to Output in High Z		TOHZ*	-	7	-	8	-	10	nS
Output Active from End of Write		Tow	0	-	0	-	0	-	nS

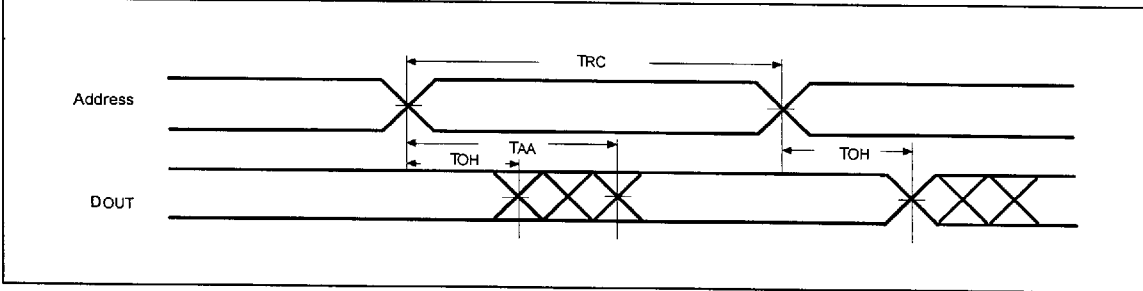
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TIMING WAVEFORMS

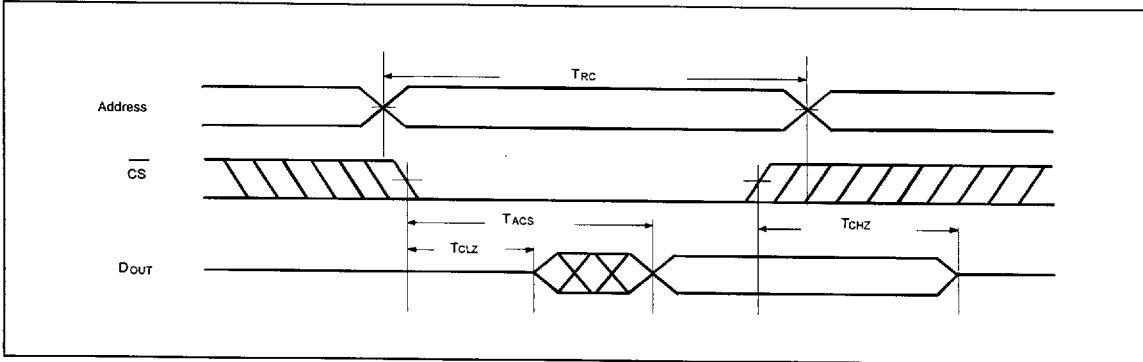
Read Cycle 1

(Address Controlled, $\overline{CS} = \overline{OE} = V_{IL}$, $\overline{WE} = V_{IH}$)



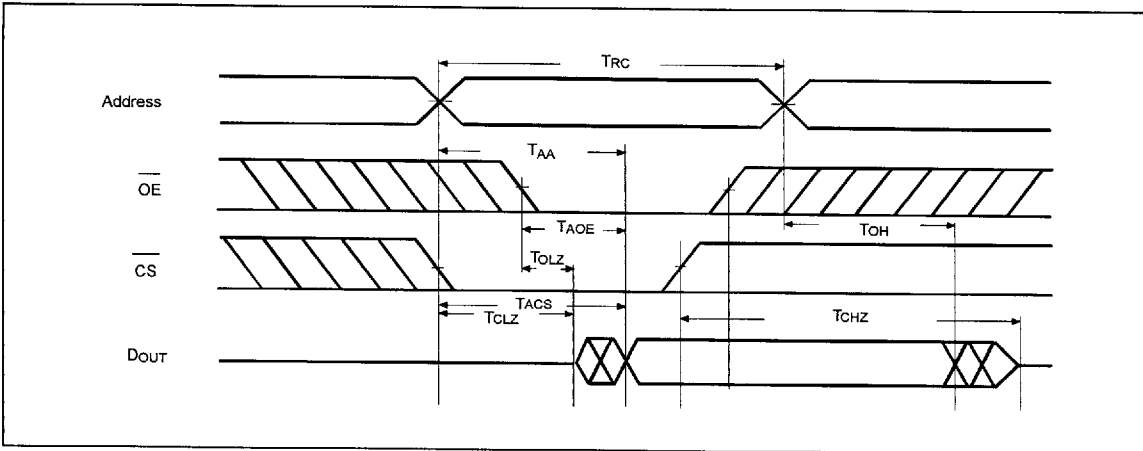
Read Cycle 2

(Chip Select Controlled)



Read Cycle 3

(Output Enable Controlled)

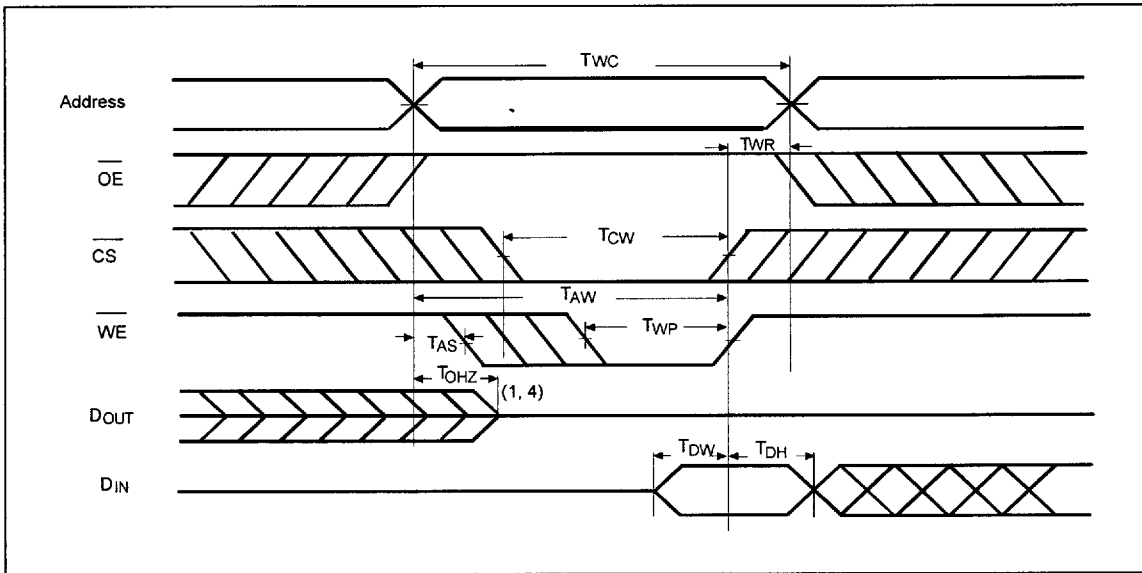




Timing Waveforms, continued

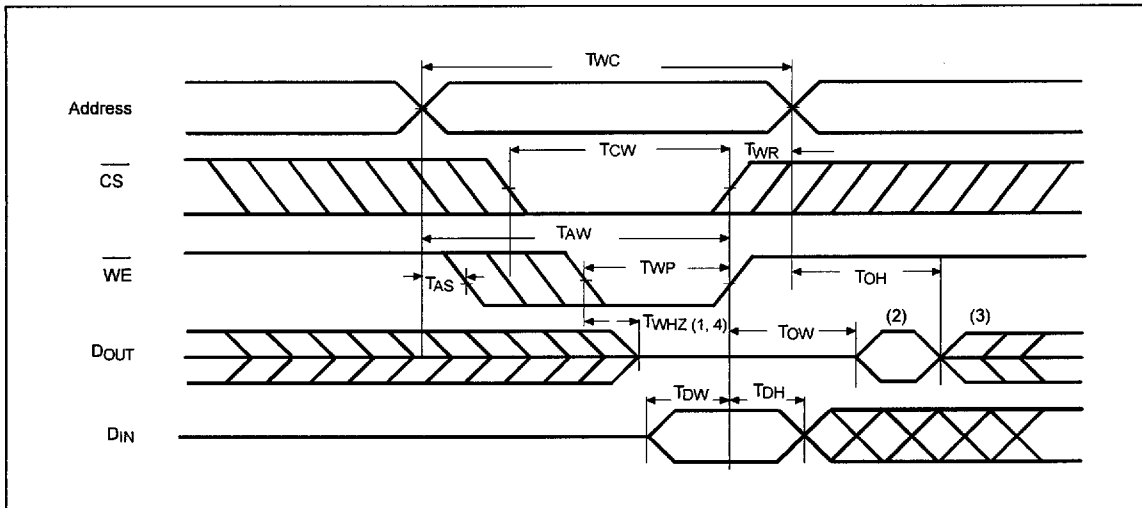
Write Cycle 1

(OE Clock)



Write Cycle 2

(OE = VIL Fixed)



Notes:

1. During this period, I/O pins are in the output state, so input signals of opposite phase to the outputs should not be applied
2. The data output from DOUT are the same as the data written to DIN during the write cycle.
3. DOUT provides the read data for the next address.
4. Transition is measured ± 500 mV from steady state with $C_L = 5$ pF. This parameter is guaranteed but not 100% tested.

W24011A



ORDERING INFORMATION

PART NO.	ACCESS TIME (nS)	OPERATING CURRENT MAX. (mA)	STANDBY CURRENT MAX. (mA)	PACKAGE
W24011AJ-12	12	200	10	300 mil SOJ
W24011AJ-15	15	200	10	300 mil SOJ
W24011AJ-20	20	170	10	300 mil SOJ
W24011AI-12	12	200	10	400 mil SOJ
W24011AI-15	15	200	10	400 mil SOJ
W24011AI-20	20	170	10	400 mil SOJ

Notes:

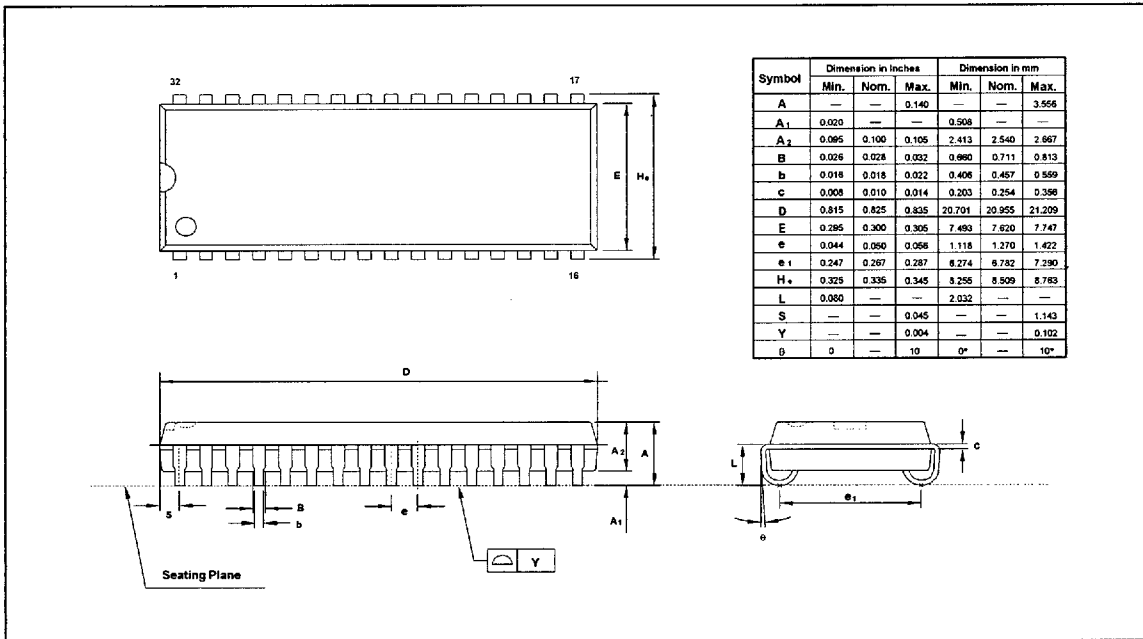
1. Winbond reserves the right to make changes to its products without prior notice.
2. Purchasers are responsible for performing appropriate quality assurance testing on products intended for use in applications where personal injury might occur as a consequence of product failure.

Publication Release Date: February 1997
Revision A1



PACKAGE DIMENSIONS

32-pin SOJ (300 mil)



32-pin SOJ (400 mil)

