64K × 16 HIGH-SPEED CMOS STATIC RAM

GENERAL DESCRIPTION

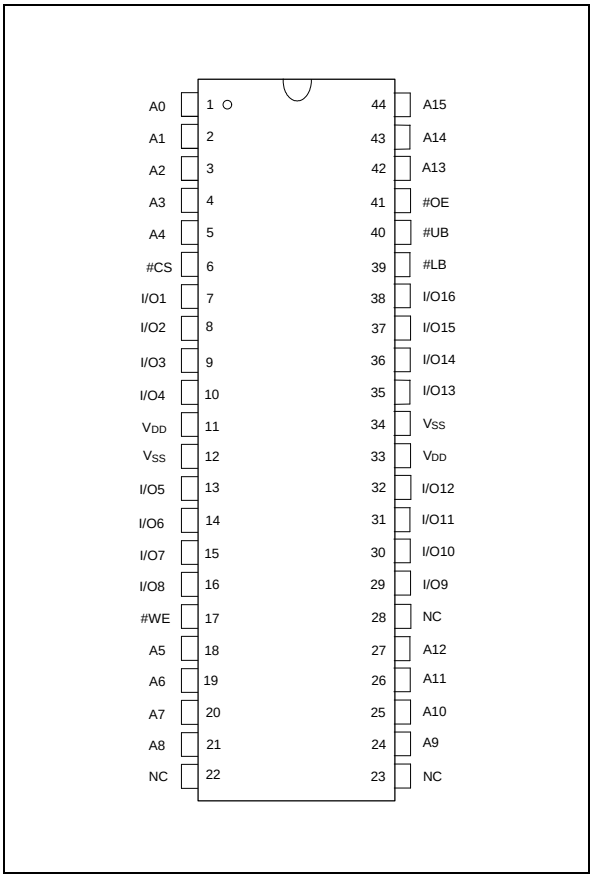
The W26010A is a high-speed, low-power CMOS static RAM organized as 65,536 × 16 bits that operates on a single 5-volt power supply. This device is manufactured using Winbond's high performance CMOS technology.

The W26010A has an active low chip select, separate upper and lower byte selects, and a fast output enable. No clock or refreshing is required. Separate byte select controls (#LB and #UB) allow individual bytes to be written and read. #LB controls I/O1-I/O8, the lower byte. #UB controls I/O9–I/O16, the upper byte. This device is well suited for use in high-density, high-speed system applications.

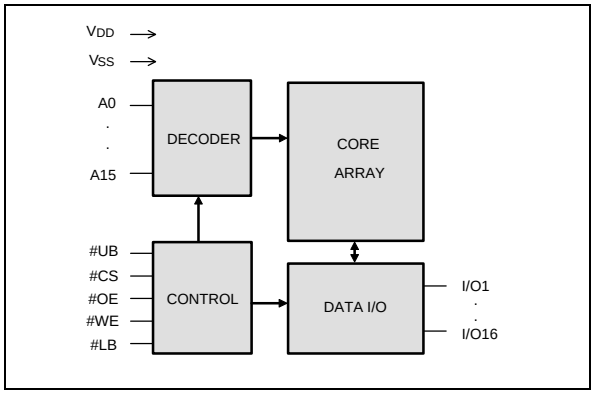
FEATURES

- High speed access time: 15/20/25 nS (max.)
- Low power consumption:
  - Active: 1.3W (max.)
- Single +5V power supply
- Fully static operation
  - No clock or refreshing
- All inputs and outputs directly TTL compatible
- Three-state outputs
- Data byte control
  - #LB (I/O1–I/O8), #UB (I/O9–I/O16)
- Available packages: 44-pin 400 mil SOJ and Type II TSOP

PIN CONFIGURATION



BLOCK DIAGRAM



PIN DESCRIPTION

SYMBOL	DESCRIPTION
A0–A15	Address Inputs
I/O1–I/O16	Data Inputs/Outputs
#CS	Chip Select Inputs
#WE	Write Enable Input
#OE	Output Enable Input
#LB	Lower Byte Select I/O1–I/O8
#UB	Upper Byte Select I/O9–I/O16
VDD	Power Supply
VSS	Ground
NC	No Connection

TRUTH TABLE

#CS	#OE	#WE	#LB	#UB	MODE	I/O1 - I/O8	I/O9 - I/O16	VDD CURRENT
H	X	X	X	X	Not Selected	High Z	High Z	ISB, ISB1
L	H	H	X	X	Output Disable	High Z	High Z	IDD
L	L	H	L	L	2 Bytes Read	DOUT	DOUT	IDD
L	L	H	L	H	Lower Byte Read	DOUT	High Z	IDD
L	L	H	H	L	Upper Byte Read	High Z	DOUT	IDD
L	X	L	L	L	2 Bytes Write	DIN	DIN	IDD
L	X	L	L	H	Lower Byte Write	DIN	High Z	IDD
L	X	L	H	L	Upper Byte Write	High Z	DIN	IDD
L	X	X	H	H	Output Disable	High Z	High Z	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
	I	-40 to 85	

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, I for –40 to 85° 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	VI/O = VSS to VDD Output Pins in High Z See Truth Table	-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 Characteristics, continued

PARAMETER	SYM.	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Operating Power Supply Current	I_{DD}	#CS = V_{IL} (max.), I/O = open, Cycle = min. Duty = 100%	15	-	-	260	mA
			20	-	-	220	
			25	-	-	200	
Standby Power Supply Current	I_{SB}	#CS = V_{IH} (min.), I/O = open All other pins = V_{DD} -0.2V/GND		-	-	50	mA
	I_{SB1}	#CS = V_{DD} -0.2V, I/O = open All other pins = V_{DD} -0.2V/GND		-	-	10	mA

Note: Typical characteristics are evaluated at V_{DD} = 5V, T_A = 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	6	pF
Input/Output Capacitance	$C_{I/O}$	V_{OUT} = 0V	8	pF

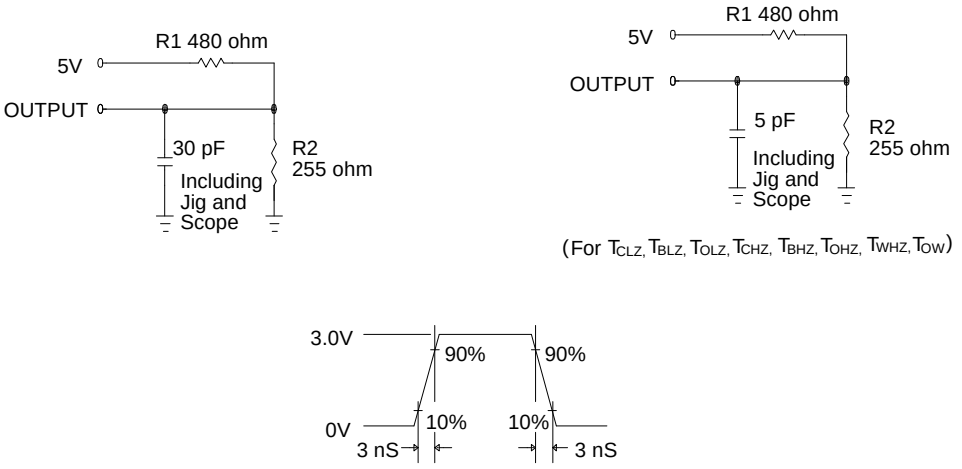
Note: These parameters are sampled but not 100% tested.

AC CHARACTERISTICS

AC Test Conditions

PARAMETER	CONDITIONS
Input Pulse Levels	0V to 3V
Input Rise and Fall Times	3 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



(V_{DD} = 5V ±10%, V_{SS} = 0V, T_A = 0 to 70° C, I for –40 to 85° C)

Read Cycle

PARAMETER	SYM.	W26010A-15		W26010A-20		W26010A-25		UNIT
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
Read Cycle Time	TRC	15	–	20	-	25	-	nS
Address Access Time	TAA	–	15	–	20	–	25	nS
Chip Select Access Time	TACS	–	15	–	20	–	25	nS
Output Enable to Output Valid	TAOE	–	7	–	10	–	12	nS
#UB, #LB Access Time	TBA	–	7	–	10	–	12	nS
Output Hold from Address Change	TOH	3	–	3	–	3	–	nS
Chip Select to Output in Low Z	TCLZ*	3	–	3	–	3	–	nS
Chip Deselect to Output in High Z	TCHZ*	–	7	–	10	–	12	nS
Output Enable to Output in Low Z	TOLZ*	0	–	0	–	0	–	nS
Output Disable to Output in High Z	TOHZ*	–	7	–	10	–	12	nS
#UB, #LB Select to Output in Low Z	TBLZ*	0	–	0	–	0	–	nS
#UB, #LB Deselect to Output in High Z	TBHZ*	–	7	–	10	–	12	nS

* These parameters are sampled but not 100% tested.

AC Characteristics, continued

Write Cycle

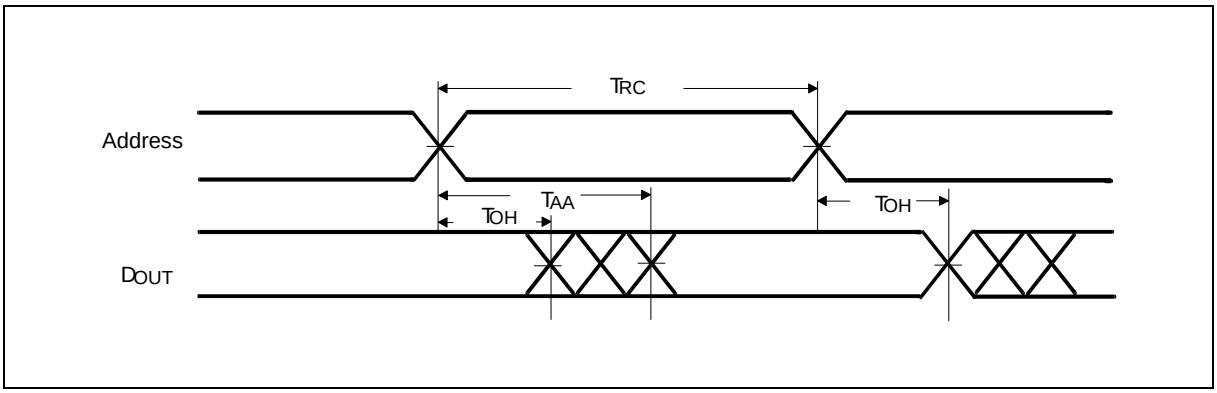
PARAMETER		SYM.	W26010A-15		W26010A-20		W26010A-25		UNIT
			MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
Write Cycle Time		TWC	15	–	20	–	25	–	nS
Chip Select to End of Write		TCW	13	–	17	–	18	–	nS
Address Valid to End of Write		TAW	13	–	17	–	18	–	nS
Address Setup Time		TAS	0	–	0	–	0	–	nS
#UB, #LB Select to End of Write		TBW	13	–	17	–	18	–	nS
Write Pulse Width		TWP	10	–	12	–	15	–	nS
Write Recovery Time	#CS, #WE	TWR	0	–	0	–	0	–	nS
Data Valid to End of Write		TDW	9	–	10	–	12	–	nS
Data Hold from End of Write		TDH	0	–	0	–	0	–	nS
Write to Output in High Z		TWHZ*	–	8	–	10	–	12	nS
End of Write to Output Active		TOW*	0	–	0	–	0	–	nS

* These parameters are sampled but not 100% tested.

TIMING WAVEFORMS

Read Cycle 1

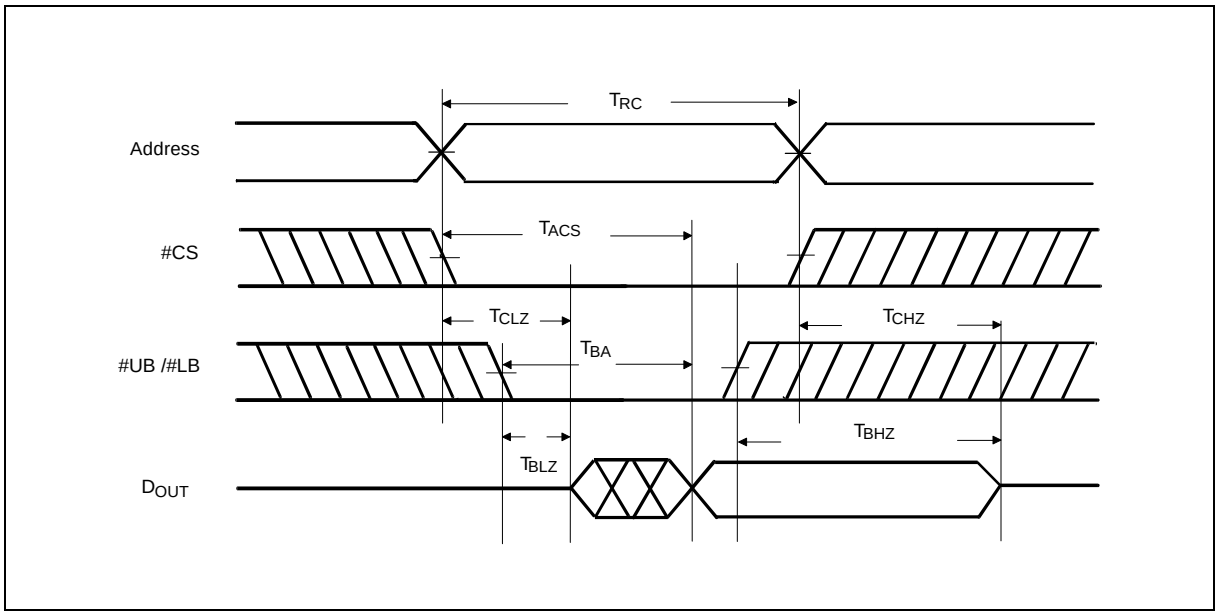
(Address Controlled, #CS = #OE = #UB = #LB = VIL, #WE = VIH)



Timing Waveforms, continued

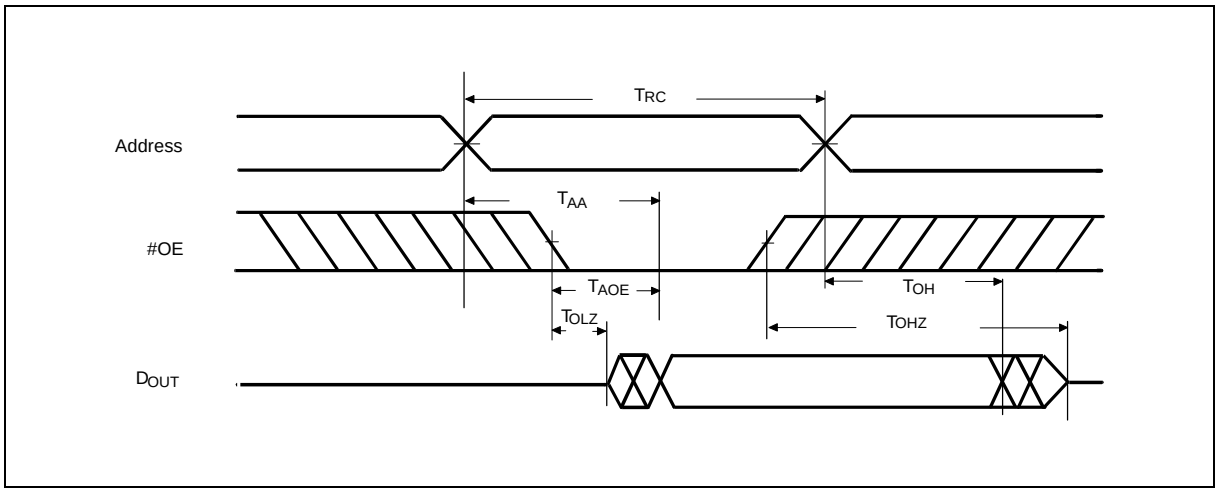
Read Cycle 2

(Chip Select Controlled, #OE = VIL, #WE = VIH)



Read Cycle 3

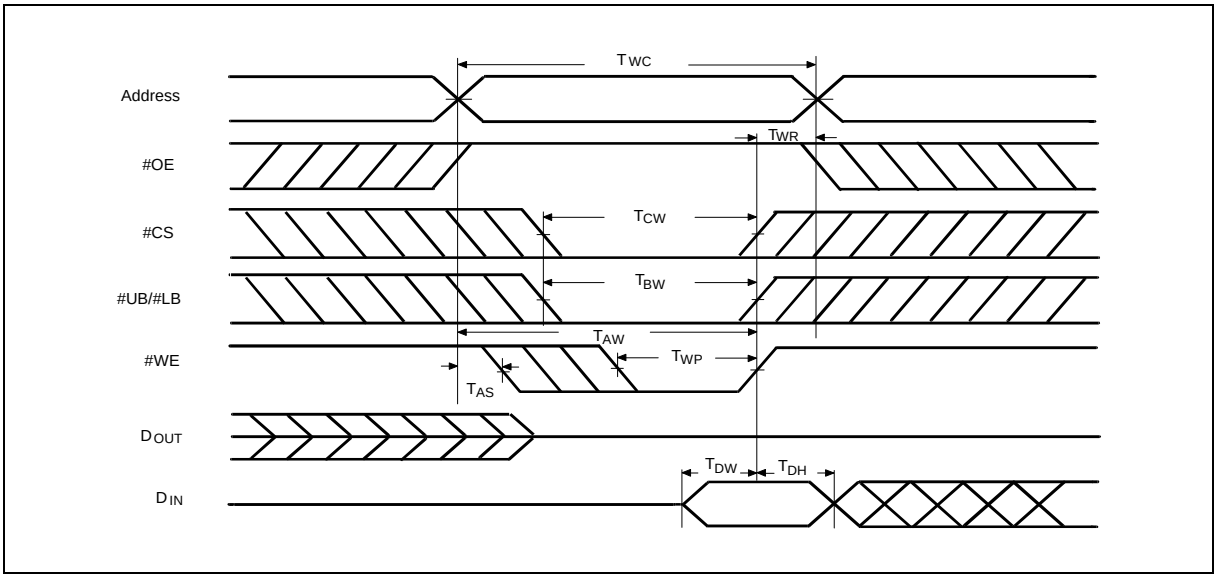
(Output Enable Controlled, #CS = #UB = #LB = VIL, #WE = VIH)



Timing Waveforms, continued

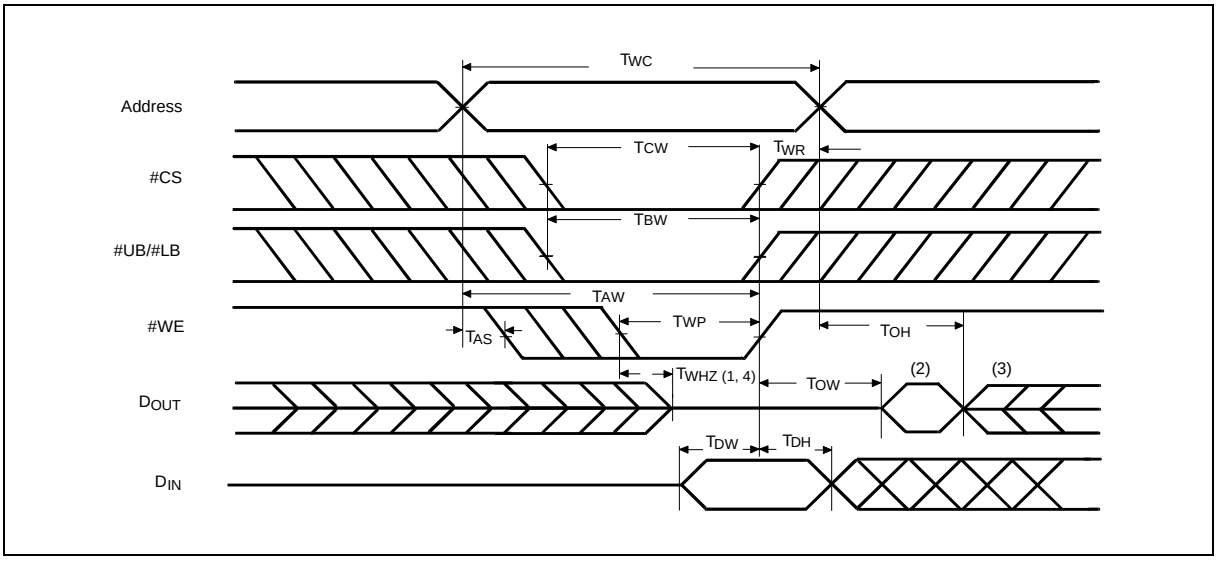
Write Cycle 1

(#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 CL = 5 pF. This parameter is guaranteed but not 100% tested.

ORDERING INFORMATION

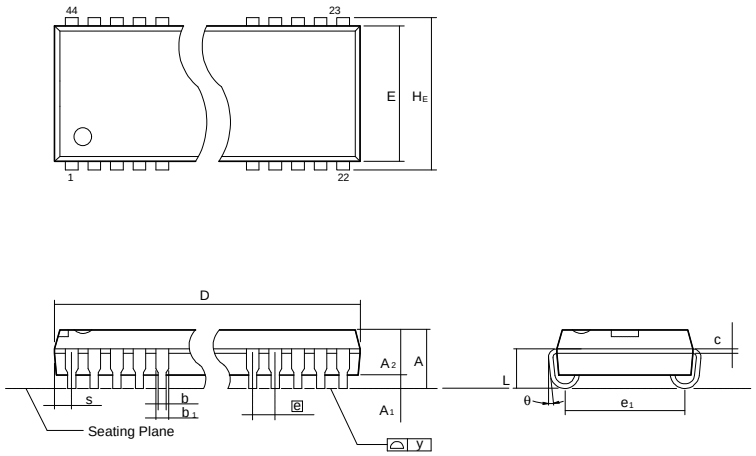
PART NO.	ACCESS TIME (nS)	OPERATING CURRENT MAX. (mA)	STANDBY CURRENT MAX. (mA)	OPERATING TEMP. (° C)	PACKAGE
W26010AJ-15	15	260	10	0 to 70	44-pin 400 mil SOJ
W26010AJ-15I	15	260	10	-40 to 85	44-pin 400 mil SOJ
W26010AJ-20	20	220	10	0 to 70	44-pin 400 mil SOJ
W26010AJ-25	25	200	10	0 to 70	44-pin 400 mil SOJ
W26010AT-15	15	260	10	0 to 70	44-pin type two TSOP
W26010AT-15I	15	260	10	-40 to 85	44-pin type two TSOP
W26010AT-20	20	220	10	0 to 70	44-pin type two TSOP
W26010AT-25	25	200	10	0 to 70	44-pin type two TSOP

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.

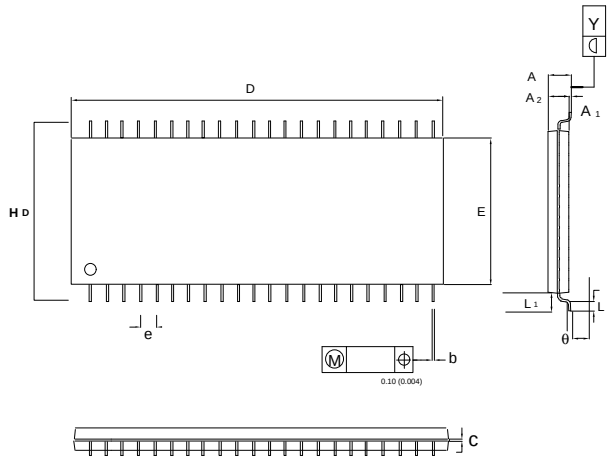
PACKAGE DIMENSIONS

44-pin Small Outline Band



Symbol	Dimension in inches			Dimension in mm		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	0.128	0.138	0.148	3.251	3.585	3.759
A_1	0.025	—	—	0.635	—	—
A_2	0.105	0.110	0.115	2.41	2.54	2.67
b_1	0.026	0.028	0.032	0.66	0.711	0.813
b	0.015	—	0.020	0.381	—	0.508
c	0.007	—	0.013	0.178	—	0.330
D	1.120	1.125	1.130	28.45	28.58	28.70
E	0.395	0.400	0.405	10.03	10.16	10.29
e	0.044	0.050	0.056	1.12	1.27	1.42
e_1	—	0.37	—	—	9.40	—
H_E	0.435	0.440	0.445	11.05	11.18	11.30
L	0.082	—	—	2.06	—	—
S	—	—	0.045	—	—	1.14
y	—	—	0.004	—	—	0.10
θ	0°	—	10°	0°	—	10°

44-pin Standard Type Two TSOP



Symbol	Dimension in inches			Dimension in mm		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	—	—	0.047	—	—	1.20
A_1	0.002	—	—	0.05	—	—
A_2	0.037	0.039	0.041	0.95	1.00	1.05
b	0.010	0.014	0.018	0.25	0.35	0.45
c	0.005	0.006	0.007	0.12	0.15	0.17
D	0.721	0.725	0.729	18.31	18.41	18.51
E	0.396	0.400	0.404	10.06	10.16	10.26
H_D	0.455	0.463	0.471	11.56	11.76	11.96
e	—	0.031	—	—	0.80	—
L	0.016	0.020	0.024	0.40	0.50	0.60
L_1	—	0.031	—	—	0.80	—
Y	—	—	0.004	—	—	0.10
θ	0°	—	5°	0°	—	5°

VERSION HISTORY

VERSION	DATE	PAGE	DESCRIPTION
A1	Apr. 1995		Initial Issued
A2	Feb. 1997	1, 9	Add package type two TSOP
A3	Oct. 1997	9	Correct 44-pin type two TSOP symbol "e" dimension in inches nom. from 0.006 to 0.031 in mm nom. from 0.15 to 0.80
A4	Feb. 1998	1	Modify the address sequence in pin configuration
		6	Modify the waveform "read cycle 3"
A5	May 2001	2, 4, 8	Add in Industrial operating temperature
		4, 5, 8	Add in Industrial grade type

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