



32K × 8 HIGH SPEED CMOS STATIC RAM

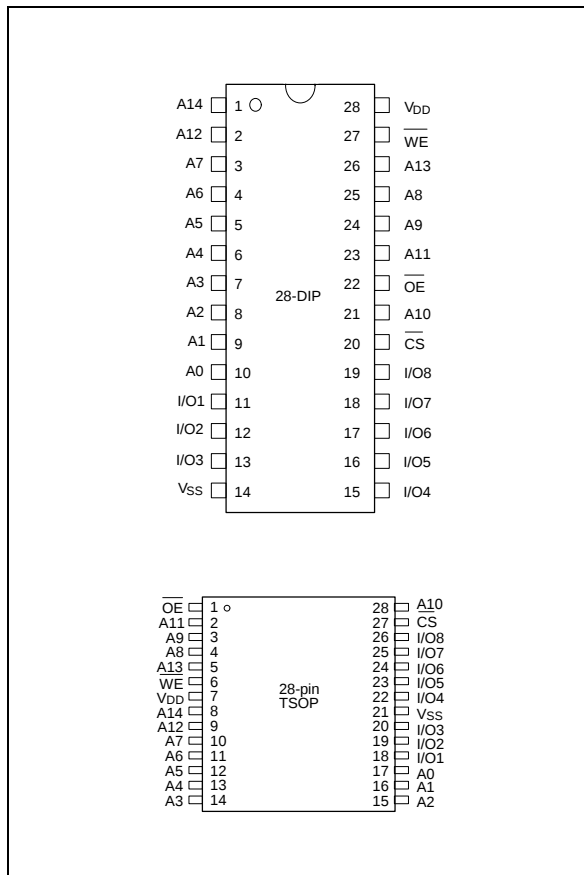
GENERAL DESCRIPTION

The W24257A is a high speed, low power CMOS static RAM organized as 32768 × 8 bits that operates on a single 5-volt power supply. This device is manufactured using Winbond's high performance CMOS technology.

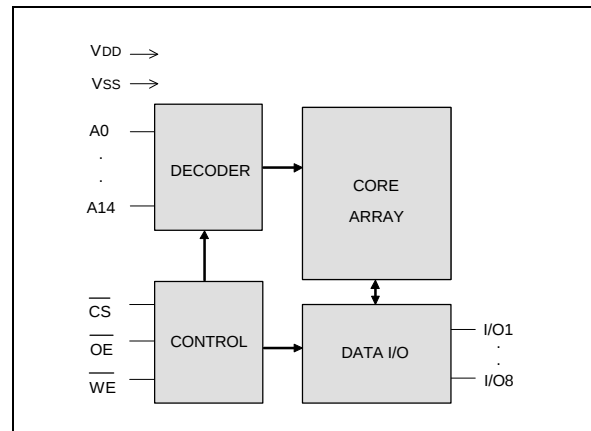
FEATURES

- High speed access time: 35 nS (max.)
- Low power consumption:
 - Active: 350 mW (max.)
- Single +5V power supply
- Fully static operation
- All inputs and outputs directly TTL compatible
- Three-state outputs
- Available packages: 28-pin 600 mil DIP, 330 mil SOP, 300 mil SOJ and standard type one TSOP (8 mm × 13.4 mm)

PIN CONFIGURATIONS



BLOCK DIAGRAM



PIN DESCRIPTION

SYMBOL	DESCRIPTION
A0–A14	Address Inputs
I/O1–I/O8	Data Inputs/Outputs
$\overline{\text{CS}}$	Chip Select Input
$\overline{\text{WE}}$	Write Enable Input
$\overline{\text{OE}}$	Output Enable Input
V _{DD}	Power Supply
V _{SS}	Ground



TRUTH TABLE

$\overline{CS}$	$\overline{OE}$	$\overline{WE}$	MODE	I/O1–I/O8	V _{DD} CURRENT
H	X	X	Not Selected	High Z	I _{SB} , I _{SB1}
L	H	H	Output Disable	High Z	I _{DD}
L	L	H	Read	Data Out	I _{DD}
L	X	L	Write	Data In	I _{DD}

DC CHARACTERISTICS

Absolute Maximum Ratings

PARAMETER	RATING	UNIT
Supply Voltage to V _{SS} Potential	-0.5 to +7.0	V
Input/Output to V _{SS} Potential	-0.5 to V _{DD} +0.5	V
Allowable Power Dissipation	1.0	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

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

PARAMETER	SYM.	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Input Low Voltage	V _{IL}	-	-0.5	-	+0.8	V
Input High Voltage	V _{IH}	-	+2.2	-	V _{DD} +0.5	V
Input Leakage Current	I _{LI}	V _{IN} = V _{SS} to V _{DD}	-10	-	+10	μA
Output Leakage Current	I _{LO}	V _{I/O} = V _{SS} to V _{DD} , $\overline{CS}$ = V _{IH} (min.) or $\overline{OE}$ = V _{IH} (min.) or $\overline{WE}$ = V _{IL} (max.)	-10	-	+10	μA
Output Low Voltage	V _{OL}	I _{OL} = +8.0 mA	-	-	0.4	V
Output High Voltage	V _{OH}	I _{OH} = -4.0 mA	2.4	-	-	V
Operating Power Supply Current	I _{DD}	$\overline{CS}$ = V _{IL} (max.), I/O = f = f _{max.} = 0 mA, Duty = 100% f = 50 MHz	-	-	100 130	mA
Standby Power Supply Current	I _{SB}	$\overline{CS}$ = V _{IH} (min.) Cycle = min., Duty = 100%	-	-	30	mA
	I _{SB1}	$\overline{CS}$ ≥ V _{DD} -0.2V	-	-	10	mA

Note: Typical characteristics are at V_{DD} = 5V, T_A = 25° C.



CAPACITANCE

($V_{DD} = 5V$, $T_A = 25^\circ C$, $f = 1\text{ MHz}$)

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

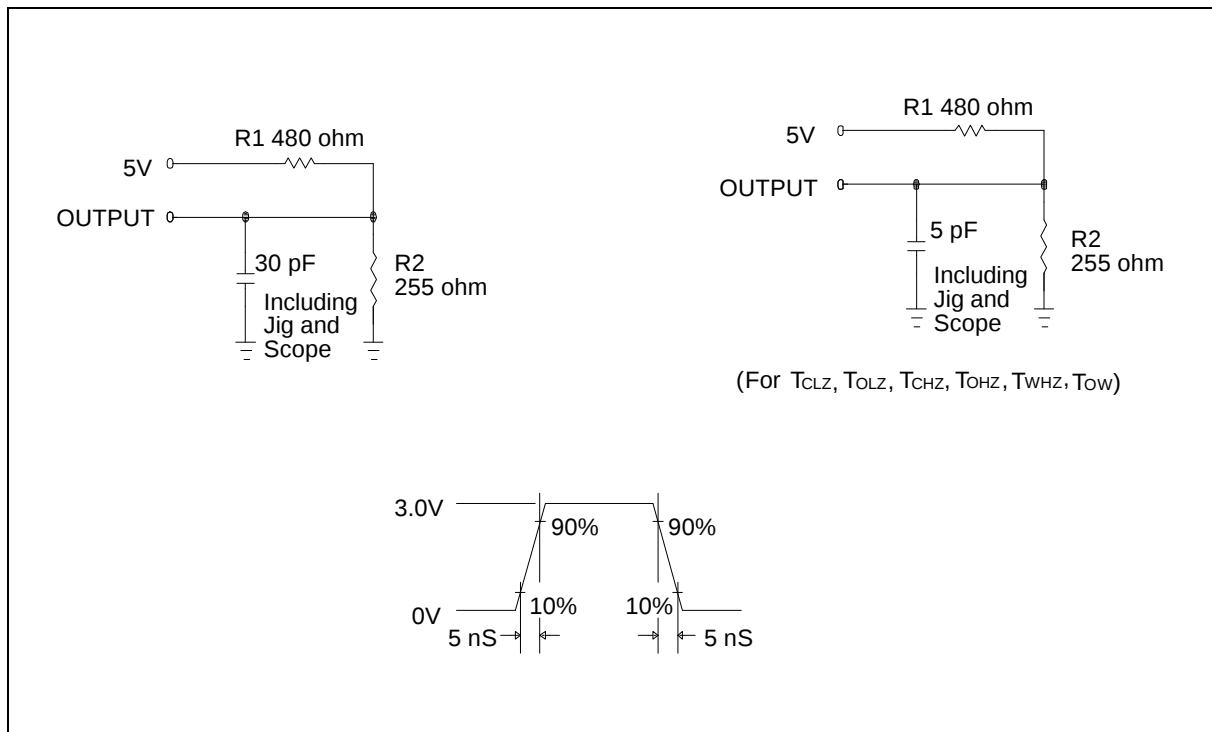
Note: These parameters are sampled but not 100% tested.

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	$C_L = 30\text{ pF}$, $I_{OH}/I_{OL} = -4\text{ mA}/8\text{ mA}$

AC Test Loads and Waveform





AC Characteristics, continued

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

Read Cycle

PARAMETER	SYMBOL	W24257A-35		UNIT
		MIN.	MAX.	
Read Cycle Time	T _{RC}	35	-	nS
Address Access Time	T _A A	-	35	nS
Chip Select Access Time	T _A CS	-	35	nS
Output Enable to Output Valid	T _A OE	-	17	nS
Chip Selection to Output in Low Z	T _{CLZ} *	3	-	nS
Output Enable to Output in Low Z	T _{OLZ} *	0	-	nS
Chip Deselection to Output in High Z	T _{CHZ} *	-	17	nS
Output Disable to Output in High Z	T _{OHZ} *	-	17	nS
Output Hold from Address Change	T _{OH}	3	-	nS

* These parameters are sampled but not 100% tested.

Write Cycle

PARAMETER		SYMBOL	W24257A-35		UNIT
			MIN.	MAX.	
Write Cycle Time		T _{WC}	35	-	nS
Chip Selection to End of Write		T _{CW}	20	-	nS
Address Valid to End of Write		T _{AW}	20	-	nS
Address Setup Time		T _{AS}	0	-	nS
Write Pulse Width		T _{WP}	18	-	nS
Write Recovery Time	$\overline{\text{CS}}, \overline{\text{WE}}$	T _{WR}	0	-	nS
Data Valid to End of Write		T _{DW}	15	-	nS
Data Hold from End of Write		T _{DH}	0	-	nS
Write to Output in High Z		T _{WHZ} *	-	15	nS
Output Disable to Output in High Z		T _{OHZ} *	-	15	nS
Output Active from End of Write		T _{OW}	0	-	nS

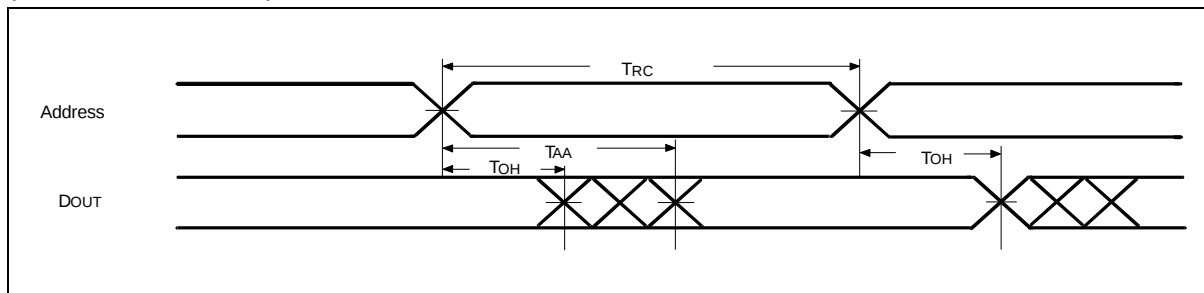
* These parameters are sampled but not 100% tested.



TIMING WAVEFORMS

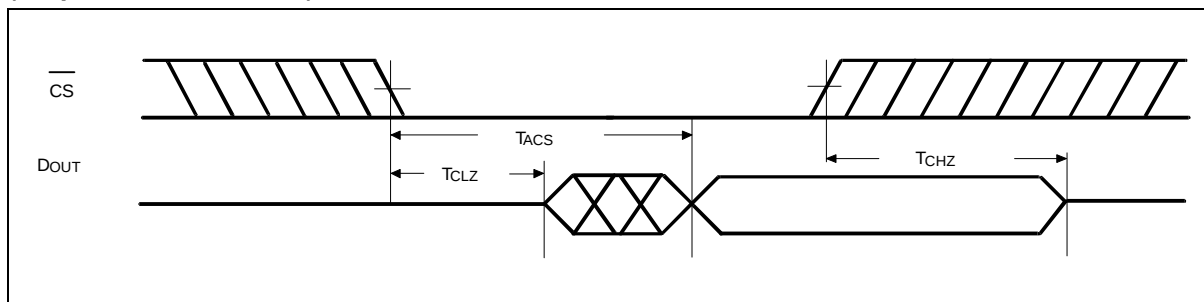
Read Cycle 1

(Address Controlled)



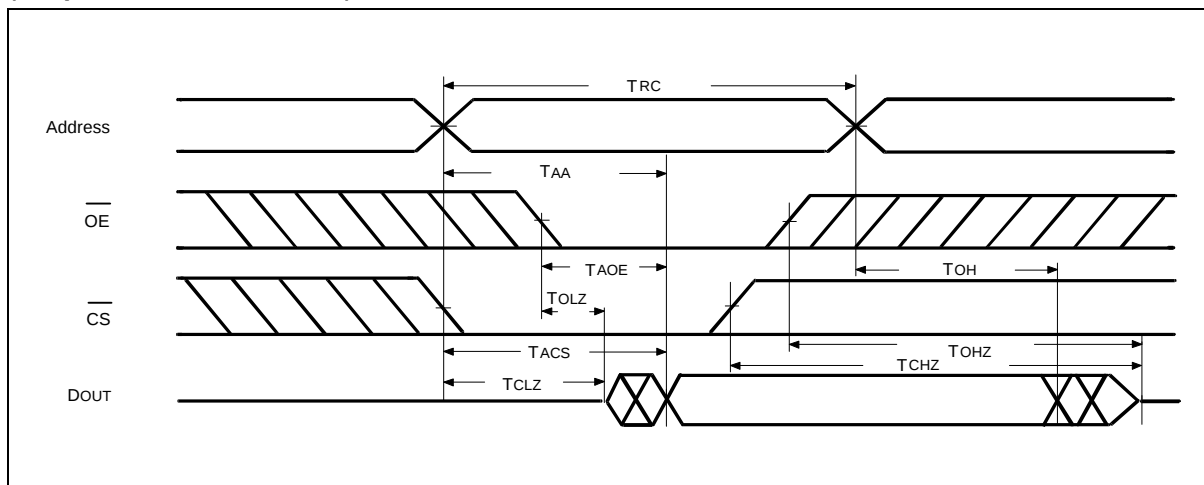
Read Cycle 2

(Chip Select Controlled)



Read Cycle 3

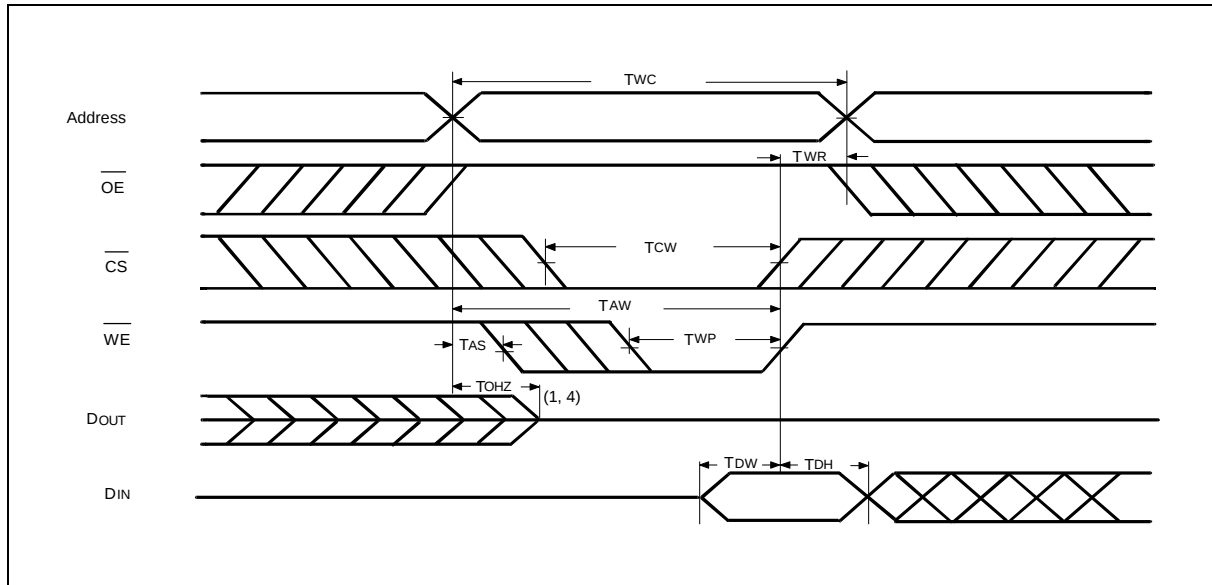
(Output Enable Controlled)



Timing Waveforms, continued

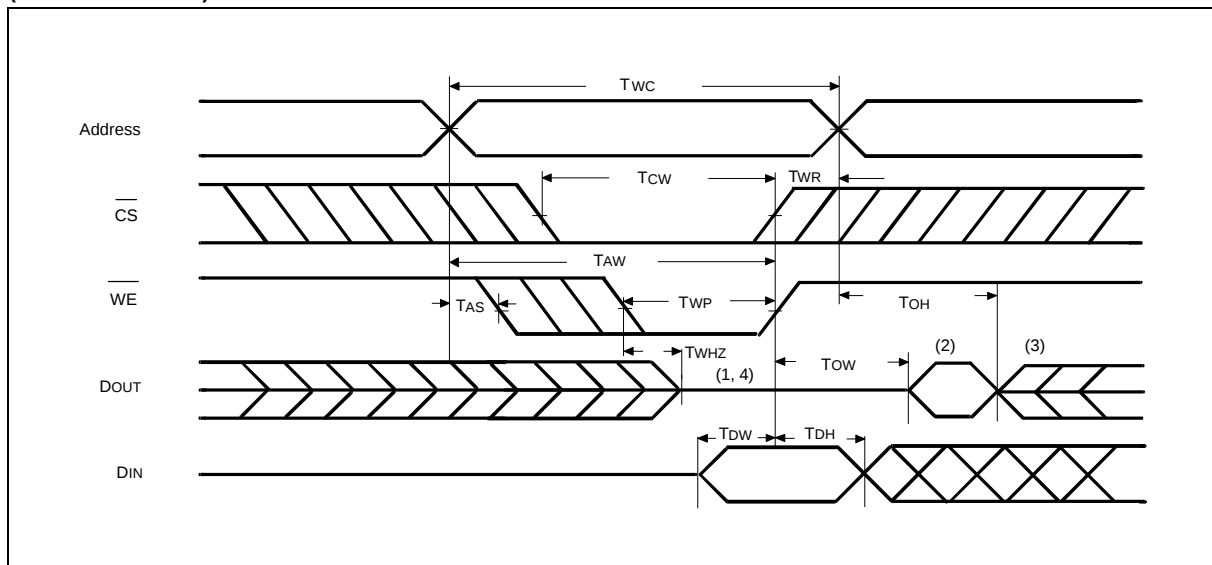
Write Cycle 1

($\overline{OE}$ Clock)



Write Cycle 2

($\overline{OE} = V_{IL}$ 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.

**ORDERING INFORMATION**

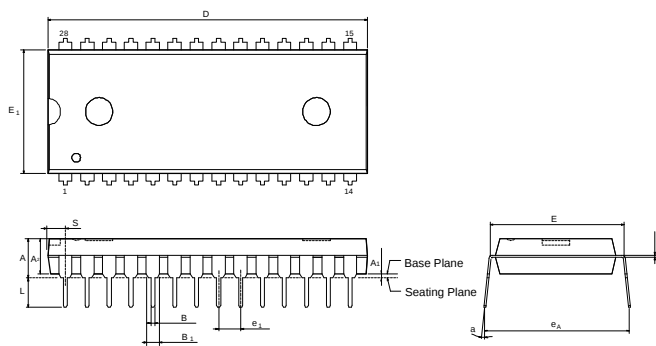
PART NO.	ACCESS TIME (nS)	OPERATING CURRENT MAX. (mA) f = max.	OPERATING CURRENT MAX. (mA) f = 50 MHz	STANDBY CURRENT MAX. (mA)	PACKAGE
W24257A-35	35	100	130	10	600 mil DIP
W24257AS-35	35	100	130	10	330 mil SOP
W24257AJ-35	35	100	130	10	300 mil SOJ
W24257AQ-35	35	100	130	10	Standard type one TSOP

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

28-pin P-DIP

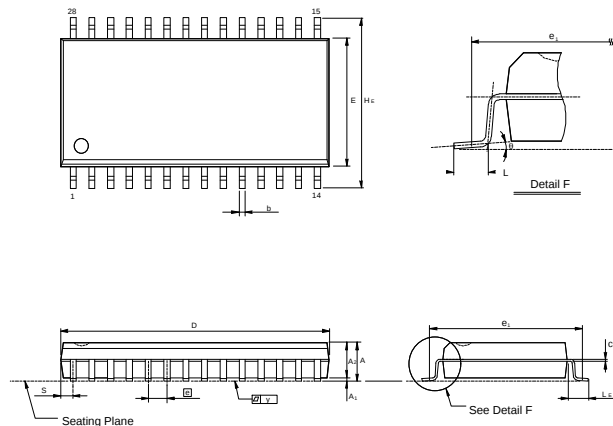


Symbol	Dimension in Inches			Dimension in mm		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	—	—	0.210	—	—	5.33
A ₁	0.010	—	—	0.25	—	—
A ₂	0.150	0.155	0.160	3.81	3.94	4.06
B	0.016	0.018	0.022	0.41	0.46	0.56
B ₁	0.058	0.060	0.064	1.47	1.52	1.63
c	0.008	0.010	0.014	0.20	0.25	0.36
D	—	1.460	1.470	—	37.08	37.34
E	0.590	0.600	0.610	14.99	15.24	15.49
E ₁	0.540	0.545	0.550	13.72	13.84	13.97
e ₁	0.090	0.100	0.110	2.29	2.54	2.79
L	0.120	0.130	0.140	3.05	3.30	3.56
a	0	—	15	0	—	15
e _A	0.630	0.650	0.670	16.00	16.51	17.02
S	—	—	0.090	—	—	2.29

Notes:

- Dimensions D Max. & S include mold flash or tie bar burrs.
- Dimension E1 does not include interlead flash.
- Dimensions D & E1 include mold mismatch and are determined at the mold parting line.
- Dimension B1 does not include dambar protrusion/intrusion.
- Controlling dimension: Inches.
- General appearance spec. should be based on final visual inspection spec.

28-pin SO Wide Body



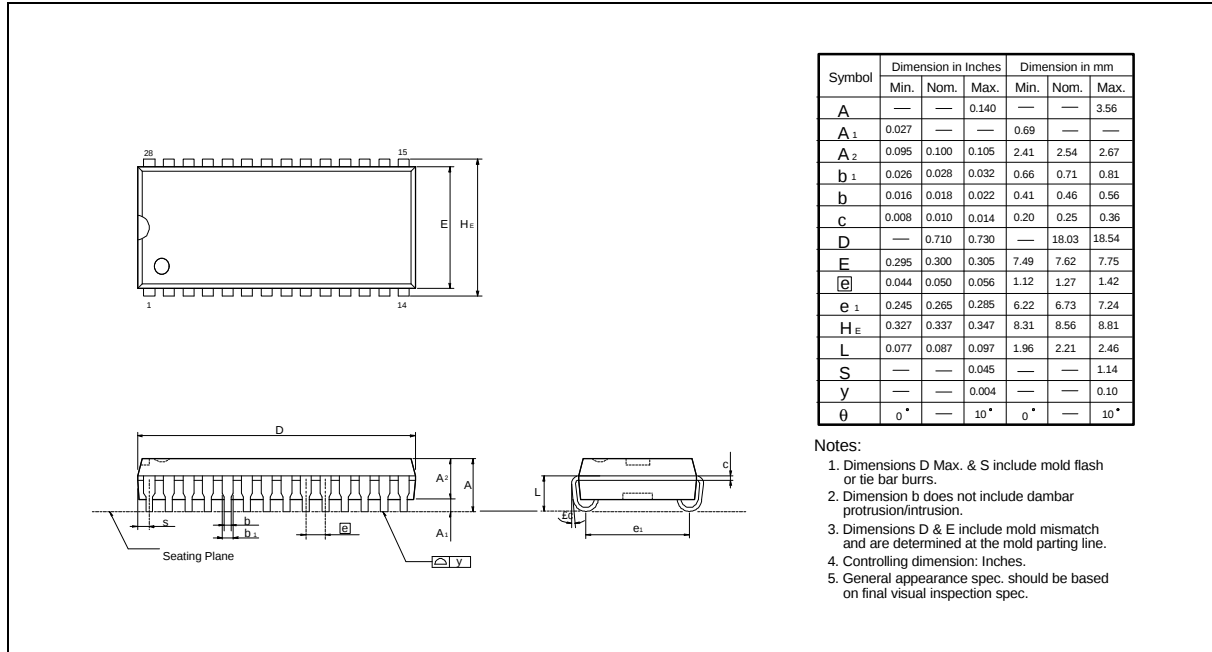
Symbol	Dimension in Inches			Dimension in mm		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	—	—	0.112	—	—	2.85
A ₁	0.004	—	—	0.10	—	—
A ₂	0.093	0.098	0.103	2.36	2.49	2.62
b	0.014	0.016	0.020	0.36	0.41	0.51
c	0.008	0.010	0.014	0.20	0.25	0.36
D	—	0.713	0.733	—	18.11	18.62
E	0.326	0.331	0.336	8.28	8.41	8.53
e	0.044	0.050	0.056	1.12	1.27	1.42
H _E	0.453	0.465	0.477	11.51	11.81	12.12
L	0.028	0.036	0.044	0.71	0.91	1.12
L _E	0.059	0.067	0.075	1.50	1.70	1.91
S	—	—	0.047	—	—	1.19
y	—	—	0.004	—	—	0.10
θ	0°	—	10°	0°	—	10°

Notes:

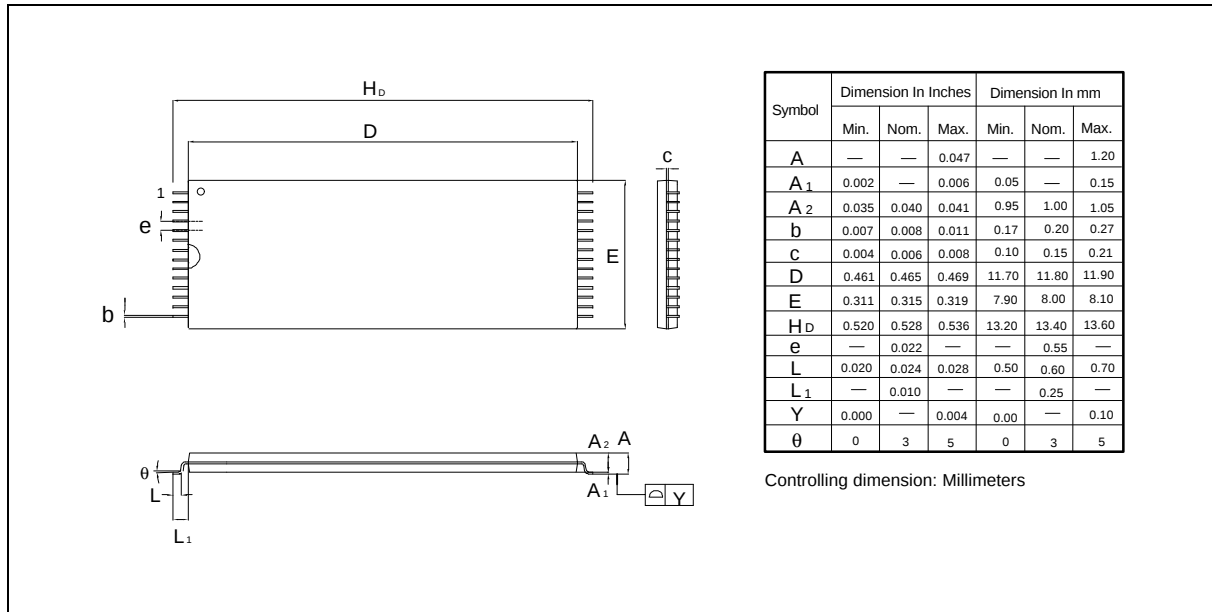
- Dimensions D Max. & S include mold flash or tie bar burrs.
- Dimension b does not include dambar protrusion/intrusion.
- Dimensions D & E include mold mismatch and are determined at the mold parting line.
- Controlling dimension: Inches.
- General appearance spec should be based on final visual inspection spec.

Package Dimensions, continued

28-pin Small Outline J Band



28-pin Standard Type One TSOP



**VERSION HISTORY**

VERSION	DATE	PAGE	DESCRIPTION
A5	Mar. 1997	1, 7	Add TSOP package
		2, 7	Modify IDD data
A6	Jan. 1998	2, 7	Modify IDD data

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