

### FEATURES

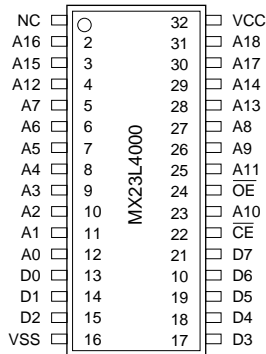
- Bit organization
  - 512Kb x 8 (byte mode)
- Fast access time
  - Random access: 150ns (max.) for 2.7~3.6V
- Current
  - Operating: 20mA
  - Standby: 20uA
- Supply voltage
  - 2.7V~3.6V
- Package
  - 32 pin SOP (450mil)
  - 32 pin TSOP (8mm x 20mm)

### ORDER INFORMATION

Part No.	Access Time	Package
MX23L4000MI-15	150ns	32 pin SOP (Industrial)
MX23L4000MI-20	200ns	32 pin SOP (Industrial)
MX23L4000TC-15	150ns	32 pin TSOP
MX23L4000TC-20	200ns	32 pin TSOP
MX23L4000TI-15	150ns	32 pin TSOP (Industrial)
MX23L4000TI-20	200ns	32 pin TSOP (Industrial)

### PIN CONFIGURATION

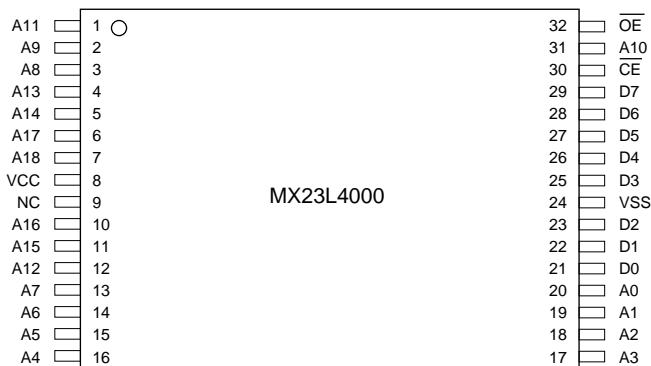
#### 32 SOP



### PIN DESCRIPTION

Symbol	Pin Function
A0~A18	Address Inputs
D0~D7	Data Outputs
$\overline{CE}$	Chip Enable Input
$\overline{OE}$	Output Enable Input
VCC	Power Supply Pin
VSS	Ground Pin
NC	No Connection

#### 32 TSOP



**ABSOLUTE MAXIMUM RATINGS**

Item	Symbol	Ratings
Voltage on any Pin Relative to VSS	VIN	-0.3V to 3.9V
Ambient Operating Temperature	Topr	-40° C to 85° C
Storage Temperature	Tstg	-65° C to 125° C

**DC CHARACTERISTICS** (Ta = -40° C ~ 85° C, VCC = 2.7V~3.6V)

Item	Symbol	MIN.	MAX.	Conditions
Output High Voltage	VOH	VCC-0.2V	-	IOH = -0.4mA
Output Low Voltage	VOL	-	0.2V	IOL = 1.6mA
Input High Voltage	VIH	2.1V	VCC+0.3V	
Input Low Voltage	VIL	-0.3V	0.4V	
Input Leakage Current	ILI	-	10uA	0V, VCC
Output Leakage Current	ILO	-	10uA	0V, VCC
Operating Current	ICC1	-	20mA	f=5MHz, all output open
Standby Current (TTL)	ISTB1	-	1mA	$\overline{CE}$ =VIH
Standby Current (CMOS)	ISTB2	-	20uA	$\overline{CE}$ > VCC - 0.2V
Input Capacitance	CIN	-	10pF	Ta = 25° C, f = 1MHZ
Output Capacitance	COUT	-	10pF	Ta = 25° C, f = 1MHZ

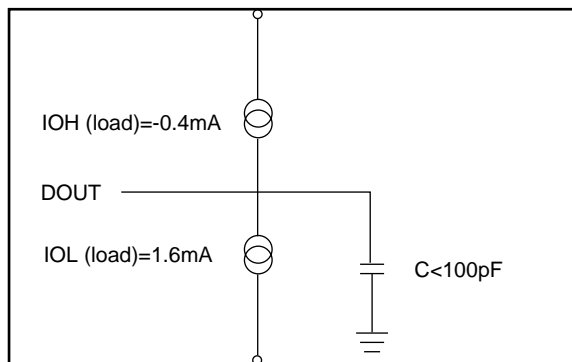
**AC CHARACTERISTICS** (Ta = -40° C ~ 85° C, VCC = 2.7V~3.6V)

Item	Symbol	23L4000-15		23L4000-20	
		MIN.	MAX.	MIN.	MAX.
Read Cycle Time	tRC	150ns	-	200ns	-
Address Access Time	tAA	-	150ns	-	200ns
Chip Enable Access Time	tACE	-	150ns	-	200ns
Output Enable Time	tOE	-	70ns	-	100ns
Output Hold After Address	tOH	0ns	-	0ns	-
Output High Z Delay	tHZ	-	20ns	-	20ns

Note: Output high-impedance delay (tHZ) is measured from OE or CE going high, and this parameter guaranteed by design over the full voltage and temperature operating range - not tested.

## AC Test Conditions

Input Pulse Levels	0.4V~2.4V
Input Rise and Fall Times	10ns
Input Timing Level	1.4V
Output Timing Level	1.4V
Output Load	See Figure



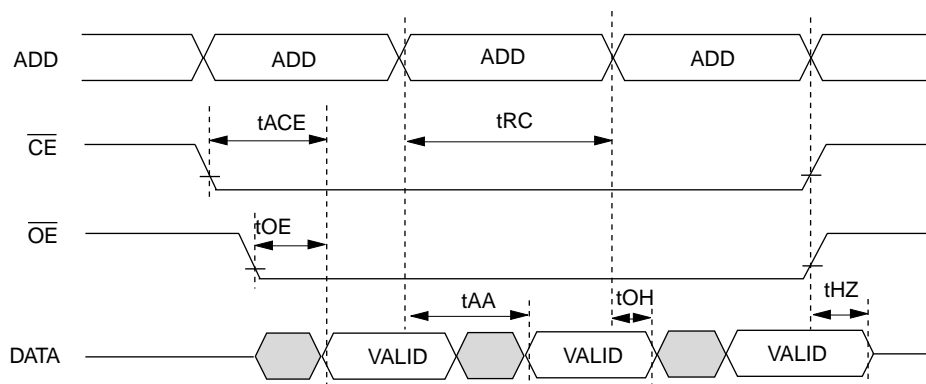
Note: No output loading is present in tester load board.

Active loading is used and under software programming control.

Output loading capacitance includes load board's and all stray capacitance.

## TIMING DIAGRAM

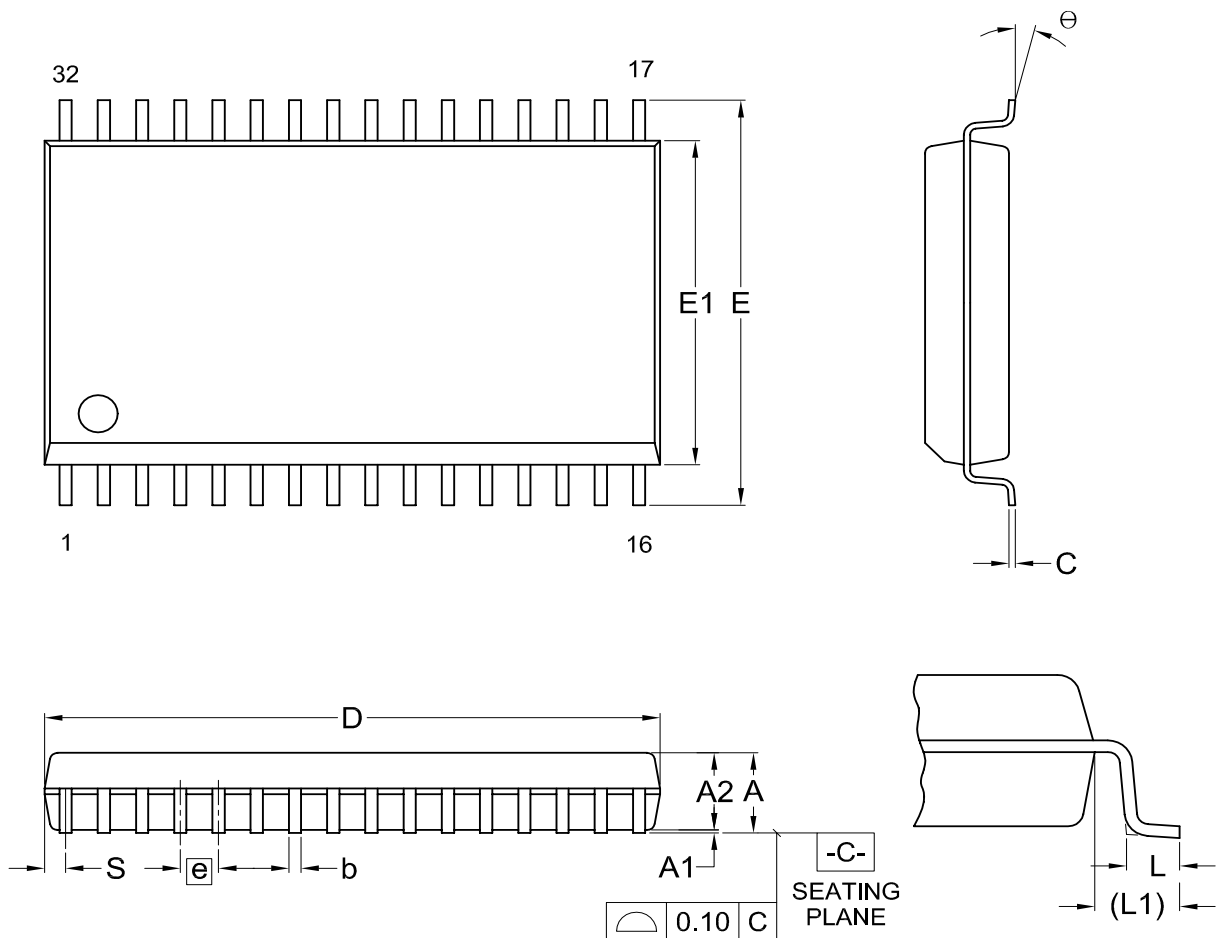
### RANDOM READ



Note :  $\overline{CE}$ ,  $\overline{OE}$  are enable.

## PACKAGE INFORMATION

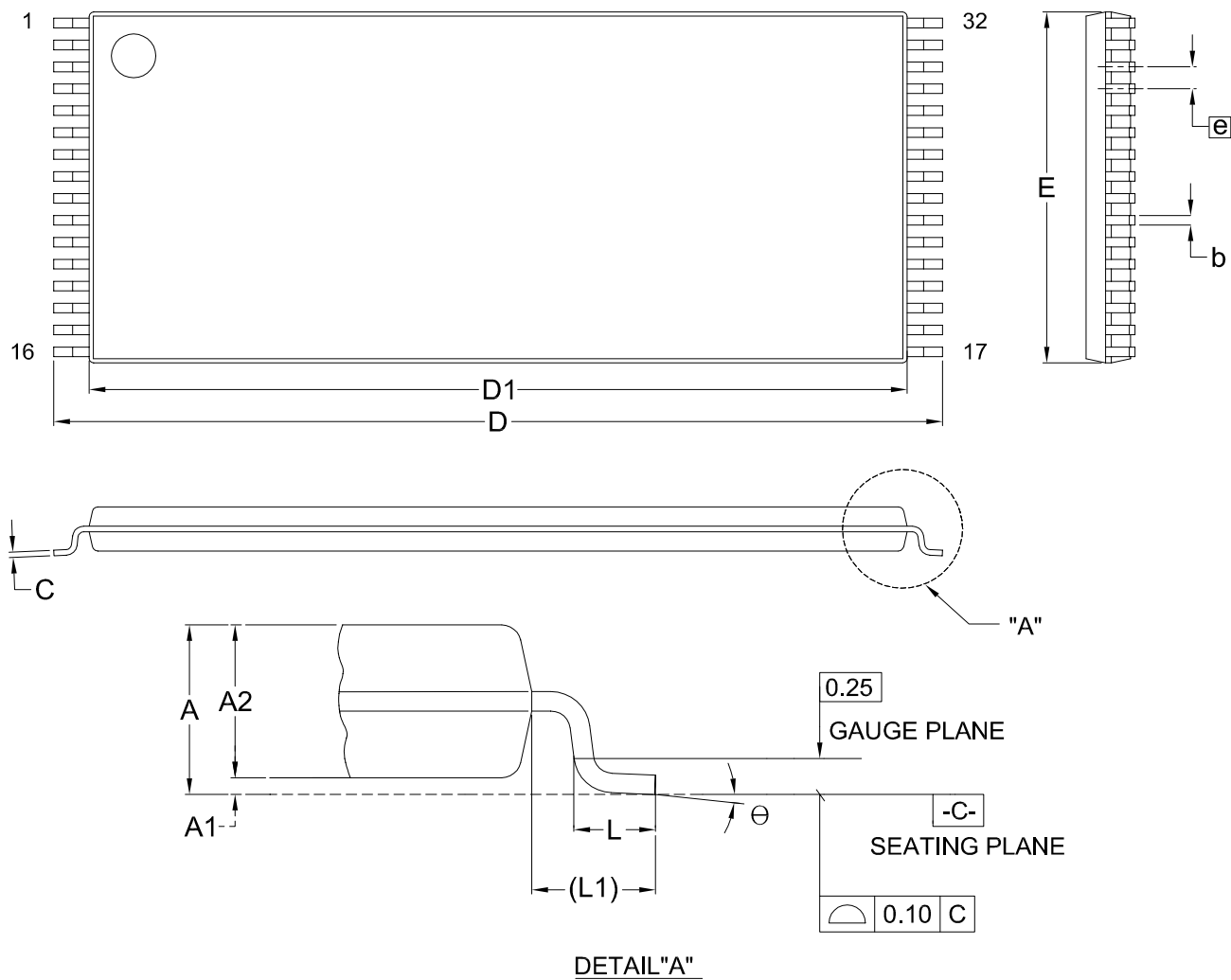
**Title:** Package Outline for SOP 32L (450MIL)



Dimensions (inch dimensions are derived from the original mm dimensions)

SYMBOL		A	A1	A2	b	C	D	E	E1	e	L	L1	S	$\Theta$
mm	Min.	—	0.10	2.59	0.36	0.15	20.32	13.92	11.18		0.56	1.20	0.58	0
	Nom.	---	0.15	2.69	0.41	0.20	20.45	14.12	11.30	1.27	0.76	1.40	0.70	5
	Max.	3.00	0.20	2.80	0.51	0.25	20.57	14.32	11.43		0.96	1.60	0.83	8
Inch	Min.	---	0.004	0.102	0.014	0.006	0.800	0.548	0.440		0.022	0.047	0.023	0
	Nom.	---	0.006	0.106	0.016	0.008	0.805	0.556	0.445	0.050	0.030	0.055	0.028	5
	Max.	0.118	0.008	0.110	0.020	0.010	0.810	0.564	0.450		0.038	0.063	0.033	8

DWG.NO.	REVISION	REFERENCE			ISSUE DATE
		JEDEC	EIAJ		
6110-1404	5	MO-099			11-26-'03

**Title: Package Outline for TSOP(I) 32L (8X20mm)**


Dimensions (inch dimensions are derived from the original mm dimensions)

SYMBOL		A	A1	A2	b	C	D	D1	E	e	L	L1	$\theta$
UNIT													
mm	Min.	---	0.05	0.95	0.17	0.10	19.80	18.30	7.90		0.50	0.70	0
	Nom.	---	0.10	1.00	0.20	0.15	20.00	18.40	8.00	0.50	0.60	0.80	5
	Max.	1.20	0.15	1.05	0.27	0.21	20.20	18.50	8.10		0.70	0.90	8
Inch	Min.	---	0.002	0.037	0.007	0.004	0.780	0.720	0.311		0.020	0.028	0
	Nom.	---	0.004	0.039	0.008	0.006	0.787	0.724	0.315	0.020	0.024	0.031	5
	Max.	0.047	0.006	0.041	0.011	0.008	0.795	0.728	0.319		0.028	0.035	8

DWG.NO.	REVISION	REFERENCE			ISSUE DATE
		JEDEC	EIAJ		
6110-1604	9	MO-142			11-26-'03



## REVISION HISTORY

REVISION	DESCRIPTION	PAGE	DATE
1.4	AC CHARACTERISTICS tOH 25ns-->0ns	P3	FEB/01/1999
1.5	1. To modify Absolute Maximum Ratings 2. To modify DC Characteristics 3. To modify Package Information	P2 P2 P4,5	JUN/19/2001
1.6	1. To modify Package Information	P4,5	NOV/22/2002



**MX23L4000**

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