MX23L1611

3.3 Volt 16-Mbit (2M x 8 / 1M x 16) Mask ROM with Page Mode

FEATURES

- Bit organization
  - 2M x 8 (byte mode)
  - 1M x 16 (word mode)
- Fast access time
  - Random access: 100ns (max.)
  - Page access: 30ns (max.)
- Page Size
  - 8 words per page
- Current
  - Operating:40mA
  - Standby:15uA
- Supply voltage
  - 100ns @3.0V ~ 3.6V
  - 120ns @2.7V ~ 3.6V
- Package
  - 44 pin SOP (500mil)
  - 48 pin TSOP (12mm x 20mm)
  - 42 pin PDIP

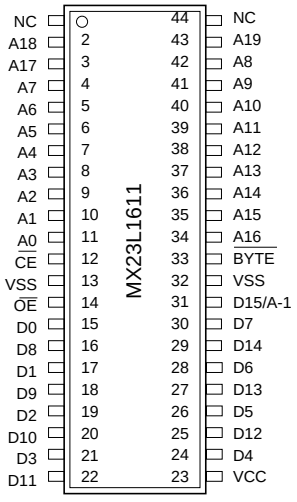
ORDER INFORMATION

Part No.	Access Time	Package	Remark
MX23L1611MC-10	100ns	44 pin SOP	
MX23L1611MC-12	120ns	44 pin SOP	
MX23L1611MC-10G	100ns	44 pin SOP	Pb-free
MX23L1611MC-12G	120ns	44 pin SOP	Pb-free
MX23L1611MI-12*	120ns	44 pin SOP	
MX23L1611TC-10	100ns	48 pin TSOP	
MX23L1611TC-10G	100ns	48 pin TSOP	Pb-ree
MX23L1611TC-12	120ns	48 pin TSOP	
MX23L1611TI-12*	120ns	48 pin TSOP	
MX23L1611PC-10	100ns	42 pin PDIP	
MX23L1611PC-12	120ns	42 pin PDIP	

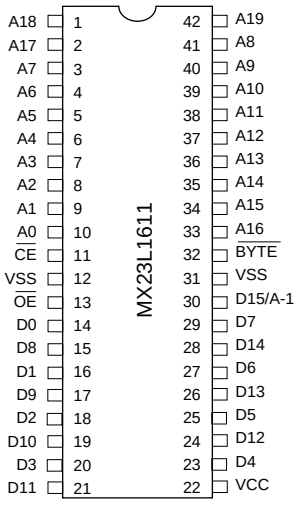
*Note: Industrial grade's temperature is -40° C~85° C

PIN CONFIGURATION

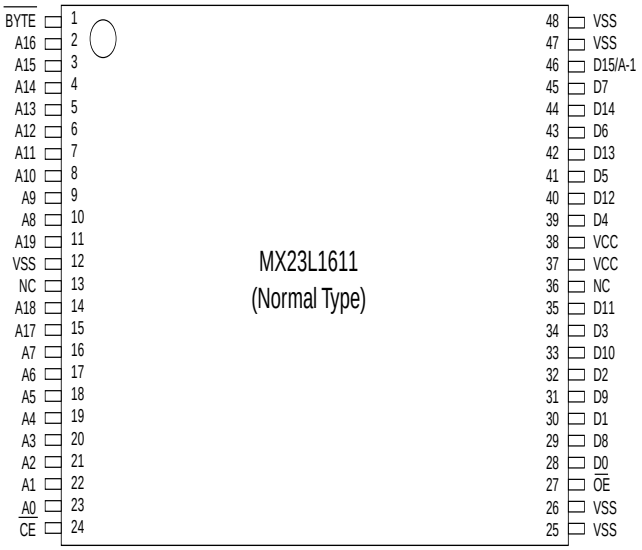
44 SOP



42 PDIP



48 TSOP (Normal Type)



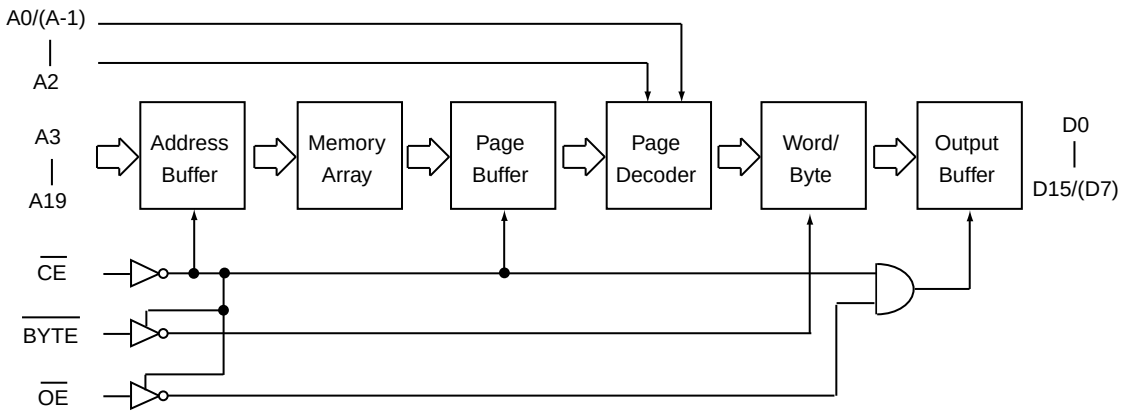
PIN DESCRIPTION

Symbol	Pin Function
A0~A19	Address Inputs
D0~D14	Data Outputs
D15/A-1	D15 (Word Mode)/ LSB Address (Byte Mode)
$\overline{CE}$	Chip Enable Input
$\overline{OE}$	Output Enable Input
$\overline{Byte}$	Word/ Byte Mode Selection
VCC	Power Supply Pin
VSS	Ground Pin
NC	No Connection

MODE SELECTION

$\overline{CE}$	$\overline{OE}$	$\overline{Byte}$	D15/A-1	D0~D7	D8~D15	Mode	Power
H	X	X	X	High Z	High Z	-	Stand-by
L	H	X	X	High Z	High Z	-	Active
L	L	H	Output	D0~D7	D8~D15	Word	Active
L	L	L	Input	D0~D7	High Z	Byte	Active

BLOCK DIAGRAM



Note: Chip Enable active low input activates the chip's control logic, Address buffer and Page buffer.

ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Ratings
Voltage on any Pin Relative to VSS	VIN	-1.3V to VCC+2.0V (Note)
Ambient Operating Temperature	Topr	-40° C to 85° C
Storage Temperature	Tstg	-65° C to 125° C

Note: Minimum DC voltage on input or I/O pins is -0.5V. During voltage transitions, inputs may undershoot VSS to -1.3V for periods of up to 20ns. Maximum DC voltage on input or I/O pins is VCC+0.5V. During voltage transitions, input may overshoot VCC to VCC+2.0V for periods of up to 20ns.

DC CHARACTERISTICS (Ta = -10° C ~ 70° C, VCC = 3.0V~3.6V)

Item	Symbol	MIN.	MAX.	Conditions
Output High Voltage	VOH	2.4V	-	IOH = -0.4mA
Output Low Voltage	VOL	-	0.4V	IOL = 1.6mA
Input High Voltage	VIH	2.2V	VCC+0.3V	
Input Low Voltage	VIL	-0.3V	0.2 x VCC	
Input Leakage Current	ILI	-	5uA	0V, VCC
Output Leakage Current	ILO	-	5uA	0V, VCC
Operating Current	ICC1	-	40mA	tRC = 100ns, all output open
Standby Current (TTL)	ISTB1	-	1mA	$\overline{CE}$ = VIH
Standby Current (CMOS)	ISTB2	-	15uA	$\overline{CE}$>VCC-0.2V
Input Capacitance	CIN	-	10pF	Ta = 25° C, f = 1MHZ
Output Capacitance	COUT	-	10pF	Ta = 25° C, f = 1MHZ

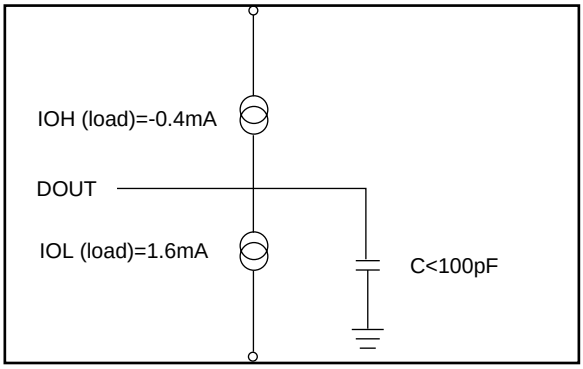
AC CHARACTERISTICS (Ta = -10° C ~ 70° C, VCC = 3.0V~3.6V)

Item	Symbol	23L1611-10		23L1611-12	
		MIN.	MAX.	MIN.	MAX.
Read Cycle Time	tRC	100ns	-	120ns	-
Address Access Time	tAA	-	100ns	-	120ns
Chip Enable Access Time	tACE	-	100ns	-	120ns
Page Mode Access Time	tPA	-	30ns	-	50ns
Output Enable Time	tOE	-	30ns	-	50ns
Output Hold After Address	tOH	0ns	-	0ns	-
Output High Z Delay	tHZ	-	20ns	-	20ns

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

AC Test Conditions

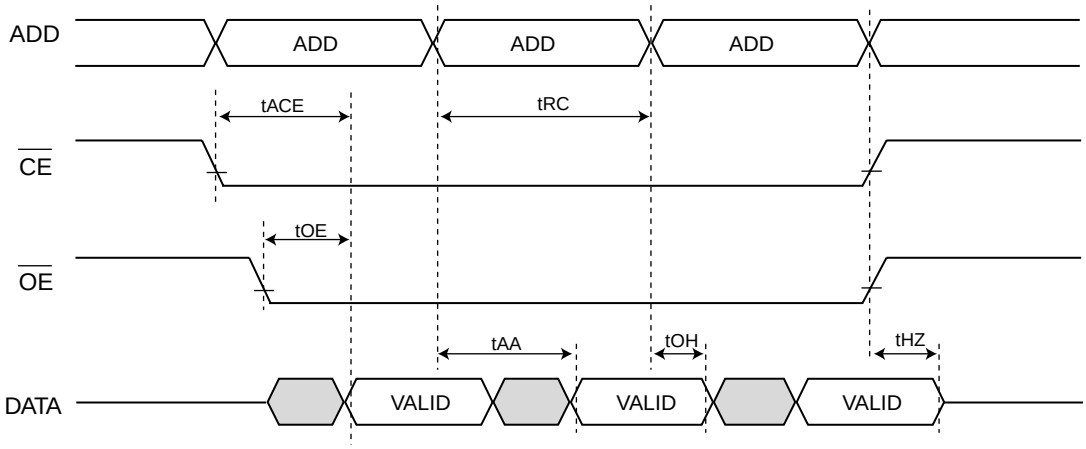
Input Pulse Levels	0.4V~ 2.6V
Input Rise and Fall Times	10ns
Input Timing Level	1.4V
Output Timing Level	1.4V
Output Load	See Figure



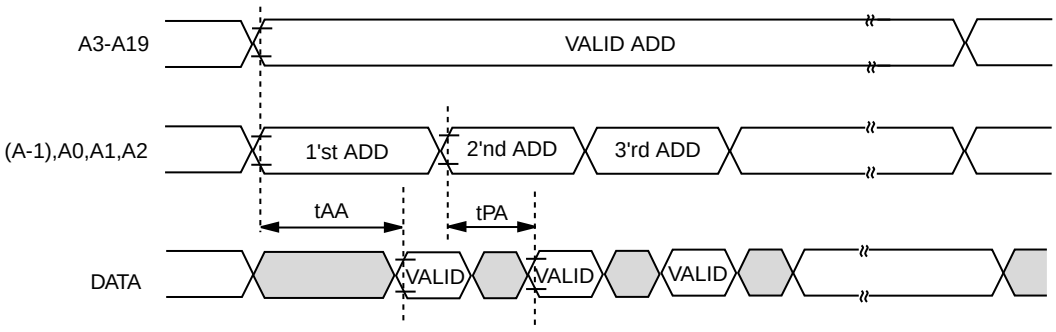
Note:
No output loading is present in tester load board.
Active loading is used and under software programming control.
Output loading capacitance includes load board's and all stray capacitance.

TIMING DIAGRAM

RANDOM READ



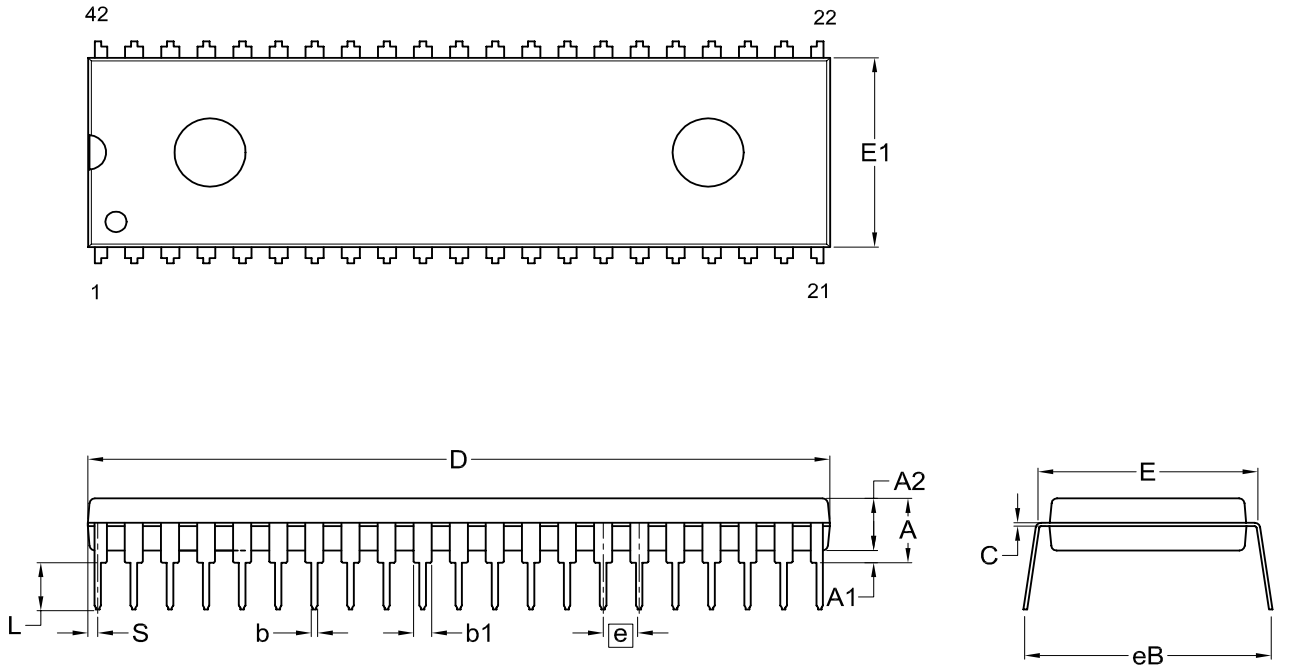
PAGE READ



Note: $\overline{CE}$, $\overline{OE}$ are enable.
Page size is 8 words in 16-bit mode, 16 bytes in 8-bit mode.

PACKAGE INFORMATION

Title: **Package Outline for PDIP 42L (600MIL)**

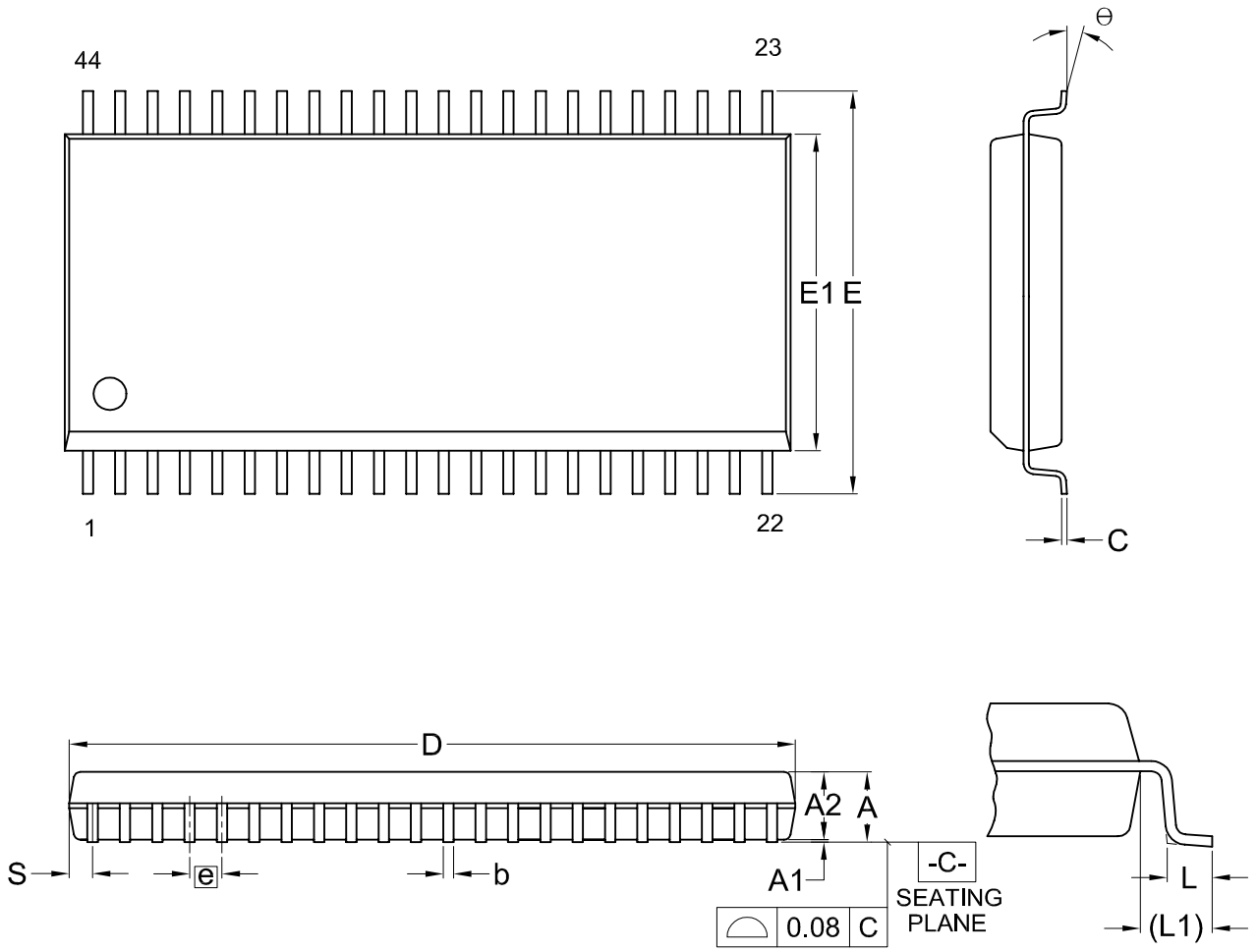


Dimensions (inch dimensions are derived from the original mm dimensions)

SYMBOL / UNIT		A	A1	A2	b	b1	C	D	E	E1	e	eB	L	S
mm	Min.	---	0.25	3.73	0.38	1.14	0.20	51.31	15.11	13.84		15.75	2.92	0.38
	Nom.	---	---	3.94	0.46	1.27	0.25	51.94	15.24	13.97	2.54	16.51	3.30	0.64
	Max.	4.90	0.76	4.14	0.53	1.40	0.30	52.57	15.37	14.10		17.27	3.68	0.89
Inch	Min.	—	0.010	0.147	0.015	0.045	0.008	2.020	0.595	0.545		0.620	0.115	0.015
	Nom.	—	—	0.155	0.018	0.050	0.010	2.045	0.600	0.550	0.100	0.650	0.130	0.025
	Max.	0.193	0.030	0.163	0.021	0.055	0.012	2.070	0.605	0.555		0.680	0.145	0.035

DWG.NO.	REVISION	REFERENCE			ISSUE DATE
		JEDEC	EIAJ		
6110-0202.5	8				11-24-'03

Title: **Package Outline for SOP 44L (500MIL)**

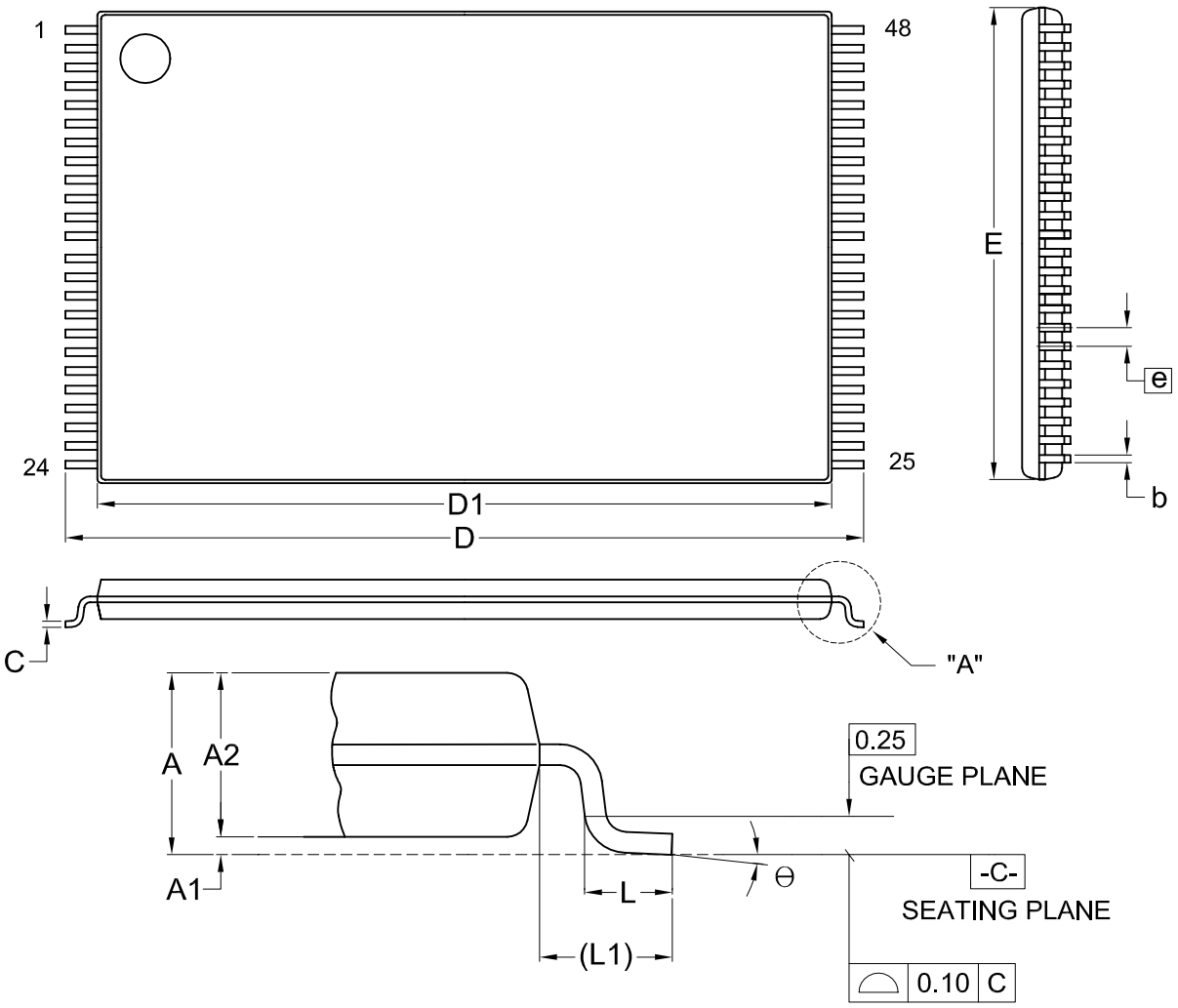


Dimensions (inch dimensions are derived from the original mm dimensions)

SYMBOL / UNIT		A	A1	A2	b	C	D	E	E1	e	L	L1	S	θ
mm	Min.	---	0.10	2.59	0.36	0.15	28.37	15.83	12.47		0.56	1.51	0.78	0
	Nom.	---	0.15	2.69	0.41	0.20	28.50	16.03	12.60	1.27	0.76	1.71	0.91	5
	Max.	3.00	0.20	2.80	0.51	0.25	28.63	16.23	12.73		0.96	1.91	1.04	10
Inch	Min.	---	0.004	0.102	0.014	0.006	1.117	0.623	0.491		0.022	0.059	0.031	0
	Nom.	---	0.006	0.106	0.016	0.008	1.122	0.631	0.496	0.050	0.030	0.067	0.036	5
	Max.	0.118	0.008	0.110	0.020	0.010	1.127	0.639	0.501		0.038	0.075	0.041	10

DWG.NO.	REVISION	REFERENCE			ISSUE DATE
		JEDEC	EIAJ		
6110-1405	6	MO-175			11-26-'03

Title: Package Outline for TSOP(I) 48L (12X20mm)NORMAL FORM



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

SYMBOL / UNIT		A	A1	A2	b	C	D	D1	E	e	L	L1	Θ
mm	Min.	---	0.05	0.95	0.17	0.10	19.80	18.30	11.90		0.50	0.70	0
	Nom.	---	0.10	1.00	0.20	0.13	20.00	18.40	12.00	0.50	0.60	0.80	5
	Max.	1.20	0.15	1.05	0.27	0.21	20.20	18.50	12.10		0.70	0.90	8
Inch	Min.	---	0.002	0.037	0.007	0.004	0.780	0.720	0.469		0.020	0.028	0
	Nom.	---	0.004	0.039	0.008	0.005	0.787	0.724	0.472	0.020	0.024	0.031	5
	Max.	0.047	0.006	0.041	0.011	0.008	0.795	0.728	0.476		0.028	0.035	8

DWG.NO.	REVISION	REFERENCE			ISSUE DATE
		JEDEC	EIAJ		
6110-1607	7	MO-142			12-01-'03

REVISION HISTORY

REVISION	DESCRIPTION	PAGE	DATE
1.5	Temperature range is revised as -10° C~70° C	P3	NOV/27/1998
1.6	Output hold after address (tOH) spec is revised as 0ns(min.)	P3	JAN/22/1999
	120ns speed grade's voltage range is revised as 2.7V~3.6V	P1	
1.7	DC characteristics Standby current (ISTB2):5uA-->15uA	P1,3	Dec/30/1999
1.8	Modify Package Information	P5~6	JUL/18/2001
1.9	Add 42-pin PDIP Package	P1,7	FEB/18/2002
2.0	Modify Package Information	P5~7	NOV/21/2002
2.1	Modify 42-PDIP Package Information	P5	JUN/20/2003
2.2	1. Add Pb-free package in order information	P1	MAY/11/2004

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