

### FEATURES

- Bit organization
  - 2Mb x 16 (word mode only)
- Fast access time
  - Random access:70ns(max.)
- Current
  - Operating:15mA
  - Standby:15uA(max.)
- Supply voltage
  - VCC : 2.7 ~ 3.6V
  - VCCQ : 2.7 ~ 3.6V
- Package
  - 48 ball mini BGA (7.0mm X 7.0mm, ball pitch 0.75mm)
  - 48 ball mini BGA (7.95mm X 9.95mm, ball pitch 0.75mm)
  - 48 pin TSOP (12mm X 20mm)
- Temperature
  - 40~85°C

### PIN DESCRIPTION

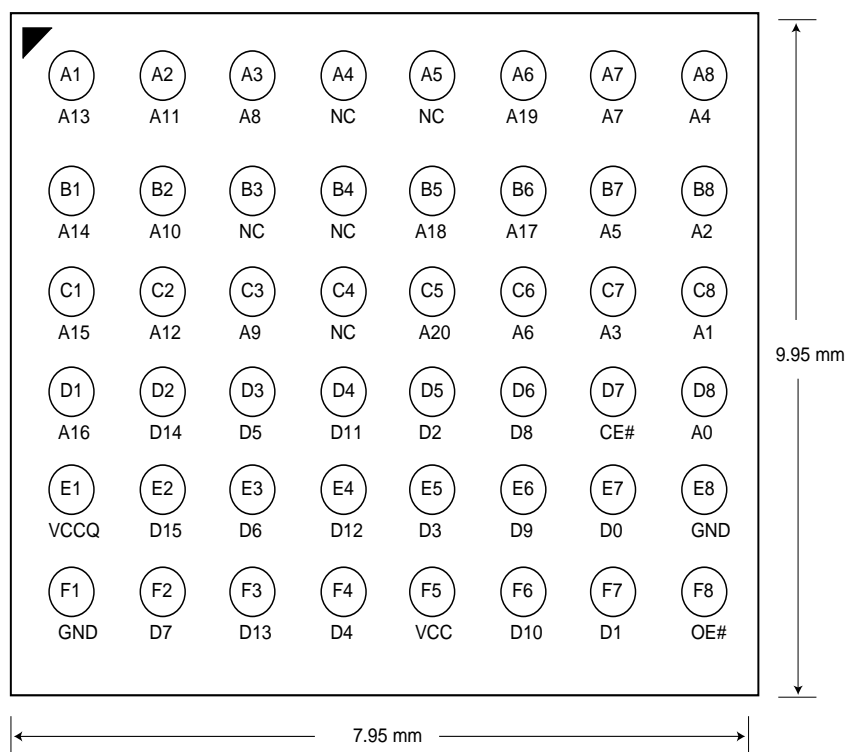
Symbol	Pin Function
A0~A20	Address Inputs
D0~D15	Data Outputs
CE#	Chip Enable Input
OE#	Output Enable Input
VCC	Power Supply Pin
VCCQ	Output VCC Pin
GND	Ground Pin
NC	No Connection

### MODE SELECTION

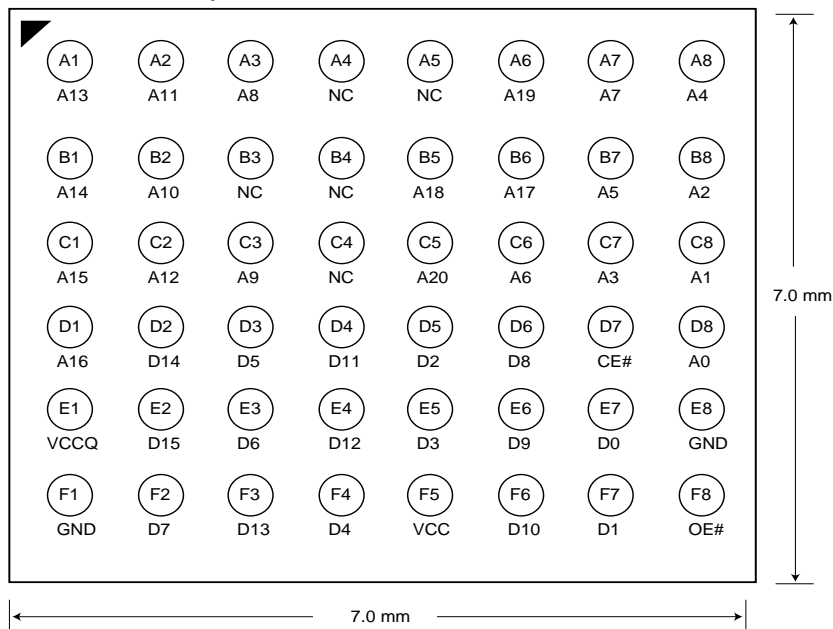
CE#	OE#	D0~D15	Power
H	X	High Z	Stand-by
L	H	High Z	Active
L	L	D0~D15	Active

### PIN CONFIGURATION

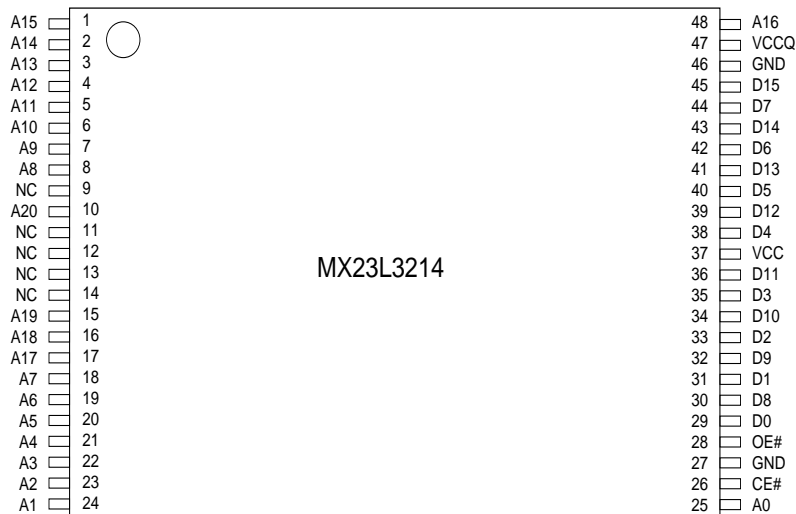
#### 48 Mini BGA (Top View, Ball Down)



## 48 Mini BGA (Top View, Ball Down)



## 48 Pin TSOP (Top View)



## ORDER INFORMATION

Part No.	Speed	Package	Grade	Remark
MX23L3214TI-80	80ns	48 pin TSOP	Industrial	
MX23L3214TI-90	90ns	48 pin TSOP	Industrial	
MX23L3214XI-70	70ns	48 ball mini BGA	Industrial	
MX23L3214XI-90	90ns	48 ball mini BGA	Industrial	
MX23L3214XI-10	100ns	48 ball mini BGA	Industrial	
MX23L3214XI-90G	90ns	48 ball mini BGA	Industrial	Pb-free

Note: Industrial grade temperature: -40 ~ 85° C  
Commercial grade temperature: 0 ~ 70° C

**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	2.4V	-	IOH = -400uA
Output Low Voltage	VOL	-	0.4V	IOL = 1.6mA
Input High Voltage	VIH	2.2V	VCCQ+0.3V	
Input Low Voltage	VIL	-0.4V	0.4V	
Input Leakage Current	ILI	-	5uA	0V, VCC
Output Leakage Current	ILO	-	5uA	0V, VCC
Operating Current	ICC	-	15mA	f=5MHz, CE#=VIL, OE#=VIH all output open
Standby Current (CMOS)	ISTB	-	15uA	CE#>VCC-0.2V
Input Capacitance	CIN	-	10pF	Ta = 25° C, f = 1MHZ
Output Capacitance	COUT	-	10pF	Ta = 25° C, f = 1MHZ

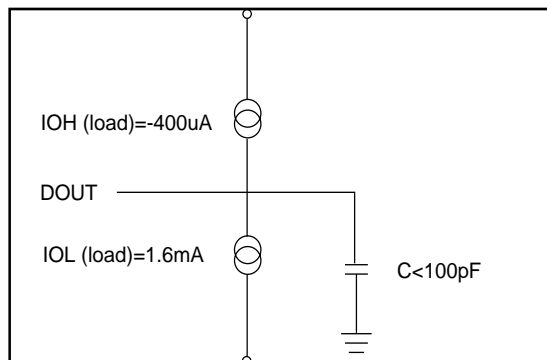
**AC CHARACTERISTICS** (Ta = -40° C ~ 85° C, VCC = 2.7V~3.6V)

Item	Symbol	23L3214-70		23L3214-80		23L3214-90		23L3214-10	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
Read Cycle Time	tRC	70ns	-	80ns	-	90ns	-	100ns	-
Address Access Time	tAA	-	70ns	-	80ns	-	90ns	-	100ns
Chip Enable Access Time	tACE	-	70ns	-	80ns	-	90ns	-	100ns
Output Enable Time	tOE	-	20ns	-	20ns	-	20ns	-	30ns
Output Hold After Address	tOH	0ns	-	0ns	-	0ns	-	0ns	-
Output High Z Delay	tHZ	-	20ns	-	20ns	-	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	5ns
Input Timing Level	1.5V
Output Timing Level	1.5V
Output Load	See Figure 100pF output load capacitance



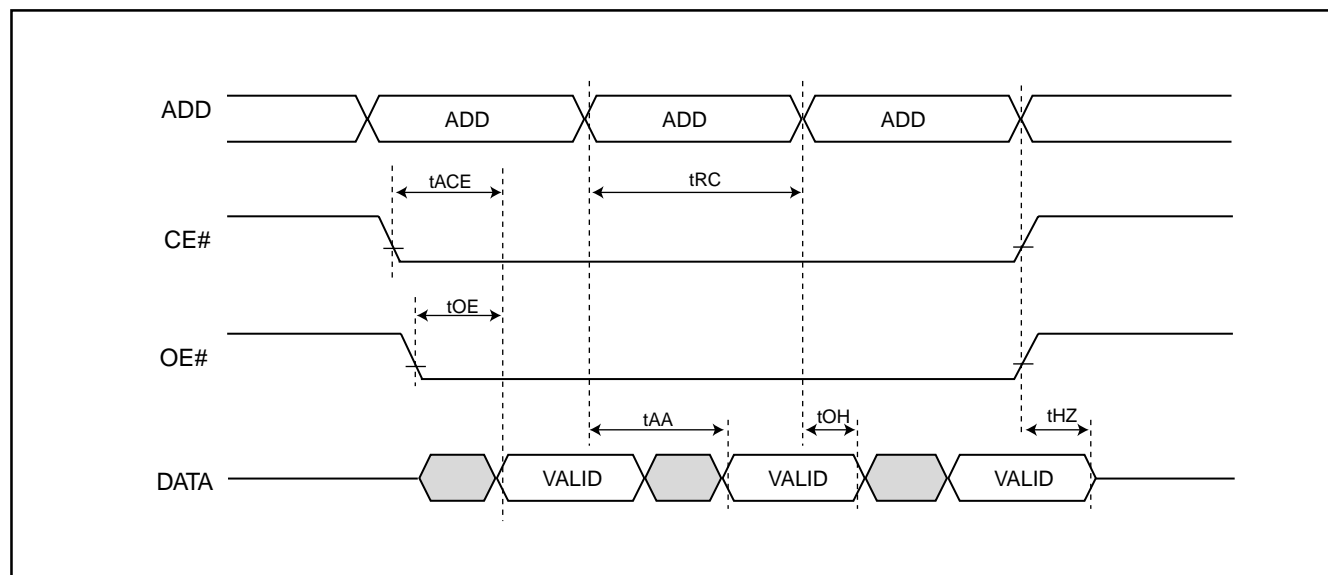
Note: No output loading is present in tester load board.

Active loading is used and under software programming control.

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

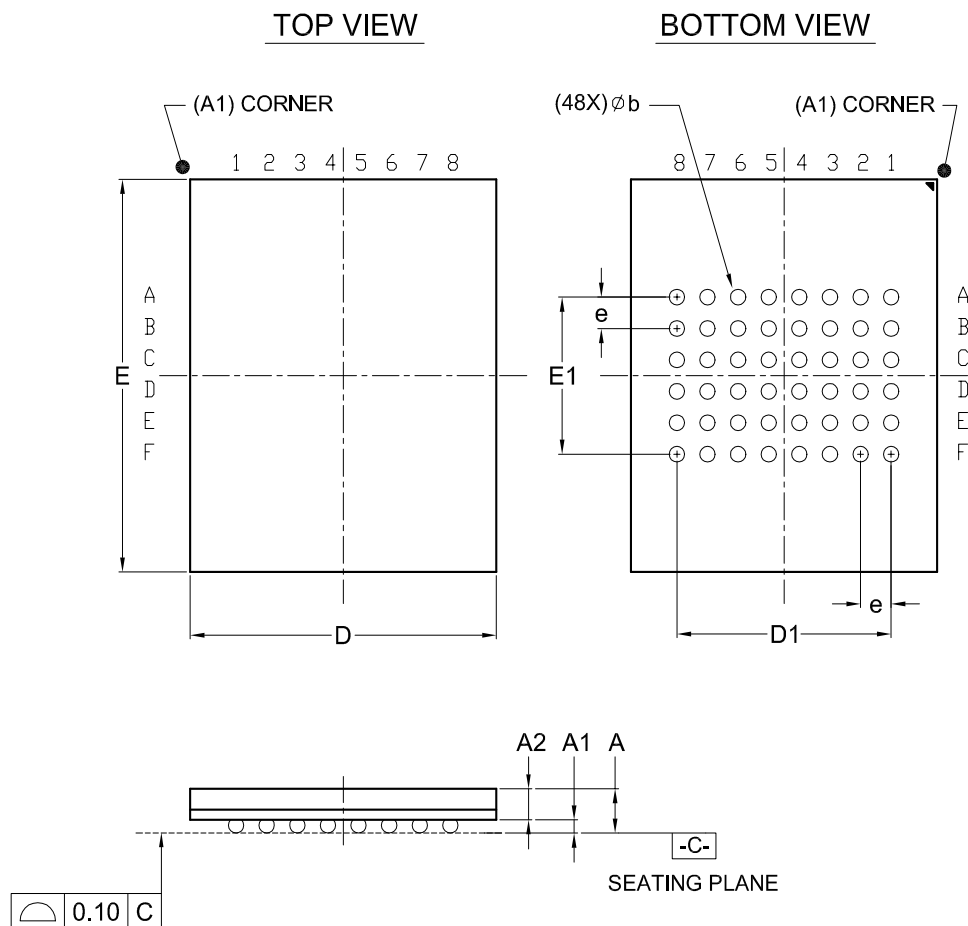
## TIMING DIAGRAM

### RANDOM READ



**PACKAGE INFORMATION**

Title: Package Outline for CSP 48BALL(7.95X9.95X1.2MM,BALL PITCH 0.75MM,BALL DIAMETER 0.35MM)



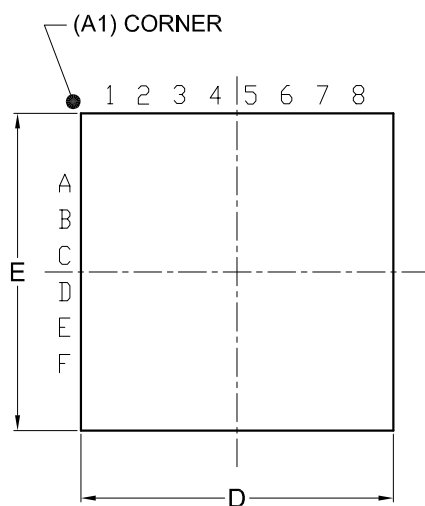
Dimensions (inch dimensions are derived from the original mm dimensions)

SYMBOL		A	A1	A2	b	D	D1	E	E1	e
mm	Min.	---	0.22	0.65	0.30	7.85		9.85		
	Nom.	---	0.27	---	0.35	7.95	5.25	9.95	3.75	0.75
	Max.	1.20	0.32	---	0.40	8.05		10.05		
Inch	Min.	---	0.009	0.026	0.012	0.309		0.388		
	Nom.	---	0.011	---	0.014	0.313	0.207	0.392	0.148	0.030
	Max.	0.047	0.013	---	0.016	0.317		0.396		

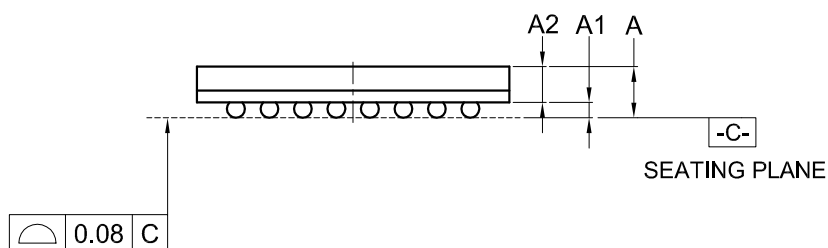
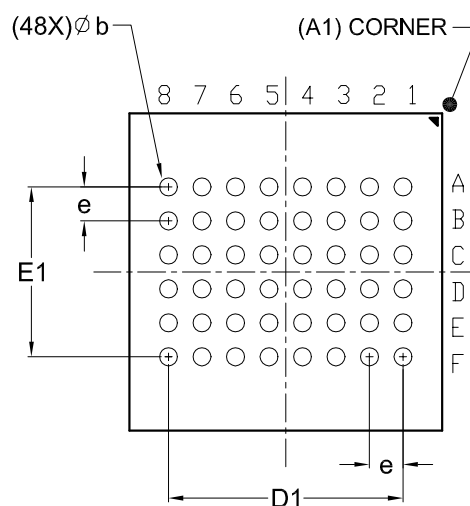
DWG.NO.	REVISION	REFERENCE			ISSUE DATE
		JEDEC	EIAJ		
6110-4207	4	MO-207			12-15-03

**Title: Package Outline for CSP 48BALL(7X7X1.2MM,BALL PITCH 0.75MM,BALL DIAMETER 0.35MM)**

TOP VIEW



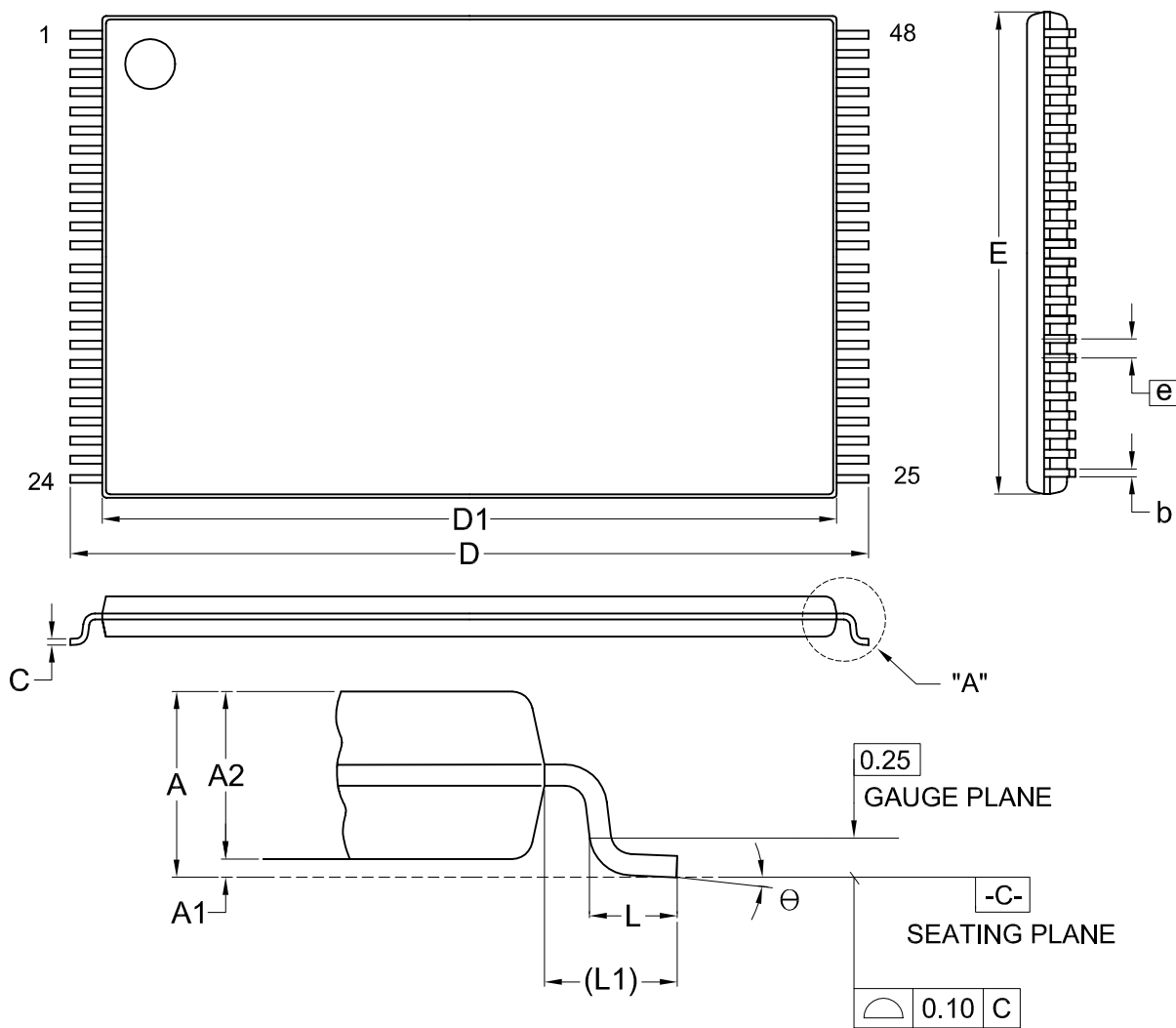
BOTTOM VIEW



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

SYMBOL		A	A1	A2	b	D	D1	E	E1	e
mm	Min.	---	0.22	0.65	0.30	6.90		6.90		
	Nom.	---	0.27	---	0.35	7.00	5.25	7.00	3.75	0.75
	Max.	1.20	0.32	---	0.40	7.10		7.10		
Inch	Min.	---	0.009	0.026	0.012	0.272		0.272		
	Nom.	---	0.011	---	0.014	0.276	0.207	0.276	0.148	0.030
	Max.	0.047	0.013	---	0.016	0.280		0.280		

DWG.NO.	REVISION	REFERENCE			ISSUE DATE
		JEDEC	EIAJ		
6110-4203	6	MO-207			12-12-'03

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

DETAIL "A"

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

SYMBOL		A	A1	A2	b	C	D	D1	E	e	L	L1	θ
UNIT													
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**

<b>Revision #</b>	<b>Description</b>	<b>Page</b>	<b>Date</b>
0.1	Modify Mode Selection-- L, H, High Z, Active	P1	DEC/14/2000
1.0	Change from Advanced Information to Preliminary	P1	DEC/29/2000
1.1	Modify Fast access time:80ns-->70ns	P1,2	JAN/18/2001
1.2	Delete Preliminary	P1	APR/09/2001
	Modify 48 ball mini BGA(8.0mm X 10.0mm)-->(7.95mm X 9.95mm)	P1	
1.3	Add Package Information	P4	APR/13/2001
1.4	Modify Package Information	P4	JUN/20/2001
1.5	Add 48-Pin TSOP & Package Information	P1,2,6	JUN/28/2001
	Modify Supply Voltage--VCC/VCCQ:2.7~3.3V-->2.7~3.6V	P1,3	
1.6	Added Order Information	P2	JUL/11/2001
1.7	Added 48 ball mini BGA (7.0mm x 7.0mm, ball pitch 0.75mm), under development	P1	JUL/13/2001
1.8	1.Modify DC Characteristics--VOH:VCCQ-0.1V-->2.4V, IOH=-100uA-->-400uA, VOL:0.1V-->0.4V, IOL:100uA-->1.6mA, VIH:VCCQ-0.4V-->2.2V	P3	SEP/10/2001
	2.Modify AC Test Conditions--Input Pulse Levels:0~VCCQ-->0.4V~2.4V, Input/Output Timing Level:VCCQx0.5-->1.5V, Output Load:50pF-->100pF output load capacitance	P4	
1.9	Modify Order Information	P2	SEP/27/2001
	Add Access Time:80ns in AC Characteristics	P3	
	Add CE#=VIL, OE#=VIH in DC Characteristics's ICC	P3	
2.0	Modify 48-ball BGA Package Information	P5	MAR/12/2002
2.1	1. To modify Package Information	P5,6,7	MAR/31/2003
2.2	1. Added Pb-free package information	P2	MAY/30/2005





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