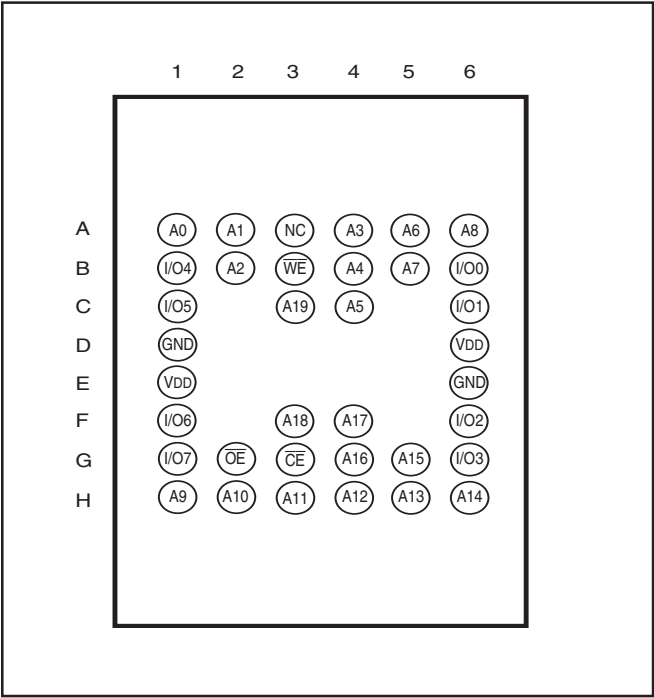
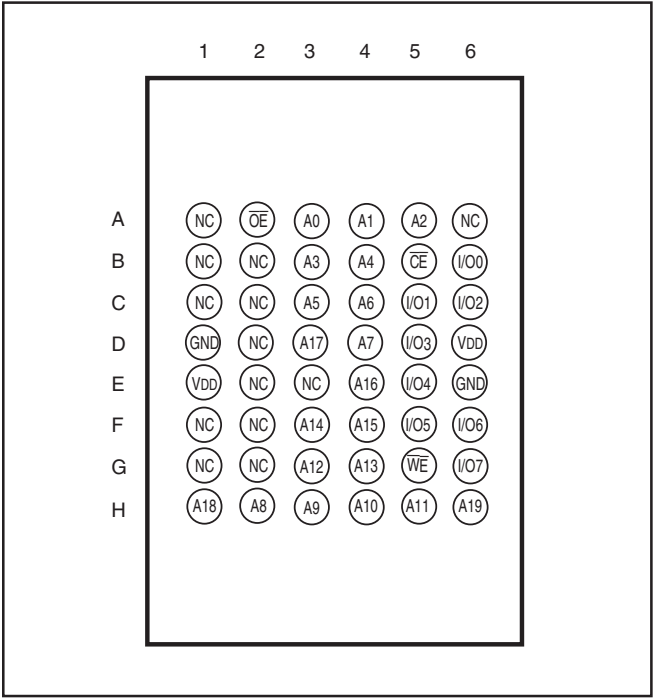


PIN CONFIGURATION

36 mini BGA (B) (9mm x 11mm)



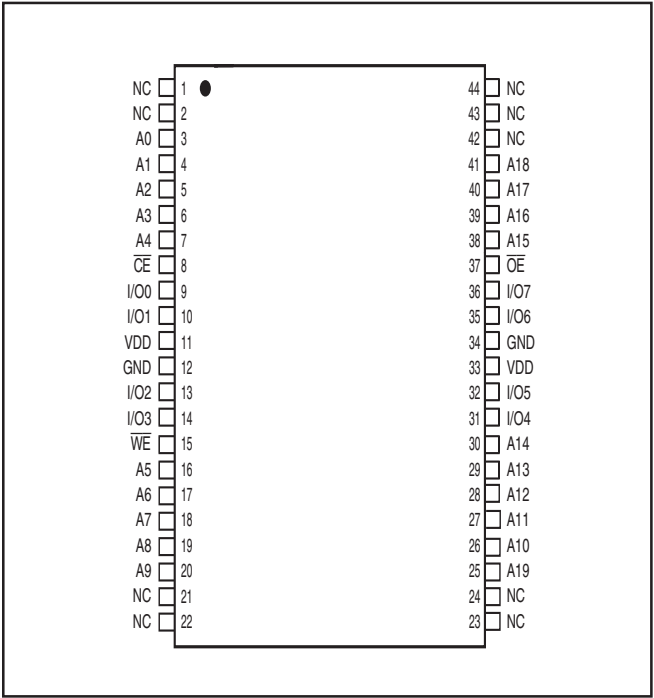
48-pin Mini BGA (M) (9mm x 11mm)



PIN DESCRIPTIONS

A0-A19	Address Inputs
\overline{CE}	Chip Enable Input
\overline{OE}	Output Enable Input
\overline{WE}	Write Enable Input
I/O0-I/O7	Data Input / Output
VDD	Power
GND	Ground
NC	No Connection

44-pin TSOP (Type II)



TRUTH TABLE

Mode	\overline{WE}	\overline{CE}	\overline{OE}	I/O Operation	V_{DD} Current
Not Selected (Power-down)	X	H	X	High-Z	I_{SB1} , I_{SB2}
Output Disabled	H	L	H	High-Z	I_{CC}
Read	H	L	L	D_{OUT}	I_{CC}
Write	L	L	X	D_{IN}	I_{CC}

ABSOLUTE MAXIMUM RATINGS⁽¹⁾

Symbol	Parameter	Value	Unit
V_{TERM}	Terminal Voltage with Respect to GND	-0.5 to $V_{DD} + 0.5$	V
V_{DD}	V_{DD} Relates to GND	-0.3 to 4.0	V
T_{STG}	Storage Temperature	-65 to +150	°C
P_T	Power Dissipation	1.0	W

Notes:

1. Stress greater than those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

OPERATING RANGE

Range	Ambient Temperature	V_{DD}
Commercial	0°C to +70°C	3.3V +10%, -5%
Industrial	-40°C to +85°C	3.3V +10%, -5%

CAPACITANCE^(1,2)

Symbol	Parameter	Conditions	Max.	Unit
C_{IN}	Input Capacitance	$V_{IN} = 0V$	6	pF
$C_{I/O}$	Input/Output Capacitance	$V_{OUT} = 0V$	8	pF

Notes:

1. Tested initially and after any design or process changes that may affect these parameters.
2. Test conditions: $T_A = 25^\circ C$, $f = 1\text{ MHz}$, $V_{DD} = 3.3V$.

DC ELECTRICAL CHARACTERISTICS (Over Operating Range)

Symbol	Parameter	Test Conditions	Min.	Max.	Unit	
V _{OH}	Output HIGH Voltage	V _{DD} = Min., I _{OH} = −4.0 mA	2.4	—	V	
V _{OL}	Output LOW Voltage	V _{DD} = Min., I _{OL} = 8.0 mA	—	0.4	V	
V _{IH}	Input HIGH Voltage		2.2	V _{DD} + 0.3	V	
V _{IL}	Input LOW Voltage ⁽¹⁾		−0.3	0.8	V	
I _{LI}	Input Leakage	GND ≤ V _{IN} ≤ V _{DD}	Com. Ind.	−1 5	1 5	μA
I _{LO}	Output Leakage	GND ≤ V _{OUT} ≤ V _{DD} , Outputs Disabled	Com. Ind.	−1 −5	1 5	μA

Note:

1. V_{IL} = -3.0V for pulse width less than 10 ns.

POWER SUPPLY CHARACTERISTICS⁽¹⁾ (Over Operating Range)

Symbol	Parameter	Test Conditions		-8		-10		Unit
				Min.	Max.	Min.	Max.	
I _{CC}	V _{DD} Dynamic Operating Supply Current	V _{DD} = Max., I _{OUT} = 0 mA, f = f _{MAX}	Com. Ind.	— —	110 120	— —	100 110	mA
I _{SB1}	TTL Standby Current (TTL Inputs)	V _{DD} = Max., V _{IN} = V _{IH} or V _{IL} $\overline{CE} \geq V_{IH}$, f = 0	Com. Ind.	— —	30 35	— —	30 35	mA
I _{SB2}	CMOS Standby Current (CMOS Inputs)	V _{DD} = Max., $\overline{CE} \geq V_{DD} - 0.2V$, V _{IN} ≥ V _{DD} - 0.2V, or V _{IN} ≤ 0.2V, f = 0	Com. Ind.	— —	20 25	— —	20 25	mA

Note:

1. At f = f_{MAX}, address and data inputs are cycling at the maximum frequency, f = 0 means no input lines change.

AC TEST CONDITIONS

Parameter	Unit
Input Pulse Level	0V to 3.0V
Input Rise and Fall Times	3 ns
Input and Output Timing and Reference Levels	1.5V
Output Load	See Figures 1 and 2

AC TEST LOADS

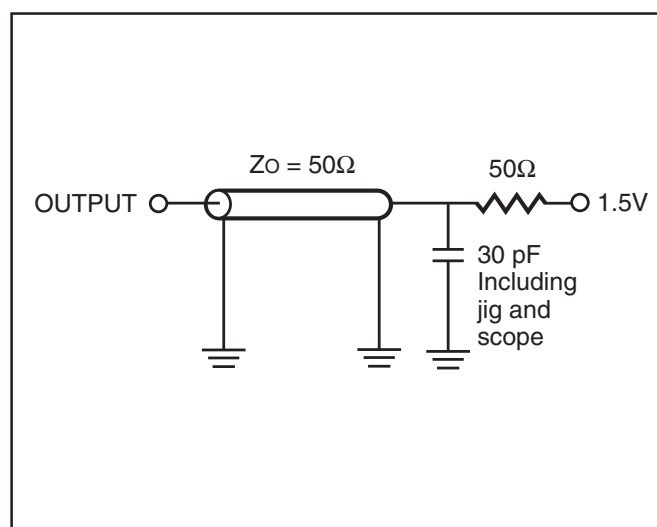


Figure 1

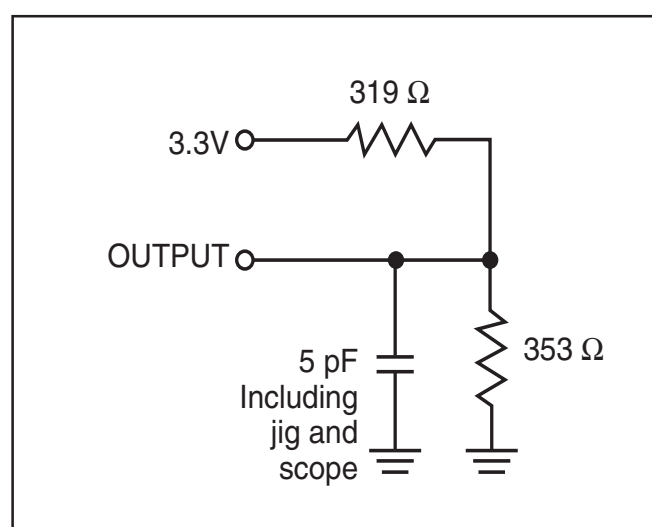


Figure 2

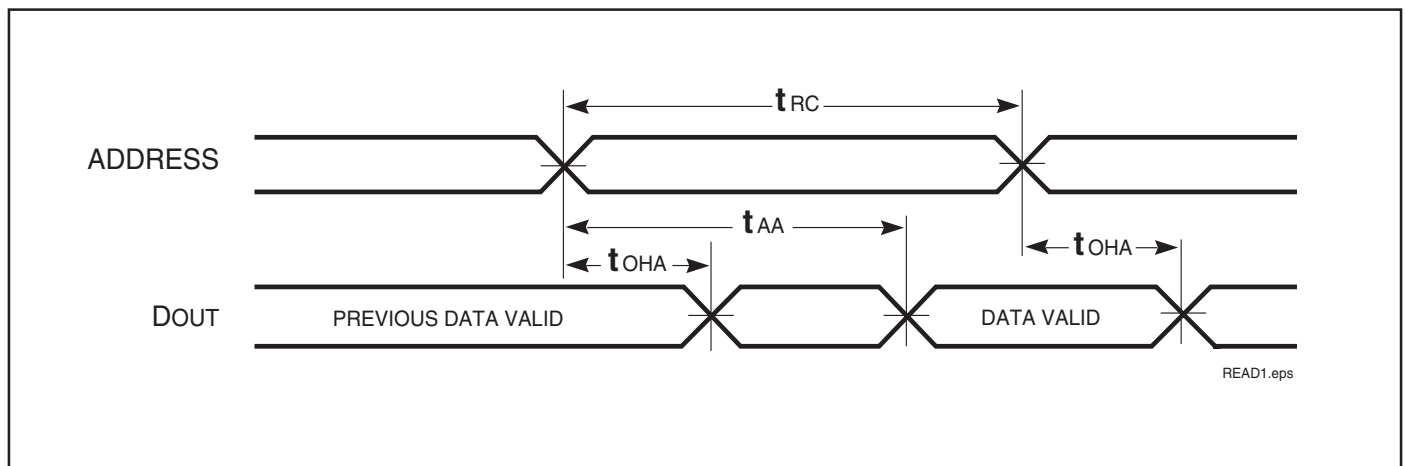
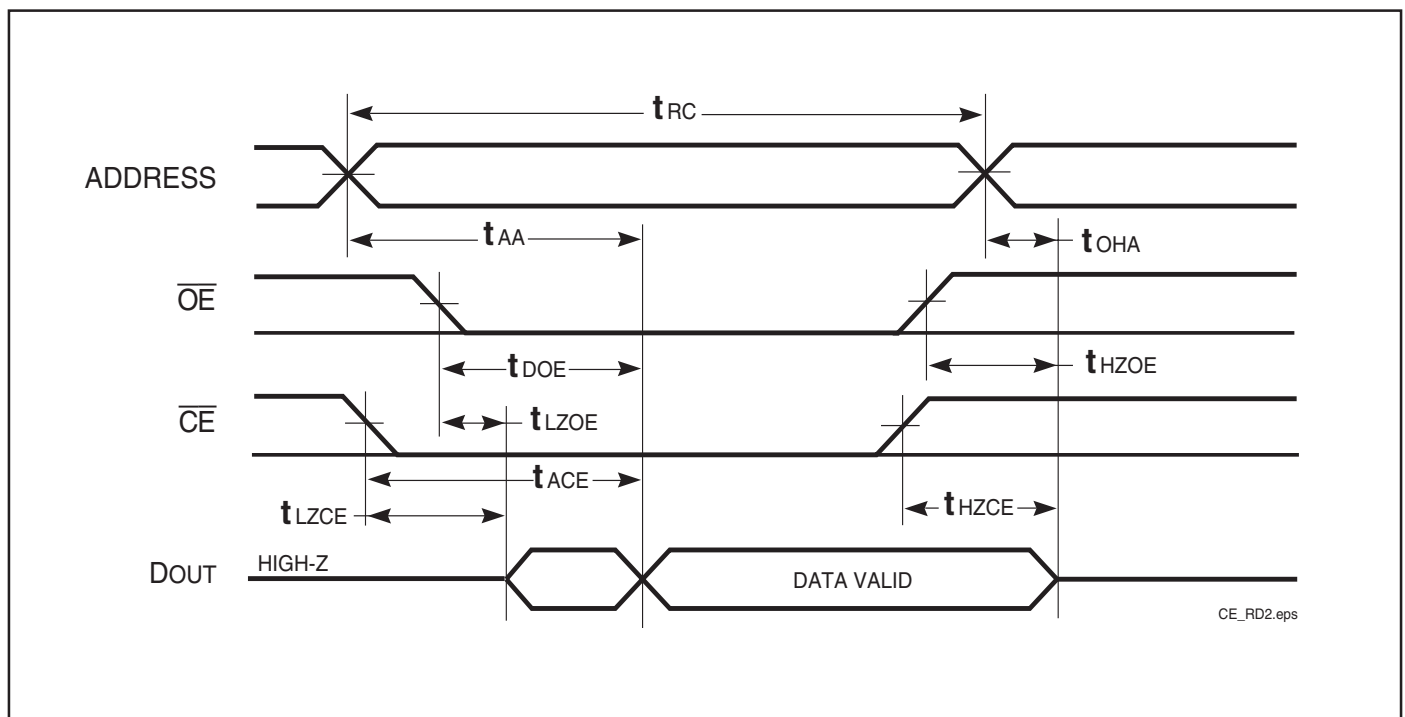
READ CYCLE SWITCHING CHARACTERISTICS⁽¹⁾ (Over Operating Range)

Symbol	Parameter	-8		-10		Unit
		Min.	Max.	Min.	Max.	
t _{RC}	Read Cycle Time	8	—	10	—	ns
t _{AA}	Address Access Time	—	8	—	10	ns
t _{OH}	Output Hold Time	3	—	3	—	ns
t _{ACE}	$\overline{\text{CE}}$ Access Time	—	8	—	10	ns
t _{DOE}	$\overline{\text{OE}}$ Access Time	—	3.5	—	4	ns
t _{HZOE} ⁽²⁾	$\overline{\text{OE}}$ to High-Z Output	—	3	—	4	ns
t _{LZOE} ⁽²⁾	$\overline{\text{OE}}$ to Low-Z Output	0	—	0	—	ns
t _{HZCE} ⁽²⁾	$\overline{\text{CE}}$ to High-Z Output	—	3	0	4	ns
t _{LZCE} ⁽²⁾	$\overline{\text{CE}}$ to Low-Z Output	3	—	3	—	ns
t _{PU}	Power Up Time	0	—	0	—	ns
t _{PD}	Power Down Time	—	8	—	10	ns

Notes:

1. Test conditions assume signal transition times of 3 ns or less, timing reference levels of 1.5V, input pulse levels of 0V to 3.0V and output loading specified in Figure 1.
2. Tested with the load in Figure 2. Transition is measured ± 500 mV from steady-state voltage.

AC WAVEFORMS

READ CYCLE NO. 1^(1,2) (Address Controlled) ($\overline{CE} = \overline{OE} = V_{IL}$)READ CYCLE NO. 2^(1,3) (\overline{CE} and \overline{OE} Controlled)

Notes:

1. \overline{WE} is HIGH for a Read Cycle.
2. The device is continuously selected. \overline{OE} , $\overline{CE} = V_{IL}$.
3. Address is valid prior to or coincident with \overline{CE} LOW transitions.

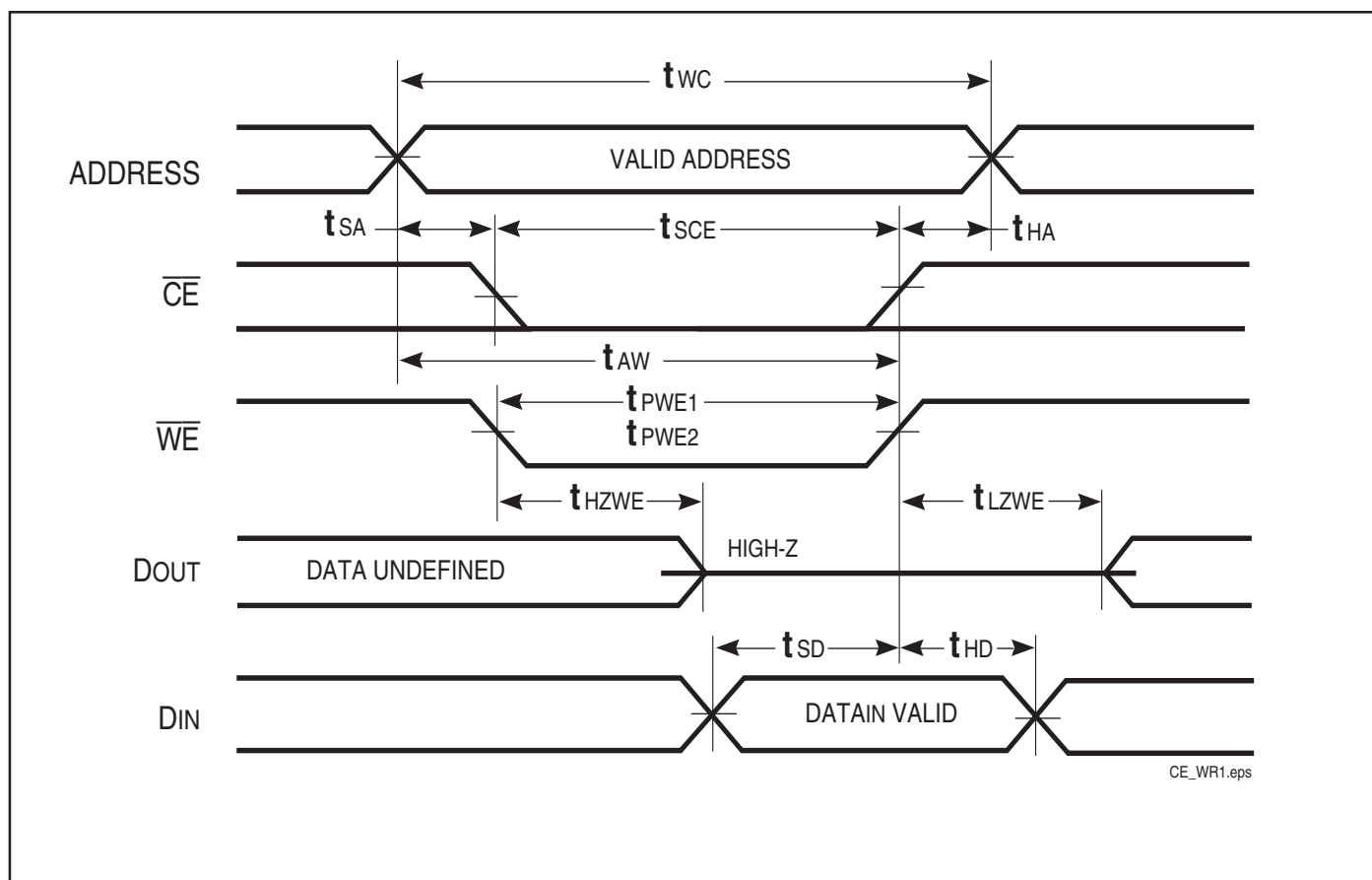
WRITE CYCLE SWITCHING CHARACTERISTICS^(1,3) (Over Operating Range)

Symbol	Parameter	-8		-10		Unit
		Min.	Max.	Min.	Max.	
t _{WC}	Write Cycle Time	8	—	10	—	ns
t _{SCE}	$\overline{\text{CE}}$ to Write End	6.5	—	8	—	ns
t _{AW}	Address Setup Time to Write End	6.5	—	8	—	ns
t _{HA}	Address Hold from Write End	0	—	0	—	ns
t _{SA}	Address Setup Time	0	—	0	—	ns
t _{PWE1}	$\overline{\text{WE}}$ Pulse Width	6.5	—	8	—	ns
t _{PWE2}	$\overline{\text{WE}}$ Pulse Width ($\overline{\text{OE}}$ = LOW)	8	—	10	—	ns
t _{SD}	Data Setup to Write End	5	—	6	—	ns
t _{HD}	Data Hold from Write End	0	—	0	—	ns
t _{HZWE⁽²⁾}	$\overline{\text{WE}}$ LOW to High-Z Output	—	3.5	—	5	ns
t _{LZWE⁽²⁾}	$\overline{\text{WE}}$ HIGH to Low-Z Output	2	—	2	—	ns

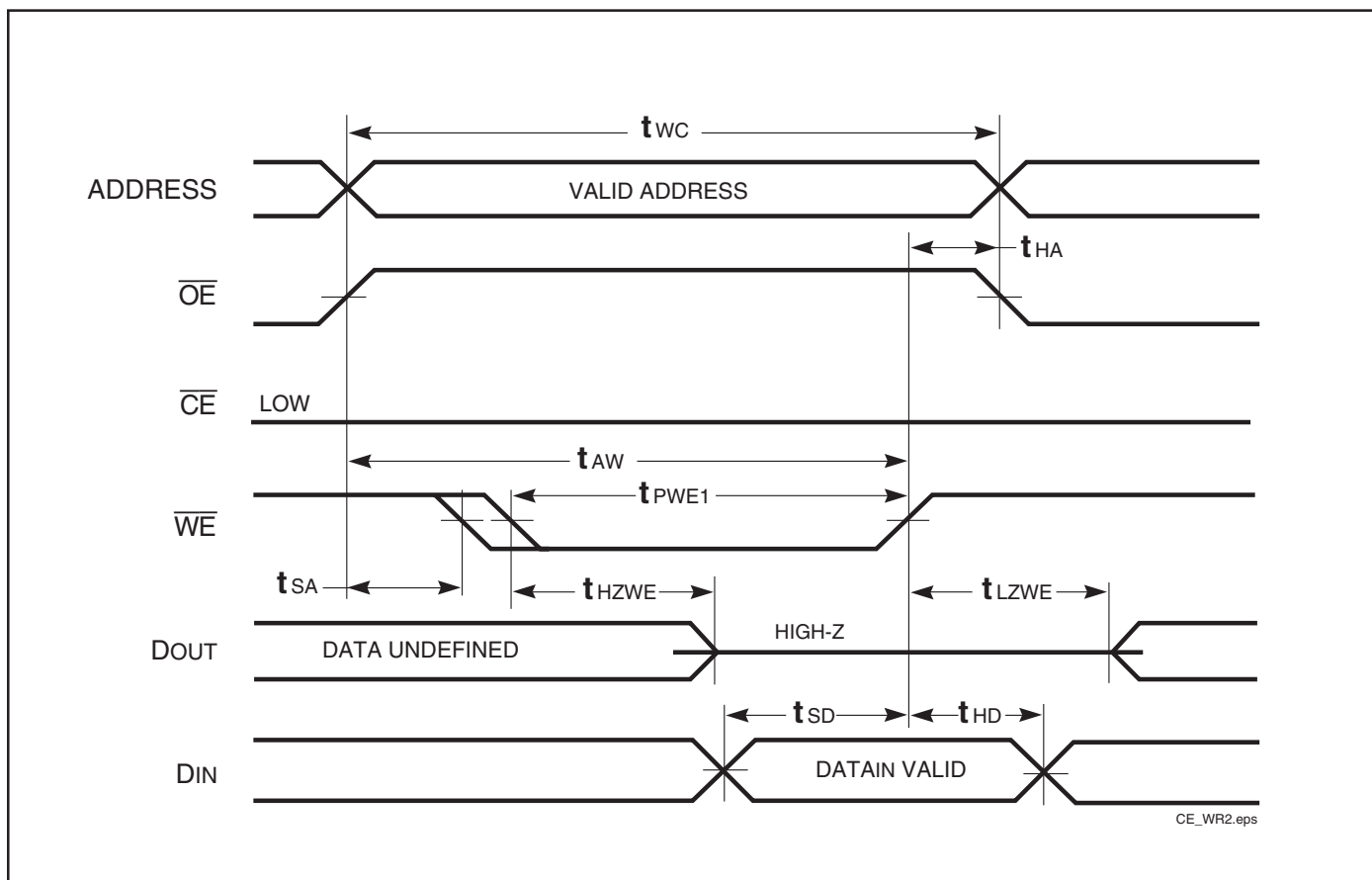
Notes:

1. Test conditions assume signal transition times of 3 ns or less, timing reference levels of 1.5V, input pulse levels of 0V to 3.0V and output loading specified in Figure 1.
2. Tested with the load in Figure 2. Transition is measured ± 500 mV from steady-state voltage. Not 100% tested.
3. The internal write time is defined by the overlap of $\overline{\text{CE}}$ LOW and $\overline{\text{WE}}$ LOW. All signals must be in valid states to initiate a Write, but any one can go inactive to terminate the Write. The Data Input Setup and Hold timing are referenced to the rising or falling edge of the signal that terminates the write.

AC WAVEFORMS

WRITE CYCLE NO. 1^(1,2) (\overline{CE} Controlled, \overline{OE} = HIGH or LOW)

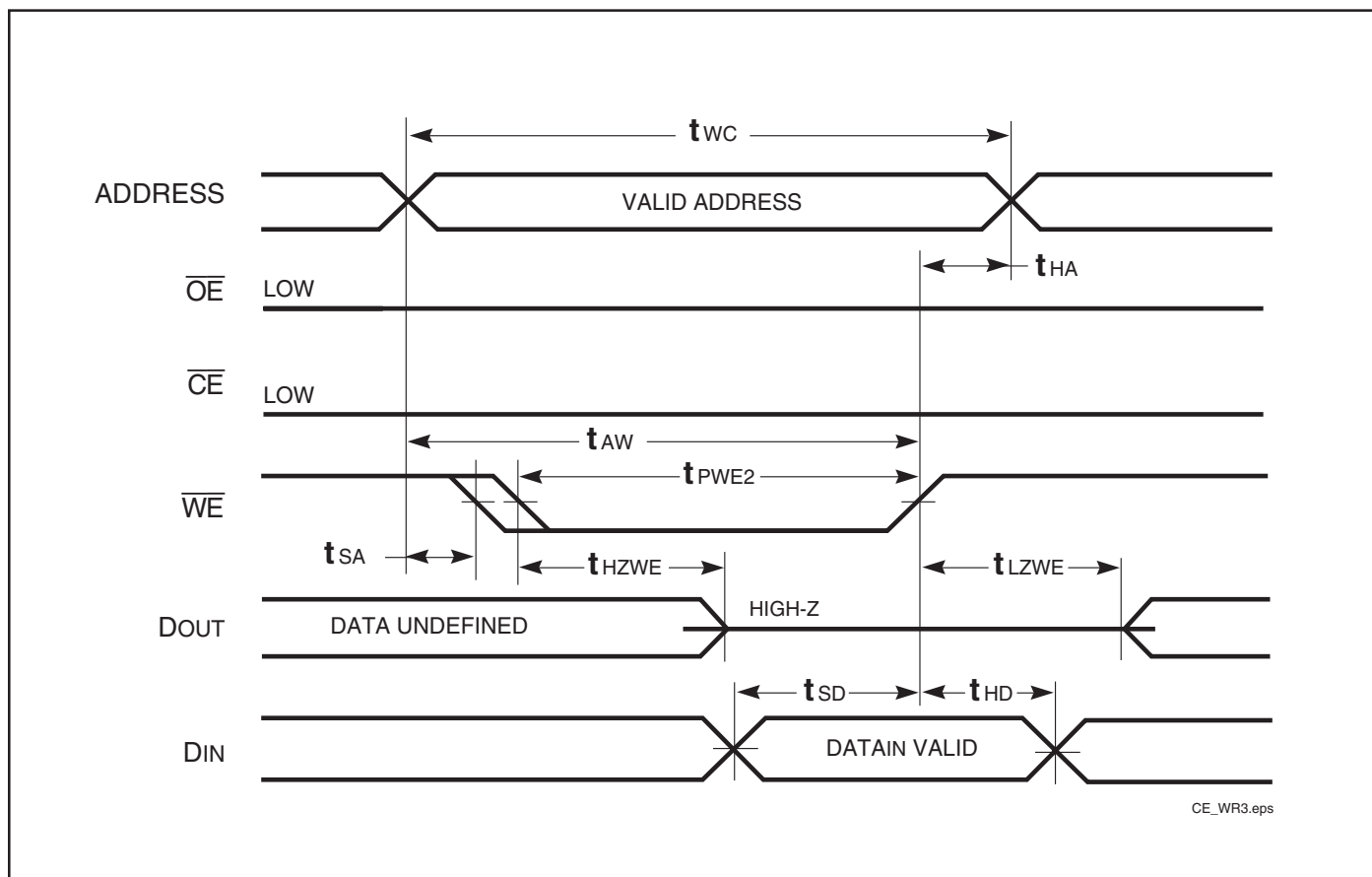
AC WAVEFORMS

WRITE CYCLE NO. 2^(1,2) (\overline{WE} Controlled: \overline{OE} is HIGH During Write Cycle)

Notes:

1. The internal write time is defined by the overlap of \overline{CE} LOW and \overline{WE} LOW. All signals must be in valid states to initiate a Write, but any one can go inactive to terminate the Write. The Data Input Setup and Hold timing are referenced to the rising or falling edge of the signal that terminates the Write.
2. I/O will assume the High-Z state if $\overline{OE} > V_{IH}$.

AC WAVEFORMS

WRITE CYCLE NO. 3 (\overline{WE} Controlled: \overline{OE} is LOW During Write Cycle)

ORDERING INFORMATION

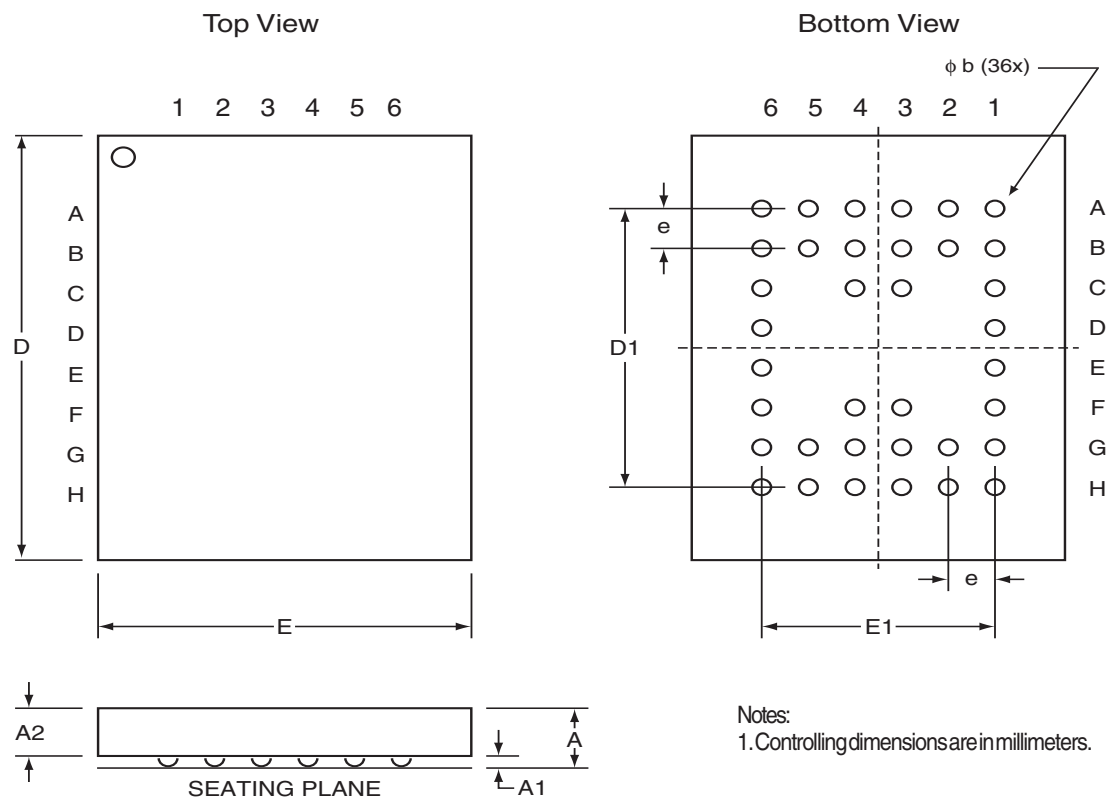
Commercial Range: 0°C to +70°C

Speed (ns)	Order Part No.	Package
8	IS61LV10248-8M	48 mini BGA (9mm x 11mm)
	IS61LV10248-8T	TSOP (Type II)
	IS61LV10248-8B	36 mini BGA (9mm x 11mm)
10	IS61LV10248-10T	TSOP (Type II)

Industrial Range: -40°C to +85°C

Speed (ns)	Order Part No.	Package
8	IS61LV10248-8MI	48 mini BGA (9mm x 11mm)
	IS61LV10248-8TI	TSOP (Type II)
	IS61LV10248-8BI	36 mini BGA (9mm x 11mm)
10	IS61LV10248-10MI	48 mini BGA (9mm x 11mm)
	IS61LV10248-10TI	TSOP (Type II)
	IS61LV10248-10TLI	TSOP (Type II), Lead-free
	IS61LV10248-10BI	36 mini BGA (9mm x 11mm)
	IS61LV10248-10BLI	36 mini BGA (9mm x 11mm), Lead-free

Mini Ball Grid Array
Package Code: B (36-pin)

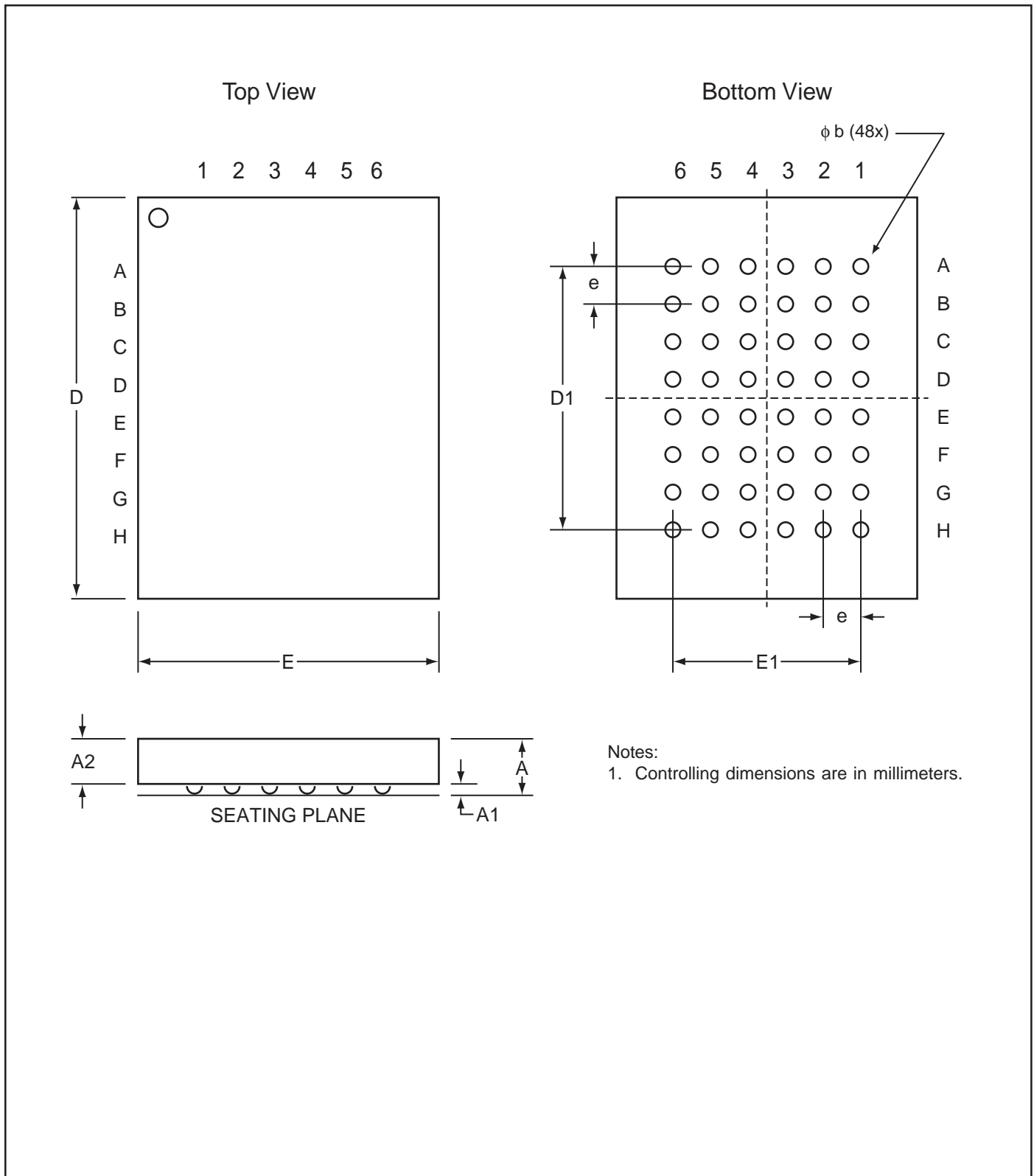


mBGA - 9mm x 11mm

	MILLIMETERS			INCHES		
Sym.	Min.	Typ.	Max.	Min.	Typ.	Max.
N0.						
Leads	36					
A	—	—	1.20	—	—	0.047
A1	0.24	—	0.30	0.009	—	0.012
A2	0.60	—	—	0.024	—	—
D	10.90	11.00	11.10	0.429	0.433	0.437
D1	5.25 BSC			0.207 BSC		
E	8.90	9.00	9.10	0.350	0.354	0.358
E1	3.75 BSC			0.148 BSC		
e	0.75 BSC			0.030 BSC		
b	0.30	0.35	0.40	0.012	0.014	0.016

PACKAGING INFORMATION

Mini Ball Grid Array Package Code: M (48-pin)



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01/15/03

PACKAGING INFORMATION



Mini Ball Grid Array

Package Code: M (48-pin)

mBGA - 6mm x 8mm

MILLIMETERS				INCHES		
Sym.	Min.	Typ.	Max.	Min.	Typ.	Max.
NO. Leads						
48						
A	—	—	1.20	—	—	0.047
A1	0.25	—	0.40	0.010	—	0.016
A2	0.60	—	—	0.024	—	—
D	7.90	8.00	8.10	0.311	0.314	0.319
D1	5.60BSC			0.220BSC		
E	5.90	6.00	6.10	0.232	0.236	0.240
E1	4.00BSC			0.157BSC		
e	0.80BSC			0.031BSC		
b	0.40	0.45	0.50	0.016	0.018	0.020

mBGA - 7.2mm x 8.7mm

MILLIMETERS				INCHES		
Sym.	Min.	Typ.	Max.	Min.	Typ.	Max.
NO. Leads						
48						
A	—	—	1.20	—	—	0.047
A1	0.24	—	0.30	0.009	—	0.012
A2	0.60	—	—	0.024	—	—
D	8.60	8.70	8.80	0.339	0.343	0.346
D1	5.25BSC			0.207BSC		
E	7.10	7.20	7.30	0.280	0.283	0.287
E1	3.75BSC			0.148BSC		
e	0.75BSC			0.030BSC		
b	0.30	0.35	0.40	0.012	0.014	0.016

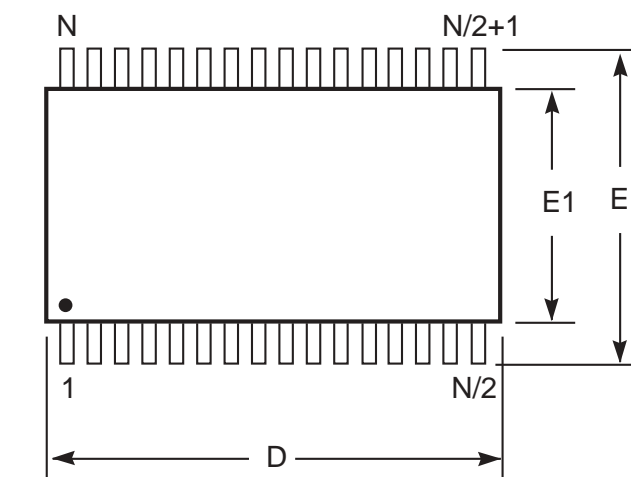
mBGA - 9mm x 11mm

MILLIMETERS				INCHES		
Sym.	Min.	Typ.	Max.	Min.	Typ.	Max.
NO. Leads						
48						
A	—	—	1.20	—	—	0.047
A1	0.24	—	0.30	0.009	—	0.012
A2	0.60	—	—	0.024	—	—
D	10.90	11.00	11.10	0.429	0.433	0.437
D1	5.25BSC			0.207BSC		
E	8.90	9.00	9.10	0.350	0.354	0.358
E1	3.75BSC			0.148BSC		
e	0.75BSC			0.030BSC		
b	0.30	0.35	0.40	0.012	0.014	0.016

PACKAGING INFORMATION

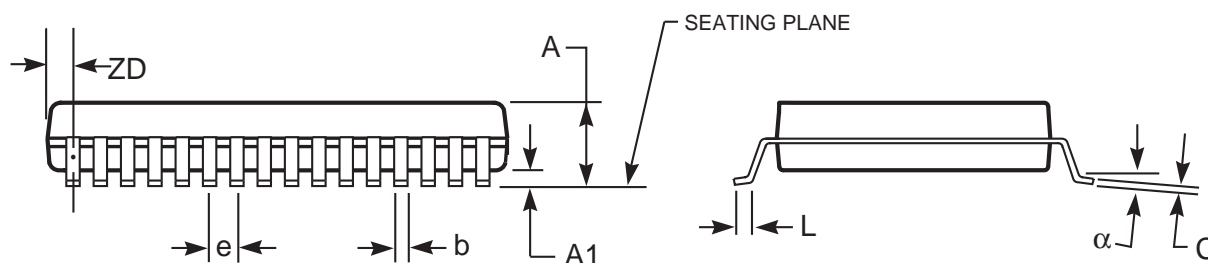
Plastic TSOP

Package Code: T (Type II)



Notes:

1. Controlling dimension: millimeters, unless otherwise specified.
2. BSC = Basic lead spacing between centers.
3. Dimensions D and E1 do not include mold flash protrusions and should be measured from the bottom of the package.
4. Formed leads shall be planar with respect to one another within 0.004 inches at the seating plane.



Plastic TSOP (T - Type II)

Symbol	Millimeters		Inches		Millimeters		Inches		Millimeters		Inches	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Ref. Std.												
No. Leads (N)	32				44				50			
A	—	1.20	—	0.047	—	1.20	—	0.047	—	1.20	—	0.047
A1	0.05	0.15	0.002	0.006	0.05	0.15	0.002	0.006	0.05	0.15	0.002	0.006
b	0.30	0.52	0.012	0.020	0.30	0.45	0.012	0.018	0.30	0.45	0.012	0.018
C	0.12	0.21	0.005	0.008	0.12	0.21	0.005	0.008	0.12	0.21	0.005	0.008
D	20.82	21.08	0.820	0.830	18.31	18.52	0.721	0.729	20.82	21.08	0.820	0.830
E1	10.03	10.29	0.391	0.400	10.03	10.29	0.395	0.405	10.03	10.29	0.395	0.405
E	11.56	11.96	0.451	0.466	11.56	11.96	0.455	0.471	11.56	11.96	0.455	0.471
e	1.27 BSC		0.050 BSC		0.80 BSC		0.032 BSC		0.80 BSC		0.031 BSC	
L	0.40	0.60	0.016	0.024	0.41	0.60	0.016	0.024	0.40	0.60	0.016	0.024
ZD	0.95 REF		0.037 REF		0.81 REF		0.032 REF		0.88 REF		0.035 REF	
α	0°	5°	0°	5°	0°	5°	0°	5°	0°	5°	0°	5°

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