

# 74LVCH32374A

32-bit edge-triggered D-type flip-flop with 5 V tolerant inputs/outputs; 3-state

Rev. 3 — 18 December 2012

Product data sheet

## 1. General description

The 74LVCH32374A is a 32-bit edge-triggered flip-flop featuring separate D-type inputs for each flip-flop and 3-state outputs for bus oriented applications. The device consists of 4 sections of 8 edge-triggered flip-flops. A clock (pin nCP) input and an output enable input (pin nOE) are provided per 8-bit section. The flip-flops will store the state of their individual D-inputs that meet the set-up and hold time requirements on the LOW-to-HIGH nCP transition. When pin nOE is LOW, the contents of the flip-flops are available at the outputs. When pin nOE is HIGH, the outputs go to the high-impedance OFF-state. Operation of pin nOE does not affect the state of the flip-flops. The inputs can be driven from either 3.3 V or 5 V devices. In 3-state operation, the outputs can handle 5 V. These features allow the use of these devices in a mixed 3.3 V or 5 V environment.

Bus hold on data inputs eliminates the need for external pull-up resistors to hold unused inputs.

## 2. Features and benefits

- 5 V tolerant inputs/outputs for interfacing with 5 V logic
- Wide supply voltage range from 1.2 V to 3.6 V
- CMOS low power consumption
- Multibyte flow-through standard pin-out architecture
- Multiple low inductance supply pins for minimum noise and ground bounce
- Direct interface with TTL levels
- All data inputs have bus hold
- High impedance when  $V_{CC} = 0$  V
- Latch-up performance exceeds 500 mA per JESD 78 Class II
- Complies with JEDEC standard:
  - ◆ JESD8-7A (1.65 V to 1.95 V)
  - ◆ JESD8-5A (2.3 V to 2.7 V)
  - ◆ JESD8-C/JESD36 (2.7 V to 3.6 V)
- ESD protection:
  - ◆ HBM JESD22-A114F exceeds 2000 V
  - ◆ MM JESD22-A115-B exceeds 200 V
  - ◆ CDM JESD22-C101E exceeds 1000 V
- Specified from  $-40$  °C to  $+85$  °C and  $-40$  °C to  $+125$  °C
- Packaged in plastic fine-pitch ball grid array package



### 3. Ordering information

Table 1. Ordering information

Type number	Package			Version
	Temperature range	Name	Description	
74LVCH32374AEC	-40 °C to +125 °C	LFBGA96	plastic low profile fine-pitch ball grid array package; 96 balls; body 13.5 × 5.5 × 1.05 mm	SOT536-1

### 4. Functional diagram

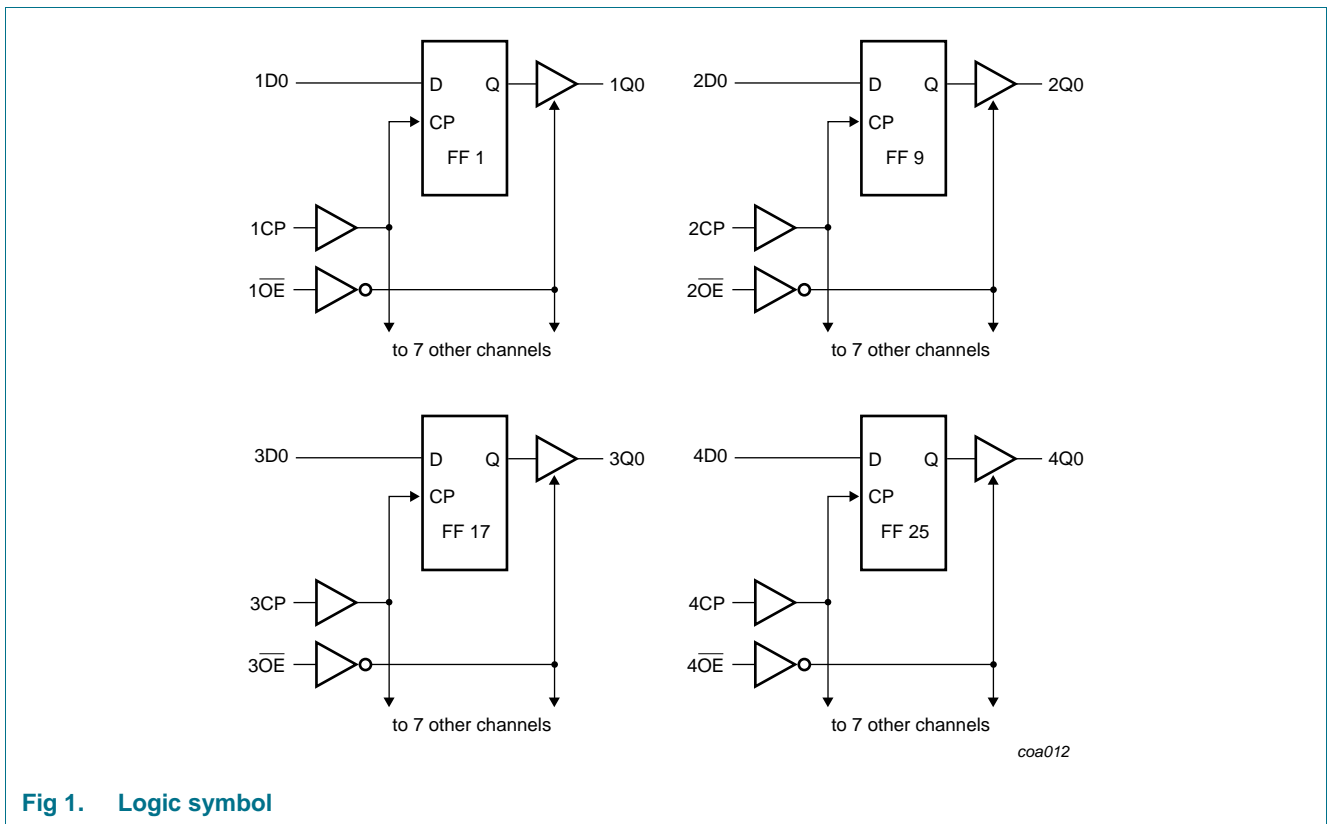


Fig 1. Logic symbol

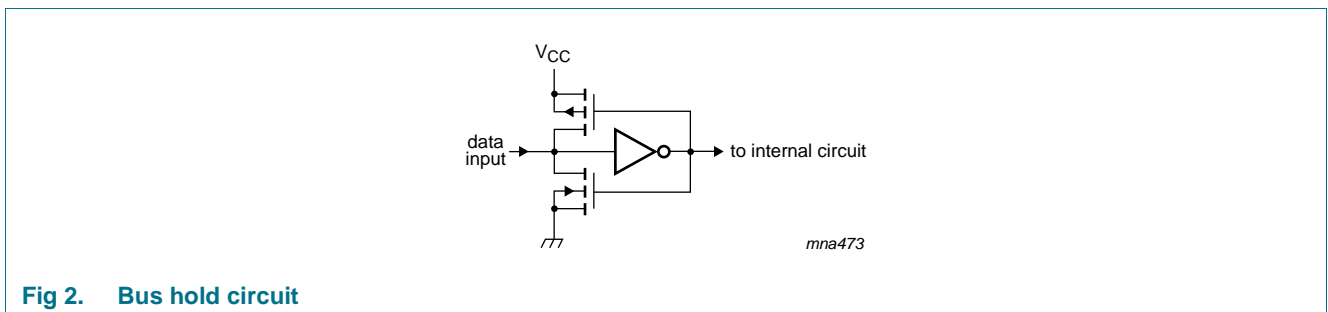


Fig 2. Bus hold circuit

## 5. Pinning information

### 5.1 Pinning

*001aah180*

6	1D1	1D3	1D5	1D7	2D1	2D3	2D5	2D6	3D1	3D3	3D5	3D7	4D1	4D3	4D5	4D6
5	1D0	1D2	1D4	1D6	2D0	2D2	2D4	2D7	3D0	3D2	3D4	3D6	4D0	4D2	4D4	4D7
4	1CP	GND	V <sub>CC</sub>	GND	GND	V <sub>CC</sub>	GND	2CP	3CP	GND	V <sub>CC</sub>	GND	GND	V <sub>CC</sub>	GND	4CP
3	1 $\overline{\text{OE}}$	GND	V <sub>CC</sub>	GND	GND	V <sub>CC</sub>	GND	2 $\overline{\text{OE}}$	3 $\overline{\text{OE}}$	GND	V <sub>CC</sub>	GND	GND	V <sub>CC</sub>	GND	4 $\overline{\text{OE}}$
2	1Q0	1Q2	1Q4	1Q6	2Q0	2Q2	2Q4	2Q7	3Q0	3Q2	3Q4	3Q6	4Q0	4Q2	4Q4	4Q7
1	1Q1	1Q3	1Q5	1Q7	2Q1	2Q3	2Q5	2Q6	3Q1	3Q3	3Q5	3Q7	4Q1	4Q3	4Q5	4Q6
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	T

**Fig 3. Pin configuration**

### 5.2 Pin description

**Table 2. Pin description**

Symbol	Ball	Description
n $\overline{\text{OE}}$ (n = 1 to 4)	A3, H3, J3, T3	output enable input (active LOW)
nCP (n = 1 to 4)	A4, H4, J4, T4	clock input
1D[0:7]	A5, A6, B5, B6, C5, C6, D5, D6	data input
2D[0:7]	E5, E6, F5, F6, G5, G6, H6, H5	data input
3D[0:7]	J5, J6, K5, K6, L5, L6, M5, M6	data input
4D[0:7]	N5, N6, P5, P6, R5, R6, T6, T5	data input
1Q[0:7]	A2, A1, B2, B1, C2, C1, D2, D1	data output
2Q[0:7]	E2, E1, F2, F1, G2, G1, H2, H1	data output
3Q[0:7]	J2, J1, K2, K1, L2, L1, M2, M1	data output
4Q[0:7]	N2, N1, P2, P1, R2, R1, T2, T1	data output
GND	B3, B4, D3, D4, E3, E4, G3, G4, K3, K4, M3, M4, N3, N4, R3, R4	ground (0 V)
V <sub>CC</sub>	C3, C4, F3, F4, L3, L4, P3, P4	supply voltage

## 6. Functional description

Table 3. Function table<sup>[1]</sup>

Operating mode	Input			Internal flip-flop	Output nQn
	nOE	nCP	nDn		
Load and read register	L	↑	l	L	L
	L	↑	h	H	H
Load register and disable outputs	H	↑	l	L	Z
	H	↑	h	H	Z

- [1] H = HIGH voltage level  
 L = LOW voltage level  
 h = HIGH voltage level one set-up time prior to the HIGH-to-LOW CP transition  
 l = LOW voltage level one set-up time prior to the HIGH-to-LOW CP transition  
 Z = high-impedance OFF-state  
 ↑ = LOW-to-HIGH CP transition

## 7. Limiting values

Table 4. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134). Voltages are referenced to GND (ground = 0 V)<sup>[1]</sup>

Symbol	Parameter	Conditions	Min	Max	Unit
V <sub>CC</sub>	supply voltage		-0.5	+6.5	V
I <sub>IK</sub>	input clamping current	V <sub>I</sub> < 0	-50	-	mA
V <sub>I</sub>	input voltage		<sup>[2]</sup> -0.5	+6.5	V
I <sub>OK</sub>	output clamping current	V <sub>O</sub> > V <sub>CC</sub> or V <sub>O</sub> < 0	-	±50	mA
V <sub>O</sub>	output voltage	output HIGH or LOW state	<sup>[3]</sup> -0.5	V <sub>CC</sub> + 0.5	V
		output 3-state	<sup>[3]</sup> -0.5	+6.5	V
I <sub>O</sub>	output current	V <sub>O</sub> = 0 V to V <sub>CC</sub>	-	±50	mA
I <sub>CC</sub>	supply current		-	200	mA
I <sub>GND</sub>	ground current		-200	-	mA
T <sub>stg</sub>	storage temperature		-65	+150	°C
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> = -40 °C to +125 °C	<sup>[4]</sup> -	1000	mW

- [1] All supply and ground pins connected externally to one voltage source.  
 [2] The minimum input voltage ratings may be exceeded if the input current ratings are observed.  
 [3] The output voltage ratings may be exceeded if the output current ratings are observed.  
 [4] Above 70 °C the value of P<sub>tot</sub> derate linearly with 1.8 mW/K.

## 8. Recommended operating conditions

**Table 5. Recommended operating conditions**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>CC</sub>	supply voltage		1.65	-	3.6	V
		functional	1.2	-	3.6	V
V <sub>I</sub>	input voltage		0	-	5.5	V
V <sub>O</sub>	output voltage	output HIGH or LOW state	0	-	V <sub>CC</sub>	V
		output 3-state	0	-	5.5	V
T <sub>amb</sub>	ambient temperature	in free air	-40	-	+125	°C
Δt/ΔV	input transition rise and fall rate	V <sub>CC</sub> = 1.65 V to 2.7 V	-	-	20	ns/V
		V <sub>CC</sub> = 2.7 V to 3.6 V	-	-	10	ns/V

## 9. Static characteristics

**Table 6. Static characteristics**

At recommended operating conditions. Voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ <sup>[1]</sup>	Max	Min	Max	
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 1.2 V	1.08	-	-	1.08	-	V
		V <sub>CC</sub> = 1.65 V to 1.95 V	0.65 × V <sub>CC</sub>	-	-	0.65 × V <sub>CC</sub>	-	V
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.7	-	-	1.7	-	V
		V <sub>CC</sub> = 2.7 V to 3.6 V	2.0	-	-	2.0	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 1.2 V	-	-	0.12	-	0.12	V
		V <sub>CC</sub> = 1.65 V to 1.95 V	-	-	0.35 × V <sub>CC</sub>	-	0.35 × V <sub>CC</sub>	V
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	-	0.7	-	0.7	V
		V <sub>CC</sub> = 2.7 V to 3.6 V	-	-	0.8	-	0.8	V
V <sub>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>						
		I <sub>O</sub> = -100 μA; V <sub>CC</sub> = 1.65 V to 3.6 V	V <sub>CC</sub> - 0.2	-	-	V <sub>CC</sub> - 0.3	-	V
		I <sub>O</sub> = -4 mA; V <sub>CC</sub> = 1.65 V	1.2	-	-	1.05	-	V
		I <sub>O</sub> = -8 mA; V <sub>CC</sub> = 2.3 V	1.8	-	-	1.65	-	V
		I <sub>O</sub> = -12 mA; V <sub>CC</sub> = 2.7 V	2.2	-	-	2.05	-	V
		I <sub>O</sub> = -18 mA; V <sub>CC</sub> = 3.0 V	2.4	-	-	2.25	-	V
V <sub>OL</sub>	LOW-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>						
		I <sub>O</sub> = 100 μA; V <sub>CC</sub> = 1.65 V to 3.6 V	-	-	0.2	-	0.3	V
		I <sub>O</sub> = 4 mA; V <sub>CC</sub> = 1.65 V	-	-	0.45	-	0.65	V
		I <sub>O</sub> = 8 mA; V <sub>CC</sub> = 2.3 V	-	-	0.6	-	0.8	V
		I <sub>O</sub> = 12 mA; V <sub>CC</sub> = 2.7 V	-	-	0.4	-	0.6	V
		I <sub>O</sub> = 24 mA; V <sub>CC</sub> = 3.0 V	-	-	0.55	-	0.8	V
I <sub>I</sub>	input leakage current	V <sub>CC</sub> = 3.6 V; V <sub>I</sub> = 5.5 V or GND <sup>[2]</sup>	-	±0.1	±5	-	±20	μA

**Table 6. Static characteristics ...continued**

At recommended operating conditions. Voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ <sup>[1]</sup>	Max	Min	Max	
I <sub>OZ</sub>	OFF-state output current	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 3.6 V; V <sub>O</sub> = 5.5 V or GND <sup>[2]</sup>	-	±0.1	±5	-	±20	μA
I <sub>OFF</sub>	power-off leakage current	V <sub>CC</sub> = 0 V; V <sub>I</sub> or V <sub>O</sub> = 5.5 V	-	±0.1	±10	-	±20	μA
I <sub>CC</sub>	supply current	V <sub>CC</sub> = 3.6 V; V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A	-	0.1	40	-	160	μA
ΔI <sub>CC</sub>	additional supply current	per input pin; V <sub>CC</sub> = 2.7 V to 3.6 V; V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; I <sub>O</sub> = 0 A	-	5	500	-	5000	μA
C <sub>I</sub>	input capacitance	V <sub>CC</sub> = 0 V to 3.6 V; V <sub>I</sub> = GND to V <sub>CC</sub>	-	5.0	-	-	-	pF
I <sub>BHL</sub>	bus hold LOW current	V <sub>CC</sub> = 1.65; V <sub>I</sub> = 0.58 V <sup>[3][4]</sup>	10	-	-	10	-	μA
		V <sub>CC</sub> = 2.3; V <sub>I</sub> = 0.7 V	30	-	-	25	-	μA
		V <sub>CC</sub> = 3.0; V <sub>I</sub> = 0.8 V	75	-	-	60	-	μA
I <sub>BHH</sub>	bus hold HIGH current	V <sub>CC</sub> = 1.65; V <sub>I</sub> = 1.07 V <sup>[3][4]</sup>	-10	-	-	-10	-	μA
		V <sub>CC</sub> = 2.3; V <sub>I</sub> = 1.7 V	-30	-	-	-25	-	μA
		V <sub>CC</sub> = 3.0; V <sub>I</sub> = 2.0 V	-75	-	-	-60	-	μA
I <sub>BHLO</sub>	bus hold LOW overdrive current	V <sub>CC</sub> = 1.95 V <sup>[3][5]</sup>	200	-	-	200	-	μA
		V <sub>CC</sub> = 2.7 V	300	-	-	300	-	μA
		V <sub>CC</sub> = 3.6 V	500	-	-	500	-	μA
I <sub>BHHO</sub>	bus hold HIGH overdrive current	V <sub>CC</sub> = 1.95 V <sup>[3][5]</sup>	-200	-	-	-200	-	μA
		V <sub>CC</sub> = 2.7 V	-300	-	-	-300	-	μA
		V <sub>CC</sub> = 3.6 V	-500	-	-	-500	-	μA

[1] All typical values are measured at V<sub>CC</sub> = 3.3 V and T<sub>amb</sub> = 25 °C.

[2] The bus hold circuit is switched off when V<sub>I</sub> > V<sub>CC</sub> allowing 5.5 V on the input pin.

[3] Valid for data inputs only. Control inputs do not have a bus hold circuit.

[4] The specified sustaining current at the data input holds the input below the specified V<sub>I</sub> level.

[5] The specified overdrive current at the data input forces the data input to the opposite logic input state.

## 10. Dynamic characteristics

**Table 7. Dynamic characteristics**

Voltages are referenced to GND (ground = 0 V). For test circuit see [Figure 7](#).

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ <sup>[1]</sup>	Max	Min	Max	
t <sub>pd</sub>	propagation delay	nCP to nQn; see <a href="#">Figure 4</a> <sup>[2]</sup>						
		V <sub>CC</sub> = 1.2 V	-	14	-	-	-	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.1	6.9	13.5	2.1	15.6	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.5	3.7	6.7	1.5	7.7	ns
		V <sub>CC</sub> = 2.7 V	1.5	3.4	6.0	1.5	7.5	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.5	3.1	5.4	1.5	7.0	ns
t <sub>en</sub>	enable time	nOE to nQn; see <a href="#">Figure 6</a> <sup>[2]</sup>						
		V <sub>CC</sub> = 1.2 V	-	20	-	-	-	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.5	5.9	13.1	1.5	15.1	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.5	3.4	6.9	1.5	8.0	ns
		V <sub>CC</sub> = 2.7 V	1.5	3.6	6.0	1.5	7.5	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.0	2.7	5.2	1.0	6.5	ns
t <sub>dis</sub>	disable time	nOE to nQn; see <a href="#">Figure 4</a> <sup>[2]</sup>						
		V <sub>CC</sub> = 1.2 V	-	12	-	-	-	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.8	4.6	9.1	2.8	10.5	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.0	2.5	4.9	1.0	5.7	ns
		V <sub>CC</sub> = 2.7 V	1.5	3.4	5.1	1.5	6.5	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.5	3.1	4.9	1.5	6.5	ns
t <sub>w</sub>	pulse width	nCP HIGH; see <a href="#">Figure 4</a>						
		V <sub>CC</sub> = 1.65 V to 1.95 V	5.0	-	-	5.0	-	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	4.0	-	-	4.0	-	ns
		V <sub>CC</sub> = 2.7 V	3.0	-	-	3.0	-	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	3.0	1.5	-	3.0	-	ns
t <sub>su</sub>	set-up time	nDn to nCP; see <a href="#">Figure 5</a>						
		V <sub>CC</sub> = 1.65 V to 1.95 V	4.0	-	-	4.0	-	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	3.0	-	-	3.0	-	ns
		V <sub>CC</sub> = 2.7 V	1.9	-	-	1.9	-	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.9	0.3	-	1.9	-	ns
t <sub>h</sub>	hold time	nDn to nCP; see <a href="#">Figure 5</a>						
		V <sub>CC</sub> = 1.65 V to 1.95 V	3.0	-	-	3.0	-	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.5	-	-	2.5	-	ns
		V <sub>CC</sub> = 2.7 V	1.1	-	-	1.1	-	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.5	-0.3	-	1.5	-	ns

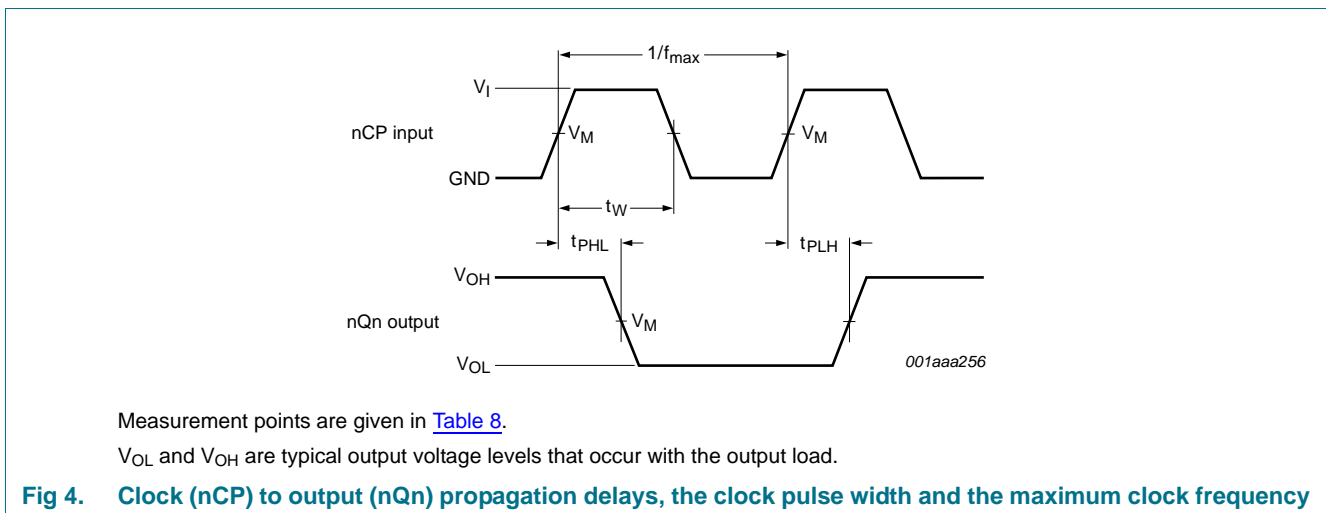
**Table 7. Dynamic characteristics ...continued**

Voltages are referenced to GND (ground = 0 V). For test circuit see [Figure 7](#).

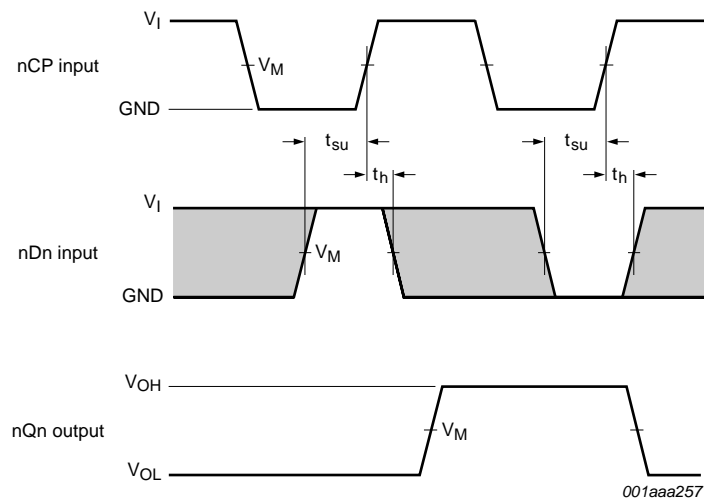
Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit	
			Min	Typ <sup>[1]</sup>	Max	Min	Max		
f <sub>max</sub>	maximum frequency	see <a href="#">Figure 4</a>							
		V <sub>CC</sub> = 1.65 V to 1.95 V	100	-	-	80	-	ns	
		V <sub>CC</sub> = 2.3 V to 2.7 V	125	-	-	100	-	ns	
		V <sub>CC</sub> = 2.7 V	150	-	-	120	-	MHz	
		V <sub>CC</sub> = 3.0 V to 3.6 V	150	300	-	120	-	MHz	
t <sub>sk(o)</sub>	output skew time	V <sub>CC</sub> = 3.0 V to 3.6 V	[3]	-	-	1.0	-	1.5	ns
C <sub>PD</sub>	power dissipation capacitance	per input; V <sub>I</sub> = GND to V <sub>CC</sub>	[4]						
		V <sub>CC</sub> = 1.65 V to 1.95 V	-	14.1	-	-	-	pF	
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	16.4	-	-	-	pF	
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	18.5	-	-	-	pF	

- [1] Typical values are measured at T<sub>amb</sub> = 25 °C and V<sub>CC</sub> = 1.2 V, 1.8 V, 2.5 V, 2.7 V and 3.3 V respectively.
- [2] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>.  
t<sub>en</sub> is the same as t<sub>PZL</sub> and t<sub>PZH</sub>.  
t<sub>dis</sub> is the same as t<sub>PZL</sub> and t<sub>PHZ</sub>.
- [3] Skew between any two outputs of the same package switching in the same direction. This parameter is guaranteed by design.
- [4] C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> in μW).  
P<sub>D</sub> = C<sub>PD</sub> × V<sub>CC</sub><sup>2</sup> × f<sub>i</sub> × N + Σ(C<sub>L</sub> × V<sub>CC</sub><sup>2</sup> × f<sub>o</sub>) where:  
f<sub>i</sub> = input frequency in MHz; f<sub>o</sub> = output frequency in MHz  
C<sub>L</sub> = output load capacitance in pF  
V<sub>CC</sub> = supply voltage in Volts  
N = number of inputs switching  
Σ(C<sub>L</sub> × V<sub>CC</sub><sup>2</sup> × f<sub>o</sub>) = sum of the outputs

## 11. Waveforms

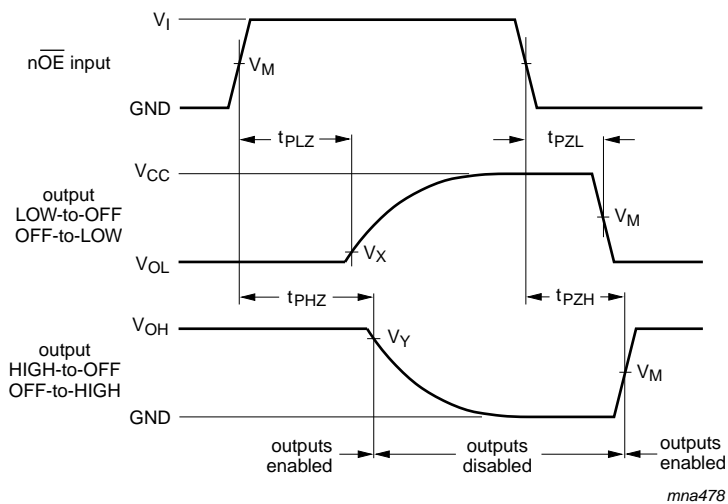






Measurement points are given in [Table 8](#).  
 $V_{OL}$  and  $V_{OH}$  are typical output voltage levels that occur with the output load.

**Fig 5. Set-up and hold times for inputs (nDn) to inputs (nCP)**

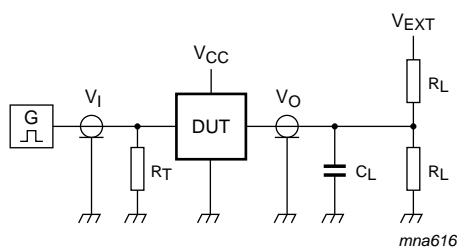


Measurement points are given in [Table 8](#).  
 $V_{OL}$  and  $V_{OH}$  are typical output voltage levels that occur with the output load.

**Fig 6. 3-state output enable and disable times**

Table 8. Measurement points

Supply voltage	Input		Output		
V <sub>CC</sub>	V <sub>I</sub>	V <sub>M</sub>	V <sub>M</sub>	V <sub>X</sub>	V <sub>Y</sub>
1.2 V	V <sub>CC</sub>	0.5 × V <sub>CC</sub>	0.5 × V <sub>CC</sub>	V <sub>OL</sub> + 0.15 V	V <sub>OH</sub> - 0.15 V
1.65 V to 1.95 V	V <sub>CC</sub>	0.5 × V <sub>CC</sub>	0.5 × V <sub>CC</sub>	V <sub>OL</sub> + 0.15 V	V <sub>OH</sub> - 0.15 V
2.3 V to 2.7 V	V <sub>CC</sub>	0.5 × V <sub>CC</sub>	0.5 × V <sub>CC</sub>	V <sub>OL</sub> + 0.15 V	V <sub>OH</sub> - 0.15 V
2.7 V	2.7 V	1.5 V	1.5 V	V <sub>OL</sub> + 0.3 V	V <sub>OH</sub> - 0.3 V
3.0 V to 3.6 V	2.7 V	1.5 V	1.5 V	V <sub>OL</sub> + 0.3 V	V <sub>OH</sub> - 0.3 V



Test data is given in Table 9. Definitions for test circuit:

R<sub>L</sub> = Load resistance

C<sub>L</sub> = Load capacitance including jig and probe capacitance

R<sub>T</sub> = Termination resistance should be equal to the output impedance Z<sub>o</sub> of the pulse generator

Fig 7. Load circuitry for switching times

Table 9. Test data

Supply voltage	Input		Load		V <sub>EXT</sub>		
	V <sub>I</sub>	t <sub>r</sub> , t <sub>f</sub>	C <sub>L</sub>	R <sub>L</sub>	t <sub>PLH</sub> , t <sub>PHL</sub>	t <sub>PLZ</sub> , t <sub>PZL</sub>	t <sub>PHZ</sub> , t <sub>PZH</sub>
1.2 V	V <sub>CC</sub>	≤ 2 ns	30 pF	1 kΩ	open	2 × V <sub>CC</sub>	GND
1.65 V to 1.95 V	V <sub>CC</sub>	≤ 2 ns	30 pF	1 kΩ	open	2 × V <sub>CC</sub>	GND
2.3 V to 2.7 V	V <sub>CC</sub>	≤ 2 ns	30 pF	500 Ω	open	2 × V <sub>CC</sub>	GND
2.7 V	2.7 V	≤ 2.5 ns	50 pF	500 Ω	open	2 × V <sub>CC</sub>	GND
3.0 V to 3.6 V	2.7 V	≤ 2.5 ns	50 pF	500 Ω	open	2 × V <sub>CC</sub>	GND

12. Package outline

LFBGA96: plastic low profile fine-pitch ball grid array package; 96 balls; body 13.5 x 5.5 x 1.05 mm SOT536-1

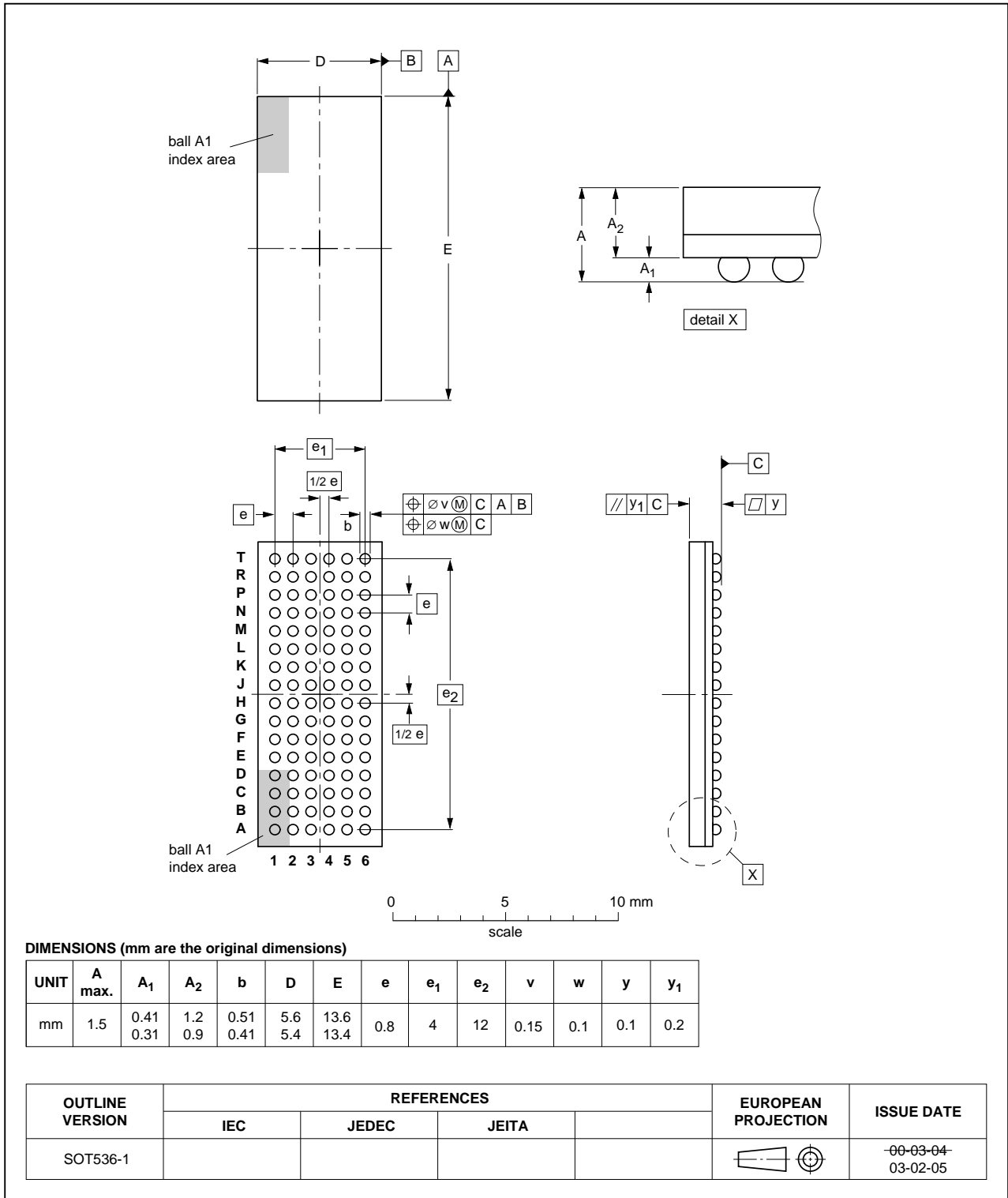


Fig 8. Package outline SOT536-1 (LFBGA96)

## 13. Abbreviations

Table 10. Abbreviations

Acronym	Description
CDM	Charged Device Model
DUT	Device Under Test
ESD	ElectroStatic Discharge
HBM	Human Body Model
MM	Machine Model
TTL	Transistor-Transistor Logic

## 14. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74LVCH32374A v.3	20121218	Product data sheet	-	74LVCH32374A v.2
Modifications:	<ul style="list-style-type: none"> <li>The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.</li> <li>Legal texts have been adapted to the new company name where appropriate.</li> <li><a href="#">Table 4</a>, <a href="#">Table 5</a>, <a href="#">Table 6</a>, <a href="#">Table 7</a>, <a href="#">Table 8</a> and <a href="#">Table 9</a>: values added for lower voltage ranges.</li> </ul>			
74LVCH32374A v.2	20040519	Product specification	-	74LVCH32374A v.1
74LVCH32374A v.1	19991124	Product specification	-	-

## 15. Legal information

### 15.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

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