

# 74LVCH32245A

32-bit bus transceiver with direction pin; 5 V tolerant; 3-state

Rev. 5 — 15 December 2011

Product data sheet

## 1. General description

The 74LVCH32245A is a 32-bit transceiver featuring non-inverting 3-state bus compatible outputs in both send and receive directions. The device features four output enable ( $\overline{\text{nOE}}$ ) inputs for easy cascading and four send/receive ( $\text{nDIR}$ ) inputs for direction control. Pin  $\overline{\text{nOE}}$  controls the outputs so that the buses are effectively isolated.

Inputs can be driven from either 3.3 V or 5 V devices. When disabled, up to 5.5 V can be applied to the outputs. These features allow the use of these devices in mixed 3.3 V and 5 V applications.

To ensure the high-impedance state during power-up or power-down, pin  $\overline{\text{nOE}}$  should be tied to  $V_{\text{CC}}$  through a pull-up resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

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 2.3 V to 3.6 V
- CMOS low power consumption
- MULTIBYTE flow-through standard pin-out architecture
- Low inductance multiple power and ground pins for minimum noise and ground bounce
- Direct interface with TTL levels
- Inputs accept voltages up to 5.5 V
- High-impedance when  $V_{\text{CC}} = 0$  V
- All data inputs have bus hold
- 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-A115B 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           |         |   |          |
|----------------|-------------------|---------|---|----------|
|                | Temperature range | Name    | Description   | Version  |
| 74LVCH32245AEC | -40 °C to +125 °C | LFPGA96 | plastic low profile fine-pitch ball grid array package; 96 balls; body 13.5 × 5.5 × 1.05 mm | SOT536-1 |

4. Functional diagram

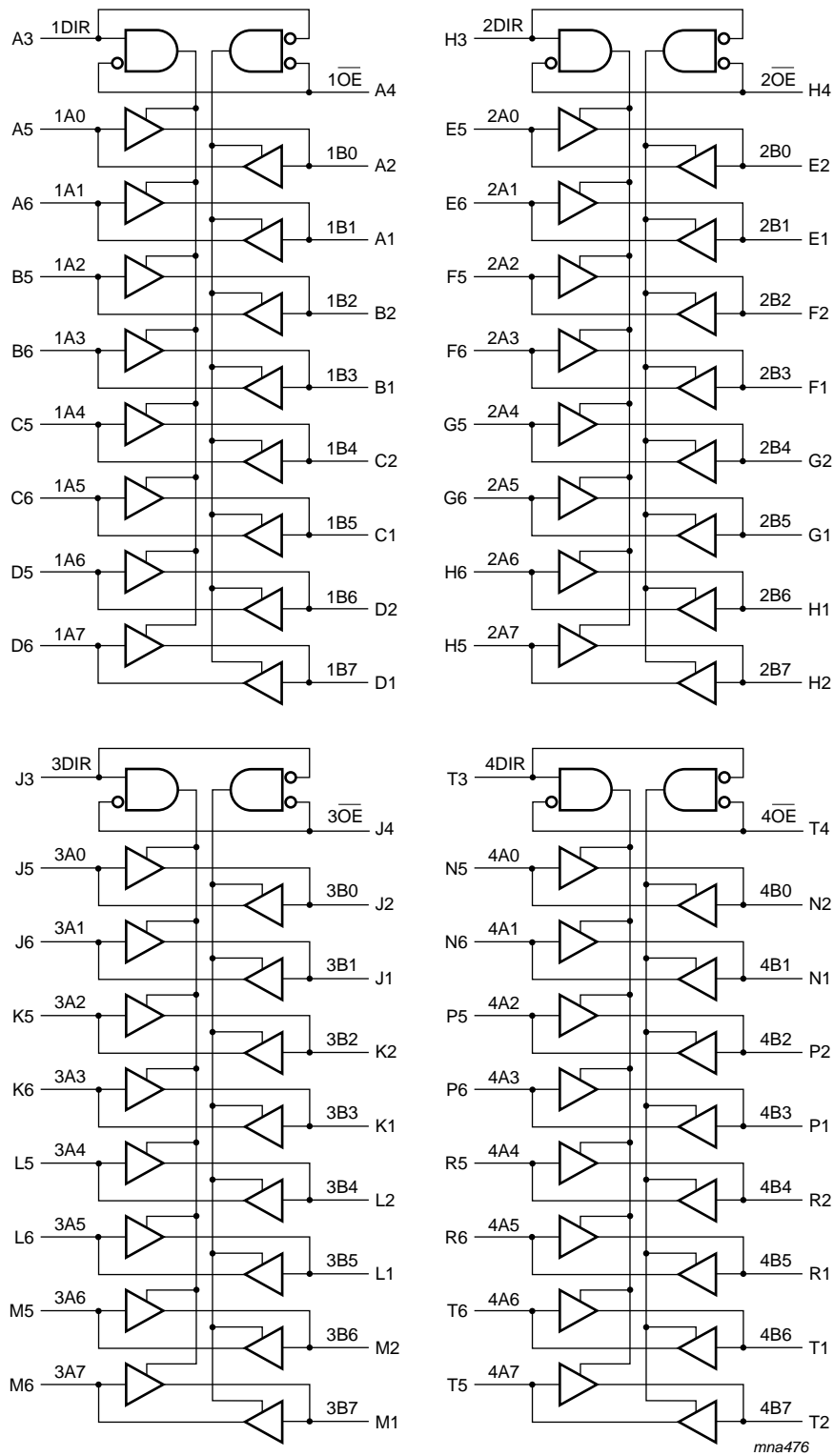


Fig 1. Logic symbol



## 6. Functional description

Table 3. Function selection

| Input |      | Output |        |  |
|-------|------|--------|--------|--|
| nOE   | nDIR | nAn    | nBn    |  |
| L     | L    | A = B  | inputs |  |
| L     | H    | inputs | B = A  |  |
| H     | X    | Z      | Z      |  |

[1] H = HIGH voltage level; L = LOW voltage level; X = don't care; Z = high-impedance OFF-state

## 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).

| 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 V                                     | -50      | -                     | mA   |
| V <sub>I</sub>   | input voltage           |  | [1] -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 V | -        | ±50                   | mA   |
| V <sub>O</sub>   | output voltage          | output HIGH or LOW state                                 | [2] -0.5 | V <sub>CC</sub> + 0.5 | V    |
|                  |                         | output 3-state   | [2] -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          |  | [3] -    | 200                   | mA   |
| I <sub>GND</sub> | ground current          |  | [3] -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                     | [4] -    | 1000                  | mW   |

[1] The minimum input voltage ratings may be exceeded if the input current ratings are observed.

[2] The output voltage ratings may be exceeded if the output current ratings are observed.

[3] All supply and ground pins connected externally to one voltage source.

[4] Above 70 °C the value of P<sub>tot</sub> derates 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  | -   | -               | 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> = 2.3 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    |
|                  |                           | I <sub>O</sub> = -24 mA; V <sub>CC</sub> = 3.0 V   | 2.2                    | -                  | -                      | 2.0                    | -                      | 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   |
| 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   |

**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>BHL</sub>  | bus hold<br>LOW current                  | V <sub>CC</sub> = 1.65; V <sub>I</sub> = 0.58 V <a href="#">[3][4]</a> | 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<br>HIGH current                 | V <sub>CC</sub> = 1.65; V <sub>I</sub> = 1.07 V <a href="#">[3][4]</a> | -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<br>LOW<br>overdrive<br>current  | V <sub>CC</sub> = 1.95 V <a href="#">[3][5]</a>                        | 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<br>HIGH<br>overdrive<br>current | V <sub>CC</sub> = 1.95 V <a href="#">[3][5]</a>                        | -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 inputs 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 6](#).

| Symbol          | Parameter            | Conditions   | T <sub>amb</sub> = -40 °C to +85 °C |                    |      | -40 °C to +125 °C |      | Unit |
|-----------------|----------------------|--|-------------------------------------|--------------------|------|-------------------|------|------|
|                 |                      |  | Min                                 | Typ <sup>[1]</sup> | Max  | Min               | Max  |      |
| t <sub>pd</sub> | propagation<br>delay | nAn to nBn; nBn to nAn; see <a href="#">Figure 4</a> <a href="#">[2]</a> |                                     |                    |      |                   |      |      |
|                 |                      | V <sub>CC</sub> = 1.2 V  | -                                   | 13.0               | -    | -                 | -    | ns   |
|                 |                      | V <sub>CC</sub> = 1.65 V to 1.95 V                                       | 1.5                                 | 5.2                | 12.2 | 1.5               | 13.8 | ns   |
|                 |                      | V <sub>CC</sub> = 2.3 V to 2.7 V   | 1.0                                 | 2.8                | 6.0  | 1.0               | 6.7  | ns   |
|                 |                      | V <sub>CC</sub> = 2.7 V  | 1.0                                 | 2.7                | 4.7  | 1.0               | 6.0  | ns   |
| t <sub>en</sub> | enable time          | nOE to nAn, nBn: see <a href="#">Figure 5</a> <a href="#">[2]</a>        |                                     |                    |      |                   |      |      |
|                 |                      | V <sub>CC</sub> = 1.2 V  | -                                   | 15.0               | -    | -                 | -    | ns   |
|                 |                      | V <sub>CC</sub> = 1.65 V to 1.95 V                                       | 1.5                                 | 5.9                | 15.0 | 1.5               | 16.9 | ns   |
|                 |                      | V <sub>CC</sub> = 2.3 V to 2.7 V   | 1.0                                 | 3.3                | 7.9  | 1.0               | 8.8  | ns   |
|                 |                      | V <sub>CC</sub> = 2.7 V  | 1.5                                 | 3.5                | 6.7  | 1.5               | 8.5  | ns   |
|                 |                      | V <sub>CC</sub> = 3.0 V to 3.6 V   | 1.0                                 | 2.7                | 5.5  | 1.0               | 7.0  | ns   |

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

Voltages are referenced to GND (ground = 0 V). For test circuit see [Figure 6](#).

| Symbol             | Parameter                     | Conditions  | T <sub>amb</sub> = -40 °C to +85 °C |                    |      | -40 °C to +125 °C |      | Unit |
|--------------------|-------------------------------|---|-------------------------------------|--------------------|------|-------------------|------|------|
|                    |                               |   | Min                                 | Typ <sup>[1]</sup> | Max  | Min               | Max  |      |
| t <sub>dis</sub>   | disable time                  | nOE to nAn, nBn; see <a href="#">Figure 5</a>       |                                     |                    |      |                   |      |      |
|                    |                               | V <sub>CC</sub> = 1.2 V                             | -                                   | 11.0               | -    | -                 | -    | ns   |
|                    |                               | V <sub>CC</sub> = 1.65 V to 1.95 V                  | 1.5                                 | 4.9                | 13.1 | 1.5               | 14.7 | ns   |
|                    |                               | V <sub>CC</sub> = 2.3 V to 2.7 V                    | 0.5                                 | 2.7                | 7.1  | 0.5               | 7.9  | ns   |
|                    |                               | V <sub>CC</sub> = 2.7 V                             | 1.5                                 | 3.4                | 6.6  | 1.5               | 8.5  | ns   |
|                    |                               | V <sub>CC</sub> = 3.0 V to 3.6 V                    | 1.5                                 | 3.3                | 5.6  | 1.5               | 7.0  | ns   |
| t <sub>sk(o)</sub> | output skew time              | V <sub>CC</sub> = 3.0 V to 3.6 V                    | -                                   | -                  | 1.0  | -                 | 1.5  | ns   |
| C <sub>PD</sub>    | power dissipation capacitance | per buffer; V <sub>I</sub> = GND to V <sub>CC</sub> |                                     |                    |      |                   |      |      |
|                    |                               | V <sub>CC</sub> = 1.65 V to 1.95 V                  | -                                   | 11.5               | -    | -                 | -    | pF   |
|                    |                               | V <sub>CC</sub> = 2.3 V to 2.7 V                    | -                                   | 15.2               | -    | -                 | -    | 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, 1.8, 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>PLZ</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).

$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$  where:

f<sub>i</sub> = input frequency in MHz; f<sub>o</sub> = output frequency in MHz

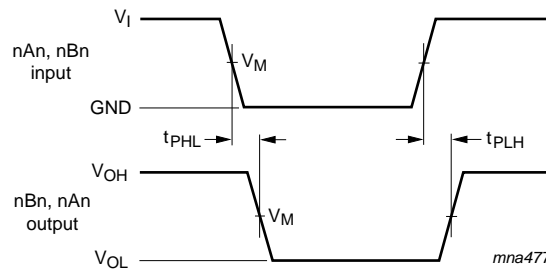
C<sub>L</sub> = output load capacitance in pF

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

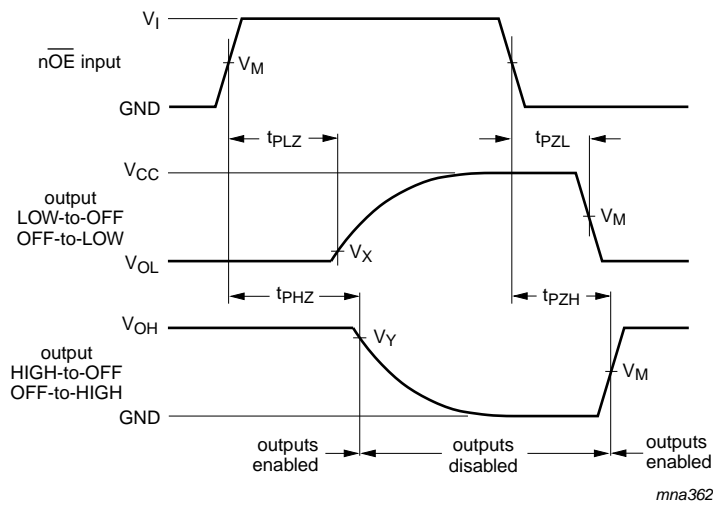


V<sub>M</sub> = 1.5 V at V<sub>CC</sub> ≥ 2.7 V.

V<sub>M</sub> = 0.5 × V<sub>CC</sub> at V<sub>CC</sub> < 2.7 V.

V<sub>OL</sub> and V<sub>OH</sub> are typical output voltage levels that occur with the output load.

**Fig 4. The input (nAn, nBn) to output (nBn, nAn) propagation delays**



$V_M = 1.5 \text{ V}$  at  $V_{CC} \geq 2.7 \text{ V}$ .

$V_M = 0.5 \times V_{CC}$  at  $V_{CC} < 2.7 \text{ V}$ .

$V_X = V_{OL} + 0.3 \text{ V}$  at  $V_{CC} \geq 2.7 \text{ V}$ ;

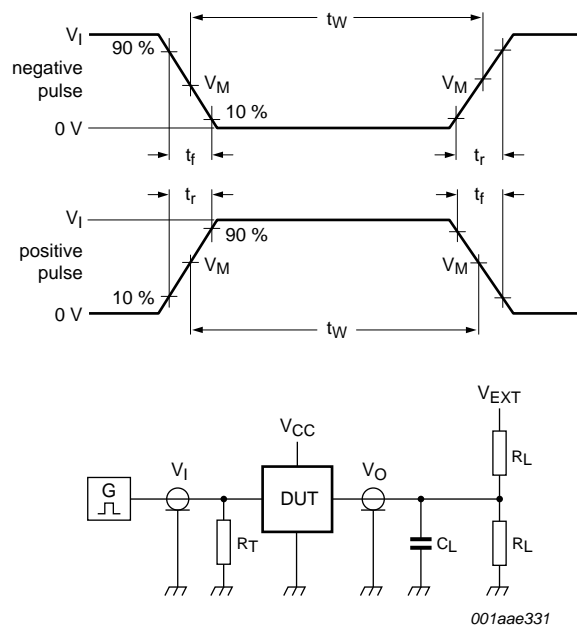
$V_X = V_{OL} + 0.15 \text{ V}$  at  $V_{CC} < 2.7 \text{ V}$ .

$V_Y = V_{OH} - 0.3 \text{ V}$  at  $V_{CC} \geq 2.7 \text{ V}$ ;

$V_Y = V_{OH} - 0.15 \text{ V}$  at  $V_{CC} < 2.7 \text{ V}$ .

$V_{OL}$  and  $V_{OH}$  are typical output voltage levels that occur with the output load.

**Fig 5. 3-state enable and disable times.**



Test data is given in [Table 8](#).

Definitions for test circuit:

$R_L$  = Load resistance.

$C_L$  = Load capacitance including jig and probe capacitance.

$R_T$  = Termination resistance should be equal to output impedance  $Z_o$  of the pulse generator.

$V_{EXT}$  = External voltage for measuring switching times.

**Fig 6. Load circuitry for switching times**

**Table 8. Test data**

| Supply voltage   | Input    |               | Load  |              | $V_{EXT}$          |                    |                    |
|------------------|----------|---------------|-------|--------------|--------------------|--------------------|--------------------|
|                  | $V_I$    | $t_r, t_f$    | $C_L$ | $R_L$        | $t_{PLH}, t_{PHL}$ | $t_{PLZ}, t_{PZL}$ | $t_{PHZ}, t_{PZH}$ |
| 1.2 V            | $V_{CC}$ | $\leq 2$ ns   | 30 pF | 1 k $\Omega$ | open               | $2 \times V_{CC}$  | GND                |
| 1.65 V to 1.95 V | $V_{CC}$ | $\leq 2$ ns   | 30 pF | 1 k $\Omega$ | open               | $2 \times V_{CC}$  | GND                |
| 2.3 V to 2.7 V   | $V_{CC}$ | $\leq 2$ ns   | 30 pF | 500 $\Omega$ | open               | $2 \times V_{CC}$  | GND                |
| 2.7 V            | 2.7 V    | $\leq 2.5$ ns | 50 pF | 500 $\Omega$ | open               | $2 \times V_{CC}$  | GND                |
| 3.0 V to 3.6 V   | 2.7 V    | $\leq 2.5$ ns | 50 pF | 500 $\Omega$ | open               | $2 \times V_{CC}$  | 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

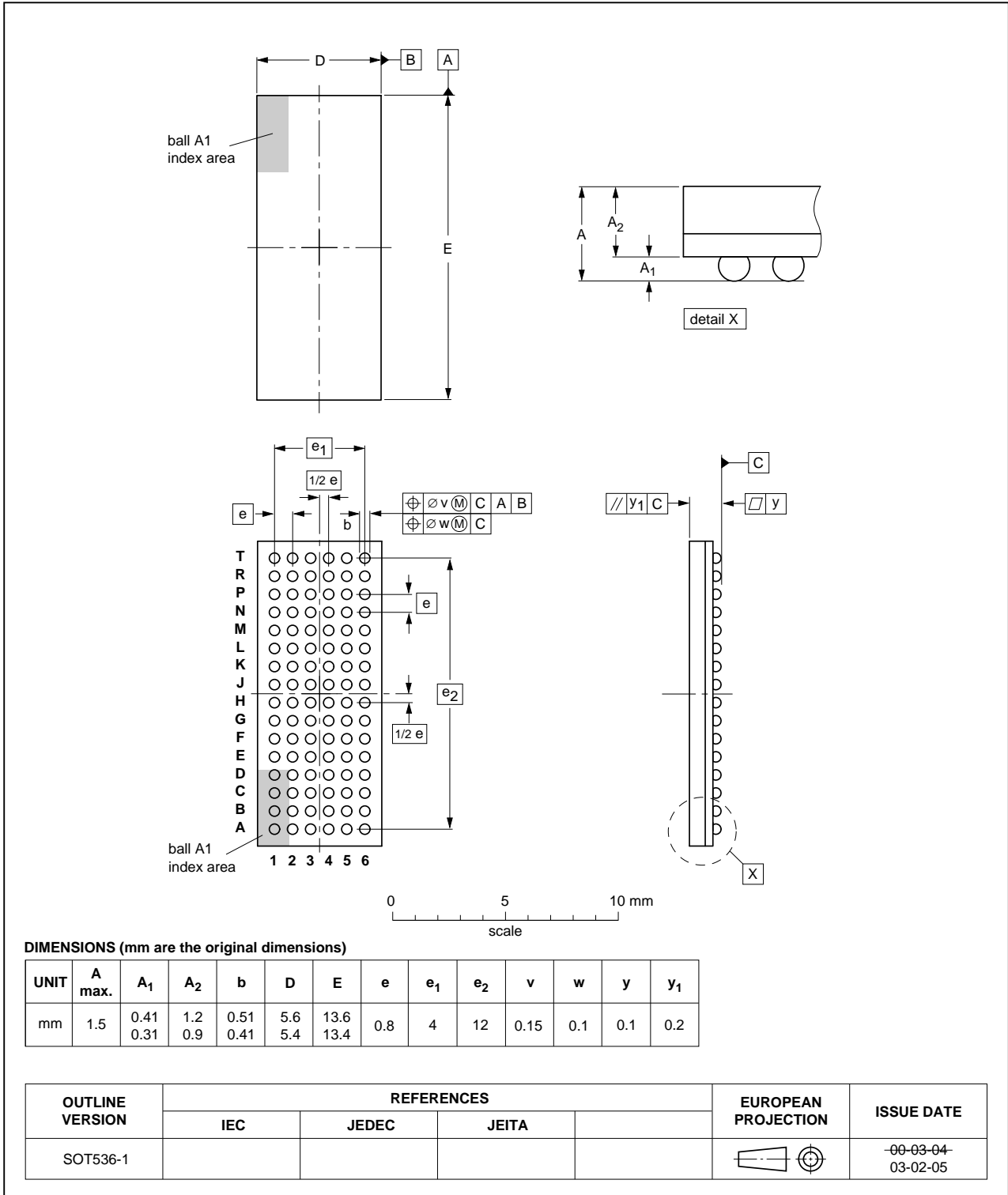


Fig 7. Package outline SOT536-1 (LFBGA96)

## 13. Abbreviations

**Table 9. 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 10. Revision history**

| Document ID          | Release date  | Data sheet status     | Change notice | Supersedes           |
|----------------------|---|-----------------------|---------------|----------------------|
| 74LVCH32245A v.5     | 20111215  | Product data sheet    | -             | 74LVCH32245A v.4     |
| Modifications:       | <ul style="list-style-type: none"> <li>Maximum propagation delay value for <math>V_{CC} = 1.65\text{ V}</math> to <math>1.95\text{ V}</math> at <math>+125\text{ °C}</math> changed from 12.9 ns to 13.8 ns</li> <li>Maximum enable time value for <math>V_{CC} = 1.65\text{ V}</math> to <math>1.95\text{ V}</math> at <math>+125\text{ °C}</math> changed from 15.8 ns to 16.9 ns</li> <li>Maximum disable time value for <math>V_{CC} = 1.65\text{ V}</math> to <math>1.95\text{ V}</math> at <math>+125\text{ °C}</math> changed from 13.7 ns to 14.7 ns</li> </ul> |                       |               |                      |
| 74LVCH32245A v.4     | 20111109  | Product data sheet    | -             | 74LVCH32245A v.3     |
| Modifications:       | <ul style="list-style-type: none"> <li><a href="#">Table 4</a>, <a href="#">Table 5</a>, <a href="#">Table 6</a>, <a href="#">Table 7</a> and <a href="#">Table 8</a>: values added for lower voltage ranges.</li> </ul>  |                       |               |                      |
| 74LVCH32245A v.3     | 20070820  | Product data sheet    | -             | 74LVCH32245A v.2     |
| 74LVCH32245A v.2     | 20040511  | Product specification | -             | 74LVC_LVCH32245A v.1 |
| 74LVC_LVCH32245A v.1 | 19990901  | Product specification | -             | -                    |

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### 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.                                     |

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

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## 17. Contents

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|           |   |           |
|-----------|---|-----------|
| <b>1</b>  | <b>General description</b> .....              | <b>1</b>  |
| <b>2</b>  | <b>Features and benefits</b> .....            | <b>1</b>  |
| <b>3</b>  | <b>Ordering information</b> .....             | <b>2</b>  |
| <b>4</b>  | <b>Functional diagram</b> .....               | <b>3</b>  |
| <b>5</b>  | <b>Pinning information</b> .....              | <b>4</b>  |
| 5.1       | Pinning .....                                 | 4         |
| 5.2       | Pin description .....                         | 4         |
| <b>6</b>  | <b>Functional description</b> .....           | <b>5</b>  |
| <b>7</b>  | <b>Limiting values</b> .....                  | <b>5</b>  |
| <b>8</b>  | <b>Recommended operating conditions</b> ..... | <b>5</b>  |
| <b>9</b>  | <b>Static characteristics</b> .....           | <b>6</b>  |
| <b>10</b> | <b>Dynamic characteristics</b> .....          | <b>7</b>  |
| <b>11</b> | <b>Waveforms</b> .....                        | <b>8</b>  |
| <b>12</b> | <b>Package outline</b> .....                  | <b>11</b> |
| <b>13</b> | <b>Abbreviations</b> .....                    | <b>12</b> |
| <b>14</b> | <b>Revision history</b> .....                 | <b>12</b> |
| <b>15</b> | <b>Legal information</b> .....                | <b>13</b> |
| 15.1      | Data sheet status .....                       | 13        |
| 15.2      | Definitions .....                             | 13        |
| 15.3      | Disclaimers .....                             | 13        |
| 15.4      | Trademarks .....                              | 14        |
| <b>16</b> | <b>Contact information</b> .....              | <b>14</b> |
| <b>17</b> | <b>Contents</b> .....                         | <b>15</b> |

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