# 74LVCU04A

## Hex unbuffered inverter

Rev. 8 — 18 December 2015 Product data sheet

## 1. General description

The 74LVCU04A is a general purpose hex unbuffered inverter. Each of the six inverters is a single stage with unbuffered outputs.

## 2. Features and benefits

- Wide supply voltage range from 1.2 V to 3.6 V
- Inputs accept voltages up to 5.5 V
- CMOS low power consumption
- Direct interface with TTL levels
- 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

## 3. Ordering information

**Table 1. Ordering information**

| Type number | Package | | | |
|---|---|---|---|---|
| | Temperature range | Name | Description | Version |
| 74LVCU04AD | −40 °C to +125 °C | SO14 | plastic small outline package; 14 leads; body width 3.9 mm | SOT108-1 |
| 74LVCU04ADB | −40 °C to +125 °C | SSOP14 | plastic shrink small outline package; 14 leads; body width 5.3 mm | SOT337-1 |
| 74LVCU04APW | −40 °C to +125 °C | TSSOP14 | plastic thin shrink small outline package; 14 leads; body width 4.4 mm | SOT402-1 |
| 74LVCU04ABQ | −40 °C to +125 °C | DHVQFN14 | plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 14 terminals; body 2.5 × 3 × 0.85 mm | SOT762-1 |

## 4. Functional diagram

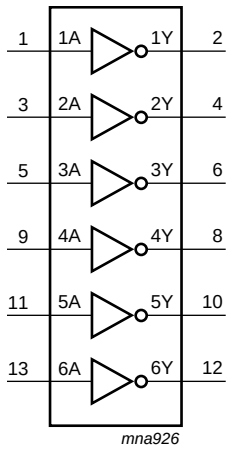



**Fig 1. Logic symbol**

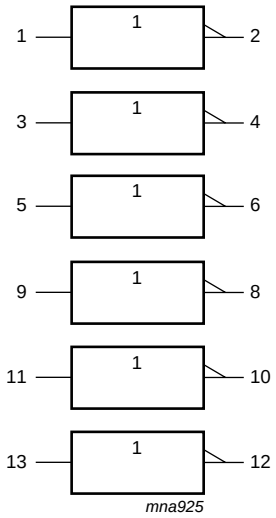



**Fig 2. IEC logic symbol**

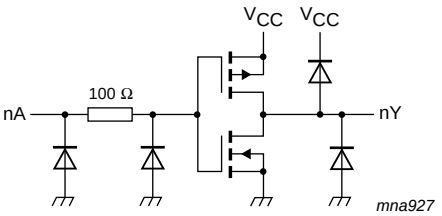



**Fig 3. Schematic diagram for one inverter**

## 5. Pinning information

### 5.1 Pinning

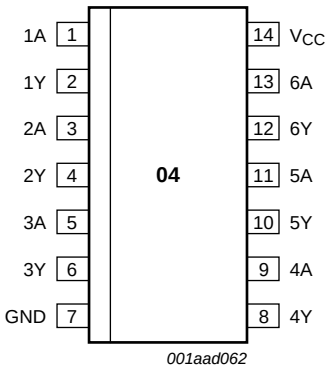
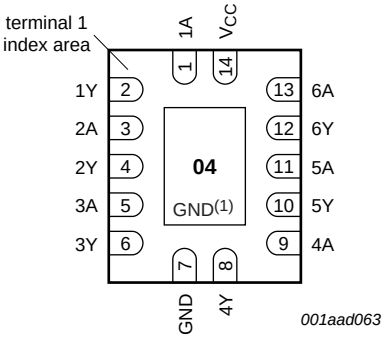



**Fig 4. Pin configuration for SO14 and (T)SSOP14**




Transparent top view

(1) This is not a supply pin. The substrate is attached to this pad using conductive die attach material. There is no electrical or mechanical requirement to solder this pad. However, if it is soldered, the solder land should remain floating or be connected to GND.

**Fig 5. Pin configuration for DHVQFN14**

### 5.2 Pin description

**Table 2. Pin description**

| Symbol | Pin | Description |
|---|---|---|
| 1A, 2A, 3A, 4A, 5A, 6A | 1, 3, 5, 9, 11, 13 | data input |
| 1Y, 2Y, 3Y, 4Y, 5Y, 6Y | 2, 4, 6, 8, 10, 12 | data output |
| GND | 7 | ground (0 V) |
| $V_{CC}$ | 14 | supply voltage |

## 6. Functional description

**Table 3. Function table[1]**

| Input nA | Output nY |
|---|---|
| L | H |
| H | L |

[1] H = HIGH voltage level; L = LOW voltage level

## 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 |
|---|---|---|---|---|---|
| $V_{CC}$ | supply voltage | | −0.5 | +6.5 | V |
| $I_{IK}$ | input clamping current | $V_I < 0$ V | −50 | - | mA |
| $V_I$ | input voltage | [1] | −0.5 | +6.5 | V |
| $I_{OK}$ | output clamping current | $V_O > V_{CC}$ or $V_O < 0$ V | - | ±50 | mA |
| $V_O$ | output voltage | [2] | −0.5 | $V_{CC}$ + 0.5 | V |
| $I_O$ | output current | $V_O$ = 0 V to $V_{CC}$ | - | ±50 | mA |
| $I_{CC}$ | supply current | | - | 100 | mA |
| $I_{GND}$ | ground current | | −100 | - | mA |
| $T_{stg}$ | storage temperature | | −65 | +150 | °C |
| $P_{tot}$ | total power dissipation | $T_{amb}$ = −40 °C to +125 °C [3] | - | 500 | 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] For SO14 packages: above 70 °C the value of $P_{tot}$ derates linearly with 8 mW/K.
For (T)SSOP14 packages: above 60 °C the value of $P_{tot}$ derates linearly with 5.5 mW/K.
For DHVQFN14 packages: above 60 °C the value of $P_{tot}$ derates linearly with 4.5 mW/K.

# 8. Recommended operating conditions

**Table 5. Recommended operating conditions**

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{CC}$ | supply voltage | | 1.65 | - | 3.6 | V |
| | | functional | 1.2 | - | - | V |
| $V_I$ | input voltage | | 0 | - | 5.5 | V |
| $V_O$ | output voltage | | 0 | - | $V_{CC}$ | V |
| $T_{amb}$ | ambient temperature | in free air | −40 | - | +125 | °C |
| $\Delta t/\Delta V$ | input transition rise and fall rate | $V_{CC}$ = 1.65 V to 2.7 V | 0 | - | 20 | ns/V |
| | | $V_{CC}$ = 2.7 V to 3.6 V | 0 | - | 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[1] | Max | Min | Max | |
| $V_{IH}$ | HIGH-level input voltage | $V_{OL(max)}$ = 0.5 V; $I_O$ = −100 μA | | | | | | |
| | | $V_{CC}$ = 1.2 V | 1.08 | - | - | 1.12 | - | V |
| | | $V_{CC}$ = 1.65 V to 1.95 V | 1.3 | - | - | 1.5 | - | V |
| | | $V_{CC}$ = 2.3 V to 2.7 V | 1.8 | - | - | 2.0 | - | V |
| | | $V_{CC}$ = 3.0 V | 2.0 | - | - | 2.4 | - | V |
| | | $V_{CC}$ = 3.6 V | 2.4 | - | - | 2.8 | - | V |
| $V_{IL}$ | LOW-level input voltage | $V_{OH(min)}$ = $V_{CC}$ − 0.5 V; $I_O$ = −100 μA | | | | | | |
| | | $V_{CC}$ = 1.2 V | - | - | 0.12 | - | 0.1 | V |
| | | $V_{CC}$ = 1.65 V to 1.95 V | - | - | 0.6 | - | 0.4 | V |
| | | $V_{CC}$ = 2.3 V to 2.7 V | - | - | 0.6 | - | 0.5 | V |
| | | $V_{CC}$ = 3.0 V | - | - | 1.0 | - | 0.6 | V |
| | | $V_{CC}$ = 3.6 V | - | - | 1.2 | - | 0.7 | V |
| $V_{OH}$ | HIGH-level output voltage | $V_I$ = GND | | | | | | |
| | | $V_{CC}$ = 3.0 V; $I_O$ = −100 μA | $V_{CC}$ − 0.2 | - | - | $V_{CC}$ − 0.3 | - | V |
| | | $V_{CC}$ = 1.65 V; $I_O$ = −4 mA | 1.2 | - | - | 1.05 | - | V |
| | | $V_{CC}$ = 2.3 V; $I_O$ = −8 mA | 1.8 | - | - | 1.65 | - | V |
| | | $V_{CC}$ = 2.7 V; $I_O$ = −12 mA | 2.2 | - | - | 2.05 | - | V |
| | | $V_{CC}$ = 3.0 V; $I_O$ = −18 mA | 2.4 | - | - | 2.25 | - | V |
| | | $V_{CC}$ = 3.0 V; $I_O$ = −24 mA | 2.2 | - | - | 2.0 | - | V |

**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[1] | Max | Min | Max | |
| $V_{OL}$ | LOW-level output voltage | $V_I = V_{CC}$ | | | | | | |
| | | $V_{CC}$ = 3.0 V; $I_O$ = 100 μA | - | - | 0.20 | - | 0.60 | V |
| | | $V_{CC}$ = 1.65 V; $I_O$ = 4 mA | - | - | 0.45 | - | 0.65 | V |
| | | $V_{CC}$ = 2.3 V; $I_O$ = 8 mA | - | - | 0.60 | - | 0.80 | V |
| | | $V_{CC}$ = 2.7 V; $I_O$ = 12 mA | - | - | 0.40 | - | 0.30 | V |
| | | $V_{CC}$ = 3.0 V; $I_O$ = 24 mA | - | - | 0.55 | - | 0.80 | V |
| $I_I$ | input leakage current | $V_{CC}$ = 3.6 V; $V_I$ = 5.5 V or GND | - | ±0.1 | ±5 | - | ±20 | μA |
| $I_{CC}$ | supply current | $V_{CC}$ = 3.6 V; $V_I$ = $V_{CC}$ or GND; $I_O$ = 0 A | - | 0.1 | 10 | - | 40 | μA |
| $\Delta I_{CC}$ | additional supply current | per input pin; $V_{CC}$ = 2.7 V to 3.6 V; $V_I$ = $V_{CC}$ − 0.6 V; $I_O$ = 0 A | - | 5 | 500 | - | 5000 | μA |
| $C_I$ | input capacitance | $V_{CC}$ = 0 V to 3.6 V; $V_I$ = GND to $V_{CC}$ | - | 5.5 | - | - | - | pF |

[1] All typical values are measured at $V_{CC}$ = 3.3 V (unless stated otherwise) and $T_{amb}$ = 25 °C.

## 10. Dynamic characteristics

**Table 7. Dynamic characteristics**

*Voltages are referenced to GND (ground = 0 V). For test circuit see Figure 9.*

| Symbol | Parameter | Conditions | | –40 °C to +85 °C | | | –40 °C to +125 °C | | Unit |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Min | Typ[1] | Max | Min | Max | |
| $t_{pd}$ | propagation delay | nA to nY; see Figure 6 | [2] | | | | | | |
| | | $V_{CC}$ = 1.2 V | | - | 6.0 | - | - | - | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | | 0.3 | 3.7 | 7.8 | 0.3 | 9.0 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | | 0.5 | 2.2 | 4.4 | 0.5 | 5.2 | ns |
| | | $V_{CC}$ = 2.7 V | | 0.5 | 2.0 | 4.5 | 0.5 | 6.0 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | | 0.5 | 2.0 | 4.0 | 0.5 | 5.0 | ns |
| $t_{sk(o)}$ | output skew time | $V_{CC}$ = 3.0 V to 3.6 V | [3] | - | - | 1.0 | - | 1.5 | ns |
| $C_{PD}$ | power dissipation capacitance | per inverter; $V_I$ = GND to $V_{CC}$ | [4] | | | | | | |
| | | $V_{CC}$ = 1.65 V to 1.95 V | | - | 2.3 | - | - | - | pF |
| | | $V_{CC}$ = 2.3 V to 2.7 V | | - | 5.5 | - | - | - | pF |
| | | $V_{CC}$ = 3.0 V to 3.6 V | | - | 8.4 | - | - | - | pF |

[1] Typical values are measured at $T_{amb}$ = 25 °C and $V_{CC}$ = 1.2 V, 1.8 V, 2.5 V, 2.7 V, and 3.3 V respectively.

[2] $t_{pd}$ is the same as $t_{PLH}$ and $t_{PHL}$.

[3] Skew between any two outputs of the same package switching in the same direction. This parameter is guaranteed by design.

[4] $C_{PD}$ is used to determine the dynamic power dissipation ($P_D$ 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:

$f_i$ = input frequency in MHz; $f_o$ = output frequency in MHz

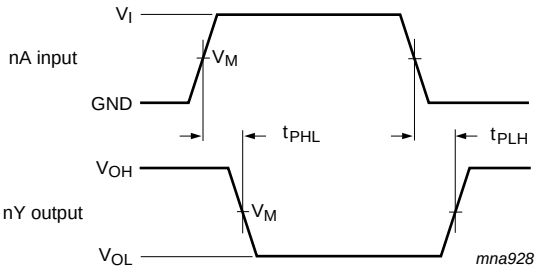
$C_L$ = output load capacitance in pF

$V_{CC}$ = supply voltage in Volts

N = number of inputs switching

$\Sigma(C_L \times V_{CC}^2 \times f_o)$ = sum of the outputs

## 11. Waveforms

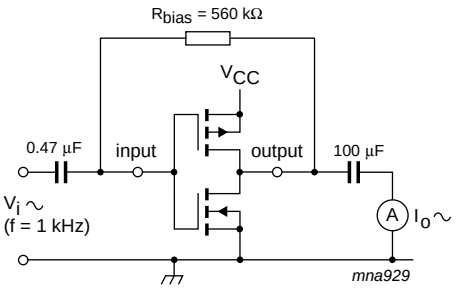



$V_M$ = 1.5 V at $V_{CC} \geq$ 2.7 V;

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

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

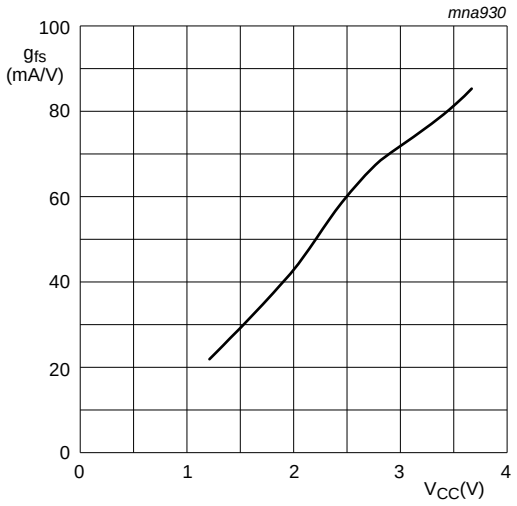
**Fig 6. Input (nA) to output (nY) propagation delays**




$$g_{fs} = \frac{dI_O}{dV_I}; \; at \; constant \; V_O$$

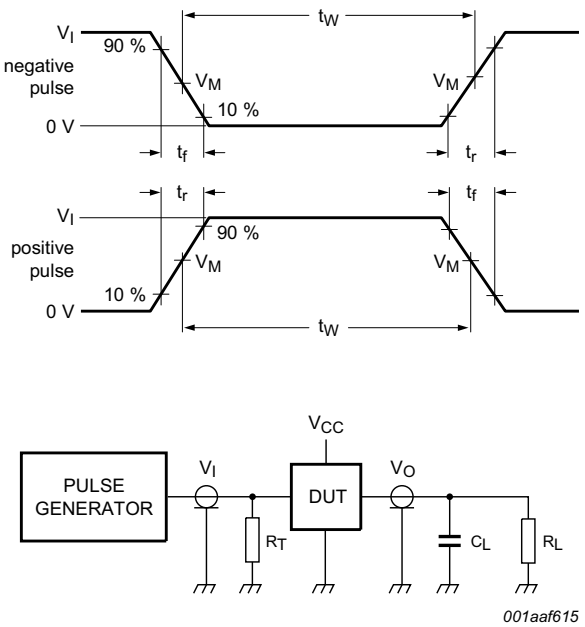
$f_i$ = 1 kHz at $V_O$ is constant

**Fig 7. Test setup for measuring forward transconductance**




$T_{amb}$ = 25 °C

**Fig 8. Typical forward transconductance as a function of supply voltage**




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.

**Fig 9. Test circuit for measuring switching times**

**Table 8. Test data**

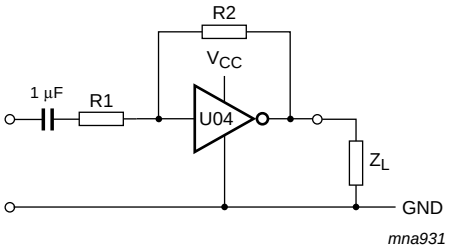
| Supply voltage | Input | | Load | |
|---|---|---|---|---|
| | $V_I$ | $t_r$, $t_f$ | $C_L$ | $R_L$ |
| 1.2 V | $V_{CC}$ | ≤ 2 ns | 30 pF | 1 kΩ |
| 1.65 V to 1.95 V | $V_{CC}$ | ≤ 2 ns | 30 pF | 1 kΩ |
| 2.3 V to 2.7 V | $V_{CC}$ | ≤ 2 ns | 30 pF | 500 Ω |
| 2.7 V | 2.7 V | ≤ 2.5 ns | 50 pF | 500 Ω |
| 3.0 V to 3.6 V | 2.7 V | ≤ 2.5 ns | 50 pF | 500 Ω |

# 12. Application information

## 12.1 Application diagrams

Some applications for the 74LVCU04A are:

- Linear amplifier: see Figure 10
- Crystal oscillator designs; see Figure 11
- Astable multivibrator; see Figure 12




$V_{o(p-p)} = V_{CC} - 1.5$ V centered at $0.5V_{CC}$.

$$A_u = -\frac{G_{OL}}{1 + \frac{R1}{R2}(1 + G_{OL})}$$

$G_{OL}$ = loop gain.

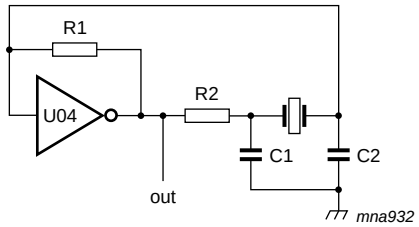
$A_u$ = voltage amplification.

$R1 \geq 3\ k\Omega$, $R2 \leq 1\ M\Omega$

$Z_L > 10\ k\Omega$; $A_{OL} = 20$ (typ.)

Typical unity gain bandwidth product is 5 MHz.

**Fig 10. 74LVCU04A used as linear amplifier**



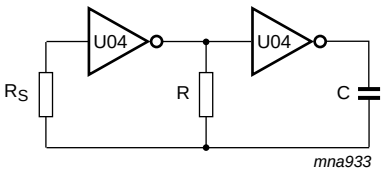

$C_1$ = 47 pF (typical)

$C_2$ = 22 pF (typical)

$R_1$ = 1 to 10 MΩ (typical)

$R_2$ optimum value depends on the frequency and required stability against changes in $V_{CC}$ or average minimum $I_{CC}$ ($I_{CC}$ is typically 2 mA at $V_{CC}$ = 3 V and f = 1 MHz)

**Fig 11. 74LVCU04A used as crystal oscillator**




$$f = \frac{1}{T} \approx \frac{1}{2.2RC}$$

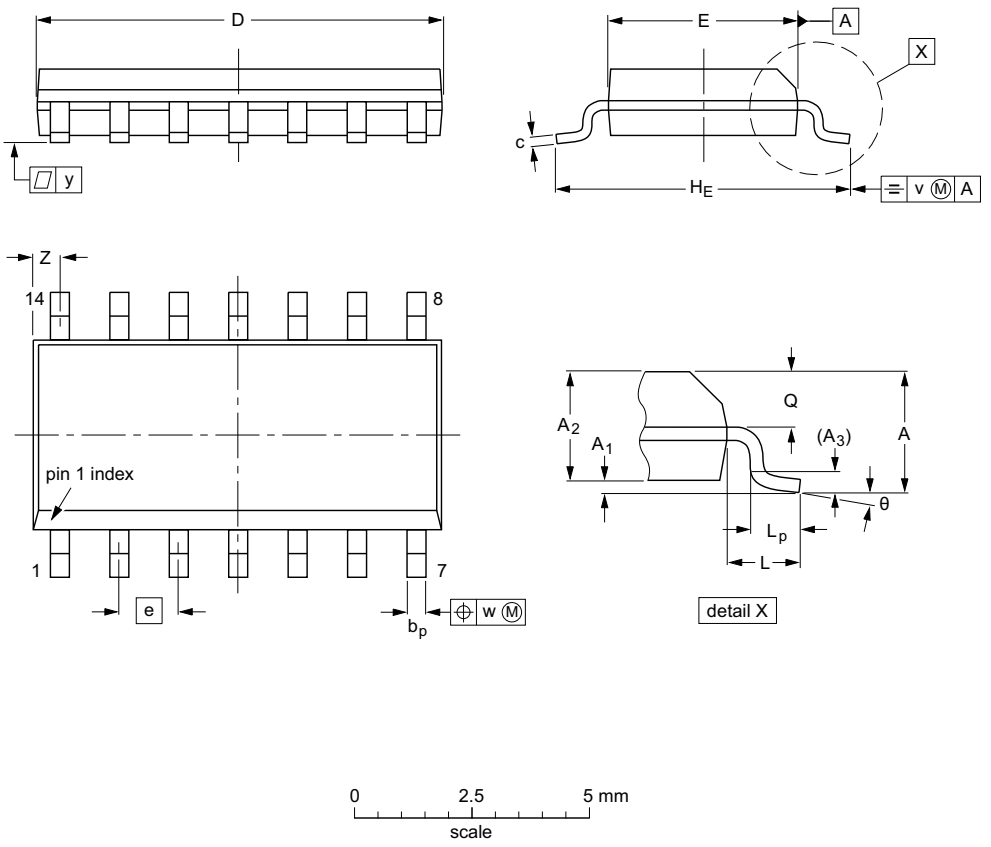
$R_S \approx 2R$.

The average $I_{CC}$ is approximately 3.5 + 0.05f (MHz) × C (pF) [mA] at $V_{CC}$ = 3.0 V.

**Fig 12. 74LVCU04A used as astable multivibrator**

## 13. Package outline

**SO14: plastic small outline package; 14 leads; body width 3.9 mm** **SOT108-1**




**DIMENSIONS (inch dimensions are derived from the original mm dimensions)**

| UNIT | A max. | $A_1$ | $A_2$ | $A_3$ | $b_p$ | c | $D^{(1)}$ | $E^{(1)}$ | e | $H_E$ | L | $L_p$ | Q | v | w | y | $Z^{(1)}$ | θ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 1.75 | 0.25<br>0.10 | 1.45<br>1.25 | 0.25 | 0.49<br>0.36 | 0.25<br>0.19 | 8.75<br>8.55 | 4.0<br>3.8 | 1.27 | 6.2<br>5.8 | 1.05 | 1.0<br>0.4 | 0.7<br>0.6 | 0.25 | 0.25 | 0.1 | 0.7<br>0.3 | $8^o$<br>$0^o$ |
| inches | 0.069 | 0.010<br>0.004 | 0.057<br>0.049 | 0.01 | 0.019<br>0.014 | 0.0100<br>0.0075 | 0.35<br>0.34 | 0.16<br>0.15 | 0.05 | 0.244<br>0.228 | 0.041 | 0.039<br>0.016 | 0.028<br>0.024 | 0.01 | 0.01 | 0.004 | 0.028<br>0.012 | |

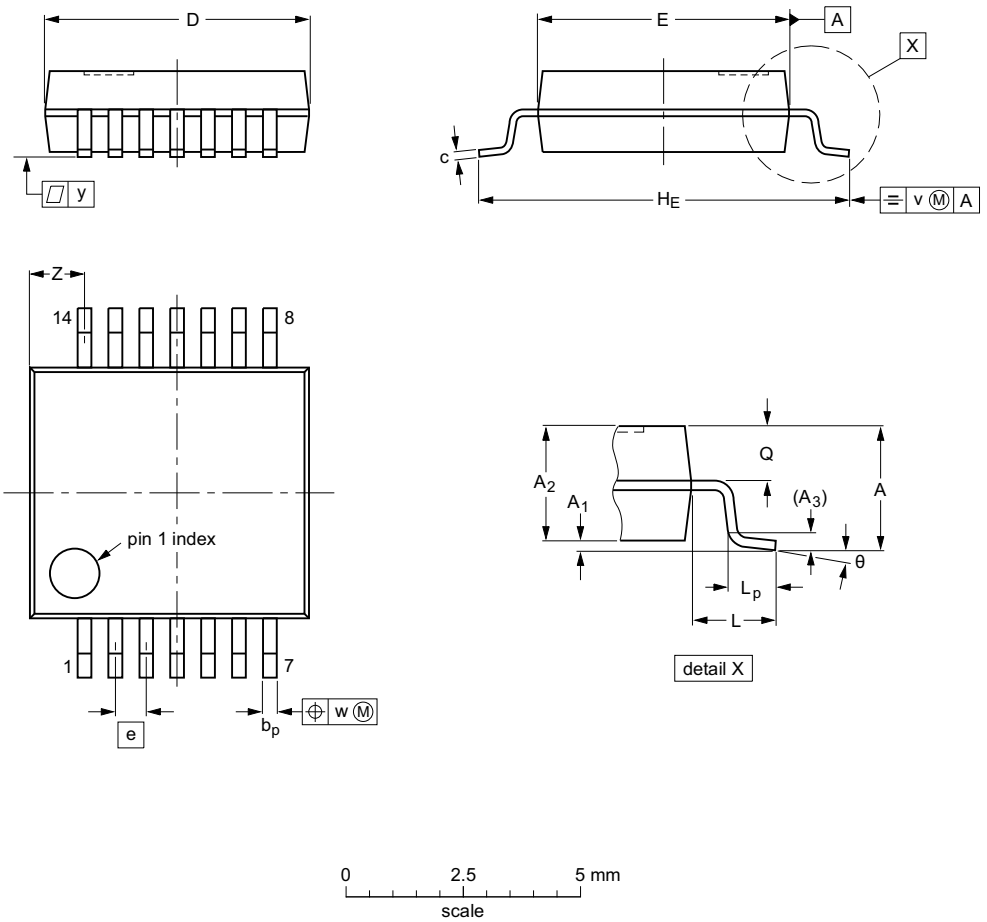
**Note**

1. Plastic or metal protrusions of 0.15 mm (0.006 inch) maximum per side are not included.

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT108-1 | 076E06 | MS-012 | | | | ~~99-12-27~~<br>03-02-19 |

**Fig 13. Package outline SOT108-1 (SO14)**

**SSOP14: plastic shrink small outline package; 14 leads; body width 5.3 mm** **SOT337-1**




**DIMENSIONS (mm are the original dimensions)**

| UNIT | A max. | $A_1$ | $A_2$ | $A_3$ | $b_p$ | c | D (1) | E (1) | e | $H_E$ | L | $L_p$ | Q | v | w | y | Z (1) | θ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 2 | 0.21<br>0.05 | 1.80<br>1.65 | 0.25 | 0.38<br>0.25 | 0.20<br>0.09 | 6.4<br>6.0 | 5.4<br>5.2 | 0.65 | 7.9<br>7.6 | 1.25 | 1.03<br>0.63 | 0.9<br>0.7 | 0.2 | 0.13 | 0.1 | 1.4<br>0.9 | 8°<br>0° |

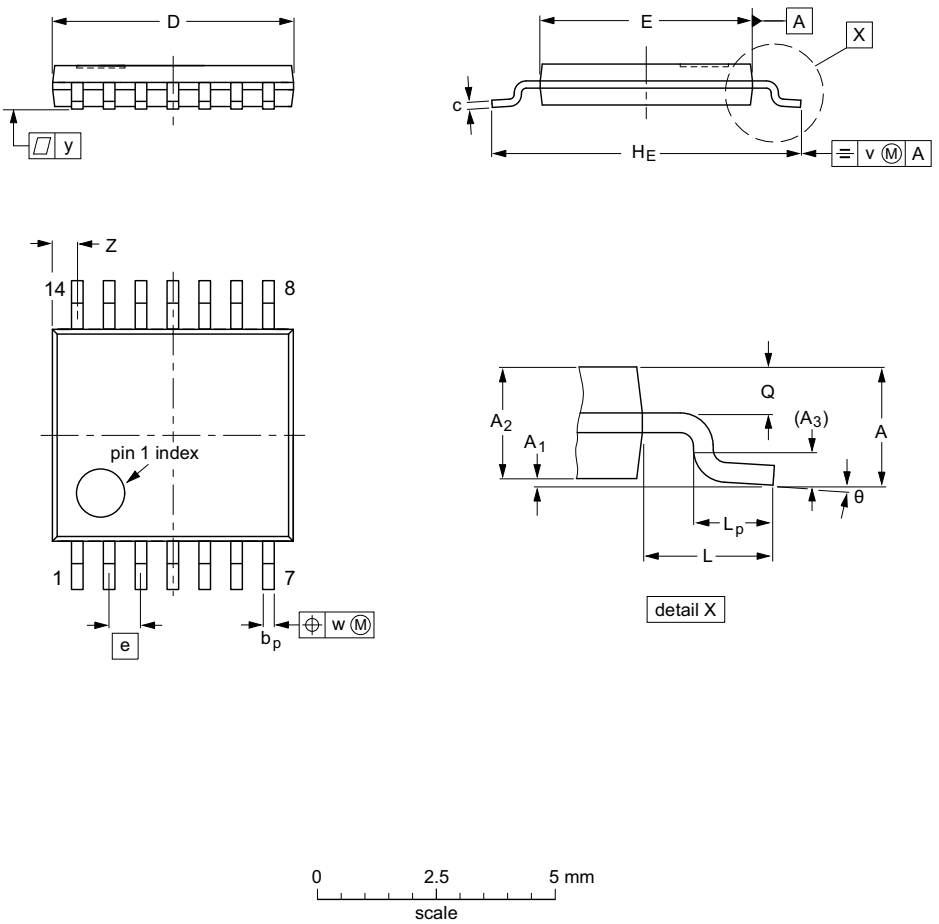
**Note**

1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT337-1 | | MO-150 | | | | ~~99-12-27~~<br>03-02-19 |

**Fig 14. Package outline SOT337-1 (SSOP14)**

**TSSOP14: plastic thin shrink small outline package; 14 leads; body width 4.4 mm** **SOT402-1**




**DIMENSIONS (mm are the original dimensions)**

| UNIT | A max. | $A_1$ | $A_2$ | $A_3$ | $b_p$ | c | D (1) | E (2) | e | $H_E$ | L | $L_p$ | Q | v | w | y | Z (1) | θ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 1.1 | 0.15<br>0.05 | 0.95<br>0.80 | 0.25 | 0.30<br>0.19 | 0.2<br>0.1 | 5.1<br>4.9 | 4.5<br>4.3 | 0.65 | 6.6<br>6.2 | 1 | 0.75<br>0.50 | 0.4<br>0.3 | 0.2 | 0.13 | 0.1 | 0.72<br>0.38 | 8°<br>0° |

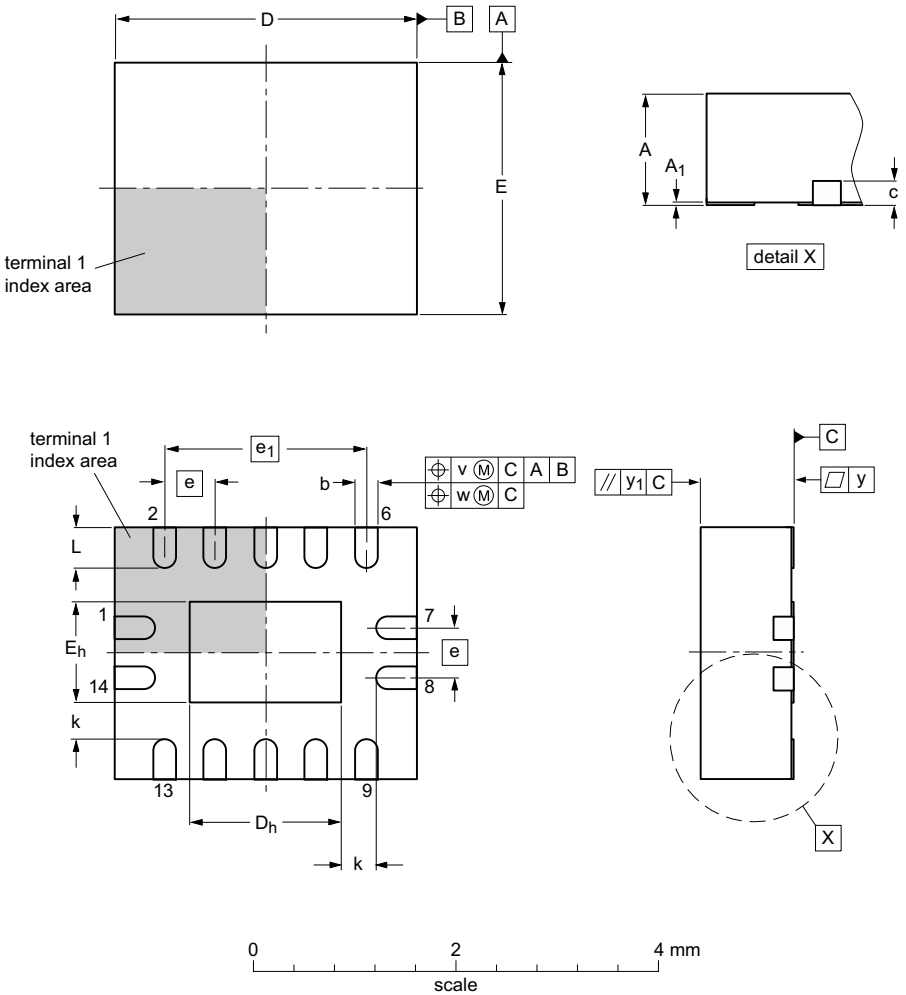
**Notes**

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.
2. Plastic interlead protrusions of 0.25 mm maximum per side are not included.

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT402-1 | | MO-153 | | | | ~~99-12-27~~<br>03-02-18 |

**Fig 15. Package outline SOT402-1 (TSSOP14)**

**DHVQFN14: plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 14 terminals; body 2.5 x 3 x 0.85 mm** **SOT762-1**




Dimensions (mm are the original dimensions)

| Unit | | $A^{(1)}$ | $A_1$ | b | c | $D^{(1)}$ | $D_h$ | $E^{(1)}$ | $E_h$ | e | $e_1$ | k | L | v | w | y | $y_1$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | max | 1 | 0.05 | 0.30 | | 3.1 | 1.65 | 2.6 | 1.15 | | | | 0.5 | | | | |
| mm | nom | | 0.02 | 0.25 | 0.2 | 3.0 | 1.50 | 2.5 | 1.00 | 0.5 | 2 | | 0.4 | 0.1 | 0.05 | 0.05 | 0.1 |
| | min | | 0.00 | 0.18 | | 2.9 | 1.35 | 2.4 | 0.85 | | | 0.2 | 0.3 | | | | |

Note

1. Plastic or metal protrusions of 0.075 mm maximum per side are not included.

*sot762-1_po*

| Outline version | References | | | | European projection | Issue date |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT762-1 | | MO-241 | | | | ~~15-04-10~~ 15-05-05 |

**Fig 16. Package outline SOT762-1 (DHVQFN14)**

## 14. 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 |

## 15. Revision history

**Table 10. Revision history**

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| 74LVCU04A v.8 | 20151218 | Product data sheet | - | 74LVCU04A v.7 |
| Modifications: | • Descriptive title updated. Added “unbuffered” (errata). | | | |
| 74LVCU04A v.7 | 20111117 | Product data sheet | - | 74LVCU04A v.6 |
| Modifications: | • Legal pages updated.<br>• Table 6, bodyrow $\Delta I_{CC}$: condition $V_{CC}$ changed. | | | |
| 74LVCU04A v.6 | 20110809 | Product data sheet | - | 74LVCU04A v.5 |
| 74LVCU04A v.5 | 20040312 | Product specification | - | 74LVCU04A v.4 |
| 74LVCU04A v.4 | 20030901 | Product specification | - | 74LVCU04A v.3 |
| 74LVCU04A v.3 | 19980729 | Product specification | - | 74LVCU04A v.2 |
| 74LVCU04A v.2 | 19980729 | Product specification | - | 74LVCU04A v.1 |
| 74LVCU04A v.1 | 19980729 | Product specification | - | - |

# 16. Legal information

## 16.1 Data sheet status

| Document status[1][2] | Product status[3] | 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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nexperia.com.

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## 18. Contents





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**Date of release: 18 December 2015**