

74AHC164; 74AHCT164

8-bit serial-in/parallel-out shift register

Rev. 03 — 24 April 2008

Product data sheet

1. General description

The 74AHC164; 74AHCT164 shift register is a high-speed Si-gate CMOS device and is pin compatible with Low-power Schottky TTL (LSTTL). It is specified in compliance with JEDEC standard No. 7A.

The 74AHC164; 74AHCT164 input signals are 8-bit serial through one of two inputs (DSA or DSB); either input can be used as an active HIGH enable for data entry through the other input. Both inputs must be connected together or an unused input must be tied HIGH.

Data shifts one place to the right on each LOW-to-HIGH transition of the clock input (CP) and enters into output Q0, which is a logical AND of the two data inputs (DSA and DSB) that existed one set-up time prior to the rising clock edge.

A LOW-level on the master reset (\overline{MR}) input overrides all other inputs and clears the register asynchronously, forcing all outputs LOW.

2. Features

- Balanced propagation delays
- All inputs have Schmitt-trigger actions
- Inputs accept voltages higher than V_{CC}
- Input levels:
 - ◆ For 74AHC164: CMOS level
 - ◆ For 74AHCT164: TTL level
- ESD protection:
 - ◆ HBM EIA/JESD22-A114E exceeds 2000 V
 - ◆ MM EIA/JESD22-A115-A exceeds 200 V
 - ◆ CDM EIA/JESD22-C101C exceeds 1000 V
- Multiple package options
- Specified from $-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$ and from $-40\text{ }^{\circ}\text{C}$ to $+125\text{ }^{\circ}\text{C}$

3. Ordering information

Table 1. Ordering information

| Type number | Package | | | Version |
|------------------|-------------------|----------|--|----------|
| | Temperature range | Name | Description | |
| 74AHC164 | | | | |
| 74AHC164D | -40 °C to +125 °C | SO14 | plastic small outline package; 14 leads; body width 3.9 mm | SOT108-1 |
| 74AHC164PW | -40 °C to +125 °C | TSSOP14 | plastic thin shrink small outline package; 14 leads; body width 4.4 mm | SOT402-1 |
| 74AHC164BQ | -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 |
| 74AHCT164 | | | | |
| 74AHCT164D | -40 °C to +125 °C | SO14 | plastic small outline package; 14 leads; body width 3.9 mm | SOT108-1 |
| 74AHCT164PW | -40 °C to +125 °C | TSSOP14 | plastic thin shrink small outline package; 14 leads; body width 4.4 mm | SOT402-1 |
| 74AHCT164BQ | -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

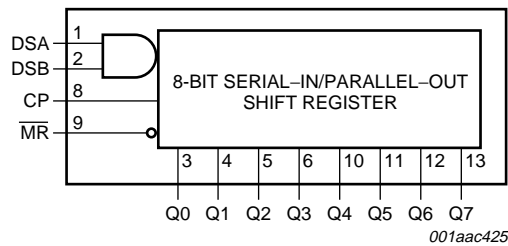
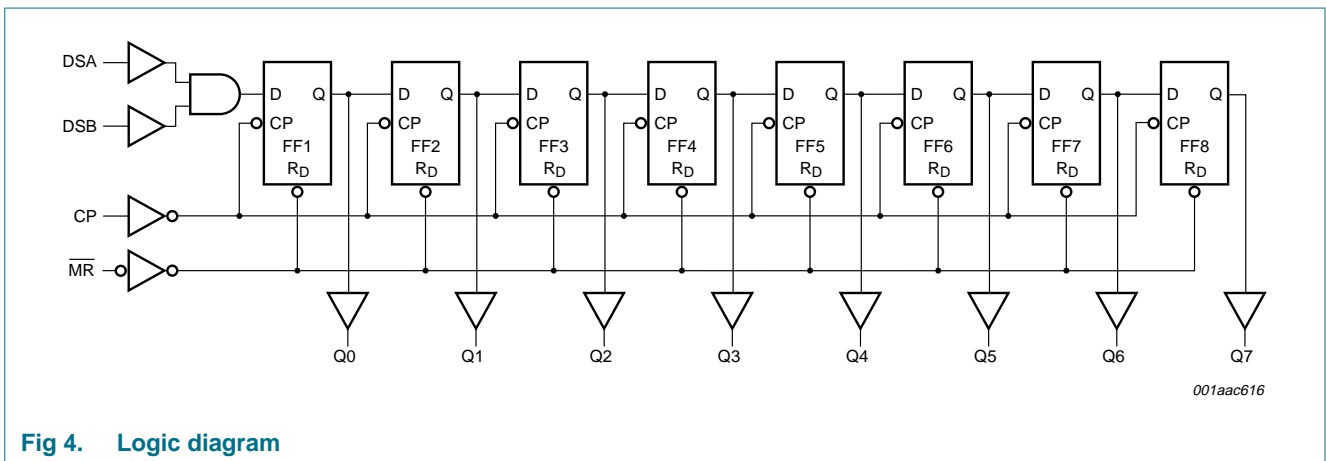
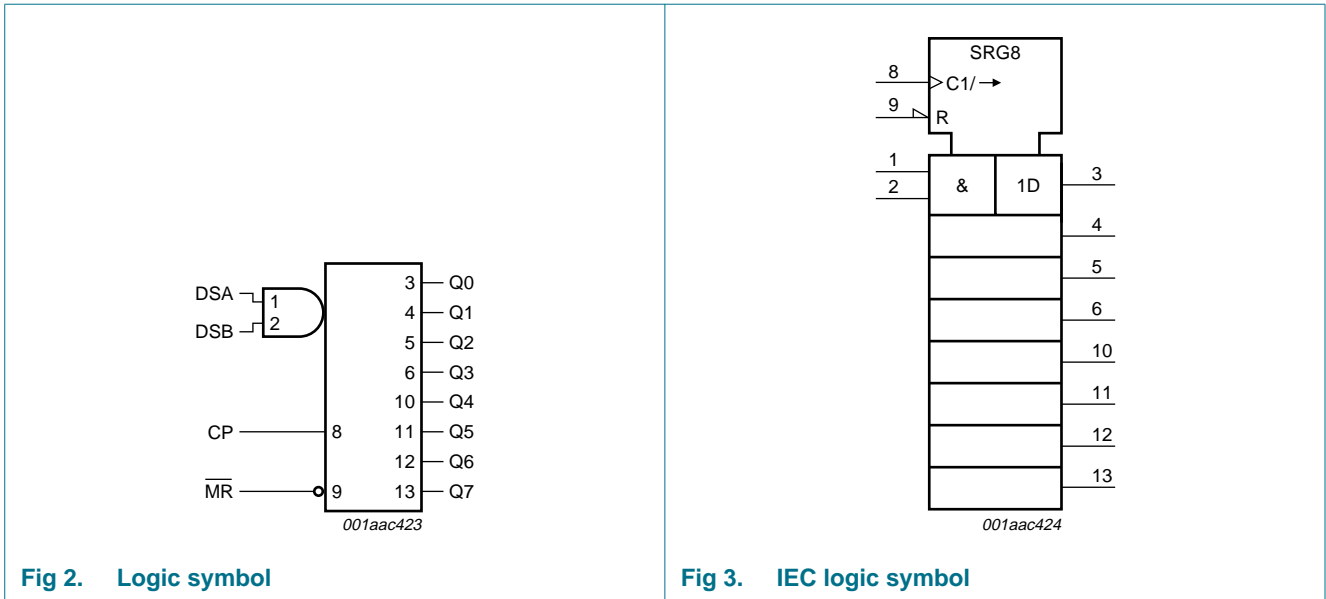
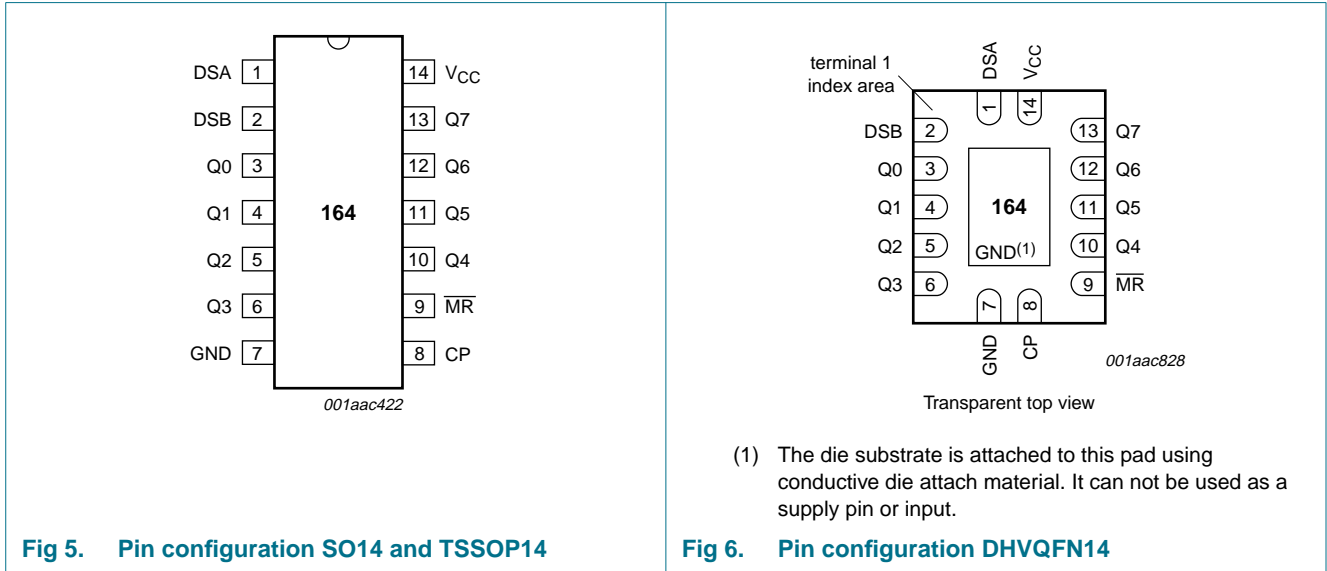


Fig 1. Functional diagram



5. Pinning information

5.1 Pinning



5.2 Pin description

Table 2. Pin description

| Symbol | Pin | Description |
|------------------------|-----|--|
| DSA | 1 | serial data input A |
| DSB | 2 | serial data input B |
| Q0 | 3 | output 0 |
| Q1 | 4 | output 1 |
| Q2 | 5 | output 2 |
| Q3 | 6 | output 3 |
| GND | 7 | ground (0 V) |
| CP | 8 | clock input (LOW-to-HIGH edge-triggered) |
| $\overline{\text{MR}}$ | 9 | master reset input (active LOW) |
| Q4 | 10 | output 4 |
| Q5 | 11 | output 5 |
| Q6 | 12 | output 6 |
| Q7 | 13 | output 7 |
| V _{CC} | 14 | supply voltage |

6. Functional description

Table 3. Function table^[1]

| Operating mode | Control | | Input | | Output | |
|----------------|---------|----|-------|-----|--------|----------|
| | MR | CP | DSA | DSB | Q0 | Q1 to Q7 |
| Reset (clear) | L | X | X | X | L | L to L |
| Shift | H | ↑ | l | l | L | q0 to q6 |
| | | | l | h | L | q0 to q6 |
| | | | h | l | L | q0 to q6 |
| | | | h | h | H | q0 to q6 |

- [1] H = HIGH voltage level;
 h = HIGH voltage level one set-up time prior to the LOW-to-HIGH clock transition;
 L = LOW voltage level;
 l = LOW voltage level one set-up time prior to the LOW-to-HIGH clock transition;
 ↑ = LOW-to-HIGH transition;
 X = don't care;
 q = lower case letter indicates the state of the referenced input one set-up time prior to the LOW-to-HIGH 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).

| Symbol | Parameter | Conditions | Min | Max | Unit |
|-----------|-------------------------|--|---------|------|------|
| V_{CC} | supply voltage | | -0.5 | +7.0 | V |
| V_I | input voltage | | -0.5 | +7.0 | V |
| I_{IK} | input clamping current | $V_I < -0.5$ V | [1] -20 | - | mA |
| I_{OK} | output clamping current | $V_O < -0.5$ V or $V_O > V_{CC} + 0.5$ V | [1] -20 | +20 | mA |
| I_O | output current | $V_O = -0.5$ V to $(V_{CC} + 0.5)$ V | -25 | +25 | mA |
| I_{CC} | supply current | | - | +75 | mA |
| I_{GND} | ground current | | -75 | - | mA |
| T_{stg} | storage temperature | | -65 | +150 | °C |
| P_{tot} | total power dissipation | $T_{amb} = -40$ °C to +125 °C | [2] - | 500 | mW |

- [1] The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
 [2] For SO14 packages: above 70 °C the value of P_{tot} derates linearly at 8 mW/K.
 For TSSOP14 packages: above 60 °C the value of P_{tot} derates linearly at 5.5 mW/K.
 For DHVQFN14 packages: above 60 °C the value of P_{tot} derates linearly at 4.5 mW/K.

8. Recommended operating conditions

Table 5. Operating conditions

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---------------------|-------------------------------------|---|-----|-----|----------|------|
| 74AHC164 | | | | | | |
| V_{CC} | supply voltage | | 2.0 | 5.0 | 5.5 | V |
| V_I | input voltage | | 0 | - | 5.5 | V |
| V_O | output voltage | | 0 | - | V_{CC} | V |
| T_{amb} | ambient temperature | | -40 | +25 | +125 | °C |
| $\Delta t/\Delta V$ | input transition rise and fall rate | $V_{CC} = 3.0\text{ V to }3.6\text{ V}$ | - | - | 100 | ns/V |
| | | $V_{CC} = 4.5\text{ V to }5.5\text{ V}$ | - | - | 20 | ns/V |
| 74AHCT164 | | | | | | |
| V_{CC} | supply voltage | | 4.5 | 5.0 | 5.5 | V |
| V_I | input voltage | | 0 | - | 5.5 | V |
| V_O | output voltage | | 0 | - | V_{CC} | V |
| T_{amb} | ambient temperature | | -40 | +25 | +125 | °C |
| $\Delta t/\Delta V$ | input transition rise and fall rate | $V_{CC} = 4.5\text{ V to }5.5\text{ V}$ | - | - | 20 | ns/V |

9. Static characteristics

Table 6. Static characteristics

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

| Symbol | Parameter | Conditions | 25 °C | | | -40 °C to +85 °C | | -40 °C to +125 °C | | Unit |
|-----------------|---|---|-------|------|------|------------------|------|-------------------|------|------|
| | | | Min | Typ | Max | Min | Max | Min | Max | |
| 74AHC164 | | | | | | | | | | |
| V_{IH} | HIGH-level input voltage | $V_{CC} = 2.0\text{ V}$ | 1.5 | - | - | 1.5 | - | 1.5 | - | V |
| | | $V_{CC} = 3.0\text{ V}$ | 2.1 | - | - | 2.1 | - | 2.1 | - | V |
| | | $V_{CC} = 5.5\text{ V}$ | 3.85 | - | - | 3.85 | - | 3.85 | - | V |
| V_{IL} | LOW-level input voltage | $V_{CC} = 2.0\text{ V}$ | - | - | 0.5 | - | 0.5 | - | 0.5 | V |
| | | $V_{CC} = 3.0\text{ V}$ | - | - | 0.9 | - | 0.9 | - | 0.9 | V |
| | | $V_{CC} = 5.5\text{ V}$ | - | - | 1.65 | - | 1.65 | - | 1.65 | V |
| V_{OH} | HIGH-level output voltage | $V_I = V_{IH}$ or V_{IL} | | | | | | | | |
| | | $I_O = -50\ \mu\text{A}; V_{CC} = 2.0\text{ V}$ | 1.9 | 2.0 | - | 1.9 | - | 1.9 | - | V |
| | | $I_O = -50\ \mu\text{A}; V_{CC} = 3.0\text{ V}$ | 2.9 | 3.0 | - | 2.9 | - | 2.9 | - | V |
| | | $I_O = -50\ \mu\text{A}; V_{CC} = 4.5\text{ V}$ | 4.4 | 4.5 | - | 4.4 | - | 4.4 | - | V |
| | | $I_O = -4.0\text{ mA}; V_{CC} = 3.0\text{ V}$ | 2.58 | - | - | 2.48 | - | 2.40 | - | V |
| | $I_O = -8.0\text{ mA}; V_{CC} = 4.5\text{ V}$ | 3.94 | - | - | 3.80 | - | 3.70 | - | V | |
| V_{OL} | LOW-level output voltage | $V_I = V_{IH}$ or V_{IL} | | | | | | | | |
| | | $I_O = 50\ \mu\text{A}; V_{CC} = 2.0\text{ V}$ | - | 0 | 0.1 | - | 0.1 | - | 0.1 | V |
| | | $I_O = 50\ \mu\text{A}; V_{CC} = 3.0\text{ V}$ | - | 0 | 0.1 | - | 0.1 | - | 0.1 | V |
| | | $I_O = 50\ \mu\text{A}; V_{CC} = 4.5\text{ V}$ | - | 0 | 0.1 | - | 0.1 | - | 0.1 | V |
| | | $I_O = 4.0\text{ mA}; V_{CC} = 3.0\text{ V}$ | - | - | 0.36 | - | 0.44 | - | 0.55 | V |
| | $I_O = 8.0\text{ mA}; V_{CC} = 4.5\text{ V}$ | - | - | 0.36 | - | 0.44 | - | 0.55 | V | |

Table 6. Static characteristics ...continued

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

| Symbol | Parameter | Conditions | 25 °C | | | -40 °C to +85 °C | | -40 °C to +125 °C | | Unit |
|------------------|---------------------------|--|-------|-----|------|------------------|------|-------------------|------|---------------|
| | | | Min | Typ | Max | Min | Max | Min | Max | |
| I_I | input leakage current | $V_I = 5.5 \text{ V or GND}; V_{CC} = 0 \text{ V to } 5.5 \text{ V}$ | - | - | 0.1 | - | 1.0 | - | 2.0 | μA |
| I_{CC} | supply current | $V_I = V_{CC} \text{ or GND}; I_O = 0 \text{ A}; V_{CC} = 5.5 \text{ V}$ | - | - | 4.0 | - | 40 | - | 80 | μA |
| C_I | input capacitance | | - | 3 | 10 | - | - | - | - | pF |
| 74AHCT164 | | | | | | | | | | |
| V_{IH} | HIGH-level input voltage | $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$ | 2.0 | - | - | 2.0 | - | 2.0 | - | V |
| V_{IL} | LOW-level input voltage | $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$ | - | - | 0.8 | - | 0.8 | - | 0.8 | V |
| V_{OH} | HIGH-level output voltage | $V_I = V_{IH} \text{ or } V_{IL}; V_{CC} = 4.5 \text{ V}$ | | | | | | | | |
| | | $I_O = -50 \mu\text{A}$ | 4.4 | 4.5 | - | 4.4 | - | 4.4 | - | V |
| | | $I_O = -8.0 \text{ mA}$ | 3.94 | - | - | 3.80 | - | 3.70 | - | V |
| V_{OL} | LOW-level output voltage | $V_I = V_{IH} \text{ or } V_{IL}; V_{CC} = 4.5 \text{ V}$ | | | | | | | | |
| | | $I_O = 50 \mu\text{A}$ | - | 0 | 0.1 | - | 0.1 | - | 0.1 | V |
| | | $I_O = 8.0 \text{ mA}$ | - | - | 0.36 | - | 0.44 | - | 0.55 | V |
| I_I | input leakage current | $V_I = 5.5 \text{ V or GND}; V_{CC} = 0 \text{ V to } 5.5 \text{ V}$ | - | - | 0.1 | - | 1.0 | - | 2.0 | μA |
| I_{CC} | supply current | $V_I = V_{CC} \text{ or GND}; I_O = 0 \text{ A}; V_{CC} = 5.5 \text{ V}$ | - | - | 4.0 | - | 40 | - | 80 | μA |
| ΔI_{CC} | additional supply current | per input pin; $V_I = V_{CC} - 2.1 \text{ V}; I_O = 0 \text{ A};$ other pins at V_{CC} or GND; $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$ | - | - | 1.35 | - | 1.5 | - | 1.5 | mA |
| C_I | input capacitance | | - | 3 | 10 | - | - | - | - | pF |

10. Dynamic characteristics

Table 7. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 10](#).

| Symbol | Parameter | Conditions | 25 °C | | | -40 °C to +85 °C | | -40 °C to +125 °C | | Unit |
|----------------------------------|-------------------|---|-------------------|------------------------------|------|------------------|------|-------------------|------|------|
| | | | Min | Typ ^[1] | Max | Min | Max | Min | Max | |
| 74AHC164 | | | | | | | | | | |
| t _{pd} | propagation delay | CP to Qn; see Figure 7 ^[2] | | | | | | | | |
| | | V _{CC} = 3.0 V to 3.6 V | | | | | | | | |
| | | C _L = 15 pF | - | 6.5 | 12.8 | 1.0 | 15.0 | 1.0 | 16.0 | ns |
| | | C _L = 50 pF | - | 9.3 | 16.3 | 1.0 | 18.5 | 1.0 | 20.5 | ns |
| | | V _{CC} = 4.5 V to 5.5 V | | | | | | | | |
| | | C _L = 15 pF | - | 4.5 | 9.0 | 1.0 | 10.5 | 1.0 | 11.5 | ns |
| | | C _L = 50 pF | - | 6.4 | 11.0 | 1.0 | 12.5 | 1.0 | 14.0 | ns |
| | | MR to Qn; see Figure 8 ^[3] | | | | | | | | |
| | | V _{CC} = 3.0 V to 3.6 V | | | | | | | | |
| | | C _L = 15 pF | - | 5.3 | 12.8 | 1.0 | 15.0 | 1.0 | 16.0 | ns |
| | | C _L = 50 pF | - | 7.6 | 16.3 | 1.0 | 18.5 | 1.0 | 20.5 | ns |
| | | f _{max} | maximum frequency | see Figure 7 | | | | | | |
| V _{CC} = 3.0 V to 3.6 V | | | | | | | | | | |
| C _L = 15 pF | 80 | | | 125 | - | 65 | - | 50 | - | MHz |
| C _L = 50 pF | 50 | | | 75 | - | 45 | - | 35 | - | MHz |
| V _{CC} = 4.5 V to 5.5 V | | | | | | | | | | |
| C _L = 15 pF | 125 | | | 175 | - | 105 | - | 85 | - | MHz |
| t _w | pulse width | CP HIGH or LOW; see Figure 7 | | | | | | | | |
| | | V _{CC} = 3.0 V to 3.6 V | 5.0 | - | - | 5.0 | - | 5.0 | - | ns |
| | | V _{CC} = 4.5 V to 5.5 V | 5.0 | - | - | 5.0 | - | 5.0 | - | ns |
| t _{wL} | pulse width LOW | MR; see Figure 8 | | | | | | | | |
| | | V _{CC} = 3.0 V to 3.6 V | 5.0 | - | - | 5.0 | - | 5.0 | - | ns |
| | | V _{CC} = 4.5 V to 5.5 V | 5.0 | - | - | 5.0 | - | 5.0 | - | ns |
| t _{su} | set-up time | DSA, DSB to CP; see Figure 9 | | | | | | | | |
| | | V _{CC} = 3.0 V to 3.6 V | 5.0 | - | - | 6.0 | - | 6.0 | - | ns |
| | | V _{CC} = 4.5 V to 5.5 V | 4.5 | - | - | 4.5 | - | 4.5 | - | ns |
| t _h | hold time | DSA, DSB to CP; see Figure 9 | | | | | | | | |
| | | V _{CC} = 3.0 V to 3.6 V | 1.5 | - | - | 1.5 | - | 1.5 | - | ns |
| | | V _{CC} = 4.5 V to 5.5 V | 2.0 | - | - | 2.0 | - | 2.0 | - | ns |

Table 7. Dynamic characteristics ...continued

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 10](#).

| Symbol | Parameter | Conditions | 25 °C | | | -40 °C to +85 °C | | -40 °C to +125 °C | | Unit |
|---|-------------------------------|--|-------|--------------------|------|------------------|------|-------------------|------|------|
| | | | Min | Typ ^[1] | Max | Min | Max | Min | Max | |
| t _{rec} | recovery time | MR to CP; see Figure 8 | | | | | | | | |
| | | V _{CC} = 3.0 V to 3.6 V | 2.5 | - | - | 2.5 | - | 2.5 | - | ns |
| | | V _{CC} = 4.5 V to 5.5 V | 2.5 | - | - | 2.5 | - | 2.5 | - | ns |
| C _{PD} | power dissipation capacitance | f _i = 1 MHz; V _I = GND to V _{CC} ^[4] | - | 48 | - | - | - | - | - | pF |
| 74AHCT164; V_{CC} = 4.5 V to 5.5 V | | | | | | | | | | |
| t _{pd} | propagation delay | CP to Q _n ; see Figure 7 ^[2] | | | | | | | | |
| | | C _L = 15 pF | - | 3.4 | 9.0 | 1.0 | 10.5 | 1.0 | 11.5 | ns |
| | | C _L = 50 pF | - | 4.9 | 11.0 | 1.0 | 12.5 | 1.0 | 14.0 | ns |
| | | MR to Q _n ; see Figure 8 ^[3] | | | | | | | | |
| | | C _L = 15 pF | - | 3.5 | 8.6 | 1.0 | 10.0 | 1.0 | 11.0 | ns |
| | | C _L = 50 pF | - | 5.0 | 10.6 | 1.0 | 12.0 | 1.0 | 13.5 | ns |
| f _{max} | maximum frequency | see Figure 7 | | | | | | | | |
| | | C _L = 15 pF | 125 | 175 | - | 105 | - | 85 | - | MHz |
| | | C _L = 50 pF | 85 | 115 | - | 75 | - | 65 | - | MHz |
| t _W | pulse width | CP HIGH or LOW; see Figure 7 | 5.0 | - | - | 5.0 | - | 5.0 | - | ns |
| t _{WL} | pulse width LOW | MR; see Figure 8 | 5.0 | - | - | 5.0 | - | 5.0 | - | ns |
| t _{su} | set-up time | DSA, DSB to CP; see Figure 9 | 4.5 | - | - | 4.5 | - | 4.5 | - | ns |
| t _h | hold time | DSA, DSB to CP; see Figure 9 | 2.0 | - | - | 2.0 | - | 2.0 | - | ns |
| t _{rec} | recovery time | MR to CP; see Figure 8 | 2.5 | - | - | 2.5 | - | 2.5 | - | ns |
| C _{PD} | power dissipation capacitance | f _i = 1 MHz; V _I = GND to V _{CC} ^[4] | - | 51 | - | - | - | - | - | pF |

[1] Typical values are measured at nominal supply voltage (V_{CC} = 3.3 V and V_{CC} = 5.0 V).

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

[3] t_{pd} is the same as t_{PHL} only.

[4] C_{PD} is used to determine the dynamic power dissipation (P_D in μW).

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

f_i = input frequency in MHz;

f_o = output frequency in MHz;

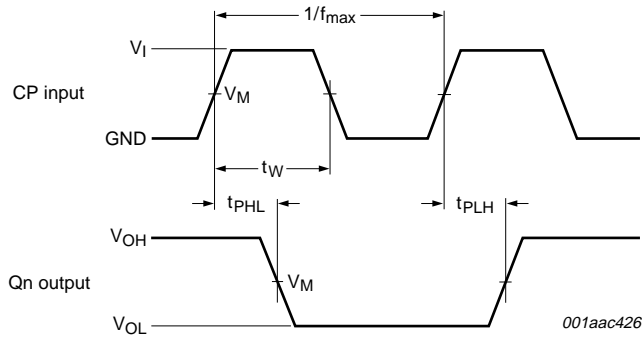
C_L = output load capacitance in pF;

V_{CC} = supply voltage in V;

N = number of inputs switching;

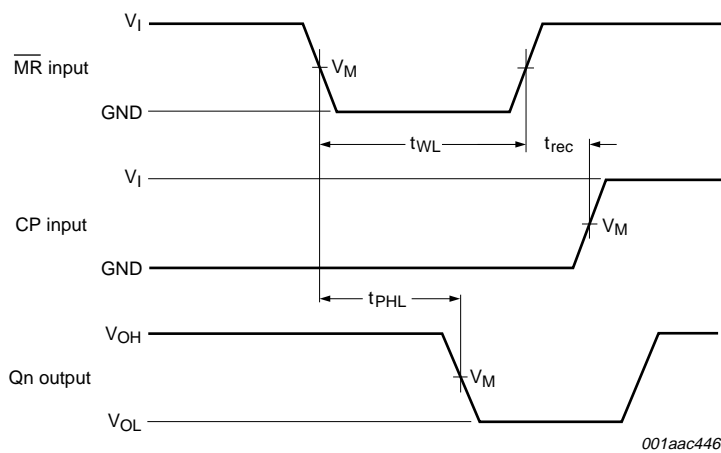
Σ(C_L × V_{CC}² × f_o) = sum of the outputs.

11. Waveforms



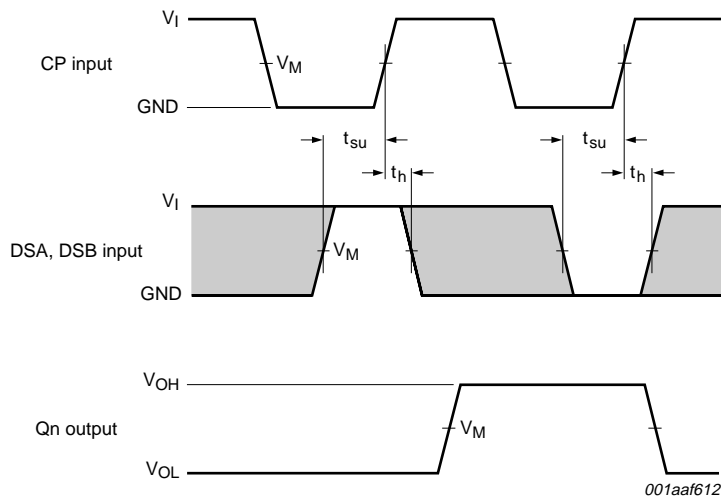
Measurement points are given in [Table 8](#).
 V_{OL} and V_{OH} are typical voltage output levels that occur with the output load.

Fig 7. Clock pulse width, maximum frequency and input to output propagation delays



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

Fig 8. Master reset pulse width, recovery time and propagation delays

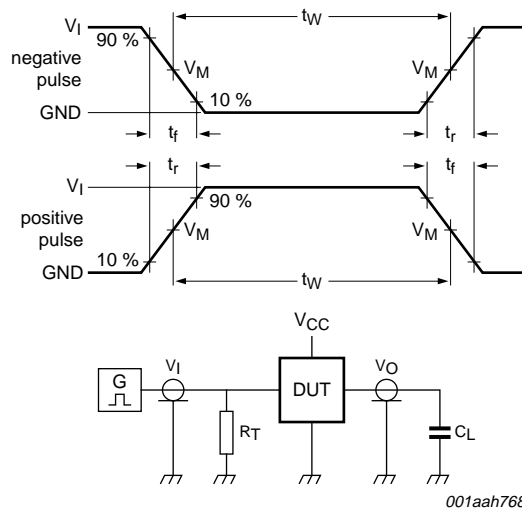


Measurement points are given in [Table 8](#).
 The shaded areas indicate when the input is permitted to change for predictable output performance.
 V_{OL} and V_{OH} are typical voltage output levels that occur with the output load.

Fig 9. Data set-up and hold times

Table 8. Measurement points

| Type | Input | Output |
|-----------|---------------------|---------------------|
| | V_M | V_M |
| 74AHC164 | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ |
| 74AHCT164 | 1.5 V | $0.5 \times V_{CC}$ |



Test data is given in [Table 9](#).

Definitions test circuit:

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

C_L = Load capacitance including jig and probe capacitance

Fig 10. Load circuitry for measuring switching times

Table 9. Test data

| Type | Input | | Load | Test |
|-----------|----------|---------------|--------------|--------------------|
| | V_I | t_r, t_f | C_L | |
| 74AHC164 | V_{CC} | ≤ 3.0 ns | 15 pF, 50 pF | t_{PLH}, t_{PHL} |
| 74AHCT164 | 3.0 V | ≤ 3.0 ns | 15 pF, 50 pF | t_{PLH}, t_{PHL} |

12. Package outline

SO14: plastic small outline package; 14 leads; body width 3.9 mm

SOT108-1

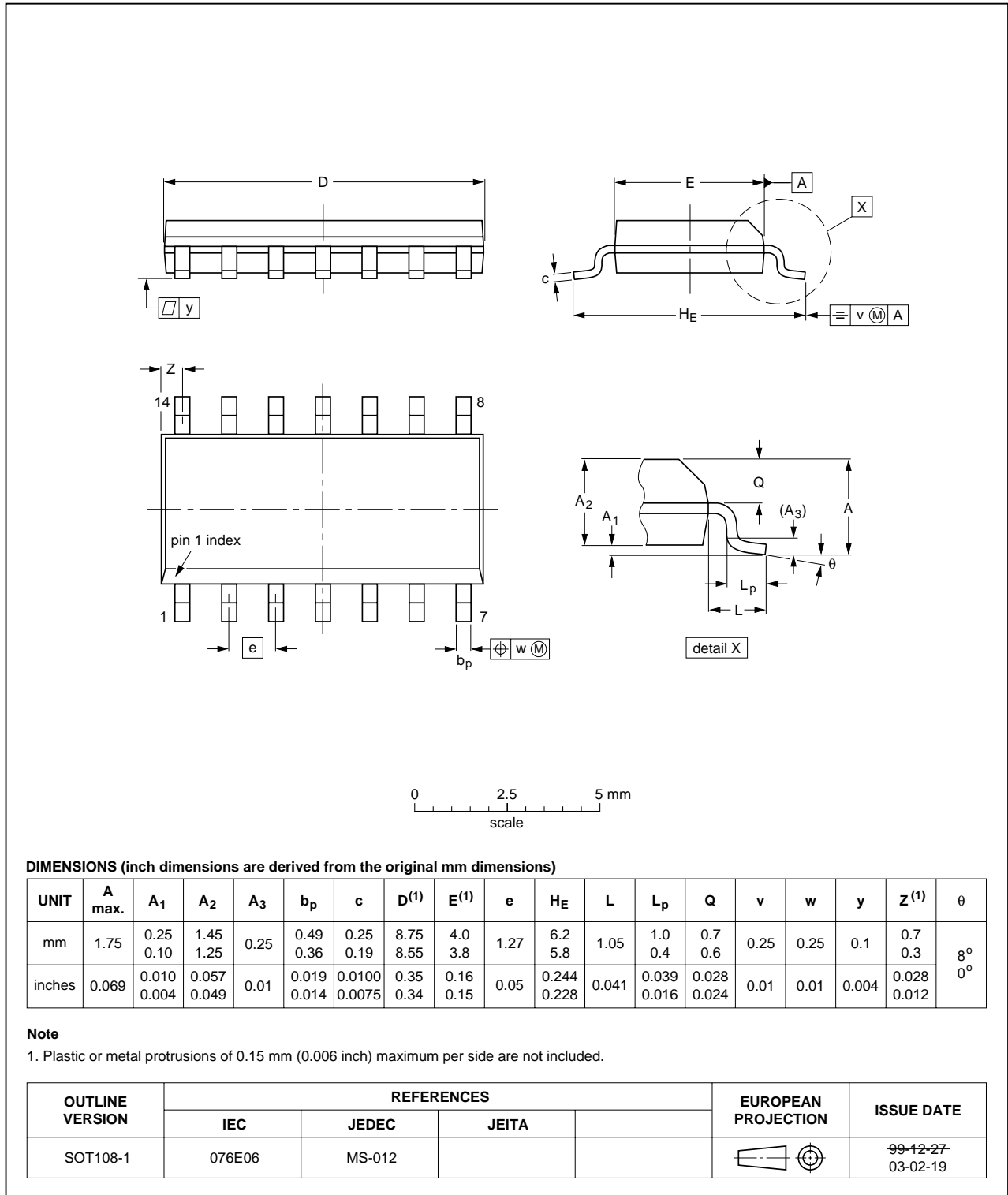


Fig 11. Package outline SOT108-1 (SO14)

TSSOP14: plastic thin shrink small outline package; 14 leads; body width 4.4 mm

SOT402-1

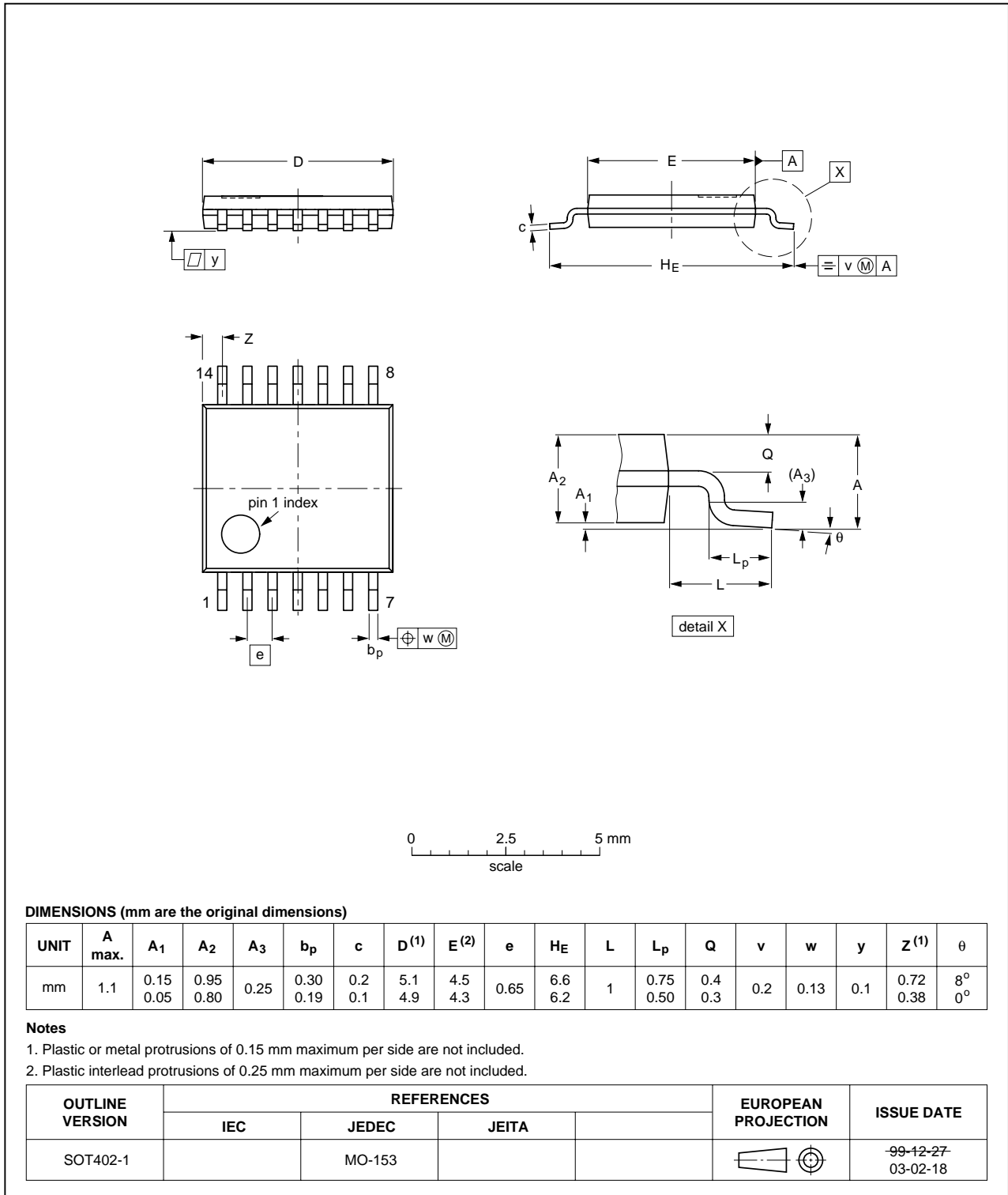


Fig 12. Package outline SOT402-1 (TSSOP14)

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

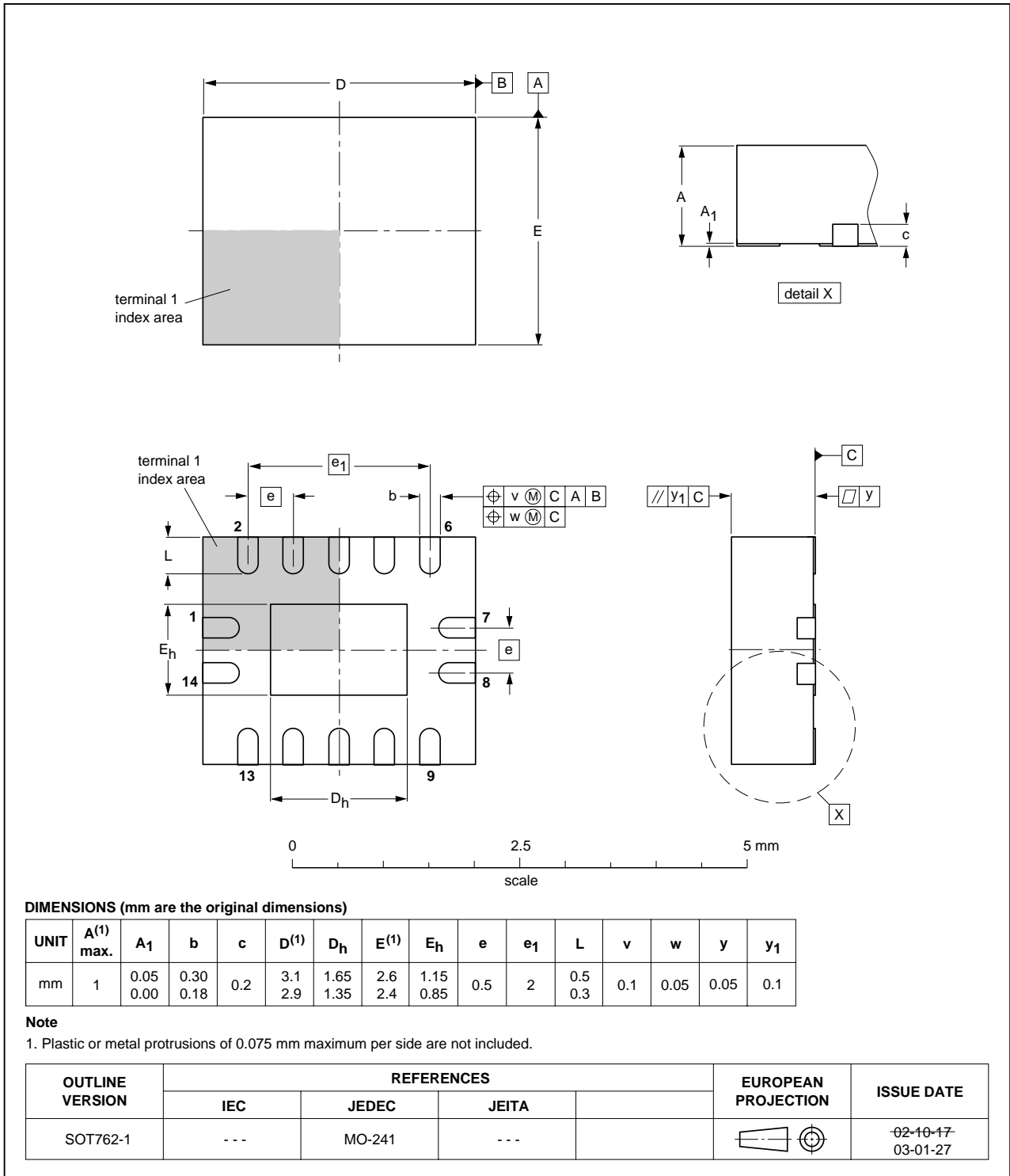


Fig 13. Package outline SOT762-1 (DHVQFN14)

13. Abbreviations

Table 10. Abbreviations

| Acronym | Description |
|---------|---|
| CDM | Charged Device Model |
| CMOS | Complementary Metal-Oxide Semiconductor |
| 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 |
|-------------------------------------|--|-----------------------|---------------|-----------------|
| 74AHC_AHCT164_3 | 20080424 | Product data sheet | - | 74AHC_AHCT164_2 |
| Modifications: | <ul style="list-style-type: none"> • Table 6: the conditions for input leakage current have been changed. | | | |
| 74AHC_AHCT164_2 | 20061129 | Product data sheet | - | 74AHC_AHCT164_1 |
| 74AHC_AHCT164_1 (9397 750 07332) | 20000815 | Product specification | - | - |

15. Legal information

15.1 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.nxp.com>.

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