

# 74AHC244; 74AHCT244

Octal buffer/line driver; 3-state

Rev. 05 — 20 December 2007

Product data sheet

## 1. General description

The 74AHC244; 74AHCT244 is a high-speed Si-gate CMOS device.

The 74AHC244; 74AHCT244 has octal non-inverting buffer/line drivers with 3-state outputs. The 3-state outputs are controlled by the output enable inputs ( $\overline{nOE}$ ). A HIGH on  $\overline{nOE}$  causes the outputs to assume a high-impedance OFF-state.

## 2. Features

- Balanced propagation delays
- All inputs have a Schmitt-trigger action
- Inputs accepts voltages higher than  $V_{CC}$
- For 74AHC244 only: operates with CMOS input levels
- For 74AHCT244 only: operates with TTL input levels
- ESD protection:
  - ◆ HBM JESD22-A114E exceeds 2000 V
  - ◆ MM JESD22-A115-A exceeds 200 V
  - ◆ CDM 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   |          |  |          |
|---------------------------|---|----------|--|----------|
|                           | Temperature range   | Name     | Description  | Version  |
| 74AHC244D<br>74AHCT244D   | $-40\text{ }^{\circ}\text{C}$ to $+125\text{ }^{\circ}\text{C}$ | SO20     | plastic small outline package; 20 leads;<br>body width 7.5 mm  | SOT163-1 |
| 74AHC244PW<br>74AHCT244PW | $-40\text{ }^{\circ}\text{C}$ to $+125\text{ }^{\circ}\text{C}$ | TSSOP20  | plastic thin shrink small outline package; 20 leads;<br>body width 4.4 mm  | SOT360-1 |
| 74AHC244BQ<br>74AHCT244BQ | $-40\text{ }^{\circ}\text{C}$ to $+125\text{ }^{\circ}\text{C}$ | DHVQFN20 | plastic dual-in-line compatible thermal enhanced<br>very thin quad flat package; no leads; 20 terminals;<br>body $2.5 \times 4.5 \times 0.85$ mm | SOT764-1 |

## 4. Functional diagram

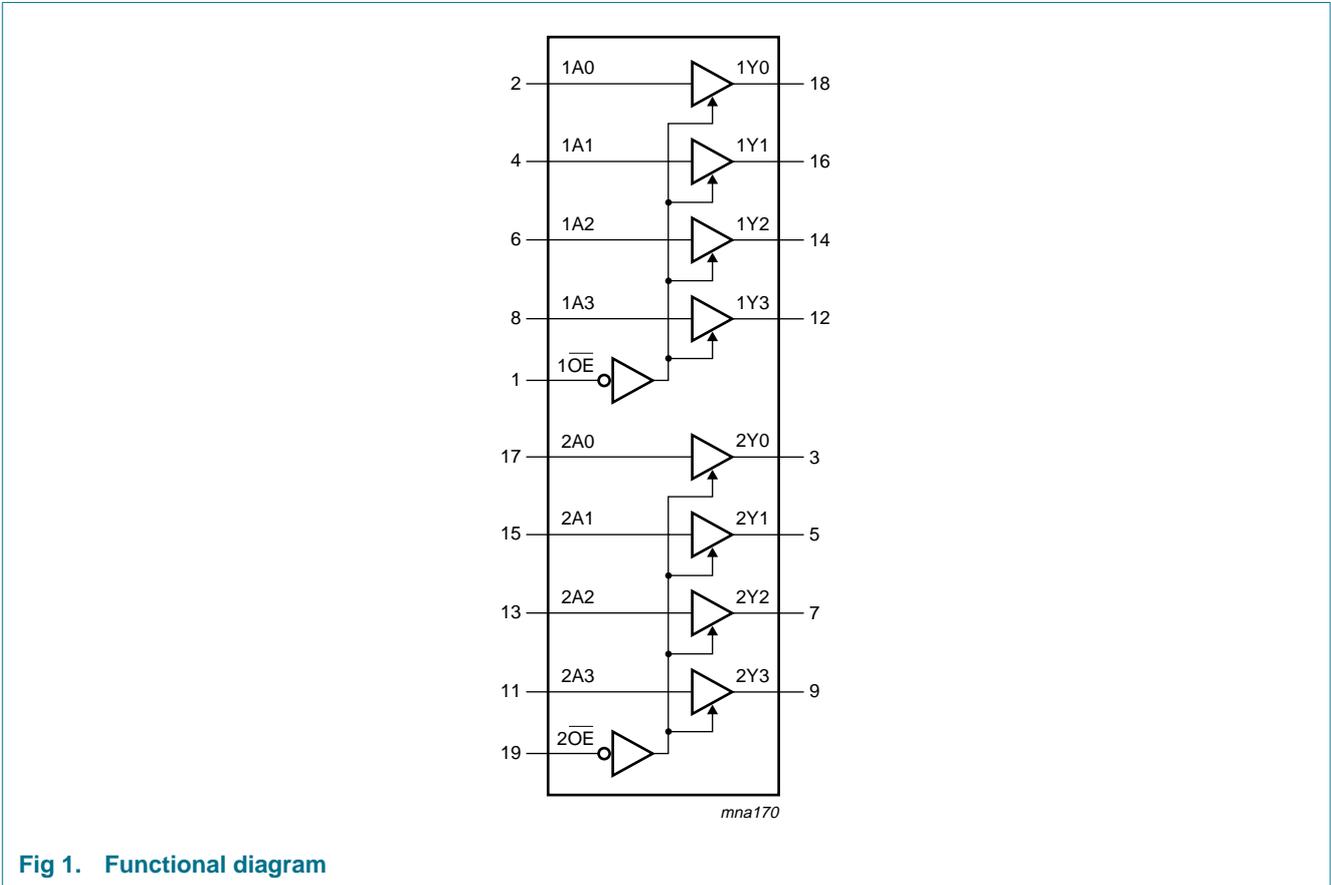


Fig 1. Functional diagram

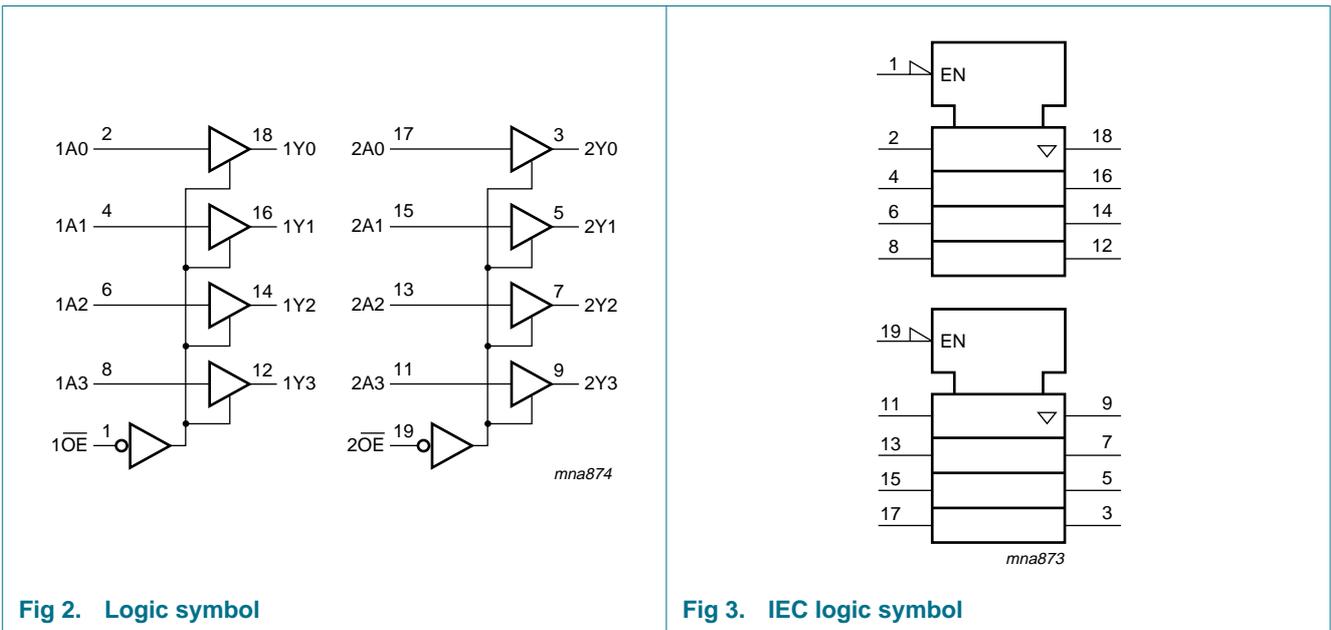
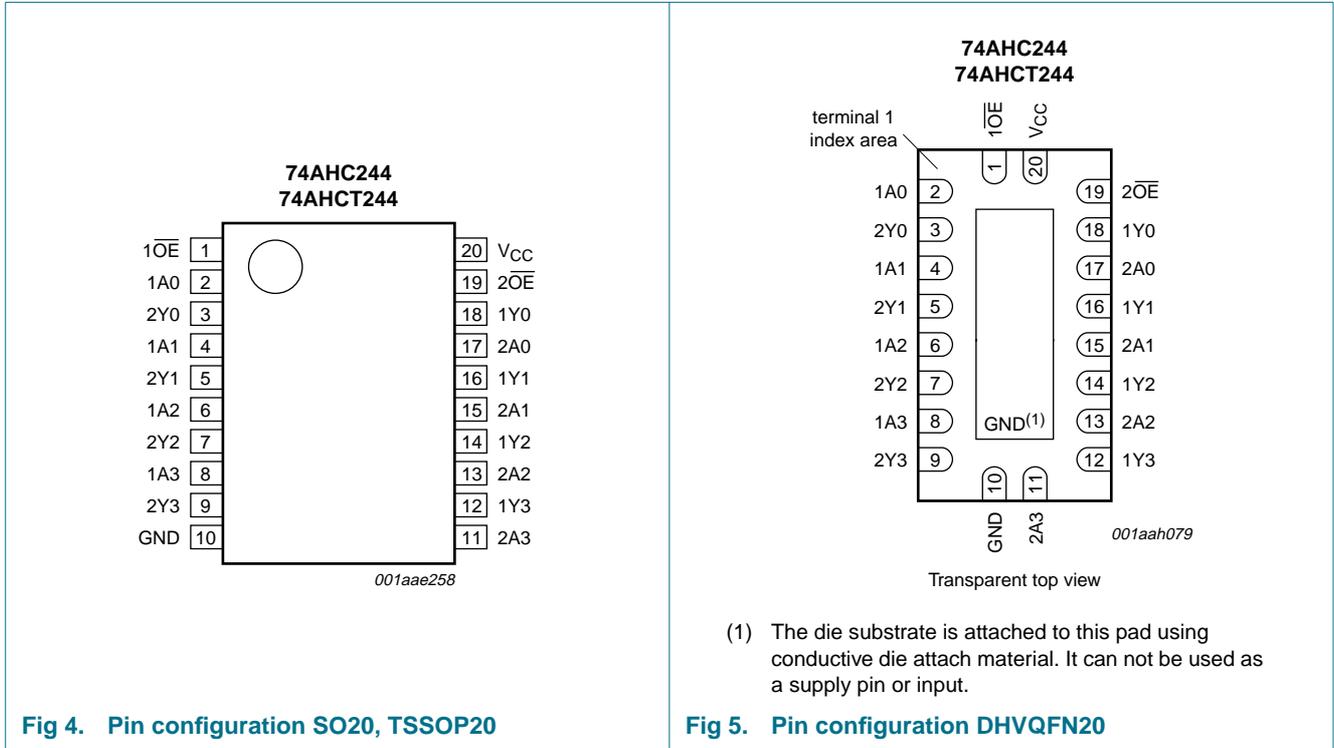


Fig 2. Logic symbol

Fig 3. IEC logic symbol

## 5. Pinning information

### 5.1 Pinning



### 5.2 Pin description

Table 2. Pin description

| Symbol  | Pin            | Description                      |
|---------|----------------|----------------------------------|
| 1OE     | 1              | output enable input (active LOW) |
| 1A[0:3] | 2, 4, 6, 8     | data input                       |
| 2A[0:3] | 17, 15, 13, 11 | data input                       |
| 1Y[0:3] | 18, 16, 14, 12 | data output                      |
| 2Y[0:3] | 3, 5, 7, 9     | data output                      |
| GND     | 10             | ground (0 V)                     |
| 2OE     | 19             | output enable input (active LOW) |
| VCC     | 20             | supply voltage                   |

## 6. Functional description

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

| Control                 | Input | Output |
|-------------------------|-------|--------|
| $\overline{\text{nOE}}$ | nAn   | nYn    |
| L                       | L     | L      |
|                         | H     | H      |
| H                       | X     | 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 |
|-----------|-------------------------|--|---------|------|------|
| $V_{CC}$  | supply voltage          |  | -0.5    | +7.0 | V    |
| $V_I$     | input voltage           |  | -0.5    | +7.0 | V    |
| $I_{IK}$  | input clamping current  | $V_I < -0.5 \text{ V}$                                   | [1] -20 | -    | mA   |
| $I_{OK}$  | output clamping current | $V_O < -0.5 \text{ V}$ or $V_O > V_{CC} + 0.5 \text{ V}$ | [1] -   | ±20  | mA   |
| $I_O$     | output current          | $V_O = -0.5 \text{ V}$ to $(V_{CC} + 0.5 \text{ V})$     | -       | ±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 | $T_{amb} = -40 \text{ °C}$ to $+125 \text{ °C}$          |         |      |      |
|           | SO20 package            |  | [2] -   | 500  | mW   |
|           | TSSOP20 package         |  | [3] -   | 500  | mW   |
|           | DHVQFN20 package        |  | [4] -   | 500  | mW   |

- [1] The input and output voltage ratings may be exceeded if the input and output current ratings are observed.  
 [2]  $P_{tot}$  derates linearly with 8 mW/K above 70 °C.  
 [3]  $P_{tot}$  derates linearly with 5.5 mW/K above 60 °C.  
 [4]  $P_{tot}$  derates linearly with 4.5 mW/K above 60 °C.

## 8. Recommended operating conditions

**Table 5. Recommended operating conditions**

Voltages are referenced to GND (ground = 0 V).

| Symbol           | Parameter                           | Conditions                      | 74AHC244 |     |                 | 74AHCT244 |     |                 | Unit |
|------------------|-------------------------------------|---------------------------------|----------|-----|-----------------|-----------|-----|-----------------|------|
|                  |                                     |                                 | Min      | Typ | Max             | Min       | Typ | Max             |      |
| V <sub>CC</sub>  | supply voltage                      |                                 | 2.0      | 5.0 | 5.5             | 4.5       | 5.0 | 5.5             | V    |
| V <sub>I</sub>   | input voltage                       |                                 | 0        | -   | 5.5             | 0         | -   | 5.5             | V    |
| V <sub>O</sub>   | output voltage                      |                                 | 0        | -   | V <sub>CC</sub> | 0         | -   | V <sub>CC</sub> | V    |
| T <sub>amb</sub> | ambient temperature                 |                                 | -40      | +25 | +125            | -40       | +25 | +125            | °C   |
| Δt/ΔV            | input transition rise and fall rate | V <sub>CC</sub> = 3.3 V ± 0.3 V | -        | -   | 100             | -         | -   | -               | ns/V |
|                  |                                     | V <sub>CC</sub> = 5.0 V ± 0.5 V | -        | -   | 20              | -         | -   | 20              | ns/V |

## 9. Static characteristics

**Table 6. Static characteristics**

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   |      |
| <b>For type 74AHC244</b>                          |                           |  |       |     |       |                  |      |                   |       |      |
| V <sub>IH</sub>                                   | HIGH-level input voltage  | V <sub>CC</sub> = 2.0 V  | 1.5   | -   | -     | 1.5              | -    | 1.5               | -     | V    |
|   |                           | V <sub>CC</sub> = 3.0 V  | 2.1   | -   | -     | 2.1              | -    | 2.1               | -     | V    |
|   |                           | V <sub>CC</sub> = 5.5 V  | 3.85  | -   | -     | 3.85             | -    | 3.85              | -     | V    |
| V <sub>IL</sub>                                   | LOW-level input voltage   | V <sub>CC</sub> = 2.0 V  | -     | -   | 0.5   | -                | 0.5  | -                 | 0.5   | V    |
|   |                           | V <sub>CC</sub> = 3.0 V  | -     | -   | 0.9   | -                | 0.9  | -                 | 0.9   | V    |
|   |                           | V <sub>CC</sub> = 5.5 V  | -     | -   | 1.65  | -                | 1.65 | -                 | 1.65  | 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> = -50 μA; V <sub>CC</sub> = 2.0 V   | 1.9   | 2.0 | -     | 1.9              | -    | 1.9               | -     | V    |
|   |                           | I <sub>O</sub> = -50 μA; V <sub>CC</sub> = 3.0 V   | 2.9   | 3.0 | -     | 2.9              | -    | 2.9               | -     | V    |
|   |                           | I <sub>O</sub> = -50 μA; V <sub>CC</sub> = 4.5 V   | 4.4   | 4.5 | -     | 4.4              | -    | 4.4               | -     | V    |
|   |                           | I <sub>O</sub> = -4.0 mA; V <sub>CC</sub> = 3.0 V  | 2.58  | -   | -     | 2.48             | -    | 2.40              | -     | V    |
| I <sub>O</sub> = -8.0 mA; V <sub>CC</sub> = 4.5 V | 3.94                      | -  | -     | 3.8 | -     | 3.70             | -    | 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> = 50 μA; V <sub>CC</sub> = 2.0 V  | -     | 0   | 0.1   | -                | 0.1  | -                 | 0.1   | V    |
|   |                           | I <sub>O</sub> = 50 μA; V <sub>CC</sub> = 3.0 V  | -     | 0   | 0.1   | -                | 0.1  | -                 | 0.1   | V    |
|   |                           | I <sub>O</sub> = 50 μA; V <sub>CC</sub> = 4.5 V  | -     | 0   | 0.1   | -                | 0.1  | -                 | 0.1   | V    |
|   |                           | I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 3.0 V   | -     | -   | 0.36  | -                | 0.44 | -                 | 0.55  | V    |
| I <sub>O</sub> = 8.0 mA; V <sub>CC</sub> = 4.5 V  | -                         | -  | 0.36  | -   | 0.44  | -                | 0.55 | V                 |       |      |
| I <sub>OZ</sub>                                   | OFF-state output current  | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ;<br>V <sub>O</sub> = V <sub>CC</sub> or GND;<br>V <sub>CC</sub> = 5.5 V | -     | -   | ±0.25 | -                | ±2.5 | -                 | ±10.0 | μA   |
| I <sub>I</sub>                                    | input leakage current     | V <sub>I</sub> = 5.5 V or GND;<br>V <sub>CC</sub> = 0 V to 5.5 V   | -     | -   | 0.1   | -                | 1.0  | -                 | 2.0   | μA   |
| I <sub>CC</sub>                                   | supply current            | V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A;<br>V <sub>CC</sub> = 5.5 V                                    | -     | -   | 4.0   | -                | 40   | -                 | 80    | μA   |

**Table 6. Static characteristics ...continued**  
 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   |      |
| C <sub>I</sub>            | input capacitance         |  | -     | 3.0 | 10    | -                | 10   | -                 | 10    | pF   |
| C <sub>O</sub>            | output capacitance        |  | -     | 4.0 | -     | -                | -    | -                 | -     | pF   |
| <b>For type 74AHCT244</b> |                           |  |       |     |       |                  |      |                   |       |      |
| V <sub>IH</sub>           | HIGH-level input voltage  | V <sub>CC</sub> = 4.5 V to 5.5 V   | 2.0   | -   | -     | 2.0              | -    | 2.0               | -     | V    |
| V <sub>IL</sub>           | LOW-level input voltage   | V <sub>CC</sub> = 4.5 V to 5.5 V   | -     | -   | 0.8   | -                | 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> ; V <sub>CC</sub> = 4.5 V  |       |     |       |                  |      |                   |       |      |
|                           |                           | I <sub>O</sub> = -50 μA  | 4.4   | 4.5 | -     | 4.4              | -    | 4.4               | -     | V    |
|                           |                           | I <sub>O</sub> = -8.0 mA   | 3.94  | -   | -     | 3.8              | -    | 3.70              | -     | V    |
| V <sub>OL</sub>           | LOW-level output voltage  | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 4.5 V  |       |     |       |                  |      |                   |       |      |
|                           |                           | I <sub>O</sub> = 50 μA   | -     | 0   | 0.1   | -                | 0.1  | -                 | 0.1   | V    |
|                           |                           | I <sub>O</sub> = 8.0 mA  | -     | -   | 0.36  | -                | 0.44 | -                 | 0.55  | V    |
| I <sub>OZ</sub>           | OFF-state output current  | per input pin; V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 5.5 V; I <sub>O</sub> = 0 A<br>V <sub>O</sub> = V <sub>CC</sub> or GND;<br>other pins at V <sub>CC</sub> or GND | -     | -   | ±0.25 | -                | ±2.5 | -                 | ±10.0 | μA   |
| I <sub>I</sub>            | input leakage current     | V <sub>I</sub> = 5.5 V or GND;<br>V <sub>CC</sub> = 0 V to 5.5 V   | -     | -   | 0.1   | -                | 1.0  | -                 | 2.0   | μA   |
| I <sub>CC</sub>           | supply current            | V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A;<br>V <sub>CC</sub> = 5.5 V  | -     | -   | 4.0   | -                | 40   | -                 | 80    | μA   |
| ΔI <sub>CC</sub>          | additional supply current | per input pin;<br>V <sub>I</sub> = V <sub>CC</sub> - 2.1 V; I <sub>O</sub> = 0 A;<br>other pins at V <sub>CC</sub> or GND;<br>V <sub>CC</sub> = 4.5 V to 5.5 V   | -     | -   | 1.35  | -                | 1.5  | -                 | 1.5   | mA   |
| C <sub>I</sub>            | input capacitance         |  | -     | 3   | 10    | -                | 10   | -                 | 10    | pF   |
| C <sub>O</sub>            | output capacitance        |  | -     | 4.0 | -     | -                | -    | -                 | -     | pF   |

10. Dynamic characteristics

**Table 7. Dynamic characteristics**  
*GND = 0 V. For test circuit see Figure 8.*

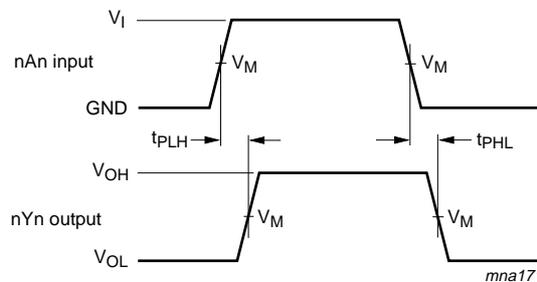
| Symbol                   | Parameter                     | Conditions  | 25 °C          |                    |      | -40 °C to +85 °C |      | -40 °C to +125 °C |      | Unit |
|--------------------------|-------------------------------|---|----------------|--------------------|------|------------------|------|-------------------|------|------|
|                          |                               |   | Min            | Typ <sup>[1]</sup> | Max  | Min              | Max  | Min               | Max  |      |
| <b>For type 74AHC244</b> |                               |   |                |                    |      |                  |      |                   |      |      |
| t <sub>pd</sub>          | propagation delay             | nAn to nYn; see <a href="#">Figure 6</a> <sup>[2]</sup>                                 |                |                    |      |                  |      |                   |      |      |
|                          |                               | V <sub>CC</sub> = 3.0 V to 3.6 V  |                |                    |      |                  |      |                   |      |      |
|                          |                               | C <sub>L</sub> = 15 pF  | -              | 5.0                | 8.4  | 1.0              | 10.0 | 1.0               | 10.5 | ns   |
|                          |                               | C <sub>L</sub> = 50 pF  | -              | 7.0                | 11.9 | 1.0              | 13.5 | 1.0               | 15.0 | ns   |
|                          |                               | V <sub>CC</sub> = 4.5 V to 5.5 V  |                |                    |      |                  |      |                   |      |      |
|                          |                               | C <sub>L</sub> = 15 pF  | -              | 3.4                | 5.5  | 1.0              | 6.5  | 1.0               | 7.0  | ns   |
|                          |                               | C <sub>L</sub> = 50 pF  |                | 5.0                | 7.5  | 1.0              | 8.5  | 1.0               | 9.5  | ns   |
| t <sub>en</sub>          | enable time                   | nOE to nYn; see <a href="#">Figure 7</a> <sup>[2]</sup>                                 |                |                    |      |                  |      |                   |      |      |
|                          |                               | V <sub>CC</sub> = 3.0 V to 3.6 V  |                |                    |      |                  |      |                   |      |      |
|                          |                               | C <sub>L</sub> = 15 pF  | -              | 6.5                | 10.6 | 1.0              | 12.5 | 1.0               | 13.5 | ns   |
|                          |                               | C <sub>L</sub> = 50 pF  | -              | 7.5                | 14.1 | 1.0              | 16.0 | 1.0               | 18.0 | ns   |
|                          |                               | V <sub>CC</sub> = 4.5 V to 5.5 V  |                |                    |      |                  |      |                   |      |      |
|                          |                               | C <sub>L</sub> = 15 pF  | -              | 4.0                | 7.3  | 1.0              | 8.5  | 1.0               | 9.5  | ns   |
|                          |                               | C <sub>L</sub> = 50 pF  | -              | 5.5                | 9.3  | 1.0              | 10.5 | 1.0               | 12.0 | ns   |
| t <sub>dis</sub>         | disable time                  | nOE to nYn; see <a href="#">Figure 7</a> <sup>[2]</sup>                                 |                |                    |      |                  |      |                   |      |      |
|                          |                               | V <sub>CC</sub> = 3.0 V to 3.6 V  |                |                    |      |                  |      |                   |      |      |
|                          |                               | C <sub>L</sub> = 15 pF  | -              | 5.5                | 9.7  | 1.0              | 11.0 | 1.0               | 12.5 | ns   |
|                          |                               | C <sub>L</sub> = 50 pF  | -              | 10.0               | 14.0 | 1.0              | 16.0 | 1.0               | 17.5 | ns   |
|                          |                               | V <sub>CC</sub> = 4.5 V to 5.5 V  |                |                    |      |                  |      |                   |      |      |
|                          |                               | C <sub>L</sub> = 15 pF  | -              | 4.8                | 7.2  | 1.0              | 8.5  | 1.0               | 9.0  | ns   |
|                          |                               | C <sub>L</sub> = 50 pF  | -              | 7.0                | 9.2  | 1.0              | 10.5 | 1.0               | 11.5 | ns   |
| C <sub>PD</sub>          | power dissipation capacitance | C <sub>L</sub> = 50 pF; f <sub>i</sub> = 1 MHz; V <sub>I</sub> = GND to V <sub>CC</sub> | <sup>[3]</sup> | -                  | 10   | -                | -    | -                 | -    | pF   |

**Table 7. Dynamic characteristics ...continued**  
*GND = 0 V. For test circuit see Figure 8.*

| Symbol                    | Parameter                     | Conditions   | 25 °C          |                    |      | -40 °C to +85 °C |      | -40 °C to +125 °C |      | Unit |
|---------------------------|-------------------------------|--|----------------|--------------------|------|------------------|------|-------------------|------|------|
|                           |                               |  | Min            | Typ <sup>[1]</sup> | Max  | Min              | Max  | Min               | Max  |      |
| <b>For type 74AHCT244</b> |                               |  |                |                    |      |                  |      |                   |      |      |
| t <sub>pd</sub>           | propagation delay             | nAn to nYn; see Figure 6 <sup>[2]</sup>  |                |                    |      |                  |      |                   |      |      |
|                           |                               | V <sub>CC</sub> = 4.5 V to 5.5 V   |                |                    |      |                  |      |                   |      |      |
|                           |                               | C <sub>L</sub> = 15 pF   | -              | 3.5                | 7.4  | 1.0              | 8.5  | 1.0               | 9.5  | ns   |
|                           |                               | C <sub>L</sub> = 50 pF   | -              | 5.0                | 8.4  | 1.0              | 9.5  | 1.0               | 10.5 | ns   |
| t <sub>en</sub>           | enable time                   | nOE to nYn; see Figure 7   |                |                    |      |                  |      |                   |      |      |
|                           |                               | V <sub>CC</sub> = 4.5 V to 5.5 V   |                |                    |      |                  |      |                   |      |      |
|                           |                               | C <sub>L</sub> = 15 pF   | -              | 3.5                | 10.4 | 1.0              | 12.0 | 1.0               | 13.0 | ns   |
|                           |                               | C <sub>L</sub> = 50 pF   | -              | 5.5                | 11.4 | 1.0              | 13.0 | 1.0               | 14.5 | ns   |
| t <sub>dis</sub>          | disable time                  | nOE to nYn; see Figure 7 <sup>[2]</sup>  |                |                    |      |                  |      |                   |      |      |
|                           |                               | V <sub>CC</sub> = 4.5 V to 5.5 V   |                |                    |      |                  |      |                   |      |      |
|                           |                               | C <sub>L</sub> = 15 pF   | -              | 5.0                | 9.4  | 1.0              | 10.0 | 1.0               | 12.0 | ns   |
|                           |                               | C <sub>L</sub> = 50 pF   | -              | 7.0                | 11.4 | 1.0              | 13.0 | 1.0               | 14.5 | ns   |
| C <sub>PD</sub>           | power dissipation capacitance | per buffer; C <sub>L</sub> = 50 pF; f = 1 MHz; V <sub>I</sub> = GND to V <sub>CC</sub> | <sup>[3]</sup> | 12                 | -    | -                | -    | -                 | -    | pF   |

- [1] Typical values are measured at nominal supply voltage (V<sub>CC</sub> = 3.3 V and V<sub>CC</sub> = 5.0 V).
- [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] C<sub>PD</sub> is used to determine the dynamic power dissipation P<sub>D</sub> (μW).  
 $P_D = C_{PD} \times V_{CC}^2 \times f_i + \sum (C_L \times V_{CC}^2 \times f_o)$  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.

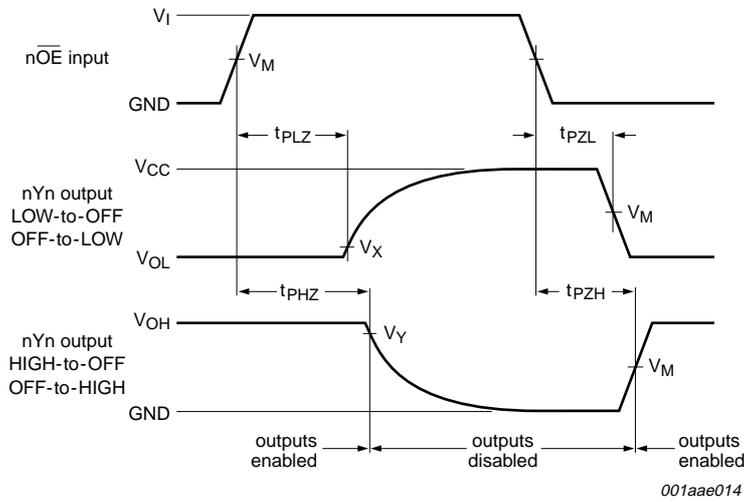
## 11. Waveforms



Measurement points are given in Table 8.

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

**Fig 6. Propagation delay input (nAn) to output (nYn)**



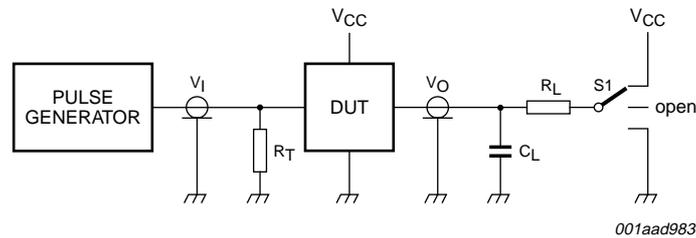
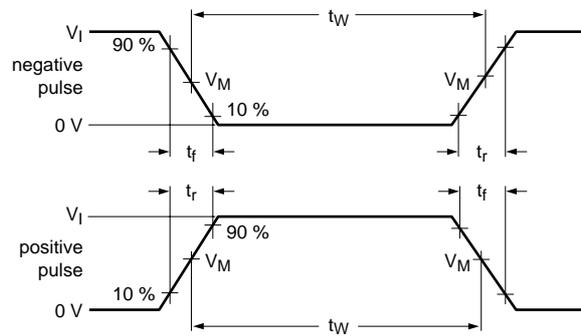
Measurement points are given in [Table 8](#).

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

**Fig 7. enable and disable times**

**Table 8. Measurement points**

| Type      | Input       | Output      |                  |                  |
|-----------|-------------|-------------|------------------|------------------|
|           | $V_M$       | $V_M$       | $V_X$            | $V_Y$            |
| 74AHC244  | $0.5V_{CC}$ | $0.5V_{CC}$ | $V_{OL} + 0.3 V$ | $V_{OH} - 0.3 V$ |
| 74AHCT244 | 1.5 V       | $0.5V_{CC}$ | $V_{OL} + 0.3 V$ | $V_{OH} - 0.3 V$ |



001aad983

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

$R_L$  = Load resistor

S1 = Test selection switch

**Fig 8. Load circuitry for switching times**

**Table 9. Test data**

| Type      | Input    |            | Load         |              | S1 position        |                    |                    |
|-----------|----------|------------|--------------|--------------|--------------------|--------------------|--------------------|
|           | $V_I$    | $t_r, t_f$ | $C_L$        | $R_L$        | $t_{PHL}, t_{PLH}$ | $t_{PZH}, t_{PHZ}$ | $t_{PZL}, t_{PLZ}$ |
| 74AHC244  | $V_{CC}$ | 3.0 ns     | 15 pF, 50 pF | 1 k $\Omega$ | open               | GND                | $V_{CC}$           |
| 74AHCT244 | 3.0 V    | 3.0 ns     | 15 pF, 50 pF | 1 k $\Omega$ | open               | GND                | $V_{CC}$           |

12. Package outline

SO20: plastic small outline package; 20 leads; body width 7.5 mm

SOT163-1

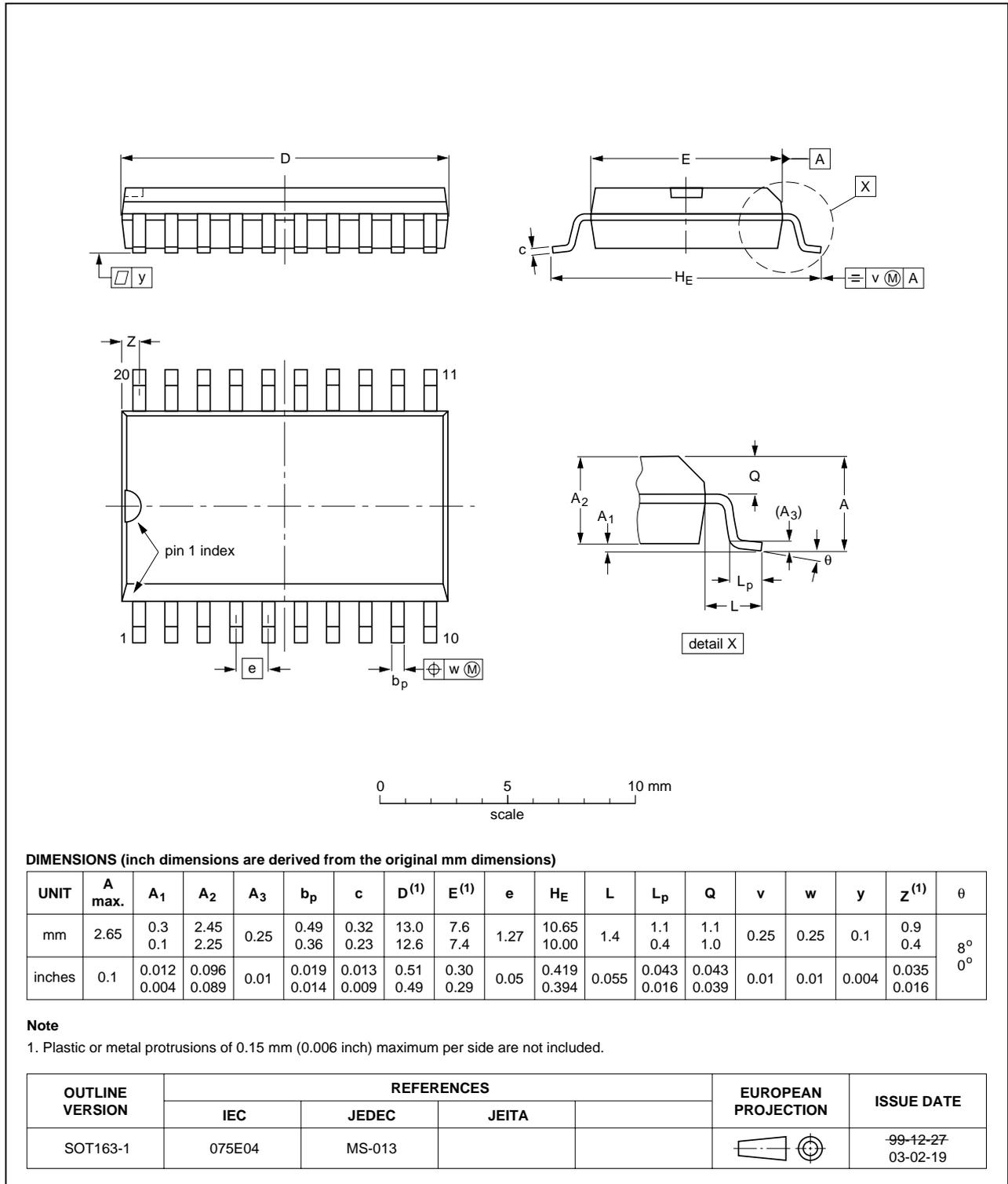


Fig 9. Package outline SOT163-1 (SO20)

TSSOP20: plastic thin shrink small outline package; 20 leads; body width 4.4 mm

SOT360-1

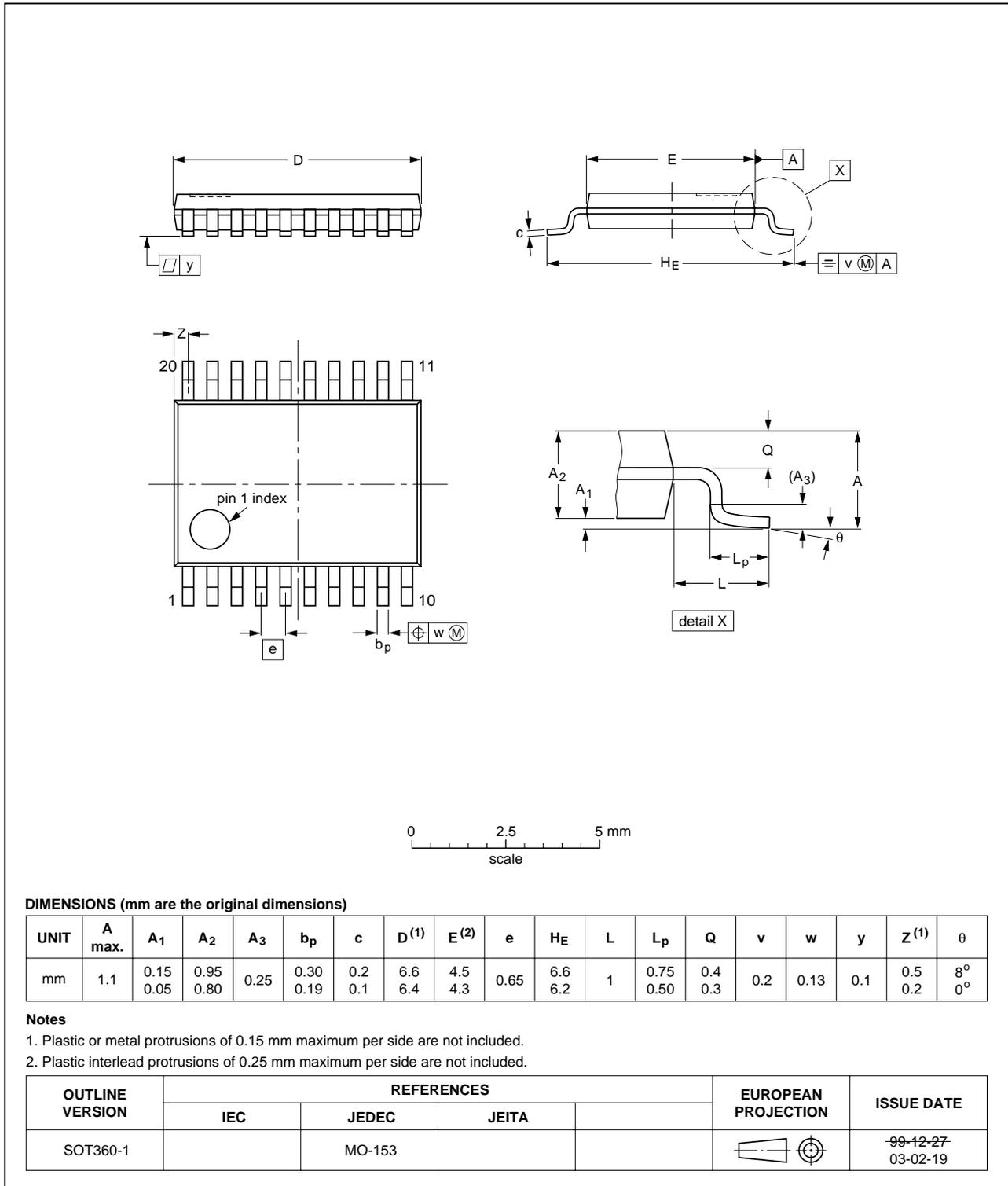
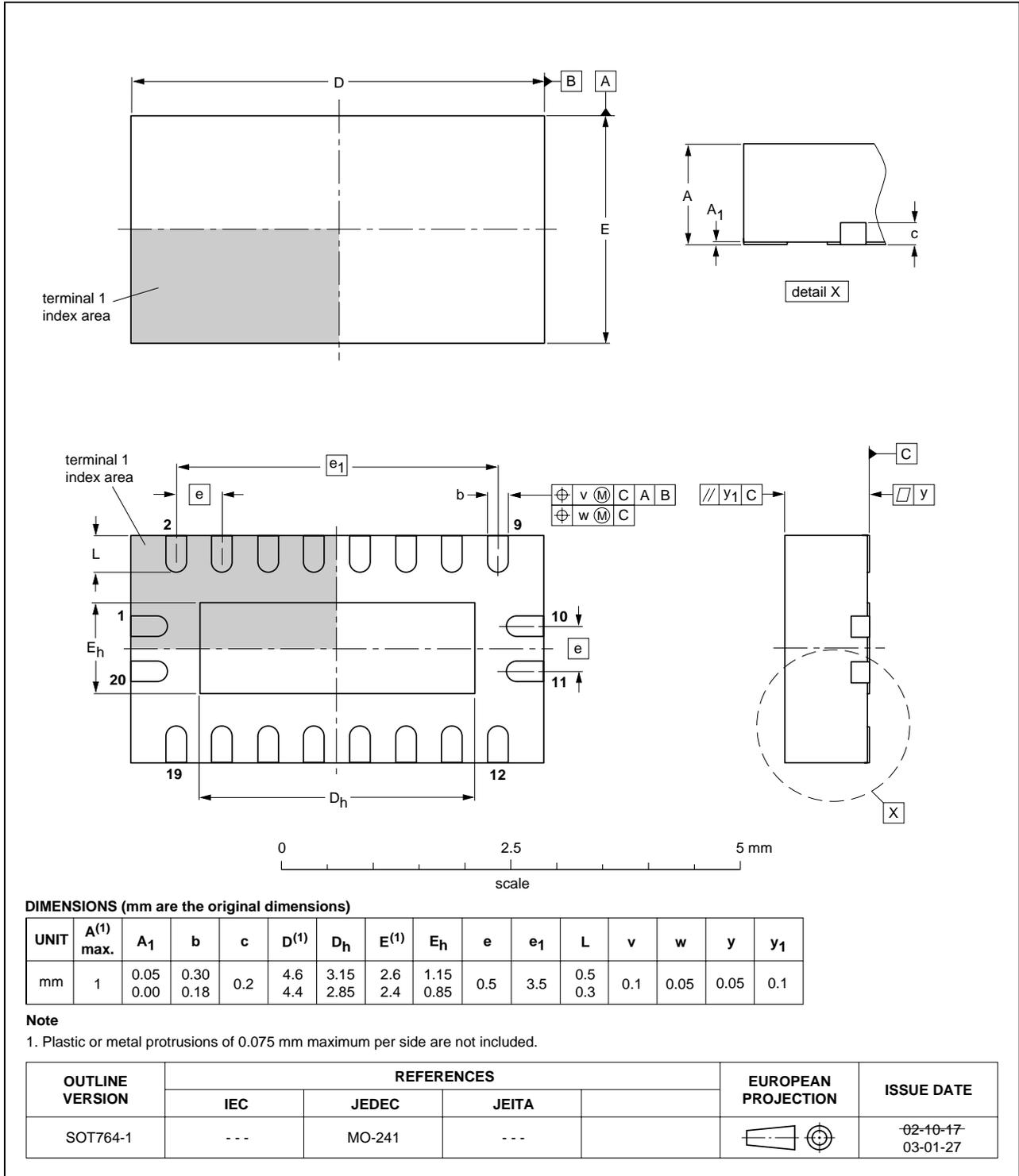


Fig 10. Package outline SOT360-1 (TSSOP20)

**DHVQFN20: plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 20 terminals; body 2.5 x 4.5 x 0.85 mm**

**SOT764-1**



**Fig 11. Package outline SOT764-1 (DHVQFN20)**

## 13. Abbreviations

Table 10. Abbreviations

| Acronym | Description                             |
|---------|---|
| CDM     | Charge Device Model                     |
| CMOS    | Complementary Metal Oxide Semiconductor |
| 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      |
|-----------------|--|-----------------------|---------------|-----------------|
| 74AHC_AHCT244_5 | 20071220   | Product data sheet    | -             | 74AHC_AHCT244_4 |
| 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="#">Section 3</a>: DHVQFN20 package added.</li> <li>• <a href="#">Section 7</a>: derating values added for DHVQFN20 package.</li> <li>• <a href="#">Section 12</a>: outline drawing added for DHVQFN20 package.</li> </ul> |                       |               |                 |
| 74AHC_AHCT244_4 | 20060210   | Product data sheet    | -             | 74AHC_AHCT244_3 |
| 74AHC_AHCT244_3 | 19990928   | Product specification | -             | 74AHC_AHCT244_2 |
| 74AHC_AHCT244_2 | 19990224   | Product specification | -             | 74AHC_AHCT244_1 |
| 74AHC_AHCT244_1 | 19980921   | 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.                                     |

[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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