

# 74AHC245; 74AHCT245

Octal bus transceiver; 3-state

Rev. 05 — 28 April 2009

Product data sheet

## 1. General description

The 74AHC245; 74AHCT245 is a high-speed Si-gate CMOS device.

The 74AHC245; 74AHCT245 is an octal transceiver featuring non-inverting 3-state bus compatible outputs in both send and receive directions.

The 74AHC245; 74AHCT245 features an output enable input ( $\overline{OE}$ ), for easy cascading, and a send and receive direction control input (DIR).

$\overline{OE}$  controls the outputs so that the buses are effectively isolated.

## 2. Features

- Balanced propagation delays
- All inputs have Schmitt-trigger actions
- Inputs accept voltages higher than  $V_{CC}$
- Input levels:
  - ◆ For 74AHC245: CMOS level
  - ◆ For 74AHCT245: 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                                                         |          |                                                                                                                                                         |          |
|---------------------------|-----------------------------------------------------------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
|                           | Temperature range                                               | Name     | Description                                                                                                                                             | Version  |
| 74AHC245D<br>74AHCT245D   | $-40\text{ }^{\circ}\text{C}$ to $+125\text{ }^{\circ}\text{C}$ | SO20     | plastic small outline package; 20 leads;<br>body width 7.5 mm                                                                                           | SOT163-1 |
| 74AHC245PW<br>74AHCT245PW | $-40\text{ }^{\circ}\text{C}$ to $+125\text{ }^{\circ}\text{C}$ | TSSOP20  | plastic thin shrink small outline package; 20 leads;<br>body width 4.4 mm                                                                               | SOT360-1 |
| 74AHC245BQ<br>74AHCT245BQ | $-40\text{ }^{\circ}\text{C}$ 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 $2.5 \times 4.5 \times 0.85\text{ mm}$ | SOT764-1 |

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## 4. Functional diagram

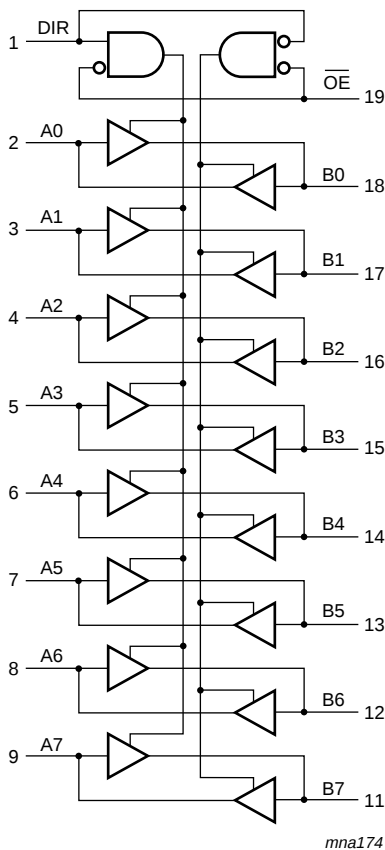


Fig 1. Logic symbol

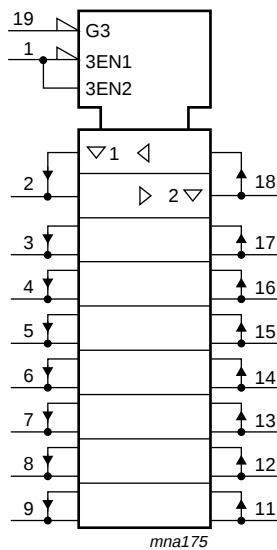


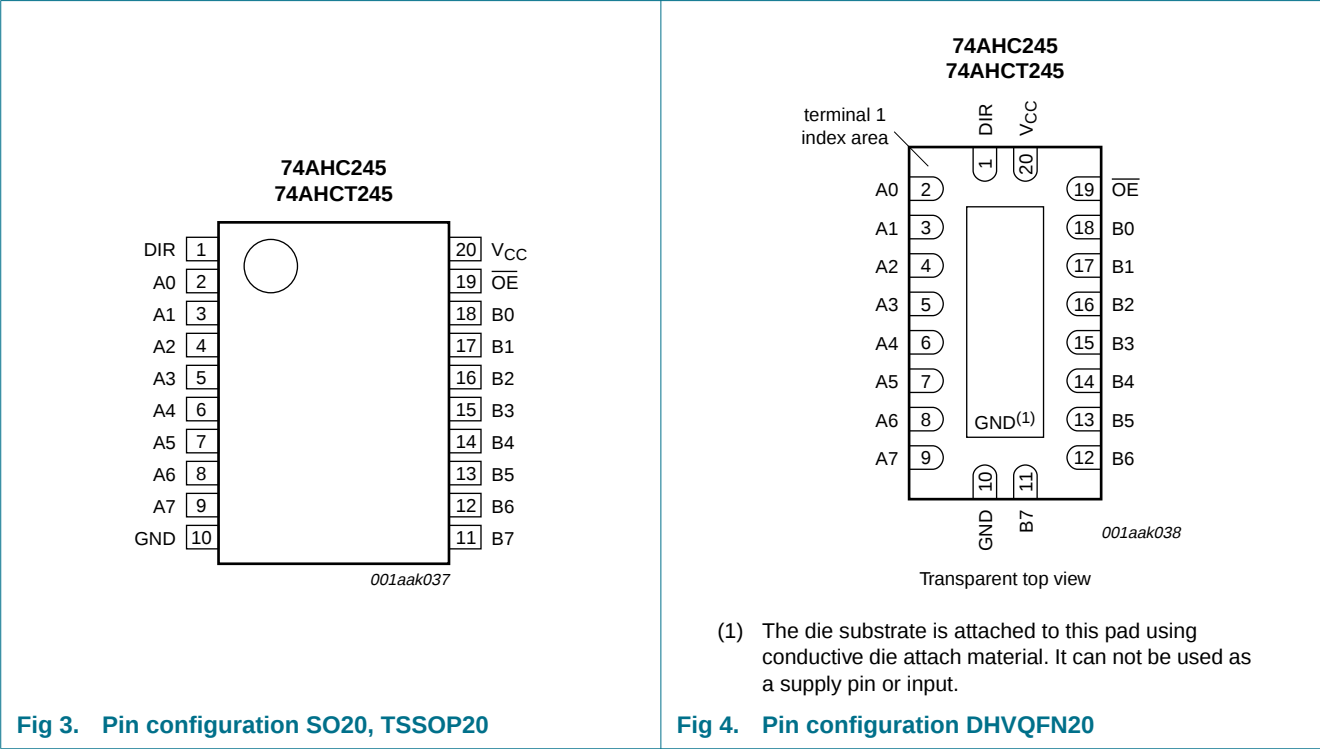
Fig 2. IEC logic symbol

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## 5. Pinning information

### 5.1 Pinning



### 5.2 Pin description

Table 2. Pin description

| Symbol | Pin | Description             |
|--------|-----|-------------------------|
| DIR    | 1   | direction control input |
| A0     | 2   | data input/output       |
| A1     | 3   | data input/output       |
| A2     | 4   | data input/output       |
| A3     | 5   | data input/output       |
| A4     | 6   | data input/output       |
| A5     | 7   | data input/output       |
| A6     | 8   | data input/output       |
| A7     | 9   | data input/output       |
| GND    | 10  | ground (0 V)            |
| B7     | 11  | data input/output       |
| B6     | 12  | data input/output       |
| B5     | 13  | data input/output       |
| B4     | 14  | data input/output       |
| B3     | 15  | data input/output       |
| B2     | 16  | data input/output       |

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**Table 2.** Pin description ...continued

| Symbol                 | Pin | Description                      |
|------------------------|-----|----------------------------------|
| B1                     | 17  | data input/output                |
| B0                     | 18  | data input/output                |
| $\overline{\text{OE}}$ | 19  | output enable input (active LOW) |
| $V_{\text{CC}}$        | 20  | supply voltage                   |

## 6. Functional description

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

| Control                |     | Input/output |        |
|------------------------|-----|--------------|--------|
| $\overline{\text{OE}}$ | DIR | An           | Bn     |
| 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 |
|------------------|-------------------------|-----------------------------------------------------------------------------------|--------------------|------|------|
| $V_{\text{CC}}$  | supply voltage          |                                                                                   | -0.5               | +7.0 | V    |
| $V_{\text{I}}$   | input voltage           |                                                                                   | -0.5               | +7.0 | V    |
| $I_{\text{IK}}$  | input clamping current  | $V_{\text{I}} < -0.5 \text{ V}$                                                   | <sup>[1]</sup> -20 | -    | mA   |
| $I_{\text{OK}}$  | output clamping current | $V_{\text{O}} < -0.5 \text{ V}$ or $V_{\text{O}} > V_{\text{CC}} + 0.5 \text{ V}$ | <sup>[1]</sup> -20 | +20  | mA   |
| $I_{\text{O}}$   | output current          | $V_{\text{O}} = -0.5 \text{ V}$ to $(V_{\text{CC}} + 0.5 \text{ V})$              | -25                | +25  | mA   |
| $I_{\text{CC}}$  | supply current          |                                                                                   | -                  | +75  | mA   |
| $I_{\text{GND}}$ | ground current          |                                                                                   | -75                | -    | mA   |
| $T_{\text{stg}}$ | storage temperature     |                                                                                   | -65                | +150 | °C   |
| $P_{\text{tot}}$ | total power dissipation | $T_{\text{amb}} = -40 \text{ °C}$ to $+125 \text{ °C}$                            | <sup>[2]</sup> -   | 500  | mW   |

- [1] The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
- [2] For SO20 packages: above 70 °C the value of  $P_{\text{tot}}$  derates linearly at 8 mW/K.  
For TSSOP20 packages: above 60 °C the value of  $P_{\text{tot}}$  derates linearly at 5.5 mW/K.  
For DHVQFN20 packages: above 60 °C the value of  $P_{\text{tot}}$  derates linearly at 4.5 mW/K.

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## 8. Recommended operating conditions

Table 5. Operating conditions

| Symbol           | Parameter                           | Conditions                       | Min | Typ | Max             | Unit |
|------------------|-------------------------------------|----------------------------------|-----|-----|-----------------|------|
| 74AHC245         |                                     |                                  |     |     |                 |      |
| V <sub>CC</sub>  | supply voltage                      |                                  | 2.0 | 5.0 | 5.5             | V    |
| V <sub>I</sub>   | input voltage                       |                                  | 0   | -   | 5.5             | V    |
| V <sub>O</sub>   | output voltage                      |                                  | 0   | -   | V <sub>CC</sub> | V    |
| T <sub>amb</sub> | ambient temperature                 |                                  | −40 | +25 | +125            | °C   |
| Δt/ΔV            | input transition rise and fall rate | V <sub>CC</sub> = 3.0 V to 3.6 V | -   | -   | 100             | ns/V |
|                  |                                     | V <sub>CC</sub> = 4.5 V to 5.5 V | -   | -   | 20              | ns/V |
| 74AHCT245        |                                     |                                  |     |     |                 |      |
| V <sub>CC</sub>  | supply voltage                      |                                  | 4.5 | 5.0 | 5.5             | V    |
| V <sub>I</sub>   | input voltage                       |                                  | 0   | -   | 5.5             | V    |
| V <sub>O</sub>   | output voltage                      |                                  | 0   | -   | V <sub>CC</sub> | V    |
| T <sub>amb</sub> | ambient temperature                 |                                  | −40 | +25 | +125            | °C   |
| Δt/ΔV            | input transition rise and fall rate | V <sub>CC</sub> = 4.5 V to 5.5 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  |      |
| 74AHC245        |                           |                                                     |       |     |      |                  |      |                   |      |      |
| 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  | -   | -    | 3.80             | -    | 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    |

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**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;<br>$V_{CC} = 0 \text{ V}$ to 5.5 V                                                                                        | -     | -   | 0.1        | -                | 1.0       | -                 | 2.0        | $\mu\text{A}$ |
| $I_{OZ}$         | OFF-state output current  | $V_I = V_{IH}$ or $V_{IL}$ ;<br>$V_O = V_{CC}$ or GND;<br>$V_{CC} = 5.5 \text{ V}$                                                                      | -     | -   | $\pm 0.25$ | -                | $\pm 2.5$ | -                 | $\pm 10.0$ | $\mu\text{A}$ |
| $I_{CC}$         | supply current            | $V_I = V_{CC}$ or GND; $I_O = 0 \text{ A}$ ;<br>$V_{CC} = 5.5 \text{ V}$                                                                                | -     | -   | 4.0        | -                | 40        | -                 | 80         | $\mu\text{A}$ |
| $C_I$            | input capacitance         | $V_I = V_{CC}$ or GND                                                                                                                                   | -     | 3   | 10         | -                | 10        | -                 | 10         | pF            |
| $C_O$            | output capacitance        |                                                                                                                                                         | -     | 4   | -          | -                | -         | -                 | -          | pF            |
| <b>74AHCT245</b> |                           |                                                                                                                                                         |       |     |            |                  |           |                   |            |               |
| $V_{IH}$         | HIGH-level input voltage  | $V_{CC} = 4.5 \text{ V}$ to 5.5 V                                                                                                                       | 2.0   | -   | -          | 2.0              | -         | 2.0               | -          | V             |
| $V_{IL}$         | LOW-level input voltage   | $V_{CC} = 4.5 \text{ V}$ to 5.5 V                                                                                                                       | -     | -   | 0.8        | -                | 0.8       | -                 | 0.8        | V             |
| $V_{OH}$         | HIGH-level output voltage | $V_I = V_{IH}$ 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  | $V_I = V_{IH}$ 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;<br>$V_{CC} = 0 \text{ V}$ to 5.5 V                                                                                        | -     | -   | 0.1        | -                | 1.0       | -                 | 2.0        | $\mu\text{A}$ |
| $I_{OZ}$         | OFF-state output current  | $V_I = V_{IH}$ or $V_{IL}$ ;<br>$V_O = V_{CC}$ or GND per input pin; other inputs at $V_{CC}$ or GND; $I_O = 0 \text{ A}$ ;<br>$V_{CC} = 5.5 \text{ V}$ | -     | -   | $\pm 0.25$ | -                | $\pm 2.5$ | -                 | $\pm 10.0$ | $\mu\text{A}$ |
| $I_{CC}$         | supply current            | $V_I = V_{CC}$ or GND; $I_O = 0 \text{ A}$ ;<br>$V_{CC} = 5.5 \text{ V}$                                                                                | -     | -   | 4.0        | -                | 40        | -                 | 80         | $\mu\text{A}$ |
| $\Delta I_{CC}$  | additional supply current | per input pin;<br>$V_I = V_{CC} - 2.1 \text{ V}$ ;<br>other pins at $V_{CC}$ or GND;<br>$I_O = 0 \text{ A}$ ; $V_{CC} = 4.5 \text{ V}$ to 5.5 V         | -     | -   | 1.35       | -                | 1.5       | -                 | 1.5        | mA            |
| $C_I$            | input capacitance         | $V_I = V_{CC}$ or GND                                                                                                                                   | -     | 3   | 10         | -                | 10        | -                 | 10         | pF            |
| $C_O$            | output capacitance        |                                                                                                                                                         | -     | 4   | -          | -                | -         | -                 | -          | pF            |

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## 10. Dynamic characteristics

**Table 7. Dynamic characteristics**

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

| 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  |      |
| 74AHC245                                    |                               |                                                                                                           |                     |                    |      |                  |      |                   |      |      |
| t <sub>pd</sub>                             | propagation delay             | An to Bn; Bn to An; see <a href="#">Figure 5</a>                                                          | <a href="#">[2]</a> |                    |      |                  |      |                   |      |      |
|                                             |                               | 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                                                                                    | -                   | 6.5                | 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                                                                                    | -                   | 3.5                | 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                   | $\overline{\text{OE}}$ to An; $\overline{\text{OE}}$ to Bn; signal name DIR; see <a href="#">Figure 6</a> | <a href="#">[3]</a> |                    |      |                  |      |                   |      |      |
|                                             |                               | V <sub>CC</sub> = 3.0 V to 3.6 V                                                                          |                     |                    |      |                  |      |                   |      |      |
|                                             |                               | C <sub>L</sub> = 15 pF                                                                                    | -                   | 6.5                | 13.2 | 1.0              | 15.5 | 1.0               | 16.5 | ns   |
|                                             |                               | C <sub>L</sub> = 50 pF                                                                                    | -                   | 9.0                | 16.7 | 1.0              | 19.0 | 1.0               | 21.0 | ns   |
|                                             |                               | V <sub>CC</sub> = 4.5 V to 5.5 V                                                                          |                     |                    |      |                  |      |                   |      |      |
|                                             |                               | C <sub>L</sub> = 15 pF                                                                                    | -                   | 4.0                | 8.5  | 1.0              | 10.0 | 1.0               | 11.0 | ns   |
|                                             |                               | C <sub>L</sub> = 50 pF                                                                                    | -                   | 5.0                | 10.6 | 1.0              | 12.0 | 1.0               | 13.5 | ns   |
| t <sub>dis</sub>                            | disable time                  | $\overline{\text{OE}}$ to An; $\overline{\text{OE}}$ to Bn; signal name DIR; see <a href="#">Figure 6</a> | <a href="#">[4]</a> |                    |      |                  |      |                   |      |      |
|                                             |                               | V <sub>CC</sub> = 3.0 V to 3.6 V                                                                          |                     |                    |      |                  |      |                   |      |      |
|                                             |                               | C <sub>L</sub> = 15 pF                                                                                    | -                   | 7.5                | 12.5 | 1.0              | 15.5 | 1.0               | 16.0 | ns   |
|                                             |                               | C <sub>L</sub> = 50 pF                                                                                    | -                   | 10.0               | 15.8 | 1.0              | 18.0 | 1.0               | 20.0 | ns   |
|                                             |                               | V <sub>CC</sub> = 4.5 V to 5.5 V                                                                          |                     |                    |      |                  |      |                   |      |      |
|                                             |                               | C <sub>L</sub> = 15 pF                                                                                    | -                   | 4.5                | 7.8  | 1.0              | 9.2  | 1.0               | 10.0 | ns   |
|                                             |                               | C <sub>L</sub> = 50 pF                                                                                    | -                   | 6.0                | 9.7  | 1.0              | 11.0 | 1.0               | 12.5 | ns   |
| C <sub>PD</sub>                             | power dissipation capacitance | f <sub>i</sub> = 1 MHz; V <sub>I</sub> = GND to V <sub>CC</sub>                                           | <a href="#">[5]</a> | -                  | 12   | -                | -    | -                 | -    | pF   |
| 74AHCT245; V <sub>CC</sub> = 4.5 V to 5.5 V |                               |                                                                                                           |                     |                    |      |                  |      |                   |      |      |
| t <sub>pd</sub>                             | propagation delay             | An to Bn; Bn to An; see <a href="#">Figure 5</a>                                                          | <a href="#">[2]</a> |                    |      |                  |      |                   |      |      |
|                                             |                               | C <sub>L</sub> = 15 pF                                                                                    | -                   | 3.5                | 7.7  | 1.0              | 8.5  | 1.0               | 10.0 | ns   |
|                                             |                               | C <sub>L</sub> = 50 pF                                                                                    | -                   | 4.5                | 8.7  | 1.0              | 9.5  | 1.0               | 11.0 | ns   |
| t <sub>en</sub>                             | enable time                   | $\overline{\text{OE}}$ to An; $\overline{\text{OE}}$ to Bn; signal name DIR; see <a href="#">Figure 6</a> | <a href="#">[3]</a> |                    |      |                  |      |                   |      |      |
|                                             |                               | C <sub>L</sub> = 15 pF                                                                                    | -                   | 5.0                | 13.8 | 1.0              | 15.0 | 1.0               | 17.5 | ns   |
|                                             |                               | C <sub>L</sub> = 50 pF                                                                                    | -                   | 6.0                | 14.8 | 1.0              | 16.0 | 1.0               | 18.5 | ns   |

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

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

| 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  |      |
| t <sub>dis</sub> | disable time                        | OE to An; OE to Bn;<br>signal name DIR;<br>see <a href="#">Figure 6</a> |       |                    |      |                  |      |                   |      |      |
|                  |                                     | C <sub>L</sub> = 15 pF                                                  | -     | 5.0                | 14.4 | 1.0              | 15.5 | 1.0               | 18.0 | ns   |
|                  |                                     | C <sub>L</sub> = 50 pF                                                  | -     | 6.0                | 15.4 | 1.0              | 16.5 | 1.0               | 19.5 | ns   |
| C <sub>PD</sub>  | power<br>dissipation<br>capacitance | f <sub>i</sub> = 1 MHz;<br>V <sub>I</sub> = GND to V <sub>CC</sub>      | -     | 15                 | -    | -                | -    | -                 | -    | 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>.

[3] t<sub>en</sub> is the same as t<sub>pZL</sub> and t<sub>pZH</sub>.

[4] t<sub>dis</sub> is the same as t<sub>pLZ</sub> and t<sub>pHZ</sub>.

[5] 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;

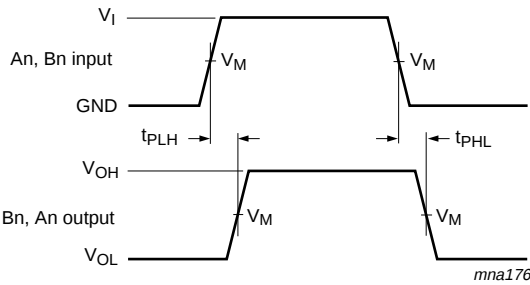
C<sub>L</sub> = output load capacitance in pF;

V<sub>CC</sub> = supply voltage in V;

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.

## 10.1 Waveforms



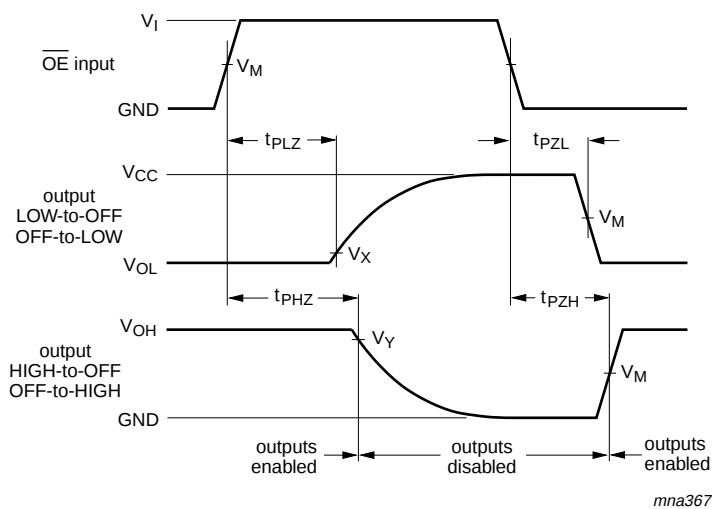
Measurement points are given in [Table 8](#).

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

**Fig 5. Input to output propagation delays**

# 74AHC245; 74AHCT245

Octal bus transceiver; 3-state



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

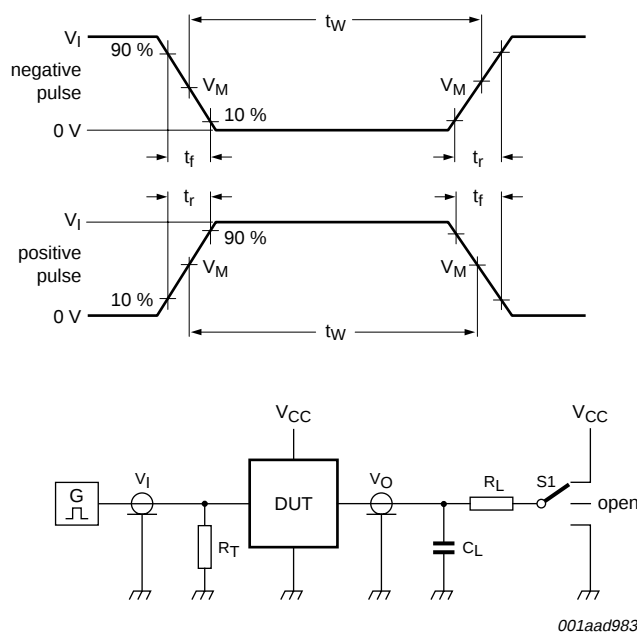
**Fig 6. Enable and disable times**

**Table 8. Measurement points**

| Type      | Input               | Output              |                          |                          |
|-----------|---------------------|---------------------|--------------------------|--------------------------|
|           | $V_M$               | $V_M$               | $V_X$                    | $V_Y$                    |
| 74AHC245  | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | $V_{OL} + 0.3 \text{ V}$ | $V_{OH} - 0.3 \text{ V}$ |
| 74AHCT245 | 1.5 V               | $0.5 \times V_{CC}$ | $V_{OL} + 0.3 \text{ V}$ | $V_{OH} - 0.3 \text{ V}$ |

# 74AHC245; 74AHCT245

Octal bus transceiver; 3-state



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 resistance.

$S1$  = Test selection switch.

**Fig 7. Load circuitry for measuring switching times**

**Table 9. Test data**

| Type      | Input    |                       | Load         |              | S1 position        |                    |                    |
|-----------|----------|-----------------------|--------------|--------------|--------------------|--------------------|--------------------|
|           | $V_I$    | $t_r, t_f$            | $C_L$        | $R_L$        | $t_{PHL}, t_{PLH}$ | $t_{PZH}, t_{PHZ}$ | $t_{PZL}, t_{PLZ}$ |
| 74AHC245  | $V_{CC}$ | $\leq 3.0 \text{ ns}$ | 15 pF, 50 pF | 1 k $\Omega$ | open               | GND                | $V_{CC}$           |
| 74AHCT245 | 3.0 V    | $\leq 3.0 \text{ ns}$ | 15 pF, 50 pF | 1 k $\Omega$ | open               | GND                | $V_{CC}$           |

# 74AHC245; 74AHCT245

Octal bus transceiver; 3-state

## 11. Package outline

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

SOT163-1

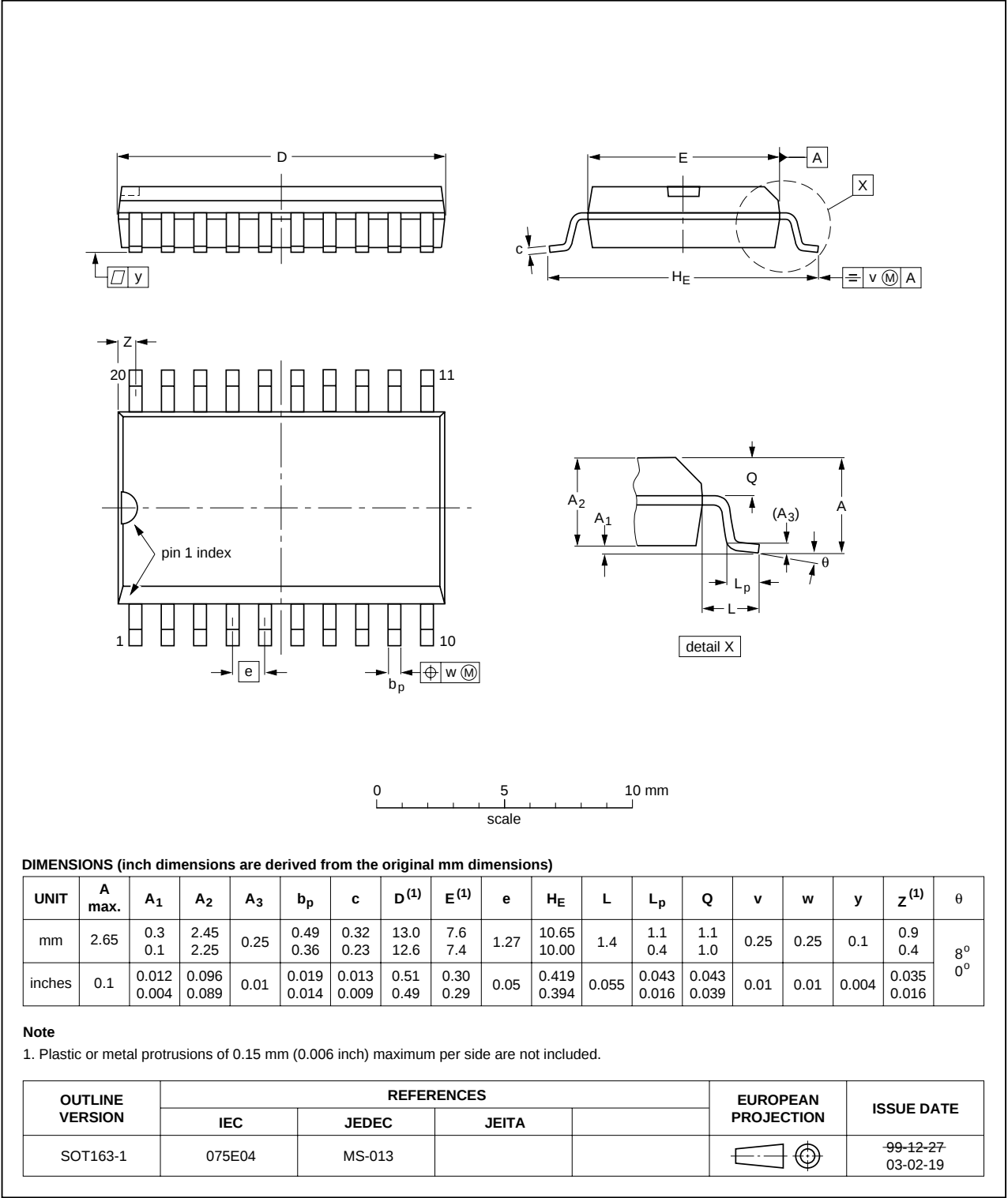


Fig 8. Package outline SOT163-1 (SO20)

# 74AHC245; 74AHCT245

Octal bus transceiver; 3-state

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

SOT360-1

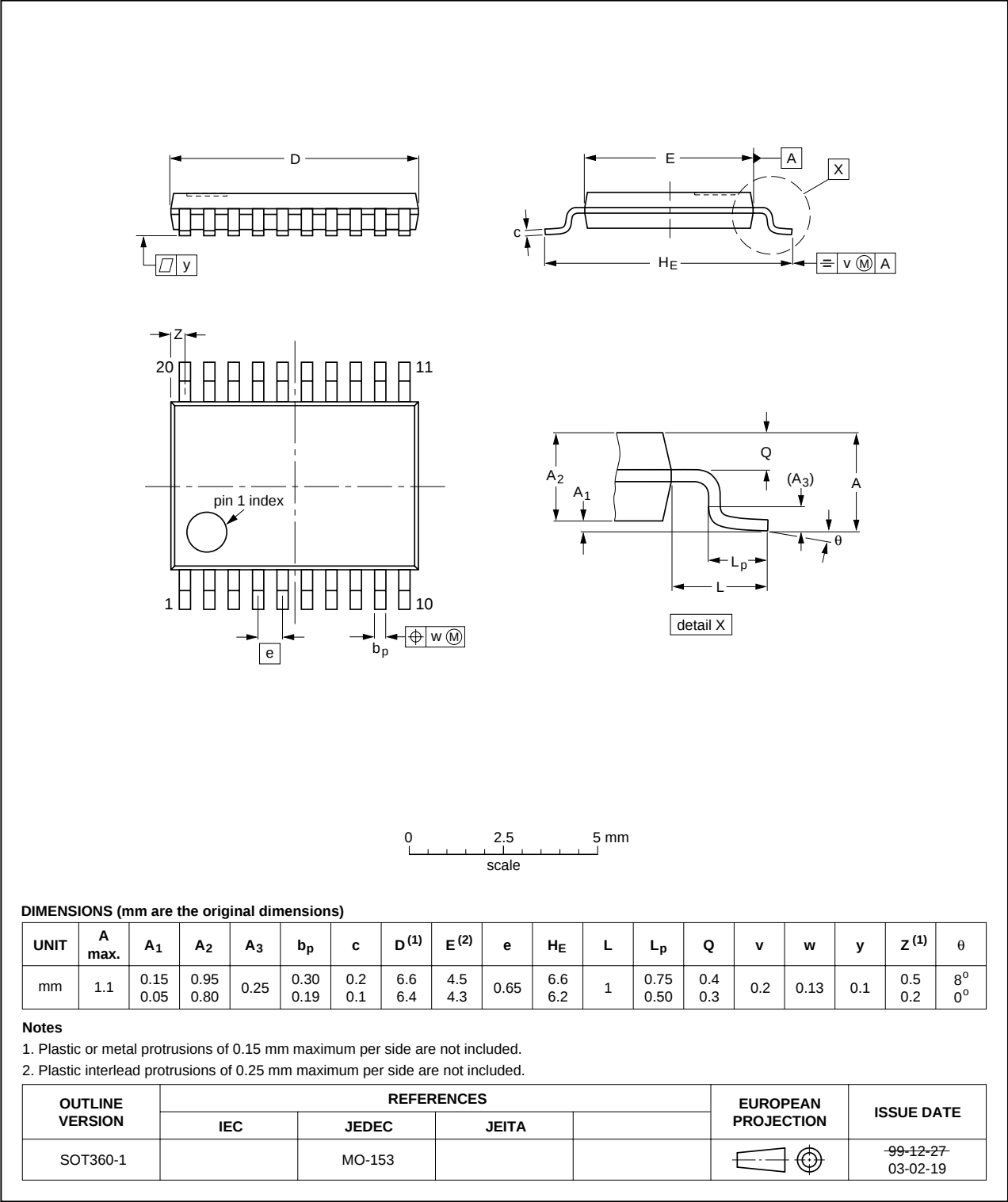


Fig 9. Package outline SOT360-1 (TSSOP20)

# 74AHC245; 74AHCT245

Octal bus transceiver; 3-state

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

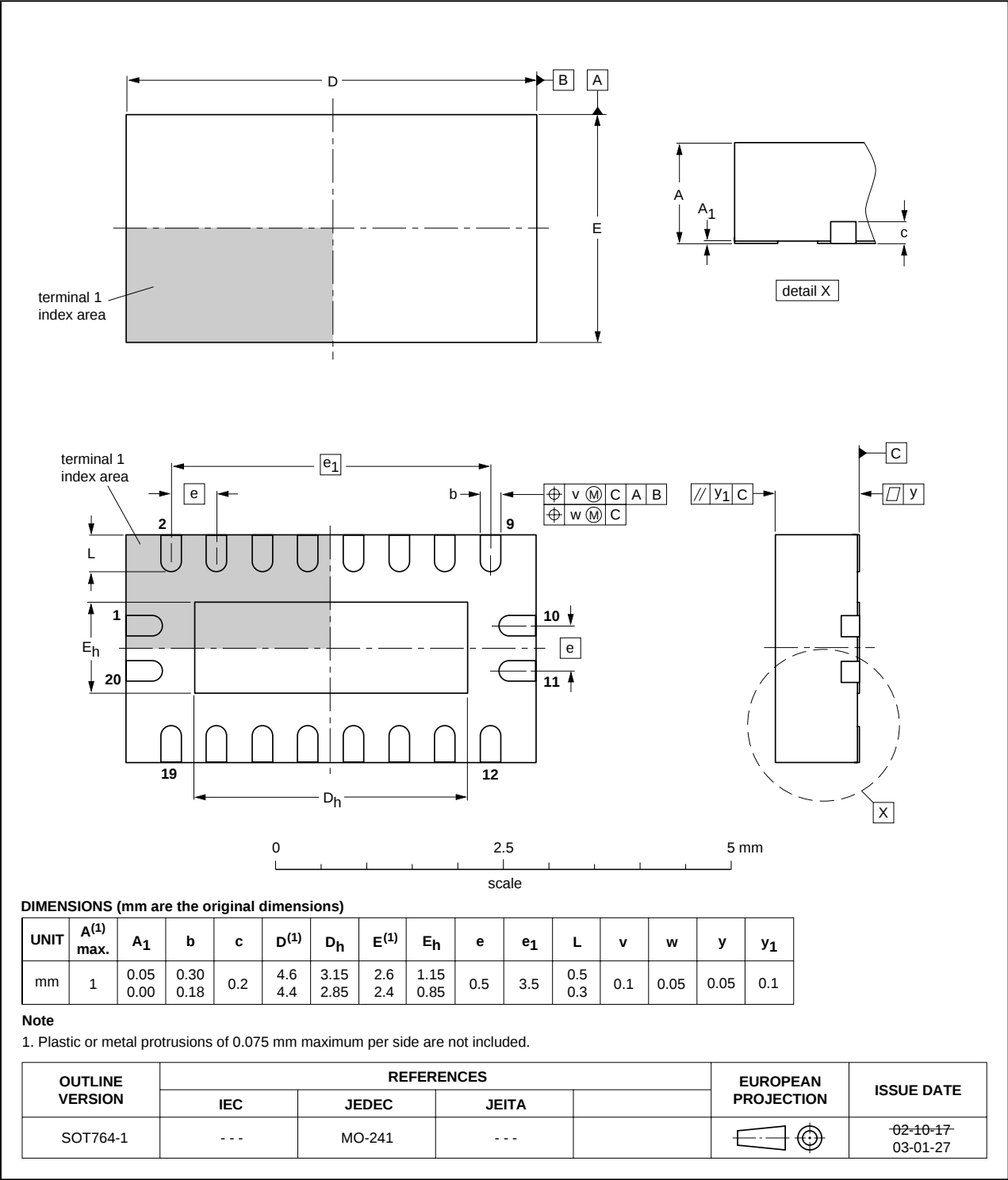


Fig 10. Package outline SOT764-1 (DHVQFN20)

# 74AHC245; 74AHCT245

Octal bus transceiver; 3-state

## 12. Abbreviations

Table 10. Abbreviations

| Acronym | Description                             |
|---------|-----------------------------------------|
| CDM     | Charged 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             |

## 13. Revision history

Table 11. Revision history

| Document ID       | Release date                                                                                                                                                                                                                                                            | Data sheet status     | Change notice | Supersedes        |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|-------------------|
| 74AHC_AHCT245_5   | 20090428                                                                                                                                                                                                                                                                | Product data sheet    | -             | 74AHC_AHCT245_4   |
| Modifications:    | <ul style="list-style-type: none"><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 11</a>: outline drawing added for DHVQFN20 package.</li></ul> |                       |               |                   |
| 74AHC_AHCT245_4   | 20080425                                                                                                                                                                                                                                                                | Product data sheet    | -             | 74AHC_AHCT245_N_3 |
| 74AHC_AHCT245_N_3 | 20070925                                                                                                                                                                                                                                                                | Product data sheet    | -             | 74AHC_AHCT245_2   |
| 74AHC_AHCT245_2   | 19990928                                                                                                                                                                                                                                                                | Product specification | -             | 74AHC_AHCT245_1   |
| 74AHC_AHCT245_1   | 19980921                                                                                                                                                                                                                                                                | Product specification | -             | -                 |

## 14. Legal information

### 14.1 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".

[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

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## 15. Contact information

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