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Kind regards,

Team Nexperia

# 74LVC244A-Q100; 74LVCH244A-Q100

Quad buffer/line driver; 3-state

Rev. 2 — 13 August 2013

Product data sheet

## 1. General description

The 74LVC244A-Q100; 74LVCH244A-Q100 is an octal non-inverting buffer/line driver with 3-state outputs. The 3-state outputs are controlled by the output enable inputs  $\overline{1OE}$  and  $\overline{2OE}$ . A HIGH on  $\overline{nOE}$  causes the outputs to assume a high-impedance OFF-state. Schmitt-trigger action at all inputs makes the circuit highly tolerant for slower input rise and fall times.

Inputs can be driven from either 3.3 V or 5.0 V devices. In 3-state operation, outputs can handle 5 V. These features allow the use of these devices as translators in a mixed 3.3 V and 5 V environment.

The 74LVCH244A-Q100 bus hold on data inputs eliminates the need for external pull-up resistors to hold unused inputs.

This product has been qualified to the Automotive Electronics Council (AEC) standard Q100 (Grade 1) and is suitable for use in automotive applications.

## 2. Features and benefits

- Automotive product qualification in accordance with AEC-Q100 (Grade 1)
  - ◆ Specified from  $-40\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$  and from  $-40\text{ }^{\circ}\text{C}$  to  $+125\text{ }^{\circ}\text{C}$
- 5 V tolerant inputs/outputs for interfacing with 5 V logic
- Wide supply voltage range from 1.2 V to 3.6 V
- CMOS low-power consumption
- Direct interface with TTL levels
- Inputs accept voltages up to 5.5 V
- High-impedance when  $V_{CC} = 0\text{ V}$
- Bus hold on all data inputs (74LVCH244A-Q100 only)
- Complies with JEDEC standard:
  - ◆ JESD8-7A (1.65 V to 1.95 V)
  - ◆ JESD8-5A (2.3 V to 2.7 V)
  - ◆ JESD8-C/JESD36 (2.7 V to 3.6 V)
- ESD protection:
  - ◆ MIL-STD-883, method 3015 exceeds 2000 V
  - ◆ HBM JESD22-A114F exceeds 2000 V
  - ◆ MM JESD22-A115-A exceeds 200 V ( $C = 200\text{ pF}$ ,  $R = 0\text{ }\Omega$ )
- Multiple package options



### 3. Ordering information

Table 1. Ordering information

| Type number       | Package           |          |                                                                                                                                      |          |
|-------------------|-------------------|----------|--------------------------------------------------------------------------------------------------------------------------------------|----------|
|                   | Temperature range | Name     | Description                                                                                                                          | Version  |
| 74LVC244AD-Q100   | -40 °C to +125 °C | SO20     | plastic small outline package; 20 leads;<br>body width 7.5 mm                                                                        | SOT163-1 |
| 74LVCH244AD-Q100  |                   |          |                                                                                                                                      |          |
| 74LVC244ADB-Q100  | -40 °C to +125 °C | SSOP20   | plastic shrink small outline package; 20 leads;<br>body width 5.3 mm                                                                 | SOT339-1 |
| 74LVCH244ADB-Q100 |                   |          |                                                                                                                                      |          |
| 74LVC244APW-Q100  | -40 °C to +125 °C | TSSOP20  | plastic thin shrink small outline package; 20<br>leads; body width 4.4 mm                                                            | SOT360-1 |
| 74LVCH244APW-Q100 |                   |          |                                                                                                                                      |          |
| 74LVC244ABQ-Q100  | -40 °C to +125 °C | DHVQFN20 | plastic dual in-line compatible thermal enhanced<br>very thin quad flat package; no leads;<br>20 terminals; body 2.5 × 4.5 × 0.85 mm | SOT764-1 |
| 74LVCH244ABQ-Q100 |                   |          |                                                                                                                                      |          |

### 4. Functional diagram

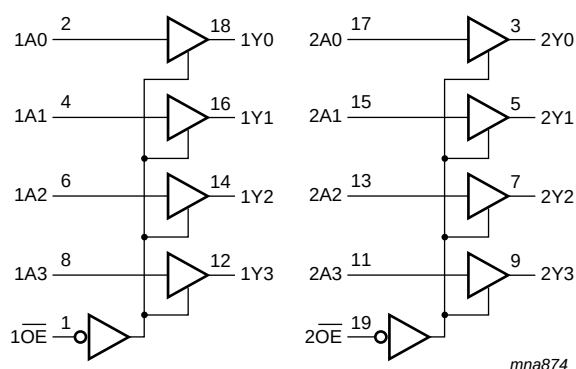


Fig 1. Logic symbol

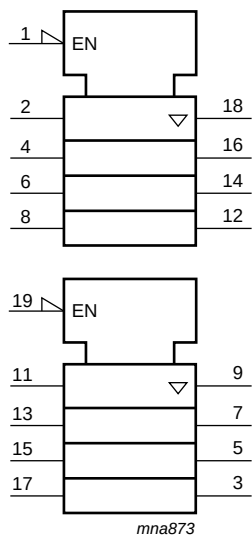


Fig 2. IEC logic diagram

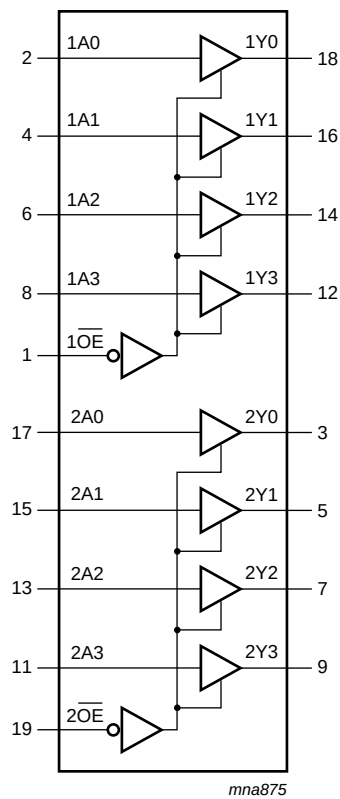


Fig 3. Functional diagram

## 5. Pinning information

### 5.1 Pinning

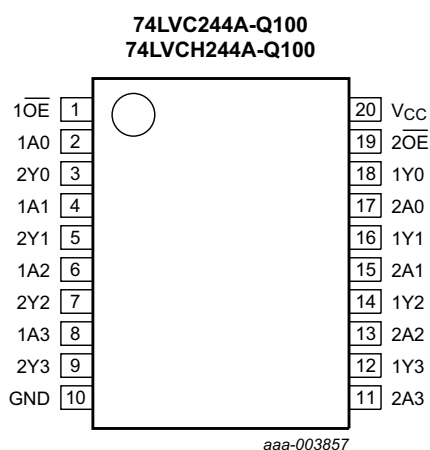
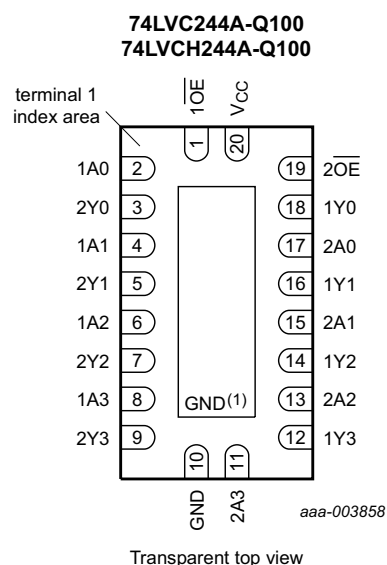


Fig 4. Pin configuration for SO20 and (T)SSOP20



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

Fig 5. Pin configuration for DHVQFN20

### 5.2 Pin description

Table 2. Pin description

| Symbol                              | Pin            | Description                      |
|-------------------------------------|----------------|----------------------------------|
| $\overline{1OE}$ , $\overline{2OE}$ | 1, 19          | output enable input (active low) |
| 1A0, 1A1, 1A2, 1A3                  | 2, 4, 6, 8     | data input                       |
| 2Y0, 2Y1, 2Y2, 2Y3                  | 3, 5, 7, 9     | data output                      |
| GND                                 | 10             | ground (0 V)                     |
| 2A0, 2A1, 2A2, 2A3                  | 17, 15, 13, 11 | data input                       |
| 1Y0, 1Y1, 1Y2, 1Y3                  | 18, 16, 14, 12 | data output                      |
| V <sub>CC</sub>                     | 20             | supply voltage                   |

## 6. Functional description

Table 3. Function table [\[1\]](#)

| Control                 | Input | Output |
|-------------------------|-------|--------|
| $\overline{\text{nOE}}$ | nAn   | nYn    |
| L                       | 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                     | +6.5           | V    |
| $I_{IK}$  | input clamping current  | $V_I < 0$ V                   | -50                      | -              | mA   |
| $V_I$     | input voltage           |                               | <a href="#">[1]</a> -0.5 | +6.5           | V    |
| $I_{OK}$  | output clamping current | $V_O > V_{CC}$ or $V_O < 0$ V | -                        | $\pm 50$       | mA   |
| $V_O$     | output voltage          | output HIGH or LOW            | <a href="#">[2]</a> -0.5 | $V_{CC} + 0.5$ | V    |
|           |                         | output 3-state                | <a href="#">[2]</a> -0.5 | +6.5           | V    |
| $I_O$     | output current          | $V_O = 0$ V to $V_{CC}$       | -                        | $\pm 50$       | mA   |
| $I_{CC}$  | supply current          |                               | -                        | 100            | mA   |
| $I_{GND}$ | ground current          |                               | -100                     | -              | mA   |
| $T_{stg}$ | storage temperature     |                               | -65                      | +150           | °C   |
| $P_{tot}$ | total power dissipation | $T_{amb} = -40$ °C to +125 °C | <a href="#">[3]</a> -    | 500            | mW   |

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

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

[3] For SO20 packages: above 70 °C derate linearly with 8 mW/K.  
 For (T)SSOP20 packages: above 60 °C derate linearly with 5.5 mW/K.  
 For DHVQFN20 packages: above 60 °C derate linearly with 4.5 mW/K.

## 8. Recommended operating conditions

**Table 5. Recommended operating conditions**

| Symbol              | Parameter                           | Conditions                                 | Min  | Typ | Max      | Unit |
|---------------------|-------------------------------------|--------------------------------------------|------|-----|----------|------|
| $V_{CC}$            | supply voltage                      |                                            | 1.65 | -   | 3.6      | V    |
|                     |                                     | functional                                 | 1.2  | -   | 3.6      | V    |
| $V_I$               | input voltage                       |                                            | 0    | -   | 5.5      | V    |
| $V_O$               | output voltage                      | output HIGH or LOW                         | 0    | -   | $V_{CC}$ | V    |
|                     |                                     | output 3-state                             | 0    | -   | 5.5      | V    |
| $T_{amb}$           | ambient temperature                 | in free air                                | -40  | -   | +125     | °C   |
| $\Delta t/\Delta V$ | input transition rise and fall rate | $V_{CC} = 1.2 \text{ V to } 2.7 \text{ V}$ | 0    | -   | 20       | ns/V |
|                     |                                     | $V_{CC} = 2.7 \text{ V to } 3.6 \text{ V}$ | 0    | -   | 10       | ns/V |

## 9. Static characteristics

**Table 6. Static characteristics**

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

| Symbol   | Parameter                 | Conditions                                                          | -40 °C to +85 °C     |                    |                      | -40 °C to +125 °C    |                      | Unit |
|----------|---------------------------|---------------------------------------------------------------------|----------------------|--------------------|----------------------|----------------------|----------------------|------|
|          |                           |                                                                     | Min                  | Typ <sup>[1]</sup> | Max                  | Min                  | Max                  |      |
| $V_{IH}$ | HIGH-level input voltage  | $V_{CC} = 1.2 \text{ V}$                                            | 1.08                 | -                  | -                    | 1.08                 | -                    | V    |
|          |                           | $V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$                        | $0.65 \times V_{CC}$ | -                  | -                    | $0.65 \times V_{CC}$ | -                    | V    |
|          |                           | $V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$                          | 1.7                  | -                  | -                    | 1.7                  | -                    | V    |
|          |                           | $V_{CC} = 2.7 \text{ V to } 3.6 \text{ V}$                          | 2.0                  | -                  | -                    | 2.0                  | -                    | V    |
| $V_{IL}$ | LOW-level input voltage   | $V_{CC} = 1.2 \text{ V}$                                            | -                    | -                  | 0.12                 | -                    | 0.12                 | V    |
|          |                           | $V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$                        | -                    | -                  | $0.35 \times V_{CC}$ | -                    | $0.35 \times V_{CC}$ | V    |
|          |                           | $V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$                          | -                    | -                  | 0.7                  | -                    | 0.7                  | V    |
|          |                           | $V_{CC} = 2.7 \text{ V to } 3.6 \text{ V}$                          | -                    | -                  | 0.8                  | -                    | 0.8                  | V    |
| $V_{OH}$ | HIGH-level output voltage | $V_I = V_{IH} \text{ or } V_{IL}$                                   |                      |                    |                      |                      |                      |      |
|          |                           | $I_O = -100 \mu\text{A}; V_{CC} = 1.65 \text{ V to } 3.6 \text{ V}$ | $V_{CC} - 0.2$       | -                  | -                    | $V_{CC} - 0.3$       | -                    | V    |
|          |                           | $I_O = -4 \text{ mA}; V_{CC} = 1.65 \text{ V}$                      | 1.2                  | -                  | -                    | 1.05                 | -                    | V    |
|          |                           | $I_O = -8 \text{ mA}; V_{CC} = 2.3 \text{ V}$                       | 1.8                  | -                  | -                    | 1.65                 | -                    | V    |
|          |                           | $I_O = -12 \text{ mA}; V_{CC} = 2.7 \text{ V}$                      | 2.2                  | -                  | -                    | 2.05                 | -                    | V    |
|          |                           | $I_O = -18 \text{ mA}; V_{CC} = 3.0 \text{ V}$                      | 2.4                  | -                  | -                    | 2.25                 | -                    | V    |
|          |                           | $I_O = -24 \text{ mA}; V_{CC} = 3.0 \text{ V}$                      | 2.2                  | -                  | -                    | 2.0                  | -                    | V    |
| $V_{OL}$ | LOW-level output voltage  | $V_I = V_{IH} \text{ or } V_{IL}$                                   |                      |                    |                      |                      |                      |      |
|          |                           | $I_O = 100 \mu\text{A}; V_{CC} = 1.65 \text{ V to } 3.6 \text{ V}$  | -                    | -                  | 0.2                  | -                    | 0.3                  | V    |
|          |                           | $I_O = 4 \text{ mA}; V_{CC} = 1.65 \text{ V}$                       | -                    | -                  | 0.45                 | -                    | 0.65                 | V    |
|          |                           | $I_O = 8 \text{ mA}; V_{CC} = 2.3 \text{ V}$                        | -                    | -                  | 0.6                  | -                    | 0.8                  | V    |
|          |                           | $I_O = 12 \text{ mA}; V_{CC} = 2.7 \text{ V}$                       | -                    | -                  | 0.4                  | -                    | 0.6                  | V    |
|          |                           | $I_O = 24 \text{ mA}; V_{CC} = 3.0 \text{ V}$                       | -                    | -                  | 0.55                 | -                    | 0.8                  | V    |

**Table 6.** Static characteristics ...continued

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

| Symbol            | Parameter                       | Conditions                                                                                                            | −40 °C to +85 °C |                    |      | −40 °C to +125 °C |      | Unit |    |
|-------------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------------|--------------------|------|-------------------|------|------|----|
|                   |                                 |                                                                                                                       | Min              | Typ <sup>[1]</sup> | Max  | Min               | Max  |      |    |
| I <sub>I</sub>    | input leakage current           | V <sub>I</sub> = 5.5 V or GND;<br>V <sub>CC</sub> = 3.6 V                                                             | [2]              | -                  | ±0.1 | ±5                | -    | ±20  | μA |
| I <sub>OZ</sub>   | OFF-state output current        | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ;<br>V <sub>O</sub> = 5.5 V or GND;<br>V <sub>CC</sub> = 3.6 V    | [2]              | -                  | ±0.1 | ±5                | -    | ±20  | μA |
| I <sub>OFF</sub>  | power-off leakage current       | V <sub>I</sub> or V <sub>O</sub> = 5.5 V; V <sub>CC</sub> = 0.0 V                                                     |                  | -                  | ±0.1 | ±10               | -    | ±20  | 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> = 3.6 V                             |                  | -                  | 0.1  | 10                | -    | 40   | μA |
| ΔI <sub>CC</sub>  | additional supply current       | per input pin;<br>V <sub>I</sub> = V <sub>CC</sub> − 0.6 V; I <sub>O</sub> = 0 A;<br>V <sub>CC</sub> = 2.7 V to 3.6 V |                  | -                  | 5    | 500               | -    | 5000 | μA |
| C <sub>I</sub>    | input capacitance               |                                                                                                                       |                  | -                  | 4.0  | -                 | -    | -    | pF |
| I <sub>BHL</sub>  | bus hold LOW current            | V <sub>CC</sub> = 1.65 V; V <sub>I</sub> = 0.58 V                                                                     | [3][4]           | 10                 | -    | -                 | 10   | -    | μA |
|                   |                                 | V <sub>CC</sub> = 2.3 V; V <sub>I</sub> = 0.7 V                                                                       |                  | 30                 | -    | -                 | 25   | -    | μA |
|                   |                                 | V <sub>CC</sub> = 3.0 V; V <sub>I</sub> = 0.8 V                                                                       |                  | 75                 | -    | -                 | 60   | -    | μA |
| I <sub>BHH</sub>  | bus hold HIGH current           | V <sub>CC</sub> = 1.65 V; V <sub>I</sub> = 1.07 V                                                                     | [3][4]           | −10                | -    | -                 | −10  | -    | μA |
|                   |                                 | V <sub>CC</sub> = 2.3 V; V <sub>I</sub> = 1.7 V                                                                       |                  | −30                | -    | -                 | −25  | -    | μA |
|                   |                                 | V <sub>CC</sub> = 3.0 V; V <sub>I</sub> = 2.0 V                                                                       |                  | −75                | -    | -                 | −60  | -    | μA |
| I <sub>BHLO</sub> | bus hold LOW overdrive current  | V <sub>CC</sub> = 1.95 V                                                                                              | [3][5]           | 200                | -    | -                 | 200  | -    | μA |
|                   |                                 | V <sub>CC</sub> = 2.7 V                                                                                               |                  | 300                | -    | -                 | 300  | -    | μA |
|                   |                                 | V <sub>CC</sub> = 3.6 V                                                                                               |                  | 500                | -    | -                 | 500  | -    | μA |
| I <sub>BHHO</sub> | bus hold HIGH overdrive current | V <sub>CC</sub> = 1.95 V                                                                                              | [3][5]           | −200               | -    | -                 | −200 | -    | μA |
|                   |                                 | V <sub>CC</sub> = 2.7 V                                                                                               |                  | −300               | -    | -                 | −300 | -    | μA |
|                   |                                 | V <sub>CC</sub> = 3.6 V                                                                                               |                  | −500               | -    | -                 | −500 | -    | μA |

[1] All typical values are measured at  $V_{CC} = 3.3 \text{ V}$  (unless stated otherwise) and  $T_{amb} = 25 \text{ }^\circ\text{C}$ .[2] The bus hold circuit is switched off when  $V_I > V_{CC}$  allowing 5.5 V on the input terminal.

[3] Valid for data inputs of bus hold parts only (74LVCH244A-Q100). Note that control inputs do not have a bus hold circuit.

[4] The specified sustaining current at the data input holds the input below the specified  $V_I$  level.

[5] The specified overdrive current at the data input forces the data input to the opposite input state.



## 10. Dynamic characteristics

**Table 7. Dynamic characteristics**

Voltages are referenced to GND (ground = 0 V). For test circuit see [Figure 8](#).

| Symbol             | Parameter                     | Conditions                                                        | –40 °C to +85 °C |                    |      | –40 °C to +125 °C |      | Unit |
|--------------------|-------------------------------|-------------------------------------------------------------------|------------------|--------------------|------|-------------------|------|------|
|                    |                               |                                                                   | Min              | Typ <sup>[1]</sup> | Max  | Min               | Max  |      |
| t <sub>pd</sub>    | propagation delay             | nAn to nYn; see <a href="#">Figure 6</a> <sup>[2]</sup>           |                  |                    |      |                   |      |      |
|                    |                               | V <sub>CC</sub> = 1.2 V                                           | -                | 17.0               | -    | -                 | -    | ns   |
|                    |                               | V <sub>CC</sub> = 1.65 V to 1.95 V                                | 1.5              | 6.4                | 13.7 | 1.5               | 15.8 | ns   |
|                    |                               | V <sub>CC</sub> = 2.3 V to 2.7 V                                  | 1.0              | 3.4                | 7.1  | 1.0               | 8.2  | ns   |
|                    |                               | V <sub>CC</sub> = 2.7 V                                           | 1.5              | 3.4                | 6.9  | 1.5               | 9.0  | ns   |
|                    |                               | V <sub>CC</sub> = 3.0 V to 3.6 V                                  | 1.5              | 2.9                | 5.9  | 1.5               | 7.5  | ns   |
| t <sub>en</sub>    | enable time                   | nOE to nYn; see <a href="#">Figure 7</a> <sup>[2]</sup>           |                  |                    |      |                   |      |      |
|                    |                               | V <sub>CC</sub> = 1.2 V                                           | -                | 24.0               | -    | -                 | -    | ns   |
|                    |                               | V <sub>CC</sub> = 1.65 V to 1.95 V                                | 1.5              | 7.0                | 17.3 | 1.5               | 20.0 | ns   |
|                    |                               | V <sub>CC</sub> = 2.3 V to 2.7 V                                  | 1.5              | 3.9                | 9.5  | 1.5               | 11.0 | ns   |
|                    |                               | V <sub>CC</sub> = 2.7 V                                           | 1.5              | 4.1                | 8.6  | 1.5               | 11.0 | ns   |
|                    |                               | V <sub>CC</sub> = 3.0 V to 3.6 V                                  | 1.0              | 3.2                | 7.6  | 1.0               | 9.5  | ns   |
| t <sub>dis</sub>   | disable time                  | nOE to nYn; see <a href="#">Figure 7</a> <sup>[2]</sup>           |                  |                    |      |                   |      |      |
|                    |                               | V <sub>CC</sub> = 1.2 V                                           | -                | 9.0                | -    | -                 | -    | ns   |
|                    |                               | V <sub>CC</sub> = 1.65 V to 1.95 V                                | 2.2              | 4.5                | 9.8  | 2.2               | 11.3 | ns   |
|                    |                               | V <sub>CC</sub> = 2.3 V to 2.7 V                                  | 0.5              | 3.6                | 5.5  | 0.5               | 6.4  | ns   |
|                    |                               | V <sub>CC</sub> = 2.7 V                                           | 1.5              | 3.3                | 6.8  | 1.5               | 8.5  | ns   |
|                    |                               | V <sub>CC</sub> = 3.0 V to 3.6 V                                  | 1.5              | 3.1                | 5.8  | 1.5               | 7.5  | ns   |
| t <sub>sk(o)</sub> | output skew time              | <sup>[3]</sup>                                                    | -                | -                  | 1.0  | -                 | 1.5  | ns   |
| C <sub>PD</sub>    | power dissipation capacitance | per input; V <sub>I</sub> = GND to V <sub>CC</sub> <sup>[4]</sup> |                  |                    |      |                   |      |      |
|                    |                               | V <sub>CC</sub> = 1.65 V to 1.95 V                                | -                | 6.4                | -    | -                 | -    | pF   |
|                    |                               | V <sub>CC</sub> = 2.3 V to 2.7 V                                  | -                | 9.6                | -    | -                 | -    | pF   |
|                    |                               | V <sub>CC</sub> = 3.0 V to 3.6 V                                  | -                | 12.5               | -    | -                 | -    | pF   |

[1] Typical values are measured at T<sub>amb</sub> = 25 °C and V<sub>CC</sub> = 1.2 V, 1.8 V, 2.5 V, 2.7 V, and 3.3 V respectively.

[2] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>.

t<sub>en</sub> is the same as t<sub>PZL</sub> and t<sub>PZH</sub>.

t<sub>dis</sub> is the same as t<sub>PLZ</sub> and t<sub>PHZ</sub>.

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

[4] C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> in μW).

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

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

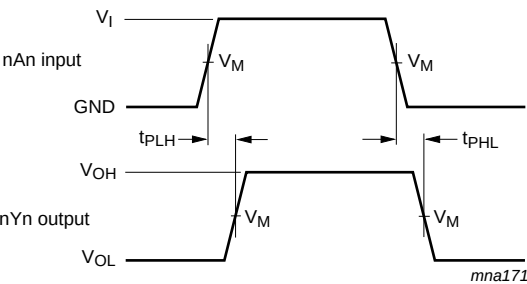
C<sub>L</sub> = output load capacitance in pF

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

N = number of inputs switching

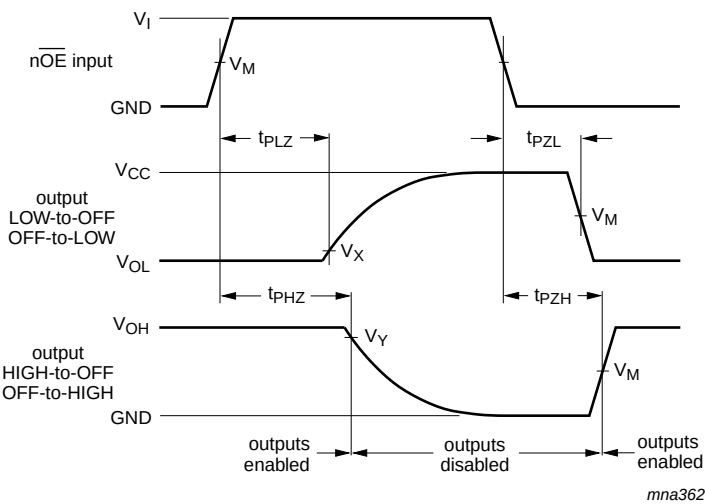
$\Sigma(C_L \times V_{CC}^2 \times f_o)$  = sum of the outputs.

11. AC waveforms



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

**Fig 6. The input (nAn) to output (nYn) propagation delays**

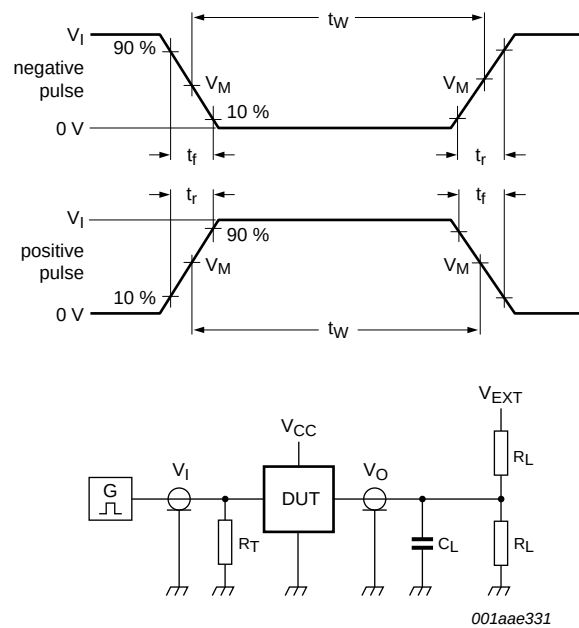


Measurement points are given in [Table 8](#).  
Logic levels:  $V_{OL}$  and  $V_{OH}$  are typical output voltage levels that occur with the output load.

**Fig 7. 3-state enable and disable times.**

**Table 8. Measurement points**

| Supply voltage   | Input    |                     | Output              |                           |                           |
|------------------|----------|---------------------|---------------------|---------------------------|---------------------------|
| $V_{CC}$         | $V_I$    | $V_M$               | $V_M$               | $V_X$                     | $V_Y$                     |
| 1.2 V            | $V_{CC}$ | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | $V_{OL} + 0.15 \text{ V}$ | $V_{OH} - 0.15 \text{ V}$ |
| 1.65 V to 1.95 V | $V_{CC}$ | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | $V_{OL} + 0.15 \text{ V}$ | $V_{OH} - 0.15 \text{ V}$ |
| 2.3 V to 2.7 V   | $V_{CC}$ | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | $V_{OL} + 0.15 \text{ V}$ | $V_{OH} - 0.15 \text{ V}$ |
| 2.7 V            | 2.7 V    | 1.5 V               | 1.5 V               | $V_{OL} + 0.3 \text{ V}$  | $V_{OH} - 0.3 \text{ V}$  |
| 3.0 V to 3.6 V   | 2.7 V    | 1.5 V               | 1.5 V               | $V_{OL} + 0.3 \text{ V}$  | $V_{OH} - 0.3 \text{ V}$  |



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

Definitions for test circuit:

$R_L$  = Load resistance.

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

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

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

**Fig 8. Test circuit for measuring switching times**

**Table 9. Test data**

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

12. Package outline

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

SOT163-1

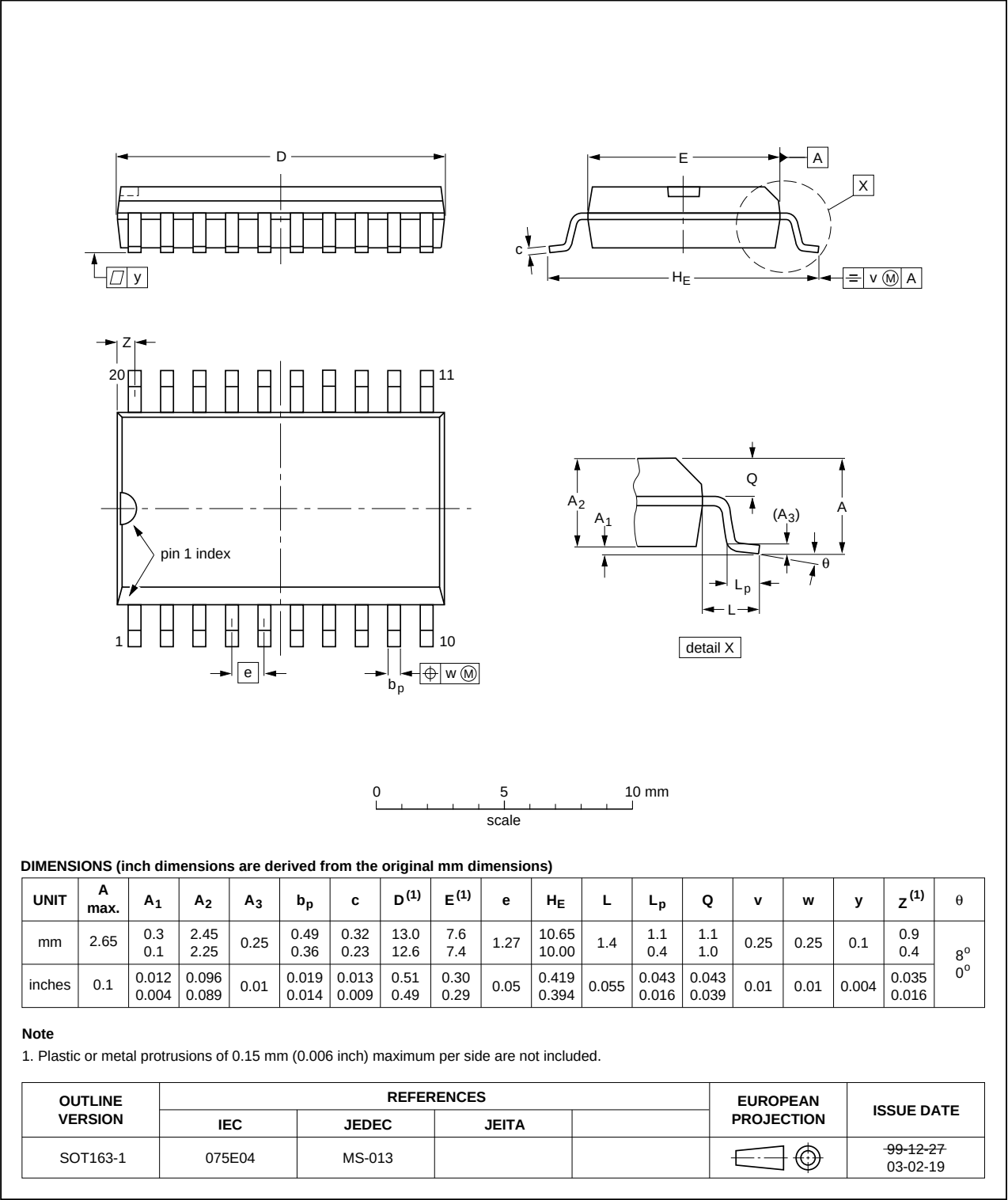


Fig 9. Package outline SOT163-1 (SO20)

SSOP20: plastic shrink small outline package; 20 leads; body width 5.3 mm

SOT339-1

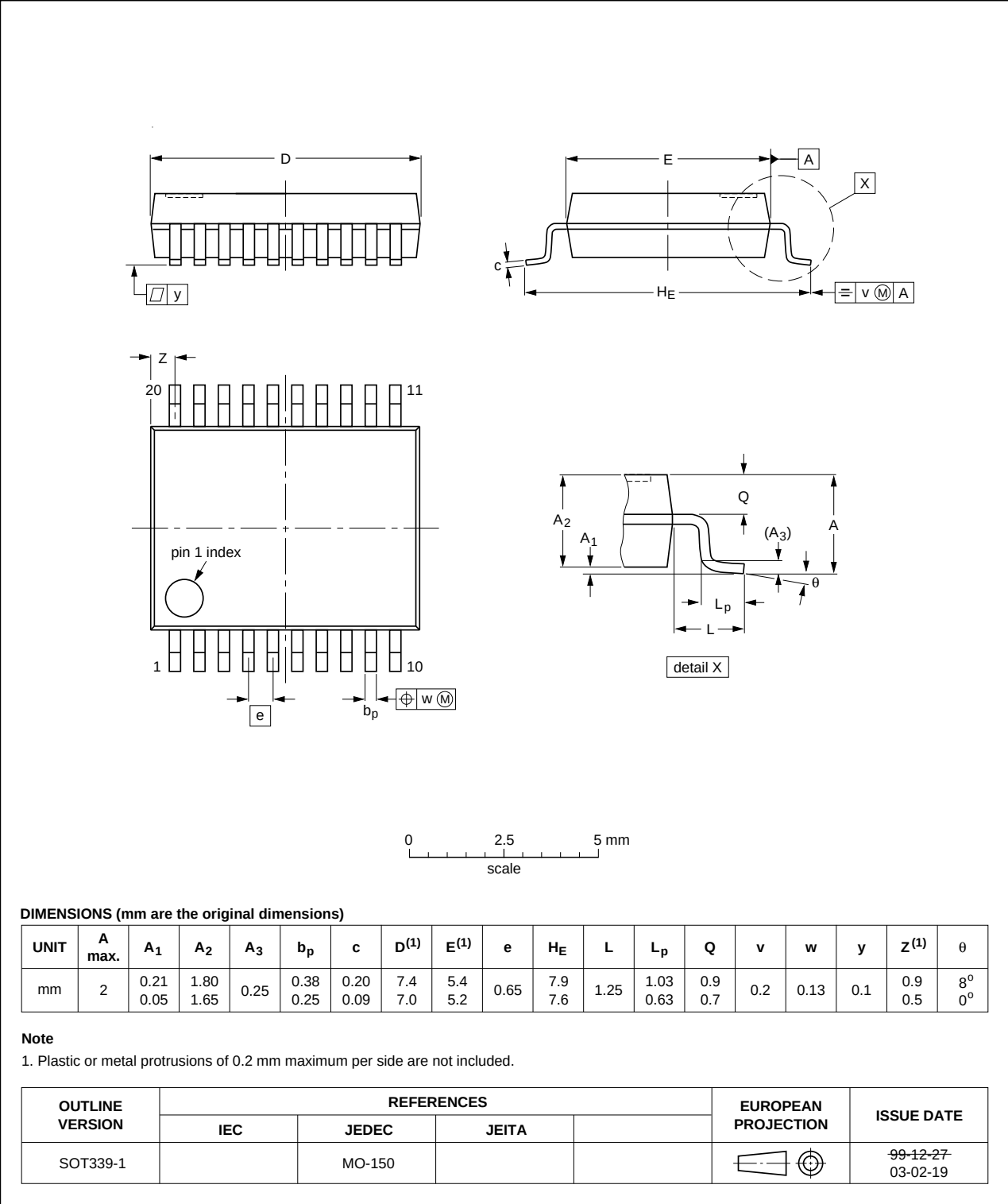


Fig 10. Package outline SOT339-1 (SSOP20)

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

SOT360-1

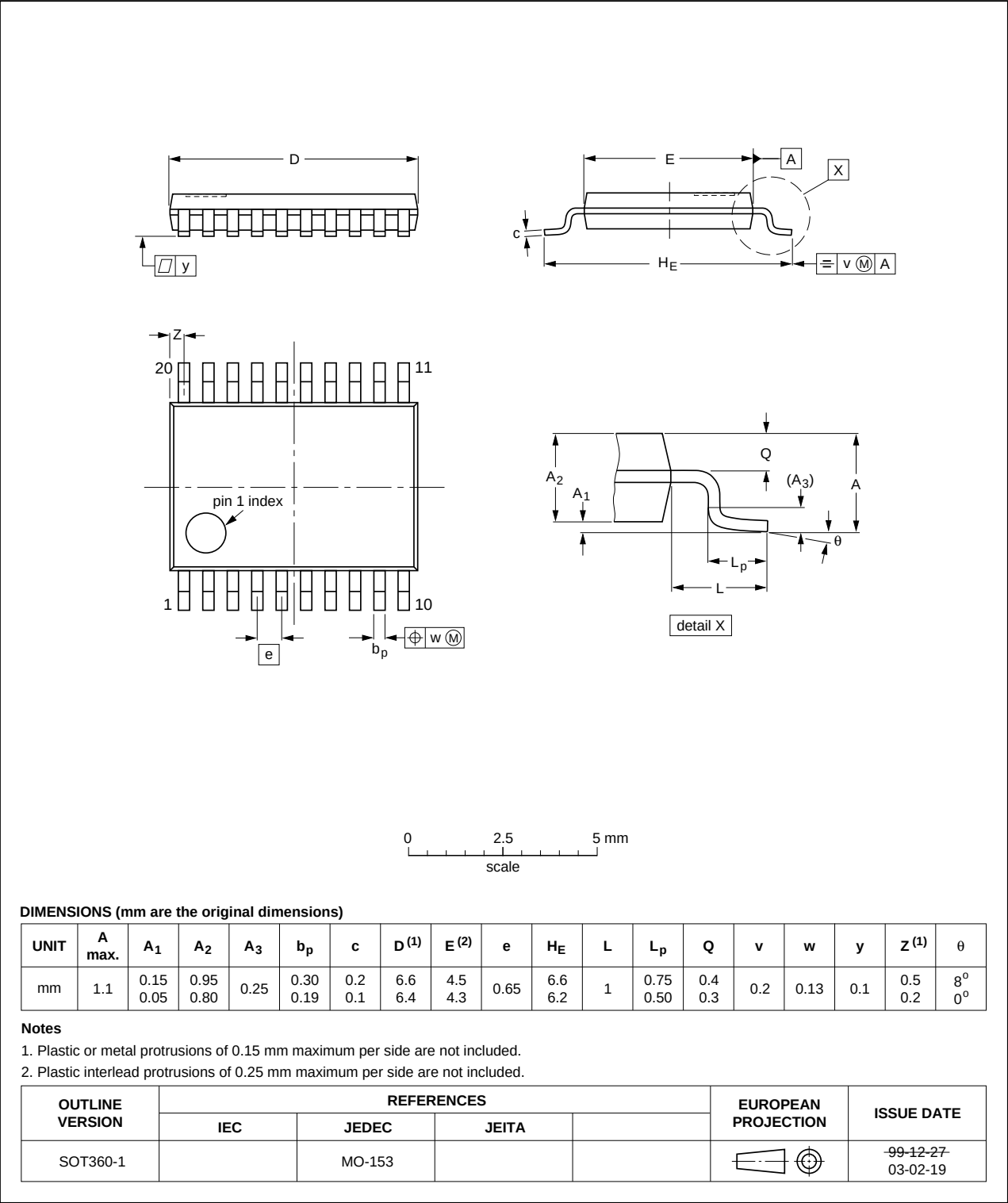


Fig 11. Package outline SOT360-1 (TSSOP20)

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

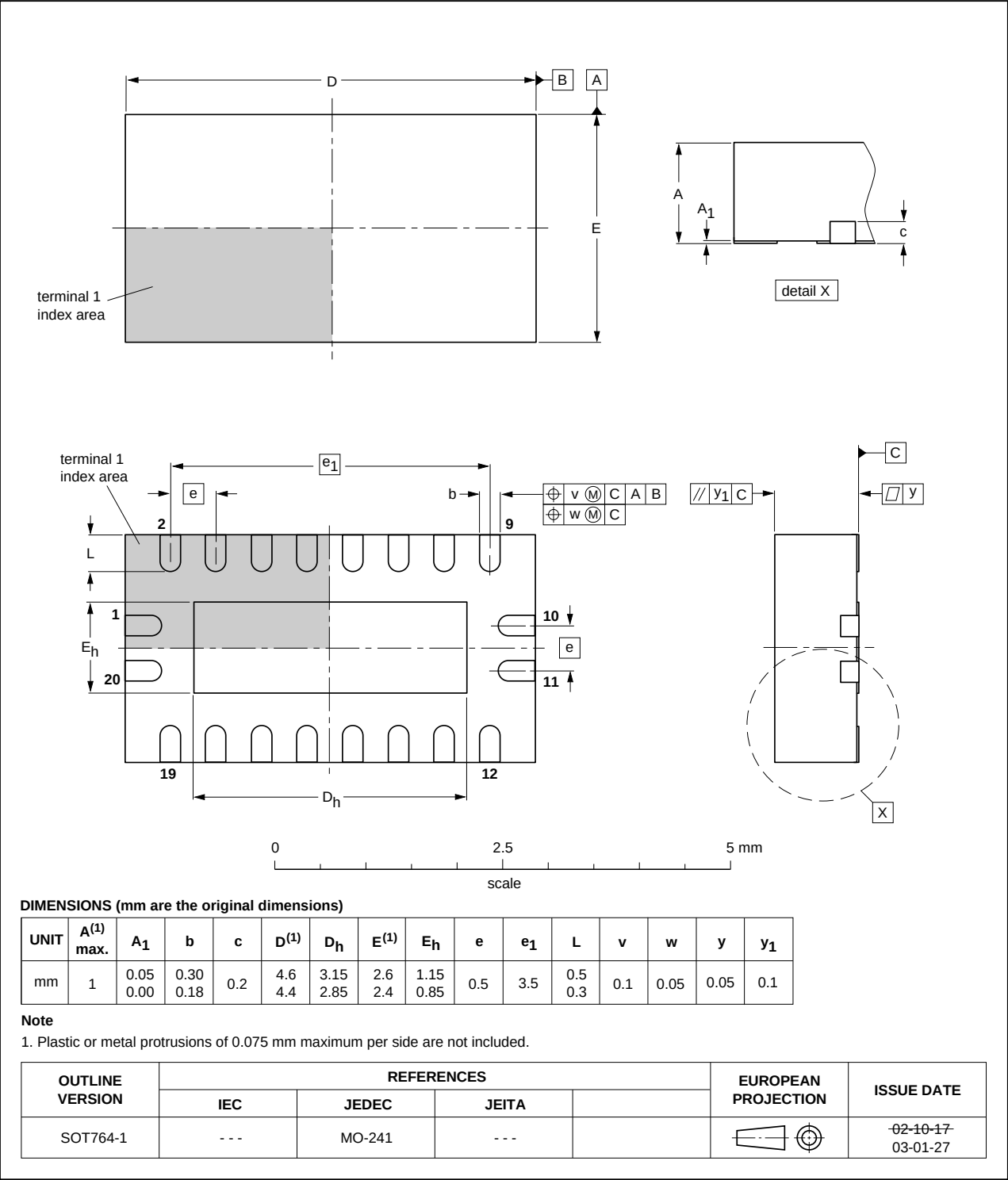


Fig 12. Package outline SOT764-1 (DHVQFN20)

## 13. 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             |
| MIL     | Military                                |

## 14. Revision history

Table 11. Revision history

| Document ID                                                                                                   | Release date | Data sheet status  | Change notice | Supersedes              |
|---------------------------------------------------------------------------------------------------------------|--------------|--------------------|---------------|-------------------------|
| 74LVC_LVCH244A_Q100 v.2                                                                                       | 20130813     | Product data sheet | -             | 74LVC_LVCH244A_Q100 v.1 |
| Modifications: <ul style="list-style-type: none"><li>• 74LVC244ADB-Q100 and 74LVCH244DB-Q100 added.</li></ul> |              |                    |               |                         |
| 74LVC_LVCH244A_Q100 v.1                                                                                       | 20120823     | Product data sheet | -             | -                       |



## 15. Legal information

### 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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