

# 74LVC574A

Octal D-type flip-flop with 5 V tolerant inputs/outputs; positive edge-trigger; 3-state

Rev. 5 — 18 December 2012

Product data sheet

## 1. General description

The 74LVC574A is an octal D-type flip-flop featuring separate D-type inputs for each flip-flop and 3-state outputs for bus-oriented applications. A clock (CP) and an Output Enable ( $\overline{OE}$ ) input are common to all flip-flops.

The eight flip-flops will store the state of their individual D-inputs that meet the set-up and hold times requirements on the LOW to HIGH CP transition.

When  $\overline{OE}$  is LOW, the contents of the eight flip-flops are available at the outputs. When  $\overline{OE}$  is HIGH, the outputs go to the high-impedance OFF-state. Operation of the  $\overline{OE}$  input does not affect the state of the flip-flops.

Inputs can be driven from either 3.3 V or 5 V devices. When disabled, up to 5.5 V can be applied to the outputs. These features allow the use of these devices as translators in mixed 3.3 V or 5 V applications.

The 74LVC574A is functionally identical to the 74LVC374A, but has a different pin arrangement.

## 2. Features and benefits

- 5 V tolerant inputs for interfacing with 5 V logic
- Supply voltage range from 1.2 V to 3.6 V
- CMOS low power consumption
- Direct interface with TTL levels
- High-impedance when  $V_{CC} = 0$  V
- 8-bit positive edge-triggered register
- Independent register and 3-state buffer operation
- Flow-through pin-out architecture
- Complies with JEDEC standard:
  - ◆ JESD8-7A (1.65 V to 1.95 V)
  - ◆ JESD8-5A (2.3 V to 2.7 V)
  - ◆ JESD8-C/JESD36 (2.7 V to 3.6 V)
- ESD protection:
  - ◆ HBM JESD22-A114F exceeds 2000 V
  - ◆ MM JESD22-A115-B exceeds 200 V
  - ◆ CDM JESD22-C101E exceeds 1000 V
- Specified from  $-40$  °C to  $+85$  °C and  $-40$  °C to  $+125$  °C



### 3. Ordering information

Table 1. Ordering information

| Type number | Package           |          |   | Version  |
|-------------|-------------------|----------|---|----------|
|             | Temperature range | Name     | Description   |          |
| 74LVC574AD  | -40 °C to +125 °C | SO20     | plastic small outline package; 20 leads;<br>body width 7.5 mm   | SOT163-1 |
| 74LVC574ADB | -40 °C to +125 °C | SSOP20   | plastic shrink small outline package; 20 leads;<br>body width 5.3 mm  | SOT339-1 |
| 74LVC574APW | -40 °C to +125 °C | TSSOP20  | plastic thin shrink small outline package; 20 leads;<br>body width 4.4 mm   | SOT360-1 |
| 74LVC574ABQ | -40 °C to +125 °C | DHVQFN20 | plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 20 terminals;<br>body 2.5 × 4.5 × 0.85 mm | SOT764-1 |

### 4. Functional diagram

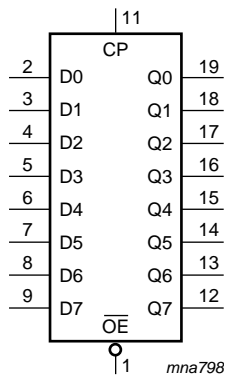


Fig 1. Logic diagram

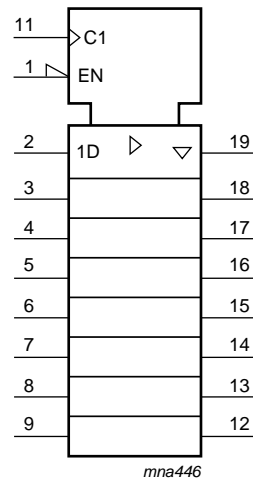


Fig 2. IEC logic symbol

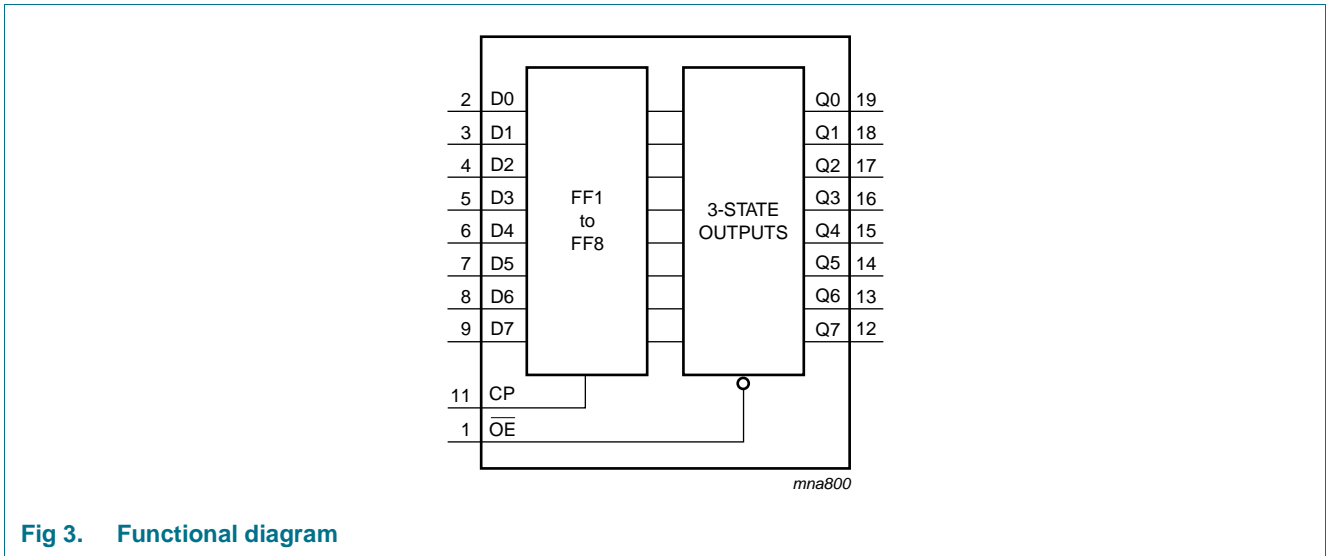


Fig 3. Functional diagram

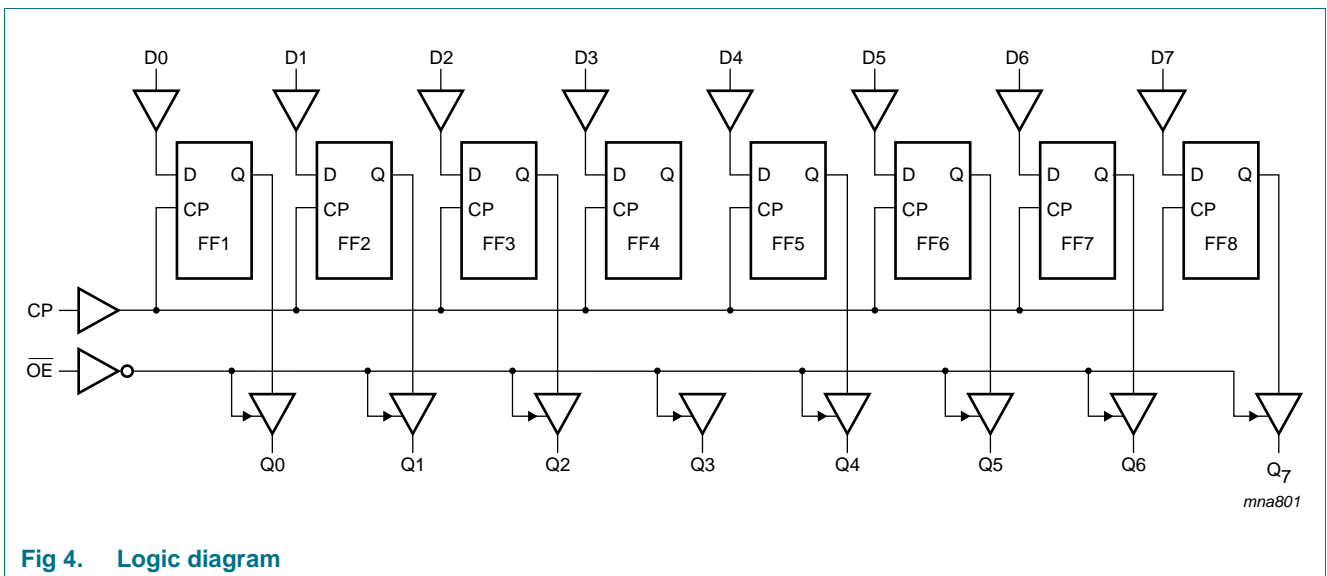
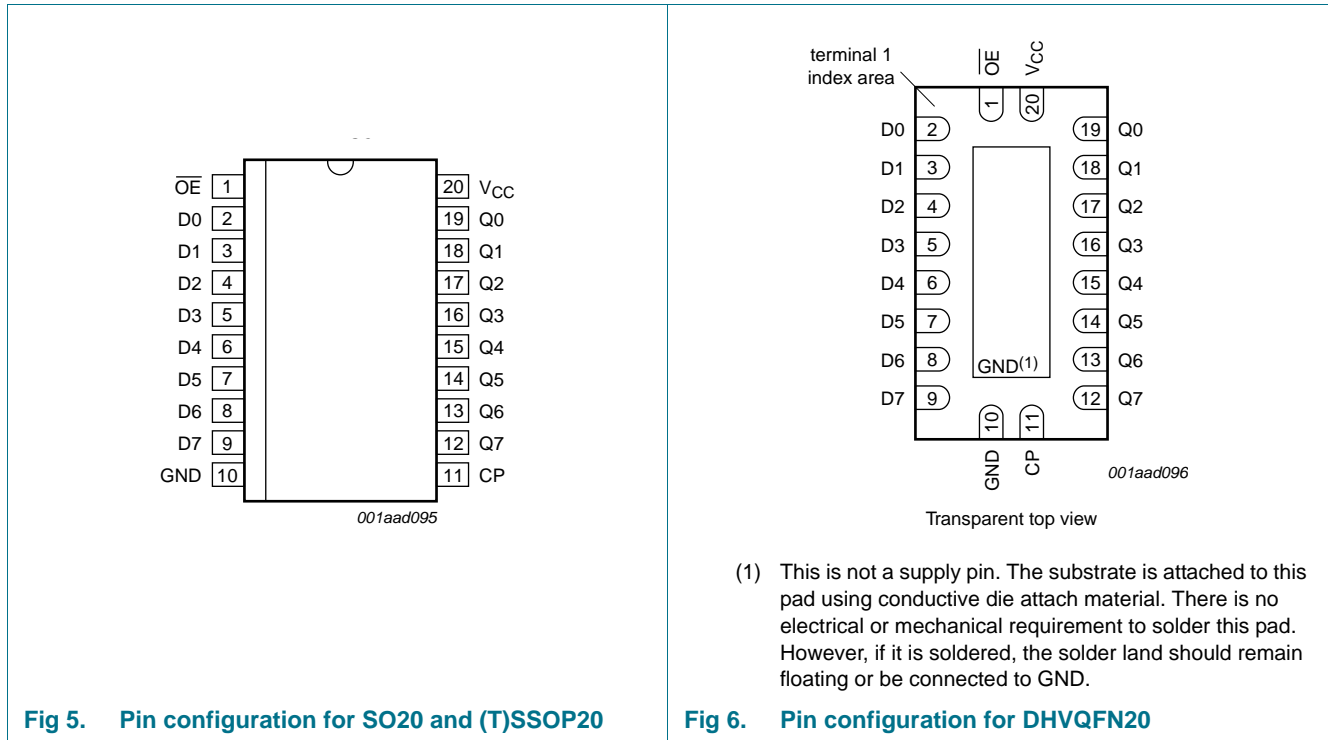


Fig 4. Logic diagram

## 5. Pinning information

### 5.1 Pinning



### 5.2 Pin description

Table 2. Pin description

| Symbol          | Pin                            | Description                               |
|-----------------|--------------------------------|---|
| $\overline{OE}$ | 1                              | output enable input (active LOW)          |
| CP              | 11                             | clock input (LOW to HIGH; edge triggered) |
| D[0:7]          | 2, 3, 4, 5, 6, 7, 8, 9         | data input                                |
| Q[0:7]          | 19, 18, 17, 16, 15, 14, 13, 12 | data output                               |
| GND             | 10                             | ground (0 V)                              |
| V <sub>CC</sub> | 20                             | supply voltage                            |

## 6. Functional description

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

| Operating modes                   | Input |    |    | Internal flip-flop | Output Qn |
|-----------------------------------|-------|----|----|--------------------|-----------|
|                                   | OE    | CP | Dn |                    |           |
| Load and read register            | L     | ↑  | l  | L                  | L         |
|                                   | L     | ↑  | h  | H                  | H         |
| Load register and disable outputs | H     | ↑  | l  | L                  | Z         |
|                                   | H     | ↑  | h  | H                  | Z         |

- [1] H = HIGH voltage level  
h = HIGH voltage level one set-up time prior to the LOW to HIGH CP transition  
L = LOW voltage level  
l = LOW voltage level one set-up time prior to the LOW to HIGH CP transition  
↑ = LOW to HIGH clock transition  
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  | $V_I < 0$                     | -50                 | -              | mA   |
| $V_I$     | input voltage           |                               | <sup>[1]</sup> -0.5 | +6.5           | V    |
| $I_{OK}$  | output clamping current | $V_O > V_{CC}$ or $V_O < 0$   | -                   | ±50            | mA   |
| $V_O$     | output voltage          | output HIGH or LOW state      | <sup>[2]</sup> -0.5 | $V_{CC} + 0.5$ | V    |
| $I_O$     | output current          | $V_O = 0$ V to $V_{CC}$       | -                   | ±50            | mA   |
| $I_{CC}$  | supply current          |                               | -                   | 100            | mA   |
| $I_{GND}$ | ground current          |                               | -100                | -              | mA   |
| $T_{stg}$ | storage temperature     |                               | -65                 | +150           | °C   |
| $P_{tot}$ | total power dissipation | $T_{amb} = -40$ °C to +125 °C | <sup>[3]</sup> -    | 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 the value of  $P_{tot}$  derates linearly with 8 mW/K.  
For (T)SSOP20 packages: above 60 °C the value of  $P_{tot}$  derates linearly with 5.5 mW/K.  
For DHVQFN20 packages: above 60 °C the value of  $P_{tot}$  derates linearly with 4.5 mW/K.

## 8. Recommended operating conditions

**Table 5. Recommended operating conditions**

| Symbol           | Parameter                           | Conditions                        | Min  | Typ | Max             | Unit |
|------------------|-------------------------------------|-----------------------------------|------|-----|-----------------|------|
| V <sub>CC</sub>  | supply voltage                      |                                   | 1.65 | -   | 3.6             | V    |
|                  |                                     | functional                        | 1.2  | -   | -               | V    |
| V <sub>I</sub>   | input voltage                       |                                   | 0    | -   | 5.5             | V    |
| V <sub>O</sub>   | output voltage                      | output HIGH or LOW state          | 0    | -   | V <sub>CC</sub> | V    |
|                  |                                     | output 3-state                    | 0    | -   | 5.5             | V    |
| T <sub>amb</sub> | ambient temperature                 | in free air                       | -40  | -   | +125            | °C   |
| Δt/ΔV            | input transition rise and fall rate | V <sub>CC</sub> = 1.65 V to 2.7 V | 0    | -   | 20              | ns/V |
|                  |                                     | V <sub>CC</sub> = 2.7 V to 3.6 V  | 0    | -   | 10              | ns/V |

## 9. Static characteristics

**Table 6. Static characteristics**

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

| Symbol          | Parameter                 | Conditions  | -40 °C to +85 °C       |                    |                        | -40 °C to +125 °C      |                        | Unit |
|-----------------|---------------------------|---|------------------------|--------------------|------------------------|------------------------|------------------------|------|
|                 |                           |   | Min                    | Typ <sup>[1]</sup> | Max                    | Min                    | Max                    |      |
| V <sub>IH</sub> | HIGH-level input voltage  | V <sub>CC</sub> = 1.2 V                                     | 1.08                   | -                  | -                      | 1.08                   | -                      | V    |
|                 |                           | V <sub>CC</sub> = 1.65 V to 1.95 V                          | 0.65 × V <sub>CC</sub> | -                  | -                      | 0.65 × V <sub>CC</sub> | -                      | V    |
|                 |                           | V <sub>CC</sub> = 2.3 V to 2.7 V                            | 1.7                    | -                  | -                      | 1.7                    | -                      | V    |
|                 |                           | V <sub>CC</sub> = 2.7 V to 3.6 V                            | 2.0                    | -                  | -                      | 2.0                    | -                      | V    |
| V <sub>IL</sub> | LOW-level input voltage   | V <sub>CC</sub> = 1.2 V                                     | -                      | -                  | 0.12                   | -                      | 0.12                   | V    |
|                 |                           | V <sub>CC</sub> = 1.65 V to 1.95 V                          | -                      | -                  | 0.35 × V <sub>CC</sub> | -                      | 0.35 × V <sub>CC</sub> | V    |
|                 |                           | V <sub>CC</sub> = 2.3 V to 2.7 V                            | -                      | -                  | 0.7                    | -                      | 0.7                    | V    |
|                 |                           | V <sub>CC</sub> = 2.7 V to 3.6 V                            | -                      | -                  | 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>         |                        |                    |                        |                        |                        |      |
|                 |                           | I <sub>O</sub> = -100 μA; V <sub>CC</sub> = 1.65 V to 3.6 V | V <sub>CC</sub> - 0.2  | -                  | -                      | V <sub>CC</sub> - 0.3  | -                      | V    |
|                 |                           | I <sub>O</sub> = -4 mA; V <sub>CC</sub> = 1.65 V            | 1.2                    | -                  | -                      | 1.05                   | -                      | V    |
|                 |                           | I <sub>O</sub> = -8 mA; V <sub>CC</sub> = 2.3 V             | 1.8                    | -                  | -                      | 1.65                   | -                      | V    |
|                 |                           | I <sub>O</sub> = -12 mA; V <sub>CC</sub> = 2.7 V            | 2.2                    | -                  | -                      | 2.05                   | -                      | V    |
|                 |                           | I <sub>O</sub> = -18 mA; V <sub>CC</sub> = 3.0 V            | 2.4                    | -                  | -                      | 2.25                   | -                      | 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> = 100 μA; V <sub>CC</sub> = 1.65 V to 3.6 V  | -                      | -                  | 0.2                    | -                      | 0.3                    | V    |
|                 |                           | I <sub>O</sub> = 4 mA; V <sub>CC</sub> = 1.65 V             | -                      | -                  | 0.45                   | -                      | 0.65                   | V    |
|                 |                           | I <sub>O</sub> = 8 mA; V <sub>CC</sub> = 2.3 V              | -                      | -                  | 0.6                    | -                      | 0.8                    | V    |
|                 |                           | I <sub>O</sub> = 12 mA; V <sub>CC</sub> = 2.7 V             | -                      | -                  | 0.4                    | -                      | 0.6                    | V    |
|                 |                           | I <sub>O</sub> = 24 mA; V <sub>CC</sub> = 3.0 V             | -                      | -                  | 0.55                   | -                      | 0.8                    | V    |
| I <sub>I</sub>  | input leakage current     | V <sub>CC</sub> = 3.6 V; V <sub>I</sub> = 5.5 V or GND      | -                      | ±0.1               | ±5                     | -                      | ±20                    | μA   |

**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>OZ</sub>  | OFF-state output current  | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 3.6 V; V <sub>O</sub> = 5.5 V or GND;   | -                | 0.1                | ±10 | -                 | ±20  | µA   |
| I <sub>OFF</sub> | power-off leakage supply  | V <sub>CC</sub> = 0 V; V <sub>I</sub> or V <sub>O</sub> = 5.5 V   | -                | 0.1                | ±10 | -                 | ±20  | µA   |
| I <sub>CC</sub>  | supply current            | V <sub>CC</sub> = 3.6 V; V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A                          | -                | 0.1                | 10  | -                 | 40   | µA   |
| ΔI <sub>CC</sub> | additional supply current | per input pin; V <sub>CC</sub> = 2.7 V to 3.6 V; V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; I <sub>O</sub> = 0 A | -                | 5                  | 500 | -                 | 5000 | µA   |
| C <sub>I</sub>   | input capacitance         | V <sub>CC</sub> = 0 V to 3.6 V; V <sub>I</sub> = GND to V <sub>CC</sub>   | -                | 5.0                | -   | -                 | -    | pF   |

[1] All typical values are measured at V<sub>CC</sub> = 3.3 V (unless stated otherwise) and T<sub>amb</sub> = 25 °C.

## 10. Dynamic characteristics

**Table 7. Dynamic characteristics**

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

| 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 | CP to Qn; see <a href="#">Figure 7</a> <sup>[2]</sup> | -                | 17.0               | -    | -                 | -    | ns   |
|                  |                   | V <sub>CC</sub> = 1.2 V                               | -                | 17.0               | -    | -                 | -    | ns   |
|                  |                   | V <sub>CC</sub> = 1.65 V to 1.95 V                    | 4.6              | 6.4                | 13.1 | 4.6               | 15.1 | ns   |
|                  |                   | V <sub>CC</sub> = 2.3 V to 2.7 V                      | 2.6              | 3.9                | 7.9  | 2.6               | 9.1  | ns   |
|                  |                   | V <sub>CC</sub> = 2.7 V                               | 1.5              | 3.7                | 8.0  | 1.5               | 10.0 | ns   |
| t <sub>en</sub>  | enable time       | OE to Qn; see <a href="#">Figure 9</a> <sup>[2]</sup> | -                | 19.0               | -    | -                 | -    | ns   |
|                  |                   | V <sub>CC</sub> = 1.2 V                               | -                | 19.0               | -    | -                 | -    | ns   |
|                  |                   | V <sub>CC</sub> = 1.65 V to 1.95 V                    | 1.5              | 7.0                | 17.1 | 1.5               | 19.8 | ns   |
|                  |                   | V <sub>CC</sub> = 2.3 V to 2.7 V                      | 1.5              | 4.0                | 9.4  | 1.5               | 10.9 | ns   |
|                  |                   | V <sub>CC</sub> = 2.7 V                               | 1.5              | 4.1                | 8.5  | 1.5               | 11.0 | ns   |
| t <sub>dis</sub> | disable time      | OE to Qn; see <a href="#">Figure 9</a> <sup>[2]</sup> | -                | 9.0                | -    | -                 | -    | ns   |
|                  |                   | V <sub>CC</sub> = 1.2 V                               | -                | 9.0                | -    | -                 | -    | ns   |
|                  |                   | V <sub>CC</sub> = 1.65 V to 1.95 V                    | 2.5              | 4.1                | 10.1 | 2.5               | 11.6 | ns   |
|                  |                   | V <sub>CC</sub> = 2.3 V to 2.7 V                      | 1.0              | 2.3                | 5.7  | 1.0               | 6.6  | ns   |
|                  |                   | V <sub>CC</sub> = 2.7 V                               | 1.5              | 3.1                | 6.5  | 1.5               | 8.5  | ns   |
| t <sub>dis</sub> | disable time      | V <sub>CC</sub> = 3.0 V to 3.6 V                      | 1.5              | 2.9                | 6.0  | 1.5               | 7.5  | ns   |

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

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

| Symbol             | Parameter                     | Conditions   | -40 °C to +85 °C |                    |     | -40 °C to +125 °C |     | Unit |
|--------------------|-------------------------------|--|------------------|--------------------|-----|-------------------|-----|------|
|                    |                               |  | Min              | Typ <sup>[1]</sup> | Max | Min               | Max |      |
| t <sub>w</sub>     | pulse width                   | clock HIGH or LOW; see <a href="#">Figure 7</a>                            |                  |                    |     |                   |     |      |
|                    |                               | V <sub>CC</sub> = 1.65 V to 1.95 V   | 5.0              | -                  | -   | 5.0               | -   | ns   |
|                    |                               | V <sub>CC</sub> = 2.3 V to 2.7 V   | 4.0              | -                  | -   | 4.0               | -   | ns   |
|                    |                               | V <sub>CC</sub> = 2.7 V  | 3.3              | -                  | -   | 3.3               | -   | ns   |
| t <sub>su</sub>    | set-up time                   | Dn to CP; see <a href="#">Figure 8</a>                                     |                  |                    |     |                   |     |      |
|                    |                               | V <sub>CC</sub> = 1.65 V to 1.95 V   | 4.0              | -                  | -   | 4.0               | -   | ns   |
|                    |                               | V <sub>CC</sub> = 2.3 V to 2.7 V   | 2.5              | -                  | -   | 2.5               | -   | ns   |
|                    |                               | V <sub>CC</sub> = 2.7 V  | 2.0              | -                  | -   | 2.0               | -   | ns   |
| t <sub>h</sub>     | hold time                     | Dn to CP; see <a href="#">Figure 8</a>                                     |                  |                    |     |                   |     |      |
|                    |                               | V <sub>CC</sub> = 1.65 V to 1.95 V   | 3.0              | -                  | -   | 3.0               | -   | ns   |
|                    |                               | V <sub>CC</sub> = 2.3 V to 2.7 V   | 2.0              | -                  | -   | 2.0               | -   | ns   |
|                    |                               | V <sub>CC</sub> = 2.7 V  | 1.5              | -                  | -   | 1.5               | -   | ns   |
| f <sub>max</sub>   | maximum frequency             | see <a href="#">Figure 7</a>   |                  |                    |     |                   |     |      |
|                    |                               | V <sub>CC</sub> = 1.65 V to 1.95 V   | 100              | -                  | -   | 80                | -   | MHz  |
|                    |                               | V <sub>CC</sub> = 2.3 V to 2.7 V   | 125              | -                  | -   | 100               | -   | MHz  |
|                    |                               | V <sub>CC</sub> = 2.7 V  | 150              | -                  | -   | 120               | -   | MHz  |
| t <sub>sk(0)</sub> | output skew time              | V <sub>CC</sub> = 3.0 V to 3.6 V <a href="#">[3]</a>                       | -                | -                  | 1.0 | -                 | 1.5 | ns   |
|                    |                               | V <sub>CC</sub> = 3.0 V to 3.6 V   | -                | -                  | 1.0 | -                 | 1.5 | ns   |
|                    |                               | V <sub>CC</sub> = 3.0 V to 3.6 V   | -                | -                  | 1.0 | -                 | 1.5 | ns   |
|                    |                               | V <sub>CC</sub> = 3.0 V to 3.6 V   | -                | -                  | 1.0 | -                 | 1.5 | ns   |
| C <sub>PD</sub>    | power dissipation capacitance | per flip-flop; V <sub>I</sub> = GND to V <sub>CC</sub> <a href="#">[4]</a> |                  |                    |     |                   |     |      |
|                    |                               | V <sub>CC</sub> = 1.65 V to 1.95 V   | -                | 11.2               | -   | -                 | -   | pF   |
|                    |                               | V <sub>CC</sub> = 2.3 V to 2.7 V   | -                | 13.2               | -   | -                 | -   | pF   |
|                    |                               | V <sub>CC</sub> = 3.0 V to 3.6 V   | -                | 14.9               | -   | -                 | -   | 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

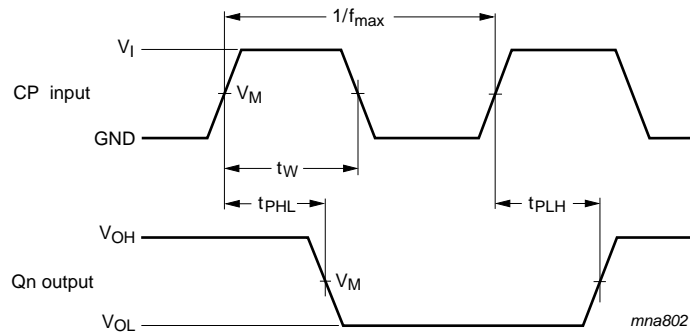
V<sub>CC</sub> = supply voltage in Volts

N = number of inputs switching

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

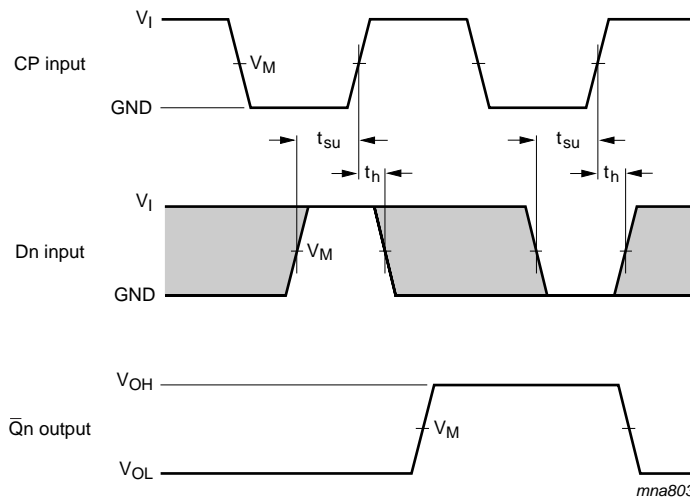


11. AC waveforms



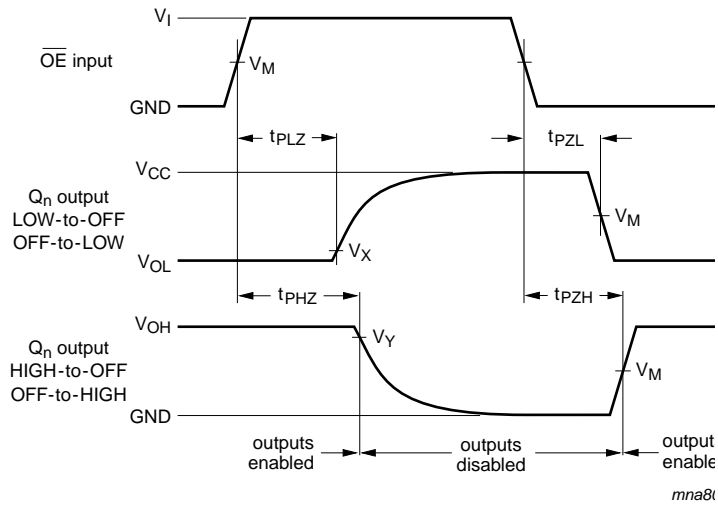
Measurement points are given in [Table 8](#).  
 VOL and VOH are typical output voltage levels that occur with the output load.

**Fig 7. Clock (CP) to output (Qn) propagation delays, the clock pulse width, output transition times, and the maximum frequency**



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

**Fig 8. Data set-up and hold times for the Dn input to the CP input**

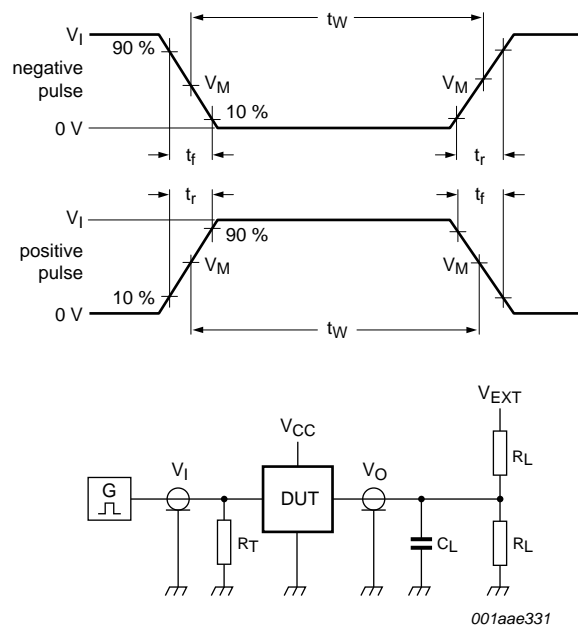


Measurement points are given in [Table 8](#).  
 V<sub>OL</sub> and V<sub>OH</sub> are typical output voltage levels that occur with the output load.

**Fig 9. 3-state enable and disable times**

**Table 8. Measurement points**

| Supply voltage   | Input           |                       | Output                |                          |                          |
|------------------|-----------------|-----------------------|-----------------------|--------------------------|--------------------------|
| V <sub>CC</sub>  | V <sub>I</sub>  | V <sub>M</sub>        | V <sub>M</sub>        | V <sub>X</sub>           | V <sub>Y</sub>           |
| 1.2 V            | V <sub>CC</sub> | 0.5 × V <sub>CC</sub> | 0.5 × V <sub>CC</sub> | V <sub>OL</sub> + 0.15 V | V <sub>OH</sub> - 0.15 V |
| 1.65 V to 1.95 V | V <sub>CC</sub> | 0.5 × V <sub>CC</sub> | 0.5 × V <sub>CC</sub> | V <sub>OL</sub> + 0.15 V | V <sub>OH</sub> - 0.15 V |
| 2.3 V to 2.7 V   | V <sub>CC</sub> | 0.5 × V <sub>CC</sub> | 0.5 × V <sub>CC</sub> | V <sub>OL</sub> + 0.15 V | V <sub>OH</sub> - 0.15 V |
| 2.7 V            | 2.7 V           | 1.5 V                 | 1.5 V                 | V <sub>OL</sub> + 0.3 V  | V <sub>OH</sub> - 0.3 V  |
| 3.0 V to 3.6 V   | 2.7 V           | 1.5 V                 | 1.5 V                 | V <sub>OL</sub> + 0.3 V  | V <sub>OH</sub> - 0.3 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 10. Test circuitry 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

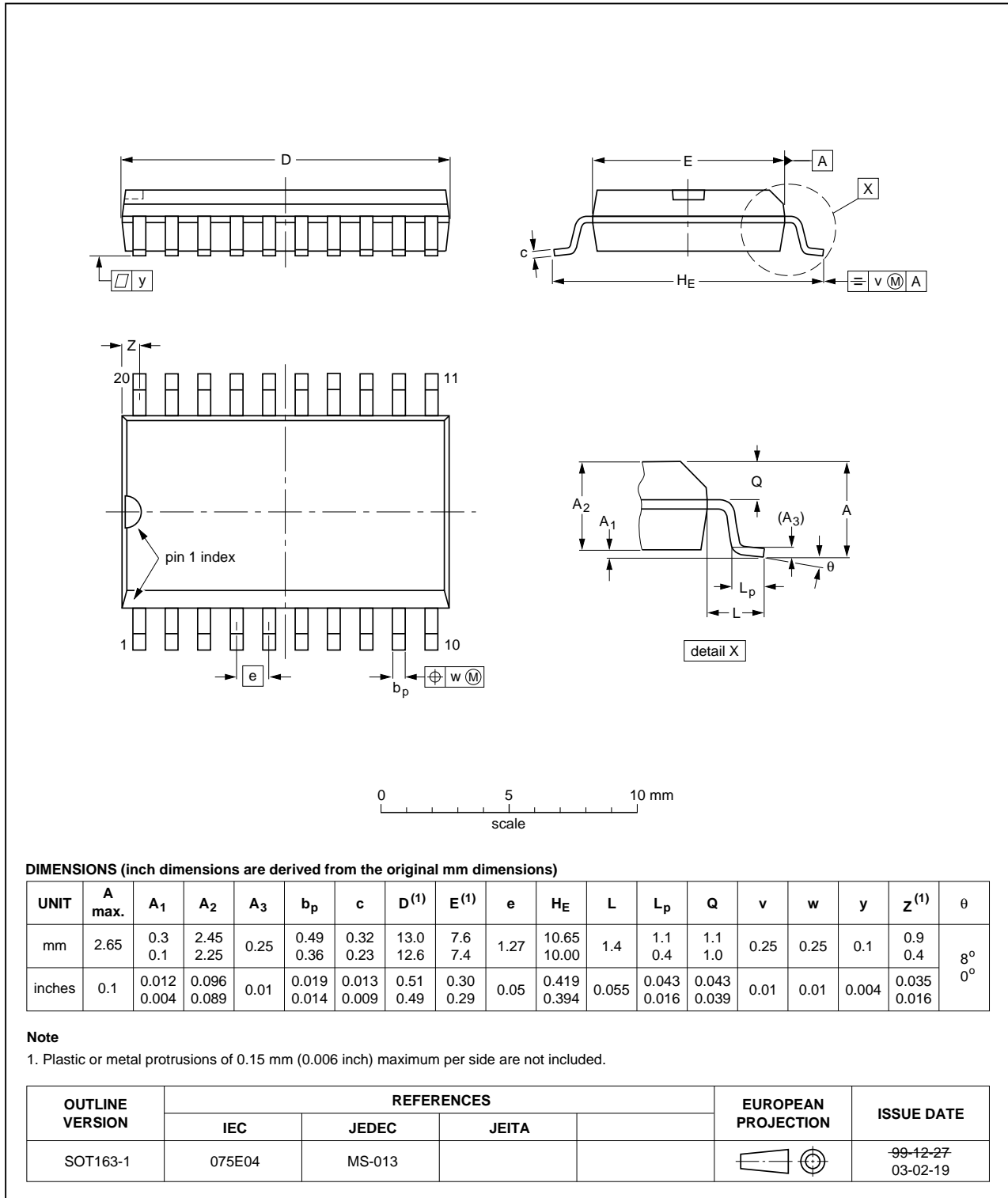


Fig 11. Package outline SOT163-1 (SO20)

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

SOT339-1

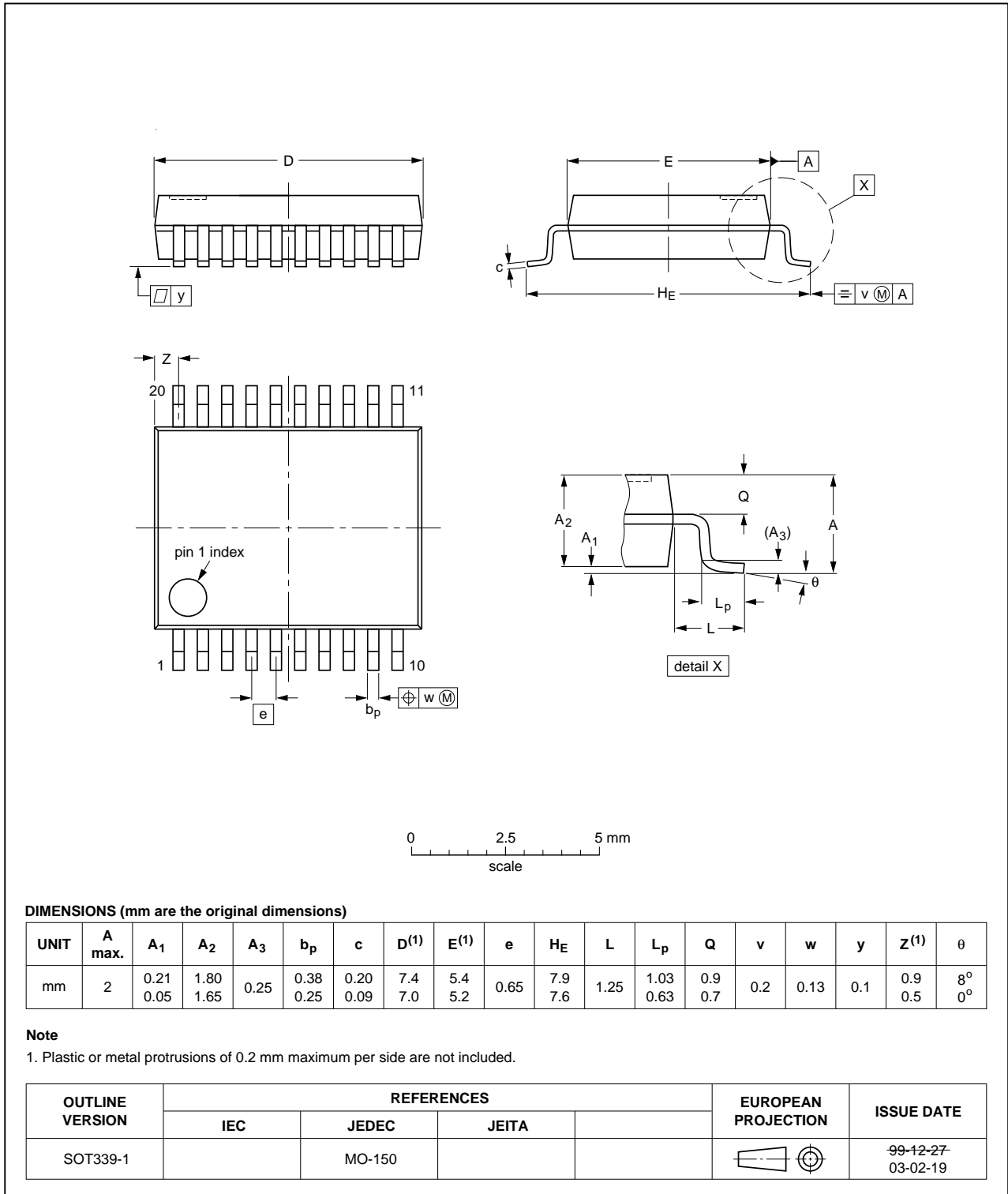


Fig 12. Package outline SOT339-1 (SSOP20)

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

SOT360-1

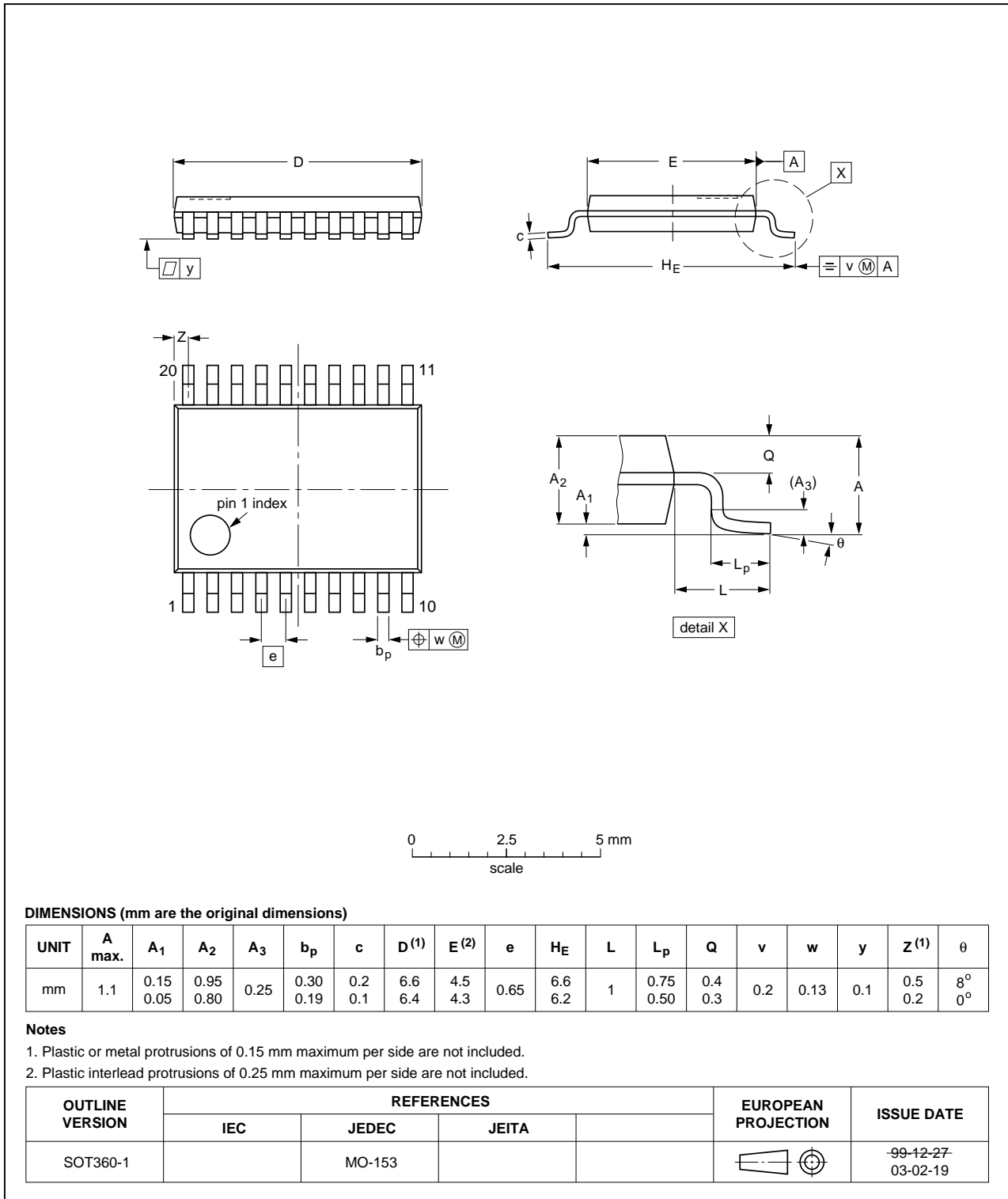


Fig 13. Package outline SOT360-1 (TSSOP20)

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

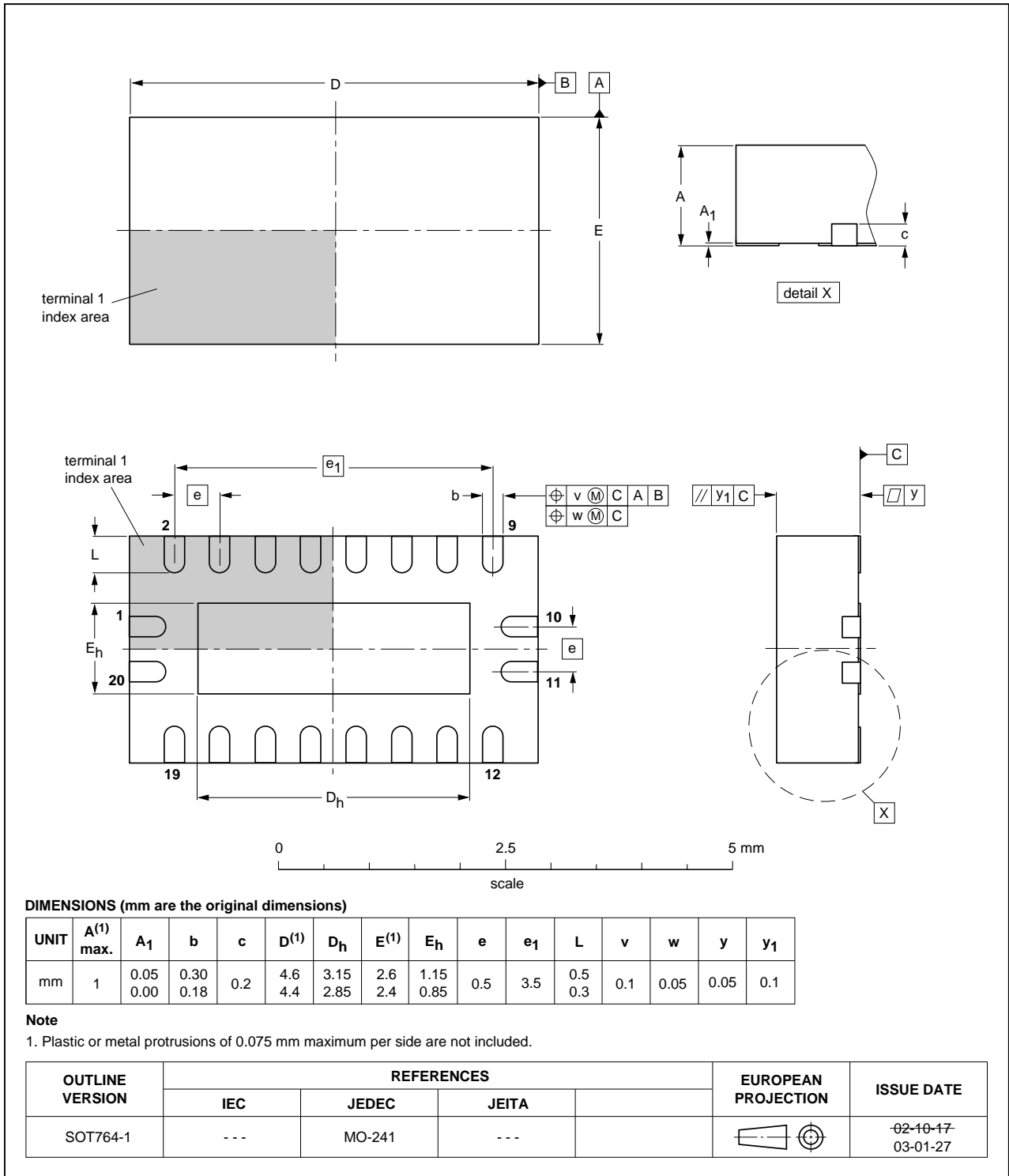


Fig 14. Package outline SOT764-1 (DHVQFN20)

## 13. Abbreviations

Table 10. Abbreviations

| Acronym | Description                 |
|---------|-----------------------------|
| CDM     | Charged Device Model        |
| DUT     | Device Under Test           |
| ESD     | ElectroStatic Discharge     |
| HBM     | Human Body Model            |
| MM      | Machine Model               |
| TTL     | Transistor-Transistor Logic |

## 14. Revision history

Table 11. Revision history

| Document ID    | Release date   | Data sheet status     | Change notice | Supersedes    |
|----------------|--|-----------------------|---------------|---------------|
| 74LVC574A v.5  | 20121218   | Product data sheet    | -             | 74LVC574A v.4 |
| Modifications: | <ul style="list-style-type: none"> <li>Changed interlacing into interfacing (errata) in features list.</li> </ul>  |                       |               |               |
| 74LVC574A v.4  | 20121203   | Product data sheet    | -             | 74LVC574A v.3 |
| 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="#">Table 4</a>, <a href="#">Table 5</a>, <a href="#">Table 6</a>, <a href="#">Table 7</a>, <a href="#">Table 8</a> and <a href="#">Table 9</a>: values added for lower voltage ranges.</li> </ul> |                       |               |               |
| 74LVC574A v.3  | 20040322   | Product specification | -             | 74LVC574A v.2 |
| 74LVC574A v.2  | 20030620   | Product specification | -             | 74LVC574A v.1 |
| 74LVC574A v.1  | 19980729   | Product specification | -             | -             |



## 15. Legal information

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| 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.                                     |

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[2] The term 'short data sheet' is explained in section "Definitions".

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Date of release: 18 December 2012

Document identifier: 74LVC574A



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