

# 74HC259; 74HCT259

## 8-bit addressable latch

Rev. 9 — 11 March 2024

Product data sheet

## 1. General description

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The 74HC259; 74HCT259 is an 8-bit addressable latch. The device features four modes of operation. In the addressable latch mode, data on the D input is written into the latch addressed by the inputs A0 to A3. The addressed latch will follow the data input, non-addressed latches will retain their previous states. In memory mode, all latches retain their previous states and are unaffected by the data or address inputs. In the 3-to-8 decoding or demultiplexing mode, the addressed output follows the D input and all other outputs are LOW. In the reset mode, all outputs are forced LOW and unaffected by the data or address inputs. Inputs include clamp diodes. This enables the use of current limiting resistors to interface inputs to voltages in excess of  $V_{CC}$ .

## 2. Features and benefits

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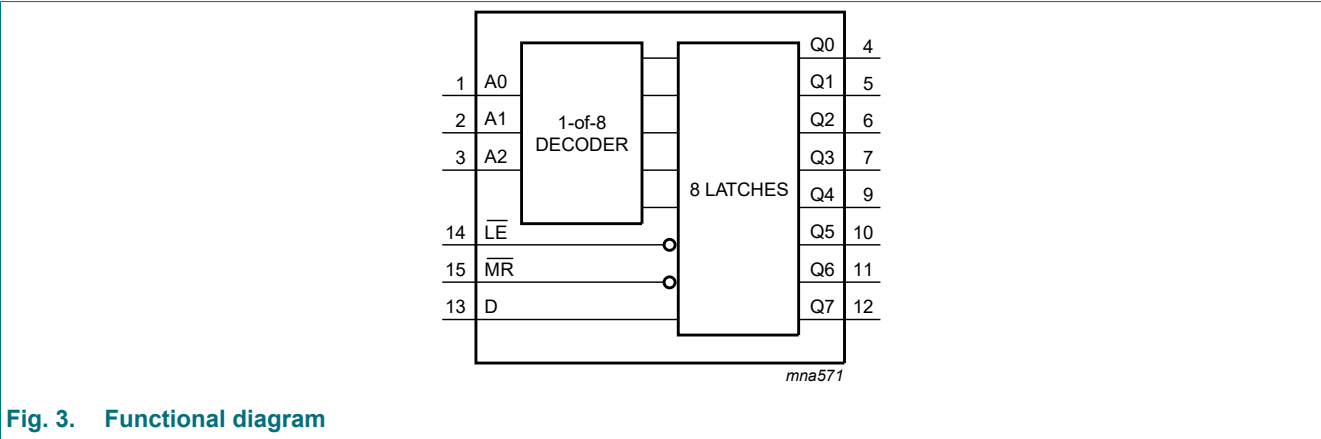
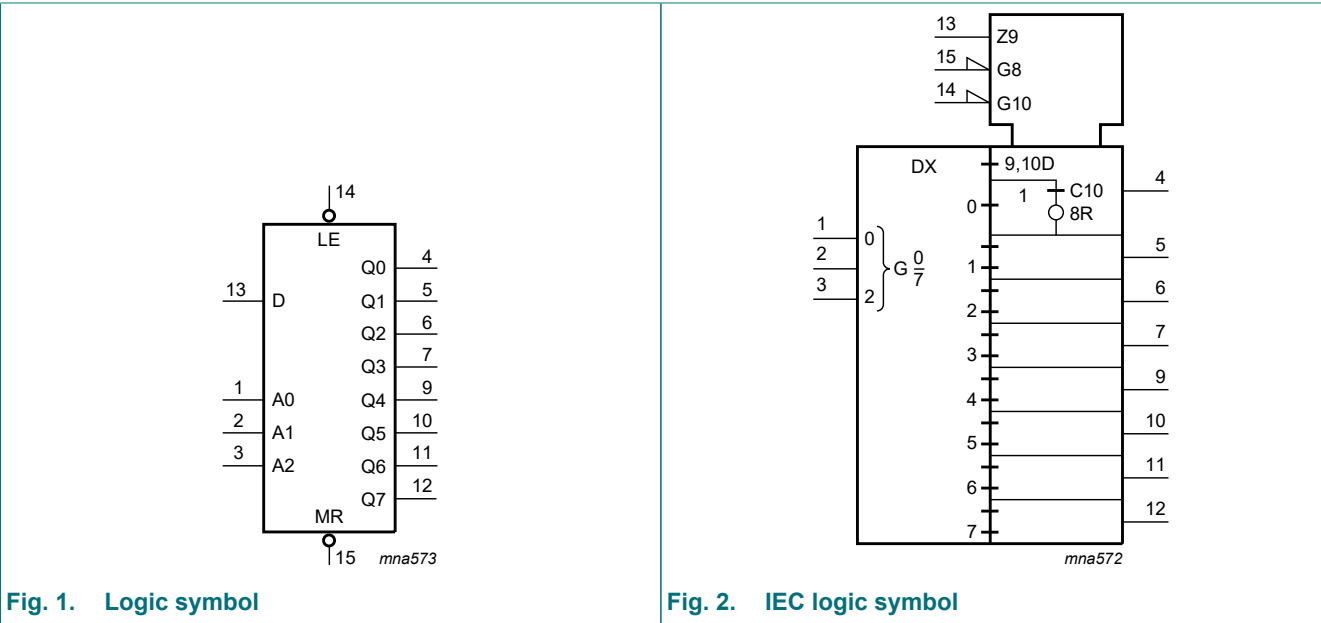
- Wide supply voltage range from 2.0 V to 6.0 V
- Latch-up performance exceeds 100 mA per JESD 78 Class II Level B
- Complies with JEDEC standards:
  - JESD8C (2.7 V to 3.6 V)
  - JESD7A (2.0 V to 6.0 V)
- Combined demultiplexer and 8-bit latch
- Serial-to-parallel capability
- Output from each storage bit available
- Random (addressable) data entry
- Easily expandable
- Common reset input
- Useful as a 3-to-8 active HIGH decoder
- Input levels:
  - For 74HC259: CMOS level
  - For 74HCT259: TTL level
- ESD protection:
  - HBM: ANSI/ESDA/JEDEC JS-001 class 2 exceeds 2000 V
  - CDM: ANSI/ESDA/JEDEC JS-002 class C3 exceeds 1000 V
- Multiple package options
- Specified from -40 °C to +85 °C and from -40 °C to +125 °C

3. Ordering information

Table 1. Ordering information

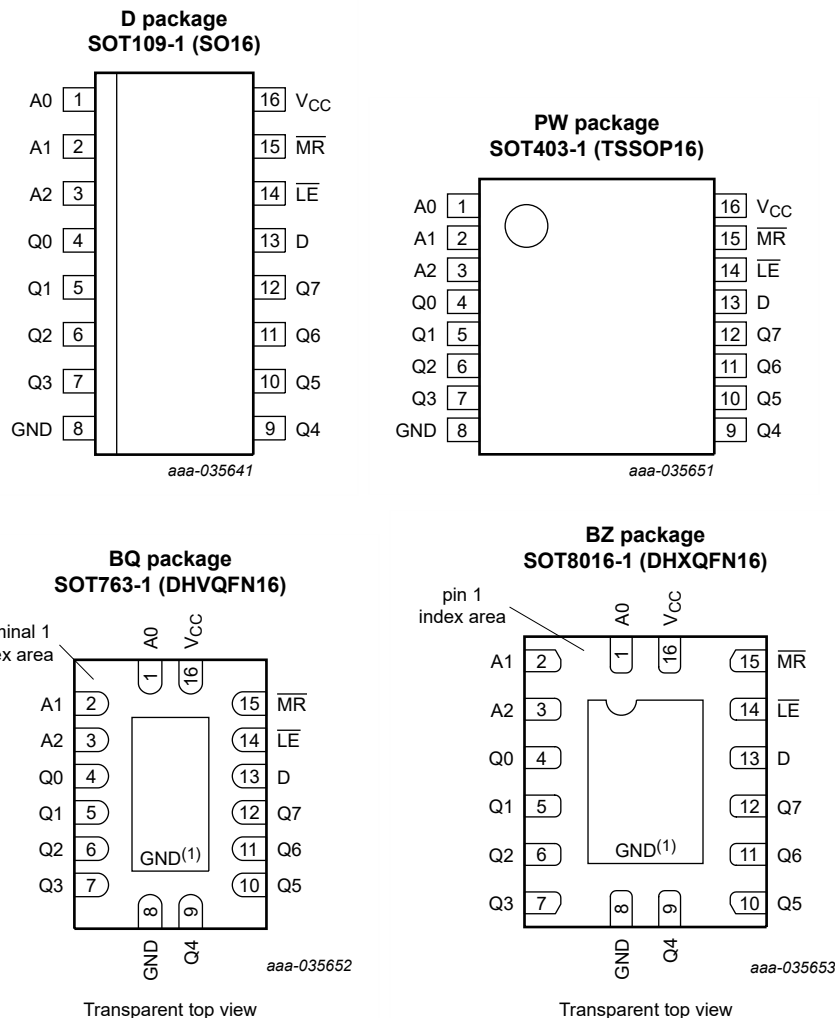
| Type number                                             | Package           |          |                                                                                                                                                                        |                           |
|---------------------------------------------------------|-------------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                                                         | Temperature range | Name     | Description                                                                                                                                                            | Version                   |
| <a href="#">74HC259D</a><br><a href="#">74HCT259D</a>   | -40 °C to +125 °C | SO16     | plastic small outline package; 16 leads;<br>body width 3.9 mm                                                                                                          | <a href="#">SOT109-1</a>  |
| <a href="#">74HC259PW</a><br><a href="#">74HCT259PW</a> | -40 °C to +125 °C | TSSOP16  | plastic thin shrink small outline package; 16 leads;<br>body width 4.4 mm                                                                                              | <a href="#">SOT403-1</a>  |
| <a href="#">74HC259BQ</a><br><a href="#">74HCT259BQ</a> | -40 °C to +125 °C | DHVQFN16 | plastic dual in-line compatible thermal enhanced<br>very thin quad flat package; no leads; 16 terminals;<br>body 2.5 × 3.5 × 0.85 mm                                   | <a href="#">SOT763-1</a>  |
| <a href="#">74HC259BZ</a><br><a href="#">74HCT259BZ</a> | -40 °C to +125 °C | DHXQFN16 | plastic, leadless dual in-line compatible thermal<br>enhanced extreme thin quad flat package;<br>no leads; 16 terminals; 0.4 mm pitch;<br>body 2 mm × 2.4 mm × 0.48 mm | <a href="#">SOT8016-1</a> |

4. Functional diagram



## 5. Pinning information

## 5.1. Pinning



(1) This is not a ground pin. There is no electrical or mechanical requirement to solder the pad. In case soldered, the solder land should remain floating or connected to GND.

## 5.2. Pin description

### Table 2. Pin description

| Symbol                         | Pin                       | Description                          |
|--------------------------------|---------------------------|--------------------------------------|
| A0, A1, A2                     | 1, 2, 3                   | address input                        |
| Q0, Q1, Q2, Q3, Q4, Q5, Q6, Q7 | 4, 5, 6, 7, 9, 10, 11, 12 | latch output                         |
| GND                            | 8                         | ground (0 V)                         |
| D                              | 13                        | data input                           |
| $\overline{\text{LE}}$         | 14                        | latch enable input (active LOW)      |
| $\overline{\text{MR}}$         | 15                        | conditional reset input (active LOW) |
| V <sub>CC</sub>                | 16                        | supply voltage                       |

6. Functional description

Table 3. Function table

H = HIGH voltage level; L = LOW voltage level; X = don't care;  
d = HIGH or LOW data one set-up time prior to the LOW-to-HIGH  $\overline{LE}$  transition;  
q = lower case letter indicates the state of the referenced input one set-up time prior to the LOW-to-HIGH transition.

| Operating mode                                                   | Input |    |   |    |    |    | Output         |                |                |                |                |                |                |                |
|------------------------------------------------------------------|-------|----|---|----|----|----|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                                                                  | MR    | LE | D | A0 | A1 | A2 | Q0             | Q1             | Q2             | Q3             | Q4             | Q5             | Q6             | Q7             |
| Reset (clear)                                                    | L     | H  | X | X  | X  | X  | L              | L              | L              | L              | L              | L              | L              | L              |
| Demultiplexer<br>(active HIGH 8-channel)<br>decoder (when D = H) | L     | L  | d | L  | L  | L  | Q = d          | L              | L              | L              | L              | L              | L              | L              |
|                                                                  | L     | L  | d | H  | L  | L  | L              | Q = d          | L              | L              | L              | L              | L              | L              |
|                                                                  | L     | L  | d | L  | H  | L  | L              | L              | Q = d          | L              | L              | L              | L              | L              |
|                                                                  | L     | L  | d | H  | H  | L  | L              | L              | L              | Q = d          | L              | L              | L              | L              |
|                                                                  | L     | L  | d | L  | L  | H  | L              | L              | L              | L              | Q = d          | L              | L              | L              |
|                                                                  | L     | L  | d | H  | L  | H  | L              | L              | L              | L              | L              | Q = d          | L              | L              |
|                                                                  | L     | L  | d | L  | H  | H  | L              | L              | L              | L              | L              | L              | Q = d          | L              |
|                                                                  | L     | L  | d | H  | H  | H  | L              | L              | L              | L              | L              | L              | L              | Q = d          |
| Memory (no action)                                               | H     | H  | X | X  | X  | X  | q <sub>0</sub> | q <sub>1</sub> | q <sub>2</sub> | q <sub>3</sub> | q <sub>4</sub> | q <sub>5</sub> | q <sub>6</sub> | q <sub>7</sub> |
| Addressable latch                                                | H     | L  | d | L  | L  | L  | Q = d          | q <sub>1</sub> | q <sub>2</sub> | q <sub>3</sub> | q <sub>4</sub> | q <sub>5</sub> | q <sub>6</sub> | q <sub>7</sub> |
|                                                                  | H     | L  | d | H  | L  | L  | q <sub>0</sub> | Q = d          | q <sub>2</sub> | q <sub>3</sub> | q <sub>4</sub> | q <sub>5</sub> | q <sub>6</sub> | q <sub>7</sub> |
|                                                                  | H     | L  | d | L  | H  | L  | q <sub>0</sub> | q <sub>1</sub> | Q = d          | q <sub>3</sub> | q <sub>4</sub> | q <sub>5</sub> | q <sub>6</sub> | q <sub>7</sub> |
|                                                                  | H     | L  | d | H  | H  | L  | q <sub>0</sub> | q <sub>1</sub> | q <sub>2</sub> | Q = d          | q <sub>4</sub> | q <sub>5</sub> | q <sub>6</sub> | q <sub>7</sub> |
|                                                                  | H     | L  | d | L  | L  | H  | q <sub>0</sub> | q <sub>1</sub> | q <sub>2</sub> | q <sub>3</sub> | Q = d          | q <sub>5</sub> | q <sub>6</sub> | q <sub>7</sub> |
|                                                                  | H     | L  | d | H  | L  | H  | q <sub>0</sub> | q <sub>1</sub> | q <sub>2</sub> | q <sub>3</sub> | q <sub>4</sub> | Q = d          | q <sub>6</sub> | q <sub>7</sub> |
|                                                                  | H     | L  | d | L  | H  | H  | q <sub>0</sub> | q <sub>1</sub> | q <sub>2</sub> | q <sub>3</sub> | q <sub>4</sub> | q <sub>5</sub> | Q = d          | q <sub>7</sub> |
|                                                                  | H     | L  | d | H  | H  | H  | q <sub>0</sub> | q <sub>1</sub> | q <sub>2</sub> | q <sub>3</sub> | q <sub>4</sub> | q <sub>5</sub> | q <sub>6</sub> | Q = d          |

Table 4. Operating mode select table

H = HIGH voltage level; L = LOW voltage level.

| LE | MR | Mode                   |
|----|----|------------------------|
| L  | H  | Addressable latch mode |
| H  | H  | Memory mode            |
| L  | L  | Demultiplexer mode     |
| H  | L  | Reset mode             |

7. Limiting values

Table 5. 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 <sub>CC</sub>  | supply voltage          |                                                                                | -0.5 | +7.0 | V    |
| I <sub>IK</sub>  | input clamping current  | V <sub>I</sub> < -0.5 V or V <sub>I</sub> > V <sub>CC</sub> + 0.5 V [1]        | -    | ±20  | mA   |
| I <sub>OK</sub>  | output clamping current | V <sub>O</sub> < -0.5 V or V <sub>O</sub> > V <sub>CC</sub> + 0.5 V [1]        | -    | ±20  | mA   |
| I <sub>O</sub>   | output current          | V <sub>O</sub> = -0.5 V to V <sub>CC</sub> + 0.5 V                             | -    | ±25  | mA   |
| I <sub>CC</sub>  | supply current          |                                                                                | -    | +70  | mA   |
| I <sub>GND</sub> | ground current          |                                                                                | -70  | -    | mA   |
| T <sub>stg</sub> | storage temperature     |                                                                                | -65  | +150 | °C   |
| P <sub>tot</sub> | total power dissipation | T <sub>amb</sub> = -40 °C to +125 °C                                           |      |      |      |
|                  |                         | SOT109-1 (SO16)<br>SOT403-1 (TSSOP16)<br>SOT763-1 (DHVQFN16) [2]<br>[3]<br>[4] | -    | 500  | mW   |
|                  |                         | SOT8016-1 (DHXQFN16)                                                           | -    | 250  | mW   |
|                  |                         |                                                                                |      |      |      |

- [1] The input and output voltage ratings may be exceeded if the input and output current ratings are observed.  
[2] For SOT109-1 (SO16) package: P<sub>tot</sub> derates linearly with 12.4 mW/K above 110 °C.  
[3] For SOT403-1 (TSSOP16) package: P<sub>tot</sub> derates linearly with 8.5 mW/K above 91 °C.  
[4] For SOT763-1 (DHVQFN16) package: P<sub>tot</sub> derates linearly with 11.2 mW/K above 106 °C.

8. Recommended operating conditions

Table 6. Recommended operating conditions  
Voltages are referenced to GND (ground = 0 V)

| Symbol           | Parameter                           | Conditions              | 74HC259 |      |                 | 74HCT259 |      |                 | Unit |
|------------------|-------------------------------------|-------------------------|---------|------|-----------------|----------|------|-----------------|------|
|                  |                                     |                         | Min     | Typ  | Max             | Min      | Typ  | Max             |      |
| V <sub>CC</sub>  | supply voltage                      |                         | 2.0     | 5.0  | 6.0             | 4.5      | 5.0  | 5.5             | V    |
| V <sub>I</sub>   | input voltage                       |                         | 0       | -    | V <sub>CC</sub> | 0        | -    | V <sub>CC</sub> | V    |
| V <sub>O</sub>   | output voltage                      |                         | 0       | -    | V <sub>CC</sub> | 0        | -    | V <sub>CC</sub> | V    |
| T <sub>amb</sub> | ambient temperature                 |                         | -40     | -    | +125            | -40      | -    | +125            | °C   |
| Δt/ΔV            | input transition rise and fall rate | V <sub>CC</sub> = 2.0 V | -       | -    | 625             | -        | -    | -               | ns/V |
|                  |                                     | V <sub>CC</sub> = 4.5 V | -       | 1.67 | 139             | -        | 1.67 | 139             | ns/V |
|                  |                                     | V <sub>CC</sub> = 6.0 V | -       | -    | 83              | -        | -    | -               | ns/V |

9. Static characteristics

Table 7. 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 |      |
| 74HC259         |                          |                         |       |     |     |                  |     |                   |     |      |
| V <sub>IH</sub> | HIGH-level input voltage | V <sub>CC</sub> = 2.0 V | 1.5   | 1.2 | -   | 1.5              | -   | 1.5               | -   | V    |
|                 |                          | V <sub>CC</sub> = 4.5 V | 3.15  | 2.4 | -   | 3.15             | -   | 3.15              | -   | V    |
|                 |                          | V <sub>CC</sub> = 6.0 V | 4.2   | 3.2 | -   | 4.2              | -   | 4.2               | -   | V    |

| Symbol           | Parameter                 | Conditions                                                                                                                               | 25 °C |      |      | -40 °C to +85 °C |      | -40 °C to +125 °C |      | Unit |
|------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-------|------|------|------------------|------|-------------------|------|------|
|                  |                           |                                                                                                                                          | Min   | Typ  | Max  | Min              | Max  | Min               | Max  |      |
| V <sub>IL</sub>  | LOW-level input voltage   | V <sub>CC</sub> = 2.0 V                                                                                                                  | -     | 0.8  | 0.5  | -                | 0.5  | -                 | 0.5  | V    |
|                  |                           | V <sub>CC</sub> = 4.5 V                                                                                                                  | -     | 2.1  | 1.35 | -                | 1.35 | -                 | 1.35 | V    |
|                  |                           | V <sub>CC</sub> = 6.0 V                                                                                                                  | -     | 2.8  | 1.8  | -                | 1.8  | -                 | 1.8  | 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> = -20 µA; V <sub>CC</sub> = 2.0 V                                                                                         | 1.9   | 2.0  | -    | 1.9              | -    | 1.9               | -    | V    |
|                  |                           | I <sub>O</sub> = -20 µA; V <sub>CC</sub> = 4.5 V                                                                                         | 4.4   | 4.5  | -    | 4.4              | -    | 4.4               | -    | V    |
|                  |                           | I <sub>O</sub> = -20 µA; V <sub>CC</sub> = 6.0 V                                                                                         | 5.9   | 6.0  | -    | 5.9              | -    | 5.9               | -    | V    |
|                  |                           | I <sub>O</sub> = -4.0 mA; V <sub>CC</sub> = 4.5 V                                                                                        | 3.98  | 4.32 | -    | 3.84             | -    | 3.7               | -    | V    |
|                  |                           | I <sub>O</sub> = -5.2 mA; V <sub>CC</sub> = 6.0 V                                                                                        | 5.48  | 5.81 | -    | 5.34             | -    | 5.2               | -    | 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> = 20 µA; V <sub>CC</sub> = 2.0 V                                                                                          | -     | 0    | 0.1  | -                | 0.1  | -                 | 0.1  | V    |
|                  |                           | I <sub>O</sub> = 20 µA; V <sub>CC</sub> = 4.5 V                                                                                          | -     | 0    | 0.1  | -                | 0.1  | -                 | 0.1  | V    |
|                  |                           | I <sub>O</sub> = 20 µA; V <sub>CC</sub> = 6.0 V                                                                                          | -     | 0    | 0.1  | -                | 0.1  | -                 | 0.1  | V    |
|                  |                           | I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 4.5 V                                                                                         | -     | 0.15 | 0.26 | -                | 0.33 | -                 | 0.4  | V    |
|                  |                           | I <sub>O</sub> = 5.2 mA; V <sub>CC</sub> = 6.0 V                                                                                         | -     | 0.16 | 0.26 | -                | 0.33 | -                 | 0.4  | V    |
| I <sub>I</sub>   | input leakage current     | V <sub>I</sub> = V <sub>CC</sub> or GND; V <sub>CC</sub> = 6.0 V                                                                         | -     | -    | ±0.1 | -                | ±1   | -                 | ±1   | µA   |
| I <sub>CC</sub>  | supply current            | V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 6.0 V                                                   | -     | -    | 8.0  | -                | 80   | -                 | 160  | µA   |
| C <sub>I</sub>   | input capacitance         |                                                                                                                                          | -     | 3.5  | -    | -                | -    | -                 | -    | pF   |
| 74HCT259         |                           |                                                                                                                                          |       |      |      |                  |      |                   |      |      |
| V <sub>IH</sub>  | HIGH-level input voltage  | V <sub>CC</sub> = 4.5 V to 5.5 V                                                                                                         | 2.0   | 1.6  | -    | 2.0              | -    | 2.0               | -    | V    |
| V <sub>IL</sub>  | LOW-level input voltage   | V <sub>CC</sub> = 4.5 V to 5.5 V                                                                                                         | -     | 1.2  | 0.8  | -                | 0.8  | -                 | 0.8  | V    |
| V <sub>OH</sub>  | HIGH-level output voltage | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 4.5 V                                                            |       |      |      |                  |      |                   |      |      |
|                  |                           | I <sub>O</sub> = -20 µA                                                                                                                  | 4.4   | 4.5  | -    | 4.4              | -    | 4.4               | -    | V    |
|                  |                           | I <sub>O</sub> = -4.0 mA                                                                                                                 | 3.98  | 4.32 | -    | 3.84             | -    | 3.7               | -    | V    |
| V <sub>OL</sub>  | LOW-level output voltage  | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 4.5 V                                                            |       |      |      |                  |      |                   |      |      |
|                  |                           | I <sub>O</sub> = 20 µA; V <sub>CC</sub> = 4.5 V                                                                                          | -     | 0    | 0.1  | -                | 0.1  | -                 | 0.1  | V    |
|                  |                           | I <sub>O</sub> = 5.2 mA; V <sub>CC</sub> = 6.0 V                                                                                         | -     | 0.15 | 0.26 | -                | 0.33 | -                 | 0.4  | V    |
| I <sub>I</sub>   | input leakage current     | V <sub>I</sub> = V <sub>CC</sub> or GND; V <sub>CC</sub> = 5.5 V                                                                         | -     | -    | ±0.1 | -                | ±1   | -                 | ±1   | µA   |
| I <sub>CC</sub>  | supply current            | V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 5.5 V                                                   | -     | -    | 8.0  | -                | 80   | -                 | 160  | µA   |
| ΔI <sub>CC</sub> | additional supply current | V <sub>I</sub> = V <sub>CC</sub> - 2.1 V; I <sub>O</sub> = 0 A; other inputs at V <sub>CC</sub> or GND; V <sub>CC</sub> = 4.5 V to 5.5 V |       |      |      |                  |      |                   |      |      |
|                  |                           | pin An, $\overline{\text{LE}}$                                                                                                           | -     | 150  | 540  | -                | 675  | -                 | 735  | µA   |
|                  |                           | pin D                                                                                                                                    | -     | 120  | 432  | -                | 540  | -                 | 588  | µA   |
|                  |                           | pin MR                                                                                                                                   | -     | 75   | 270  | -                | 338  | -                 | 368  | µA   |
| C <sub>I</sub>   | input capacitance         |                                                                                                                                          | -     | 3.5  | -    | -                | -    | -                 | -    | pF   |

10. Dynamic characteristics

Table 8. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 10.

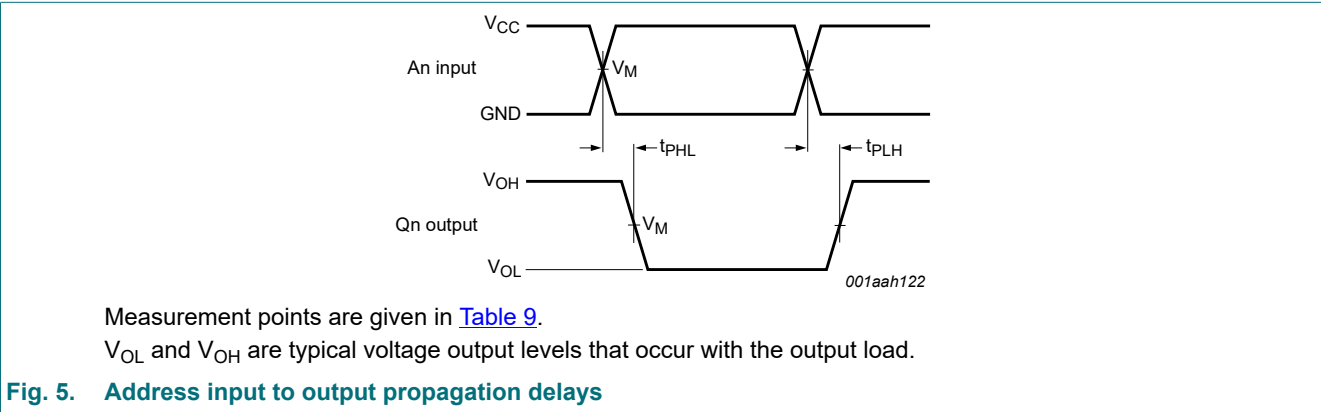
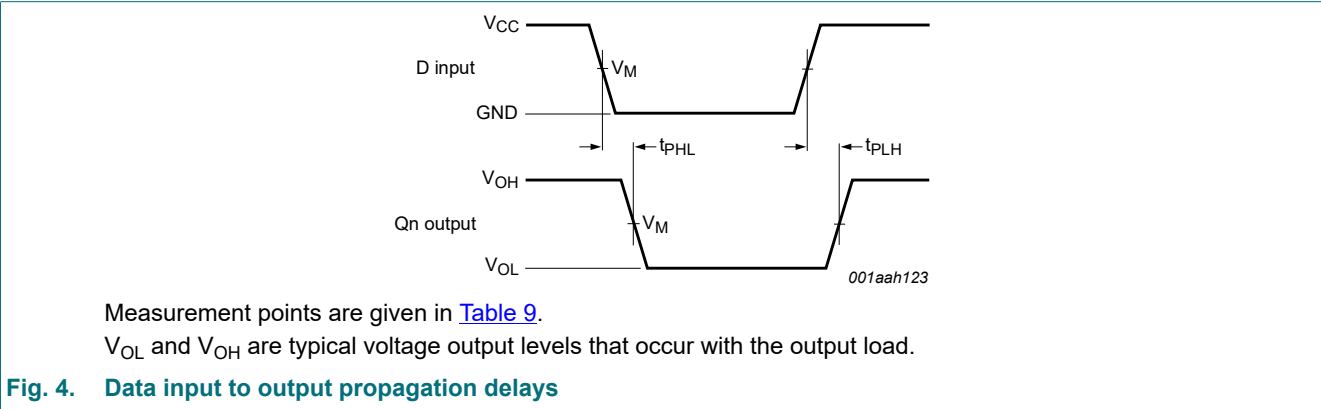
| Symbol           | Parameter                     | Conditions                                      | 25 °C |        |     | -40 °C to +85 °C |     | -40 °C to +125 °C |     | Unit |
|------------------|-------------------------------|-------------------------------------------------|-------|--------|-----|------------------|-----|-------------------|-----|------|
|                  |                               |                                                 | Min   | Typ[1] | Max | Min              | Max | Min               | Max |      |
| 74HC259          |                               |                                                 |       |        |     |                  |     |                   |     |      |
| t <sub>pd</sub>  | propagation delay             | D to Qn; see Fig. 4 [2]                         |       |        |     |                  |     |                   |     |      |
|                  |                               | V <sub>CC</sub> = 2.0 V                         | -     | 58     | 185 | -                | 230 | -                 | 280 | ns   |
|                  |                               | V <sub>CC</sub> = 4.5 V                         | -     | 21     | 37  | -                | 46  | -                 | 56  | ns   |
|                  |                               | V <sub>CC</sub> = 5.0 V; C <sub>L</sub> = 15 pF | -     | 18     | -   | -                | -   | -                 | -   | ns   |
|                  |                               | V <sub>CC</sub> = 6.0 V                         | -     | 17     | 31  | -                | 39  | -                 | 48  | ns   |
|                  |                               | An to Qn; see Fig. 5 [2]                        |       |        |     |                  |     |                   |     |      |
|                  |                               | V <sub>CC</sub> = 2.0 V                         | -     | 58     | 185 | -                | 230 | -                 | 280 | ns   |
|                  |                               | V <sub>CC</sub> = 4.5 V                         | -     | 21     | 37  | -                | 46  | -                 | 56  | ns   |
|                  |                               | V <sub>CC</sub> = 5.0 V; C <sub>L</sub> = 15 pF | -     | 17     | -   | -                | -   | -                 | -   | ns   |
|                  |                               | V <sub>CC</sub> = 6.0 V                         | -     | 17     | 31  | -                | 39  | -                 | 48  | ns   |
|                  |                               | LE to Qn; see Fig. 6 [2]                        |       |        |     |                  |     |                   |     |      |
|                  |                               | V <sub>CC</sub> = 2.0 V                         | -     | 55     | 170 | -                | 215 | -                 | 255 | ns   |
|                  |                               | V <sub>CC</sub> = 4.5 V                         | -     | 20     | 34  | -                | 43  | -                 | 51  | ns   |
|                  |                               | V <sub>CC</sub> = 5.0 V; C <sub>L</sub> = 15 pF | -     | 17     | -   | -                | -   | -                 | -   | ns   |
|                  |                               | V <sub>CC</sub> = 6.0 V                         | -     | 16     | 29  | -                | 37  | -                 | 43  | ns   |
| t <sub>PHL</sub> | HIGH to LOW propagation delay | MR to Qn; see Fig. 7                            |       |        |     |                  |     |                   |     |      |
|                  |                               | V <sub>CC</sub> = 2.0 V                         | -     | 50     | 155 | -                | 195 | -                 | 235 | ns   |
|                  |                               | V <sub>CC</sub> = 4.5 V                         | -     | 18     | 31  | -                | 39  | -                 | 47  | ns   |
|                  |                               | V <sub>CC</sub> = 5.0 V; C <sub>L</sub> = 15 pF | -     | 15     | -   | -                | -   | -                 | -   | ns   |
|                  |                               | V <sub>CC</sub> = 6.0 V                         | -     | 14     | 26  | -                | 33  | -                 | 40  | ns   |
| t <sub>t</sub>   | transition time               | see Fig. 6 [3]                                  |       |        |     |                  |     |                   |     |      |
|                  |                               | V <sub>CC</sub> = 2.0 V                         | -     | 19     | 75  | -                | 95  | -                 | 119 | ns   |
|                  |                               | V <sub>CC</sub> = 4.5 V                         | -     | 7      | 15  | -                | 19  | -                 | 22  | ns   |
|                  |                               | V <sub>CC</sub> = 6.0 V                         | -     | 6      | 13  | -                | 16  | -                 | 19  | ns   |
| t <sub>w</sub>   | pulse width                   | LE HIGH or LOW; see Fig. 6                      |       |        |     |                  |     |                   |     |      |
|                  |                               | V <sub>CC</sub> = 2.0 V                         | 70    | 17     | -   | 90               | -   | 105               | -   | ns   |
|                  |                               | V <sub>CC</sub> = 4.5 V                         | 14    | 6      | -   | 18               | -   | 21                | -   | ns   |
|                  |                               | V <sub>CC</sub> = 6.0 V                         | 12    | 5      | -   | 15               | -   | 18                | -   | ns   |
|                  |                               | MR LOW; see Fig. 7                              |       |        |     |                  |     |                   |     |      |
|                  |                               | V <sub>CC</sub> = 2.0 V                         | 70    | 17     | -   | 90               | -   | 105               | -   | ns   |
|                  |                               | V <sub>CC</sub> = 4.5 V                         | 14    | 6      | -   | 18               | -   | 21                | -   | ns   |
|                  |                               | V <sub>CC</sub> = 6.0 V                         | 12    | 5      | -   | 15               | -   | 18                | -   | ns   |
| t <sub>su</sub>  | set-up time                   | D, An to LE; see Fig. 8 and Fig. 9              |       |        |     |                  |     |                   |     |      |
|                  |                               | V <sub>CC</sub> = 2.0 V                         | 80    | 19     | -   | 100              | -   | 120               | -   | ns   |
|                  |                               | V <sub>CC</sub> = 4.5 V                         | 16    | 7      | -   | 20               | -   | 24                | -   | ns   |
|                  |                               | V <sub>CC</sub> = 6.0 V                         | 14    | 6      | -   | 17               | -   | 20                | -   | ns   |

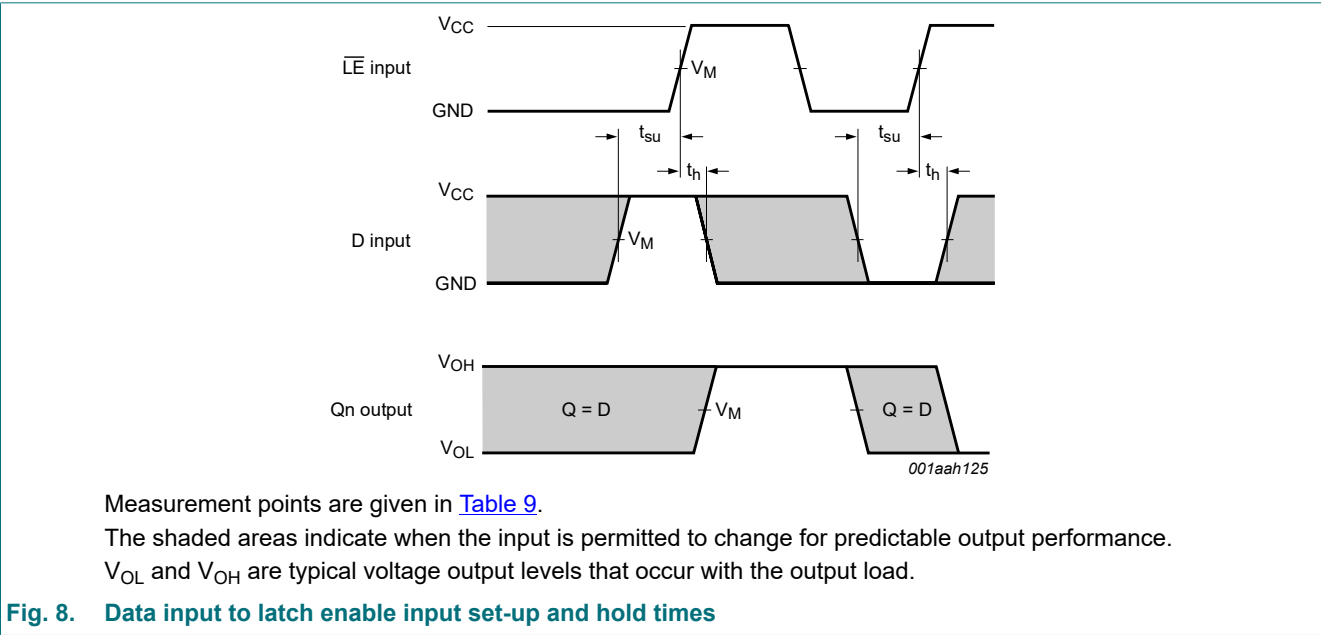
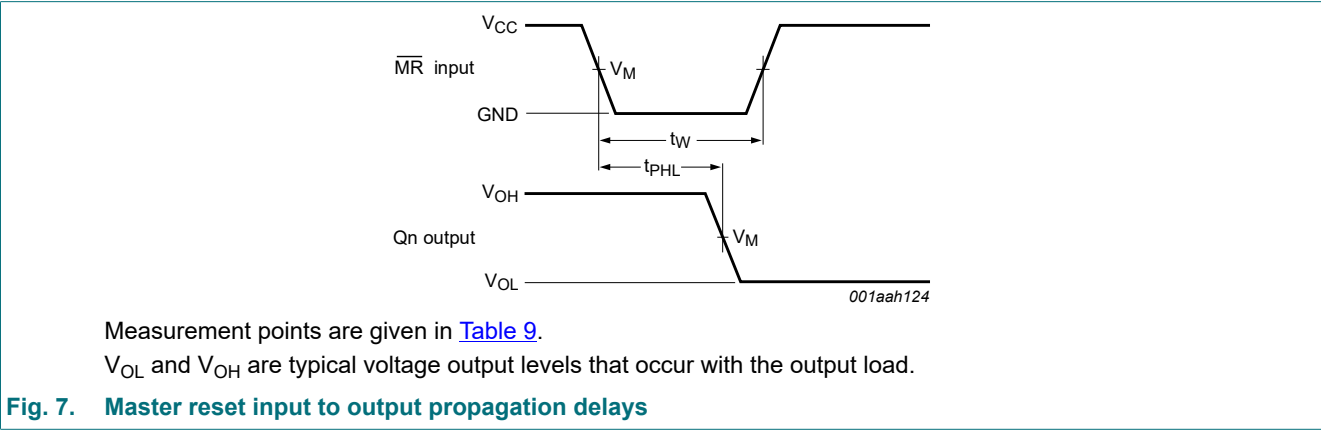
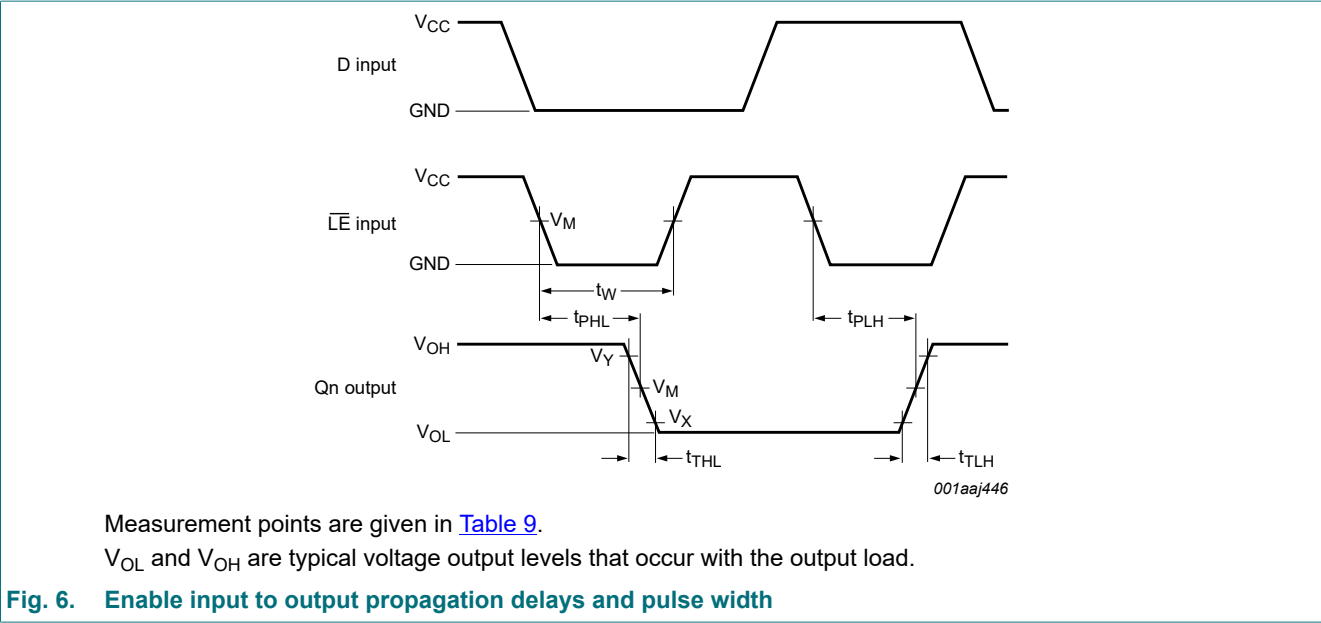
| Symbol          | Parameter                     | Conditions                                               | 25 °C |        |     | -40 °C to +85 °C |     | -40 °C to +125 °C |     | Unit |
|-----------------|-------------------------------|----------------------------------------------------------|-------|--------|-----|------------------|-----|-------------------|-----|------|
|                 |                               |                                                          | Min   | Typ[1] | Max | Min              | Max | Min               | Max |      |
| $t_h$           | hold time                     | D to $\overline{LE}$ ; see Fig. 8 and Fig. 9             |       |        |     |                  |     |                   |     |      |
|                 |                               | $V_{CC} = 2.0\text{ V}$                                  | 0     | -19    | -   | 0                | -   | 0                 | -   | ns   |
|                 |                               | $V_{CC} = 4.5\text{ V}$                                  | 0     | -6     | -   | 0                | -   | 0                 | -   | ns   |
|                 |                               | $V_{CC} = 6.0\text{ V}$                                  | 0     | -5     | -   | 0                | -   | 0                 | -   | ns   |
|                 |                               | An to $\overline{LE}$ ; see Fig. 8 and Fig. 9            |       |        |     |                  |     |                   |     |      |
|                 |                               | $V_{CC} = 2.0\text{ V}$                                  | 2     | -11    | -   | 2                | -   | 2                 | -   | ns   |
|                 |                               | $V_{CC} = 4.5\text{ V}$                                  | 2     | -4     | -   | 2                | -   | 2                 | -   | ns   |
|                 |                               | $V_{CC} = 6.0\text{ V}$                                  | 2     | -3     | -   | 2                | -   | 2                 | -   | ns   |
| $C_{PD}$        | power dissipation capacitance | $f_i = 1\text{ MHz}$ ; $V_I = \text{GND to } V_{CC}$ [4] | -     | 19     | -   | -                | -   | -                 | -   | pF   |
| <b>74HCT259</b> |                               |                                                          |       |        |     |                  |     |                   |     |      |
| $t_{pd}$        | propagation delay             | D to Qn; see Fig. 4 [2]                                  |       |        |     |                  |     |                   |     |      |
|                 |                               | $V_{CC} = 4.5\text{ V}$                                  | -     | 23     | 39  | -                | 49  | -                 | 59  | ns   |
|                 |                               | $V_{CC} = 5.0\text{ V}$ ; $C_L = 15\text{ pF}$           | -     | 20     | -   | -                | -   | -                 | -   | ns   |
|                 |                               | An to Qn; see Fig. 5 [2]                                 |       |        |     |                  |     |                   |     |      |
|                 |                               | $V_{CC} = 4.5\text{ V}$                                  | -     | 25     | 41  |                  | 51  |                   | 62  | ns   |
|                 |                               | $V_{CC} = 5.0\text{ V}$ ; $C_L = 15\text{ pF}$           | -     | 20     | -   | -                | -   | -                 | -   | ns   |
|                 |                               | $\overline{LE}$ to Qn; see Fig. 6 [2]                    |       |        |     |                  |     |                   |     |      |
|                 |                               | $V_{CC} = 4.5\text{ V}$                                  | -     | 22     | 38  | -                | 48  | -                 | 57  | ns   |
|                 |                               | $V_{CC} = 5.0\text{ V}$ ; $C_L = 15\text{ pF}$           | -     | 20     | -   | -                | -   | -                 | -   | ns   |
| $t_{PHL}$       | HIGH to LOW propagation delay | MR to Qn; see Fig. 7                                     |       |        |     |                  |     |                   |     |      |
|                 |                               | $V_{CC} = 4.5\text{ V}$                                  | -     | 23     | 39  | -                | 49  | -                 | 59  | ns   |
|                 |                               | $V_{CC} = 5.0\text{ V}$ ; $C_L = 15\text{ pF}$           | -     | 20     | -   | -                | -   | -                 | -   | ns   |
| $t_t$           | transition time               | see Fig. 6 [3]                                           |       |        |     |                  |     |                   |     |      |
|                 |                               | $V_{CC} = 4.5\text{ V}$                                  | -     | 7      | 15  | -                | 19  | -                 | 22  | ns   |
| $t_W$           | pulse width                   | $\overline{LE}$ HIGH or LOW; see Fig. 6                  |       |        |     |                  |     |                   |     |      |
|                 |                               | $V_{CC} = 4.5\text{ V}$                                  | 19    | 11     | -   | 24               | -   | 29                | -   | ns   |
|                 |                               | MR LOW; see Fig. 7                                       |       |        |     |                  |     |                   |     |      |
|                 |                               | $V_{CC} = 4.5\text{ V}$                                  | 18    | 10     | -   | 23               | -   | 27                | -   | ns   |
| $t_{su}$        | set-up time                   | D, An to $\overline{LE}$ ; see Fig. 8 and Fig. 9         |       |        |     |                  |     |                   |     |      |
|                 |                               | $V_{CC} = 4.5\text{ V}$                                  | 17    | 10     | -   | 21               | -   | 26                | -   | ns   |
| $t_h$           | hold time                     | D to $\overline{LE}$ ; see Fig. 8 and Fig. 9             |       |        |     |                  |     |                   |     |      |
|                 |                               | $V_{CC} = 4.5\text{ V}$                                  | 0     | -8     | -   | 0                | -   | 0                 | -   | ns   |
|                 |                               | An to $\overline{LE}$ ; see Fig. 8 and Fig. 9            |       |        |     |                  |     |                   |     |      |
|                 |                               | $V_{CC} = 4.5\text{ V}$                                  | 0     | -4     | -   | 0                | -   | 0                 | -   | ns   |

| Symbol          | Parameter                     | Conditions                                                                     | 25 °C |        |     | -40 °C to +85 °C |     | -40 °C to +125 °C |     | Unit |
|-----------------|-------------------------------|--------------------------------------------------------------------------------|-------|--------|-----|------------------|-----|-------------------|-----|------|
|                 |                               |                                                                                | Min   | Typ[1] | Max | Min              | Max | Min               | Max |      |
| C <sub>PD</sub> | power dissipation capacitance | f <sub>i</sub> = 1 MHz;<br>V <sub>I</sub> = GND to V <sub>CC</sub> - 1.5 V [4] | -     | 19     | -   | -                | -   | -                 | -   | 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>i</sub> is the same as t<sub>THL</sub> and t<sub>TLH</sub>.
- [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 V;  
N = number of inputs switching;  
 $\Sigma(C_L \times V_{CC}^2 \times f_o)$  = sum of the outputs.

10.1. Waveforms and test circuit





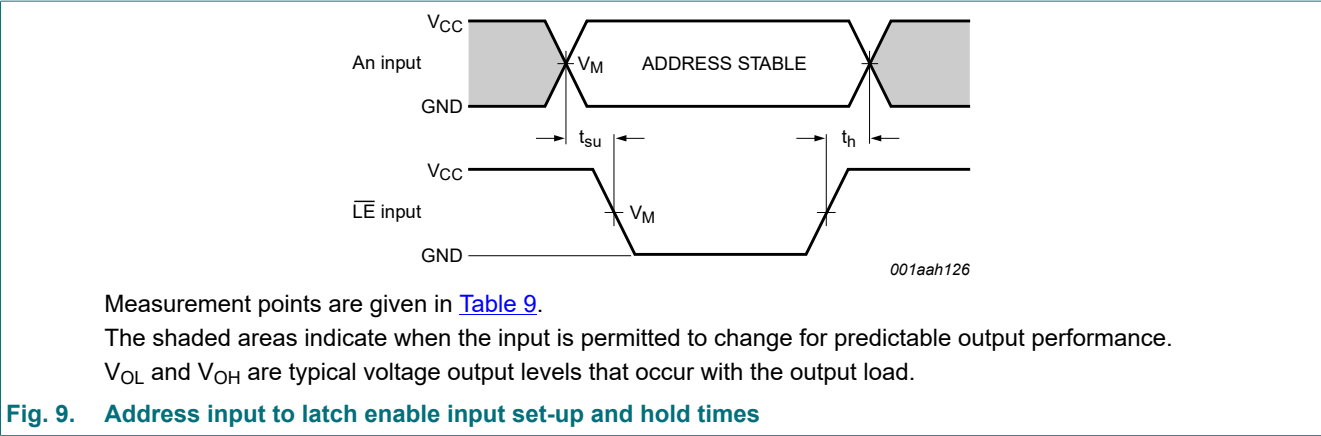


Table 9. Measurement points

| Type     | Input                 | Output                |                       |                       |
|----------|-----------------------|-----------------------|-----------------------|-----------------------|
|          | V <sub>M</sub>        | V <sub>M</sub>        | V <sub>X</sub>        | V <sub>Y</sub>        |
| 74HC259  | 0.5 × V <sub>CC</sub> | 0.5 × V <sub>CC</sub> | 0.1 × V <sub>CC</sub> | 0.9 × V <sub>CC</sub> |
| 74HCT259 | 1.3 V                 | 1.3 V                 | 0.1 × V <sub>CC</sub> | 0.9 × V <sub>CC</sub> |

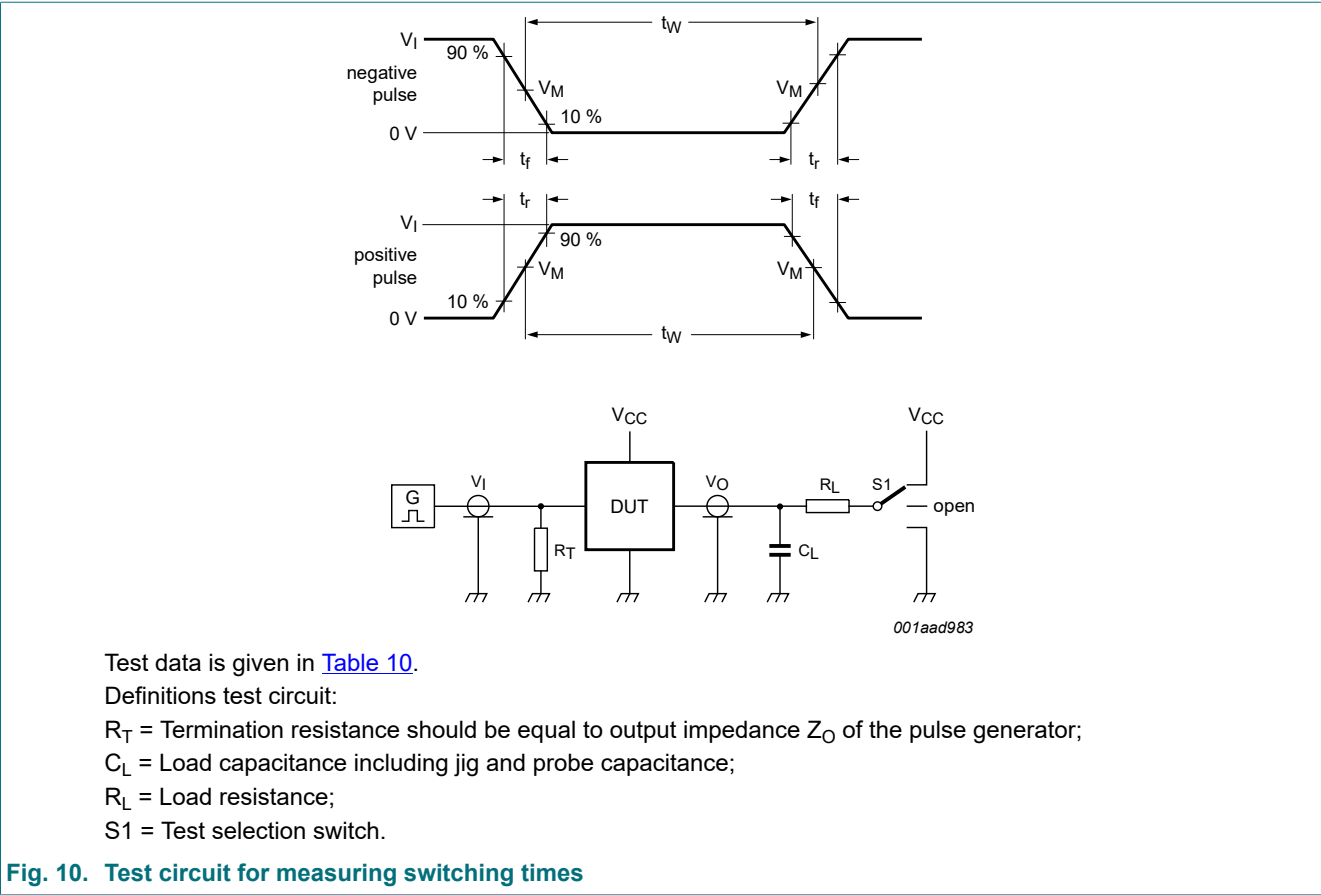


Table 10. Test data

| Type     | Input           |                                 | Load           |                | S1 position                         |
|----------|-----------------|---------------------------------|----------------|----------------|-------------------------------------|
|          | V <sub>I</sub>  | t <sub>r</sub> , t <sub>f</sub> | C <sub>L</sub> | R <sub>L</sub> | t <sub>pHL</sub> , t <sub>pLH</sub> |
| 74HC259  | V <sub>CC</sub> | 6 ns                            | 15 pF, 50 pF   | 1 kΩ           | open                                |
| 74HCT259 | 3 V             | 6 ns                            | 15 pF, 50 pF   | 1 kΩ           | open                                |

11. Package outline

SO16: plastic small outline package; 16 leads; body width 3.9 mm

SOT109-1

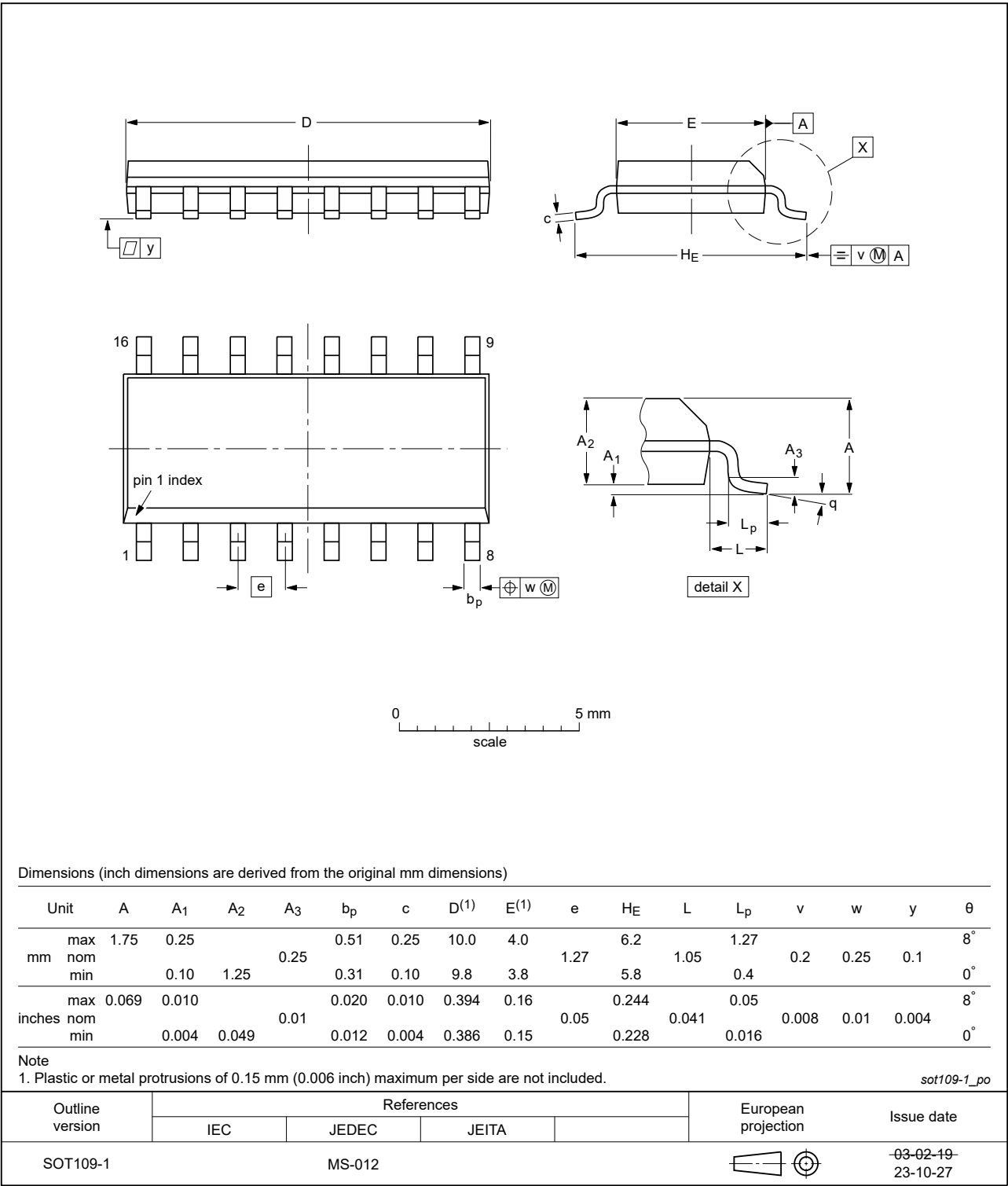


Fig. 11. Package outline SOT109-1 (SO16)

TSSOP16: plastic thin shrink small outline package; 16 leads; body width 4.4 mm

SOT403-1

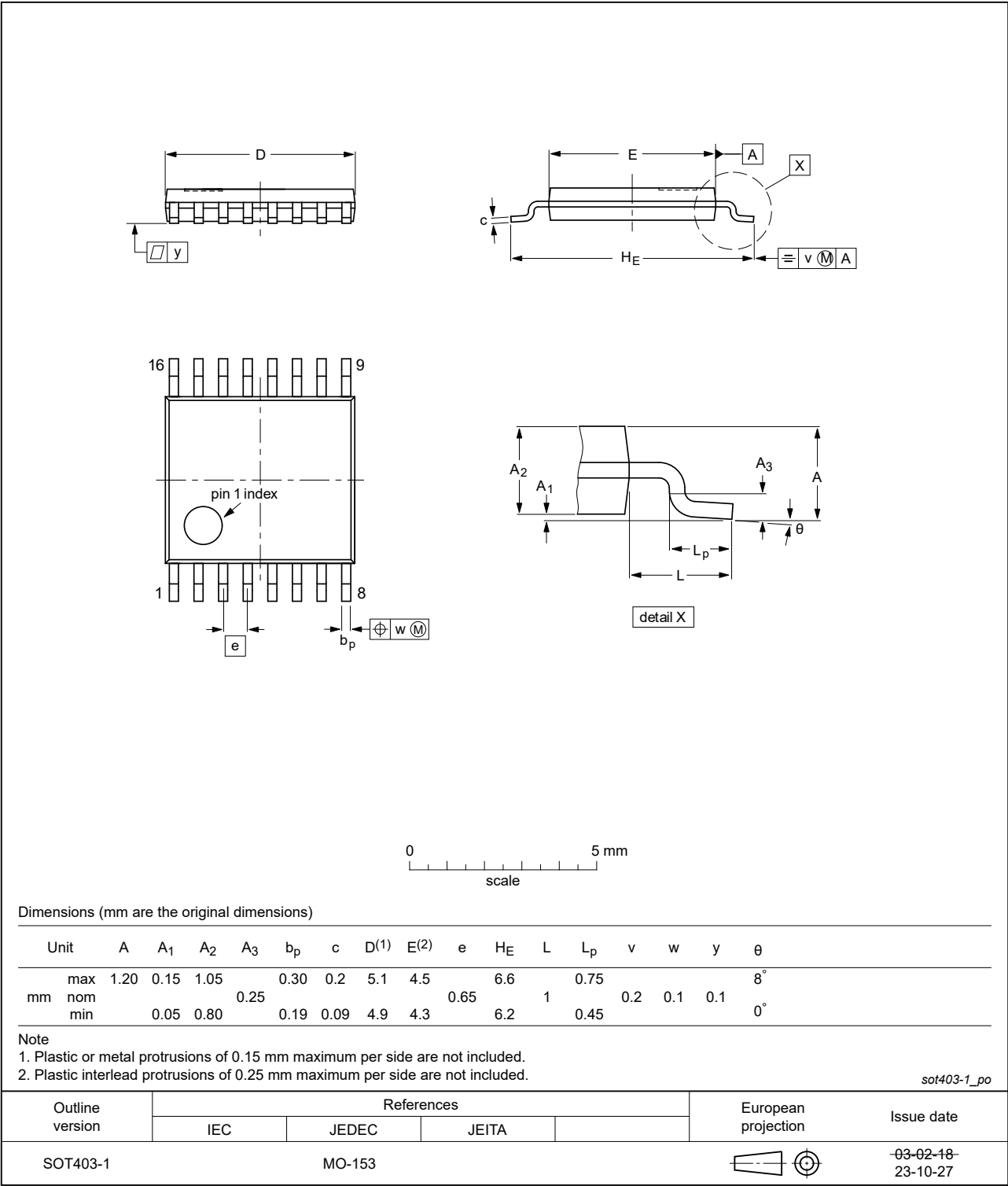


Fig. 12. Package outline SOT403-1 (TSSOP16)

DHVQFN16: plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads;  
16 terminals; body 2.5 x 3.5 x 0.85 mm SOT763-1

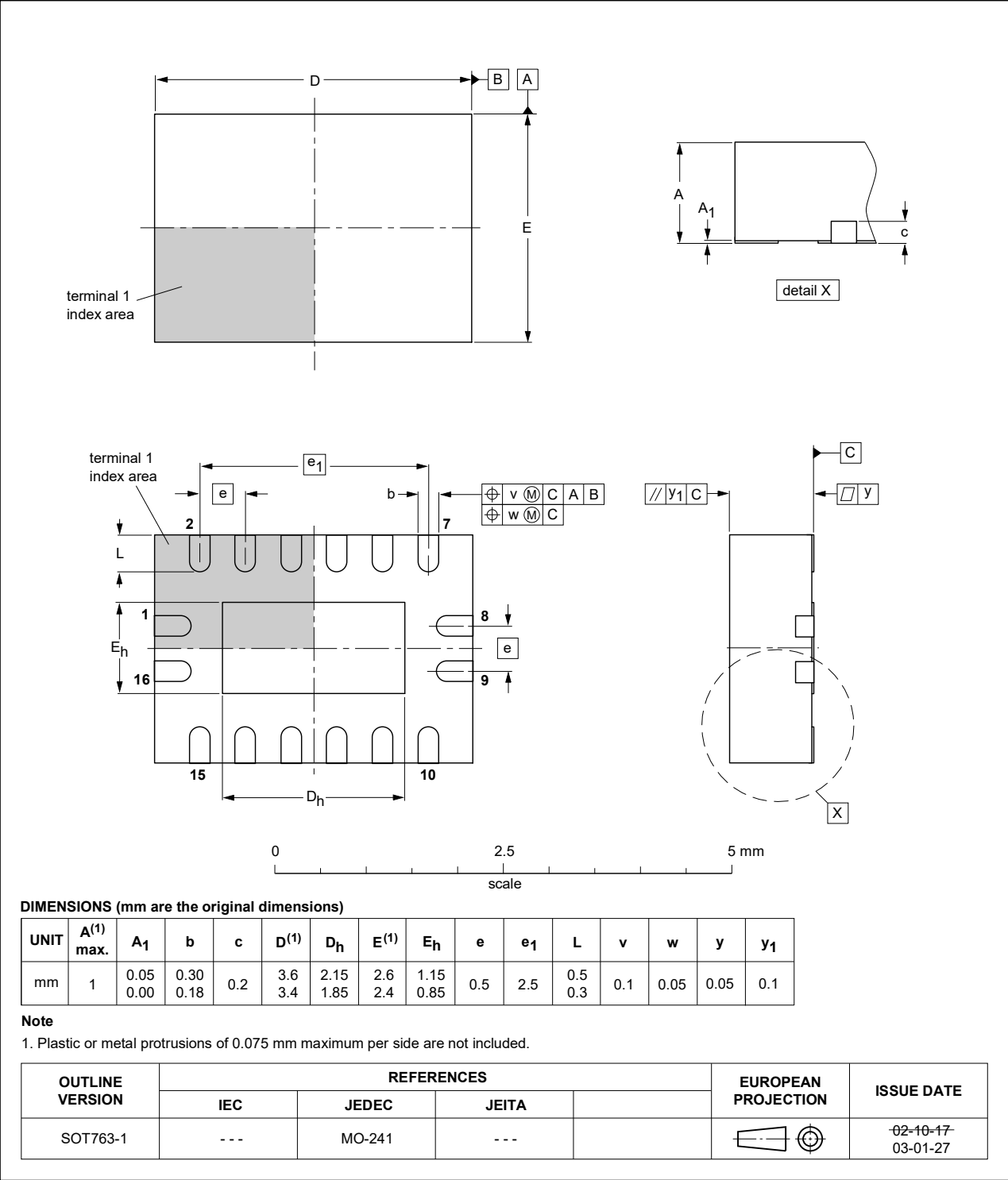


Fig. 13. Package outline SOT763-1 (DHVQFN16)

DHXQFN16: plastic, leadless dual in-line compatible thermal enhanced extreme thin quad flat package;  
no leads; 16 terminals; 0.4 mm pitch; body 2 mm x 2.4 mm x 0.48 mm

SOT8016-1

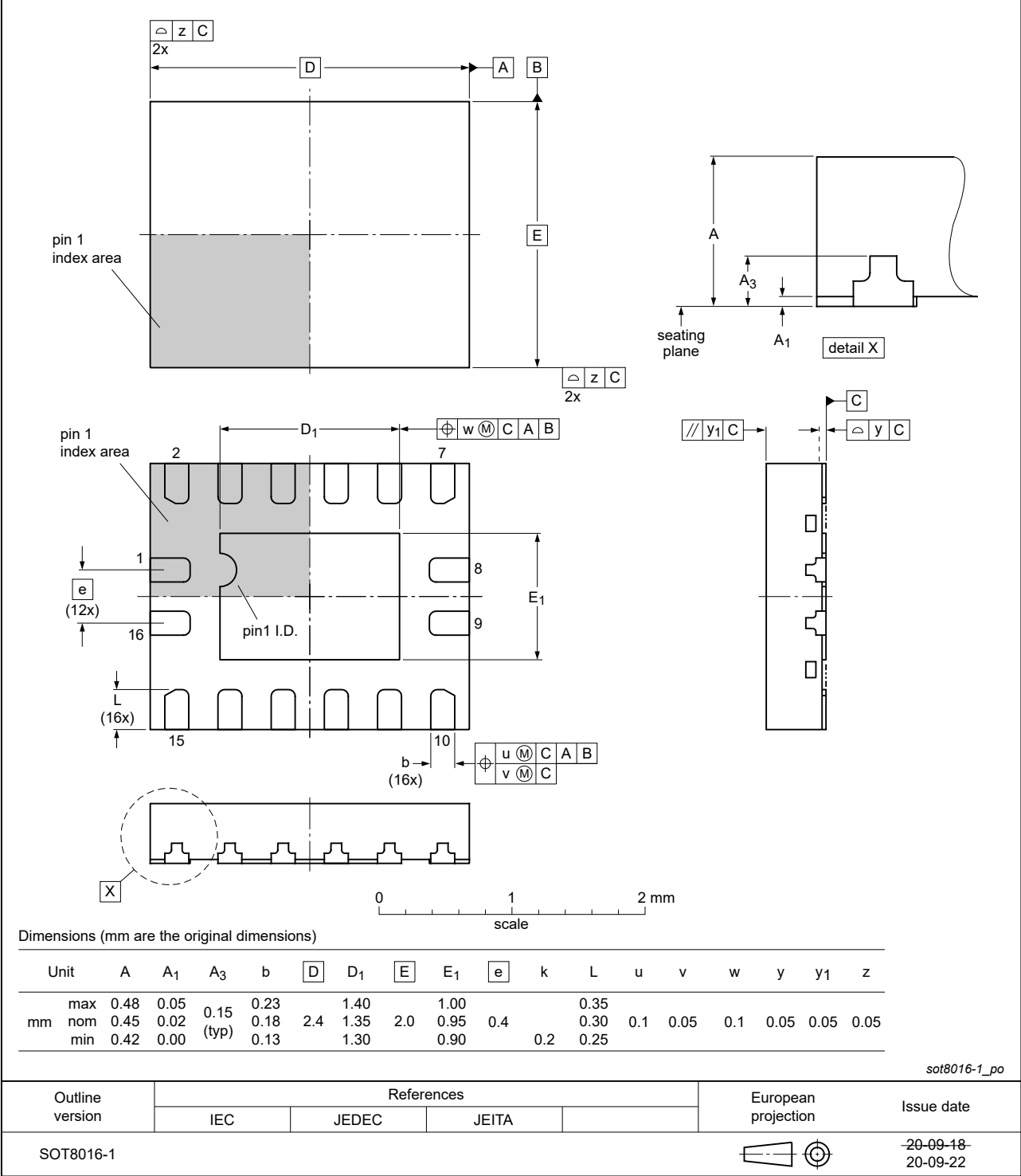


Fig. 14. Package outline SOT8016-1 (DHXQFN16)

12. Abbreviations

Table 11. Abbreviations

| Acronym | Description                             |
|---------|-----------------------------------------|
| CDM     | Charged Device Model                    |
| CMOS    | Complementary Metal-Oxide Semiconductor |
| DUT     | Device Under Test                       |
| ESD     | ElectroStatic Discharge                 |
| HBM     | Human Body Model                        |
| TTL     | Transistor-Transistor Logic             |

13. Revision history

Table 12. Revision history

| Document ID         | Release date                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Data sheet status     | Change notice | Supersedes          |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|---------------------|
| 74HC_HCT259 v.9     | 20240311                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Product data sheet    | -             | 74HC_HCT259 v.8     |
| Modifications:      | <ul style="list-style-type: none"><li>• <a href="#">Fig. 11</a>, <a href="#">Fig. 12</a>: Aligned SO and TSSOP package outline drawings to JEDEC MS-012 and MO-153.</li><li>• <a href="#">Section 2</a>: ESD specification updated according to the latest JEDEC standard.</li></ul>                                                                                                                                                                                                |                       |               |                     |
| 74HC_HCT259 v.8     | 20221205                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Product data sheet    | -             | 74HC_HCT259 v.7     |
| Modifications:      | <ul style="list-style-type: none"><li>• Type numbers 74HC259BZ and 74HCT259BZ (SOT8016-1/DHXQFN16) added.</li></ul>                                                                                                                                                                                                                                                                                                                                                                 |                       |               |                     |
| 74HC_HCT259 v.7     | 20200902                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Product data sheet    | -             | 74HC_HCT259 v.6     |
| Modifications:      | <ul style="list-style-type: none"><li>• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li><li>• Legal texts have been adapted to the new company name where appropriate.</li><li>• Type number 74HC259DB and 74HCT259DB (SOT338-1/SSOP16) removed.</li><li>• <a href="#">Section 2</a> updated.</li><li>• <a href="#">Table 5</a>: Derating values for P<sub>TOT</sub> total power dissipation have been updated.</li></ul> |                       |               |                     |
| 74HC_HCT259 v.6     | 20160202                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Product data sheet    | -             | 74HC_HCT259 v.5     |
| Modifications:      | <ul style="list-style-type: none"><li>• Type numbers 74HC259N and 74HCT259N (SOT38-4) removed.</li></ul>                                                                                                                                                                                                                                                                                                                                                                            |                       |               |                     |
| 74HC_HCT259 v.5     | 20120807                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Product data sheet    | -             | 74HC_HCT259 v.4     |
| Modifications:      | <ul style="list-style-type: none"><li>• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.</li><li>• Legal texts have been adapted to the new company name where appropriate.</li></ul>                                                                                                                                                                                                                            |                       |               |                     |
| 74HC_HCT259 v.4     | 20090225                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Product data sheet    | -             | 74HC_HCT259 v.3     |
| Modifications:      | <ul style="list-style-type: none"><li>• Added type number 74HC259N and 74HCT259N (DIP16 package)</li><li>• Added type number 74HC259DB and 74HCT259DB (SSOP16 package)</li></ul>                                                                                                                                                                                                                                                                                                    |                       |               |                     |
| 74HC_HCT259 v.3     | 20090108                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Product data sheet    | -             | 74HC_HCT259_CNV v.2 |
| 74HC_HCT259_CNV v.2 | 19970828                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Product specification | -             | -                   |

14. Legal information

Data sheet status

| Document status [1][2]         | Product status [3] | Definition                                                                            |
|--------------------------------|--------------------|---------------------------------------------------------------------------------------|
| Objective [short] data sheet   | Development        | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet | Qualification      | This document contains data from the preliminary specification.                       |
| Product [short] data sheet     | Production         | This document contains the product specification.                                     |

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
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