



**THE DATASHEET OF  
74HCT259PW,118**

# 74HC259; 74HCT259

## 8-bit addressable latch

Rev. 6 — 2 February 2016

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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- 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
- Complies with JEDEC standard no. 7A
- Input levels:
  - ◆ For 74HC259: CMOS level
  - ◆ For 74HCT259: TTL level
- ESD protection:
  - ◆ HBM JESD22-A114F exceeds 2000 V
  - ◆ MM JESD22-A115-A exceeds 200 V
  - ◆ CDM JESD22E exceeds 1000 V
- Multiple package options
- Specified from  $-40\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$  and from  $-40\text{ }^{\circ}\text{C}$  to  $+125\text{ }^{\circ}\text{C}$

### 3. Ordering information

Table 1. Ordering information

| Type number | Package           |          |  | Version  |
|-------------|-------------------|----------|--|----------|
|             | Temperature range | Name     | Description  |          |
| 74HC259D    | -40 °C to +125 °C | SO16     | plastic small outline package; 16 leads; body width 3.9 mm   | SOT109-1 |
| 74HCT259D   |                   |          |  |          |
| 74HC259DB   | -40 °C to +125 °C | SSOP16   | plastic shrink small outline package; 16 leads; body width 5.3 mm  | SOT338-1 |
| 74HCT259DB  |                   |          |  |          |
| 74HC259PW   | -40 °C to +125 °C | TSSOP16  | plastic thin shrink small outline package; 16 leads; body width 4.4 mm   | SOT403-1 |
| 74HCT259PW  |                   |          |  |          |
| 74HC259BQ   | -40 °C to +125 °C | DHVQFN16 | plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 16 terminals; body 2.5 × 3.5 × 0.85 mm | SOT763-1 |
| 74HCT259BQ  |                   |          |  |          |

### 4. Functional diagram

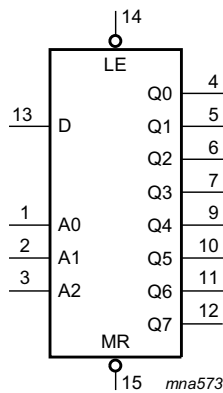


Fig 1. Logic symbol

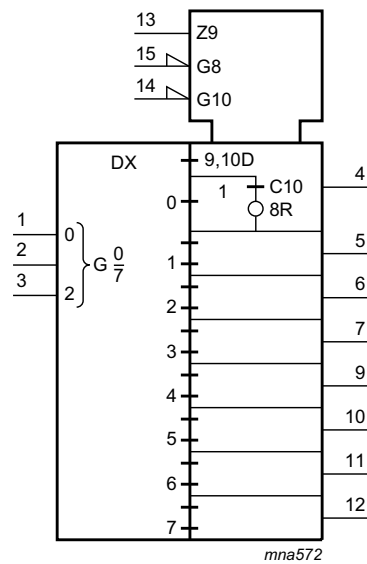


Fig 2. IEC logic symbol

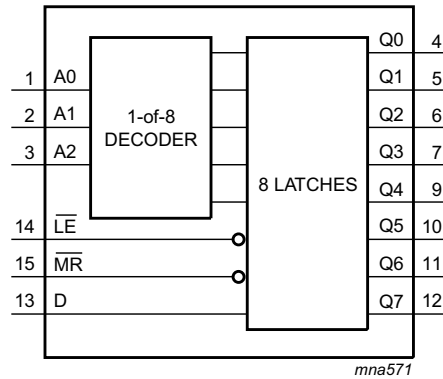


Fig 3. Functional diagram

## 5. Pinning information

### 5.1 Pinning

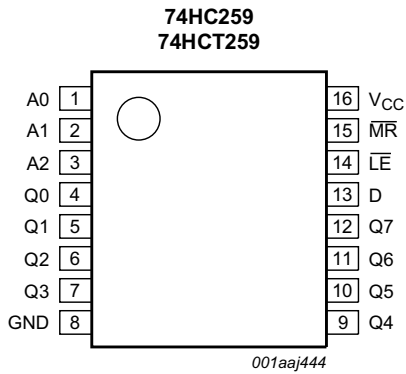
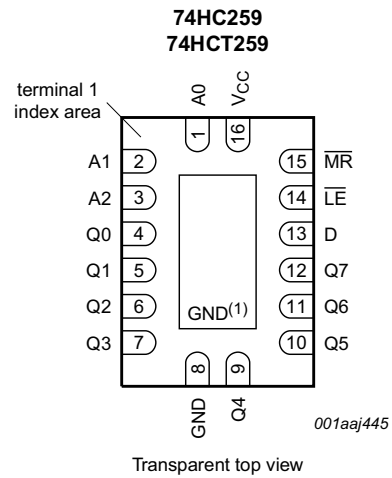


Fig 4. Pin configuration SO16, SSOP16 and TSSOP16



(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 DHVQFN16

## 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<sup>[1]</sup>

| Operating mode   | Input                  |                        |   |    |    |    | Output         |                |                |                |                |                |                |                |
|--|------------------------|------------------------|---|----|----|----|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|  | $\overline{\text{MR}}$ | $\overline{\text{LE}}$ | 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          |

[1] 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  $\overline{\text{LE}}$  transition;

q = lower case letter indicates the state of the referenced input one set-up time prior to the LOW-to-HIGH transition.

Table 4. Operating mode select table<sup>[1]</sup>

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

[1] H = HIGH voltage level; L = LOW voltage level.

## 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 |
|-----------|-------------------------|---|------|----------|------|
| $V_{CC}$  | supply voltage          |   | -0.5 | +7.0     | V    |
| $I_{IK}$  | input clamping current  | $V_I < -0.5\text{ V}$ or $V_I > V_{CC} + 0.5\text{ V}$ <sup>[1]</sup> | -    | $\pm 20$ | mA   |
| $I_{OK}$  | output clamping current | $V_O < -0.5\text{ V}$ or $V_O > V_{CC} + 0.5\text{ V}$ <sup>[1]</sup> | -    | $\pm 20$ | mA   |
| $I_O$     | output current          | $V_O = -0.5\text{ V}$ to $V_{CC} + 0.5\text{ V}$                      | -    | $\pm 25$ | mA   |
| $I_{CC}$  | supply current          |   | -    | +70      | mA   |
| $I_{GND}$ | ground current          |   | -70  | -        | mA   |
| $T_{stg}$ | storage temperature     |   | -65  | +150     | °C   |
| $P_{tot}$ | total power dissipation | $T_{amb} = -40\text{ °C}$ to $+125\text{ °C}$                         |      |          |      |
|           |                         | SO16 package <sup>[2]</sup>   | -    | 500      | mW   |
|           |                         | (T)SSOP16 package <sup>[3]</sup>                                      | -    | 500      | mW   |
|           |                         | DHVQFN16 package <sup>[4]</sup>                                       | -    | 500      | mW   |

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

[2]  $P_{tot}$  derates linearly with 8 mW/K above 70 °C.

[3]  $P_{tot}$  derates linearly with 5.5 mW/K above 60 °C.

[4]  $P_{tot}$  derates linearly with 4.5 mW/K above 60 °C.

## 8. Recommended operating conditions

**Table 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  |      |
| <b>74HC259</b>  |                           |   |                |   |      |                  |      |                   |      |      |
| 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    |
| 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    |
| 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>I</sub>  | input leakage current     | V <sub>I</sub> = V <sub>CC</sub> or GND;<br>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;<br>V <sub>CC</sub> = 6.0 V | -    | -                | 8.0  | -                 | 80   | -    |

**Table 7. Static characteristics ...continued**

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

| Symbol           | Parameter                 | Conditions   | 25 °C |      |      | –40 °C to +85 °C |      | –40 °C to +125 °C |     | Unit |
|------------------|---------------------------|--|-------|------|------|------------------|------|-------------------|-----|------|
|                  |                           |  | Min   | Typ  | Max  | Min              | Max  | Min               | Max |      |
| C <sub>I</sub>   | input capacitance         |  | -     | 3.5  | -    | -                | -    | -                 | -   | pF   |
| <b>74HCT259</b>  |                           |  |       |      |      |                  |      |                   |     |      |
| 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;<br>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;<br>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;<br>other inputs at V <sub>CC</sub> or GND;<br>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 $\overline{\text{MR}}$   | -     | 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 [Figure 12](#).

| Symbol  | Parameter                     | Conditions  | 25 °C |                    |     | −40 °C to +85 °C |     | −40 °C to +125 °C |     | Unit |
|---|-------------------------------|---|-------|--------------------|-----|------------------|-----|-------------------|-----|------|
|   |                               |   | Min   | Typ <sup>[1]</sup> | Max | Min              | Max | Min               | Max |      |
| <b>74HC259</b>                                  |                               |   |       |                    |     |                  |     |                   |     |      |
| t <sub>pd</sub>                                 | propagation delay             | D to Qn; see <a href="#">Figure 6</a> <sup>[2]</sup>                      |       |                    |     |                  |     |                   |     |      |
|   |                               | 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 <a href="#">Figure 7</a> <sup>[2]</sup>                     |       |                    |     |                  |     |                   |     |      |
|   |                               | 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   |
|   |                               | $\overline{\text{LE}}$ to Qn; see <a href="#">Figure 8</a> <sup>[2]</sup> |       |                    |     |                  |     |                   |     |      |
|   |                               | 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 <a href="#">Figure 9</a>                                    |       |                    |     |                  |     |                   |     |      |
|   |                               | 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 <a href="#">Figure 8</a> <sup>[3]</sup>                               |       |                    |     |                  |     |                   |     |      |
|   |                               | 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                   | $\overline{\text{LE}}$ HIGH or LOW; see <a href="#">Figure 8</a>          |       |                    |     |                  |     |                   |     |      |
|   |                               | 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   |
|   |                               | $\overline{\text{MR}}$ LOW; see <a href="#">Figure 9</a>                  |       |                    |     |                  |     |                   |     |      |
|   |                               | 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   |

**Table 8. Dynamic characteristics ...continued**Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 12](#).

| Symbol           | Parameter                           | Conditions  | 25 °C |                    |     | -40 °C to +85 °C |     | -40 °C to +125 °C |     | Unit |
|------------------|-------------------------------------|---|-------|--------------------|-----|------------------|-----|-------------------|-----|------|
|                  |                                     |   | Min   | Typ <sup>[1]</sup> | Max | Min              | Max | Min               | Max |      |
| t <sub>su</sub>  | set-up time                         | D, An to $\overline{\text{LE}}$ ;<br>see <a href="#">Figure 10</a> and<br><a href="#">Figure 11</a> |       |                    |     |                  |     |                   |     |      |
|                  |                                     | 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   |
| t <sub>h</sub>   | hold time                           | D to $\overline{\text{LE}}$ ; see <a href="#">Figure 10</a><br>and <a href="#">Figure 11</a>        |       |                    |     |                  |     |                   |     |      |
|                  |                                     | V <sub>CC</sub> = 2.0 V   | 0     | -19                | -   | 0                | -   | 0                 | -   | ns   |
|                  |                                     | V <sub>CC</sub> = 4.5 V   | 0     | -6                 | -   | 0                | -   | 0                 | -   | ns   |
|                  |                                     | V <sub>CC</sub> = 6.0 V   | 0     | -5                 | -   | 0                | -   | 0                 | -   | ns   |
|                  |                                     | An to $\overline{\text{LE}}$ ; see <a href="#">Figure 10</a><br>and <a href="#">Figure 11</a>       |       |                    |     |                  |     |                   |     |      |
|                  |                                     | V <sub>CC</sub> = 2.0 V   | 2     | -11                | -   | 2                | -   | 2                 | -   | ns   |
|                  |                                     | V <sub>CC</sub> = 4.5 V   | 2     | -4                 | -   | 2                | -   | 2                 | -   | ns   |
|                  |                                     | V <sub>CC</sub> = 6.0 V   | 2     | -3                 | -   | 2                | -   | 2                 | -   | ns   |
| C <sub>PD</sub>  | power<br>dissipation<br>capacitance | f <sub>i</sub> = 1 MHz;<br>V <sub>I</sub> = GND to V <sub>CC</sub> <sup>[4]</sup>                   | -     | 19                 | -   | -                | -   | -                 | -   | pF   |
| <b>74HCT259</b>  |                                     |   |       |                    |     |                  |     |                   |     |      |
| t <sub>pd</sub>  | propagation<br>delay                | D to Qn; see <a href="#">Figure 6</a> <sup>[2]</sup>  |       |                    |     |                  |     |                   |     |      |
|                  |                                     | V <sub>CC</sub> = 4.5 V   | -     | 23                 | 39  | -                | 49  | -                 | 59  | ns   |
|                  |                                     | V <sub>CC</sub> = 5.0 V; C <sub>L</sub> = 15 pF   | -     | 20                 | -   | -                | -   | -                 | -   | ns   |
|                  |                                     | An to Qn; see <a href="#">Figure 7</a> <sup>[2]</sup>   |       |                    |     |                  |     |                   |     |      |
|                  |                                     | V <sub>CC</sub> = 4.5 V   | -     | 25                 | 41  | -                | 51  | -                 | 62  | ns   |
|                  |                                     | V <sub>CC</sub> = 5.0 V; C <sub>L</sub> = 15 pF   | -     | 20                 | -   | -                | -   | -                 | -   | ns   |
|                  |                                     | $\overline{\text{LE}}$ to Qn; see <a href="#">Figure 8</a> <sup>[2]</sup>                           |       |                    |     |                  |     |                   |     |      |
|                  |                                     | V <sub>CC</sub> = 4.5 V   | -     | 22                 | 38  | -                | 48  | -                 | 57  | ns   |
| t <sub>PHL</sub> | HIGH to LOW<br>propagation<br>delay | $\overline{\text{MR}}$ to Qn; see <a href="#">Figure 9</a>  |       |                    |     |                  |     |                   |     |      |
|                  |                                     | V <sub>CC</sub> = 4.5 V   | -     | 23                 | 39  | -                | 49  | -                 | 59  | ns   |
|                  |                                     | V <sub>CC</sub> = 5.0 V; C <sub>L</sub> = 15 pF   | -     | 20                 | -   | -                | -   | -                 | -   | ns   |
| t <sub>t</sub>   | transition time                     | see <a href="#">Figure 8</a> <sup>[3]</sup>   |       |                    |     |                  |     |                   |     |      |
|                  |                                     | V <sub>CC</sub> = 4.5 V   | -     | 7                  | 15  | -                | 19  | -                 | 22  | ns   |
| t <sub>w</sub>   | pulse width                         | $\overline{\text{LE}}$ HIGH or LOW;<br>see <a href="#">Figure 8</a>                                 |       |                    |     |                  |     |                   |     |      |
|                  |                                     | V <sub>CC</sub> = 4.5 V   | 19    | 11                 | -   | 24               | -   | 29                | -   | ns   |
|                  |                                     | $\overline{\text{MR}}$ LOW; see <a href="#">Figure 9</a>  |       |                    |     |                  |     |                   |     |      |
|                  |                                     | V <sub>CC</sub> = 4.5 V   | 18    | 10                 | -   | 23               | -   | 27                | -   | ns   |

**Table 8. Dynamic characteristics ...continued**

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 12](#).

| Symbol          | Parameter                           | Conditions   | 25 °C |                    |     | -40 °C to +85 °C |     | -40 °C to +125 °C |     | Unit |
|-----------------|-------------------------------------|--|-------|--------------------|-----|------------------|-----|-------------------|-----|------|
|                 |                                     |  | Min   | Typ <sup>[1]</sup> | Max | Min              | Max | Min               | Max |      |
| t <sub>su</sub> | set-up time                         | D, An to $\overline{LE}$ ;<br>see <a href="#">Figure 10</a> and<br><a href="#">Figure 11</a> |       |                    |     |                  |     |                   |     |      |
|                 |                                     | V <sub>CC</sub> = 4.5 V  | 17    | 10                 | -   | 21               | -   | 26                | -   | ns   |
| t <sub>h</sub>  | hold time                           | D to $\overline{LE}$ ; see <a href="#">Figure 10</a><br>and <a href="#">Figure 11</a>        |       |                    |     |                  |     |                   |     |      |
|                 |                                     | V <sub>CC</sub> = 4.5 V  | 0     | -8                 | -   | 0                | -   | 0                 | -   | ns   |
|                 |                                     | An to $\overline{LE}$ ; see <a href="#">Figure 10</a><br>and <a href="#">Figure 11</a>       |       |                    |     |                  |     |                   |     |      |
| C <sub>PD</sub> | power<br>dissipation<br>capacitance | f <sub>i</sub> = 1 MHz;<br>V <sub>I</sub> = GND to V <sub>CC</sub> - 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).

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

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

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

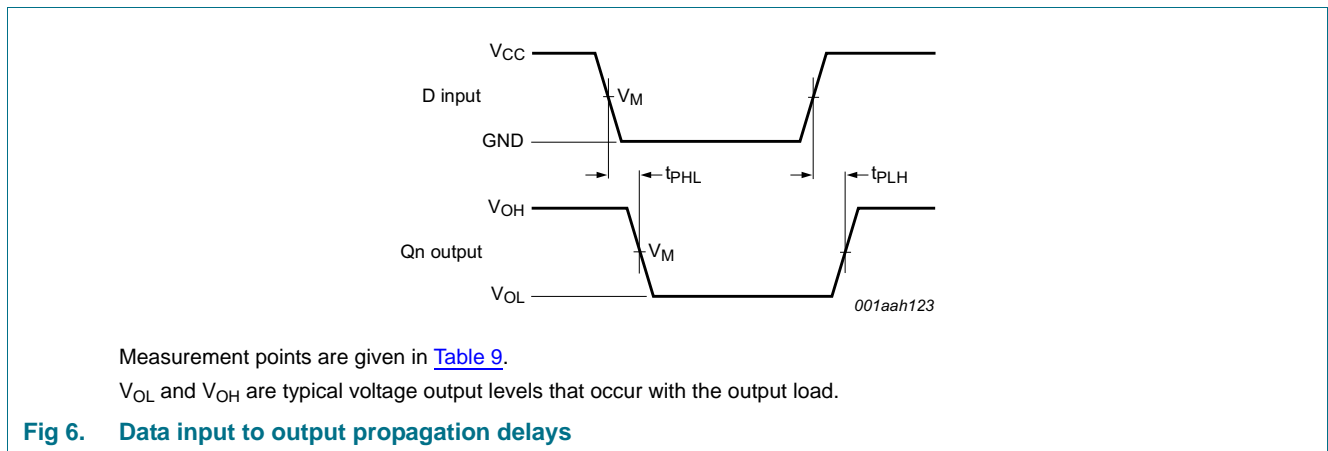
C<sub>L</sub> = output load capacitance in pF;

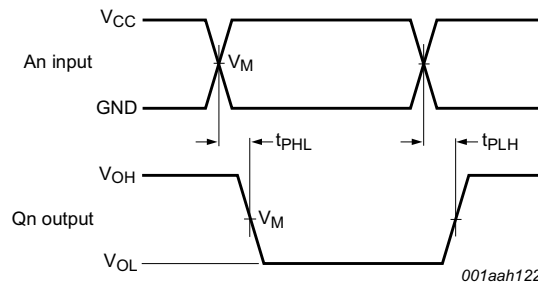
V<sub>CC</sub> = supply voltage in V;

N = number of inputs switching;

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

## 11. Waveforms

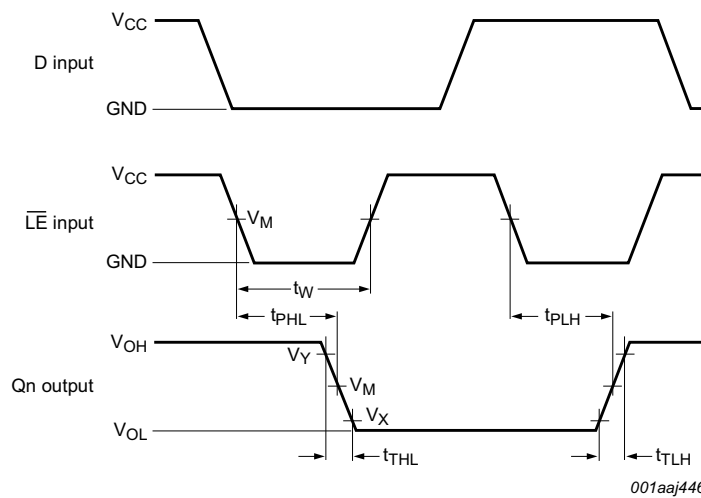




Measurement points are given in [Table 9](#).

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

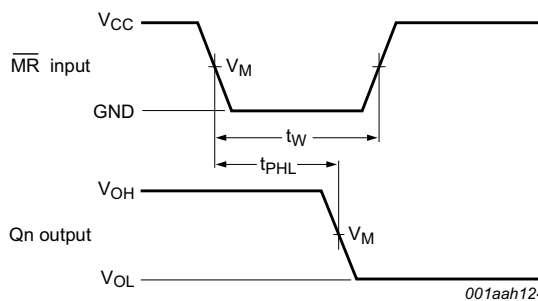
**Fig 7. Address input to output propagation delays**



Measurement points are given in [Table 9](#).

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

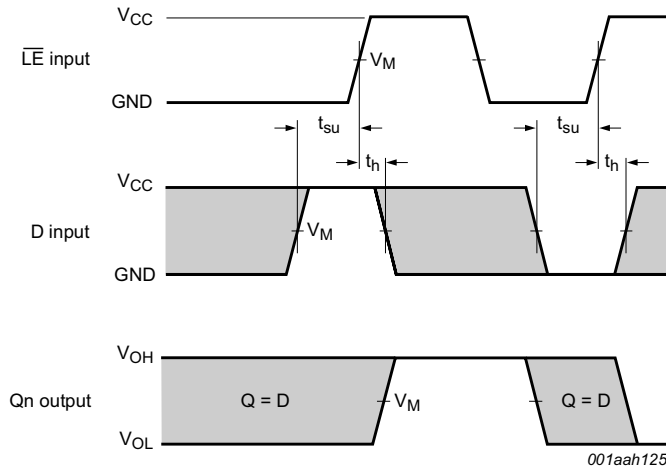
**Fig 8. Enable input to output propagation delays and pulse width**



Measurement points are given in [Table 9](#).

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

**Fig 9. Master reset input to output propagation delays**

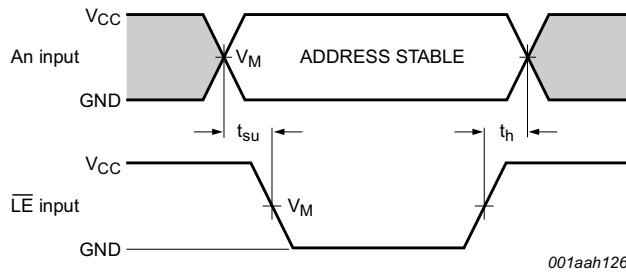


Measurement points are given in [Table 9](#).

The shaded areas indicate when the input is permitted to change for predictable output performance.

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

**Fig 10. Data input to latch enable input set-up and hold times**



Measurement points are given in [Table 9](#).

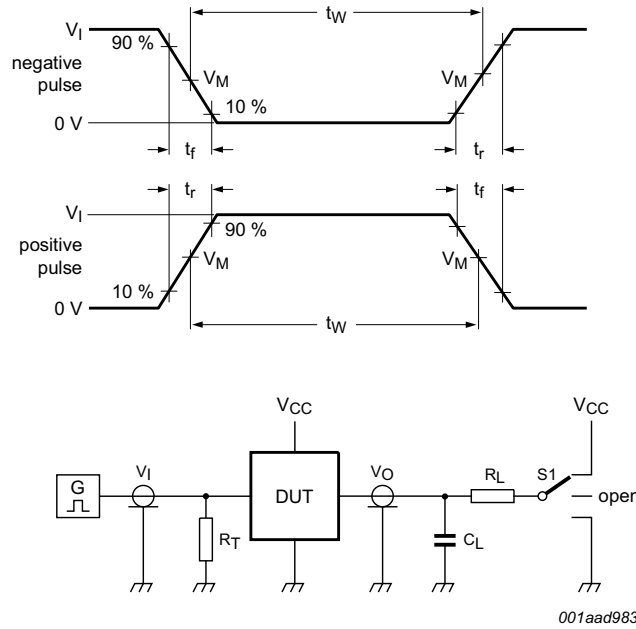
The shaded areas indicate when the input is permitted to change for predictable output performance.

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

**Fig 11. Address input to latch enable input set-up and hold times**

**Table 9. Measurement points**

| Type     | Input       | Output      |             |             |
|----------|-------------|-------------|-------------|-------------|
|          | $V_M$       | $V_M$       | $V_X$       | $V_Y$       |
| 74HC259  | $0.5V_{CC}$ | $0.5V_{CC}$ | $0.1V_{CC}$ | $0.9V_{CC}$ |
| 74HCT259 | 1.3 V       | 1.3 V       | $0.1V_{CC}$ | $0.9V_{CC}$ |



001aad983

Test data is given in [Table 10](#).

Definitions test circuit:

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

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

$R_L$  = Load resistance.

S1 = Test selection switch

**Fig 12. Test circuit for measuring switching times**

**Table 10. Test data**

| Type     | Input    |            | Load         |              | S1 position        |
|----------|----------|------------|--------------|--------------|--------------------|
|          | $V_I$    | $t_r, t_f$ | $C_L$        | $R_L$        | $t_{PHL}, t_{PLH}$ |
| 74HC259  | $V_{CC}$ | 6 ns       | 15 pF, 50 pF | 1 k $\Omega$ | open               |
| 74HCT259 | 3 V      | 6 ns       | 15 pF, 50 pF | 1 k $\Omega$ | open               |

12. Package outline

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

SOT109-1

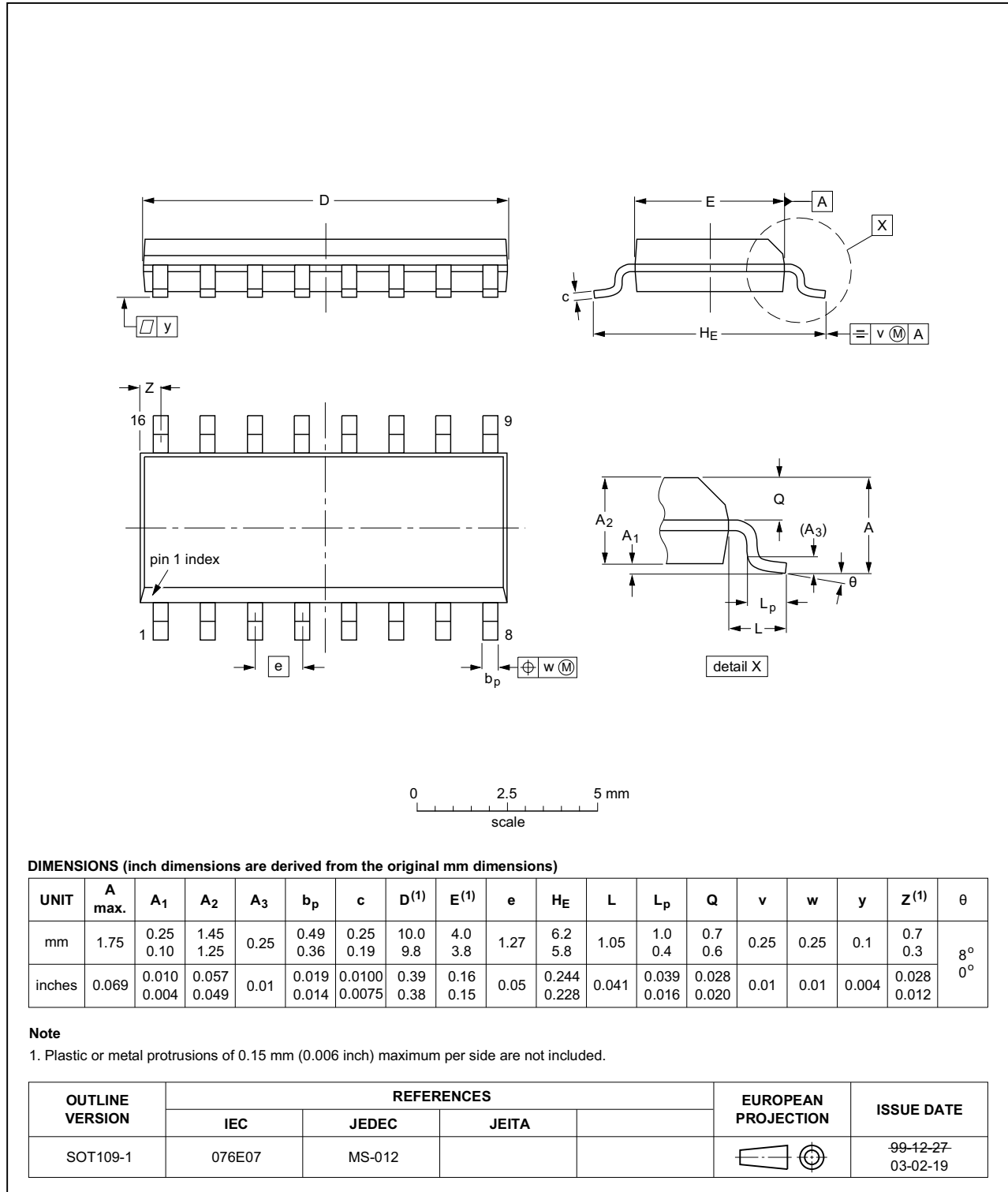


Fig 13. Package outline SOT109-1 (SO16)

SSOP16: plastic shrink small outline package; 16 leads; body width 5.3 mm

SOT338-1

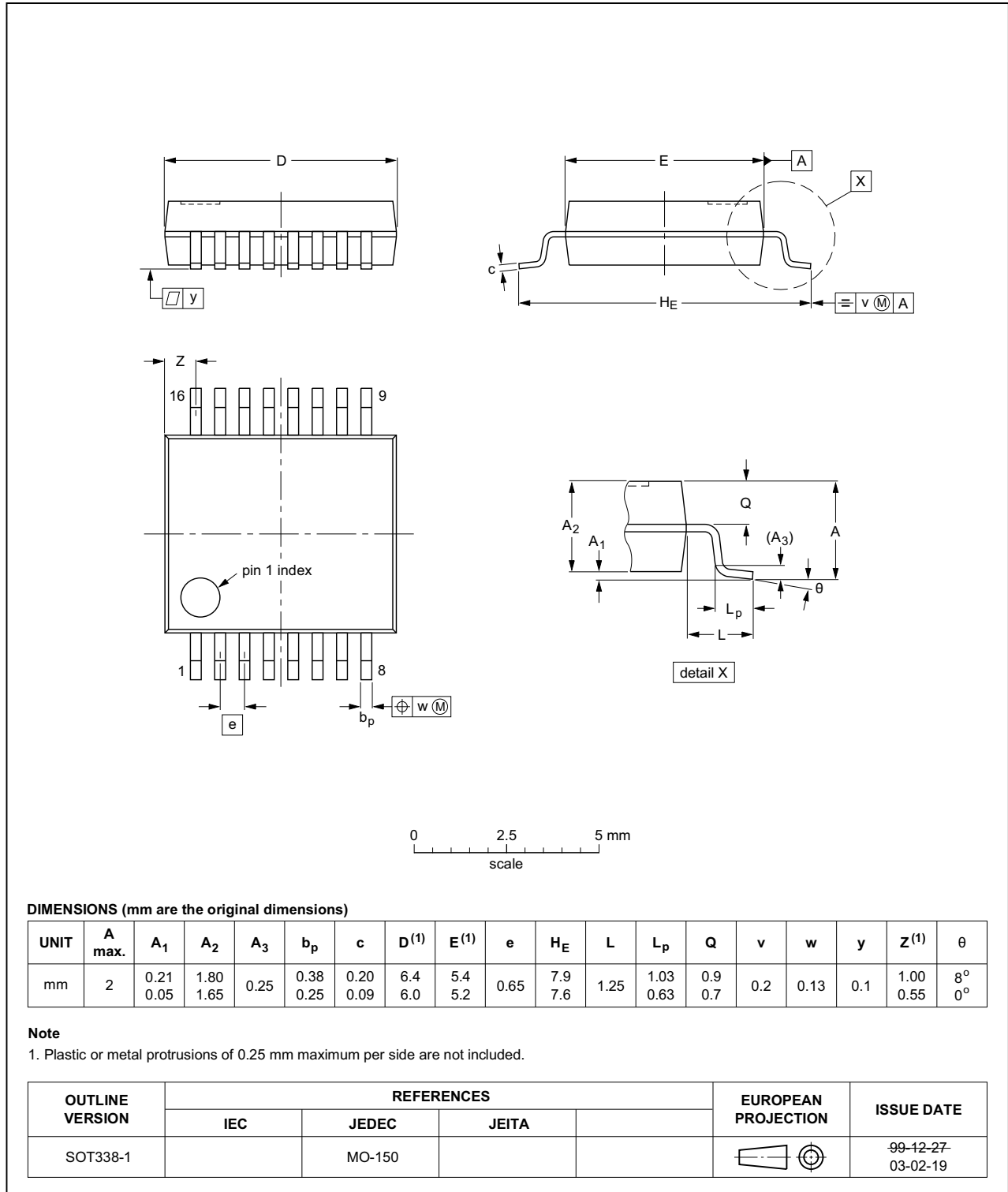


Fig 14. Package outline SOT338-1 (SSOP16)

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

SOT403-1

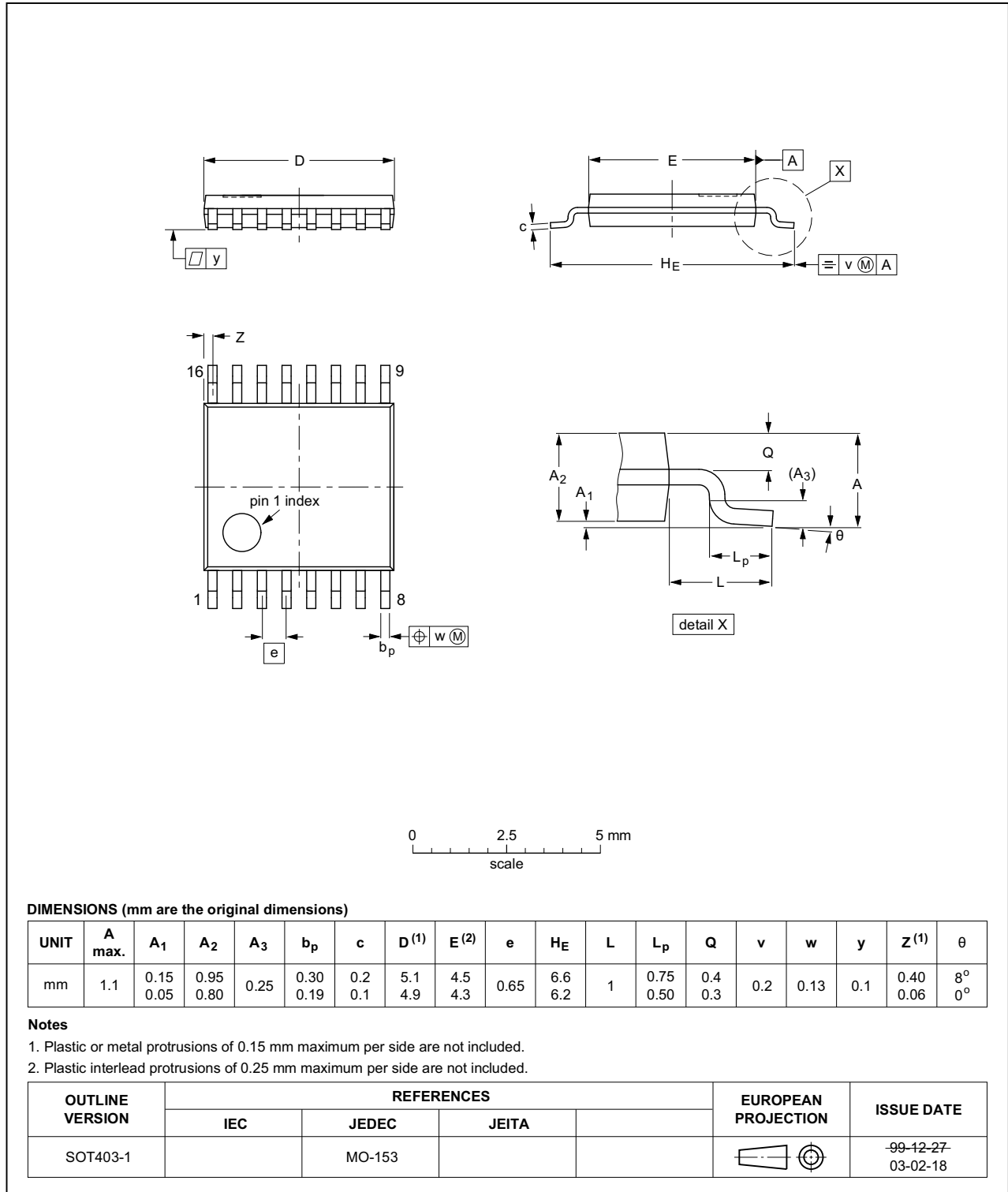


Fig 15. Package outline SOT403-1 (TSSOP16)

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

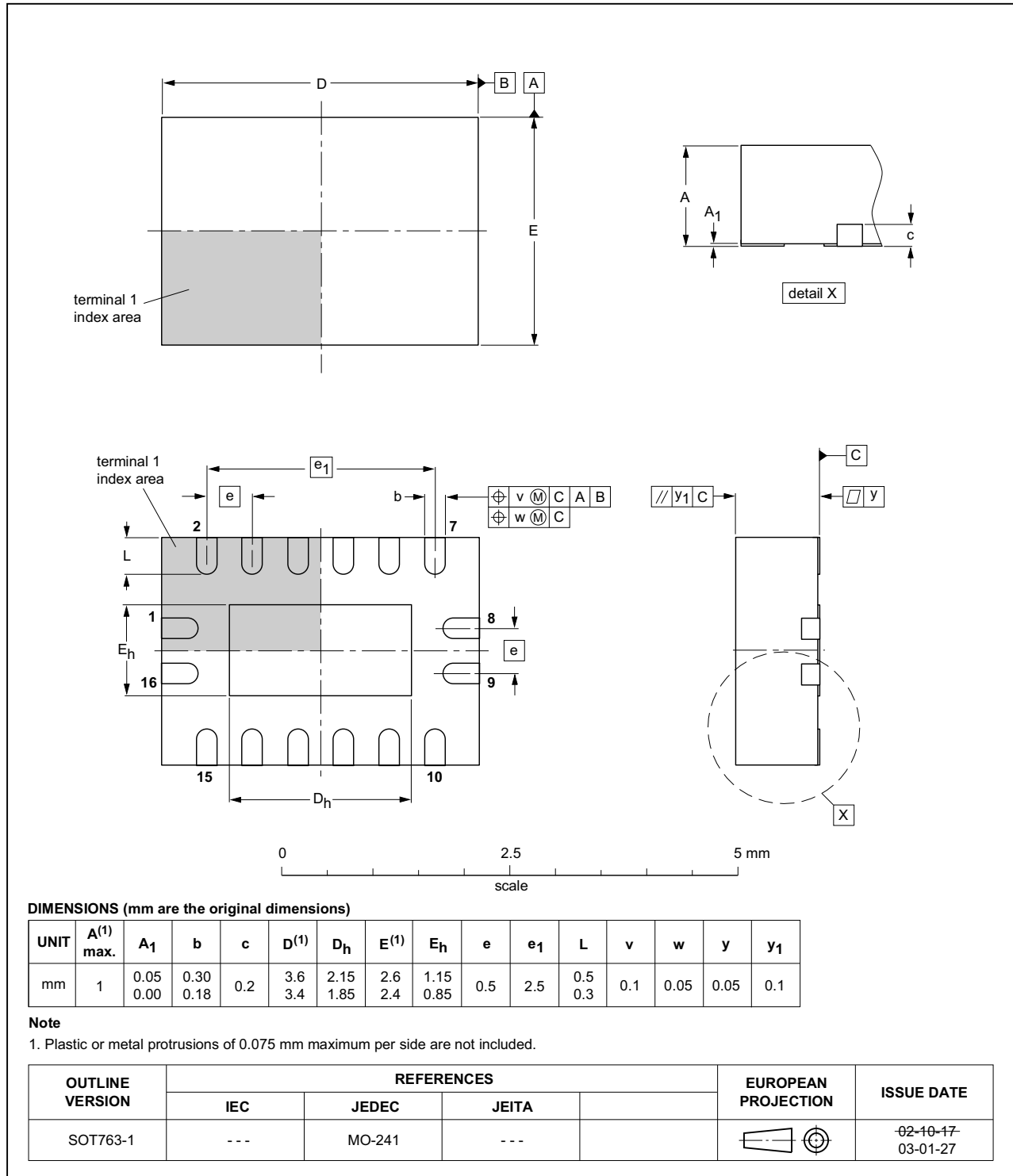


Fig 16. Package outline SOT763-1 (DHVQFN16)

## 13. 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                        |
| MM      | Machine Model                           |
| TTL     | Transistor-Transistor Logic             |

## 14. Revision history

Table 12. Revision history

| Document ID         | Release date   | Data sheet status     | Change notice | Supersedes          |
|---------------------|--|-----------------------|---------------|---------------------|
| 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.</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 | -             | -                   |

## 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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nexperia.com>.

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