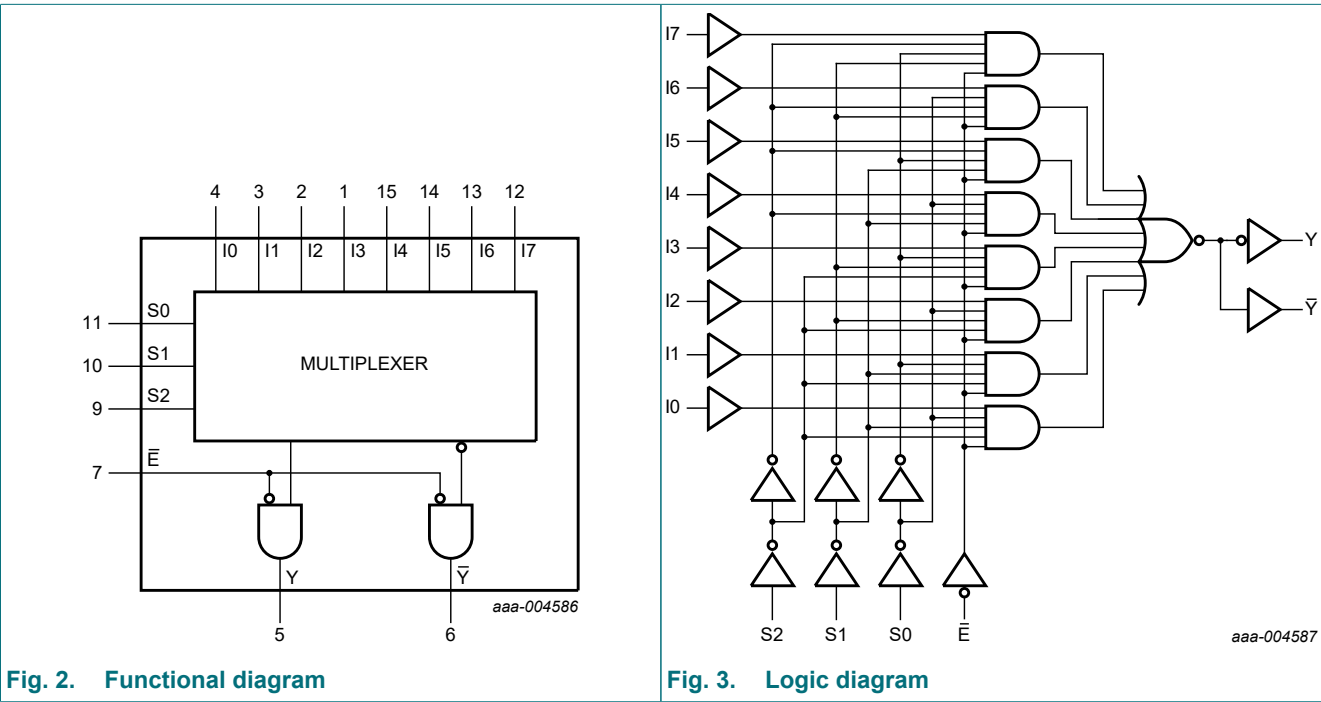
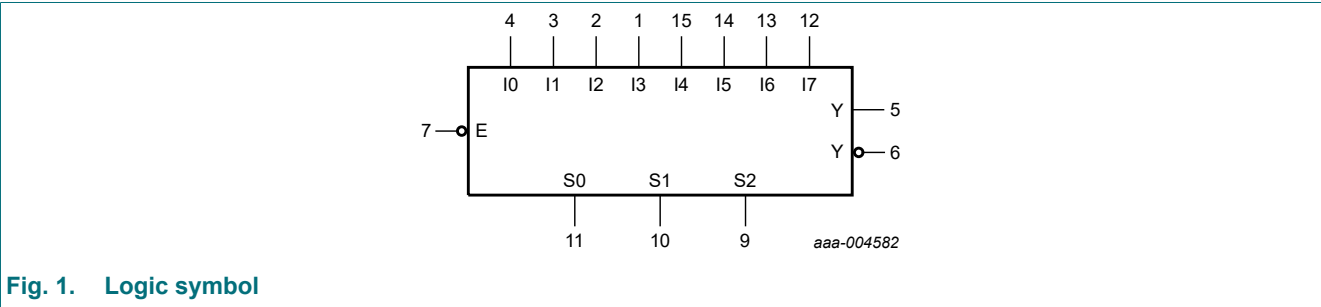
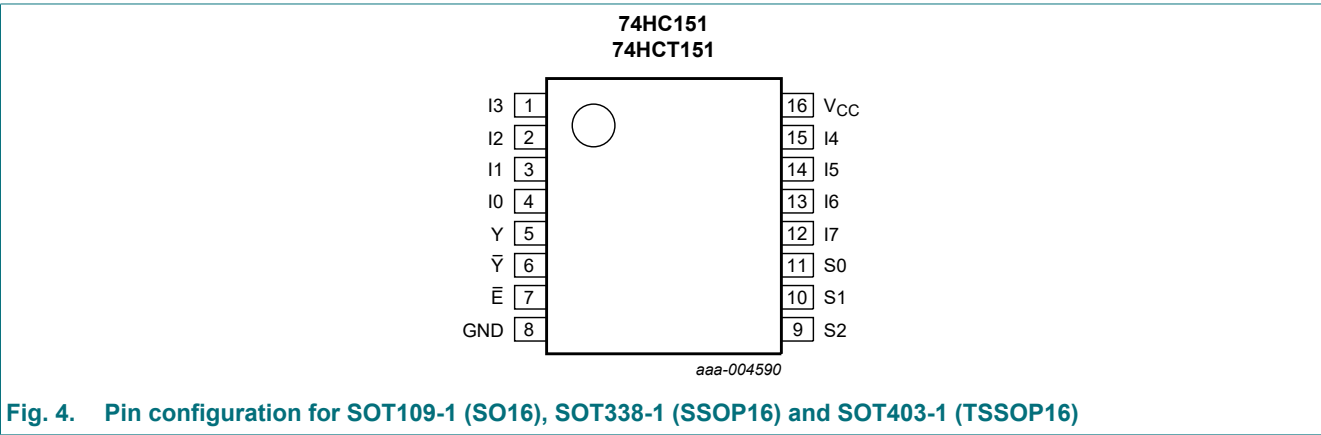


4. Functional diagram



5. Pinning information

5.1. Pinning



5.2. Pin description

Table 2. Pin description

| Symbol | Pin | Description |
|-----------------|----------------------------|----------------------------------|
| I0 to I7 | 4, 3, 2, 1, 15, 14, 13, 12 | data inputs |
| Y | 5 | multiplexer output |
| \bar{Y} | 6 | complementary multiplexer output |
| \bar{E} | 7 | enable input (active LOW) |
| GND | 8 | ground (0 V) |
| S0, S1, S2 | 11, 10, 9 | common data select inputs |
| V _{CC} | 16 | supply voltage |

6. Functional description

Table 3. Function table

H = HIGH voltage level; L = LOW voltage level; X = don't care.

| Input | | | | | | | | | | | | Output | |
|-----------|----|----|----|----|----|----|----|----|----|----|----|-----------|---|
| \bar{E} | S2 | S1 | S0 | I0 | I1 | I2 | I3 | I4 | I5 | I6 | I7 | \bar{Y} | Y |
| H | X | X | X | X | X | X | X | X | X | X | X | H | L |
| L | L | L | L | L | X | X | X | X | X | X | X | H | L |
| L | L | L | L | H | X | X | X | X | X | X | X | L | H |
| L | L | L | H | X | L | X | X | X | X | X | X | H | L |
| L | L | L | H | X | H | X | X | X | X | X | X | L | H |
| L | L | H | L | X | X | L | X | X | X | X | X | H | L |
| L | L | H | L | X | X | H | X | X | X | X | X | L | H |
| L | L | H | H | X | X | X | L | X | X | X | X | H | L |
| L | L | H | H | X | X | X | H | X | X | X | X | L | H |
| L | H | L | L | X | X | X | X | L | X | X | X | H | L |
| L | H | L | L | X | X | X | X | H | X | X | X | L | H |
| L | H | L | H | X | X | X | X | X | L | X | X | H | L |
| L | H | L | H | X | X | X | X | X | H | X | X | L | H |
| L | H | H | L | X | X | X | X | X | X | L | X | H | L |
| L | H | H | L | X | X | X | X | X | X | H | X | L | H |
| L | H | H | H | X | X | X | X | X | X | X | L | H | L |
| L | H | H | H | X | X | X | X | X | X | X | H | L | H |

7. Limiting values

Table 4. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134). Voltages are referenced to GND (ground = 0 V).

| Symbol | Parameter | Conditions | Min | Max | Unit |
|-----------|-------------------------|----------------------------------------------------------|------|----------|------|
| V_{CC} | supply voltage | | -0.5 | +7 | V |
| I_{IK} | input clamping current | $V_I < -0.5 \text{ V}$ or $V_I > V_{CC} + 0.5 \text{ V}$ | - | ± 20 | mA |
| I_{OK} | output clamping current | $V_O < -0.5 \text{ V}$ or $V_O > V_{CC} + 0.5 \text{ V}$ | - | ± 20 | mA |
| I_O | output current | $V_O = -0.5 \text{ V}$ to $(V_{CC} + 0.5 \text{ V})$ | - | ± 25 | mA |
| I_{CC} | supply current | | - | +50 | mA |
| I_{GND} | ground current | | -50 | - | mA |
| T_{stg} | storage temperature | | -65 | +150 | °C |
| P_{tot} | total power dissipation | $T_{amb} = -40 \text{ °C}$ to $+125 \text{ °C}$ [1] | - | 500 | mW |

- [1] For SOT109-1 (SO16) package: P_{tot} derates linearly with 12.4 mW/K above 110 °C.
 For SOT338-1 (SSOP16) package: P_{tot} derates linearly with 8.5 mW/K above 91 °C.
 For SOT403-1 (TSSOP16) package: P_{tot} derates linearly with 8.5 mW/K above 91 °C.

8. Recommended operating conditions

Table 5. Recommended operating conditions

Voltages are referenced to GND (ground = 0 V)

| Symbol | Parameter | Conditions | 74HC151 | | | 74HCT151 | | | Unit |
|---------------------|-------------------------------------|--------------------------|---------|------|----------|----------|------|----------|------|
| | | | Min | Typ | Max | Min | Typ | Max | |
| V_{CC} | supply voltage | | 2.0 | 5.0 | 6.0 | 4.5 | 5.0 | 5.5 | V |
| V_I | input voltage | | 0 | - | V_{CC} | 0 | - | V_{CC} | V |
| V_O | output voltage | | 0 | - | V_{CC} | 0 | - | V_{CC} | V |
| T_{amb} | ambient temperature | | -40 | +25 | +125 | -40 | +25 | +125 | °C |
| $\Delta t/\Delta V$ | input transition rise and fall rate | $V_{CC} = 2.0 \text{ V}$ | - | - | 625 | - | - | - | ns/V |
| | | $V_{CC} = 4.5 \text{ V}$ | - | 1.67 | 139 | - | 1.67 | 139 | ns/V |
| | | $V_{CC} = 6.0 \text{ V}$ | - | - | 83 | - | - | - | ns/V |

9. Static characteristics

Table 6. Static characteristics

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

| Symbol | Parameter | Conditions | 25 °C | | | -40 °C to +85 °C | | -40 °C to +125 °C | | Unit |
|-----------------|--------------------------|-------------------------|-------|-----|------|------------------|------|-------------------|------|------|
| | | | Min | Typ | Max | Min | Max | Min | Max | |
| 74HC151 | | | | | | | | | | |
| V _{IH} | HIGH-level input voltage | V _{CC} = 2.0 V | 1.5 | 1.2 | - | 1.5 | - | 1.5 | - | V |
| | | V _{CC} = 4.5 V | 3.15 | 2.4 | - | 3.15 | - | 3.15 | - | V |
| | | V _{CC} = 6.0 V | 4.2 | 3.2 | - | 4.2 | - | 4.2 | - | V |
| V _{IL} | LOW-level input voltage | V _{CC} = 2.0 V | - | 0.8 | 0.5 | - | 0.5 | - | 0.5 | V |
| | | V _{CC} = 4.5 V | - | 2.1 | 1.35 | - | 1.35 | - | 1.35 | V |
| | | V _{CC} = 6.0 V | - | 2.8 | 1.8 | - | 1.8 | - | 1.8 | 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 _{OH} | HIGH-level output voltage | V _I = V _{IH} or V _{IL} | | | | | | | | |
| | | I _O = -20 µA; V _{CC} = 2.0 V | 1.9 | 2.0 | - | 1.9 | - | 1.9 | - | V |
| | | I _O = -20 µA; V _{CC} = 4.5 V | 4.4 | 4.5 | - | 4.4 | - | 4.4 | - | V |
| | | I _O = -20 µA; V _{CC} = 6.0 V | 5.9 | 6.0 | - | 5.9 | - | 5.9 | - | V |
| | | I _O = -4.0 mA; V _{CC} = 4.5 V | 3.98 | 4.32 | - | 3.84 | - | 3.7 | - | V |
| | | I _O = -5.2 mA; V _{CC} = 6.0 V | 5.48 | 5.81 | - | 5.34 | - | 5.2 | - | V |
| V _{OL} | LOW-level output voltage | V _I = V _{IH} or V _{IL} | | | | | | | | |
| | | I _O = 20 µA; V _{CC} = 2.0 V | - | 0 | 0.1 | - | 0.1 | - | 0.1 | V |
| | | I _O = 20 µA; V _{CC} = 4.5 V | - | 0 | 0.1 | - | 0.1 | - | 0.1 | V |
| | | I _O = 20 µA; V _{CC} = 6.0 V | - | 0 | 0.1 | - | 0.1 | - | 0.1 | V |
| | | I _O = 4.0 mA; V _{CC} = 4.5 V | - | 0.15 | 0.26 | - | 0.33 | - | 0.4 | V |
| | | I _O = 5.2 mA; V _{CC} = 6.0 V | - | 0.16 | 0.26 | - | 0.33 | - | 0.4 | V |
| I _I | input leakage current | V _I = V _{CC} or GND; V _{CC} = 6.0 V | - | - | ±0.1 | - | ±1.0 | - | ±1.0 | µA |
| I _{CC} | supply current | V _I = V _{CC} or GND; I _O = 0 A; V _{CC} = 6.0 V | - | - | 8.0 | - | 80 | - | 160 | µA |
| C _I | input capacitance | | - | 3.5 | - | - | - | - | - | pF |
| 74HCT151 | | | | | | | | | | |
| V _{IH} | HIGH-level input voltage | V _{CC} = 4.5 V to 5.5 V | 2.0 | 1.6 | - | 2.0 | - | 2.0 | - | V |
| V _{IL} | LOW-level input voltage | V _{CC} = 4.5 V to 5.5 V | - | 1.2 | 0.8 | - | 0.8 | - | 0.8 | V |
| V _{OH} | HIGH-level output voltage | V _I = V _{IH} or V _{IL} ; V _{CC} = 4.5 V | | | | | | | | |
| | | I _O = -20 µA | 4.4 | 4.5 | - | 4.4 | - | 4.4 | - | V |
| | | I _O = -4 mA | 3.98 | 4.32 | - | 3.84 | - | 3.7 | - | V |
| V _{OL} | LOW-level output voltage | V _I = V _{IH} or V _{IL} ; V _{CC} = 4.5 V | | | | | | | | |
| | | I _O = 20 µA | - | 0 | 0.1 | - | 0.1 | - | 0.1 | V |
| | | I _O = 4.0 mA | - | 0.15 | 0.26 | - | 0.33 | - | 0.4 | V |
| I _I | input leakage current | V _I = V _{CC} or GND; V _{CC} = 5.5 V | - | - | ±0.1 | - | ±1.0 | - | ±1.0 | µA |
| I _{CC} | supply current | V _I = V _{CC} or GND; I _O = 0 A; V _{CC} = 5.5 V | - | - | 8.0 | - | 80 | - | 160 | µA |
| ΔI _{CC} | additional supply current | V _I = V _{CC} - 2.1 V; other inputs at V _{CC} or GND; V _{CC} = 4.5 V to 5.5 V; I _O = 0 A | | | | | | | | |
| | | per input pin; In inputs | - | 45 | 162 | - | 203 | - | 221 | µA |
| | | per input pin; \bar{E} input | - | 30 | 108 | - | 135 | - | 147 | µA |
| | | per input pin; Sn input | - | 150 | 540 | - | 675 | - | 735 | µA |
| C _I | input capacitance | | - | 3.5 | - | - | - | - | - | pF |

10. Dynamic characteristics

Table 7. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); $C_L = 50$ pF unless otherwise specified; for test circuit see Fig. 7.

| Symbol | Parameter | Conditions | 25 °C | | | -40 °C to +85 °C | | -40 °C to +125 °C | | Unit |
|-----------------|-------------------------------|--------------------------------------------------------------------------------|-------|-----|-----|------------------|-----|-------------------|-----|------|
| | | | Min | Typ | Max | Min | Max | Min | Max | |
| 74HC151 | | | | | | | | | | |
| t _{pd} | propagation delay | In to Y; see Fig. 5 [1] | | | | | | | | |
| | | V _{CC} = 2.0 V | - | 52 | 170 | - | 215 | - | 255 | ns |
| | | V _{CC} = 4.5 V | - | 19 | 34 | - | 43 | - | 51 | ns |
| | | V _{CC} = 5 V; C _L = 15 pF | - | 17 | - | - | - | - | - | ns |
| | | V _{CC} = 6.0 V | - | 15 | 29 | - | 37 | - | 43 | ns |
| | | In to \bar{Y} ; see Fig. 5 [1] | | | | | | | | |
| | | V _{CC} = 2.0 V | - | 58 | 185 | - | 230 | - | 280 | ns |
| | | V _{CC} = 4.5 V | - | 21 | 37 | - | 46 | - | 56 | ns |
| | | V _{CC} = 5 V; C _L = 15 pF | - | 17 | - | - | - | - | - | ns |
| | | V _{CC} = 6.0 V | - | 17 | 31 | - | 39 | - | 48 | ns |
| | | Sn to Y; see Fig. 6 [1] | | | | | | | | |
| | | V _{CC} = 2.0 V | - | 61 | 185 | - | 230 | - | 280 | ns |
| | | V _{CC} = 4.5 V | - | 22 | 37 | - | 46 | - | 56 | ns |
| | | V _{CC} = 5 V; C _L = 15 pF | - | 19 | - | - | - | - | - | ns |
| | | V _{CC} = 6.0 V | - | 18 | 31 | - | 39 | - | 48 | ns |
| | | Sn to \bar{Y} ; see Fig. 6 [1] | | | | | | | | |
| | | V _{CC} = 2.0 V | - | 61 | 205 | - | 255 | - | 310 | ns |
| | | V _{CC} = 4.5 V | - | 22 | 41 | - | 51 | - | 62 | ns |
| | | V _{CC} = 5 V; C _L = 15 pF | - | 19 | - | - | - | - | - | ns |
| | | V _{CC} = 6.0 V | - | 18 | 35 | - | 43 | - | 53 | ns |
| | | \bar{E} to Y; see Fig. 6 | | | | | | | | |
| | | V _{CC} = 2.0 V | - | 41 | 125 | - | 155 | - | 190 | ns |
| | | V _{CC} = 4.5 V | - | 15 | 25 | - | 31 | - | 38 | ns |
| | | V _{CC} = 5 V; C _L = 15 pF | - | 12 | - | - | - | - | - | ns |
| | | V _{CC} = 6.0 V | - | 12 | 21 | - | 26 | - | 32 | ns |
| | | \bar{E} to \bar{Y} ; see Fig. 6 | | | | | | | | |
| | | V _{CC} = 2.0 V | - | 47 | 145 | - | 180 | - | 220 | ns |
| | | V _{CC} = 4.5 V | - | 17 | 29 | - | 36 | - | 44 | ns |
| | | V _{CC} = 5 V; C _L = 15 pF | - | 14 | - | - | - | - | - | ns |
| | | V _{CC} = 6.0 V | - | 14 | 25 | - | 31 | - | 38 | ns |
| t _t | transition time | Y, \bar{Y} ; see Fig. 5 [2] | | | | | | | | |
| | | V _{CC} = 2.0 V | - | 19 | 75 | - | 95 | - | 110 | ns |
| | | V _{CC} = 4.5 V | - | 7 | 15 | - | 19 | - | 22 | ns |
| | | V _{CC} = 6.0 V | - | 6 | 13 | - | 16 | - | 19 | ns |
| C _{PD} | power dissipation capacitance | C _L = 50 pF; f = 1 MHz; V _I = GND to V _{CC} [3] | - | 40 | - | - | - | - | - | pF |

| Symbol | Parameter | Conditions | 25 °C | | | -40 °C to +85 °C | | -40 °C to +125 °C | | Unit |
|-----------------|-------------------------------|----------------------------------------------------------------------------------------|-------|-----|-----|------------------|-----|-------------------|-----|------|
| | | | Min | Typ | Max | Min | Max | Min | Max | |
| 74HCT151 | | | | | | | | | | |
| t _{pd} | propagation delay | In to Y; see Fig. 5 [1] | | | | | | | | |
| | | V _{CC} = 4.5 V | - | 22 | 38 | - | 48 | - | 57 | ns |
| | | V _{CC} = 5 V; C _L = 15 pF | - | 19 | - | - | - | - | - | ns |
| | | In to \bar{Y} ; see Fig. 5 [1] | | | | | | | | |
| | | V _{CC} = 4.5 V | - | 22 | 38 | - | 48 | - | 57 | ns |
| | | V _{CC} = 5 V; C _L = 15 pF | - | 19 | - | - | - | - | - | ns |
| | | Sn to Y; see Fig. 6 [1] | | | | | | | | |
| | | V _{CC} = 4.5 V | - | 23 | 41 | - | 51 | - | 62 | ns |
| | | V _{CC} = 5 V; C _L = 15 pF | - | 20 | - | - | - | - | - | ns |
| | | Sn to \bar{Y} ; see Fig. 6 [1] | | | | | | | | |
| | | V _{CC} = 4.5 V | - | 25 | 43 | - | 54 | - | 65 | ns |
| | | V _{CC} = 5 V; C _L = 15 pF | - | 20 | - | - | - | - | - | ns |
| | | \bar{E} to Y; see Fig. 6 [1] | | | | | | | | |
| | | V _{CC} = 4.5 V | - | 16 | 29 | - | 36 | - | 44 | ns |
| | | V _{CC} = 5 V; C _L = 15 pF | - | 13 | - | - | - | - | - | ns |
| | | \bar{E} to \bar{Y} ; see Fig. 6 [1] | | | | | | | | |
| | | V _{CC} = 4.5 V | - | 21 | 36 | - | 45 | - | 54 | ns |
| | | V _{CC} = 5 V; C _L = 15 pF | - | 18 | - | - | - | - | - | ns |
| t _t | transition time | Y, \bar{Y} ; see Fig. 5 [2] | | | | | | | | |
| | | V _{CC} = 4.5 V | - | 7 | 15 | - | 19 | - | 22 | ns |
| C _{PD} | power dissipation capacitance | C _L = 50 pF; f = 1 MHz; V _I = GND to V _{CC} - 1.5 V [3] | - | 40 | - | - | - | - | - | pF |

[1] t_{pd} is the same as t_{PLH} and t_{PHL} .

[2] t_t is the same as t_{THL} and t_{TLH} .

[3] C_{PD} is used to determine the dynamic power dissipation (P_D 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_i = input frequency in MHz;

f_o = output frequency in MHz;

C_L = output load capacitance in pF;

V_{CC} = supply voltage in V;

N = number of inputs switching;

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

10.1. Waveforms and test circuit

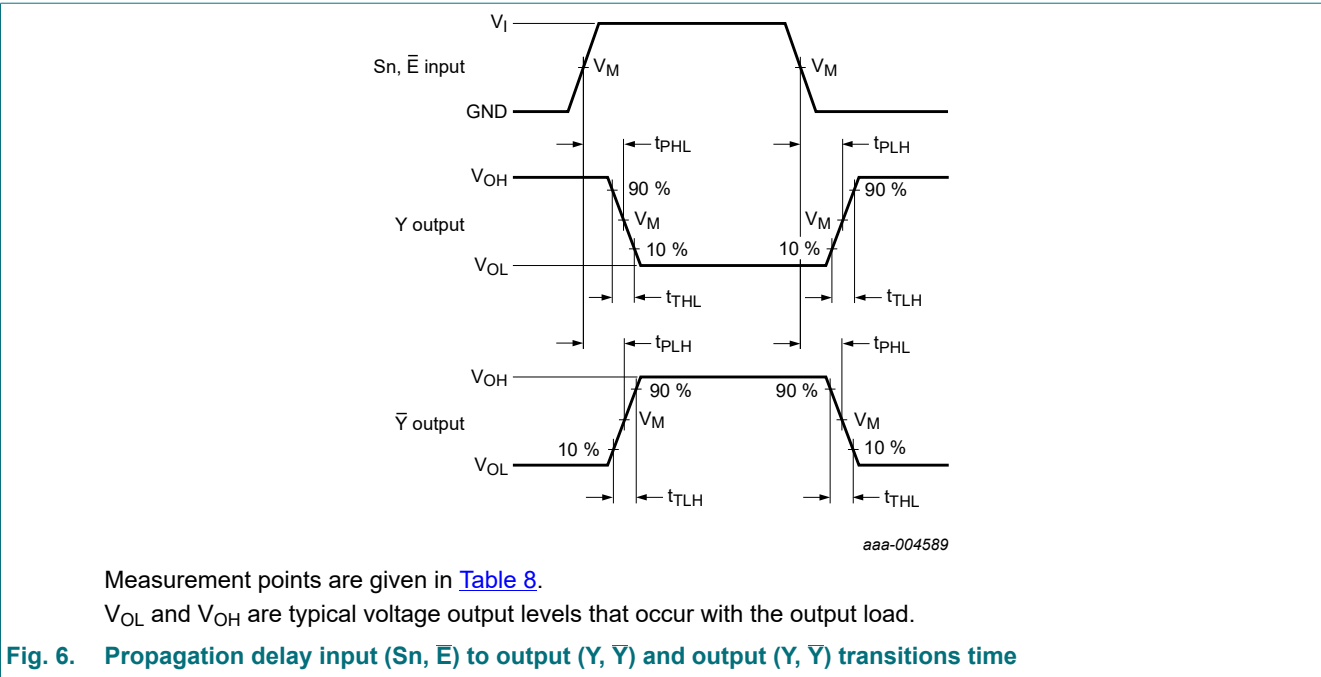
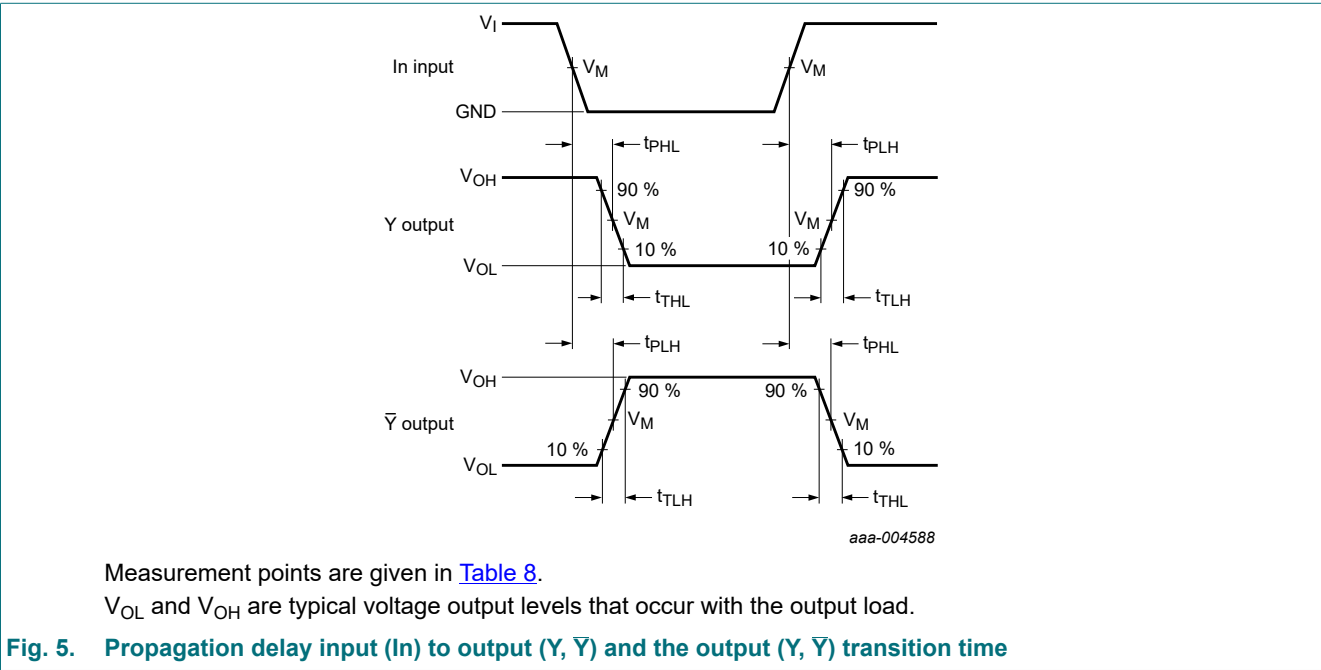
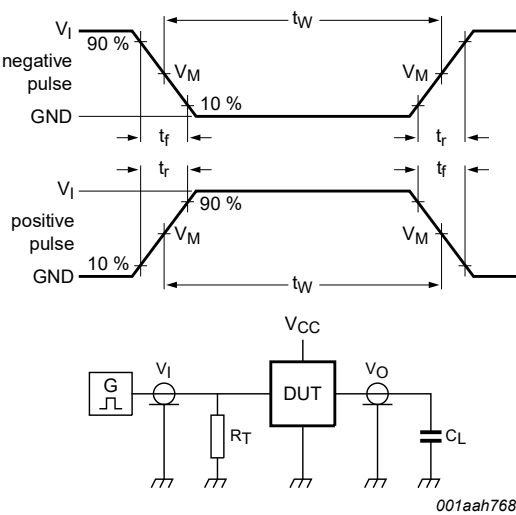


Table 8. Measurement points

| Type | Input | Output |
|----------|-------------|-------------|
| | V_M | V_M |
| 74HC151 | $0.5V_{CC}$ | $0.5V_{CC}$ |
| 74HCT151 | 1.3 V | 1.3 V |



Test data is given in [Table 9](#).
Definitions test circuit:
 R_T = Termination resistance should be equal to output impedance Z_o of the pulse generator.
 C_L = Load capacitance including jig and probe capacitance.
 R_L = Load resistance.
 $S1$ = Test selection switch.

Fig. 7. Test circuit for measuring switching times

Table 9. Test data

| Type | Input | | Load | Test |
|----------|----------|------------|--------------|--------------------|
| | V_I | t_r, t_f | C_L | |
| 74HC151 | V_{CC} | 6.0 ns | 15 pF, 50 pF | t_{PLH}, t_{PHL} |
| 74HCT151 | 3.0 V | 6.0 ns | 15 pF, 50 pF | t_{PLH}, t_{PHL} |

11. Package outline

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

SOT109-1

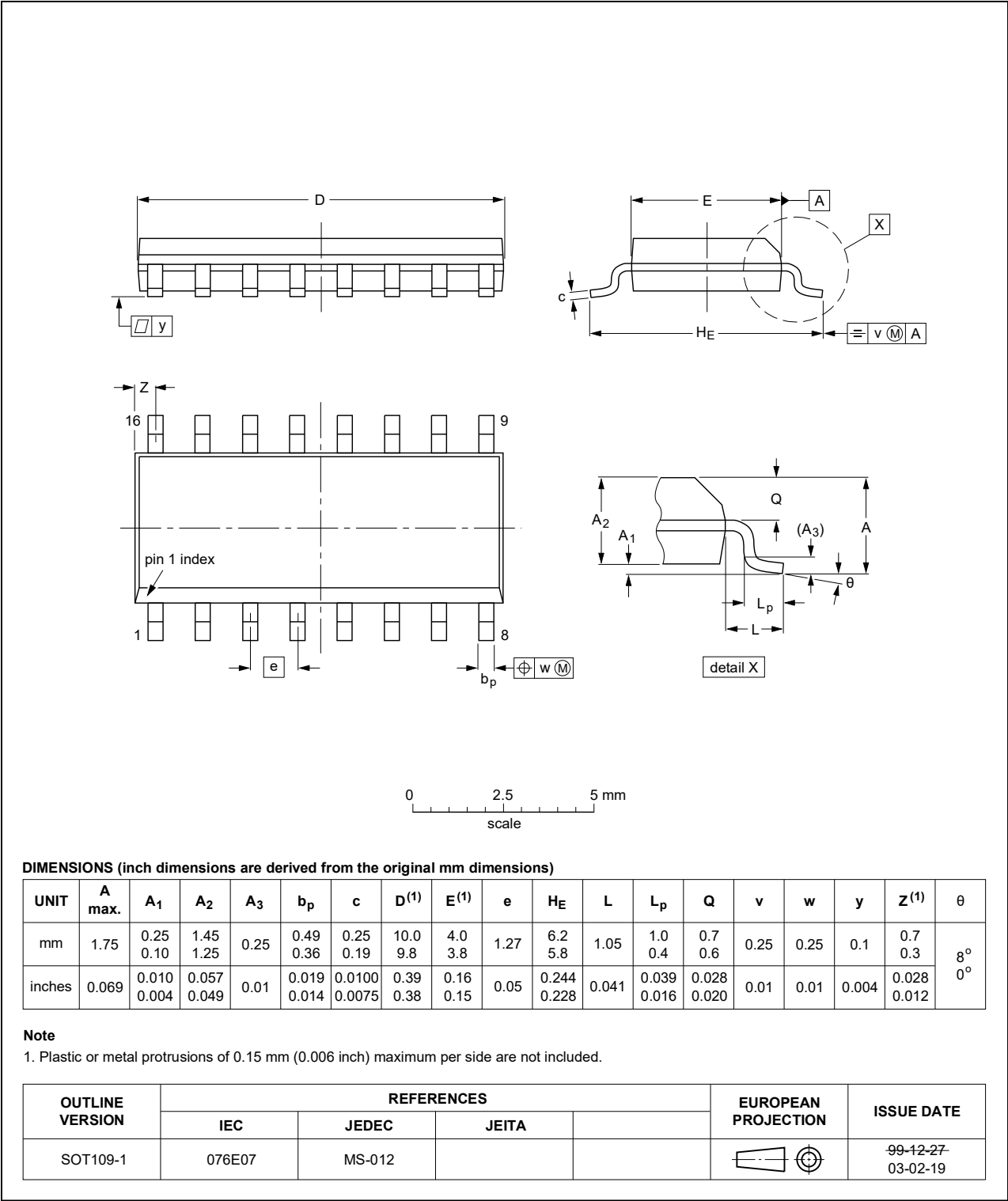


Fig. 8. Package outline SOT109-1 (SO16)

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

SOT338-1

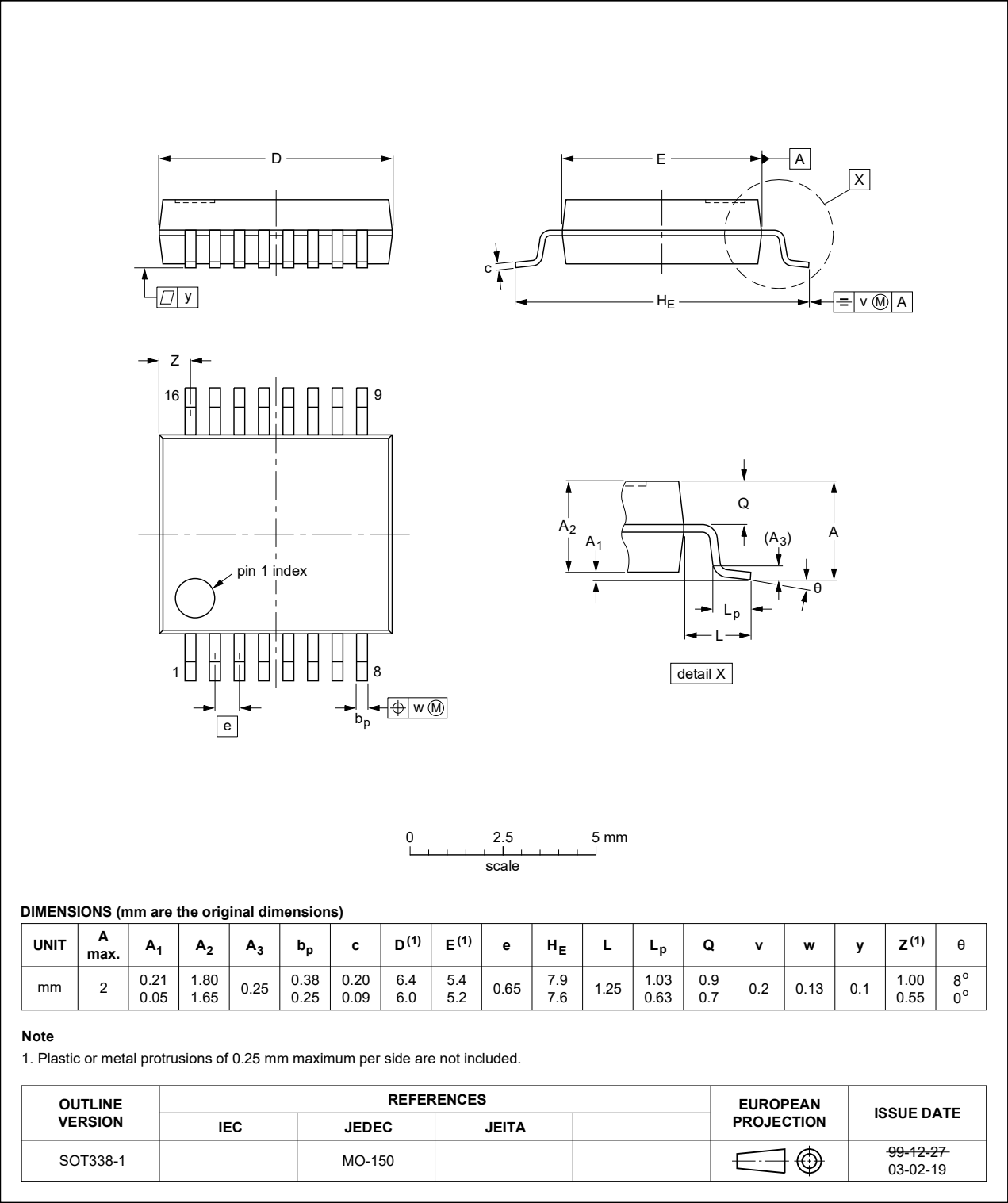


Fig. 9. Package outline SOT338-1 (SSOP16)

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

SOT403-1

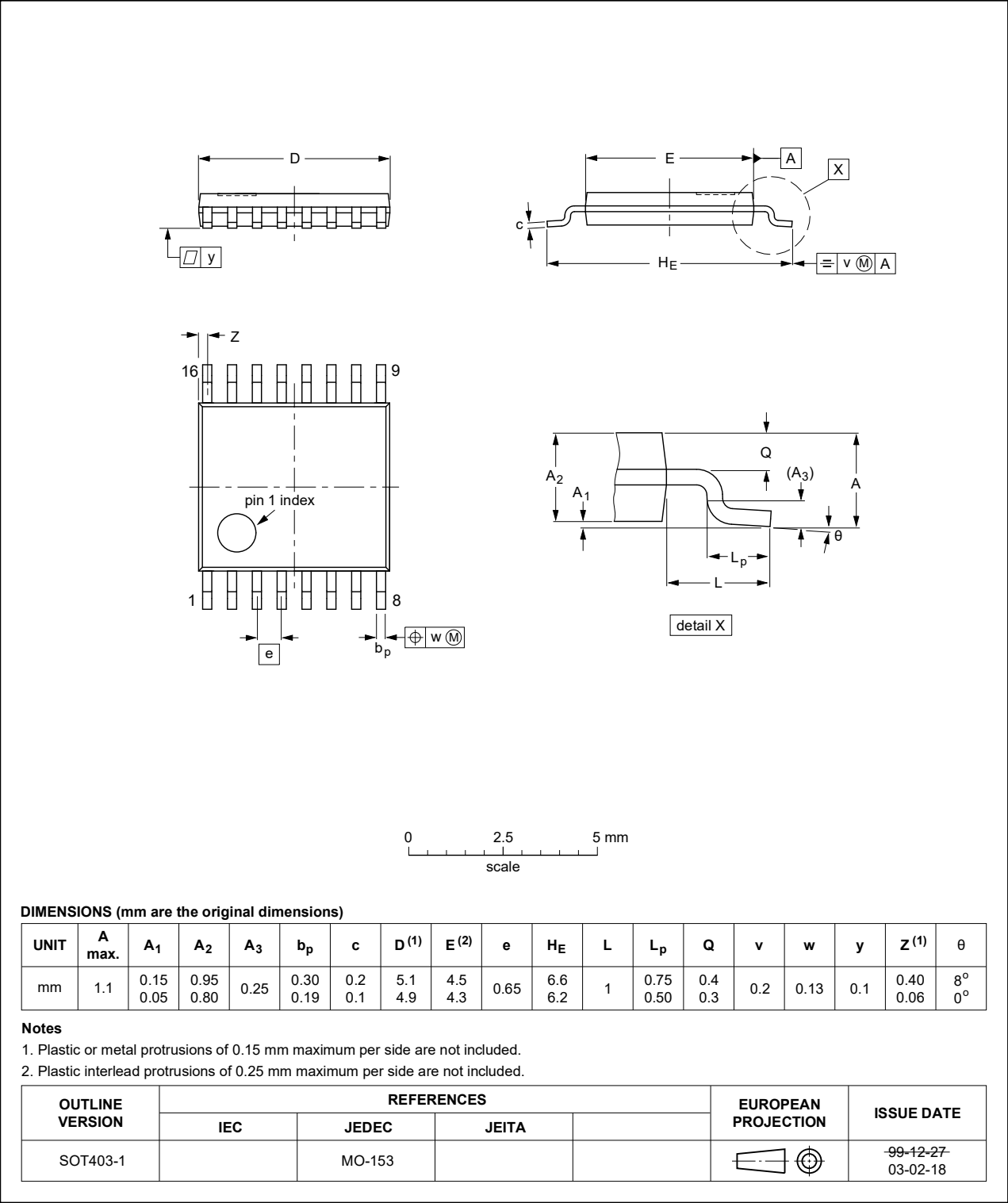


Fig. 10. Package outline SOT403-1 (TSSOP16)

12. Abbreviations

Table 10. Abbreviations

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

13. Revision history

Table 11. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|---------------------|
| 74HC_HCT151 v.8 | 20210318 | Product data sheet | - | 74HC_HCT151 v.7 |
| Modifications: | <ul style="list-style-type: none"> Type number 74HC151DB (SOT338-1 / SSOP16) added. | | | |
| 74HC_HCT151 v.7 | 20210114 | Product data sheet | - | 74HC_HCT151 v.6 |
| Modifications: | <ul style="list-style-type: none"> The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia. Legal texts have been adapted to the new company name where appropriate. Type numbers 74HC151DB and 74HCT151DB (SOT338-1 / SSOP16) removed. Section 7: Derating values for P_{tot} total power dissipation have been updated. | | | |
| 74HC_HCT151 v.6 | 20151228 | Product data sheet | - | 74HC_HCT151 v.5 |
| Modifications: | <ul style="list-style-type: none"> Type numbers 74HC151N and 74HCT151N (SOT38-4) removed. | | | |
| 74HC_HCT151 v.5 | 20150126 | Product data sheet | - | 74HC_HCT151 v.4 |
| Modifications: | <ul style="list-style-type: none"> Table 7: Power dissipation capacitance condition for 74HCT151 is corrected. | | | |
| 74HC_HCT151 v.4 | 20130211 | Product data sheet | - | 74HC_HCT151 v.3 |
| Modifications: | <ul style="list-style-type: none"> New descriptive title (errata). | | | |
| 74HC_HCT151 v.3 | 20120919 | Product data sheet | - | 74HC_HCT151_CNV v.2 |
| 74HC_HCT151_CNV v.2 | 19970827 | 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".
- [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 <https://www.nexperia.com>.

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