

# 74AHC1G66-Q100; 74AHCT1G66-Q100

## Single-pole single-throw analog switch

Rev. 1 — 27 January 2015

Product data sheet

## 1. General description

74AHC1G66-Q100 and 74AHCT1G66-Q100 are high-speed Si-gate CMOS devices. They are single-pole single-throw analog switches. The switch has two input/output pins (Y and Z) and an active HIGH enable input pin (E). When pin E is LOW, the analog switch is turned off.

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

## 2. Features and benefits

- Automotive product qualification in accordance with AEC-Q100 (Grade 1)
  - ◆ Specified from  $-40\text{ °C}$  to  $+85\text{ °C}$  and from  $-40\text{ °C}$  to  $+125\text{ °C}$
- Very low ON resistance:
  - ◆  $26\ \Omega$  (typ.) at  $V_{CC} = 3.0\text{ V}$
  - ◆  $16\ \Omega$  (typ.) at  $V_{CC} = 4.5\text{ V}$
  - ◆  $14\ \Omega$  (typ.) at  $V_{CC} = 5.5\text{ V}$
- High noise immunity
- Low power dissipation
- Balanced propagation delays
- Multiple package options
- ESD protection:
  - ◆ MIL-STD-883, method 3015 exceeds 2000 V
  - ◆ HBM JESD22-A114F exceeds 2000 V
  - ◆ MM JESD22-A115-A exceeds 200 V ( $C = 200\text{ pF}$ ,  $R = 0\ \Omega$ )

## 3. Ordering information

Table 1. Ordering information

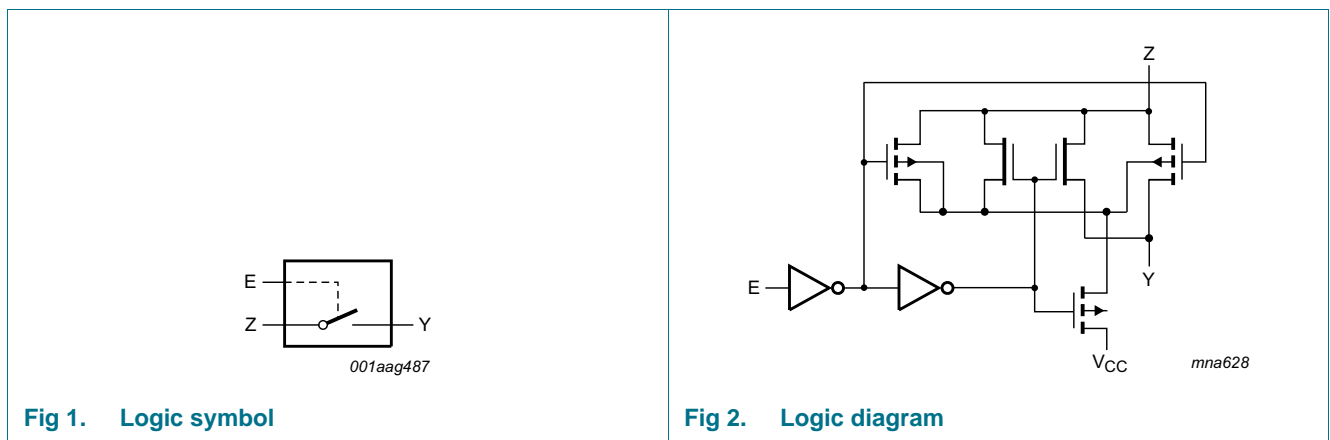
| Type number       | Package                             |        |   |          |
|-------------------|-------------------------------------|--------|---|----------|
|                   | Temperature range                   | Name   | Description   | Version  |
| 74AHC1G66GW-Q100  | $-40\text{ °C}$ to $+125\text{ °C}$ | TSSOP5 | plastic thin shrink small outline package;<br>5 leads; body width 1.25 mm | SOT353-1 |
| 74AHCT1G66GW-Q100 |                                     |        |   |          |
| 74AHC1G66GV-Q100  | $-40\text{ °C}$ to $+125\text{ °C}$ | SC-74A | plastic surface-mounted package; 5 leads                                  | SOT753   |
| 74AHCT1G66GV-Q100 |                                     |        |   |          |

## 4. Marking

Table 2. Marking codes

| Type number       | Marking |
|-------------------|---------|
| 74AHC1G66GW-Q100  | AL      |
| 74AHCT1G66GW-Q100 | CL      |
| 74AHC1G66GV-Q100  | A66     |
| 74AHCT1G66GV-Q100 | C66     |

## 5. Functional diagram



## 6. Pinning information

### 6.1 Pinning

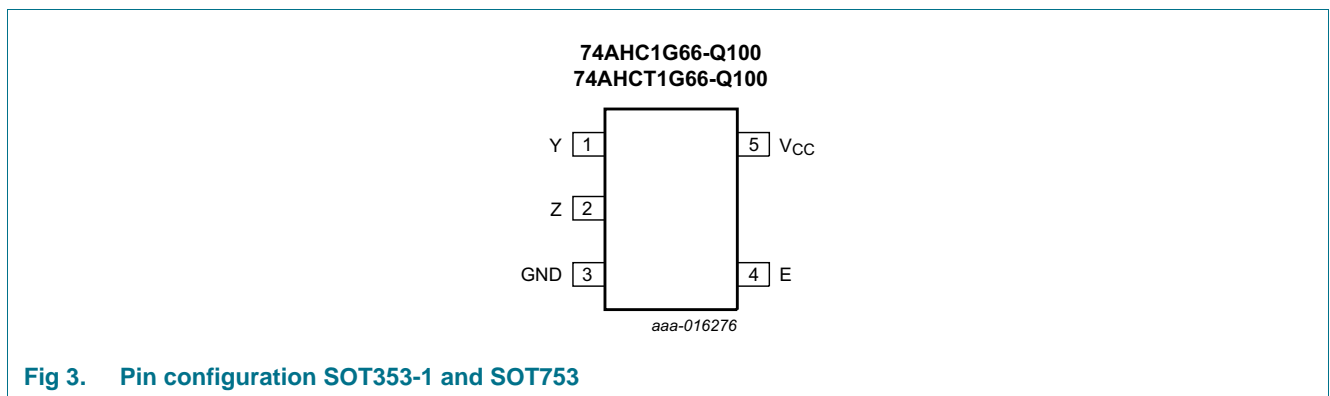


Fig 3. Pin configuration SOT353-1 and SOT753

## 6.2 Pin description

Table 3. Pin description

| Symbol          | Pin | Description                 |
|-----------------|-----|-----------------------------|
| Y               | 1   | independent input or output |
| Z               | 2   | independent input or output |
| GND             | 3   | ground (0 V)                |
| E               | 4   | enable input (active HIGH)  |
| V <sub>CC</sub> | 5   | supply voltage              |

## 7. Functional description

Table 4. Function table<sup>[1]</sup>

| Input E | Switch |
|---------|--------|
| L       | OFF    |
| H       | ON     |

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

## 8. 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 <sup>[1]</sup>   | -20  | -    | mA   |
| I <sub>SK</sub>  | switch clamping current | V <sub>I</sub> < -0.5 V or V <sub>I</sub> > V <sub>CC</sub> + 0.5 V <sup>[1]</sup> | -    | ±20  | mA   |
| I <sub>SW</sub>  | switch current          | -0.5 V < V <sub>O</sub> < V <sub>CC</sub> + 0.5 V                                  | -    | ±25  | mA   |
| I <sub>CC</sub>  | supply current          |  | -    | 75   | mA   |
| I <sub>GND</sub> | ground current          |  | -75  | -    | 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 <sup>[2]</sup>                                | -    | 250  | mW   |

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

[2] For TSSOP5 and SC-74A packages: above 87.5 °C the value of P<sub>tot</sub> derates linearly with 4.0 mW/K.

## 9. Recommended operating conditions

Table 6. Recommended operating conditions

Voltages are referenced to GND (ground = 0 V).<sup>[1]</sup>

| Symbol          | Parameter      | Conditions | 74AHC1G66-Q100 |     |                 | 74AHCT1G66-Q100 |     |                 | Unit |
|-----------------|----------------|------------|----------------|-----|-----------------|-----------------|-----|-----------------|------|
|                 |                |            | Min            | Typ | Max             | Min             | Typ | Max             |      |
| V <sub>CC</sub> | supply voltage |            | 2.0            | 5.0 | 5.5             | 4.5             | 5.0 | 5.5             | V    |
| V <sub>I</sub>  | input voltage  |            | 0              | -   | 5.5             | 0               | -   | 5.5             | V    |
| V <sub>SW</sub> | switch voltage |            | 0              | -   | V <sub>CC</sub> | 0               | -   | V <sub>CC</sub> | V    |

**Table 6. Recommended operating conditions ...continued**Voltages are referenced to GND (ground = 0 V).<sup>[1]</sup>

| Symbol           | Parameter                           | Conditions                                   | 74AHC1G66-Q100 |     |      | 74AHCT1G66-Q100 |     |      | Unit |
|------------------|-------------------------------------|--|----------------|-----|------|-----------------|-----|------|------|
|                  |                                     |  | Min            | Typ | Max  | Min             | Typ | Max  |      |
| T <sub>amb</sub> | ambient temperature                 |  | -40            | +25 | +125 | -40             | +25 | +125 | °C   |
| Δt/ΔV            | input transition rise and fall rate | V <sub>CC</sub> = 3.3 ± 0.3 V <sup>[2]</sup> | -              | -   | 100  | -               | -   | -    | ns/V |
|                  |                                     | V <sub>CC</sub> = 5.0 ± 0.5 V <sup>[2]</sup> | -              | -   | 20   | -               | -   | 20   | ns/V |

[1] To avoid drawing V<sub>CC</sub> current from pin Z, when switch-current flows in pin Y, the voltage drop across the bidirectional switch must not exceed 0.4 V. If switch-current flows into pin Z, no V<sub>CC</sub> current flows out of terminal Y. In this case, there is no limit for the voltage drop across the switch. However, the voltage at pins Y and Z may not exceed V<sub>CC</sub> or GND.

[2] Applies to control signal levels.

## 10. Static characteristics

**Table 7. Static characteristics**

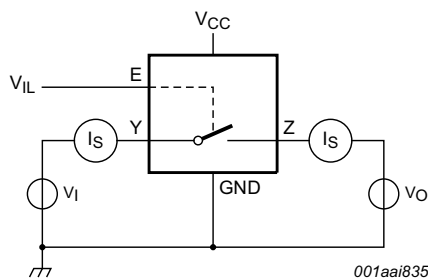
Voltages are referenced to GND (ground = 0 V).

| Symbol                 | Parameter                 | Conditions   | 25 °C |     |      | -40 °C to +85 °C |      | -40 °C to +125 °C |      | Unit |
|------------------------|---------------------------|--|-------|-----|------|------------------|------|-------------------|------|------|
|                        |                           |  | Min   | Typ | Max  | Min              | Max  | Min               | Max  |      |
| <b>74AHC1G66-Q100</b>  |                           |  |       |     |      |                  |      |                   |      |      |
| V <sub>IH</sub>        | HIGH-level input voltage  | V <sub>CC</sub> = 2.0 V  | 1.5   | -   | -    | 1.5              | -    | 1.5               | -    | V    |
|                        |                           | V <sub>CC</sub> = 3.0 V  | 2.1   | -   | -    | 2.1              | -    | 2.1               | -    | V    |
|                        |                           | V <sub>CC</sub> = 5.5 V  | 3.85  | -   | -    | 3.85             | -    | 3.85              | -    | V    |
| V <sub>IL</sub>        | LOW-level input voltage   | V <sub>CC</sub> = 2.0 V  | -     | -   | 0.5  | -                | 0.5  | -                 | 0.5  | V    |
|                        |                           | V <sub>CC</sub> = 3.0 V  | -     | -   | 0.9  | -                | 0.9  | -                 | 0.9  | V    |
|                        |                           | V <sub>CC</sub> = 5.5 V  | -     | -   | 1.65 | -                | 1.65 | -                 | 1.65 | V    |
| I <sub>I</sub>         | input leakage current     | V <sub>I</sub> = 5.5 V or GND;<br>V <sub>CC</sub> = 5.5 V        | -     | -   | 0.1  | -                | 1.0  | -                 | 2.0  | μA   |
| I <sub>S(OFF)</sub>    | OFF-state leakage current | Y or Z; V <sub>CC</sub> = 5.5 V;<br>see <a href="#">Figure 4</a> | -     | -   | 0.1  | -                | 1.0  | -                 | 4.0  | μA   |
| I <sub>S(ON)</sub>     | ON-state leakage current  | Y or Z; V <sub>CC</sub> = 5.5 V;<br>see <a href="#">Figure 5</a> | -     | -   | 0.1  | -                | 1.0  | -                 | 4.0  | μA   |
| I <sub>CC</sub>        | supply current            | E, Y or Z = V <sub>CC</sub> or GND;<br>V <sub>CC</sub> = 5.5 V   | -     | -   | 1.0  | -                | 10   | -                 | 40   | μA   |
| C <sub>I</sub>         | input capacitance         | E input  | -     | 2.0 | 10   | -                | 10   | -                 | 10   | pF   |
| C <sub>S(ON)</sub>     | ON-state capacitance      | Y or Z input or output   | -     | 4.0 | 10   | -                | 10   | -                 | 10   | pF   |
| <b>74AHCT1G66-Q100</b> |                           |  |       |     |      |                  |      |                   |      |      |
| V <sub>IH</sub>        | HIGH-level input voltage  | V <sub>CC</sub> = 4.5 V to 5.5 V                                 | 2.0   | -   | -    | 2.0              | -    | 2.0               | -    | V    |
| V <sub>IL</sub>        | LOW-level input voltage   | V <sub>CC</sub> = 4.5 V to 5.5 V                                 | -     | -   | 0.8  | -                | 0.8  | -                 | 0.8  | V    |
| I <sub>I</sub>         | input leakage current     | V <sub>I</sub> = 5.5 V or GND;<br>V <sub>CC</sub> = 5.5 V        | -     | -   | 0.1  | -                | 1.0  | -                 | 2.0  | μA   |

**Table 7. Static characteristics ...continued**  
 Voltages are referenced to GND (ground = 0 V).

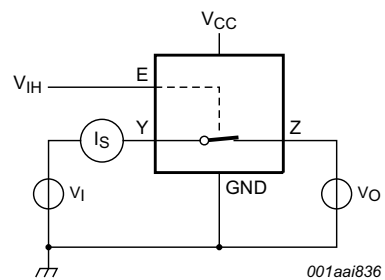
| Symbol          | Parameter                 | Conditions   | 25 °C |     |      | -40 °C to +85 °C |     | -40 °C to +125 °C |     | Unit    |
|-----------------|---------------------------|--|-------|-----|------|------------------|-----|-------------------|-----|---------|
|                 |                           |  | Min   | Typ | Max  | Min              | Max | Min               | Max |         |
| $I_{S(OFF)}$    | OFF-state leakage current | Y or Z; $V_{CC} = 5.5$ V; see <a href="#">Figure 4</a>                                       | -     | -   | 0.1  | -                | 1.0 | -                 | 4.0 | $\mu$ A |
| $I_{S(ON)}$     | ON-state leakage current  | Y or Z; $V_{CC} = 5.5$ V; see <a href="#">Figure 5</a>                                       | -     | -   | 0.1  | -                | 1.0 | -                 | 4.0 | $\mu$ A |
| $I_{CC}$        | supply current            | E, Y or Z = $V_{CC}$ or GND; $V_{CC} = 5.5$ V  | -     | -   | 1.0  | -                | 10  | -                 | 40  | $\mu$ A |
| $\Delta I_{CC}$ | additional supply current | per input pin; $V_I = 3.4$ V; other inputs at $V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 5.5$ V | -     | -   | 1.35 | -                | 1.5 | -                 | 1.5 | mA      |
| $C_I$           | input capacitance         | E input  | -     | 2.0 | 10   | -                | 10  | -                 | 10  | pF      |
| $C_{S(ON)}$     | ON-state capacitance      | Y or Z input or output   | -     | 4.0 | 10   | -                | 10  | -                 | 10  | pF      |

## 10.1 Test circuits



$V_I = V_{CC}$  or GND and  $V_O =$  GND or  $V_{CC}$ .

**Fig 4. Test circuit for measuring OFF-state leakage current**



$V_I = V_{CC}$  or GND and  $V_O =$  open circuit.

**Fig 5. Test circuit for measuring ON-state leakage current**

## 10.2 ON resistance

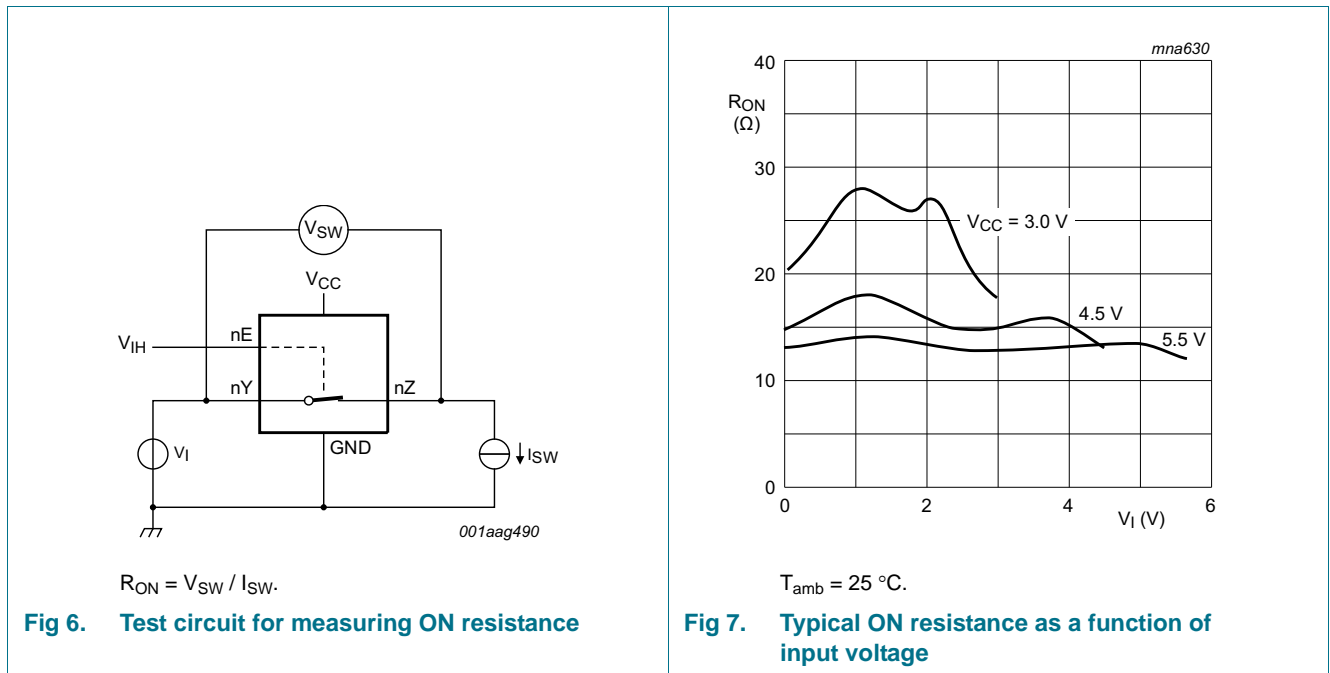
**Table 8. ON resistance**

At recommended operating conditions; voltages are referenced to GND (ground 0 V); for graph see [Figure 7 \[1\]](#).

| Symbol                                    | Parameter            | Conditions  | 25 °C  |     | -40 °C to +85 °C | -40 °C to +125 °C | Unit |
|---|----------------------|---|--------|-----|------------------|-------------------|------|
|   |                      |   | Typ    | max | Max              | Max               |      |
| <b>74AHC1G66-Q100 and 74AHCT1G66-Q100</b> |                      |   |        |     |                  |                   |      |
| R <sub>ON(peak)</sub>                     | ON resistance (peak) | V <sub>I</sub> = V <sub>CC</sub> to GND; see <a href="#">Figure 6</a> |        |     |                  |                   |      |
|   |                      | I <sub>SW</sub> = 1.0 mA; V <sub>CC</sub> = 2.0 V                     | 148[1] | -   | -                | -                 | Ω    |
|   |                      | I <sub>SW</sub> = 10 mA; V <sub>CC</sub> = 3.0 V to 3.6 V             | 28     | 50  | 70               | 110               | Ω    |
|   |                      | I <sub>SW</sub> = 10 mA; V <sub>CC</sub> = 4.5 V to 5.5 V             | 15     | 30  | 40               | 60                | Ω    |
| R <sub>ON(rail)</sub>                     | ON resistance (rail) | V <sub>I</sub> = GND; see <a href="#">Figure 6</a>                    |        |     |                  |                   |      |
|   |                      | I <sub>SW</sub> = 1.0 mA; V <sub>CC</sub> = 2.0 V                     | 30     | -   | -                | -                 | Ω    |
|   |                      | I <sub>SW</sub> = 10 mA; V <sub>CC</sub> = 3.0 V to 3.6 V             | 20     | 50  | 65               | 90                | Ω    |
|   |                      | I <sub>SW</sub> = 10 mA; V <sub>CC</sub> = 4.5 V to 5.5 V             | 15     | 22  | 26               | 40                | Ω    |
|   |                      | V <sub>I</sub> = V <sub>CC</sub> ; see <a href="#">Figure 6</a>       |        |     |                  |                   |      |
|   |                      | I <sub>SW</sub> = 1.0 mA; V <sub>CC</sub> = 2.0 V                     | 28     | -   | -                | -                 | Ω    |
|   |                      | I <sub>SW</sub> = 10 mA; V <sub>CC</sub> = 3.0 V to 3.6 V             | 18     | 50  | 65               | 90                | Ω    |
|   |                      | I <sub>SW</sub> = 10 mA; V <sub>CC</sub> = 4.5 V to 5.5 V             | 13     | 22  | 26               | 40                | Ω    |

[1] At supply voltages approaching 2 V, the analog switch ON resistance becomes extremely non-linear. Therefore it is recommended that these devices be used to transmit digital signals only, when using this supply voltage.

## 10.3 ON resistance test circuit and graphs



## 11. Dynamic characteristics

**Table 9. Dynamic characteristics**

Voltages are referenced to GND (ground = 0 V);  $C_L = 50$  pF; unless otherwise specified; For test circuit, see [Figure 10](#).

| Symbol                 | Parameter                     | Conditions  | 25 °C              |      | -40 °C to +85 °C | -40 °C to +125 °C | Unit |
|------------------------|-------------------------------|---|--------------------|------|------------------|-------------------|------|
|                        |                               |   | Typ <sup>[1]</sup> | max  | Max              | Max               |      |
| <b>74AHC1G66-Q100</b>  |                               |   |                    |      |                  |                   |      |
| $t_{pd}$               | propagation delay             | Y to Z or Z to Y; see <a href="#">Figure 8</a> <sup>[2]</sup> |                    |      |                  |                   |      |
|                        |                               | $V_{CC} = 2.0$ V  | 2.2                | 5.0  | 6.0              | 7.0               | ns   |
|                        |                               | $V_{CC} = 3.0$ V to 3.6 V                                     | 1.0                | 2.0  | 3.0              | 4.0               | ns   |
|                        |                               | $V_{CC} = 4.5$ V to 5.5 V                                     | 0.6                | 1.0  | 2.0              | 3.0               | ns   |
| $t_{en}$               | enable time                   | E to Y or Z; see <a href="#">Figure 9</a> <sup>[2]</sup>      |                    |      |                  |                   |      |
|                        |                               | $V_{CC} = 2.0$ V; $C_L = 15$ pF                               | 7.0                | 25.0 | 33.0             | 40.0              | ns   |
|                        |                               | $V_{CC} = 2.0$ V  | 11.0               | 35.0 | 46.0             | 57.0              | ns   |
|                        |                               | $V_{CC} = 3.0$ V to 3.6 V;<br>$C_L = 15$ pF                   | 4.0                | 11.0 | 14.0             | 18.0              | ns   |
|                        |                               | $V_{CC} = 3.0$ V to 3.6 V                                     | 5.8                | 15.0 | 20.0             | 25.0              | ns   |
|                        |                               | $V_{CC} = 4.5$ V to 5.5 V;<br>$C_L = 15$ pF                   | 3.0                | 8.0  | 10.0             | 13.0              | ns   |
|                        |                               | $V_{CC} = 4.5$ V to 5.5 V                                     | 4.0                | 11.0 | 13.0             | 17.0              | ns   |
| $t_{dis}$              | disable time                  | E to Y or Z; see <a href="#">Figure 9</a> <sup>[2]</sup>      |                    |      |                  |                   |      |
|                        |                               | $V_{CC} = 2.0$ V; $C_L = 15$ pF                               | 9.0                | 25.0 | 33.0             | 40.0              | ns   |
|                        |                               | $V_{CC} = 2.0$ V  | 13.0               | 35.0 | 46.0             | 57.0              | ns   |
|                        |                               | $V_{CC} = 3.0$ V to 3.6 V;<br>$C_L = 15$ pF                   | 6.0                | 11.0 | 14.0             | 18.0              | ns   |
|                        |                               | $V_{CC} = 3.0$ V to 3.6 V                                     | 8.4                | 15.0 | 20.0             | 25.0              | ns   |
|                        |                               | $V_{CC} = 4.5$ V to 5.5 V;<br>$C_L = 15$ pF                   | 5.0                | 8.0  | 10.0             | 13.0              | ns   |
|                        |                               | $V_{CC} = 4.5$ V to 5.5 V                                     | 6.1                | 11.0 | 13.0             | 17.0              | ns   |
| $C_{PD}$               | power dissipation capacitance | $V_I = \text{GND to } V_{CC}$ <sup>[3]</sup>                  | 13                 | -    | -                | -                 | pF   |
| <b>74AHCT1G66-Q100</b> |                               |   |                    |      |                  |                   |      |
| $t_{pd}$               | propagation delay             | Y to Z or Z to Y; see <a href="#">Figure 8</a> <sup>[2]</sup> |                    |      |                  |                   |      |
|                        |                               | $V_{CC} = 4.5$ V to 5.5 V                                     | 0.7                | 1.0  | 2.0              | 3.0               | ns   |
| $t_{en}$               | enable time                   | E to Y or Z; see <a href="#">Figure 9</a> <sup>[2]</sup>      |                    |      |                  |                   |      |
|                        |                               | $V_{CC} = 4.5$ V to 5.5 V;<br>$C_L = 15$ pF                   | 3.0                | 7.0  | 10.0             | 13.0              | ns   |
|                        |                               | $V_{CC} = 4.5$ V to 5.5 V                                     | 4.7                | 10.0 | 13.0             | 17.0              | ns   |
| $t_{dis}$              | disable time                  | E to Y or Z; see <a href="#">Figure 9</a> <sup>[2]</sup>      |                    |      |                  |                   |      |
|                        |                               | $V_{CC} = 4.5$ V to 5.5 V;<br>$C_L = 15$ pF                   | 5.0                | 8.0  | 10.0             | 13.0              | ns   |
|                        |                               | $V_{CC} = 4.5$ V to 5.5 V                                     | 6.5                | 11.0 | 13.0             | 17.0              | ns   |

**Table 9. Dynamic characteristics ...continued**

Voltages are referenced to GND (ground = 0 V);  $C_L = 50$  pF; unless otherwise specified; For test circuit, see [Figure 10](#).

| Symbol   | Parameter                     | Conditions                    | 25 °C              |     | -40 °C to +85 °C | -40 °C to +125 °C | Unit |
|----------|-------------------------------|-------------------------------|--------------------|-----|------------------|-------------------|------|
|          |                               |                               | Typ <sup>[1]</sup> | max | Max              | Max               |      |
| $C_{PD}$ | power dissipation capacitance | $V_I = \text{GND to } V_{CC}$ | 15                 | -   | -                | -                 | pF   |

[1] All typical values are measured at  $V_{CC} = 2.0$  V,  $V_{CC} = 3.3$  V,  $V_{CC} = 5.0$  V and  $T_{amb} = 25$  °C.

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

$t_{en}$  is the same as  $t_{PZL}$  and  $t_{PZH}$ .

$t_{dis}$  is the same as  $t_{PLZ}$  and  $t_{PHZ}$ .

[3]  $C_{PD}$  is used to determine the dynamic power dissipation  $P_D$  ( $\mu$ W).

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

$f_i$  = input frequency in MHz;

$f_o$  = output frequency in MHz;

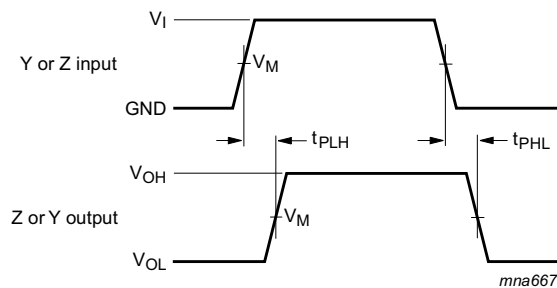
$C_L$  = output load capacitance in pF;

$C_{SW}$  = maximum switch capacitance in pF (see [Table 7](#));

$V_{CC}$  = supply voltage in Volt;

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

## 11.1 Waveforms and test circuit

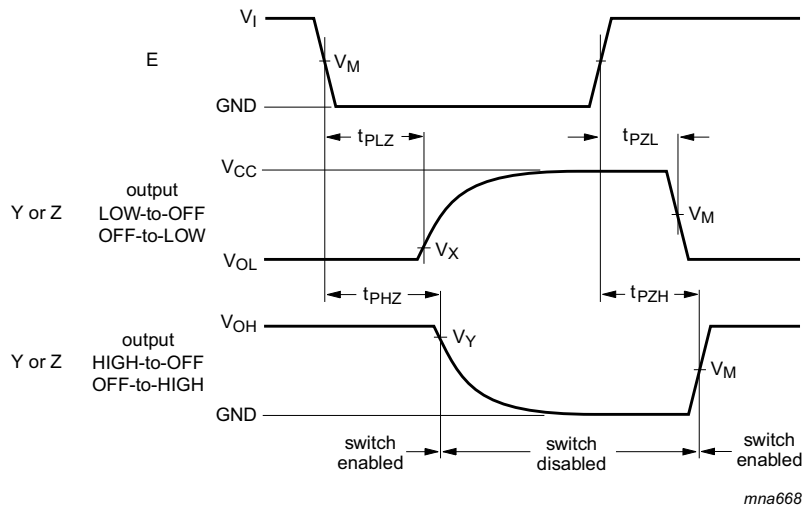


Measurement points are given in [Table 10](#).

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

**Fig 8. Input (Y or Z) to output (Z or Y) propagation delays**



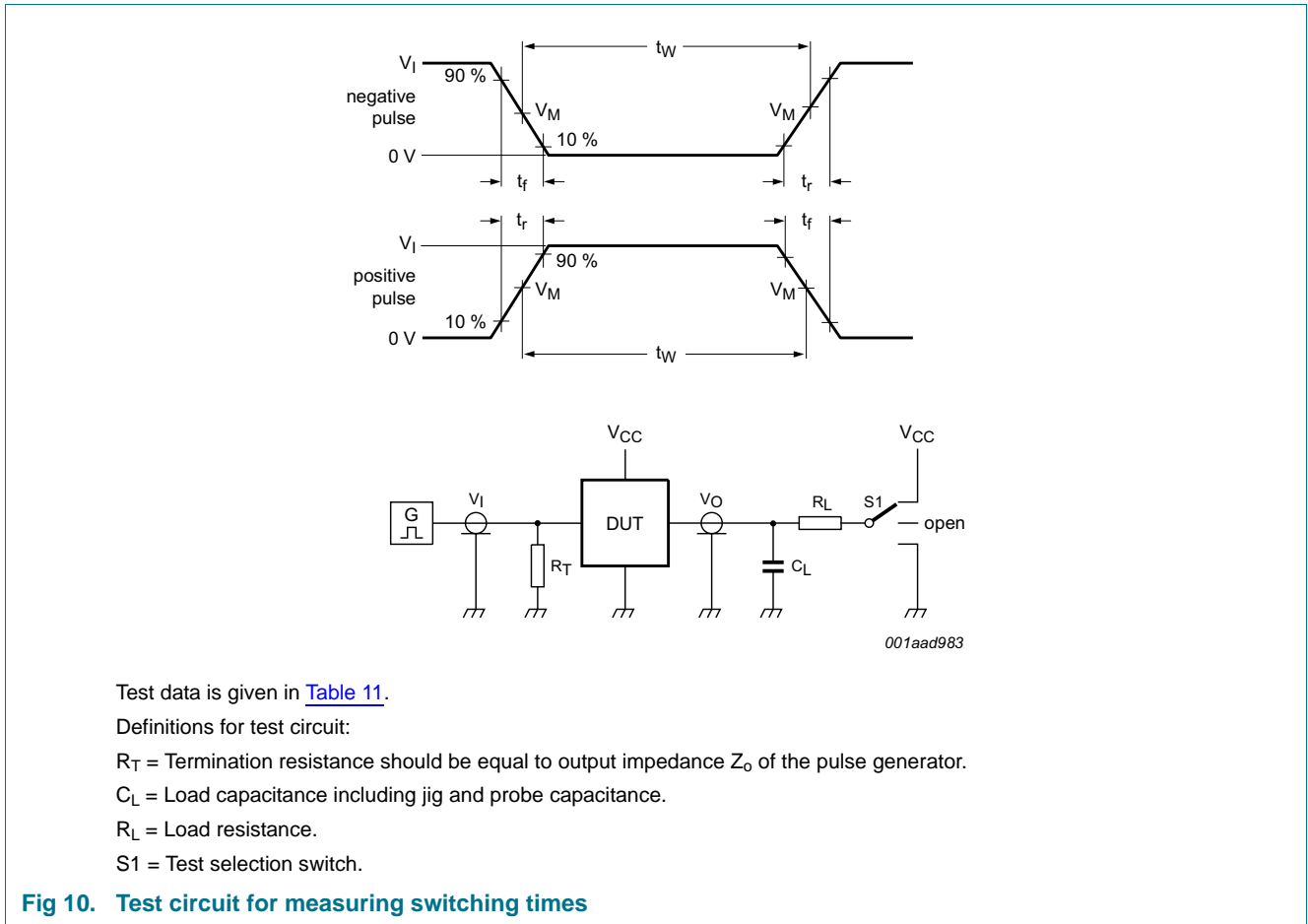


Measurement points are given in [Table 10](#).  
 Logic levels:  $V_{OL}$  and  $V_{OH}$  are typical output voltage levels that occur with the output load.

**Fig 9. Enable and disable times**

**Table 10. Measurement points**

| Type            | Input       | Output      |                         |                         |
|-----------------|-------------|-------------|-------------------------|-------------------------|
|                 | $V_M$       | $V_M$       | $V_X$                   | $V_Y$                   |
| 74AHC1G66-Q100  | $0.5V_{CC}$ | $0.5V_{CC}$ | $V_{OL} + 0.3\text{ V}$ | $V_{OH} - 0.3\text{ V}$ |
| 74AHCT1G66-Q100 | 1.5 V       | 1.5 V       | $V_{OL} + 0.3\text{ V}$ | $V_{OH} - 0.3\text{ V}$ |



**Table 11. Test data**

| Type            | Input           |            | Load         |              | S1 position        |                    |                    |
|-----------------|-----------------|------------|--------------|--------------|--------------------|--------------------|--------------------|
|                 | $V_I$           | $t_r, t_f$ | $C_L$        | $R_L$        | $t_{PHL}, t_{PLH}$ | $t_{PZH}, t_{PHZ}$ | $t_{PZL}, t_{PLZ}$ |
| 74AHC1G66-Q100  | GND to $V_{CC}$ | 3 ns       | 15 pF, 50 pF | 1 k $\Omega$ | open               | GND                | $V_{CC}$           |
| 74AHCT1G66-Q100 | GND to 3 V      | 3 ns       | 15 pF, 50 pF | 1 k $\Omega$ | open               | GND                | $V_{CC}$           |

## 11.2 Additional dynamic characteristics

**Table 12. Additional dynamic characteristics for 74AHC1G66-Q100 and 74AHCT1G66-Q100**

$GND = 0 V$ ;  $t_r = t_f = 3.0 ns$ ;  $C_L = 50 pF$ ; unless otherwise specified. All typical values are measured at  $T_{amb} = 25 ^\circ C$ .

| Symbol | Parameter                 | Conditions  | Min | Typ   | Max | Unit |  |
|--------|---------------------------|---|-----|-------|-----|------|--|
| THD    | total harmonic distortion | $f_i = 1 kHz$ ; $R_L = 10 k\Omega$ ; see <a href="#">Figure 11</a>  |     |       |     |      |  |
|        |                           | $V_{CC} = 3.0 V$ to $3.6 V$   | -   | 0.025 | -   | %    |  |
|        |                           | $V_{CC} = 4.5 V$ to $5.5 V$   | -   | 0.015 | -   | %    |  |
|        |                           | $f_i = 10 kHz$ ; $R_L = 10 k\Omega$ ; see <a href="#">Figure 11</a> |     |       |     |      |  |
|        |                           | $V_{CC} = 3.0 V$ to $3.6 V$ ; $V_I = 2.5 V$                         | -   | 0.025 | -   | %    |  |
|        |                           | $V_{CC} = 4.5 V$ to $5.5 V$ ; $V_I = 4.0 V$                         | -   | 0.015 | -   | %    |  |

**Table 12. Additional dynamic characteristics for 74AHC1G66-Q100 and 74AHCT1G66-Q100 ...continued**  
*GND = 0 V;  $t_r = t_f = 3.0$  ns;  $C_L = 50$  pF; unless otherwise specified. All typical values are measured at  $T_{amb} = 25$  °C.*

| Symbol         | Parameter                | Conditions  | Min | Typ | Max | Unit |
|----------------|--------------------------|---|-----|-----|-----|------|
| $f_{(-3dB)}$   | -3 dB frequency response | $R_L = 50 \Omega$ ; $C_L = 10$ pF; see <a href="#">Figure 12</a> and <a href="#">13</a> |     |     |     |      |
|                |                          | $V_{CC} = 3.0$ V to $3.6$ V   | -   | 230 | -   | MHz  |
|                |                          | $V_{CC} = 4.5$ V to $5.5$ V   | -   | 280 | -   | MHz  |
| $\alpha_{iso}$ | isolation (OFF-state)    | $R_L = 600 \Omega$ ; $f_i = 1$ MHz; see <a href="#">Figure 14</a> <a href="#">[1]</a>   |     |     |     |      |
|                |                          | $V_{CC} = 3.0$ V to $3.6$ V; $V_I = 2.5$ V  | -   | -50 | -   | dB   |
|                |                          | $V_{CC} = 4.5$ V to $5.5$ V; $V_I = 4.0$ V  | -   | -50 | -   | dB   |

[1] Adjust input voltage  $V_I$  to 0 dBm level (0 dBm = 1 mW into 50  $\Omega$ ).

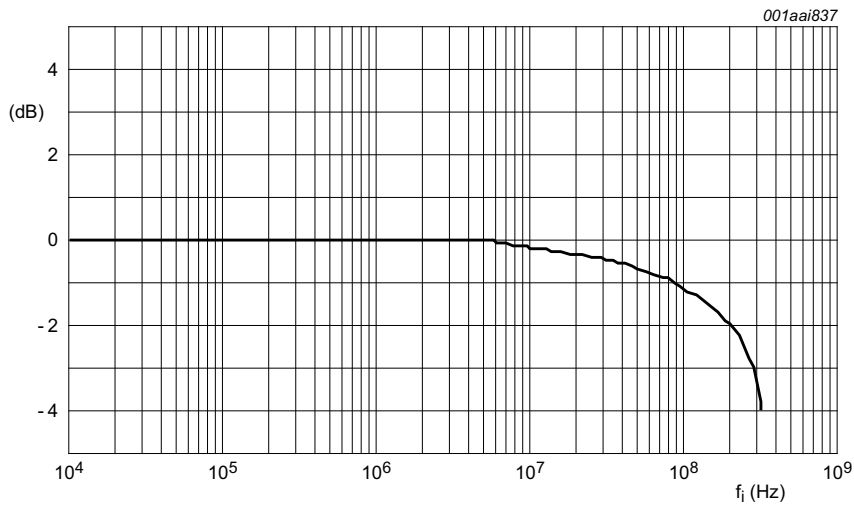
### 11.3 Test circuits and graphs

**Test conditions:**  
 $V_{CC} = 3.0$  V to  $3.6$  V;  $V_I = 2.5$  V (p-p).  
 $V_{CC} = 4.5$  V to  $5.5$  V;  $V_I = 4.0$  V (p-p).

**Fig 11. Test circuit for measuring total harmonic distortion**

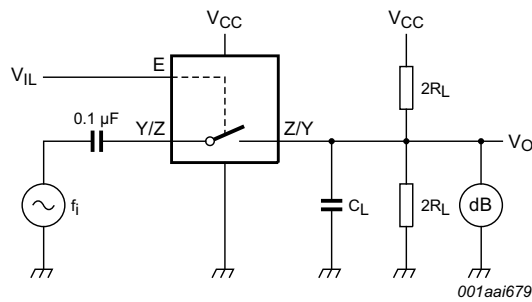
With  $f_i = 1$  MHz, adjust the switch input voltage for a 0 dBm level at the switch output (0 dBm = 1 mW into 50  $\Omega$ ). Then increase the input  $f_i$  frequency until the dB meter reads -3 dB.

**Fig 12. Test circuit for measuring the -3 dB frequency response**



Test conditions:  $V_{CC} = 4.5\text{ V}$ ;  $GND = 0\text{ V}$ ;  $R_L = 50\ \Omega$ ;  $R_{SOURCE} = 1\text{ k}\Omega$ .

**Fig 13. Typical -3 dB frequency response**



Adjust the switch input voltage for a 0 dBm level (0 dBm = 1 mW into 600  $\Omega$ ).

**Fig 14. Test circuit for measuring isolation (OFF-state)**

12. Package outline

TSSOP5: plastic thin shrink small outline package; 5 leads; body width 1.25 mm

SOT353-1

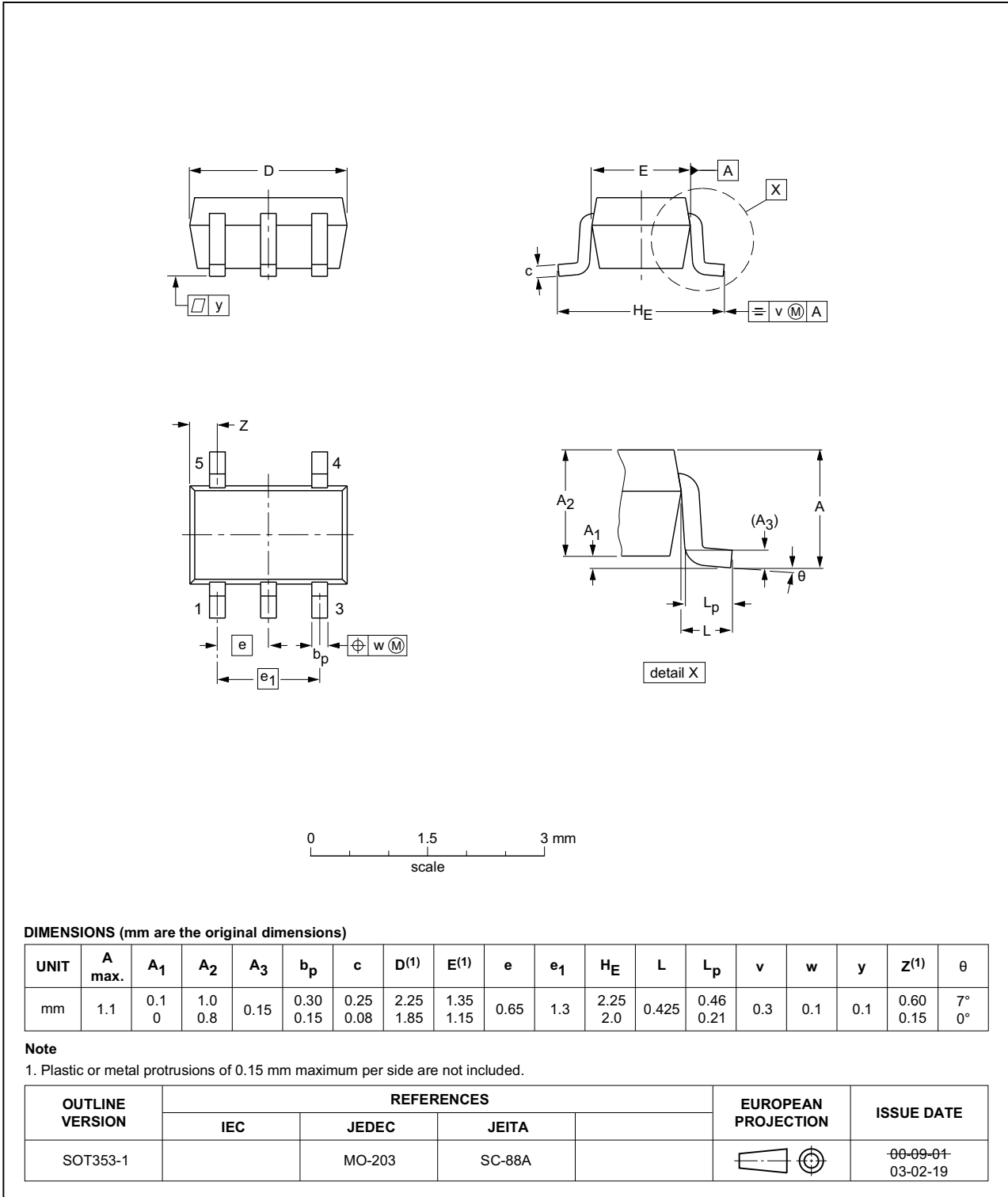


Fig 15. Package outline SOT353-1 (TSSOP5)

Plastic surface-mounted package; 5 leads

SOT753

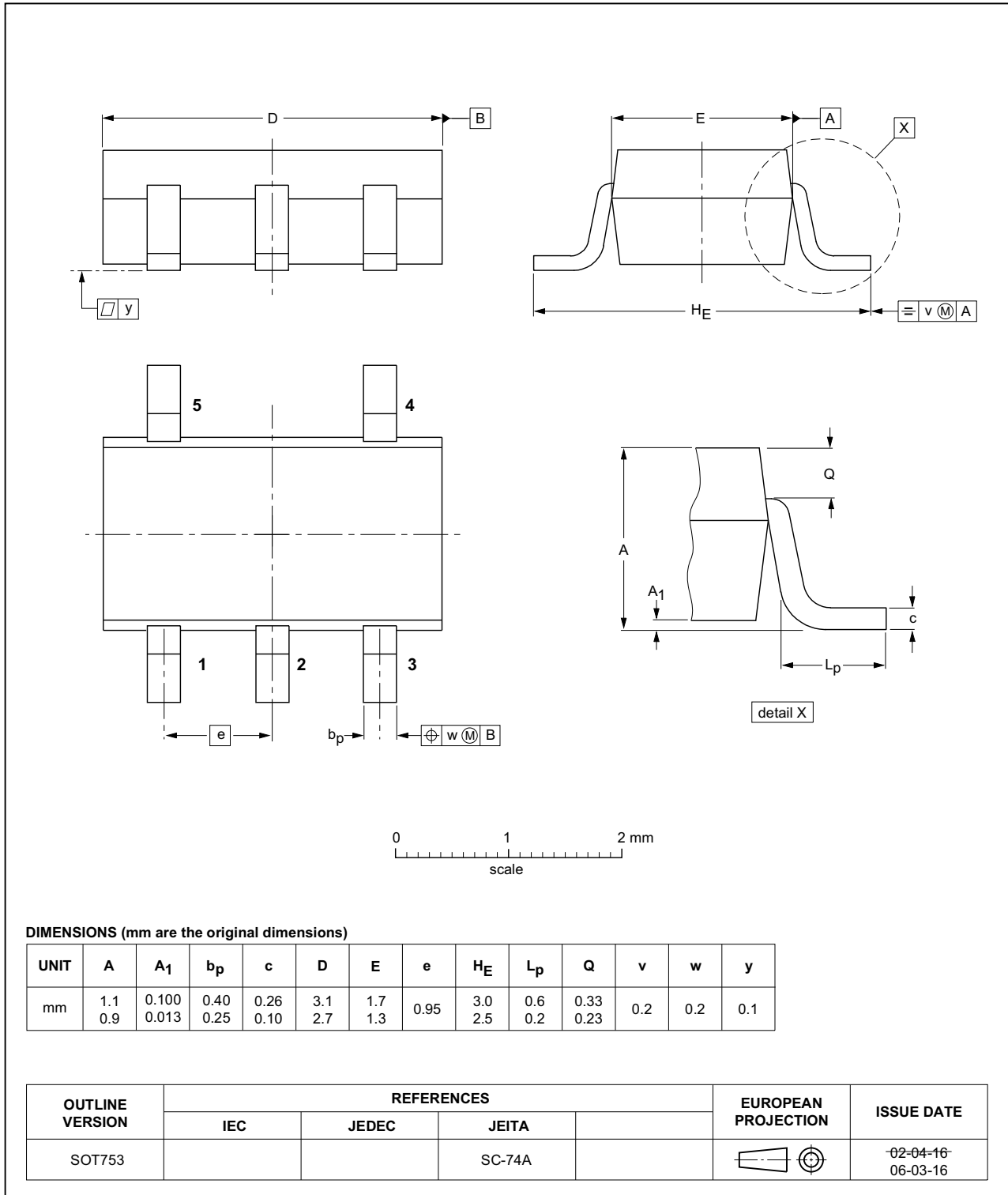


Fig 16. Package outline SOT753 (SC-74A)

## 13. Abbreviations

Table 13. Abbreviations

| Acronym | Description                             |
|---------|---|
| CDM     | Charged Device Model                    |
| CMOS    | Complementary Metal-Oxide Semiconductor |
| DUT     | Device Under Test                       |
| ESD     | ElectroStatic Discharge                 |
| HBM     | Human Body Model                        |
| MIL     | Military                                |
| MM      | Machine Model                           |

## 14. Revision history

Table 14. Revision history

| Document ID             | Release date | Data sheet status  | Change notice | Supersedes |
|-------------------------|--------------|--------------------|---------------|------------|
| 74AHC_AHCT1G66_Q100 v.1 | 20150127     | Product data sheet | -             | -          |

## 15. Legal information

### 15.1 Data sheet status

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

[1] Please consult the most recently issued document before initiating or completing a design.

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

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