

74HC2G34; 74HCT2G34

Dual buffer gate

Rev. 01 — 6 October 2006

Product data sheet

1. General description

The 74HC2G34; 74HCT2G34 is a high-speed Si-gate CMOS device.

The 74HC2G34; 74HCT2G34 provides two buffers.

2. Features

- Wide supply voltage range from 2.0 V to 6.0 V
- Complies with JEDEC standard no. 7A
- High noise immunity
- ESD protection:
 - ◆ HBM JESD22-A114-D exceeds 2000 V
 - ◆ MM JESD22-A115-A exceeds 200 V
- Low power dissipation
- Balanced propagation delays
- Unlimited input rise and fall times
- Multiple package options
- Specified from -40 °C to $+85\text{ °C}$ and -40 °C to $+125\text{ °C}$

3. Ordering information

Table 1. Ordering information

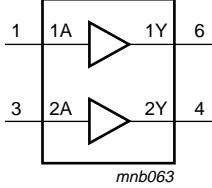
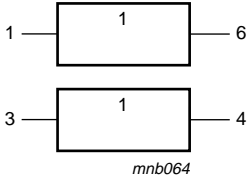
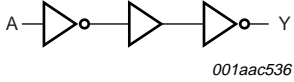
| Type number | Package | | | |
|-------------|-------------------------------------|-------|--|---------|
| | Temperature range | Name | Description | Version |
| 74HC2G34GW | -40 °C to $+125\text{ °C}$ | SC-88 | plastic surface-mounted package; 6 leads | SOT363 |
| 74HC2G34GV | -40 °C to $+125\text{ °C}$ | SC-74 | plastic surface-mounted package (TSOP6); 6 leads | SOT457 |
| 74HCT2G34GW | -40 °C to $+125\text{ °C}$ | SC-88 | plastic surface-mounted package; 6 leads | SOT363 |
| 74HCT2G34GV | -40 °C to $+125\text{ °C}$ | SC-74 | plastic surface-mounted package (TSOP6); 6 leads | SOT457 |

4. Marking

Table 2. Marking

| Type number | Marking code |
|-------------|--------------|
| 74HC2G34GW | PA |
| 74HC2G34GV | P34 |
| 74HCT2G34GW | UA |
| 74HCT2G34GV | U34 |

5. Functional diagram

| | | |
|---|---|---|
|  |  |  |
| <p>Fig 1. Logic symbol</p> | <p>Fig 2. IEC logic symbol</p> | <p>Fig 3. Logic diagram (one gate)</p> |

6. Pinning information

6.1 Pinning

74HC2G34
74HCT2G34

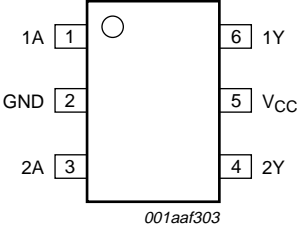


Fig 4. Pin configuration

6.2 Pin description

Table 3. Pin description

| Symbol | Pin | Description |
|-----------------|-----|----------------|
| 1A | 1 | data input |
| GND | 2 | ground (0 V) |
| 2A | 3 | data input |
| 2Y | 4 | data output |
| V _{CC} | 5 | supply voltage |
| 1Y | 6 | data output |

7. Functional description

Table 4. Function table^[1]

| Input | Output |
|-------|--------|
| nA | nY |
| L | L |
| H | H |

[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_{CC} | supply voltage | | -0.5 | +7.0 | V |
| I_{IK} | input clamping current | $V_I < -0.5\text{ V}$ or $V_I > V_{CC} + 0.5\text{ V}$ | [1] - | ± 20 | mA |
| I_{OK} | output clamping current | $V_O < -0.5\text{ V}$ or $V_O > V_{CC} + 0.5\text{ V}$ | [1] - | ± 20 | mA |
| I_O | output current | $V_O = -0.5\text{ V}$ to $V_{CC} + 0.5\text{ V}$ | [1] - | ± 25 | mA |
| I_{CC} | supply current | | [1] - | +50 | mA |
| I_{GND} | ground current | | [1] - | -50 | mA |
| T_{stg} | storage temperature | | -65 | +150 | °C |
| P_{tot} | total power dissipation | | [2] - | 250 | mW |

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

[2] For SC-88 and SC-74 packages: above 87.5 °C the value of P_{tot} derates linearly with 4.0 mW/K.

9. Recommended operating conditions

Table 6. Recommended operating conditions

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|----------------------|---------------------|-----------------------------------|-----|-----|----------|------|
| Type 74HC2G34 | | | | | | |
| V_{CC} | supply voltage | | 2.0 | 5.0 | 6.0 | V |
| V_I | input voltage | | 0 | - | V_{CC} | V |
| V_O | output voltage | | 0 | - | V_{CC} | V |
| T_{amb} | ambient temperature | | -40 | +25 | +125 | °C |
| t_r | rise time | except for Schmitt trigger inputs | | | | |
| | | $V_{CC} = 2.0\text{ V}$ | - | - | 1000 | ns |
| | | $V_{CC} = 4.5\text{ V}$ | - | - | 500 | ns |
| | | $V_{CC} = 6.0\text{ V}$ | - | - | 400 | ns |
| t_f | fall time | except for Schmitt trigger inputs | | | | |
| | | $V_{CC} = 2.0\text{ V}$ | - | - | 1000 | ns |
| | | $V_{CC} = 4.5\text{ V}$ | - | - | 500 | ns |
| | | $V_{CC} = 6.0\text{ V}$ | - | - | 400 | ns |

Table 6. Recommended operating conditions ...continued

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------------------|---------------------|-----------------------------------|-----|-----|----------|------|
| Type 74HCT2G34 | | | | | | |
| V_{CC} | supply voltage | | 4.5 | 5.0 | 5.5 | V |
| V_I | input voltage | | 0 | - | V_{CC} | V |
| V_O | output voltage | | 0 | - | V_{CC} | V |
| T_{amb} | ambient temperature | | -40 | +25 | +125 | °C |
| t_r | rise time | except for Schmitt trigger inputs | | | | |
| | | $V_{CC} = 4.5\text{ V}$ | - | - | 500 | ns |
| t_f | fall time | except for Schmitt trigger inputs | | | | |
| | | $V_{CC} = 4.5\text{ V}$ | - | - | 500 | ns |

10. Static characteristics

Table 7. Static characteristics for 74HC2G34

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--|---------------------------|--|------|------|-----------|---------------|
| $T_{amb} = 25\text{ °C}$ | | | | | | |
| V_{IH} | HIGH-level input voltage | $V_{CC} = 2.0\text{ V}$ | 1.5 | 1.2 | - | V |
| | | $V_{CC} = 4.5\text{ V}$ | 3.15 | 2.4 | - | V |
| | | $V_{CC} = 6.0\text{ V}$ | 4.2 | 3.2 | - | V |
| V_{IL} | LOW-level input voltage | $V_{CC} = 2.0\text{ V}$ | - | 0.8 | 0.5 | V |
| | | $V_{CC} = 4.5\text{ V}$ | - | 2.1 | 1.35 | V |
| | | $V_{CC} = 6.0\text{ V}$ | - | 2.8 | 1.8 | V |
| V_{OH} | HIGH-level output voltage | $V_I = V_{IH}$ or V_{IL} | | | | |
| | | $I_O = -20\text{ }\mu\text{A}$; $V_{CC} = 2.0\text{ V}$ | 1.9 | 2.0 | - | V |
| | | $I_O = -20\text{ }\mu\text{A}$; $V_{CC} = 4.5\text{ V}$ | 4.4 | 4.5 | - | V |
| | | $I_O = -20\text{ }\mu\text{A}$; $V_{CC} = 6.0\text{ V}$ | 5.9 | 6.0 | - | V |
| | | $I_O = -4.0\text{ mA}$; $V_{CC} = 4.5\text{ V}$ | 4.18 | 4.32 | - | V |
| | | $I_O = -5.2\text{ mA}$; $V_{CC} = 6.0\text{ V}$ | 5.68 | 5.81 | - | V |
| V_{OL} | LOW-level output voltage | $V_I = V_{IH}$ or V_{IL} | | | | |
| | | $I_O = 20\text{ }\mu\text{A}$; $V_{CC} = 2.0\text{ V}$ | - | 0 | 0.1 | V |
| | | $I_O = 20\text{ }\mu\text{A}$; $V_{CC} = 4.5\text{ V}$ | - | 0 | 0.1 | V |
| | | $I_O = 20\text{ }\mu\text{A}$; $V_{CC} = 6.0\text{ V}$ | - | 0 | 0.1 | V |
| | | $I_O = 4.0\text{ mA}$; $V_{CC} = 4.5\text{ V}$ | - | 0.15 | 0.26 | V |
| | | $I_O = 5.2\text{ mA}$; $V_{CC} = 6.0\text{ V}$ | - | 0.16 | 0.26 | V |
| I_I | input leakage current | $V_I = \text{GND}$ or V_{CC} ; $V_{CC} = 6.0\text{ V}$ | - | - | ± 0.1 | μA |
| I_{CC} | supply current | $V_I = \text{GND}$ or V_{CC} ; $I_O = 0\text{ A}$; $V_{CC} = 6.0\text{ V}$ | - | - | 1.0 | μA |
| C_I | input capacitance | | - | 1.5 | - | pF |

Table 7. Static characteristics for 74HC2G34 ...continued

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---------------------------|---|------|-----|-----------|---------------|
| $T_{amb} = -40\text{ °C to }+85\text{ °C}$ | | | | | | |
| V_{IH} | HIGH-level input voltage | $V_{CC} = 2.0\text{ V}$ | 1.5 | - | - | V |
| | | $V_{CC} = 4.5\text{ V}$ | 3.15 | - | - | V |
| | | $V_{CC} = 6.0\text{ V}$ | 4.2 | - | - | V |
| V_{IL} | LOW-level input voltage | $V_{CC} = 2.0\text{ V}$ | - | - | 0.5 | V |
| | | $V_{CC} = 4.5\text{ V}$ | - | - | 1.35 | V |
| | | $V_{CC} = 6.0\text{ V}$ | - | - | 1.8 | V |
| V_{OH} | HIGH-level output voltage | $V_I = V_{IH}$ or V_{IL} | | | | |
| | | $I_O = -20\text{ }\mu\text{A}; V_{CC} = 2.0\text{ V}$ | 1.9 | - | - | V |
| | | $I_O = -20\text{ }\mu\text{A}; V_{CC} = 4.5\text{ V}$ | 4.4 | - | - | V |
| | | $I_O = -20\text{ }\mu\text{A}; V_{CC} = 6.0\text{ V}$ | 5.9 | - | - | V |
| | | $I_O = -4.0\text{ mA}; V_{CC} = 4.5\text{ V}$ | 4.13 | - | - | V |
| V_{OL} | LOW-level output voltage | $V_I = V_{IH}$ or V_{IL} | | | | |
| | | $I_O = 20\text{ }\mu\text{A}; V_{CC} = 2.0\text{ V}$ | - | - | 0.1 | V |
| | | $I_O = 20\text{ }\mu\text{A}; V_{CC} = 4.5\text{ V}$ | - | - | 0.1 | V |
| | | $I_O = 20\text{ }\mu\text{A}; V_{CC} = 6.0\text{ V}$ | - | - | 0.1 | V |
| | | $I_O = 4.0\text{ mA}; V_{CC} = 4.5\text{ V}$ | - | - | 0.33 | V |
| I_I | input leakage current | $V_I = \text{GND}$ or $V_{CC}; V_{CC} = 6.0\text{ V}$ | - | - | ± 1.0 | μA |
| | | $V_I = \text{GND}$ or $V_{CC}; I_O = 0\text{ A}; V_{CC} = 6.0\text{ V}$ | - | - | 10.0 | μA |
| $T_{amb} = -40\text{ °C to }+125\text{ °C}$ | | | | | | |
| V_{IH} | HIGH-level input voltage | $V_{CC} = 2.0\text{ V}$ | 1.5 | - | - | V |
| | | $V_{CC} = 4.5\text{ V}$ | 3.15 | - | - | V |
| | | $V_{CC} = 6.0\text{ V}$ | 4.2 | - | - | V |
| V_{IL} | LOW-level input voltage | $V_{CC} = 2.0\text{ V}$ | - | - | 0.5 | V |
| | | $V_{CC} = 4.5\text{ V}$ | - | - | 1.35 | V |
| | | $V_{CC} = 6.0\text{ V}$ | - | - | 1.8 | V |
| V_{OH} | HIGH-level output voltage | $V_I = V_{IH}$ or V_{IL} | | | | |
| | | $I_O = -20\text{ }\mu\text{A}; V_{CC} = 2.0\text{ V}$ | 1.9 | - | - | V |
| | | $I_O = -20\text{ }\mu\text{A}; V_{CC} = 4.5\text{ V}$ | 4.4 | - | - | V |
| | | $I_O = -20\text{ }\mu\text{A}; V_{CC} = 6.0\text{ V}$ | 5.9 | - | - | V |
| | | $I_O = -4.0\text{ mA}; V_{CC} = 4.5\text{ V}$ | 3.7 | - | - | V |
| | | $I_O = -5.2\text{ mA}; V_{CC} = 6.0\text{ V}$ | 5.2 | - | - | V |

Table 7. Static characteristics for 74HC2G34 ...continued

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------------|--------------------------|--|-----|-----|------|------|
| V _{OL} | LOW-level output voltage | V _I = V _{IH} or V _{IL} | | | | |
| | | I _O = 20 μA; V _{CC} = 2.0 V | - | - | 0.1 | V |
| | | I _O = 20 μA; V _{CC} = 4.5 V | - | - | 0.1 | V |
| | | I _O = 20 μA; V _{CC} = 6.0 V | - | - | 0.1 | V |
| | | I _O = 4.0 mA; V _{CC} = 4.5 V | - | - | 0.4 | V |
| | | I _O = 5.2 mA; V _{CC} = 6.0 V | - | - | 0.4 | V |
| I _I | input leakage current | V _I = GND or V _{CC} ; V _{CC} = 6.0 V | - | - | ±1.0 | μA |
| I _{CC} | supply current | V _I = GND or V _{CC} ; I _O = 0 A; V _{CC} = 6.0 V | - | - | 20.0 | μA |

Table 8. Static characteristics for 74HCT2G34

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---------------------------|---|------|------|------|------|
| T_{amb} = 25 °C | | | | | | |
| V _{IH} | HIGH-level input voltage | V _{CC} = 4.5 V to 5.5 V | 2.0 | 1.6 | - | V |
| V _{IL} | LOW-level input voltage | V _{CC} = 4.5 V to 5.5 V | - | 1.2 | 0.8 | V |
| V _{OH} | HIGH-level output voltage | V _I = V _{IH} or V _{IL} | | | | |
| | | I _O = -20 μA; V _{CC} = 4.5 V | 4.4 | 4.5 | - | V |
| | | I _O = -4.0 mA; V _{CC} = 4.5 V | 4.18 | 4.32 | - | V |
| V _{OL} | LOW-level output voltage | V _I = V _{IH} or V _{IL} | | | | |
| | | I _O = 20 μA; V _{CC} = 4.5 V | - | 0 | 0.1 | V |
| | | I _O = 4.0 mA; V _{CC} = 4.5 V | - | 0.15 | 0.26 | V |
| I _I | input leakage current | V _I = GND or V _{CC} ; V _{CC} = 5.5 V | - | - | ±0.1 | μA |
| I _{CC} | supply current | V _I = GND or V _{CC} ; I _O = 0 A; V _{CC} = 5.5 V | - | - | 1.0 | μA |
| ΔI _{CC} | additional supply current | V _I = V _{CC} - 2.1 V; V _{CC} = 4.5 V to 5.5 V; I _O = 0 A | - | - | 300 | μA |
| C _I | input capacitance | | - | 1.5 | - | pF |
| T_{amb} = -40 °C to +85 °C | | | | | | |
| V _{IH} | HIGH-level input voltage | V _{CC} = 4.5 V to 5.5 V | 2.0 | - | - | V |
| V _{IL} | LOW-level input voltage | V _{CC} = 4.5 V to 5.5 V | - | - | 0.8 | V |
| V _{OH} | HIGH-level output voltage | V _I = V _{IH} or V _{IL} | | | | |
| | | I _O = -20 μA; V _{CC} = 4.5 V | 4.4 | - | - | V |
| | | I _O = -4.0 mA; V _{CC} = 4.5 V | 4.13 | - | - | V |
| V _{OL} | LOW-level output voltage | V _I = V _{IH} or V _{IL} | | | | |
| | | I _O = 20 μA; V _{CC} = 4.5 V | - | - | 0.1 | V |
| | | I _O = 4.0 mA; V _{CC} = 4.5 V | - | - | 0.33 | V |
| I _I | input leakage current | V _I = GND or V _{CC} ; V _{CC} = 5.5 V | - | - | ±1.0 | μA |
| I _{CC} | supply current | V _I = GND or V _{CC} ; I _O = 0 A; V _{CC} = 5.5 V | - | - | 10.0 | μA |
| ΔI _{CC} | additional supply current | V _I = V _{CC} - 2.1 V; V _{CC} = 4.5 V to 5.5 V; I _O = 0 A | - | - | 375 | μA |

Table 8. Static characteristics for 74HCT2G34 ...continued

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--|---------------------------|---|-----|-----|------|------|
| T_{amb} = -40 °C to +125 °C | | | | | | |
| V _{IH} | HIGH-level input voltage | V _{CC} = 4.5 V to 5.5 V | 2.0 | - | - | V |
| V _{IL} | LOW-level input voltage | V _{CC} = 4.5 V to 5.5 V | - | - | 0.8 | V |
| V _{OH} | HIGH-level output voltage | V _I = V _{IH} or V _{IL} | | | | |
| | | I _O = -20 μA; V _{CC} = 4.5 V | 4.4 | - | - | V |
| | | I _O = -4.0 mA; V _{CC} = 4.5 V | 3.7 | - | - | V |
| V _{OL} | LOW-level output voltage | V _I = V _{IH} or V _{IL} | | | | |
| | | I _O = 20 μA; V _{CC} = 4.5 V | - | - | 0.1 | V |
| | | I _O = 4.0 mA; V _{CC} = 4.5 V | - | - | 0.4 | V |
| I _I | input leakage current | V _I = GND or V _{CC} ; V _{CC} = 5.5 V | - | - | ±1.0 | μA |
| I _{CC} | supply current | V _I = GND or V _{CC} ; I _O = 0 A; V _{CC} = 5.5 V | - | - | 20.0 | μA |
| ΔI _{CC} | additional supply current | V _I = V _{CC} - 2.1 V; V _{CC} = 4.5 V to 5.5 V; I _O = 0 A | - | - | 410 | μA |

11. Dynamic characteristics

Table 9. Dynamic characteristicsVoltages are referenced to GND (ground = 0 V); for test circuit see [Figure 6](#).

| Symbol | Parameter | Conditions | 25 °C | | | -40 °C to +125 °C | | | Unit |
|-----------------|-------------------------------|---|-------|-----|-----|-------------------|-------------|--------------|------|
| | | | Min | Typ | Max | Min | Max (85 °C) | Max (125 °C) | |
| 74HC2G34 | | | | | | | | | |
| t _{pd} | propagation delay | nA to nY; see Figure 5 [1] | | | | | | | |
| | | V _{CC} = 2.0 V; C _L = 50 pF | - | 29 | 75 | - | 95 | 125 | ns |
| | | V _{CC} = 4.5 V; C _L = 50 pF | - | 9 | 15 | - | 19 | 25 | ns |
| | | V _{CC} = 6.0 V; C _L = 50 pF | - | 8 | 13 | - | 16 | 20 | ns |
| t _t | transition time | nY; see Figure 5 [2] | | | | | | | |
| | | V _{CC} = 2.0 V; C _L = 50 pF | - | 18 | 75 | - | 95 | 125 | ns |
| | | V _{CC} = 4.5 V; C _L = 50 pF | - | 6 | 15 | - | 19 | 25 | ns |
| | | V _{CC} = 6.0 V; C _L = 50 pF | - | 5 | 13 | - | 16 | 20 | ns |
| C _{PD} | power dissipation capacitance | V _I = GND to V _{CC} [3] | - | 10 | - | - | - | - | pF |

Table 9. Dynamic characteristics ...continued
 Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 6](#).

| Symbol | Parameter | Conditions | 25 °C | | | -40 °C to +125 °C | | | Unit | |
|------------------|-------------------------------|---|-------|-----|-----|-------------------|-------------|--------------|------|----|
| | | | Min | Typ | Max | Min | Max (85 °C) | Max (125 °C) | | |
| 74HCT2G34 | | | | | | | | | | |
| t_{pd} | propagation delay | nA to nY; see Figure 5 $V_{CC} = 4.5\text{ V}; C_L = 50\text{ pF}$ | [1] | - | 10 | 18 | - | 23 | 29 | ns |
| t_t | transition time | nY; see Figure 5 $V_{CC} = 4.5\text{ V}; C_L = 50\text{ pF}$ | [2] | - | 6 | 15 | - | 19 | 25 | ns |
| C_{PD} | power dissipation capacitance | $V_I = \text{GND to } V_{CC} - 1.5\text{ V}$ | [3] | - | 9 | - | - | - | - | pF |

- [1] t_{pd} is the same as t_{PLH} and t_{PHL}
- [2] t_t is the same as t_{TLH} and t_{THL}
- [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 the outputs.

12. Waveforms

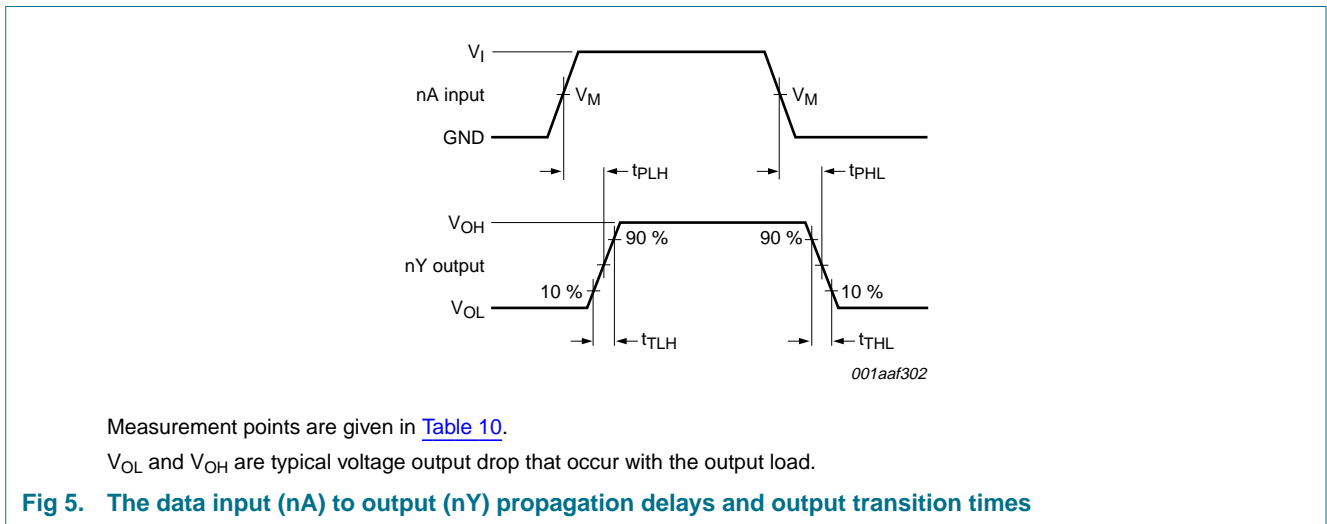
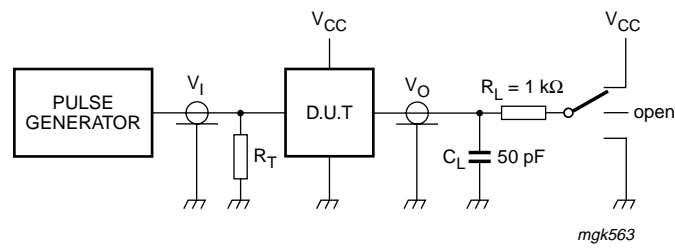


Table 10. Measurement points

| Type | Input | | | Output |
|-----------|-------------|-----------------|-------------|-------------|
| | V_M | V_I | $t_r = t_f$ | V_M |
| 74HC2G34 | $0.5V_{CC}$ | GND to V_{CC} | 6.0 ns | $0.5V_{CC}$ |
| 74HCT2G34 | 1.3 V | GND to 3.0 V | 6.0 ns | 1.3 V |



Test data is given in [Table 11](#).

Definitions test circuit:

R_L = Load resistance.

C_L = Load capacitance including jig and probe capacitance.

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

Fig 6. Load circuitry for switching times

Table 11. Test data

| Type | Input | | Test |
|-----------|-----------------|------------|--------------------|
| | V_I | t_r, t_f | t_{PHL}, t_{PLH} |
| 74HC2G34 | GND to V_{CC} | 6 ns | open |
| 74HCT2G34 | GND to 3.0 V | 6 ns | open |

13. Package outline

Plastic surface-mounted package; 6 leads

SOT363

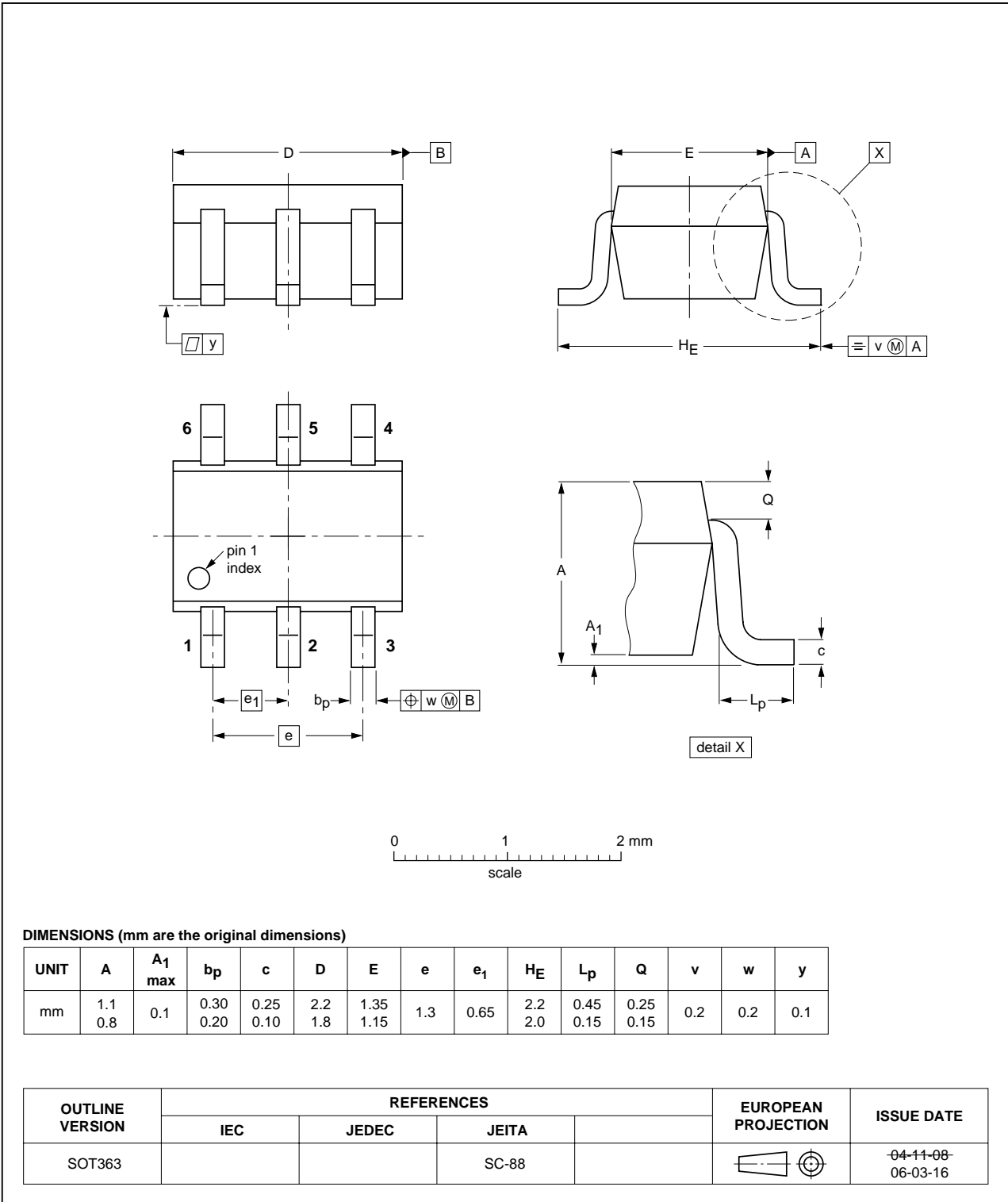


Fig 7. Package outline SOT363 (SC-88)

Plastic surface-mounted package (TSOP6); 6 leads

SOT457

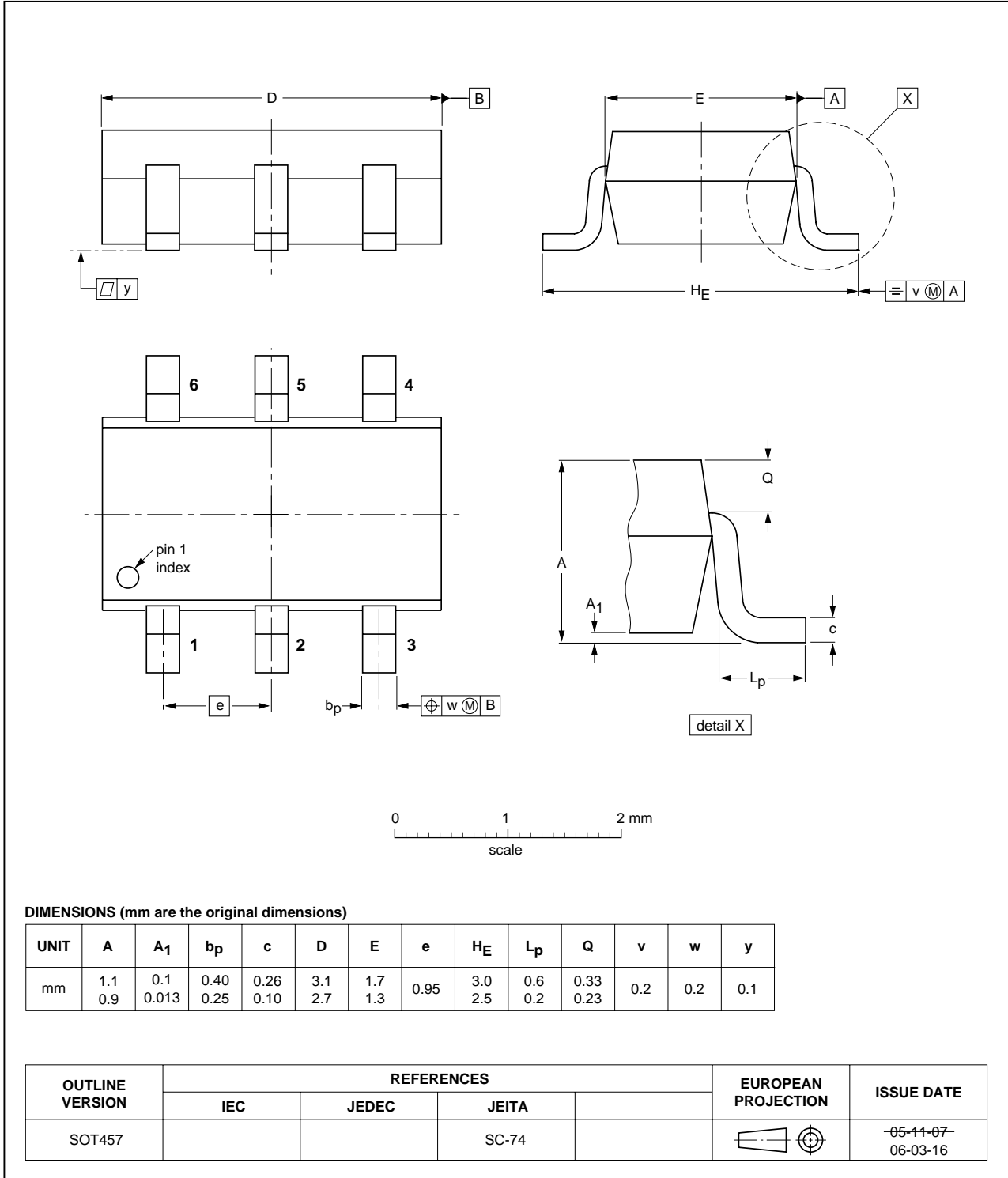


Fig 8. Package outline SOT457 (SC-74)

14. Abbreviations

Table 12. Abbreviations

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

15. Revision history

Table 13. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|--------------|--------------------|---------------|------------|
| 74HC_HCT2G34_1 | 20061006 | Product data sheet | - | - |

16. Legal information

16.1 Data sheet status

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

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

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

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