

# 74HC2G34; 74HCT2G34

## Dual buffer gate

Rev. 2 — 3 February 2022

Product data sheet

## 1. General description

The 74HC2G34; 74HCT2G34 is a dual buffer. 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

- Wide supply voltage range from 2.0 V to 6.0 V
- High noise immunity
- CMOS low power dissipation
- Balanced propagation delays
- Unlimited input rise and fall times
- Input levels:
  - For 74HC2G34: CMOS level
  - For 74HCT2G34: TTL level
- Latch-up performance exceeds 100 mA per JESD 78 Class II Level B
- Complies with JEDEC standards
  - JESD8C (2.7 V to 3.6 V)
  - JESD7A (2.0 V to 6.0 V)
- ESD protection:
  - HBM JESD22-A114-D exceeds 2000 V
  - MM JESD22-A115-A exceeds 200 V
- Specified from -40 °C to +85 °C and -40 °C to +125 °C

## 3. Ordering information

Table 1. Ordering information

Type number	Package			
	Temperature range	Name	Description	Version
74HC2G34GW	-40 °C to +125 °C	TSSOP6	plastic thin shrink small outline package; 6 leads; body width 1.25 mm	SOT363-2
74HCT2G34GW				
74HC2G34GV	-40 °C to +125 °C	SC-74; TSOP6	plastic surface-mounted package; 6 leads	SOT457
74HCT2G34GV				

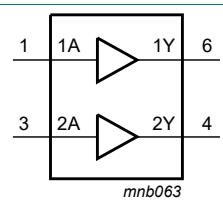
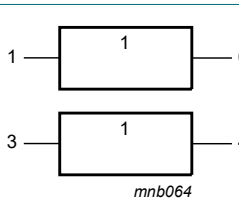
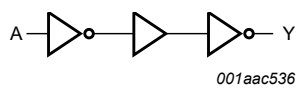
## 4. Marking

Table 2. Marking

Type number	Marking code[1]
74HC2G34GW	PA
74HCT2G34GW	UA
74HC2G34GV	P34
74HCT2G34GV	U34

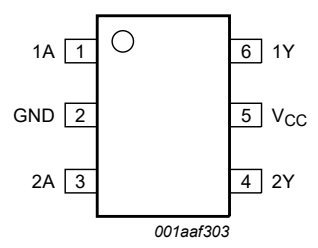
[1] The pin 1 indicator is located on the lower left corner of the device, below the marking code.

## 5. Functional diagram

 <p><b>Fig. 1. Logic symbol</b></p>	 <p><b>Fig. 2. IEC logic symbol</b></p>	 <p><b>Fig. 3. Logic diagram (one gate)</b></p>
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## 6. Pinning information

### 6.1. Pinning

<p><b>74HC2G34</b> <b>74HCT2G34</b></p> 	
<p><b>Fig. 4. Pin configuration SOT363-2 (TSSOP6) and SOT457 (SC-74; TSOP6)</b></p>	

### 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 <sub>CC</sub>	5	supply voltage
1Y	6	data output

## 7. Functional description

**Table 4. Function table**

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

Input	Output
nA	nY
L	L
H	H

## 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]	-	$\pm 20$	mA
$I_{OK}$	output clamping current	$V_O < -0.5\text{ V}$ or $V_O > V_{CC} + 0.5\text{ V}$ [1]	-	$\pm 20$	mA
$I_O$	output current	$V_O = -0.5\text{ V}$ to $V_{CC} + 0.5\text{ V}$ [1]	-	$\pm 25$	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 SOT363-2 (TSSOP6) package:  $P_{tot}$  derates linearly with 3.7 mW/K above 83 °C.  
For SOT457 (SC-74; TSOP6) package:  $P_{tot}$  derates linearly with 4.1 mW/K above 89 °C.

## 9. Recommended operating conditions

**Table 6. Recommended operating conditions**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>74HC2G34</b>						
$V_{CC}$	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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>74HCT2G34</b>						
$V_{CC}$	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
<b><math>T_{amb} = 25\text{ °C}</math></b>						
$V_{IH}$	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
$V_{OL}$	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 $V_{CC}$ ; $V_{CC} = 6.0\text{ V}$	-	-	$\pm 0.1$	$\mu\text{A}$
$I_{CC}$	supply current	$V_I = \text{GND}$ or $V_{CC}$ ; $I_O = 0\text{ A}$ ; $V_{CC} = 6.0\text{ V}$	-	-	1.0	$\mu\text{A}$
$C_I$	input capacitance		-	1.5	-	pF

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>T<sub>amb</sub> = -40 °C to +85 °C</b>						
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 2.0 V	1.5	-	-	V
		V <sub>CC</sub> = 4.5 V	3.15	-	-	V
		V <sub>CC</sub> = 6.0 V	4.2	-	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 2.0 V	-	-	0.5	V
		V <sub>CC</sub> = 4.5 V	-	-	1.35	V
		V <sub>CC</sub> = 6.0 V	-	-	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	-	-	V
		I <sub>O</sub> = -20 µA; V <sub>CC</sub> = 4.5 V	4.4	-	-	V
		I <sub>O</sub> = -20 µA; V <sub>CC</sub> = 6.0 V	5.9	-	-	V
		I <sub>O</sub> = -4.0 mA; V <sub>CC</sub> = 4.5 V	4.13	-	-	V
		I <sub>O</sub> = -5.2 mA; V <sub>CC</sub> = 6.0 V	5.63	-	-	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	-	-	0.1	V
		I <sub>O</sub> = 20 µA; V <sub>CC</sub> = 4.5 V	-	-	0.1	V
		I <sub>O</sub> = 20 µA; V <sub>CC</sub> = 6.0 V	-	-	0.1	V
		I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 4.5 V	-	-	0.33	V
		I <sub>O</sub> = 5.2 mA; V <sub>CC</sub> = 6.0 V	-	-	0.33	V
I <sub>I</sub>	input leakage current	V <sub>I</sub> = GND or V <sub>CC</sub> ; V <sub>CC</sub> = 6.0 V	-	-	±1.0	µA
I <sub>CC</sub>	supply current	V <sub>I</sub> = GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 6.0 V	-	-	10.0	µA
<b>T<sub>amb</sub> = -40 °C to +125 °C</b>						
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 2.0 V	1.5	-	-	V
		V <sub>CC</sub> = 4.5 V	3.15	-	-	V
		V <sub>CC</sub> = 6.0 V	4.2	-	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 2.0 V	-	-	0.5	V
		V <sub>CC</sub> = 4.5 V	-	-	1.35	V
		V <sub>CC</sub> = 6.0 V	-	-	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	-	-	V
		I <sub>O</sub> = -20 µA; V <sub>CC</sub> = 4.5 V	4.4	-	-	V
		I <sub>O</sub> = -20 µA; V <sub>CC</sub> = 6.0 V	5.9	-	-	V
		I <sub>O</sub> = -4.0 mA; V <sub>CC</sub> = 4.5 V	3.7	-	-	V
		I <sub>O</sub> = -5.2 mA; V <sub>CC</sub> = 6.0 V	5.2	-	-	V
V <sub>OL</sub>	LOW-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>				
		I <sub>O</sub> = 20 µA; V <sub>CC</sub> = 2.0 V	-	-	0.1	V
		I <sub>O</sub> = 20 µA; V <sub>CC</sub> = 4.5 V	-	-	0.1	V
		I <sub>O</sub> = 20 µA; V <sub>CC</sub> = 6.0 V	-	-	0.1	V
		I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 4.5 V	-	-	0.4	V
		I <sub>O</sub> = 5.2 mA; V <sub>CC</sub> = 6.0 V	-	-	0.4	V
I <sub>I</sub>	input leakage current	V <sub>I</sub> = GND or V <sub>CC</sub> ; V <sub>CC</sub> = 6.0 V	-	-	±1.0	µA
I <sub>CC</sub>	supply current	V <sub>I</sub> = GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 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
<b>T<sub>amb</sub> = 25 °C</b>						
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	2.0	1.6	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	-	1.2	0.8	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> = 4.5 V	4.4	4.5	-	V
		I <sub>O</sub> = -4.0 mA; V <sub>CC</sub> = 4.5 V	4.18	4.32	-	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> = 4.5 V	-	0	0.1	V
		I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 4.5 V	-	0.15	0.26	V
I <sub>I</sub>	input leakage current	V <sub>I</sub> = GND or V <sub>CC</sub> ; V <sub>CC</sub> = 5.5 V	-	-	±0.1	μA
I <sub>CC</sub>	supply current	V <sub>I</sub> = GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 5.5 V	-	-	1.0	μA
ΔI <sub>CC</sub>	additional supply current	V <sub>I</sub> = V <sub>CC</sub> - 2.1 V; V <sub>CC</sub> = 4.5 V to 5.5 V; I <sub>O</sub> = 0 A	-	-	300	μA
C <sub>I</sub>	input capacitance		-	1.5	-	pF
<b>T<sub>amb</sub> = -40 °C to +85 °C</b>						
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	2.0	-	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	-	-	0.8	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> = 4.5 V	4.4	-	-	V
		I <sub>O</sub> = -4.0 mA; V <sub>CC</sub> = 4.5 V	4.13	-	-	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> = 4.5 V	-	-	0.1	V
		I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 4.5 V	-	-	0.33	V
I <sub>I</sub>	input leakage current	V <sub>I</sub> = GND or V <sub>CC</sub> ; V <sub>CC</sub> = 5.5 V	-	-	±1.0	μA
I <sub>CC</sub>	supply current	V <sub>I</sub> = GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 5.5 V	-	-	10.0	μA
ΔI <sub>CC</sub>	additional supply current	V <sub>I</sub> = V <sub>CC</sub> - 2.1 V; V <sub>CC</sub> = 4.5 V to 5.5 V; I <sub>O</sub> = 0 A	-	-	375	μA
<b>T<sub>amb</sub> = -40 °C to +125 °C</b>						
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	2.0	-	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	-	-	0.8	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> = 4.5 V	4.4	-	-	V
		I <sub>O</sub> = -4.0 mA; V <sub>CC</sub> = 4.5 V	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> = 4.5 V	-	-	0.1	V
		I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 4.5 V	-	-	0.4	V
I <sub>I</sub>	input leakage current	V <sub>I</sub> = GND or V <sub>CC</sub> ; V <sub>CC</sub> = 5.5 V	-	-	±1.0	μA
I <sub>CC</sub>	supply current	V <sub>I</sub> = GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 5.5 V	-	-	20.0	μA
ΔI <sub>CC</sub>	additional supply current	V <sub>I</sub> = V <sub>CC</sub> - 2.1 V; V <sub>CC</sub> = 4.5 V to 5.5 V; I <sub>O</sub> = 0 A	-	-	410	μA

## 11. Dynamic characteristics

**Table 9. Dynamic characteristics**

Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 6.

Symbol	Parameter	Conditions	25 °C			-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Typ	Max	Min	Max	Min	Max	
<b>74HC2G34</b>										
$t_{pd}$	propagation delay	nA to nY; see Fig. 5 [1]								
		$V_{CC} = 2.0\text{ V}; C_L = 50\text{ pF}$	-	29	75	-	95	-	125	ns
		$V_{CC} = 4.5\text{ V}; C_L = 50\text{ pF}$	-	9	15	-	19	-	25	ns
		$V_{CC} = 6.0\text{ V}; C_L = 50\text{ pF}$	-	8	13	-	16	-	20	ns
$t_t$	transition time	nY; see Fig. 5 [2]								
		$V_{CC} = 2.0\text{ V}; C_L = 50\text{ pF}$	-	18	75	-	95	-	125	ns
		$V_{CC} = 4.5\text{ V}; C_L = 50\text{ pF}$	-	6	15	-	19	-	25	ns
		$V_{CC} = 6.0\text{ V}; C_L = 50\text{ pF}$	-	5	13	-	16	-	20	ns
$C_{PD}$	power dissipation capacitance	$V_I = \text{GND to } V_{CC}$ [3]	-	10	-	-	-	-	-	pF
<b>74HCT2G34</b>										
$t_{pd}$	propagation delay	nA to nY; see Fig. 5 [1]								
		$V_{CC} = 4.5\text{ V}; C_L = 50\text{ pF}$	-	10	18	-	23	-	29	ns
$t_t$	transition time	nY; see Fig. 5 [2]								
		$V_{CC} = 4.5\text{ V}; C_L = 50\text{ pF}$	-	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  $\mu\text{W}$ ).

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

$f_i$  = 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.

11.1. Waveforms and test circuit

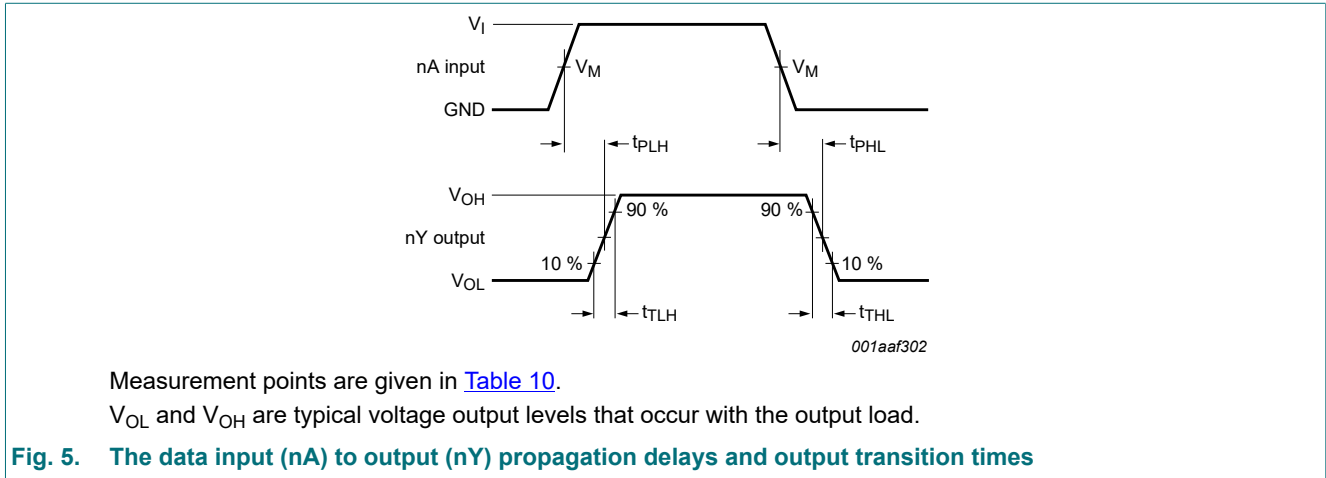


Table 10. Measurement points

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

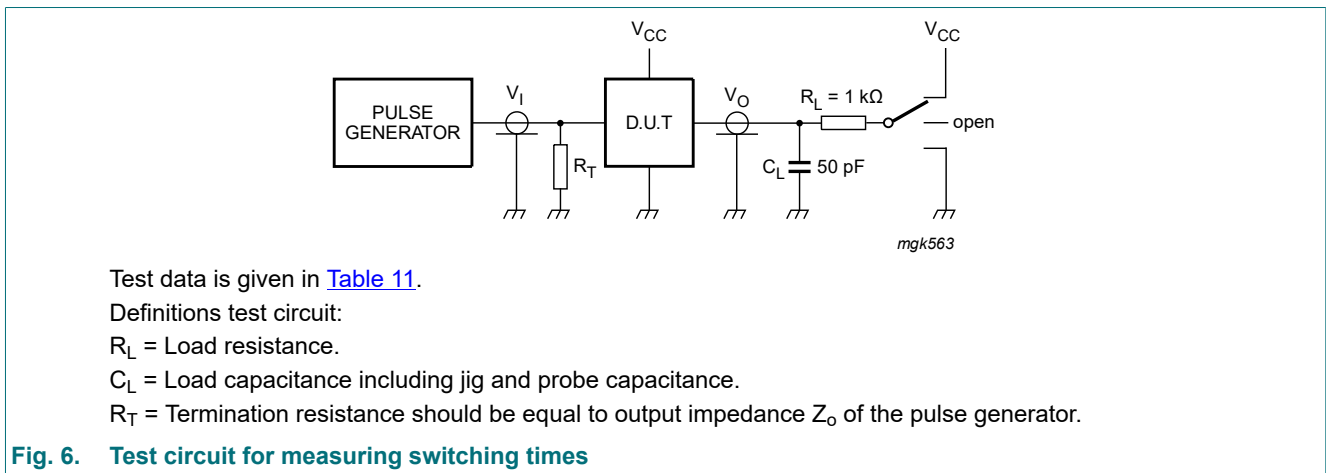


Table 11. Test data

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



12. Package outline

TSSOP6: plastic thin shrink small outline package; 6 leads; body width 1.25 mm

SOT363-2

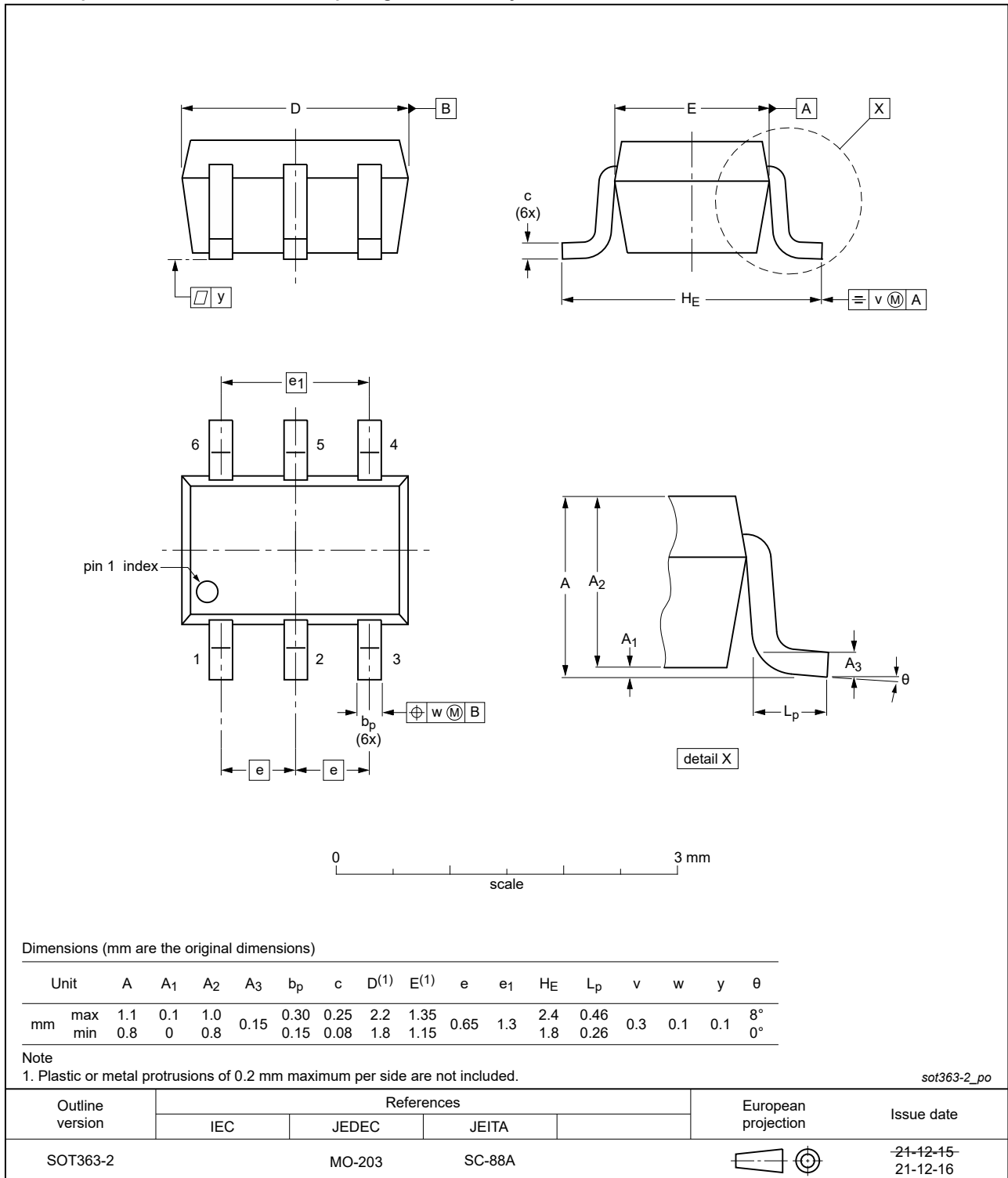


Fig. 7. Package outline SOT363-2 (TSSOP6)

Plastic, surface-mounted package (SC-74; TSOP6); 6 leads

SOT457

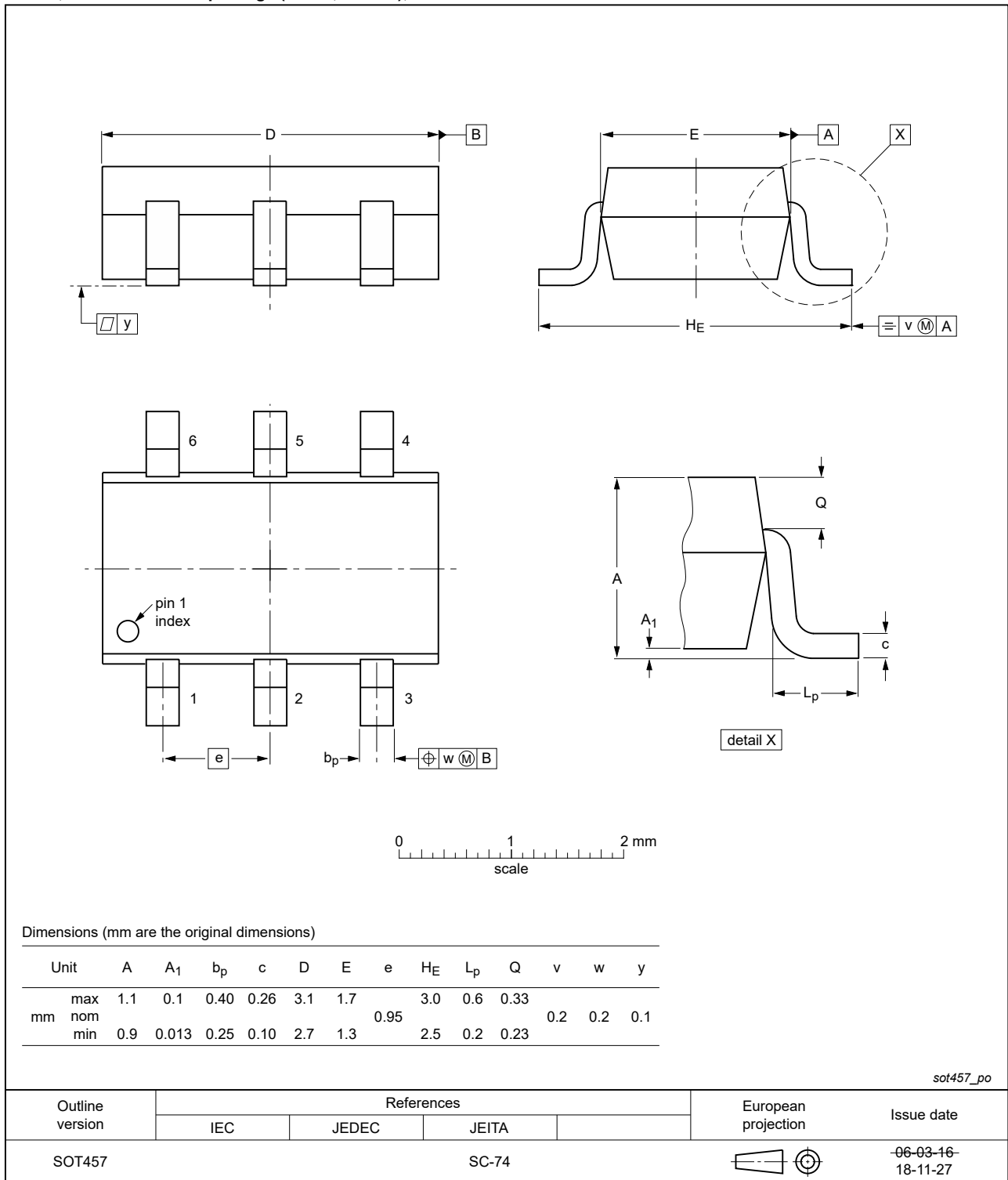


Fig. 8. Package outline SOT457 (SC-74; TSOP6)

## 13. Abbreviations

Table 12. 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

## 14. Revision history

Table 13. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74HC_HCT2G34 v.2	20220203	Product data sheet	-	74HC_HCT2G34 v.1
Modifications:	<ul style="list-style-type: none"> <li>The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li> <li>Legal texts have been adapted to the new company name where appropriate.</li> <li><a href="#">Section 1</a> and <a href="#">Section 2</a> updated.</li> <li>Package SOT363 (SC-88) changed to SOT363-2 (SC-88).</li> <li><a href="#">Section 8</a>: Derating values for <math>P_{tot}</math> total power dissipation updated.</li> <li><a href="#">Fig. 8</a>: Package outline drawing SOT457 (SC-74; TSOP6) has changed.</li> </ul>			
74HC_HCT2G34 v.1	20061006	Product data sheet	-	-

## 15. 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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