

# 74HC2G14-Q100; 74HCT2G14-Q100

## Dual inverting Schmitt trigger

Rev. 1 — 20 March 2014

Product data sheet

## 1. General description

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The 74HC2G14-Q100; 74HCT2G14-Q100 is a dual inverter with Schmitt trigger inputs. Inputs include clamp diodes. This enables the use of current limiting resistors to interface inputs to voltages in excess of  $V_{CC}$ . Schmitt trigger inputs transform slowly changing input signals into sharply defined jitter-free output signals.

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

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- 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  $+125\text{ °C}$
- Wide supply voltage range from 2.0 V to 6.0 V
- Complies with JEDEC standard no. 7A
- Input levels:
  - ◆ For 74HC2G14-Q100: CMOS level
  - ◆ For 74HCT2G14-Q100: TTL level
- High noise immunity
- Low power dissipation
- Balanced propagation delays
- Unlimited input rise and fall times
- ESD protection:
  - ◆ MIL-STD-883, method 3015 exceeds 2000 V
  - ◆ HBM JESD22-A114F exceeds 2000 V
  - ◆ MM JESD22-A115-A exceeds 200 V ( $C = 200\text{ pF}$ ,  $R = 0\ \Omega$ )
- Multiple package options

## 3. Applications

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- Wave and pulse shaper for highly noisy environments
- Astable multivibrators
- Monostable multivibrators



## 4. Ordering information

Table 1. Ordering information

Type number	Package			
	Temperature range	Name	Description	Version
74HC2G14GW-Q100	-40 °C to +125 °C	SC-88	plastic surface-mounted package; 6 leads	SOT363
74HC2G14GV-Q100	-40 °C to +125 °C	SC-74	plastic surface-mounted package (TSOP6); 6 leads	SOT457
74HCT2G14GW-Q100	-40 °C to +125 °C	SC-88	plastic surface-mounted package; 6 leads	SOT363
74HCT2G14GV-Q100	-40 °C to +125 °C	SC-74	plastic surface-mounted package (TSOP6); 6 leads	SOT457

## 5. Marking

Table 2. Marking codes

Type number	Marking code <sup>[1]</sup>
74HC2G14GW-Q100	HK
74HC2G14GV-Q100	H14
74HCT2G14GW-Q100	TK
74HCT2G14GV-Q100	T14

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

## 6. Functional diagram

<b>Fig 1. Logic symbol</b>	<b>Fig 2. IEC logic symbol</b>	<b>Fig 3. Logic diagram</b>

## 7. Pinning information

### 7.1 Pinning

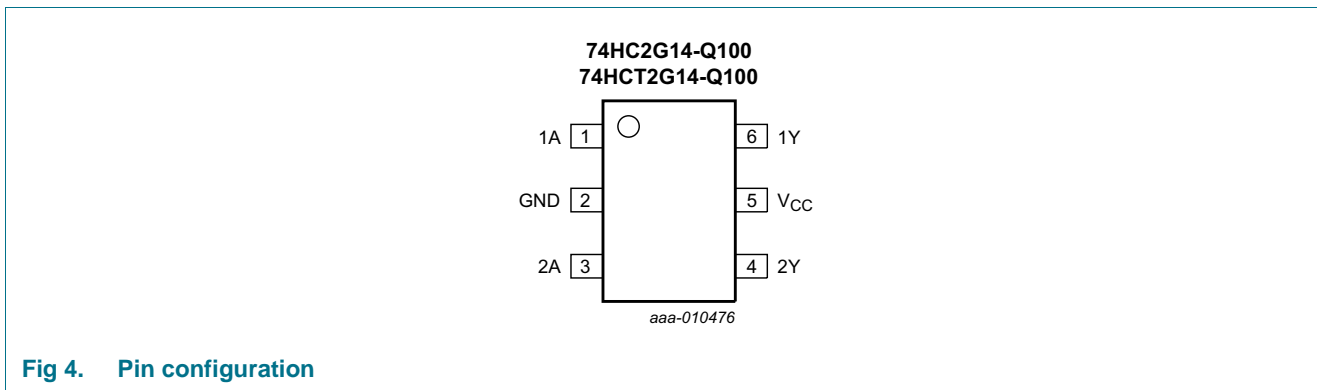


Fig 4. Pin configuration

### 7.2 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

## 8. Functional description

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

Input	Output
nA	nY
L	H
H	L

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

## 9. 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 or V <sub>I</sub> > V <sub>CC</sub> + 0.5 V	[1]	-	±20 mA
I <sub>OK</sub>	output clamping current	V <sub>O</sub> < -0.5 V or V <sub>O</sub> > V <sub>CC</sub> + 0.5 V	[1]	-	±20 mA
I <sub>O</sub>	output current	V <sub>O</sub> = -0.5 V to V <sub>CC</sub> + 0.5 V	[1]	-	±25 mA
I <sub>CC</sub>	supply current		[1]	-	+50 mA
I <sub>GND</sub>	ground current		[1]	-50	- mA
T <sub>stg</sub>	storage temperature		-65	+150	°C
P <sub>tot</sub>	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<sub>tot</sub> derates linearly with 4.0 mW/K.

## 10. Recommended operating conditions

**Table 6. Recommended operating conditions**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>74HC2G14-Q100</b>						
V <sub>CC</sub>	supply voltage		2.0	5.0	6.0	V
V <sub>I</sub>	input voltage		0	-	V <sub>CC</sub>	V
V <sub>O</sub>	output voltage		0	-	V <sub>CC</sub>	V
T <sub>amb</sub>	ambient temperature		-40	+25	+125	°C
<b>74HCT2G14-Q100</b>						
V <sub>CC</sub>	supply voltage		4.5	5.0	5.5	V
V <sub>I</sub>	input voltage		0	-	V <sub>CC</sub>	V
V <sub>O</sub>	output voltage		0	-	V <sub>CC</sub>	V
T <sub>amb</sub>	ambient temperature		-40	+25	+125	°C

## 11. Static characteristics

**Table 7. Static characteristics for 74HC2G14-Q100**

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>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>T+</sub> or V <sub>T-</sub>				
		I <sub>O</sub> = -20 μA; V <sub>CC</sub> = 2.0 V	1.9	2.0	-	V
		I <sub>O</sub> = -20 μA; V <sub>CC</sub> = 4.5 V	4.4	4.5	-	V
		I <sub>O</sub> = -20 μA; V <sub>CC</sub> = 6.0 V	5.9	6.0	-	V
		I <sub>O</sub> = -4.0 mA; V <sub>CC</sub> = 4.5 V	4.18	4.32	-	V
		I <sub>O</sub> = -5.2 mA; V <sub>CC</sub> = 6.0 V	5.68	5.81	-	V
V <sub>OL</sub>	LOW-level output voltage	V <sub>I</sub> = V <sub>T+</sub> or V <sub>T-</sub>				
		I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 2.0 V	-	0	0.1	V
		I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 4.5 V	-	0	0.1	V
		I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 6.0 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>O</sub> = 5.2 mA; V <sub>CC</sub> = 6.0 V	-	0.16	0.26	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	-	-	±0.1	μA
I <sub>CC</sub>	supply current	V <sub>I</sub> = GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 μA; V <sub>CC</sub> = 6.0 V	-	-	1.0	μA
C <sub>I</sub>	input capacitance		-	2.0	-	pF
<b>T<sub>amb</sub> = -40 °C to +85 °C</b>						
V <sub>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>T+</sub> or V <sub>T-</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>T+</sub> or V <sub>T-</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 μA; V <sub>CC</sub> = 6.0 V	-	-	10.0	μA

**Table 7. Static characteristics for 74HC2G14-Q100 ...continued**

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>T<sub>amb</sub> = -40 °C to +125 °C</b>						
V <sub>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>T+</sub> or V <sub>T-</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>T+</sub> or V <sub>T-</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 μA; V <sub>CC</sub> = 6.0 V	-	-	20.0	μA

**Table 8. Static characteristics for 74HCT2G14-Q100**

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>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>T+</sub> or V <sub>T-</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>T+</sub> or V <sub>T-</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 μA; 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 μA	-	-	300	μA
C <sub>I</sub>	input capacitance		-	2.0	-	pF

**Table 8. Static characteristics for 74HCT2G14-Q100 ...continued**

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>T<sub>amb</sub> = -40 °C to +85 °C</b>						
V <sub>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>T+</sub> or V <sub>T-</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>T+</sub> or V <sub>T-</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 μA; 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 μA	-	-	375	μA
<b>T<sub>amb</sub> = -40 °C to +125 °C</b>						
V <sub>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>T+</sub> or V <sub>T-</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>T+</sub> or V <sub>T-</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 μA; 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 μA	-	-	410	μA

## 12. Dynamic characteristics

**Table 9. Dynamic characteristics**

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)	
<b>74HC2G14-Q100</b>									
t <sub>pd</sub>	propagation delay	nA to nY; see <a href="#">Figure 5</a> <a href="#">[1]</a>							
		V <sub>CC</sub> = 2.0 V; C <sub>L</sub> = 50 pF	-	53	125	-	155	190	ns
		V <sub>CC</sub> = 4.5 V; C <sub>L</sub> = 50 pF	-	16	25	-	31	38	ns
		V <sub>CC</sub> = 6.0 V; C <sub>L</sub> = 50 pF	-	13	21	-	26	32	ns
t <sub>t</sub>	transition time	nY; see <a href="#">Figure 5</a> <a href="#">[1]</a>							
		V <sub>CC</sub> = 2.0 V; C <sub>L</sub> = 50 pF	-	20	75	-	95	110	ns
		V <sub>CC</sub> = 4.5 V; C <sub>L</sub> = 50 pF	-	7	15	-	19	22	ns
		V <sub>CC</sub> = 6.0 V; C <sub>L</sub> = 50 pF	-	5	13	-	16	19	ns
C <sub>PD</sub>	power dissipation capacitance	V <sub>I</sub> = GND to V <sub>CC</sub> <a href="#">[2]</a>	-	10	-	-	-	-	pF

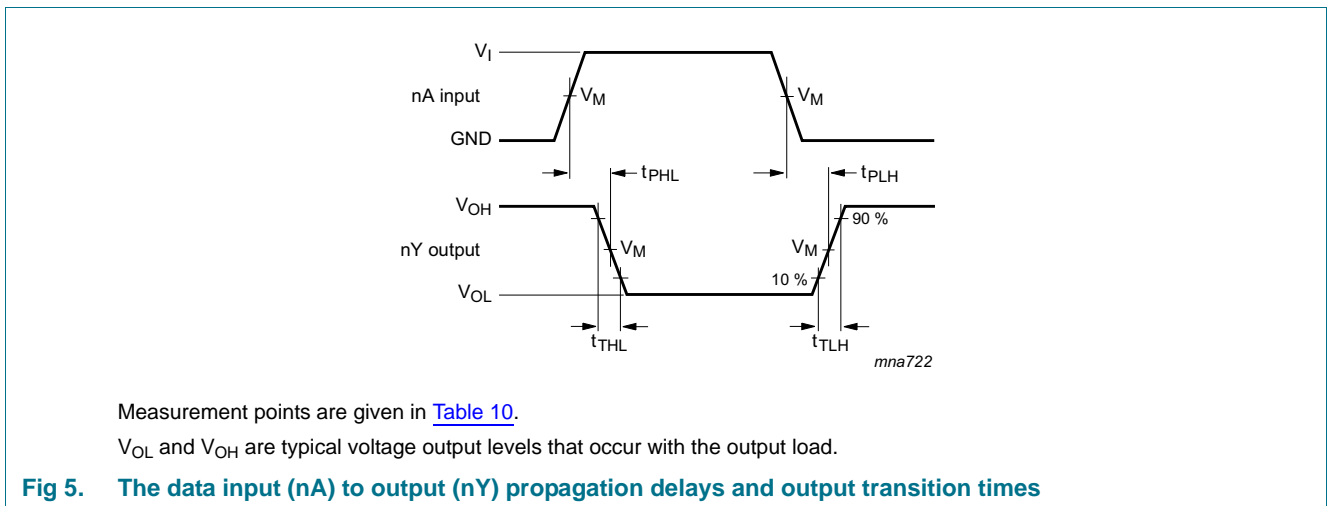
**Table 9. Dynamic characteristics ...continued**

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)	
<b>74HCT2G14-Q100</b>									
t <sub>pd</sub>	propagation delay	nA to nY; see <a href="#">Figure 5</a> <a href="#">[1]</a>							
		V <sub>CC</sub> = 4.5 V; C <sub>L</sub> = 50 pF	-	21	32	-	40	48	ns
t <sub>t</sub>	transition time	nY; see <a href="#">Figure 5</a> <a href="#">[1]</a>							
		V <sub>CC</sub> = 4.5 V; C <sub>L</sub> = 50 pF	-	6	15	-	19	22	ns
C <sub>PD</sub>	power dissipation capacitance	V <sub>I</sub> = GND to V <sub>CC</sub> - 1.5 V <a href="#">[2]</a>	-	10	-	-	-	-	pF

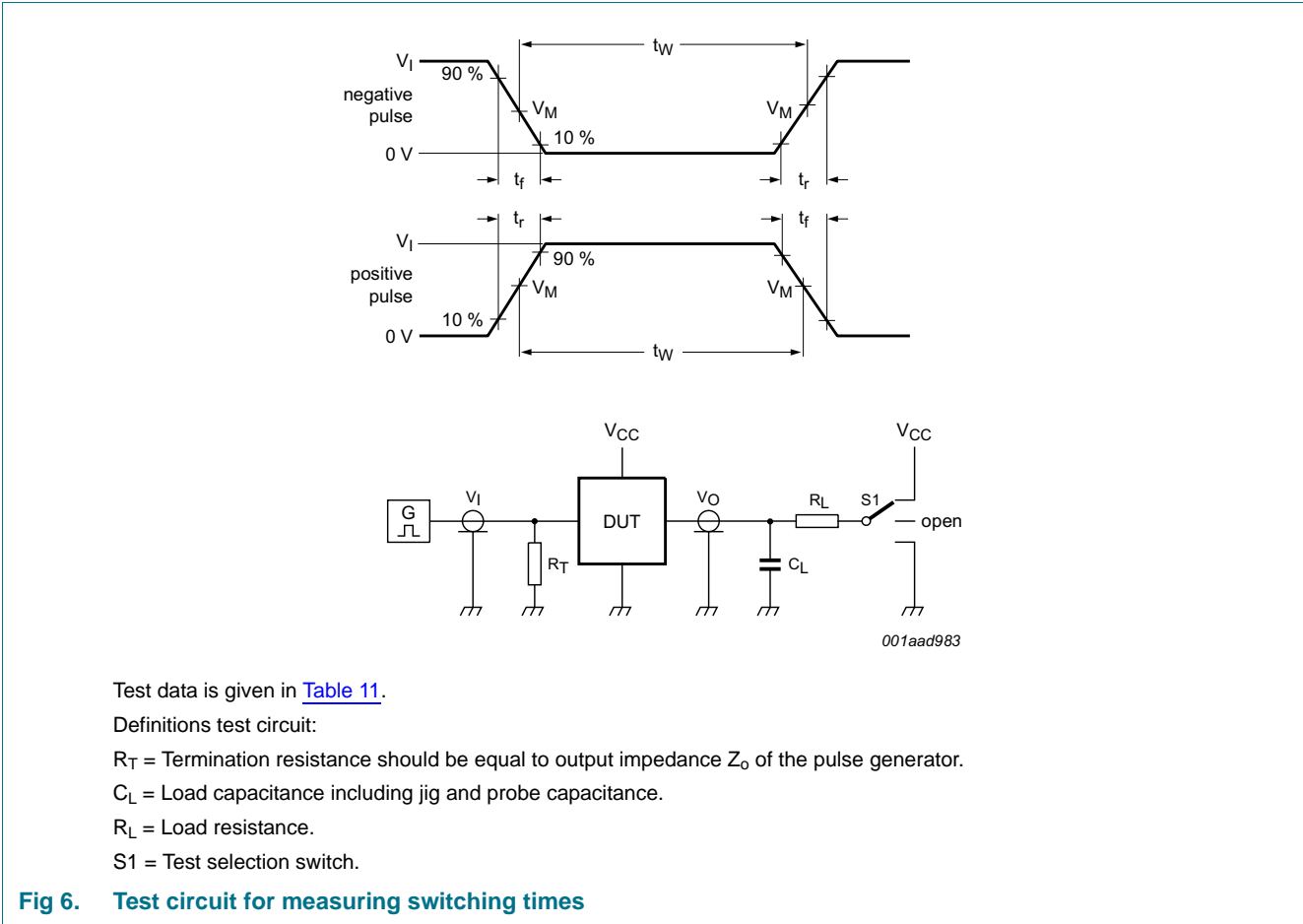
- [1] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>; t<sub>t</sub> is the same as t<sub>TLH</sub> and t<sub>THL</sub>.
- [2] C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> in μW).  
 $P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$  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;  
 Σ(C<sub>L</sub> × V<sub>CC</sub><sup>2</sup> × f<sub>o</sub>) = sum of the outputs.

### 13. Waveforms and test circuit



**Table 10. Measurement points**

Type	Input	Output
	V <sub>M</sub>	V <sub>M</sub>
74HC2G14-Q100	0.5V <sub>CC</sub>	0.5V <sub>CC</sub>
74HCT2G14-Q100	1.3 V	1.3 V



**Table 11. Test data**

Type	Input		Test
	$V_I$	$t_r, t_f$	$t_{PHL}, t_{PLH}$
74HC2G14-Q100	GND to $V_{CC}$	6 ns	open
74HCT2G14-Q100	GND to 3.0 V	6 ns	open

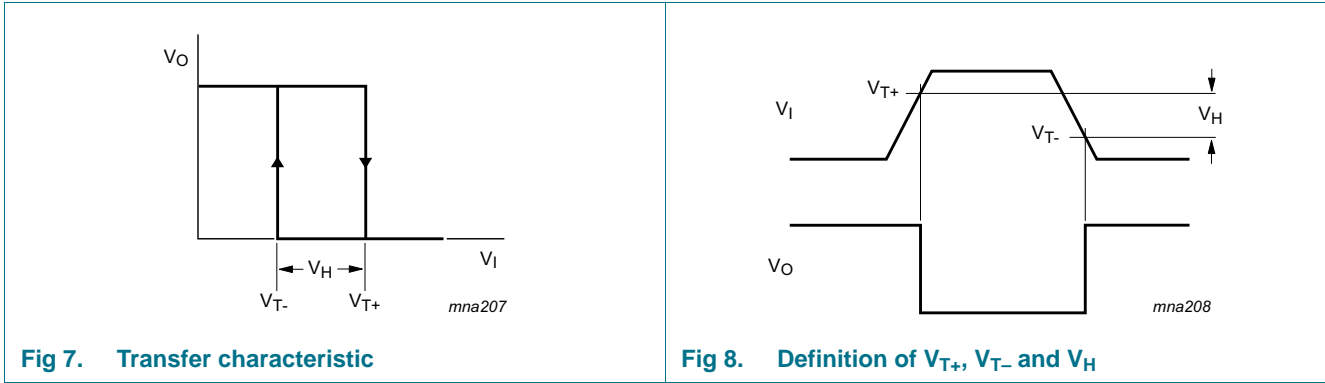
## 14. Transfer characteristics

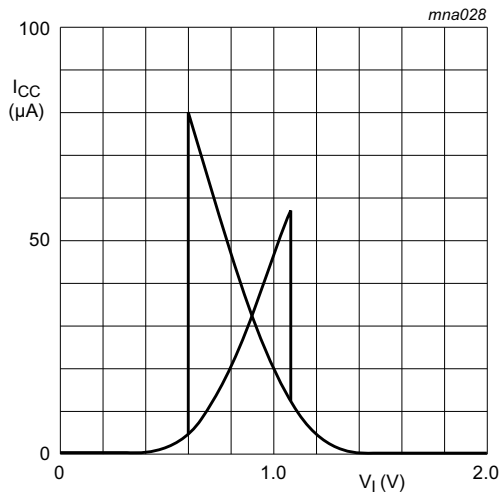
**Table 12. Transfer characteristics**

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

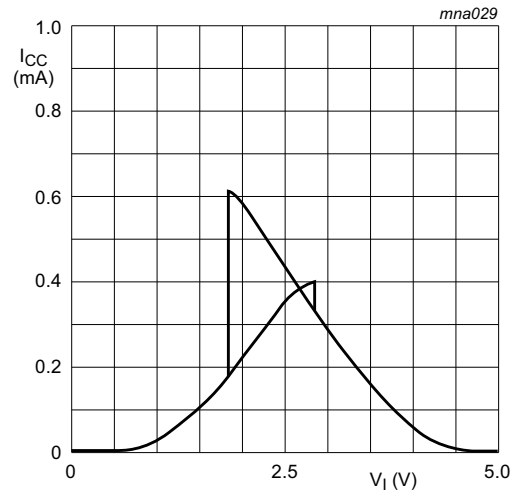
Symbol	Parameter	Conditions	25 °C			-40 °C to +125 °C			Unit
			Min	Typ	Max	Min	Max (85 °C)	Max (125 °C)	
<b>74HC2G14-Q100</b>									
V <sub>T+</sub>	positive-going threshold voltage	see <a href="#">Figure 7</a> and <a href="#">Figure 8</a>							
		V <sub>CC</sub> = 2.0 V	1.00	1.18	1.50	1.00	1.50	1.50	V
		V <sub>CC</sub> = 4.5 V	2.30	2.60	3.15	2.30	3.15	3.15	V
		V <sub>CC</sub> = 6.0 V	3.00	3.46	4.20	3.00	4.20	4.20	V
V <sub>T-</sub>	negative-going threshold voltage	see <a href="#">Figure 7</a> and <a href="#">Figure 8</a>							
		V <sub>CC</sub> = 2.0 V	0.30	0.60	0.90	0.30	0.90	0.90	V
		V <sub>CC</sub> = 4.5 V	1.13	1.47	2.00	1.13	2.00	2.00	V
		V <sub>CC</sub> = 6.0 V	1.50	2.06	2.60	1.50	2.60	2.60	V
V <sub>H</sub>	hysteresis voltage	(V <sub>T+</sub> - V <sub>T-</sub> ); see <a href="#">Figure 7</a> , <a href="#">Figure 8</a> and <a href="#">Figure 9</a>							
		V <sub>CC</sub> = 2.0 V	0.30	0.60	1.00	0.30	1.00	1.00	V
		V <sub>CC</sub> = 4.5 V	0.60	1.13	1.40	0.60	1.40	1.40	V
		V <sub>CC</sub> = 6.0 V	0.80	1.40	1.70	0.80	1.70	1.70	V
<b>74HCT2G14-Q100</b>									
V <sub>T+</sub>	positive-going threshold voltage	see <a href="#">Figure 7</a> and <a href="#">Figure 8</a>							
		V <sub>CC</sub> = 4.5 V	1.20	1.58	1.90	1.20	1.90	1.90	V
		V <sub>CC</sub> = 5.5 V	1.40	1.78	2.10	1.40	2.10	2.10	V
V <sub>T-</sub>	negative-going threshold voltage	see <a href="#">Figure 7</a> and <a href="#">Figure 8</a>							
		V <sub>CC</sub> = 4.5 V	0.50	0.87	1.20	0.50	1.20	1.20	V
		V <sub>CC</sub> = 5.5 V	0.60	1.11	1.40	0.60	1.40	1.40	V
V <sub>H</sub>	hysteresis voltage	(V <sub>T+</sub> - V <sub>T-</sub> ); see <a href="#">Figure 7</a> , <a href="#">Figure 8</a> and <a href="#">Figure 10</a>							
		V <sub>CC</sub> = 4.5 V	0.40	0.71	-	0.40	-	-	V
		V <sub>CC</sub> = 5.5 V	0.40	0.67	-	0.40	-	-	V

15. Waveforms transfer characteristics

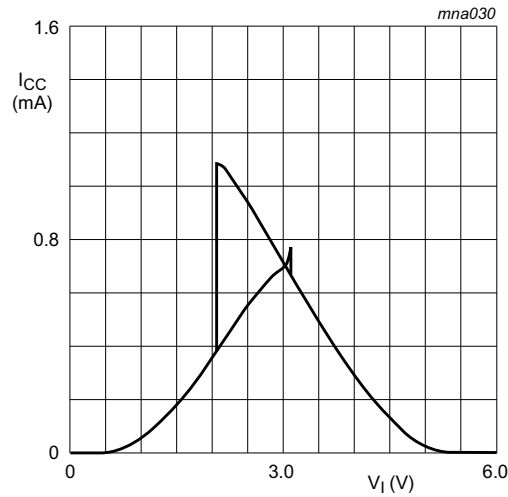




a.  $V_{CC} = 2.0\text{ V}$

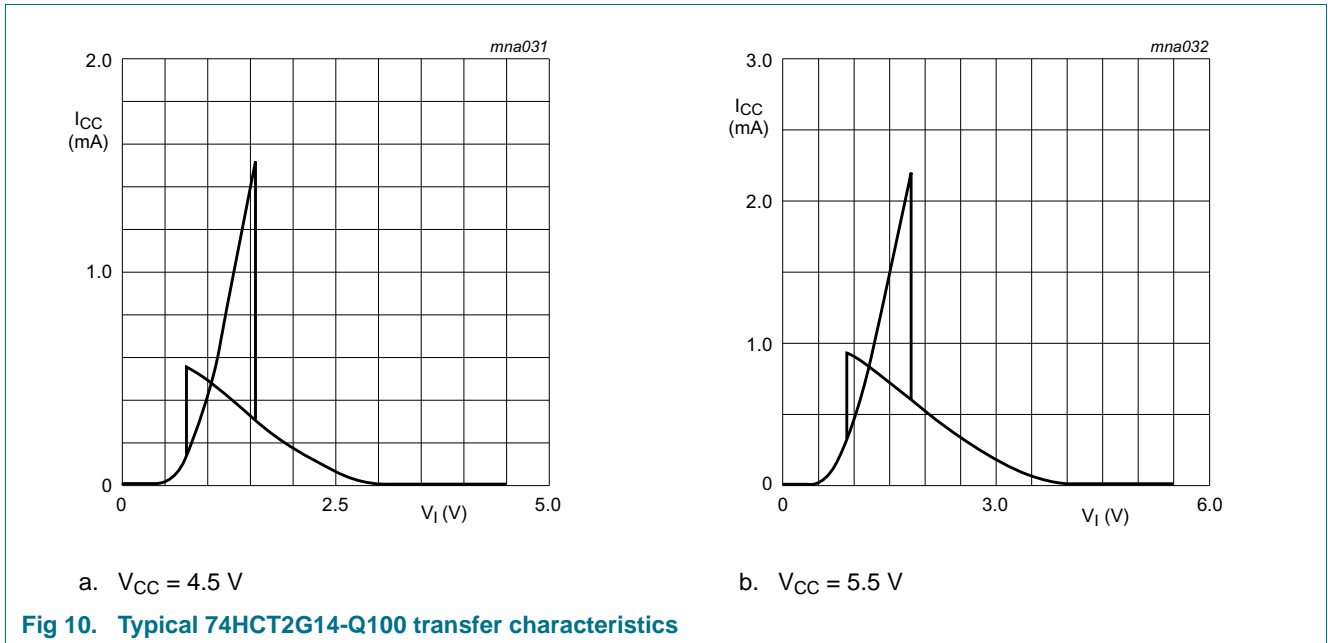


b.  $V_{CC} = 4.5\text{ V}$



c.  $V_{CC} = 6.0\text{ V}$

**Fig 9. Typical 74HC2G14-Q100 transfer characteristics**



## 16. Application information

The slow input rise and fall times cause additional power dissipation, this can be calculated using the following formula:

$$P_{\text{add}} = f_i \times (t_r \times \Delta I_{\text{CC(AV)}} + t_f \times \Delta I_{\text{CC(AV)}}) \times V_{\text{CC}} \text{ where:}$$

$P_{\text{add}}$  = additional power dissipation ( $\mu\text{W}$ );

$f_i$  = input frequency (MHz);

$t_r$  = input rise time (ns); 10 % to 90 %;

$t_f$  = input fall time (ns); 90 % to 10 %;

$\Delta I_{\text{CC(AV)}}$  = average additional supply current ( $\mu\text{A}$ ).

$\Delta I_{\text{CC(AV)}}$  differs with positive or negative input transitions, as shown in [Figure 11](#) and [Figure 12](#).

An example of a relaxation circuit using the 74HC2G14-Q100; 74HCT2G14-Q100 is shown in [Figure 13](#).

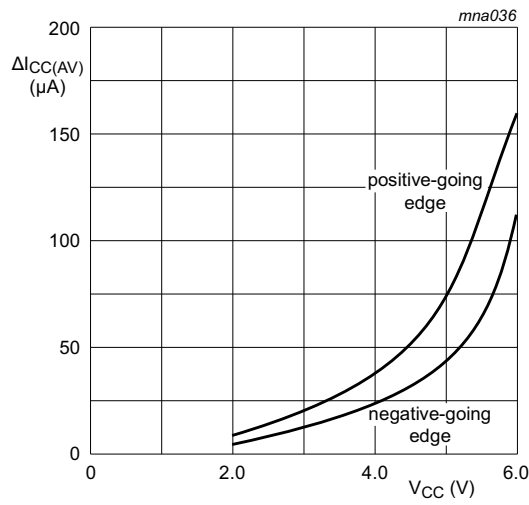


Fig 11.  $\Delta I_{CC(AV)}$  as a function of  $V_{CC}$  for 74HC2G14-Q100; linear change of  $V_I$  between  $0.1V_{CC}$  to  $0.9V_{CC}$

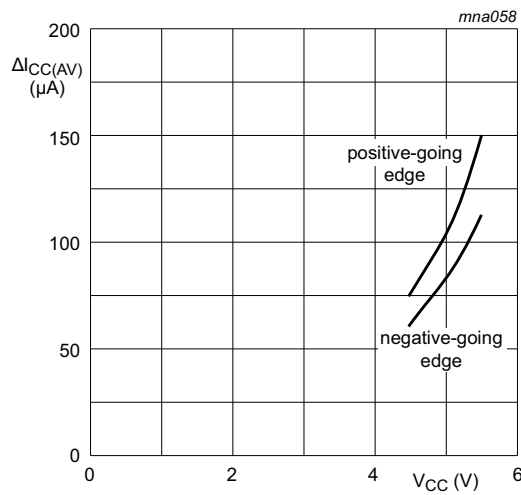
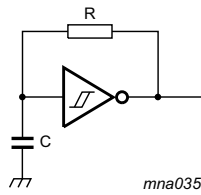


Fig 12.  $\Delta I_{CC(AV)}$  as a function of  $V_{CC}$  for 74HCT2G14-Q100; linear change of  $V_I$  between  $0.1V_{CC}$  to  $0.9V_{CC}$

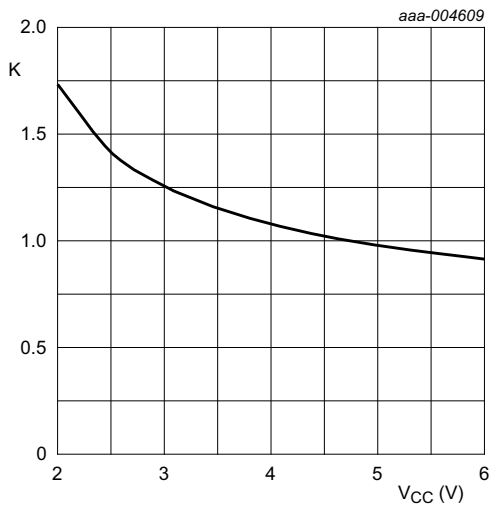


For 74HC2G14-Q100:  $f = \frac{1}{T} \approx \frac{1}{0.8 \times RC}$

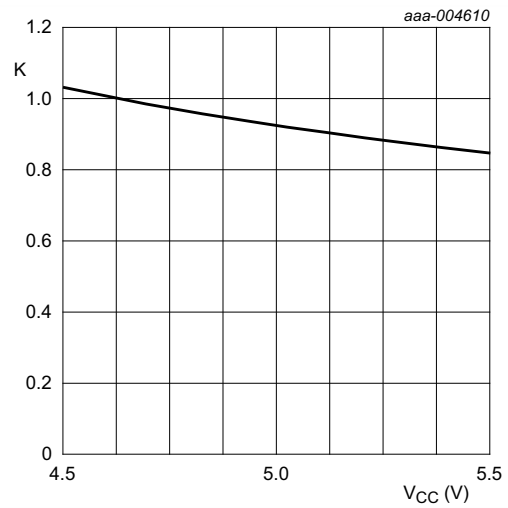
For 74HCT2G14-Q100:  $f = \frac{1}{T} \approx \frac{1}{0.67 \times RC}$

For K-factor, see [Figure 14](#)

**Fig 13. Relaxation oscillator**



a. K-factor for 74HC2G14-Q100



b. K-factor for 74HCT2G14-Q100

**Fig 14. Typical K-factor for relaxation oscillator**

17. Package outline

Plastic surface-mounted package; 6 leads

SOT363

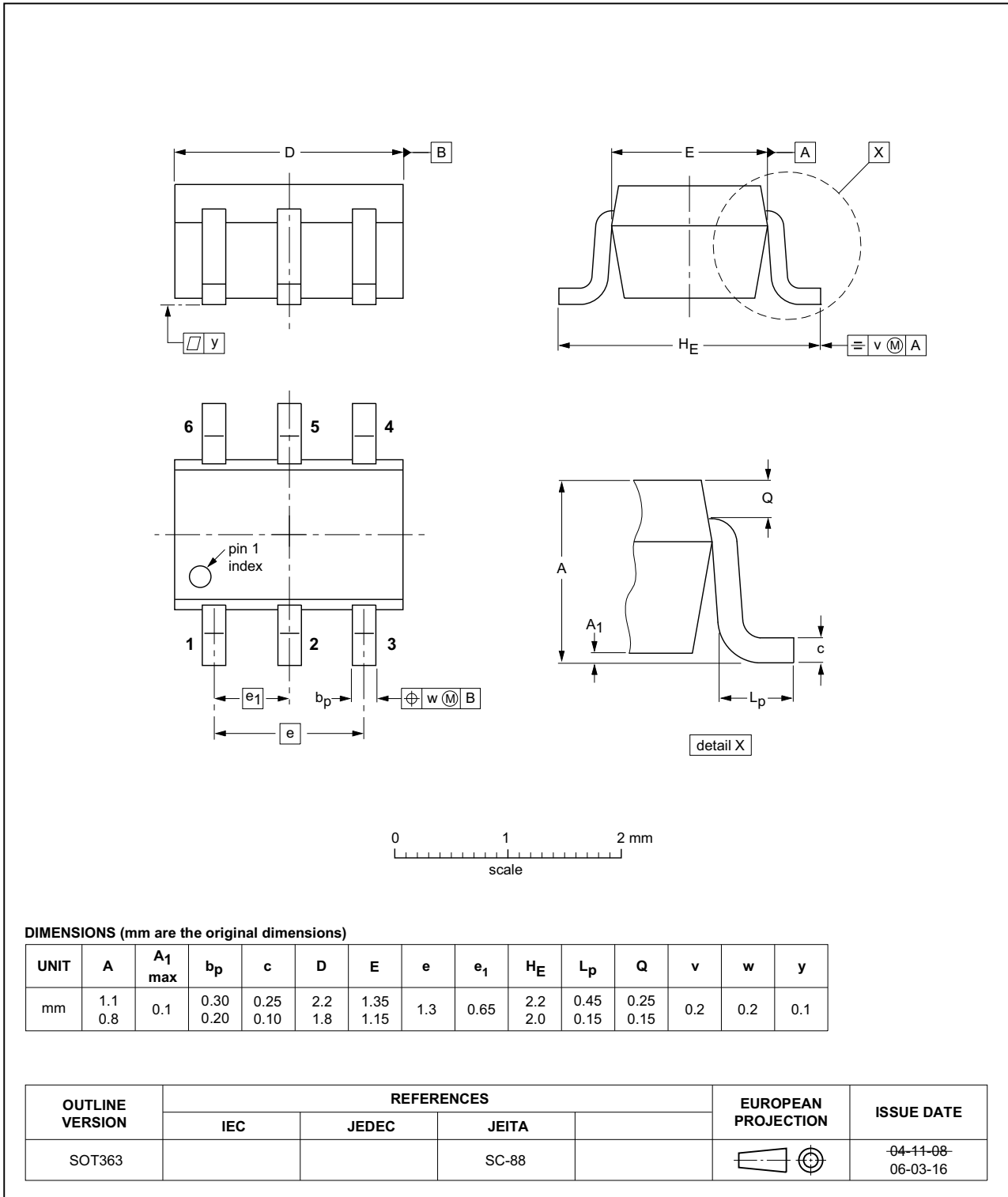


Fig 15. Package outline SOT363 (SC-88)

Plastic surface-mounted package (TSOP6); 6 leads

SOT457

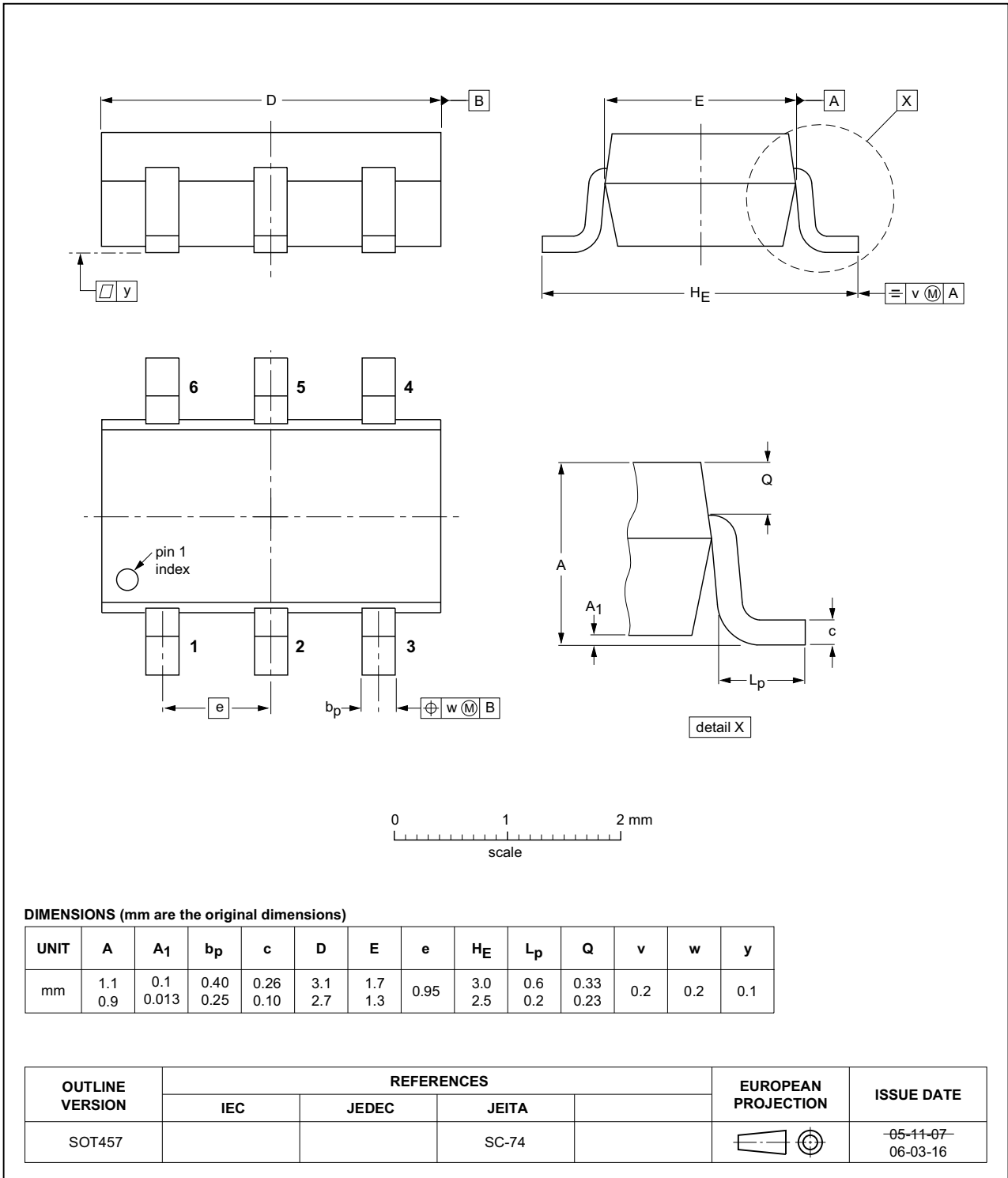


Fig 16. Package outline SOT457 (SC-74)

## 18. Abbreviations

**Table 13. Abbreviations**

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

## 19. Revision history

**Table 14. Revision history**

Document ID	Release date	Data sheet status	Change notice	Supersedes
74HC_HCT2G14_Q100 v.1	20140320	Product data sheet	-	-

## 20. Legal information

### 20.1 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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