

# 74HC4020-Q100; 74HCT4020-Q100

## 14-stage binary ripple counter

Rev. 1 — 23 May 2013

Product data sheet

## 1. General description

The 74HC4020-Q100; 74HCT4020-Q100 are 14-stage binary ripple counters with a clock input ( $\overline{CP}$ ), an overriding asynchronous master reset input (MR) and 12 buffered parallel outputs (Q0, and Q3 to Q13). The counter advances on the HIGH-to-LOW transition of  $\overline{CP}$ . A HIGH on MR clears all counter stages and forces all outputs LOW, independent of the state of  $\overline{CP}$ . Each counter stage is a static toggle flip-flop.. Inputs include clamp diodes. This enables the use of current limiting resistors to interface inputs to voltages in excess of  $V_{CC}$ .

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  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  and from  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$
- Input levels:
  - ◆ For 74HC4020-Q100: CMOS level
  - ◆ For 74HCT4020-Q100: TTL level
- Complies with JEDEC standard no. 7A
- 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

- Frequency dividing circuits
- Time delay circuits
- Control counters



## 4. Ordering information

Table 1. Ordering information

Type number	Package	Temperature range	Name	Description	Version
74HC4020D-Q100	SO16	−40 °C to +125 °C		plastic small outline package; 16 leads; body width 3.9 mm	SOT109-1
74HCT4020D-Q100					
74HC4020PW-Q100	TSSOP16	−40 °C to +125 °C		plastic thin shrink small outline package; 16 leads; body width 4.4 mm	SOT403-1
74HCT4020PW-Q100					
74HC4020BQ-Q100	DHVQFN16	−40 °C to +125 °C		plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 16 terminals; body 2.5 × 3.5 × 0.85 mm	SOT763-1
74HCT4020BQ-Q100					

## 5. Functional diagram

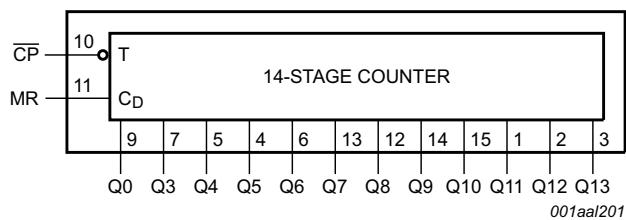


Fig 1. Functional diagram

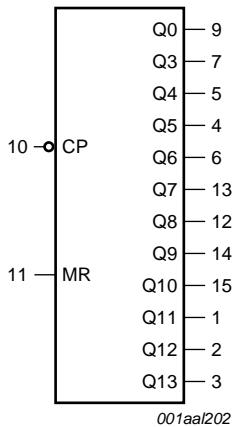


Fig 2. Logic symbol

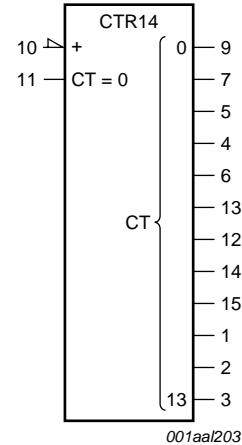


Fig 3. IEC logic symbol

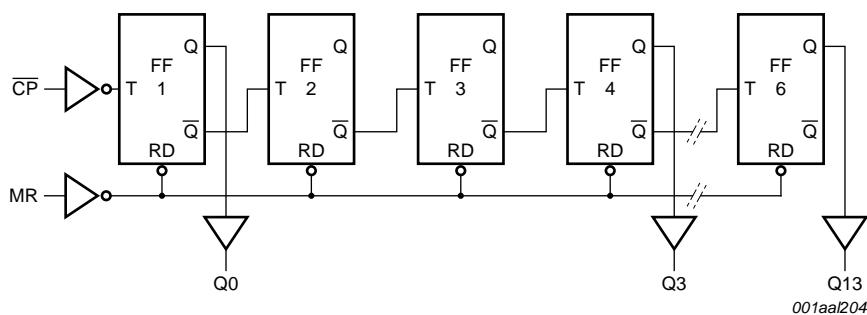


Fig 4. Logic diagram

## 6. Pinning information

### 6.1 Pinning

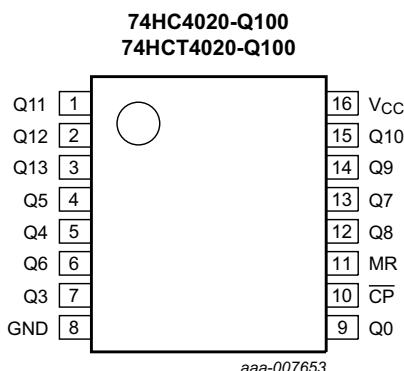


Fig 5. Pin configuration SO16 and TSSOP16

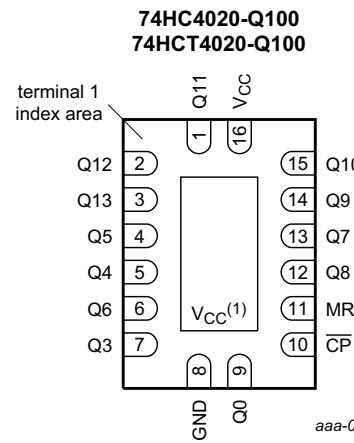


Fig 6. Pin configuration DHVQFN16

(1) This is not a supply pin. The substrate is attached to this pad using conductive die attach material. There is no electrical or mechanical requirement to solder this pad. However, if it is soldered, the solder land should remain floating or be connected to  $V_{CC}$ .

## 6.2 Pin description

Table 2. Pin description

Symbol	Pin	Description
Q0, Q3 to Q13	9, 7, 5, 4, 6, 13, 12, 14, 15, 1, 2, 3	output
GND	8	ground (0 V)
$\overline{CP}$	10	clock input (HIGH-to-LOW, edge-triggered)
MR	11	master reset input (active HIGH)
$V_{CC}$	16	positive supply voltage

## 7. Functional description

Table 3. Function table

Input		Output
$\overline{CP}$	MR	Q0, Q3 to Q13
↑	L	no change
↓	L	count
X	H	L

[1] H = HIGH voltage level; L = LOW voltage level; X = don't care; ↑ = LOW-to-HIGH clock transition; ↓ = HIGH-to-LOW clock transition.

## 7.1 Timing diagram

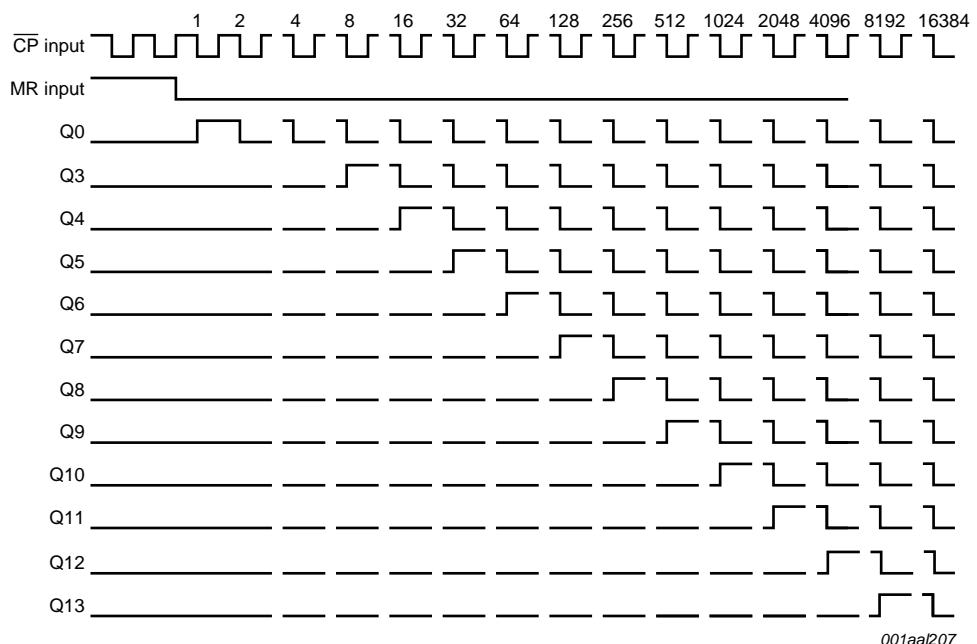


Fig 7. Timing diagram

## 8. Limiting values

**Table 4. Limiting values**

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

Symbol	Parameter	Conditions	Min	Max	Unit
V <sub>CC</sub>	supply voltage		-0.5	+7	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	-	±20	mA
I <sub>OK</sub>	output clamping current	V <sub>I</sub> < -0.5 V or V <sub>I</sub> > V <sub>CC</sub> + 0.5 V	-	±20	mA
I <sub>O</sub>	output current	-0.5 V < V <sub>O</sub> < V <sub>CC</sub> + 0.5 V	-	±25	mA
I <sub>CC</sub>	supply current		-	±50	mA
I <sub>GND</sub>	ground current		-	±50	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	[1]	-	500 mW

[1] For SO16 package: P<sub>tot</sub> derates linearly with 8 mW/K above 70 °C.

For TSSOP16 package: P<sub>tot</sub> derates linearly with 5.5 mW/K above 60 °C.

For DHVQFN16 package: P<sub>tot</sub> derates linearly with 4.5 mW/K above 60 °C.

## 9. Recommended operating conditions

**Table 5. Recommended operating conditions**

Symbol	Parameter	Conditions	74HC4020-Q100			74HCT4020-Q100			Unit
			Min	Typ	Max	Min	Typ	Max	
V <sub>CC</sub>	supply voltage		2.0	5.0	6.0	4.5	5.0	5.5	V
V <sub>I</sub>	input voltage		0	-	V <sub>CC</sub>	0	-	V <sub>CC</sub>	V
V <sub>O</sub>	output voltage		0	-	V <sub>CC</sub>	0	-	V <sub>CC</sub>	V
Δt/ΔV	input transition rise and fall rate	except for Schmitt trigger inputs							
		V <sub>CC</sub> = 2.0 V	-	-	625	-	-	-	ns/V
		V <sub>CC</sub> = 4.5 V	-	1.67	139	-	1.67	139	ns/V
		V <sub>CC</sub> = 6.0 V	-	-	83	-	-	-	ns/V
T <sub>amb</sub>	ambient temperature		-40	+25	+125	-40	+25	+125	°C

## 10. Static characteristics

**Table 6. Static characteristics**

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

Symbol	Parameter	Conditions	25 °C			−40 °C to +85 °C		−40 °C to +125 °C		Unit
			Min	Typ	Max	Min	Max	Min	Max	
<b>74HC4020-Q100</b>										
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 2.0 V	1.5	1.2	-	1.5	-	1.5	-	V
		V <sub>CC</sub> = 4.5 V	3.15	2.4	-	3.15	-	3.15	-	V
		V <sub>CC</sub> = 6.0 V	4.2	3.2	-	4.2	-	4.2	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 2.0 V	-	0.8	0.5	-	0.5	-	0.5	V
		V <sub>CC</sub> = 4.5 V	-	2.1	1.35	-	1.35	-	1.35	V
		V <sub>CC</sub> = 6.0 V	-	2.8	1.8	-	1.8	-	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	2.0	-	1.9	-	1.9	-	V
		I <sub>O</sub> = −20 μA; V <sub>CC</sub> = 4.5 V	4.4	4.5	-	4.4	-	4.4	-	V
		I <sub>O</sub> = −20 μA; V <sub>CC</sub> = 6.0 V	5.9	6.0	-	5.9	-	5.9	-	V
		I <sub>O</sub> = −4.0 mA; V <sub>CC</sub> = 4.5 V	3.98	4.32	-	3.84	-	3.7	-	V
		I <sub>O</sub> = −5.2 mA; V <sub>CC</sub> = 6.0 V	5.48	5.81	-	5.34	-	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	0.1	-	0.1	-	0.1	V
		I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 4.5 V	-	0	0.1	-	0.1	-	0.1	V
		I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 6.0 V	-	0	0.1	-	0.1	-	0.1	V
		I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 4.5 V	-	0.15	0.26	-	0.33	-	0.4	V
		I <sub>O</sub> = 5.2 mA; V <sub>CC</sub> = 6.0 V	-	0.16	0.26	-	0.33	-	0.4	V
I <sub>I</sub>	input leakage current	V <sub>I</sub> = V <sub>CC</sub> or GND; V <sub>CC</sub> = 6.0 V	-	-	±0.1	-	±1	-	±1	μA
I <sub>CC</sub>	supply current	V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 6.0 V	-	-	8.0	-	80	-	160	μA
C <sub>I</sub>	input capacitance		-	3.5	-	-	-	-	-	pF
<b>74HCT4020-Q100</b>										
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	2.0	1.6	-	2.0	-	2.0	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	-	1.2	0.8	-	0.8	-	0.8	V
V <sub>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 4.5 V								
		I <sub>O</sub> = −20 μA	4.4	4.5	-	4.4	-	4.4	-	V
		I <sub>O</sub> = −4.0 mA	3.98	4.32	-	3.84	-	3.7	-	V
V <sub>OL</sub>	LOW-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 4.5 V								
		I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 4.5 V	-	0	0.1	-	0.1	-	0.1	V
		I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 4.5 V	-	0.15	0.26	-	0.33	-	0.4	V
I <sub>I</sub>	input leakage current	V <sub>I</sub> = V <sub>CC</sub> or GND; V <sub>CC</sub> = 5.5 V	-	-	±0.1	-	±1	-	±1	μA

**Table 6. Static characteristics ...continued**

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

Symbol	Parameter	Conditions	25 °C			−40 °C to +85 °C		−40 °C to +125 °C		Unit
			Min	Typ	Max	Min	Max	Min	Max	
I <sub>CC</sub>	supply current	V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 5.5 V	-	-	8.0	-	80	-	160	μA
ΔI <sub>CC</sub>	additional supply current	V <sub>I</sub> = V <sub>CC</sub> − 2.1 V; I <sub>O</sub> = 0 A; other inputs at V <sub>CC</sub> or GND; V <sub>CC</sub> = 4.5 V to 5.5 V	pin MR		-	110	396	-	495	-
		pin $\overline{CP}$		-	85	306	-	383	-	417
				-	3.5	-	-	-	-	μA
C <sub>I</sub>	input capacitance		-	3.5	-	-	-	-	-	pF

## 11. Dynamic characteristics

**Table 7. Dynamic characteristics**GND (ground = 0 V); C<sub>L</sub> = 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	
			Min	Typ	Max	Min	Max	Min	Max		
<b>74HC4020-Q100</b>											
t <sub>pd</sub>	propagation delay	CP to Q <sub>0</sub> ; see <a href="#">Figure 8</a>	[1]								
		V <sub>CC</sub> = 2.0 V; C <sub>L</sub> = 50 pF	-	39	140	-	175	-	210	ns	
		V <sub>CC</sub> = 4.5 V; C <sub>L</sub> = 50 pF	-	14	28	-	35	-	42	ns	
		V <sub>CC</sub> = 5.0 V; C <sub>L</sub> = 15 pF	-	11	-	-	-	-	-	ns	
		V <sub>CC</sub> = 6.0 V; C <sub>L</sub> = 50 pF	-	11	24	-	30	-	36	ns	
		Q <sub>n</sub> to Q <sub>n+1</sub> ; see <a href="#">Figure 9</a>									
		V <sub>CC</sub> = 2.0 V; C <sub>L</sub> = 50 pF	-	22	75	-	95	-	110	ns	
		V <sub>CC</sub> = 4.5 V; C <sub>L</sub> = 50 pF	-	8	15	-	19	-	22	ns	
		V <sub>CC</sub> = 5.0 V; C <sub>L</sub> = 15 pF	-	6	-	-	-	-	-	ns	
		V <sub>CC</sub> = 6.0 V; C <sub>L</sub> = 50 pF	-	6	13	-	16	-	19	ns	
t <sub>PHL</sub>	HIGH to LOW propagation delay	MR to Q <sub>n</sub> ; see <a href="#">Figure 8</a>	[1]								
		V <sub>CC</sub> = 2.0 V; C <sub>L</sub> = 50 pF	-	55	170	-	215	-	225	ns	
		V <sub>CC</sub> = 4.5 V; C <sub>L</sub> = 50 pF	-	20	34	-	43	-	51	ns	
		V <sub>CC</sub> = 5.0 V; C <sub>L</sub> = 15 pF	-	17	-	-	-	-	-	ns	
t <sub>t</sub>	transition time	Q <sub>n</sub> ; see <a href="#">Figure 8</a>	[2]								
		V <sub>CC</sub> = 2.0 V; C <sub>L</sub> = 50 pF	-	19	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	-	6	13	-	16	-	19	ns	

Table 7. Dynamic characteristics ...continued

GND (ground = 0 V);  $C_L = 50 \text{ pF}$  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
			Min	Typ	Max	Min	Max	Min	Max	
$t_W$	pulse width	CP HIGH or LOW; see <a href="#">Figure 8</a>								
		$V_{CC} = 2.0 \text{ V}; C_L = 50 \text{ pF}$	80	14	-	100	-	120	-	ns
		$V_{CC} = 4.5 \text{ V}; C_L = 50 \text{ pF}$	16	4	-	20	-	24	-	ns
		$V_{CC} = 6.0 \text{ V}; C_L = 50 \text{ pF}$	14	3	-	17	-	20	-	ns
		MR HIGH; see <a href="#">Figure 8</a>								
		$V_{CC} = 2.0 \text{ V}; C_L = 50 \text{ pF}$	80	17	-	100	-	120	-	ns
		$V_{CC} = 4.5 \text{ V}; C_L = 50 \text{ pF}$	16	6	-	20	-	24	-	ns
		$V_{CC} = 6.0 \text{ V}; C_L = 50 \text{ pF}$	14	5	-	17	-	20	-	ns
		MR to CP; see <a href="#">Figure 8</a>								
		$V_{CC} = 2.0 \text{ V}; C_L = 50 \text{ pF}$	50	6	-	65	-	75	-	ns
$t_{rec}$	recovery time	$V_{CC} = 4.5 \text{ V}; C_L = 50 \text{ pF}$	10	2	-	13	-	15	-	ns
		$V_{CC} = 6.0 \text{ V}; C_L = 50 \text{ pF}$	9	2	-	11	-	13	-	ns
		see <a href="#">Figure 8</a>								
		$V_{CC} = 2.0 \text{ V}; C_L = 50 \text{ pF}$	6.0	30	-	4.8	-	4.0	-	MHz
$f_{max}$	maximum frequency	$V_{CC} = 4.5 \text{ V}; C_L = 50 \text{ pF}$	30	92	-	24	-	20	-	MHz
		$V_{CC} = 5.0 \text{ V}; C_L = 15 \text{ pF}$	-	101	-	-	-	-	-	MHz
		$V_{CC} = 6.0 \text{ V}; C_L = 50 \text{ pF}$	35	109	-	28	-	24	-	MHz
		[3]	-	19	-	-	-	-	-	pF
$C_{PD}$	power dissipation capacitance									

## 74HCT4020-Q100

$t_{pd}$	propagation delay	CP to Q0; see <a href="#">Figure 8</a>	[1]							
		$V_{CC} = 4.5 \text{ V}; C_L = 50 \text{ pF}$	-	18	36	-	45	-	54	ns
		$V_{CC} = 5.0 \text{ V}; C_L = 15 \text{ pF}$	-	15	-	-	-	-	-	ns
		Qn to Qn+1; see <a href="#">Figure 9</a>								
		$V_{CC} = 4.5 \text{ V}; C_L = 50 \text{ pF}$	-	8	15	-	19	-	22	ns
$t_{PHL}$	HIGH to LOW propagation delay	$V_{CC} = 5.0 \text{ V}; C_L = 15 \text{ pF}$	-	6	-	-	-	-	-	ns
		MR to Qn; see <a href="#">Figure 8</a>								
		$V_{CC} = 4.5 \text{ V}; C_L = 50 \text{ pF}$	-	22	45	-	56	-	68	ns
$t_t$	transition time	$V_{CC} = 5.0 \text{ V}; C_L = 15 \text{ pF}$	-	19	-	-	-	-	-	ns
		Qn; see <a href="#">Figure 8</a>	[2]							
		$V_{CC} = 4.5 \text{ V}; C_L = 50 \text{ pF}$	-	7	15	-	19	-	22	ns
$t_W$	pulse width	CP HIGH or LOW; see <a href="#">Figure 8</a>								
		$V_{CC} = 4.5 \text{ V}; C_L = 50 \text{ pF}$	20	7	-	25	-	30	-	ns
		MR HIGH; see <a href="#">Figure 8</a>								
		$V_{CC} = 4.5 \text{ V}; C_L = 50 \text{ pF}$	20	8	-	25	-	30	-	ns
$t_{rec}$	recovery time	MR to CP; see <a href="#">Figure 8</a>								
		$V_{CC} = 4.5 \text{ V}; C_L = 50 \text{ pF}$	10	2	-	13	-	15	-	ns

Table 7. Dynamic characteristics ...continued

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
			Min	Typ	Max	Min	Max	Min	Max	
$f_{max}$	maximum frequency	see <a href="#">Figure 8</a> $V_{CC} = 4.5$ V; $C_L = 50$ pF $V_{CC} = 5.0$ V; $C_L = 15$ pF	25	47	-	20	-	17	-	MHz
			-	52	-	-	-	-	-	MHz
$C_{PD}$	power dissipation capacitance	[3]	-	20	-	-	-	-	-	pF

[1]  $t_{pd}$  is the same as  $t_{PHL}$  and  $t_{PLH}$ .[2]  $t_t$  is the same as  $t_{THL}$  and  $t_{TLH}$ .[3]  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu$ W).

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

 $f_i$  = input frequency in MHz; $f_o$  = output frequency in MHz; $\sum (C_L \times V_{CC}^2 \times f_o)$  = sum of outputs; $C_L$  = output load capacitance in pF; $V_{CC}$  = supply voltage in V.

## 12. Waveforms

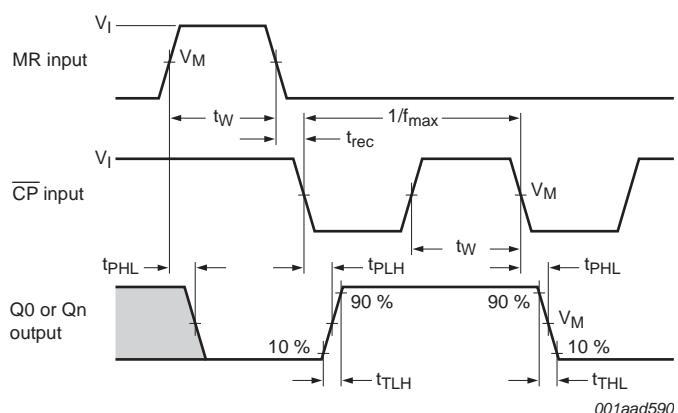
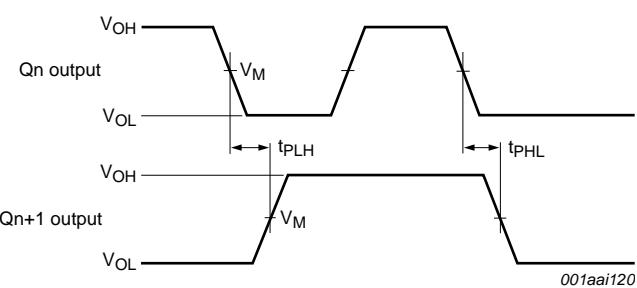
Measurement points are given in [Table 8](#). $V_{OL}$  and  $V_{OH}$  are typical voltage output levels that occur with the output load.

Fig 8. Clock timing, propagation delays, pulse widths and measurement points



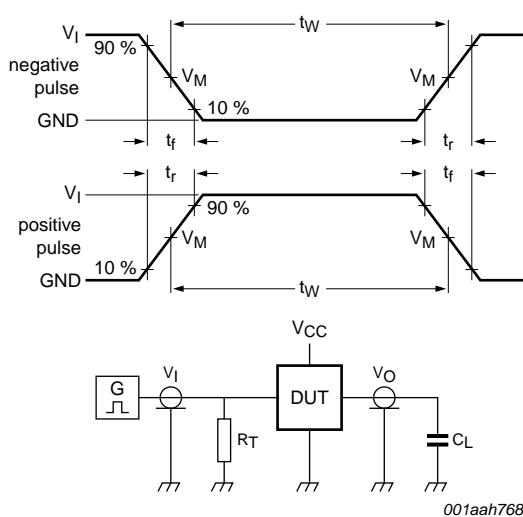
Measurement points are given in [Table 8](#).

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

**Fig 9. Waveforms showing the output Qn to output Qn+1 propagation delays**

**Table 8. Measurement points**

Type	Input	Output
	$V_M$	$V_M$
74HC4020-Q100	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$
74HCT4020-Q100	1.3 V	1.3 V



Test data is given in [Table 9](#).

Definitions test circuit:

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

$C_L$  = Load capacitance including jig and probe capacitance.

**Fig 10. Test circuit for measuring switching times**

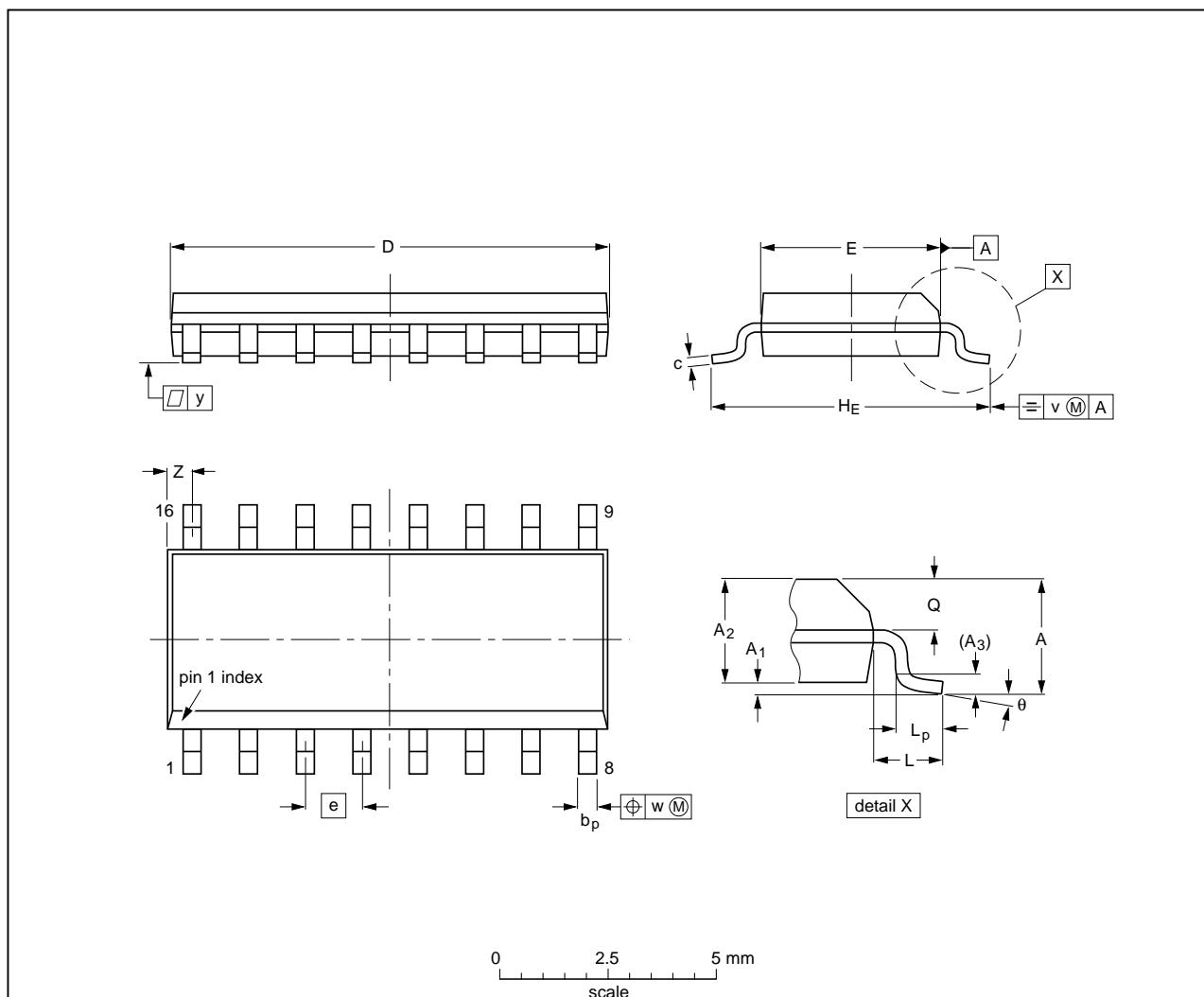
**Table 9. Test data**

Type	Input	Load
	$V_I$	$t_r, t_f$
74HC4020-Q100	$V_{CC}$	6 ns 15 pF, 50 pF
74HCT4020-Q100	3 V	6 ns 15 pF, 50 pF

## 13. Package outline

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

SOT109-1



### DIMENSIONS (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	b <sub>p</sub>	c	D <sup>(1)</sup>	E <sup>(1)</sup>	e	H <sub>E</sub>	L	L <sub>p</sub>	Q	v	w	y	Z <sup>(1)</sup>	θ
mm	1.75 0.10	0.25 0.10	1.45 1.25	0.25	0.49 0.36	0.25 0.19	10.0 9.8	4.0 3.8	1.27	6.2 5.8	1.05	1.0 0.4	0.7 0.6	0.25	0.25	0.1	0.7 0.3	8° 0°
inches	0.069 0.004	0.010 0.004	0.057 0.049	0.01	0.019 0.014	0.0100 0.0075	0.39 0.38	0.16 0.15	0.05	0.244 0.228	0.041	0.039 0.016	0.028 0.020	0.01	0.01	0.004	0.028 0.012	0°

### Note

1. Plastic or metal protrusions of 0.15 mm (0.006 inch) maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT109-1	076E07	MS-012				99-12-27 03-02-19

Fig 11. Package outline SOT109-1 (SO16)

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

SOT403-1

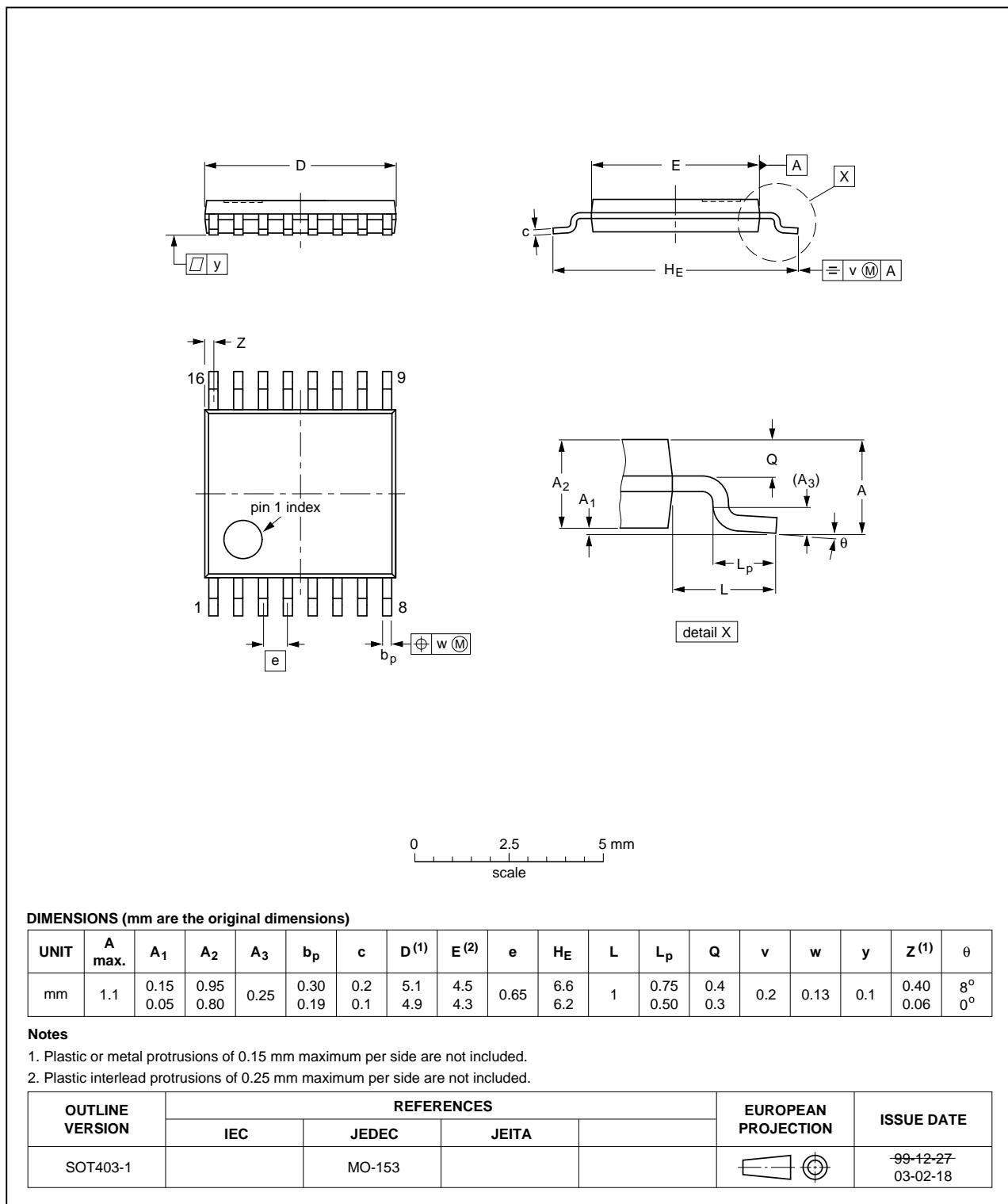


Fig 12. Package outline SOT403-1 (TSSOP16)

DHVQFN16: plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads;  
16 terminals; body 2.5 x 3.5 x 0.85 mm

SOT763-1

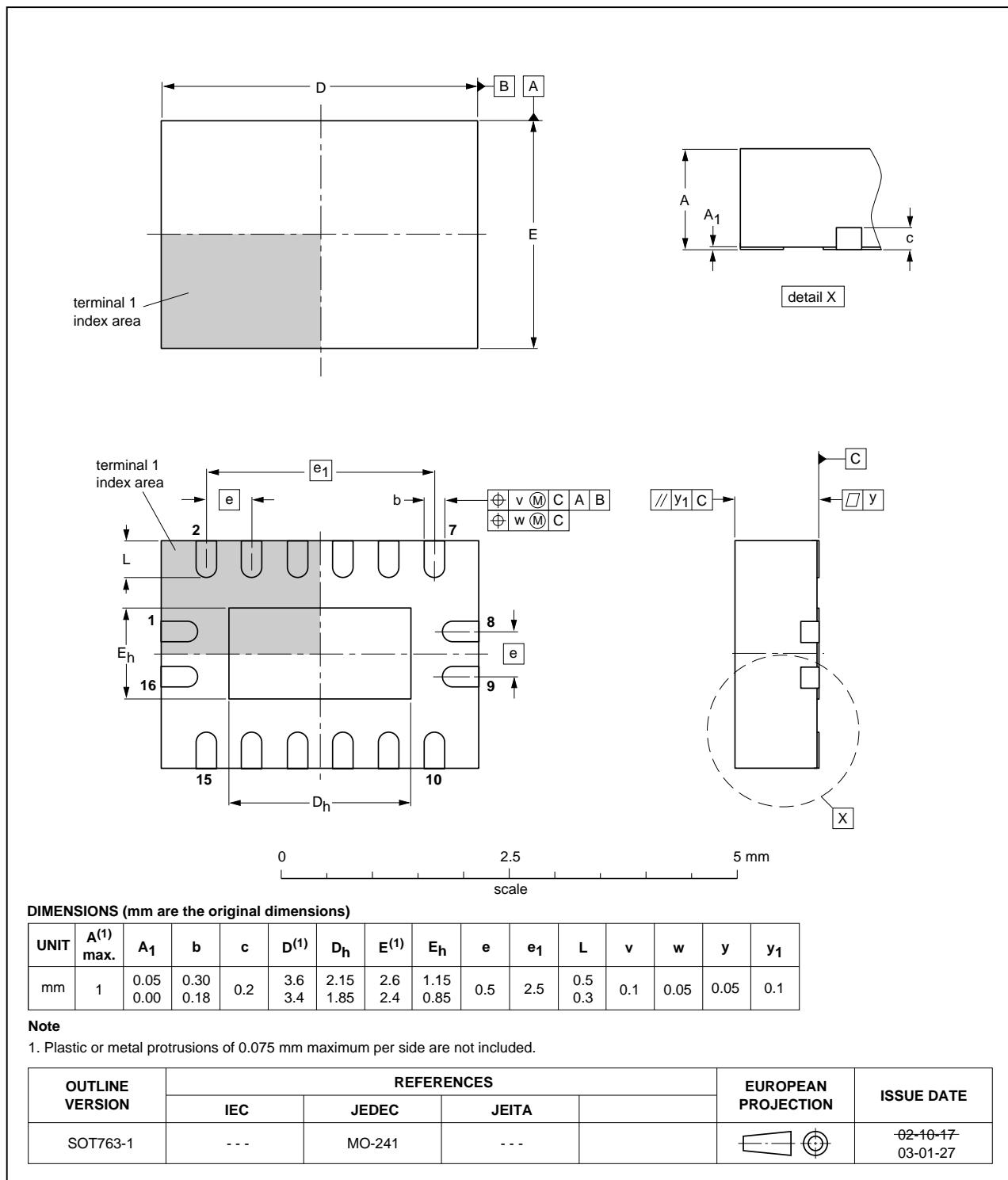


Fig 13. Package outline SOT763-1 (DHVQFN16)

## 14. Abbreviations

**Table 10. 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

## 15. Revision history

**Table 11. Revision history**

Document ID	Release date	Data sheet status	Change notice	Supersedes
74HC_HCT4020_Q100 v.1	20130523	Product data sheet	-	-

## 16. Legal information

### 16.1 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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