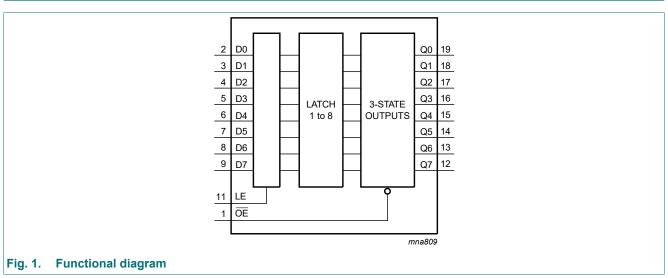
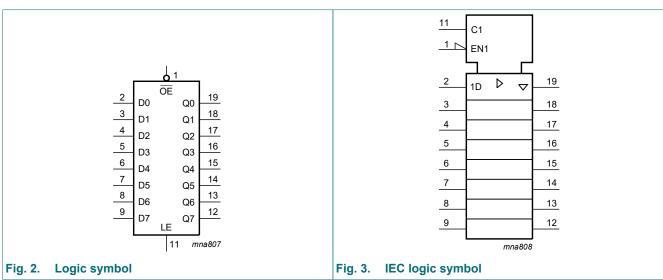
# 3. Ordering information

**Table 1. Ordering information** 

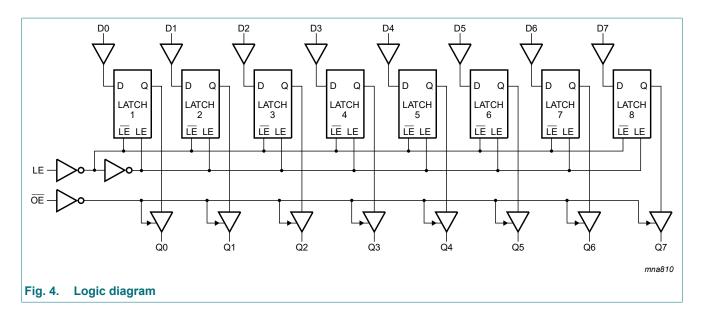
Type number	Package			
	Temperature range	Name	Description	Version
74AHC573D-Q100	-40 °C to +125 °C	SO20	plastic small outline package; 20 leads;	SOT163-1
74AHCT573D-Q100			body width 7.5 mm	
74AHC573PW-Q100	-40 °C to +125 °C	TSSOP20	plastic thin shrink small outline package;	SOT360-1
74AHCT573PW-Q100			20 leads; body width 4.4 mm	
74AHC573BQ-Q100	-40 °C to +125 °C	DHVQFN20	plastic dual in-line compatible	SOT764-1
74AHCT573BQ-Q100			thermal enhanced very thin quad flat package; no leads; 20 terminals; body 2.5 × 4.5 × 0.85 mm	

# 4. Functional diagram



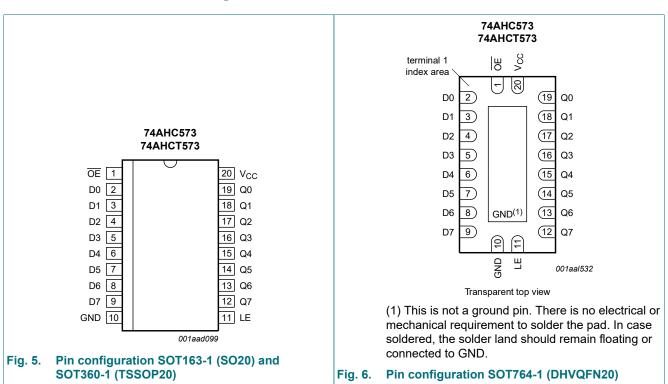


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### 5. Pinning information

### 5.1. Pinning



### 5.2. Pin description

### Table 2. Pin description

Symbol	Pin	Description
ŌĒ	1	output enable input (active LOW)
D0 to D7	2, 3, 4, 5, 6, 7, 8, 9	data input
GND	10	ground (0 V)
LE	11	latch enable (active HIGH)
Q0 to Q7	19, 18, 17, 16, 15, 14, 13, 12	data output
V <sub>CC</sub>	20	supply voltage

# 6. Functional description

#### Table 3. Function table

H = HIGH voltage level; h = HIGH voltage level one set-up time prior to the HIGH-to-LOW LE transition;

L = LOW voltage level; I = LOW voltage level one set-up time prior to the HIGH-to-LOW LE transition;

Z = high-impedance OFF-state.

Operating mode	Input			Internal latch	Output
	OE	LE	Dn		Qn
Enable and read register (transparent mode)	L	Н	L	L	L
			H	Н	Н
Latch and read register	L	L	I	L	L
			h	Н	Н
Latch register and disable outputs	Н	L	I	L	Z
			h	Н	Z

# 7. 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	+7.0	V
VI	input voltage			-0.5	+7.0	V
I <sub>IK</sub>	input clamping current	V <sub>I</sub> < -0.5 V	[1]	-20	-	mA
I <sub>OK</sub>	output clamping current	$V_{O}$ < -0.5 V or $V_{O}$ > $V_{CC}$ + 0.5 V	[1]	-20	+20	mA
Io	output current	$V_{O} = -0.5 \text{ V to } (V_{CC} + 0.5 \text{ V})$		-25	+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	[2]	-	500	mW

<sup>[1]</sup> The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

<sup>[2]</sup> For SOT163-1 (SO20) package: P<sub>tot</sub> derates linearly with 12.3 mW/K above 109 °C. For SOT360-1 (TSSOP20) package: P<sub>tot</sub> derates linearly with 10.0 mW/K above 100 °C. For SOT764-1 (DHVQFN20) package: P<sub>tot</sub> derates linearly with 12.9 mW/K above 111 °C.

# 8. Recommended operating conditions

#### Table 5. Recommended operating conditions

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

Symbol	Parameter	Conditions	74A	HC573-C	100	74AI	Q100	Unit	
			Min	Тур	Max	Min	Тур	Max	
V <sub>CC</sub>	supply voltage		2.0	5.0	5.5	4.5	5.0	5.5	V
VI	input voltage		0	-	5.5	0	-	5.5	V
Vo	output voltage		0	-	V <sub>CC</sub>	0	-	V <sub>CC</sub>	V
T <sub>amb</sub>	ambient temperature		-40	+25	+125	-40	+25	+125	°C
Δt/ΔV	input transition rise and	$V_{CC} = 3.3 \text{ V} \pm 0.3 \text{ V}$	-	-	100	-	-	-	ns/V
	fall rate	V <sub>CC</sub> = 5.0 V ± 0.5 V	-	-	20	-	-	20	ns/V

### 9. 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	Тур	Max	Min	Max	Min	Тур	Max	
74AHC5	73-Q100			'	'						'
V <sub>IH</sub>	HIGH-level	V <sub>CC</sub> = 2.0 V	1.5	-	-	1.5	-	1.5	-	-	V
	input voltage	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	V <sub>CC</sub> = 2.0 V	-	-	0.5	-	0.5	-	-	0.5	V
	input voltage	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
V <sub>OH</sub>	HIGH-level	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>									
	output voltage	I <sub>O</sub> = -50 μA; V <sub>CC</sub> = 2.0 V	1.9	2.0	-	1.9	-	1.9	-	-	V
		I <sub>O</sub> = -50 μA; V <sub>CC</sub> = 3.0 V	2.9	3.0	-	2.9	-	2.9	-	-	V
		I <sub>O</sub> = -50 μA; V <sub>CC</sub> = 4.5 V	4.4	4.5	-	4.4	-	4.4	-	-	V
		$I_{O}$ = -4.0 mA; $V_{CC}$ = 3.0 V	2.58	-	-	2.48	-	2.40	-	-	V
		$I_{O}$ = -8.0 mA; $V_{CC}$ = 4.5 V	3.94	-	-	3.80	-	3.70	-	-	V
V <sub>OL</sub>	LOW-level	$V_I = V_{IH}$ or $V_{IL}$									
	output voltage	I <sub>O</sub> = 50 μA; V <sub>CC</sub> = 2.0 V	-	0	0.1	-	0.1	-	-	0.1	V
		$I_{O} = 50 \mu A; V_{CC} = 3.0 V$	-	0	0.1	-	0.1	-	-	0.1	V
		I <sub>O</sub> = 50 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> = 3.0 V	-	-	0.36	-	0.44	-	-	0.55	V
		I <sub>O</sub> = 8.0 mA; V <sub>CC</sub> = 4.5 V	-	-	0.36	-	0.44	-	-	0.55	V
I <sub>OZ</sub>	OFF-state output current	$V_I = V_{IH}$ or $V_{IL}$ ; $V_O = V_{CC}$ or GND; $V_{CC} = 5.5 \text{ V}$	-	-	±0.25	-	±2.5	-	-	±10.0	μΑ
I <sub>I</sub>	input leakage current	$V_I = V_{CC}$ or GND; $V_{CC} = 0$ V to 5.5 V	-	-	0.1	-	1.0	-	-	2.0	μΑ
I <sub>CC</sub>	supply current	$V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 5.5 \text{ V}$	-	-	4.0	-	40	-	-	80	μΑ

Symbol	Parameter	Conditions		25 °C		-40 °C	to +85 °C	-40 °C to +125 °C			Unit
			Min	Тур	Max	Min	Max	Min	Тур	Max	
Cı	input capacitance	V <sub>I</sub> = V <sub>CC</sub> or GND	-	3	10	-	10	-	-	10	pF
Co	output capacitance		-	4	-	-	-	-	-	10	pF
74AHCT	573-Q100						1		1		
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
V <sub>OH</sub>	HIGH-level	$V_I = V_{IH}$ or $V_{IL}$ ; $V_{CC} = 4.5 \text{ V}$									
	output voltage	I <sub>O</sub> = -50 μA	4.4	4.5	-	4.4	-	4.4	-	-	V
		I <sub>O</sub> = -8.0 mA	3.94	-	-	3.80	-	3.70	-	-	V
V <sub>OL</sub>	LOW-level	$V_I = V_{IH}$ or $V_{IL}$ ; $V_{CC} = 4.5 \text{ V}$									
	output voltage	I <sub>O</sub> = 50 μA	-	0	0.1	-	0.1	-	-	0.1	V
		I <sub>O</sub> = 8.0 mA	-	-	0.36	-	0.44	-	-	0.55	V
I <sub>OZ</sub>	OFF-state output current	$V_I = V_{IH}$ or $V_{IL}$ ; $V_O = V_{CC}$ or GND; $V_{CC} = 5.5 \text{ V}$	-	-	±0.25	-	±2.5	-	-	±10.0	μA
I <sub>I</sub>	input leakage current	V <sub>I</sub> = 5.5 V or GND; V <sub>CC</sub> = 0 V to 5.5 V	-	-	0.1	-	1.0	-	-	2.0	μΑ
I <sub>CC</sub>	supply current	$V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 5.5 \text{ V}$	-	-	4.0	-	40	-	-	80	μΑ
ΔI <sub>CC</sub>	additional supply current	per input pin; $V_I = V_{CC} - 2.1 \text{ V}; I_O = 0 \text{ A};$ other pins at $V_{CC}$ or GND; $V_{CC} = 4.5 \text{ V}$ to 5.5 V	-	-	1.35	-	1.5	-	-	1.5	mA
Cı	input capacitance	V <sub>I</sub> = V <sub>CC</sub> or GND	-	3	10	-	10	-	-	10	pF
Co	output capacitance		-	4	-	-	-	-	-	10	pF

# 10. Dynamic characteristics

#### **Table 7. Dynamic characteristics**

Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 11.

Symbol	Parameter	Conditions		25 °C		-40 °C	to +85 °C	-40 °C to +125 °C		Unit
			Mir	Typ[1]	Max	Min	Max	Min	Max	
74AHC5	73-Q100		<u> </u>	<u> </u>		ı	1	<u> </u>	l	
t <sub>pd</sub>	propagation	Dn to Qn; see Fig. 7	[2]							T
	delay	V <sub>CC</sub> = 3.0 V to 3.6 V								
		C <sub>L</sub> = 15 pF	-	5.5	11.0	1.0	13.0	1.0	14.0	ns
		C <sub>L</sub> = 50 pF	_	7.8	14.5	1.0	16.5	1.0	18.5	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V								
		C <sub>L</sub> = 15 pF	-	3.9	6.8	1.0	8.0	1.0	8.5	ns
		C <sub>L</sub> = 50 pF	_	5.5	8.8	1.0	10.0	1.0	11.0	ns
		LE to Qn; see Fig. 8	[2]							
		V <sub>CC</sub> = 3.0 V to 3.6 V								
		C <sub>L</sub> = 15 pF	-	5.8	11.9	1.0	14.0	1.0	15.0	ns
		C <sub>L</sub> = 50 pF	-	8.3	15.4	1.0	17.5	1.0	19.5	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V								+
		C <sub>L</sub> = 15 pF	-	4.2	7.7	1.0	9.0	1.0	10.0	ns
		C <sub>L</sub> = 50 pF	-	5.9	9.7	1.0	11.0	1.0	12.5	ns
t <sub>en</sub>	enable time	OE to Qn; see Fig. 9	[3]							
		V <sub>CC</sub> = 3.0 V to 3.6 V								
		C <sub>L</sub> = 15 pF	-	5.8	11.5	1.0	13.5	1.0	14.5	ns
		C <sub>L</sub> = 50 pF	-	8.3	15.0	1.0	17.0	1.0	19.0	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V								
		C <sub>L</sub> = 15 pF	-	4.4	7.7	1.0	9.0	1.0	10.0	ns
		C <sub>1</sub> = 50 pF	-	6.3	9.7	1.0	11.0	1.0	12.5	ns
t <sub>dis</sub>	disable time	OE to Qn; see Fig. 9	[4]							
4.5		V <sub>CC</sub> = 3.0 V to 3.6 V								
		C <sub>L</sub> = 15 pF	-	6.8	11.0	1.0	13.0	1.0	14.0	ns
		C <sub>L</sub> = 50 pF	-	9.7	14.5	1.0	16.5	1.0	18.5	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V								
		C <sub>L</sub> = 15 pF	-	4.6	7.7	1.0	9.0	1.0	10.0	ns
		C <sub>L</sub> = 50 pF	-	7.4	9.7	1.0	11.0	1.0	12.5	ns
t <sub>W</sub>	pulse width	LE HIGH; see Fig. 8								
	·	V <sub>CC</sub> = 3.0 V to 3.6 V	5.0	-	-	5.0	-	5.0	-	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V	5.0	-	_	5.0	-	5.0	-	ns
t <sub>su</sub>	set-up time	Dn to LE; see Fig. 10								
		V <sub>CC</sub> = 3.0 V to 3.6 V	3.5	-	_	3.5	-	3.5	-	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V	3.5		-	3.5	-	3.5	-	ns
t <sub>h</sub>	hold time	Dn to LE; see Fig. 10								+
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.5	-	-	1.5	-	1.5	-	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V	1.5		_	1.5	_	1.5	_	ns

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Symbol	Parameter	Conditions		25 °C		-40 °C	to +85 °C	-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	Min	Max	
C <sub>PD</sub>	power dissipation capacitance	$f_i = 1 \text{ MHz};$ [5 $V_I = GND \text{ to } V_{CC}$	-	12	-	-	-	-	-	pF
74AHCT	573-Q100; V <sub>C</sub>	<sub>C</sub> = 4.5 V to 5.5 V							'	
t <sub>pd</sub>	propagation	Dn to Qn; see Fig. 7 [2	]							
	delay	C <sub>L</sub> = 15 pF	-	3.5	5.5	1	6.5	1	7.0	ns
		C <sub>L</sub> = 50 pF	-	4.9	7.5	1	8.5	1	9.5	ns
		LE to Qn; see Fig. 8 [2	]							
		C <sub>L</sub> = 15 pF	-	3.9	6.0	1	7.0	1	7.5	ns
		C <sub>L</sub> = 50 pF	-	5.5	8.5	1	9.5	1	11.0	ns
t <sub>en</sub>	enable time	OE to Qn; see Fig. 9 [3	]							
		C <sub>L</sub> = 15 pF	-	4.1	6.5	1	7.5	1	8.5	ns
		C <sub>L</sub> = 50 pF	-	5.9	8.5	1	10.0	1	11.0	ns
t <sub>dis</sub>	disable time	OE to Qn; see Fig. 9 [4	]							
		C <sub>L</sub> = 15 pF	-	4.5	6.5	1	7.5	1	8.5	ns
		C <sub>L</sub> = 50 pF	-	6.4	9.0	1	10.0	1	11.5	ns
t <sub>W</sub>	pulse width	LE HIGH; see Fig. 8	5.0	-	-	5.0	-	5.0	-	ns
t <sub>su</sub>	set-up time	Dn to LE; see Fig. 10	3.5	-	-	3.5	-	3.5	-	ns
t <sub>h</sub>	hold time	Dn to LE; see Fig. 10	1.5	-	-	1.5	-	1.5	-	ns
C <sub>PD</sub>	power dissipation capacitance	$f_i = 1 \text{ MHz};$ [5 $V_I = GND \text{ to } V_{CC}$	-	18	-	-	-	-	-	pF

- Typical values are measured at nominal supply voltage ( $V_{CC}$  = 3.3 V and  $V_{CC}$  = 5.0 V).
- [2]  $t_{\text{pd}}$  is the same as  $t_{\text{PHL}}$  and  $t_{\text{PLH}}.$
- $\dot{t}_{en}$  is the same as  $t_{PZH}$  and  $t_{PZL}$ . [3]
- $t_{\text{dis}}$  is the same as  $t_{\text{PHZ}}$  and  $t_{\text{PLZ}}$ .
- $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu W$ ).

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

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

### 10.1. Waveforms and test circuit

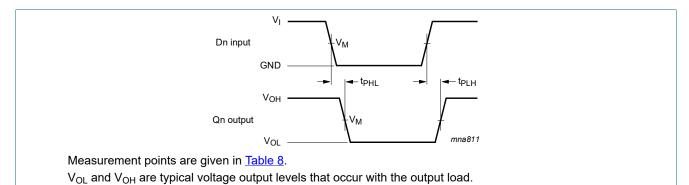
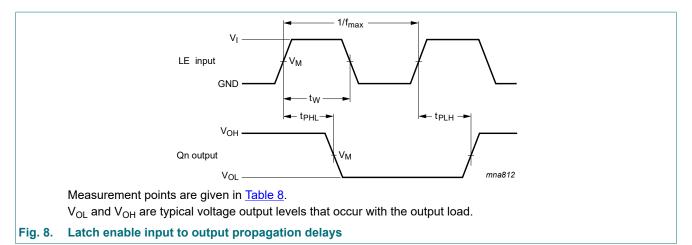


Fig. 7. Data input to output propagation delays



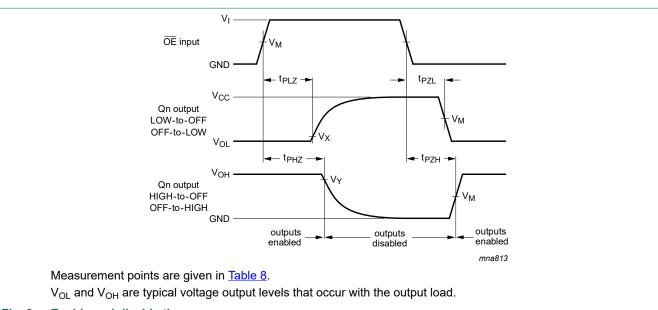
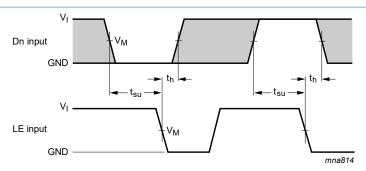


Fig. 9. Enable and disable times

**Product data sheet** 



Measurement points are given in <u>Table 8</u>.

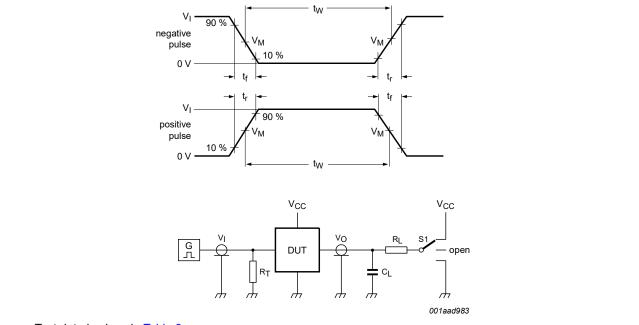
 $V_{\text{OL}}$  and  $V_{\text{OH}}$  are typical voltage output levels that occur with the output load.

The shaded areas indicate when the input is permitted to change for predicable output performance.

Fig. 10. Data set-up and hold times

**Table 8. Measurement points** 

Туре	Input	Output								
	V <sub>M</sub>	V <sub>M</sub>	V <sub>X</sub>	V <sub>Y</sub>						
74AHC573-Q100	0.5 x V <sub>CC</sub>	0.5 x V <sub>CC</sub>	V <sub>OL</sub> + 0.3 V	V <sub>OH</sub> - 0.3 V						
74AHCT573-Q100	1.5 V	0.5 x V <sub>CC</sub>	V <sub>OL</sub> + 0.3 V	V <sub>OH</sub> - 0.3 V						



Test data is given in Table 9.

Definitions test circuit:

 $R_T$  = termination resistance should be equal to output impedance  $Z_0$  of the pulse generator.

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

R<sub>L</sub> = load resistance.

S1 = test selection switch.

Fig. 11. Test circuit for measuring switching times

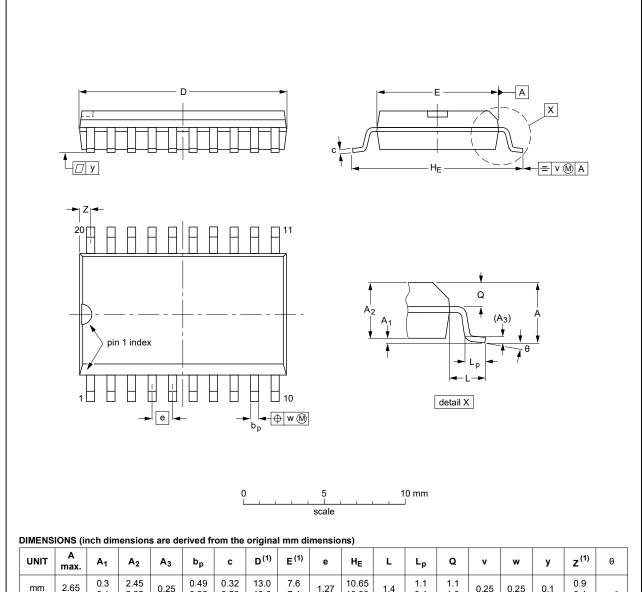
Table 9. Test data

Туре	Input		Load		S1 position				
	V <sub>I</sub>	t <sub>r</sub> , t <sub>f</sub>	CL	$R_L$	t <sub>PHL</sub> , t <sub>PLH</sub>	t <sub>PZH</sub> , t <sub>PHZ</sub>	t <sub>PZL</sub> , t <sub>PLZ</sub>		
74AHC573-Q100	V <sub>CC</sub>	≤ 3.0 ns	15 pF, 50 pF	1 kΩ	open	GND	V <sub>CC</sub>		
74AHCT573-Q100	3.0 V	≤ 3.0 ns	15 pF, 50 pF	1 kΩ	open	GND	V <sub>CC</sub>		

# 11. Package outline

#### SO20: plastic small outline package; 20 leads; body width 7.5 mm

SOT163-1



UNIT	A max.	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	bp	С	D <sup>(1)</sup>	E <sup>(1)</sup>	е	HE	L	Lp	Q	v	w	у	z <sup>(1)</sup>	θ
mm	2.65	0.3 0.1	2.45 2.25	0.25	0.49 0.36	0.32 0.23	13.0 12.6	7.6 7.4	1.27	10.65 10.00	1.4	1.1 0.4	1.1 1.0	0.25	0.25	0.1	0.9 0.4	8°
inches	0.1	0.012 0.004	0.096 0.089	0.01	0.019 0.014	0.013 0.009	0.51 0.49	0.30 0.29	0.05	0.419 0.394	0.055	0.043 0.016	0.043 0.039	0.01	0.01	0.004	0.035 0.016	0°

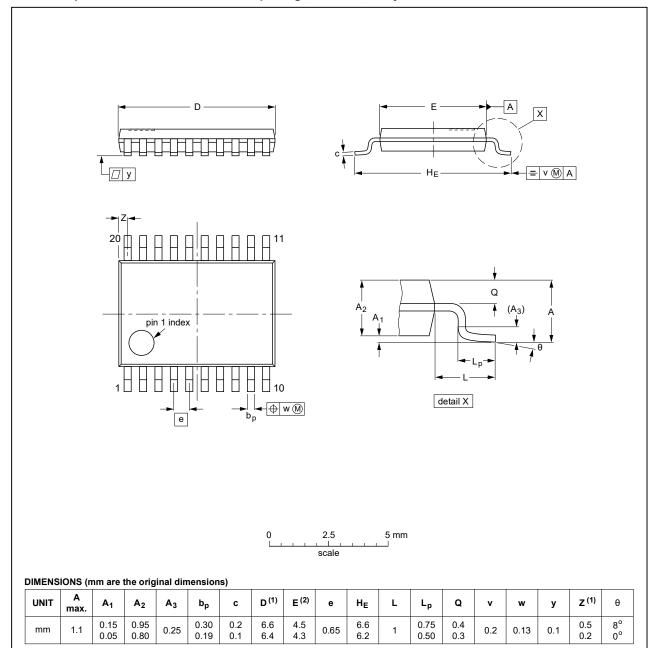
1. Plastic or metal protrusions of 0.15 mm (0.006 inch) maximum per side are not included.

OUTLINE	REFERENCES			EUROPEAN	ISSUE DATE	
VERSION	IEC	JEDEC	JEITA		PROJECTION	1330E DATE
SOT163-1	075E04	MS-013				<del>99-12-27</del> 03-02-19

Fig. 12. Package outline SOT163-1 (SO20)

TSSOP20: plastic thin shrink small outline package; 20 leads; body width 4.4 mm

SOT360-1



#### Notes

- 1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.
- 2. Plastic interlead protrusions of 0.25 mm maximum per side are not included.

OUTLINE	REFERENCES			EUROPEAN	ISSUE DATE	
VERSION	IEC	JEDEC	JEITA		PROJECTION	ISSUE DATE
SOT360-1		MO-153				<del>99-12-27</del> 03-02-19

Fig. 13. Package outline SOT360-1 (TSSOP20)

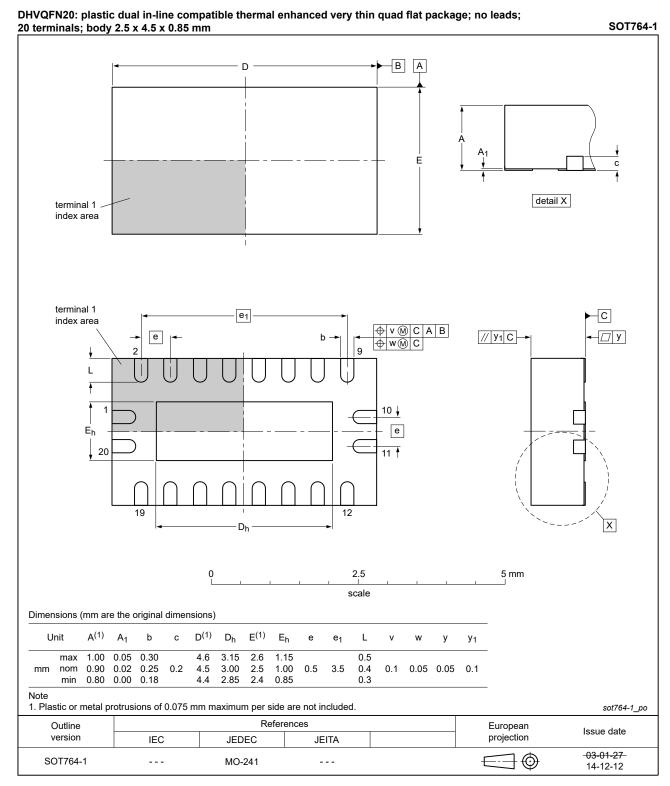


Fig. 14. Package outline SOT764-1 (DHVQFN20)

### 12. Abbreviations

#### **Table 10. Abbreviations**

Acronym	Description		
CMOS	Complementary Metal-Oxide Semiconductor		
ESD	ElectroStatic Discharge		
НВМ	Human Body Model		
MM	Machine Model		
MIL	Military		
TTL	Transistor-Transistor Logic		

# 13. Revision history

### Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes	
74AHC_AHCT573_Q100 v.2	20200713	Product data sheet	-	74AHC_AHCT573_Q100 v.1	
Modifications:	The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.				
	Legal texts have been adapted to the new company name where appropriate.				
	• <u>Section 1</u> and <u>Section 2</u> updated.				
	• Table 4: Derating	g values for P <sub>tot</sub> total po	wer dissipation have	been updated.	
	Table 6: Conditions for I <sub>OZ</sub> corrected.				
<ul> <li>Package outline drawing of SOT764-1 (Fig. 14) updated.</li> </ul>					
74AHC_AHCT573_Q100 v.1	20130610	Product data sheet	-	-	

### 14. 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.

- Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
- 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 <a href="https://www.nexperia.com">https://www.nexperia.com</a>.

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