74HC573-Q100; 74HCT573-Q100

Octal D-type transparent latch; 3-state

Rev. 6 — 10 February 2021

Product data sheet

1. General description

The 74HC573-Q100; 74HCT573-Q100 is an 8-bit D-type transparent latch with 3-state outputs. The device features latch enable (LE) and output enable (\overline{OE}) inputs. When LE is HIGH, data at the inputs enter the latches. In this condition the latches are transparent, a latch output will change each time its corresponding D-input changes. When LE is LOW the latches store the information that was present at the inputs a set-up time preceding the HIGH-to-LOW transition of LE. A HIGH on \overline{OE} causes the outputs to assume a high-impedance OFF-state. Operation of the \overline{OE} input does not affect the state of the latches. 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 °C to +85 °C and from -40 °C to +125 °C
- Input levels:
 - For 74HC573-Q100: CMOS level
 - For 74HCT573-Q100: TTL level
- · Inputs and outputs on opposite sides of package allowing easy interface with microprocessors
- · Useful as input or output port for microprocessors and microcomputers
- 3-state non-inverting outputs for bus-oriented applications
- · Common 3-state output enable input
- Multiple package options
- ESD protection:
 - MIL-STD-883, method 3015 exceeds 2000 V
 - HBM JESD22-A114F exceeds 2 000 V
 - MM JESD22-A115-A exceeds 200 V (C = 200 pF, R = 0 Ω)
- DHVQFN package with Side-Wettable Flanks enabling Automatic Optical Inspection (AOI) of solder joints

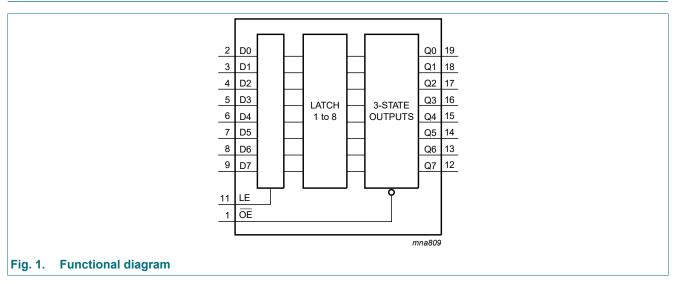
3. Ordering information

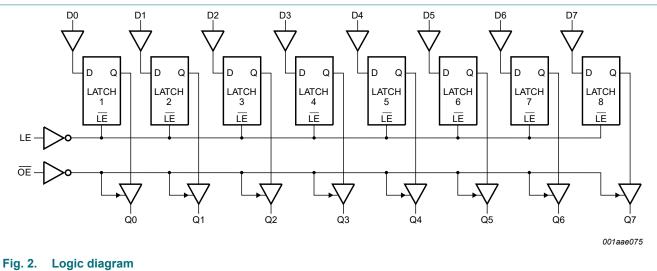
Table 1. Ordering information

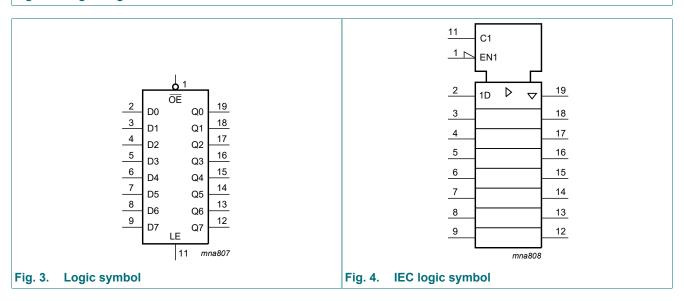
Type number	Package									
	Temperature range	Name	Description	Version						
74HC573D-Q100	-40 °C to +125 °C	SO20	plastic small outline package; 20 leads;	SOT163-1						
74HCT573D-Q100			body width 7.5 mm							
74HC573PW-Q100	-40 °C to +125 °C	TSSOP20	plastic thin shrink small outline package;	SOT360-1						
74HCT573PW-Q100			20 leads; body width 4.4 mm							
74HC573BQ-Q100	-40 °C to +125 °C	DHVQFN20	plastic dual in-line compatible thermal	SOT764-1						
74HCT573BQ-Q100			enhanced very thin quad flat package; no leads; 20 terminals; body 2.5 × 4.5 × 0.85 mm							



4. Functional diagram

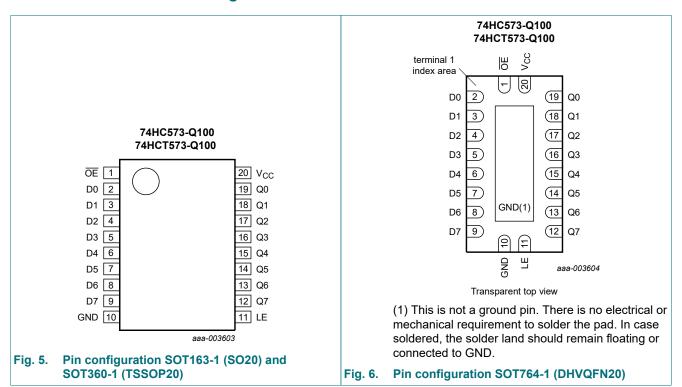






5. Pinning information

5.1. Pinning



5.2. Pin description

Table 2. Pin description

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Symbol	Pin	Description
OE	1	3-state output enable input (active LOW)
D0, D1, D2, D3, D4, D5, D6, D7	2, 3, 4, 5, 6, 7, 8, 9	data input
GND	10	ground (0 V)
LE	11	latch enable input (active HIGH)
Q0, Q1, Q2, Q3, Q4, Q5, Q6, Q7	19, 18, 17, 16, 15, 14, 13, 12	3-state latch output
V _{CC}	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	Control		Input	Internal latches	Output
	OE	LE			Qn
Enable and read register	L	Н	L	L	L
(transparent mode)			Н	Н	Н
Latch and read register	L	L	I	L	L
			h	Н	Н
atch register and disable outputs H L		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 _{CC}	supply voltage		-0.5	+7	V
I _{IK}	input clamping current	$V_{I} < -0.5 \text{ V or } V_{I} > V_{CC} + 0.5 \text{ V}$	-	±20	mA
I _{OK}	output clamping current	$V_{O} < -0.5 \text{ V or } V_{O} > V_{CC} + 0.5 \text{ V}$	-	±20	mA
Io	output current	$V_{O} = -0.5 \text{ V to } (V_{CC} + 0.5 \text{ V})$	-	±35	mA
I _{CC}	supply current		-	+70	mA
I _{GND}	ground current		-70	-	mA
T _{stg}	storage temperature		-65	+150	°C
P _{tot}	total power dissipation	[1]	-	500	mW

^[1] For SOT163-1 (SO20) package: P_{tot} derates linearly with 12.3 mW/K above 109 °C. For SOT360-1 (TSSOP20) package: P_{tot} derates linearly with 10.0 mW/K above 100 °C. For SOT764-1 (DHVQFN20) package: P_{tot} 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	74HC573-Q100			74F	Unit		
			Min	Тур	Max	Min	Тур	Max	
V _{CC}	supply voltage		2.0	5.0	6.0	4.5	5.0	5.5	V
VI	input voltage		0	-	V _{CC}	0	-	V _{CC}	V
Vo	output voltage		0	-	V _{CC}	0	-	V _{CC}	V
T _{amb}	ambient temperature		-40	+25	+125	-40	+25	+125	°C
Δt/ΔV	input transition rise and fall	V _{CC} = 2.0 V	-	-	625	-	-	-	ns/V
	rate	V _{CC} = 4.5 V	-	1.67	139	-	1.67	139	ns/V
		V _{CC} = 6.0 V	-	-	83	-	-	-	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		_	°C to 5 °C		°C to 5 °C	Unit
			Min	Тур	Max	Min	Max	Min	Max	-
74HC57	3-Q100									
V _{IH}	HIGH-level	V _{CC} = 2.0 V	1.5	1.2	-	1.5	-	1.5	-	V
	input voltage	V _{CC} = 4.5 V	3.15	2.4	-	3.15	-	3.15	-	V
		V _{CC} = 6.0 V	4.2	3.2	-	4.2	-	4.2	-	V
V _{IL}	LOW-level	V _{CC} = 2.0 V	-	0.8	0.5	-	0.5	-	0.5	٧
	input voltage	V _{CC} = 4.5 V	-	2.1	1.35	-	1.35	-	1.35	V
		V _{CC} = 6.0 V	-	2.8	1.8	-	1.8	-	1.8	٧
V _{OH}	HIGH-level	V _I = V _{IH} or V _{IL}								
	output voltage	I_{O} = -20 μ A; V_{CC} = 2.0 V	1.9	2.0	-	1.9	-	1.9	-	V
		I _O = -20 μA; V _{CC} = 4.5 V	4.4	4.5	-	4.4	-	4.4	-	V
		I_{O} = -20 μ A; V_{CC} = 6.0 V	5.9	6.0	-	5.9	-	5.9	-	V
		I _O = -6.0 mA; V _{CC} = 4.5 V	3.98	4.32	-	3.84	-	3.7	-	V
		I_{O} = -7.8 mA; V_{CC} = 6.0 V	5.48	5.81	-	5.34	-	5.2	-	٧
V _{OL}	LOW-level	V _I = V _{IH} or V _{IL}								
	output voltage	I _O = 20 μA; V _{CC} = 2.0 V	-	0	0.1	-	0.1	-	0.1	V
		I _O = 20 μA; V _{CC} = 4.5 V	-	0	0.1	-	0.1	-	0.1	٧
		I _O = 20 μA; V _{CC} = 6.0 V	-	0	0.1	-	0.1	-	0.1	٧
		I _O = 6.0 mA; V _{CC} = 4.5 V	-	0.15	0.26	-	0.33	-	0.4	V
		I _O = 7.8 mA; V _{CC} = 6.0 V	-	0.16	0.26	-	0.33	-	0.4	V
lį	input leakage current	$V_I = V_{CC}$ or GND; $V_{CC} = 6.0 \text{ V}$	-	-	±0.1	-	±1.0	-	±1.0	μA
l _{OZ}	OFF-state output current	$V_I = V_{IH}$ or V_{IL} ; $V_{CC} = 6.0 \text{ V}$; $V_O = V_{CC}$ or GND	-	-	±0.5	-	±5.0	-	±10.0	μA
I _{CC}	supply current	V _I = V _{CC} or GND; I _O = 0 A; V _{CC} = 6.0 V	-	-	8.0	-	80	-	160	μA
Cı	input capacitance		-	3.5	-					pF
74HCT5	73-Q100			'	,		'	'	•	
V _{IH}	HIGH-level input voltage	V _{CC} = 4.5 V to 5.5 V	2.0	1.6	-	2.0	-	2.0	-	V
V _{IL}	LOW-level input voltage	V _{CC} = 4.5 V to 5.5 V	-	1.2	0.8	-	0.8	-	0.8	V
V _{OH}	HIGH-level	$V_I = V_{IH}$ or V_{IL} ; $V_{CC} = 4.5 \text{ V}$								
	output voltage	I _O = -20 μA	4.4	4.5	-	4.4	-	4.4	-	٧
		I _O = -6 mA	3.98	4.32	-	3.84	-	3.7	-	٧
V _{OL}	LOW-level	$V_I = V_{IH}$ or V_{IL} ; $V_{CC} = 4.5 V$								
	output voltage	Ι _Ο = 20 μΑ	-	0	0.1	-	0.1	-	0.1	٧
		I _O = 6.0 mA	-	0.16	0.26	-	0.33	-	0.4	V

Symbol	Parameter	Conditions	25 °C			°C to 5 °C	-40 °C to +125 °C		Unit	
			Min	Тур	Max	Min	Max	Min	Max	
Iı	input leakage current	$V_I = V_{CC}$ or GND; $V_{CC} = 5.5 \text{ V}$	-	-	±0.1	-	±1.0	-	±1.0	μΑ
I _{OZ}		$V_I = V_{IH}$ or V_{IL} ; $V_{CC} = 5.5 V$; $V_O = V_{CC}$ or GND	-	-	±0.5	-	±5.0	-	±10	μΑ
I _{CC}	supply current	$V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 5.5 \text{ V}$	-	-	8.0	-	80	-	160	μΑ
ΔI _{CC}	additional supply current	$V_1 = V_{CC} - 2.1 \text{ V};$ other inputs at V_{CC} or GND; $V_{CC} = 4.5 \text{ V}$ to 5.5 V; $I_0 = 0 \text{ A}$								
		per input pin; Dn inputs	-	35	126	-	158	-	172	μΑ
		per input pin; LE input	-	65	234	-	293	-	319	μΑ
		per input pin; OE input	-	125	450	-	563	-	613	μΑ
C _I	input capacitance		-	3.5	-	-	-	-	-	pF

10. Dynamic characteristics

Table 7. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); C_L = 50 pF unless otherwise specified; for test circuit see Fig. 11.

Symbol	Parameter	Conditions		25 °C			C to		°C to 5 °C	Unit
			Min	Тур	Max	Min	Max	Min	Max	
74HC57	3-Q100									
t _{pd}	propagation	Dn to Qn; see Fig. 7 [1]								
	delay	V _{CC} = 2.0 V	-	47	150	-	190	-	225	ns
		V _{CC} = 4.5 V	-	17	30	-	38	-	45	ns
		V _{CC} = 5 V; C _L = 15 pF	-	14	-	-	-	-	-	ns
		V _{CC} = 6.0 V	-	14	26	-	33	-	38	ns
		LE to Qn; see Fig. 8 [1]								
		V _{CC} = 2.0 V	-	50	150	-	190	-	225	ns
		V _{CC} = 4.5 V	-	18	30	-	38	-	45	ns
		V _{CC} = 5 V; C _L = 15 pF	-	15	-	-	-	-	-	ns
		V _{CC} = 6.0 V	-	14	26	-	33	-	38	ns
t _{en}	enable time	OE to Qn; see Fig. 9 [2]								
		V _{CC} = 2.0 V	-	44	140	-	175	-	210	ns
		V _{CC} = 4.5 V	-	16	28	-	35	-	42	ns
		V _{CC} = 6.0 V	-	13	24	-	30	-	36	ns
t _{dis}	disable time	OE to Qn; see Fig. 9 [3]								
		V _{CC} = 2.0 V	-	55	150	-	190	-	225	ns
		V _{CC} = 4.5 V	-	20	30	-	38	-	45	ns
		V _{CC} = 6.0 V	-	16	26	-	33	-	38	ns

Symbol	Parameter	Conditions			25 °C			°C to 5 °C	-40 °C to +125 °C		Unit
				Min	Тур	Max	Min	Max	Min	Max	
t _t	transition time	Qn; see Fig. 7	[4]								
		V _{CC} = 2.0 V		-	14	60	-	75	-	90	ns
		V _{CC} = 4.5 V		-	5	12	-	15	-	18	ns
		V _{CC} = 6.0 V		-	4	10	-	13	-	15	ns
t _W	pulse width	LE HIGH; see Fig. 8									
		V _{CC} = 2.0 V		80	14	-	100	-	120	-	ns
		V _{CC} = 4.5 V		16	5	-	20	-	24	-	ns
		V _{CC} = 6.0 V		14	4	-	17	-	20	-	ns
t _{su}	set-up time	Dn to LE; see Fig. 10									
		V _{CC} = 2.0 V		50	11	-	65	-	75	-	ns
		V _{CC} = 4.5 V		10	4	-	13	-	15	-	ns
		V _{CC} = 6.0 V		9	3	-	11	-	13	-	ns
t _h	hold time	Dn to LE; see Fig. 10									
		V _{CC} = 2.0 V		5	3	-	5	-	5	-	ns
		V _{CC} = 4.5 V		5	1	-	5	-	5	-	ns
		V _{CC} = 6.0 V		5	1	-	5	-	5	-	ns
C _{PD}	power dissipation capacitance	C_L = 50 pF; f = 1 MHz; V_I = GND to V_{CC}	[5]	-	26	-	-	-	-	-	pF
74HCT5	73-Q100					ı					
t _{pd}	propagation	Dn to Qn; see Fig. 7	[1]								
	delay	V _{CC} = 4.5 V		-	20	35	-	44	-	53	ns
		V _{CC} = 5 V; C _L = 15 pF		-	17	-	-	-	-	-	ns
		LE to Qn; see Fig. 8	[1]								
		V _{CC} = 4.5 V		-	18	35	-	44	-	53	ns
		V _{CC} = 5 V; C _L = 15 pF		-	15	-	-	-	-	-	ns
t _{en}	enable time	OE to Qn; see Fig. 9	[2]								
		V _{CC} = 4.5 V		-	17	30	-	38	-	45	ns
t _{dis}	disable time	OE to Qn; see Fig. 9	[3]								
		V _{CC} = 4.5 V		-	18	30	-	38	-	45	ns
t _t	transition time	Qn; see Fig. 7	[4]								
		V _{CC} = 4.5 V		-	5	12	-	15	-	18	ns
t _W	pulse width	LE HIGH; see Fig. 8									
		V _{CC} = 4.5 V		16	5	-	20	-	24	-	ns

Symbol	Parameter	Conditions	25 °C		-40 °C to +85 °C		-40 °C to +125 °C		Unit	
			Min	Тур	Max	Min	Max	Min	Max	
t _{su}	set-up time	Dn to LE; see Fig. 10								
		V _{CC} = 4.5 V	13	7	-	16	-	20	-	ns
t _h	hold time	Dn to LE; see Fig. 10								
		V _{CC} = 4.5 V	9	4	-	11	-	15	-	ns
C _{PD}	power dissipation capacitance	$C_L = 50 \text{ pF}; f = 1 \text{ MHz};$ [5] V _I = GND to V _{CC} - 1.5 V	-	26	-	-	-	-	-	pF

- [1] t_{pd} is the same as t_{PLH} and t_{PHL} .
- [2] t_{en} is the same as t_{PZH} and t_{PZL} .
- [3] t_{dis} is the same as t_{PLZ} and t_{PHZ} .
- [4] t_t is the same as t_{THL} and t_{TLH} .
- [5] C_{PD} is used to determine the dynamic power dissipation (P_D in μ 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_i = input frequency in MHz;

 f_0 = output frequency in MHz;

C_L = output load capacitance in pF;

V_{CC} = supply voltage in V;

N = number of inputs switching;

 $\Sigma(C_L \times V_{CC}^2 \times f_0) = \text{sum of outputs.}$

10.1. Waveforms and test circuit

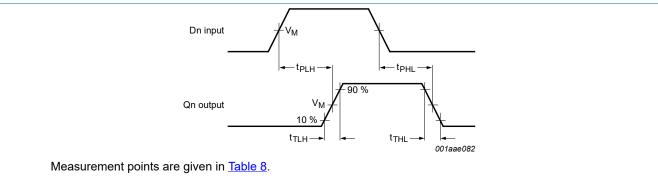
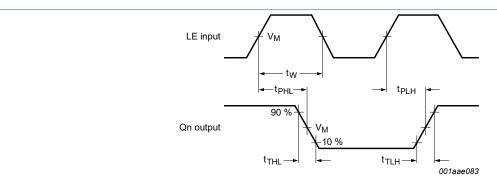


Fig. 7. Propagation delay data input (Dn) to output (Qn) and output transition time



Measurement points are given in Table 8.

Fig. 8. Pulse width latch enable input (LE), propagation delay latch enable input (LE) to output (Qn) and output transition time

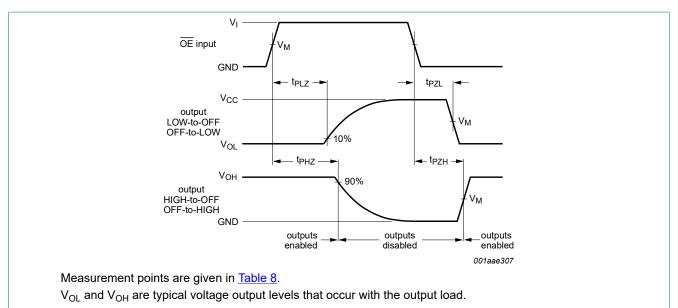
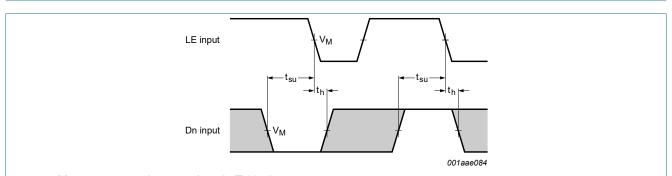


Fig. 9. Enable and disable times



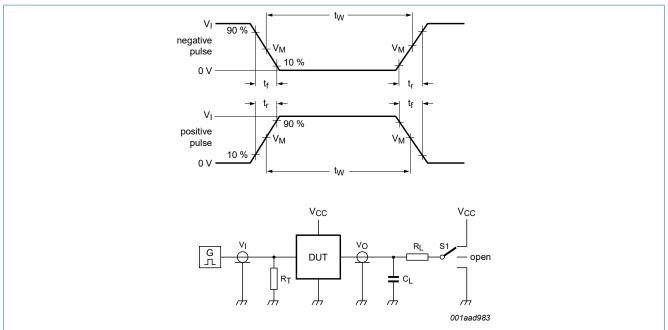
Measurement points are given in <u>Table 8</u>.

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

Fig. 10. Set-up and hold times for data input (Dn) to latch input (LE)

Table 8. Measurement points

Туре	Input	Output
	V _M	V _M
74HC573-Q100	0.5V _{CC}	0.5V _{CC}
74HCT573-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.

 R_{I} = Load resistance.

S1 = Test selection switch.

Fig. 11. Test circuit for measuring switching times

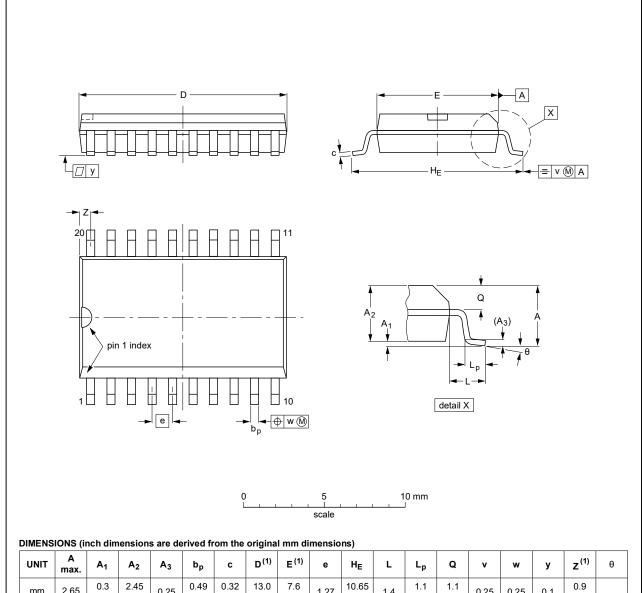
Table 9. Test data

Туре	Input		Load		S1 position		
	V _I	t _r , t _f	C _L R _L t _P		t _{PHL} , t _{PLH}	t _{PZH} , t _{PHZ}	t _{PZL} , t _{PLZ}
74HC573-Q100	V _{CC}	6 ns	15 pF, 50 pF	1 kΩ	open	GND	V _{CC}
74HCT573-Q100	3 V	6 ns	15 pF, 50 pF	1 kΩ	open	GND	V _{CC}

11. Package outline

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

SOT163-1



UNIT	A max.	A ₁	A ₂	A ₃	bp	С	D ⁽¹⁾	E ⁽¹⁾	е	HE	L	Lp	Q	v	w	у	z ⁽¹⁾	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°

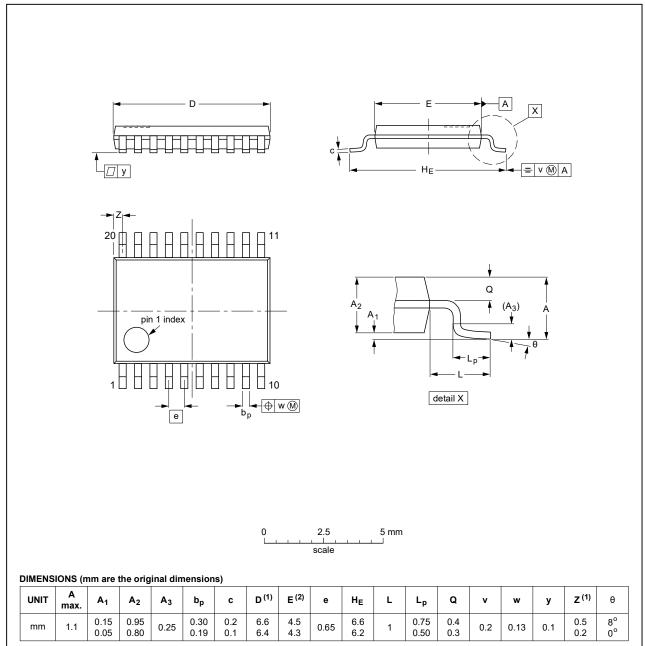
1. Plastic or metal protrusions of 0.15 mm (0.006 inch) maximum per side are not included.

OUTLINE		REFER	EUROPEAN	ISSUE DATE			
VERSION	IEC	JEDEC	JEITA		PROJECTION	ISSUE DATE	
SOT163-1	075E04	MS-013				99-12-27 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		REFER	EUROPEAN	ISSUE DATE		
VERSION	IEC	JEDEC	JEITA		PROJECTION	ISSUE DATE
SOT360-1		MO-153				99-12-27 03-02-19

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

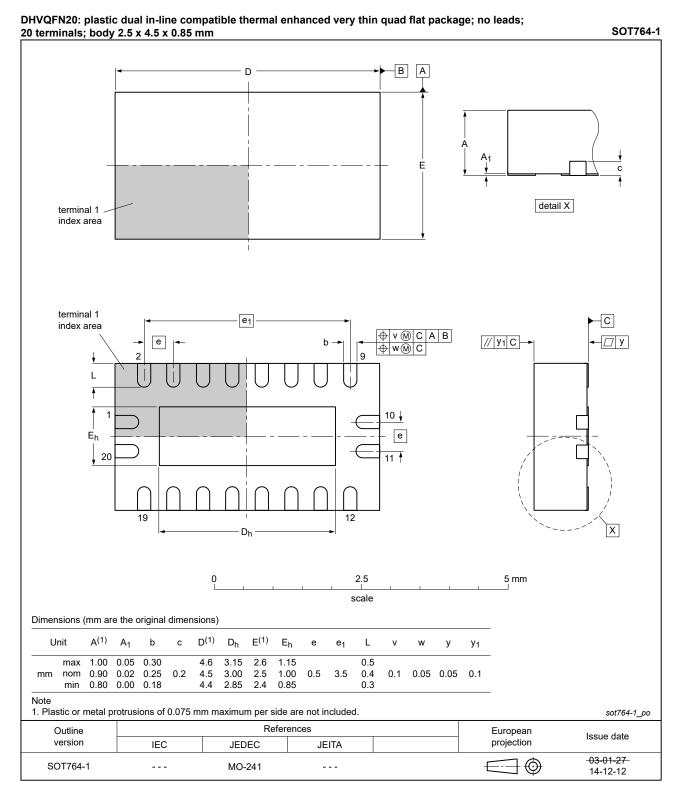


Fig. 14. Package outline SOT764-1 (DHVQFN20)

12. Abbreviations

Table 10. Abbreviations

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

13. Revision history

Table 11. Revision history

	I	T					
Document ID	Release date	Data sheet status	Change notice	Supersedes			
74HC_HCT573_Q100 v.6	20210210	Product data sheet	-	74HC_HCT573_Q100 v.5			
Modifications:	Type number	ers 74HC573DB-Q100 and	74HCT573DB-Q	100 (SOT339-1) removed.			
74HC_HCT573_Q100 v.5	20200310	Product data sheet	-	74HC_HCT573_Q100 v.4			
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. Section 1 and Section 2 undeted.						
	Section 1 and Section 2 updated.						
	• <u>Section 7</u> : Derating values for P _{tot} total power dissipation updated.						
74HC_HCT573_Q100 v.4	20150126	Product data sheet	-	74HC_HCT573_Q100 v.3			
Modifications:	• <u>Table 7</u> : Pov	wer dissipation capacitance	e condition for 74h	HCT573-Q100 is corrected.			
74HC_HCT573_Q100 v.3	20130305	Product data sheet	-	74HC_HCT573_Q100 v.2			
Modifications:	• 74HC573DE	3-Q100 and 74HCT573DB	-Q100 added.				
74HC_HCT573_Q100 v.2	20120816	Product data sheet	-	74HC_HCT573_Q100 v.1			
74HC_HCT573_Q100 v.1	20120802	Product data sheet	-	-			

14. Legal information

Data sheet status

Document status [1][2]	Product status [3]	Definition
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