74HC373; 74HCT373

Octal D-type transparent latch; 3-state

Rev. 9 — 5 August 2024

Product data sheet

1. General description

The 74HC373; 74HCT373 is an octal D-type transparent latch with 3-state outputs. The device features latch enable (LE) and output enable ($\overline{\text{OE}}$) 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 $\overline{\text{OE}}$ causes the outputs to assume a high-impedance OFF-state. Operation of the $\overline{\text{OE}}$ 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} .

2. Features and benefits

- Wide supply voltage range from 2.0 V to 6.0 V
- · CMOS low power dissipation
- High noise immunity
- · 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)
- Input levels:
 - For 74HC373: CMOS level
 - For 74HCT373: TTL level
- 3-state non-inverting outputs for bus oriented applications
- · Common 3-state output enable input
- ESD protection:
 - HBM: ANSI/ESDA/JEDEC JS-001 class 2 exceeds 2000 V
 - CDM: ANSI/ESDA/JEDEC JS-002 class C3 exceeds 1000 V
- · Multiple package options
- Specified from -40 °C to +85 °C and from -40 °C to +125 °C

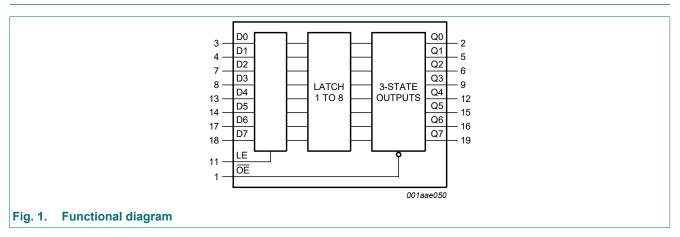
3. Ordering information

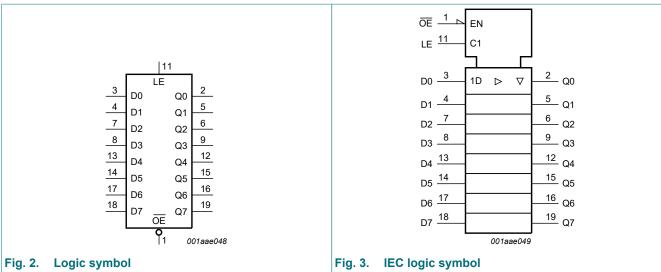
Table 1. Ordering information

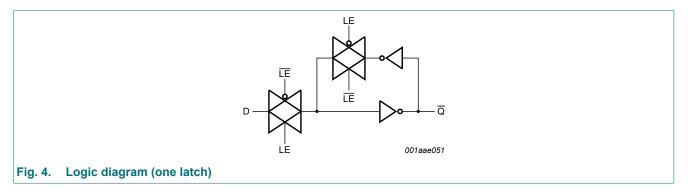
Type number	Package			
	Temperature range	Name	Description	Version
74HC373D 74HCT373D	-40 °C to +125 °C	SO20	plastic small outline package; 20 leads; body width 7.5 mm	SOT163-1
74HC373PW 74HCT373PW	-40 °C to +125 °C	TSSOP20	plastic thin shrink small outline package; 20 leads; body width 4.4 mm	SOT360-1
74HC373BQ 74HCT373BQ	-40 °C to +125 °C	DHVQFN20	plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 20 terminals; body 2.5 × 4.5 × 0.85 mm	SOT764-1

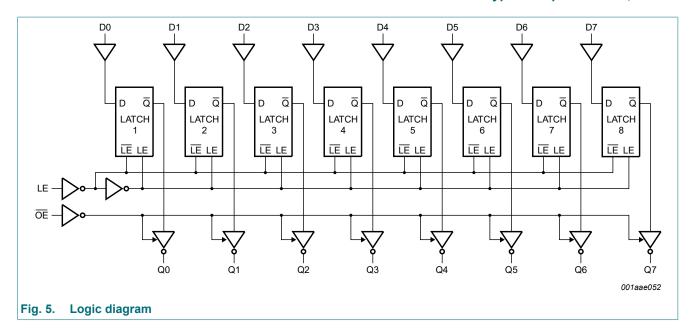


4. Functional diagram



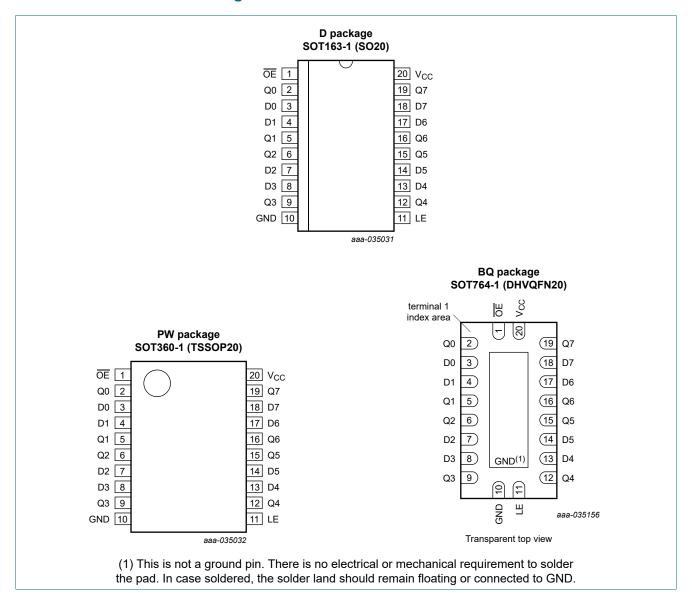






5. Pinning information

5.1. Pinning



5.2. Pin description

Table 2. Pin description

Symbol	Pin	Description
ŌE	1	3-state output enable input (active LOW)
Q0, Q1, Q2, Q3, Q4, Q5, Q6, Q7	2, 5, 6, 9, 12, 15, 16, 19	3-state latch output
D0, D1, D2, D3, D4, D5, D6, D7	3, 4, 7, 8, 13, 14, 17, 18	data input
GND	10	ground (0 V)
LE	11	latch enable input (active HIGH)
V _{CC}	20	supply voltage

74HC_HCT373

6. Functional description

Table 3. Functional description

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;

X = don't care; Z = high-impedance OFF-state.

Operating mode	Control		Input	Internal latches	Output
	OE	LE	Dn		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
Latch register and disable outputs	Н	Х	Х	Х	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 V or V_{O} > V_{CC} + 0.5 V	-	±20	mA
I _O	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		74HC373	3	7	'4HCT37	3	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 rate	V _{CC} = 2.0 V	-	-	625	-	-	-	ns/V
		V _{CC} = 4.5 V	-	1.67	139	-	1.67	139	ns/V
		V _{CC} = 6.0 V	-	-	83	-	-	-	ns/V

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9. Static characteristics

Table 6. Static characteristics

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

Symbol	Parameter	Conditions	Tar	_{nb} = 25	°C		-40 °C 5 °C		: -40 °C 25 °C	Unit
			Min	Тур	Max	Min	Max	Min	Max	
74HC37	3									
V _{IH}	HIGH-level input	V _{CC} = 2.0 V	1.5	1.2	-	1.5	-	1.5	-	V
	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 input	V _{CC} = 2.0 V	-	0.8	0.5	-	0.5	-	0.5	V
	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	V
V _{OH}	HIGH-level output	$V_I = V_{IH}$ or V_{IL}	-	-	-					
	voltage	I _O = -20 μA; 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 μA; 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	-	V
V _{OL}	LOW-level output	V _I = V _{IH} or V _{IL}								
	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	V
		I _O = 20 μA; V _{CC} = 6.0 V	-	0	0.1	-	0.1	-	0.1	V
		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
l _l	input leakage current	$V_I = V_{CC}$ or GND; $V_{CC} = 6.0 \text{ V}$	-	-	±0.1	-	±1.0	-	±1.0	μΑ
I _{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	μΑ
I _{CC}	supply current	V _{CC} = 6.0 V; I _O = 0 A; V _I = V _{CC} or GND	-	-	8.0	-	80	-	160	μΑ
Cı	input capacitance		-	3.5	-	-	-	-	-	pF
74HCT3	73		'				'		'	
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	8.0	-	0.8	-	0.8	V
V _{OH}	HIGH-level output	$V_I = V_{IH}$ or V_{IL}								
	voltage	I _O = -20 μA; V _{CC} = 4.5 V	4.4	4.5	-	4.4	-	4.4	-	V
		I _O = -6.0 mA; V _{CC} = 4.5 V	3.98	4.32	-	3.84	-	3.7	-	V
V _{OL}	LOW-level output	V _I = V _{IH} or V _{IL}								
	voltage	I _O = 20 μA; V _{CC} = 4.5 V	-	0.0	0.1	-	0.1	-	0.1	V
		I _O = 6.0 mA; V _{CC} = 4.5 V	-	0.16	0.26	-	0.33	-	0.4	V
l _l	input leakage current	$V_I = V_{CC}$ or GND; $V_{CC} = 5.5 \text{ V}$	-	-	±0.1	-	±1.0	-	±1.0	μΑ

Symbol	Parameter	Conditions	T _{ar}	_{nb} = 25	°C		-40 °C 5 °C	T _{amb} = to 12	Unit	
			Min	Тур	Max	Min	Max	Min	Max	
l _{OZ}	OFF-state output current	$V_I = V_{IH}$ 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	$V_I = V_{CC} - 2.1 \text{ V};$ other inputs at V_{CC} or GND; $V_{CC} = 4.5 \text{ V}$ to 5.5 V; $I_O = 0 \text{ A}$								
		Dn	-	30	108	-	135	-	147	μΑ
		LE	-	150	540	-	675	-	735	μΑ
		ŌĒ	-	100	360	-	450	-	490	μΑ
Cı	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. 10.

Symbol	Parameter	Conditions	Tai	_{mb} = 25	°C		-40 °C 35 °C		-40 °C 25 °C	Unit
			Min	Тур	Max	Min	Max	Min	Max	
74HC37	3									
t _{pd}	propagation	Dn to Qn; see Fig. 6 [1]								
	delay	V _{CC} = 2.0 V	-	41	150	-	190	-	225	ns
		V _{CC} = 4.5 V	-	15	30	-	38	-	45	ns
		V _{CC} = 5 V; C _L = 15 pF	-	12	-	-	-	-	-	ns
		V _{CC} = 6.0 V	-	12	26	-	33	-	38	ns
		LE to Qn; see Fig. 7								
		V _{CC} = 2.0 V	-	50	175	-	220	-	265	ns
		V _{CC} = 4.5 V	-	18	35	-	44	-	53	ns
		V _{CC} = 5 V; C _L = 15 pF	-	15	-	-	-	-	-	ns
		V _{CC} = 6.0 V	-	14	30	-	37	-	45	ns
t _{en}	enable time	OE to Qn; see Fig. 8 [2]								
		V _{CC} = 2.0 V	-	44	150	-	190	-	225	ns
		V _{CC} = 4.5 V	-	16	30	-	38	-	45	ns
		V _{CC} = 6.0 V	-	13	26	-	33	-	38	ns
t _{dis}	disable time	OE to Qn; see Fig. 8 [3]								
		V _{CC} = 2.0 V	-	47	150	-	190	-	225	ns
		V _{CC} = 4.5 V	-	17	30	-	38	-	45	ns
		V _{CC} = 6.0 V	-	14	26	-	33	-	38	ns
t _t	transition time	Qn; see Fig. 6 and 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

Symbol	Parameter	Conditions		T _{aml}	_b = 25	°C		-40 °C 35 °C	T _{amb} = to +1	Unit	
			Mi	n	Тур	Max	Min	Max	Min	Max	
t _W	pulse width	LE HIGH; see Fig. 7									
		V _{CC} = 2.0 V	80)	17	-	100	-	120	-	ns
		V _{CC} = 4.5 V	16	3	6	-	20	-	24	-	ns
		V _{CC} = 6.0 V	14	1	5	-	17	-	20	-	ns
t _{su}	set-up time	Dn to LE; see Fig. 9									
		V _{CC} = 2.0 V	50)	14	-	65	-	75	-	ns
		V _{CC} = 4.5 V	10)	5	-	13	-	15	-	ns
		V _{CC} = 6.0 V	9		4	-	11	-	13	-	ns
t _h	hold time	Dn to LE; see Fig. 9									
		V _{CC} = 2.0 V	+{	5	-8	-	5	-	5	-	ns
		V _{CC} = 4.5 V	+	5	-3	-	5	-	5	-	ns
		V _{CC} = 6.0 V	+	5	-2	-	5	-	5	-	ns
C _{PD}	power dissipation capacitance	per latch; V_I = GND to V_{CC}	[5] -		45	-	-	-	-	-	pF
74HCT3	73										
t _{pd}	propagation	Dn to Qn; see Fig. 6	[1]								
	delay	V _{CC} = 4.5 V	-		17	30	-	38	-	45	ns
		V _{CC} = 5 V; C _L = 15 pF	-		14	-	-	-	-	-	ns
		LE to Qn; see Fig. 7									
		V _{CC} = 4.5 V	-		16	32	-	40	-	48	ns
		V _{CC} = 5 V; C _L = 15 pF	-		13	-	-	-	-	-	ns
t _{en}	enable time	OE to Qn; V _{CC} = 4.5 V; see Fig. 8	[2] -		19	32	-	40	-	48	ns
t _{dis}	disable time	OE to Qn; V _{CC} = 4.5 V; see Fig. 8	[3] -		18	30	-	38	-	45	ns
t _t	transition time	Qn; V _{CC} = 4.5 V; see <u>Fig. 6</u> and <u>Fig. 7</u>	[4] -		5	12	-	15	-	18	ns
t _W	pulse width	LE HIGH; V _{CC} = 4.5 V; see <u>Fig. 7</u>	16	3	4	-	20	-	24	-	ns
t _{su}	set-up time	Dn to LE; V _{CC} = 4.5 V; see <u>Fig. 9</u>	12	2	6	-	15	-	18	-	ns
t _h	hold time	Dn to LE; V _{CC} = 4.5 V; see <u>Fig. 9</u>	4		-1	-	4	-	4	-	ns
C _{PD}	power dissipation capacitance	per latch; V _I = GND to (V _{CC} - 1.5 V)	[5] -		41	-	-	-	-	-	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} .
- t_t is the same as t_{THL} and t_{TLH}.
 C_{PD} is used to determine the dynamic power dissipation (P_D in μW).
 P_D = C_{PD} × V_{CC}² × f_i × N + Σ(C_L × V_{CC}² × f_o) 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;

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

10.1. Waveforms and test circuit

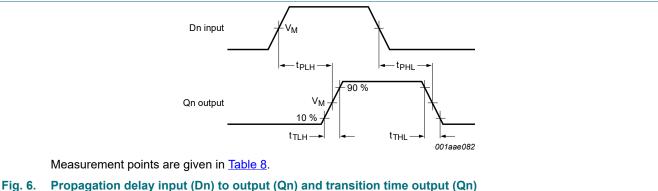


Fig. 6.

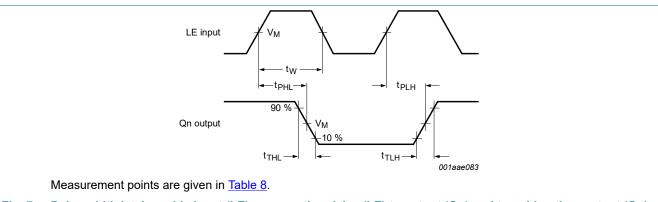
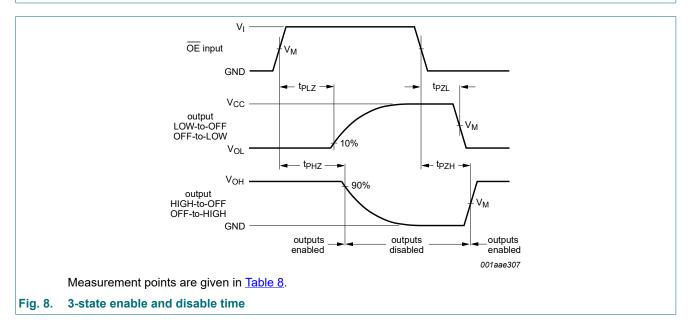
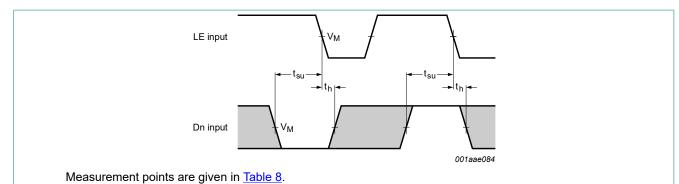


Fig. 7. Pulse width latch enable input (LE), propagation delay (LE) to output (Qn) and transition time output (Qn)

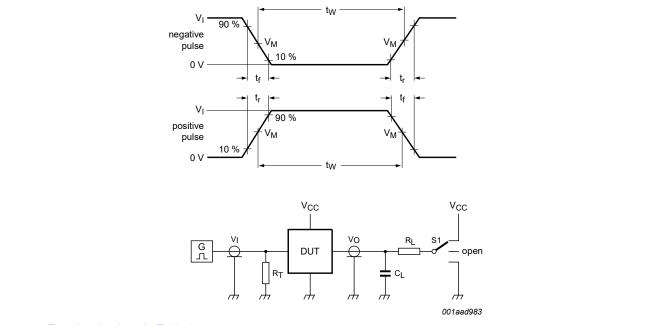




. 9. Set-up and hold time data input (Dn) to latch enable input (LE)

Table 8. Measurement points

Туре	Input	Output
	V _M	V _M
74HC373	0.5 × V _{CC}	0.5 × V _{CC}
74HCT373	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_0 of the pulse generator;

 C_L = Load capacitance including jig and probe capacitance;

R_I = Load resistor;

S1 = Test selection switch.

Fig. 10. Test circuit for measuring switching times

Table 9. Test data

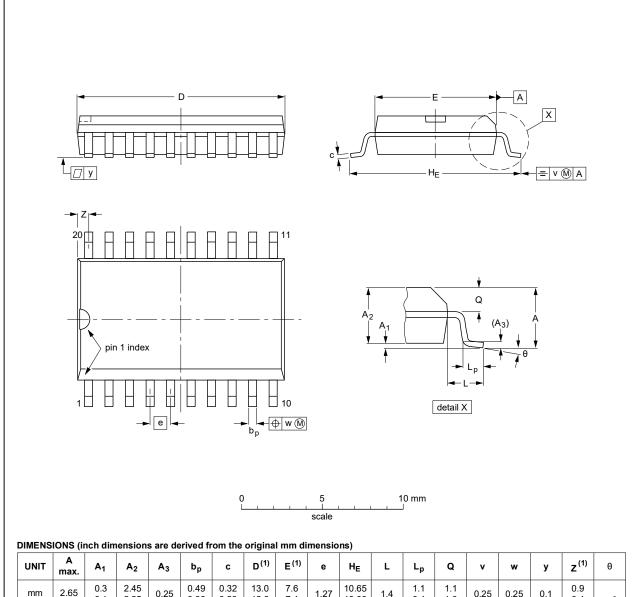
Туре	Input		Load		S1 position				
	V _I	t _r , t _f	CL	R _L	t _{PHL} , t _{PLH}	t _{PZH} , t _{PHZ}	t _{PZL} , t _{PLZ}		
74HC373	V _{CC}	6 ns	15 pF, 50 pF	1 kΩ	open	GND	V _{CC}		
74HCT373	3 V	6 ns	15 pF, 50 pF	1 kΩ	open	GND	V _{CC}		

74HC_HCT373

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°

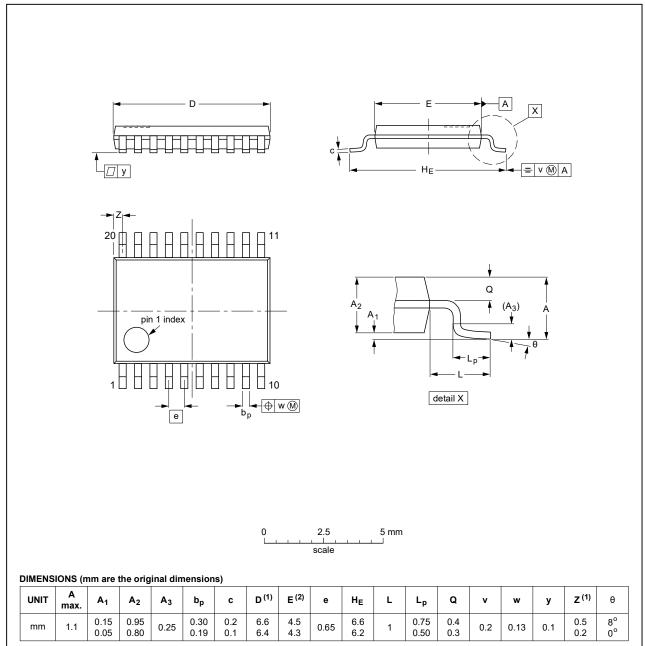
1. Plastic or metal protrusions of 0.15 mm (0.006 inch) maximum per side are not included.

OUTLINE	REFERENCE		ENCES	EUROPEAN	ISSUE DATE
VERSION	IEC	JEDEC	JEITA	PROJECTION	ISSUE DATE
SOT163-1	075E04	MS-013			99-12-27 03-02-19

Fig. 11. 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	REFERENC		ENCES	EUROPEAN	ISSUE DATE
VERSION	IEC	JEDEC	JEITA	PROJECTION	ISSUE DATE
SOT360-1		MO-153			99-12-27 03-02-19

Fig. 12. Package outline SOT360-1 (TSSOP20)

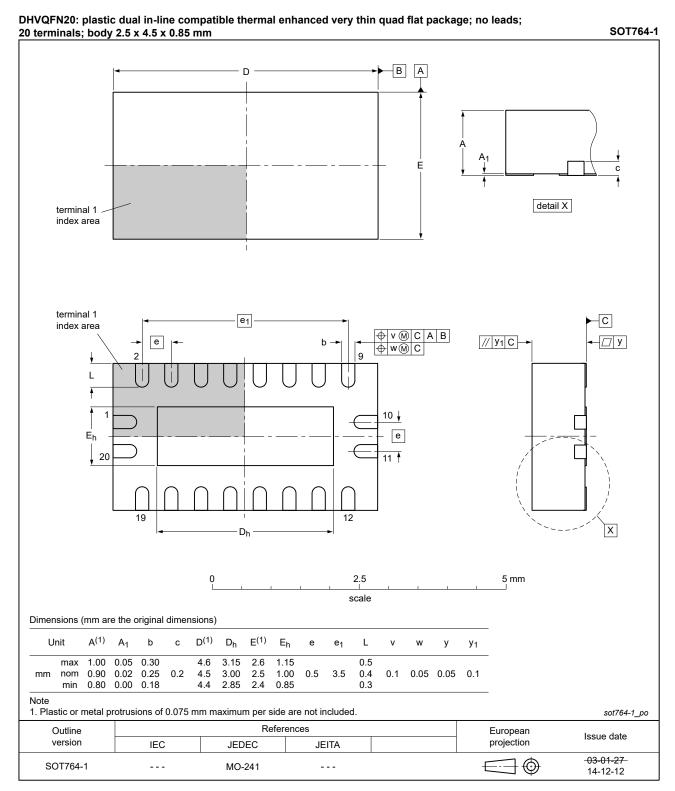


Fig. 13. Package outline SOT764-1 (DHVQFN20)

12. Abbreviations

Table 10. Abbreviations

Table 1017 table or late	***
Acronym	Description
ANSI	American National Standards Institute
CDM	Charged Device Model
CMOS	Complementary Metal Oxide Semiconductor
ESD	ElectroStatic Discharge
ESDA	ElectroStatic Discharge Association
НВМ	Human Body Model
JEDEC	Joint Electron Device Engineering Council
TTL	Transistor-Transistor Logic

13. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes		
74HC_HCT373 v.9	20240805	Product data sheet	-	74HC_HCT373 v.8		
Modifications:	Section 2: E	SD specification updated a	according to the la	itest JEDEC standard.		
74HC_HCT373 v.8	20210906	Product data sheet	-	74HC_HCT373 v.7		
Modifications:	Type number	Type number 74HC373DB (SOT339-1/SSOP20) removed.				
74HC_HCT373 v.7	20200722	Product data sheet	-	74HC_HCT373 v.6		
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. Type number 74HCT373DB (SOT339-1/SSOP20) removed. Table 4: Derating values for P_{tot} total power dissipation updated. 					
74HC_HCT373 v.6	20160226	Product data sheet	-	74HC_HCT373 v.5		
Modifications:	Type number	ers 74HC373N and 74HCT	373N (SOT146-1)	removed.		
74HC_HCT373 v.5	20111213	Product data sheet	-	74HC_HCT373 v.4		
Modifications:	 Legal pages 	updated.				
74HC_HCT373 v.4	20100903	Product data sheet	-	74HC_HCT373 v.3		
74HC_HCT373 v.3	20060120	Product data sheet	-	74HC_HCT373_CNV v.2		
74HC_HCT373_CNV v.2	19970827	Product specification	-	-		

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".
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