

# 74HC373; 74HCT373

Octal D-type transparent latch; 3-state

Rev. 6 — 26 February 2016

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 ( $\overline{OE}$ ) 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  $V_{CC}$ .

## 2. Features and benefits

- 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
- Functionally identical to the 74HC563; 74HCT563 and 74HC573; 74HCT573
- Complies with JEDEC standard no. 7 A
- ESD protection:
  - ◆ HBM JESD22-A114F exceeds 2000 V
  - ◆ MM JESD22-A115-A exceeds 200 V
- Multiple package options
- Specified from  $-40\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$  and from  $-40\text{ }^{\circ}\text{C}$  to  $+125\text{ }^{\circ}\text{C}$

## 3. Ordering information

Table 1. Ordering information

Type number	Package			
	Temperature range	Name	Description	Version
74HC373D	$-40\text{ }^{\circ}\text{C}$ to $+125\text{ }^{\circ}\text{C}$	SO20	plastic small outline package; 20 leads; body width 7.5 mm	SOT163-1
74HCT373D				
74HC373DB	$-40\text{ }^{\circ}\text{C}$ to $+125\text{ }^{\circ}\text{C}$	SSOP20	plastic shrink small outline package; 20 leads; body width 5.3 mm	SOT339-1
74HCT373DB				

Table 1. Ordering information ...continued

Type number	Package			Version
	Temperature range	Name	Description	
74HC373PW	-40 °C to +125 °C	TSSOP20	plastic thin shrink small outline package; 20 leads; body width 4.4 mm	SOT360-1
74HCT373PW				
74HC373BQ	-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
74HCT373BQ				

## 4. Functional diagram

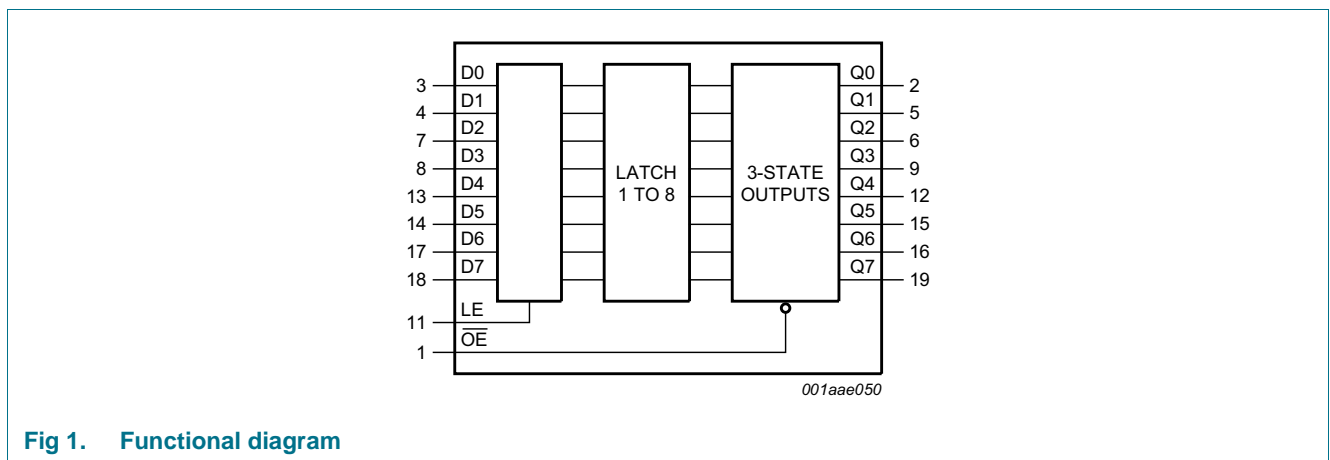


Fig 1. Functional diagram

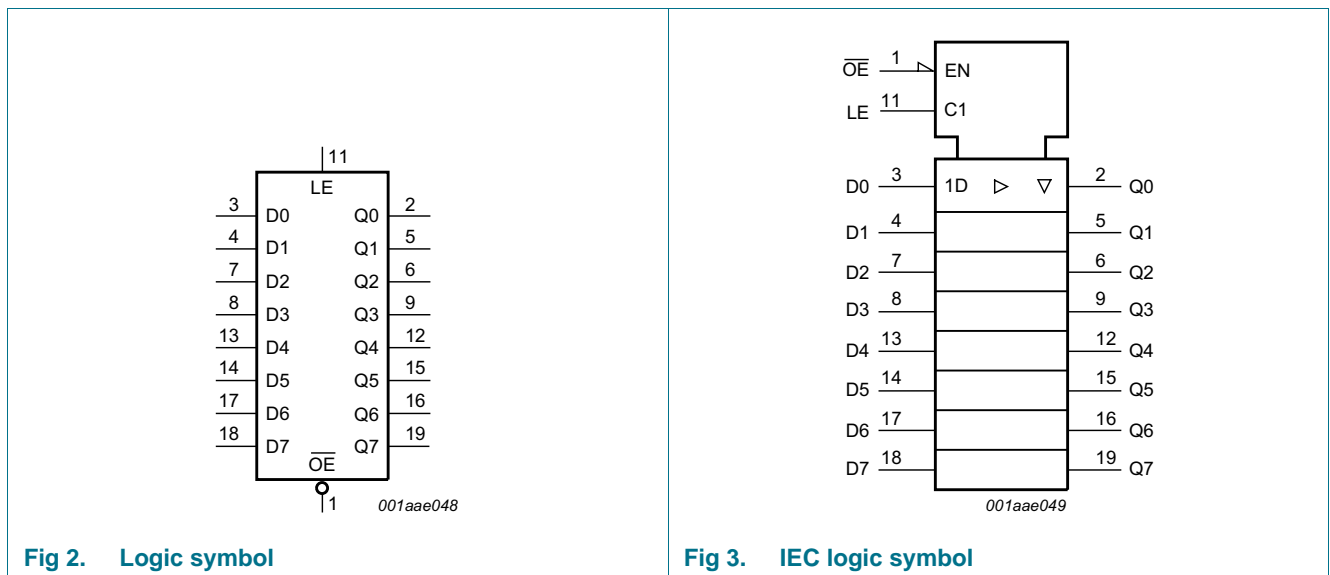


Fig 2. Logic symbol

Fig 3. IEC logic symbol

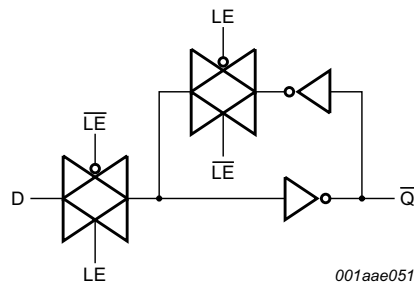


Fig 4. Logic diagram (one latch)

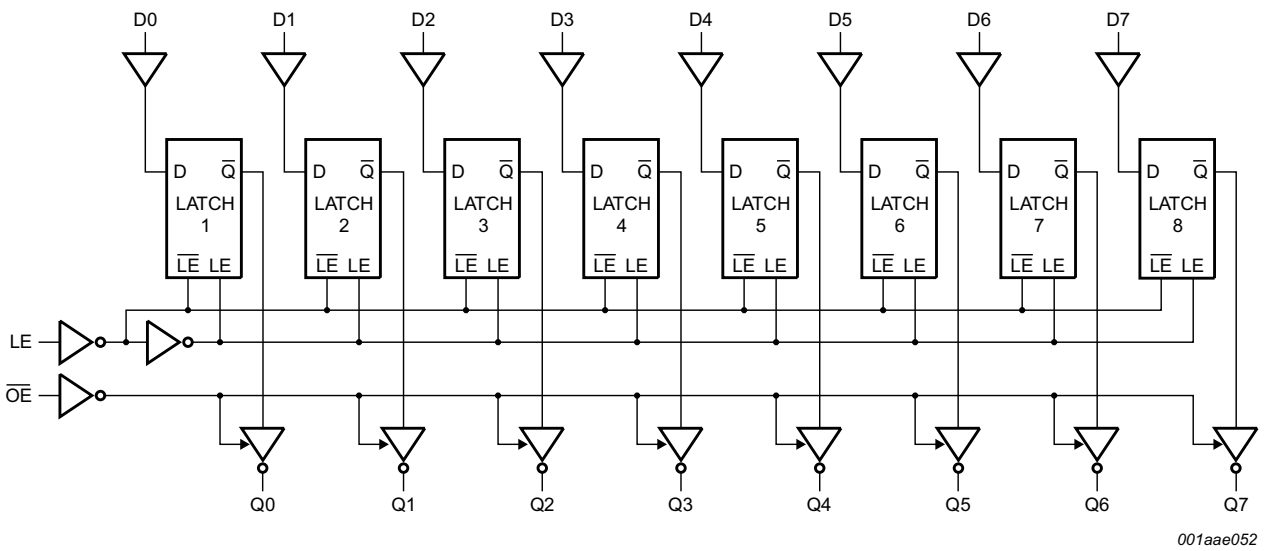
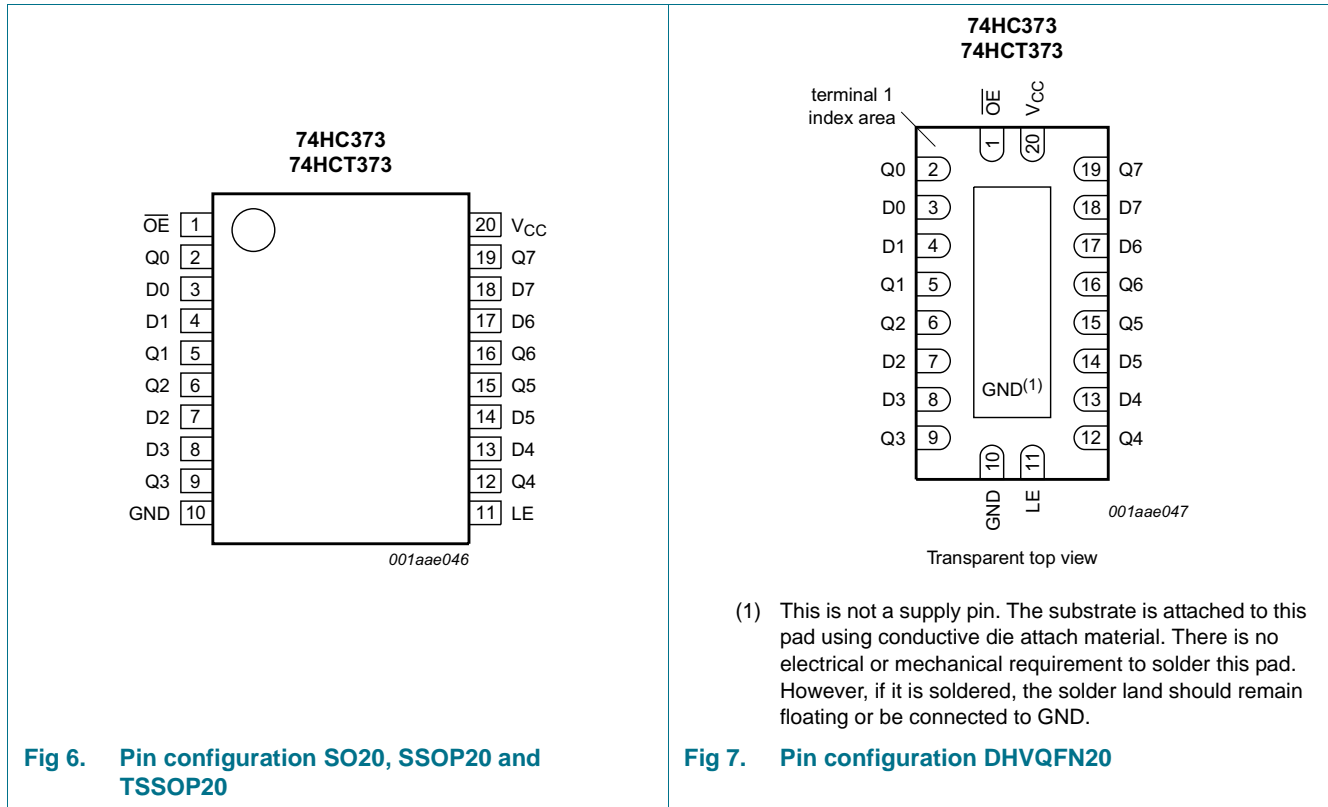


Fig 5. Logic diagram

## 5. Pinning information

### 5.1 Pinning



### 5.2 Pin description

Table 2. Pin description

Symbol	Pin	Description
$\overline{\text{OE}}$	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 <sub>CC</sub>	20	supply voltage

## 6. Functional description

### 6.1 Function table

Table 3. Function table<sup>[1]</sup>

Operating mode	Control		Input	Internal latches	Output
	OE	LE	Dn		Qn
Enable and read register (transparent mode)	L	H	L	L	L
			H	H	H
Latch and read register	L	L	l	L	L
			h	H	H
Latch register and disable outputs	H	X	X	X	Z

- [1] H = HIGH voltage level;  
 h = HIGH voltage level one set-up time prior to the HIGH-to-LOW LE transition;  
 L = LOW voltage level;  
 l = LOW voltage level one set-up time prior to the HIGH-to-LOW LE transition;  
 X = don't care;  
 Z = high-impedance OFF-state.

## 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 $V_I > V_{CC} + 0.5\text{ V}$	-	$\pm 20$	mA
$I_{OK}$	output clamping current	$V_O < -0.5\text{ V}$ or $V_O > V_{CC} + 0.5\text{ V}$	-	$\pm 20$	mA
$I_O$	output current	$V_O = -0.5\text{ V}$ to $(V_{CC} + 0.5\text{ V})$	-	$\pm 35$	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	SO20 package <a href="#">[1]</a>	-	500	mW
		SSOP20 package <a href="#">[2]</a>	-	500	mW
		TSSOP20 package <a href="#">[2]</a>	-	500	mW
		DHVQFN20 package <a href="#">[3]</a>	-	500	mW

- [1] For SO20:  $P_{tot}$  derates linearly with 8 mW/K above 70 °C.  
 [2] For SSOP20 and TSSOP20 packages:  $P_{tot}$  derates linearly with 5.5 mW/K above 60 °C.  
 [3] For DHVQFN20 package:  $P_{tot}$  derates linearly with 4.5 mW/K above 60 °C.

## 8. Recommended operating conditions

**Table 5. Recommended operating conditions**

Voltages are referenced to GND (ground = 0 V)

Symbol	Parameter	Conditions	74HC373			74HCT373			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
T <sub>amb</sub>	ambient temperature		-40	+25	+125	-40	+25	+125	°C
Δt/ΔV	input transition rise and fall rate	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

## 9. Static characteristics

**Table 6. Static characteristics 74HC373**

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>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 2.0 V	1.5	1.2	-	V
		V <sub>CC</sub> = 4.5 V	3.15	2.4	-	V
		V <sub>CC</sub> = 6.0 V	4.2	3.2	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 2.0 V	-	0.8	0.5	V
		V <sub>CC</sub> = 4.5 V	-	2.1	1.35	V
		V <sub>CC</sub> = 6.0 V	-	2.8	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	-	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> = -6.0 mA; V <sub>CC</sub> = 4.5 V	3.98	4.32	-	V
V <sub>OL</sub>	LOW-level output voltage	I <sub>O</sub> = -7.8 mA; V <sub>CC</sub> = 6.0 V	5.48	5.81	-	V
		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	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>I</sub>	input leakage current	I <sub>O</sub> = 6.0 mA; V <sub>CC</sub> = 4.5 V	-	0.15	0.26	V
		I <sub>O</sub> = 7.8 mA; V <sub>CC</sub> = 6.0 V	-	0.16	0.26	V
		V <sub>I</sub> = V <sub>CC</sub> or GND; V <sub>CC</sub> = 6.0 V	-	-	±0.1	μA
I <sub>OZ</sub>	OFF-state output current	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 6.0 V; V <sub>O</sub> = V <sub>CC</sub> or GND	-	-	±0.5	μA
I <sub>CC</sub>	supply current	V <sub>CC</sub> = 6.0 V; I <sub>O</sub> = 0 A; V <sub>I</sub> = V <sub>CC</sub> or GND	-	-	8.0	μA
C <sub>I</sub>	input capacitance		-	3.5	-	pF

**Table 6.** Static characteristics 74HC373 ...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>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 2.0 V	1.5	-	-	V
		V <sub>CC</sub> = 4.5 V	3.15	-	-	V
		V <sub>CC</sub> = 6.0 V	4.2	-	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 2.0 V	-	-	0.5	V
		V <sub>CC</sub> = 4.5 V	-	-	1.35	V
		V <sub>CC</sub> = 6.0 V	-	-	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	-	-	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> = -6.0 mA; V <sub>CC</sub> = 4.5 V	3.84	-	-	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	-	-	0.1	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> = 6.0 mA; V <sub>CC</sub> = 4.5 V	-	-	0.33	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	-	-	±1.0	μA
		V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 6.0 V; V <sub>O</sub> = V <sub>CC</sub> or GND	-	-	±5.0	μA
I <sub>CC</sub>	supply current	V <sub>CC</sub> = 6.0 V; I <sub>O</sub> = 0 A; V <sub>I</sub> = V <sub>CC</sub> or GND	-	-	80	μA
<b>T<sub>amb</sub> = -40 °C to +125 °C</b>						
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 2.0 V	1.5	-	-	V
		V <sub>CC</sub> = 4.5 V	3.15	-	-	V
		V <sub>CC</sub> = 6.0 V	4.2	-	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 2.0 V	-	-	0.5	V
		V <sub>CC</sub> = 4.5 V	-	-	1.35	V
		V <sub>CC</sub> = 6.0 V	-	-	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	-	-	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> = -6.0 mA; V <sub>CC</sub> = 4.5 V	3.7	-	-	V
I <sub>O</sub> = -7.8 mA; V <sub>CC</sub> = 6.0 V		5.2	-	-	V	

**Table 6.** Static characteristics 74HC373 ...continued

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
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	-	-	0.1	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> = 6.0 mA; V <sub>CC</sub> = 4.5 V	-	-	0.4	V
		I <sub>O</sub> = 7.8 mA; V <sub>CC</sub> = 6.0 V	-	-	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	-	-	±1.0	μA
I <sub>OZ</sub>	OFF-state output current	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 6.0 V; V <sub>O</sub> = V <sub>CC</sub> or GND	-	-	±10.0	μA
I <sub>CC</sub>	supply current	V <sub>CC</sub> = 6.0 V; I <sub>O</sub> = 0 A; V <sub>I</sub> = V <sub>CC</sub> or GND	-	-	160	μA

**Table 7.** Static characteristics 74HCT373

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>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	2.0	1.6	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	-	1.2	0.8	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> = 4.5 V	4.4	4.5	-	V
		I <sub>O</sub> = -6.0 mA; V <sub>CC</sub> = 4.5 V	3.98	4.32	-	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> = 4.5 V	-	0.0	0.1	V
		I <sub>O</sub> = 6.0 mA; V <sub>CC</sub> = 4.5 V	-	0.16	0.26	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	μA
I <sub>OZ</sub>	OFF-state output current	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 5.5 V; V <sub>O</sub> = V <sub>CC</sub> or GND	-	-	±0.5	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> = 5.5 V	-	-	8.0	μA
ΔI <sub>CC</sub>	additional supply current	V <sub>I</sub> = V <sub>CC</sub> - 2.1 V; other inputs at V <sub>CC</sub> or GND; V <sub>CC</sub> = 4.5 V to 5.5 V; I <sub>O</sub> = 0 A				
		D <sub>n</sub>	-	30	108	μA
		LE	-	150	540	μA
		OE	-	100	360	μA
C <sub>I</sub>	input capacitance		-	3.5	-	pF
<b>T<sub>amb</sub> = -40 °C to +85 °C</b>						
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	2.0	-	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	-	-	0.8	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> = 4.5 V	4.4	-	-	V
		I <sub>O</sub> = -6.0 μA; V <sub>CC</sub> = 4.5 V	3.84	-	-	V



**Table 7. Static characteristics 74HCT373 ...continued**

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
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> = 4.5 V	-	-	0.1	V
		I <sub>O</sub> = 6.0 mA; V <sub>CC</sub> = 4.5 V	-	-	0.33	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	-	-	±1.0	μA
I <sub>OZ</sub>	OFF-state output current	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 5.5 V; V <sub>O</sub> = V <sub>CC</sub> or GND	-	-	±5.0	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> = 5.5 V	-	-	80	μA
ΔI <sub>CC</sub>	additional supply current	V <sub>I</sub> = V <sub>CC</sub> - 2.1 V; other inputs at V <sub>CC</sub> or GND; V <sub>CC</sub> = 4.5 V to 5.5 V; I <sub>O</sub> = 0 A				
		Dn	-	-	135	μA
		LE	-	-	675	μA
		$\overline{\text{OE}}$	-	-	450	μA
<b>T<sub>amb</sub> = -40 °C to +125 °C</b>						
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	2.0	-	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	-	-	0.8	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> = 4.5 V	4.4	-	-	V
		I <sub>O</sub> = -6.0 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>IH</sub> or V <sub>IL</sub>				
		I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 4.5 V	-	-	0.1	V
		I <sub>O</sub> = 6.0 mA; V <sub>CC</sub> = 4.5 V	-	-	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	-	-	±1.0	μA
I <sub>OZ</sub>	OFF-state output current	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 5.5 V; V <sub>O</sub> = V <sub>CC</sub> or GND	-	-	±10	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> = 5.5 V	-	-	160	μA
ΔI <sub>CC</sub>	additional supply current	V <sub>I</sub> = V <sub>CC</sub> - 2.1 V; other inputs at V <sub>CC</sub> or GND; V <sub>CC</sub> = 4.5 V to 5.5 V; I <sub>O</sub> = 0 A				
		Dn	-	-	147	μA
		LE	-	-	735	μA
		$\overline{\text{OE}}$	-	-	490	μA

## 10. Dynamic characteristics

**Table 8. Dynamic characteristics 74HC373**

Voltages are referenced to GND (ground = 0 V);  $C_L = 50$  pF unless otherwise specified; for test circuit see [Figure 12](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>T<sub>amb</sub> = 25 °C</b>						
t <sub>pd</sub>	propagation delay	Dn to Qn; see <a href="#">Figure 8</a> <a href="#">[1]</a>				
		V <sub>CC</sub> = 2.0 V	-	41	150	ns
		V <sub>CC</sub> = 4.5 V	-	15	30	ns
		V <sub>CC</sub> = 5 V; C <sub>L</sub> = 15 pF	-	12	-	ns
		V <sub>CC</sub> = 6.0 V	-	12	26	ns
		LE to Qn; see <a href="#">Figure 9</a>				
		V <sub>CC</sub> = 2.0 V	-	50	175	ns
		V <sub>CC</sub> = 4.5 V	-	18	35	ns
		V <sub>CC</sub> = 5 V; C <sub>L</sub> = 15 pF	-	15	-	ns
V <sub>CC</sub> = 6.0 V	-	14	30	ns		
t <sub>en</sub>	enable time	$\overline{\text{OE}}$ to Qn; see <a href="#">Figure 10</a> <a href="#">[2]</a>				
		V <sub>CC</sub> = 2.0 V	-	44	150	ns
		V <sub>CC</sub> = 4.5 V	-	16	30	ns
		V <sub>CC</sub> = 6.0 V	-	13	26	ns
t <sub>dis</sub>	disable time	$\overline{\text{OE}}$ to Qn; see <a href="#">Figure 10</a> <a href="#">[3]</a>				
		V <sub>CC</sub> = 2.0 V	-	47	150	ns
		V <sub>CC</sub> = 4.5 V	-	17	30	ns
		V <sub>CC</sub> = 6.0 V	-	14	26	ns
t <sub>t</sub>	transition time	Qn; see <a href="#">Figure 8</a> and <a href="#">Figure 9</a> <a href="#">[4]</a>				
		V <sub>CC</sub> = 2.0 V	-	14	60	ns
		V <sub>CC</sub> = 4.5 V	-	5	12	ns
		V <sub>CC</sub> = 6.0 V	-	4	10	ns
t <sub>w</sub>	pulse width	LE HIGH; see <a href="#">Figure 9</a>				
		V <sub>CC</sub> = 2.0 V	80	17	-	ns
		V <sub>CC</sub> = 4.5 V	16	6	-	ns
		V <sub>CC</sub> = 6.0 V	14	5	-	ns
t <sub>su</sub>	set-up time	Dn to LE; see <a href="#">Figure 11</a>				
		V <sub>CC</sub> = 2.0 V	50	14	-	ns
		V <sub>CC</sub> = 4.5 V	10	5	-	ns
		V <sub>CC</sub> = 6.0 V	9	4	-	ns
t <sub>h</sub>	hold time	Dn to LE; see <a href="#">Figure 11</a>				
		V <sub>CC</sub> = 2.0 V	+5	-8	-	ns
		V <sub>CC</sub> = 4.5 V	+5	-3	-	ns
		V <sub>CC</sub> = 6.0 V	+5	-2	-	ns
C <sub>PD</sub>	power dissipation capacitance	per latch; V <sub>I</sub> = GND to V <sub>CC</sub> <a href="#">[5]</a>	-	45	-	pF

**Table 8. Dynamic characteristics 74HC373 ...continued**

Voltages are referenced to GND (ground = 0 V);  $C_L = 50$  pF unless otherwise specified; for test circuit see [Figure 12](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$T_{amb} = -40$ °C to $+85$ °C						
$t_{pd}$	propagation delay	Dn to Qn; see <a href="#">Figure 8</a> <sup>[1]</sup>				
		$V_{CC} = 2.0$ V	-	-	190	ns
		$V_{CC} = 4.5$ V	-	-	38	ns
		$V_{CC} = 6.0$ V	-	-	33	ns
		LE to Qn; see <a href="#">Figure 9</a>				
		$V_{CC} = 2.0$ V	-	-	220	ns
		$V_{CC} = 4.5$ V	-	-	44	ns
$t_{en}$	enable time	$\overline{OE}$ to Qn; see <a href="#">Figure 10</a> <sup>[2]</sup>				
		$V_{CC} = 2.0$ V	-	-	190	ns
		$V_{CC} = 4.5$ V	-	-	38	ns
$t_{dis}$	disable time	$\overline{OE}$ to Qn; see <a href="#">Figure 10</a> <sup>[3]</sup>				
		$V_{CC} = 2.0$ V	-	-	190	ns
		$V_{CC} = 4.5$ V	-	-	38	ns
$t_t$	transition time	Qn; see <a href="#">Figure 8</a> and <a href="#">Figure 9</a> <sup>[4]</sup>				
		$V_{CC} = 2.0$ V	-	-	75	ns
		$V_{CC} = 4.5$ V	-	-	15	ns
$t_W$	pulse width	LE HIGH; see <a href="#">Figure 9</a>				
		$V_{CC} = 2.0$ V	100	-	-	ns
		$V_{CC} = 4.5$ V	20	-	-	ns
$t_{su}$	set-up time	Dn to LE; see <a href="#">Figure 11</a>				
		$V_{CC} = 2.0$ V	65	-	-	ns
		$V_{CC} = 4.5$ V	13	-	-	ns
$t_h$	hold time	Dn to LE; see <a href="#">Figure 11</a>				
		$V_{CC} = 2.0$ V	5	-	-	ns
		$V_{CC} = 4.5$ V	5	-	-	ns
$t_h$	hold time	$V_{CC} = 6.0$ V	5	-	-	ns

**Table 8. Dynamic characteristics 74HC373 ...continued**

Voltages are referenced to GND (ground = 0 V);  $C_L = 50$  pF unless otherwise specified; for test circuit see [Figure 12](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b><math>T_{amb} = -40</math> °C to <math>+125</math> °C</b>						
$t_{pd}$	propagation delay	Dn to Qn; see <a href="#">Figure 8</a> <sup>[1]</sup>				
		$V_{CC} = 2.0$ V	-	-	225	ns
		$V_{CC} = 4.5$ V	-	-	45	ns
		$V_{CC} = 6.0$ V	-	-	38	ns
		LE to Qn; see <a href="#">Figure 9</a>				
		$V_{CC} = 2.0$ V	-	-	265	ns
		$V_{CC} = 4.5$ V	-	-	53	ns
$t_{en}$	enable time	$\overline{OE}$ to Qn; see <a href="#">Figure 10</a> <sup>[2]</sup>				
		$V_{CC} = 2.0$ V	-	-	225	ns
		$V_{CC} = 4.5$ V	-	-	45	ns
$t_{dis}$	disable time	$\overline{OE}$ to Qn; see <a href="#">Figure 10</a> <sup>[3]</sup>				
		$V_{CC} = 2.0$ V	-	-	225	ns
		$V_{CC} = 4.5$ V	-	-	45	ns
$t_t$	transition time	Qn; see <a href="#">Figure 8</a> and <a href="#">Figure 9</a> <sup>[4]</sup>				
		$V_{CC} = 2.0$ V	-	-	90	ns
		$V_{CC} = 4.5$ V	-	-	18	ns
$t_W$	pulse width	LE HIGH; see <a href="#">Figure 9</a>				
		$V_{CC} = 2.0$ V	120	-	-	ns
		$V_{CC} = 4.5$ V	24	-	-	ns
$t_{su}$	set-up time	Dn to LE; see <a href="#">Figure 11</a>				
		$V_{CC} = 2.0$ V	75	-	-	ns
		$V_{CC} = 4.5$ V	15	-	-	ns
		$V_{CC} = 6.0$ V	13	-	-	ns

**Table 8. Dynamic characteristics 74HC373 ...continued**

Voltages are referenced to GND (ground = 0 V);  $C_L = 50$  pF unless otherwise specified; for test circuit see [Figure 12](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$t_h$	hold time	Dn to LE; see <a href="#">Figure 11</a>				
		$V_{CC} = 2.0$ V	5	-	-	ns
		$V_{CC} = 4.5$ V	5	-	-	ns
		$V_{CC} = 6.0$ V	5	-	-	ns

- [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  $\mu$ W).  
 $P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \sum(C_L \times V_{CC}^2 \times f_o)$  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;  
 $\sum(C_L \times V_{CC}^2 \times f_o)$  = sum of outputs.

**Table 9. Dynamic characteristics 74HCT373**

Voltages are referenced to GND (ground = 0 V);  $C_L = 50$  pF unless otherwise specified; for test circuit see [Figure 12](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b><math>T_{amb} = 25</math> °C</b>						
$t_{pd}$	propagation delay	Dn to Qn; see <a href="#">Figure 8</a> [1]				
		$V_{CC} = 4.5$ V	-	17	30	ns
		$V_{CC} = 5$ V; $C_L = 15$ pF	-	14	-	ns
		LE to Qn; see <a href="#">Figure 9</a>				
		$V_{CC} = 4.5$ V	-	16	32	ns
		$V_{CC} = 5$ V; $C_L = 15$ pF	-	13	-	ns
$t_{en}$	enable time	$\overline{OE}$ to Qn; see <a href="#">Figure 10</a> [2]				
		$V_{CC} = 4.5$ V	-	19	32	ns
$t_{dis}$	disable time	$\overline{OE}$ to Qn; see <a href="#">Figure 10</a> [3]				
		$V_{CC} = 4.5$ V	-	18	30	ns
$t_t$	transition time	Qn; see <a href="#">Figure 8</a> and <a href="#">Figure 9</a> [4]				
		$V_{CC} = 4.5$ V	-	5	12	ns
$t_W$	pulse width	LE HIGH; see <a href="#">Figure 9</a>				
		$V_{CC} = 4.5$ V	16	4	-	ns
$t_{su}$	set-up time	Dn to LE; see <a href="#">Figure 11</a>				
		$V_{CC} = 4.5$ V	12	6	-	ns
$t_h$	hold time	Dn to LE; see <a href="#">Figure 11</a>				
		$V_{CC} = 4.5$ V	4	-1	-	ns
$C_{PD}$	power dissipation capacitance	per latch; $V_1 = \text{GND to } (V_{CC} - 1.5 \text{ V})$ [5]	-	41	-	pF

**Table 9. Dynamic characteristics 74HCT373 ...continued**

Voltages are referenced to GND (ground = 0 V);  $C_L = 50$  pF unless otherwise specified; for test circuit see [Figure 12](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b><math>T_{amb} = -40</math> °C to <math>+85</math> °C</b>						
$t_{pd}$	propagation delay	Dn to Qn; see <a href="#">Figure 8</a> [1]				
		$V_{CC} = 4.5$ V	-	-	38	ns
		LE to Qn; see <a href="#">Figure 9</a>				
		$V_{CC} = 4.5$ V	-	-	40	ns
$t_{en}$	enable time	$\overline{OE}$ to Qn; see <a href="#">Figure 10</a> [2]				
		$V_{CC} = 4.5$ V	-	-	40	ns
$t_{dis}$	disable time	$\overline{OE}$ to Qn; see <a href="#">Figure 10</a> [3]				
		$V_{CC} = 4.5$ V	-	-	38	ns
$t_t$	transition time	Qn; see <a href="#">Figure 8</a> and <a href="#">Figure 9</a> [4]				
		$V_{CC} = 4.5$ V	-	-	15	ns
$t_W$	pulse width	LE HIGH; see <a href="#">Figure 9</a>				
		$V_{CC} = 4.5$ V	20	-	-	ns
$t_{su}$	set-up time	Dn to LE; see <a href="#">Figure 11</a>				
		$V_{CC} = 4.5$ V	15	-	-	ns
$t_h$	hold time	Dn to LE; see <a href="#">Figure 11</a>				
		$V_{CC} = 4.5$ V	4	-	-	ns
<b><math>T_{amb} = -40</math> °C to <math>+125</math> °C</b>						
$t_{pd}$	propagation delay	Dn to Qn; see <a href="#">Figure 8</a> [1]				
		$V_{CC} = 4.5$ V	-	-	45	ns
		LE to Qn; see <a href="#">Figure 9</a>				
		$V_{CC} = 4.5$ V	-	-	48	ns
$t_{en}$	enable time	$\overline{OE}$ to Qn; see <a href="#">Figure 10</a> [2]				
		$V_{CC} = 4.5$ V	-	-	48	ns
$t_{dis}$	disable time	$\overline{OE}$ to Qn; see <a href="#">Figure 10</a> [3]				
		$V_{CC} = 4.5$ V	-	-	45	ns
$t_t$	transition time	Qn; see <a href="#">Figure 8</a> and <a href="#">Figure 9</a> [4]				
		$V_{CC} = 4.5$ V	-	-	18	ns
$t_W$	pulse width	LE HIGH; see <a href="#">Figure 9</a>				
		$V_{CC} = 4.5$ V	24	-	-	ns
$t_{su}$	set-up time	Dn to LE; see <a href="#">Figure 11</a>				
		$V_{CC} = 4.5$ V	18	-	-	ns

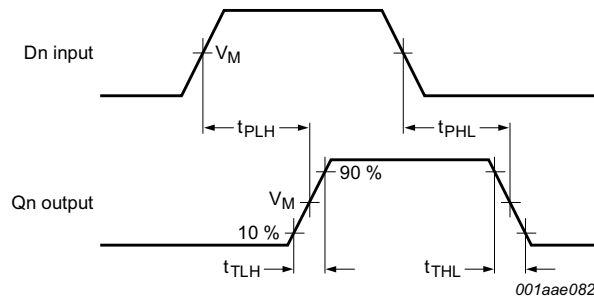
**Table 9. Dynamic characteristics 74HCT373 ...continued**

Voltages are referenced to GND (ground = 0 V);  $C_L = 50$  pF unless otherwise specified; for test circuit see [Figure 12](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$t_h$	hold time	Dn to LE; see <a href="#">Figure 11</a>				
		$V_{CC} = 4.5$ V	4	-	-	ns

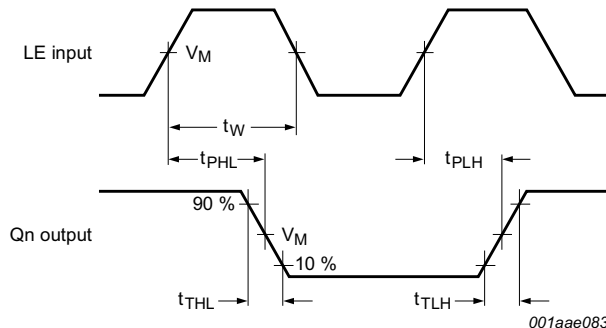
- [1]  $t_{pd}$  is the same as  $t_{PLH}$  and  $t_{PHL}$ .
- [2]  $t_{en}$  is the same as  $t_{PZH}$  and  $t_{PZL}$ .
- [3]  $t_{dis}$  is the same as  $t_{PLZ}$  and  $t_{PHZ}$ .
- [4]  $t_i$  is the same as  $t_{THL}$  and  $t_{TLH}$ .
- [5]  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu$ W).  
 $P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \sum(C_L \times V_{CC}^2 \times f_o)$  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;  
 $\sum(C_L \times V_{CC}^2 \times f_o)$  = sum of outputs.

## 11. Waveforms



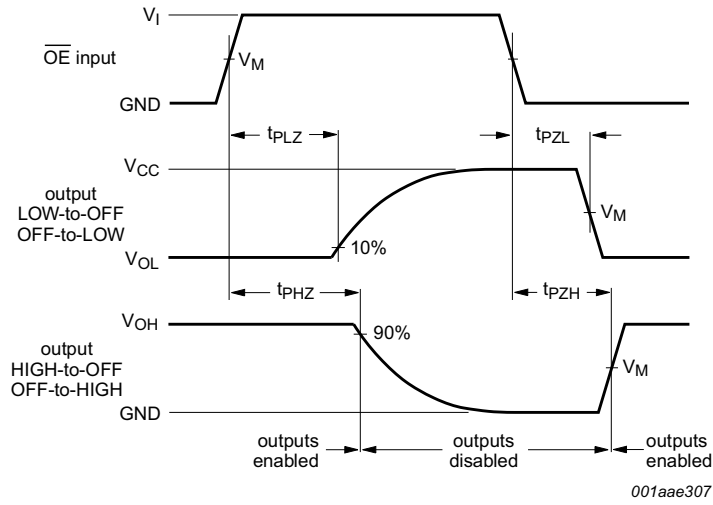
Measurement points are given in [Table 10](#).

**Fig 8. Propagation delay input (Dn) to output (Qn) and transition time output (Qn)**



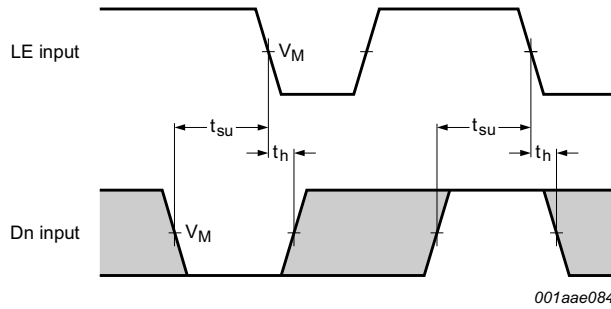
Measurement points are given in [Table 10](#).

**Fig 9. Pulse width latch enable input (LE), propagation delay (LE) to output (Qn) and transition time output (Qn)**



Measurement points are given in [Table 10](#).

**Fig 10. 3-state enable and disable time**



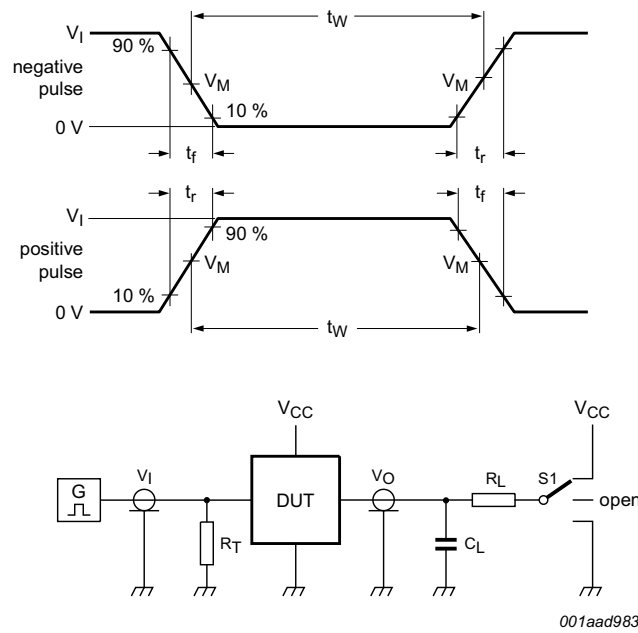
Measurement points are given in [Table 10](#).

**Fig 11. Set-up and hold time data input (Dn) to latch enable input (LE)**

**Table 10. Measurement points**

Type	Input	Output
	$V_M$	$V_M$
74HC373	$0.5V_{CC}$	$0.5V_{CC}$
74HCT373	1.3 V	1.3 V





Test data is given in [Table 11](#).

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

$R_L$  = Load resistor

S1 = Test selection switch

**Fig 12. Test circuit for measuring switching times**

**Table 11. Test data**

Type	Input		Load		S1 position		
	$V_I$	$t_r, t_f$	$C_L$	$R_L$	$t_{PHL}, t_{PLH}$	$t_{PZH}, t_{PHZ}$	$t_{PZL}, t_{PLZ}$
74HC373	$V_{CC}$	6 ns	15 pF, 50 pF	1 k $\Omega$	open	GND	$V_{CC}$
74HCT373	3 V	6 ns	15 pF, 50 pF	1 k $\Omega$	open	GND	$V_{CC}$

12. Package outline

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

SOT163-1

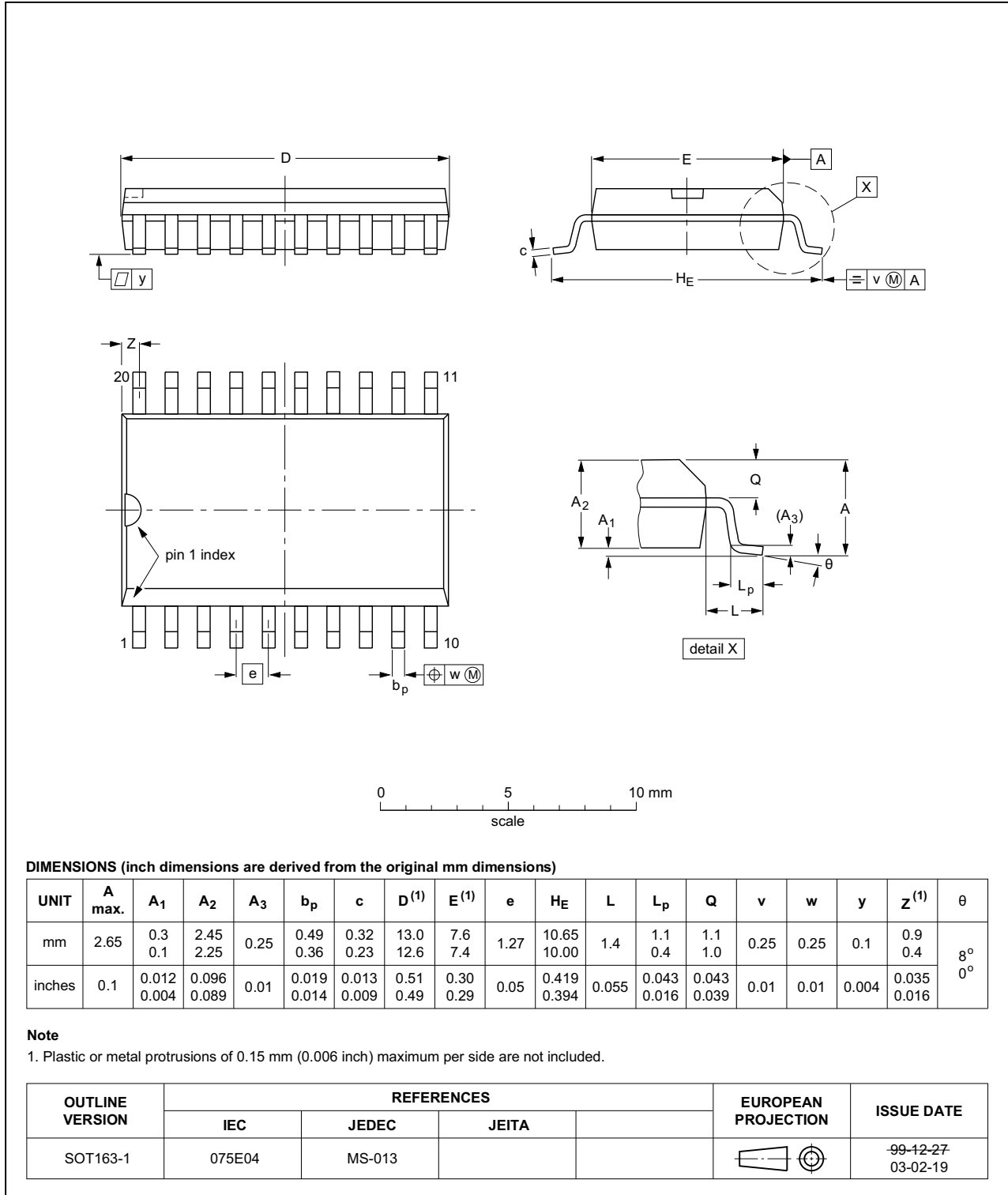


Fig 13. Package outline SOT163-1 (SO20)

SSOP20: plastic shrink small outline package; 20 leads; body width 5.3 mm

SOT339-1

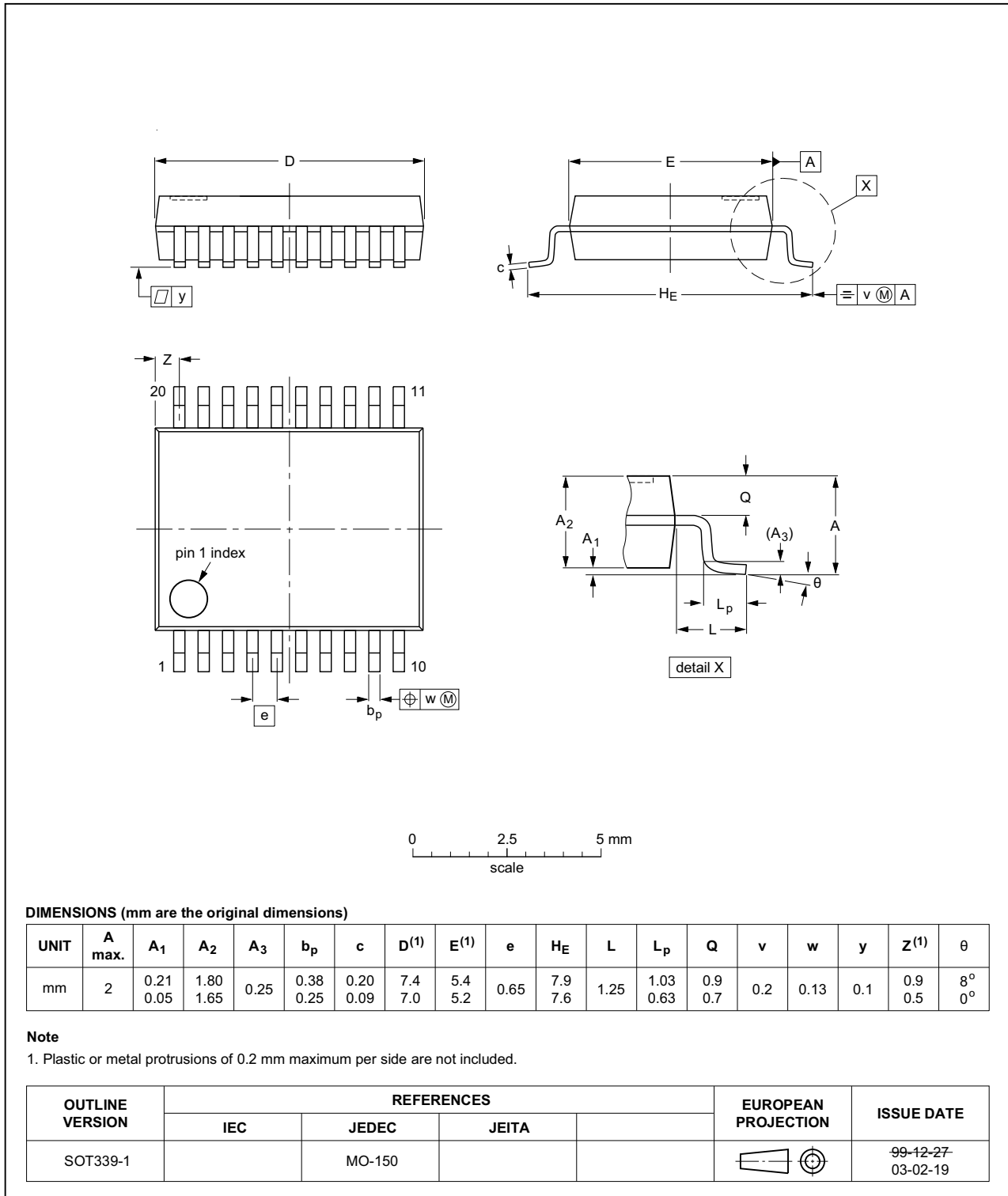


Fig 14. Package outline SOT339-1 (SSOP20)

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

SOT360-1

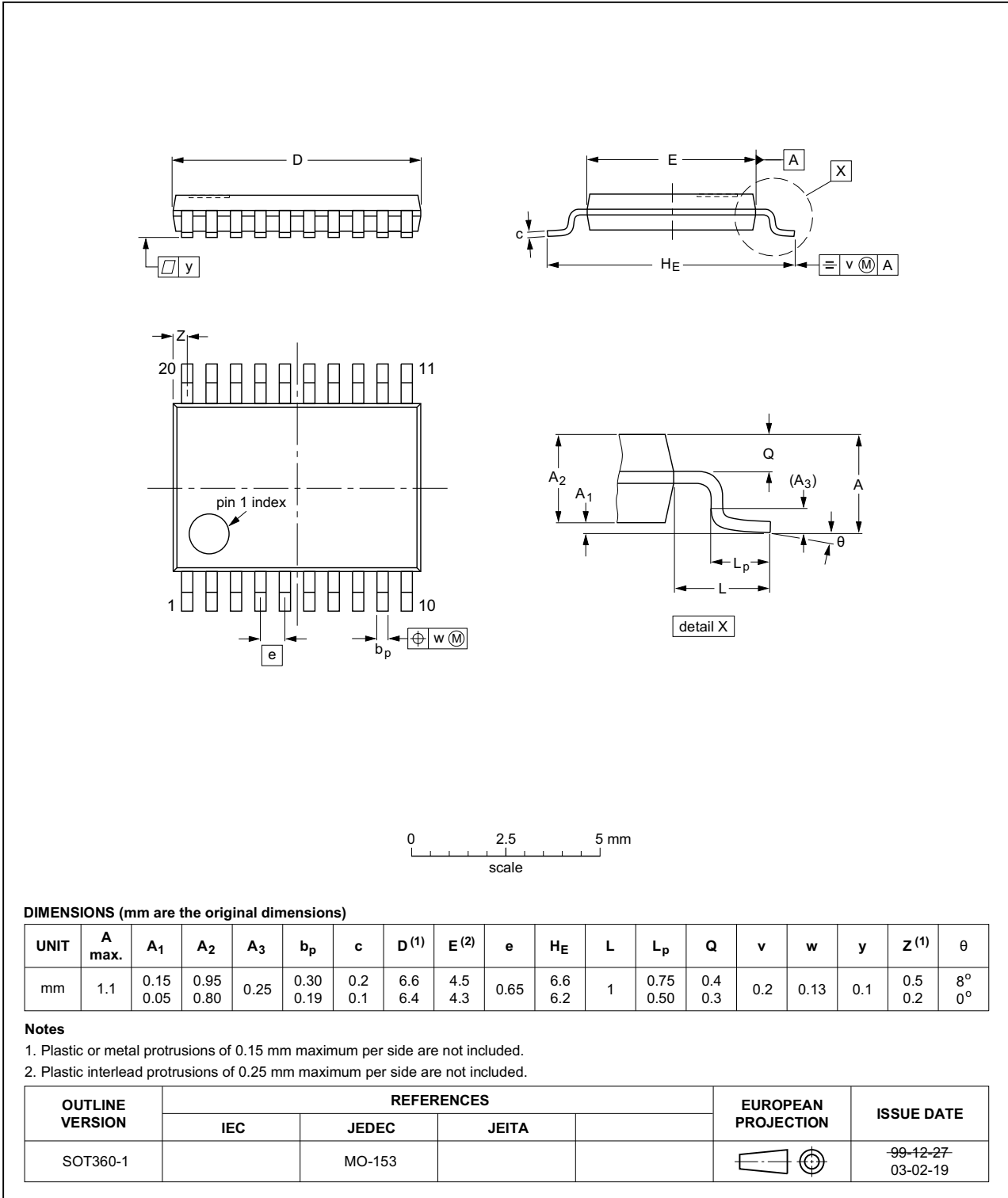


Fig 15. Package outline SOT360-1 (TSSOP20)

DHVQFN20: plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads;  
20 terminals; body 2.5 x 4.5 x 0.85 mm

SOT764-1

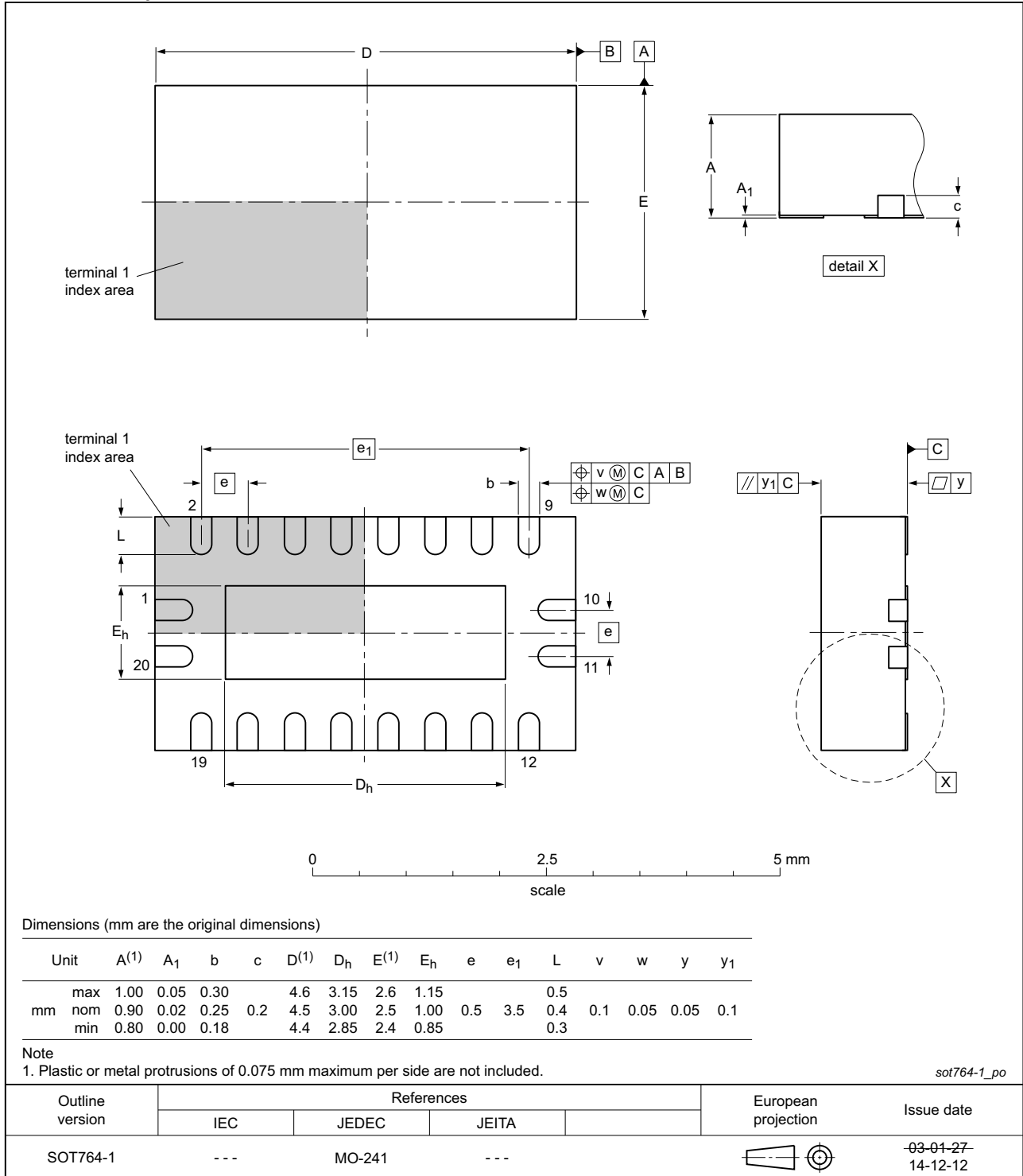


Fig 16. Package outline SOT764-1 (DHVQFN20)

## 13. Abbreviations

Table 12. Abbreviations

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

## 14. Revision history

Table 13. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74HC_HCT373 v.6	20160226	Product data sheet	-	74HC_HCT373 v.5
Modifications:	<ul style="list-style-type: none"> <li>Type numbers 74HC373N and 74HCT373N (SOT146-1) removed.</li> </ul>			
74HC_HCT373 v.5	20111213	Product data sheet	-	74HC_HCT373 v.4
Modifications:	<ul style="list-style-type: none"> <li>Legal pages updated.</li> </ul>			
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	-	-

## 15. Legal information

### 15.1 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".

[3] 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 URL <http://www.nexperia.com>.

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## 15.4 Trademarks

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## 16. Contact information

For more information, please visit: <http://www.nexperia.com>

For sales office addresses, please send an email to: [salesaddresses@nexperia.com](mailto:salesaddresses@nexperia.com)