

74AHC573; 74AHCT573

Octal D-type transparent latch; 3-state

Rev. 7 — 8 November 2011

Product data sheet

1. General description

The 74AHC573; 74AHCT573 is a high-speed Si-gate CMOS device and is pin compatible with Low-power Schottky TTL (LSTTL). It is specified in compliance with JEDEC standard No. 7A.

The 74AHC573; 74AHCT573 consists of eight D-type transparent latches featuring separate D-type inputs for each latch and 3-state true outputs for bus oriented applications. A latch enable input (LE) and an output enable input (\overline{OE}) are common to all latches.

When pin LE is HIGH, data at the Dn inputs enters the latches. In this condition the latches are transparent, i.e. a latch output will change state each time its corresponding Dn input changes. When pin LE is LOW, the latches store the information that is present at the Dn inputs, after a set-up time preceding the HIGH-to-LOW transition of LE.

When pin \overline{OE} is LOW, the contents of the 8 latches are available at the outputs. When pin \overline{OE} is HIGH, the outputs go to the high-impedance OFF-state. Operation of the \overline{OE} input does not affect the state of the latches.

The 74AHC573; 74AHCT573 is functionally identical to the 74AHC373; 74AHCT373, but has a different pin arrangement.

2. Features and benefits

- Balanced propagation delays
- All inputs have a Schmitt trigger action
- Common 3-state output enable input
- Functionally identical to the 74AHC373; 74AHCT373
- Inputs accept voltages higher than V_{CC}
- Input levels:
 - ◆ For 74AHC573: CMOS input level
 - ◆ For 74AHCT573: TTL input level
- ESD protection:
 - ◆ HBM EIA/JESD22-A114E exceeds 2000 V
 - ◆ MM EIA/JESD22-A115-A exceeds 200 V
 - ◆ CDM EIA/JESD22-C101C exceeds 1000 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			Version
	Temperature range	Name	Description	
74AHC573				
74AHC573D	-40 °C to +125 °C	SO20	plastic small outline package; 20 leads; body width 7.5 mm	SOT163-1
74AHC573PW	-40 °C to +125 °C	TSSOP20	plastic thin shrink small outline package; 20 leads; body width 4.4 mm	SOT360-1
74AHC573BQ	-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
74AHCT573				
74AHCT573D	-40 °C to +125 °C	SO20	plastic small outline package; 20 leads; body width 7.5 mm	SOT163-1
74AHCT573PW	-40 °C to +125 °C	TSSOP20	plastic thin shrink small outline package; 20 leads; body width 4.4 mm	SOT360-1
74AHCT573BQ	-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

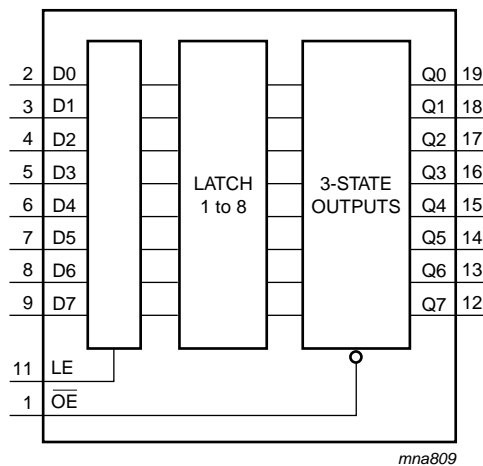


Fig 1. Functional diagram

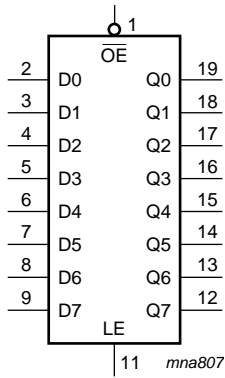


Fig 2. Logic symbol

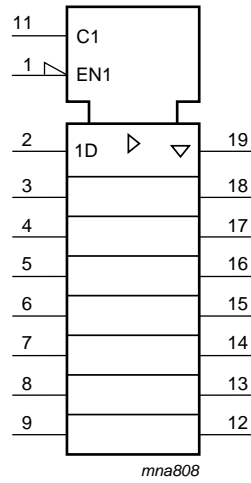


Fig 3. IEC logic symbol

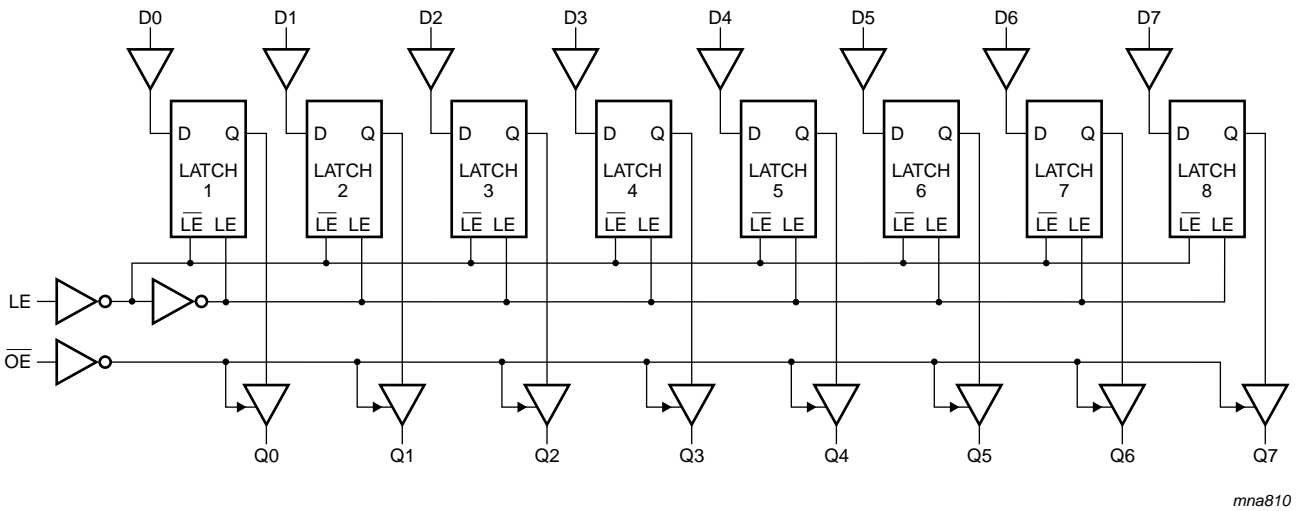
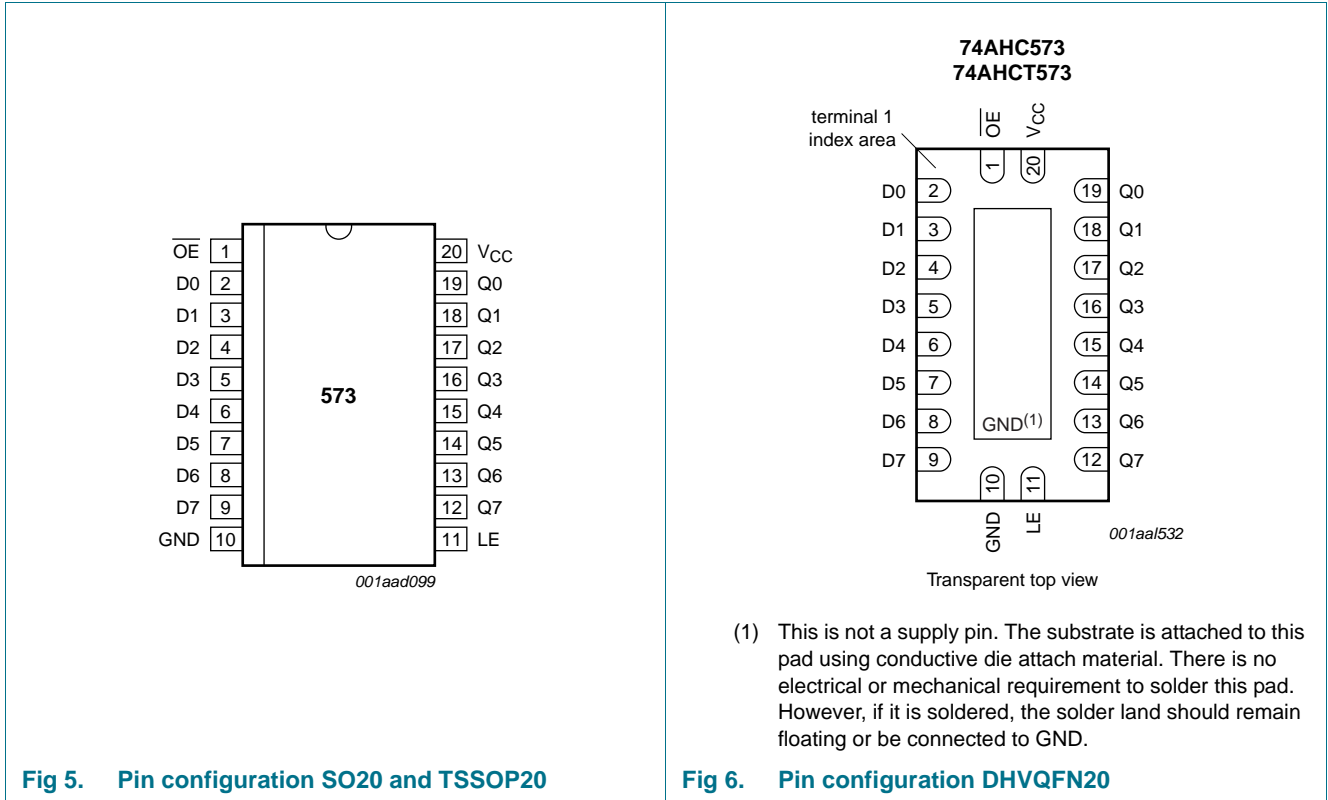


Fig 4. Logic diagram

5. Pinning information

5.1 Pinning



5.2 Pin description

Table 2. Pin description

Symbol	Pin	Description
\overline{OE}	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 _{CC}	20	supply voltage

6. Functional description

Table 3. Function table^[1]

Operating mode	Input			Internal latch	Output Qn
	$\overline{\text{OE}}$	LE	Dn		
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	L	l	L	Z
			h	H	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;
 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	+7.0	V
V_I	input voltage		-0.5	+7.0	V
I_{IK}	input clamping current	$V_I < -0.5 \text{ V}$	^[1] -20	-	mA
I_{OK}	output clamping current	$V_O < -0.5 \text{ V}$ or $V_O > V_{CC} + 0.5 \text{ V}$	^[1] -20	+20	mA
I_O	output current	$V_O = -0.5 \text{ V}$ to $(V_{CC} + 0.5 \text{ V})$	-25	+25	mA
I_{CC}	supply current		-	+75	mA
I_{GND}	ground current		-75	-	mA
T_{stg}	storage temperature		-65	+150	°C
P_{tot}	total power dissipation	$T_{amb} = -40 \text{ °C}$ to $+125 \text{ °C}$	^[2] -	500	mW

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

- [2] For SO20 packages: above 70 °C the value of P_{tot} derates linearly at 8 mW/K.
 For TSSOP20 packages: above 60 °C the value of P_{tot} derates linearly at 5.5 mW/K.
 For DHVQFN20 packages: above 60 °C the value of P_{tot} derates linearly with 4.5 mW/K.

8. Recommended operating conditions

Table 5. Operating conditions

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
74AHC573						
V_{CC}	supply voltage		2.0	5.0	5.5	V
V_I	input voltage		0	-	5.5	V
V_O	output voltage		0	-	V_{CC}	V
T_{amb}	ambient temperature		-40	+25	+125	°C
$\Delta t/\Delta V$	input transition rise and fall rate	$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	-	-	100	ns/V
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	-	-	20	ns/V
74AHCT573						
V_{CC}	supply voltage		4.5	5.0	5.5	V
V_I	input voltage		0	-	5.5	V
V_O	output voltage		0	-	V_{CC}	V
T_{amb}	ambient temperature		-40	+25	+125	°C
$\Delta t/\Delta V$	input transition rise and fall rate	$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	-	-	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	Typ	Max	Min	Max	Min	Typ	Max	
74AHC573											
V_{IH}	HIGH-level input voltage	$V_{CC} = 2.0\text{ V}$	1.5	-	-	1.5	-	1.5	-	-	V
		$V_{CC} = 3.0\text{ V}$	2.1	-	-	2.1	-	2.1	-	-	V
		$V_{CC} = 5.5\text{ V}$	3.85	-	-	3.85	-	3.85	-	-	V
V_{IL}	LOW-level input voltage	$V_{CC} = 2.0\text{ V}$	-	-	0.5	-	0.5	-	-	0.5	V
		$V_{CC} = 3.0\text{ V}$	-	-	0.9	-	0.9	-	-	0.9	V
		$V_{CC} = 5.5\text{ V}$	-	-	1.65	-	1.65	-	-	1.65	V
V_{OH}	HIGH-level output voltage	$V_I = V_{IH}$ or V_{IL}									
		$I_O = -50\ \mu\text{A}; V_{CC} = 2.0\text{ V}$	1.9	2.0	-	1.9	-	1.9	-	-	V
		$I_O = -50\ \mu\text{A}; V_{CC} = 3.0\text{ V}$	2.9	3.0	-	2.9	-	2.9	-	-	V
		$I_O = -50\ \mu\text{A}; V_{CC} = 4.5\text{ V}$	4.4	4.5	-	4.4	-	4.4	-	-	V
		$I_O = -4.0\text{ mA}; V_{CC} = 3.0\text{ V}$	2.58	-	-	2.48	-	2.40	-	-	V
	$I_O = -8.0\text{ mA}; V_{CC} = 4.5\text{ V}$	3.94	-	-	3.80	-	3.70	-	-	V	
V_{OL}	LOW-level output voltage	$V_I = V_{IH}$ or V_{IL}									
		$I_O = 50\ \mu\text{A}; V_{CC} = 2.0\text{ V}$	-	0	0.1	-	0.1	-	-	0.1	V
		$I_O = 50\ \mu\text{A}; V_{CC} = 3.0\text{ V}$	-	0	0.1	-	0.1	-	-	0.1	V
		$I_O = 50\ \mu\text{A}; V_{CC} = 4.5\text{ V}$	-	0	0.1	-	0.1	-	-	0.1	V
		$I_O = 4.0\text{ mA}; V_{CC} = 3.0\text{ V}$	-	-	0.36	-	0.44	-	-	0.55	V
	$I_O = 8.0\text{ mA}; V_{CC} = 4.5\text{ V}$	-	-	0.36	-	0.44	-	-	0.55	V	

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	Typ	Max	
I _{OZ}	OFF-state output current	V _I = V _{IH} or V _{IL} ; V _O = V _{CC} or GND; V _{CC} = 5.5 V	-	-	±0.25	-	±2.5	-	-	±10.0	μA
I _I	input leakage current	V _I = V _{CC} or GND; V _{CC} = 0 V to 5.5 V	-	-	0.1	-	1.0	-	-	2.0	μA
I _{CC}	supply current	V _I = V _{CC} or GND; I _O = 0 A; V _{CC} = 5.5 V	-	-	4.0	-	40	-	-	80	μA
C _I	input capacitance	V _I = V _{CC} or GND	-	3	10	-	10	-	-	10	pF
C _O	output capacitance		-	4	-	-	-	-	-	10	pF

74AHCT573

V _{IH}	HIGH-level input voltage	V _{CC} = 4.5 V to 5.5 V	2.0	-	-	2.0	-	2.0	-	-	V
V _{IL}	LOW-level input voltage	V _{CC} = 4.5 V to 5.5 V	-	-	0.8	-	0.8	-	-	0.8	V
V _{OH}	HIGH-level output voltage	V _I = V _{IH} or V _{IL} ; V _{CC} = 4.5 V									
		I _O = −50 μA	4.4	4.5	-	4.4	-	4.4	-	-	V
		I _O = −8.0 mA	3.94	-	-	3.80	-	3.70	-	-	V
V _{OL}	LOW-level output voltage	V _I = V _{IH} or V _{IL} ; V _{CC} = 4.5 V									
		I _O = 50 μA	-	0	0.1	-	0.1	-	-	0.1	V
		I _O = 8.0 mA	-	-	0.36	-	0.44	-	-	0.55	V
I _{OZ}	OFF-state output current	V _I = V _{IH} or V _{IL} ; V _O = V _{CC} or GND per input pin; other inputs at V _{CC} or GND; I _O = 0 A	-	-	±0.25	-	±2.5	-	-	±10.0	μA
I _I	input leakage current	V _I = 5.5 V or GND; V _{CC} = 0 V to 5.5 V	-	-	0.1	-	1.0	-	-	2.0	μA
I _{CC}	supply current	V _I = V _{CC} or GND; I _O = 0 A; V _{CC} = 5.5 V	-	-	4.0	-	40	-	-	80	μA
ΔI _{CC}	additional supply current	per input pin; V _I = V _{CC} − 2.1 V; I _O = 0 A; other pins at V _{CC} or GND; V _{CC} = 4.5 V to 5.5 V	-	-	1.35	-	1.5	-	-	1.5	mA
C _I	input capacitance	V _I = V _{CC} or GND	-	3	10	-	10	-	-	10	pF
C _O	output capacitance		-	4	-	-	-	-	-	10	pF

10. Dynamic characteristics

Table 7. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 11](#).

Symbol	Parameter	Conditions	25 °C			–40 °C to +85 °C		–40 °C to +125 °C		Unit
			Min	Typ ^[1]	Max	Min	Max	Min	Max	
74AHC573										
t _{pd}	propagation delay	Dn to Qn; see Figure 7 ^[2]								
		V _{CC} = 3.0 V to 3.6 V								
		C _L = 15 pF	-	5.5	11.0	1.0	13.0	1.0	14.0	ns
		C _L = 50 pF	-	7.8	14.5	1.0	16.5	1.0	18.5	ns
		V _{CC} = 4.5 V to 5.5 V								
		C _L = 15 pF	-	3.9	6.8	1.0	8.0	1.0	8.5	ns
	C _L = 50 pF	-	5.5	8.8	1.0	10.0	1.0	11.0	ns	
	LE to Qn; see Figure 8 ^[2]	V _{CC} = 3.0 V to 3.6 V								
		C _L = 15 pF	-	5.8	11.9	1.0	14.0	1.0	15.0	ns
		C _L = 50 pF	-	8.3	15.4	1.0	17.5	1.0	19.5	ns
		V _{CC} = 4.5 V to 5.5 V								
		C _L = 15 pF	-	4.2	7.7	1.0	9.0	1.0	10.0	ns
C _L = 50 pF		-	5.9	9.7	1.0	11.0	1.0	12.5	ns	
t _{en}	enable time	OE to Qn; see Figure 9 ^[3]								
		V _{CC} = 3.0 V to 3.6 V								
		C _L = 15 pF	-	5.8	11.5	1.0	13.5	1.0	14.5	ns
		C _L = 50 pF	-	8.3	15.0	1.0	17.0	1.0	19.0	ns
		V _{CC} = 4.5 V to 5.5 V								
		C _L = 15 pF	-	4.4	7.7	1.0	9.0	1.0	10.0	ns
C _L = 50 pF	-	6.3	9.7	1.0	11.0	1.0	12.5	ns		
t _{dis}	disable time	OE to Qn; see Figure 9 ^[4]								
		V _{CC} = 3.0 V to 3.6 V								
		C _L = 15 pF	-	6.8	11.0	1.0	13.0	1.0	14.0	ns
		C _L = 50 pF	-	9.7	14.5	1.0	16.5	1.0	18.5	ns
		V _{CC} = 4.5 V to 5.5 V								
		C _L = 15 pF	-	4.6	7.7	1.0	9.0	1.0	10.0	ns
C _L = 50 pF	-	7.4	9.7	1.0	11.0	1.0	12.5	ns		
t _w	pulse width	LE HIGH; see Figure 8								
		V _{CC} = 3.0 V to 3.6 V	5.0	-	-	5.0	-	5.0	-	ns
		V _{CC} = 4.5 V to 5.5 V	5.0	-	-	5.0	-	5.0	-	ns
t _{su}	set-up time	Dn to LE; see Figure 10								
		V _{CC} = 3.0 V to 3.6 V	3.5	-	-	3.5	-	3.5	-	ns
		V _{CC} = 4.5 V to 5.5 V	3.5	-	-	3.5	-	3.5	-	ns

Table 7. Dynamic characteristics ...continuedVoltages are referenced to GND (ground = 0 V); for test circuit see [Figure 11](#).

Symbol	Parameter	Conditions	25 °C			–40 °C to +85 °C		–40 °C to +125 °C		Unit
			Min	Typ ^[1]	Max	Min	Max	Min	Max	
t _h	hold time	Dn to LE; see Figure 10								
		V _{CC} = 3.0 V to 3.6 V	1.5	-	-	1.5	-	1.5	-	ns
		V _{CC} = 4.5 V to 5.5 V	1.5	-	-	1.5	-	1.5	-	ns
C _{PD}	power dissipation capacitance	f _i = 1 MHz; V _i = GND to V _{CC}	[5]	-	12	-	-	-	-	pF
74AHCT573; V_{CC} = 4.5 V to 5.5 V										
t _{pd}	propagation delay	Dn to Qn; see Figure 7	[2]							
		C _L = 15 pF	-	3.5	5.5	1	6.5	1	7.0	ns
		C _L = 50 pF	-	4.9	7.5	1	8.5	1	9.5	ns
		LE to Qn; see Figure 8	[2]							
		C _L = 15 pF	-	3.9	6.0	1	7.0	1	7.5	ns
		C _L = 50 pF	-	5.5	8.5	1	9.5	1	11.0	ns
t _{en}	enable time	OE to Qn; see Figure 9	[3]							
		C _L = 15 pF	-	4.1	6.5	1	7.5	1	8.5	ns
		C _L = 50 pF	-	5.9	8.5	1	10.0	1	11.0	ns
t _{dis}	disable time	OE to Qn; see Figure 9	[4]							
		C _L = 15 pF	-	4.5	6.5	1	7.5	1	8.5	ns
		C _L = 50 pF	-	6.4	9.0	1	10.0	1	11.5	ns
t _W	pulse width	LE HIGH; see Figure 8	5.0	-	-	5.0	-	5.0	-	ns
t _{su}	set-up time	Dn to LE; see Figure 10	3.5	-	-	3.5	-	3.5	-	ns
t _h	hold time	Dn to LE; see Figure 10	1.5	-	-	1.5	-	1.5	-	ns
C _{PD}	power dissipation capacitance	f _i = 1 MHz; V _i = GND to V _{CC}	[5]	-	18	-	-	-	-	pF

[1] Typical values are measured at nominal supply voltage (V_{CC} = 3.3 V and V_{CC} = 5.0 V).[2] t_{pd} is the same as t_{PHL} and t_{PLH}.[3] t_{en} is the same as t_{PZH} and t_{PZL}.[4] t_{dis} is the same as t_{PHZ} and t_{PLZ}.[5] C_{PD} is used to determine the dynamic power dissipation (P_D in μW).

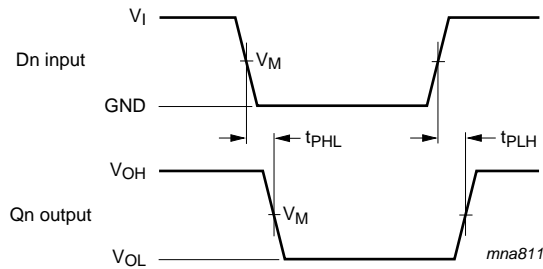
$$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \sum(C_L \times V_{CC}^2 \times f_o) \text{ where:}$$

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;

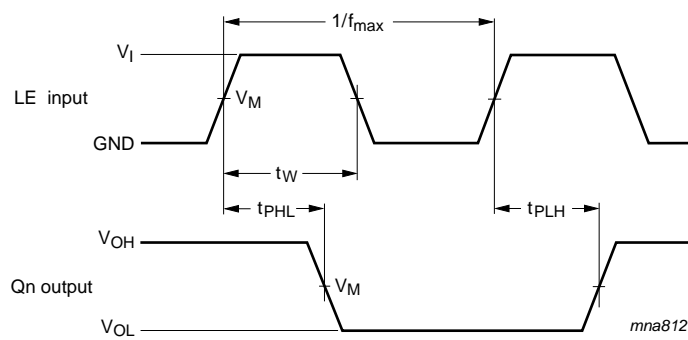
Σ(C_L × V_{CC}² × f_o) = sum of the outputs.

11. Waveforms



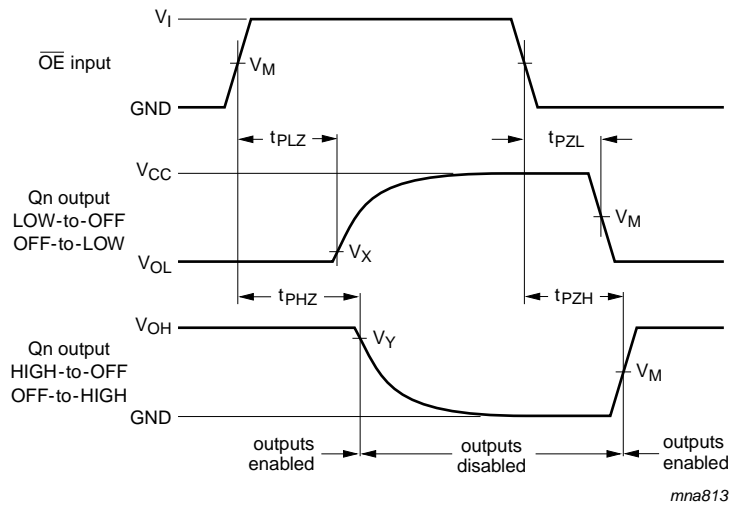
Measurement points are given in [Table 8](#).
 V_{OL} and V_{OH} are typical voltage output levels that occur with the output load.

Fig 7. Data input to output propagation delays



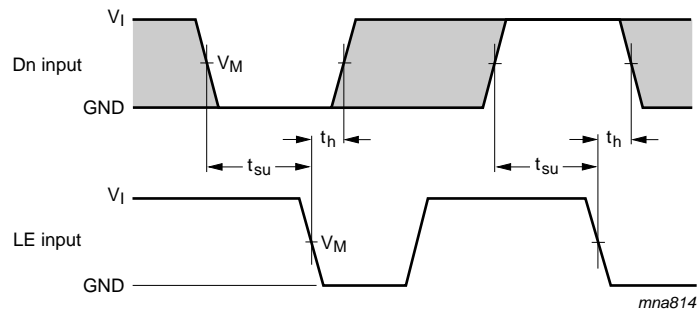
V_{OL} and V_{OH} are typical voltage output levels that occur with the output load.

Fig 8. Latch enable input to output propagation delays



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. Enable and disable times

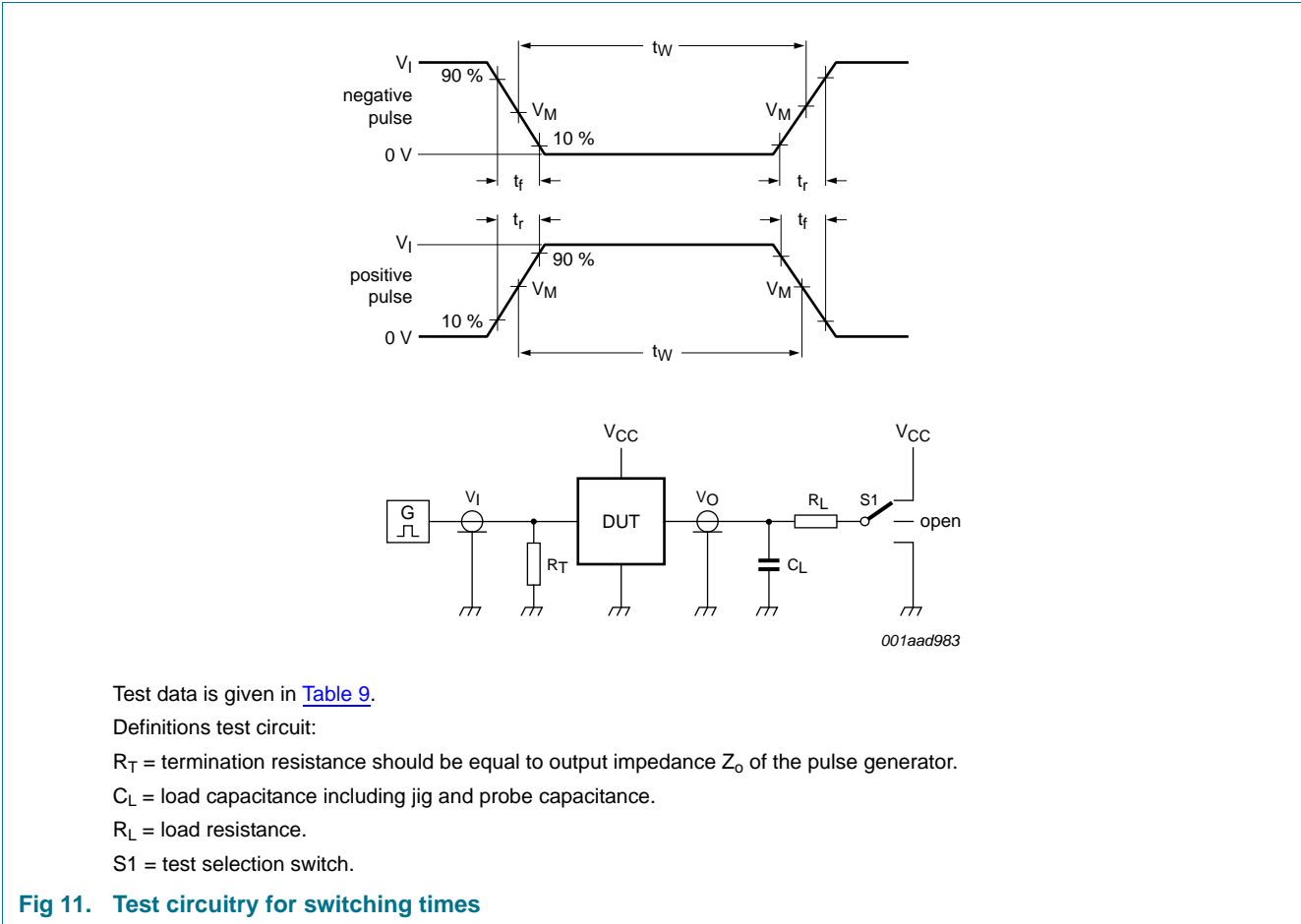


Measurement points are given in [Table 8](#).
 V_{OL} and V_{OH} are typical voltage output levels that occur with the output load.
 The shaded areas indicate when the input is permitted to change for predictable output performance.

Fig 10. Data set-up and hold times

Table 8. Measurement points

Type	Input	Output		
	V_M	V_M	V_X	V_Y
74AHC573	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.3 \text{ V}$	$V_{OH} - 0.3 \text{ V}$
74AHCT573	1.5 V	$0.5 \times V_{CC}$	$V_{OL} + 0.3 \text{ V}$	$V_{OH} - 0.3 \text{ V}$



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_L = load resistance.

S1 = test selection switch.

Fig 11. Test circuitry for switching times

Table 9. 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}
74AHC573	V_{CC}	≤ 3.0 ns	15 pF, 50 pF	1 k Ω	open	GND	V_{CC}
74AHCT573	3.0 V	≤ 3.0 ns	15 pF, 50 pF	1 k Ω	open	GND	V_{CC}

12. Package outline

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

SOT163-1

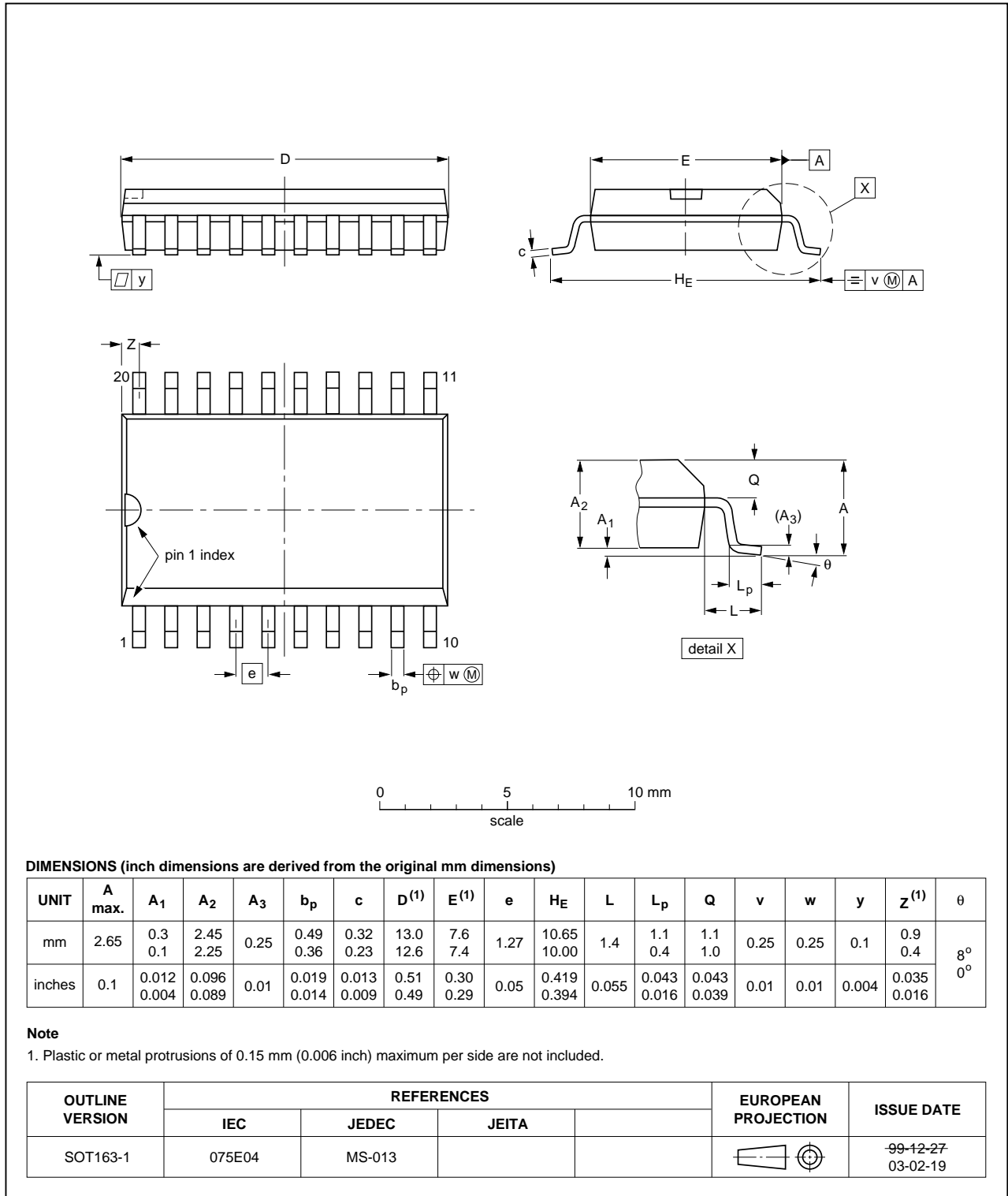


Fig 12. Package outline SOT163-1 (SO20)

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

SOT360-1

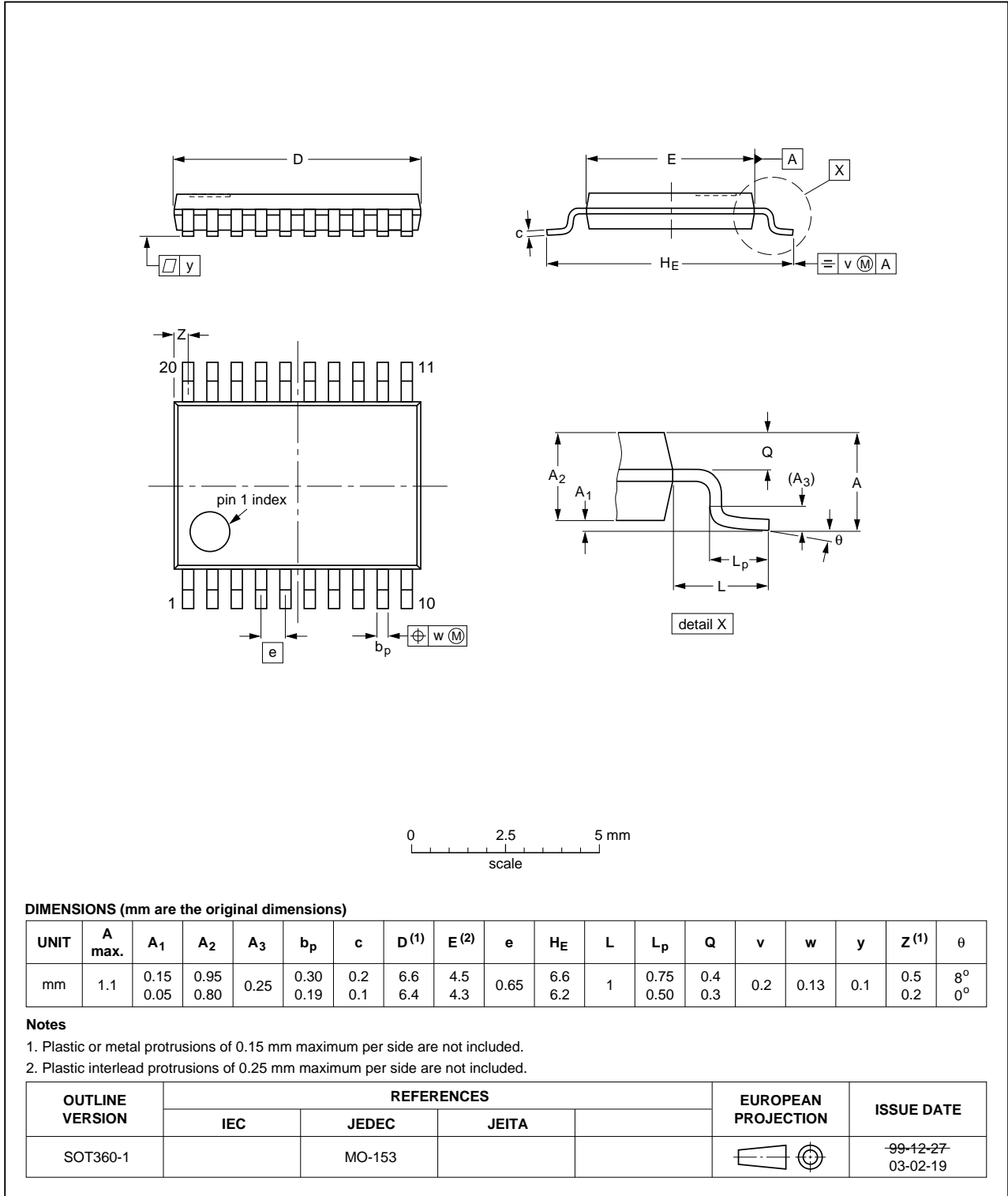


Fig 13. Package outline SOT360-1 (TSSOP20)

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

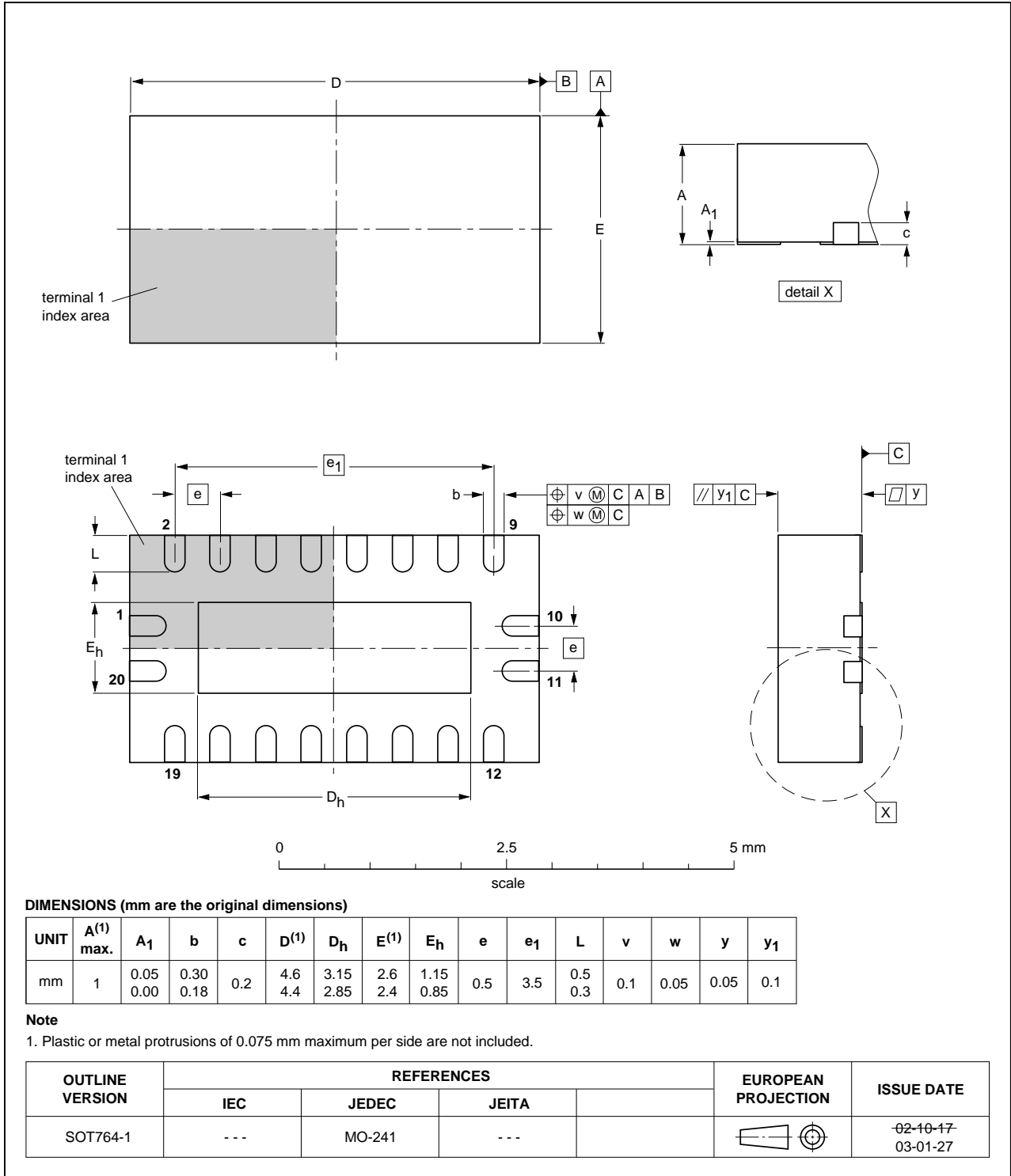


Fig 14. Package outline SOT764-1 (DHVQFN20)

13. Abbreviations

Table 10. Abbreviations

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

14. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AHC_AHCT573 v.7	20111108	Product data sheet	-	74AHC_AHCT573 v.6
Modifications:	<ul style="list-style-type: none"> Legal pages updated. 			
74AHC_AHCT573 v.6	20101125	Product data sheet	-	74AHC_AHCT573 v.5
74AHC_AHCT573 v.5	20100325	Product data sheet	-	74AHC_AHCT573 v.4
74AHC_AHCT573 v.4	20100303	Product data sheet	-	74AHC_AHCT573 v.3
74AHC_AHCT573 v.3	20080424	Product data sheet	-	74AHC_AHCT573 v.2
74AHC_AHCT573 v.2	20031208	Product specification	-	74AHC_AHCT573 v.1
74AHC_AHCT573 v.1	19990927	Product specification	-	-

15. Legal information

15.1 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.

[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>.

15.2 Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. Nexperia does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

Short data sheet — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local Nexperia sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

Product specification — The information and data provided in a Product data sheet shall define the specification of the product as agreed between Nexperia and its customer, unless Nexperia and customer have explicitly agreed otherwise in writing. In no event however, shall an agreement be valid in which the Nexperia product is deemed to offer functions and qualities beyond those described in the Product data sheet.

15.3 Disclaimers

Limited warranty and liability — Information in this document is believed to be accurate and reliable. However, Nexperia does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information.

In no event shall Nexperia be liable for any indirect, incidental, punitive, special or consequential damages (including - without limitation - lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory.

Notwithstanding any damages that customer might incur for any reason whatsoever, Nexperia's aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the *Terms and conditions of commercial sale* of Nexperia.

Right to make changes — Nexperia reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — Nexperia products are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or

malfunction of a Nexperia product can reasonably be expected to result in personal injury, death or severe property or environmental damage. Nexperia accepts no liability for inclusion and/or use of Nexperia products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. Nexperia makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Customers are responsible for the design and operation of their applications and products using Nexperia products, and Nexperia accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the Nexperia product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products.

Nexperia does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the customer's applications or products, or the application or use by customer's third party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using Nexperia products in order to avoid a default of the applications and the products or of the application or use by customer's third party customer(s). Nexperia does not accept any liability in this respect.

Limiting values — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) will cause permanent damage to the device. Limiting values are stress ratings only and (proper) operation of the device at these or any other conditions above those given in the Recommended operating conditions section (if present) or the Characteristics sections of this document is not warranted. Constant or repeated exposure to limiting values will permanently and irreversibly affect the quality and reliability of the device.

Terms and conditions of commercial sale — Nexperia products are sold subject to the general terms and conditions of commercial sale, as published at <http://www.nexperia.com/profile/terms>, unless otherwise agreed in a valid written individual agreement. In case an individual agreement is concluded only the terms and conditions of the respective agreement shall apply. Nexperia hereby expressly objects to applying the customer's general terms and conditions with regard to the purchase of Nexperia products by customer.

No offer to sell or license — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

Export control — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from competent authorities.

Non-automotive qualified products — Unless this data sheet expressly states that this specific Nexperia product is automotive qualified, the product is not suitable for automotive use. It is neither qualified nor tested in accordance with automotive testing or application requirements. Nexperia accepts no liability for inclusion and/or use of non-automotive qualified products in automotive equipment or applications.

In the event that customer uses the product for design-in and use in automotive applications to automotive specifications and standards, customer (a) shall use the product without Nexperia's warranty of the product for such automotive applications, use and specifications, and (b) whenever customer uses the product for automotive applications beyond

Nexperia's specifications such use shall be solely at customer's own risk, and (c) customer fully indemnifies Nexperia for any liability, damages or failed product claims resulting from customer design and use of the product for automotive applications beyond Nexperia's standard warranty and Nexperia's product specifications.

15.4 Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

16. Contact information

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

For sales office addresses, please send an email to: salesaddresses@nexperia.com