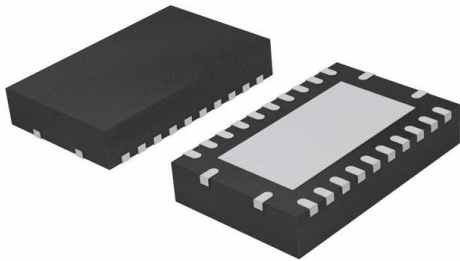


# 74LVC823ABQ,118 Datasheet

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<https://www.DiGi-Electronics.com>

DiGi Electronics Part Number	74LVC823ABQ,118-DG
Manufacturer	<a href="#">Nexperia USA Inc.</a>
Manufacturer Product Number	74LVC823ABQ,118
Description	IC FF D-TYPE SNGL 9BIT 24DHVQFN
Detailed Description	Flip Flop 1 Element D-Type 9 Bit Positive Edge 24-V FQFN Exposed Pad



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RFQ Email: [Info@DiGi-Electronics.com](mailto:Info@DiGi-Electronics.com)

DiGi is a global authorized distributor of electronic components.

## Purchase and inquiry

**Manufacturer Product Number:**

74LVC823ABQ,118

**Series:**

74LVC

**Function:**

Master Reset

**Output Type:**

Tri-State, Non-Inverted

**Number of Bits per Element:**

9

**Max Propagation Delay @ V, Max CL:**

10ns @ 3.3V, 50pF

**Current - Output High, Low:**

24mA, 24mA

**Current - Quiescent (Iq):**10  $\mu$ A**Operating Temperature:**

-40°C ~ 125°C (TA)

**Supplier Device Package:**

24-DHVQFN (5.5x3.5)

**Base Product Number:**

74LVC823

**Manufacturer:**

Nexperia USA Inc.

**Product Status:**

Obsolete

**Type:**

D-Type

**Number of Elements:**

1

**Clock Frequency:**

200 MHz

**Trigger Type:**

Positive Edge

**Voltage - Supply:**

1.65V ~ 3.6V

**Input Capacitance:**

5 pF

**Mounting Type:**

Surface Mount

**Package / Case:**

24-VFQFN Exposed Pad

## Environmental & Export classification

**RoHS Status:**

ROHS3 Compliant

**REACH Status:**

REACH Unaffected

**HTSUS:**

8542.39.0001

**Moisture Sensitivity Level (MSL):**

1 (Unlimited)

**ECCN:**

EAR99

# 74LVC823A

9-bit D-type flip-flop with 5 V tolerant inputs/outputs;  
positive edge-trigger; 3-state

Rev. 6 — 18 June 2020

Product data sheet

## 1. General description

The 74LVC823A is a 9-bit D-type flip-flop with common clock (pin CP), clock enable (pin  $\overline{CE}$ ), master reset (pin  $\overline{MR}$ ) and 3-state outputs (pins Qn) for bus-oriented applications. The 9 flip-flops store the state of their individual D-inputs that meet the set-up and hold times requirements on the LOW to HIGH CP transition, provided pin  $\overline{CE}$  is LOW. When pin  $\overline{CE}$  is HIGH, the flip-flops hold their data. A LOW on pin  $\overline{MR}$  resets all flip-flops. When pin  $\overline{OE}$  is LOW, the contents of the 9 flip-flops 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 flip-flops.

Inputs can be driven from either 3.3 V or 5 V devices. When disabled, up to 5.5 V can be applied to the outputs. These features allow the use of these devices as translators in mixed 3.3 V and 5 V applications.

## 2. Features and benefits

- 5 V tolerant inputs/outputs for interfacing with 5 V logic
- Wide supply voltage range from 1.2 V to 3.6 V
- CMOS low power consumption
- Direct interface with TTL levels
- Flow-through pinout architecture
- 9-bit positive edge-triggered register
- Independent register and 3-state buffer operation
- Complies with JEDEC standard:
  - JESD8-7A (1.65 V to 1.95 V)
  - JESD8-5A (2.3 V to 2.7 V)
  - JESD8-C/JESD36 (2.7 V to 3.6 V)
- ESD protection:
  - HBM JESD22-A114F exceeds 2000 V
  - MM JESD22-A115-B exceeds 200 V
  - CDM JESD22-C101E exceeds 1000 V
- Specified from -40 °C to +85 °C and -40 °C to +125 °C.

## 3. Ordering information

Table 1. Ordering information

Type number	Package			Version
	Temperature range	Name	Description	
74LVC823AD	-40 °C to +125 °C	SO24	plastic small outline package; 24 leads; body width 7.5 mm	SOT137-1
74LVC823APW	-40 °C to +125 °C	TSSOP24	plastic thin shrink small outline package; 24 leads; body width 4.4 mm	SOT355-1
74LVC823ABQ	-40 °C to +125 °C	DHVQFN24	plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 24 terminals; body 3.5 x 5.5 x 0.85 mm	SOT815-1

## 4. Functional diagram

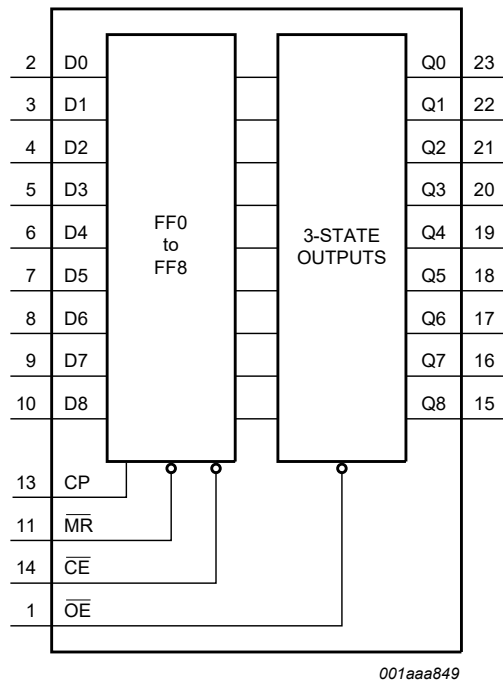


Fig. 1. Functional diagram

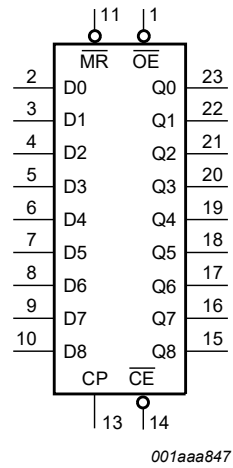


Fig. 2. Logic symbol

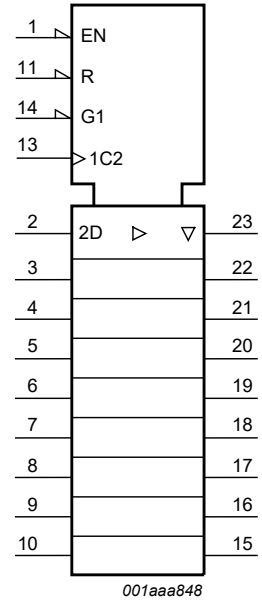


Fig. 3. IEC logic symbol

## 9-bit D-type flip-flop with 5 V tolerant inputs/outputs; positive edge-trigger; 3-state

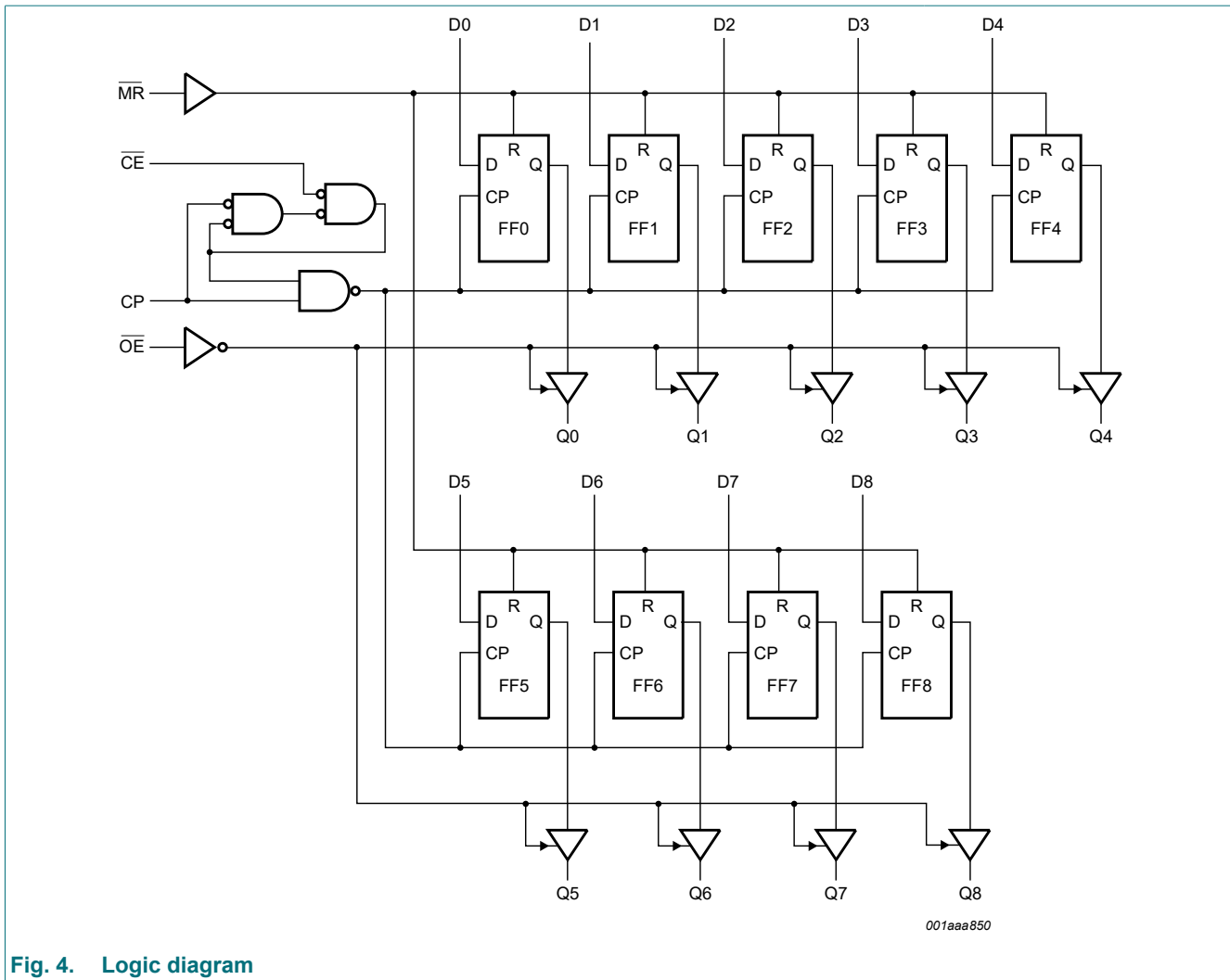
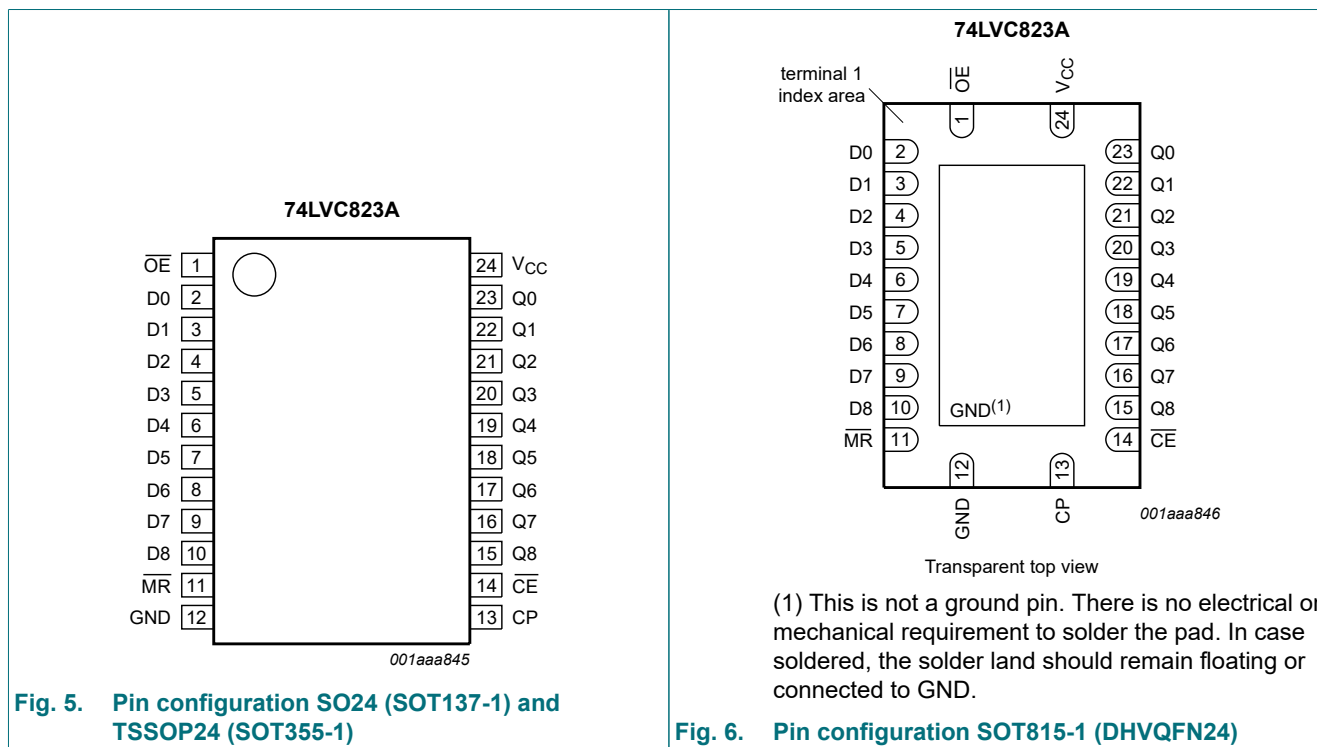


Fig. 4. Logic diagram

## 5. Pinning information

### 5.1. Pinning



### 5.2. Pin description

Table 2. Pin description

Pin	Name	Description
$\overline{\text{OE}}$	1	output enable input (active LOW)
$\overline{\text{MR}}$	11	master reset input (active LOW)
D0, D1, D2, D3, D4, D5, D6, D7, D8	2, 3, 4, 5, 6, 7, 8, 9, 10	data input
Q0, Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8	23, 22, 21, 20, 19, 18, 17, 16, 15	3-state flip-flop output
CP	13	clock input (LOW to HIGH; edge-triggered)
CE	14	clock enable input (active LOW)
GND	12	ground (0 V)
V <sub>CC</sub>	24	supply voltage

## 6. Functional description

**Table 3. Function table**

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

*L = LOW voltage level; l = LOW voltage level one set-up time prior to the LOW to HIGH CP transition*

*↑ = LOW to HIGH level transition*

*Z = high-impedance OFF-state; X = don't care; NC = no change*

Operating mode	Input					Internal flip-flop	Output
	OE	MR	CE	CP	Dn		Qn
Clear	L	L	X	X	X	L	L
Load and read register	L	H	L	↑	l	L	L
	L	H	L	↑	h	H	H
Load register and disable outputs	H	H	L	↑	l	L	Z
	H	H	L	↑	h	H	Z
Hold	L	H	H	NC	X	NC	NC

## 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	+6.5	V	
$I_{IK}$	input clamping current	$V_I < 0$ V	-50	-	mA	
$V_I$	input voltage	[1]	-0.5	+6.5	V	
$I_{OK}$	output clamping current	$V_O > V_{CC}$ or $V_O < 0$ V	-	±50	mA	
$V_O$	output voltage	HIGH or LOW state	[2]	-0.5	$V_{CC} + 0.5$	V
		3-state	[2]	-0.5	+6.5	V
$I_O$	output current	$V_O = 0$ V to $V_{CC}$	-	±50	mA	
$I_{CC}$	supply current		-	100	mA	
$I_{GND}$	ground current		-100	-	mA	
$T_{stg}$	storage temperature		-65	+150	°C	
$P_{tot}$	total power dissipation	$T_{amb} = -40$ °C to $+125$ °C	[3]	-	500	mW

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

[2] The output voltage ratings may be exceeded if the output current ratings are observed.

[3] For SOT137-1 (SO24) package:  $P_{tot}$  derates linearly with 16.2 mW/K above 119 °C.

For SOT355-1 (TSSOP24) package:  $P_{tot}$  derates linearly with 12.4 mW/K above 110 °C.

For SOT815-1 (DHVQFN24) package:  $P_{tot}$  derates linearly with 15.0 mW/K above 117 °C.

## 8. Recommended operating conditions

Table 5. Recommended operating conditions

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>CC</sub>	supply voltage		1.65	-	3.6	V
		functional	1.2	-	-	V
V <sub>I</sub>	input voltage		0	-	5.5	V
V <sub>O</sub>	output voltage	HIGH or LOW state	0	-	V <sub>CC</sub>	V
		3-state	0	-	5.5	V
T <sub>amb</sub>	ambient temperature	in free air	-40	-	+125	°C
Δt/ΔV	input transition rise and fall rate	V <sub>CC</sub> = 1.65 V to 2.7 V	0	-	20	ns/V
		V <sub>CC</sub> = 2.7 V to 3.6 V	0	-	10	ns/V

## 9. Static characteristics

Table 6. Static characteristics

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

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 1.2 V	1.08	-	-	1.08	-	V
		V <sub>CC</sub> = 1.65 V to 1.95 V	0.65V <sub>CC</sub>	-	-	0.65V <sub>CC</sub>	-	V
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.7	-	-	1.7	-	V
		V <sub>CC</sub> = 2.7 V to 3.6 V	2.0	-	-	2.0	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 1.2 V	-	-	0.12	-	0.12	V
		V <sub>CC</sub> = 1.65 V to 1.95 V	-	-	0.35V <sub>CC</sub>	-	0.35V <sub>CC</sub>	V
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	-	0.7	-	0.7	V
		V <sub>CC</sub> = 2.7 V to 3.6 V	-	-	0.8	-	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> = -100 μA; V <sub>CC</sub> = 1.65 V to 3.6 V	V <sub>CC</sub> - 0.2	-	-	V <sub>CC</sub> - 0.3	-	V
		I <sub>O</sub> = -4 mA; V <sub>CC</sub> = 1.65 V	1.2	-	-	1.05	-	V
		I <sub>O</sub> = -8 mA; V <sub>CC</sub> = 2.3 V	1.8	-	-	1.65	-	V
		I <sub>O</sub> = -12 mA; V <sub>CC</sub> = 2.7 V	2.2	-	-	2.05	-	V
		I <sub>O</sub> = -18 mA; V <sub>CC</sub> = 3.0 V	2.4	-	-	2.25	-	V
		I <sub>O</sub> = -24 mA; V <sub>CC</sub> = 3.0 V	2.2	-	-	2.0	-	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> = 100 μA; V <sub>CC</sub> = 1.65 V to 3.6 V	-	-	0.2	-	0.3	V
		I <sub>O</sub> = 4 mA; V <sub>CC</sub> = 1.65 V	-	-	0.45	-	0.65	V
		I <sub>O</sub> = 8 mA; V <sub>CC</sub> = 2.3 V	-	-	0.6	-	0.8	V
		I <sub>O</sub> = 12 mA; V <sub>CC</sub> = 2.7 V	-	-	0.4	-	0.6	V
		I <sub>O</sub> = 24 mA; V <sub>CC</sub> = 3.0 V	-	-	0.55	-	0.8	V
I <sub>I</sub>	input leakage current	V <sub>CC</sub> = 3.6 V; V <sub>I</sub> = 5.5 V or GND	-	±0.1	±5	-	±20	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> = 3.6 V; V <sub>O</sub> = 5.5 V or GND	-	0.1	±5	-	±20	μA



## 9-bit D-type flip-flop with 5 V tolerant inputs/outputs; positive edge-trigger; 3-state

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
I <sub>OFF</sub>	power-off leakage current	V <sub>CC</sub> = 0 V; V <sub>I</sub> or V <sub>O</sub> = 5.5 V	-	0.1	±10	-	±20	µA
I <sub>CC</sub>	supply current	V <sub>CC</sub> = 3.6 V; V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A	-	0.1	10	-	40	µA
ΔI <sub>CC</sub>	additional supply current	per input pin; V <sub>CC</sub> = 2.7 V to 3.6 V; V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; I <sub>O</sub> = 0 A	-	5	500	-	5000	µA
C <sub>I</sub>	input capacitance	V <sub>CC</sub> = 0 V to 3.6 V; V <sub>I</sub> = GND to V <sub>CC</sub>	-	5.0	-	-	-	pF

[1] All typical values are measured at V<sub>CC</sub> = 3.3 V (unless stated otherwise) and T<sub>amb</sub> = 25 °C.

## 10. Dynamic characteristics

**Table 7. Dynamic characteristics**

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

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
t <sub>pd</sub>	propagation delay	CP to Qn; see Fig. 7 [2]						
		V <sub>CC</sub> = 1.2 V	-	20	-	-	-	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.4	8.4	18.7	2.4	21.5	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.7	4.4	9.6	1.7	11.1	ns
		V <sub>CC</sub> = 2.7 V	1.5	4.1	8.9	1.5	11.5	ns
t <sub>PHL</sub>	HIGH to LOW propagation delay	MR to Qn; see Fig. 9						
		V <sub>CC</sub> = 1.2 V	-	15	-	-	-	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.1	9.5	21.4	2.1	24.7	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.5	4.9	10.5	1.5	12.1	ns
		V <sub>CC</sub> = 2.7 V	1.5	4.7	8.8	1.5	11.0	ns
t <sub>en</sub>	enable time	OE to Qn; see Fig. 10 [2]						
		V <sub>CC</sub> = 1.2 V	-	18	-	-	-	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.7	7.4	16.5	1.7	19.0	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.5	4.2	9.1	1.5	10.5	ns
		V <sub>CC</sub> = 2.7 V	1.5	4.3	8.3	1.5	10.5	ns
t <sub>dis</sub>	disable time	OE to Qn; see Fig. 10 [2]						
		V <sub>CC</sub> = 1.2 V	-	8.0	-	-	-	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.3	4.2	10.0	2.3	11.5	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.0	2.3	5.6	1.0	6.5	ns
		V <sub>CC</sub> = 2.7 V	1.5	3.2	7.1	1.5	9.0	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.5	2.9	6.0	1.5	7.5	ns

## 9-bit D-type flip-flop with 5 V tolerant inputs/outputs; positive edge-trigger; 3-state

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
t <sub>w</sub>	pulse width	CP HIGH or LOW; see <a href="#">Fig. 7</a>						
		V <sub>CC</sub> = 1.65 V to 1.95 V	5.0	-	-	5.0	-	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	4.0	-	-	4.0	-	ns
		V <sub>CC</sub> = 2.7 V	3.3	-	-	3.3	-	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	3.3	1.7	-	3.3	-	ns
		MR HIGH or LOW; see <a href="#">Fig. 9</a>						
		V <sub>CC</sub> = 1.65 V to 1.95 V	5.0	-	-	5.0	-	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	4.0	-	-	4.0	-	ns
		V <sub>CC</sub> = 2.7 V	3.3	-	-	3.3	-	ns
t <sub>su</sub>	set-up time	Dn to CP; see <a href="#">Fig. 8</a>						
		V <sub>CC</sub> = 1.65 V to 1.95 V	3.0	-	-	3.0	-	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.0	-	-	2.0	-	ns
		V <sub>CC</sub> = 2.7 V	1.0	-	-	1.0	-	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	+1.8	-0.8	-	+1.8	-	ns
		CE to CP; see <a href="#">Fig. 8</a>						
		V <sub>CC</sub> = 1.65 V to 1.95 V	3.0	-	-	3.0	-	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.0	-	-	2.0	-	ns
		V <sub>CC</sub> = 2.7 V	1.8	-	-	1.8	-	ns
t <sub>rec</sub>	recovery time	MR; see <a href="#">Fig. 9</a>						
		V <sub>CC</sub> = 1.65 V to 1.95 V	3.0	-	-	3.0	-	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.5	-	-	2.5	-	ns
		V <sub>CC</sub> = 2.7 V	2.0	-	-	2.0	-	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	+1.0	-0.5	-	+1.0	-	ns
t <sub>h</sub>	hold time	Dn to CP; see <a href="#">Fig. 8</a>						
		V <sub>CC</sub> = 1.65 V to 1.95 V	3.0	-	-	3.0	-	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.5	-	-	2.5	-	ns
		V <sub>CC</sub> = 2.7 V	2.0	-	-	2.0	-	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.0	0.8	-	2.0	-	ns
		CE to CP; see <a href="#">Fig. 8</a>						
		V <sub>CC</sub> = 1.65 V to 1.95 V	3.0	-	-	3.0	-	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.0	-	-	2.0	-	ns
		V <sub>CC</sub> = 2.7 V	1.3	-	-	1.3	-	ns
f <sub>max</sub>	maximum frequency	CP; see <a href="#">Fig. 7</a>						
		V <sub>CC</sub> = 1.65 V to 1.95 V	100	-	-	80	-	MHz
		V <sub>CC</sub> = 2.3 V to 2.7 V	125	-	-	100	-	MHz
		V <sub>CC</sub> = 2.7 V	150	-	-	120	-	MHz
		V <sub>CC</sub> = 3.0 V to 3.6 V	150	200	-	120	-	MHz
t <sub>sk(o)</sub>	output skew time	Qn; V <sub>CC</sub> = 3.0 V to 3.6 V [3]	-	-	1.0	-	1.5	ns

## 9-bit D-type flip-flop with 5 V tolerant inputs/outputs; positive edge-trigger; 3-state

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
C <sub>PD</sub>	power dissipation capacitance	per input; V <sub>I</sub> = GND to V <sub>CC</sub>						
		V <sub>CC</sub> = 1.65 V to 1.95 V	-	12.4	-	-	-	pF
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	14.5	-	-	-	pF
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	16.4	-	-	-	pF

[1] Typical values are measured at T<sub>amb</sub> = 25 °C and V<sub>CC</sub> = 1.2 V, 1.8 V, 2.5 V, 2.7 V and 3.3 V respectively.

[2] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>.

t<sub>en</sub> is the same as t<sub>PZL</sub> and t<sub>PZH</sub>.

t<sub>dis</sub> is the same as t<sub>PLZ</sub> and t<sub>PHZ</sub>.

[3] Skew between any two outputs of the same package switching in the same direction. This parameter is guaranteed by design.

[4] C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> in μW).

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

f<sub>i</sub> = input frequency in MHz; f<sub>o</sub> = output frequency in MHz

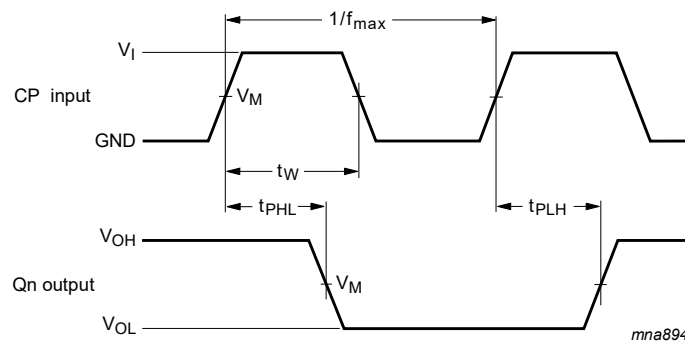
C<sub>L</sub> = output load capacitance in pF

V<sub>CC</sub> = supply voltage in Volts

N = number of inputs switching

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

## 10.1. Waveforms and test circuit

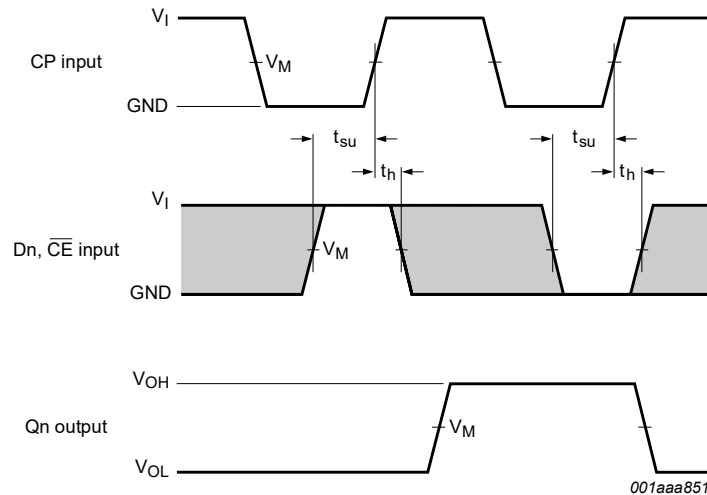


Measurement points are given in [Table 8](#).

V<sub>OL</sub> and V<sub>OH</sub> are the typical output voltage levels that occur with the output load.

**Fig. 7. Clock to output propagation delays, clock pulse width, and maximum frequency**

## 9-bit D-type flip-flop with 5 V tolerant inputs/outputs; positive edge-trigger; 3-state

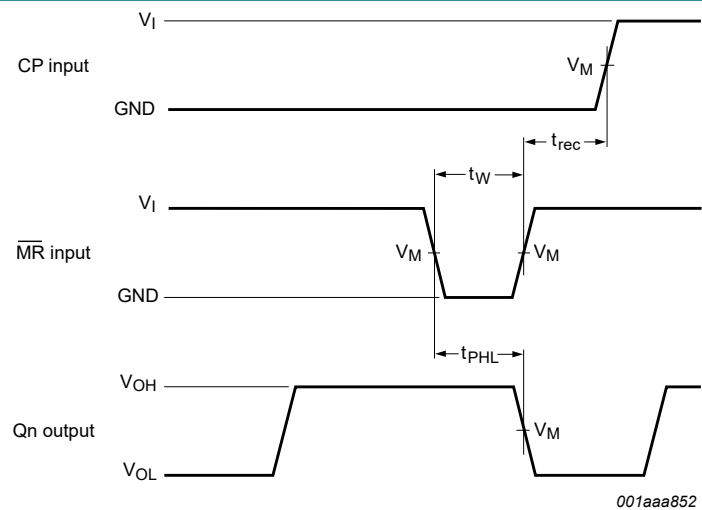


Measurement points are given in [Table 8](#).

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

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

**Fig. 8. Data set-up and hold times for data and clock enable inputs to clock input**

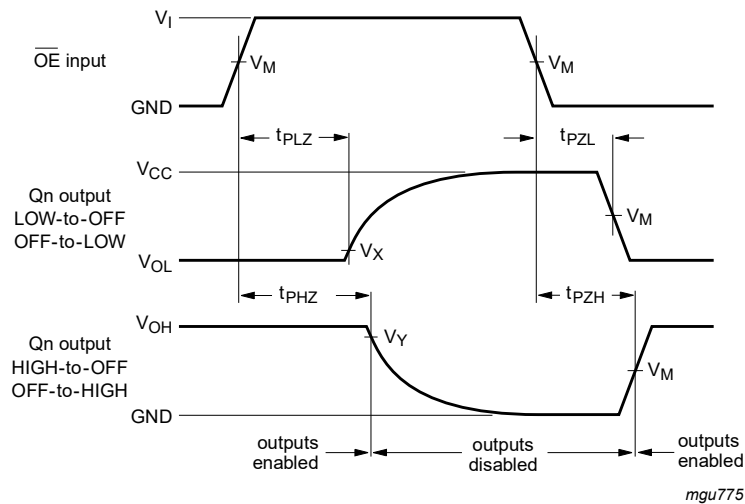


Measurement points are given in [Table 8](#).

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

**Fig. 9. Master reset pulse width, master reset to clock removal time and master reset to output propagation delay**

## 9-bit D-type flip-flop with 5 V tolerant inputs/outputs; positive edge-trigger; 3-state



Measurement points are given in [Table 8](#).

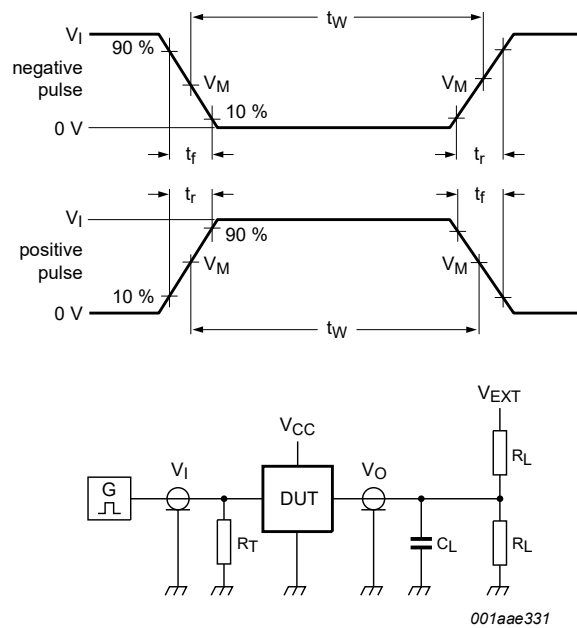
$V_{OL}$  and  $V_{OH}$  are the typical output voltage drops that occur with the output load.

**Fig. 10. 3-state outputs enable and disable times**

**Table 8. Measurement points**

Supply voltage	Input		Output		
	$V_I$	$V_M$	$V_M$	$V_X$	$V_Y$
1.2 V	$V_{CC}$	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.15 \text{ V}$	$V_{OH} - 0.15 \text{ V}$
1.65 V to 1.95 V	$V_{CC}$	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.15 \text{ V}$	$V_{OH} - 0.15 \text{ V}$
2.3 V to 2.7 V	$V_{CC}$	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.15 \text{ V}$	$V_{OH} - 0.15 \text{ V}$
2.7 V	2.7 V	1.5 V	1.5 V	$V_{OL} + 0.3 \text{ V}$	$V_{OH} - 0.3 \text{ V}$
3.0 V to 3.6 V	2.7 V	1.5 V	1.5 V	$V_{OL} + 0.3 \text{ V}$	$V_{OH} - 0.3 \text{ V}$

## 9-bit D-type flip-flop with 5 V tolerant inputs/outputs; positive edge-trigger; 3-state



Test data is given in [Table 9](#).

Definitions for test circuit:

$R_L$  = Load resistance.

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

$R_T$  = Termination resistance should be equal to output impedance  $Z_o$  of the pulse generator.

$V_{EXT}$  = External voltage for measuring switching times.

**Fig. 11. Test circuit for measuring switching times**

**Table 9. Test data**

Supply voltage	Input		Load		$V_{EXT}$		
	$V_I$	$t_r, t_f$	$C_L$	$R_L$	$t_{PLH}, t_{PHL}$	$t_{PLZ}, t_{PZL}$	$t_{PHZ}, t_{PZH}$
1.2 V	$V_{CC}$	$\leq 2$ ns	30 pF	1 k $\Omega$	open	2 x $V_{CC}$	GND
1.65 V to 1.95 V	$V_{CC}$	$\leq 2$ ns	30 pF	1 k $\Omega$	open	2 x $V_{CC}$	GND
2.3 V to 2.7 V	$V_{CC}$	$\leq 2$ ns	30 pF	500 $\Omega$	open	2 x $V_{CC}$	GND
2.7 V	2.7 V	$\leq 2.5$ ns	50 pF	500 $\Omega$	open	2 x $V_{CC}$	GND
3.0 V to 3.6 V	2.7 V	$\leq 2.5$ ns	50 pF	500 $\Omega$	open	2 x $V_{CC}$	GND

## 11. Package outline

SO24: plastic small outline package; 24 leads; body width 7.5 mm

SOT137-1

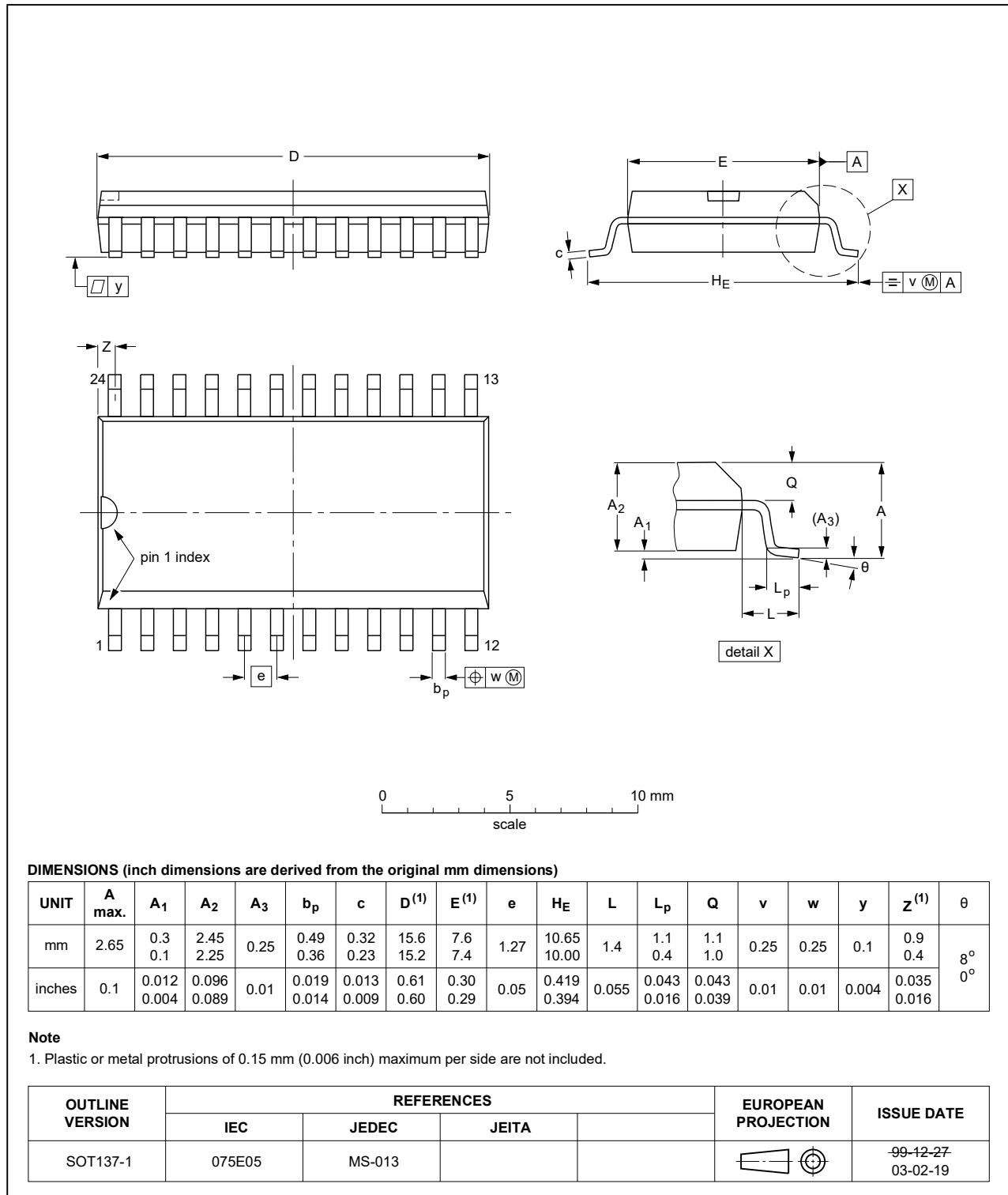


Fig. 12. Package outline SOT137-1 (SO24)

TSSOP24: plastic thin shrink small outline package; 24 leads; body width 4.4 mm

SOT355-1

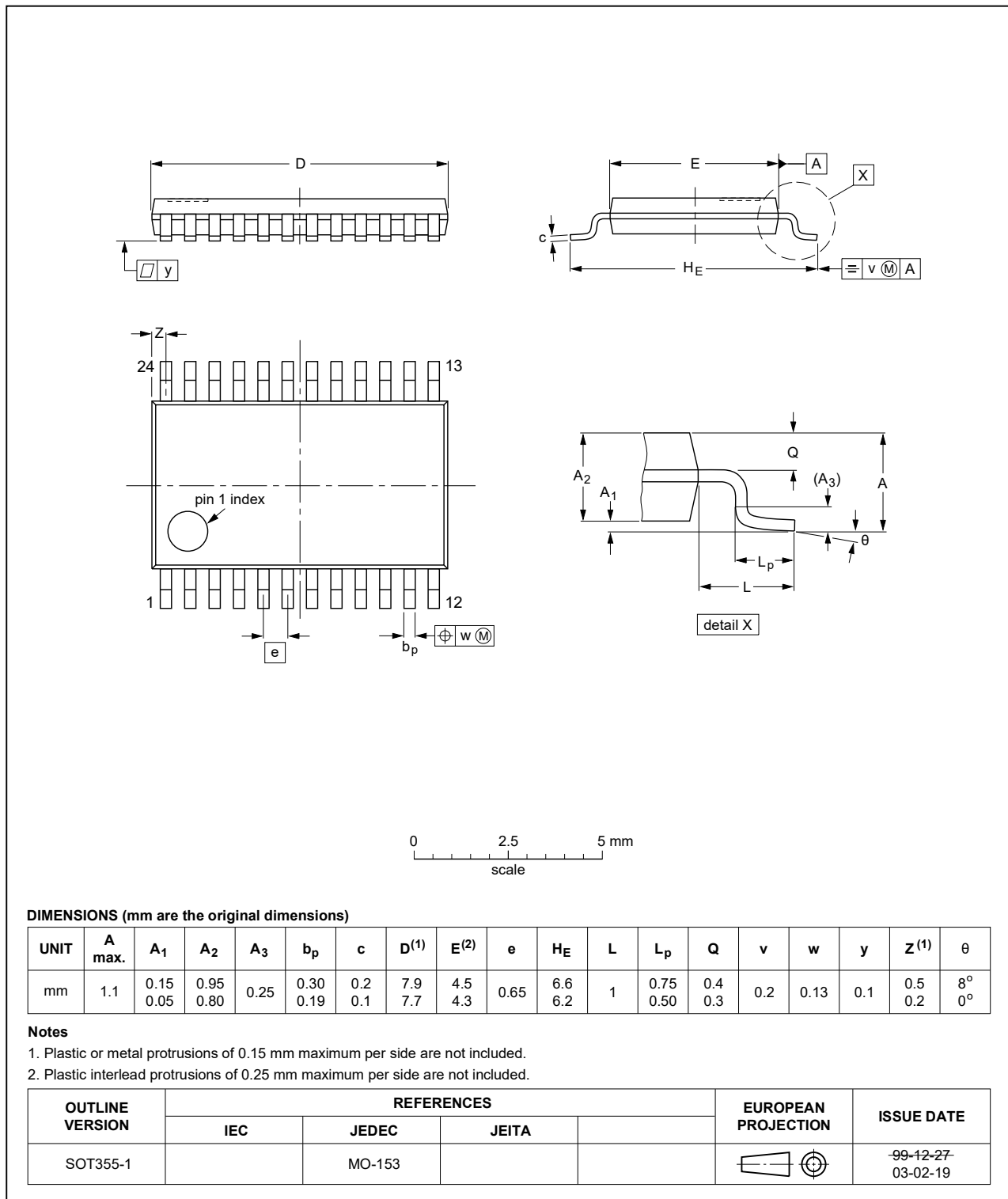


Fig. 13. Package outline SOT355-1 (TSSOP24)



## 9-bit D-type flip-flop with 5 V tolerant inputs/outputs; positive edge-trigger; 3-state

DHVQFN24: plastic dual in-line compatible thermal enhanced very thin quad flat package;  
no leads; 24 terminals; body 3.5 x 5.5 x 0.85 mm

SOT815-1

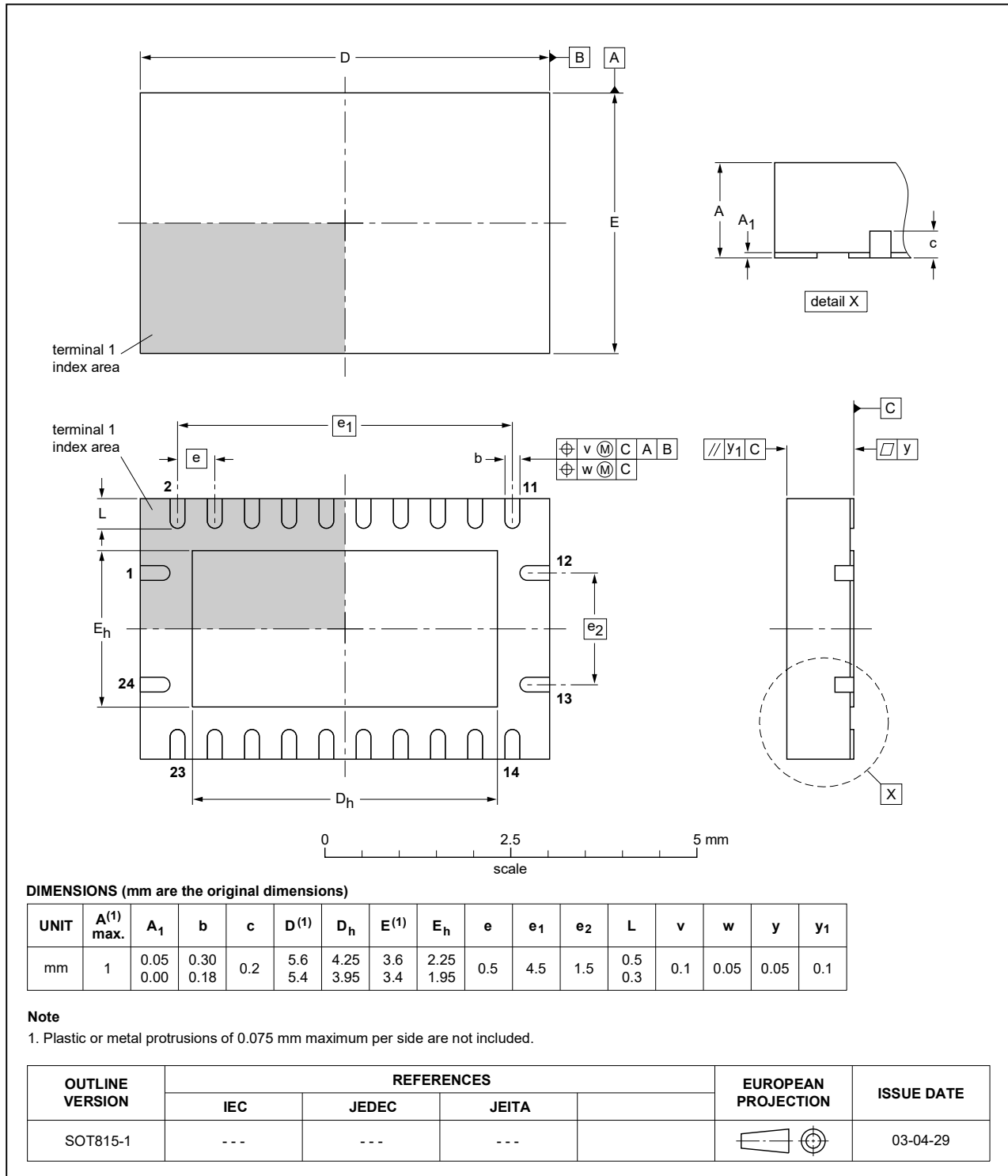


Fig. 14. Package outline SOT815-1 (DHVQFN24)

## 12. Abbreviations

Table 10. Abbreviations

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

## 13. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74LVC823A v.6	20200618	Product data sheet	-	74LVC823A v.5
Modifications:	<ul style="list-style-type: none"> <li><a href="#">Table 4</a>: Derating values for <math>P_{tot}</math> total power dissipation have been updated.</li> </ul>			
74LVC823A v.5	20190501	Product data sheet	-	74LVC823A v.4
Modifications:	<ul style="list-style-type: none"> <li>The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li> <li>Legal texts have been adapted to the new company name where appropriate.</li> <li>Type number 74LVC823ADB (SOT340-1) removed.</li> </ul>			
74LVC823A v.4	20130408	Product data sheet	-	74LVC823A v.3
Modifications:	<ul style="list-style-type: none"> <li>Features corrected (errata).</li> </ul>			
74LVC823A v.3	20130327	Product data sheet	-	74LVC823A v.2
Modifications:	<ul style="list-style-type: none"> <li>The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.</li> <li>Legal texts have been adapted to the new company name where appropriate.</li> <li><a href="#">Table 4</a>, <a href="#">Table 5</a>, <a href="#">Table 6</a>, <a href="#">Table 7</a>, <a href="#">Table 8</a> and <a href="#">Table 9</a>: values added for lower voltage ranges.</li> </ul>			
74LVC823A v.2	20040510	Product specification	-	74LVC823A v.1
74LVC823A v.1	19980924	Product specification	-	-

## 9-bit D-type flip-flop with 5 V tolerant inputs/outputs; positive edge-trigger; 3-state

## 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.

- [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".
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