

# 74LVC2G74

Single D-type flip-flop with set and reset; positive edge trigger

Rev. 01 — 3 November 2005

Product data sheet

## 1. General description

The 74LVC2G74 is a high-performance, low-voltage, Si-gate CMOS device, superior to most advanced CMOS compatible TTL families.

The 74LVC2G74 is a single positive edge triggered D-type flip-flop with individual data (D) inputs, clock (CP) inputs, set ( $\overline{SD}$ ) and ( $\overline{RD}$ ) inputs, and complementary Q and  $\overline{Q}$  outputs.

This device is fully specified for partial power down applications using  $I_{OFF}$ . The  $I_{OFF}$  circuitry disables the output, preventing damaging backflow current through the device when it is powered down.

The set and reset are asynchronous active LOW inputs and operate independently of the clock input. Information on the data input is transferred to the Q output on the LOW-to-HIGH transition of the clock pulse. The D inputs must be stable, one set-up time prior to the LOW-to-HIGH clock transition for predictable operation.

Schmitt-trigger action at all inputs makes the circuit highly tolerant to slower input rise and fall times.

## 2. Features

- Wide supply voltage range from 1.65 V to 5.5 V
- 5 V tolerant inputs for interfacing with 5 V logic
- High noise immunity
- Complies with JEDEC standard:
  - ◆ JESD8-7 (1.65 V to 1.95 V)
  - ◆ JESD8-5 (2.3 V to 2.7 V)
  - ◆ JESD8-B/JESD36 (2.7 V to 3.6 V)
- $\pm 24$  mA output drive ( $V_{CC} = 3.0$  V)
- ESD protection:
  - ◆ HBM EIA/JESD22-A114-C exceeds 2000 V
  - ◆ MM EIA/JESD22-A115-A exceeds 200 V
- CMOS low power consumption
- Latch-up performance exceeds 250 mA
- Direct interface with TTL levels
- Inputs accept voltages up to 5 V
- Multiple package options
- Specified from  $-40$  °C to  $+85$  °C and  $-40$  °C to  $+125$  °C

**PHILIPS**

### 3. Quick reference data

**Table 1: Quick reference data**

$GND = 0\text{ V}$ ;  $T_{amb} = 25\text{ °C}$ ;  $t_r = t_f \leq 2.5\text{ ns}$ .

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$t_{PHL}$ , $t_{PLH}$	propagation delay					
	CP to Q, $\bar{Q}$	$C_L = 50\text{ pF}$ ; $V_{CC} = 3.3\text{ V}$	-	3.5	-	ns
	$\bar{SD}$ to Q, $\bar{Q}$	$C_L = 50\text{ pF}$ ; $V_{CC} = 3.3\text{ V}$	-	3.0	-	ns
	RD to Q, $\bar{Q}$	$C_L = 50\text{ pF}$ ; $V_{CC} = 3.3\text{ V}$	-	3.0	-	ns
$f_{max}$	maximum input clock frequency	$C_L = 50\text{ pF}$ ; $V_{CC} = 3.3\text{ V}$	-	280	-	MHz
$C_i$	input capacitance		-	4.0	-	pF
$C_{PD}$	power dissipation capacitance	$V_{CC} = 3.3\text{ V}$	[1][2]	15	-	pF

[1]  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu\text{W}$ ).

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

$f_i$  = input frequency in MHz;

$f_o$  = output frequency in MHz;

$C_L$  = output load capacitance in pF;

$V_{CC}$  = supply voltage in V;

$N$  = number of inputs switching;

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

[2] The condition is  $V_i = GND$  to  $V_{CC}$ .

### 4. Ordering information

**Table 2: Ordering information**

Type number	Package			Version
	Temperature range	Name	Description	
74LVC2G74DP	-40 °C to +125 °C	TSSOP8	plastic thin shrink small outline package; 8 leads; body width 3 mm; lead length 0.5 mm	SOT505-2
74LVC2G74DC	-40 °C to +125 °C	VSSOP8	plastic very thin shrink small outline package; 8 leads; body width 2.3 mm	SOT765-1
74LVC2G74GT	-40 °C to +125 °C	XSON8	plastic extremely thin small outline package; no leads; 8 terminals; body 1 × 1.95 × 0.5 mm	SOT833-1

### 5. Marking

**Table 3: Marking**

Type number	Marking code
74LVC2G74DP	V74
74LVC2G74DC	V74
74LVC2G74GT	V74



## 7. Pinning information

### 7.1 Pinning

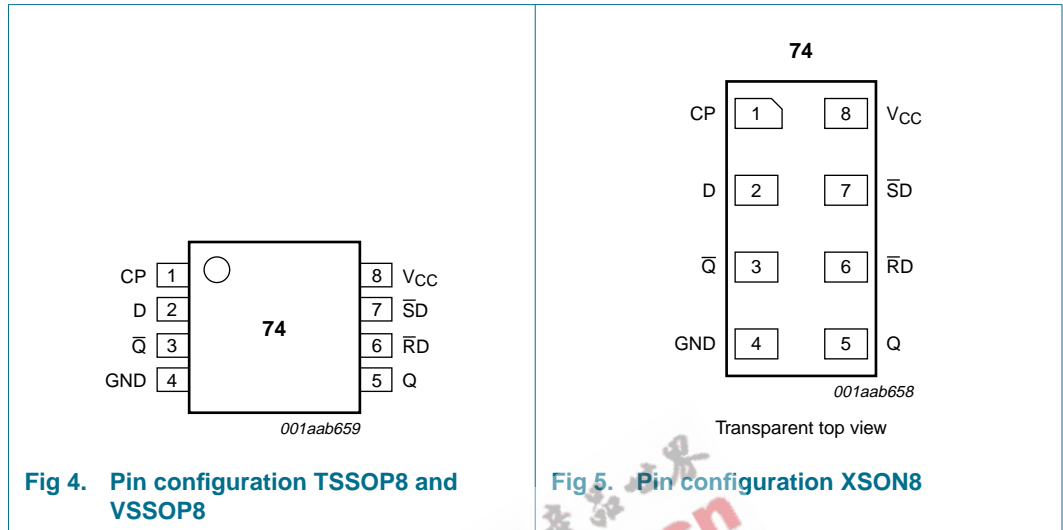


Fig 4. Pin configuration TSSOP8 and VSSOP8

Fig 5. Pin configuration XSON8

### 7.2 Pin description

Table 4: Pin description

Symbol	Pin	Description
CP	1	clock input (LOW-to-HIGH, edge-triggered)
D	2	data input
$\bar{Q}$	3	complement flip-flop output
GND	4	ground (0 V)
Q	5	true flip-flop output
$\bar{RD}$	6	asynchronous reset-direct input (active LOW)
$\bar{SD}$	7	asynchronous set-direct input (active LOW)
V <sub>CC</sub>	8	supply voltage

## 8. Functional description

### 8.1 Function table

Table 5: Function table for asynchronous operation [1]

Input				Output	
$\bar{SD}$	$\bar{RD}$	CP	D	Q	$\bar{Q}$
L	H	X	X	H	L
H	L	X	X	L	H
L	L	X	X	H	H

[1] H = HIGH voltage level;  
L = LOW voltage level;  
X = don't care.

Table 6: Function table for synchronous operation [1]

Input				Output	
$\overline{SD}$	$\overline{RD}$	CP	D	$Q_{n+1}$	$\overline{Q}_{n+1}$
H	H	↑	L	L	H
H	H	↑	H	H	L

- [1] H = HIGH voltage level;  
 L = LOW voltage level;  
 X = don't care;  
 ↑ = LOW-to-HIGH CP transition;  
 $Q_{n+1}$  = state after the next LOW-to-HIGH CP transition.

## 9. Limiting values

Table 7: 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	active mode	[1][2] -0.5	$V_{CC} + 0.5$	V
		Power-down mode	[1][2] -0.5	+6.5	V
$I_O$	output current	$V_O = 0$ V to $V_{CC}$	-	±50	mA
$I_{CC}$	quiescent 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	-	250	mW

- [1] The input and output voltage ratings may be exceeded if the input and output current ratings are observed.  
 [2] When  $V_{CC} = 0$  V (Power-down mode), the output voltage can be 5.5 V in normal operation.

## 10. Recommended operating conditions

Table 8: Recommended operating conditions

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{CC}$	supply voltage		1.65	-	5.5	V
$V_I$	input voltage		0	-	5.5	V
$V_O$	output voltage	active mode	0	-	$V_{CC}$	V
		Power-down mode; $V_{CC} = 0$ V	0	-	5.5	V
$T_{amb}$	ambient temperature		-40	-	+125	°C
$\Delta t/\Delta V$	input transition rise and fall rate	$V_{CC} = 1.65$ V to 2.7 V	0	-	20	ns/V
		$V_{CC} = 2.7$ V to 5.5 V	0	-	10	ns/V

## 11. Static characteristics

**Table 9: Static characteristics**

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b><math>T_{amb} = -40\text{ °C to }+85\text{ °C}</math> [1]</b>						
$V_{IH}$	HIGH-state input voltage	$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	$0.65 \times V_{CC}$	-	-	V
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.7	-	-	V
		$V_{CC} = 2.7\text{ V to }3.6\text{ V}$	2.0	-	-	V
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	$0.7 \times V_{CC}$	-	-	V
$V_{IL}$	LOW-state input voltage	$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	-	-	$0.35 \times V_{CC}$	V
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	-	-	0.7	V
		$V_{CC} = 2.7\text{ V to }3.6\text{ V}$	-	-	0.8	V
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	-	-	$0.3 \times V_{CC}$	V
$V_{OH}$	HIGH-state output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$I_O = -100\text{ }\mu\text{A}$ ; $V_{CC} = 1.65\text{ V to }5.5\text{ V}$	$V_{CC} - 0.1$	-	-	V
		$I_O = -4\text{ mA}$ ; $V_{CC} = 1.65\text{ V}$	1.2	1.54	-	V
		$I_O = -8\text{ mA}$ ; $V_{CC} = 2.3\text{ V}$	1.9	2.15	-	V
		$I_O = -12\text{ mA}$ ; $V_{CC} = 2.7\text{ V}$	2.2	2.50	-	V
		$I_O = -24\text{ mA}$ ; $V_{CC} = 3.0\text{ V}$	2.3	2.62	-	V
		$I_O = -32\text{ mA}$ ; $V_{CC} = 4.5\text{ V}$	3.8	4.11	-	V
$V_{OL}$	LOW-state output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$I_O = 100\text{ }\mu\text{A}$ ; $V_{CC} = 1.65\text{ V to }5.5\text{ V}$	-	-	0.10	V
		$I_O = 4\text{ mA}$ ; $V_{CC} = 1.65\text{ V}$	-	0.07	0.45	V
		$I_O = 8\text{ mA}$ ; $V_{CC} = 2.3\text{ V}$	-	0.12	0.30	V
		$I_O = 12\text{ mA}$ ; $V_{CC} = 2.7\text{ V}$	-	0.17	0.40	V
		$I_O = 24\text{ mA}$ ; $V_{CC} = 3.0\text{ V}$	-	0.33	0.55	V
		$I_O = 32\text{ mA}$ ; $V_{CC} = 4.5\text{ V}$	-	0.39	0.55	V
$I_{LI}$	input leakage current	$V_I = 5.5\text{ V}$ or GND; $V_{CC} = 5.5\text{ V}$	-	$\pm 0.1$	$\pm 5$	$\mu\text{A}$
$I_{OFF}$	power-off leakage current	$V_I$ or $V_O = 5.5\text{ V}$ ; $V_{CC} = 0\text{ V}$	-	$\pm 0.1$	$\pm 10$	$\mu\text{A}$
$I_{CC}$	quiescent supply current	$V_I = V_{CC}$ or GND; $I_O = 0\text{ A}$ ; $V_{CC} = 5.5\text{ V}$	-	0.1	10	$\mu\text{A}$
$\Delta I_{CC}$	additional quiescent supply current (per pin)	$V_I = V_{CC} - 0.6\text{ V}$ ; $I_O = 0\text{ A}$ ; $V_{CC} = 2.3\text{ V to }5.5\text{ V}$	-	5	500	$\mu\text{A}$
$C_i$	input capacitance		-	4.0	-	pF

**Table 9: Static characteristics ...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 +125 °C</b>						
V <sub>IH</sub>	HIGH-state input voltage	V <sub>CC</sub> = 1.65 V to 1.95 V	0.65 × V <sub>CC</sub>	-	-	V
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.7	-	-	V
		V <sub>CC</sub> = 2.7 V to 3.6 V	2.0	-	-	V
		V <sub>CC</sub> = 4.5 V to 5.5 V	0.7 × V <sub>CC</sub>	-	-	V
V <sub>IL</sub>	LOW-state input voltage	V <sub>CC</sub> = 1.65 V to 1.95 V	-	-	0.35 × V <sub>CC</sub>	V
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	-	0.7	V
		V <sub>CC</sub> = 2.7 V to 3.6 V	-	-	0.8	V
		V <sub>CC</sub> = 4.5 V to 5.5 V	-	-	0.3 × V <sub>CC</sub>	V
V <sub>OH</sub>	HIGH-state 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 5.5 V	V <sub>CC</sub> - 0.1	-	-	V
		I <sub>O</sub> = -4 mA; V <sub>CC</sub> = 1.65 V	0.95	-	-	V
		I <sub>O</sub> = -8 mA; V <sub>CC</sub> = 2.3 V	1.7	-	-	V
		I <sub>O</sub> = -12 mA; V <sub>CC</sub> = 2.7 V	1.9	-	-	V
		I <sub>O</sub> = -24 mA; V <sub>CC</sub> = 3.0 V	2.0	-	-	V
V <sub>OL</sub>	LOW-state 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 5.5 V	-	-	0.10	V
		I <sub>O</sub> = 4 mA; V <sub>CC</sub> = 1.65 V	-	-	0.70	V
		I <sub>O</sub> = 8 mA; V <sub>CC</sub> = 2.3 V	-	-	0.45	V
		I <sub>O</sub> = 12 mA; V <sub>CC</sub> = 2.7 V	-	-	0.60	V
		I <sub>O</sub> = 24 mA; V <sub>CC</sub> = 3.0 V	-	-	0.80	V
I <sub>LI</sub>	input leakage current	V <sub>I</sub> = 5.5 V or GND; V <sub>CC</sub> = 5.5 V	-	-	±20	μA
		V <sub>I</sub> or V <sub>O</sub> = 5.5 V; V <sub>CC</sub> = 0 V	-	-	±20	μA
I <sub>CC</sub>	quiescent 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	-	-	40	μA
ΔI <sub>CC</sub>	additional quiescent supply current (per pin)	V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 2.3 V to 5.5 V	-	-	5000	μA

[1] All typical values are measured at T<sub>amb</sub> = 25 °C.

## 12. Dynamic characteristics

**Table 10: Dynamic characteristics**

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 8](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b><math>T_{amb} = -40\text{ °C to }+85\text{ °C}</math> [1]</b>						
$t_{PHL}, t_{PLH}$	propagation delay					
	CP to Q, $\bar{Q}$	see <a href="#">Figure 6</a>				
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	1.5	6.0	13.4	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.0	3.5	7.1	ns
		$V_{CC} = 2.7\text{ V}$	1.0	3.5	7.1	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.0	3.5 [2]	5.9	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.0	2.5	4.1	ns
	$\bar{S}D$ to Q, $\bar{Q}$	see <a href="#">Figure 7</a>				
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	1.5	6.0	12.9	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.0	3.5	7.0	ns
		$V_{CC} = 2.7\text{ V}$	1.0	3.5	7.0	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.0	3.0 [2]	5.9	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.0	2.5	4.1	ns
	$\bar{R}D$ to Q, $\bar{Q}$	see <a href="#">Figure 7</a>				
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	1.5	5.0	12.9	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.0	3.5	7.0	ns
		$V_{CC} = 2.7\text{ V}$	1.0	3.5	7.0	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.0	3.0 [2]	5.9	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.0	2.5	4.1	ns
$t_W$	pulse width					
	clock CP HIGH or LOW	see <a href="#">Figure 6</a>				
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	6.2	-	-	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	2.7	-	-	ns
		$V_{CC} = 2.7\text{ V}$	2.7	-	-	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	2.7	1.3 [2]	-	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	2.0	-	-	ns
	set $\bar{S}D$ (LOW) and reset $\bar{R}D$ (LOW)	see <a href="#">Figure 7</a>				
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	6.2	-	-	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	2.7	-	-	ns
		$V_{CC} = 2.7\text{ V}$	2.7	-	-	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	2.7	1.6 [2]	-	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	2.0	-	-	ns



**Table 10: Dynamic characteristics ...continued**Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 8](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$t_{\text{rec}}$	recovery time set $\overline{\text{SD}}$ or reset $\overline{\text{RD}}$	see <a href="#">Figure 7</a>				
		$V_{\text{CC}} = 1.65 \text{ V to } 1.95 \text{ V}$	1.9	-	-	ns
		$V_{\text{CC}} = 2.3 \text{ V to } 2.7 \text{ V}$	1.4	-	-	ns
		$V_{\text{CC}} = 2.7 \text{ V}$	1.3	-	-	ns
		$V_{\text{CC}} = 3.0 \text{ V to } 3.6 \text{ V}$	1.2	-3.0 [2]	-	ns
		$V_{\text{CC}} = 4.5 \text{ V to } 5.5 \text{ V}$	1.0	-	-	ns
$t_{\text{su}}$	setup time D to CP	see <a href="#">Figure 6</a>				
		$V_{\text{CC}} = 1.65 \text{ V to } 1.95 \text{ V}$	2.9	-	-	ns
		$V_{\text{CC}} = 2.3 \text{ V to } 2.7 \text{ V}$	1.7	-	-	ns
		$V_{\text{CC}} = 2.7 \text{ V}$	1.7	-	-	ns
		$V_{\text{CC}} = 3.0 \text{ V to } 3.6 \text{ V}$	1.3	0.5 [2]	-	ns
		$V_{\text{CC}} = 4.5 \text{ V to } 5.5 \text{ V}$	1.1	-	-	ns
$t_{\text{h}}$	hold time D to CP	see <a href="#">Figure 6</a>				
		$V_{\text{CC}} = 1.65 \text{ V to } 1.95 \text{ V}$	0.0	-	-	ns
		$V_{\text{CC}} = 2.3 \text{ V to } 2.7 \text{ V}$	0.3	-	-	ns
		$V_{\text{CC}} = 2.7 \text{ V}$	0.5	-	-	ns
		$V_{\text{CC}} = 3.0 \text{ V to } 3.6 \text{ V}$	1.2	0.6 [2]	-	ns
		$V_{\text{CC}} = 4.5 \text{ V to } 5.5 \text{ V}$	0.5	-	-	ns
$f_{\text{max}}$	maximum input clock frequency	see <a href="#">Figure 6</a>				
		$V_{\text{CC}} = 1.65 \text{ V to } 1.95 \text{ V}$	80	-	-	MHz
		$V_{\text{CC}} = 2.3 \text{ V to } 2.7 \text{ V}$	175	-	-	MHz
		$V_{\text{CC}} = 2.7 \text{ V}$	175	-	-	MHz
		$V_{\text{CC}} = 3.0 \text{ V to } 3.6 \text{ V}$	175	280 [2]	-	MHz
		$V_{\text{CC}} = 4.5 \text{ V to } 5.5 \text{ V}$	200	-	-	MHz

Table 10: Dynamic characteristics ...continued

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 8](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
<b><math>T_{amb} = -40\text{ °C to }+125\text{ °C}</math></b>							
$t_{PHL}, t_{PLH}$	propagation delay CP to Q, $\bar{Q}$	see <a href="#">Figure 6</a>					
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	1.5	-	13.4	ns	
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.0	-	7.1	ns	
		$V_{CC} = 2.7\text{ V}$	1.0	-	7.1	ns	
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.0	-	5.9	ns	
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.0	-	4.1	ns	
	$\bar{SD}$ to Q, $\bar{Q}$	see <a href="#">Figure 7</a>					
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	1.5	-	12.9	ns	
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.0	-	7.0	ns	
		$V_{CC} = 2.7\text{ V}$	1.0	-	7.0	ns	
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.0	-	5.9	ns	
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.0	-	4.1	ns	
	$\bar{RD}$ to Q, $\bar{Q}$	see <a href="#">Figure 7</a>					
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	1.5	-	12.9	ns	
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.0	-	7.0	ns	
		$V_{CC} = 2.7\text{ V}$	1.0	-	7.0	ns	
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.0	-	5.9	ns	
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.0	-	4.1	ns	
	$t_w$	pulse width clock CP HIGH or LOW	see <a href="#">Figure 6</a>				
$V_{CC} = 1.65\text{ V to }1.95\text{ V}$			6.2	-	-	ns	
$V_{CC} = 2.3\text{ V to }2.7\text{ V}$			2.7	-	-	ns	
$V_{CC} = 2.7\text{ V}$			2.7	-	-	ns	
$V_{CC} = 3.0\text{ V to }3.6\text{ V}$			2.7	-	-	ns	
$V_{CC} = 4.5\text{ V to }5.5\text{ V}$			2.0	-	-	ns	
set $\bar{SD}$ (LOW) and reset $\bar{RD}$ (LOW)		see <a href="#">Figure 7</a>					
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	6.2	-	-	ns	
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	2.7	-	-	ns	
		$V_{CC} = 2.7\text{ V}$	2.7	-	-	ns	
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	2.7	-	-	ns	
$t_{rec}$		recovery time set $\bar{SD}$ or reset $\bar{RD}$	see <a href="#">Figure 7</a>				
			$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	1.9	-	-	ns
			$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.4	-	-	ns
			$V_{CC} = 2.7\text{ V}$	1.3	-	-	ns
	$V_{CC} = 3.0\text{ V to }3.6\text{ V}$		1.2	-	-	ns	
	$V_{CC} = 4.5\text{ V to }5.5\text{ V}$		1.0	-	-	ns	

**Table 10: Dynamic characteristics ...continued**

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 8](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$t_{su}$	setup time D to CP	see <a href="#">Figure 6</a>				
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	2.9	-	-	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.7	-	-	ns
		$V_{CC} = 2.7\text{ V}$	1.7	-	-	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.3	-	-	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.1	-	-	ns
$t_h$	hold time D to CP	see <a href="#">Figure 6</a>				
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	0.0	-	-	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	0.3	-	-	ns
		$V_{CC} = 2.7\text{ V}$	0.5	-	-	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.2	-	-	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	0.5	-	-	ns
$f_{max}$	maximum input clock frequency	see <a href="#">Figure 6</a>				
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	80	-	-	MHz
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	175	-	-	MHz
		$V_{CC} = 2.7\text{ V}$	175	-	-	MHz
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	175	-	-	MHz
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	200	-	-	MHz

[1] All typical values are measured at  $T_{amb} = 25\text{ °C}$ .

[2] These typical values are measured at  $V_{CC} = 3.3\text{ V}$ .

13. Waveforms

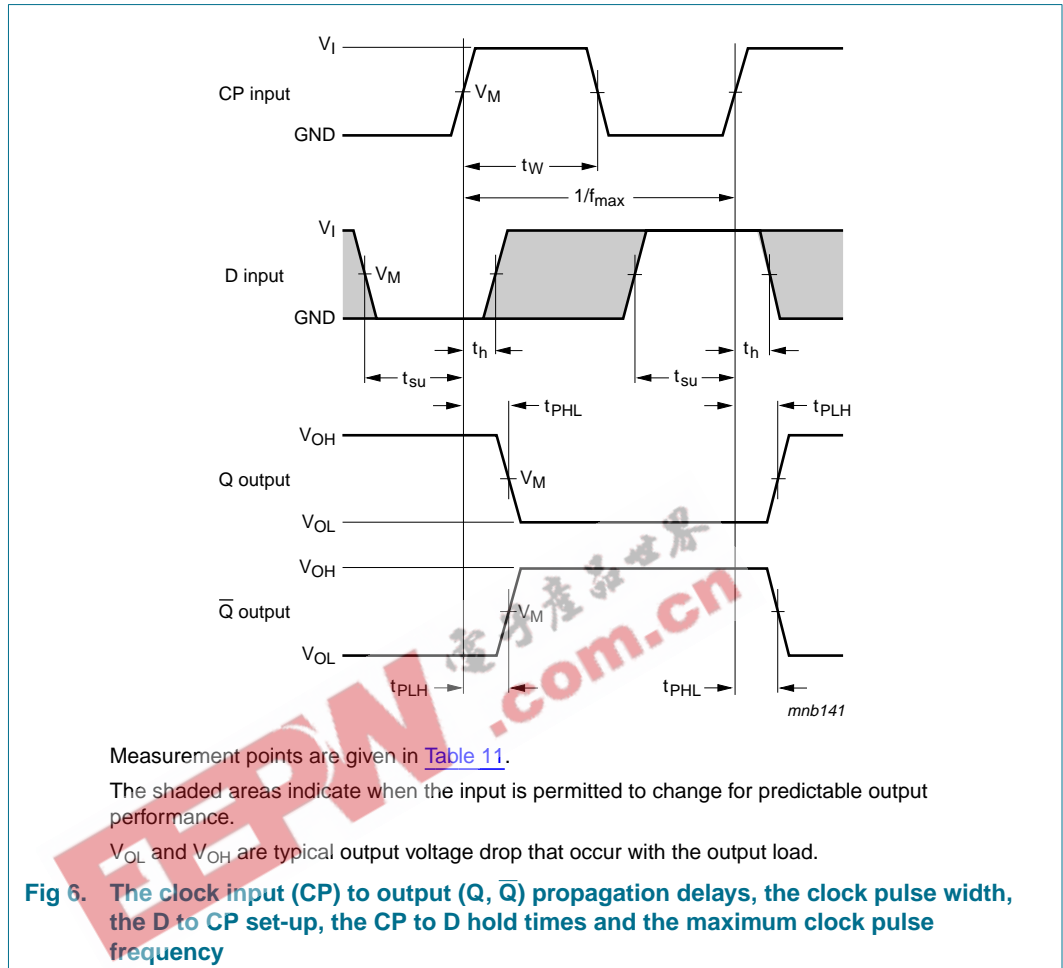


Table 11: Measurement points

Supply voltage	Input	Output
$V_{CC}$	$V_M$	$V_M$
1.65 V to 1.95 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$
2.3 V to 2.7 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$
2.7 V	1.5 V	1.5 V
3.0 V to 3.6 V	1.5 V	1.5 V
4.5 V to 5.5 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$

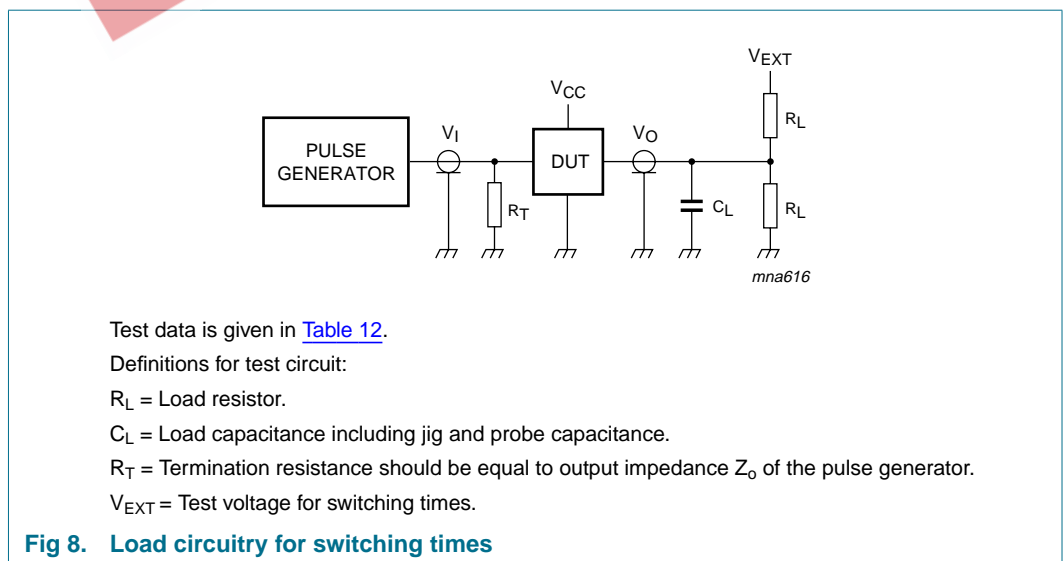
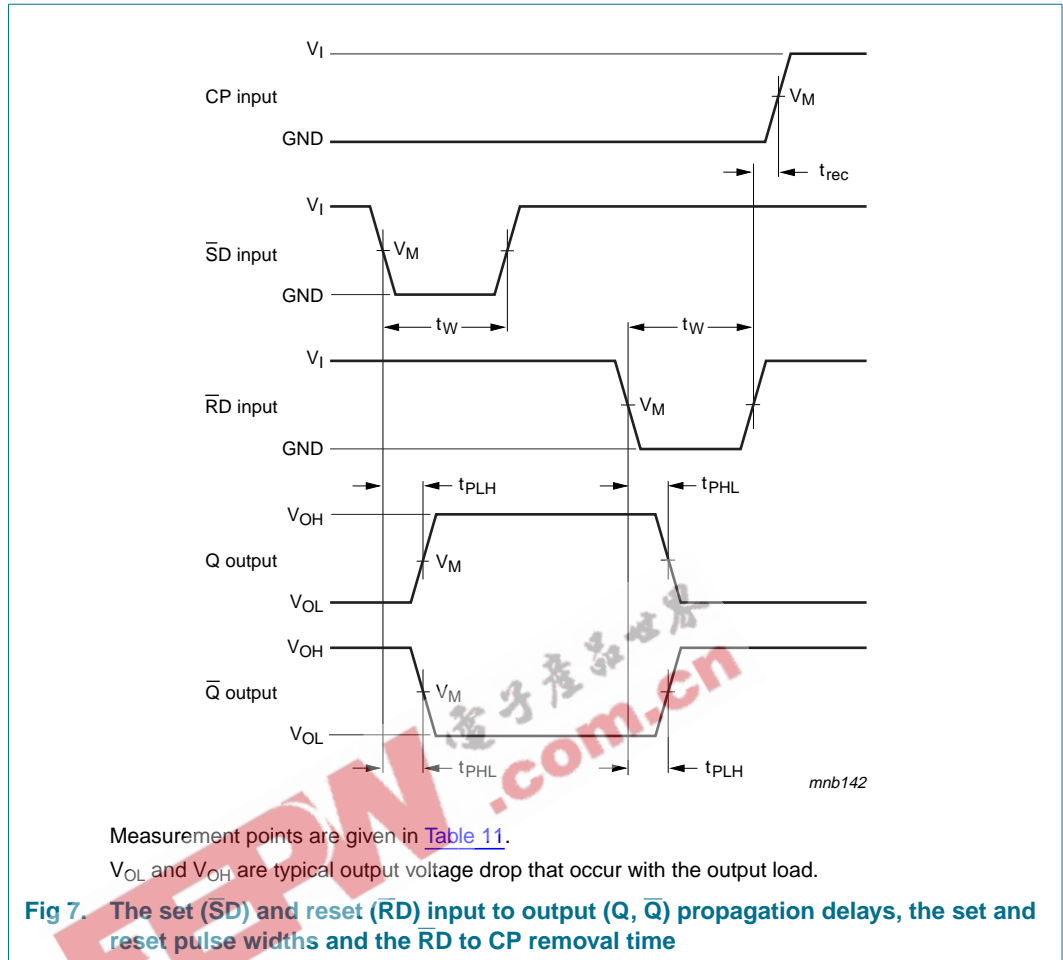


Table 12: Test data

Supply voltage	Input		Load		V <sub>EXT</sub>		
V <sub>CC</sub>	V <sub>I</sub>	t <sub>r</sub> = t <sub>f</sub>	C <sub>L</sub>	R <sub>L</sub>	t <sub>PLH</sub> , t <sub>PHL</sub>	t <sub>PZH</sub> , t <sub>PHZ</sub>	t <sub>PZL</sub> , t <sub>PLZ</sub>
1.65 V to 1.95 V	V <sub>CC</sub>	≤ 2.0 ns	30 pF	1 kΩ	open	GND	2 × V <sub>CC</sub>
2.3 V to 2.7 V	V <sub>CC</sub>	≤ 2.0 ns	30 pF	500 Ω	open	GND	2 × V <sub>CC</sub>
2.7 V	2.7 V	≤ 2.5 ns	50 pF	500 Ω	open	GND	6 V
3.0 V to 3.6 V	2.7 V	≤ 2.5 ns	50 pF	500 Ω	open	GND	6 V
4.5 V to 5.5 V	V <sub>CC</sub>	≤ 2.5 ns	50 pF	500 Ω	open	GND	2 × V <sub>CC</sub>

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14. Package outline

TSSOP8: plastic thin shrink small outline package; 8 leads; body width 3 mm; lead length 0.5 mm SOT505-2

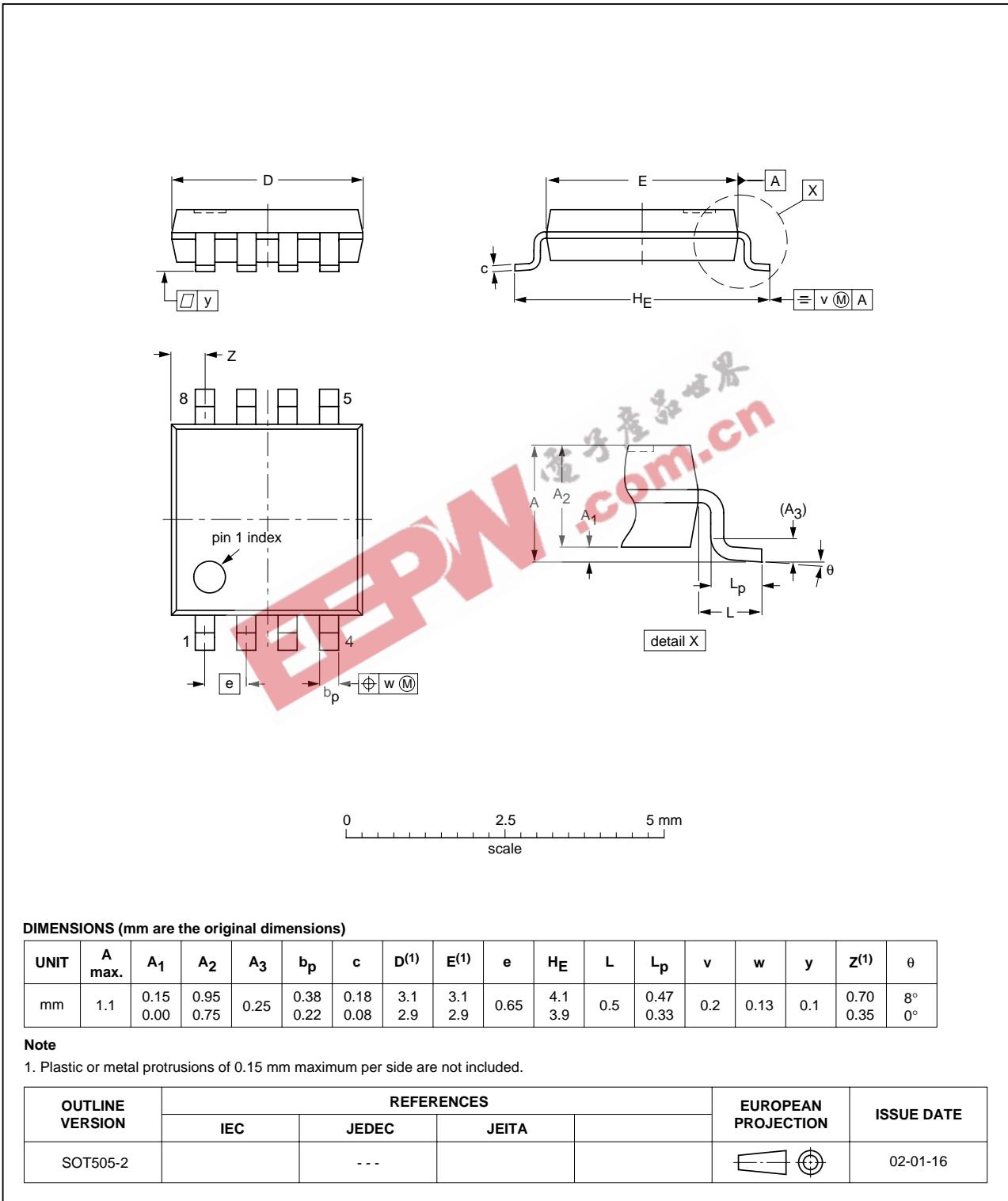


Fig 9. Package outline SOT505-2 (TSSOP8)

VSSOP8: plastic very thin shrink small outline package; 8 leads; body width 2.3 mm

SOT765-1

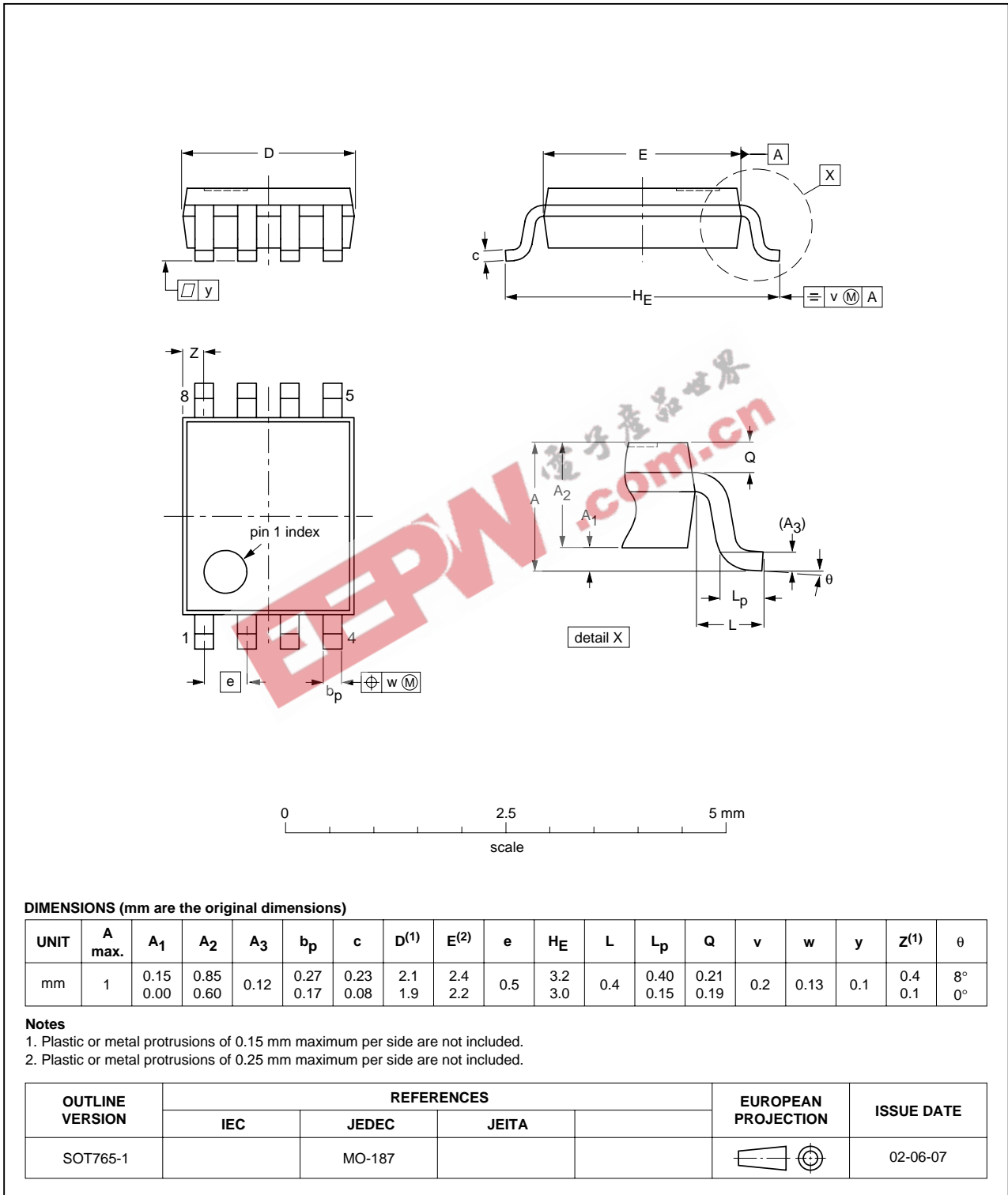


Fig 10. Package outline SOT765-1 (VSSOP8)



XSON8: plastic extremely thin small outline package; no leads; 8 terminals; body 1 x 1.95 x 0.5 mm

SOT833-1

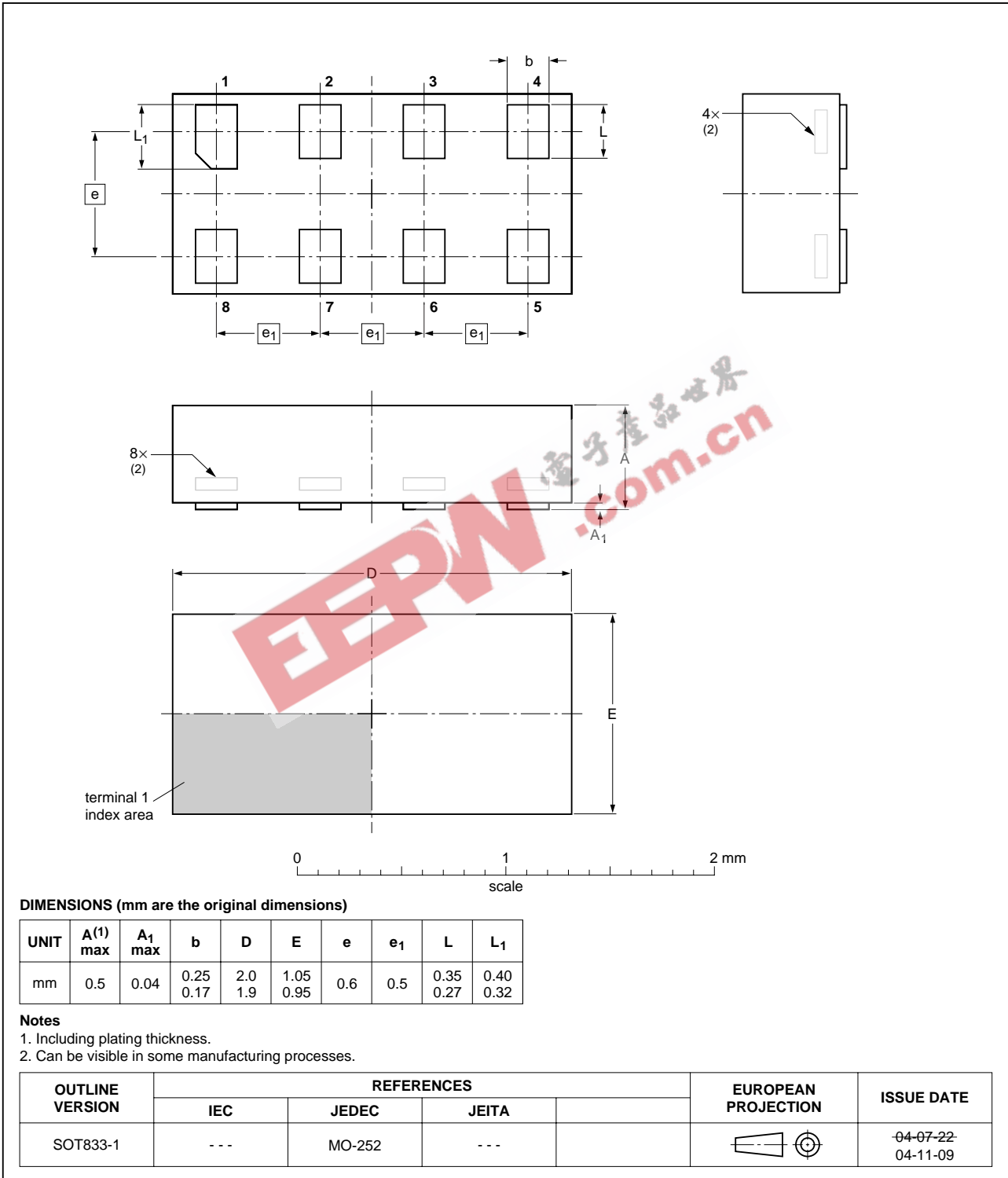


Fig 11. Package outline SOT833-1 (XSON8)

## 15. Abbreviations

Table 13: Abbreviations

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

## 16. Revision history

Table 14: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
74LVC2G74_1	20051103	Product data sheet	-	-	-

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## 17. Data sheet status

Level	Data sheet status <sup>[1]</sup>	Product status <sup>[2] [3]</sup>	Definition
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
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