

74LVC1G384

Bilateral switch

Rev. 01 — 26 February 2004

Product data sheet

1. General description

The 74LVC1G384 is a high-speed Si-gate CMOS device.

The 74LVC1G384 provides an analog switch. The switch has input and output terminals (pins Y and Z) and an active LOW enable input (pin \bar{E}). When pin \bar{E} is HIGH, the analog switch is turned off.

2. Features

- Very low ON-resistance:
 - ◆ 7.5 Ω (typ) at $V_{CC} = 2.7$ V
 - ◆ 6.5 Ω (typ) at $V_{CC} = 3.3$ V
 - ◆ 6.0 Ω (typ) at $V_{CC} = 5$ V.
- ESD protection:
 - ◆ HBM EIA/JESD22-A114-A exceeds 2 000 V
 - ◆ MM EIA/JESD22-A115-A exceeds 200 V.
- High noise immunity
- CMOS low power consumption
- Direct interface TTL-levels
- Latch-up performance meets requirements of JESD78 Class I
- Multiple package options
- Specified from -40 °C to $+80$ °C and -40 °C to $+125$ °C.

3. Quick reference data

Table 1: Quick reference data

Ground = 0 V; $T_{amb} = 25$ °C; $t_r = t_f \leq 3.0$ ns.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
t_{PZH}, t_{PZL}	turn-on time E to Y or Z	$C_L = 50$ pF; $R_L = 500$ Ω $V_{CC} = 3.3$ V $V_{CC} = 5.0$ V	-	4.8 3.3	-	ns ns
t_{PHZ}, t_{PLZ}	turn-off time E to Y or Z	$C_L = 50$ pF; $R_L = 500$ Ω $V_{CC} = 3.3$ V $V_{CC} = 5.0$ V	-	5.4 3.6	-	ns ns
C_i	input capacitance		-	2	-	pF

Table 1: Quick reference data ...continued

Ground = 0 V; $T_{amb} = 25\text{ }^{\circ}\text{C}$; $t_r = t_f \leq 3.0\text{ ns}$.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
C_{PD}	power dissipation capacitance	$C_L = 50\text{ pF}$; $f_i = 10\text{ MHz}$; $V_{CC} = 3.3\text{ V}$	[1]	15.2	-	pF
C_S	switch capacitance	OFF-state	-	5	-	pF
		ON-state	-	9.5	-	pF

[1] C_{PD} is used to determine the dynamic power dissipation (P_D in μW).

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

f_i = input frequency in MHz;

f_o = output frequency in MHz;

C_L = output load capacitance in pF;

C_S = maximum switch capacitance in pF;

V_{CC} = supply voltage in V.

[2] The condition is $V_1 = \text{GND to } V_{CC}$.

4. Ordering information

Table 2: Ordering information

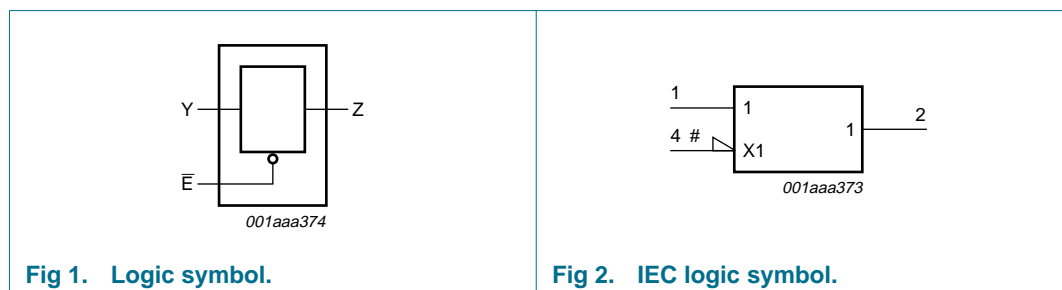
Type number	Package			Version
	Temperature range	Name	Description	
74LVC1G384GW	-40 °C to +125 °C	-	plastic surface mounted package; 5 leads	SOT353
74LVC1G384GV	-40 °C to +125 °C	-	plastic surface mounted package; 5 leads	SOT753

5. Marking

Table 3: Marking

Type number	Marking code
74LVC1G384GW	YL
74LVC1G384GV	YL

6. Functional diagram



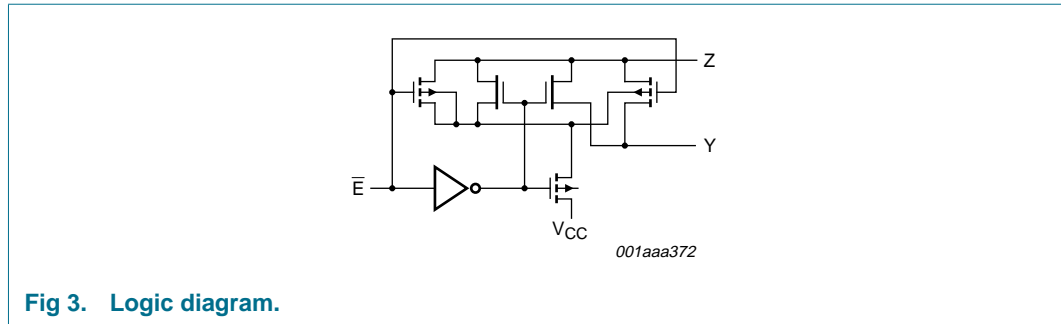


Fig 3. Logic diagram.

7. Pinning information

7.1 Pinning

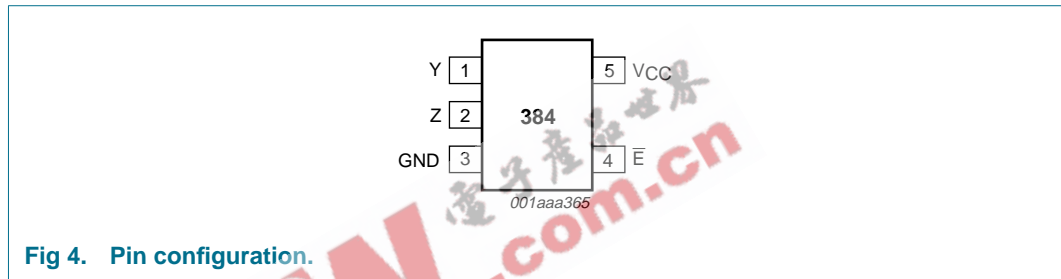


Fig 4. Pin configuration.

7.2 Pin description

Table 4: Pin description

Pin	Symbol	Description
1	Y	independent input or output
2	Z	independent output or input
3	GND	ground (0 V)
4	\bar{E}	enable input (active LOW)
5	V _{CC}	supply voltage

8. Functional description

8.1 Function table

Table 5: Function table [1]

Input \bar{E}	Switch
L	ON-state
H	OFF-state

[1] H = HIGH voltage level;
L = LOW voltage level.

9. Limiting values

Table 6: 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
V_I	input voltage		[1] -0.5	+6.5	V
I_{IK}	input diode current	$V_I < -0.5$ V or $V_I > V_{CC} + 0.5$ V	-	-50	mA
I_{SK}	switch diode current	$V_I < -0.5$ V or $V_I > V_{CC} + 0.5$ V	-	± 50	mA
V_S	DC switch voltage range	enable and disable mode	-0.5	$V_{CC} + 0.5$	V
I_S	DC switch source or sink current	$V_S > -0.5$ V or $V_S < V_{CC} + 0.5$ V	-	± 50	mA
I_{CC}, I_{GND}	V_{CC} or GND current		-	± 100	mA
T_{stg}	storage temperature		-65	+150	$^{\circ}\text{C}$
P_{tot}	power dissipation	$T_{amb} = -40$ $^{\circ}\text{C}$ to $+125$ $^{\circ}\text{C}$	-	250	mW

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

10. Recommended operating conditions

Table 7: 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_S	DC switch voltage range		[1] 0	-	V_{CC}	V
T_{amb}	ambient temperature		-40	-	+125	$^{\circ}\text{C}$
t_r, t_f	input rise and fall times	$V_{CC} = 1.65$ V to 2.7 V	0	-	20	ns/V
		$V_{CC} = 2.7$ V to 5.5 V	0	-	10	ns/V

[1] To avoid drawing V_{CC} current out of terminal Z, when switch current flows in terminal Y, the voltage drop across the bidirectional switch must not exceed 0.4 V. If the switch current flows into terminal Z, no V_{CC} current will flow out of terminal Y. In this case there is no limit for the voltage drop across the switch.

11. Static characteristics

Table 8: Static characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
T_{amb} = -40 °C to +85 °C [1]							
V _{IH}	HIGH-level input voltage	V _{CC} = 1.65 V to 1.95 V	0.65 × V _{CC}	-	-	V	
		V _{CC} = 2.3 V to 2.7 V	1.7	-	-	V	
		V _{CC} = 2.7 V to 3.6 V	2.0	-	-	V	
		V _{CC} = 4.5 V to 5.5 V	0.7 × V _{CC}	-	-	V	
V _{IL}	LOW-level input voltage	V _{CC} = 1.65 V to 1.95 V	-	-	0.35 × V _{CC}	V	
		V _{CC} = 2.3 V to 2.7 V	-	-	0.7	V	
		V _{CC} = 2.7 V to 3.6 V	-	-	0.8	V	
		V _{CC} = 4.5 V to 5.5 V	-	-	0.3 × V _{CC}	V	
I _{LI}	input leakage current on control pin	V _I = 5.5 V or GND; V _{CC} = 5.5 V	[2] -	±0.1	±5	µA	
I _{S(OFF)}	analog switch OFF-state current	V _I = V _{IH} or V _{IL} ; V _S = V _{CC} - GND; V _{CC} = 5.5 V; see Figure 5	[2] -	±0.1	±5	µA	
I _{S(ON)}	analog switch ON-state current	V _I = V _{IH} or V _{IL} ; V _S = V _{CC} - GND; V _{CC} = 5.5 V; see Figure 6	[2] -	±0.1	±5	µA	
I _{CC}	quiescent supply current	V _I = V _{CC} or GND; V _S = GND or V _{CC} ; I _O = 0 A; V _{CC} = 5.5 V	[2] -	0.1	10	µA	
ΔI _{CC}	additional quiescent supply current per control pin	V _I = V _{CC} - 0.6 V; V _S = GND or V _{CC} ; I _O = 0 A; V _{CC} = 5.5 V	[2] -	5	500	µA	
C _I	input capacitance		-	2	-	pF	
R _{ON(peak)}	switch ON-state resistance (peak)	V _I = GND to V _{CC} ; see Figure 7 and Figure 8					
		I _S = 4 mA; V _{CC} = 1.65 V to 1.95 V	-	35	130	Ω	
		I _S = 8 mA; V _{CC} = 2.3 V to 2.7 V	-	14	30	Ω	
		I _S = 12 mA; V _{CC} = 2.7 V	-	11.5	25	Ω	
		I _S = 24 mA; V _{CC} = 3.0 V to 3.6 V	-	8.5	20	Ω	
		I _S = 32 mA; V _{CC} = 4.5 V to 5.5 V	-	6.5	15	Ω	
R _{ON(rail)}	switch ON-state resistance rail	V _I = GND					
		I _S = 4 mA; V _{CC} = 1.65 V to 1.95 V	-	10	30	Ω	
		I _S = 8 mA; V _{CC} = 2.3 V to 2.7 V	-	8.5	20	Ω	
		I _S = 12 mA; V _{CC} = 2.7 V	-	7.5	18	Ω	
		I _S = 24 mA; V _{CC} = 3.0 V to 3.6 V	-	6.5	15	Ω	
		I _S = 32 mA; V _{CC} = 4.5 V to 5.5 V	-	6	10	Ω	
		V _I = V _{CC}					
		I _S = 4 mA; V _{CC} = 1.65 V to 1.95 V	-	12	30	Ω	
		I _S = 8 mA; V _{CC} = 2.3 V to 2.7 V	-	8.5	20	Ω	
		I _S = 12 mA; V _{CC} = 2.7 V	-	7.5	18	Ω	
		I _S = 24 mA; V _{CC} = 3.0 V to 3.6 V	-	6.5	15	Ω	
		I _S = 32 mA; V _{CC} = 4.5 V to 5.5 V	-	6	10	Ω	

Table 8: Static characteristics ...continued

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{ON(Flat)}$	switch ON-state resistance flatness	$V_I = \text{GND to } V_{CC}$; see Figure 9	[3]			
		$I_S = 4 \text{ mA}; V_{CC} = 1.8 \text{ V}$	-	100	-	Ω
		$I_S = 8 \text{ mA}; V_{CC} = 2.5 \text{ V}$	-	17	-	Ω
		$I_S = 12 \text{ mA}; V_{CC} = 2.7 \text{ V}$	-	10	-	Ω
		$I_S = 24 \text{ mA}; V_{CC} = 3.3 \text{ V}$	-	5	-	Ω
		$I_S = 32 \text{ mA}; V_{CC} = 5.0 \text{ V}$	-	3	-	Ω
$T_{amb} = -40 \text{ }^\circ\text{C to } +125 \text{ }^\circ\text{C}$						
V_{IH}	HIGH-level 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-level 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
I_{LI}	input leakage current on control pin	$V_I = 5.5 \text{ V or GND}; V_{CC} = 5.5 \text{ V}$	-	-	100	μA
$I_{S(OFF)}$	analog switch OFF-state current	$V_I = V_{IH} \text{ or } V_{IL}; V_S = V_{CC} - \text{GND}; V_{CC} = 5.5 \text{ V}$; see Figure 5	-	-	200	μA
$I_{S(ON)}$	analog switch ON-state current	$V_I = V_{IH} \text{ or } V_{IL}; V_S = V_{CC} - \text{GND}; V_{CC} = 5.5 \text{ V}$; see Figure 6	-	-	200	μA
I_{CC}	quiescent supply current	$V_I = V_{CC} \text{ or GND}; V_S = \text{GND or } V_{CC}; I_O = 0 \text{ A}; V_{CC} = 5.5 \text{ V}$	-	-	200	μA
ΔI_{CC}	additional quiescent supply current per control pin	$V_I = V_{CC} - 0.6 \text{ V}; V_S = \text{GND or } V_{CC}; I_O = 0 \text{ A}; V_{CC} = 5.5 \text{ V}$	-	-	5000	μA
$R_{ON(peak)}$	switch ON-state resistance (peak)	$V_I = \text{GND to } V_{CC}$; see Figure 7				
		$I_S = 4 \text{ mA}; V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	-	-	180	Ω
		$I_S = 8 \text{ mA}; V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	-	-	45	Ω
		$I_S = 12 \text{ mA}; V_{CC} = 2.7 \text{ V}$	-	-	38	Ω
		$I_S = 24 \text{ mA}; V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	-	-	30	Ω
		$I_S = 32 \text{ mA}; V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	-	-	23	Ω

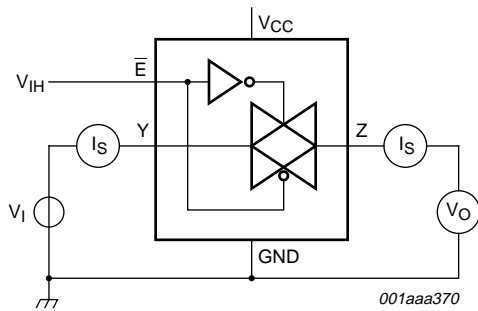
Table 8: Static characteristics ...continued

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
$R_{ON(rail)}$	switch ON-state resistance rail	$V_I = GND$					
		$I_S = 4 \text{ mA}; V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	-	-	45	Ω	
		$I_S = 8 \text{ mA}; V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	-	-	30	Ω	
		$I_S = 12 \text{ mA}; V_{CC} = 2.7 \text{ V}$	-	-	27	Ω	
		$I_S = 24 \text{ mA}; V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	-	-	23	Ω	
		$I_S = 32 \text{ mA}; V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	-	-	15	Ω	
		$V_I = V_{CC}$					
		$I_S = 4 \text{ mA}; V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	-	-	45	Ω	
		$I_S = 8 \text{ mA}; V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	-	-	30	Ω	
		$I_S = 12 \text{ mA}; V_{CC} = 2.7 \text{ V}$	-	-	27	Ω	
		$I_S = 24 \text{ mA}; V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	-	-	23	Ω	
		$I_S = 32 \text{ mA}; V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	-	-	15	Ω	

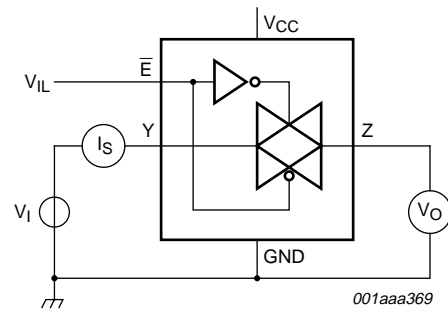
[1] Typical values are measured at $T_{amb} = 25 \text{ }^\circ\text{C}$.[2] These typical values are measured at $V_{CC} = 3.3 \text{ V}$ [3] These typical values are measured over the operating temperature range from $-40 \text{ }^\circ\text{C}$ to $+125 \text{ }^\circ\text{C}$.

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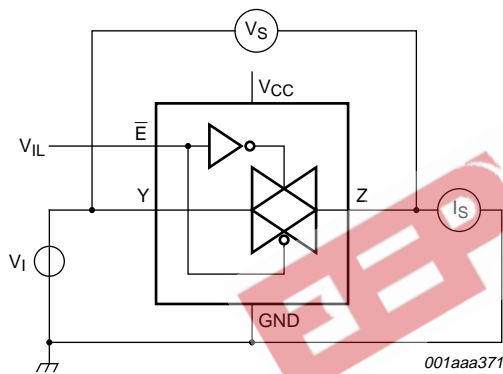
$V_I = V_{CC}$ and $V_O = GND$;
 $V_I = GND$ and $V_O = V_{CC}$

Fig 5. Test circuit for measuring switch OFF-state current.



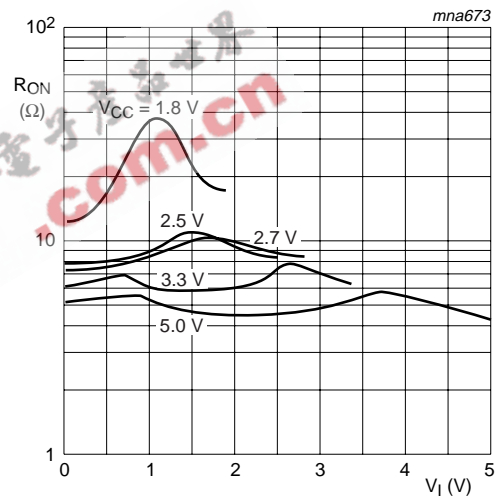
$V_I = V_{CC}$ and $V_O = \text{open circuit}$;
 $V_I = GND$ and $V_O = \text{open circuit}$

Fig 6. Test circuit for measuring switch ON-state current.



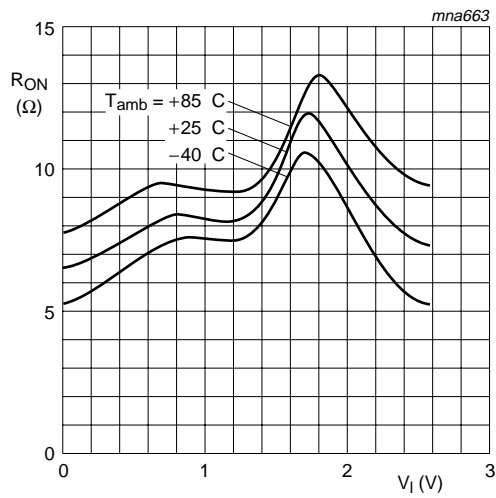
$V_I = GND$ to V_{CC} ; $R_{ON} = V_S/I_S$

Fig 7. Test circuit for measuring switch ON-resistance.

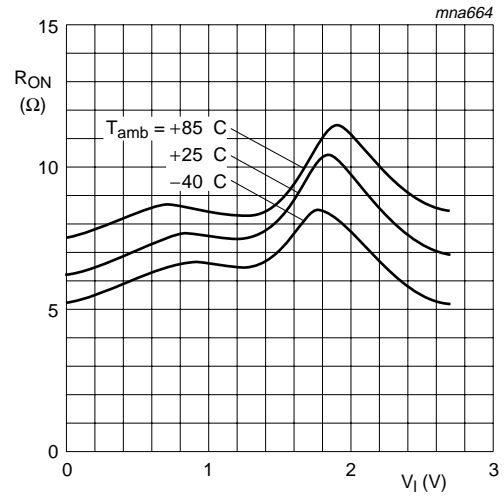


$V_S = GND$ to V_{CC} .

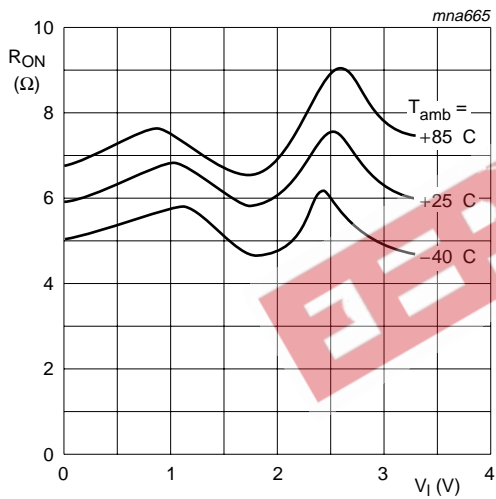
Fig 8. Typical switch ON-resistance as a function of input voltage.



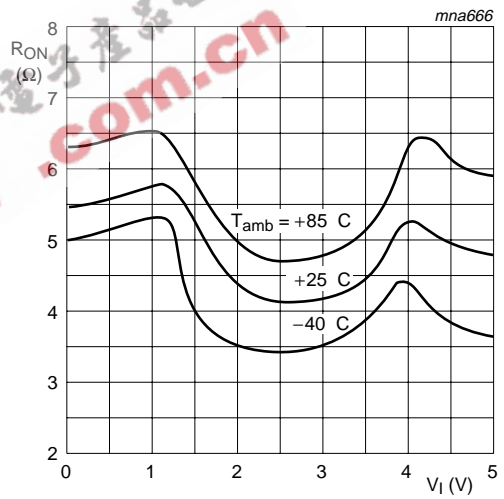
a. $V_{CC} = 2.5\text{ V}$



b. $V_{CC} = 2.7\text{ V}$



c. $V_{CC} = 3.3\text{ V}$



d. $V_{CC} = 5.0\text{ V}$

Fig 9. Switch ON-resistance at various supply voltages as a function of input voltage.

12. Dynamic characteristics

Table 9: Dynamic characteristics

At recommended operating conditions; voltages are referenced to GND (ground = 0 V); test circuit [Figure 12](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$T_{amb} = -40\text{ °C to }+85\text{ °C}$ [1]						
t_{PHL} , t_{PLH}	propagation delay Y to Z or Z to Y	see Figure 10	[2]			
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	-	0.8	2.0	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	-	0.4	1.2	ns
		$V_{CC} = 2.7\text{ V}$	-	0.4	1.0	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	-	0.3	0.8	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	-	0.2	0.6	ns
t_{PZH} , t_{PZL}	turn-on time \bar{E} to Y or Z	see Figure 11				
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	1.0	10.0	12.0	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.0	5.7	6.5	ns
		$V_{CC} = 2.7\text{ V}$	1.0	5.4	6.0	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.0	4.8	5.0	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.0	3.3	4.2	ns
t_{PHZ} , t_{PLZ}	turn-off time \bar{E} to Y or Z	see Figure 11				
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	1.0	7.4	10.0	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.0	4.1	6.9	ns
		$V_{CC} = 2.7\text{ V}$	1.0	4.9	7.5	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.0	5.4	6.5	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.0	3.6	5.0	ns
C_{PD}	power dissipation capacitance	$C_L = 50\text{ pF}$; $f_i = 10\text{ MHz}$; $V_I = \text{GND to }V_{CC}$	[3] [4]			
		$V_{CC} = 2.5\text{ V}$	-	13.7	-	pF
		$V_{CC} = 3.3\text{ V}$	-	15.2	-	pF
		$V_{CC} = 5.0\text{ V}$	-	18.3	-	pF
$T_{amb} = -40\text{ °C to }+125\text{ °C}$						
t_{PHL} , t_{PLH}	propagation delay Y to Z or Z to Y	see Figure 10	[2]			
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	-	-	3.0	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	-	-	2.0	ns
		$V_{CC} = 2.7\text{ V}$	-	-	1.5	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	-	-	1.5	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	-	-	1.0	ns
t_{PZH} , t_{PZL}	turn-on time \bar{E} to Y or Z	see Figure 11				
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	1.0	-	15.5	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.0	-	8.5	ns
		$V_{CC} = 2.7\text{ V}$	1.0	-	8.0	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.0	-	6.5	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.0	-	5.5	ns

Table 9: Dynamic characteristics ...continued

At recommended operating conditions; voltages are referenced to GND (ground = 0 V); test circuit [Figure 12](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
t_{PHZ}, t_{PLZ}	turn-off time \bar{E} to Y or Z	see Figure 11				
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	1.0	-	13.0	ns
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	1.0	-	9.0	ns
		$V_{CC} = 2.7 \text{ V}$	1.0	-	9.5	ns
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	1.0	-	8.5	ns
		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	1.0	-	6.5	ns

- [1] All typical values are measured at $T_{amb} = 25 \text{ }^\circ\text{C}$.
- [2] t_{PHL} and t_{PLH} propagation delay is the calculated RC time constant of the typical switch ON-resistance of the switch and the specified capacitance when driven by an ideal voltage source (zero output impedance).
- [3] C_{PD} is used to determine the dynamic power dissipation (P_D in μW).
 $P_D = C_{PD} \times V_{CC}^2 \times f_i + (C_L + C_S) \times V_{CC}^2 \times f_o$ where:
 f_i = input frequency in MHz;
 f_o = output frequency in MHz;
 C_L = output load capacitance in pF;
 C_S = maximum switch capacitance in pF;
 V_{CC} = supply voltage in V.
- [4] The condition is $V_I = \text{GND to } V_{CC}$.

13. Waveforms

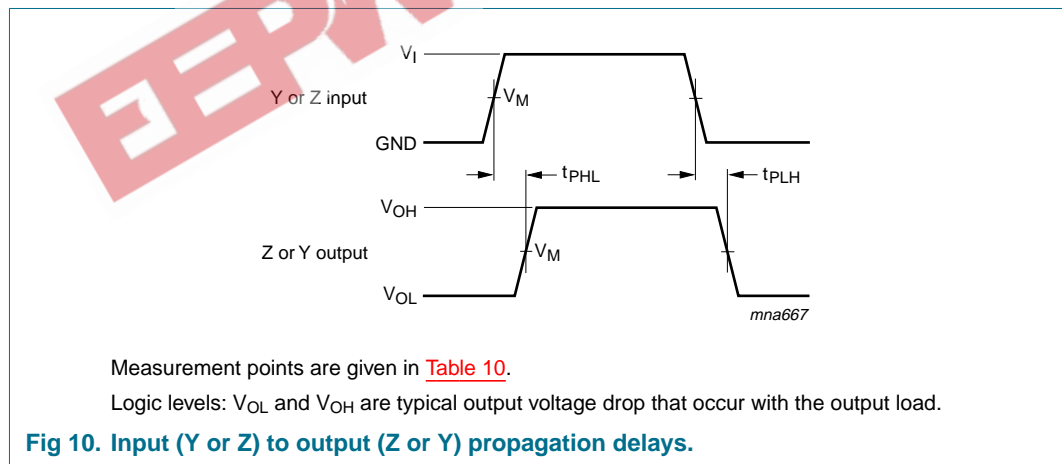


Table 10: Measurement points

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	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$

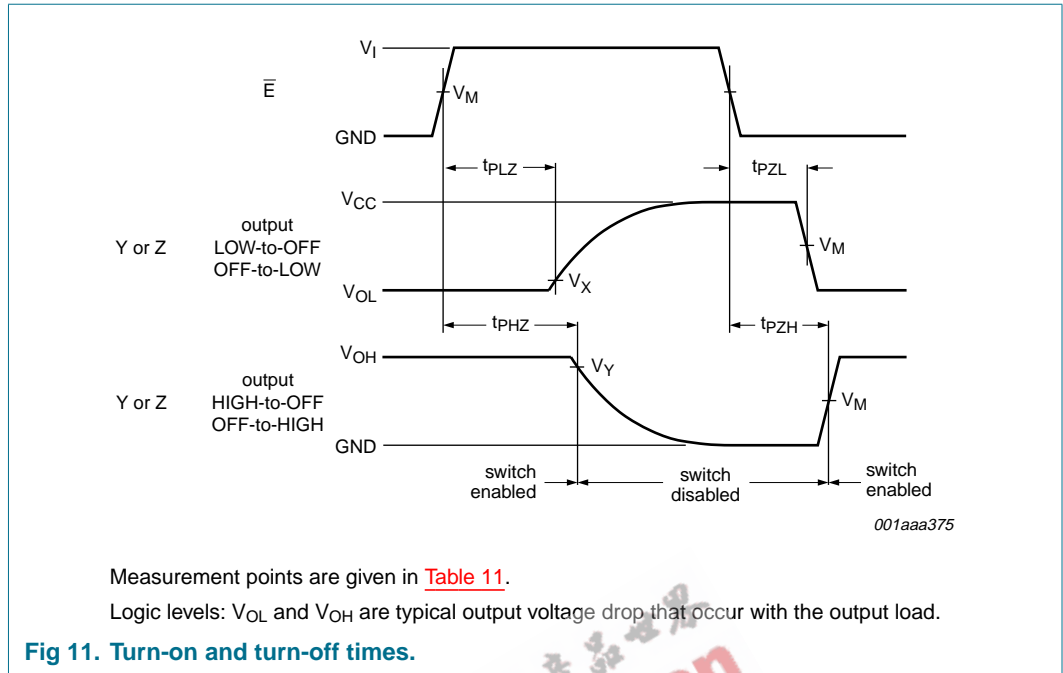


Table 11: Measurement points

Supply voltage	Input	Output		
V_{CC}	V_M	V_M	V_X	V_Y
1.65 V to 1.95 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.1 \times V_{CC}$	$V_{OH} - 0.1 \times V_{CC}$
2.3 V to 2.7 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.1 \times V_{CC}$	$V_{OH} - 0.1 \times V_{CC}$
2.7 V	1.5 V	1.5 V	$V_{OL} + 0.3 V$	$V_{OH} - 0.3 V$
3.0 V to 3.6 V	1.5 V	1.5 V	$V_{OL} + 0.3 V$	$V_{OH} - 0.3 V$
4.5 V to 5.5 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.3 V$	$V_{OH} - 0.3 V$

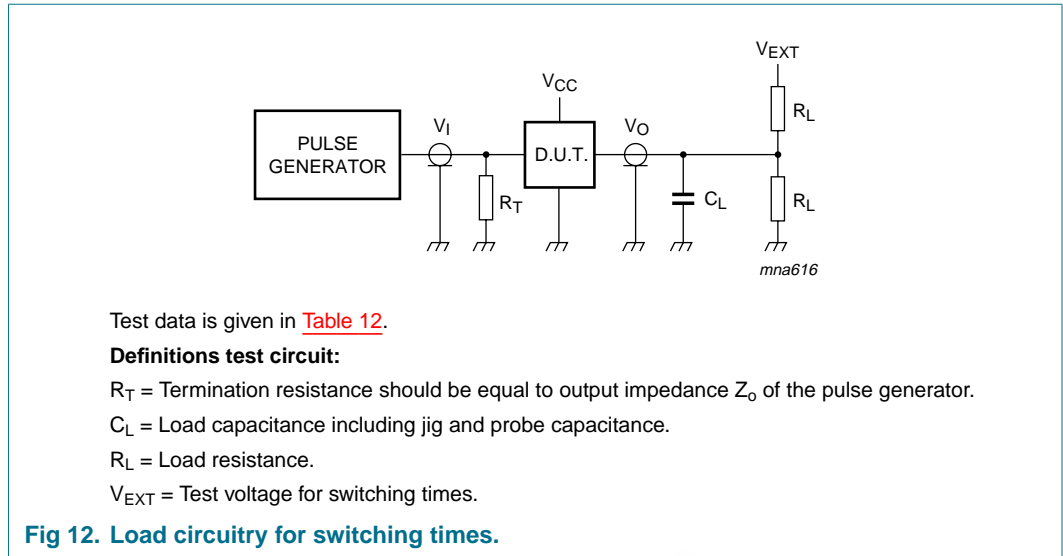


Table 12: Test data

Supply voltage	Input		Load		V_{EXT}		
V_{CC}	V_I	t_r, t_f	C_L	R_L	t_{PLH}, t_{PHL}	t_{PZH}, t_{PHZ}	t_{PZL}, t_{PLZ}
1.65 V to 1.95 V	V_{CC}	≤ 2.0 ns	30 pF	1 k Ω	open	GND	$2 \times V_{CC}$
2.3 V to 2.7 V	V_{CC}	≤ 2.0 ns	30 pF	500 Ω	open	GND	$2 \times V_{CC}$
2.7 V	2.7 V	≤ 2.5 ns	50 pF	500 Ω	open	GND	6.0 V
3.0 V to 3.6 V	2.7 V	≤ 2.5 ns	50 pF	500 Ω	open	GND	6.0 V
4.5 V to 5.5 V	V_{CC}	≤ 2.5 ns	50 pF	500 Ω	open	GND	$2 \times V_{CC}$

14. Additional dynamic characteristics

Table 13: Additional dynamic characteristics

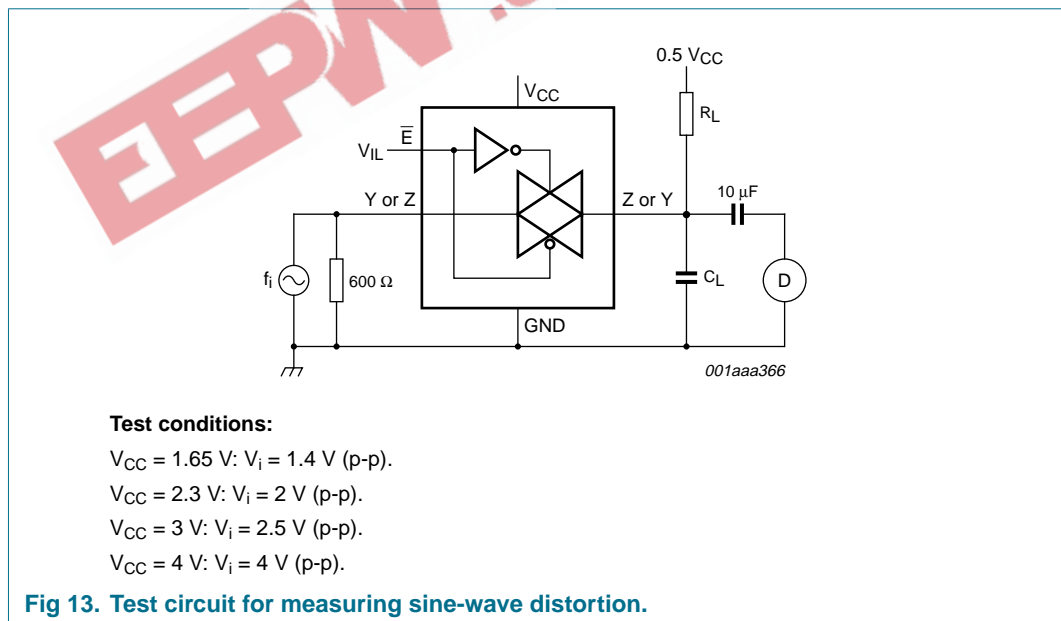
At recommended conditions; typical values measured at $T_{amb} = 25^\circ\text{C}$.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
d_{sin}	sine-wave distortion	$f_i = 1\text{ kHz}$; $R_L = 10\text{ k}\Omega$; $C_L = 50\text{ pF}$; see Figure 13					
		$V_{CC} = 1.65\text{ V}$	-	0.032	-	%	
		$V_{CC} = 2.3\text{ V}$	-	0.008	-	%	
		$V_{CC} = 3.0\text{ V}$	-	0.006	-	%	
		$V_{CC} = 4.5\text{ V}$	-	0.001	-	%	
		$f_i = 10\text{ kHz}$; $R_L = 10\text{ k}\Omega$; $C_L = 50\text{ pF}$; see Figure 13					
		$V_{CC} = 1.65\text{ V}$	-	0.068	-	%	
		$V_{CC} = 2.3\text{ V}$	-	0.009	-	%	
$f_{ON-state(res)}$	switch ON-state signal frequency response	$R_L = 600\ \Omega$; $C_L = 50\text{ pF}$; $f_i = 1\text{ MHz}$; see Figure 14					
		$V_{CC} = 1.65\text{ V}$	-	135	-	MHz	
		$V_{CC} = 2.3\text{ V}$	-	145	-	MHz	
		$V_{CC} = 3.0\text{ V}$	-	150	-	MHz	
		$V_{CC} = 4.5\text{ V}$	-	155	-	MHz	
		$R_L = 50\ \Omega$; $C_L = 5\text{ pF}$; $f_i = 1\text{ MHz}$; see Figure 14	[1]				
		$V_{CC} = 1.65\text{ V}$	-	>500	-	MHz	
		$V_{CC} = 2.3\text{ V}$	-	>500	-	MHz	
$\alpha_{OFF(ft)}$	switch OFF-state signal feed-through attenuation	$R_L = 600\ \Omega$; $C_L = 50\text{ pF}$; $f_i = 1\text{ MHz}$; see Figure 15					
		$V_{CC} = 1.65\text{ V}$	-	-46	-	dB	
		$V_{CC} = 2.3\text{ V}$	-	-46	-	dB	
		$V_{CC} = 3.0\text{ V}$	-	-46	-	dB	
		$V_{CC} = 4.5\text{ V}$	-	-46	-	dB	
		$R_L = 50\ \Omega$; $C_L = 5\text{ pF}$; $f_i = 1\text{ MHz}$; see Figure 15	[2]				
		$V_{CC} = 1.65\text{ V}$	-	-37	-	dB	
		$V_{CC} = 2.3\text{ V}$	-	-37	-	dB	
$V_{CC} = 3.0\text{ V}$	-	-37	-	dB			
$V_{CC} = 4.5\text{ V}$	-	-37	-	dB			

Table 13: Additional dynamic characteristics ...continued
 At recommended conditions; typical values measured at $T_{amb} = 25^{\circ}C$.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{ct}	crosstalk between control input to signal output	$R_L = 600 \Omega$; $C_L = 50 \text{ pF}$; $f_i = 1 \text{ MHz}$; $t_r = t_f = 2 \text{ ns}$; see Figure 16	-	69	-	mV
		$V_{CC} = 1.65 \text{ V}$	-	87	-	mV
		$V_{CC} = 2.3 \text{ V}$	-	156	-	mV
		$V_{CC} = 3.0 \text{ V}$	-	302	-	mV
f_{max}	frequency response (-3 dB)	$R_L = 50 \Omega$; $C_L = 10 \text{ pF}$; see Figure 14	[1]	-	-	-
		$V_{CC} = 1.65 \text{ V}$	-	200	-	MHz
		$V_{CC} = 2.3 \text{ V}$	-	350	-	MHz
		$V_{CC} = 3.0 \text{ V}$	-	410	-	MHz
Q	injection charge	$C_L = 0.1 \text{ nF}$; $V_{gen} = 0 \text{ V}$; $R_{gen} = 0 \Omega$; $f = 1 \text{ MHz}$; $R_L = 1 \text{ M}\Omega$; $V_{CC} = 1.65 \text{ V}$ to 5.5 V ; see Figure 17	[3]	-	0.05	pC

- [1] Adjust f_i voltage to obtain 0 dBm level at output. Increase f_i frequency until dB meter reads -3 dB.
- [2] Adjust f_i voltage to obtain 0 dBm level at input.
- [3] Definition: $Q = \Delta V_{out} \times C_L$. Guaranteed by design.



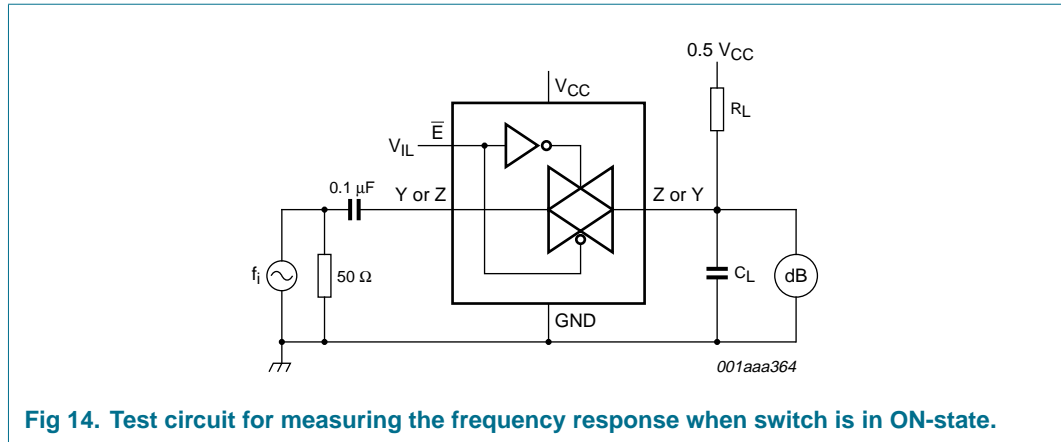


Fig 14. Test circuit for measuring the frequency response when switch is in ON-state.

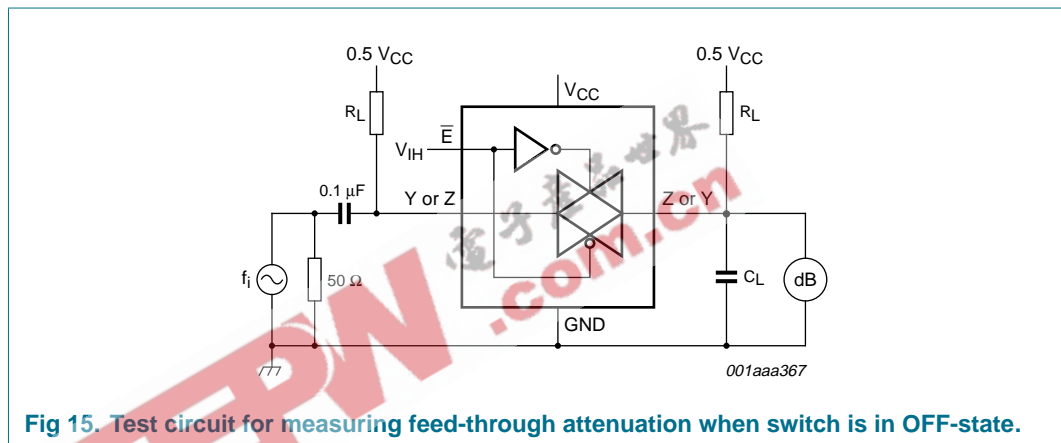


Fig 15. Test circuit for measuring feed-through attenuation when switch is in OFF-state.

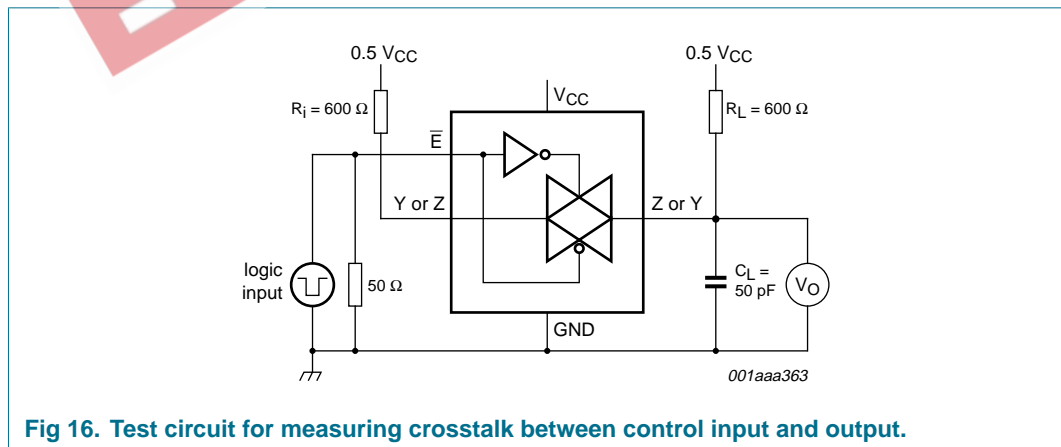
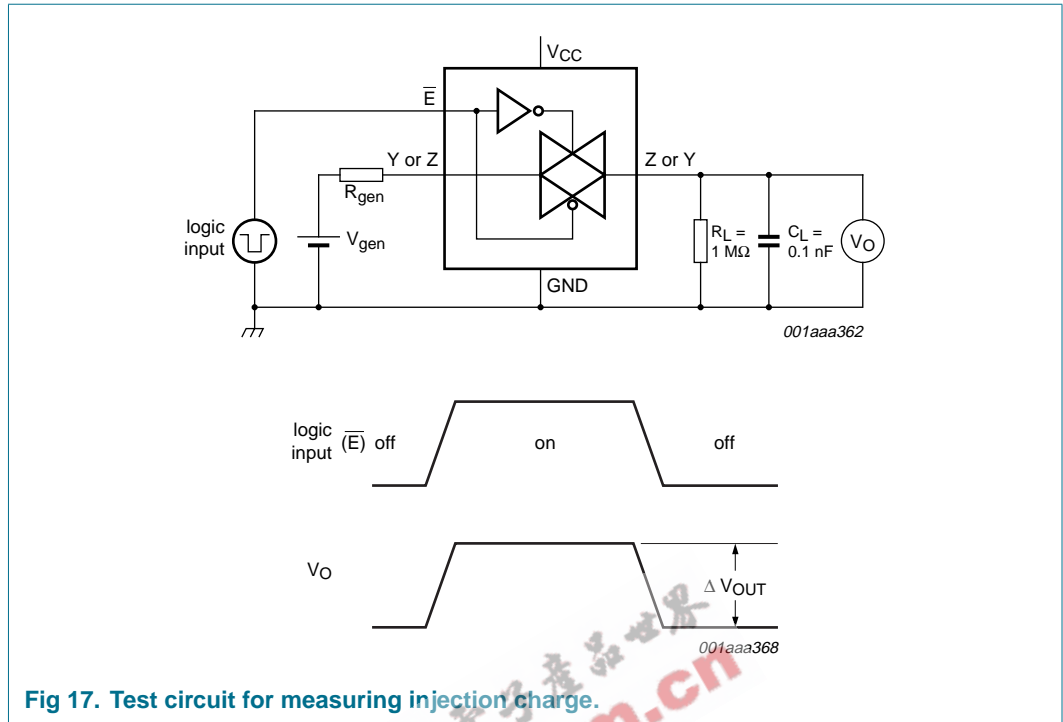


Fig 16. Test circuit for measuring crosstalk between control input and output.



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15. Package outline

Plastic surface mounted package; 5 leads

SOT353

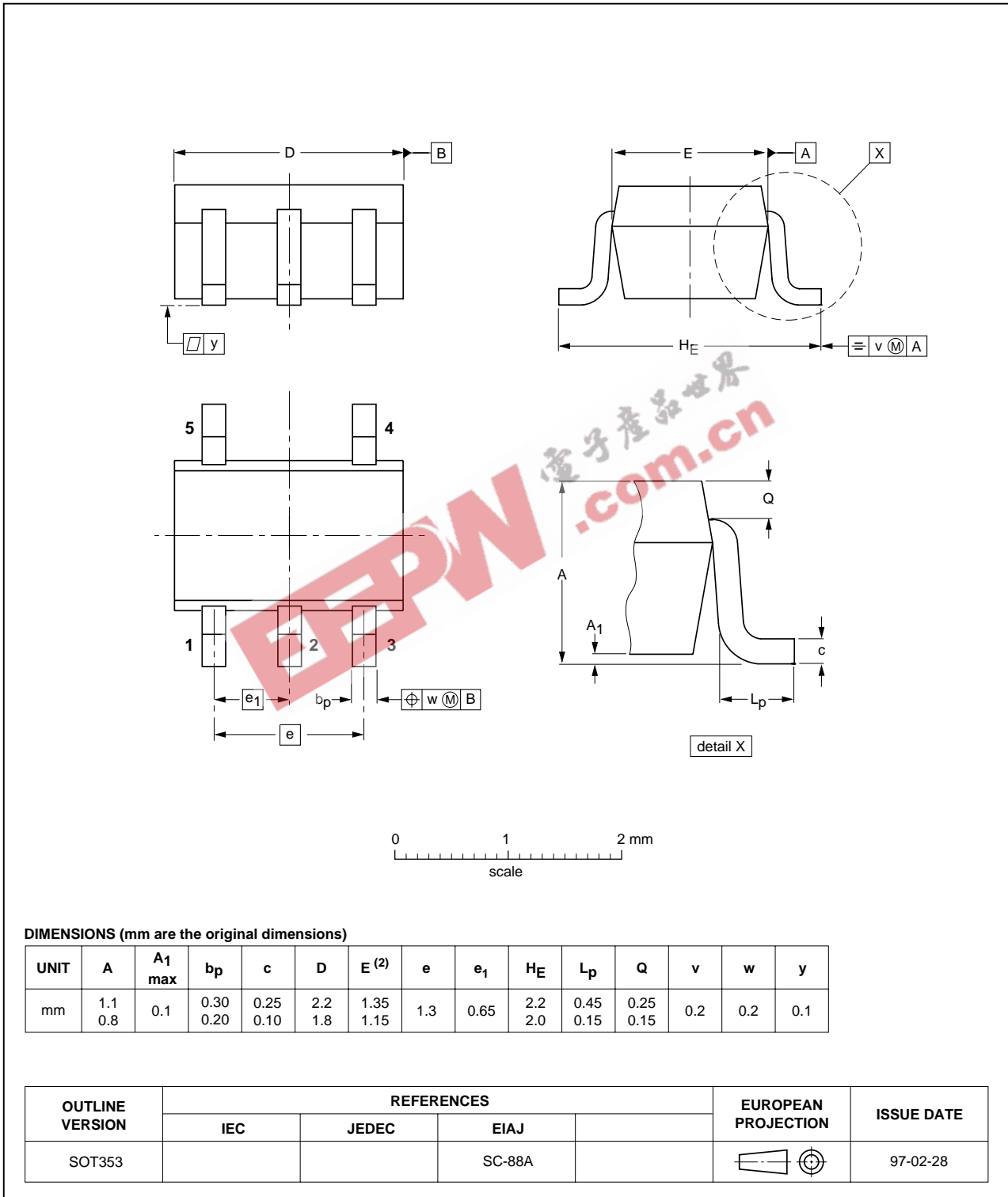


Fig 18. Package outline SOT353.

Plastic surface mounted package; 5 leads

SOT753

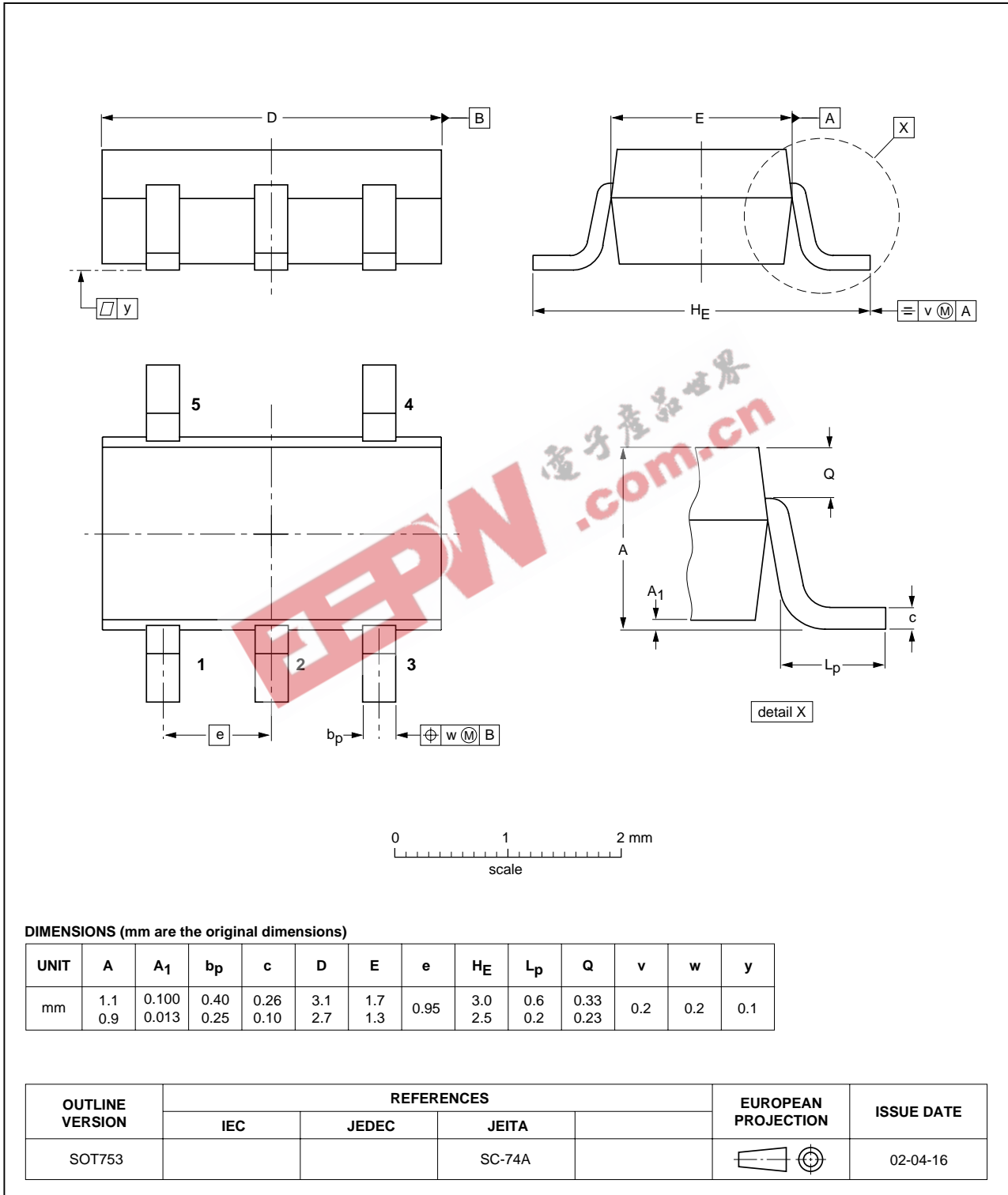


Fig 19. Package outline SOT753.

16. Revision history

Table 14: Revision history

Document ID	Release date	Data sheet status	Change notice	Order number	Supersedes
74LVC1G384_1	20040226	Product data	-	9397 750 12675	-

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17. Data sheet status

Level	Data sheet status ^[1]	Product status ^[2] ^[3]	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.
II	Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
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[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

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Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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