

74LVC2G66

Bilateral switch

Rev. 01 — 29 June 2004

Product data sheet

1. General description

The 74LVC2G66 is a high-performance, low-power, low-voltage, Si-gate CMOS device.

The 74LVC2G66 provides two analog switches. Each switch has a input and output (pins Y and Z) and an active HIGH enable input (pin E). When pin E is LOW, the analog switch is turned off.

2. Features

- Wide supply voltage range from 1.65 V to 5.5 V
- Very low ON-resistance:
 - ◆ 7.5 Ω (typical) at $V_{CC} = 2.7$ V
 - ◆ 6.5 Ω (typical) at $V_{CC} = 3.3$ V
 - ◆ 6 Ω (typical) at $V_{CC} = 5$ V.
- 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).
- ESD protection:
 - ◆ HBM EIA/JESD22-A114-B exceeds 2000 V
 - ◆ MM EIA/JESD22-A115-A exceeds 200 V.
- CMOS low-power consumption
- Latch-up performance meets requirements of JESD78 Class I
- Direct interface with TTL levels
- Enable inputs accept voltages up to 5 V
- SOT505-2 and SOT765-1 package
- Specified from -40 °C to $+85$ °C and -40 °C to $+125$ °C.

3. Quick reference data

Table 1: Quick reference data

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
t_{pZH} , t_{pZL}	turn-on time nE to V_{OS}	$C_L = 50$ pF; $R_L = 500$ Ω				
		$V_{CC} = 3$ V	-	2.4	-	ns
		$V_{CC} = 5$ V	-	1.8	-	ns

PHILIPS

Table 1: Quick reference data ...continued $GND = 0\text{ V}$; $T_{amb} = 25\text{ °C}$; $t_r = t_f \leq 2.5\text{ ns}$.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
t_{PHZ} , t_{PLZ}	turn-off time nE to V_{OS}	$C_L = 50\text{ pF}$; $R_L = 500\ \Omega$					
		$V_{CC} = 3\text{ V}$	-	3.0	-	ns	
		$V_{CC} = 5\text{ V}$	-	2.2	-	ns	
C_I	enable input capacitance		-	2.0	-	pF	
C_S	switch capacitance	OFF-state	-	5	-	pF	
		ON-state	-	9.5	-	pF	
C_{PD}	power dissipation capacitance	$C_L = 50\text{ pF}$; $f_i = 10\text{ MHz}$; $V_{CC} = 3.3\text{ V}$	[1][2]	-	11.0	-	pF

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

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

f_i = input frequency in MHz;

f_o = output frequency in MHz;

C_L = output load capacitance in pF;

C_S = switch capacitance in pF;

V_{CC} = supply voltage in V;

N = total load switching 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	
74LVC2G66DP	-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
74LVC2G66DC	-40 °C to +125 °C	VSSOP8	plastic very thin shrink small outline package; 8 leads; body width 2.3 mm	SOT765-1

5. Marking

Table 3: Marking

Type number	Marking code
74LVC2G66DP	V66
74LVC2G66DC	V66

6. Functional diagram

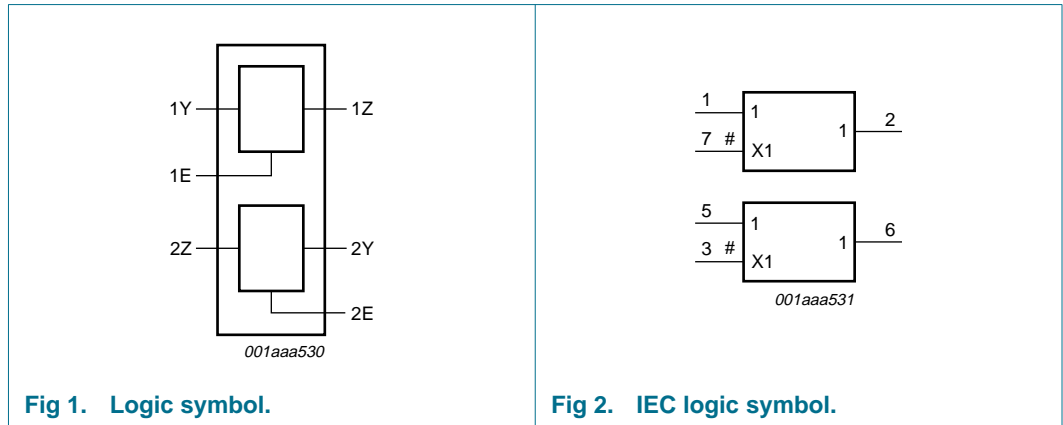


Fig 1. Logic symbol.

Fig 2. IEC logic symbol.

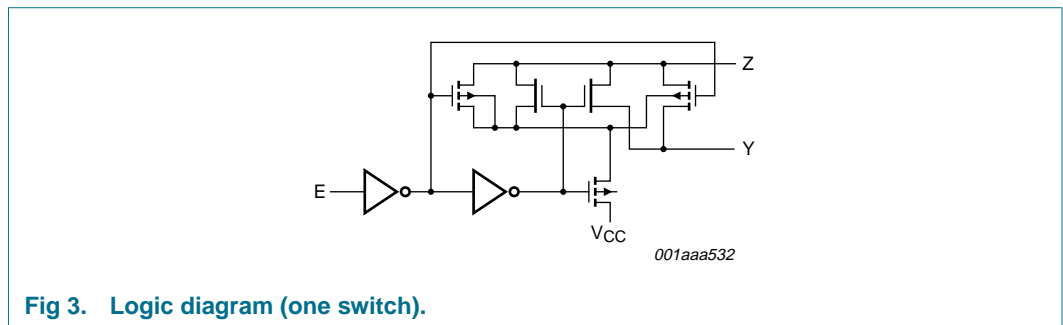


Fig 3. Logic diagram (one switch).

7. Pinning information

7.1 Pinning

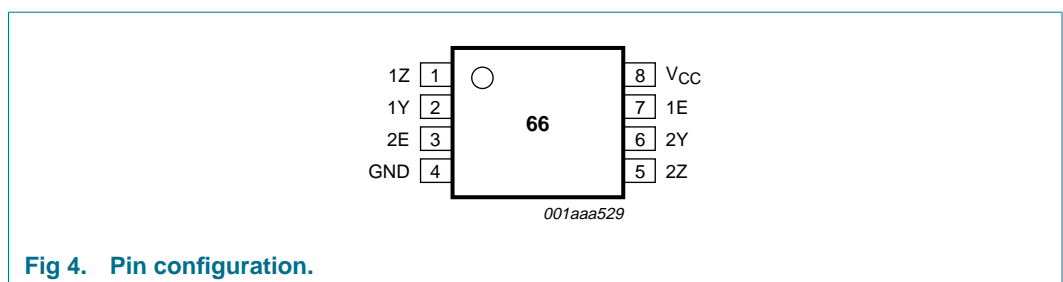


Fig 4. Pin configuration.

7.2 Pin description

Table 4: Pin description

Symbol	Pin	Description
1Y	1	independent input or output
1Z	2	independent input or output
2E	3	enable input (active HIGH)
GND	4	ground (0 V)
2Y	5	independent input or output

Table 4: Pin description ...continued

Symbol	Pin	Description
2Z	6	independent input or output
1E	7	enable input (active HIGH)
V _{CC}	8	supply voltage

8. Functional description

8.1 Function table

Table 5: Function table [1]

Input E	Switch
L	OFF-state
H	ON-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	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	°C
P _{tot}	power dissipation	T _{amb} = -40 °C to +125 °C	-	300	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	enable and disable mode [1][2]	0	-	V _{CC}	V

Table 7: Recommended operating conditions ...continued

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_{amb}	operating ambient temperature		-40	-	+125	°C
t_r, t_f	input rise and fall times	$V_{CC} = 1.65 \text{ V to } 2.7 \text{ V}$	[3] 0	-	20	ns/V
		$V_{CC} = 2.7 \text{ V to } 5.5 \text{ V}$	[3] 0	-	10	ns/V

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

[2] For overvoltage tolerant switch voltage capability, see the 74LVCV2G66.

[3] Applies to control signal levels.

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
$T_{amb} = -40 \text{ °C to } +85 \text{ °C}$ [1]						
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	$V_I = 5.5 \text{ V or GND}; V_{CC} = 5.5 \text{ V}$	-	± 0.1	± 5	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	-	± 0.1	± 5	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	-	± 0.1	± 5	μA
I_{CC}	quiescent supply current	$V_I = V_{CC} \text{ or GND}; V_S = \text{GND or } V_{CC}; I_O = 0 \text{ A}; V_{CC} = 5.5 \text{ V}$	-	0.1	10	μA
ΔI_{CC}	additional quiescent supply current per control pin	$V_I = V_{CC} - 0.6 \text{ V}; V_S = \text{GND or } V_{CC}; I_O = 0 \text{ A}; V_{CC} = 5.5 \text{ V}$	-	5	500	μA
C_I	input capacitance		-	2.0	-	pF
C_S	switch capacitance	OFF-state	-	5	-	pF
		ON-state	-	9.5	-	pF
$T_{amb} = -40 \text{ °C to } +125 \text{ °C}$						
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

Table 8: Static characteristics ...continued

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
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	-	-	±100	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	-	-	±200	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	-	-	±200	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	-	-	200	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	-	-	5000	µA

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

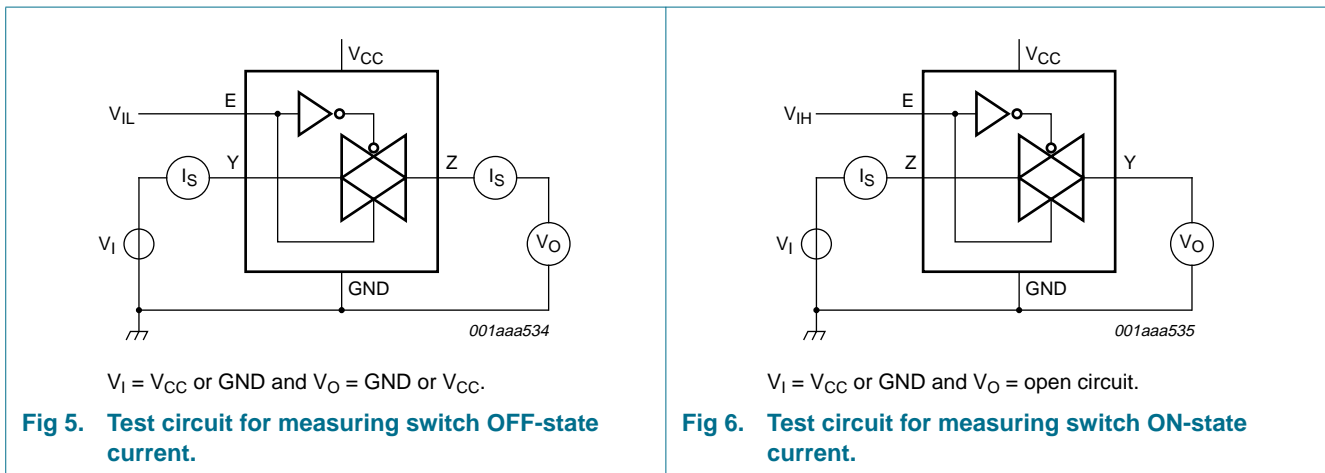


Table 9: Resistance R_{ON}

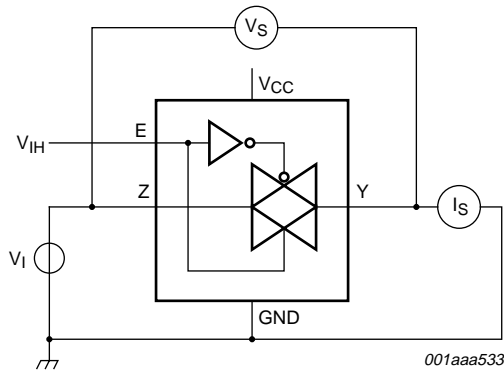
At recommended operating conditions; voltages are referenced to GND (ground = 0 V); see test circuit [Figure 7](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_{amb} = -40 °C to +85 °C						
R _{ON(peak)}	switch ON-state resistance (peak)	V _S = GND to V _{CC} ; V _I = V _{IH}	[1]			
		I _S = 4 mA; V _{CC} = 1.65 V to 1.95 V	-	35	100	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

Table 9: Resistance R_{ON} ...continuedAt recommended operating conditions; voltages are referenced to GND (ground = 0 V); see test circuit [Figure 7](#).

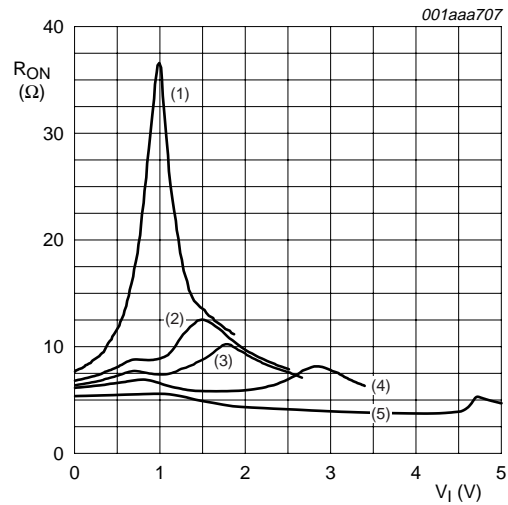
Symbol	Parameter	Conditions	Min	Typ	Max	Unit		
$R_{ON(rail)}$	switch ON-state resistance (rail)	$V_S = GND; V_I = V_{IH}$	[1]					
		$I_S = 4 \text{ mA}; V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	-	10	30	Ω		
		$I_S = 8 \text{ mA}; V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	-	8.5	20	Ω		
		$I_S = 12 \text{ mA}; V_{CC} = 2.7 \text{ V}$	-	7.5	18	Ω		
		$I_S = 24 \text{ mA}; V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	-	6.5	15	Ω		
		$I_S = 32 \text{ mA}; V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	-	6	10	Ω		
		$V_S = V_{CC}; V_I = V_{IH}$						
		$I_S = 4 \text{ mA}; V_{CC} = 1.65 \text{ to } 1.95 \text{ V}$	-	12	30	Ω		
		$I_S = 8 \text{ mA}; V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	-	8.5	20	Ω		
		$I_S = 12 \text{ mA}; V_{CC} = 2.7 \text{ V}$	-	7.5	18	Ω		
		$I_S = 24 \text{ mA}; V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	-	6.5	15	Ω		
		$I_S = 32 \text{ mA}; V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	-	6	10	Ω		
		$R_{ON(flat)}$	switch ON-state resistance (flatness)	$V_S = GND \text{ to } V_{CC}; V_I = V_{IH};$ see Figure 9 to Figure 13	[2]			
				$I_S = 4 \text{ mA}; V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	-	100	-	Ω
				$I_S = 8 \text{ mA}; V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	-	17	-	Ω
$I_S = 12 \text{ mA}; V_{CC} = 2.7 \text{ V}$	-			10	-	Ω		
$I_S = 24 \text{ mA}; V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	-			5	-	Ω		
$I_S = 32 \text{ mA}; V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	-			3	-	Ω		
$T_{amb} = -40 \text{ }^\circ\text{C to } +125 \text{ }^\circ\text{C}$								
$R_{ON(peak)}$	switch ON-state resistance (peak)	$V_S = GND \text{ to } V_{CC}; V_I = V_{IH}$						
		$I_S = 4 \text{ mA}; V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	-	-	150	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		
$R_{ON(rail)}$	switch ON-state resistance (rail)	$V_S = GND; V_I = V_{IH}$						
		$I_S = 4 \text{ mA}; V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	-	-	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		
		$V_S = V_{CC}; V_I = V_{IH}$						
		$I_S = 4 \text{ mA}; V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	-	-	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] These typical values are measured at $T_{amb} = 25 \text{ }^\circ\text{C}$ and nominal V_{CC} .[2] These typical values are measured at $T_{amb} = -40 \text{ }^\circ\text{C}$ to $+85 \text{ }^\circ\text{C}$ and nominal V_{CC} .



$V_I = \text{GND to } V_{CC}$.

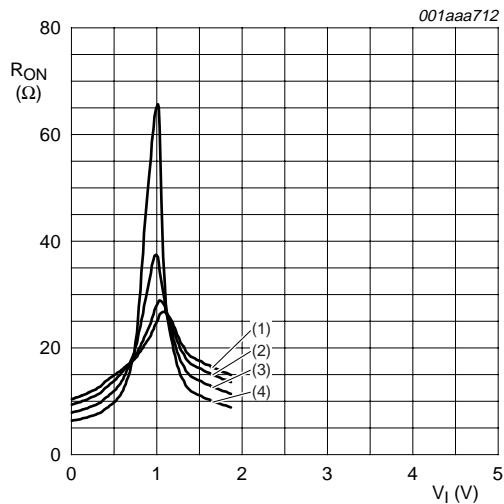
Fig 7. Test circuit for measuring switch ON-resistance.



- (1) $V_{CC} = 1.8 \text{ V}$.
- (2) $V_{CC} = 2.5 \text{ V}$.
- (3) $V_{CC} = 2.7 \text{ V}$.
- (4) $V_{CC} = 3.3 \text{ V}$.
- (5) $V_{CC} = 5.0 \text{ V}$.

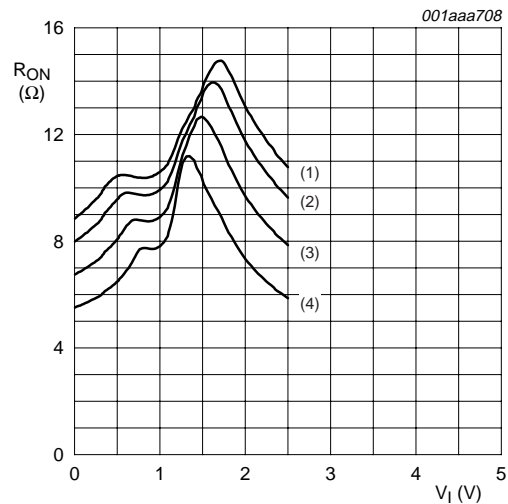
Measured at $T_{amb} = 25 \text{ }^\circ\text{C}$.

Fig 8. Typical switch ON-resistance as a function of input voltage; $V_S = \text{GND to } V_{CC}$.



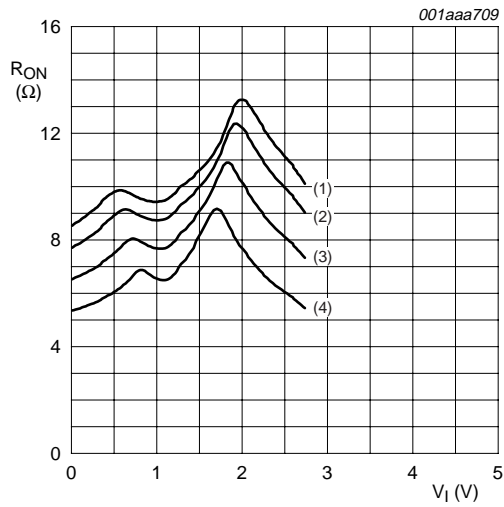
- (1) $T_{amb} = 125 \text{ }^\circ\text{C}$.
- (2) $T_{amb} = 85 \text{ }^\circ\text{C}$.
- (3) $T_{amb} = 25 \text{ }^\circ\text{C}$.
- (4) $T_{amb} = -40 \text{ }^\circ\text{C}$.

Fig 9. Switch ON-resistance as a function of input voltage; $V_{CC} = 1.8 \text{ V}$.



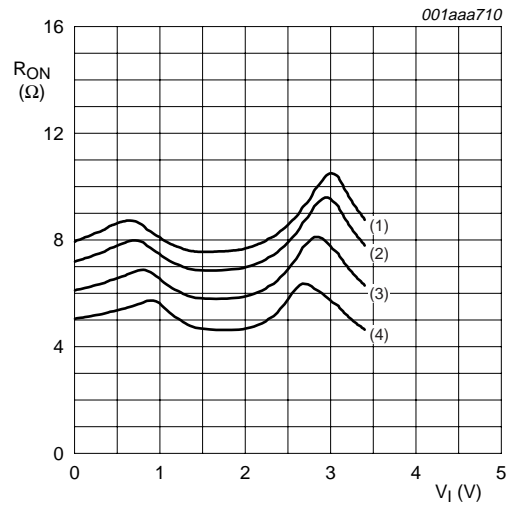
- (1) $T_{amb} = 125 \text{ }^\circ\text{C}$.
- (2) $T_{amb} = 85 \text{ }^\circ\text{C}$.
- (3) $T_{amb} = 25 \text{ }^\circ\text{C}$.
- (4) $T_{amb} = -40 \text{ }^\circ\text{C}$.

Fig 10. Switch ON-resistance as a function of input voltage; $V_{CC} = 2.5 \text{ V}$.



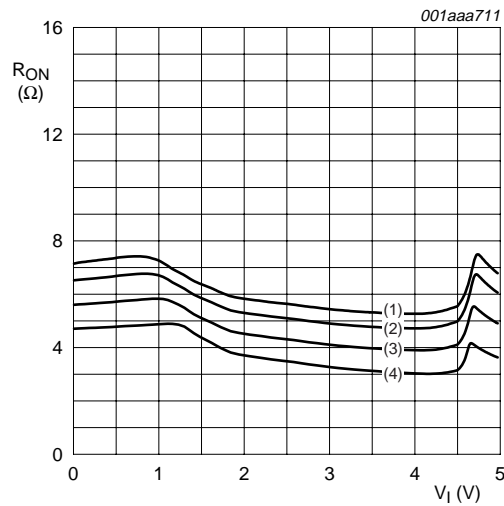
- (1) $T_{amb} = 125\text{ }^{\circ}\text{C}.$
- (2) $T_{amb} = 85\text{ }^{\circ}\text{C}.$
- (3) $T_{amb} = 25\text{ }^{\circ}\text{C}.$
- (4) $T_{amb} = -40\text{ }^{\circ}\text{C}.$

Fig 11. Switch ON-resistance as a function of input voltage; $V_{CC} = 2.7\text{ V}.$



- (1) $T_{amb} = 125\text{ }^{\circ}\text{C}.$
- (2) $T_{amb} = 85\text{ }^{\circ}\text{C}.$
- (3) $T_{amb} = 25\text{ }^{\circ}\text{C}.$
- (4) $T_{amb} = -40\text{ }^{\circ}\text{C}.$

Fig 12. Switch ON-resistance as a function of input voltage; $V_{CC} = 3.3\text{ V}.$



- (1) $T_{amb} = 125\text{ }^{\circ}\text{C}.$
- (2) $T_{amb} = 85\text{ }^{\circ}\text{C}.$
- (3) $T_{amb} = 25\text{ }^{\circ}\text{C}.$
- (4) $T_{amb} = -40\text{ }^{\circ}\text{C}.$

Fig 13. Switch ON-resistance as a function of input voltage; $V_{CC} = 5.0\text{ V}.$

12. Dynamic characteristics

Table 10: Dynamic characteristics

At recommended operating conditions; voltages are referenced to GND (ground = 0 V); test circuit [Figure 16](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$T_{amb} = -40\text{ °C to }+85\text{ °C}$ [1]						
t_{PHL} , t_{PLH}	propagation delay nY to nZ or nZ to nY	see Figure 14				
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	-	0.8	2	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	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 nE to V_{OS}	see Figure 15				
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	1.0	4.6	10	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.0	2.7	5.6	ns
		$V_{CC} = 2.7\text{ V}$	1.0	2.7	5.0	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.0	2.4	4.4	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.0	1.8	3.9	ns
t_{PHZ} , t_{PLZ}	turn-off time nE to V_{OS}	see Figure 15				
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	1.0	3.8	9.0	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.0	2.1	5.5	ns
		$V_{CC} = 2.7\text{ V}$	1.0	3.5	6.5	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.0	3.0	6.0	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.0	2.2	5.0	ns
C_{PD}	power dissipation capacitance	$f_i = 10\text{ MHz}$				
			[2] [3]			
		$V_{CC} = 2.5\text{ V}$	-	9.0	-	pF
		$V_{CC} = 3.3\text{ V}$	-	11.0	-	pF
		$V_{CC} = 5.0\text{ V}$	-	15.7	-	pF
$T_{amb} = -40\text{ °C to }+125\text{ °C}$						
t_{PHL} , t_{PLH}	propagation delay nY to nZ or nZ to nY	see Figure 14				
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	-	-	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 nE to V_{OS}	see Figure 15				
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	1.0	-	13.0	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.0	-	7.5	ns
		$V_{CC} = 2.7\text{ V}$	1.0	-	6.5	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.0	-	6.0	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.0	-	5.0	ns

Table 10: Dynamic characteristics ...continued

At recommended operating conditions; voltages are referenced to GND (ground = 0 V); test circuit [Figure 16](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
t_{PHZ} , t_{PLZ}	turn-off time nE to V_{OS}	see Figure 15				
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	1.0	-	11.5	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	-	8.5	ns
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	1.0	-	8.0	ns
		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	1.0	-	6.5	ns

[1] All typical values are measured at $T_{amb} = 25 \text{ }^\circ\text{C}$ and nominal V_{CC} .

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

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

where:

f_i = input frequency in MHz;

f_o = output frequency in MHz;

C_L = output load capacitance in pF;

V_{CC} = supply voltage in V;

N = total load switching outputs;

C_S = switch capacitance.

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

13. Waveforms

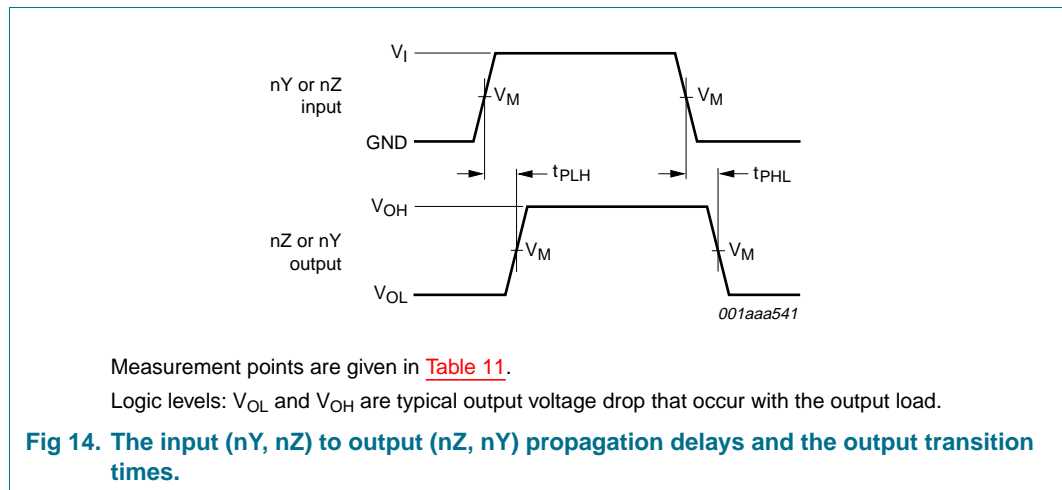


Table 11: Measurement points

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

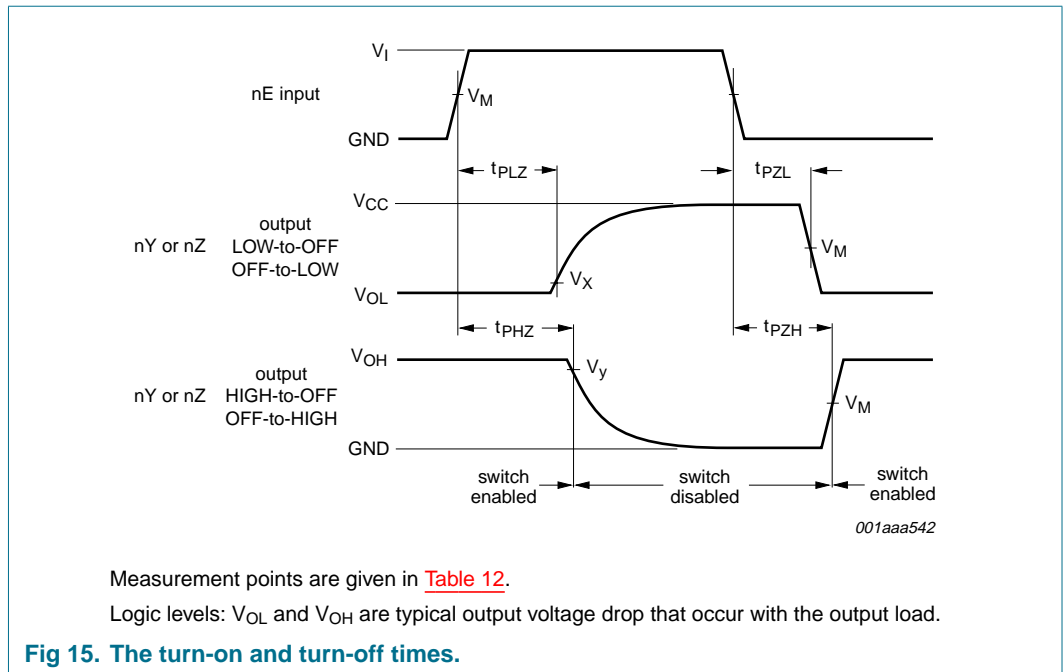


Table 12: Measurement points

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	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.3 V$	$V_{OH} - 0.3 V$

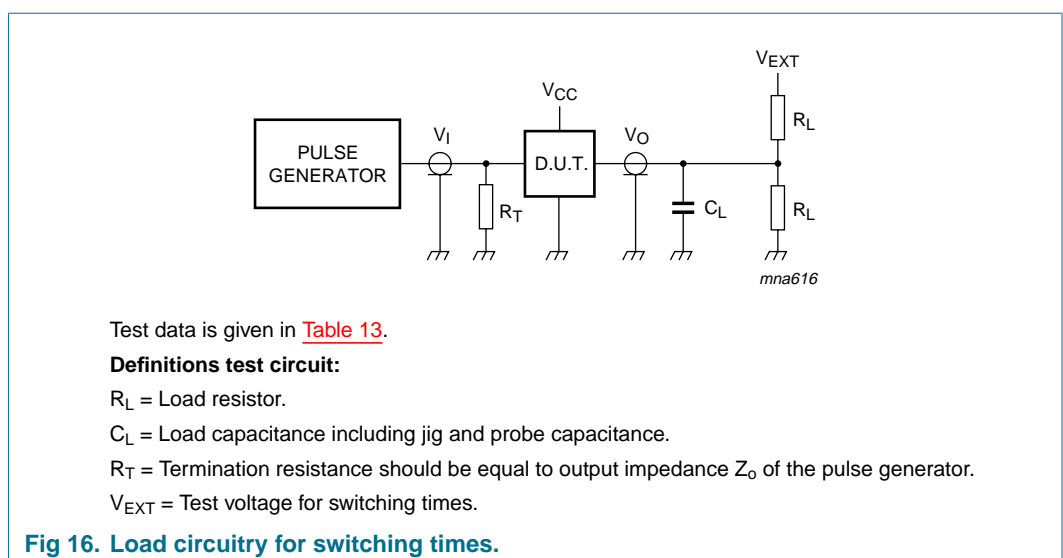


Table 13: Test data

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 kΩ	open	GND	2 × V _{CC}
2.3 V to 2.7 V	V _{CC}	≤ 2.0 ns	30 pF	500 Ω	open	GND	2 × V _{CC}
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 _{CC}	≤ 2.5 ns	50 pF	500 Ω	open	GND	2 × V _{CC}

14. Additional dynamic characteristics

Table 14: Additional dynamic characteristics

At recommended conditions; typical values measured at T_{amb} = 25 °C.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
d _{sin}	sine-wave distortion	R _L = 10 kΩ; C _L = 50 pF; f _i = 1 kHz; see Figure 17					
		V _{CC} = 1.65 V	-	0.032	-	%	
		V _{CC} = 2.3 V	-	0.008	-	%	
		V _{CC} = 3 V	-	0.006	-	%	
		V _{CC} = 4.5 V	-	0.005	-	%	
		R _L = 10 kΩ; C _L = 50 pF; f _i = 10 kHz; see Figure 17					
		V _{CC} = 1.65 V	-	0.068	-	%	
		V _{CC} = 2.3 V	-	0.009	-	%	
		V _{CC} = 3 V	-	0.008	-	%	
		V _{CC} = 4.5 V	-	0.006	-	%	
f _{ON-state(res)}	switch ON-state signal frequency response	R _L = 600 Ω; C _L = 50 pF; see Figure 18 ^[1]					
		V _{CC} = 1.65 V	-	135	-	MHz	
		V _{CC} = 2.3 V	-	145	-	MHz	
		V _{CC} = 3 V	-	150	-	MHz	
		V _{CC} = 4.5 V	-	155	-	MHz	
		R _L = 50 Ω; C _L = 5 pF; see Figure 18 ^[1]					
		V _{CC} = 1.65 V	-	>500	-	MHz	
		V _{CC} = 2.3 V	-	>500	-	MHz	
		V _{CC} = 3 V	-	>500	-	MHz	
		V _{CC} = 4.5 V	-	>500	-	MHz	

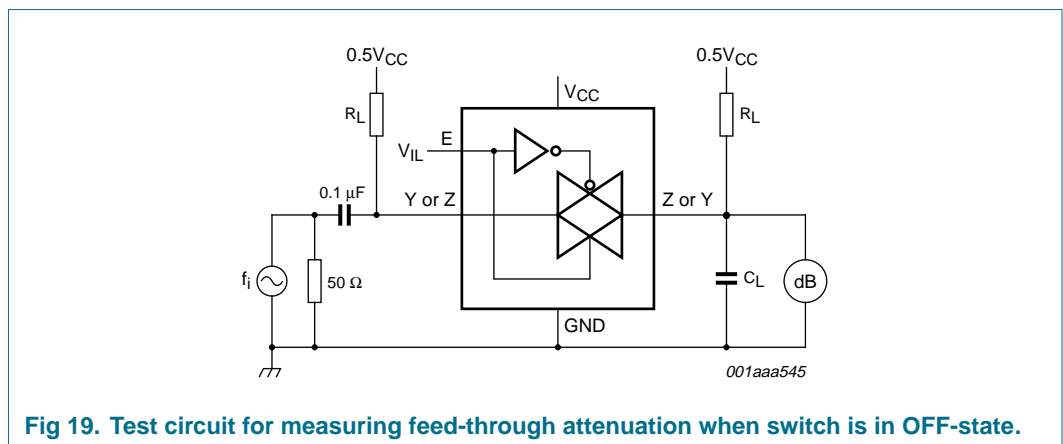
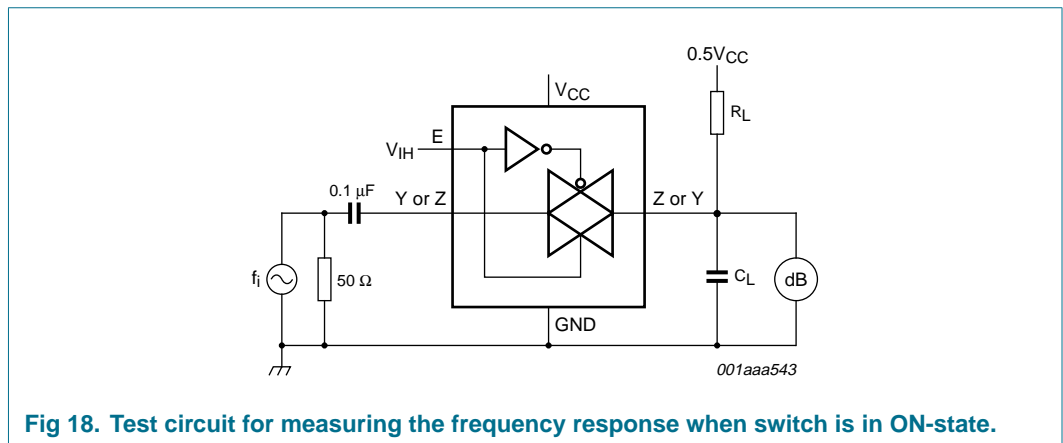
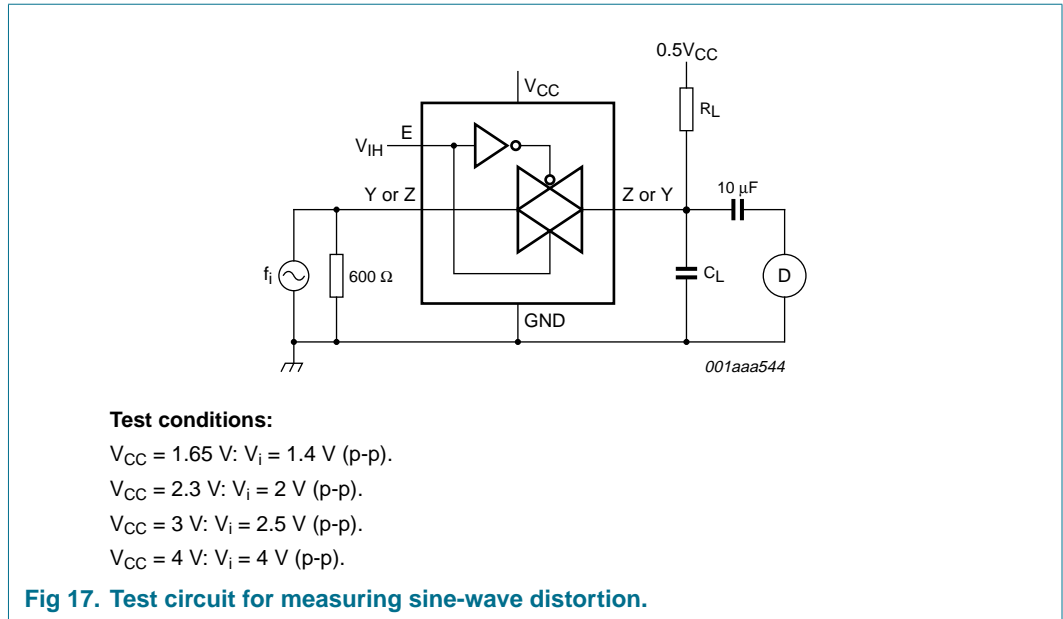
Table 14: Additional dynamic characteristics ...continued
 At recommended conditions; typical values measured at $T_{amb} = 25^\circ\text{C}$.

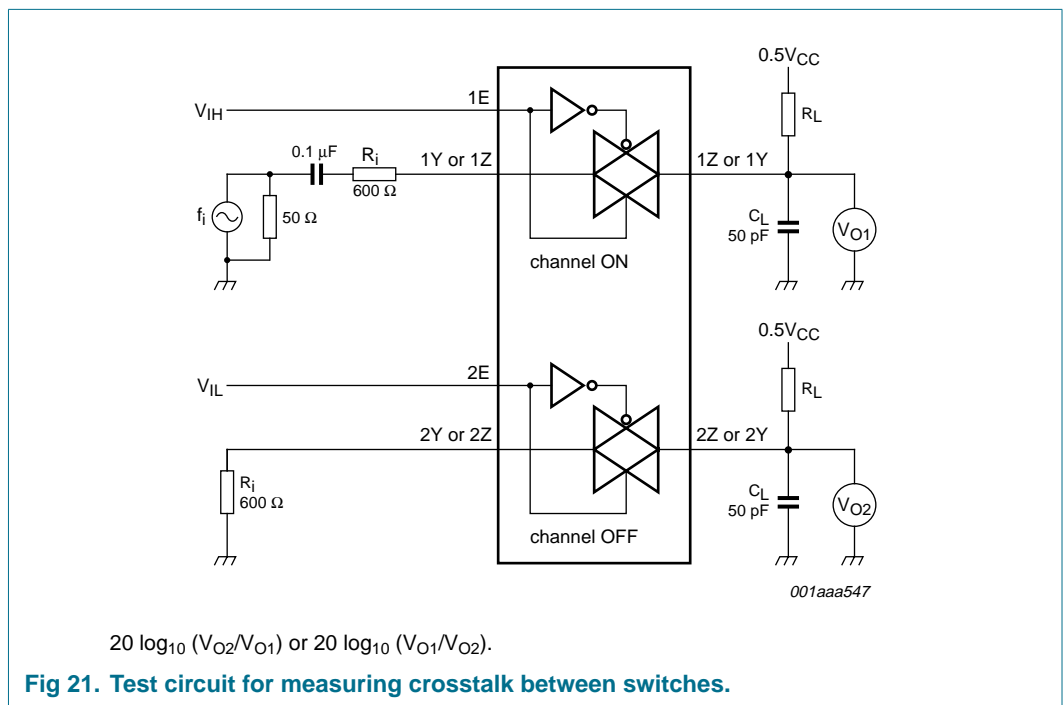
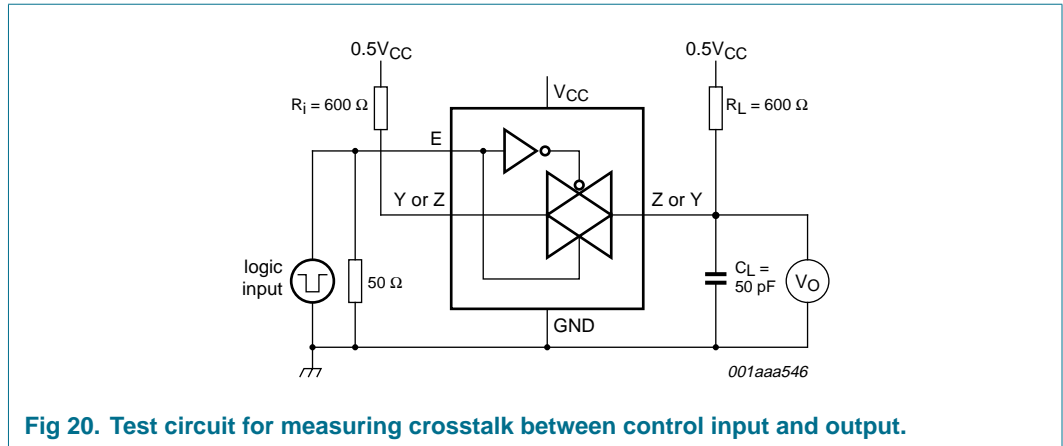
Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
$\alpha_{\text{OFF(ft)}}$	switch OFF-state signal feed-through attenuation	$R_L = 600\ \Omega$; $C_L = 50\ \text{pF}$; $f_i = 1\ \text{MHz}$; see Figure 19	[2]				
		$V_{CC} = 1.65\ \text{V}$	-	-46	-	dB	
		$V_{CC} = 2.3\ \text{V}$	-	-46	-	dB	
		$V_{CC} = 3\ \text{V}$	-	-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 19	[2]				
		$V_{CC} = 1.65\ \text{V}$	-	-37	-	dB	
		$V_{CC} = 2.3\ \text{V}$	-	-37	-	dB	
$V_{\text{ct(cti-sw)}}$	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 20					
		$V_{CC} = 1.65\ \text{V}$	-	-	-	mV	
		$V_{CC} = 2.3\ \text{V}$	-	91	-	mV	
		$V_{CC} = 3\ \text{V}$	-	119	-	mV	
$V_{\text{ct(sw-sw)}}$	crosstalk between switches	$R_L = 600\ \Omega$; $C_L = 50\ \text{pF}$; $f_i = 1\ \text{MHz}$; see Figure 21					
		$V_{CC} = 1.65\ \text{V}$	-	-	-	dB	
		$V_{CC} = 2.3\ \text{V}$	-	-56	-	dB	
		$V_{CC} = 3\ \text{V}$	-	-56	-	dB	
		$V_{CC} = 4.5\ \text{V}$	-	-56	-	dB	
		$R_L = 50\ \Omega$; $C_L = 5\ \text{pF}$; $f_i = 1\ \text{MHz}$; see Figure 21					
		$V_{CC} = 1.65\ \text{V}$	-	-	-	dB	
		$V_{CC} = 2.3\ \text{V}$	-	-29	-	dB	
f_{max}	frequency response (-3 dB)	$R_L = 50\ \Omega$; $C_L = 10\ \text{pF}$; see Figure 18	[1]				
		$V_{CC} = 1.65\ \text{V}$	-	200	-	MHz	
		$V_{CC} = 2.3\ \text{V}$	-	350	-	MHz	
		$V_{CC} = 3\ \text{V}$	-	410	-	MHz	
Q	charge injection	$C_L = 0.1\ \text{nF}$; $V_{\text{gen}} = 0\ \text{V}$; $R_{\text{gen}} = 0\ \Omega$; $f_i = 1\ \text{MHz}$; $R_L = 1\ \text{M}\Omega$; see Figure 22	[3]				
		$V_{CC} = 3.5\ \text{V}$	-	0.003	-	pC	
		$V_{CC} = 5.5\ \text{V}$	-	0.0035	-	pC	

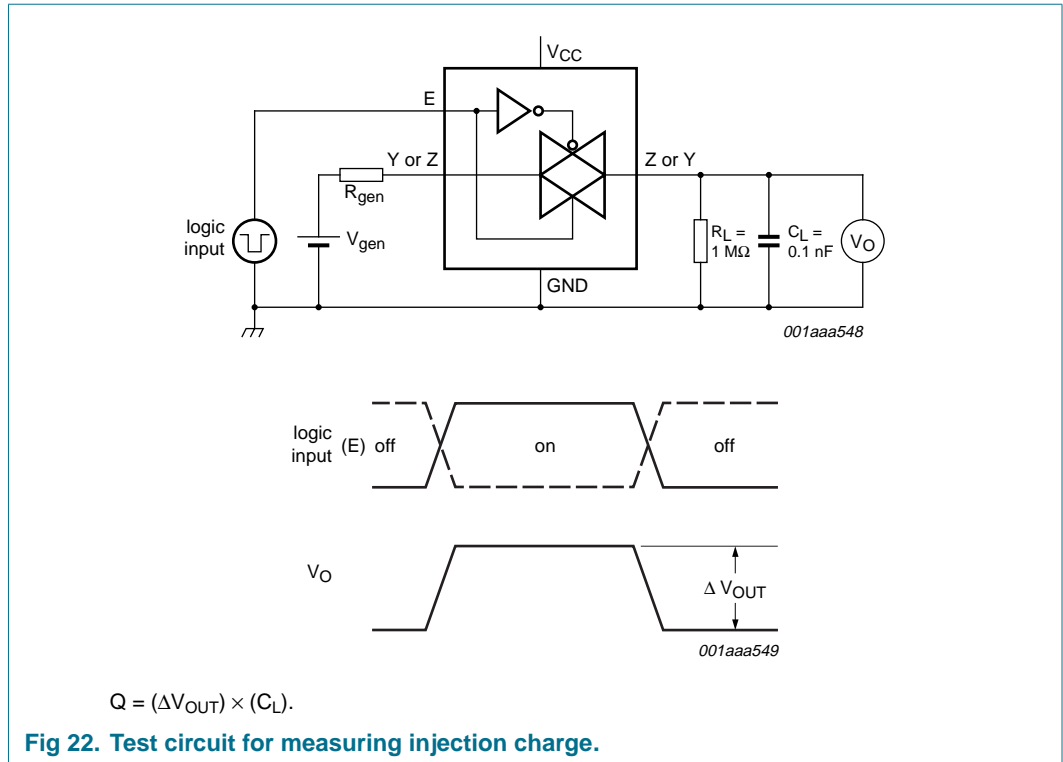
[1] Adjust f_i voltage to obtain 0 dBm level at output. Increase f_i frequency until dB meter reads -3 dB.

[2] Adjust f_i voltage to obtain 0 dBm level at input.

[3] Guaranteed by design.







15. Package outline

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

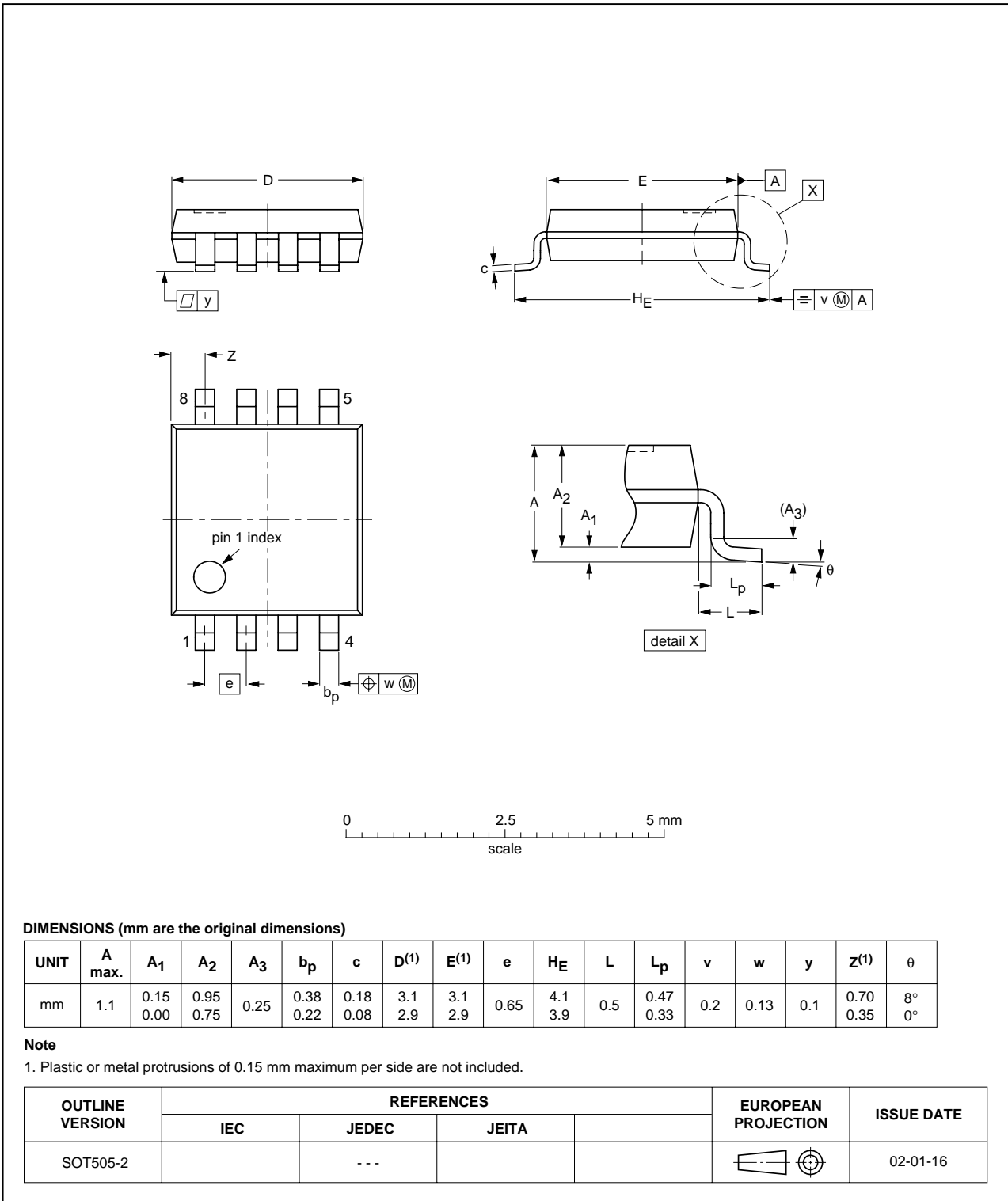


Fig 23. Package outline TSSOP8.

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

SOT765-1

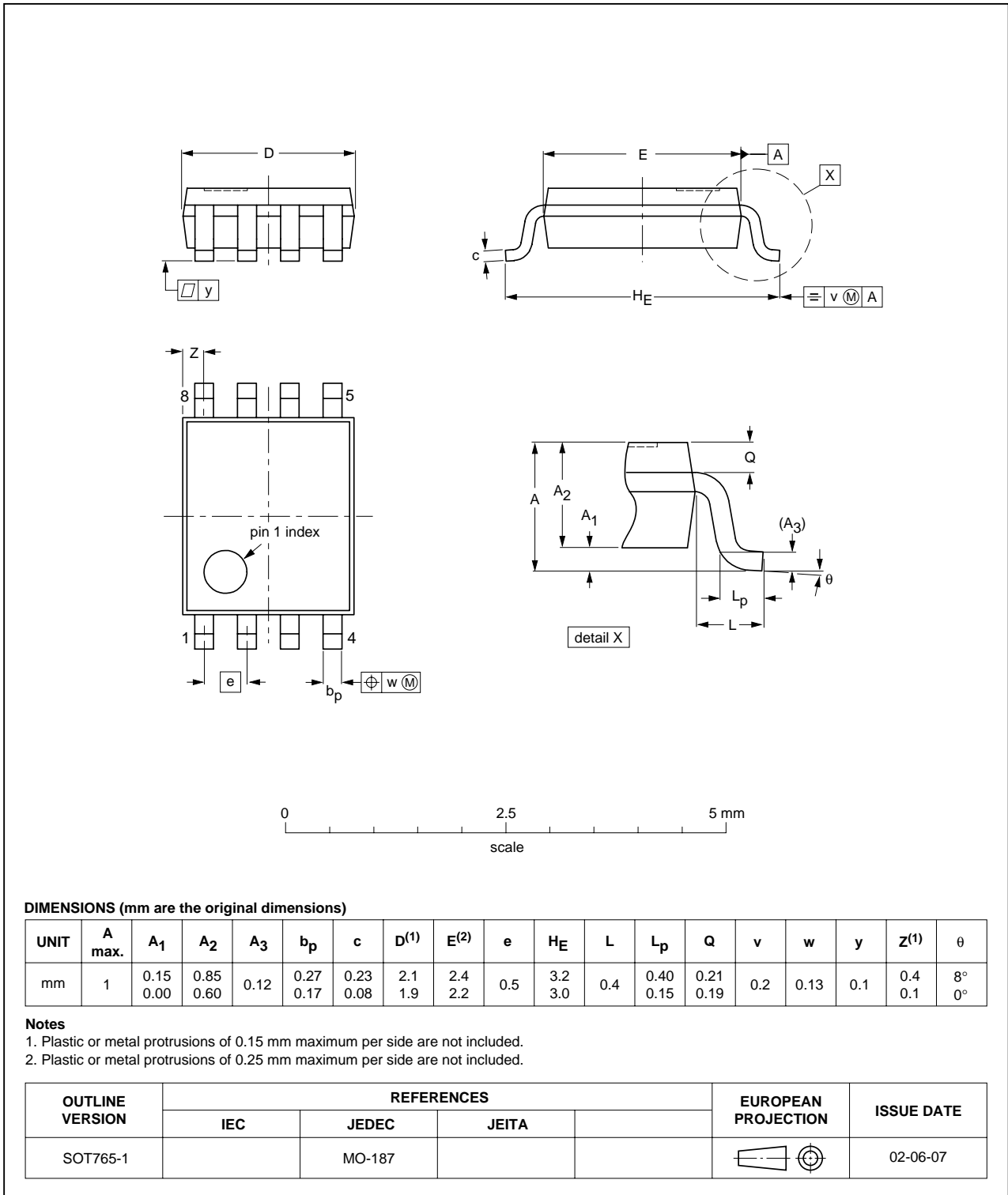


Fig 24. Package outline VSSOP8.

16. Revision history

Table 15: Revision history

Document ID	Release date	Data sheet status	Change notice	Order number	Supersedes
74LVC2G66_1	20040629	Product data sheet	-	9397 750 13259	-

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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[1] Please consult the most recently issued data sheet before initiating or completing a design.

[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL <http://www.semiconductors.philips.com>.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

18. Definitions

Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

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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