

# 74LVCV2G66

## Overvoltage tolerant bilateral switch

Rev. 01 — 2 April 2004

Product data sheet

### 1. General description

The 74LVCV2G66 is a high-performance, low-power, low-voltage, Si-gate CMOS device that provides superior performance to most advanced CMOS compatible TTL families.

The 74LVCV2G66 provides two single pole, single throw analog or digital switches. Each switch includes an overvoltage tolerant input/output terminal (pin nZ), an output/input terminal (pin nY) and low-power active HIGH enable input (pin nE).

The overvoltage tolerant switch terminals allow the switching of signals in excess of  $V_{CC}$ . The low-power enable input eliminates the necessity of using current limiting resistors in portable applications when using control logic signals much lower than  $V_{CC}$ . These inputs are also overvoltage tolerant.

### 2. Features

- Wide supply voltage range from 2.3 V to 5.5 V
- Ultra low-power operation
- Very low ON-resistance:
  - ◆ 8.0  $\Omega$  (typ) at  $V_{CC} = 2.7$  V
  - ◆ 7.5  $\Omega$  (typ) at  $V_{CC} = 3.3$  V
  - ◆ 7.3  $\Omega$  (typ) at  $V_{CC} = 5.0$  V.
- 5 V tolerant input for interfacing with 5 V logic
- High noise immunity
- Switch handling capability of 32 mA
- CMOS low-power consumption
- Latch-up performance exceeds 250 mA
- Incorporates overvoltage tolerant analog switch technology
- Switch accepts voltages up to 5.5 V independent of  $V_{CC}$
- 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;  $t_r = t_f \leq 2.5$  ns; min and max at  $T_{amb} = -40$  °C to  $+85$  °C; typical at  $T_{amb} = 25$  °C.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$t_{PZH}$ , $t_{PZL}$	turn-on time E to Y or Z	$C_L = 50$ pF; $R_L = 500$ $\Omega$				
		$V_{CC} = 3.0$ V to 3.6 V	1.0	3.8	7.5	ns
		$V_{CC} = 4.5$ V to 5.5 V	1.0	2.7	5.0	ns

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**Table 1: Quick reference data ...continued**

$GND = 0\text{ V}$ ;  $t_r = t_f \leq 2.5\text{ ns}$ ; min and max at  $T_{amb} = -40\text{ }^\circ\text{C}$  to  $+85\text{ }^\circ\text{C}$ ; typical at  $T_{amb} = 25\text{ }^\circ\text{C}$ .

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$t_{PHZ}, t_{PLZ}$	turn-off time E to Y or Z	$C_L = 50\text{ pF}$ ; $R_L = 500\ \Omega$				
		$V_{CC} = 3.0\text{ V}$ to $3.6\text{ V}$	1.0	6.5	13.5	ns
		$V_{CC} = 4.5\text{ V}$ to $5.5\text{ V}$	1.0	4.4	9.0	ns
$C_I$	input capacitance		-	2.5	-	pF
$C_S$	switch capacitance	OFF-state	-	8.0	-	pF
		ON-state	-	16	-	pF
$C_{PD}$	power dissipation capacitance per switch	$f_i = 10\text{ MHz}$ ; $V_{CC} = 3.3\text{ V}$	[1][2] -	10.3	-	pF

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

$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N$  where:

$f_i$  = input frequency in MHz;

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

$N$  = number of inputs.

[2] The condition is  $V_I = GND$  to  $5.5\text{ V}$ .

## 4. Ordering information

**Table 2: Ordering information**

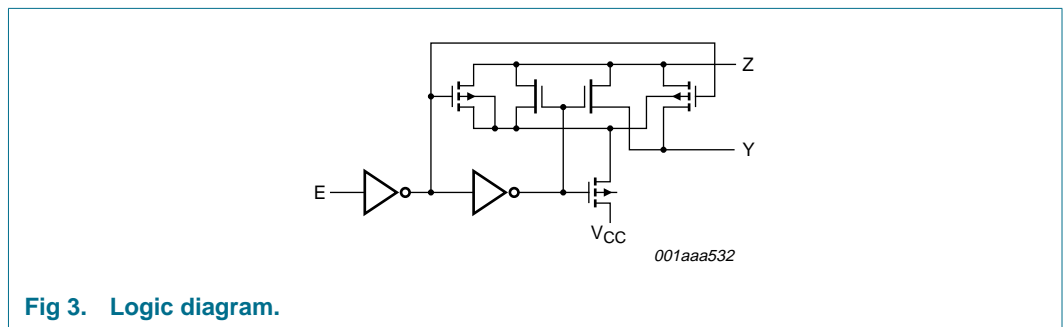
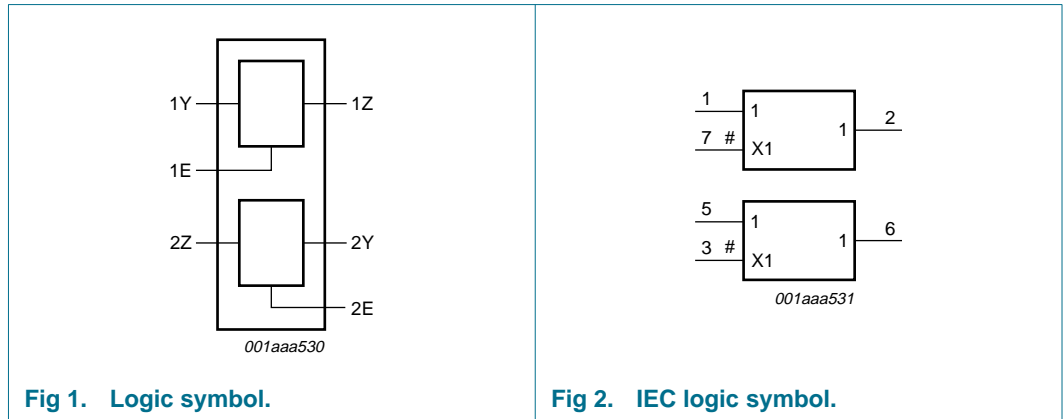
Type number	Package			
	Temperature range	Name	Description	Version
74LVCV2G66DP	$-40\text{ }^\circ\text{C}$ to $+125\text{ }^\circ\text{C}$	TSSOP8	plastic thin shrink small outline package; 8 leads; body width 3 mm; lead length 0.5 mm	SOT505-2
74LVCV2G66DC	$-40\text{ }^\circ\text{C}$ to $+125\text{ }^\circ\text{C}$	VSSOP8	plastic very thin shrink small outline package; 8 leads; body width 2.3 mm	SOT765-1

## 5. Marking

**Table 3: Marking**

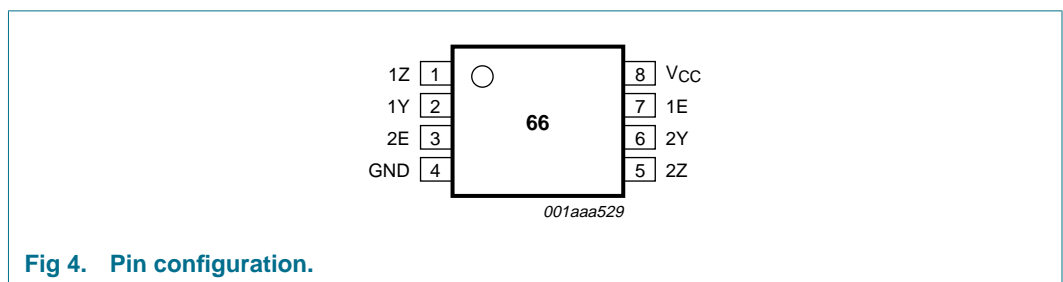
Type number	Marking code
74LVCV2G66DP	Y66
74LVCV2G66DC	Y66

## 6. Functional diagram



## 7. Pinning information

### 7.1 Pinning



### 7.2 Pin description

Table 4: Pin description

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

Table 4: Pin description ...continued

Pin	Symbol	Description
6	2Y	independent input/output
7	1E	enable input (active HIGH)
8	V <sub>CC</sub>	supply voltage

## 8. Functional description

### 8.1 Function table

Table 5: Function table [1]

Input nE	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 <sub>CC</sub>	supply voltage		-0.5	+6.5	V
V <sub>I</sub>	input voltage		[1] -0.5	+6.5	V
I <sub>IK</sub>	input diode current	V <sub>I</sub> < -0.5 V or V <sub>I</sub> > 6.5 V	-	-50	mA
I <sub>SK</sub>	switch diode current	V <sub>I</sub> < -0.5 V or V <sub>I</sub> > 6.5 V	-	±50	mA
V <sub>S</sub>	DC switch voltage range	enable and disable mode	-0.5	+6.5	V
I <sub>S</sub>	switch source or sink current	V <sub>S</sub> < -0.5 V or V <sub>S</sub> > 6.5 V	-	±50	mA
I <sub>CC</sub> , I <sub>GND</sub>	V <sub>CC</sub> or GND current		-	±100	mA
T <sub>stg</sub>	storage temperature		-65	+150	°C
P <sub>tot</sub>	power dissipation	T <sub>amb</sub> = -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		2.3	-	5.5	V
$V_I$	input voltage		0	-	5.5	V
$V_S$	DC switch voltage range	enable and disable mode	[1] 0	-	5.5	V
$T_{amb}$	operating ambient temperature		-40	-	+125	°C
$t_r, t_f$	input rise and fall times	$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	0	-	20	ns/V
		$V_{CC} = 2.7 \text{ V to } 5.5 \text{ V}$	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.

## 11. Static characteristics

**Table 8: Static characteristics**

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

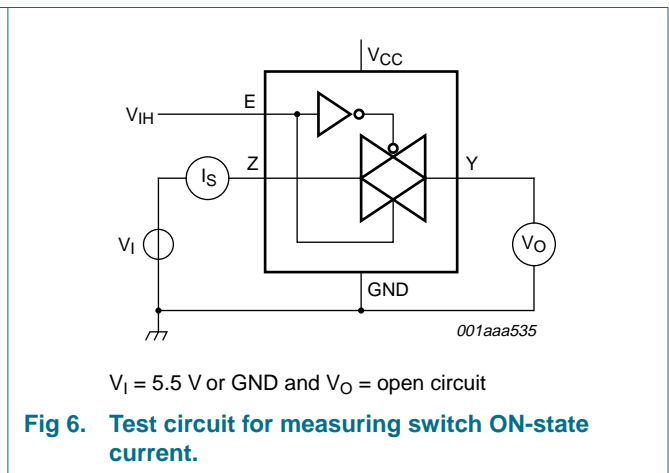
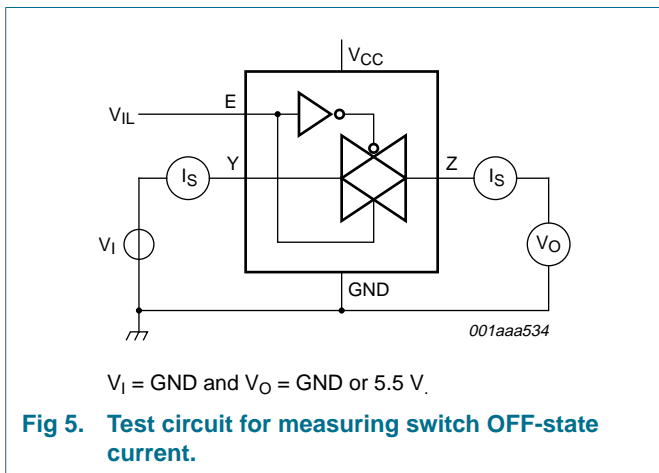
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$T_{amb} = -40 \text{ °C to } +85 \text{ °C}$ [1]						
$V_{IH}$	HIGH-level input voltage	$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	$0.6 \times V_{CC}$	-	-	V
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	2.0	-	-	V
		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	$0.55 \times V_{CC}$	-	-	V
$V_{IL}$	LOW-level input voltage	$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	-	-	$0.1 \times V_{CC}$	V
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	-	-	0.5	V
		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	-	-	$0.15 \times V_{CC}$	V
$I_{LI}$	input leakage current	$V_I = 5.5 \text{ V or GND}; V_{CC} = 5.5 \text{ V}$	-	$\pm 0.1$	$\pm 5$	$\mu\text{A}$
$I_{S(OFF)}$	analog switch OFF-state current per channel	$V_S = 0 \text{ V or } 5.5 \text{ V}; V_{CC} = 2.3 \text{ V to } 5.5 \text{ V};$ see <a href="#">Figure 5</a>	[2] -	$\pm 0.1$	$\pm 10$	$\mu\text{A}$
$I_{S(ON)}$	analog switch ON-state current per channel	$V_S = 0 \text{ V or } 5.5 \text{ V}; V_{CC} = 2.3 \text{ V to } 5.5 \text{ V};$ see <a href="#">Figure 6</a>	[2] -	$\pm 0.1$	$\pm 10$	$\mu\text{A}$
$I_{CC}$	quiescent supply current	$V_I = V_{CC} \text{ or GND}; I_O = 0 \text{ A}; V_{CC} = 5.5 \text{ V}$	-	0.1	10	$\mu\text{A}$
$\Delta I_{CC}$	additional quiescent supply current per pin	$V_I = V_{CC} - 0.6 \text{ V}; I_O = 0 \text{ A}; V_{CC} = 3.0 \text{ V to } 5.5 \text{ V}$	-	0.1	5	$\mu\text{A}$
$C_I$	input capacitance		-	2.5	-	pF
$C_S$	switch capacitance	OFF-state	-	8.0	-	pF
		ON-state	-	16	-	pF

**Table 8: 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-level input voltage	V <sub>CC</sub> = 2.3 V to 2.7 V	0.6 × V <sub>CC</sub>	-	-	V
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.0	-	-	V
		V <sub>CC</sub> = 4.5 V to 5.5 V	0.55 × V <sub>CC</sub>	-	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 2.3 V to 2.7 V	-	-	0.1 × V <sub>CC</sub>	V
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	-	0.5	V
		V <sub>CC</sub> = 4.5 V to 5.5 V	-	-	0.15 × V <sub>CC</sub>	V
I <sub>LI</sub>	input leakage current	V <sub>I</sub> = 5.5 V or GND; V <sub>CC</sub> = 5.5 V	-	-	±5	µA
I <sub>S(OFF)</sub>	analog switch OFF-state current per channel	V <sub>S</sub> = 0 V or 5.5 V; V <sub>CC</sub> = 2.3 V to 5.5 V; see <a href="#">Figure 5</a>	[2]	-	±10	µA
I <sub>S(ON)</sub>	analog switch ON-state current per channel	V <sub>S</sub> = 0 V or 5.5 V; V <sub>CC</sub> = 2.3 V to 5.5 V; see <a href="#">Figure 6</a>	[2]	-	±10	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> = 3.0 V to 5.5 V	-	-	50	µA

- [1] All typical values are measured at T<sub>amb</sub> = 25 °C.
- [2] For overvoltage signals (V<sub>S</sub> > V<sub>CC</sub>) the condition V<sub>Y</sub> < V<sub>Z</sub> must be observed.

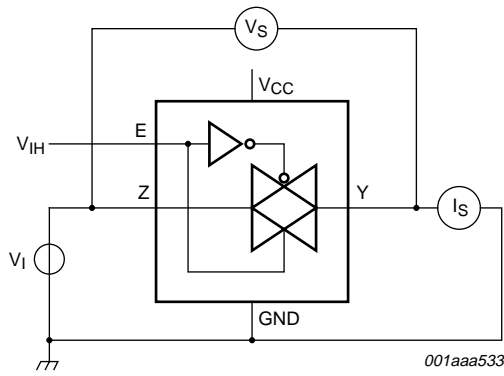


**Table 9: Resistance  $R_{ON}$**

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

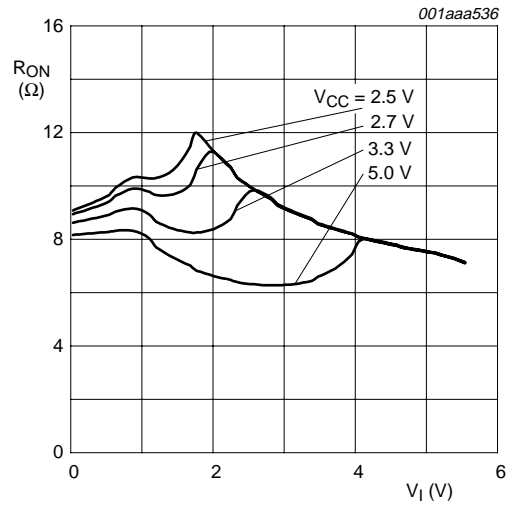
Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
<b><math>T_{amb} = -40\text{ °C to }+85\text{ °C}</math> [1]</b>							
$R_{ON(peak)}$	switch ON-state resistance (peak)	$V_S = \text{GND to } V_{CC}; V_I = V_{IH}$					
		$I_S = 8\text{ mA}; V_{CC} = 2.3\text{ V to } 2.7\text{ V}$	-	13	30	$\Omega$	
		$I_S = 12\text{ mA}; V_{CC} = 2.7\text{ V}$	-	10	25	$\Omega$	
		$I_S = 24\text{ mA}; V_{CC} = 3.0\text{ V to } 3.6\text{ V}$	-	8.3	20	$\Omega$	
$R_{ON(rail)}$	switch ON-state resistance (rail)	$V_S = \text{GND}; V_I = V_{IH}$					
		$I_S = 8\text{ mA}; V_{CC} = 2.3\text{ V to } 2.7\text{ V}$	-	8.5	20	$\Omega$	
		$I_S = 12\text{ mA}; V_{CC} = 2.7\text{ V}$	-	8.0	18	$\Omega$	
		$I_S = 24\text{ mA}; V_{CC} = 3.0\text{ V to } 3.6\text{ V}$	-	7.5	15	$\Omega$	
	$I_S = 32\text{ mA}; V_{CC} = 4.5\text{ V to } 5.5\text{ V}$	-	7.3	10	$\Omega$		
	$R_{ON(flatness)}$	switch ON-resistance (flatness)	$V_S = V_{CC}; V_I = V_{IH}$				
			$I_S = 8\text{ mA}; V_{CC} = 2.3\text{ V to } 2.7\text{ V}$	-	8.5	20	$\Omega$
			$I_S = 12\text{ mA}; V_{CC} = 2.7\text{ V}$	-	7.2	18	$\Omega$
$I_S = 24\text{ mA}; V_{CC} = 3.0\text{ V to } 3.6\text{ V}$			-	6.5	15	$\Omega$	
$I_S = 32\text{ mA}; V_{CC} = 4.5\text{ V to } 5.5\text{ V}$	-	5.7	10	$\Omega$			
$R_{ON(flatness)}$	switch ON-resistance (flatness)	$V_S = \text{GND to } V_{CC}; V_I = V_{IH}; \text{ see } \text{Figure 9}$					
		$I_S = 8\text{ mA}; V_{CC} = 2.5\text{ V}$	-	17	-	$\Omega$	
		$I_S = 12\text{ mA}; V_{CC} = 2.7\text{ V}$	-	10	-	$\Omega$	
		$I_S = 24\text{ mA}; V_{CC} = 3.3\text{ V}$	-	5	-	$\Omega$	
$I_S = 32\text{ mA}; V_{CC} = 5.0\text{ V}$	-	3	-	$\Omega$			
<b><math>T_{amb} = -40\text{ °C to }+125\text{ °C}</math></b>							
$R_{ON(peak)}$	switch ON-state resistance (peak)	$V_S = \text{GND to } V_{CC}; V_I = V_{IH}$					
		$I_S = 8\text{ mA}; V_{CC} = 2.3\text{ V to } 2.7\text{ V}$	-	-	30	$\Omega$	
		$I_S = 12\text{ mA}; V_{CC} = 2.7\text{ V}$	-	-	25	$\Omega$	
		$I_S = 24\text{ mA}; V_{CC} = 3.0\text{ V to } 3.6\text{ V}$	-	-	20	$\Omega$	
$R_{ON(rail)}$	switch ON-state resistance (rail)	$V_S = \text{GND}; V_I = V_{IH}$					
		$I_S = 8\text{ mA}; V_{CC} = 2.3\text{ V to } 2.7\text{ V}$	-	-	20	$\Omega$	
		$I_S = 12\text{ mA}; V_{CC} = 2.7\text{ V}$	-	-	18	$\Omega$	
		$I_S = 24\text{ mA}; V_{CC} = 3.0\text{ V to } 3.6\text{ V}$	-	-	15	$\Omega$	
	$I_S = 32\text{ mA}; V_{CC} = 4.5\text{ V to } 5.5\text{ V}$	-	-	10	$\Omega$		
	$R_{ON(flatness)}$	switch ON-resistance (flatness)	$V_S = V_{CC}; V_I = V_{IH}$				
			$I_S = 8\text{ mA}; V_{CC} = 2.3\text{ V to } 2.7\text{ V}$	-	-	20	$\Omega$
			$I_S = 12\text{ mA}; V_{CC} = 2.7\text{ V}$	-	-	18	$\Omega$
$I_S = 24\text{ mA}; V_{CC} = 3.0\text{ V to } 3.6\text{ V}$			-	-	15	$\Omega$	
$I_S = 32\text{ mA}; V_{CC} = 4.5\text{ V to } 5.5\text{ V}$	-	-	10	$\Omega$			

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



$V_I = \text{GND to } 5.5 \text{ V}; R_{ON} = V_S/I_S.$

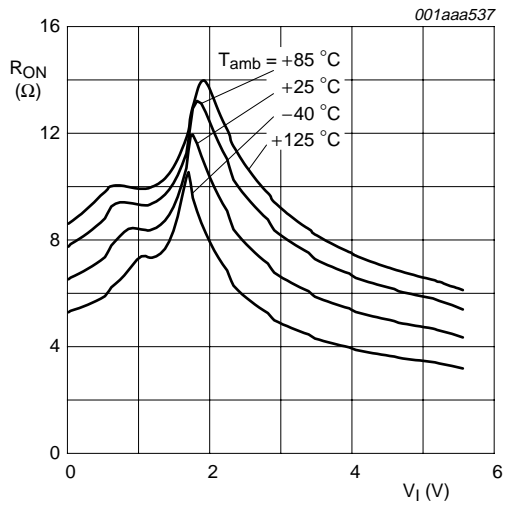
**Fig 7. Test circuit for measuring switch ON-resistance.**



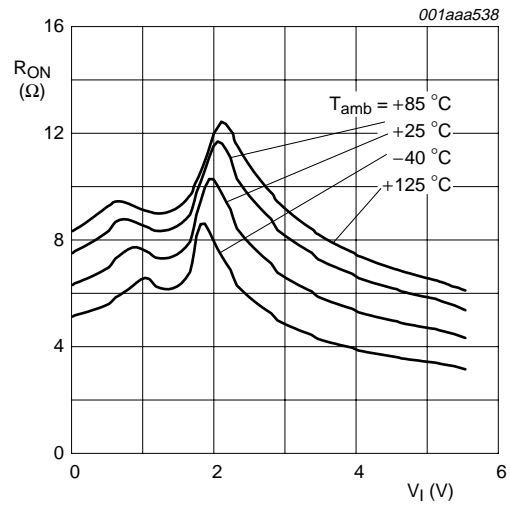
$V_I = \text{GND to } 5.5 \text{ V}; T_{amb} = 25 \text{ }^\circ\text{C}.$

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

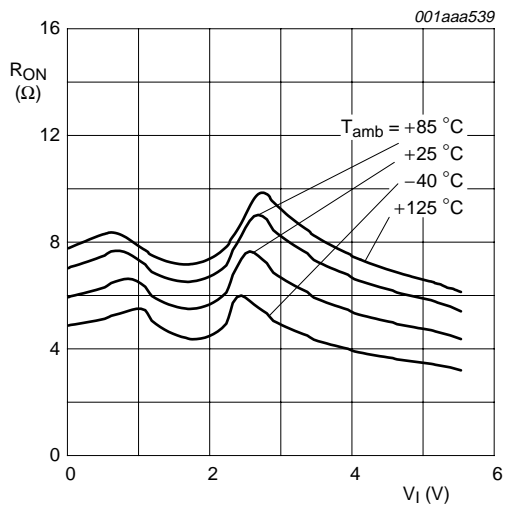




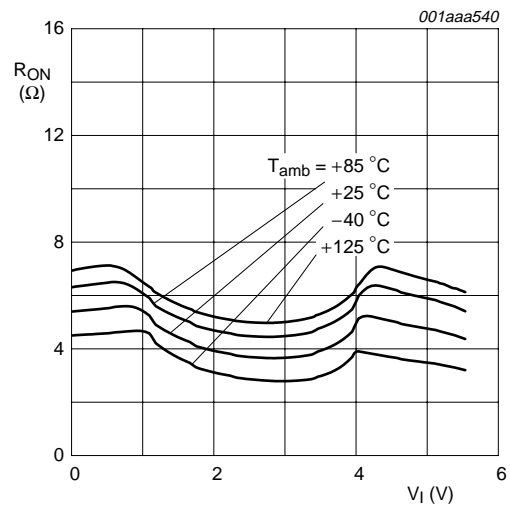
a.  $V_{CC} = 2.5 \text{ V}$



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 10: Dynamic characteristics**

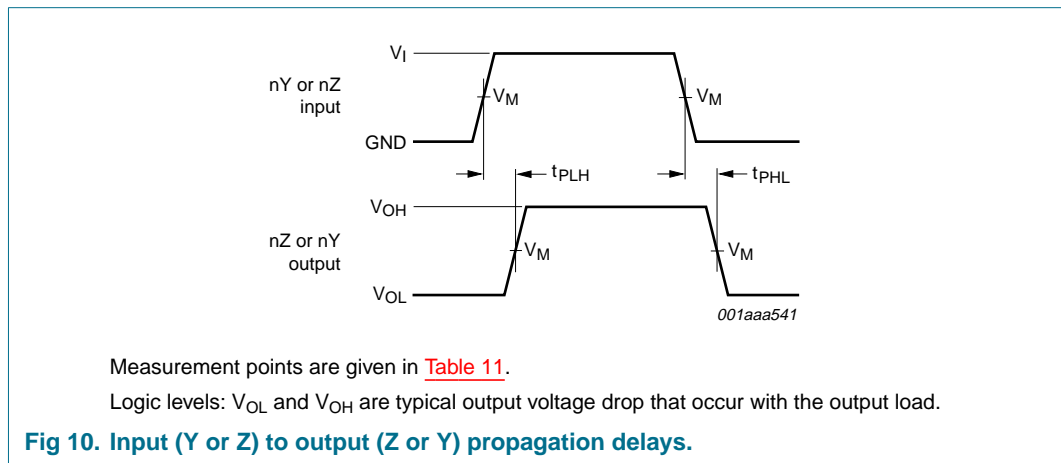
At recommended operating conditions; voltages are referenced to GND (ground = 0 V); test circuit [Figure 12](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>T<sub>amb</sub> = -40 °C to +85 °C [1]</b>						
t <sub>PHL</sub> , t <sub>PLH</sub>	propagation delay nY to nZ or nZ to nY	see <a href="#">Figure 10</a>				[2]
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	0.4	1.2	ns
		V <sub>CC</sub> = 2.7 V	-	0.4	1.0	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	0.3	0.8	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V	-	0.2	0.6	ns
t <sub>PZH</sub> , t <sub>PZL</sub>	turn-on time E to Y or Z	see <a href="#">Figure 11</a>				
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.0	4.7	12	ns
		V <sub>CC</sub> = 2.7 V	1.0	4.4	8.5	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.0	3.8	7.5	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V	1.0	2.7	5.0	ns
t <sub>PHZ</sub> , t <sub>PLZ</sub>	turn-off time E to Y or Z	see <a href="#">Figure 11</a>				
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.0	6.0	16	ns
		V <sub>CC</sub> = 2.7 V	1.0	7.9	15	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.0	6.5	13.5	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V	1.0	4.4	9.0	ns
C <sub>PD</sub>	power dissipation capacitance per switch	C <sub>L</sub> = 50 pF; f <sub>i</sub> = 10 MHz				[3] [4]
		V <sub>CC</sub> = 2.5 V	-	9.7	-	pF
		V <sub>CC</sub> = 3.3 V	-	10.3	-	pF
		V <sub>CC</sub> = 5.0 V	-	11.3	-	pF
<b>T<sub>amb</sub> = -40 °C to +125 °C</b>						
t <sub>PHL</sub> , t <sub>PLH</sub>	propagation delay nY to nZ or nZ to nY	see <a href="#">Figure 10</a>				[2]
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	-	2.0	ns
		V <sub>CC</sub> = 2.7 V	-	-	1.5	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	-	1.5	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V	-	-	1.0	ns
t <sub>PZH</sub> , t <sub>PZL</sub>	turn-on time E to Y or Z	see <a href="#">Figure 11</a>				
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.0	-	15	ns
		V <sub>CC</sub> = 2.7 V	1.0	-	11	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.0	-	9.5	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V	1.0	-	6.5	ns
t <sub>PHZ</sub> , t <sub>PLZ</sub>	turn-off time E to Y or Z	see <a href="#">Figure 11</a>				
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.0	-	20	ns
		V <sub>CC</sub> = 2.7 V	1.0	-	19	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.0	-	17	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V	1.0	-	11.5	ns

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

- [2]  $t_{PHL}$  and  $t_{PLH}$  propagation delay is the calculated RC time constant of the typical ON-state 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  $\mu W$ ).  
 $P_D = C_{PD} \times V_{CC}^2 \times f_i \times N$  where:  
 $f_i$  = input frequency in MHz;  
 $V_{CC}$  = supply voltage in V;  
 $N$  = number of inputs.
- [4] The condition is  $V_I = GND$  to 5.5 V.

### 13. Waveforms



**Table 11: Measurement points**

Supply voltage	Input	Output
$V_{CC}$	$V_M$	$V_M$
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	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$

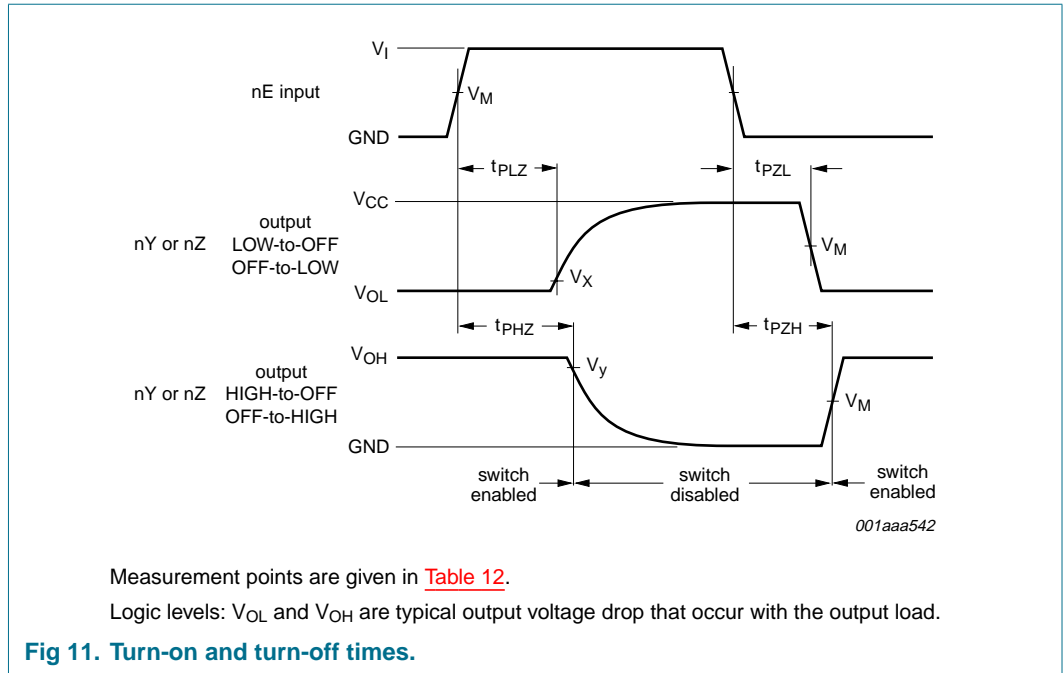


Table 12: Measurement points

Supply voltage	Input	Output		
$V_{CC}$	$V_M$	$V_M$	$V_X$	$V_Y$
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	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.3 V$	$V_{OH} - 0.3 V$

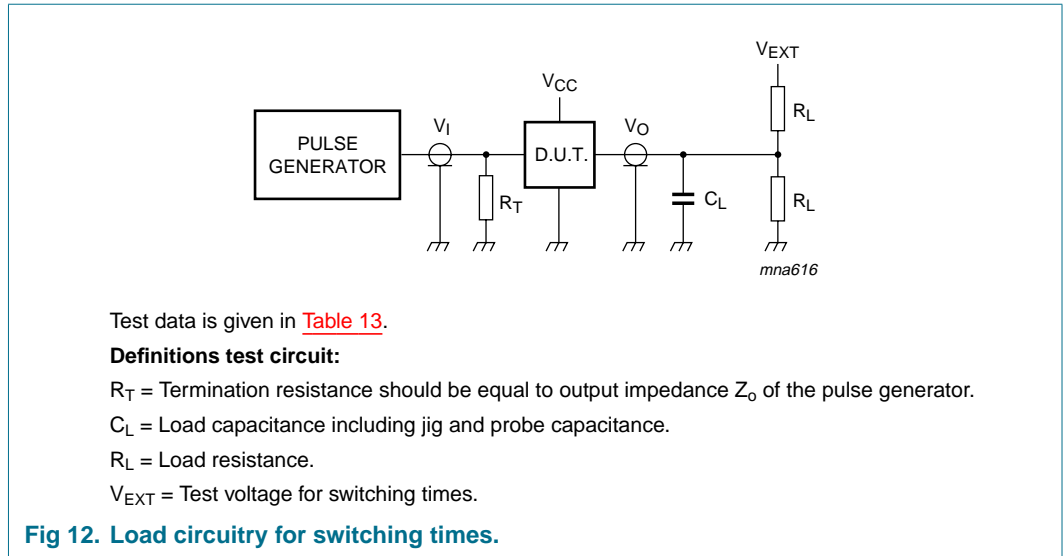


Table 13: Test data

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

## 14. Additional dynamic characteristics

**Table 14: Additional dynamic characteristics**

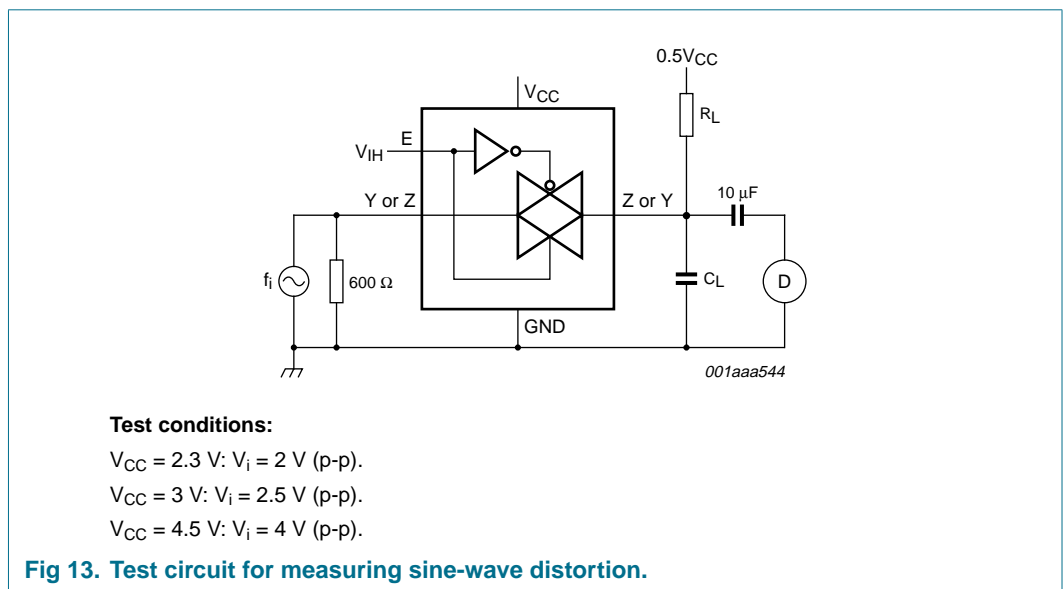
At recommended conditions; typical values measured at  $T_{amb} = 25^\circ\text{C}$ .

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$d_{\text{sin}}$	sine-wave distortion	$f_i = 1\text{ kHz}$ ; $R_L = 10\text{ k}\Omega$ ; $C_L = 50\text{ pF}$ ; see <a href="#">Figure 13</a>				
		$V_{CC} = 2.3\text{ V}$	-	0.42	-	%
		$V_{CC} = 3.0\text{ V}$	-	0.36	-	%
		$V_{CC} = 4.5\text{ V}$	-	0.47	-	%
		$f_i = 10\text{ kHz}$ ; $R_L = 10\text{ k}\Omega$ ; $C_L = 50\text{ pF}$ ; see <a href="#">Figure 13</a>				
		$V_{CC} = 2.3\text{ V}$	-	0.11	-	%
		$V_{CC} = 3.0\text{ V}$	-	0.07	-	%
		$V_{CC} = 4.5\text{ V}$	-	0.01	-	%
		$f_{\text{ON-state(res)}}$	switch ON-state signal frequency response	$R_L = 600\ \Omega$ ; $C_L = 50\text{ pF}$ ; $f_i = 1\text{ MHz}$ ; see <a href="#">Figure 14</a>	[1]	
$V_{CC} = 2.3\text{ V}$	-			160	-	MHz
$V_{CC} = 3.0\text{ V}$	-			200	-	MHz
$V_{CC} = 4.5\text{ V}$	-			210	-	MHz
$R_L = 50\ \Omega$ ; $C_L = 5\text{ pF}$ ; $f_i = 1\text{ MHz}$ ; see <a href="#">Figure 14</a>	[1]					
$V_{CC} = 2.3\text{ V}$	-			180	-	MHz
$V_{CC} = 3.0\text{ V}$	-			180	-	MHz
$V_{CC} = 4.5\text{ V}$	-			180	-	MHz
$\alpha_{\text{OFF(ft)}}$	switch OFF-state signal feed-through attenuation			$R_L = 600\ \Omega$ ; $C_L = 50\text{ pF}$ ; $f_i = 1\text{ MHz}$ ; see <a href="#">Figure 15</a>	[2]	
		$V_{CC} = 2.3\text{ V}$	-	-65	-	dB
		$V_{CC} = 3.0\text{ V}$	-	-65	-	dB
		$V_{CC} = 4.5\text{ V}$	-	-62	-	dB
		$R_L = 50\ \Omega$ ; $C_L = 5\text{ pF}$ ; $f_i = 1\text{ MHz}$ ; see <a href="#">Figure 15</a>	[2]			
		$V_{CC} = 2.3\text{ V}$	-	-37	-	dB
		$V_{CC} = 3.0\text{ V}$	-	-36	-	dB
		$V_{CC} = 4.5\text{ V}$	-	-36	-	dB
		$V_{\text{ct(ctl-sw)}}$	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 <a href="#">Figure 16</a>		
$V_{CC} = 2.3\text{ V}$	-			91	-	mV
$V_{CC} = 3.0\text{ V}$	-			119	-	mV
$V_{CC} = 4.5\text{ V}$	-			205	-	mV

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{ct(sw-sw)}$	crosstalk between switches	$R_L = 600 \Omega$ ; $C_L = 50 \text{ pF}$ ; $f_i = 1 \text{ MHz}$ ; see <a href="#">Figure 17</a>				
		$V_{CC} = 2.3 \text{ V}$	-	-56	-	dB
		$V_{CC} = 3.0 \text{ V}$	-	-55	-	dB
		$V_{CC} = 4.5 \text{ V}$	-	-55	-	dB
		$R_L = 50 \Omega$ ; $C_L = 5 \text{ pF}$ ; $f_i = 1 \text{ MHz}$ ; see <a href="#">Figure 17</a>				
		$V_{CC} = 2.3 \text{ V}$	-	-29	-	dB
Q	injection charge	$C_L = 0.1 \text{ nF}$ ; $V_{gen} = 0 \text{ V}$ ; $R_{gen} = 0 \Omega$ ; $f = 1 \text{ MHz}$ ; $R_L = 1 \text{ M}\Omega$ ; see <a href="#">Figure 18</a>				
		$V_{CC} = 2.5 \text{ V}$	-	<0.003	-	pC
		$V_{CC} = 3.3 \text{ V}$	-	0.003	-	pC
		$V_{CC} = 4.5 \text{ V}$	-	0.0035	-	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] Definition:  $Q = \Delta V_{out} \times C_L$ . Guaranteed by design.



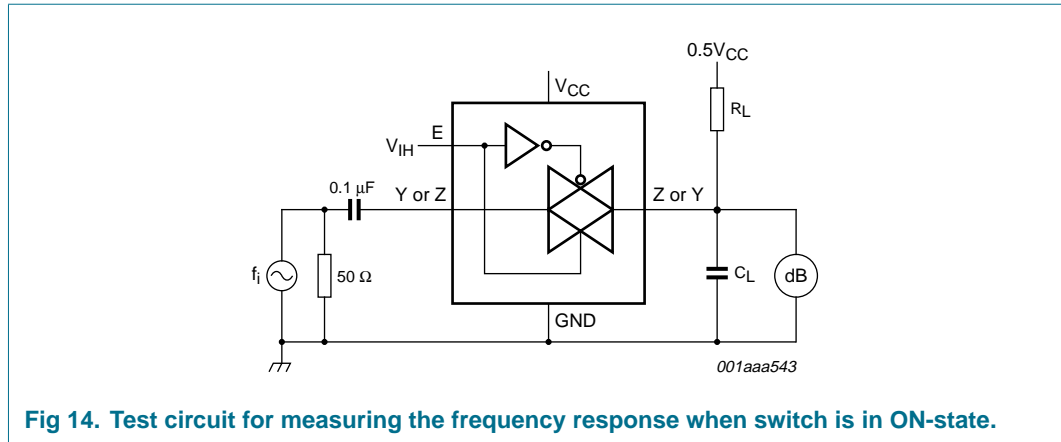


Fig 14. Test circuit for measuring the frequency response when switch is in ON-state.

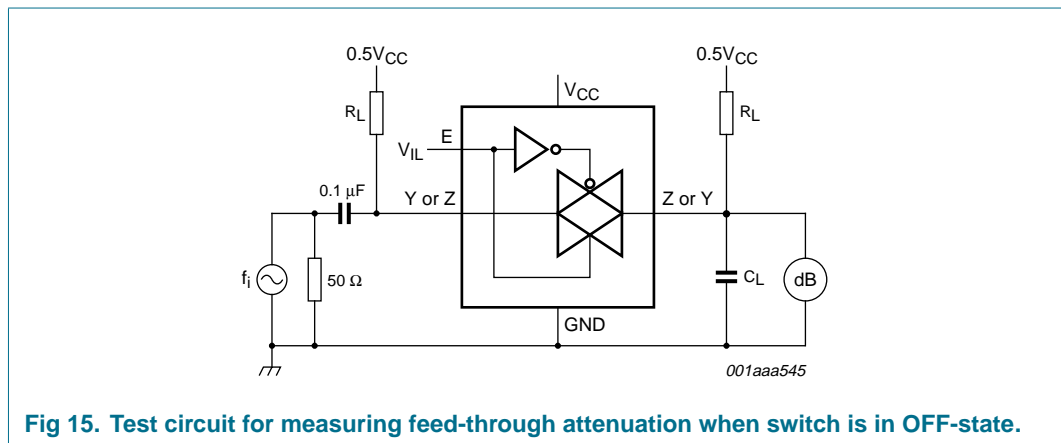


Fig 15. Test circuit for measuring feed-through attenuation when switch is in OFF-state.

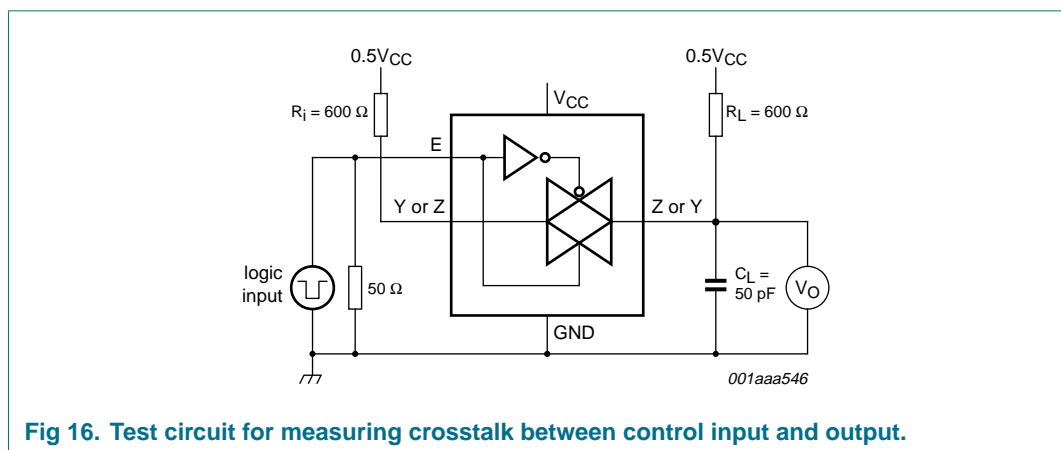
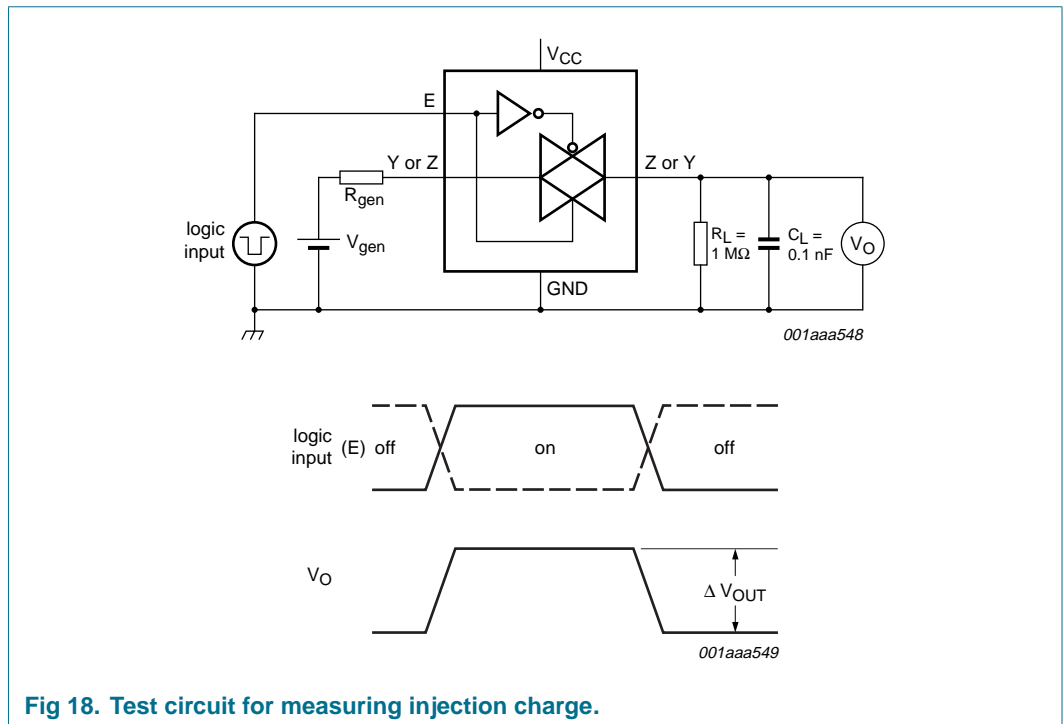
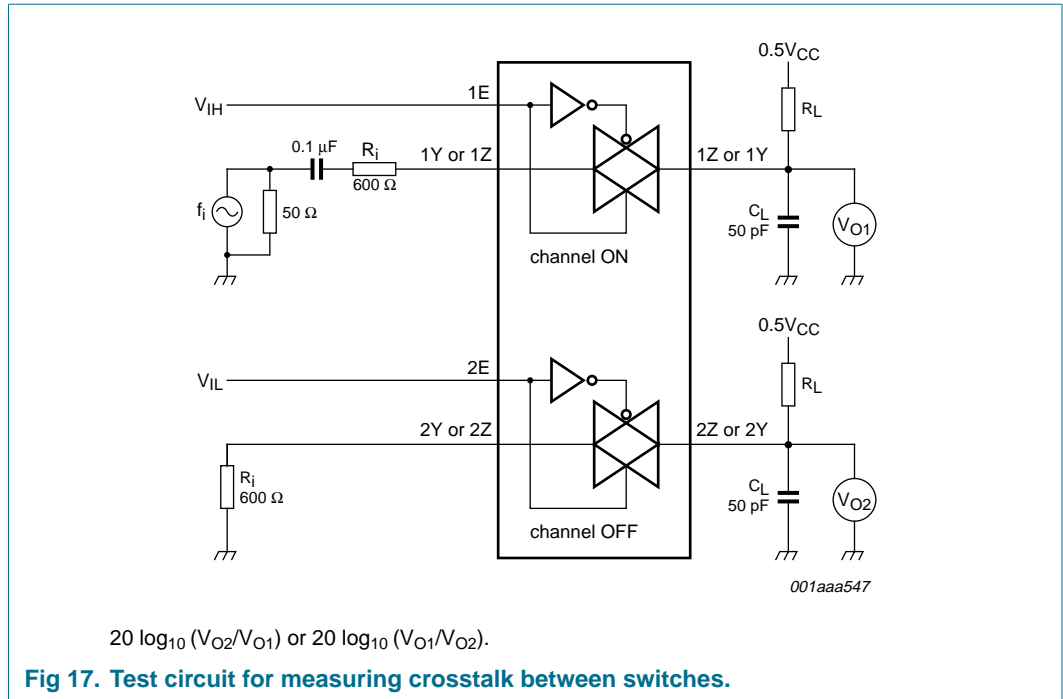


Fig 16. Test circuit for measuring crosstalk between control input and output.





## 15. Application information

Use the 74LVCV2G66 to reduce component count and footprint in low-power portable applications.

Typical '66' devices do not have low-power enable inputs causing a high  $\Delta I_{CC}$ . To reduce power consumption in portable (battery) applications, a current limiting resistor is used. (see [Figure 19a](#)). The low-power enable inputs of the 74 LVCV2G66 have much lower  $\Delta I_{CC}$ , eliminating the necessity of the current limiting resistor (see [Figure 19b](#)).

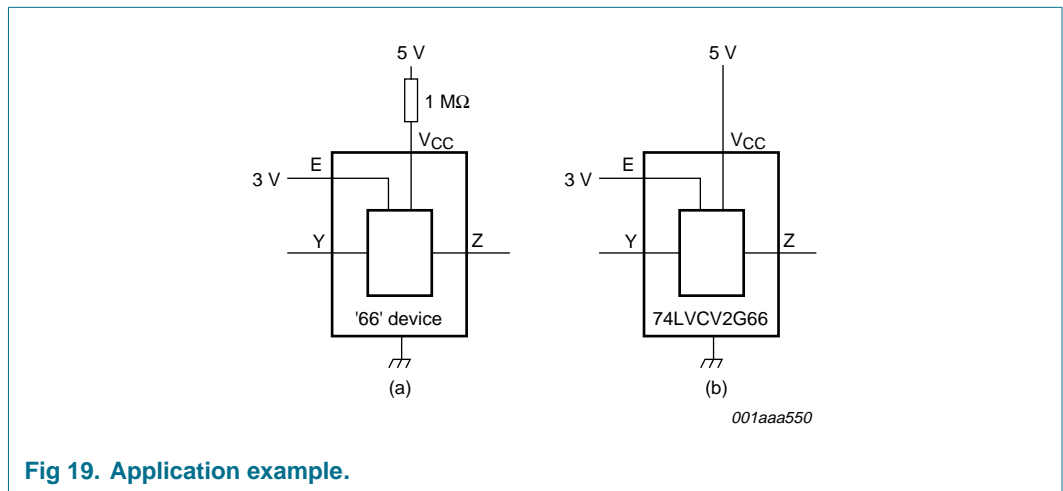


Fig 19. Application example.

16. Package outline

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

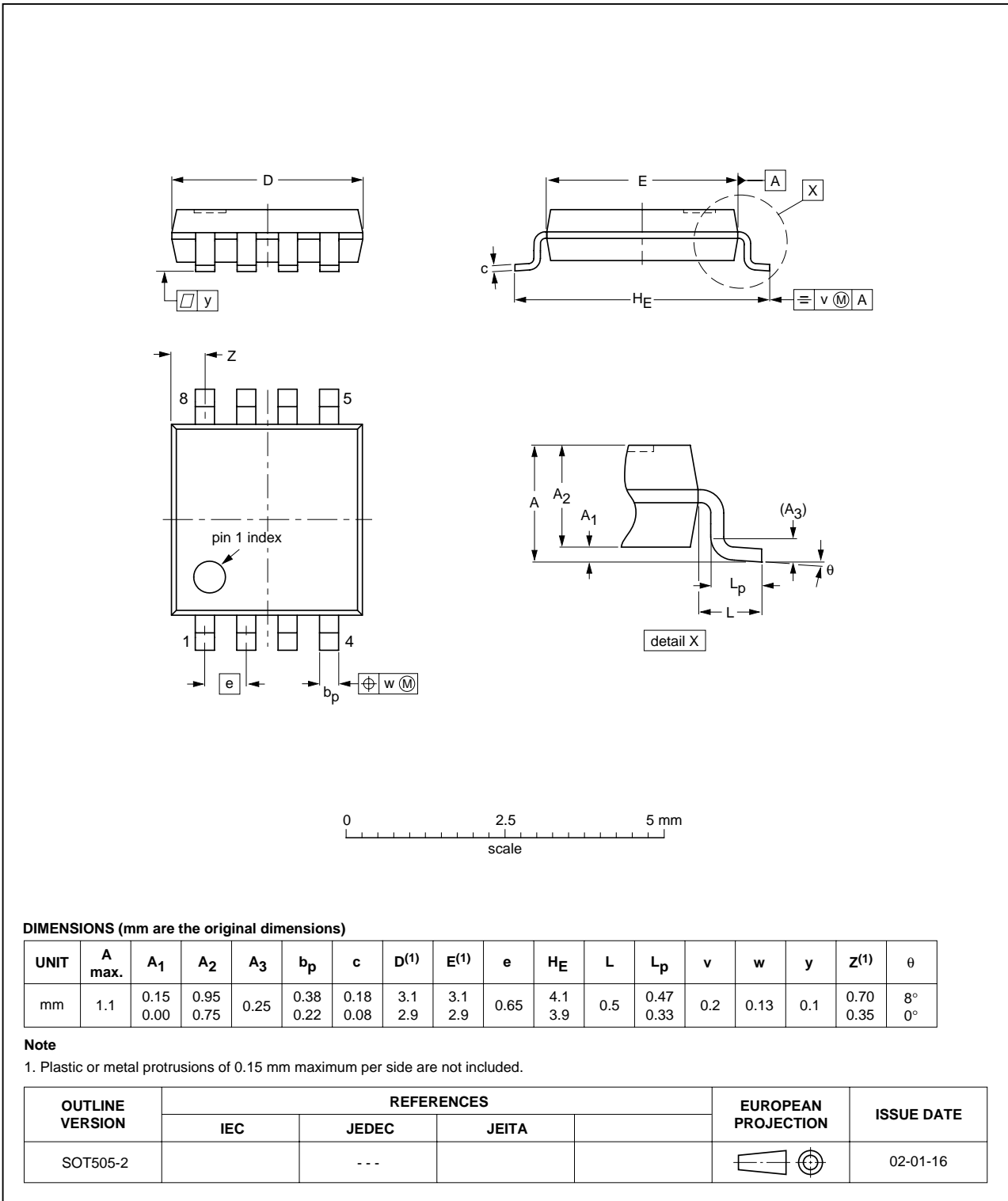


Fig 20. Package outline TSSOP8.

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

SOT765-1

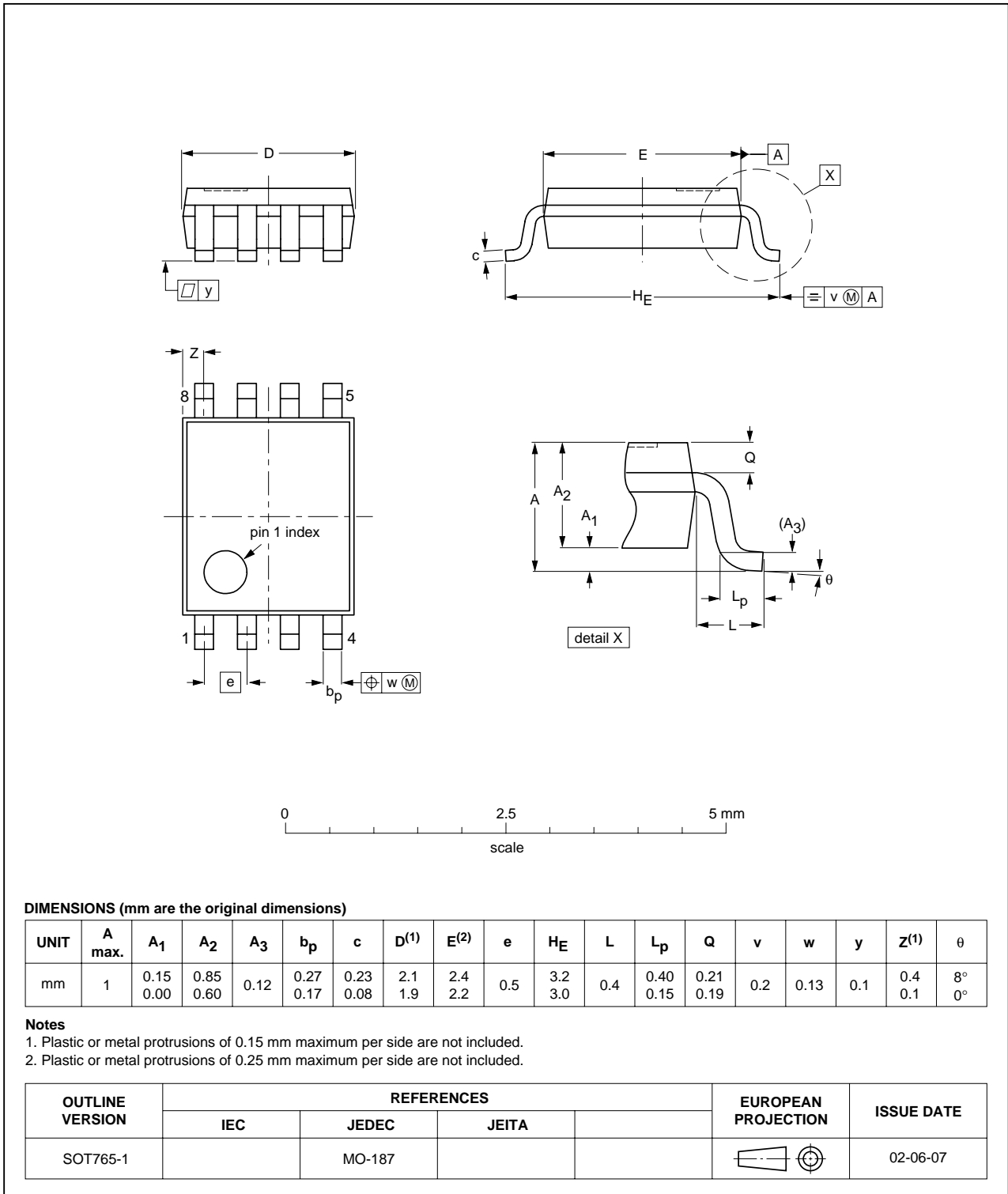


Fig 21. Package outline VSSOP8.



## 17. Revision history

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**Table 15: Revision history**

Document ID	Release date	Data sheet status	Change notice	Order number	Supersedes
74LVCV2G66_1	20040402	Product data sheet	-	9397 750 13027	-

## 18. Data sheet status

Level	Data sheet status <sup>[1]</sup>	Product status <sup>[2]</sup> <sup>[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.
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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