

74LVC2G53

2-channel analog multiplexer/demultiplexer

Rev. 01 — 10 January 2006

Product data sheet

1. General description

The 74LVC2G53 is a high-performance, low-power, low-voltage, Si-gate CMOS device that provides superior performance to most advanced CMOS compatible TTL families.

The 74LVC2G53 provides one analog multiplexer/demultiplexer with a digital select input (S), two independent inputs/outputs (B0 and B1), a common input/output (A) and an active LOW enable input (\bar{E}). When pin \bar{E} is HIGH, the switch is turned off.

The 74LVC2G53 can handle both analog and digital signals.

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
- ESD protection:
 - ◆ HBM JESD22-A114-C exceeds 2000 V
 - ◆ MM JESD22-A115-A exceeds 200 V
 - ◆ CDM JESD22-C101-C exceeds 1000 V
- CMOS low-power consumption
- Latch-up performance meets requirements of JESD 78 Class I
- Direct interface with TTL levels
- Control inputs accepts voltages up to 5 V
- Multiple package options
- Specified from -40 °C to $+85$ °C and from -40 °C to $+125$ °C

PHILIPS

3. Quick reference data

Table 1: Quick reference data

$GND = 0\text{ V}$; $t_r = t_f \leq 2.5\text{ ns}$; minimum and maximum values at $T_{amb} = -40\text{ °C}$ to $+85\text{ °C}$; typical values at $T_{amb} = 25\text{ °C}$.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit		
t_{on}	turn-on time	S to A or Bn $C_L = 50\text{ pF}$; $R_L = 500\ \Omega$	$V_{CC} = 3.3\text{ V}$	1.8	3.4	5.0	ns	
			$V_{CC} = 5.0\text{ V}$	1.3	2.6	3.8	ns	
			\bar{E} to A or Bn $C_L = 50\text{ pF}$; $R_L = 500\ \Omega$	$V_{CC} = 3.3\text{ V}$	1.2	2.2	3.8	ns
	t_{off}	turn-off time	S to A or Bn $C_L = 50\text{ pF}$; $R_L = 500\ \Omega$	$V_{CC} = 3.3\text{ V}$	1.1	4.0	5.4	ns
				$V_{CC} = 5.0\text{ V}$	1.0	2.9	3.8	ns
				\bar{E} to A or Bn $C_L = 50\text{ pF}$; $R_L = 500\ \Omega$	$V_{CC} = 3.3\text{ V}$	2.0	3.7	5.0
C_i	input capacitance		$V_{CC} = 5.0\text{ V}$	1.3	2.9	3.8	ns	
				-	2.5	-	pF	
				-	6.0	-	pF	
$C_{S(OFF)}$	OFF-state capacitance		-	18	-	pF		
$C_{S(ON)}$	ON-state capacitance		-	18	-	pF		

4. Ordering information

Table 2: Ordering information

Type number	Package			
	Temperature range	Name	Description	Version
74LVC2G53DC	-40 °C to +125 °C	VSSOP8	plastic very thin shrink small outline package; 8 leads; body width 2.3 mm	SOT765-1
74LVC2G53GT	-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
74LVC2G53DC	V53
74LVC2G53GT	V53

6. Functional diagram

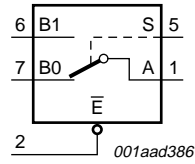


Fig 1. Logic symbol

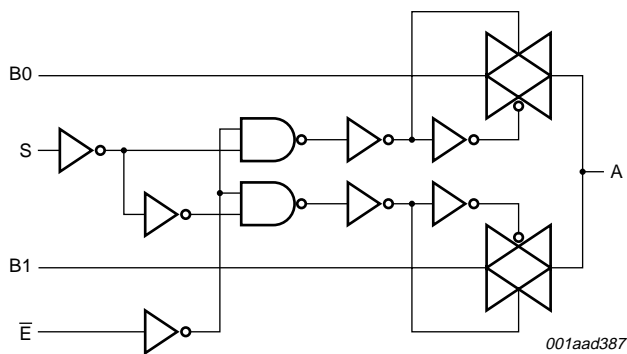


Fig 2. Logic diagram

7. Pinning information

7.1 Pinning

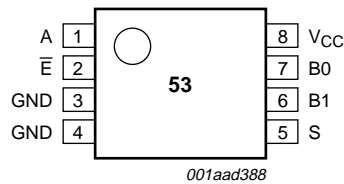


Fig 3. Pin configuration VSSOP8

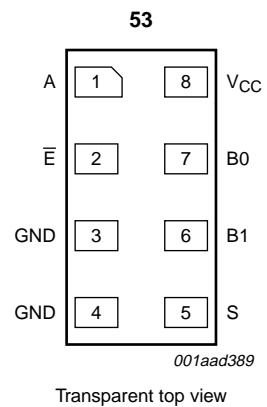


Fig 4. Pin configuration XSON8

7.2 Pin description

Table 4: Pin description

Symbol	Pin	Description
A	1	common A output or input
\bar{E}	2	enable input (active LOW)
GND	3	ground (0 V)
GND	4	ground (0 V)
S	5	select input
B1	6	independent B1 input or output
B0	7	independent B0 input or output
V _{CC}	8	supply voltage

8. Functional description

8.1 Function table

Table 5: Function table [\[1\]](#)

Input		Channel on
S	\bar{E}	
L	L	B0 to A or A to B0
H	L	B1 to A or A to B1
X	H	Z (switch off)

- [1] H = HIGH voltage level;
L = LOW voltage level;
X = don't care;
Z = high-impedance OFF-state.

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 clamping current	$V_I < -0.5\text{ V}$ or $V_I > V_{CC} + 0.5$	-	-50	mA
I_{SK}	switch clamping current	$V_I < -0.5\text{ V}$ or $V_I > V_{CC} + 0.5$	-	± 50	mA
V_{SW}	switch voltage	enable and disable mode	-0.5	$V_{CC} + 0.5$	V
I_{SW}	switch current	$V_{SW} = -0.5\text{ V}$ to $(V_{CC} + 0.5\text{ V})$	-	± 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	$T_{amb} = -40\text{ °C}$ to $+125\text{ °C}$	[2] -	300	mW

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

[2] For VSSOP8 package: above 110 °C the value of P_{tot} derates linearly with 8 mW/K.
For XSON8 package: above 45 °C the value of P_{tot} derates linearly with 2.4 mW/K.

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_{SW}	switch voltage	enable and disable mode	[1] 0	-	V_{CC}	V
T_{amb}	ambient temperature		-40	-	+125	°C
$\Delta t/\Delta V$	input transition rise and fall rate	$V_{CC} = 1.65\text{ V}$ to 2.7 V	[2] 0	-	20	ns/V
		$V_{CC} = 2.7\text{ V}$ to 5.5 V	[2] 0	-	10	ns/V

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

[2] 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-state input voltage	$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	$0.65V_{CC}$	-	-	V
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.7	-	-	V
		$V_{CC} = 3\text{ V to }3.6\text{ V}$	2.0	-	-	V
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	$0.7V_{CC}$	-	-	V
V_{IL}	LOW-state input voltage	$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	-	-	$0.35V_{CC}$	V
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	-	-	0.7	V
		$V_{CC} = 3\text{ V to }3.6\text{ V}$	-	-	0.8	V
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	-	-	$0.3V_{CC}$	V
I_{LI}	input leakage current	on pin S and pin \bar{E} ; $V_I = 5.5\text{ V or GND}$; $V_{CC} = 5.5\text{ V}$	-	± 0.1	± 2	μA
$I_{S(OFF)}$	OFF-state leakage current	per channel; $V_{SW} = \text{GND and } V_O = V_{CC}$ or $V_{SW} = V_{CC}$ and $V_O = \text{GND}$; $V_{CC} = 5.5\text{ V}$; see Figure 5	-	± 0.1	± 5	μA
$I_{S(ON)}$	ON-state leakage current	per channel; $V_{SW} = \text{GND or } V_{CC}$; $V_{CC} = 5.5\text{ V}$; see Figure 6	-	± 0.1	± 5	μA
I_{CC}	quiescent supply current	$V_I = V_{CC}$ or GND; $V_{SW} = \text{GND or } V_{CC}$; $I_O = 0\text{ A}$; $V_{CC} = 5.5\text{ V}$	-	0.1	10	μA
ΔI_{CC}	additional quiescent supply current	per input pin; $V_I = V_{CC} - 0.6\text{ V}$; $V_{SW} = \text{GND or } V_{CC}$; $I_O = 0\text{ A}$; $V_{CC} = 5.5\text{ V}$	-	5	500	μA
C_i	input capacitance		-	2.5	-	pF
$C_{S(OFF)}$	OFF-state capacitance		-	6.0	-	pF
$C_{S(ON)}$	ON-state capacitance		-	18	-	pF
$T_{amb} = -40\text{ °C to }+125\text{ °C}$						
V_{IH}	HIGH-state input voltage	$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	$0.65V_{CC}$	-	-	V
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.7	-	-	V
		$V_{CC} = 3\text{ V to }3.6\text{ V}$	2.0	-	-	V
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	$0.7V_{CC}$	-	-	V
V_{IL}	LOW-state input voltage	$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	-	-	$0.35V_{CC}$	V
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	-	-	0.7	V
		$V_{CC} = 3\text{ V to }3.6\text{ V}$	-	-	0.8	V
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	-	-	$0.3V_{CC}$	V
I_{LI}	input leakage current	on pin S and pin \bar{E} ; $V_I = 5.5\text{ V or GND}$; $V_{CC} = 5.5\text{ V}$	-	-	± 10	μA
$I_{S(OFF)}$	OFF-state leakage current	per channel; $V_{SW} = \text{GND and } V_O = V_{CC}$ or $V_{SW} = V_{CC}$ and $V_O = \text{GND}$; $V_{CC} = 5.5\text{ V}$; see Figure 5	-	-	± 20	μA

Table 8: Static characteristics ...continued

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{S(ON)}$	ON-state leakage current	per channel; $V_{SW} = GND$ or V_{CC} ; $V_{CC} = 5.5 V$; see Figure 6	-	-	± 20	μA
I_{CC}	quiescent supply current	$V_I = V_{CC}$ or GND ; $V_{SW} = GND$ or V_{CC} ; $I_O = 0 A$; $V_{CC} = 5.5 V$	-	-	40	μA
ΔI_{CC}	additional quiescent supply current	per input pin; $V_I = V_{CC} - 0.6 V$; $V_{SW} = GND$ or V_{CC} ; $I_O = 0 A$; $V_{CC} = 5.5 V$	-	-	5000	μA

[1] Typical values are measured at $T_{amb} = 25\text{ }^\circ C$.

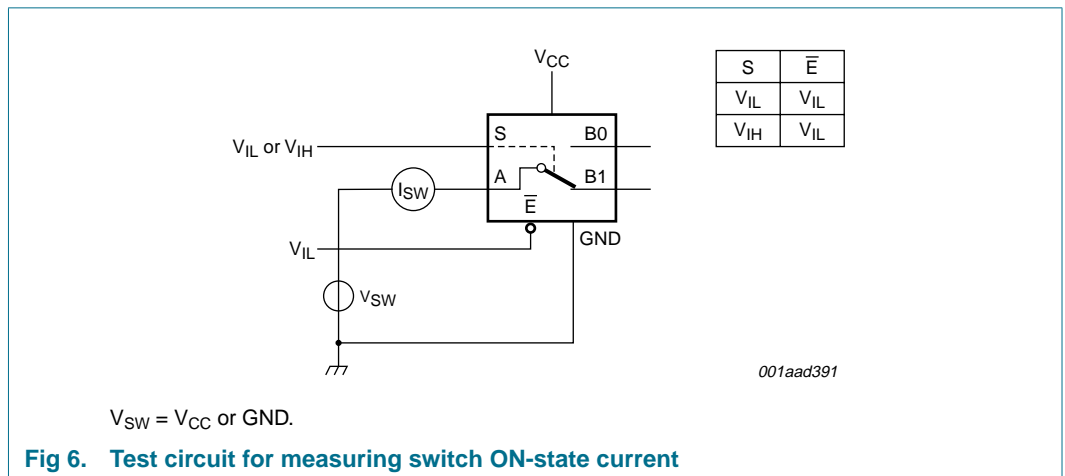
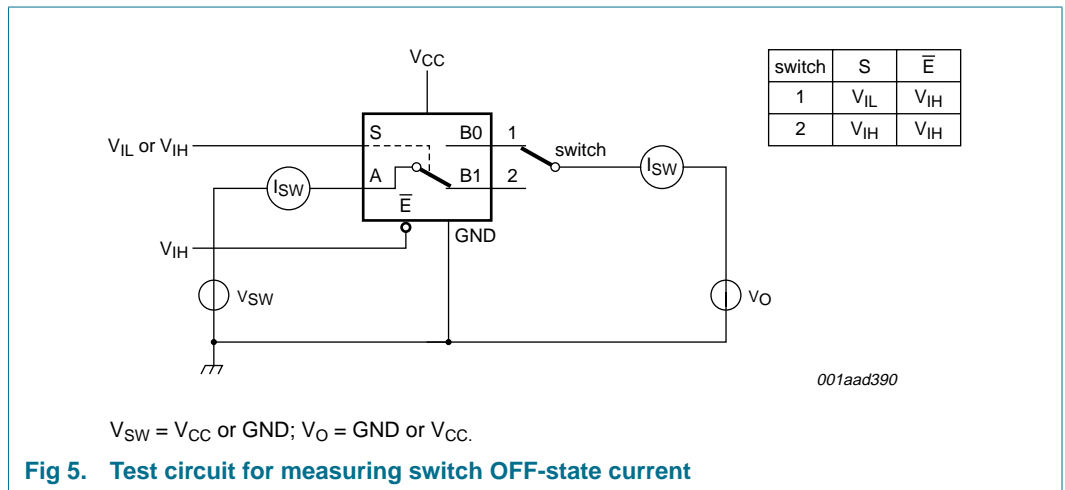


Table 9: Resistance R_{on}

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

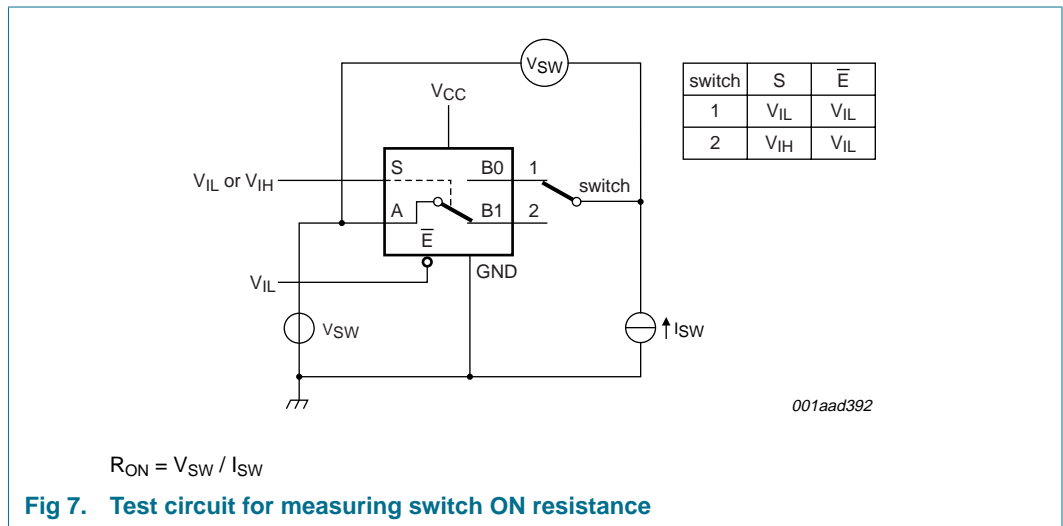
Symbol	Parameter	Conditions	Min	Typ	Max	Unit		
$T_{amb} = -40\text{ °C to }+85\text{ °C}$ [1]								
$R_{ON(rail)}$	ON resistance (rail)	$V_{SW} = GND$						
		$I_{SW} = 4\text{ mA}; V_{CC} = 1.65\text{ V to }1.95\text{ V}$	-	8.7	18	Ω		
		$I_{SW} = 8\text{ mA}; V_{CC} = 2.3\text{ V to }2.7\text{ V}$	-	7.2	16	Ω		
		$I_{SW} = 12\text{ mA}; V_{CC} = 2.7\text{ V}$	-	7.0	14	Ω		
		$I_{SW} = 24\text{ mA}; V_{CC} = 3\text{ V to }3.6\text{ V}$	-	6.5	12	Ω		
		$I_{SW} = 32\text{ mA}; V_{CC} = 4.5\text{ V to }5.5\text{ V}$	-	5.9	10	Ω		
		$V_{SW} = V_{CC}$						
		$I_{SW} = 4\text{ mA}; V_{CC} = 1.65\text{ V to }1.95\text{ V}$	-	12	30	Ω		
		$I_{SW} = 8\text{ mA}; V_{CC} = 2.3\text{ V to }2.7\text{ V}$	-	8.3	20	Ω		
		$I_{SW} = 12\text{ mA}; V_{CC} = 2.7\text{ V}$	-	7.8	18	Ω		
		$I_{SW} = 24\text{ mA}; V_{CC} = 3\text{ V to }3.6\text{ V}$	-	6.7	15	Ω		
		$I_{SW} = 32\text{ mA}; V_{CC} = 4.5\text{ V to }5.5\text{ V}$	-	5.2	10	Ω		
		$R_{ON(peak)}$	ON resistance (peak)	$V_{SW} = GND\text{ to }V_{CC}$				
				$I_{SW} = 4\text{ mA}; V_{CC} = 1.65\text{ V to }1.95\text{ V}$	-	57	130	Ω
$I_{SW} = 8\text{ mA}; V_{CC} = 2.3\text{ V to }2.7\text{ V}$	-			15	30	Ω		
$I_{SW} = 12\text{ mA}; V_{CC} = 2.7\text{ V}$	-			13	25	Ω		
$I_{SW} = 24\text{ mA}; V_{CC} = 3\text{ V to }3.6\text{ V}$	-			9.0	20	Ω		
$I_{SW} = 32\text{ mA}; V_{CC} = 4.5\text{ V to }5.5\text{ V}$	-			6.0	15	Ω		
$R_{ON(flat)}$	ON resistance (flatness)	$V_{SW} = GND\text{ to }V_{CC}$; see Figure 9						
		$I_{SW} = 4\text{ mA}; V_{CC} = 1.65\text{ V to }1.95\text{ V}$	-	100	-	Ω		
		$I_{SW} = 8\text{ mA}; V_{CC} = 2.3\text{ V to }2.7\text{ V}$	-	17	-	Ω		
		$I_{SW} = 12\text{ mA}; V_{CC} = 2.7\text{ V}$	-	10	-	Ω		
		$I_{SW} = 24\text{ mA}; V_{CC} = 3\text{ V to }3.6\text{ V}$	-	5	-	Ω		
		$I_{SW} = 32\text{ mA}; V_{CC} = 4.5\text{ V to }5.5\text{ V}$	-	3	-	Ω		
$T_{amb} = -40\text{ °C to }+125\text{ °C}$								
$R_{ON(rail)}$	ON resistance (rail)	$V_{SW} = GND$						
		$I_{SW} = 4\text{ mA}; V_{CC} = 1.65\text{ V to }1.95\text{ V}$	-	-	27	Ω		
		$I_{SW} = 8\text{ mA}; V_{CC} = 2.3\text{ V to }2.7\text{ V}$	-	-	24	Ω		
		$I_{SW} = 12\text{ mA}; V_{CC} = 2.7\text{ V}$	-	-	21	Ω		
		$I_{SW} = 24\text{ mA}; V_{CC} = 3\text{ V to }3.6\text{ V}$	-	-	18	Ω		
		$I_{SW} = 32\text{ mA}; V_{CC} = 4.5\text{ V to }5.5\text{ V}$	-	-	15	Ω		
		$V_{SW} = V_{CC}$						
		$I_{SW} = 4\text{ mA}; V_{CC} = 1.65\text{ V to }1.95\text{ V}$	-	-	45	Ω		
		$I_{SW} = 8\text{ mA}; V_{CC} = 2.3\text{ V to }2.7\text{ V}$	-	-	30	Ω		
		$I_{SW} = 12\text{ mA}; V_{CC} = 2.7\text{ V}$	-	-	27	Ω		
		$I_{SW} = 24\text{ mA}; V_{CC} = 3\text{ V to }3.6\text{ V}$	-	-	23	Ω		
		$I_{SW} = 32\text{ mA}; V_{CC} = 4.5\text{ V to }5.5\text{ V}$	-	-	15	Ω		

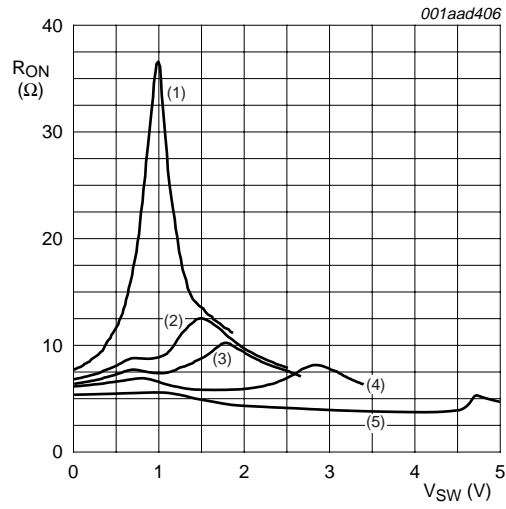
Table 9: Resistance R_{ON} ...continued

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{ON(peak)}$	ON resistance (peak)	$V_{SW} = GND \text{ to } V_{CC}$				
		$I_{SW} = 4 \text{ mA}; V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	-	-	130	Ω
		$I_{SW} = 8 \text{ mA}; V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	-	-	55	Ω
		$I_{SW} = 12 \text{ mA}; V_{CC} = 2.7 \text{ V}$	-	-	35	Ω
		$I_{SW} = 24 \text{ mA}; V_{CC} = 3 \text{ V to } 3.6 \text{ V}$	-	-	25	Ω
		$I_{SW} = 32 \text{ mA}; V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	-	-	20	Ω

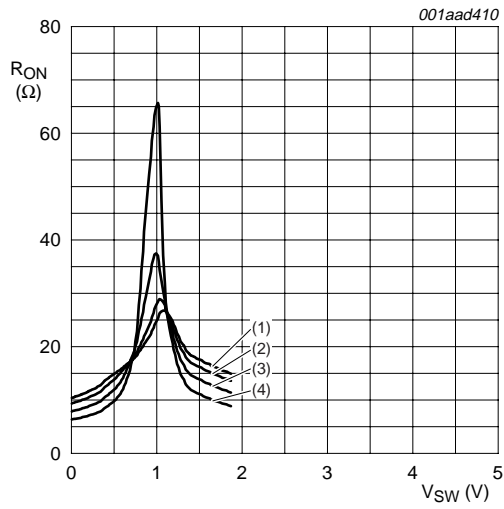
[1] Typical values are measured at $T_{amb} = 25 \text{ }^\circ\text{C}$ and nominal V_{CC} .



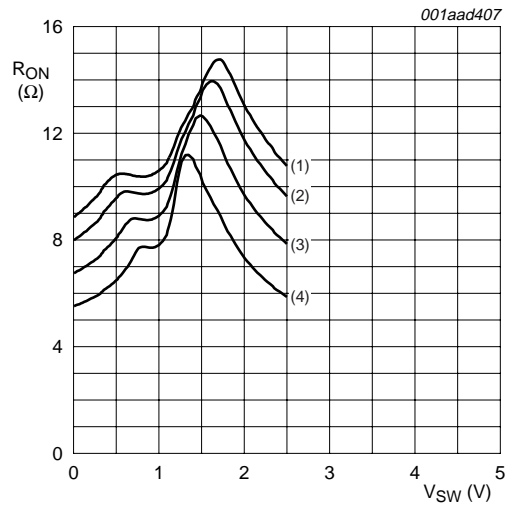


- (1) $V_{CC} = 1.8\text{ V}$
- (2) $V_{CC} = 2.5\text{ V}$
- (3) $V_{CC} = 2.7\text{ V}$
- (4) $V_{CC} = 3.3\text{ V}$
- (5) $V_{CC} = 5.0\text{ V}$
- (6) $T_{amb} = 25\text{ }^{\circ}\text{C}$

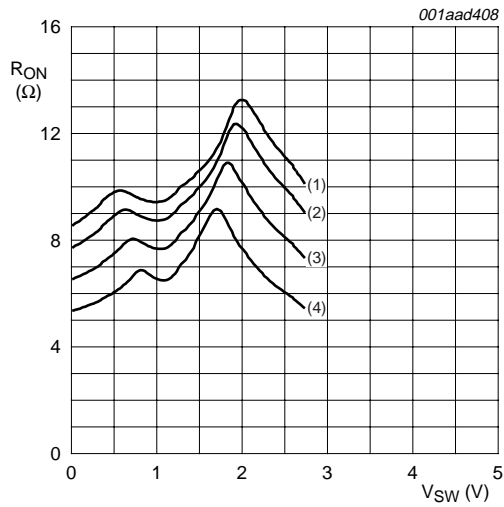
Fig 8. Typical switch ON resistance as a function of input voltage



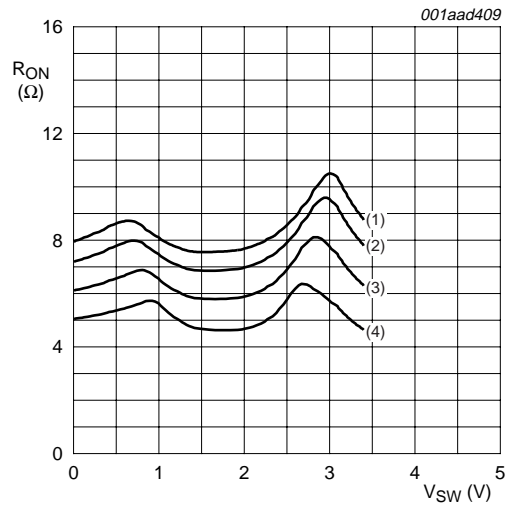
- (1) $T_{amb} = 125\text{ }^{\circ}\text{C}$
 - (2) $T_{amb} = 85\text{ }^{\circ}\text{C}$
 - (3) $T_{amb} = 25\text{ }^{\circ}\text{C}$
 - (4) $T_{amb} = -40\text{ }^{\circ}\text{C}$
- a. $V_{CC} = 1.8\text{ V}$



- (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) $T_{amb} = -40\text{ }^{\circ}\text{C}$
- b. $V_{CC} = 2.5\text{ V}$



- (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) $T_{amb} = -40\text{ }^{\circ}\text{C}$
- c. $V_{CC} = 2.7\text{ V}$



- (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) $T_{amb} = -40\text{ }^{\circ}\text{C}$
- d. $V_{CC} = 3.3\text{ V}$

Fig 9. Switch ON resistance as a function of switch 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	
T_{amb} = -40 °C to +85 °C [1]							
t _{PHL}	HIGH-to-LOW propagation delay A to Bn or Bn to A	see Figure 10					
		V _{CC} = 1.65 V to 1.95 V	-	-	2	ns	
		V _{CC} = 2.3 V to 2.7 V	-	-	1.2	ns	
		V _{CC} = 2.7 V	-	-	1.0	ns	
		V _{CC} = 3 V to 3.6 V	-	-	0.8	ns	
		V _{CC} = 4.5 V to 5.5 V	-	-	0.6	ns	
t _{PLH}	LOW-to-HIGH propagation delay A to Bn or Bn to A	see Figure 10					
		V _{CC} = 1.65 V to 1.95 V	-	-	2	ns	
		V _{CC} = 2.3 V to 2.7 V	-	-	1.2	ns	
		V _{CC} = 2.7 V	-	-	1.0	ns	
		V _{CC} = 3 V to 3.6 V	-	-	0.8	ns	
		V _{CC} = 4.5 V to 5.5 V	-	-	0.6	ns	
t _{on}	turn-on time	see Figure 11					
		S to A or Bn	V _{CC} = 1.65 V to 1.95 V	2.6	6.7	10.3	ns
			V _{CC} = 2.3 V to 2.7 V	1.9	4.1	6.4	ns
			V _{CC} = 2.7 V	1.9	4.0	5.5	ns
			V _{CC} = 3 V to 3.6 V	1.8	3.4	5.0	ns
			V _{CC} = 4.5 V to 5.5 V	1.3	2.6	3.8	ns
		E̅ to A or Bn	V _{CC} = 1.65 V to 1.95 V	1.9	4.0	7.3	ns
			V _{CC} = 2.3 V to 2.7 V	1.4	2.5	4.4	ns
			V _{CC} = 2.7 V	1.1	2.6	3.9	ns
			V _{CC} = 3 V to 3.6 V	1.2	2.2	3.8	ns
			V _{CC} = 4.5 V to 5.5 V	1.0	1.7	2.6	ns
		t _{off}	turn-off time	see Figure 11			
S to A or Bn	V _{CC} = 1.65 V to 1.95 V			2.1	6.8	10.0	ns
	V _{CC} = 2.3 V to 2.7 V			1.4	3.7	6.1	ns
	V _{CC} = 2.7 V			1.4	4.9	6.2	ns
	V _{CC} = 3 V to 3.6 V			1.1	4.0	5.4	ns
	V _{CC} = 4.5 V to 5.5 V			1.0	2.9	3.8	ns
E̅ to A or Bn	V _{CC} = 1.65 V to 1.95 V			2.3	5.6	8.6	ns
	V _{CC} = 2.3 V to 2.7 V			1.2	3.2	4.8	ns
	V _{CC} = 2.7 V			1.4	4.0	5.2	ns
	V _{CC} = 3 V to 3.6 V			2.0	3.7	5.0	ns
	V _{CC} = 4.5 V to 5.5 V			1.3	2.9	3.8	ns

Table 10: 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_{amb} = -40 °C to +125 °C									
t _{PHL}	HIGH-to-LOW propagation delay	see Figure 10							
		A to Bn or Bn to A	V _{CC} = 1.65 V to 1.95 V	-	-	2.5	ns		
			V _{CC} = 2.3 V to 2.7 V	-	-	1.5	ns		
			V _{CC} = 2.7 V	-	-	1.25	ns		
			V _{CC} = 3 V to 3.6 V	-	-	1.0	ns		
			V _{CC} = 4.5 V to 5.5 V	-	-	0.8	ns		
t _{PLH}	LOW-to-HIGH propagation delay	see Figure 10							
		A to Bn or Bn to A	V _{CC} = 1.65 V to 1.95 V	-	-	2.5	ns		
			V _{CC} = 2.3 V to 2.7 V	-	-	1.5	ns		
			V _{CC} = 2.7 V	-	-	1.25	ns		
			V _{CC} = 3 V to 3.6 V	-	-	1.0	ns		
			V _{CC} = 4.5 V to 5.5 V	-	-	0.8	ns		
t _{on}	turn-on time	see Figure 11							
		S to A or Bn	V _{CC} = 1.65 V to 1.95 V	2.6	-	12.9	ns		
			V _{CC} = 2.3 V to 2.7 V	1.9	-	8.0	ns		
			V _{CC} = 2.7 V	1.8	-	7.0	ns		
			V _{CC} = 3 V to 3.6 V	1.8	-	6.3	ns		
			V _{CC} = 4.5 V to 5.5 V	1.3	-	4.8	ns		
		\bar{E} to A or Bn	V _{CC} = 1.65 V to 1.95 V	1.9	-	9.2	ns		
			V _{CC} = 2.3 V to 2.7 V	1.4	-	5.5	ns		
			V _{CC} = 2.7 V	1.1	-	4.9	ns		
			V _{CC} = 3 V to 3.6 V	1.2	-	4.8	ns		
			V _{CC} = 4.5 V to 5.5 V	1.0	-	3.3	ns		
		t _{off}	turn-off time	see Figure 11					
				S to A or Bn	V _{CC} = 1.65 V to 1.95 V	2.1	-	12.5	ns
					V _{CC} = 2.3 V to 2.7 V	1.4	-	7.7	ns
V _{CC} = 2.7 V	1.4				-	7.8	ns		
V _{CC} = 3 V to 3.6 V	1.1				-	6.8	ns		
V _{CC} = 4.5 V to 5.5 V	1.0				-	4.8	ns		
\bar{E} to A or Bn	V _{CC} = 1.65 V to 1.95 V			2.3	-	11.0	ns		
	V _{CC} = 2.3 V to 2.7 V			1.2	-	6.0	ns		
	V _{CC} = 2.7 V			1.4	-	6.5	ns		
	V _{CC} = 3 V to 3.6 V			2.0	-	6.3	ns		
	V _{CC} = 4.5 V to 5.5 V			1.3	-	4.8	ns		

[1] Typical values are measured at T_{amb} = 25 °C and nominal V_{CC}.

13. Waveforms

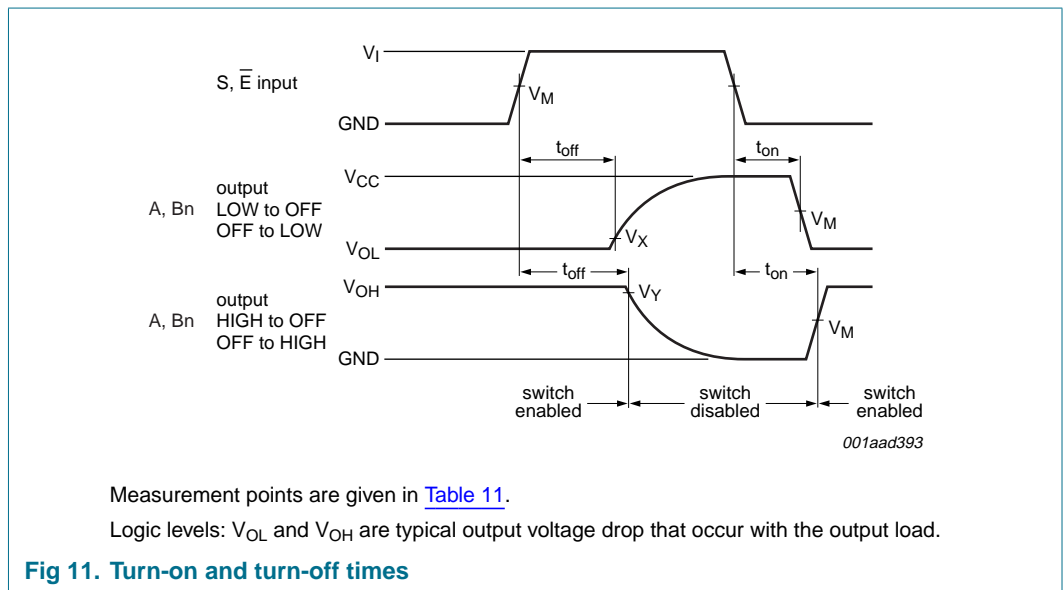
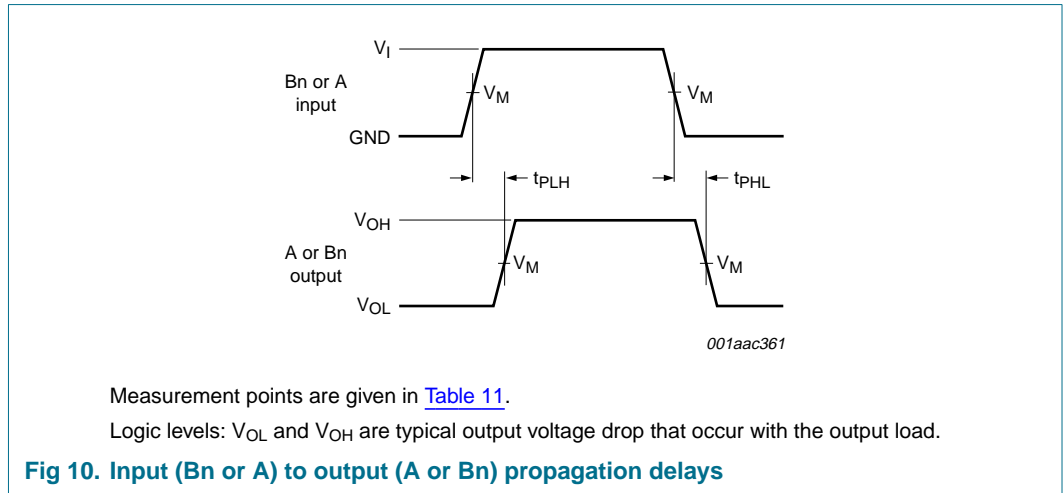


Table 11: Measurement points

Supply voltage	Input	Output		
V_{CC}	V_M	V_M	V_X	V_Y
1.65 V to 2.7 V	$0.5V_{CC}$	$0.5V_{CC}$	$V_{OL} + 0.15 V$	$V_{OH} - 0.15 V$
2.7 V to 5.5 V	$0.5V_{CC}$	$0.5V_{CC}$	$V_{OL} + 0.3 V$	$V_{OH} - 0.3 V$

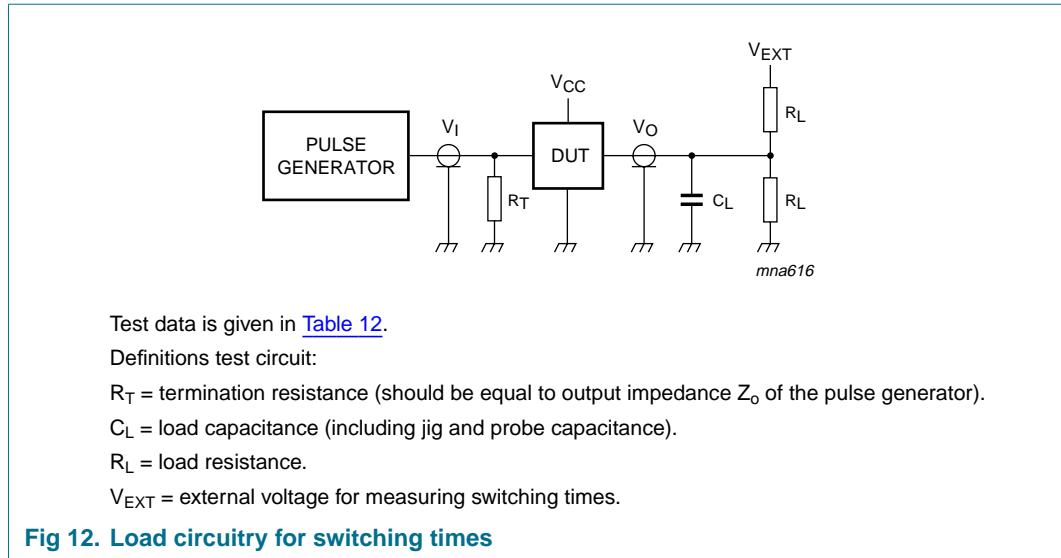


Table 12: Test data

Supply voltage	Input		Load		V_{EXT}		
V_{CC}	V_I	t_r, t_f	C_L	R_L	t_{PLH}, t_{PHL}	t_{on}, t_{off}	
						HIGH to OFF	LOW to OFF
						OFF to HIGH	OFF to LOW
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	V_{CC}	≤ 2.5 ns	50 pF	500 Ω	open	GND	$2 \times V_{CC}$
3 V to 3.6 V	V_{CC}	≤ 2.5 ns	50 pF	500 Ω	open	GND	$2 \times V_{CC}$
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 operating conditions; typical values measured at $T_{amb} = 25^\circ C$.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
THD	total harmonic distortion	$f_i = 600$ Hz to 20 kHz; $R_L = 600 \Omega$; $C_L = 50$ pF; $V_i = 0.5$ V (p-p); see Figure 13				
		$V_{CC} = 1.65$ V	-	0.260	-	%
		$V_{CC} = 2.3$ V	-	0.078	-	%
		$V_{CC} = 3.0$ V	-	0.078	-	%
		$V_{CC} = 4.5$ V	-	0.078	-	%
$f_{(-3dB)}$	-3 dB frequency response	$R_L = 50 \Omega$; $C_L = 5$ pF; see Figure 14		[1]		
		$V_{CC} = 1.65$ V	-	200	-	MHz
		$V_{CC} = 2.3$ V	-	300	-	MHz
		$V_{CC} = 3.0$ V	-	300	-	MHz
		$V_{CC} = 4.5$ V	-	300	-	MHz

Table 13: Additional dynamic characteristics ...continued

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$\alpha_{\text{OFF(ft)}}$	OFF-state feed-through attenuation	$R_L = 50\ \Omega$; $C_L = 5\ \text{pF}$; $f_i = 10\ \text{MHz}$; see Figure 15	[2]			
		$V_{CC} = 1.65\ \text{V}$	-	-42	-	dB
		$V_{CC} = 2.3\ \text{V}$	-	-42	-	dB
		$V_{CC} = 3.0\ \text{V}$	-	-40	-	dB
$V_{\text{ct(sw-sw)}}$	crosstalk between switches	$R_L = 50\ \Omega$; $C_L = 5\ \text{pF}$; $f_i = 10\ \text{MHz}$; see Figure 16				
		$V_{CC} = 1.65\ \text{V}$	-	-68	-	dBV
		$V_{CC} = 2.3\ \text{V}$	-	-70	-	dBV
		$V_{CC} = 3.0\ \text{V}$	-	-70	-	dBV
Q_{inj}	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 17	[3]			
		$V_{CC} = 1.8\ \text{V}$	-	< 0.003	-	pC
		$V_{CC} = 2.5\ \text{V}$	-	0.004	-	pC
		$V_{CC} = 3.3\ \text{V}$	-	0.0045	-	pC
		$V_{CC} = 4.5\ \text{V}$	-	0.0045	-	pC
		$V_{CC} = 5.5\ \text{V}$	-	0.0045	-	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: $Q_{\text{inj}} = \Delta V_O \times C_L$. Guaranteed by design.

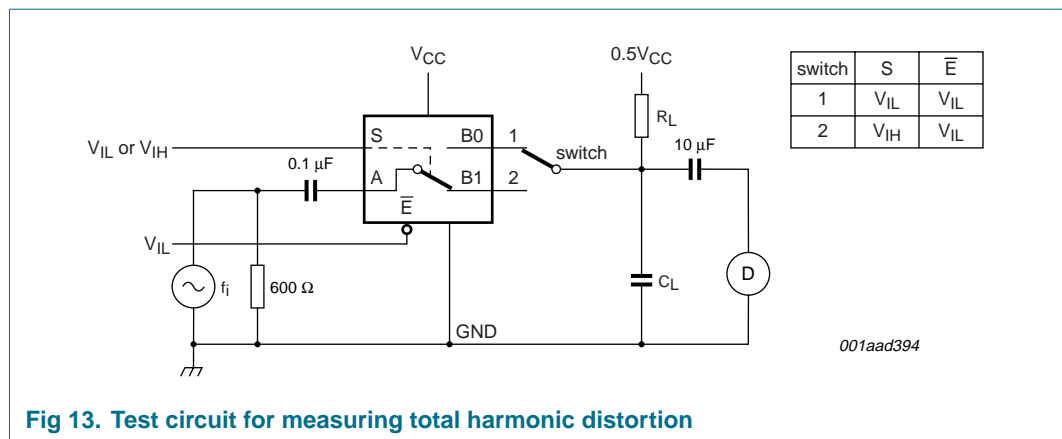


Fig 13. Test circuit for measuring total harmonic distortion

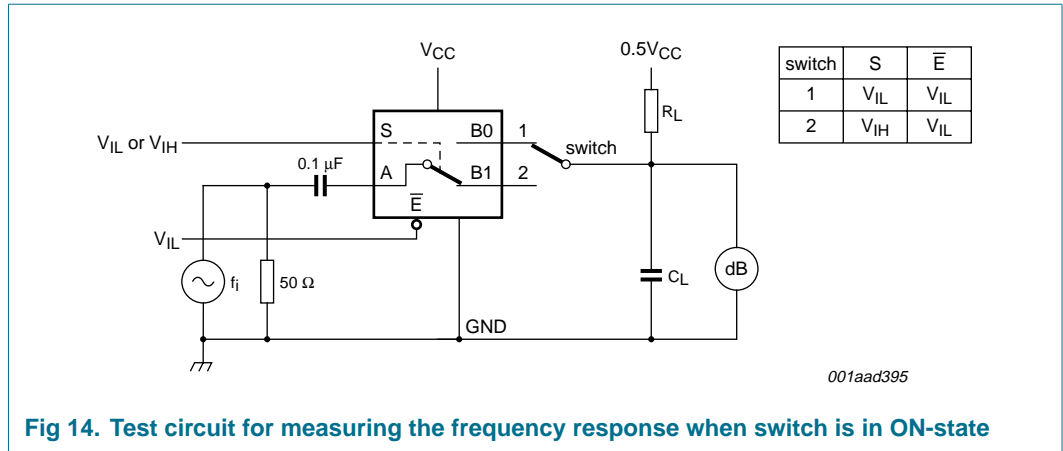


Fig 14. Test circuit for measuring the frequency response when switch is in ON-state

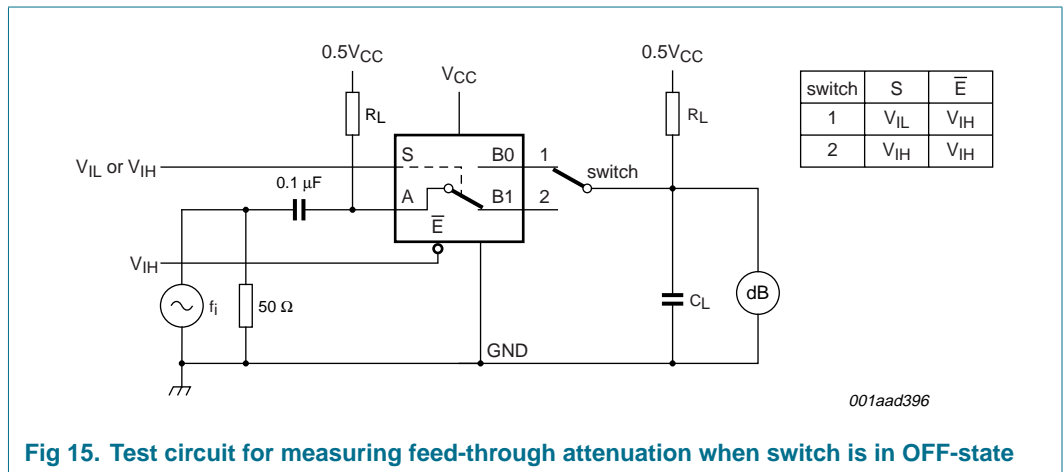


Fig 15. Test circuit for measuring feed-through attenuation when switch is in OFF-state

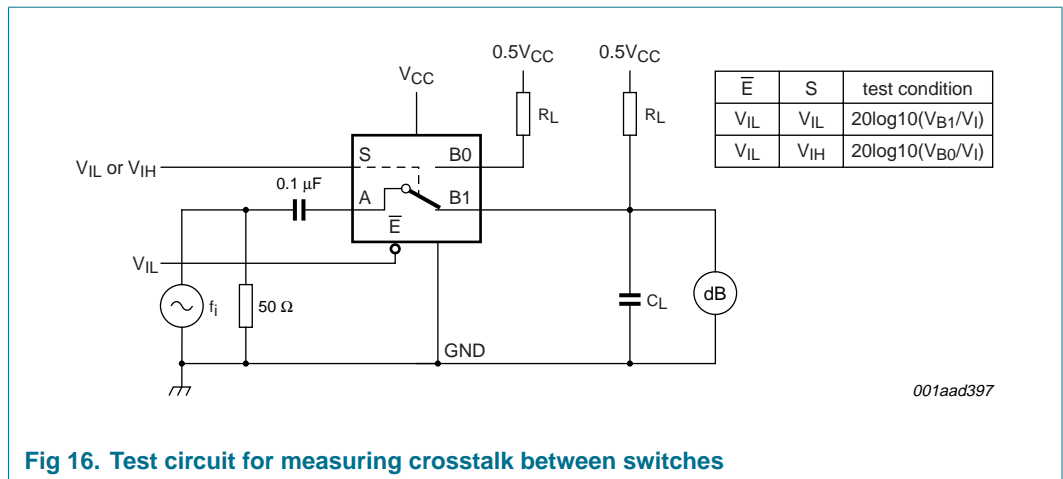
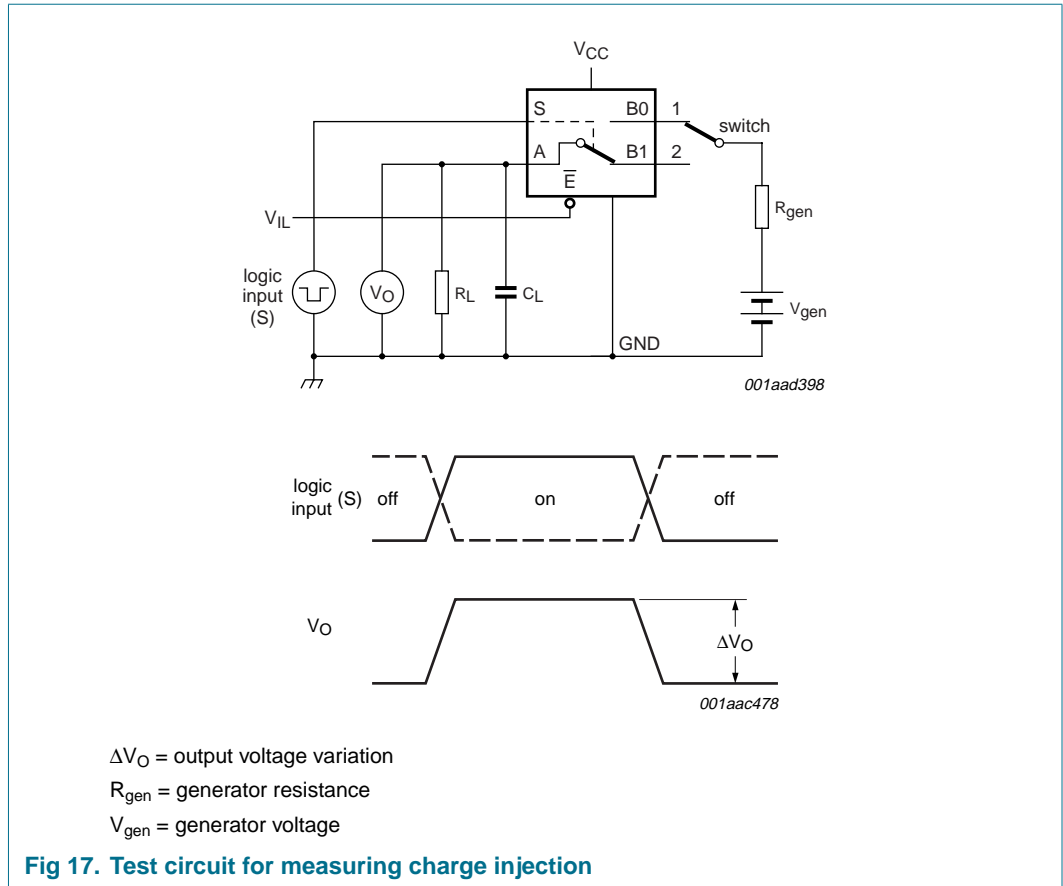


Fig 16. Test circuit for measuring crosstalk between switches



15. Package outline

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

SOT765-1

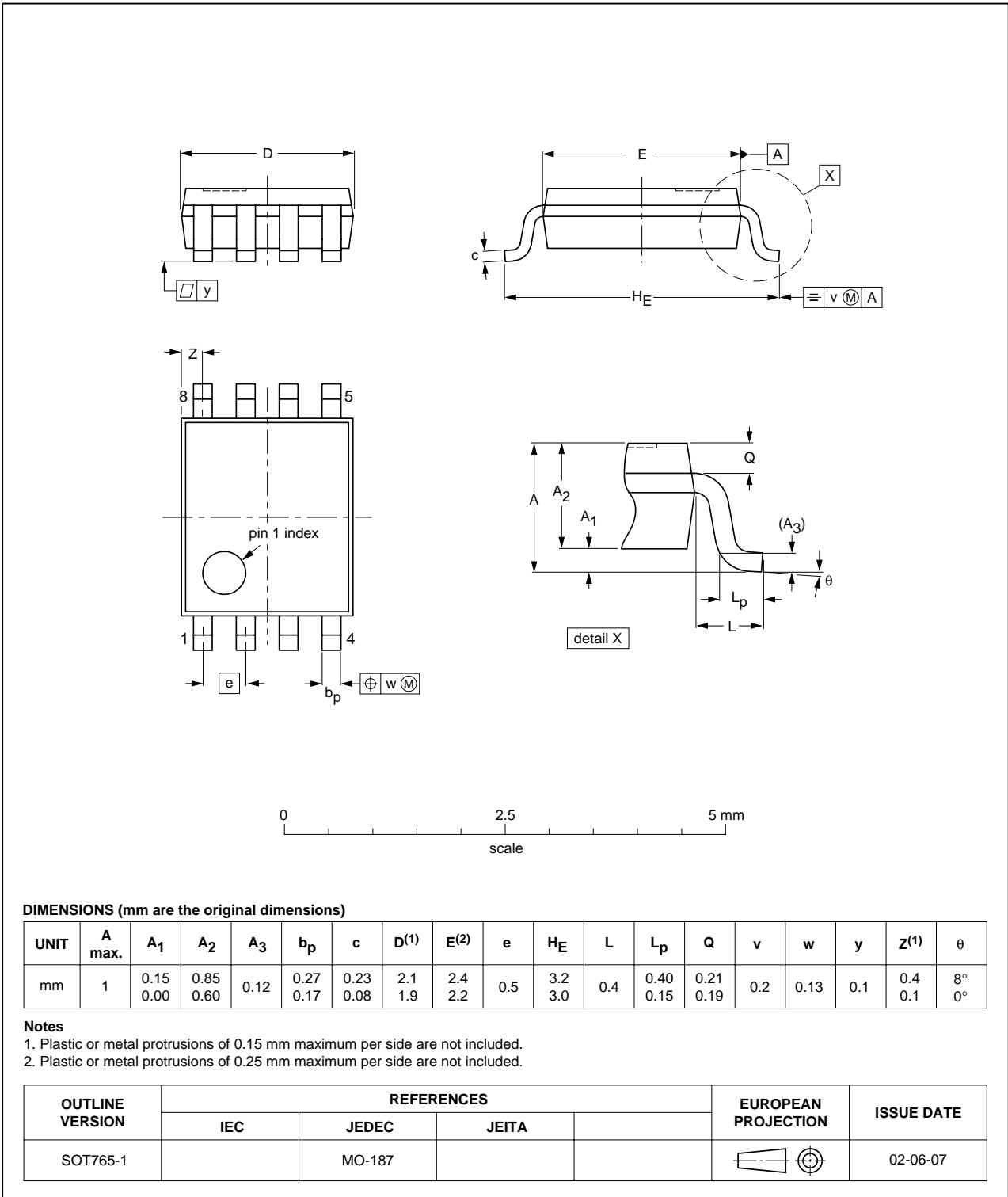


Fig 18. Package outline SOT765-1 (VSSOP8)

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

SOT833-1

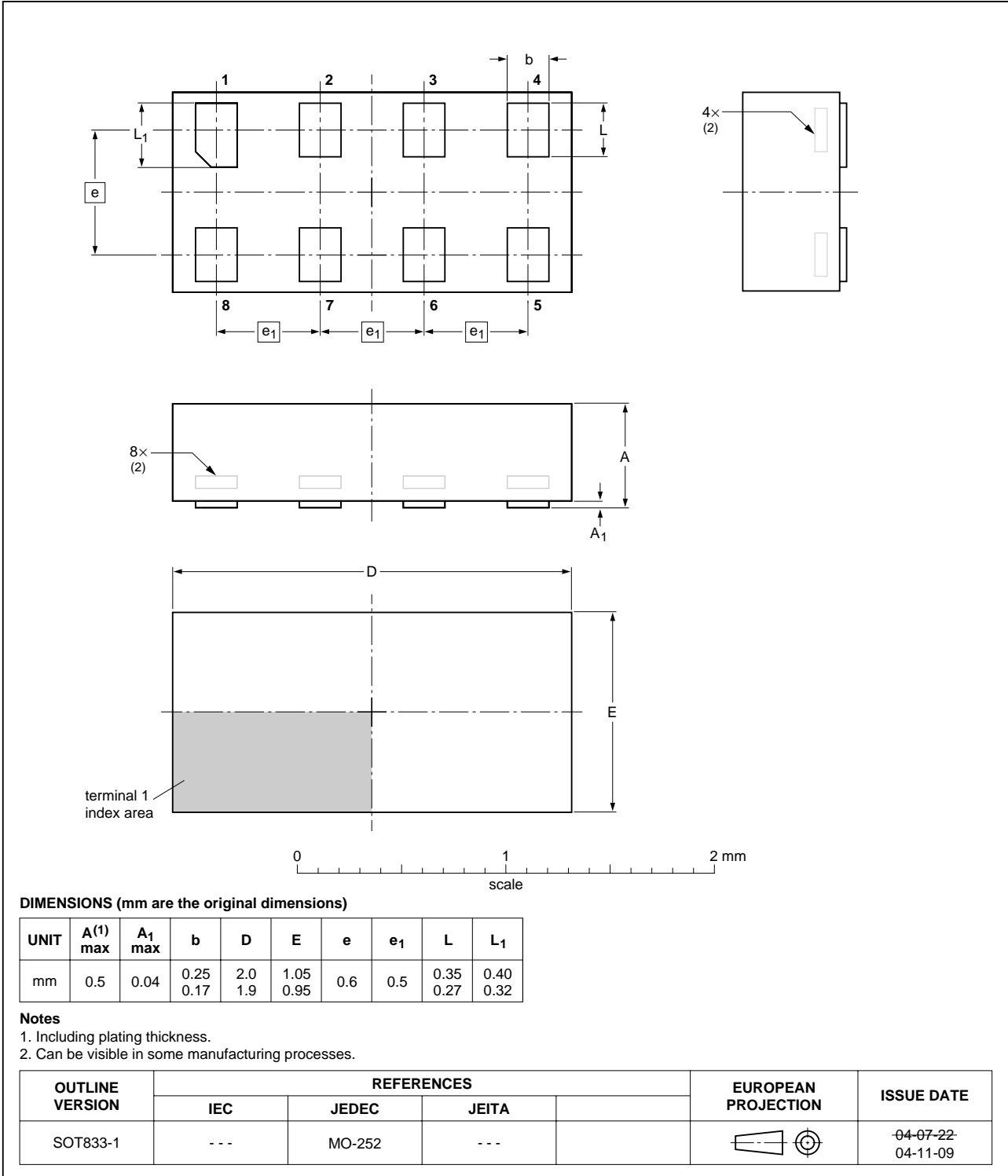


Fig 19. Package outline SOT833-1 (XSON8)

16. Abbreviations

Table 14: 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

17. Revision history

Table 15: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
74LVC2G53_1	20060110	Product data sheet	-	-	-

18. 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.
III	Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN).

[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.

19. 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.

Application information — Applications that are described herein for any of these products are for illustrative purposes only. Philips Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips Semiconductors for any damages resulting from such application.

Right to make changes — Philips Semiconductors reserves the right to make changes in the products - including circuits, standard cells, and/or software - described or contained herein in order to improve design and/or performance. When the product is in full production (status 'Production'), relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN). Philips Semiconductors assumes no responsibility or liability for the use of any of these products, conveys no license or title under any patent, copyright, or mask work right to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified.

20. Disclaimers

Life support — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips Semiconductors

21. Trademarks

Notice — All referenced brands, product names, service names and trademarks are the property of their respective owners.

22. Contact information

For additional information, please visit: <http://www.semiconductors.philips.com>

For sales office addresses, send an email to: sales.addresses@www.semiconductors.philips.com

23. Contents

1	General description	1
2	Features	1
3	Quick reference data	2
4	Ordering information	2
5	Marking	2
6	Functional diagram	3
7	Pinning information	3
7.1	Pinning	3
7.2	Pin description	4
8	Functional description	4
8.1	Function table	4
9	Limiting values	5
10	Recommended operating conditions	5
11	Static characteristics	6
12	Dynamic characteristics	12
13	Waveforms	14
14	Additional dynamic characteristics	15
15	Package outline	19
16	Abbreviations	21
17	Revision history	21
18	Data sheet status	22
19	Definitions	22
20	Disclaimers	22
21	Trademarks	22
22	Contact information	22



© Koninklijke Philips Electronics N.V. 2006

All rights are reserved. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent- or other industrial or intellectual property rights.

Date of release: 10 January 2006
Document number: 74LVC2G53_1

Published in The Netherlands