

74LVC2G53

2-channel analog multiplexer/demultiplexer

Rev. 02 — 31 March 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

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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
		$V_{CC} = 5.0\text{ V}$	1.0	1.7	2.6	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	ns
		$V_{CC} = 5.0\text{ V}$	1.3	2.9	3.8	ns		
C_i		input capacitance		-	2.5	-	pF	
$C_{S(OFF)}$		OFF-state capacitance		-	6.0	-	pF	
$C_{S(ON)}$	ON-state capacitance		-	18	-	pF		

4. Ordering information

Table 2. Ordering information

Type number	Package			Version
	Temperature range	Name	Description	
74LVC2G53DP	-40 °C to $+125\text{ °C}$	TSSOP8	plastic thin shrink small outline package; 8 leads; body width 3 mm; lead length 0.5 mm	SOT505-2
74LVC2G53DC	-40 °C to $+125\text{ °C}$	VSSOP8	plastic very thin shrink small outline package; 8 leads; body width 2.3 mm	SOT765-1
74LVC2G53GT	-40 °C to $+125\text{ °C}$	XSON8	plastic extremely thin small outline package; no leads; 8 terminals; body $1 \times 1.95 \times 0.5\text{ mm}$	SOT833-1

5. Marking

Table 3. Marking

Type number	Marking code
74LVC2G53DP	V53
74LVC2G53DC	V53
74LVC2G53GT	V53

6. Functional diagram

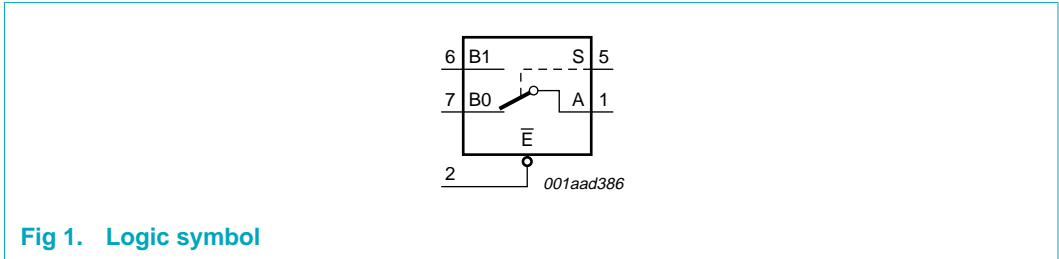


Fig 1. Logic symbol

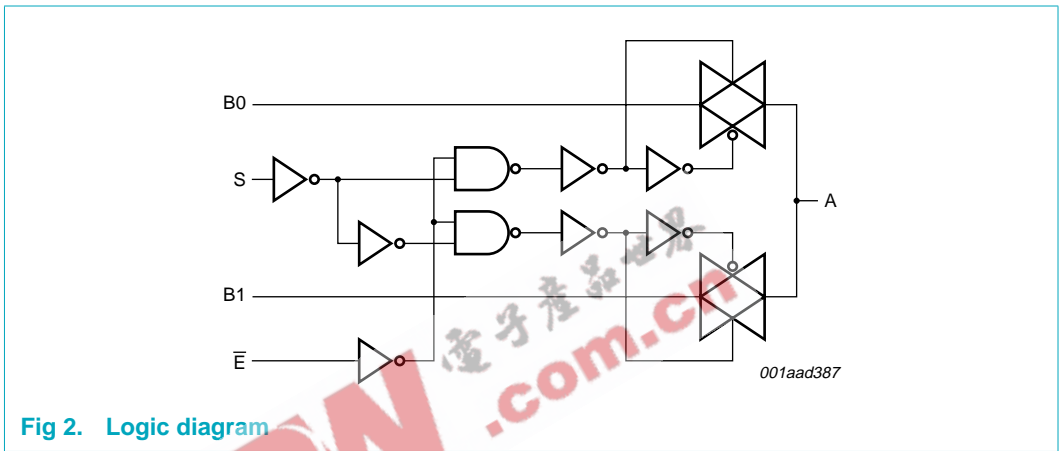


Fig 2. Logic diagram

7. Pinning information

7.1 Pinning

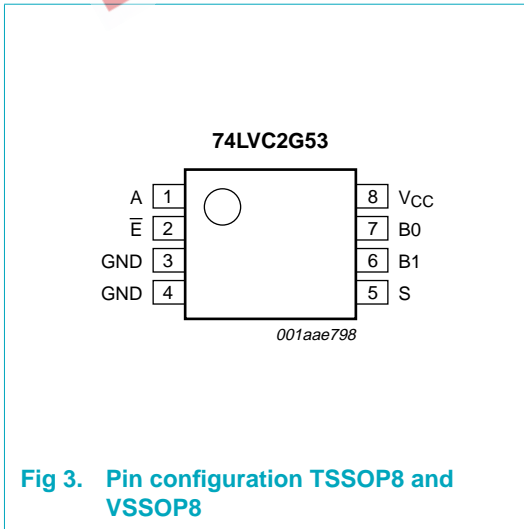


Fig 3. Pin configuration TSSOP8 and VSSOP8

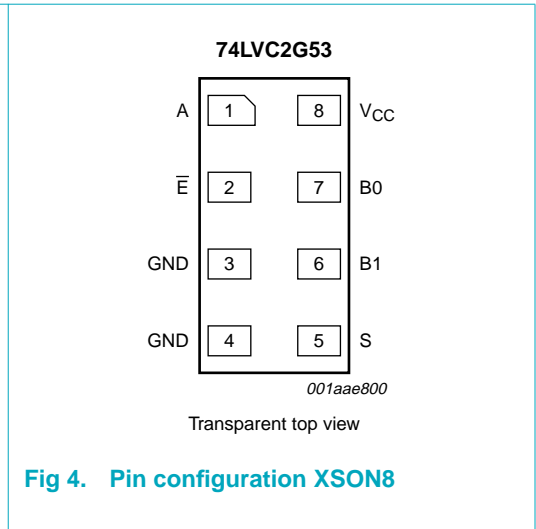


Fig 4. Pin configuration XSON8

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 TSSOP8 package: above 55 °C the value of P_{tot} derates linearly with 2.5 mW/K.
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 $V_{SW} = V_{CC} \text{ and } V_O = \text{GND};$ $V_{CC} = 5.5\text{ V};$ 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	$V_I = V_{CC} \text{ or GND};$ $V_{SW} = \text{GND or } V_{CC}; I_O = 0\text{ A};$ $V_{CC} = 5.5\text{ V}$	-	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 $V_{SW} = V_{CC} \text{ and } V_O = \text{GND};$ $V_{CC} = 5.5\text{ V};$ 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 $T_{amb} = 25$ °C.

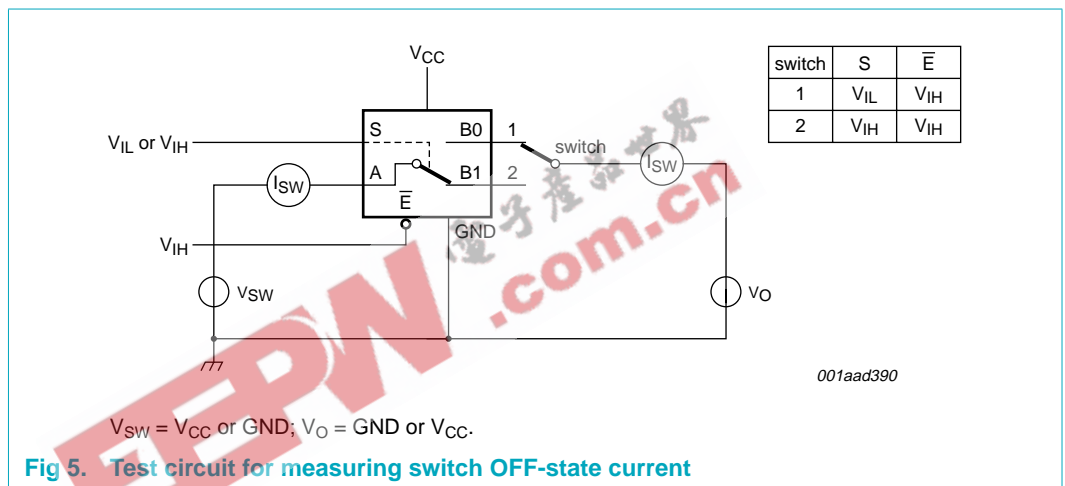


Fig 5. Test circuit for measuring switch OFF-state current

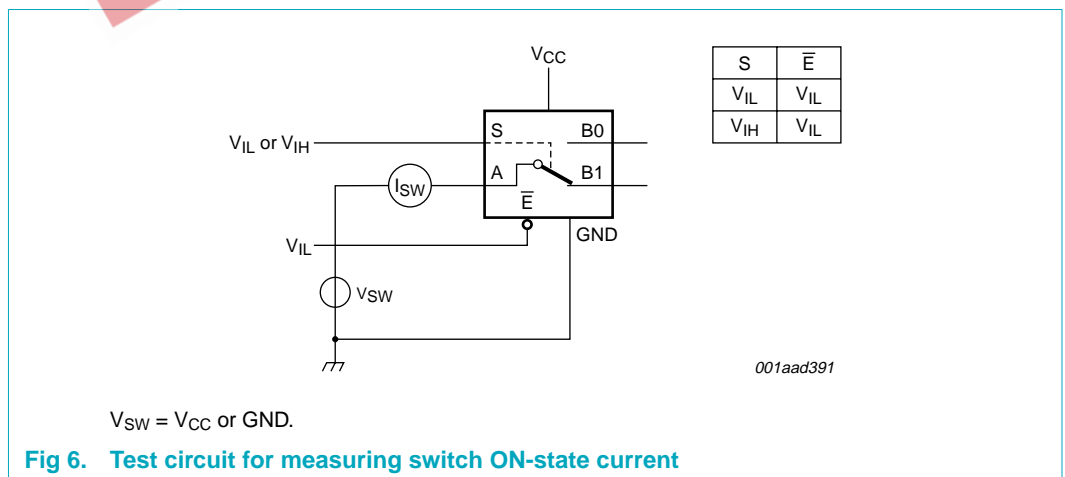


Fig 6. Test circuit for measuring switch ON-state current

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		
$T_{amb} = -40\text{ °C to }+85\text{ °C}$								
$R_{ON(rail)}$	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} .

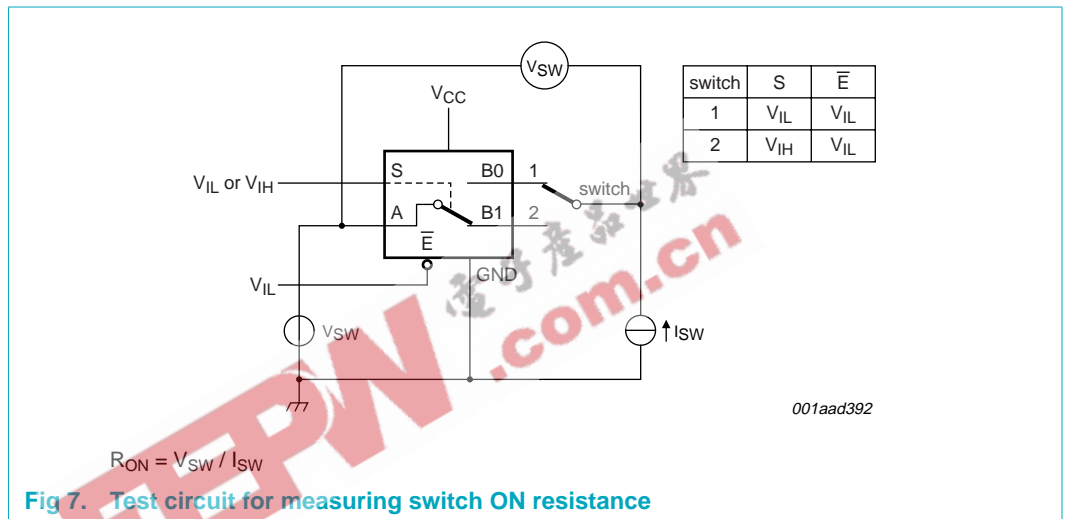
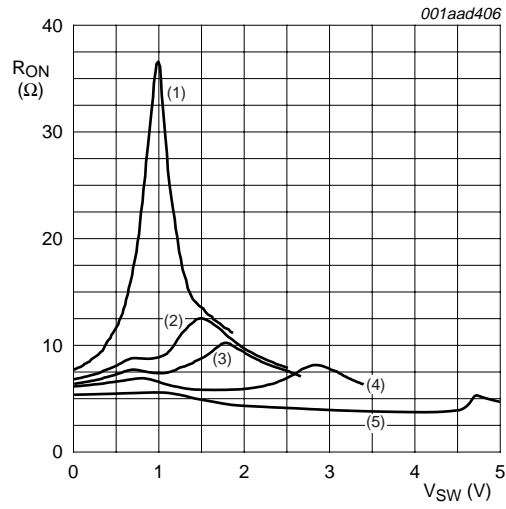


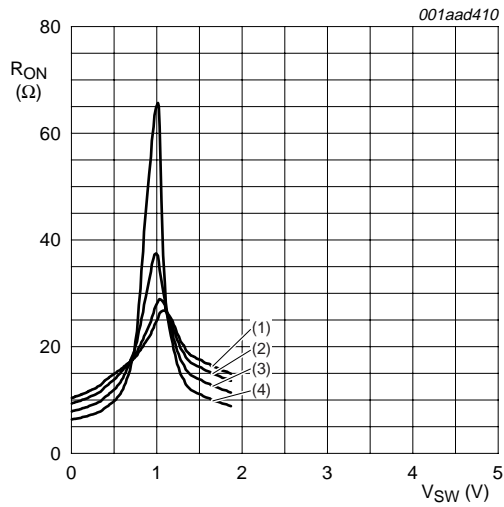
Fig 7. Test circuit for measuring switch ON resistance



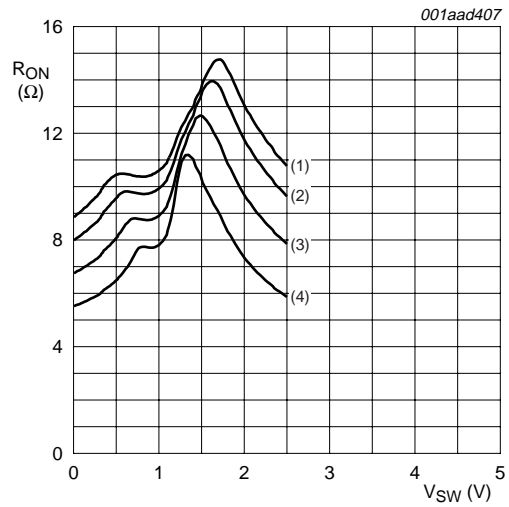
- (1) $V_{CC} = 1.8\text{ V}$
 - (2) $V_{CC} = 2.5\text{ V}$
 - (3) $V_{CC} = 2.7\text{ V}$
 - (4) $V_{CC} = 3.3\text{ V}$
 - (5) $V_{CC} = 5.0\text{ V}$
- $T_{amb} = 25\text{ }^{\circ}\text{C}$

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

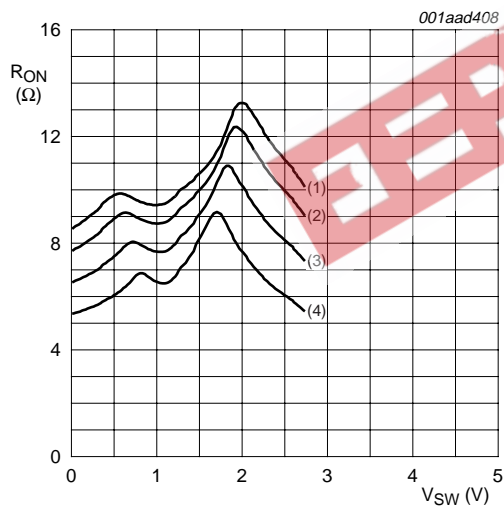
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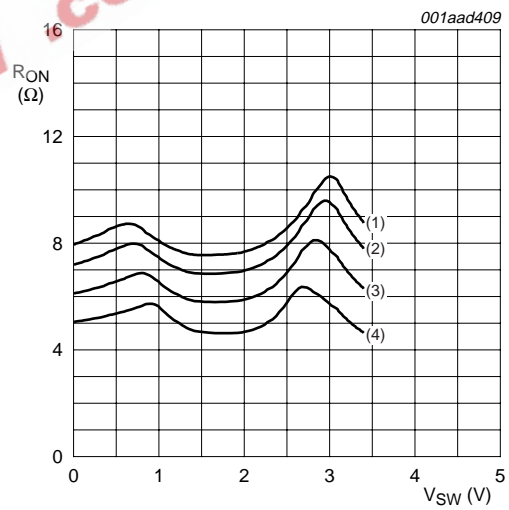
- (1) $T_{amb} = 125\text{ °C}$
 - (2) $T_{amb} = 85\text{ °C}$
 - (3) $T_{amb} = 25\text{ °C}$
 - (4) $T_{amb} = -40\text{ °C}$
- a. $V_{CC} = 1.8\text{ V}$



- (1) $T_{amb} = 125\text{ °C}$
 - (2) $T_{amb} = 85\text{ °C}$
 - (3) $T_{amb} = 25\text{ °C}$
 - (4) $T_{amb} = -40\text{ °C}$
- b. $V_{CC} = 2.5\text{ V}$



- (1) $T_{amb} = 125\text{ °C}$
 - (2) $T_{amb} = 85\text{ °C}$
 - (3) $T_{amb} = 25\text{ °C}$
 - (4) $T_{amb} = -40\text{ °C}$
- c. $V_{CC} = 2.7\text{ V}$



- (1) $T_{amb} = 125\text{ °C}$
 - (2) $T_{amb} = 85\text{ °C}$
 - (3) $T_{amb} = 25\text{ °C}$
 - (4) $T_{amb} = -40\text{ °C}$
- 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			
$T_{amb} = -40\text{ °C to }+85\text{ °C}$[1]									
t_{PHL}	HIGH-to-LOW propagation delay A to Bn or Bn to A	see Figure 10							
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	-	-	2	ns			
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	-	-	1.2	ns			
		$V_{CC} = 2.7\text{ V}$	-	-	1.0	ns			
		$V_{CC} = 3\text{ V to }3.6\text{ V}$	-	-	0.8	ns			
t_{PLH}	LOW-to-HIGH propagation delay A to Bn or Bn to A	see Figure 10							
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	-	-	2	ns			
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	-	-	1.2	ns			
		$V_{CC} = 2.7\text{ V}$	-	-	1.0	ns			
		$V_{CC} = 3\text{ V to }3.6\text{ V}$	-	-	0.8	ns			
t_{on}	turn-on time	see Figure 11							
		S to A or Bn	$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	2.6	6.7	10.3	ns		
			$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.9	4.1	6.4	ns		
			$V_{CC} = 2.7\text{ V}$	1.9	4.0	5.5	ns		
			$V_{CC} = 3\text{ V to }3.6\text{ V}$	1.8	3.4	5.0	ns		
			$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.3	2.6	3.8	ns		
		\bar{E} to A or Bn	$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	1.9	4.0	7.3	ns		
			$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.4	2.5	4.4	ns		
			$V_{CC} = 2.7\text{ V}$	1.1	2.6	3.9	ns		
			$V_{CC} = 3\text{ V to }3.6\text{ V}$	1.2	2.2	3.8	ns		
			$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.0	1.7	2.6	ns		
		t_{off}	turn-off time	see Figure 11					
				S to A or Bn	$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	2.1	6.8	10.0	ns
					$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.4	3.7	6.1	ns
					$V_{CC} = 2.7\text{ V}$	1.4	4.9	6.2	ns
$V_{CC} = 3\text{ V to }3.6\text{ V}$	1.1				4.0	5.4	ns		
$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.0				2.9	3.8	ns		
\bar{E} to A or Bn	$V_{CC} = 1.65\text{ V to }1.95\text{ V}$			2.3	5.6	8.6	ns		
	$V_{CC} = 2.3\text{ V to }2.7\text{ V}$			1.2	3.2	4.8	ns		
	$V_{CC} = 2.7\text{ V}$			1.4	4.0	5.2	ns		
	$V_{CC} = 3\text{ V to }3.6\text{ V}$			2.0	3.7	5.0	ns		
	$V_{CC} = 4.5\text{ V to }5.5\text{ V}$			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	
$T_{amb} = -40\text{ }^{\circ}\text{C to }+125\text{ }^{\circ}\text{C}$							
t_{PHL}	HIGH-to-LOW propagation delay	see Figure 10					
		A to Bn or Bn to A	$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	-	-	2.5	ns
			$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	-	-	1.5	ns
			$V_{CC} = 2.7\text{ V}$	-	-	1.25	ns
			$V_{CC} = 3\text{ V to }3.6\text{ V}$	-	-	1.0	ns
			$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	-	-	0.8	ns
t_{PLH}	LOW-to-HIGH propagation delay	see Figure 10					
		A to Bn or Bn to A	$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	-	-	2.5	ns
			$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	-	-	1.5	ns
			$V_{CC} = 2.7\text{ V}$	-	-	1.25	ns
			$V_{CC} = 3\text{ V to }3.6\text{ V}$	-	-	1.0	ns
			$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	-	-	0.8	ns
t_{on}	turn-on time	see Figure 11					
		S to A or Bn	$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	2.6	-	12.9	ns
			$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.9	-	8.0	ns
			$V_{CC} = 2.7\text{ V}$	1.8	-	7.0	ns
			$V_{CC} = 3\text{ V to }3.6\text{ V}$	1.8	-	6.3	ns
			$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.3	-	4.8	ns
		\bar{E} to A or Bn	$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	1.9	-	9.2	ns
			$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.4	-	5.5	ns
			$V_{CC} = 2.7\text{ V}$	1.1	-	4.9	ns
			$V_{CC} = 3\text{ V to }3.6\text{ V}$	1.2	-	4.8	ns
			$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.0	-	3.3	ns
	t_{off}	turn-off time	see Figure 11				
			S to A or Bn	$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	2.1	-	12.5
				$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.4	-	7.7
			$V_{CC} = 2.7\text{ V}$	1.4	-	7.8	ns
			$V_{CC} = 3\text{ V to }3.6\text{ V}$	1.1	-	6.8	ns
			$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.0	-	4.8	ns
		\bar{E} to A or Bn	$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	2.3	-	11.0	ns
			$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.2	-	6.0	ns
			$V_{CC} = 2.7\text{ V}$	1.4	-	6.5	ns
			$V_{CC} = 3\text{ V to }3.6\text{ V}$	2.0	-	6.3	ns
			$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.3	-	4.8	ns

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

13. Waveforms

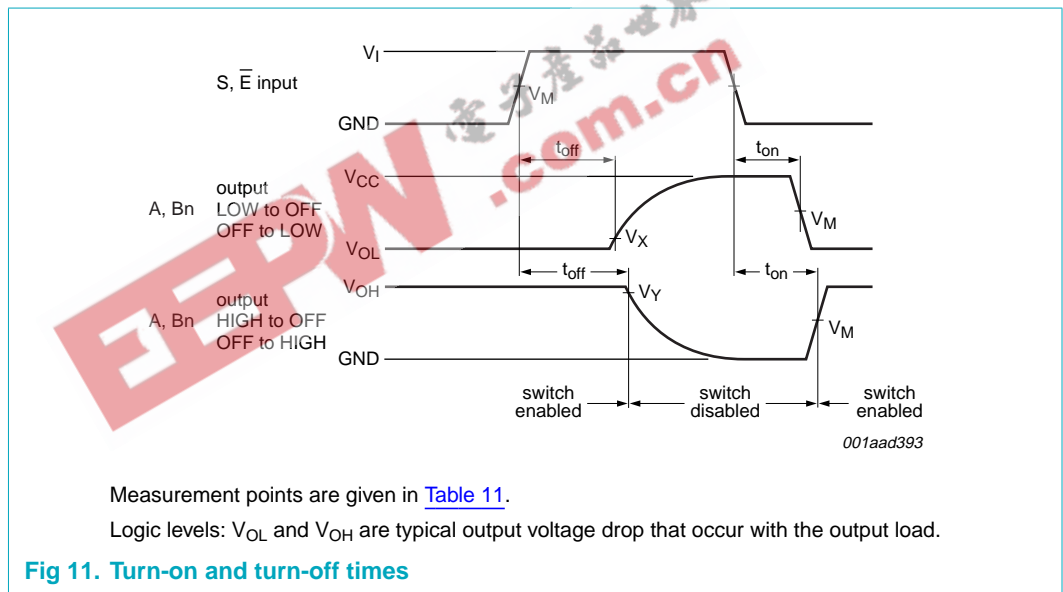
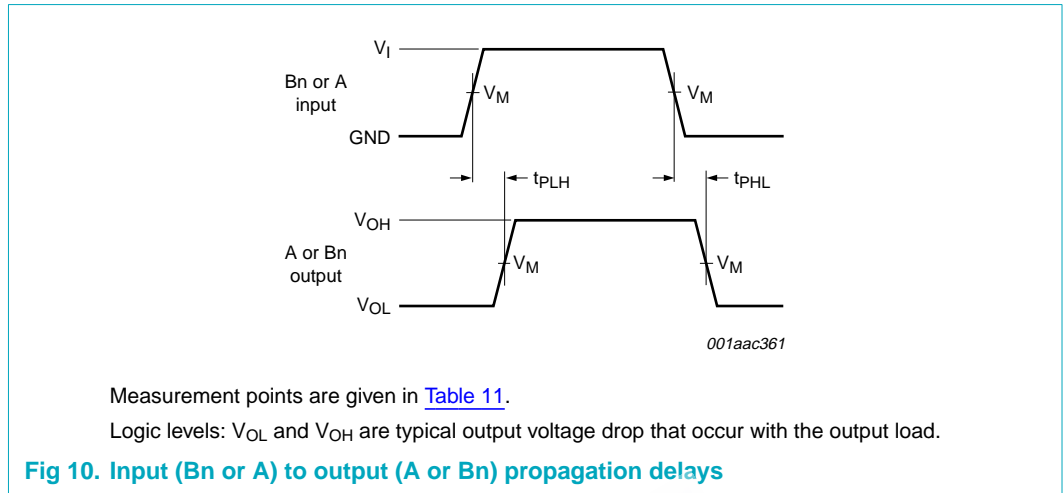


Table 11. Measurement points

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

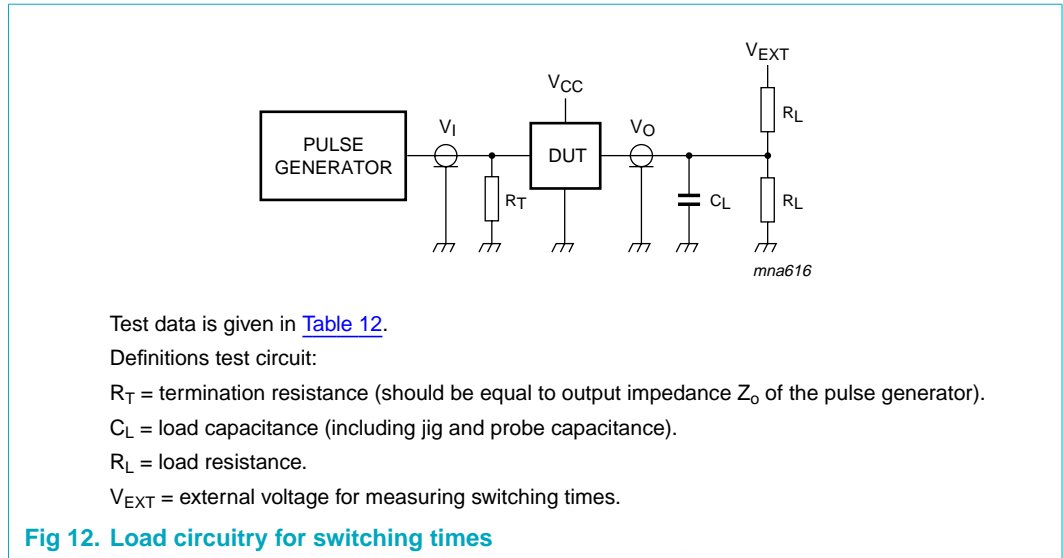


Table 12. Test data

Supply voltage	Input		Load		V_{EXT}	t_{on}, t_{off}	
V_{CC}	V_I	t_r, t_f	C_L	R_L	t_{PLH}, t_{PHL}	HIGH to OFF OFF to HIGH	LOW to OFF 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				
		$V_{CC} = 1.65$ 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.

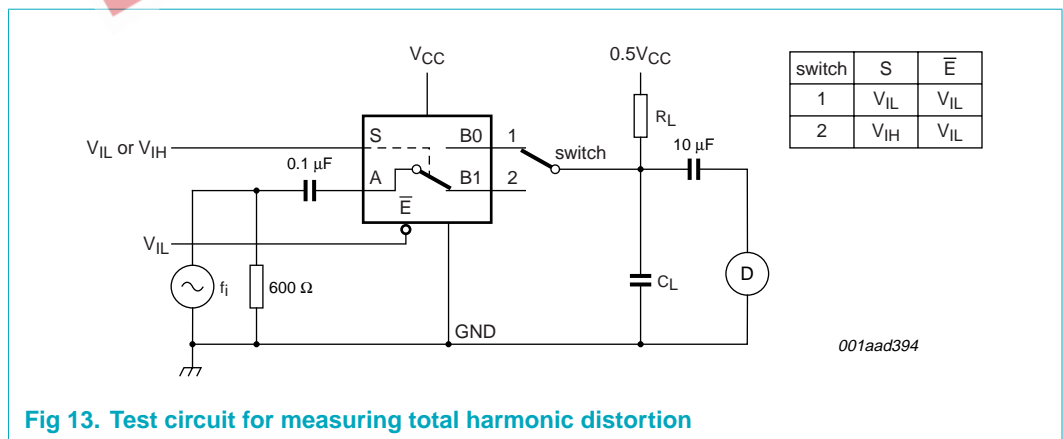


Fig 13. Test circuit for measuring total harmonic distortion

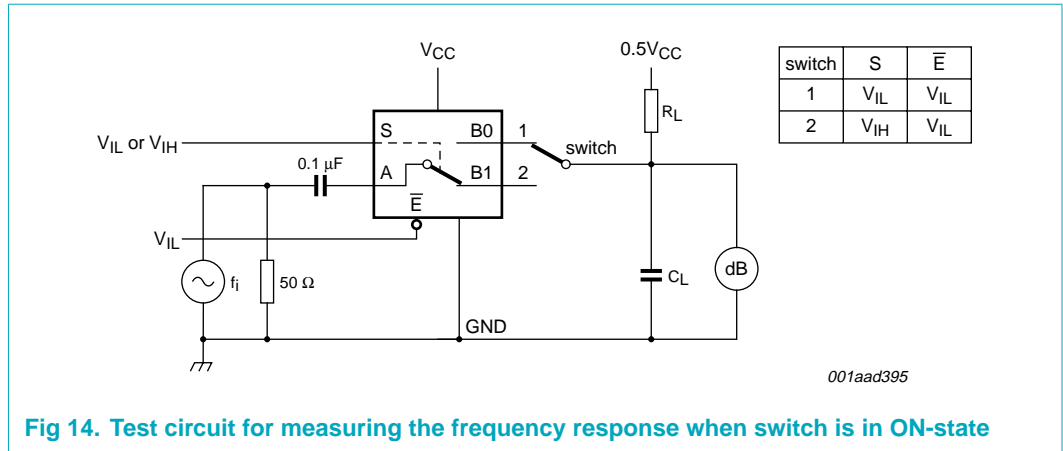


Fig 14. Test circuit for measuring the frequency response when switch is in ON-state

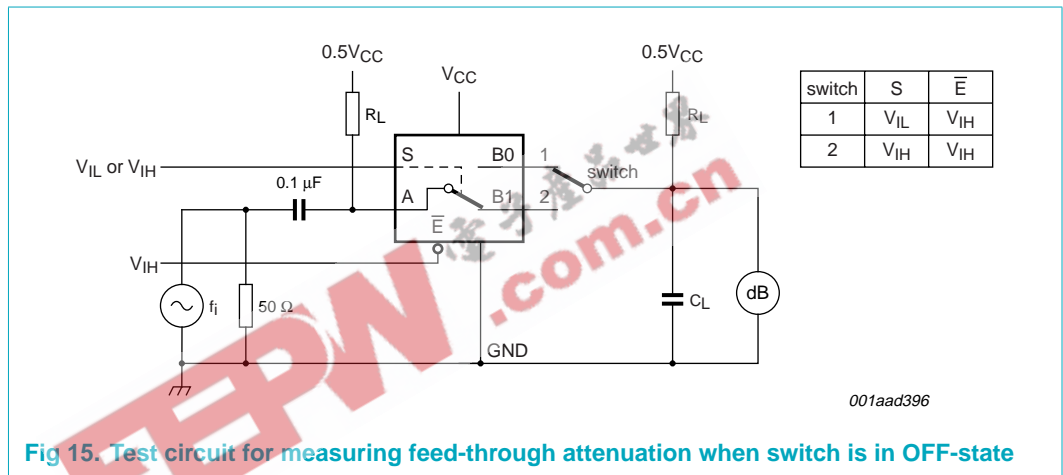


Fig 15. Test circuit for measuring feed-through attenuation when switch is in OFF-state

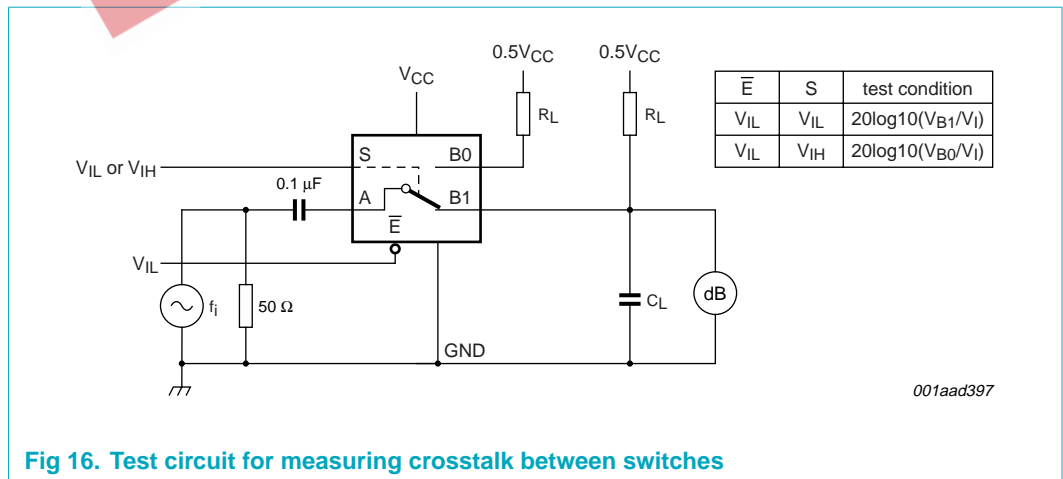
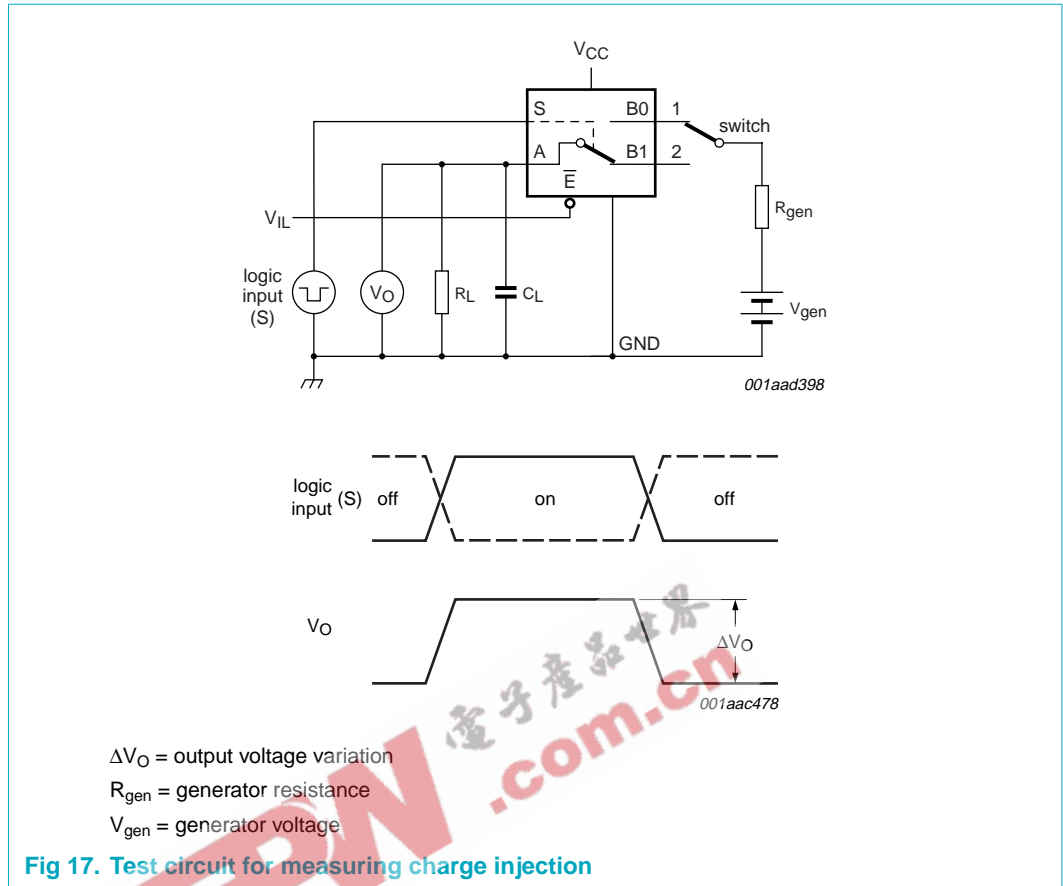


Fig 16. Test circuit for measuring crosstalk between switches



15. Package outline

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

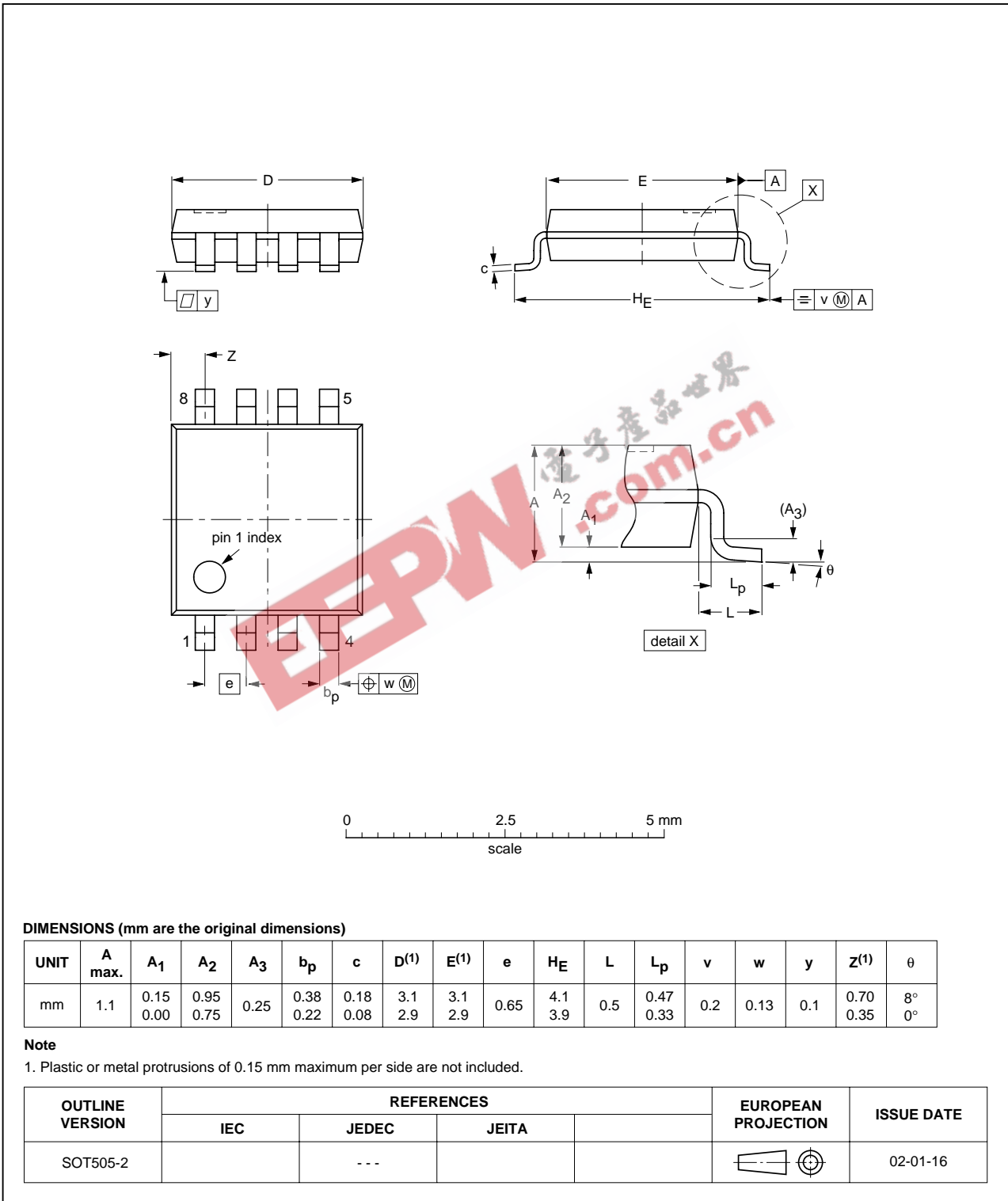


Fig 18. Package outline SOT505-2 (TSSOP8)

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

SOT765-1

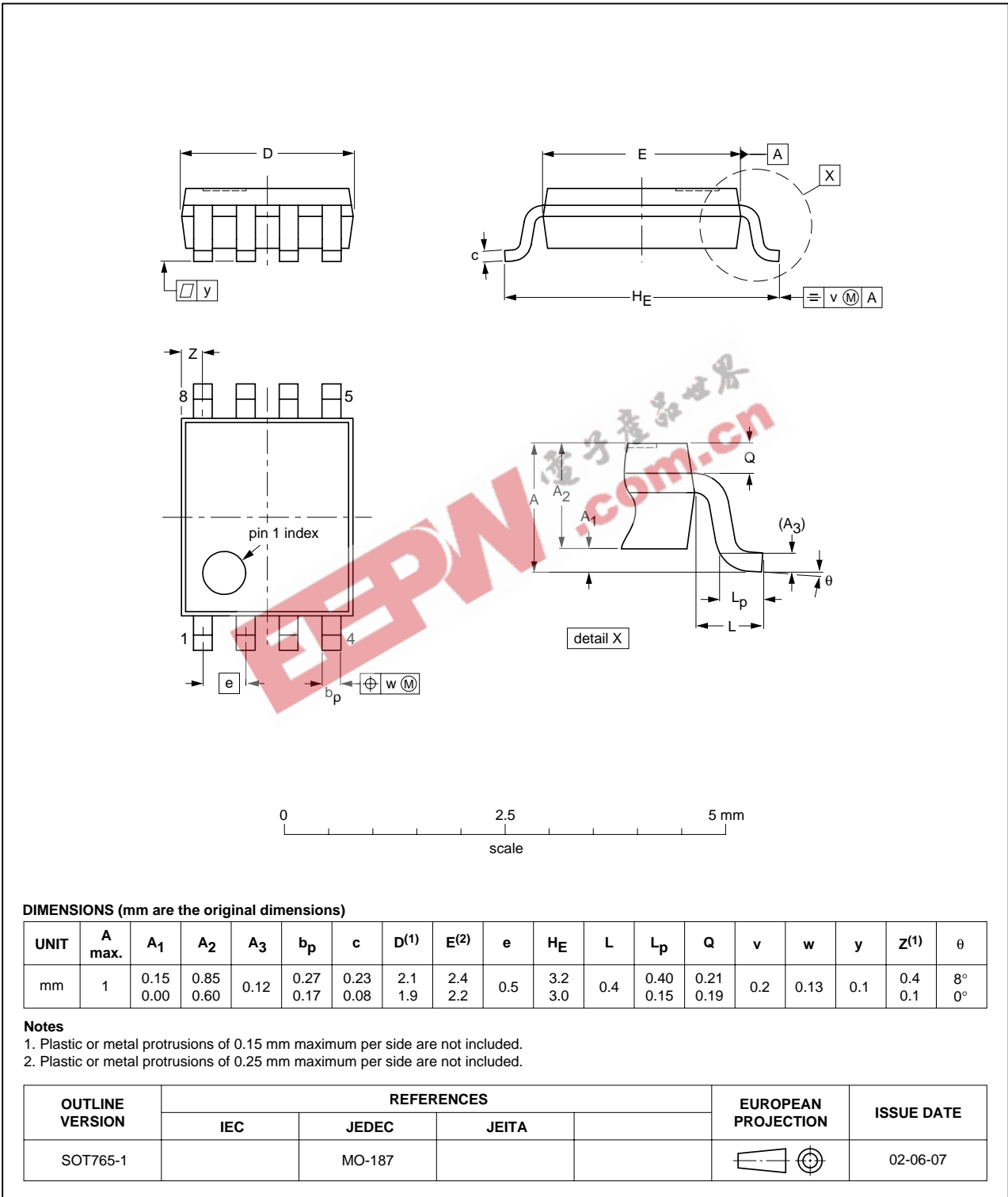


Fig 19. Package outline SOT765-1 (VSSOP8)

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

SOT833-1

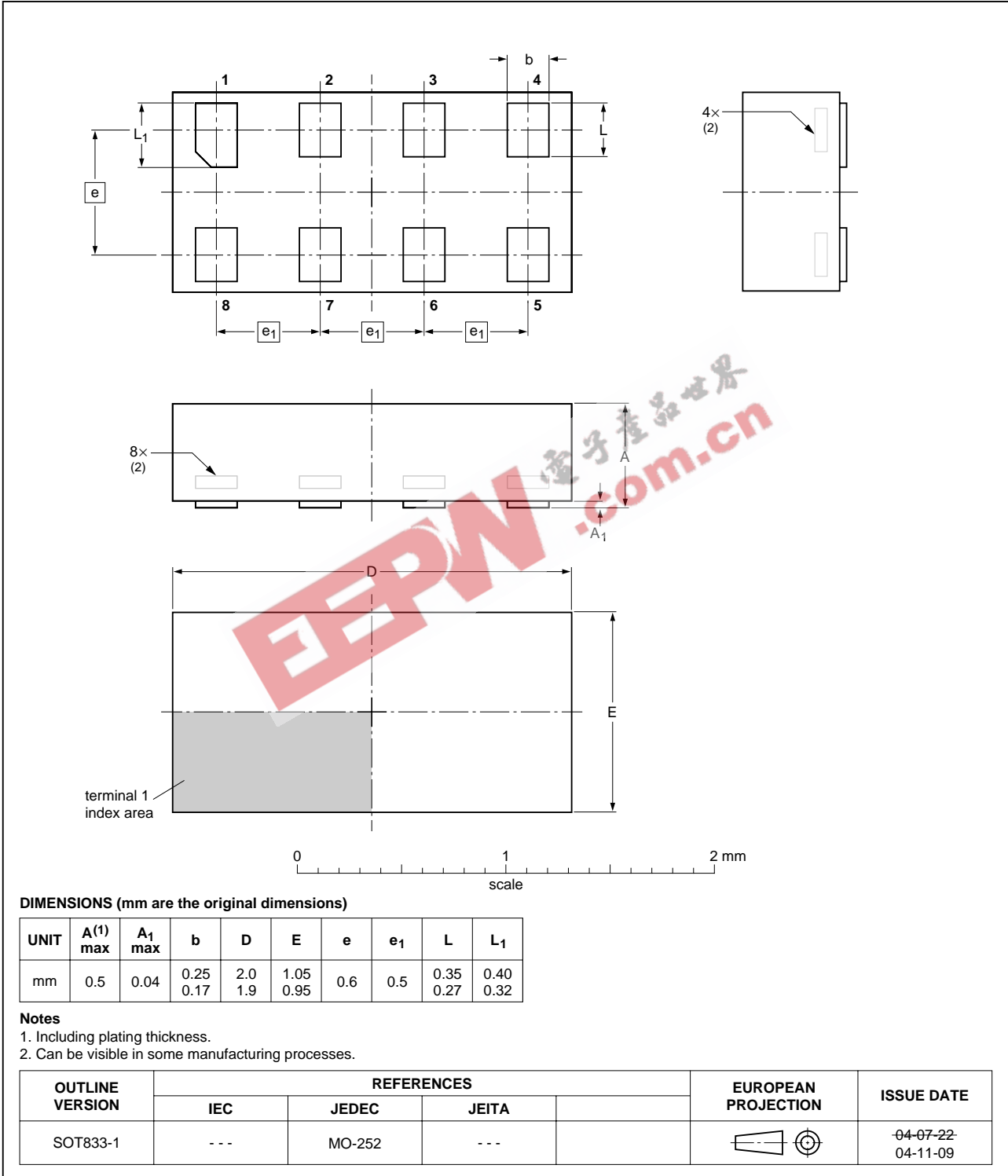


Fig 20. Package outline SOT833-1 (XSON8)

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	Supersedes
74LVC2G53_2	20060331	Product data sheet	-	74LVC2G53_1
Modifications:	<ul style="list-style-type: none"> Added: type number 74LVC2G53DP (TSSOP8 package) 			
74LVC2G53_1	20060110	Product data sheet	-	-

18. Legal information

18.1 Data sheet status

Document status ^{[1][2]}	Product status ^[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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

[2] The term 'short data sheet' is explained in section "Definitions".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.semiconductors.philips.com>.

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20. 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	22
17	Revision history	22
18	Legal information	23
18.1	Data sheet status	23
18.2	Definitions	23
18.3	Disclaimers	23
18.4	Trademarks	23
19	Contact information	23
20	Contents	24



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