

# DATA SHEET

**74LVC4066**

**Quad bilateral switches**

Product specification

2003 Aug 12

## Quad bilateral switches

## 74LVC4066

## FEATURES

- Very low ON resistance:
  - 7.5  $\Omega$  (typical) at  $V_{CC} = 2.7$  V
  - 6.5  $\Omega$  (typical) at  $V_{CC} = 3.3$  V
  - 6  $\Omega$  (typical) at  $V_{CC} = 5$  V.
- ESD protection:
  - HBM EIA/JESD22-A114-A Exceeds 2000 V
  - MM EIA/JESD22-A115-A Exceeds 200 V.
- High noise immunity
- CMOS low power consumption
- Latch up performance exceeds 250 mA
- Complies with JEDEC standard no. 8-1A
- Direct interface TTL-levels.

## DESCRIPTION

The 74LVC4066 is a high-speed Si-gate CMOS device.

The 74LVC4066 has four independent analog switches. Each switch has two input/output terminals (nY and nZ) and an active HIGH enable input (nE). When nE is LOW, the analog switch is turned off.

## QUICK REFERENCE DATA

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

SYMBOL	PARAMETER	CONDITIONS	TYPICAL	UNIT
$t_{PZH}/t_{PZL}$	turn-on time E to $V_{os}$	$C_L = 50$ pF; $R_L = 500$ $\Omega$ ; $V_{CC} = 3$ V	2.5	ns
		$C_L = 50$ pF; $R_L = 500$ $\Omega$ ; $V_{CC} = 5$ V	1.9	ns
$t_{PHZ}/t_{PLZ}$	turn-off time E to $V_{os}$	$C_L = 50$ pF; $R_L = 500$ $\Omega$ ; $V_{CC} = 3$ V	3.4	ns
		$C_L = 50$ pF; $R_L = 500$ $\Omega$ ; $V_{CC} = 5$ V	2.5	ns
$C_I$	input capacitance	$V_{CC} = 3$ V	3.5	pF
$C_{PD}$	power dissipation capacitance	$V_{CC} = 3.3$ V; notes 1 and 2	12.5	pF
$C_S$	switch capacitance	OFF-state	8.0	pF
		ON-state	14.0	pF

## Notes

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

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

$f_i$  = input frequency in MHz;

$f_o$  = output frequency in MHz;

$C_L$  = output load capacitance in pF;

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

N = total load switching outputs;

$C_S$  = switch capacitance.

2. The condition is  $V_I = \text{GND to } V_{CC}$ .

Quad bilateral switches

74LVC4066

**FUNCTION TABLE**

See note 1.

INPUT nE	SWITCH
L	OFF
H	ON

**Note**

- 1. H = HIGH voltage level;  
L = LOW voltage level.

**ORDERING INFORMATION**

TYPE NUMBER	PACKAGE				
	TEMPERATURE RANGE	PINS	PACKAGE	MATERIAL	CODE
74LVC4066D	-40 to +125 °C	14	SO14	plastic	SOT108-2
74LVC4066PW	-40 to +125 °C	14	TSSOP14	plastic	SOT402-1
74LVC4066BQ	-40 to +125 °C	14	DHVQFN14	plastic	SOT762-1

**PINNING**

PIN	SYMBOL	DESCRIPTION
1	1Y	independent input/output
2	1Z	independent output/input
3	2Z	independent output/input
4	2Y	independent input/output
5	2E	enable input (active HIGH)
6	3E	enable input (active HIGH)
7	GND	ground (0 V)
8	3Y	independent input/output
9	3Z	independent output/input
10	4Z	independent output/input
11	4Y	independent input/output
12	4E	enable input (active HIGH)
13	1E	enable input (active HIGH)
14	V <sub>CC</sub>	supply voltage

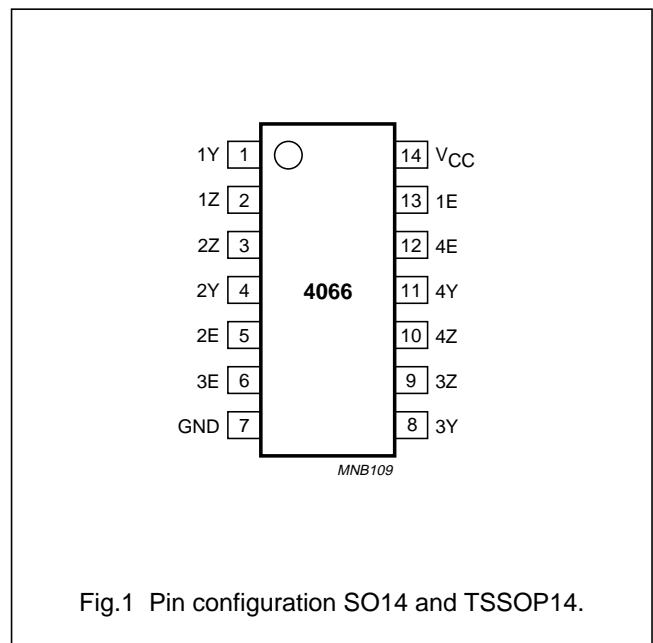
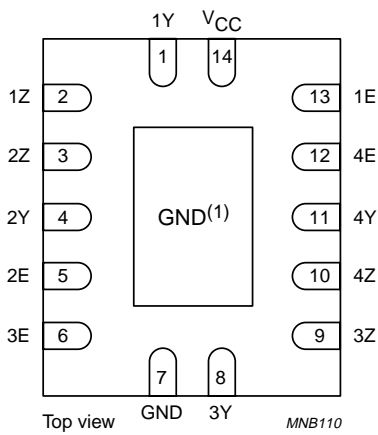


Fig.1 Pin configuration SO14 and TSSOP14.

Quad bilateral switches

74LVC4066



(1) The die substrate is attached to this pad using conductive die attach material. It can not be used as a supply pin or input.

Fig.2 Pin configuration DHVQFN14.

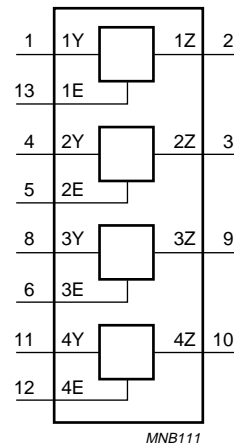


Fig.3 Logic symbol.

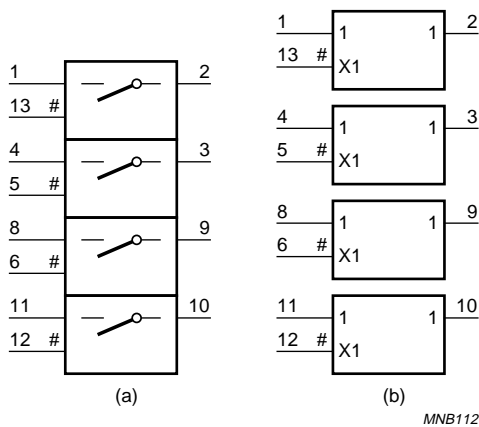


Fig.4 logic symbol (IEEE/IEC).

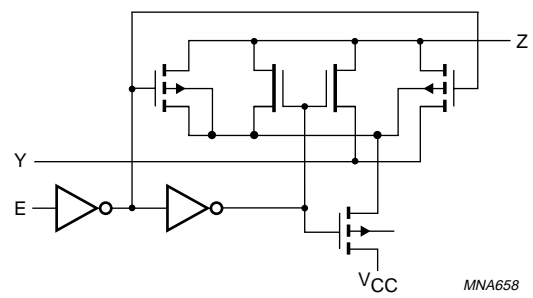


Fig.5 Logic diagram (one switch).

## Quad bilateral switches

74LVC4066

## RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{CC}$	supply voltage		1.65	5.5	V
$V_I$	input voltage		0	5.5	V
$V_S$	switch voltage		0	$V_{CC}$	V
$T_{amb}$	operating ambient temperature		-40	+125	°C
$t_r, t_f$	input rise and fall times	$V_{CC} = 1.65$ to $2.7$ V	0	20	ns/V
		$V_{CC} = 2.7$ to $5.5$ V	0	10	ns/V

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134); voltages are referenced to GND (ground = 0 V); see note 1.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{CC}$	supply voltage		-0.5	+6.5	V
$V_I$	input voltage	note 2	-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
$V_S$	switch voltage	enable and disable mode	-0.5	+6.5	V
$I_S$	switch source or sink current	$-0.5 < V_S < V_{CC} + 0.5$ 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	$T_{amb} = -40$ to $+125$ °C; note 3	-	500	mW

## Notes

- To avoid drawing  $V_{CC}$  current out of terminal Z, when switch current flows in terminal Y, the voltage drop across the bidirectional switch must not exceed 0.4 V. If the switch current flows into terminal Z, no  $V_{CC}$  current will flow out of terminal Y. In this case there is no limit for the voltage drop across the switch, but the voltage at Y and Z may not exceed  $V_{CC}$  or GND.
- The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
- For SO14 packages: above 70 °C derate linearly with 8 mW/K.  
For TSSOP14 packages: above 60 °C derate linearly with 5.5 mW/K.  
For DHVQFN14 packages: above 60 °C derate linearly with 4.5 mW/K.

## Quad bilateral switches

74LVC4066

## DC CHARACTERISTICS

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

SYMBOL	PARAMETER	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
		OTHER	V <sub>CC</sub> (V)				
<b>T<sub>amb</sub> = -40 to +85 °C; note 1</b>							
V <sub>IH</sub>	HIGH-level input voltage		1.65 to 1.95	0.65V <sub>CC</sub>	–	–	V
			2.3 to 2.7	1.7	–	–	V
			2.7 to 3.6	2.0	–	–	V
			4.5 to 5.5	0.7V <sub>CC</sub>	–	–	V
V <sub>IL</sub>	LOW-level input voltage		1.65 to 1.95	–	–	0.35V <sub>CC</sub>	V
			2.3 to 2.7	–	–	0.7	V
			2.7 to 3.6	–	–	0.8	V
			4.5 to 5.5	–	–	0.30V <sub>CC</sub>	V
I <sub>LI</sub>	input leakage current (control pin)	V <sub>I</sub> = 5.5 V or GND	5.5	–	±0.1	±5	μA
I <sub>S(OFF)</sub>	analog switch OFF-state current	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ;  V <sub>S</sub>   = V <sub>CC</sub> – GND; see Fig.7	5.5	–	±0.1	±5	μA
I <sub>S(ON)</sub>	analog switch ON-state current	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ;  V <sub>S</sub>   = V <sub>CC</sub> – GND; see Fig.8	5.5	–	±0.1	±5	μA
I <sub>CC</sub>	quiescent supply current	V <sub>I</sub> = V <sub>CC</sub> or GND; V <sub>S</sub> = GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 A	5.5	–	0.1	10	μA
ΔI <sub>CC</sub>	additional quiescent supply current per control pin	V <sub>I</sub> = V <sub>CC</sub> – 0.6 V; V <sub>S</sub> = GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 A	5.5	–	5	500	μA

## Quad bilateral switches

74LVC4066

SYMBOL	PARAMETER	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
		OTHER	V <sub>CC</sub> (V)				
<b>T<sub>amb</sub> = -40 to +125 °C</b>							
V <sub>IH</sub>	HIGH-level input voltage		1.65 to 1.95	0.65V <sub>CC</sub>	-	-	V
			2.3 to 2.7	1.7	-	-	V
			2.7 to 3.6	2.0	-	-	V
			4.5 to 5.5	0.7V <sub>CC</sub>	-	-	V
V <sub>IL</sub>	LOW-level input voltage		1.65 to 1.95	-	-	0.35V <sub>CC</sub>	V
			2.3 to 2.7	-	-	0.7	V
			2.7 to 3.6	-	-	0.8	V
			4.5 to 5.5	-	-	0.30V <sub>CC</sub>	V
I <sub>LI</sub>	input leakage current (control pin)	V <sub>I</sub> = 5.5 V or GND	5.5	-	-	±20	μA
I <sub>S(OFF)</sub>	analog switch OFF-state current	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ;  V <sub>S</sub>   = V <sub>CC</sub> - GND; see Fig.7	5.5	-	-	±20	μA
I <sub>S(ON)</sub>	analog switch ON-state current	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ;  V <sub>S</sub>   = V <sub>CC</sub> - GND; see Fig.8	5.5	-	-	±20	μA
I <sub>CC</sub>	quiescent supply current	V <sub>I</sub> = V <sub>CC</sub> or GND; V <sub>S</sub> = GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 A	5.5	-	-	40	μA
ΔI <sub>CC</sub>	additional quiescent supply current per control pin	V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; V <sub>S</sub> = GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 A	5.5	-	-	5000	μA

**Note**

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

Quad bilateral switches

74LVC4066

Resistance  $R_{ON}$

SYMBOL	PARAMETER	TEST CONDITIONS			MIN.	TYP.	MAX.	UNIT
		OTHER	$I_S$ (mA)	$V_{CC}$ (V)				
$T_{amb} = -40$ to $+85$ °C; note 1; see Fig.6								
$R_{ON(peak)}$	ON-resistance (peak)	$V_S = GND$ to $V_{CC}$ ; $V_I = V_{IH}$	4	1.65 to 1.95	–	35	100	$\Omega$
			8	2.3 to 2.7	–	14	30	$\Omega$
			12	2.7	–	11.5	25	$\Omega$
			24	3.0 to 3.6	–	8.5	20	$\Omega$
			32	4.5 to 5.5	–	6.5	15	$\Omega$
$R_{ON(rail)}$	ON-resistance (rail)	$V_S = GND$ ; $V_I = V_{IH}$	4	1.65 to 1.95	–	10	30	$\Omega$
			8	2.3 to 2.7	–	8.5	20	$\Omega$
			12	2.7	–	7.5	18	$\Omega$
			24	3.0 to 3.6	–	6.5	15	$\Omega$
			32	4.5 to 5.5	–	6	10	$\Omega$
		$V_S = V_{CC}$ ; $V_I = V_{IH}$	4	1.65 to 1.95	–	12	30	$\Omega$
			8	2.3 to 2.7	–	8.5	20	$\Omega$
			12	2.7	–	7.5	18	$\Omega$
			24	3.0 to 3.6	–	6.5	15	$\Omega$
			32	4.5 to 5.5	–	6	10	$\Omega$
$R_{ON(flatness)}$	ON-resistance (flatness)	$V_S = GND$ to $V_{CC}$ ; $V_I = V_{IH}$ ; see Figs.10 to 13	4	1.8	–	100	–	$\Omega$
			8	2.5	–	17	–	$\Omega$
			12	2.7	–	10	–	$\Omega$
			24	3.3	–	5	–	$\Omega$
			32	5.0	–	3	–	$\Omega$



## Quad bilateral switches

74LVC4066

SYMBOL	PARAMETER	TEST CONDITIONS			MIN.	TYP.	MAX.	UNIT
		OTHER	I <sub>S</sub> (mA)	V <sub>CC</sub> (V)				
<b>T<sub>amb</sub> = -40 to +125 °C; see Fig.6</b>								
R <sub>ON(peak)</sub>	ON-resistance (peak)	V <sub>S</sub> = GND to V <sub>CC</sub> ; V <sub>I</sub> = V <sub>IH</sub>	4	1.65 to 1.95	–	–	150	Ω
			8	2.3 to 2.7	–	–	45	Ω
			12	2.7	–	–	38	Ω
			24	3.0 to 3.6	–	–	30	Ω
			32	4.5 to 5.5	–	–	23	Ω
R <sub>ON(rail)</sub>	ON-resistance (rail)	V <sub>S</sub> = GND; V <sub>I</sub> = V <sub>IH</sub>	4	1.65 to 1.95	–	–	45	Ω
			8	2.3 to 2.7	–	–	30	Ω
			12	2.7	–	–	27	Ω
			24	3.0 to 3.6	–	–	23	Ω
			32	4.5 to 5.5	–	–	15	Ω
		V <sub>S</sub> = V <sub>CC</sub> ; V <sub>I</sub> = V <sub>IH</sub>	4	1.65 to 1.95	–	–	45	Ω
			8	2.3 to 2.7	–	–	30	Ω
			12	2.7	–	–	27	Ω
			24	3.0 to 3.6	–	–	23	Ω
			32	4.5 to 5.5	–	–	15	Ω

**Note**

1. Typical value R<sub>on(flatness)</sub> is measured at T<sub>amb</sub> = -40 to +85 °C, all other typical values are measured at T<sub>amb</sub> = 25 °C.

Quad bilateral switches

74LVC4066

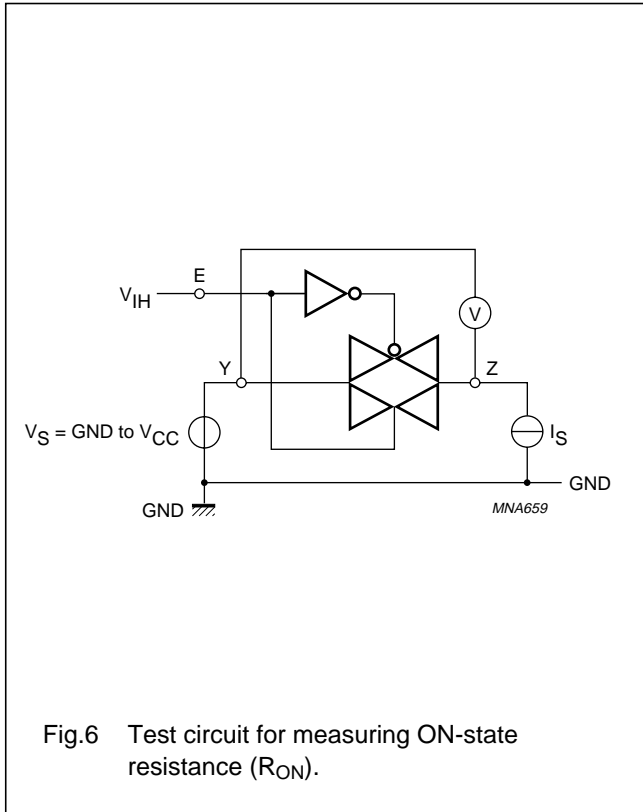


Fig.6 Test circuit for measuring ON-state resistance ( $R_{ON}$ ).

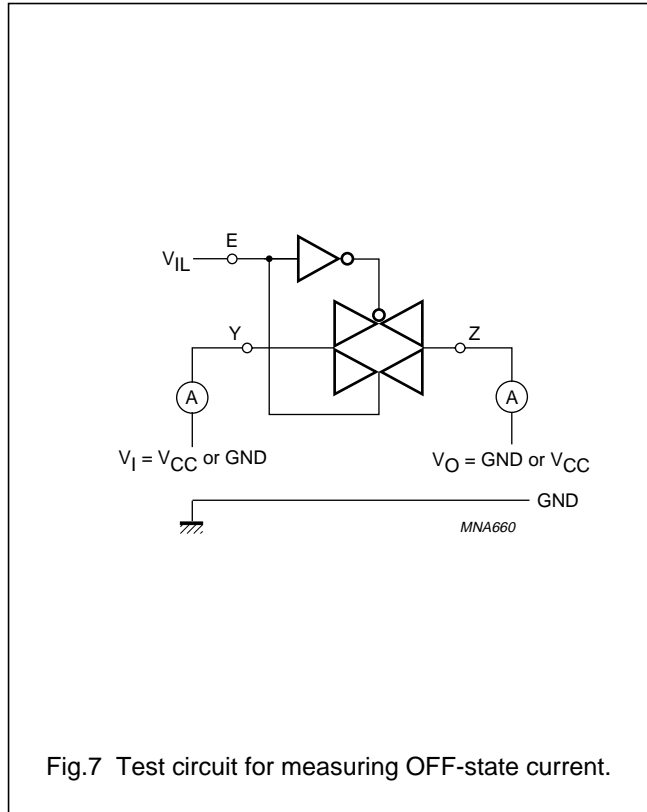


Fig.7 Test circuit for measuring OFF-state current.

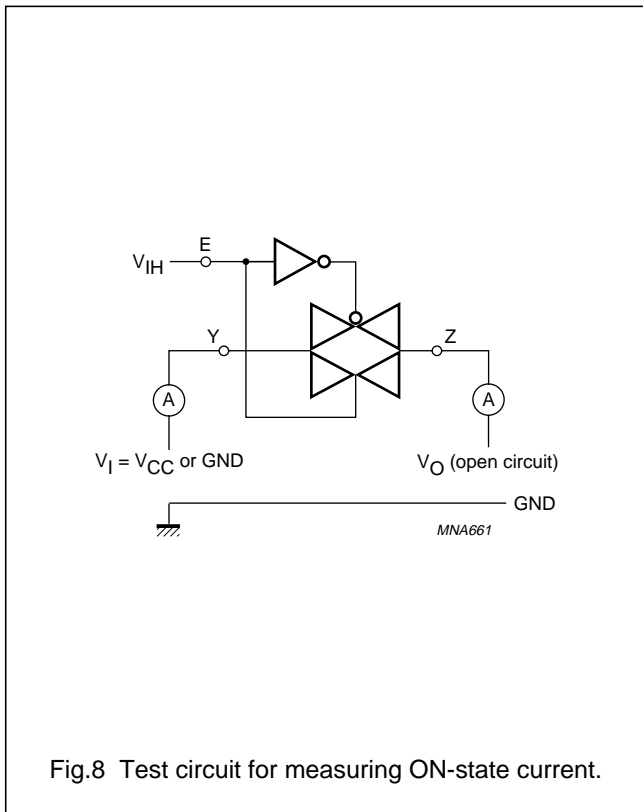


Fig.8 Test circuit for measuring ON-state current.

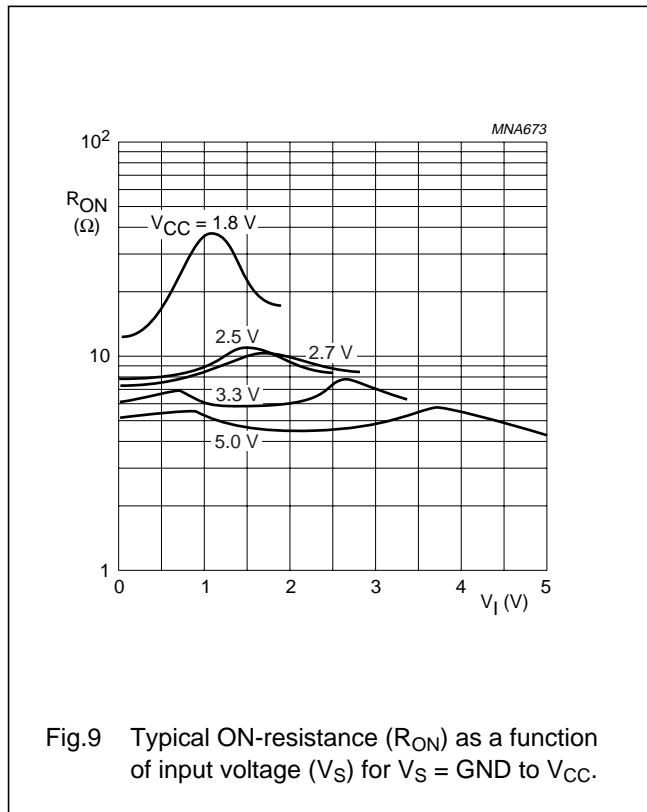
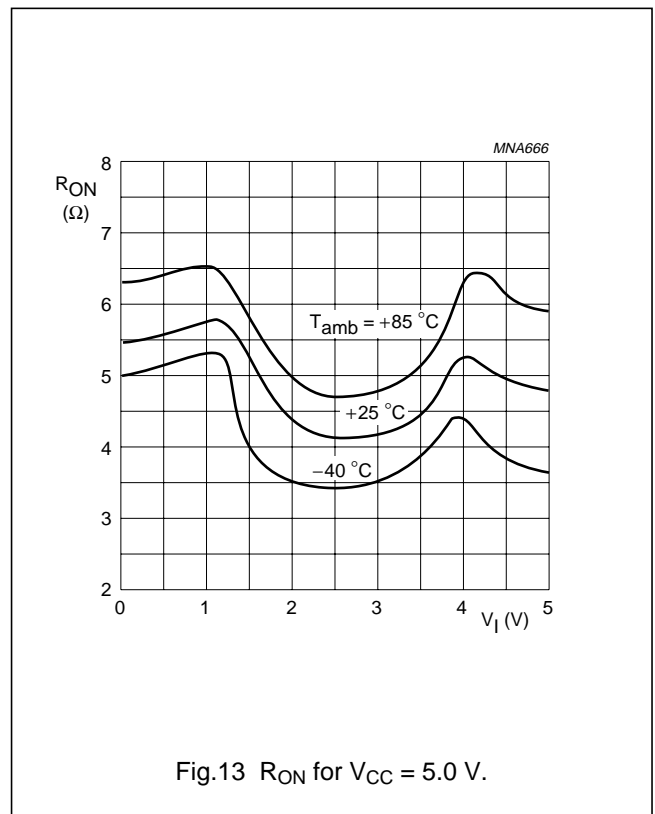
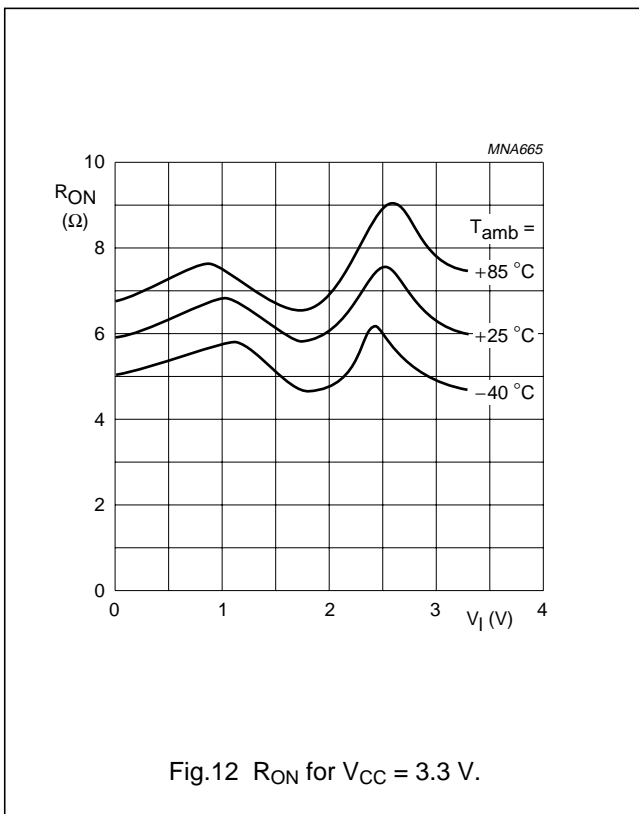
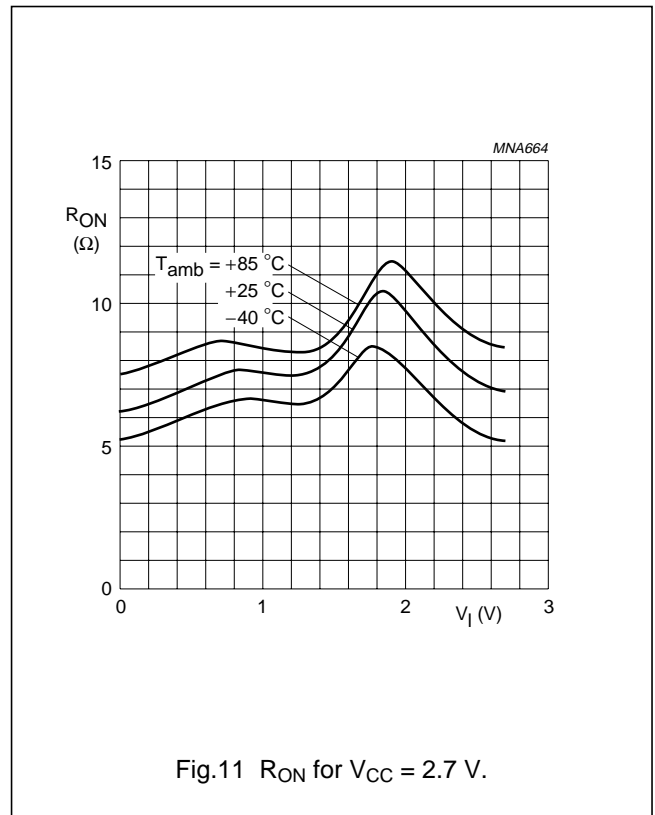
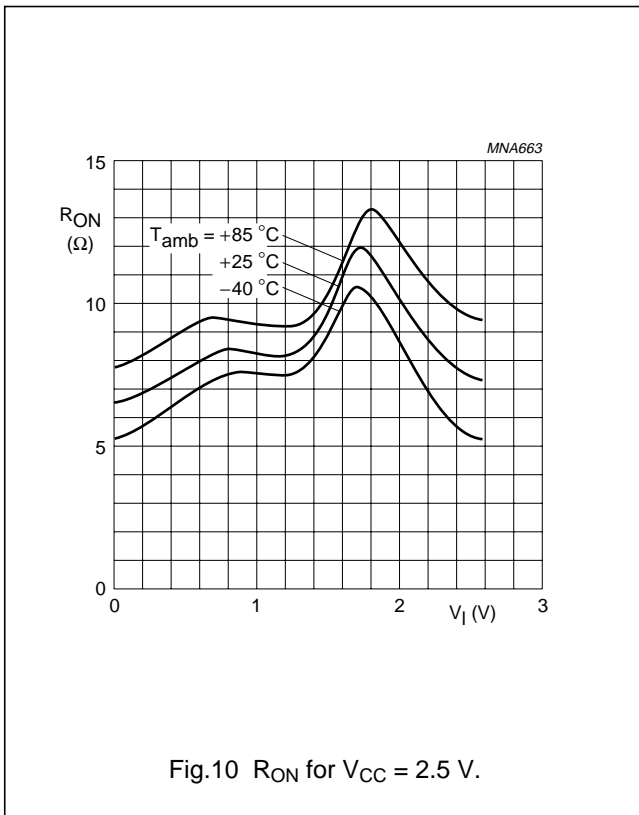


Fig.9 Typical ON-resistance ( $R_{ON}$ ) as a function of input voltage ( $V_S$ ) for  $V_S = \text{GND to } V_{CC}$ .

Quad bilateral switches

74LVC4066



## Quad bilateral switches

74LVC4066

## AC CHARACTERISTICS

GND = 0 V.

SYMBOL	PARAMETER	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
		WAVEFORMS	V <sub>CC</sub> (V)				
<b>T<sub>amb</sub> = -40 to +85 °C; note 1</b>							
t <sub>PHL</sub> /t <sub>PLH</sub>	propagation delay nY to nZ or nZ to nY	see Figs 14 and 16; note 2	1.65 to 1.95	–	0.8	2.0	ns
			2.3 to 2.7	–	0.4	1.2	ns
			2.7	–	0.4	1.0	ns
			3.0 to 3.6	–	0.3	0.8	ns
			4.5 to 5.5	–	0.2	0.6	ns
t <sub>PZH</sub> /t <sub>PZL</sub>	turn-ON time E to V <sub>OS</sub>	see Figs 15 and 16	1.65 to 1.95	1.0	5.3	10	ns
			2.3 to 2.7	1.0	3.0	5.6	ns
			2.7	1.0	2.6	5.0	ns
			3.0 to 3.6	1.0	2.5	4.4	ns
			4.5 to 5.5	1.0	1.9	3.9	ns
t <sub>PHZ</sub> /t <sub>PLZ</sub>	turn-OFF time E to V <sub>OS</sub>	see Figs 15 and 16	1.65 to 1.95	1.0	4.2	9.0	ns
			2.3 to 2.7	1.0	2.4	5.5	ns
			2.7	1.0	3.6	6.5	ns
			3.0 to 3.6	1.0	3.4	6.0	ns
			4.5 to 5.5	1.0	2.5	5.0	ns
<b>T<sub>amb</sub> = -40 to +125 °C</b>							
t <sub>PHL</sub> /t <sub>PLH</sub>	propagation delay nY to nZ or nZ to nY	see Figs 14 and 16; note 2	1.65 to 1.95	–	–	3.0	ns
			2.3 to 2.7	–	–	2.0	ns
			2.7	–	–	1.5	ns
			3.0 to 3.6	–	–	1.5	ns
			4.5 to 5.5	–	–	1.0	ns
t <sub>PZH</sub> /t <sub>PZL</sub>	turn-ON time E to V <sub>OS</sub>	see Figs 15 and 16	1.65 to 1.95	1.0	–	12.5	ns
			2.3 to 2.7	1.0	–	7.0	ns
			2.7	1.0	–	6.5	ns
			3.0 to 3.6	1.0	–	5.5	ns
			4.5 to 5.5	1.0	–	5.0	ns
t <sub>PHZ</sub> /t <sub>PLZ</sub>	turn-OFF time E to V <sub>OS</sub>	see Figs 15 and 16	1.65 to 1.95	1.0	–	11.5	ns
			2.3 to 2.7	1.0	–	7.0	ns
			2.7	1.0	–	8.5	ns
			3.0 to 3.6	1.0	–	7.5	ns
			4.5 to 5.5	1.0	–	6.5	ns

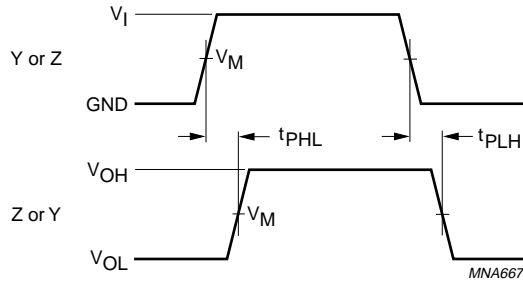
## Notes

1. All typical values are measured at T<sub>amb</sub> = 25 °C.
2. t<sub>PHL</sub>/t<sub>PLH</sub> 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).

Quad bilateral switches

74LVC4066

AC WAVEFORMS



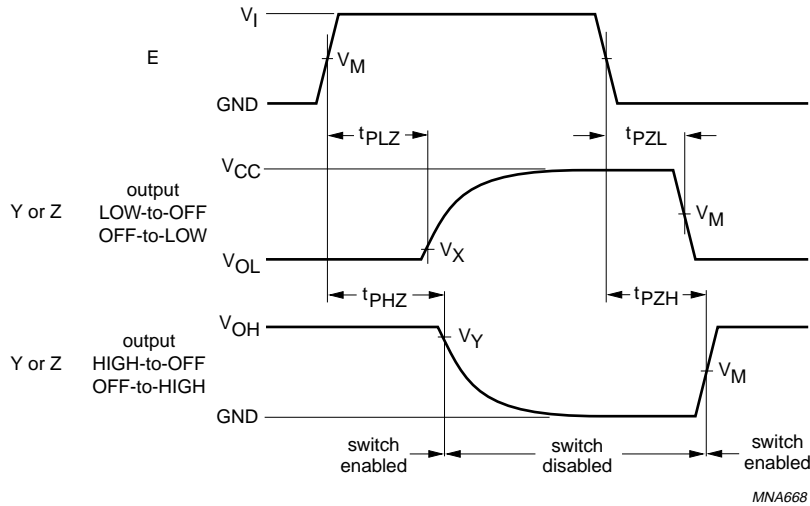
V <sub>CC</sub>	V <sub>M</sub>	INPUT	
		V <sub>I</sub>	t <sub>r</sub> = t <sub>f</sub>
1.65 to 1.95 V	0.5V <sub>CC</sub>	V <sub>CC</sub>	≤ 2.0 ns
2.3 to 2.7 V	0.5V <sub>CC</sub>	V <sub>CC</sub>	≤ 2.0 ns
2.7 and 3.0 to 3.6 V	1.5 V	2.7 V	≤ 2.5 ns
4.5 to 5.5 V	0.5V <sub>CC</sub>	V <sub>CC</sub>	≤ 2.5 ns

V<sub>OL</sub> and V<sub>OH</sub> are typical output voltage drop that occur with the output load.

Fig.14 The input (V<sub>S</sub>) to output (V<sub>O</sub>) propagation delays.

Quad bilateral switches

74LVC4066



V <sub>CC</sub>	V <sub>M</sub>	INPUT	
		V <sub>I</sub>	t <sub>r</sub> = t <sub>f</sub>
1.65 to 1.95 V	0.5V <sub>CC</sub>	V <sub>CC</sub>	≤ 2.0 ns
2.3 to 2.7 V	0.5V <sub>CC</sub>	V <sub>CC</sub>	≤ 2.0 ns
2.7 and 3.0 to 3.6 V	1.5 V	2.7 V	≤ 2.5 ns
4.5 to 5.5 V	0.5V <sub>CC</sub>	V <sub>CC</sub>	≤ 2.5 ns

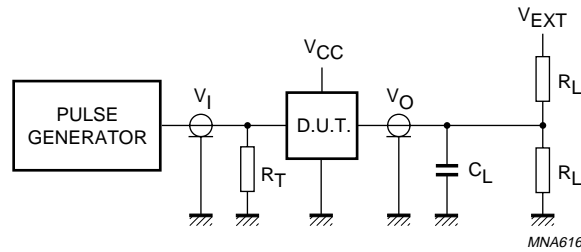
$V_X = V_{OL} + 0.3 \text{ V}$  at  $V_{CC} \geq 2.7 \text{ V}$ ;  
 $V_X = V_{OL} + 0.1 \times V_{CC}$  at  $V_{CC} < 2.7 \text{ V}$ ;  
 $V_Y = V_{OH} - 0.3 \text{ V}$  at  $V_{CC} \geq 2.7 \text{ V}$ ;  
 $V_Y = V_{OH} - 0.1 \times V_{CC}$  at  $V_{CC} < 2.7 \text{ V}$ .

V<sub>OL</sub> and V<sub>OH</sub> are typical output voltage drop that occur with the output load.

Fig.15 Turn-on and turn-off times.

Quad bilateral switches

74LVC4066



V <sub>CC</sub>	V <sub>I</sub>	C <sub>L</sub>	R <sub>L</sub>	V <sub>EXT</sub>		
				t <sub>PLH</sub> /t <sub>PHL</sub>	t <sub>PZH</sub> /t <sub>PHZ</sub>	t <sub>PZL</sub> /t <sub>PLZ</sub>
1.65 to 1.95 V	V <sub>CC</sub>	30 pF	1 kΩ	open	GND	2V <sub>CC</sub>
2.3 to 2.7 V	V <sub>CC</sub>	30 pF	500 Ω	open	GND	2V <sub>CC</sub>
2.7 and 3.0 to 3.6 V	2.7 V	50 pF	500 Ω	open	GND	6 V
4.5 to 5.5 V	V <sub>CC</sub>	50 pF	500 Ω	open	GND	2V <sub>CC</sub>

Definitions for test circuits:

R<sub>L</sub> = Load resistor.

C<sub>L</sub> = Load capacitance including jig and probe capacitance.

R<sub>T</sub> = Termination resistance should be equal to the output impedance Z<sub>o</sub> of the pulse generator.

Fig.16 Load circuitry for switching times.

**ADDITIONAL AC CHARACTERISTICS**

Recommended conditions and typical values at T<sub>amb</sub> = 25 °C.

SYMBOL	PARAMETER	TEST CONDITIONS	V <sub>CC</sub> (V)	TYPICAL	UNIT
d <sub>sin</sub>	sine-wave distortion	R <sub>L</sub> = 10 kΩ; C <sub>L</sub> = 50 pF; f <sub>in</sub> = 1 kHz; see Fig.18	1.65	0.032	%
			2.3	0.008	%
			3	0.006	%
			4.5	0.005	%
		R <sub>L</sub> = 10 kΩ; C <sub>L</sub> = 50 pF; f <sub>in</sub> = 10 kHz; see Fig.18	1.65	0.068	%
			2.3	0.009	%
			3	0.008	%
			4.5	0.006	%
f <sub>ON</sub>	switch ON signal frequency response	R <sub>L</sub> = 600 Ω; C <sub>L</sub> = 50 pF; see Fig.17; note 1	1.65	170	MHz
			2.3	210	MHz
			3	212	MHz
			4.5	215	MHz
		R <sub>L</sub> = 50 Ω; C <sub>L</sub> = 5 pF; see Fig.17; note 1	1.65	> 500	MHz
			2.3	> 500	MHz
			3	> 500	MHz
			4.5	> 500	MHz

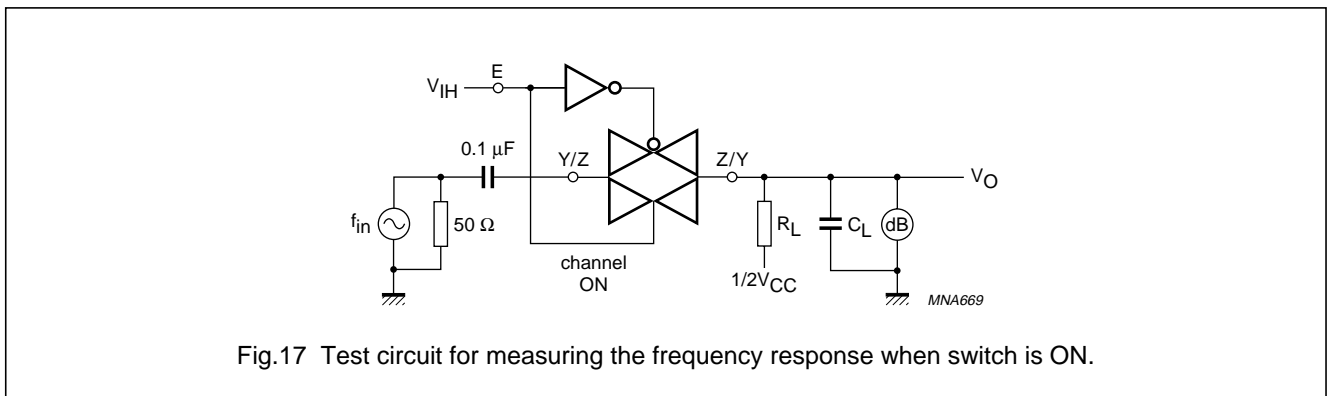
Quad bilateral switches

74LVC4066

SYMBOL	PARAMETER	TEST CONDITIONS	V <sub>CC</sub> (V)	TYPICAL	UNIT
$\alpha_{OFF(Feedthru)}$	switch OFF signal feed-through attenuation	$R_L = 600 \Omega; C_L = 50 \text{ pF}; f_{in} = 1 \text{ MHz};$ see Fig.19; note 2	1.65	-46	dB
			2.3	-46	dB
			3	-46	dB
			4.5	-46	dB
		$R_L = 50 \Omega; C_L = 5 \text{ pF}; f_{in} = 1 \text{ MHz};$ see Fig.19; note 2	1.65	-42	dB
			2.3	-42	dB
			3	-42	dB
			4.5	-42	dB
$\alpha_{ct(E-Y/Z)}$	crosstalk between control input to signal output	$R_L = 600 \Omega; C_L = 50 \text{ pF}; f_{in} = 1 \text{ MHz}; t_r = t_f = 2 \text{ ns};$ see Fig.20	1.65	69	mV
			2.3	87	mV
			3	156	mV
			4.5	302	mV
$\alpha_{ct(S)}$	crosstalk between switches)	$R_L = 600 \Omega; C_L = 50 \text{ pF}; f_{in} = 1 \text{ MHz};$ see Fig.21	1.65	-58	dB
			2.3	-58	dB
			3	-58	dB
			4.5	-58	dB
		$R_L = 50 \Omega; C_L = 5 \text{ pF}; f_{in} = 1 \text{ MHz};$ see Fig.21	1.65	-58	dB
			2.3	-58	dB
			3	-58	dB
			4.5	-58	dB
$C_{PD}$	power dissipation capacitance	$f_{in} = 10 \text{ MHz}$	2.5	11.0	pF
			3.3	12.5	pF
			5.0	15.6	pF
Q	charge injection	$C_L = 0.1 \text{ nF}; V_{gen} = 0 \text{ V}; R_{gen} = 0 \Omega;$ $f = 1 \text{ MHz}; R_L = 1 \text{ M}\Omega;$ see Fig.22; note 3	3.3	0.8	pC
			5.5	1.2	pC

Notes

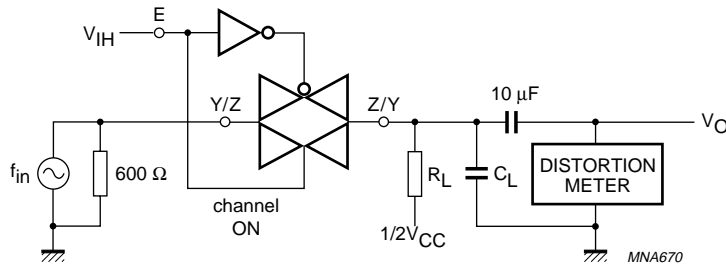
1. Adjust  $f_{in}$  voltage to obtain 0 dBm level at output. Increase  $f_{in}$  frequency until dB meter reads -3 dB.
2. Adjust  $f_{in}$  voltage to obtain 0 dBm level at input.
3. Guaranteed by design.





Quad bilateral switches

74LVC4066



V <sub>CC</sub>	V <sub>IH</sub>
1.65 V	1.4 V (p-p)
2.3 V	2 V (p-p)
3 V	2.5 V (p-p)
4. V	4 V (p-p)

Fig.18 Test circuit for measuring sine-wave distortion.

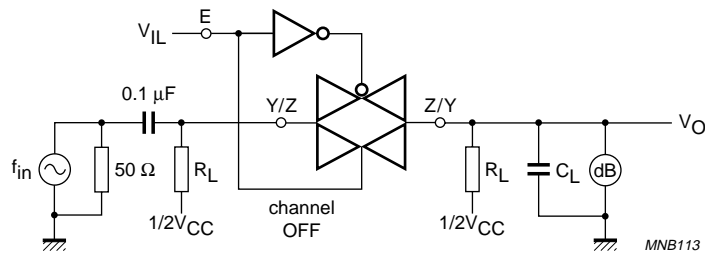


Fig.19 Test circuit for measuring feed-through when switch is OFF.

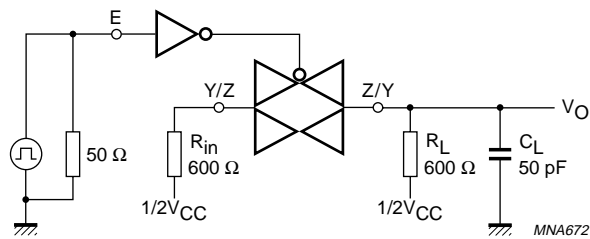
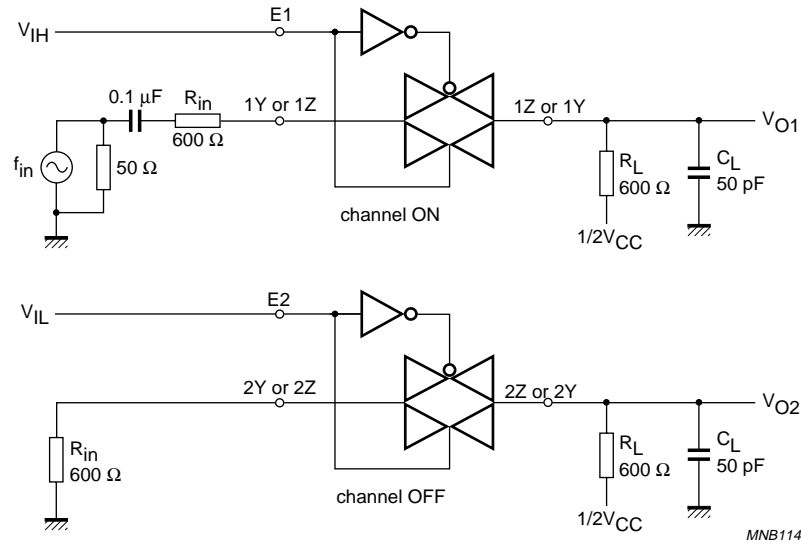


Fig.20 Crosstalk between control input to signal output.

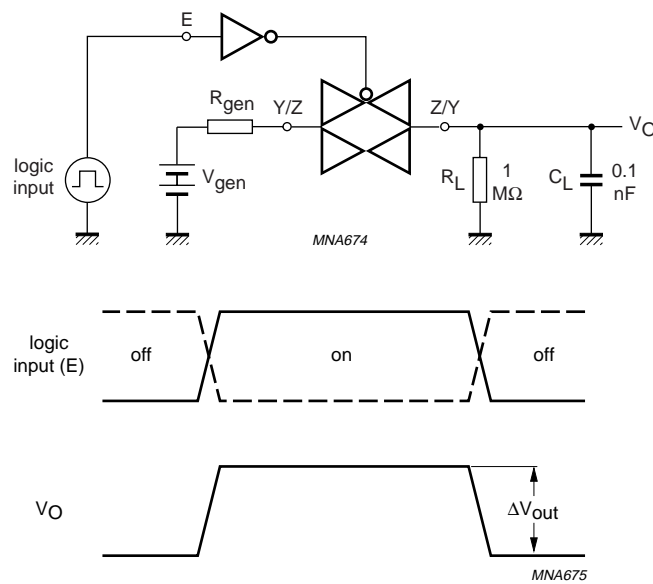
Quad bilateral switches

74LVC4066



MNB114

Fig.21 Crosstalk between switches.



MNA675

$$Q = \Delta V_{out} \times C_L$$

Fig.22 Charge injection test.

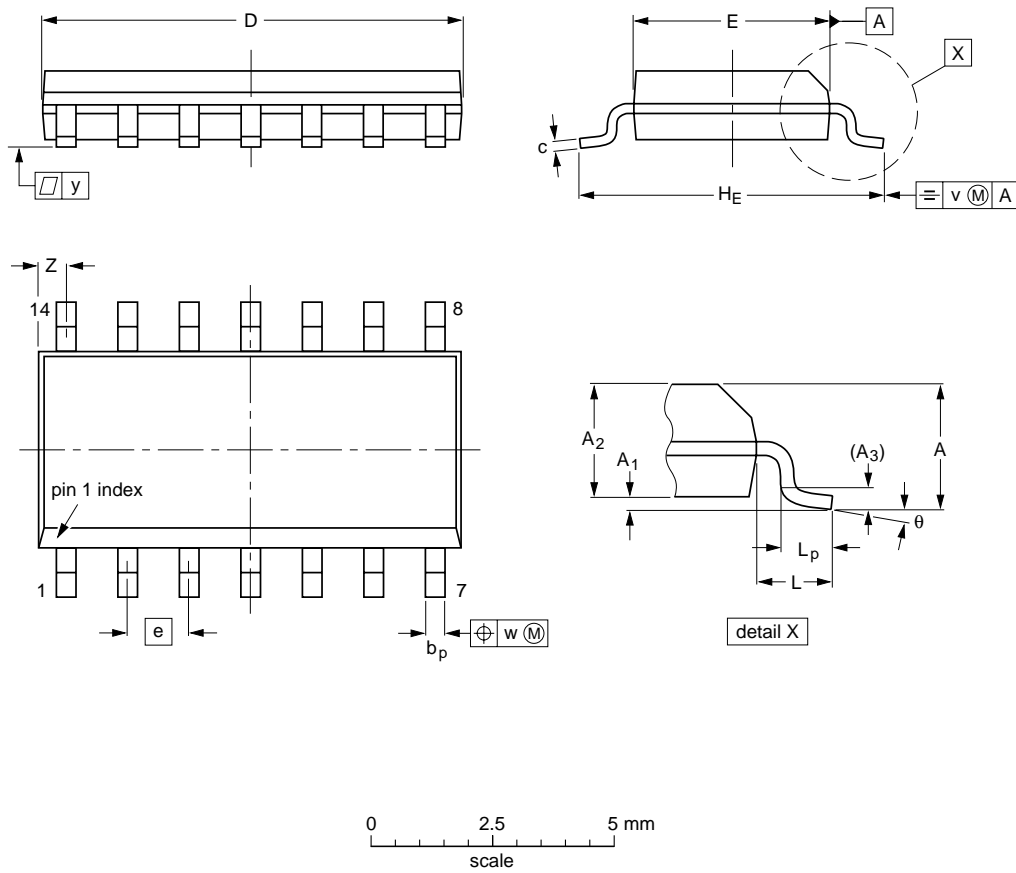
Quad bilateral switches

74LVC4066

PACKAGE OUTLINES

SO14: plastic small outline package; 14 leads; body width 3.9 mm; body thickness 1.47 mm

SOT108-2



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	b <sub>p</sub>	c	D <sup>(1)</sup>	E <sup>(1)</sup>	e	H <sub>E</sub>	L	L <sub>p</sub>	v	w	y	Z <sup>(1)</sup>	θ
mm	1.75	0.25 0.10	1.55 1.40	0.25	0.49 0.36	0.25 0.19	8.75 8.55	4.0 3.8	1.27	6.2 5.8	1.05	1.0 0.4	0.25	0.25	0.1	0.7 0.3	8° 0°
inches	0.069	0.010 0.004	0.061 0.055	0.01	0.019 0.014	0.0100 0.0075	0.35 0.34	0.16 0.15	0.05	0.244 0.228	0.041	0.039 0.016	0.01	0.01	0.004	0.028 0.012	

Note

1. Plastic or metal protrusions of 0.15 mm (0.006 inch) maximum per side are not included.

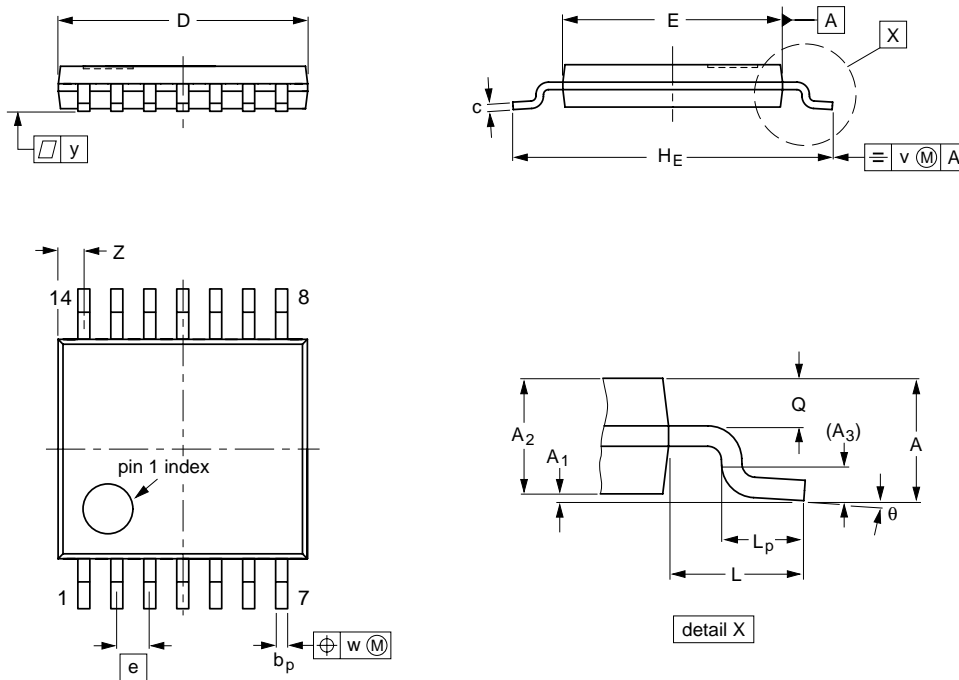
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT108-2		MS-012				01-05-29 03-02-19

Quad bilateral switches

74LVC4066

TSSOP14: plastic thin shrink small outline package; 14 leads; body width 4.4 mm

SOT402-1



**DIMENSIONS (mm are the original dimensions)**

UNIT	A max.	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	b <sub>p</sub>	c	D <sup>(1)</sup>	E <sup>(2)</sup>	e	H <sub>E</sub>	L	L <sub>p</sub>	Q	v	w	y	z <sup>(1)</sup>	θ
mm	1.1	0.15 0.05	0.95 0.80	0.25	0.30 0.19	0.2 0.1	5.1 4.9	4.5 4.3	0.65	6.6 6.2	1	0.75 0.50	0.4 0.3	0.2	0.13	0.1	0.72 0.38	8° 0°

**Notes**

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.
2. Plastic interlead protrusions of 0.25 mm maximum per side are not included.

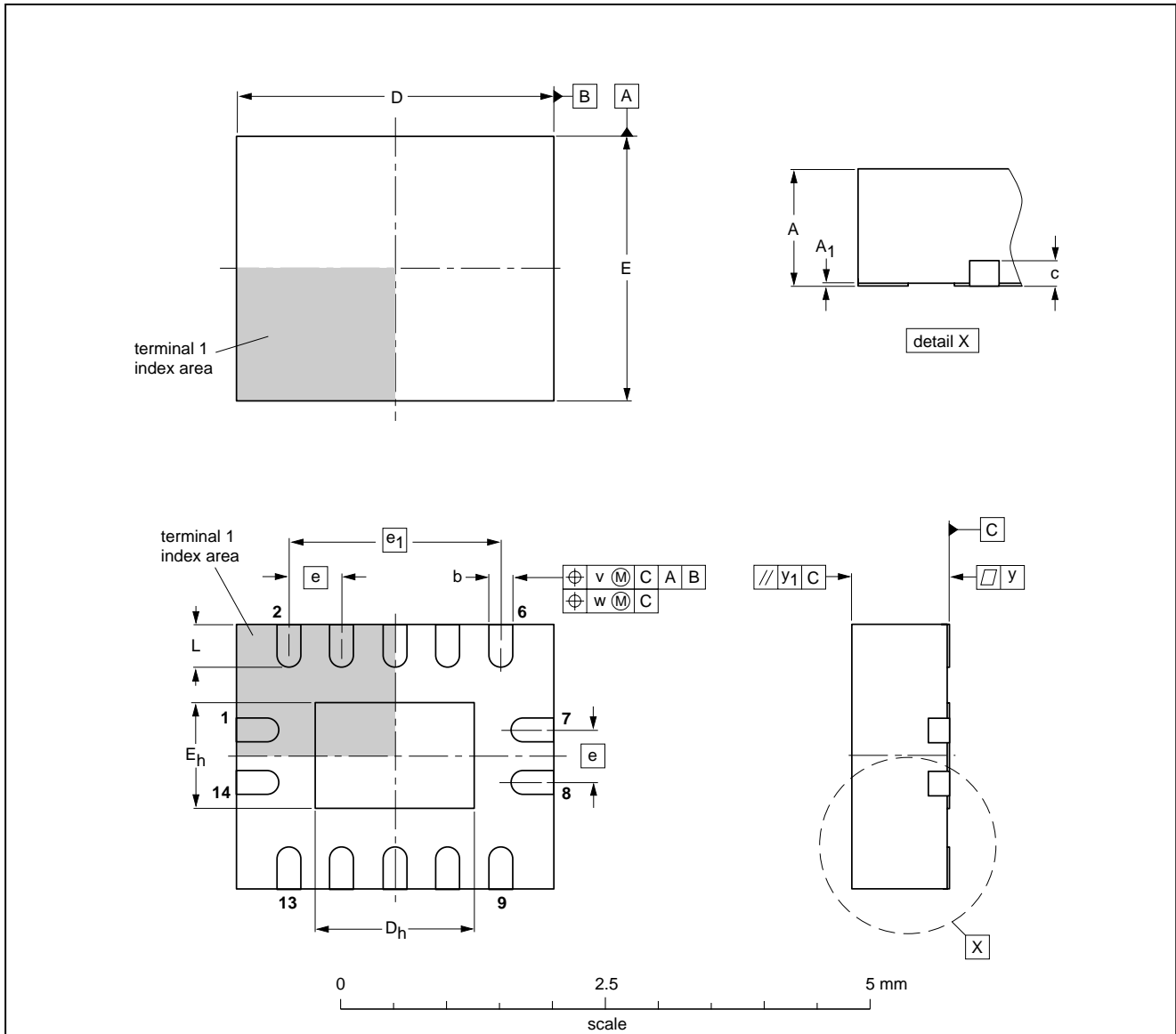
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT402-1		MO-153				99-12-27 03-02-18

Quad bilateral switches

74LVC4066

DHVQFN14: plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 14 terminals; body 2.5 x 3 x 0.85 mm

SOT762-1



DIMENSIONS (mm are the original dimensions)

UNIT	A <sup>(1)</sup> max.	A <sub>1</sub>	b	c	D <sup>(1)</sup>	D <sub>h</sub>	E <sup>(1)</sup>	E <sub>h</sub>	e	e <sub>1</sub>	L	v	w	y	y <sub>1</sub>
mm	1	0.05 0.00	0.30 0.18	0.2	3.1 2.9	1.65 1.35	2.6 2.4	1.15 0.85	0.5	2	0.5 0.3	0.1	0.05	0.05	0.1

Note

1. Plastic or metal protrusions of 0.075 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
SOT762-1	---	MO-241	---		02-10-17 03-01-27

## Quad bilateral switches

74LVC4066

## DATA SHEET STATUS

LEVEL	DATA SHEET STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)(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.
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