# DATA SHEET

For a complete data sheet, please also download:

- The IC06 74HC/HCT/HCU/HCMOS Logic Family Specifications
- The IC06 74HC/HCT/HCU/HCMOS Logic Package Information
- The IC06 74HC/HCT/HCU/HCMOS Logic Package Outlines

# 74HC/HCT4016
## Quad bilateral switches

Product specification
File under Integrated Circuits, IC06

December 1990

Philips Semiconductors

PHILIPS

# Quad bilateral switches 74HC/HCT4016

## FEATURES

- Low “ON” resistance:
  160 Ω (typ.) at $V_{CC}$ = 4.5 V
  120 Ω (typ.) at $V_{CC}$ = 6.0 V
  80 Ω (typ.) at $V_{CC}$ = 9.0 V
- Individual switch controls
- Typical “break before make” built in
- Output capability: non-standard
- $I_{CC}$ category: SSI

## GENERAL DESCRIPTION

The 74HC/HCT4016 are high-speed Si-gate CMOS devices and are pin compatible with the “4016” of the “4000B” series. They are specified in compliance with JEDEC standard no. 7A.

The 74HC/HCT4016 have four independent analog switches (transmission gates).
Each switch has two input/output terminals ($Y_n$, $Z_n$) and an active HIGH enable input ($E_n$). When $E_n$ is connected to $V_{CC}$, a low bidirectional path between $Y_n$ and $Z_n$ is established (ON condition). When $E_n$ is connected to ground (GND), the switch is disabled and a high impedance between $Y_n$ and $Z_n$ is established (OFF condition).

Current through a switch will not cause additional $V_{CC}$ current provided the voltage at the terminals of the switch is maintained within the supply voltage range; $V_{CC}$ >> ($V_Y$, $V_Z$) >> GND. Inputs $Y_n$ and $Z_n$ are electrically equivalent terminals.

## QUICK REFERENCE DATA

GND = 0 V; $T_{amb}$ = 25 °C; $t_r = t_f$ = 6 ns

| SYMBOL | PARAMETER | CONDITIONS | TYPICAL | | UNIT |
|---|---|---|---|---|---|
| | | | HC | HCT | |
| $t_{PZH}$/ $t_{PZL}$ | turn “ON” time $E_n$ to $V_{OS}$ | $C_L$ = 15 pF; $R_L$ = 1 kΩ; $V_{CC}$ = 5 V | 16 | 17 | ns |
| $t_{PHZ}$/ $t_{PLZ}$ | turn “OFF” time $E_n$ to $V_{OS}$ | | 14 | 20 | ns |
| $C_I$ | input capacitance | | 3.5 | 3.5 | pF |
| $C_{PD}$ | power dissipation capacitance per switch | notes 1 and 2 | 12 | 12 | pF |
| $C_S$ | max. switch capacitance | | 5 | 5 | pF |

### Notes

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

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

   $f_i$ = input frequency in MHz

   $f_o$ = output frequency in MHz

   $\sum \{(C_L + C_S) \times V_{CC}^2 \times f_o\}$ = sum of outputs

   $C_L$ = output load capacitance in pF
   $C_S$ = max. switch capacitance in pF

   $V_{CC}$ = supply voltage in V

2. For HC the condition is $V_I$ = GND to $V_{CC}$
   For HCT the condition is $V_I$ = GND to $V_{CC}$ − 1.5 V

## ORDERING INFORMATION

See *“74HC/HCT/HCU/HCMOS Logic Package Information”*.

**PIN DESCRIPTION**

| PIN NO. | SYMBOL | NAME AND FUNCTION |
|---|---|---|
| 1, 4, 8, 11 | $Y_0$ to $Y_3$ | independent inputs/outputs |
| 7 | GND | ground (0 V) |
| 2, 3, 9, 10 | $Z_0$ to $Z_3$ | independent inputs/outputs |
| 13, 5, 6, 12 | $E_0$ to $E_3$ | enable inputs (active HIGH) |
| 14 | $V_{CC}$ | positive supply voltage |

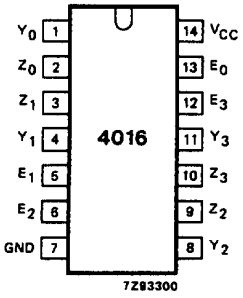



Fig.1 Pin configuration.

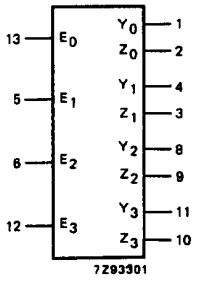



Fig.2 Logic symbol.

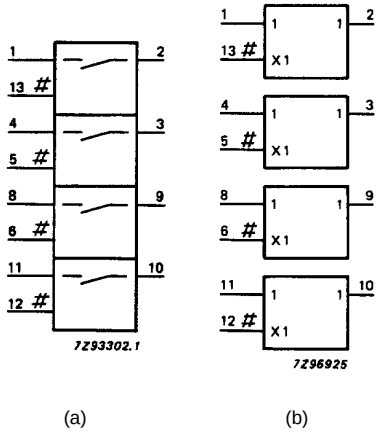



Fig.3 IEC logic symbol.

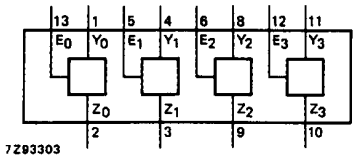



Fig.4 Functional diagram.

**APPLICATIONS**

- Signal gating
- Modulation
- Demodulation
- Chopper

**FUNCTION TABLE**

| INPUT $E_n$ | CHANNEL IMPEDANCE |
|---|---|
| L | high |
| H | low |

**Notes**

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

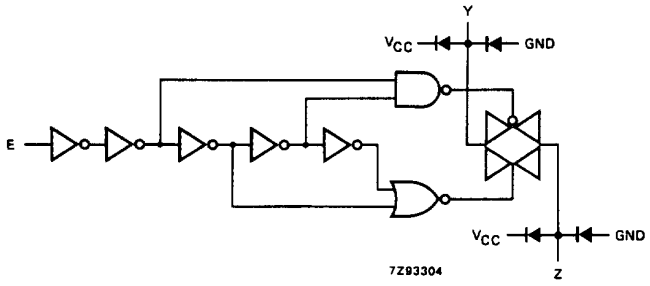



Fig.5 Schematic diagram (one switch).

## RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)
Voltages are referenced to GND (ground = 0 V)

| SYMBOL | PARAMETER | MIN. | MAX. | UNIT | CONDITIONS |
|---|---|---|---|---|---|
| $V_{CC}$ | DC supply voltage | −0.5 | +11.0 | V | |
| $\pm I_{IK}$ | DC digital input diode current | | 20 | mA | for $V_I < -0.5$ V or $V_I > V_{CC} + 0.5$ V |
| $\pm I_{SK}$ | DC switch diode current | | 20 | mA | for $V_S < -0.5$ V or $V_S > V_{CC} + 0.5$ V |
| $\pm I_S$ | DC switch current | | 25 | mA | for $-0.5$ V $< V_S < V_{CC} + 0.5$ V |
| $\pm I_{CC}$; $\pm I_{GND}$ | DC $V_{CC}$ or GND current | | 50 | mA | |
| $T_{stg}$ | storage temperature range | −65 | +150 | °C | |
| $P_{tot}$ | power dissipation per package | | | | for temperature range: −40 to +125 °C 74HC/HCT |
| | plastic DIL | | 750 | mW | above +70 °C: derate linearly with 12 mW/K |
| | plastic mini-pack (SO) | | 500 | mW | above +70 °C: derate linearly with 8 mW/K |
| $P_S$ | power dissipation per switch | | 100 | mW | |

## RECOMMENDED OPERATING CONDITIONS

| SYMBOL | PARAMETER | 74HC | | | 74HCT | | | UNIT | CONDITIONS |
|---|---|---|---|---|---|---|---|---|---|
| | | min. | typ. | max. | min. | typ. | max. | | |
| $V_{CC}$ | DC supply voltage | 2.0 | 5.0 | 10.0 | 4.5 | 5.0 | 5.5 | V | |
| $V_I$ | DC input voltage range | GND | | $V_{CC}$ | GND | | $V_{CC}$ | V | |
| $V_S$ | DC switch voltage range | GND | | $V_{CC}$ | GND | | $V_{CC}$ | V | |
| $T_{amb}$ | operating ambient temperature range | −40 | | +85 | −40 | | +85 | °C | see DC and AC CHARACTERISTICS |
| $T_{amb}$ | operating ambient temperature range | −40 | | +125 | −40 | | +125 | °C | |
| $t_r$, $t_f$ | input rise and fall times | | 6.0 | 1000<br>500<br>400<br>250 | | 6.0 | 500 | ns | $V_{CC}$ = 2.0 V<br>$V_{CC}$ = 4.5 V<br>$V_{CC}$ = 6.0 V<br>$V_{CC}$ = 10.0 V |

**DC CHARACTERISTICS FOR 74HC/HCT**

For 74HC: $V_{CC}$ = 2.0, 4.5, 6.0 and 9.0 V

For 74HCT: $V_{CC}$ = 4.5 V

| SYMBOL | PARAMETER | $T_{amb}$ (°C) | | | | | | | UNIT | TEST CONDITIONS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 74HC/HCT | | | | | | | | | | | |
| | | +25 | | | −40 to +85 | | −40 to +125 | | | $V_{CC}$ (V) | $I_S$ (μA) | $V_{is}$ | $V_I$ |
| | | min. | typ. | max. | min. | max. | min. | max. | | | | | |
| $R_{ON}$ | ON resistance (peak) | | –<br>160<br>120<br>85 | –<br>320<br>240<br>170 | | –<br>400<br>300<br>213 | | –<br>480<br>360<br>255 | Ω<br>Ω<br>Ω<br>Ω | 2.0<br>4.5<br>6.0<br>9.0 | 100<br>1000<br>1000<br>1000 | $V_{CC}$<br>to<br>GND | $V_{IH}$<br>or<br>$V_{IL}$ |
| $R_{ON}$ | ON resistance (rail) | | 160<br>80<br>70<br>60 | –<br>160<br>140<br>120 | | –<br>200<br>175<br>150 | | –<br>240<br>210<br>180 | Ω<br>Ω<br>Ω<br>Ω | 2.0<br>4.5<br>6.0<br>9.0 | 100<br>1000<br>1000<br>1000 | GND | $V_{IH}$<br>or<br>$V_{IL}$ |
| $R_{ON}$ | ON resistance (rail) | | 170<br>90<br>80<br>65 | –<br>180<br>160<br>135 | | –<br>225<br>200<br>170 | | –<br>270<br>240<br>205 | Ω<br>Ω<br>Ω<br>Ω | 2.0<br>4.5<br>6.0<br>9.0 | 100<br>1000<br>1000<br>1000 | $V_{CC}$ | $V_{IH}$<br>or<br>$V_{IL}$ |
| $\Delta R_{ON}$ | maximum ΔON resistance between any two channels | | –<br>16<br>12<br>9 | | | | | | Ω<br>Ω<br>Ω<br>Ω | 2.0<br>4.5<br>6.0<br>9.0 | | $V_{CC}$<br>to<br>GND | $V_{IH}$<br>or<br>$V_{IL}$ |

**Notes to the DC Characteristics**

1. At supply voltages approaching 2.0 V the analog switch ON-resistance becomes extremely non-linear. Therefore it is recommended that these devices be used to transmit digital signals only, when using these supply voltages.
2. For test circuit measuring $R_{ON}$ see Fig.6.

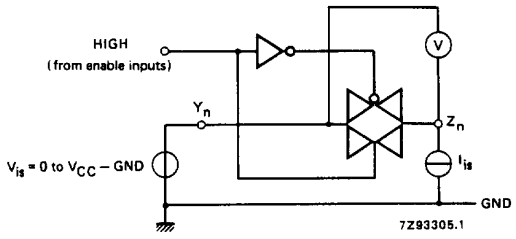



Fig.6 Test circuit for measuring $R_{ON}$.

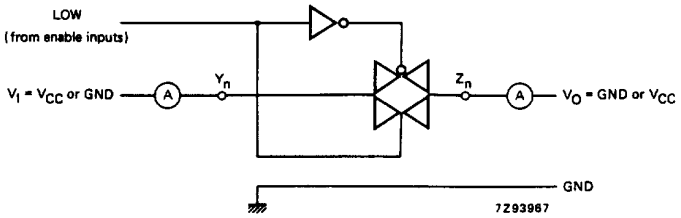



Fig.7 Test circuit for measuring OFF-state current.

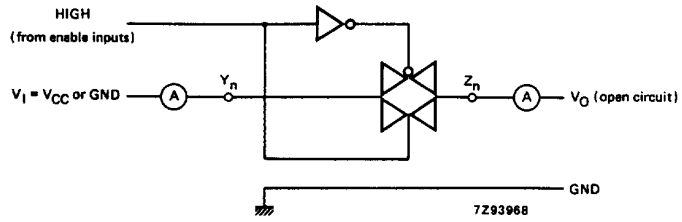



Fig.8 Test circuit for measuring ON-state current.

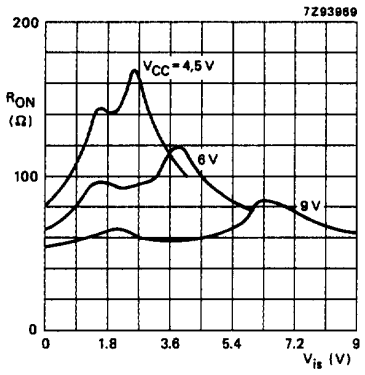



Fig.9 Typical $R_{ON}$ as a function of input voltage $V_{is}$ for $V_{is}$ = 0 to $V_{CC}$.

### DC CHARACTERISTICS FOR 74HC

Voltages are referenced to GND (ground = 0 V)

| SYMBOL | PARAMETER | $T_{amb}$ (°C) | | | | | | | UNIT | TEST CONDITIONS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 74HC | | | | | | | | $V_{CC}$ (V) | $V_I$ | OTHER |
| | | +25 | | | −40 to +85 | | −40 to +125 | | | | | |
| | | min. | typ. | max. | min. | max. | min. | max. | | | | |
| $V_{IH}$ | HIGH level input voltage | 1.5<br>3.15<br>4.2<br>6.3 | 1.2<br>2.4<br>3.2<br>4.3 | | 1.5<br>3.15<br>4.2<br>6.3 | | 1.5<br>3.15<br>4.2<br>6.3 | | V | 2.0<br>4.5<br>6.0<br>9.0 | | |
| $V_{IL}$ | LOW level input voltage | | 0.8<br>2.1<br>2.8<br>4.3 | 0.50<br>1.35<br>1.80<br>2.70 | | 0.50<br>1.35<br>1.80<br>2.70 | | 0.50<br>1.35<br>1.80<br>2.70 | V | 2.0<br>4.5<br>6.0<br>9.0 | | |
| $\pm I_I$ | input leakage current | | | 0.1<br>0.2 | | 1.0<br>2.0 | | 1.0<br>2.0 | µA | 6.0<br>10.0 | $V_{CC}$ or GND | |
| $\pm I_S$ | analog switch OFF-state current per channel | | | 0.1 | | 1.0 | | 1.0 | µA | 10.0 | $V_{IH}$ or $V_{IL}$ | $\lvert V_S \rvert$ = $V_{CC}$ − GND (see Fig.7) |
| $\pm I_S$ | analog switch ON-state current | | | 0.1 | | 1.0 | | 1.0 | µA | 10.0 | $V_{IH}$ or $V_{IL}$ | $\lvert V_S \rvert$ = $V_{CC}$ − GND (see Fig.8) |
| $I_{CC}$ | quiescent supply current | | | 2.0<br>4.0 | | 20.0<br>40.0 | | 40.0<br>80.0 | µA | 6.0<br>10.0 | $V_{CC}$ or GND | $V_{is}$ = GND or $V_{CC}$; $V_{os}$ = $V_{CC}$ or GND |

### AC CHARACTERISTICS FOR 74HC

GND = 0 V; $t_r = t_f$ = 6 ns; $C_L$ = 50 pF

| SYMBOL | PARAMETER | $T_{amb}$ (°C) | | | | | | | UNIT | TEST CONDITIONS | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 74HC | | | | | | | | $V_{CC}$ (V) | OTHER |
| | | +25 | | | −40 to +85 | | −40 to +125 | | | | |
| | | min. | typ. | max. | min. | max. | min. | max. | | | |
| $t_{PHL}/ t_{PLH}$ | propagation delay $V_{is}$ to $V_{os}$ | | 17<br>6<br>5<br>4 | 60<br>12<br>10<br>8 | | 75<br>15<br>13<br>10 | | 90<br>18<br>15<br>12 | ns | 2.0<br>4.5<br>6.0<br>9.0 | $R_L$ = ∞; $C_L$ = 50 pF (see Fig.16) |
| $t_{PZH}/ t_{PZL}$ | turn “ON” time $E_n$ to $V_{os}$ | | 52<br>19<br>15<br>11 | 190<br>38<br>32<br>28 | | 240<br>48<br>41<br>35 | | 235<br>57<br>48<br>42 | ns | 2.0<br>4.5<br>6.0<br>9.0 | $R_L$ = 1 kΩ; $C_L$ = 50 pF (see Figs 17 and 18) |
| $t_{PHZ}/ t_{PLZ}$ | turn “OFF” time $E_n$ to $V_{os}$ | | 47<br>17<br>14<br>13 | 145<br>29<br>25<br>22 | | 180<br>36<br>31<br>28 | | 220<br>44<br>38<br>33 | ns | 2.0<br>4.5<br>6.0<br>9.0 | $R_L$ = 1 kΩ; $C_L$ = 50 pF (see Figs 17 and 18) |

**DC CHARACTERISTICS FOR 74HCT**

Voltages are referenced to GND (ground = 0 V)

| SYMBOL | PARAMETER | $T_{amb}$ (°C) | | | | | | | UNIT | TEST CONDITIONS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 74HCT | | | | | | | | $V_{CC}$ (V) | $V_I$ | OTHER |
| | | +25 | | | −40 to +85 | | −40 to +125 | | | | | |
| | | min. | typ. | max. | min. | max. | min. | max. | | | | |
| $V_{IH}$ | HIGH level input voltage | 2.0 | 1.6 | | 2.0 | | 2.0 | | V | 4.5 to 5.5 | | |
| $V_{IL}$ | LOW level input voltage | | 1.2 | 0.8 | | 0.8 | | 0.8 | V | 4.5 to 5.5 | | |
| $\pm I_I$ | input leakage current | | | 0.1 | | 1.0 | | 1.0 | μA | 5.5 | $V_{CC}$ or GND | |
| $\pm I_S$ | analog switch OFF-state current per channel | | | 0.1 | | 1.0 | | 1.0 | μA | 5.5 | $V_{IH}$ or $V_{IL}$ | $\lvert V_S \rvert$ = $V_{CC}$ − GND (see Fig.7) |
| $\pm I_S$ | analog switch ON-state current | | | 0.1 | | 1.0 | | 1.0 | μA | 5.5 | $V_{IH}$ or $V_{IL}$ | $\lvert V_S \rvert$ = $V_{CC}$ − GND (see Fig.8) |
| $I_{CC}$ | quiescent supply current | | | 2.0 | | 20.0 | | 40.0 | μA | 4.5 to 5.5 | $V_{CC}$ or GND | $V_{is}$ = GND or $V_{CC}$; $V_{os}$ = $V_{CC}$ or GND |
| $\Delta I_{CC}$ | additional quiescent supply current per input pin for unit load coefficient is 1 (note 1) | | 100 | 360 | | 450 | | 490 | μA | 4.5 to 5.5 | $V_{CC}$ –2.1V | other inputs at $V_{CC}$ or GND |

**Note**

1. The value of additional quiescent supply current ($\Delta I_{CC}$) for a unit load of 1 is given here. To determine $\Delta I_{CC}$ per input, multiply this value by the unit load coefficient shown in the table below.

| INPUT | UNIT LOAD COEFFICIENT |
|---|---|
| $E_N$ | 1.00 |

### AC CHARACTERISTICS FOR 74HCT

GND = 0 V; $t_r = t_f$ = 6 ns; $C_L$ = 50 pF

| SYMBOL | PARAMETER | $T_{amb}$ (°C) | | | | | | | UNIT | TEST CONDITIONS | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 74HCT | | | | | | | | $V_{CC}$ (V) | OTHER |
| | | +25 | | | −40 to +85 | | −40 to +125 | | | | |
| | | min. | typ. | max. | min. | max. | min. | max. | | | |
| $t_{PHL}/ t_{PLH}$ | propagation delay $V_{is}$ to $V_{os}$ | | 6 | 12 | | 15 | | 18 | ns | 4.5 | $R_L = \infty$; $C_L$ = 50 pF (see Fig.16) |
| $t_{PZH}$ | turn “ON” time $E_n$ to $V_{os}$ | | 19 | 35 | | 44 | | 53 | ns | 4.5 | $R_L$ = 1 kΩ; $C_L$ = 50 pF (see Figs 17 and 18) |
| $t_{PZL}$ | turn “ON” time $E_n$ to $V_{os}$ | | 20 | 35 | | 44 | | 53 | ns | 4.5 | $R_L$ = 1 kΩ; $C_L$ = 50 pF (see Figs 17 and 18) |
| $t_{PHZ}/ t_{PLZ}$ | turn “OFF” time $E_n$ to $V_{os}$ | | 23 | 35 | | 44 | | 53 | ns | 4.5 | $R_L$ = 1 kΩ; $C_L$ = 50 pF (see Figs 17 and 18) |

### ADDITIONAL AC CHARACTERISTICS FOR 74HC/HCT

#### Recommended conditions and typical values

GND = 0 V; $t_r = t_f$ = 6 ns

| SYMBOL | PARAMETER | typ. | UNIT | $V_{CC}$ (V) | $V_{is(p-p)}$ (V) | CONDITIONS |
|---|---|---|---|---|---|---|
| | sine-wave distortion f = 1 kHz | 0.80<br>0.40 | %<br>% | 4.5<br>9.0 | 4.0<br>8.0 | $R_L$ = 10 kΩ; $C_L$ = 50 pF (see Fig.14) |
| | sine-wave distortion f = 10 kHz | 2.40<br>1.20 | %<br>% | 4.5<br>9.0 | 4.0<br>8.0 | $R_L$ = 10 kΩ; $C_L$ = 50 pF (see Fig.14) |
| | switch “OFF” signal feed-through | −50<br>−50 | dB<br>dB | 4.5<br>9.0 | note 3 | $R_L$ = 600 Ω; $C_L$ = 50 pF; f = 1 MHz (see Figs 10 and 15) |
| | crosstalk between any two switches | −60<br>−60 | dB<br>dB | 4.5<br>9.0 | note 3 | $R_L$ = 600 Ω; $C_L$ = 50 pF; f = 1 MHz (see Fig.12) |
| $V_{(p-p)}$ | crosstalk voltage between enable or address input to any switch (peak-to-peak value) | 110<br>220 | mV<br>mV | 4.5<br>9.0 | | $R_L$ = 600 Ω; $C_L$ = 50 pF; f = 1 MHz ($E_n$, square wave between $V_{CC}$ and GND, $t_r = t_f$ = 6 ns) (see Fig.13) |
| $f_{max}$ | minimum frequency response (−3dB) | 150<br>160 | MHz<br>MHz | 4.5<br>9.0 | note 4 | $R_L$ = 50 Ω; $C_L$ = 10 pF (see Figs 11 and 14) |
| $C_S$ | maximum switch capacitance | 5 | pF | | | |

#### Notes

1. $V_{is}$ is the input voltage at a $Y_n$ or $Z_n$ terminal, whichever is assigned as an input.
2. $V_{os}$ is the output voltage at a $Y_n$ or $Z_n$ terminal, whichever is assigned as an output.
3. Adjust input voltage $V_{is}$ to 0 dBm level (0 dBm = 1 mW into 600 Ω).
4. Adjust input voltage $V_{is}$ to 0 dBm level at $V_{os}$ for 1 MHz (0 dBm = 1 mW into 50 Ω).

Test conditions:
$V_{CC}$ = 4.5 V; GND = 0 V;
$R_L$ = 50 Ω; $R_{source}$ = 1 kΩ.

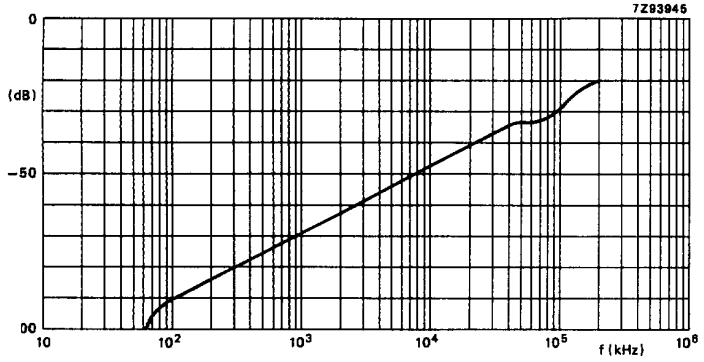



Fig.10 Typical switch “OFF” signal feed-through as a function of frequency.

Test conditions:
$V_{CC}$ = 4.5 V; GND = 0 V;
$R_L$ = 50 Ω; $R_{source}$ = 1 kΩ.

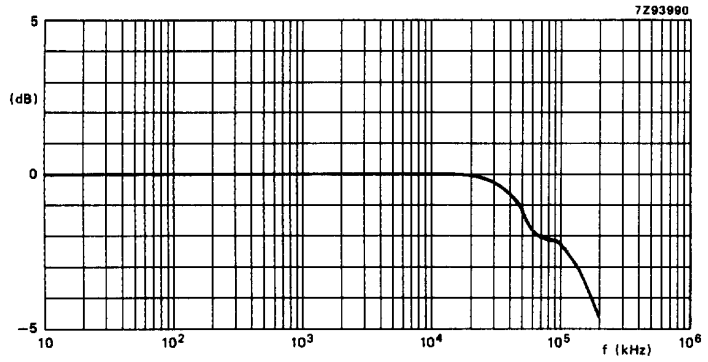



Fig.11 Typical frequency response.

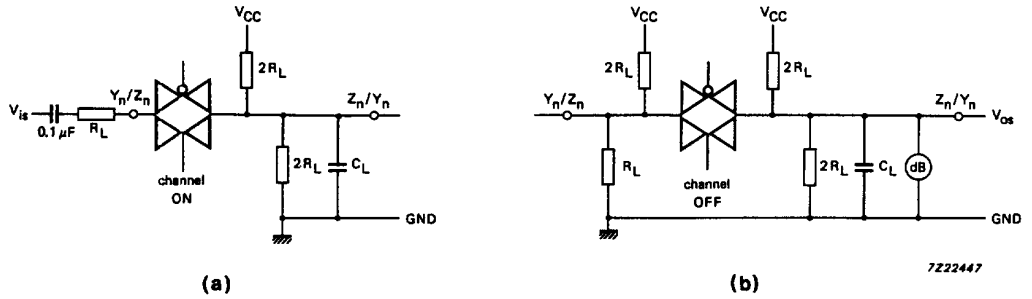
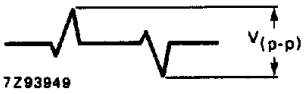



Fig.12 Test circuit for measuring crosstalk between any two switches.
(a) channel ON condition; (b) channel OFF condition.

The crosstalk is defined as follows (oscilloscope output):



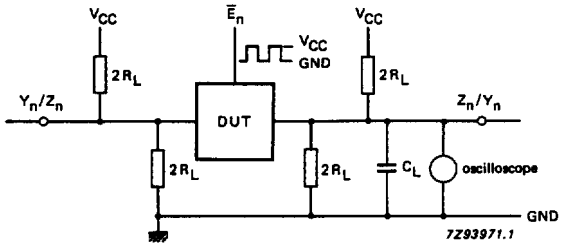




Fig.13 Test circuit for measuring crosstalk between control and any switch.

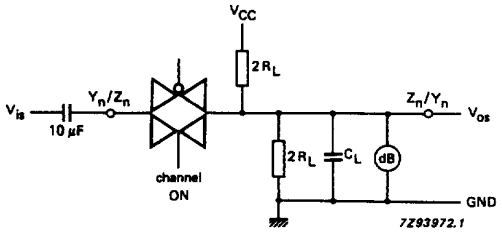



Fig.14 Test circuit for measuring sine-wave distortion and minimum frequency response.

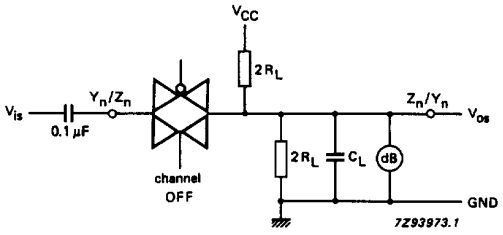
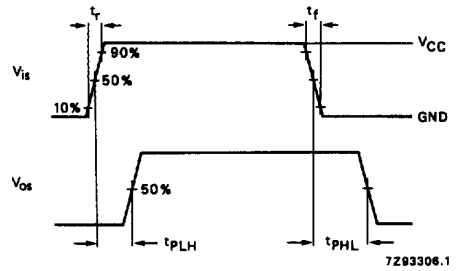


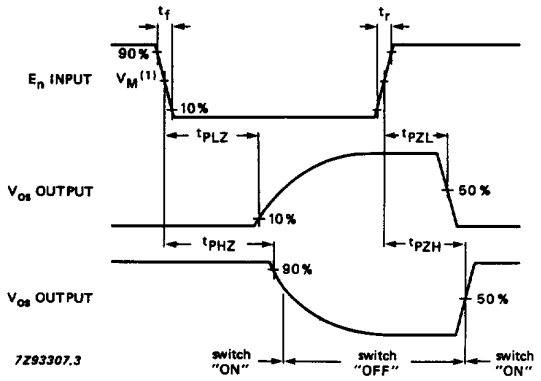

Fig.15 Test circuit for measuring switch “OFF” signal feed-through.

## AC WAVEFORMS




(1) HC : $V_M$ = 50%; $V_I$ = GND to $V_{CC}$.
HCT: $V_M$ = 1.3 V; $V_I$ = GND to 3 V.

Fig.16 Waveforms showing the input ($V_{is}$) to output ($V_{os}$) propagation delays.



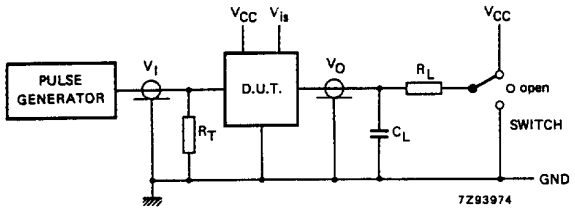

(1) HC : $V_M$ = 50%; $V_I$ = GND to $V_{CC}$.
HCT: $V_M$ = 1.3 V; $V_I$ = GND to 3 V.

Fig.17 Waveforms showing the turn-ON and turn-OFF times.

## TEST CIRCUIT AND WAVEFORMS

### Conditions

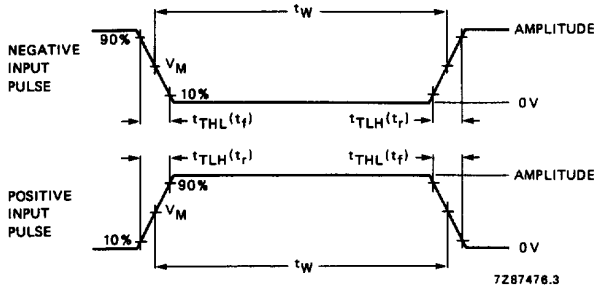
| TEST | SWITCH | $V_{is}$ |
|---|---|---|
| $t_{PZH}$ | GND | $V_{CC}$ |
| $t_{PZL}$ | $V_{CC}$ | GND |
| $t_{PHZ}$ | GND | $V_{CC}$ |
| $t_{PLZ}$ | $V_{CC}$ | GND |
| others | open | pulse |




$C_L$ = load capacitance including jig and probe capacitance (see AC CHARACTERISTICS for values).
$R_T$ = termination resistance should be equal to the output impedance $Z_O$ of the pulse generator.
$t_r = t_f$ = 6 ns; when measuring $f_{max}$, there is no constraint $t_r$, $t_f$ with 50% duty factor.

| FAMILY | AMPLITUDE | $V_M$ | $t_r$; $t_f$ | |
|---|---|---|---|---|
| | | | $f_{max}$; PULSE WIDTH | OTHER |
| 74HC | $V_{CC}$ | 50% | < 2 ns | 6 ns |
| 74HCT | 3.0 V | 1.3 V | < 2 ns | 6 ns |

Fig.18 Test circuit for measuring AC performance.




$C_L$ = load capacitance including jig and probe capacitance (see AC CHARACTERISTICS for values).
$R_T$ = termination resistance should be equal to the output impedance $Z_O$ of the pulse generator.
$t_r = t_f$ = 6 ns; when measuring $f_{max}$, there is no constraint $t_r$, $t_f$ with 50% duty factor.

| FAMILY | AMPLITUDE | $V_M$ | $t_r$; $t_f$ | |
|---|---|---|---|---|
| | | | $f_{max}$; PULSE WIDTH | OTHER |
| 74HC | $V_{CC}$ | 50% | < 2 ns | 6 ns |
| 74HCT | 3.0 V | 1.3 V | < 2 ns | 6 ns |

Fig.19 Input pulse definitions.

## PACKAGE OUTLINES

See *"74HC/HCT/HCU/HCMOS Logic Package Outlines"*.

Стандарт Электрон Связь

Мы молодая и активно развивающаяся компания в области поставок электронных компонентов. Мы поставляем электронные компоненты отечественного и импортного производства напрямую от производителей и с крупнейших складов мира.

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