

74HC4066; 74HCT4066

Quad single-pole single-throw analog switch

Rev. 9 — 14 April 2020

Product data sheet

1. General description

The 74HC4066; 74HCT4066 is a quad single pole, single throw analog switch. Each switch features two input/output terminals (nY and nZ) and an active HIGH enable input (nE). When nE is LOW, the analog switch is turned off. Inputs include clamp diodes. This enables the use of current limiting resistors to interface inputs to voltages in excess of V_{CC} .

2. Features and benefits

- Input levels nE inputs:
 - For 74HC4066: CMOS level
 - For 74HCT4066: TTL level
- Low ON resistance:
 - 50 Ω (typical) at $V_{CC} = 4.5$ V
 - 45 Ω (typical) at $V_{CC} = 6.0$ V
 - 35 Ω (typical) at $V_{CC} = 9.0$ V
- Specified in compliance with JEDEC standard no. 7A
- ESD protection:
 - HBM JESD22-A114F exceeds 2000 V
 - MM JESD22-A115-A exceeds 200 V
- Multiple package options
- Specified from -40 °C to +85 °C and -40 °C to +125 °C

3. Ordering information

Table 1. Ordering information

| Type number | Package | | | |
|-------------|-------------------|----------|--|----------|
| | Temperature range | Name | Description | Version |
| 74HC4066D | -40 °C to +125 °C | SO14 | plastic small outline package; 14 leads; body width 3.9 mm | SOT108-1 |
| 74HCT4066D | | | | |
| 74HC4066DB | -40 °C to +125 °C | SSOP14 | plastic shrink small outline package; 14 leads; body width 5.3 mm | SOT337-1 |
| 74HCT4066DB | | | | |
| 74HC4066PW | -40 °C to +125 °C | TSSOP14 | plastic thin shrink small outline package; 14 leads; body width 4.4 mm | SOT402-1 |
| 74HCT4066PW | | | | |
| 74HC4066BQ | -40 °C to +125 °C | DHVQFN14 | plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 14 terminals; body 2.5 × 3 × 0.85 mm | SOT762-1 |
| 74HCT4066BQ | | | | |

4. Functional diagram



Fig. 1. Logic symbol



Fig. 2. IEC logic symbol



Fig. 3. Schematic diagram (one switch)

5. Pinning information

5.1. Pinning



Fig. 4. Pin configuration SOT108-1 (SO14), SOT337-1 (SSOP14) and SOT402-1 (TSSOP14)

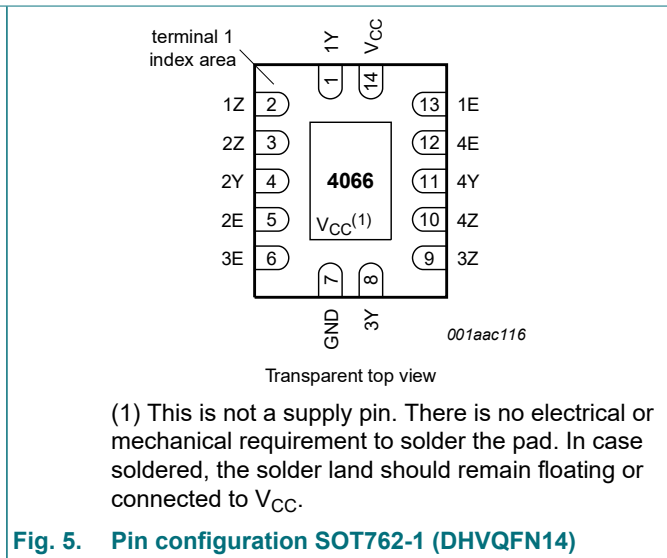


Fig. 5. Pin configuration SOT762-1 (DHVQFN14)

5.2. Pin description

Table 2. Pin description

| Symbol | Pin | Description |
|-----------------|--------------|-----------------------------|
| 1Z, 2Z, 3Z, 4Z | 2, 3, 9, 10 | independent input or output |
| 1Y, 2Y, 3Y, 4Y | 1, 4, 8, 11 | independent input or output |
| GND | 7 | ground (0 V) |
| 1E, 2E, 3E, 4E | 13, 5, 6, 12 | enable input (active HIGH) |
| V _{CC} | 14 | supply voltage |

6. Functional description

Table 3. Function table

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

| Input nE | Switch |
|----------|--------|
| L | OFF |
| H | ON |

7. Limiting values

Table 4. 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 | +11.0 | V |
| I _{IK} | input clamping current | V _I < -0.5 V or V _I > V _{CC} + 0.5 V | - | ±20 | mA |
| I _{SK} | switch clamping current | V _{SW} < -0.5 V or V _{SW} > V _{CC} + 0.5 V | - | ±20 | mA |
| I _{SW} | switch current | V _{SW} = -0.5 V to V _{CC} + 0.5 V [1] | - | ±25 | mA |
| I _{CC} | supply current | | - | 50 | mA |
| I _{GND} | ground current | | - | -50 | mA |
| T _{stg} | storage temperature | | -65 | +150 | °C |
| P _{tot} | total power dissipation | T _{amb} = -40 °C to +125 °C [2] | - | 500 | mW |
| P | power dissipation | per switch | - | 100 | mW |

- [1] To avoid drawing V_{CC} current out of terminal Z, when switch current flows in terminals Y_n, 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 terminals Y_n. In this case there is no limit for the voltage drop across the switch, but the voltages at Y_n and Z may not exceed V_{CC} or GND.
- [2] For SOT108-1 (SO14) package: P_{tot} derates linearly with 10.1 mW/K above 100 °C.
 For SOT337-1 (SSOP14) package: P_{tot} derates linearly with 7.3 mW/K above 81 °C.
 For SOT402-1 (TSSOP14) package: P_{tot} derates linearly with 7.3 mW/K above 81 °C.
 For SOT762-1 (DHVQFN14) package: P_{tot} derates linearly with 9.6 mW/K above 98 °C.

8. Recommended operating conditions

Table 5. Recommended operating conditions

| Symbol | Parameter | Conditions | 74HC4066 | | | 74HCT4066 | | | Unit |
|------------------|-------------------------------------|--------------------------|----------|------|-----------------|-----------|------|-----------------|------|
| | | | Min | Typ | Max | Min | Typ | Max | |
| V _{CC} | supply voltage | | 2.0 | 5.0 | 10.0 | 4.5 | 5.0 | 5.5 | V |
| V _I | input voltage | | GND | - | V _{CC} | GND | - | V _{CC} | V |
| V _{SW} | switch voltage | | GND | - | V _{CC} | GND | - | V _{CC} | V |
| T _{amb} | ambient temperature | | -40 | +25 | +125 | -40 | +25 | +125 | °C |
| Δt/ΔV | input transition rise and fall rate | V _{CC} = 2.0 V | - | - | 625 | - | - | - | ns/V |
| | | V _{CC} = 4.5 V | - | 1.67 | 139 | - | 1.67 | 139 | ns/V |
| | | V _{CC} = 6.0 V | - | - | 83 | - | - | - | ns/V |
| | | V _{CC} = 10.0 V | - | - | 35 | - | - | - | ns/V |

9. Static characteristics

Table 6. R_{ON} resistance per switch for types 74HC4066 and 74HCT4066

V_I = V_{IH} or V_{IL}; for test circuit see Fig. 6.

V_{is} is the input voltage at a Yn or Z terminal, whichever is assigned as an input.

V_{os} is the output voltage at a Yn or Z terminal, whichever is assigned as an output.

For 74HC4066: V_{CC} - GND = 2.0 V, 4.5 V, 6.0 V and 9.0 V.

For 74HCT4066: V_{CC} - GND = 4.5 V.

| Symbol | Parameter | Conditions | -40 °C to +85 °C | | | -40 °C to +125 °C | | Unit |
|-----------------------|----------------------|---|------------------|--------|-----|-------------------|-----|------|
| | | | Min | Typ[1] | Max | Min | Max | |
| R _{ON(peak)} | ON resistance (peak) | V _{is} = V _{CC} to GND | | | | | | |
| | | V _{CC} = 2.0 V; I _{SW} = 100 μA [2] | - | - | - | - | - | Ω |
| | | V _{CC} = 4.5 V; I _{SW} = 1000 μA | - | 54 | - | 118 | 142 | Ω |
| | | V _{CC} = 6.0 V; I _{SW} = 1000 μA | - | 42 | - | 105 | 126 | Ω |
| | | V _{CC} = 9.0 V; I _{SW} = 1000 μA | - | 32 | - | 88 | 105 | Ω |
| R _{ON(rail)} | ON resistance (rail) | V _{is} = GND | | | | | | |
| | | V _{CC} = 2.0 V; I _{SW} = 100 μA [2] | - | 80 | - | - | - | Ω |
| | | V _{CC} = 4.5 V; I _{SW} = 1000 μA | - | 35 | - | 95 | 115 | Ω |
| | | V _{CC} = 6.0 V; I _{SW} = 1000 μA | - | 27 | - | 82 | 100 | Ω |
| | | V _{CC} = 9.0 V; I _{SW} = 1000 μA | - | 20 | - | 70 | 85 | Ω |
| | | V _{is} = V _{CC} | | | | | | |
| | | V _{CC} = 2.0 V; I _{SW} = 100 μA [2] | - | 100 | - | - | - | Ω |
| | | V _{CC} = 4.5 V; I _{SW} = 1000 μA | - | 42 | - | 106 | 128 | Ω |
| | | V _{CC} = 6.0 V; I _{SW} = 1000 μA | - | 35 | - | 94 | 113 | Ω |
| | | V _{CC} = 9.0 V; I _{SW} = 1000 μA | - | 20 | - | 78 | 95 | Ω |

| Symbol | Parameter | Conditions | -40 °C to +85 °C | | | -40 °C to +125 °C | | Unit |
|-----------------|---|--------------------------|------------------|--------|-----|-------------------|-----|----------|
| | | | Min | Typ[1] | Max | Min | Max | |
| ΔR_{ON} | ON resistance mismatch between channels | $V_{is} = V_{CC}$ to GND | | | | | | |
| | | $V_{CC} = 2.0$ V | [2] | - | - | - | - | Ω |
| | | $V_{CC} = 4.5$ V | | - | 5 | - | - | Ω |
| | | $V_{CC} = 6.0$ V | | - | 4 | - | - | Ω |
| | | $V_{CC} = 9.0$ V | | - | 3 | - | - | Ω |

- [1] Typical values are measured at $T_{amb} = 25$ °C.
- [2] At supply voltages ($V_{CC} - GND$) approaching 2 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.



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



Fig. 7. Typical R_{ON} as a function of input voltage V_{is}

Table 7. Static characteristics 74HC4066

At recommended operating conditions; voltages are referenced to GND (ground = 0 V).
 V_{is} is the input voltage at a Yn or Z terminal, whichever is assigned as an input.
 V_{os} is the output voltage at a Yn or Z terminal, whichever is assigned as an output.

| Symbol | Parameter | Conditions | Min | Typ[1] | Max | Unit |
|---|---------------------------|---|------|--------|-----------|---------|
| $T_{amb} = -40$ °C to $+85$ °C | | | | | | |
| V_{IH} | HIGH-level input voltage | $V_{CC} = 2.0$ V | 1.5 | 1.2 | - | V |
| | | $V_{CC} = 4.5$ V | 3.15 | 2.4 | - | V |
| | | $V_{CC} = 6.0$ V | 4.2 | 3.2 | - | V |
| | | $V_{CC} = 9.0$ V | 6.3 | 4.7 | - | V |
| V_{IL} | LOW-level input voltage | $V_{CC} = 2.0$ V | - | 0.8 | 0.5 | V |
| | | $V_{CC} = 4.5$ V | - | 2.1 | 1.35 | V |
| | | $V_{CC} = 6.0$ V | - | 2.8 | 1.80 | V |
| | | $V_{CC} = 9.0$ V | - | 4.3 | 2.70 | V |
| I_I | input leakage current | $V_I = V_{CC}$ or GND | | | | |
| | | $V_{CC} = 6.0$ V | - | - | ± 1.0 | μA |
| | | $V_{CC} = 10.0$ V | - | - | ± 2.0 | μA |
| $I_{S(OFF)}$ | OFF-state leakage current | $V_{CC} = 10.0$ V; $V_I = V_{IH}$ or V_{IL} ; $ V_{SW} = V_{CC} - GND$; see Fig. 8 | | | | |
| | | per channel | - | - | ± 1.0 | μA |

| Symbol | Parameter | Conditions | Min | Typ[1] | Max | Unit |
|--|---------------------------|--|------|--------|-----------|---------------|
| $I_{S(ON)}$ | ON-state leakage current | $V_{CC} = 10.0\text{ V}$; $V_I = V_{IH}$ or V_{IL} ; $ V_{SW} = V_{CC} - \text{GND}$; see Fig. 9 | - | - | ± 1.0 | μA |
| I_{CC} | supply current | $V_I = V_{CC}$ or GND; $V_{is} = \text{GND}$ or V_{CC} ; $V_{os} = V_{CC}$ or GND | | | | |
| | | $V_{CC} = 6.0\text{ V}$ | - | - | 20.0 | μA |
| | | $V_{CC} = 10.0\text{ V}$ | - | - | 40.0 | μA |
| C_I | input capacitance | | - | 3.5 | - | pF |
| C_{SW} | switch capacitance | | - | 8 | - | pF |
| $T_{amb} = -40\text{ }^\circ\text{C}$ to $+125\text{ }^\circ\text{C}$ | | | | | | |
| V_{IH} | HIGH-level input voltage | $V_{CC} = 2.0\text{ V}$ | 1.5 | - | - | V |
| | | $V_{CC} = 4.5\text{ V}$ | 3.15 | - | - | V |
| | | $V_{CC} = 6.0\text{ V}$ | 4.2 | - | - | V |
| | | $V_{CC} = 9.0\text{ V}$ | 6.3 | - | - | V |
| V_{IL} | LOW-level input voltage | $V_{CC} = 2.0\text{ V}$ | - | - | 0.50 | V |
| | | $V_{CC} = 4.5\text{ V}$ | - | - | 1.35 | V |
| | | $V_{CC} = 6.0\text{ V}$ | - | - | 1.80 | V |
| | | $V_{CC} = 9.0\text{ V}$ | - | - | 2.70 | V |
| I_I | input leakage current | $V_I = V_{CC}$ or GND | | | | |
| | | $V_{CC} = 6.0\text{ V}$ | - | - | ± 1.0 | μA |
| | | $V_{CC} = 10.0\text{ V}$ | - | - | ± 2.0 | μA |
| $I_{S(OFF)}$ | OFF-state leakage current | $V_{CC} = 10.0\text{ V}$; $V_I = V_{IH}$ or V_{IL} ; $ V_{SW} = V_{CC} - \text{GND}$; see Fig. 8 | | | | |
| | | per channel | - | - | ± 1.0 | μA |
| $I_{S(ON)}$ | ON-state leakage current | $V_{CC} = 10.0\text{ V}$; $V_I = V_{IH}$ or V_{IL} ; $ V_{SW} = V_{CC} - \text{GND}$; see Fig. 9 | - | - | ± 1.0 | μA |
| I_{CC} | supply current | $V_I = V_{CC}$ or GND; $V_{is} = \text{GND}$ or V_{CC} ; $V_{os} = V_{CC}$ or GND | | | | |
| | | $V_{CC} = 6.0\text{ V}$ | - | - | 40 | μA |
| | | $V_{CC} = 10.0\text{ V}$ | - | - | 80 | μA |

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

Table 8. Static characteristics 74HCT4066

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

V_{is} is the input voltage at a Y_n or Z terminal, whichever is assigned as an input.

V_{os} is the output voltage at a Y_n or Z terminal, whichever is assigned as an output.

| Symbol | Parameter | Conditions | Min | Typ[1] | Max | Unit |
|---|---------------------------|---|-----|--------|-----------|---------------|
| $T_{amb} = -40\text{ °C to }+85\text{ °C}$ | | | | | | |
| V_{IH} | HIGH-level input voltage | $V_{CC} = 4.5\text{ V to }5.5\text{ V}$ | 2.0 | 1.6 | - | V |
| V_{IL} | LOW-level input voltage | $V_{CC} = 4.5\text{ V to }5.5\text{ V}$ | - | 1.2 | 0.8 | V |
| I_I | input leakage current | $V_I = V_{CC}$ or GND; $V_{CC} = 5.5\text{ V}$ | - | - | ± 1.0 | μA |
| $I_{S(OFF)}$ | OFF-state leakage current | $V_{CC} = 5.5\text{ V}$; $V_I = V_{IH}$ or V_{IL} ; $ V_{SW} = V_{CC} - \text{GND}$; see Fig. 8 | | | | |
| | | per channel | - | - | ± 1.0 | μA |
| $I_{S(ON)}$ | ON-state leakage current | $V_{CC} = 5.5\text{ V}$; $V_I = V_{IH}$ or V_{IL} ; $ V_{SW} = V_{CC} - \text{GND}$; see Fig. 9 | - | - | ± 1.0 | μA |
| I_{CC} | supply current | $V_I = V_{CC}$ or GND; $V_{is} = \text{GND}$ or V_{CC} ; $V_{os} = V_{CC}$ or GND; $V_{CC} = 4.5\text{ V to }5.5\text{ V}$ | - | - | 20.0 | μA |
| ΔI_{CC} | additional supply current | per input pin; $V_I = V_{CC} - 2.1\text{ V}$; other inputs at V_{CC} or GND; $V_{CC} = 4.5\text{ V to }5.5\text{ V}$ | - | 100 | 450 | μA |
| C_I | input capacitance | | - | 3.5 | - | pF |
| C_{SW} | switch capacitance | | - | 8 | - | pF |
| $T_{amb} = -40\text{ °C to }+125\text{ °C}$ | | | | | | |
| V_{IH} | HIGH-level input voltage | $V_{CC} = 4.5\text{ V to }5.5\text{ V}$ | 2.0 | - | - | V |
| V_{IL} | LOW-level input voltage | $V_{CC} = 4.5\text{ V to }5.5\text{ V}$ | - | - | 0.8 | V |
| I_I | input leakage current | $V_I = V_{CC}$ or GND; $V_{CC} = 5.5\text{ V}$ | - | - | ± 1.0 | μA |
| $I_{S(OFF)}$ | OFF-state leakage current | $V_{CC} = 5.5\text{ V}$; $V_I = V_{IH}$ or V_{IL} ; $ V_{SW} = V_{CC} - \text{GND}$; see Fig. 8 | | | | |
| | | per channel | - | - | ± 1.0 | μA |
| $I_{S(ON)}$ | ON-state leakage current | $V_{CC} = 5.5\text{ V}$; $V_I = V_{IH}$ or V_{IL} ; $ V_{SW} = V_{CC} - \text{GND}$; see Fig. 9 | - | - | ± 1.0 | μA |
| I_{CC} | supply current | $V_I = V_{CC}$ or GND; $V_{is} = \text{GND}$ or V_{CC} ; $V_{os} = V_{CC}$ or GND; $V_{CC} = 4.5\text{ V to }5.5\text{ V}$ | - | - | 40 | μA |
| ΔI_{CC} | additional supply current | per input pin; $V_I = V_{CC} - 2.1\text{ V}$; other inputs at V_{CC} or GND; $V_{CC} = 4.5\text{ V to }5.5\text{ V}$ | - | - | 490 | μA |

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



10. Dynamic characteristics

Table 9. Dynamic characteristics 74HC4066

$GND = 0\text{ V}$; $t_r = t_f = 6\text{ ns}$; $C_L = 50\text{ pF}$ unless specified otherwise; for test circuit see Fig. 12.

V_{is} is the input voltage at a Yn or Z terminal, whichever is assigned as an input.

V_{os} is the output voltage at a Yn or Z terminal, whichever is assigned as an output.

| Symbol | Parameter | Conditions | -40 °C to +85 °C | | | -40 °C to +125 °C | | Unit |
|-----------|-------------------------------|--|------------------|--------|-----|-------------------|-----|------|
| | | | Min | Typ[1] | Max | Min | Max | |
| t_{pd} | propagation delay | nY to nZ or nZ to nY; $R_L = \infty\ \Omega$; see Fig. 10 [2] | | | | | | |
| | | $V_{CC} = 2.0\text{ V}$ | - | 8 | 75 | - | 90 | ns |
| | | $V_{CC} = 4.5\text{ V}$ | - | 3 | 15 | - | 18 | ns |
| | | $V_{CC} = 6.0\text{ V}$ | - | 2 | 13 | - | 15 | ns |
| | | $V_{CC} = 9.0\text{ V}$ | - | 2 | 10 | - | 12 | ns |
| t_{off} | turn-off time | nE to nY or nZ; see Fig. 11 [3] | | | | | | |
| | | $V_{CC} = 2.0\text{ V}$ | - | 44 | 190 | - | 225 | ns |
| | | $V_{CC} = 4.5\text{ V}$ | - | 16 | 38 | - | 45 | ns |
| | | $V_{CC} = 5.0\text{ V}$; $C_L = 15\text{ pF}$ | - | 13 | - | - | - | ns |
| | | $V_{CC} = 6.0\text{ V}$ | - | 13 | 33 | - | 38 | ns |
| | | $V_{CC} = 9.0\text{ V}$ | - | 16 | 26 | - | 30 | ns |
| t_{on} | turn-on time | nE to nY or nZ; see Fig. 11 [4] | | | | | | |
| | | $V_{CC} = 2.0\text{ V}$ | - | 36 | 125 | - | 150 | ns |
| | | $V_{CC} = 4.5\text{ V}$ | - | 13 | 25 | - | 30 | ns |
| | | $V_{CC} = 5.0\text{ V}$; $C_L = 15\text{ pF}$ | - | 11 | - | - | - | ns |
| | | $V_{CC} = 6.0\text{ V}$ | - | 10 | 21 | - | 26 | ns |
| | | $V_{CC} = 9.0\text{ V}$ | - | 8 | 16 | - | 20 | ns |
| C_{PD} | power dissipation capacitance | per switch; $V_I = GND$ to V_{CC} [5] | - | 11 | - | - | - | pF |

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

[2] t_{pd} is the same as t_{PHL} and t_{PLH} .

[3] t_{off} is the same as t_{PZH} and t_{PZL} .

[4] t_{on} is the same as t_{PHZ} and t_{PLZ} .

[5] C_{PD} is used to determine the dynamic power dissipation (P_D in μW).

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

f_i = input frequency in MHz;

f_o = output frequency in MHz;

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

C_L = output load capacitance in pF;

C_{sw} = switch capacitance in pF;

V_{CC} = supply voltage in V.

Table 10. Dynamic characteristics 74HCT4066

$GND = 0\text{ V}$; $t_r = t_f = 6\text{ ns}$; $C_L = 50\text{ pF}$ unless specified otherwise; for test circuit see Fig. 12.

V_{is} is the input voltage at a Yn or Z terminal, whichever is assigned as an input.

V_{os} is the output voltage at a Yn or Z terminal, whichever is assigned as an output.

| Symbol | Parameter | Conditions | -40 °C to +85 °C | | | -40 °C to +125 °C | | Unit |
|-----------|-------------------------------|--|------------------|--------|-----|-------------------|-----|------|
| | | | Min | Typ[1] | Max | Min | Max | |
| t_{pd} | propagation delay | nY to nZ or nZ to nY; $R_L = \infty\ \Omega$; see Fig. 10 [2] | | | | | | |
| | | $V_{CC} = 4.5\text{ V}$ | - | 3 | 15 | - | 18 | ns |
| t_{off} | turn-off time | nE to nY or nZ; see Fig. 11 [3] | | | | | | |
| | | $V_{CC} = 4.5\text{ V}$ | - | 20 | 44 | - | 53 | ns |
| | | $V_{CC} = 5.0\text{ V}$; $C_L = 15\text{ pF}$ | - | 16 | - | - | - | ns |
| t_{on} | turn-on time | nE to nY or nZ; see Fig. 11 [4] | | | | | | |
| | | $V_{CC} = 4.5\text{ V}$ | - | 12 | 30 | - | 36 | ns |
| | | $V_{CC} = 5.0\text{ V}$; $C_L = 15\text{ pF}$ | - | 12 | - | - | - | ns |
| C_{PD} | power dissipation capacitance | per switch; $V_I = GND$ to $(V_{CC} - 1.5\text{ V})$ [5] | - | 12 | - | - | - | pF |

- [1] Typical values are measured at $T_{amb} = 25\text{ °C}$.
- [2] t_{pd} is the same as t_{PHL} and t_{PLH} .
- [3] t_{off} is the same as t_{PZH} and t_{PZL} .
- [4] t_{on} is the same as t_{PHZ} and t_{PLZ} .
- [5] C_{PD} is used to determine the dynamic power dissipation (P_D in μW).
 $P_D = C_{PD} \times V_{CC}^2 \times f_i + \sum\{(C_L + C_{sw}) \times V_{CC}^2 \times f_o\}$ where:
 f_i = input frequency in MHz;
 f_o = output frequency in MHz;
 $\sum\{(C_L + C_{sw}) \times V_{CC}^2 \times f_o\}$ = sum of outputs;
 C_L = output load capacitance in pF;
 C_{sw} = switch capacitance in pF;
 V_{CC} = supply voltage in V.

10.1. Waveforms and test circuit



Fig. 10. Input (V_{is}) to output (V_{os}) propagation delays



Table 11. Measurement points

| Type | V _I | V _M |
|-----------|-----------------|--------------------|
| 74HC4066 | V _{CC} | 0.5V _{CC} |
| 74HCT4066 | 3.0 V | 1.3 V |



Table 12. Test data

| Test | Input | | | Output | | S1 position |
|--------------------|-----------------|-----------------|------------|---------------|--------------|-------------|
| | Control E | Switch Yn (Z) | t_r, t_f | Switch Z (Yn) | | |
| | V_i [1] | V_{is} | | C_L | R_L | |
| t_{PHL}, t_{PLH} | GND | GND to V_{CC} | 6 ns | 50 pF | - | open |
| t_{PHZ}, t_{PZH} | GND to V_{CC} | V_{CC} | 6 ns | 50 pF, 15 pF | 1 k Ω | GND |
| t_{PLZ}, t_{PZL} | GND to V_{CC} | GND | 6 ns | 50 pF, 15 pF | 1 k Ω | V_{CC} |

[1] For 74HCT4066: maximum input voltage $V_i = 3.0$ V.

11. Additional dynamic characteristics

Table 13. Additional dynamic characteristics

Recommended conditions and typical values; GND = 0 V; $T_{amb} = 25$ °C.

V_{is} is the input voltage at a Yn or Z terminal, whichever is assigned as an input.

V_{os} is the output voltage at a Yn or Z terminal, whichever is assigned as an output.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|----------------|---------------------------|---|-----|------|-----|------|
| THD | total harmonic distortion | $f_i = 1$ kHz; $R_L = 10$ k Ω ; $C_L = 50$ pF; see Fig. 13 | | | | % |
| | | $V_{CC} = 4.5$ V; $V_i = 4.0$ V (p-p) | - | 0.04 | - | % |
| | | $V_{CC} = 9.0$ V; $V_i = 8.0$ V (p-p) | - | 0.02 | - | % |
| | | $f_i = 10$ kHz; $R_L = 10$ k Ω ; $C_L = 50$ pF; see Fig. 13 | | | | |
| | | $V_{CC} = 4.5$ V; $V_i = 4.0$ V (p-p) | - | 0.12 | - | % |
| | | $V_{CC} = 9.0$ V; $V_i = 8.0$ V (p-p) | - | 0.06 | - | % |
| $f_{(-3dB)}$ | -3 dB frequency response | $R_L = 50$ Ω ; $C_L = 10$ pF; see Fig. 14 [1] | | | | |
| | | $V_{CC} = 4.5$ V | - | 180 | - | MHz |
| | | $V_{CC} = 9.0$ V | - | 200 | - | MHz |
| α_{iso} | isolation (OFF-state) | $R_L = 600$ Ω ; $C_L = 50$ pF; $f_i = 1$ MHz; see Fig. 15 [2] | | | | |
| | | $V_{CC} = 4.5$ V | - | -50 | - | dB |
| | | $V_{CC} = 9.0$ V | - | -50 | - | dB |
| V_{ct} | crosstalk voltage | between digital input and switch (peak to peak value); $R_L = 600$ Ω ; $C_L = 50$ pF; $f_i = 1$ MHz; see Fig. 16 | | | | |
| | | $V_{CC} = 4.5$ V | - | 110 | - | mV |
| | | $V_{CC} = 9.0$ V | - | 220 | - | mV |
| Xtalk | crosstalk | between switches; $R_L = 600$ Ω ; $C_L = 50$ pF; $f_i = 1$ MHz; see Fig. 17 [2] | | | | |
| | | $V_{CC} = 4.5$ V | - | -60 | - | dB |
| | | $V_{CC} = 9.0$ V | - | -60 | - | dB |

[1] Adjust input voltage V_{is} to 0 dBm level at V_{os} for $f_i = 1$ MHz (0 dBm = 1 mW into 50 Ω). After set-up, f_i is increased to obtain a reading of -3 dB at V_{os} .

[2] Adjust input voltage V_{is} to 0 dBm level (0 dBm = 1 mW into 600 Ω).



Fig. 13. Test circuit for measuring total harmonic distortion



a. Typical -3 dB frequency response



b. Test circuit

$V_{CC} = 4.5 \text{ V}$; $GND = 0 \text{ V}$; $R_L = 50 \text{ } \Omega$; $R_{source} = 1 \text{ k}\Omega$.

Fig. 14. -3 dB frequency response as a function of frequency



a. Isolation (OFF-state)



b. Test circuit

$V_{CC} = 4.5\text{ V}$; $GND = 0\text{ V}$; $R_L = 600\ \Omega$; $R_{source} = 1\text{ k}\Omega$.

Fig. 15. Isolation (OFF-state) as a function of frequency



a. Test circuit



b. Crosstalk voltage

Fig. 16. Test circuit for measuring crosstalk voltage (between the digital input and the switch)



Fig. 17. Test circuit for measuring crosstalk (between the switches)

12. Package outline

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

SOT108-1



Fig. 18. Package outline SOT108-1 (SO14)

SSOP14: plastic shrink small outline package; 14 leads; body width 5.3 mm

SOT337-1



Fig. 19. Package outline SOT337-1 (SSOP14)

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

SOT402-1



Fig. 20. Package outline SOT402-1 (TSSOP14)

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



Fig. 21. Package outline SOT762-1 (DHVQFN14)

13. Abbreviations

Table 14. Abbreviations

| Acronym | Description |
|---------|---|
| CMOS | Complementary Metal-Oxide Semiconductor |
| DUT | Device Under Test |
| ESD | ElectroStatic Discharge |
| HBM | Human Body Model |
| MM | Machine Model |
| TTL | Transistor-Transistor Logic |

14. Revision history

Table 15. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------------|--|-----------------------|---------------|----------------------|
| 74HC_HCT4066 v.9 | 20200414 | Product data sheet | - | 74HC_HCT4066 v.8 |
| Modifications: | <ul style="list-style-type: none"> The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia. Legal texts have been adapted to the new company name where appropriate. Table 9: C_{PD} value of 74HC4066 moved to typical column. Table 4: Derating values for P_{tot} total power dissipation have been updated. | | | |
| 74HC_HCT4066 v.8 | 20151203 | Product data sheet | - | 74HC_HCT4066 v.7 |
| Modifications: | <ul style="list-style-type: none"> Type numbers 74HC4066N and 74HCT4066N (SOT27-1) removed. | | | |
| 74HC_HCT4066 v.7 | 20130402 | Product data sheet | - | 74HC_HCT4066 v.6 |
| Modifications: | <ul style="list-style-type: none"> Descriptive title corrected (errata). New general description (errata). | | | |
| 74HC_HCT4066 v.6 | 20120718 | Product data sheet | - | 74HC_HCT4066 v.5 |
| Modifications: | <ul style="list-style-type: none"> The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors. Legal texts have been adapted to the new company name where appropriate. | | | |
| 74HC_HCT4066 v.5 | 20041111 | Product data sheet | - | 74HC_HCT4066 v.4 |
| 74HC_HCT4066 v.4 | 20030617 | Product data sheet | - | 74HC_HCT4066_CNV v.3 |
| 74HC_HCT4067_CNV v.3 | 19981110 | Product data sheet | - | 74HC_HCT4066_CNV v.2 |
| 74HC_HCT4066_CNV v.2 | 19981002 | Product specification | - | - |

15. Legal information

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 <https://www.nexperia.com>.

Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. Nexperia does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

Short data sheet — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local Nexperia sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

Product specification — The information and data provided in a Product data sheet shall define the specification of the product as agreed between Nexperia and its customer, unless Nexperia and customer have explicitly agreed otherwise in writing. In no event however, shall an agreement be valid in which the Nexperia product is deemed to offer functions and qualities beyond those described in the Product data sheet.

Disclaimers

Limited warranty and liability — Information in this document is believed to be accurate and reliable. However, Nexperia does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information. Nexperia takes no responsibility for the content in this document if provided by an information source outside of Nexperia.

In no event shall Nexperia be liable for any indirect, incidental, punitive, special or consequential damages (including - without limitation - lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory.

Notwithstanding any damages that customer might incur for any reason whatsoever, Nexperia's aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the Terms and conditions of commercial sale of Nexperia.

Right to make changes — Nexperia reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — Nexperia products are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or malfunction of an Nexperia product can reasonably be expected to result in personal

injury, death or severe property or environmental damage. Nexperia and its suppliers accept no liability for inclusion and/or use of Nexperia products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Quick reference data — The Quick reference data is an extract of the product data given in the Limiting values and Characteristics sections of this document, and as such is not complete, exhaustive or legally binding.

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

Customers are responsible for the design and operation of their applications and products using Nexperia products, and Nexperia accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the Nexperia product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products.

Nexperia does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the customer's applications or products, or the application or use by customer's third party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using Nexperia products in order to avoid a default of the applications and the products or of the application or use by customer's third party customer(s). Nexperia does not accept any liability in this respect.

Limiting values — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) will cause permanent damage to the device. Limiting values are stress ratings only and (proper) operation of the device at these or any other conditions above those given in the Recommended operating conditions section (if present) or the Characteristics sections of this document is not warranted. Constant or repeated exposure to limiting values will permanently and irreversibly affect the quality and reliability of the device.

Terms and conditions of commercial sale — Nexperia products are sold subject to the general terms and conditions of commercial sale, as published at <http://www.nexperia.com/profile/terms>, unless otherwise agreed in a valid written individual agreement. In case an individual agreement is concluded only the terms and conditions of the respective agreement shall apply. Nexperia hereby expressly objects to applying the customer's general terms and conditions with regard to the purchase of Nexperia products by customer.

No offer to sell or license — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

Export control — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from competent authorities.

Non-automotive qualified products — Unless this data sheet expressly states that this specific Nexperia product is automotive qualified, the product is not suitable for automotive use. It is neither qualified nor tested in accordance with automotive testing or application requirements. Nexperia accepts no liability for inclusion and/or use of non-automotive qualified products in automotive equipment or applications.

In the event that customer uses the product for design-in and use in automotive applications to automotive specifications and standards, customer (a) shall use the product without Nexperia's warranty of the product for such automotive applications, use and specifications, and (b) whenever customer uses the product for automotive applications beyond Nexperia's specifications such use shall be solely at customer's own risk, and (c) customer fully indemnifies Nexperia for any liability, damages or failed product claims resulting from customer design and use of the product for automotive applications beyond Nexperia's standard warranty and Nexperia's product specifications.

Translations — A non-English (translated) version of a document is for reference only. The English version shall prevail in case of any discrepancy between the translated and English versions.

Trademarks

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

Contents

| | |
|---|-----------|
| 1. General description | 1 |
| 2. Features and benefits | 1 |
| 3. Ordering information | 1 |
| 4. Functional diagram | 2 |
| 5. Pinning information | 2 |
| 5.1. Pinning..... | 2 |
| 5.2. Pin description..... | 3 |
| 6. Functional description | 3 |
| 7. Limiting values | 3 |
| 8. Recommended operating conditions | 4 |
| 9. Static characteristics | 4 |
| 10. Dynamic characteristics | 8 |
| 10.1. Waveforms and test circuit..... | 9 |
| 11. Additional dynamic characteristics | 11 |
| 12. Package outline | 15 |
| 13. Abbreviations | 18 |
| 14. Revision history | 19 |
| 15. Legal information | 20 |

© Nexperia B.V. 2020. All rights reserved

For more information, please visit: <http://www.nexperia.com>

For sales office addresses, please send an email to: salesaddresses@nexperia.com

Date of release: 14 April 2020

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)

Email: org@lifeelectronics.ru