

阅读申明

- 1.本站收集的数据手册和产品资料都来自互联网，版权归原作者所有。如读者和版权方有任何异议请及时告之，我们将妥善解决。
- 2.本站提供的中文数据手册是英文数据手册的中文翻译，其目的是协助用户阅读，该译文无法自动跟随原稿更新，同时也可能存在翻译上的不当。建议读者以英文原稿为参考以便获得更精准的信息。
- 3.本站提供的产品资料，来自厂商的技术支持或者使用者的心得体会等，其内容可能存在描述上的差异，建议读者做出适当判断。
- 4.如需与我们联系，请发邮件到marketing@iczoom.com，主题请标有“数据手册”字样。

Read Statement

1. The datasheets and other product information on the site are all from network reference or other public materials, and the copyright belongs to the original author and original published source. If readers and copyright owners have any objections, please contact us and we will deal with it in a timely manner.
2. The Chinese datasheets provided on the website is a Chinese translation of the English datasheets. Its purpose is for reader's learning exchange only and do not involve commercial purposes. The translation cannot be automatically updated with the original manuscript, and there may also be improper translations. Readers are advised to use the English manuscript as a reference for more accurate information.
3. All product information provided on the website refer to solutions from manufacturers' technical support or users the contents may have differences in description, and readers are advised to take the original article as the standard.
4. If you have any questions, please contact us at marketing@iczoom.com and mark the subject with "Datasheets" .



3.3V CMOS 1-TO-4 CLOCK DRIVER

IDT74FCT38074

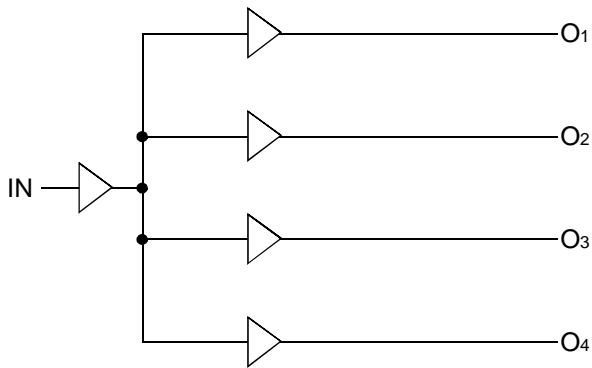
FEATURES:

- Advanced CMOS Technology
- Guaranteed low skew < 100ps (max.)
- Very low duty cycle distortion < 250ps (max.)
- High speed propagation delay < 3ns (max.)
- Very low CMOS power levels
- TTL compatible inputs and outputs
- 1:4 fanout
- Maximum output rise and fall time < 1.5ns (max.)
- Low input capacitance: 3pF typical
- $V_{CC} = 3.3V \pm 0.3V$
- Inputs can be driven from 3.3V or 5V components
- Operating frequency up to 166MHz
- Available in SOIC package

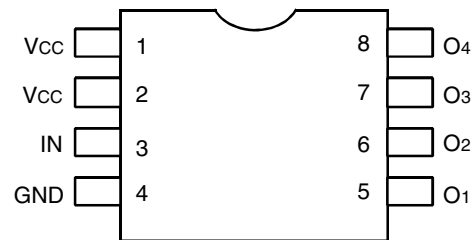
DESCRIPTION:

The FCT38074 is a 3.3V clock driver built using advanced CMOS technology. This low skew clock driver offers 1:4 fanout. The large fanout from a single input reduces loading on the preceding driver and provides an efficient clock distribution network. Multiple power and grounds reduce noise. Typical applications are clock and signal distribution.

FUNCTIONAL BLOCK DIAGRAM



PIN CONFIGURATION



SOIC
TOP VIEW

ABSOLUTE MAXIMUM RATINGS⁽¹⁾

| Symbol | Description | Max | Unit |
|------------------|----------------------------|------------------------------|------|
| V _{CC} | Input Power Supply Voltage | -0.5 to +4.6 | V |
| V _I | Input Voltage | -0.5 to +5.5 | V |
| V _O | Output Voltage | -0.5 to V _{CC} +0.5 | V |
| T _J | Junction Temperature | 150 | °C |
| T _{STG} | Storage Temperature | -65 to +165 | °C |

NOTE:

- Stresses greater than those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

CAPACITANCE (T_A = +25°C, f = 1.0MHz)

| Symbol | Parameter ⁽¹⁾ | Conditions | Typ. | Max. | Unit |
|------------------|--------------------------|-----------------------|------|------|------|
| C _{IN} | Input Capacitance | V _{IN} = 0V | 3 | 4 | pF |
| C _{OUT} | Output Capacitance | V _{OUT} = 0V | — | 6 | pF |

NOTE:

- This parameter is measured at characterization but not tested.

PIN DESCRIPTION

| Pin Names | Description |
|----------------|-------------|
| I _N | Input |
| O _x | Outputs |

POWER SUPPLY CHARACTERISTICS

| Symbol | Parameter | Test Conditions ⁽¹⁾ | | Min. | Typ. ⁽²⁾ | Max. | Unit |
|------------------|--|--|---|------|---------------------|------|--------|
| I _{CCQ} | Quiescent Power Supply Current | V _{CC} = Max. | V _{IN} = GND or V _{CC} | — | 0.1 | 30 | μA |
| ΔI _{CC} | Power Supply Current per Input HIGH | V _{CC} = Max. | V _{IN} = V _{CC} - 0.6V | — | 45 | 300 | μA |
| I _{CCD} | Dynamic Power Supply Current per Output ⁽³⁾ | V _{CC} = Max. C _L = 15pF All Outputs Toggling | V _{IN} = V _{CC} V _{IN} = GND | — | 80 | 120 | μA/MHz |
| I _C | Total Power Supply Current ⁽⁴⁾ | V _{CC} = Max. C _L = 15pF All Outputs Toggling f _i = 133MHz | V _{IN} = V _{CC} V _{IN} = GND | | 80 | 110 | mA |
| | | | V _{IN} = V _{CC} - 0.6V V _{IN} = GND | | 80 | 110 | |
| | | V _{CC} = Max. C _L = 15pF All Outputs Toggling f _i = 166MHz | V _{IN} = V _{CC} V _{IN} = GND | — | 110 | 140 | |
| | | | V _{IN} = V _{CC} - 0.6V V _{IN} = GND | — | 110 | 140 | |

NOTES:

- For conditions shown as Max. or Min., use appropriate value specified under Electrical Characteristics for the applicable device type.
- Typical values are at V_{CC} = 3.3V, +25°C ambient.
- This parameter is not directly testable, but is derived for use in Total Power Supply calculations.
- I_C = I_{QUIESCENT} + I_{INPUTS} + I_{DYNAMIC}
 $I_C = I_{CC} + \Delta I_{CC} \cdot D_H \cdot N_T + I_{CCD} \cdot f_i$
 I_{CC} = Quiescent Current
 ΔI_{CC} = Power Supply Current for a TTL High Input (V_{IN} = V_{CC} - 0.6V)
 D_H = Duty Cycle for TTL Inputs High
 N_T = Number of TTL Inputs at D_H
 I_{CCD} = Dynamic Current Caused by an Input Transition Pair (HLH or LHL)
 f_i = Input Frequency

DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE

Following Conditions Apply Unless Otherwise Specified

Industrial: $T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$, $V_{CC} = 3.3\text{V} \pm 0.3\text{V}$

| Symbol | Parameter | Test Conditions ⁽¹⁾ | | Min. | Typ. ⁽²⁾ | Max. | Unit |
|-----------|-----------------------|--|----------------------------|--------------------|---------------------|---------|---------------|
| V_{IH} | Input HIGH Level | | | 2 | — | 5.5 | V |
| V_{IL} | Input LOW Level | | | -0.5 | — | 0.8 | V |
| I_{IH} | Input HIGH Current | $V_{CC} = \text{Max.}$ | $V_i = 5.5\text{V}$ | — | — | ± 1 | μA |
| I_{IL} | Input LOW Current | $V_{CC} = \text{Max.}$ | $V_i = \text{GND}$ | — | — | ± 1 | |
| V_{IK} | Clamp Diode Voltage | $V_{CC} = \text{Min.}, I_{IN} = -18\text{mA}$ | | — | -0.7 | -1.2 | V |
| I_{ODH} | Output HIGH Current | $V_{CC} = 3.3\text{V}, V_{IN} = V_{IH}$ or $V_{IL}, V_O = 1.5\text{V}^{(3,4)}$ | | -45 | -75 | -180 | mA |
| I_{ODL} | Output LOW Current | $V_{CC} = 3.3\text{V}, V_{IN} = V_{IH}$ or $V_{IL}, V_O = 1.5\text{V}^{(3,4)}$ | | 50 | 92 | 200 | mA |
| I_{OS} | Short Circuit Current | $V_{CC} = \text{Max.}, V_O = \text{GND}^{(3,4)}$ | | -60 | -135 | -240 | mA |
| V_{OH} | Output HIGH Voltage | $V_{CC} = \text{Min.}$ | $I_{OH} = -12\text{mA}$ | 2.4 ⁽⁵⁾ | 3 | — | V |
| | | $V_{IN} = V_{IH}$ or V_{IL} | $I_{OH} = -100\mu\text{A}$ | $V_{CC} - 0.2$ | — | — | |
| V_{OL} | Output LOW Voltage | $V_{CC} = \text{Min.}$ | $I_{OL} = 12\text{mA}$ | — | 0.3 | 0.5 | V |
| | | $V_{IN} = V_{IH}$ or V_{IL} | $I_{OL} = 100\mu\text{A}$ | — | — | 0.2 | |

NOTES:

- For conditions shown as Max. or Min., use appropriate value specified under Electrical Characteristics for the applicable device type.
- Typical values are at $V_{CC} = 3.3$, 25°C ambient.
- This parameter is guaranteed but not tested.
- Not more than one output should be shorted at one time. Duration of the test should not exceed one second.
- $V_{OH} = V_{CC} - 0.6\text{V}$ at rated current.

SWITCHING CHARACTERISTICS OVER OPERATING RANGE (3,4)

| Symbol | Parameter | Conditions ^(1,8) | Min. ⁽²⁾ | Max. | Unit |
|------------------------|---|---|---------------------|------|------|
| t_{PLH} t_{PHL} | Propagation Delay | $C_L = 15\text{pF}$ $f \leq 166\text{MHz}$ | 0.5 | 3 | ns |
| t_R | Output Rise Time (0.8V to 2V) | | — | 1.5 | ns |
| t_F | Output Fall Time (2V to 0.8V) | | — | 1.5 | ns |
| $t_{SK(O)}$ | Same device output pin-to-pin skew ⁽⁵⁾ | | — | 100 | ps |
| $t_{SK(P)}$ | Pulse skew ⁽⁶⁾ | | — | 250 | ps |
| $t_{SK(PP)}$ | Part to part skew ⁽⁷⁾ | | — | 550 | ps |
| f_{MAX} | Input Frequency | | — | 166 | MHz |

NOTES:

- See test circuits and waveforms.
- Minimum limits are guaranteed but not tested on Propagation Delays.
- t_{PLH} , t_{PHL} , $t_{SK(P)}$, and $t_{SK(O)}$ are production tested. All other parameters guaranteed but not production tested.
- Propagation delay range indicated by Min. and Max. limit is due to V_{CC} , operating temperature and process parameters. These propagation delay limits do not imply skew.
- Skew measured between all outputs under identical transitions and load conditions.
- Skew measured is difference between propagation delay times t_{PHL} and t_{PLH} of same output under identical load conditions.
- Part to part skew for all outputs given identical transitions and load conditions at identical V_{CC} levels and temperature.
- Airflow of 1m/s is recommended for frequencies above 133MHz.

TEST CIRCUITS

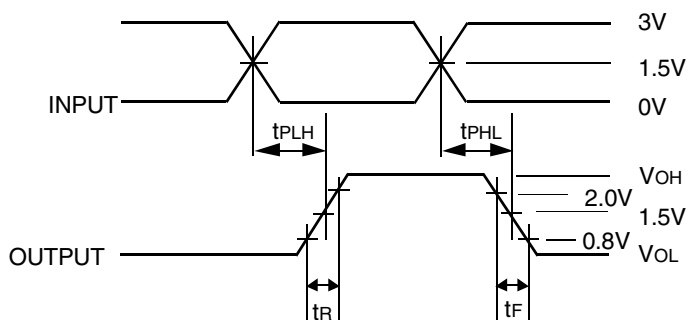
TEST CONDITIONS

| Symbol | V _{CC} = 3.3V ±0.3V | Unit |
|---------------------------------|-------------------------------------|------|
| C _L | 15 | pF |
| R _L | 33 | Ω |
| R _T | Z _{OUT} of pulse generator | Ω |
| t _R / t _F | 1 (0V to 3V or 3V to 0V) | ns |

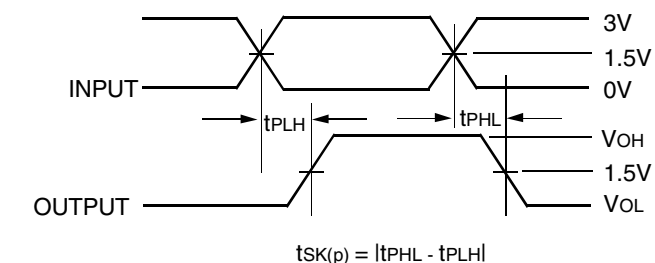
DEFINITIONS:

C_L = Load capacitance: includes jig and probe capacitance.
 R_T = Termination resistance: should be equal to Z_{OUT} of the Pulse Generator.
 t_R / t_F = Rise/Fall time of the input stimulus from the Pulse Generator.

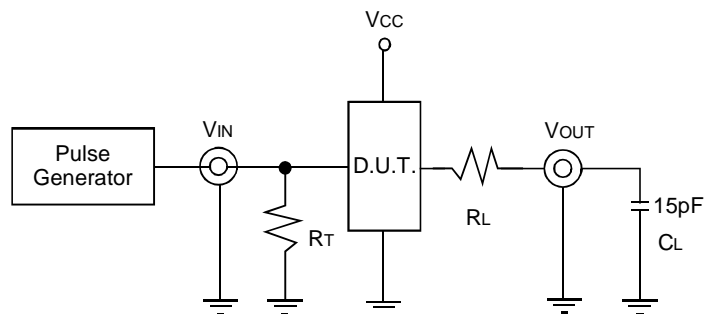
TEST WAVEFORMS



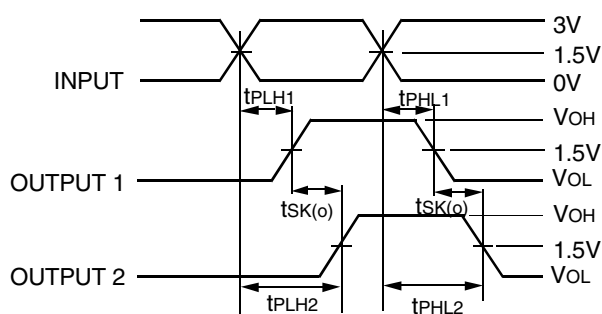
Propagation Delay



Pulse Skew - tsk(p)

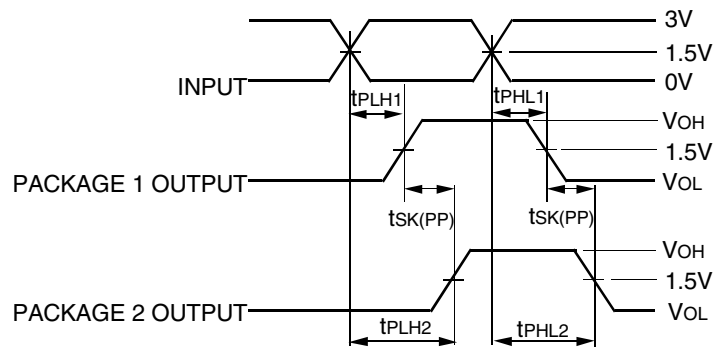


CL = 15pF Circuit



$$tsk(o) = |tPLH2 - tPLH1| \text{ or } |tPHL2 - tPHL1|$$

Output Skew - tsk(o)

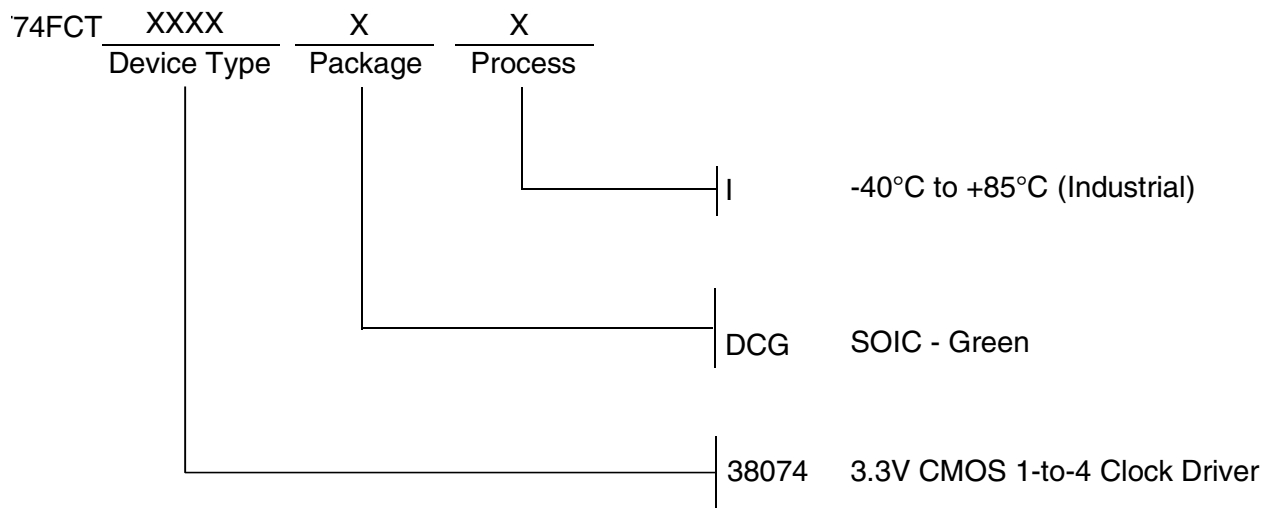


$$tsk(pp) = |tPLH2 - tPLH1| \text{ or } |tPHL2 - tPHL1|$$

Part-to-Part Skew - tsk(pp)

Part-to-Part Skew is for the same package and speed grade.

ORDERING INFORMATION



CORPORATE HEADQUARTERS
6024 Silver Creek Valley Road
San Jose, CA 95138

for SALES:
800-345-7015 or 408-284-8200
fax: 408-284-2775
www.idt.com

for Tech Support:
clockhelp@idt.com