3.3V CMOS
1-TO-10 CLOCK DRIVER

IDT74FCT3807/A

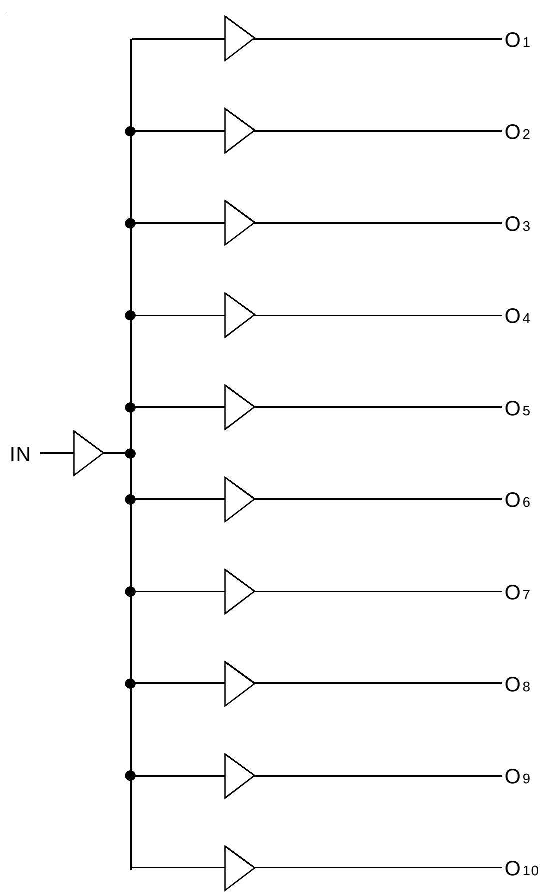
FEATURES:

- **0.5 MICRON CMOS Technology**
- **Guaranteed low skew < 350ps (max.)**
- **Very low duty cycle distortion < 350ps (max.)**
- **High speed: propagation delay < 3ns (max.)**
- **Very low CMOS power levels**
- **TTL compatible inputs and outputs**
- **1:10 fanout**
- **Maximum output rise and fall time < 1.5ns (max.)**
- **Low input capacitance: 4.5pF typical**
- **V_{CC} = 3.3V ± 0.3V**
- **Inputs can be driven from 3.3V or 5V components**
- **Available in SSOP, SOIC, and QSOP packages**

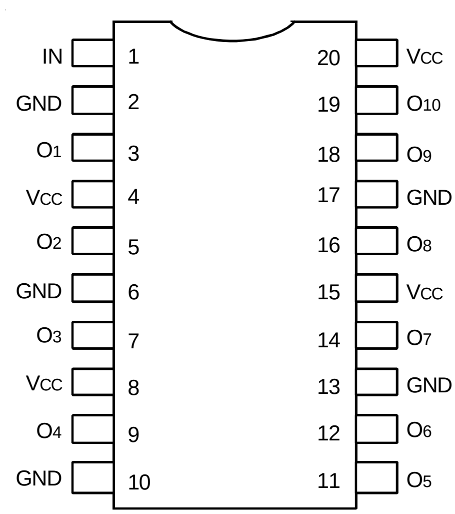
DESCRIPTION:

The FCT3807/A 3.3V clock driver is built using advanced dual metal CMOS technology. This low skew clock driver offers 1:10 fanout. The large fanout from a single input reduces loading on the preceding driver and provides an efficient clock distribution network. The FCT3807/A offers low capacitance inputs with hysteresis for improved noise margins. Multiple power and grounds reduce noise. Typical applications are clock and signal distribution.

FUNCTIONAL BLOCK DIAGRAM



PIN CONFIGURATION



SOIC/ SSOP/ QSOP
TOP VIEW

ABSOLUTE MAXIMUM RATINGS(1)

Symbol	Description	Max	Unit
V_{TERM}(2)	Terminal Voltage with Respect to GND	–0.5 to +4.6	V
V_{TERM}(3)	Terminal Voltage with Respect to GND	–0.5 to +7	V
V_{TERM}(4)	Terminal Voltage with Respect to GND	–0.5 to V_{CC}+0.5	V
T_{STG}	Storage Temperature	–65 to +150	°C
I_{OUT}	DC Output Current	–60 to +60	mA

NOTES:
1. 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.
2. V_{CC} terminals.
3. Input terminals.
4. Outputs and I/O terminals.

CAPACITANCE (T_A = +25°C, f = 1.0MHz)

Symbol	Parameter(1)	Conditions	Typ.	Max.	Unit
C_{IN}	Input Capacitance	V_{IN} = 0V	4.5	6	pF
C_{OUT}	Output Capacitance	V_{OUT} = 0V	5.5	8	pF

NOTE:
1. This parameter is measured at characterization but not tested.

PIN DESCRIPTION

Pin Names	Description
IN	Clock Inputs
Ox	Clock Outputs

POWER SUPPLY CHARACTERISTICS

Symbol	Parameter	Test Conditions(1)		Min.	Typ.(2)	Max.	Unit
ΔI_{CC}	Quiescent Power Supply Current TTL Inputs HIGH	V_{CC} = Max. V_{IN} = V_{CC} –0.6V(3)		—	10	30	µA
I_{CCD}	Dynamic Power Supply Current(4)	V_{CC} = Max. Input toggling 50% Duty Cycle Outputs Open	V_{IN} = V_{CC} V_{IN} = GND	—	0.31	0.45	mA/MHz
I_C	Total Power Supply Current(6)	V_{CC} = Max. Input toggling 50% Duty Cycle Outputs Open fi = 50MHz	V_{IN} = V_{CC} V_{IN} = GND	—	15.5	22.8	mA
			V_{IN} = V_{CC} –0.6V V_{IN} = GND	—	15.5	22.8	

NOTES:
1. For conditions shown as Max. or Min., use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at V_{CC} = 3.3V, +25°C ambient.
3. Per TTL driven input (V_{IN} = V_{CC} -0.6V); all other inputs at V_{CC} or GND.
4. This parameter is not directly testable, but is derived for use in Total Power Supply calculations.
5. Values for these conditions are examples of the I_C formula. These limits are guaranteed but not tested.
6. $I_C = I_{QUIESCENT} + I_{INPUTS} + I_{DYNAMIC}$
   $I_C = I_{CC} + \Delta I_{CC} D_H N_T + I_{CCD} (f_i)$
   I_{CC} = Quiescent Current (I_{CCL}, I_{CCH} and I_{CCZ})
   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
   All currents are in milliamps and all frequencies are in megahertz.

DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE

Following Conditions Apply Unless Otherwise Specified
Commercial: T_A = 0°C to +75°C, Industrial: T_A = -40°C to +85°C, V_{CC} = 3.3V ± 0.3V

Symbol	Parameter	Test Conditions[1]		Min.	Typ.	Max.	Unit
V_{IH}	Input HIGH Level (Input pins)	Guaranteed Logic HIGH Level		2	—	5.5	V
	Input HIGH Level (I/O pins)			2	—	V_{CC} + 0.5	
V_{IL}	Input LOW Level (Input and I/O pins)	Guaranteed Logic LOW Level		–0.5	—	0.8	V
I_{IH}	Input HIGH Current (Input pins)	V_{CC} = Max.	V_I = 5.5V	—	—	±1	µA
	Input HIGH Current (I/O pins)		V_I = V_{CC}	—	—	±1	
I_{IL}	Input LOW Current (Input pins)	V_{CC} = Max.	V_I = GND	—	—	±1	
	Input LOW Current (I/O pins)		V_I = GND	—	—	±1	
I_{OZH}	High Impedence Output Current	V_{CC} = Max.	V_O = V_{CC}	—	—	±1	µA
I_{OZL}	(3-State Output Pins)		V_O = GND	—	—	±1	
V_{IK}	Clamp Diode Voltage	V_{CC} = Min., I_{IN} = –18mA		—	–0.7	–1.2	V
I_{ODH}	Output HIGH Current	V_{CC} = 3.3V, V_{IN} = V_{IH} or V_{IL}, V_O = 1.5V[3]		–36	–60	–110	mA
I_{ODL}	Output LOW Current	V_{CC} = 3.3V, V_{IN} = V_{IH} or V_{IL}, V_O = 1.5V[3]		50	90	200	mA
V_{OH}	Output HIGH Voltage	V_{CC} = Min.	I_{OH} = –0.1mA	V_{CC}–0.2	—	—	V
		V_{IN} = V_{IH} or V_{IL}	I_{OH} = –8mA	2.4[5]	3	—	
V_{OL}	Output LOW Voltage	V_{CC} = Min.	I_{OL} = 0.1mA	—	—	0.2	V
		V_{IN} = V_{IH} or V_{IL}	I_{OL} = 16mA	—	0.2	0.4	
			I_{OL} = 24mA	—	0.3	0.5	
I_{OFF}	Input Power Off Leakage	V_{CC} = 0V, V_{IN} = 4.5V		—	—	±1	µA
I_{OS}	Short Circuit Current[4]	V_{CC} = Max., V_O = GND[3]		–60	–135	–240	mA
V_H	Input Hysteresis	—		—	150	—	mV
I_{CCL} I_{CCH} I_{CCZ}	Quiescent Power Supply Current	V_{CC} = Max. V_{IN} = GND or V_{CC}		—	0.1	10	µA

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

SWITCHING CHARACTERISTICS OVER OPERATING RANGE - COMMERCIAL(3,4)

Symbol	Parameter	Conditions(1)	FCT3807 Min.(2)	FCT3807 Max.	FCT3807A Min.(2)	FCT3807A Max.	Unit
t_{PLH} t_{PHL}	Propagation Delay	50Ω to $V_{CC}/2$ C_L = 10pF	1.5	3.5	1.5	3	ns
t_R	Output Rise Time	(See figure 1)	—	1.5	—	1.5	ns
t_F	Output Fall Time	or 10Ω AC	—	1.5	—	1.5	ns
$t_{SK(O)}$	Output skew: skew between outputs of same package (same transition)	termination, C_L = 50pF	—	0.5	—	0.35	ns
$t_{SK(P)}$	Pulse skew: skew between opposite transitions of same output ($\|t_{PHL} - t_{PLH}\|$)	(See figure 2) $f \leq 100MHz$	—	0.5	—	0.35	ns
$t_{SK(T)}$	Package skew: skew between outputs of different packages at same power supply voltage, temperature, package type and speed grade	Outputs connected in groups of two	—	0.9	—	0.65	ns

Symbol	Parameter	Conditions(1)	FCT3807 Min.(2)	FCT3807 Max.	FCT3807A Min.(2)	FCT3807A Max.	Unit
t_{PLH} t_{PHL}	Propagation Delay	C_L = 30pF $f \leq 67MHz$	1.5	4.5	1.5	4	ns
t_R	Output Rise Time	(See figure 3)	—	1.5	—	1.5	ns
t_F	Output Fall Time		—	1.5	—	1.5	ns
$t_{SK(O)}$	Output skew: skew between outputs of same package (same transition)		—	0.5	—	0.35	ns
$t_{SK(P)}$	Pulse skew: skew between opposite transitions of same output ($\|t_{PHL} - t_{PLH}\|$)		—	0.5	—	0.35	ns
$t_{SK(T)}$	Package skew: skew between outputs of different packages at same power supply voltage, temperature, package type and speed grade		—	1	—	0.75	ns

Symbol	Parameter	Conditions(1)	FCT3807 Min.(2)	FCT3807 Max.	FCT3807A Min.(2)	FCT3807A Max.	Unit
t_{PLH} t_{PHL}	Propagation Delay	C_L = 50pF $f \leq 40MHz$	1.5	4.8	1.5	4.3	ns
t_R	Output Rise Time	(See figure 4)	—	1.5	—	1.5	ns
t_F	Output Fall Time		—	1.5	—	1.5	ns
$t_{SK(O)}$	Output skew: skew between outputs of same package (same transition)		—	0.5	—	0.35	ns
$t_{SK(P)}$	Pulse skew: skew between opposite transitions of same output ($\|t_{PHL} - t_{PLH}\|$)		—	0.5	—	0.35	ns
$t_{SK(T)}$	Package skew: skew between outputs of different packages at same power supply voltage, temperature, package type and speed grade		—	1	—	0.75	ns

NOTES:
1. See test circuits and waveforms.
2. Minimum limits are guaranteed but not tested on Propagation Delays.
3. t_{PLH}, t_{PHL}, $t_{SK}(t)$ are production tested. All other parameters guaranteed but not production tested.
4. 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.

SWITCHING CHARACTERISTICS OVER OPERATING RANGE - INDUSTRIAL(3,4)

Symbol	Parameter	Conditions(1)	FCT3807 Min.(2)	FCT3807 Max.	FCT3807A Min.(2)	FCT3807A Max.	Unit
t_{PLH} t_{PHL}	Propagation Delay	50Ω to $V_{CC}/2$ C_L = 10pF	1.5	3.5	1.5	3	ns
t_R	Output Rise Time	(See figure 1)	—	1.5	—	1.5	ns
t_F	Output Fall Time	or 50Ω AC	—	1.5	—	1.5	ns
$t_{SK(O)}$	Output skew: skew between outputs of same package (same transition)	termination, C_L = 10pF	—	0.6	—	0.45	ns
$t_{SK(P)}$	Pulse skew: skew between opposite transitions of same output ($\|t_{PHL} - t_{PLH}\|$)	(See figure 2) f ≤ 100MHz	—	0.6	—	0.45	ns
$t_{SK(T)}$	Package skew: skew between outputs of different packages at same power supply voltage, temperature, package type and speed grade	Outputs connected in groups of two	—	0.9	—	0.65	ns

Symbol	Parameter	Conditions(1)	FCT3807 Min.(2)	FCT3807 Max.	FCT3807A Min.(2)	FCT3807A Max.	Unit
t_{PLH} t_{PHL}	Propagation Delay	C_L = 30pF f ≤ 67MHz	1.5	4.5	1.5	4	ns
t_R	Output Rise Time	(See figure 3)	—	1.5	—	1.5	ns
t_F	Output Fall Time		—	1.5	—	1.5	ns
$t_{SK(O)}$	Output skew: skew between outputs of same package (same transition)		—	0.6	—	0.45	ns
$t_{SK(P)}$	Pulse skew: skew between opposite transitions of same output ($\|t_{PHL} - t_{PLH}\|$)		—	0.6	—	0.45	ns
$t_{SK(T)}$	Package skew: skew between outputs of different packages at same power supply voltage, temperature, package type and speed grade		—	1	—	0.75	ns

Symbol	Parameter	Conditions(1)	FCT3807 Min.(2)	FCT3807 Max.	FCT3807A Min.(2)	FCT3807A Max.	Unit
t_{PLH} t_{PHL}	Propagation Delay	C_L = 50pF f ≤ 40MHz	1.5	4.8	1.5	4.3	ns
t_R	Output Rise Time	(See figure 4)	—	1.5	—	1.5	ns
t_F	Output Fall Time		—	1.5	—	1.5	ns
$t_{SK(O)}$	Output skew: skew between outputs of same package (same transition)		—	0.6	—	0.45	ns
$t_{SK(P)}$	Pulse skew: skew between opposite transitions of same output ($\|t_{PHL} - t_{PLH}\|$)		—	0.6	—	0.45	ns
$t_{SK(T)}$	Package skew: skew between outputs of different packages at same power supply voltage, temperature, package type and speed grade		—	1	—	0.75	ns

NOTES:
1. See test circuits and waveforms.
2. Minimum limits are guaranteed but not tested on Propagation Delays.
3. t_{PLH}, t_{PHL}, $t_{SK}(t)$ are production tested. All other parameters guaranteed but not production tested.
4. 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.

TEST CIRCUITS

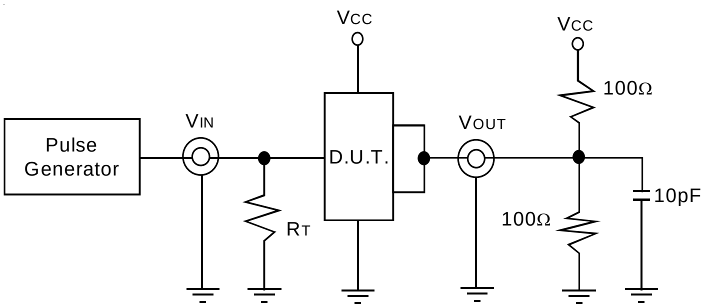


Figure 1. $Z_O = 50\Omega$ to $V_{CC}/2$, $C_L = 10pF$

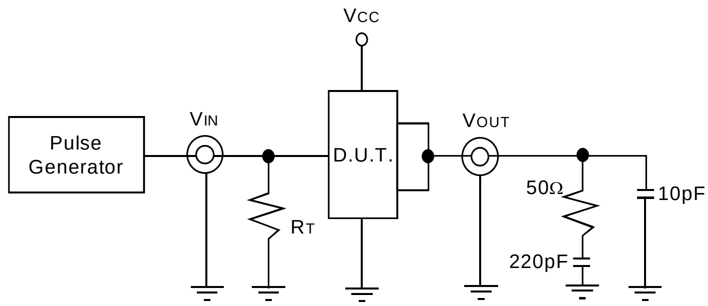


Figure 2. $Z_O = 50\Omega$ AC Termination, $C_L = 10pF$

The capacitor value for ac termination is determined by the operating frequency. For very low frequencies a higher capacitor value should be selected.

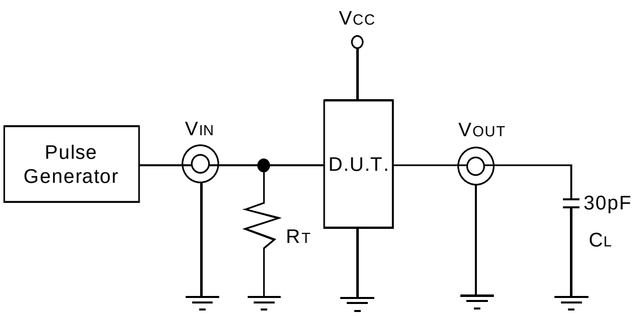


Figure 3. $C_L = 30pF$ Circuit

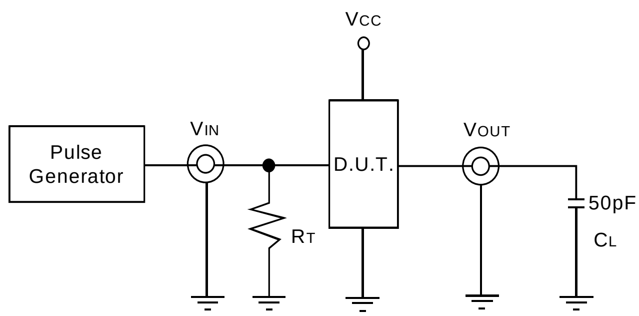


Figure 3. $C_L = 50pF$ Circuit

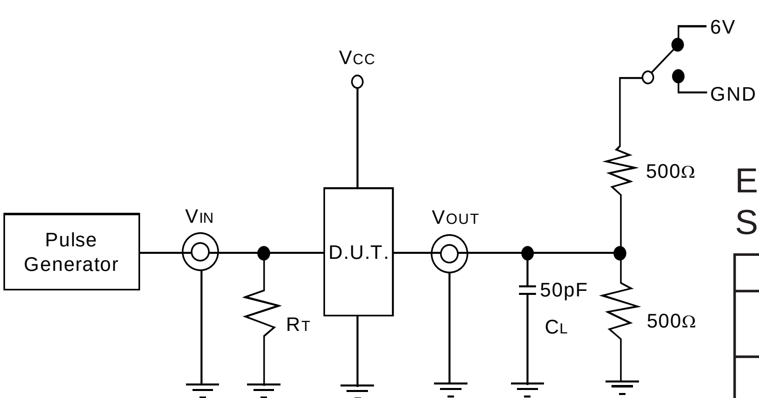


Figure 5. Enable and Disable Time Circuit

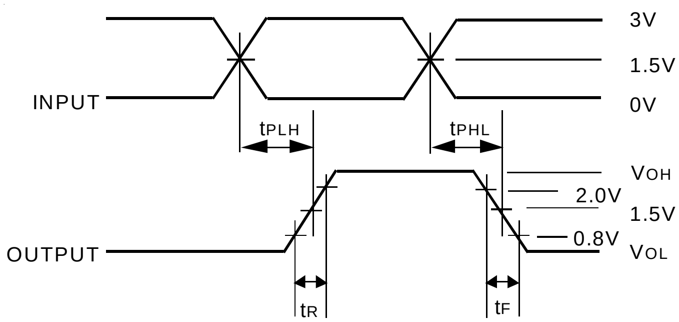
ENABLE AND DISABLE TIME SWITCH POSITION

Test	Switch
Disable LOW Enable LOW	6V
Disable HIGH Enable HIGH	GND

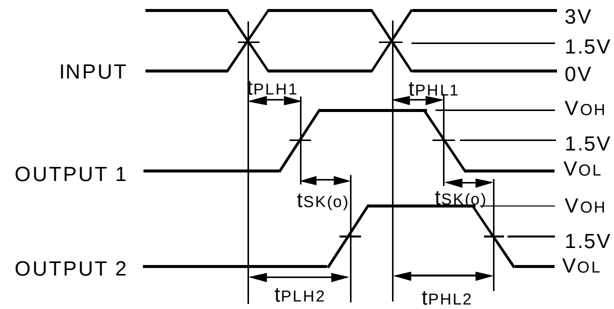
DEFINITIONS:

C_L = Load capacitance: includes jig and probe capacitance.
R_T = Termination resistance: should be equal to Z_{OUT} of the Pulse Generator.

TEST WAVEFORMS

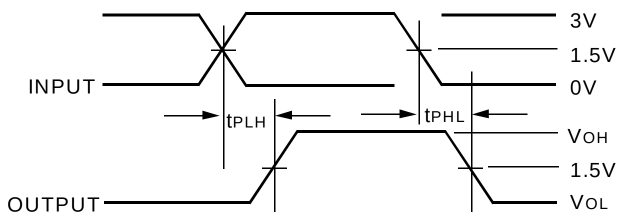


Package Delay



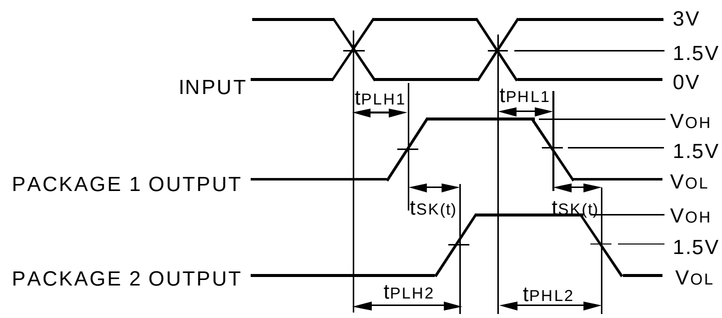
tSK(o) = |tPLH2 - tPLH1| or |tPHL2 - tPHL1|

Output Skew - tSK(O)



tSK(p) = |tPHL - tPLH|

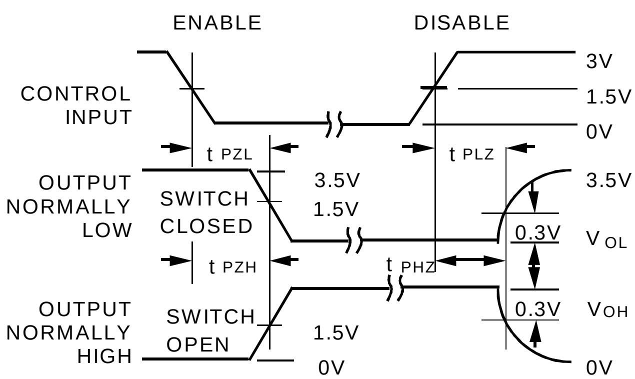
Pulse Skew - tSK(P)



tSK(t) = |tPLH2 - tPLH1| or |tPHL2 - tPHL1|

Package Skew - tSK(T)

Package 1 and Package 2 are same device type and speed grade



Enable and Disable Times

NOTES:
1. Diagram shown for input Control Enable-LOW and input Control Disable-HIGH
2. Pulse Generator for All Pulses: f ≤ 1.0MHz; t_F ≤ 2.5ns; t_R ≤ 2.5ns

ORDERING INFORMATION

IDT74FCT XXXX X X

XXXX	X	X
Device Type	Package	Temp. Range

Temp. Range

Blank	Commercial (0°C to +70°C)
I	Industrial (-40°C to +85°C)

Package

SO	Small Outline IC
PY	Shrink Small Outline IC
Q	Quarter-size Small Outline IC

Device Type

3807 3807A	1-to-10 3.3V Clock Driver

Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.

Как с нами связаться

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