

1:8 Clock Fanout Buffer

Features

- Low-voltage operation $V_{DD} = 3.3V$
- 1:8 fanout
- Single-input-configurable for LVDS, LVPECL, or LVTTTL
- 8 pairs of LVPECL outputs with enable/disable
- Drives a 50-ohm load
- Low input capacitance
- Low output skew
- Low propagation delay Typical ($t_{pd} < 4 ns$)
- Industrial versions available
- Package available include: TSSOP
- Does not exceed Bellcore 802.3 standards
- Operation up to 350 MHz/700 Mbps

Description

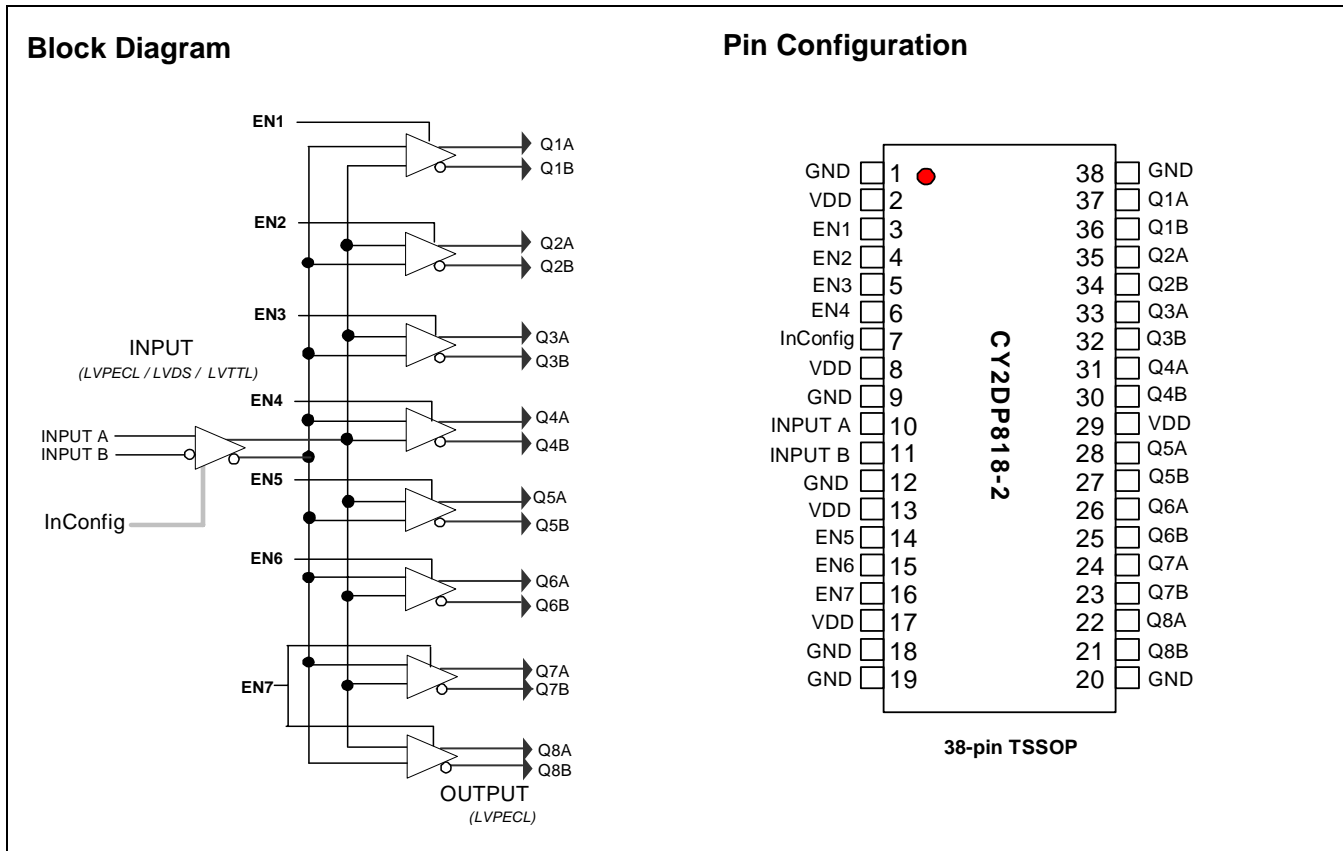
This Cypress series of network circuits is produced using advanced 0.35-micron CMOS technology, achieving the industry's fastest logic.

The Cypress CY2DP818-2 fanout buffer features a single LVDS or a single-ended LVTTTL-compatible input and eight LVPECL output pairs.

Designed for data-communications clock-management applications, the large fanout from a single input reduces loading on the input clock.

The CY2DP818-2 is ideal for both level translations from single-ended to LVPECL and/or for the distribution of LVPECL-based clock signals.

The Cypress CY2DP818-2 has configurable input functions. The input is user-configurable via the Inconfig pin for single ended or differential input.



Pin Description

Pin Number	Pin Name	Pin Standard Interface	Description
1, 9,12,18,19,20,38	GND	POWER	Ground
2,8,13,29,17	VDD	POWER	Power Supply
3,4,5,6,14,15,16	EN(1:7)	LVTTTL/LVCMOS	The respective outputs are enabled when these pins are pulled high. Outputs are disabled when connected to GND. EN7 controls both Q7(A,B) and Q8(A,B)
10,11	Input A, Input B	Default: LVPECL/LVDS Optional: LVTTTL/LVCMOS single pin	Differential input pair or single line. LVPECL/LVDS default. See InConfig, below.
37, 36,35,34, 33,32,31, 30, 28,27,26,25, 24,23,22,21	Q1(A,B), Q2(A,B) Q3(A,B), Q4(A,B) Q5(A,B), Q6(A,B) Q7(A,B), Q8(A,B)	LVPECL	Differential Outputs
7	InConfig	LVTTTL/LVCMOS	Converts inputs from the default LVPECL/LVDS (logic = 0) to LVTTTL/LVCMOS (logic = 1) See Input Receiver Configuration for Differential or LVTTTL/LVCMOS table (below), <i>Figure 5</i> and <i>Figure 6</i> for additional Information

Power Supply Characteristics

Parameter	Description	Test Conditions	Min.	Typ.	Max.	Unit
ICCD	Dynamic Power Supply Current	V _{DD} = Max. Input toggling 50% Duty Cycle, Outputs Open		1.5	2.0	mA/ MHz
IC	Total Power Supply Current	V _{DD} = Max. Input toggling 50% Duty Cycle, Outputs 50 ohms, f _L =100 MHz			350	mA
IC Core	Core current when output loads are disabled	V _{DD} = Max. Input toggling 50% Duty Cycle, Outputs Disabled, not connected to VTT f _L = 100 MHz			50	mA

Input Receiver Configuration for Differential or LVTTTL/LVCMOS

INCONFIG Pin 7 Binary Value	Input Receiver Family	Input Receiver Type
1	LVTTTL in LVCMOS	Single-ended, non-inverting, inverting, void of bias resistors
0	LVDS	Low-voltage differential signaling
	LVPECL	Low-voltage pseudo (positive) emitter coupled logic

Function Control of the TTL Input Logic used to Accept or Invert the Input Signal

LVTTTL/LVCMOS Input Logic			
Input Condition		Input Logic	Output Logic Q Pins, Q1A or Q1
Ground	Input B (-) Pin 11		
	Input A (+) Pin 10	Input	True
V _{DD}	Input B (-) Pin 11		
	Input A (+) Pin 10	Input	Invert
Ground	Input A (+) Pin 10		
	Input B (-) Pin 11	Input	Invert
V _{DD}	Input A (+) Pin 10		
	Input B (-) Pin 11	Input	True

Absolute Maximum Conditions

Parameter	Description	Condition	Min.	Max.	Unit	
V _{DD}	DC Supply Voltage	Inputs and V _{CC}	-0.3	4.6	V	
V _{DD}	DC Operating Voltage	Outputs	-0.3	V _{DD} + 0.3	V	
V _{IN}	DC Input Voltage	Relative to V _{SS} , with or V _{DD} applied	-0.3	V _{DD} + 0.3	V	
V _{OUT}	DC Output Voltage	Relative to V _{SS}	-0.3	V _{DD} + 0.9	V	
V _{TT}	Output termination Voltage		-	V _{DD} ÷ 2	V	
T _S	Temperature, Storage	Non-functional	-65	+150	°C	
T _A	Temperature, Operating Ambient	Commercial	Functional	0	70	°C
		Industrial	Functional	-40	+85	

Multiple Supplies: The voltage on any input or I/O pin cannot exceed the power pin during power-up. Power supply sequencing is NOT required.

DC Electrical Specifications (3.3V – LVDS Input @ V_{DD} = 3.3V ± 5%, T_A = 0°C to 70°C or -40°C to 85°C)

Parameter	Description	Conditions	Min.	Typ.	Max.	Unit
V _{ID}	Magnitude of Differential Input Voltage		100		600	mV
V _{IC}	Common-mode of Differential Input Voltage V _{ID} (min. and max.)		IV _{ID} /2	2.4-(IV _{ID} /2)		V
I _{IH}	Input High Current	V _{DD} = Max. V _{IN} = V _{DD}	-	±10	±20	µA
I _{IL}	Input Low Current	V _{DD} = Max. V _{IN} = V _{SS}	-	±10	±20	µA

DC Electrical Specifications (3.3V – LVPECL Input @ V_{DD} = 3.3V ± 5%, T_A = 0°C to 70°C or -40°C to 85°C)

Parameter	Description	Conditions	Min.	Typ.	Max.	Unit
V _{ID}	Differential Input Voltage p-p	Guaranteed Logic High Level	400	-	2600	mV
V _{IH}	Input High Voltage	Guaranteed Logic High Level	2.15	-	2.4	V
V _{IL}	Input Low Voltage	Guaranteed Logic Low Level	1.5	-	1.8	V
I _{IH}	Input High Current	V _{DD} = Max. V _{IN} = V _{DD}	-	±10	±20	µA
I _{IL}	Input Low Current	V _{DD} = Max. V _{IN} = V _{SS}	-	±10	±20	µA
V _{CM}	Common-mode Voltage		1650	-	2250	mV

DC Electrical Specifications (3.3V – LVTTTL/LVCMOS Input @ V_{DD} = 3.3V ± 5%, T_A = 0°C to 70°C or -40°C to 85°C)

Parameter	Description	Conditions	Min.	Typ.	Max.	Units
V _{IH}	Input High Voltage	Guaranteed Logic High Level	2	-	-	V
V _{IL}	Input Low Voltage	Guaranteed Logic Low Level	-	-	0.8	V
I _{IH}	Input High Current	V _{DD} = Max V _{IN} = 2.7V	-	-	1	µA
I _{IL}	Input Low Current	V _{DD} = Max V _{IN} = 0.5V	-	-	-1	µA
I _I	Input High Current	V _{DD} = Max., V _{IN} = V _{DD} (Max.)				
V _{IK}	Clamp Diode Voltage	V _{DD} = Min., I _{IN} = -18 mA	-	-0.7	-1.2	V
V _H	Input Hysteresis ^[1]		-	80		mV

DC Electrical Specifications (3.3V – LVPECL Output @ V_{DD} = 3.3V ± 5%, T_A = 0°C to 70°C or -40°C to 85°C)

Parameter	Description	Conditions	Min.	Typ.	Max.	Unit
V _{OD}	Driver Differential Output voltage p-p	V _{DD} = Min., V _{IN} = V _{IH} or V _{IL} RL = 50 ohm	1000	-	3600	mV
ΔV _{OC}	Driver common-mode variation p-p	V _{DD} = Min., V _{IN} = V _{IH} or V _{IL} RL = 50 ohm	-	-	300	mV

Note:

1. Guaranteed but not tested.

DC Electrical Specifications (3.3V – LVPECL Output @ $V_{DD} = 3.3V \pm 5\%$, $T_A = 0^\circ C$ to $70^\circ C$ or $-40^\circ C$ to $85^\circ C$) (continued)

Parameter	Description	Conditions		Min.	Typ.	Max.	Unit
Rise Time	Differential 20% to 80%	CL–10 pF RL and CL to GND	RL = 50 ohm	300		1200	ps
Fall Time							
V_{OH}	Output High Voltage	$V_{DD} = \text{Min.}, V_{IN} = V_{IH} \text{ or } V_{IL}$	$I_{OH} = -12 \text{ mA}$	2.1	–	3.0	V
V_{OL}	Output Low Voltage	$V_{DD} = \text{Min.}, V_{IN} = V_{IH} \text{ or } V_{IL}$ User-defined by VTT RTT.		0.8	–	1.3	V
I_{OS}	Short Circuit Current	$V_{DD} = \text{Max.}, V_{OUT} = \text{GND}$		–	–	–150	mA

AC Switching Characteristics (@ $V_{DD} = 3.3V \pm 5\%$, $T_A = 0^\circ C$ to $70^\circ C$ or $-40^\circ C$ to $85^\circ C$)

Parameter	Description	Conditions	Min.	Typ.	Max.	Unit
t_{PLH}	Propagation Delay – Low to High	$V_{OD} = 100 \text{ mV}$	3	4	5	ns
t_{PHL}	Propagation Delay – High to Low		3	4	5	ns
T_{PE}	Enable (EN) to functional operation		–	–	6	ns
T_{PD}	Functional operation to Disable		–	–	5	ns
$t_{SK(0)}$	Output Skew: Skew between outputs of the same package (in phase)		–	–	0.2	ns
$t_{SK(p)}$	Pulse Skew: Skew between opposite transitions of the same output ($t_{PHL} - t_{PLH}$)		–	0.2		ns
$t_{SK(t)}$	Package Skew: Skew between outputs of different packages at the same power supply voltage, temperature and package type. Same input signal level and output load.	$V_{ID} = 100 \text{ mV}$	–	–	1	ns

High-frequency Parametrics

Parameter	Description	Conditions	Min.	Typ.	Max.	Unit
Fmax	Maximum frequency $V_{DD} = 3.3V$	45%–55% duty cycle Standard load circuit	–	–	350	MHz

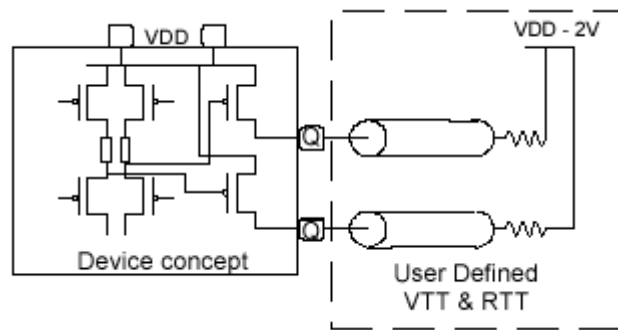
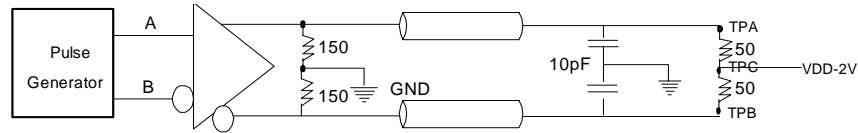
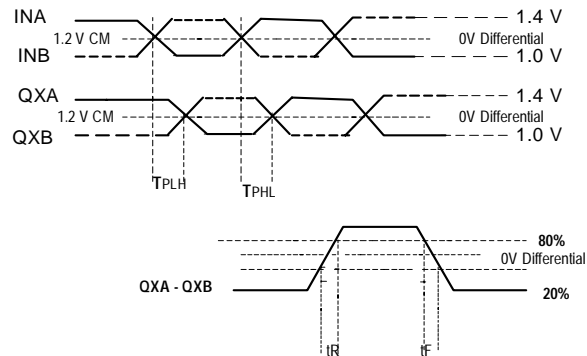
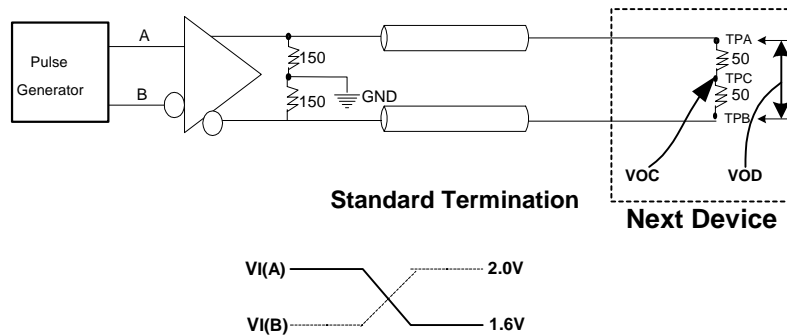
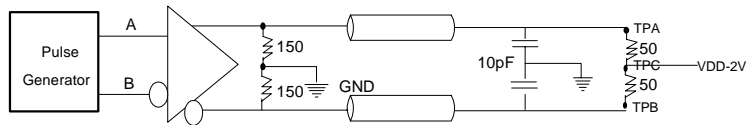
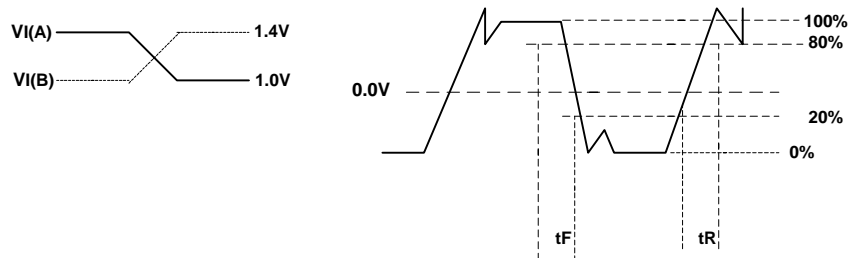
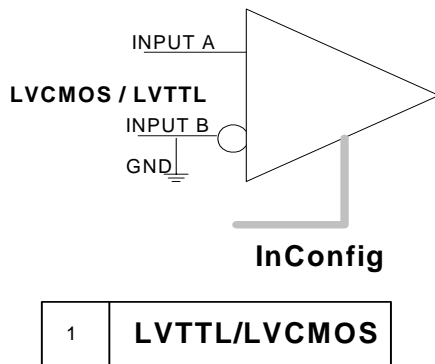
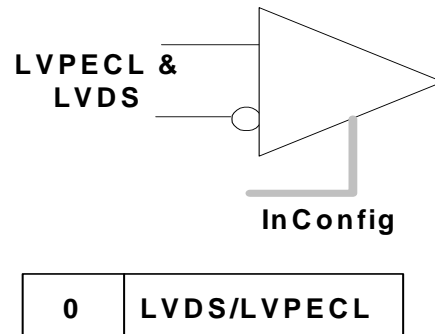


Figure 1. Driver Design


Standard Termination

Figure 2. Differential Receiver to Driver Propagation Delay and Driver Transition Time^[2,3,4,5]

Figure 3. Test Circuit and Voltage Definitions for the Driver Common-Mode Output Voltage^[2,3,4,5]
Notes:

2. All input pulses are supplied by a frequency generator with the following characteristics: t_R and $t_F \leq 1$ ns; pulse rate = 50 Mpps; pulse width = 10 ± 0.2 ns.
3. $R_L = 50 \text{ ohm} \pm 1\%$; $Z_{line} = 50 \text{ ohm } 6''$.
4. CL includes instrumentation and fixture capacitance within 6" of the DUT.
5. TPA and B are used for prop delay and Rise/Fall measurements. TPC is used for VOC measurements only and is otherwise connected to $V_{DD} - 2$.


Standard Termination

Figure 4. Test Circuit and Voltage Definitions for the Differential Output Signal^[2,3,4,5]

Figure 5. ^[7]

Figure 6. ^[7]
Ordering Information

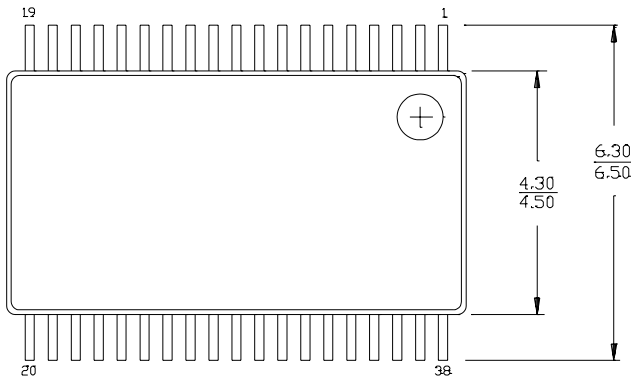
Part Number	Package Type	Product Flow
CY2DP818ZI-2	38-pin TSSOP	Industrial, -40° to 85°C
CY2DP818ZI-2T	38-pin TSSOP–Tape and Reel	Industrial, -40° to 85°C
CY2DP818ZC-2	38-pin TSSOP	Commercial, 0°C to 70°C
CY2DP818ZC-2T	38-pin TSSOP–Tape and Reel	Commercial, 0°C to 70°C

Notes:

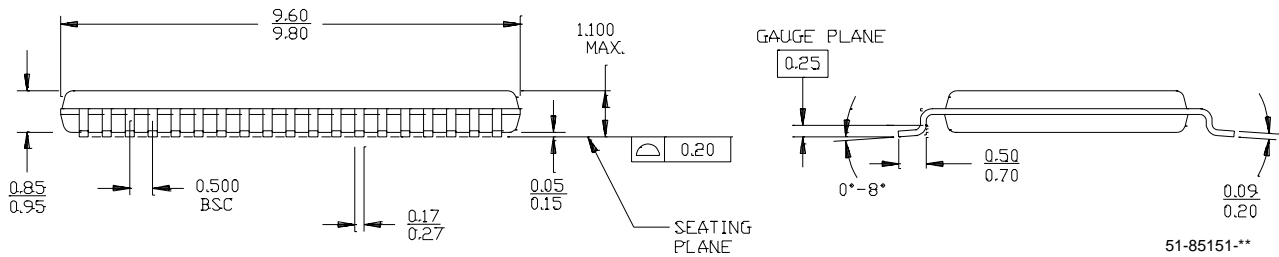
- 6. See *Table .*
- 7. LVPECL or LVDS differential input value.

Package Drawing and Dimensions

38-lead TSSOP (4.40 mm Body) Z38



DIMENSIONS IN MM MIN.
MAX.



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Document History Page

Document Title: CY2DP818-2 1:8 Clock Fanout Buffer Document Number: 38-07588				
REV.	ECN NO.	Issue Date	Orig. of Change	Description of Change
**	129879	11/07/03	RGL	New Data Sheet

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