1:8 Clock Fanout Buffer

Features

- **Low-voltage operation V_{DD} = 3.3V**
- **1:8 fanout**
- **Single-input-configurable for LVDS, LVPECL, or LVTTL**
- **8 pairs of LVPECL outputs with enable/disable**
- **Drives a 50-ohm load**
- **Low input capacitance**
- **Low output skew**
- **Low propagation delay Typical *(tpd < 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.

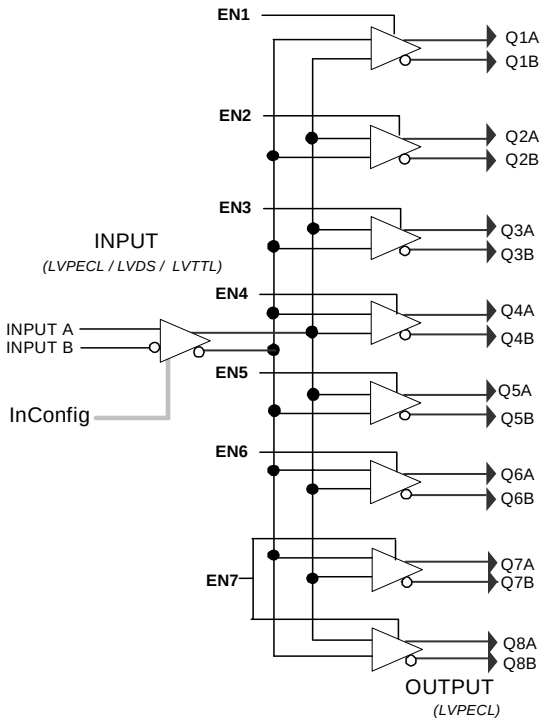
The Cypress CY2DP818-2 fanout buffer features a single LVDS or a single-ended LVTTL-compatible input and eight LVPECL output pairs.

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

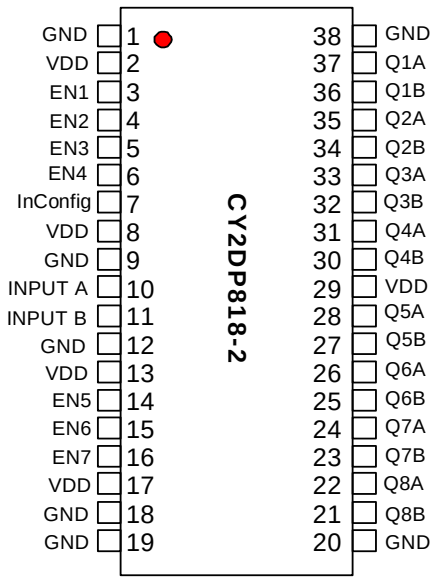
The CY2DP818-2 is ideal for both level translations from single-ended to LVPECL and/or for the distribution of LVPECL-based clock signals.

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

Block Diagram



Pin Configuration



38-pin TSSOP

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)	LVTTL/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/LDVS Optional: LVTTL/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	LVTTL/LVCMOS	**Converts inputs from the default LVPECL/LVDS (logic = 0) to LVTTL/LVCMOS (logic = 1)** See Input Receiver Configuration for Differential or LVTTL/LVCMOS table (below), *Figure 5* and *Figure 6* 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, fL=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 fL = 100 MHz			50	mA

Input Receiver Configuration for Differential or LVTTL/LVCMOS

INCONFIG Pin 7 Binary Value	Input Receiver Family	Input Receiver Type
1	LVTTL 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

LVTTL/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			–	$V_{DD} \div 2$	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.)			$\|V_{ID}\|/2$	2.4–($\|V_{ID}\|/2$)		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 – LVTTL/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 ± 5%, T_A = 0°C to 70°C or –40°C to 85°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} = Min., V_{IN} = V_{IH} or V_{IL}	I_{OH} = –12 mA	2.1	–	3.0	V
V_{OL}	Output Low Voltage	V_{DD} = Min., V_{IN} = V_{IH} or V_{IL} User-defined by VTT RTT.		0.8	–	1.3	V
I_{OS}	Short Circuit Current	V_{DD} = Max, V_{OUT} = GND		–	–	–150	mA

AC Switching Characteristics (@ 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
t_{PLH}	Propagation Delay – Low to High	V_{OD} = 100 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 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

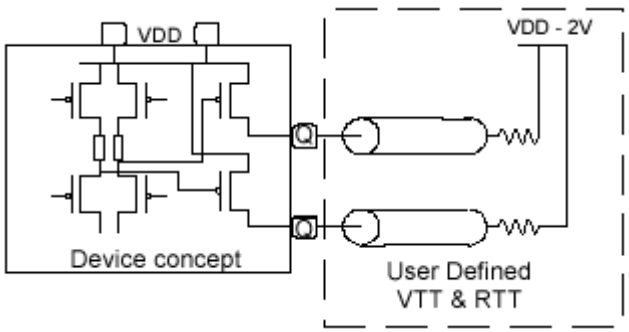
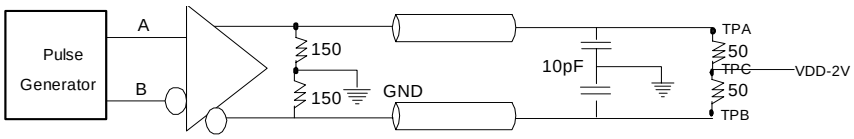


Figure 1. Driver Design



Standard Termination

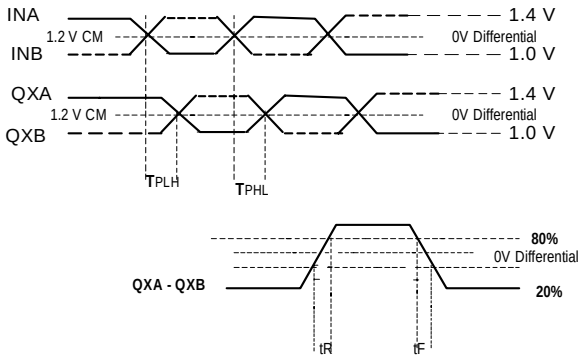


Figure 2. Differential Receiver to Driver Propagation Delay and Driver Transition Time[2,3,4,5]

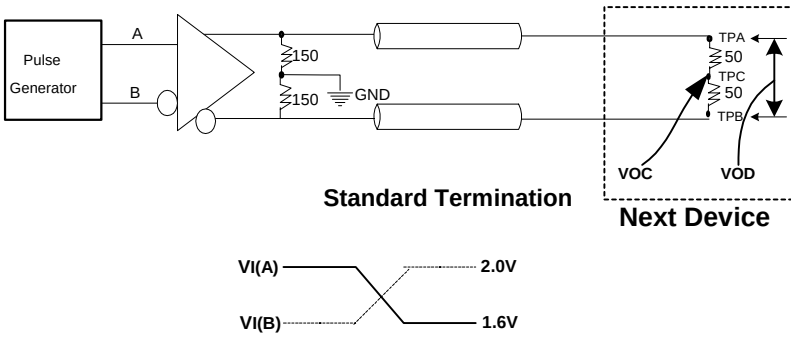
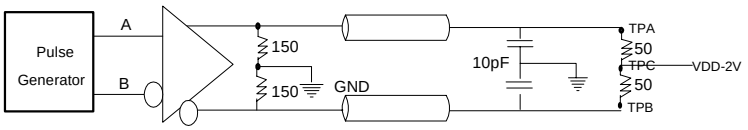


Figure 3. Test Circuit and Voltage Definitions for the Driver Common-Mode Output Voltage[2,3,4,5]

Notes:
2. All input pulses are supplied by a frequency generator with the following characteristics: t_R and $t_F \leq 1$ ns; pulse rerate = 50 Mpps; pulse width = 10 ± 0.2 ns.
3. RL = 50 ohm ± 1%; Zline = 50 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

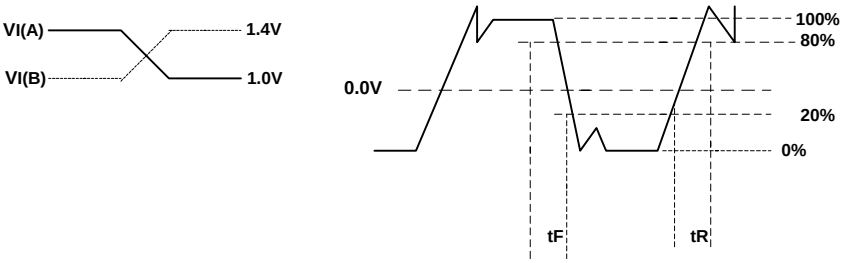
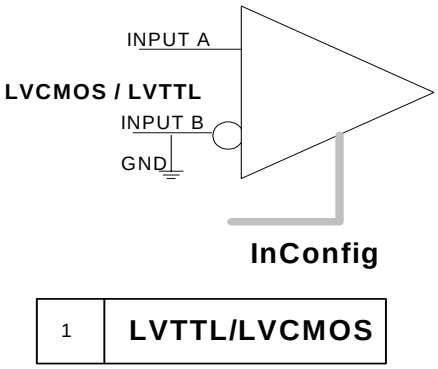
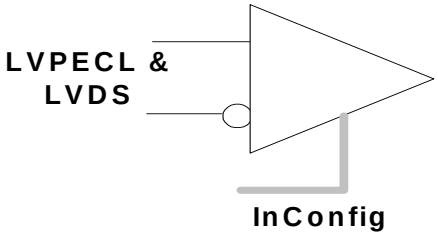


Figure 4. Test Circuit and Voltage Definitions for the Differential Output Signal[2,3,4,5]



1	LVTTL/LVCMOS

Figure 5. [7]



0	LVDS/LVPECL

Figure 6. [7]

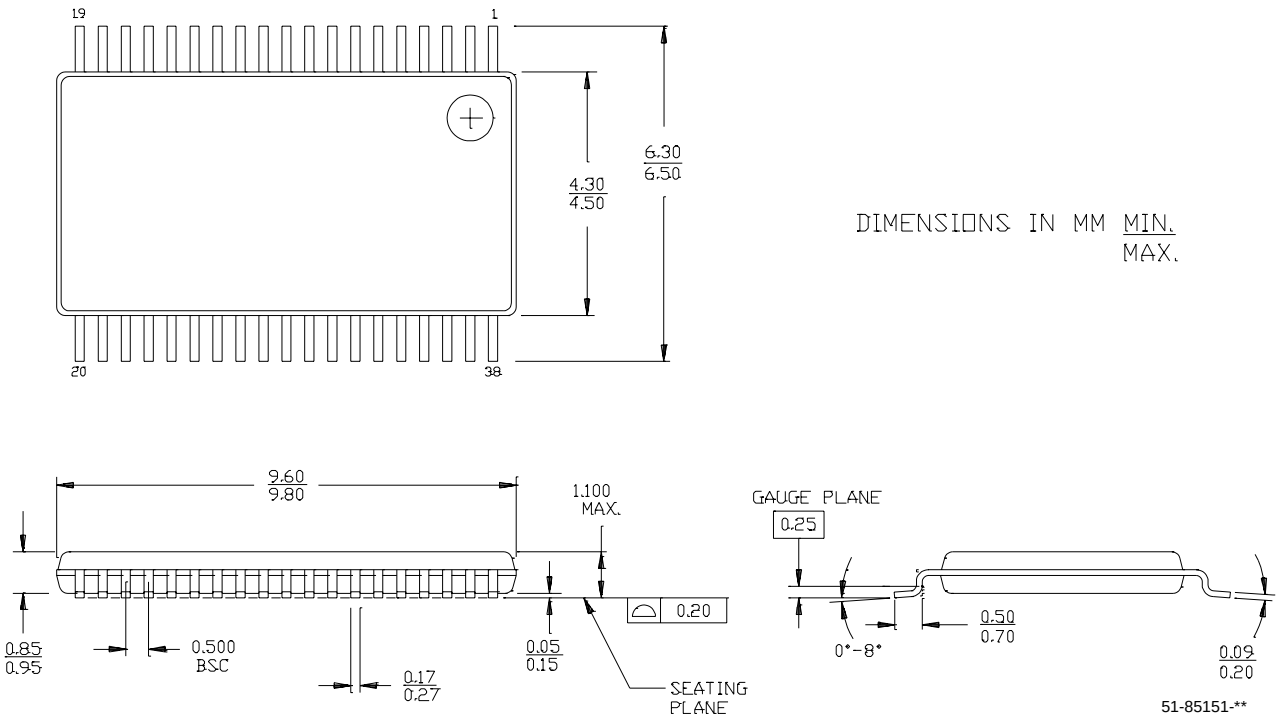
Ordering Information

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



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