Low Voltage 1:4 CMOS Clock Buffer

The MPC94551 is a CMOS 1:4 fanout buffer. The MPC94551 is ideal for applications requiring lower voltage.

Features

- 1:4 CMOS fanout buffer
- 300 ps output to output skew
- I/O frequency up to 160 MHz operation
- Non-inverting output clock
- 3.3 V supply voltage
- Output Enable mode tri-states outputs
- -40°C to 85°C industrial temperature range
- Standard 8-lead SOIC package

MPC94551

1:4 LVCMOS CLOCK BUFFER

D SUFFIX
8-LEAD SOIC PACKAGE
CASE 751-06

EF SUFFIX
8-LEAD SOIC PACKAGE
Pb-FREE PACKAGE
CASE 751-06

ORDERING INFORMATION	
Device	**Package**
MPC94551D	SO-8
MPC94551DR2	SO-8
MPC94551EF	SO-8 (Pb-FREE)
MPC94551EFR2	SO-8 (Pb-FREE)

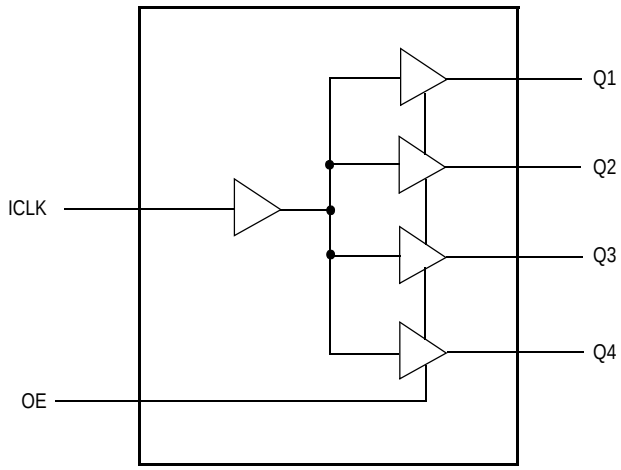


Figure 1. Logic Diagram

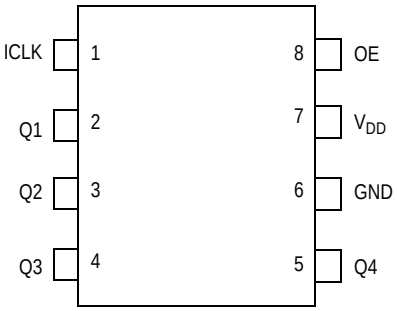


Figure 2. Pin Assignment

Table 1. Pin Description

Pin Number	Pin Name	Pin Type	Pin Description
1	ICLK	Input	Clock input, internal pull-up resistor
2	Q1	Output	Clock output(1)
3	Q2	Output	Clock output(1)
4	Q3	Output	Clock output(1)
5	Q4	Output	Clock output(1)
6	GND	Power	Connect to ground(2)
7	V_{DD}	Power	Connect to 3.3 V(2)
8	OE	Input	Output enable, tri-states outputs when low, internal pull-up resistor

1. A 33 Ω series terminating resistor may be used on each clock output if the trace is longer than 1 inch.
2. A decoupling capacitor of 0.01 μF should be connected between V_{DD} on pin 7 and GND on pin 6, as close to the device as possible.

Table 2. Absolute Maximum Ratings(1)

Parameter	Rating	Unit
Power Supply Voltage, V_{DD}	3.9	V
All Inputs and Outputs	–0.5 to V_{DD} +0.5	V
Ambient Operating Temperature	–40 to +85	°C
Storage Temperature	–65 to +150	°C
Junction Temperature	175	°C
Soldering Temperature	260	°C

1. Stresses above the ratings listed below can cause permanent damage to the device. These ratings are stress ratings only. Functional operation of the device at these or any other conditions above those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods can affect product reliability. Electrical parameters are guaranteed only over the recommended operating temperature range.

Table 3. DC Characteristics (V_{DD} = 3.3 V ± 5%; Ambient Temperature = –40°C to 85°C)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Operating Voltage	V_{DD}		3.15		3.45	V
Input High Voltage(1), ICLK	V_{IH}		V_{DD}/2 + 0.7		3.8	V
Input Low Voltage(1), ICLK	V_{IL}				V_{DD}/2 – 0.7	V
Input High Voltage, OE	V_{IH}		2		V_{DD}	V
Input Low Voltage, OE	V_{IL}				0.8	V
Ouput Low Voltage	V_{OL}	I_{OL} = 12 mA			0.4	V
Output High Voltage	V_{OH}	I_{OH} = –12 mA	2.4			V
Operating Supply Current	I_{DD}	No load, 135 MHz		30		mA
Nominal Output Impedance	Z_O			27		Ω
Internal Pull-up Resistor	R_{PU}	ICLK		31		kΩ
Input Capacitance	C_{IN}	OE pin		5		pF
	C_{IN}	ICLK		1		pF
Short Circuit Current	I_{OS}			±50		mA

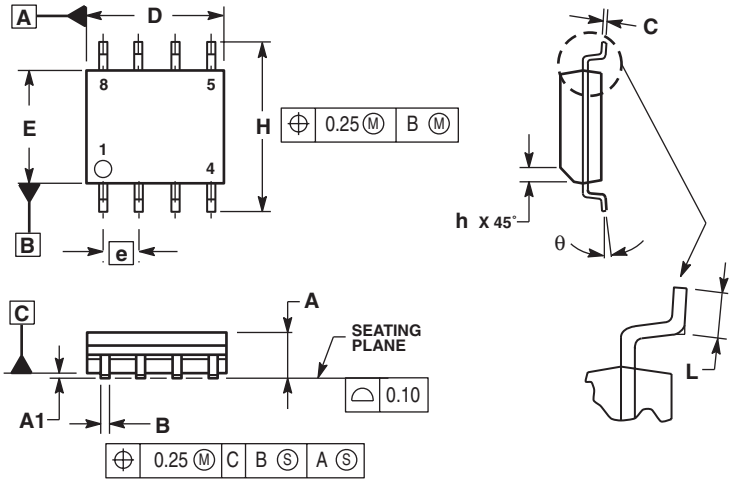
1. Nominal switching threshold is V_{DD}/2.

Table 4. AC Characteristics (V_{DD} = 3.3 V ± 5%; Ambient Temperature = –40°C to 85°C)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Input Frequency			0		160	MHz
Output Frequency(1)		15 pF load			160	MHz
Output Clock Rise Time	t_{OR}	0.8 V to 2.0 V			1.5	ns
Output Clock Fall Time	t_{OF}	2.0 V to 0.8 V			1.5	ns
Propagation Delay(2)		135 MHz	1.5	4	5	ns
Output to Output Skew(3)		Rising edges at V_{DD}/2			300	ps

1. Measured with an external series resistor of 33Ω positioned close to each output pin
2. Measured with rail to rail input clock
3. Measured between any 2 outputs with equal loading

PACKAGE DIMENSIONS



NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. DIMENSIONS ARE IN MILLIMETER.
3. DIMENSION D AND E DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
5. DIMENSION B DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 TOTAL IN EXCESS OF THE B DIMENSION AT MAXIMUM MATERIAL CONDITION.

	MILLIMETERS	
DIM	MIN	MAX
A	1.35	1.75
A1	0.10	0.25
B	0.35	0.49
C	0.19	0.25
D	4.80	5.00
E	3.80	4.00
e	1.27 BSC	
H	5.80	6.20
h	0.25	0.50
L	0.40	1.25
θ	0°	7°

D/EF SUFFIX
SOIC PACKAGE
CASE 751-06
ISSUE T

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MPC94551
Rev. 3
2/2005

Launched by Motorola
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