



# Low Cost Frequency Multiplier

## Features

- Generates 4x clock of the input clock frequency
- Input clock frequency: 3MHz to 78MHz
- Output clock frequency: 12MHz to 312MHz
- External loop filter
- Low Cycle-to-Cycle Jitter
- 3.3V operating voltage range
- 10mA output drives
- TTL or CMOS compatible outputs
- Ultra-low power CMOS design
- Available in 8-pin SOIC

## Product Description

P2084A is a versatile frequency multiplier that is designed specifically as cost effective alternatives to the high precision frequency oscillator.

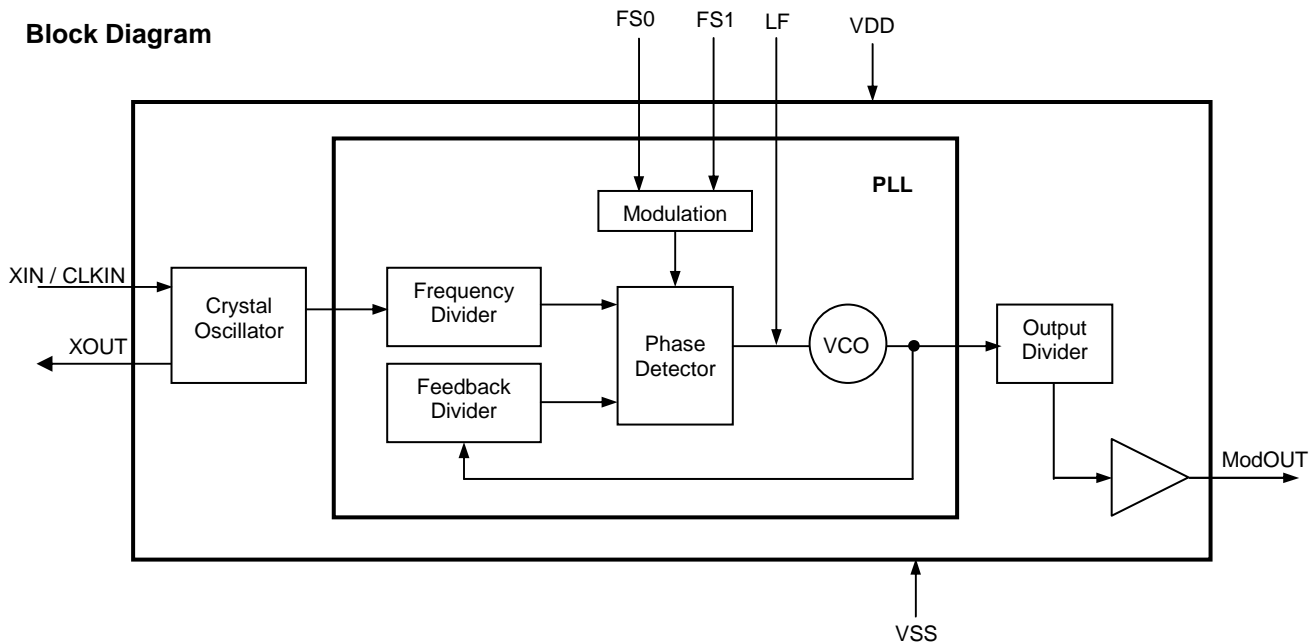
The P2084A can generate a 4x output clock of the input frequency which allows system cost savings by using an inexpensive crystal or resonator to achieve high frequency multiplication.

The P2084A provides up to 312MHz output clock frequencies respectively through the use of the Phase-Lock-Loop (PLL) technique which delivers low jitter and high precision synthesized clocks.

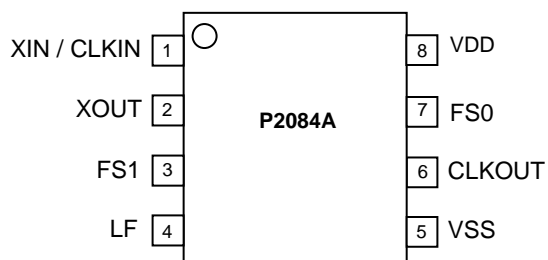
## Applications

The P2084A is targeted towards the high frequency CAN OSC replacement market. Applications include xDSL, routers, networking, PC peripherals, and embedded systems.

## Block Diagram



## Pin Configuration



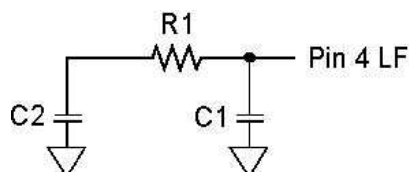
## Pin Description

Pin#	Pin Name	Type	Description
1	XIN / CLKIN	I	Connect to crystal or clock input.
2	XOUT	I	Crystal connection. If using an external reference, this pin must be left unconnected.
3	FS1	I	Digital logic input used to select input frequency range. (See Input Frequency Selection.) This pin has an internal pull-up resistor.
4	LF	I	External loop filter for the PLL. (See <i>Loop Filter Selection</i> Table for value.)
5	VSS	P	Ground connection. Connect to system ground.
6	CLKOUT	O	Clock output.
7	FS0	I	Digital logic input used to select input frequency range. (See <i>Input Frequency Selection</i> .) This pin has an internal pull-up resistor.
8	VDD	P	Connect to +3.3V.

## Input Frequency Selection

FS1	FS0	Input (MHz)	Output Frequency Scaling
			P2084A
0	0	3 to 9	12 to 36
0	1	10 to 19	40 to 76
1	0	20 to 38	80 to 152
1	1	39 to 78	156 to 312

**Loop Filter Selection Table VDD 3.3V**

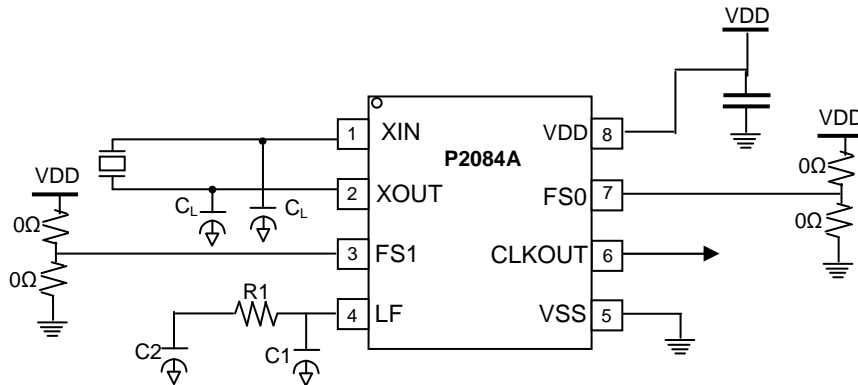


Input (MHz)	FS1	FS0	C1(pF)	C2(pF)	R1 (ohms)
3	0	0	270	330,000	220
4	0	0	270	100,000	270
5	0	0	270	100,000	390
6	0	0	270	100,000	510
7	0	0	270	100,000	620
8	0	0	270	100,000	820
9	0	0	270	100,000	1,000
10	0	1	270	100,000	330
11	0	1	270	100,000	390
12	0	1	270	100,000	510
13	0	1	270	100,000	560
14	0	1	270	100,000	620
15	0	1	270	100,000	750
16	0	1	270	100,000	820
17	0	1	270	100,000	910
18	0	1	270	100,000	1,000
19	0	1	270	100,000	1,200
20	1	0	270	100,000	330
21 - 22	1	0	270	100,000	390
23 - 24	1	0	270	100,000	510
25 - 26	1	0	270	100,000	560
27 - 28	1	0	270	100,000	620
29 - 30	1	0	270	100,000	750
31 - 32	1	0	270	100,000	820
33 - 34	1	0	270	100,000	910
35 - 36	1	0	270	100,000	1,000
37 - 38	1	0	270	100,000	1,200
39 - 42	1	1	270	100,000	330
43 - 46	1	1	270	100,000	390
47 - 50	1	1	270	100,000	510
51 - 54	1	1	270	100,000	560
55 - 58	1	1	270	100,000	620
59 - 62	1	1	270	100,000	750
63 - 66	1	1	270	100,000	820
67 - 70	1	1	270	100,000	910
71 - 74	1	1	270	100,000	1,000
75 - 78	1	1	270	100,000	1,200

## Output Clock Selection Example

The P2084A can generate 4x from the input reference frequency. P2084A's internal crystal oscillator circuits allow the use of an inexpensive crystal of resonator to replace expensive can oscillators that are used in networking, PC peripherals, xDSL, and consumer

applications for high frequency generation. Its input frequency range is optimized for operation from 3MHz to 78MHz, and its output frequency can deliver up to 312MHz.



## Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
V <sub>DD</sub>	Voltage on any pin with respect to Ground	-0.5 to +4.6	V
T <sub>STG</sub>	Storage temperature	-65 to +125	°C
T <sub>s</sub>	Max. Soldering Temperature (10 sec)	260	°C
T <sub>J</sub>	Junction Temperature	150	°C
T <sub>DV</sub>	Static Discharge Voltage (As per JEDEC STD22- A114-B)	2	KV

Note: These are stress ratings only and are not implied for functional use. Exposure to absolute maximum ratings for prolonged periods of time may affect device reliability.

## Operating Conditions

Parameter	Description	Min	Max	Unit
V <sub>DD</sub>	Supply Voltage	3.0	3.6	V
T <sub>A</sub>	Operating Temperature (Ambient Temperature)	-40	+85	°C
C <sub>L</sub>	Load Capacitance		15	pF
C <sub>IN</sub>	Input Capacitance		7	pF

## DC Electrical Characteristics

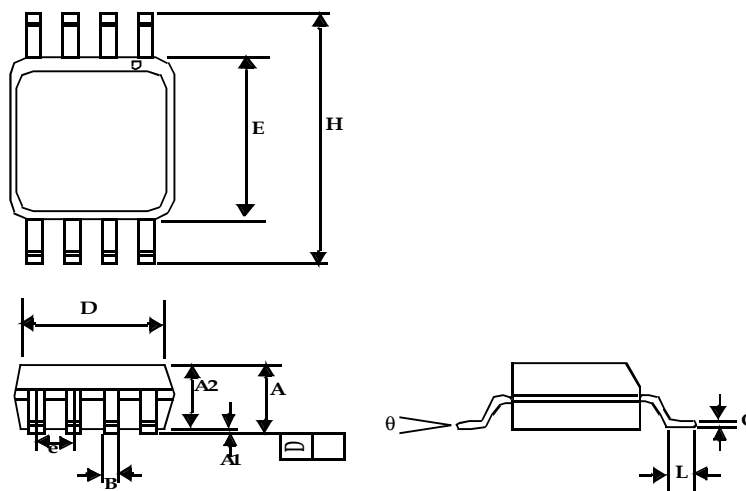
Symbol	Parameter	Min	Typ	Max	Unit
V <sub>IL</sub>	Input low voltage	GND-0.3		0.8	V
V <sub>IH</sub>	Input high voltage	2.0		V <sub>DD</sub> +0.3	V
I <sub>IL</sub>	Input low current (internal input pull-up resistor on FS0 and FS1)		60		μA
I <sub>IH</sub>	Input high current (internal input pull-up resistor on FS0 and FS1)		0		μA
I <sub>XOL</sub>	XOUT output low current		10		mA
I <sub>XOH</sub>	XOUT output high current		10		mA
V <sub>OL</sub>	Output low voltage (V <sub>DD</sub> = 3.3V, I <sub>OL</sub> = 20mA)			0.4	V
V <sub>OH</sub>	Output high voltage (V <sub>DD</sub> = 3.3V, I <sub>OH</sub> = 20mA)	2.5			V
I <sub>DD</sub>	Static supply current		3		mA
I <sub>CC</sub>	Typical dynamic supply current (25pF scope probe loading)	5.2 at 3MHz		21.2 at 82MHz	mA
V <sub>DD</sub>	Operating voltage	3.0	3.3	3.6	V
t <sub>ON</sub>	Power-up time (C <sub>LOOP</sub> = 0.1μF at 16MHz, first locked cycle after power up)		7		mS
Z <sub>OUT</sub>	Clock output impedance (at 16MHz)		28		Ω

## AC Electrical Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
f <sub>IN</sub>	Input frequency	3		78	MHz
	P2084A	12		312	MHz
t <sub>LH</sub> <sup>1</sup>	Output rise time (measured at 0.8V to 2.0V)		1		ns
t <sub>HL</sub> <sup>1</sup>	Output fall time (measured at 2.0V to 0.8V)		1		ns
t <sub>JC</sub>	Jitter (cycle-to-cycle)		±200		ps
t <sub>D</sub>	Output duty cycle	45	50	55	%

Note: 1. t<sub>LH</sub> and t<sub>HL</sub> are measured into a capacitive load of 15 pF.

8-Pin SOIC




Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A1	0.004	0.010	0.10	0.25
A	0.053	0.069	1.35	1.75
A2	0.049	0.059	1.25	1.50
B	0.012	0.020	0.31	0.51
C	0.007	0.010	0.18	0.25
D	0.193 BSC		4.90 BSC	
E	0.154 BSC		3.91 BSC	
e	0.050 BSC		1.27 BSC	
H	0.236 BSC		6.00 BSC	
L	0.016	0.050	0.41	1.27
$\theta$	0°	8°	0°	8°

## Ordering Codes

Part Number	Marking	Package Type	Qty per reel	Temperature
P2084AF-08ST	ABM	8-pin SOIC, tube, Pb Free		0°C to +70°C
P2084AF-08SR	ABM	8-pin SOIC, tape & reel, Pb Free	2500	0°C to +70°C

A "microdot" placed at the end of last row of marking or just below the last row toward the center of package indicates Pb-free

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