



rev 0.4

## Low Cost Frequency Multiplier

### Features

- Generates 2X and 4X clocks of the input clock frequency
- Input clock frequency range from 3 MHz to 78 MHz
- Provides up to:
  - P2082A: 156 MHz output clock frequency
  - P2084A: 312 MHz output clock frequency
- External loop filter
- Low cycle-to-cycle jitter
- 3.3 V operating voltage range
- 10 mA output drives
- TTL or CMOS compatible outputs
- Ultra-low power CMOS design
- Available in industrial temperature range (-25C to +85C)
- Available in 8-pin SOIC and TSSOP

### Product Description

The P2082A and P2084A are versatile frequency

multipliers that are designed specifically as cost effective alternatives to the high precision frequency oscillator.

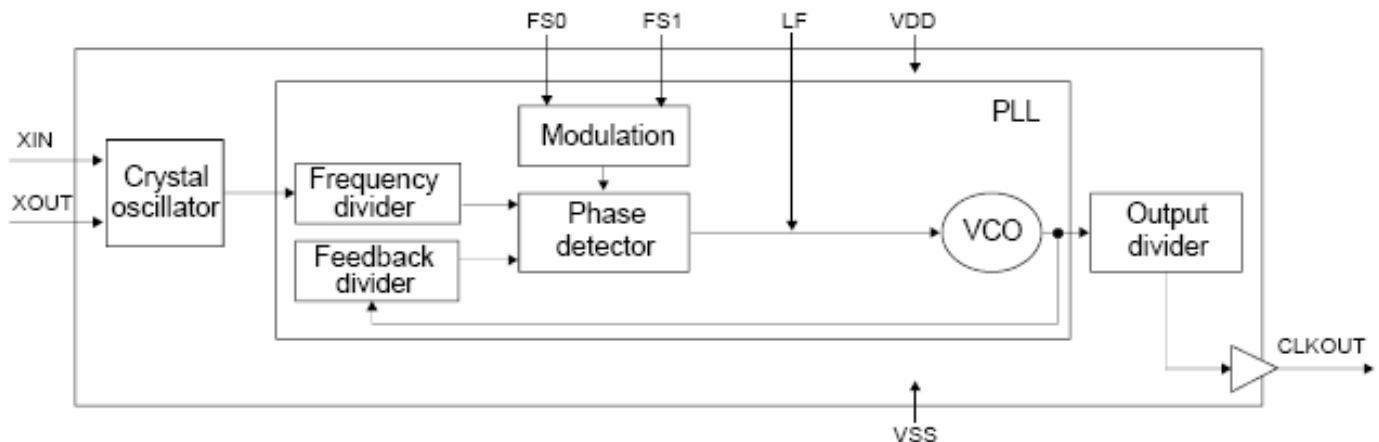
The P2082A/84A can generate a 2X and 4X output clock respectively of the input frequency which allows system cost savings by using an inexpensive crystal or resonator to achieve high frequency multiplication.

The P2082A/84A provides up to 156 MHz and 312 MHz 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 P2082A/84A is targeted towards the high frequency CAN OSC replacement market. Applications include xDSL, routers, networking, PC peripherals, and embedded systems.

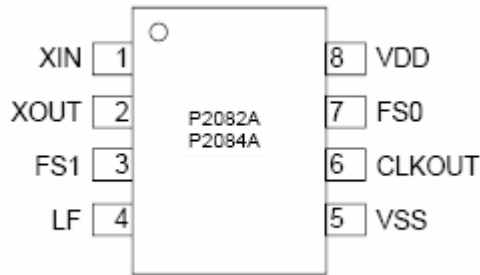
### Block Diagram





rev 0.4

**Pin Configuration**



**Pin Description**

Pin#	Pin Name	Type	Description
1	XIN/CLKIN	I	Connect to crystal or clock input.
2	XOUT	I	Crystal output.
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 Loop Filter Selection 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 Input Frequency Selection.) This pin has an internal pull-up resistor.
8	VDD	P	Connect to +3.3 V.

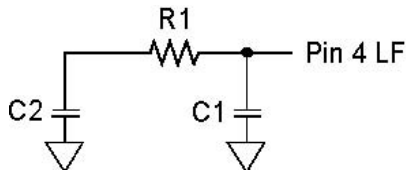
**Input Frequency Selection**

FS1	FS0	Input (MHz)	Output Frequency Scaling	
			P2082A	P2084A
0	0	3 to 9	6 to 18	12 to 36
0	1	10 to 19	20 to 38	40 to 76
1	0	20 to 38	40 to 76	80 to 152
1	1	39 to 78	78 to 156	156 to 312



rev 0.4

Loop Filter Selection Table VDD 3.3 V



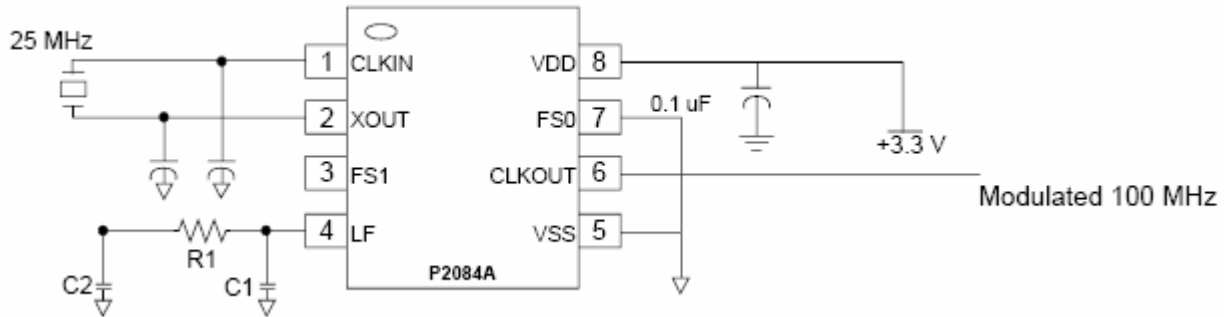
Input (MHz)	FS1	FS0	C1(pF)	C2(pF)	R1 (ohms)
3	0	0	270	330,000	220
4	0	0	270	100,000	270
5	0	0	270	100,000	390
6	0	0	270	100,000	510
7	0	0	270	100,000	620
8	0	0	270	100,000	820
9	0	0	270	100,000	1,000
10	0	1	270	100,000	330
11	0	1	270	100,000	390
12	0	1	270	100,000	510
13	0	1	270	100,000	560
14	0	1	270	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



rev 0.4

### 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 3 MHz to 78 MHz, and its output frequency can deliver up to 312 MHz.



ADVANTAGE



rev 0.4

**Absolute Maximum Ratings**

Symbol	Parameter	Rating	Unit
$V_{DD}, V_{IN}$	Voltage on any pin with respect to GND	-0.5 to + 7.0	V
$T_{STG}$	Storage temperature	-65 to +125	°C
$T_A$	Operating temperature	0 to 70	°C

**DC Electrical Characteristics**

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

**AC Electrical Characteristics**

Symbol	Parameter	Min	Typ	Max	Unit
$f_{IN}$	Input frequency	3	–	78	MHz
$f_{OUT}$	P2082A	6	–	156	MHz
	P2084A	12	–	312	MHz
$t_{LH}^1$	Output rise time (measured at 0.8 V to 2.0 V)	–	1	–	ns
$t_{HL}^1$	Output fall time (measured at 2.0 V to 0.8 V)	–	1	–	ns
$t_{JC}$	Jitter (cycle to cycle)	–	±200	–	ps
$t_D$	Output duty cycle	45	50	55	%

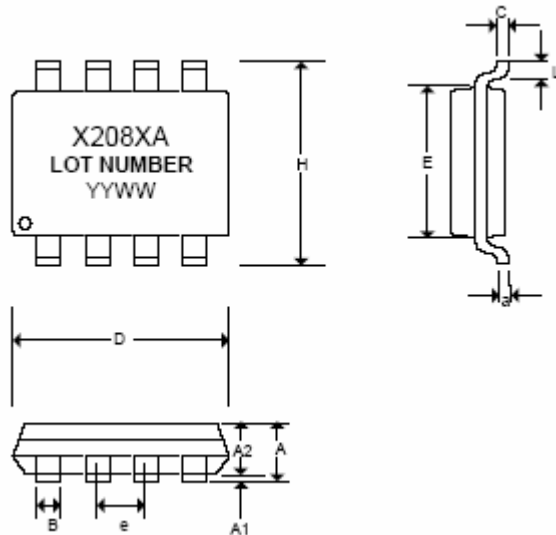
<sup>1</sup>  $t_{LH}$  and  $t_{HL}$  are measured into a capacitive load of 15 pF



rev 0.4

Package Information

Mechanical Package Outline 8-Pin SOIC

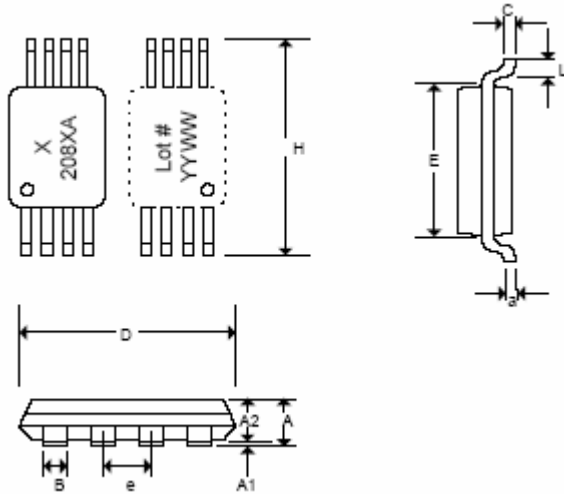


Symbol	Dimensions in inches			Dimensions in millimeters		
	Min	Nor	Max	Min	Nor	Max
A	0.057	0.064	0.071	1.45	1.63	1.80
A1	0.004	0.007	0.010	0.10	0.18	0.25
A2	0.053	0.061	0.069	1.35	1.55	1.75
B	0.012	0.016	0.020	0.31	0.41	0.51
C	0.004	0.006	0.01	0.10	0.15	0.25
D	0.186	0.194	0.202	4.72	4.92	5.12
E	0.148	0.156	0.164	3.75	3.95	4.15
e	0.050 BSC			1.27 BSC		
H	0.224	0.236	0.248	5.70	6.00	6.30
L	0.012	0.020	0.028	0.30	0.50	0.70
a	0°	5°	8°	0°	5°	8°

Note: Controlling dimensions are millimeters  
SOIC – 0.074 grams unit weight



Mechanical Package Outline 8-Pin TSSOP



Symbol	Dimensions in inches			Dimensions in millimeters		
	Min	Nor	Max	Min	Nor	Max
A			0.047			1.10
A1	0.002		0.006	0.05		0.15
A2	0.031	0.039	0.041	0.80	1.00	1.05
B	0.007		0.012	0.19		0.30
C	0.004		0.008	0.09		0.20
D	0.114	0.118	0.122	2.90	3.00	3.10
E	0.169	0.173	0.177	4.30	4.40	4.50
e	0.026 BSC			0.65 BSC		
H	0.244	0.252	0.260	6.20	6.40	6.60
L	0.018	0.024	0.030	0.45	0.60	0.75
a	0°	5°	8°	0°	5°	8°

Note: Controlling dimensions are millimeters  
TSSOP – 0.034 grams unit weight

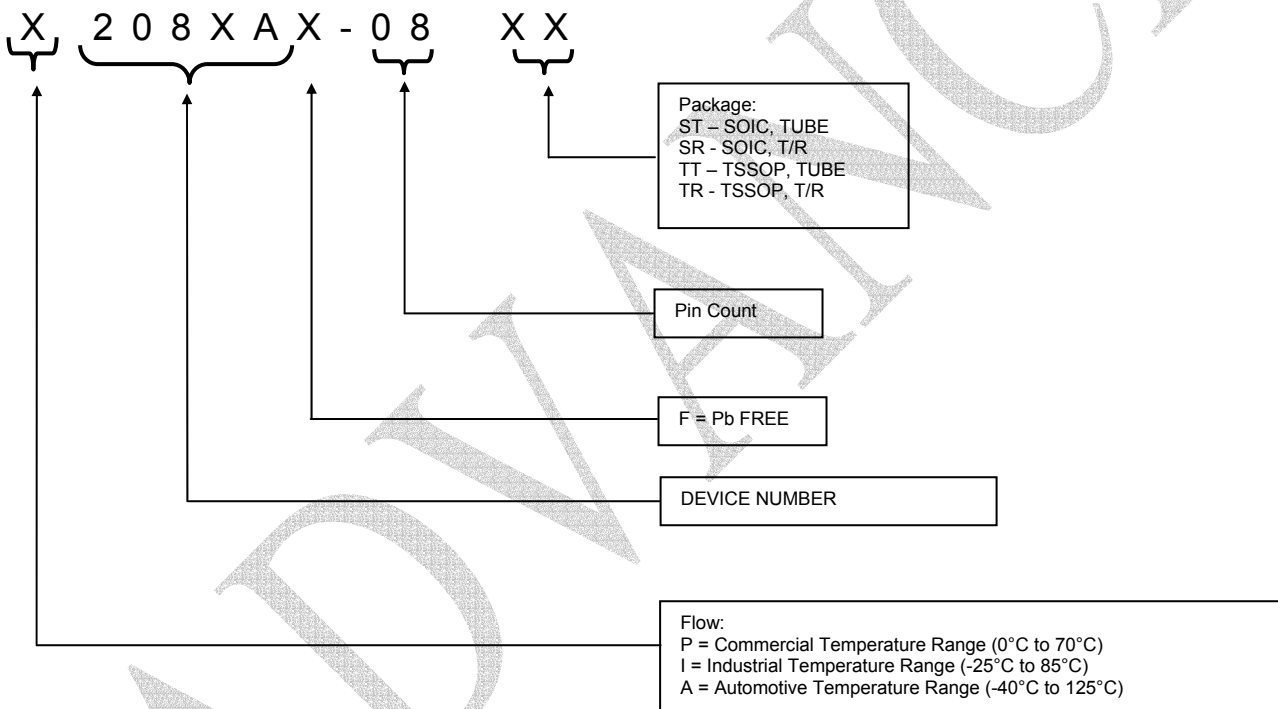


rev 0.4

Ordering Codes

Part Number	Marking	Package Type	Qty per reel	Temperature (°C)
P208XA-08ST	P208XA	8-pin SOIC, tube		0 to 70
P208XA-08SR	P208XA	8-pin SOIC, tape & reel	2500	0 to 70
P208XA-08TT	P208XA	8-pin TSSOP, tube		0 to 70
P208XA-08TR	P208XA	8-pin TSSOP, tape & reel	2500	0 to 70

Device Ordering Information



Licensed under US patent Nos 5,488,627 and 5,631,920.  
 Advance datasheet. Specification subject to change without notice.





rev 0.4



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