

rev 0.2

### Multi-Output Custom Clock Generator

#### Features

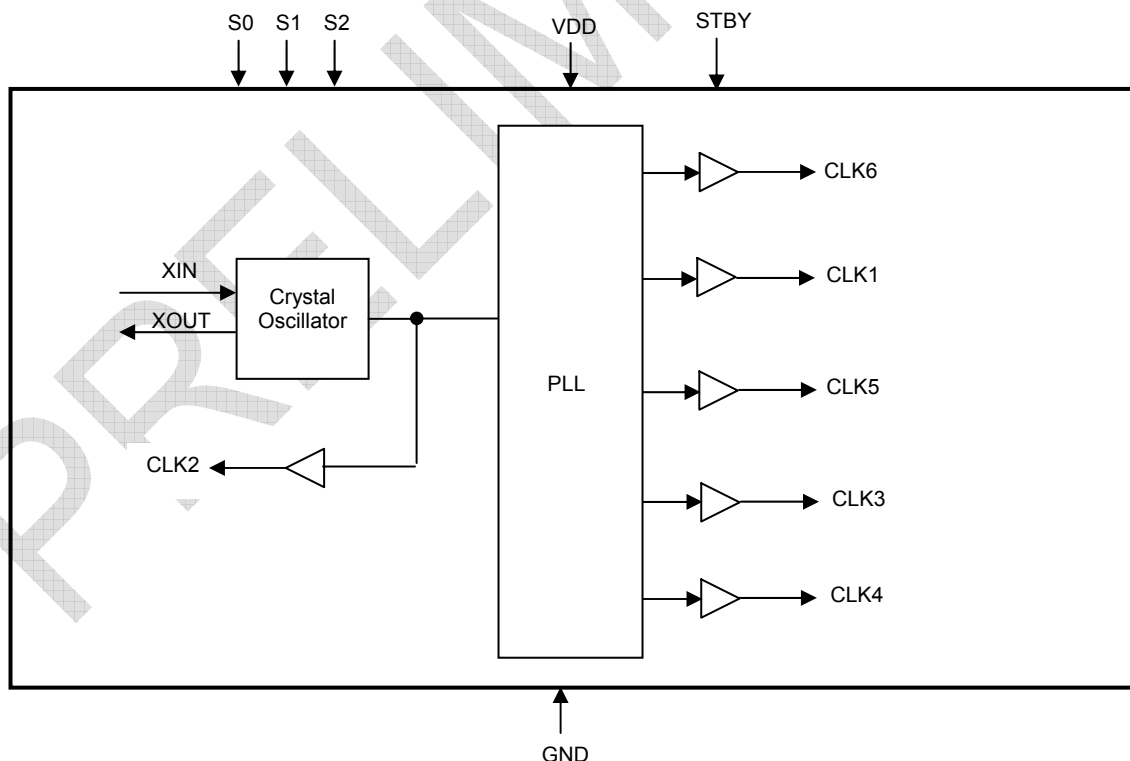
- Generates five clock outputs from an inexpensive 20MHz crystal or external reference clock.
- Output Frequencies are selectable through select bits
- Generates an EMI optimized clock signal at the output.
- $\pm 1.5\%$  (Typ) Centre Spread for Spread Spectrum Clock Outputs
- Operates with a  $3.3V \pm 0.3V$  Supply Voltage
- Output Clocks disable feature using STBY pin
- Available in 20-pin TSSOP.

clock generator. The five high frequency Clock outputs are generated using an inexpensive 20MHz Crystal or external reference clock. The accuracy of the 20MHz Input Clock should be within  $\pm 50\text{ppm}$ . The output clocks consist of a low EMI spread spectrum clock and other non-spread clocks. Three Select bits choose the combination of Output Clock Frequency. Refer to the Output Frequency Selection Table for the values. Output clocks can be disabled using the STBY pin. The device operates from a Supply Voltage of  $3.3V \pm 0.3V$  with a tolerable ripple voltage of 50mV. The device is available in a 20 pin TSSOP JEDEC package.

#### Product Description

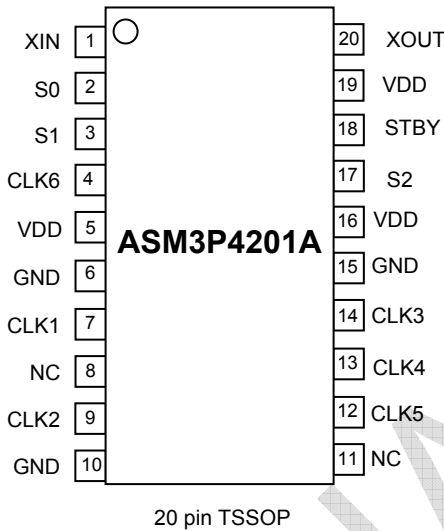
The ASM3P4201A is a versatile multi output custom

#### Block Diagram



rev 0.2

Pin Assignment



Pin Description

Pin #	Pin Name	Pin Type	Pin Description
1	XIN	Input	Crystal connection or external reference frequency input. It can be connected to a 20MHz Fundamental mode crystal or to an external reference clock.
2	S0	Input	Select Bit for Desired Output Frequency at different output pins. Refer to the Output Frequency Selection Table for details. Has an internal pull down resistor
3	S1	Input	Select Bit for Desired Output Frequency at different output pins. Refer to the Output Frequency Selection Table for details. Has an internal pull down resistor
4	CLK6	Output	Clock Output. Refer to the Output Frequency Selection Table for details.
5	VDD	Power	Connect to +3.3V.
6	GND	Power	Connect to ground.
7	CLK1	Output	Clock Output. Refer to the Output Frequency Selection Table for details.
8	NC	-	No connect
9	CLK2	Output	Clock Output. Refer to the Output Frequency Selection Table for details.
10	GND	Power	Connect to ground.
11	NC	-	No connect
12	CLK5	Output	Clock Output. Refer to the Output Frequency Selection Table for details.
13	CLK4	Output	Spread Spectrum Clock Output. Refer to the Output Frequency Selection Table for details.
14	CLK3	Output	Spread Spectrum Clock Output. Refer to the Output Frequency Selection Table for details.
15	GND	Power	Connect to ground.
16	VDD	Power	Connect to +3.3V.
17	S2	Input	Select Bit for Desired Output Frequency at different output pins. Refer to the Output Frequency Selection Table for details. Has an internal pull down resistor
18	STBY	Input	When this pin is made is HIGH, all the output clocks are enabled.
19	VDD	Power	Connect to +3.3V.
20	XOUT	Output	Crystal connection. If an external reference clock is used, this pin must be left unconnected.

**Output Frequency Selection Table**

Selection Bits			CLK1 (MHz)	CLK2 (MHz)	CLK3* (MHz)	CLK4* (MHz)	CLK5 (MHz)	CLK6 (MHz)
S2	S1	S0						
0	0	0	39.5	20	65	20	84	36.6
0	0	1	39.5	20	60	20	84	36.6
0	1	0	39.5	20	50	20	36	36.6
0	1	1	39.5	20	75	20	84	36.6

\* CLK3 and CLK4 are Spread Spectrum Clocks

**Absolute Maximum Ratings**

Symbol	Parameter	Rating	Unit
VDD	Power Supply Voltage relative to Ground	-0.5 to +4.6	V
V <sub>IN</sub>	Input Voltage relative to Ground (Input Pins)	-0.5 to VDD+0.3	
T <sub>STG</sub>	Storage temperature	-65 to +150	°C
T <sub>A</sub>	Operating temperature	-20 to +85	°C
T <sub>s</sub>	Max. Soldering Temperature (10 sec)	260	°C
T <sub>J</sub>	Junction Temperature	125	°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.

**DC Electrical Characteristics**

(Test condition: All parameters are measured at room temperature (+ 25°C) unless otherwise stated)

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	-	VDD + 0.3	V
I <sub>IL</sub>	Input low current	-	-	-35	µA
I <sub>IH</sub>	Input high current	-	-	35	µA
I <sub>XOL</sub>	XOUT output low current (V <sub>XOL</sub> @0.4V, VDD=3.3V)	-	3	-	mA
I <sub>XOH</sub>	XOUT output high current (V <sub>XOH</sub> @2.5V, VDD=3.3V)	-	3	-	mA
V <sub>OL</sub>	Output low voltage (VDD = 3.3V, I <sub>OL</sub> =12mA)	-	-	0.4	V
V <sub>OH</sub>	Output high voltage (VDD = 3.3V, I <sub>OH</sub> =12mA)	2.5	-	-	V
I <sub>DD</sub>	Static supply current*	-	TBD	-	mA
I <sub>CC</sub>	Dynamic supply current ( VDD =3.3V )	-	TBD	-	mA
VDD	Operating Voltage	3.0	3.3	3.6	V
t <sub>ON</sub>	Power-up time (first locked cycle after power-up)**	-	-	5	mS
Z <sub>OUT</sub>	Output impedance	-	17	-	Ω

\* XIN and STBY Pins are pulled low  
 \*\* VDD and XIN input are stable.

rev 0.2

AC Electrical Characteristics

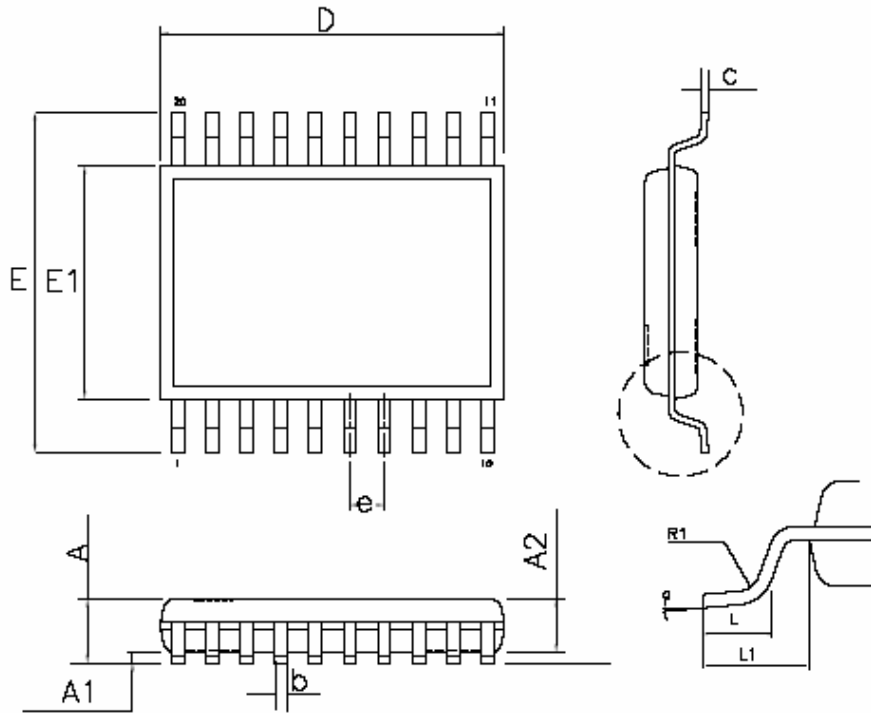
Symbol	Parameter	Min	Typ	Max	Unit
CLKIN	Input frequency	-	20	-	MHz
$f_d$	Spread Percentage	Output Frequency = 20MHz (Pin 13)	±1.5	-	%
		Output Frequency = 50MHz			
		Output Frequency = 60MHz			
		Output Frequency = 65MHz			
		Output Frequency = 75MHz			
$t_{LH}^*$	Output rise time (Measured from 0.8V to 2.0V)	-	-	1	nS
$t_{HL}^*$	Output fall time ( Measured from 2.0V to 0.8V)	-	-	1	nS
$t_{JC}$	Jitter (Cycle to cycle)	-	±250	-	pS
$t_p$	Jitter( Period)	-	±150	-	pS
$t_D$	Output duty cycle	45	50	55	%

\* $t_{LH}$  and  $t_{HL}$  are measured into a capacitive load of 30pF

PRELIMINARY

Package Information

20-lead Thin Shrink Small Outline Package (4.40-MM Body) – JEDEC Standard



Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	....	0.043	...	1.2
A1	0.0020	0.0059	0.05	0.15
A2	0.031	0.041	0.80	1.05
D	0.252	0.26	6.40	6.60
L	0.020	0.030	0.50	0.75
E	0.252 BSC		6.40 BSC	
E1	0.169	0.177	4.30	4.50
R1	0.004	....	0.09	.....
b	0.007	0.012	0.19	0.30
c	0.004	0.008	0.09	0.20
L1	0.039 REF		1.0 REF	
e	0.026 BSC		0.65 BSC	
a	0°	8°	0°	8°

rev 0.2

Ordering Information

Part Number	Marking	Package	Temperature
ASM3P4201AG-28-TT	3P4201AG	20-Pin TSSOP, Tube, Green	Commercial
ASM3P4201AG-28-TR	3P4201AG	20-Pin TSSOP, Tape and Reel, Green	Commercial

Device Ordering Information

A S M 3 P 4 2 0 1 A G - 2 0 - T T

OR – TSOT23 -6,T/R TT – TSSOP, TUBE TR – TSSOP, T/R VT – TVSOP, TUBE VR – TVSOP, T/R ST – SOIC, TUBE AR – SSOP, T/R AT – SSOP, TUBE	SR – SOIC, T/R QR – QFN, T/R QT – QFN, TRAY BT – BGA, TRAY BR – BGA, T/R UR – SOT-23, T/R DR – QSOP, T/R DT – QSOP, TUBE
PIN COUNT	
G = GREEN PACKAGE, LEAD FREE, and RoHS	
PART NUMBER	
X = Automotive (-40C to +125C)    I = Industrial (-40C to +85C)    P or n/c = Commercial (0C to +70C)	
1 – reserved 2 – Non PLL based 3 – EMI Reduction 4 – DDR support products 5 – STD Zero Delay Buffer	6 – power management 7 – power management 8 – power management 9 – Hi performance 0 - reserved
PulseCore Semiconductor Mixed Signal Product	

Licensed under US patent Nos 5,488,627 and 5,631,920

*Giving you the edge*

PulseCore Semiconductor Corporation  
1715 S. Bascom Ave Suite 200  
Campbell, CA 95008  
Tel: 408-879-9077  
Fax: 408-879-9018  
[www.pulsecoresemi.com](http://www.pulsecoresemi.com)

Copyright © PulseCore Semiconductor  
All Rights Reserved  
Part Numbers: ASM3P4201A  
Document Version: 0.2

Note: This product utilizes US Patent # 6,646,463 Impedance Emulator Patent issued to PulseCore Semiconductor, dated 11-11-2003

© Copyright 2003 PulseCore Semiconductor. All rights reserved. Our three-point logo, our name and Intelliwatt are trademarks or registered trademarks of PulseCore. All other brand and product names may be the trademarks of their respective companies. PulseCore reserves the right to make changes to this document and its products at any time without notice. PulseCore assumes no responsibility for any errors that may appear in this document. The data contained herein represents PulseCore's best data and/or estimates at the time of issuance. PulseCore reserves the right to change or correct this data at any time, without notice. If the product described herein is under development, significant changes to these specifications are possible. The information in this product data sheet is intended to be general descriptive information for potential customers and users, and is not intended to operate as, or provide, any guarantee or warranty to any user or customer. PulseCore does not assume any responsibility or liability arising out of the application or use of any product described herein, and disclaims any express or implied warranties related to the sale and/or use of PulseCore products including liability or warranties related to fitness for a particular purpose, merchantability, or infringement of any intellectual property rights, except as express agreed to in PulseCore's Terms and Conditions of Sale (which are available from PulseCore). All sales of PulseCore products are made exclusively according to PulseCore's Terms and Conditions of Sale. The purchase of products from PulseCore does not convey a license under any patent rights, copyrights; mask works rights, trademarks, or any other intellectual property rights of PulseCore or third parties. PulseCore does not authorize its products for use as critical components in life-supporting systems where a malfunction or failure may reasonably be expected to result in significant injury to the user, and the inclusion of PulseCore products in such life-supporting systems implies that the manufacturer assumes all risk of such use and agrees to indemnify PulseCore against all claims arising from such use