ON Semiconductor®

ASM3P2108A

Peak EMI Reducing Solution

Features

- FCC approved method of EMI attenuation.
- Generates a 1X low EMI spread spectrum clock of the input frequency.
- Input frequency range: 25MHz to 45MHz.
- Internal loop filter minimizes external components and board space.
- Frequency deviation: - 1.3%(Typ) @ 32MHz.
- Low cycle-to-cycle jitter.
- 5.0V ± 5% operating voltage range.
- TTL or CMOS compatible outputs.
- Available in 8-pin SOIC Package.

Product Description

The ASM3P2108A is a versatile spread spectrum frequency modulator designed specifically for input clock frequencies from 25MHz to 45MHz. The ASM3P2108A can generate an EMI reduced clock from crystal, ceramic resonator, or system clock.

The ASM3P2108A reduces electromagnetic interference (EMI) at the clock source, allowing system wide reduction of EMI of down stream clock and data dependent signals. The ASM3P2108A allows significant system cost savings by reducing the number of circuit board layers ferrite beads, shielding and other passive components that are traditionally required to pass EMI regulations.

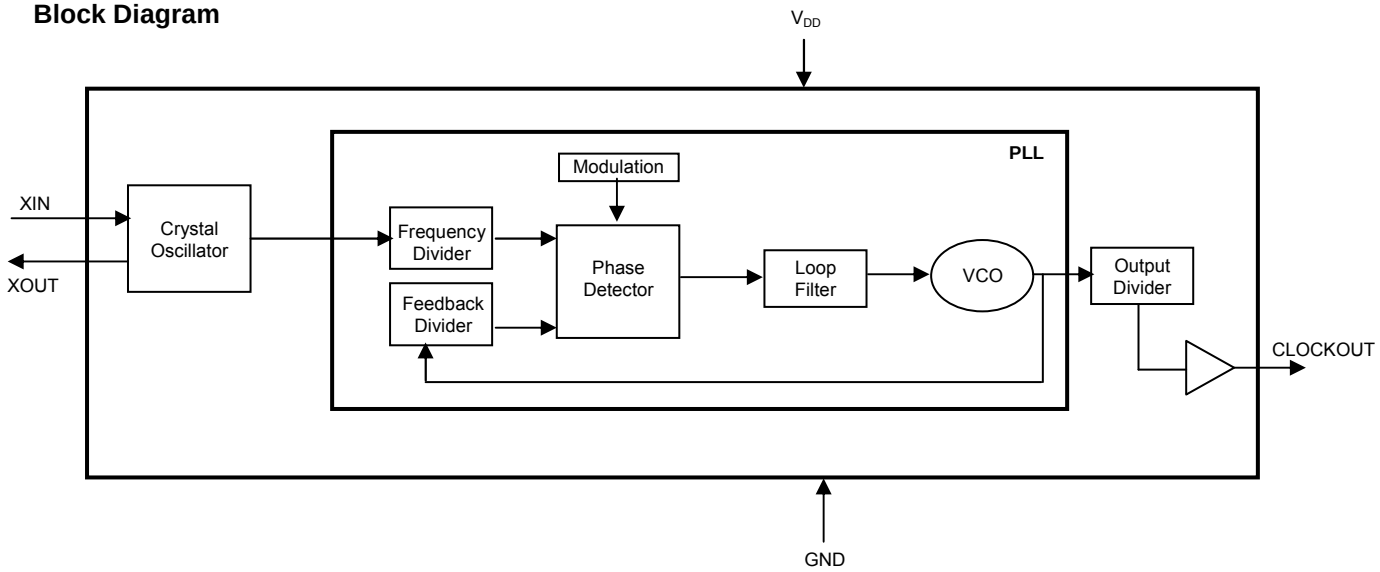
The ASM3P2108A uses the most efficient and optimized modulation profile approved by the FCC and is implemented in a proprietary all digital method.

The ASM3P2108A modulates the output of a single PLL in order to “spread” the bandwidth of a synthesized clock, and more importantly, decreases the peak amplitudes of its harmonics. This results in significantly lower system EMI compared to the typical narrow band signal produced by oscillators and most frequency generators. Lowering EMI by increasing a signal’s bandwidth is called ‘spread spectrum clock generation.’

Applications

The ASM3P2108A is targeted towards EMI management for high speed digital applications such as PC peripheral devices, consumer electronics and embedded controller systems.

Block Diagram



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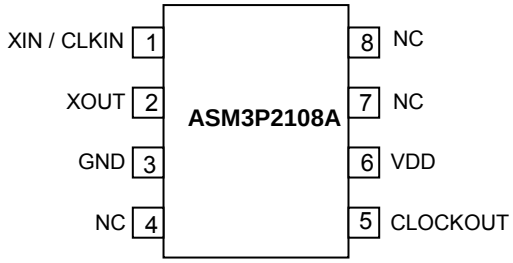
ASM3P2108/D

Pin Configuration



Pin Description

Pin#	Pin Name	Type	Description
1	XIN / CLKIN	I	Crystal connection or external reference frequency input. This pin has dual functions. It can be connected to either an external crystal or an external reference clock.
2	XOUT	O	Crystal connection. If using an external reference, this pin must be left unconnected.
3	GND	P	Ground to entire chip.
4	NC	-	No connect.
5	CLOCKOUT	O	Spread spectrum low EMI output.
6	VDD	P	Power supply for the entire chip (5V).
7	NC	-	No connect.
8	NC	-	No connect.

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
V_{DD}, V_{IN}	Voltage on any pin with respect to Ground	-0.5 to +7.0	V
T_{STG}	Storage temperature	-65 to +125	℃
T_A	Operating temperature	0 to 70	℃
T_s	Max. Soldering Temperature (10 sec)	260	℃
T_J	Junction Temperature	150	℃
T_{DV}	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

Symbol	Parameter	Min	Max	Unit
VDD	Supply Voltage with respect to VSS	4.75	5.25	V
T_A	Operating temperature	-40	+85	℃
C_L	Load Capacitance		15	pF
C_{IN}	Input Capacitance		7	pF

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		44		µA
I_{IH}	Input high current		66		µA
I_{XOL}	X_{OUT} output low current (@ 0.4, V_{DD} = 5V)		3		mA
I_{XOH}	X_{OUT} output high current (@2.5V, V_{DD} = 5V)		3		mA
V_{OL}	Output low voltage (V_{DD} = 5V, I_{OL} = 20mA)			0.4	V
V_{OH}	Output high voltage (V_{DD} = 5V, I_{OH} = 20mA)	2.5			V
I_{CC}	Dynamic supply current normal mode (5V, 32MHz and 15pF loading)		40		mA
I_{DD}	Static supply current standby mode		40		µA
V_{DD}	Operating voltage	4.75	5.0	5.25	V
t_{ON}	Power up time (first locked clock cycle after power up)		0.18		mS
Z_{OUT}	Clock out impedance		50		Ω

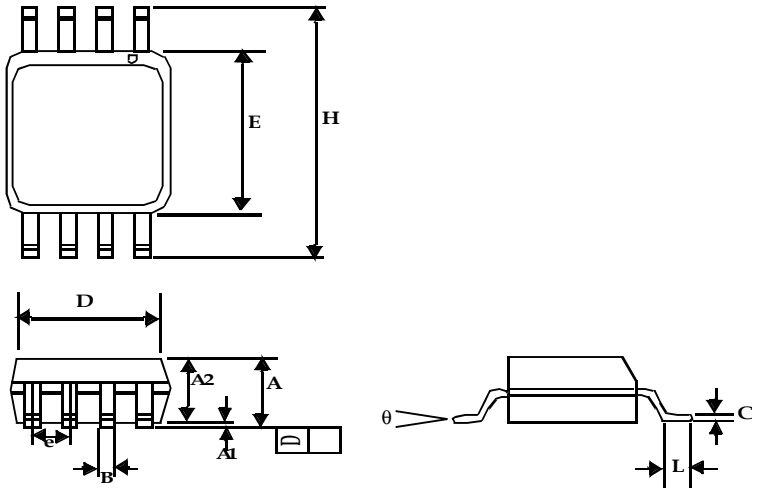
AC Electrical Characteristics

Symbol	Parameter		Min	Typ	Max	Unit
f_{IN}	Input frequency		25		45	MHz
MODOUT	Output frequency		25		45	MHz
f_d	Frequency Deviation	Input Frequency = 25MHz		-1.98		%
		Input Frequency = 45MHz		-0.60		
t_{LH}*	Output rise time (measured at 0.8V to 2.0V)			440		pS
t_{HL}*	Output fall time (measured at 2.0V to 0.8V)			300		pS
t_{JC}	Jitter (cycle to cycle)				±360	pS
t_D	Output duty cycle		45	50	55	%

* V_{DD} = +5V, Input Frequency = 32MHz, t_{LH} and t_{HL} are measured into a capacitive load of 15pF

Package Information

8-Pin SOIC Package



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
θ	0°	8°	0°	8°

Ordering Codes

Part Number	Marking	Package	Temperature
ASM3P2108AF-08SR	AEG	8-PIN SOIC, TAPE AND REEL, Pb Free	0℃ to +70℃

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.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
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