

# 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.
- $5.0V \pm 5\%$  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.

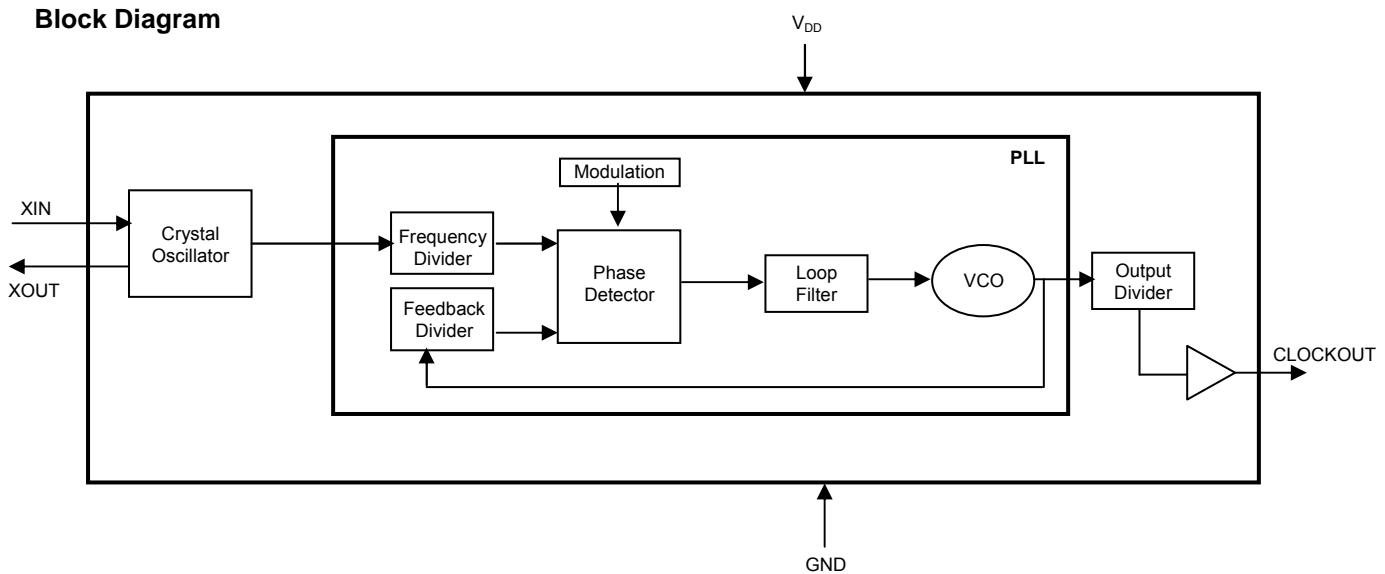
The ASM3P2108A uses the most efficient and optimized modulation profile approved by the FCC and is implemented in a proprietary all digital method.

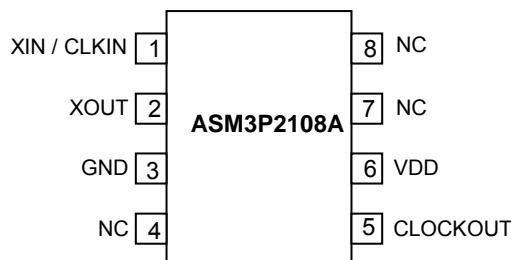
The ASM3P2108A modulates the output of a single PLL in order to "spread" the bandwidth of a synthesized clock, and more importantly, decreases the peak amplitudes of its harmonics. This results in significantly lower system EMI compared to the typical narrow band signal produced by oscillators and most 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



**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	°C
$T_A$	Operating temperature	0 to 70	°C
$T_s$	Max. Soldering Temperature (10 sec)	260	°C
$T_J$	Junction Temperature	150	°C
$T_{DV}$	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
$V_{DD}$	Supply Voltage with respect to VSS	4.75	5.25	V
$T_A$	Operating temperature	-40	+85	°C
$C_L$	Load Capacitance		15	pF
$C_{IN}$	Input Capacitance		7	pF

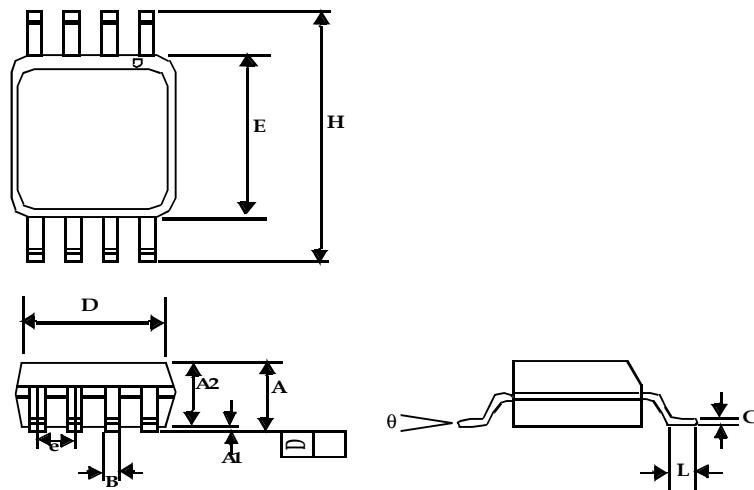
**DC Electrical Characteristics**

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		$\mu A$
$I_{IH}$	Input high current		66		$\mu A$
$I_{XOL}$	$X_{OUT}$ 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		$\mu A$
$V_{DD}$	Operating voltage	4.75	5.0	5.25	V
$t_{on}$	Power up time (first locked clock cycle after power up)		0.18		$\mu s$
$Z_{OUT}$	Clock out impedance		50		$\Omega$

**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 Input Frequency = 45MHz		-1.98 -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)				$\pm 360$	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°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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