

# ASM3P2108A

## Product Preview

# Peak EMI Reducing Solution

### Description

The ASM3P2108A is a versatile spread spectrum frequency modulator designed specifically for input clock frequencies from 25 MHz to 45 MHz. 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.

### Features

- FCC Approved Method of EMI Attenuation
- Generates a 1X Low EMI Spread Spectrum Clock of the Input Frequency
- Input Frequency Range: 25 MHz to 45 MHz
- Internal Loop Filter Minimizes External Components and Board Space
- Frequency Deviation: - 1.3% (Typ) @ 32 MHz
- Low Cycle-to-Cycle Jitter
- 5.0 V ± 5% Operating Voltage Range
- TTL or CMOS Compatible Outputs
- Available in 8-pin TSSOP and SOIC Packages
- These are Pb-Free Devices

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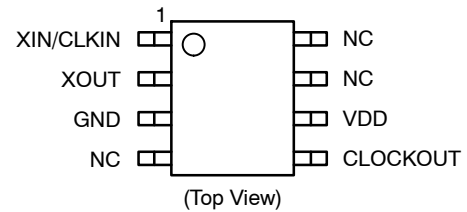


SOIC-8  
S SUFFIX  
CASE 751BD



TSSOP-8  
T SUFFIX  
CASE 948AL

### PIN CONFIGURATION



### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 6 of this data sheet.

# ASM3P2108A

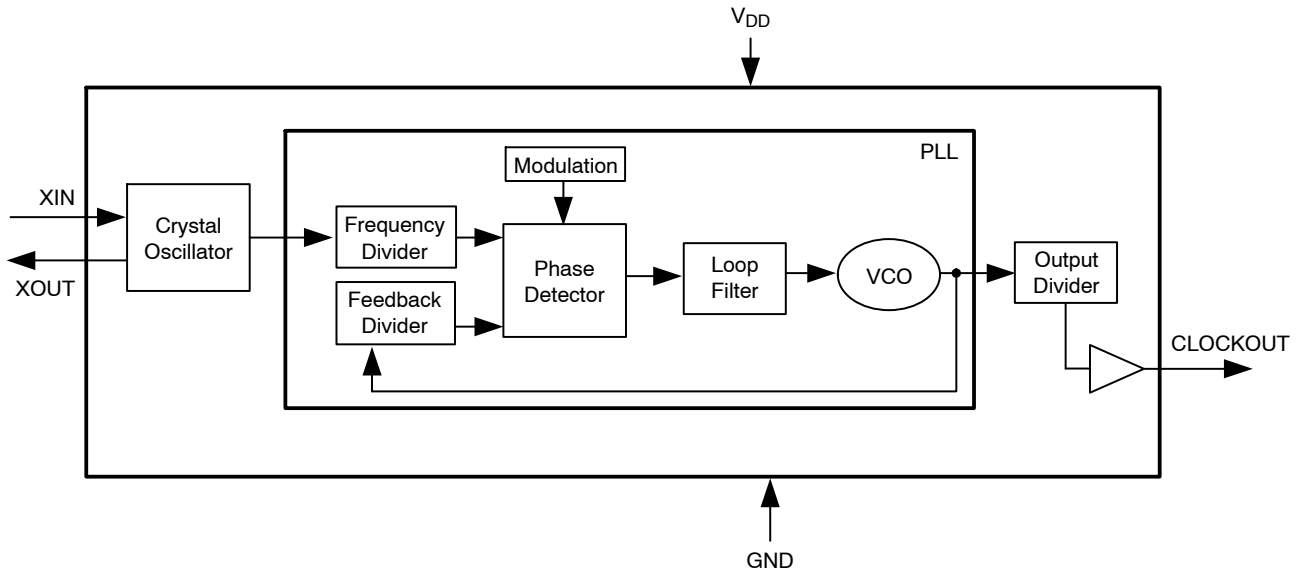


Figure 1. Block Diagram

Table 1. 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 (5 V).
7	NC	-	No connect.
8	NC	-	No connect.

Table 2. 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

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

# ASM3P2108A

**Table 3. 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	-	44	-	μA
I <sub>IH</sub>	Input high current	-	66	-	μA
I <sub>XOL</sub>	X <sub>OUT</sub> output low current (@ 0.4, V <sub>DD</sub> = 5 V)	-	3	-	mA
I <sub>XOH</sub>	X <sub>OUT</sub> output high current (@ 2.5 V, V <sub>DD</sub> = 5 V)	-	3	-	mA
V <sub>OL</sub>	Output low voltage (V <sub>DD</sub> = 5 V, I <sub>OL</sub> = 20 mA)	-	-	0.4	V
V <sub>OH</sub>	Output high voltage (V <sub>DD</sub> = 5 V, I <sub>OH</sub> = 20 mA)	2.5	-	-	V
I <sub>CC</sub>	Dynamic supply current normal mode (5 V, 18 MHz and 15 pF loading)	-	40	-	mA
I <sub>DD</sub>	Static supply current standby mode	-	40	-	μA
V <sub>DD</sub>	Operating voltage	4.75	5.0	5.25	V
t <sub>ON</sub>	Power up time (first locked clock cycle after power up)	-	0.18	-	mS
Z <sub>OUT</sub>	Clock out impedance	-	50	-	Ω

**Table 4. AC ELECTRICAL CHARACTERISTICS**

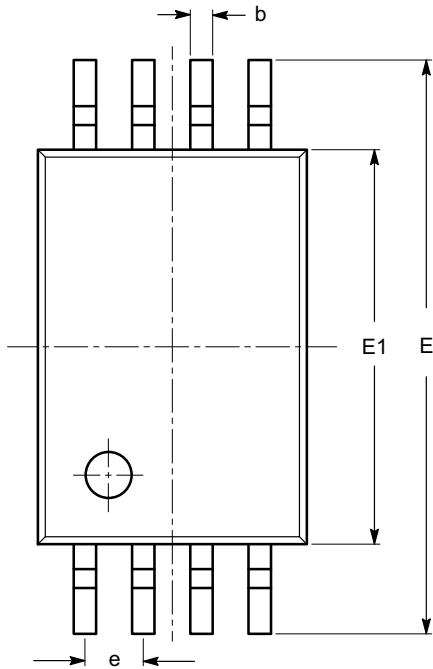
Symbol	Parameter	Min	Typ	Max	Unit	
f <sub>IN</sub>	Input frequency	25	-	45	MHz	
MODOUT	Output frequency	25	-	45	MHz	
f <sub>d</sub>	Frequency Deviation	Input Frequency = 25 MHz	-	-1.98	-	%
		Input Frequency = 45 MHz	-	-0.60	-	
t <sub>LH</sub> (Note 1)	Output rise time (measured at 0.8 V to 2.0 V)	-	440	-	pS	
t <sub>HL</sub> (Note 1)	Output fall time (measured at 2.0 V to 0.8 V)	-	300	-	pS	
t <sub>JC</sub>	Jitter (cycle to cycle)	-	-	360	pS	
t <sub>D</sub>	Output duty cycle	45	50	55	%	

1. V<sub>DD</sub> = +5 V, Input Frequency = 32 MHz, t<sub>LH</sub> and t<sub>HL</sub> are measured into a capacitive load of 15 pF

# ASM3P2108A

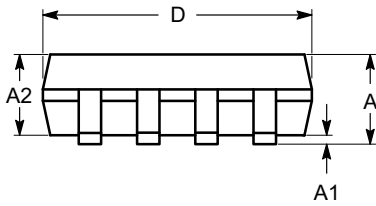
## PACKAGE DIMENSIONS

TSSOP8, 4.4x3  
CASE 948AL-01  
ISSUE O

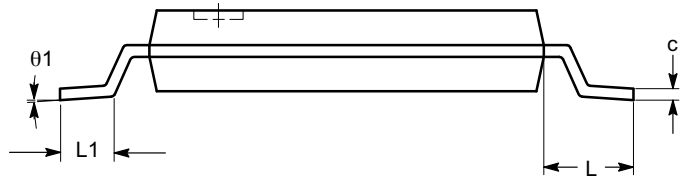


SYMBOL	MIN	NOM	MAX
A			1.20
A1	0.05		0.15
A2	0.80	0.90	1.05
b	0.19		0.30
c	0.09		0.20
D	2.90	3.00	3.10
E	6.30	6.40	6.50
E1	4.30	4.40	4.50
e	0.65 BSC		
L	1.00 REF		
L1	0.50	0.60	0.75
$\theta$	0°		8°

TOP VIEW



SIDE VIEW



END VIEW

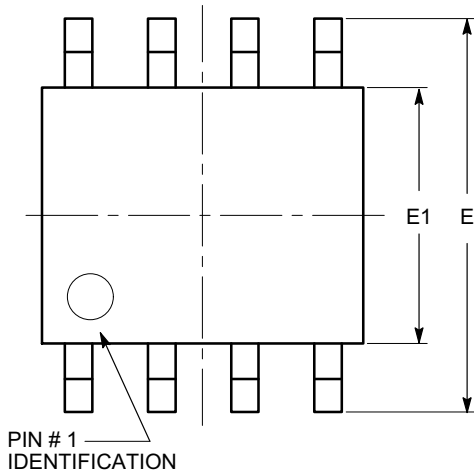
### Notes:

- (1) All dimensions are in millimeters. Angles in degrees.
- (2) Complies with JEDEC MO-153.

# ASM3P2108A

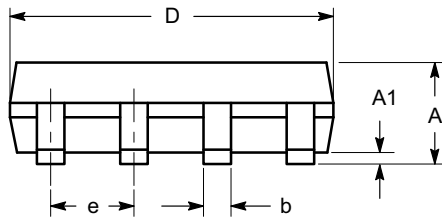
## PACKAGE DIMENSIONS

SOIC 8, 150 mils  
CASE 751BD-01  
ISSUE O

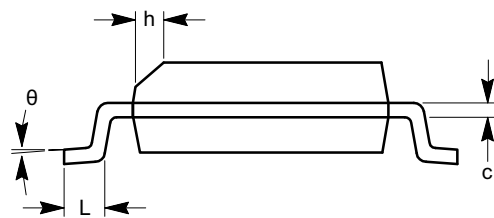


TOP VIEW

SYMBOL	MIN	NOM	MAX
A	1.35		1.75
A1	0.10		0.25
b	0.33		0.51
c	0.19		0.25
D	4.80		5.00
E	5.80		6.20
E1	3.80		4.00
e	1.27 BSC		
h	0.25		0.50
L	0.40		1.27
$\theta$	0°		8°



SIDE VIEW



END VIEW


**Notes:**

- (1) All dimensions are in millimeters. Angles in degrees.
- (2) Complies with JEDEC MS-012.

# ASM3P2108A

**Table 5. ORDERING INFORMATION**

Part Number	Marking	Package Type	Temperature
ASM3P2108AF-08-SR	3P2108AF	8-PIN SOIC, TAPE AND REEL, Pb Free	Commercial
ASM3P2108AF-08-ST	3P2108AF	8-PIN SOIC, TUBE, Pb Free	Commercial
ASM3P2108AF-08-TR	3P2108AF	8-PIN TSSOP, TAPE AND REEL, Pb Free	Commercial
ASM3P2108AF-08-TT	3P2108AF	8-PIN TSSOP, TUBE, Pb Free	Commercial
ASM3P2108AG-08-SR	3P2108AG	8-PIN SOIC, TAPE AND REEL, Green	Commercial
ASM3P2108AG-08-ST	3P2108AG	8-PIN SOIC, TUBE, Green	Commercial
ASM3P2108AG-08-TR	3P2108AG	8-PIN TSSOP, TAPE AND REEL, Green	Commercial
ASM3P2108AG-08-TT	3P2108AG	8-PIN TSSOP, TUBE, Green	Commercial

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