



**THE DATASHEET OF
ASM3P2107AF**





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: 12MHz to 22MHz.
- Internal loop filter minimizes external components and board space.
- Frequency deviation: - 0.8%(Typ) @ 20MHz.
- Low cycle-to-cycle jitter.
- 5.0V \pm 5% operating voltage range.
- TTL or CMOS compatible outputs.
- Available in 8-pin TSSOP and SOIC package.

Product Description

The ASM3P2107A is a versatile spread spectrum frequency modulator designed specifically for input clock frequencies from 12MHz to 22MHz. The ASM3P2107A can generate an EMI reduced clock from crystal, ceramic resonator, or system clock.

The ASM3P2107A reduces electromagnetic interference (EMI) at the clock source, allowing system wide reduction of EMI of down stream clock and data dependent signals. The ASM3P2107A 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.

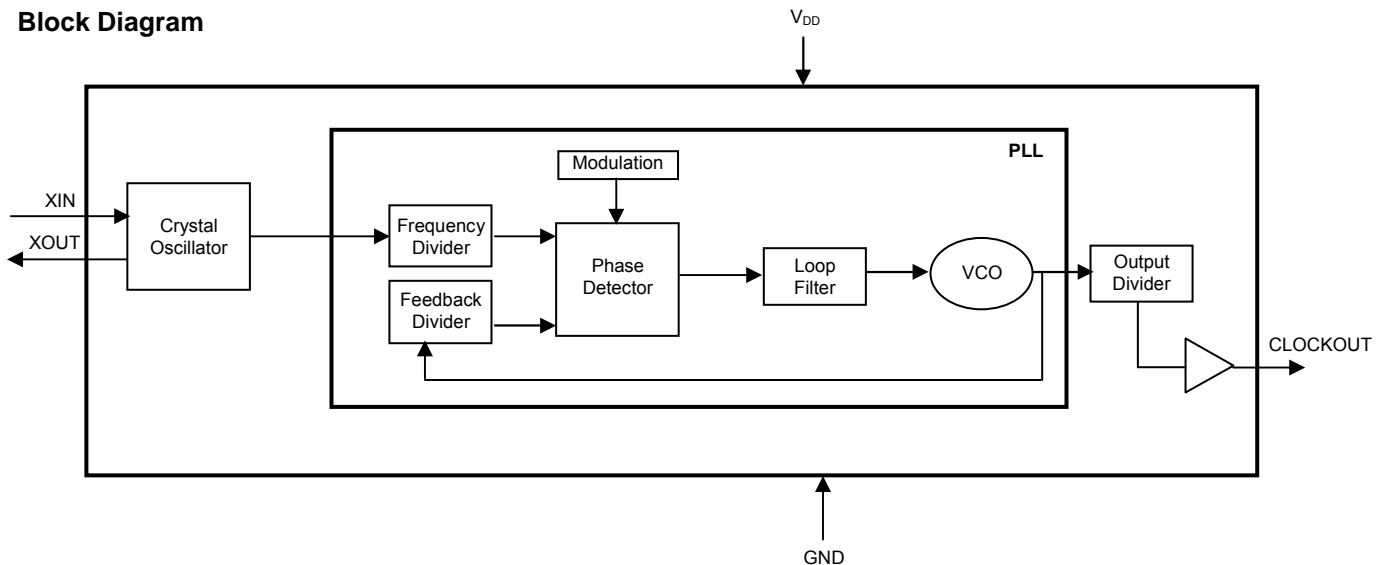
The ASM3P2107A uses the most efficient and optimized modulation profile approved by the FCC and is implemented in a proprietary all digital method.

The ASM3P2107A 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.’

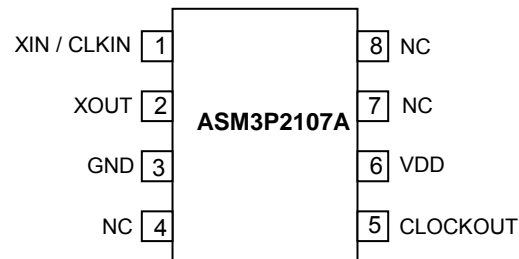
Applications

The ASM3P2107A 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

| Parameter | Description | Min | Max | Unit |
|-----------|---|------|------|------|
| VDD | Supply Voltage | 4.75 | 5.25 | V |
| T_A | Operating Temperature (Ambient 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 | | 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, 18MHz 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 |

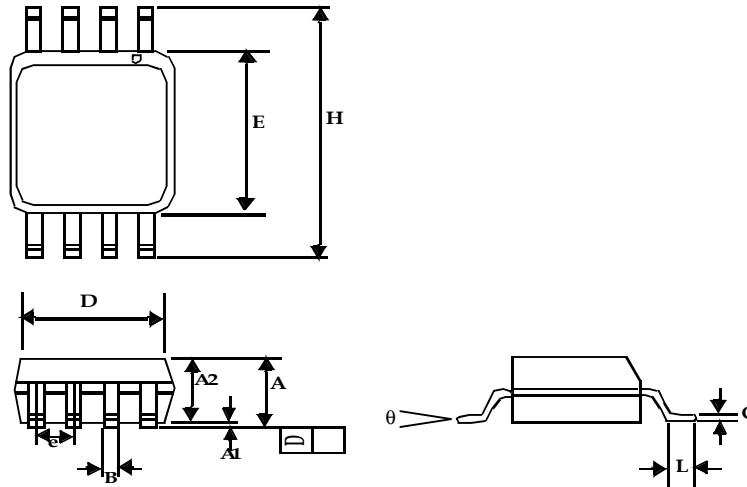
AC Electrical Characteristics

| Symbol | Parameter | Min | Typ | Max | Unit |
|-------------------|---|-------------------------|-----|-------|------|
| f _{IN} | Input frequency | 12 | | 22 | MHz |
| MODOUT | Output frequency | 12 | | 22 | MHz |
| f _d | Frequency Deviation | Input Frequency = 12MHz | | -2.13 | % |
| | | Input Frequency = 22MHz | | -0.62 | |
| 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 = 18MHz, t_{LH} and t_{HL} are measured into a capacitive load of 15pF

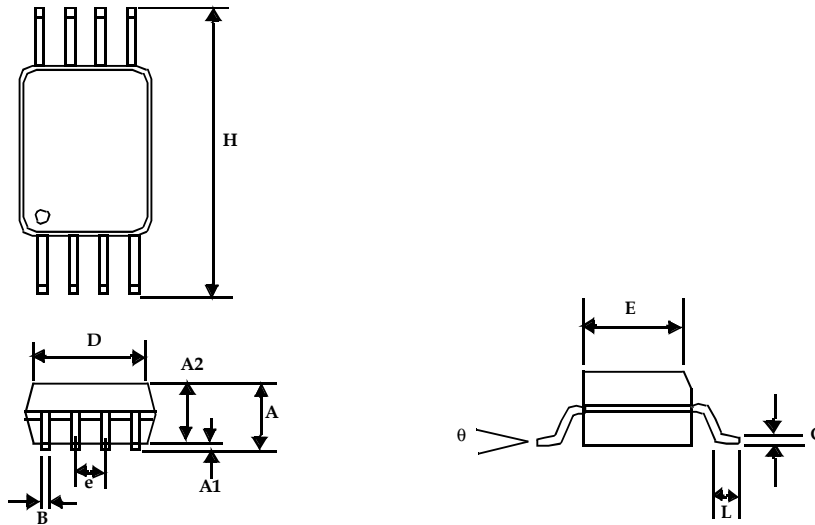
Package Information

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° |

8-Pin TSSOP




| Symbol | Dimensions | | | |
|--------|------------|-------|-------------|------|
| | Inches | | Millimeters | |
| | Min | Max | Min | Max |
| A | | 0.043 | | 1.10 |
| A1 | 0.002 | 0.006 | 0.05 | 0.15 |
| A2 | 0.033 | 0.037 | 0.85 | 0.95 |
| B | 0.008 | 0.012 | 0.19 | 0.30 |
| c | 0.004 | 0.008 | 0.09 | 0.20 |
| D | 0.114 | 0.122 | 2.90 | 3.10 |
| E | 0.169 | 0.177 | 4.30 | 4.50 |
| e | 0.026 BSC | | 0.65 BSC | |
| H | 0.252 BSC | | 6.40 BSC | |
| L | 0.020 | 0.028 | 0.50 | 0.70 |
| θ | 0° | 8° | 0° | 8° |

ASM3P2107A

Ordering Codes

| Part Number | Marking | Package | Temperature |
|------------------|---------|------------------------------------|--------------|
| ASM3P2107AF-08SR | AEE | 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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