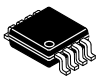
ASM3P2107A

Product Preview

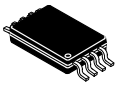
Peak EMI Reducing Solution

ON Semiconductor®

http://onsemi.com



SOIC−8
S SUFFIX
CASE 751BD



TSSOP−8
T SUFFIX
CASE 948AL

Description

The ASM3P2107A is a versatile spread spectrum frequency modulator designed specifically for input clock frequencies from 12 MHz to 22 MHz. 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

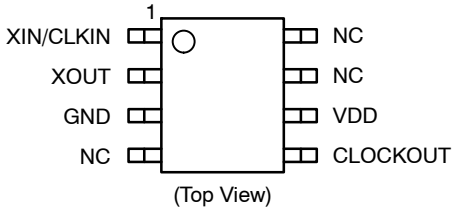
The ASM3P2107A is targeted towards EMI management for high speed digital applications such as PC peripheral devices, consumer electronics and embedded controller systems.

Features

- FCC Approved Method of EMI Attenuation
- Generates a 1X Low EMI Spread Spectrum Clock of the Input Frequency
- Input Frequency Range: 12 MHz to 22 MHz
- Internal Loop Filter Minimizes External Components and Board Space
- Frequency Deviation: − 0.8% (Typ) @ 20 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 Package
- These are Pb−Free Devices

This document contains information on a product under development. ON Semiconductor reserves the right to change or discontinue this product without notice.

PIN CONFIGURATION



(Top View)

ORDERING INFORMATION

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

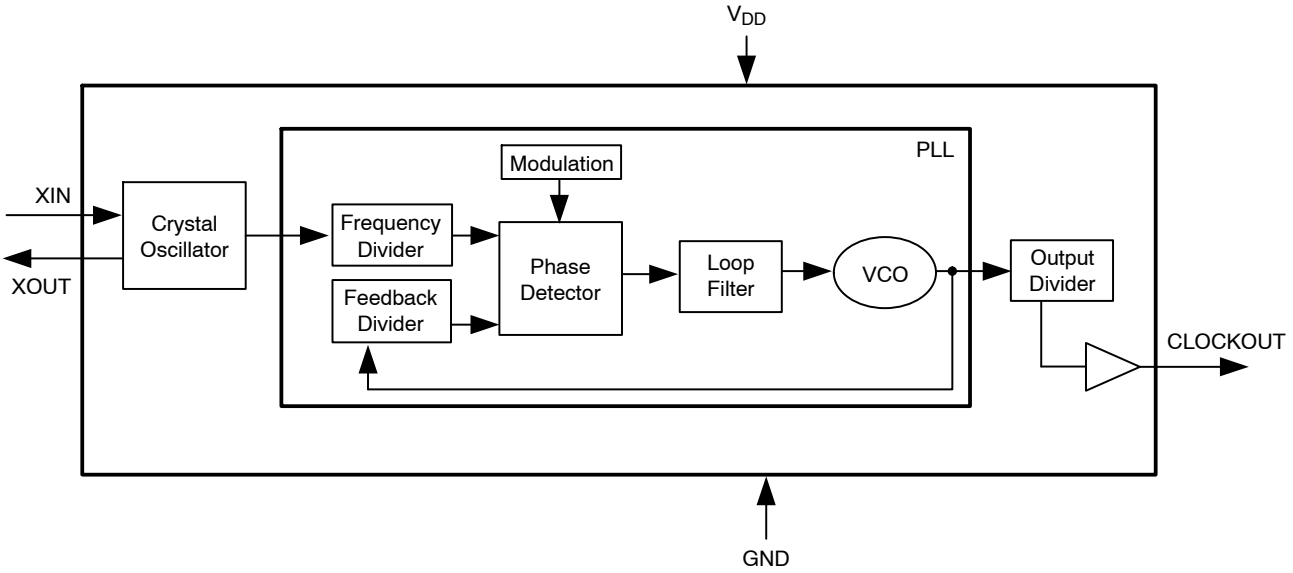


Figure 1. Block Diagram

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.

Table 3. 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} = 5 V)	–	3	–	mA
I_{XOH}	X_{OUT} output high current (@ 2.5 V, V_{DD} = 5 V)	–	3	–	mA
V_{OL}	Output low voltage (V_{DD} = 5 V, I_{OL} = 20 mA)	–	–	0.4	V
V_{OH}	Output high voltage (V_{DD} = 5 V, I_{OH} = 20 mA)	2.5	–	–	V
I_{CC}	Dynamic supply current normal mode (5 V, 18 MHz and 15 pF 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

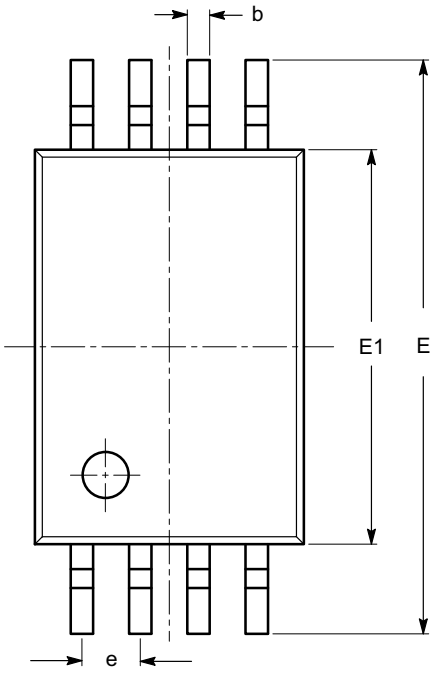
Table 4. AC ELECTRICAL CHARACTERISTICS

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 = 12 MHz	–	–2.13	–	%
		Input Frequency = 22 MHz	–	–0.62	–	
t_{LH} (Note 1)	Output rise time (measured at 0.8 V to 2.0 V)		–	440	–	pS
t_{HL} (Note 1)	Output fall time (measured at 2.0 V to 0.8 V)		–	300	–	pS
t_{JC}	Jitter (cycle to cycle)		–	–	360	pS
t_D	Output duty cycle		45	50	55	%

1. V_{DD} = +5 V, Input Frequency = 18 MHz, t_{LH} and t_{HL} are measured into a capacitive load of 15 pF

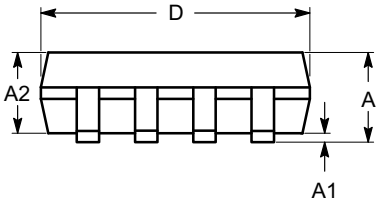
PACKAGE DIMENSIONS

TSSOP8, 4.4x3
CASE 948AL−01
ISSUE O

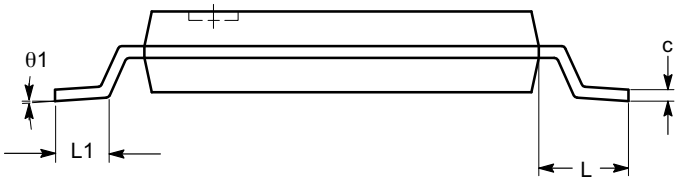


TOP VIEW

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
θ	0º		8º



SIDE VIEW



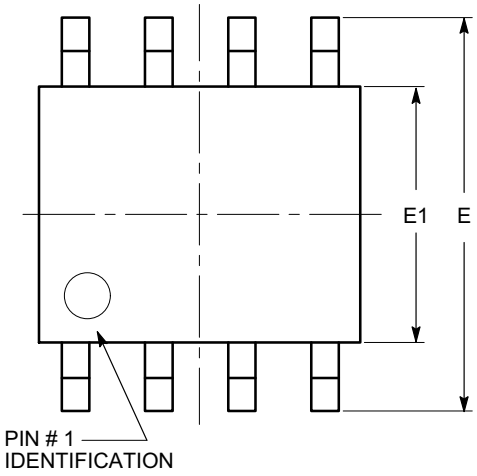
END VIEW

Notes:

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

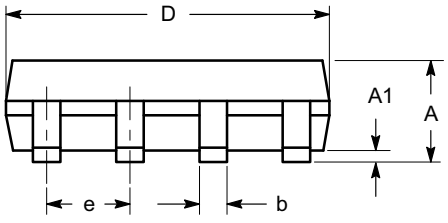
PACKAGE DIMENSIONS

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

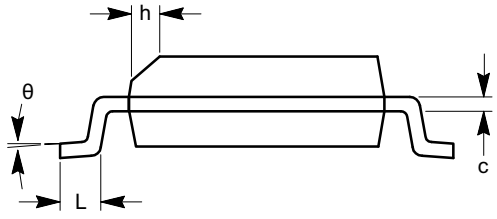


TOP VIEW

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
θ	0º		8º



SIDE VIEW



END VIEW

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

Table 5. ORDERING INFORMATION

Part Number	Marking	Package Type	Temperature
ASM3P2107AF-08-SR	3P2107AF	8-PIN SOIC, TAPE AND REEL, Pb Free	Commercial
ASM3P2107AF-08-ST	3P2107AF	8-PIN SOIC, TUBE, Pb Free	Commercial
ASM3P2107AF-08-TR	3P2107AF	8-PIN TSSOP, TAPE AND REEL, Pb Free	Commercial
ASM3P2107AF-08-TT	3P2107AF	8-PIN TSSOP, TUBE, Pb Free	Commercial
ASM3P2107AG-08-SR	3P2107AG	8-PIN SOIC, TAPE AND REEL, Green	Commercial
ASM3P2107AG-08-ST	3P2107AG	8-PIN SOIC, TUBE, Green	Commercial
ASM3P2107AG-08-TR	3P2107AG	8-PIN TSSOP, TAPE AND REEL, Green	Commercial
ASM3P2107AG-08-TT	3P2107AG	8-PIN TSSOP, TUBE, Green	Commercial

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
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