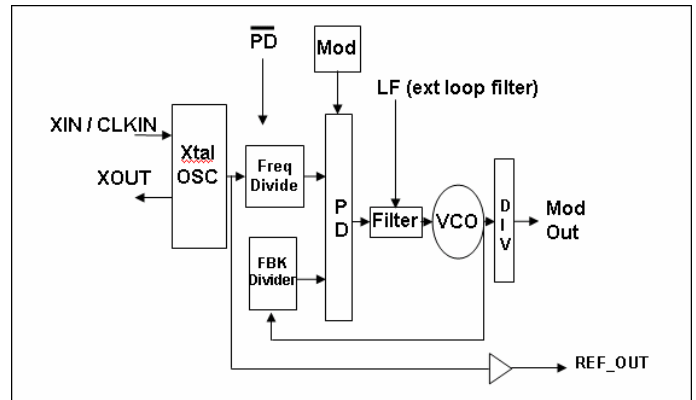




Low Power EMI Reduction IC

Features

- FCC approved method of EMI attenuation.
- Provides up to 15dB EMI reduction.
- Generates a 4X REF EMI spread output
- Spectrum clock of the input frequency.
- Optimized for input frequency range from 10 to 20MHz.
- External Loop Filter for configurability and flexibility in application and design (spread percentage adjust)
- Reference Output
- Power Down Mode
- Very Low Cycle-to-Cycle Jitter.
- 3.3V operating Range
- CMOS / TTL compatible inputs and outputs
- Available in 8-pin SOIC and 8-pin TSSOP packages.



Product Description

The ASM3P2109A device is a versatile spread spectrum Frequency Synthesizer / Modulator designed specifically for a wide Range of input clock frequencies from 10MHz to 20MHz with a 4X multiplier for output clock frequencies from 40MHz to 80 MHz.

The ASM3P2109A generates an EMI reduced clock signal from a crystal, ceramic resonator, or system clock. The ASM3P2109A generates a range of modulation rates and deviations (spread) from Center Frequency based upon the input frequency, and is set / determined via an external filter network (see Loop Filter Selection table)

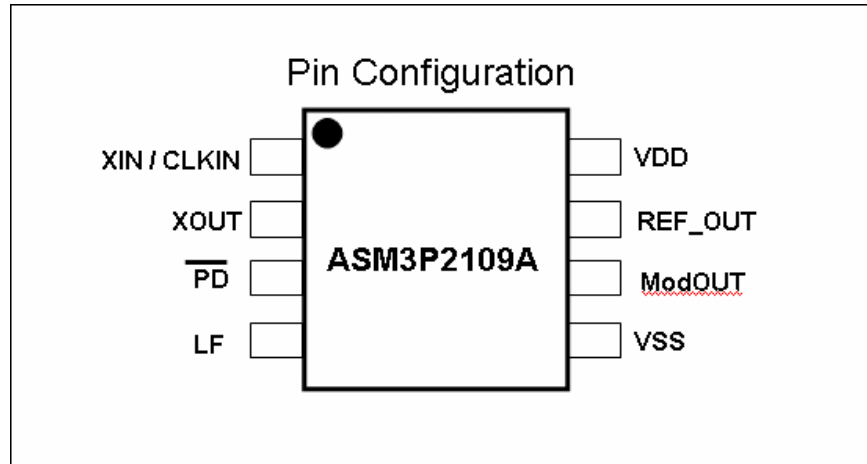
The ASM3P2109A reduces Electro Magnetic Interference (EMI), at the Clock Source, allowing system wide reduction of EMI on downstream clock and data dependant signals.

The resulting EMI reduction provides for significant cost savings by reducing the number of circuit board layers and shielding that are traditionally associated with designs in order to achieve EMI regulatory compliance.

The ASM3P2109A modulates the output of a single PLL in order to “spread” the bandwidth of a synthesized clock, thereby decreasing the Peak amplitudes of its associated harmonics. This results in significantly lower radiated EMI compared to the narrow band signal produced by standard oscillators and most clock synthesizers & generators. This technique of lowering EMI by increasing the signals bandwidth is called Spread Spectrum Clocking (SSC). The ASM3P2109A utilizes the most efficient and optimized modulation profile approved by the FCC, and is implemented using a proprietary, All-Digital method.

Applications

The ASM3P2109A is targeted towards the Consumer and PC/Data Processing, or Computation markets. Entertainment devices, LCD displays, Notebook computers, PC peripheral devices, embedded systems, PDA’s, and hand held devices provide a platform to take full advantage of the feature set of the ASM3P2109A.



Pin Description

Pin#	Pin Name	Type	Description
1	XIN / CLKIN	Input	Crystal Connection or external frequency input. This pin has dual functions - it may be connected to an external XTAL or driven by an external LVC MOS REF clock.
2	XOUT	Output	Crystal connection. If using an external REFERENCE, this pin MUST be left open
3	PD#	Input	Power Down (active Low)
4	LF	Input	External Loop Filter for the PLL. By changing the value of the CRC circuit, the percentage spread will be adjusted accordingly (see filter selection table)
5	VSS	Power	Power Return, Ground
6	Mod_OUT	Output	Spread Spectrum Clock Signal Output
7	REF_OUT	Output	Provides a Reference output for the input frequency
8	VDD	Power	Device Power Supply

**Absolute Maximum Ratings**

Symbol	Parameter	Rating	Units
VDD, Vin	Voltage on any pin with respect to ground	-0.5 to 7.0	Volts
TSTG	Storage Temperature	-65 to + 125	Degrees C
TA	Operating Temperature	0 to 70	Degrees C

Note: These are Stress ratings Only, and functional operation is not implied. Exposure to absolute maximum ratings for extended periods may affect device reliability...

DC Electrical Characteristics (VDD= 3.3V Temp - 25 degrees C)

Symbol	Parameter	Min	Typ	Max	Units
V _{IL}	Input Low Voltage	VSS - 0.3V	-	0.8	V
V _{IH}	Input High Voltage	2	-	VDD + 0.3	V
I _{IL}	Input Low Current (internal pull-up 65k Ω)	-60.0	-	-20.0	μ A
I _{IH}	Input High Current (internal pull-up 65k Ω)	-	-	1.0	μ A
I _{XOL}	XOUT Output Low Current (@0.4V, VDD = 3.3V)	2.0	-	12.0	mA
I _{XOH}	XOUT Output High Current (@2.5V, VDD = 3.3V)	-	-	12.0	mA
V _{OL}	Output Low Voltage	-	-	0.4	V
I _{CC}	Dynamic Supply Current	-	~20 (@80mHz)	tbd	mA
	Power Down mode		50.0		μ A
I _{DD}	Static Supply Current	-	3.0	-	mA
V _{DD}	Operating Voltage	3.0	3.3	3.6	V
T _{ON}	Power up time to Lock (first locked clock cycle after power on)	-	<1.0	-	mS
Z _{OUT}	REF_Out & Mod_Out Clock Driver impedance	-	50.0	-	Ω

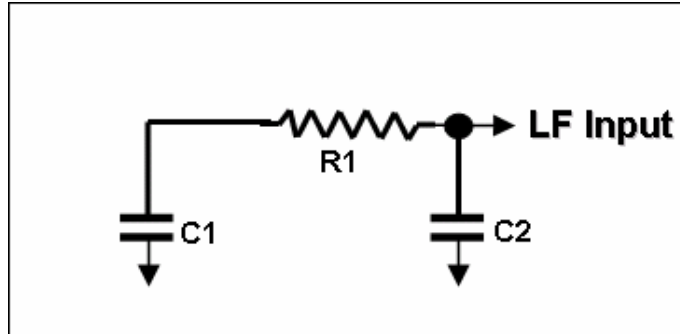
AC Electrical Characteristics (VDD= 3.3V Temp - 25 degrees C)

Symbol	Parameter	Min	Typ	Max	Units
F _{IN}	Input Frequency	10.0	-	40.0	MHz
F _{OUT}	Output Frequency	40.0	-	80.0	MHz
T _{LH}	Time Output propagation L to H (Trise) (measured @ 0.8V to 2.0V - 25pf load)	-	1.00	-	nS
T _{HL}	Time Output propagation H to L (Tfall) (measured @ 0.8V to 2.0V - 25pf load)	-	1.00	-	nS
T _{JC}	Jitter (Cycle-to-Cycle)	-250.0	-	250.0	pS
T _D	Output Duty Cycle (@ 40MHz)	45.0	50.0	55.0	%
Δ F	Frequency deviation tolerance from BW% stated in the Loop Filter Selection Table	-20	0	20	%



Loop Filter Selection Table

VDD = 3.3V, Temp =25 degrees C

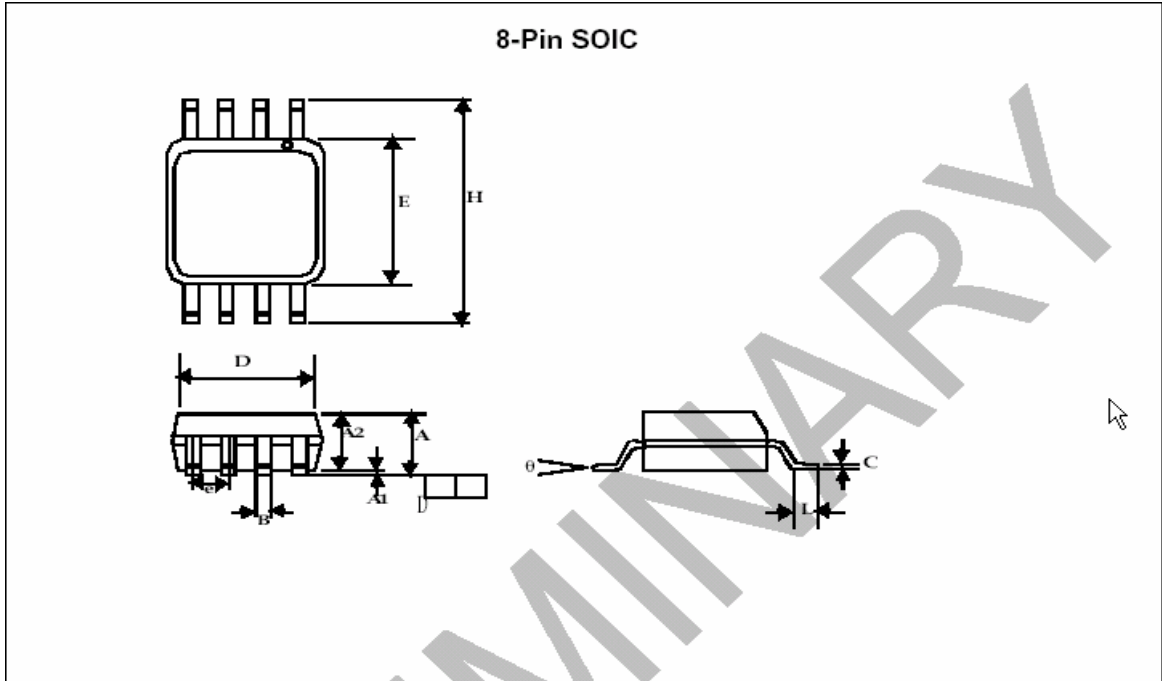


INPUT (MHz)	BW=+/-0.50%			BW=+/-0.75%			BW=+/-1.00%			BW=+/-1.25%		
	C1 (pF)	C2 (pF)	R1 (ohms)	C1 (pF)	C2 (pF)	R1 (ohms)	C1 (pF)	C2 (pF)	R1 (ohms)	C1 (pF)	C2 (pF)	R1 (ohms)
10	270	100,000	330	270	100,000	510	560	100,000	750	560	100,000	910
11	270	100,000	390	270	100,000	560	560	100,000	866(1%)	560	100,000	1,100
12	270	100,000	510	270	100,000	750	1,000	10,000	1,000	680	6,800	1,200
13	270	100,000	560	270	100,000	820	1,200	12,000	1,200	470	4,700	1,200
14	270	100,000	620	270	100,000	1,000	560	5,600	1,200	330	3,300	1,200
15	270	100,000	750	270	100,000	1,100	390	3,900	1,200	330	3,300	1,500
16	270	100,000	820	270	100,000	1,200	1,200	12,000	2,200	680	6,800	2,200
17	270	100,000	910	270	100,000	1,300	1,000	10,000	2,200	390	3,900	2,200
18	270	100,000	1,000	270	100,000	1,500	560	5,600	2,200	270	2,700	2,200
19	270	100,000	1,200	270	100,000	1,600	330	3,300	2,200	270	2,700	2,700
20	270	100,000	330	270	100,000	560	560	100,000	750	560	100,000	910

For frequency deviations other than noted above, contact the factory applications group for information and details...



Package Dimensions

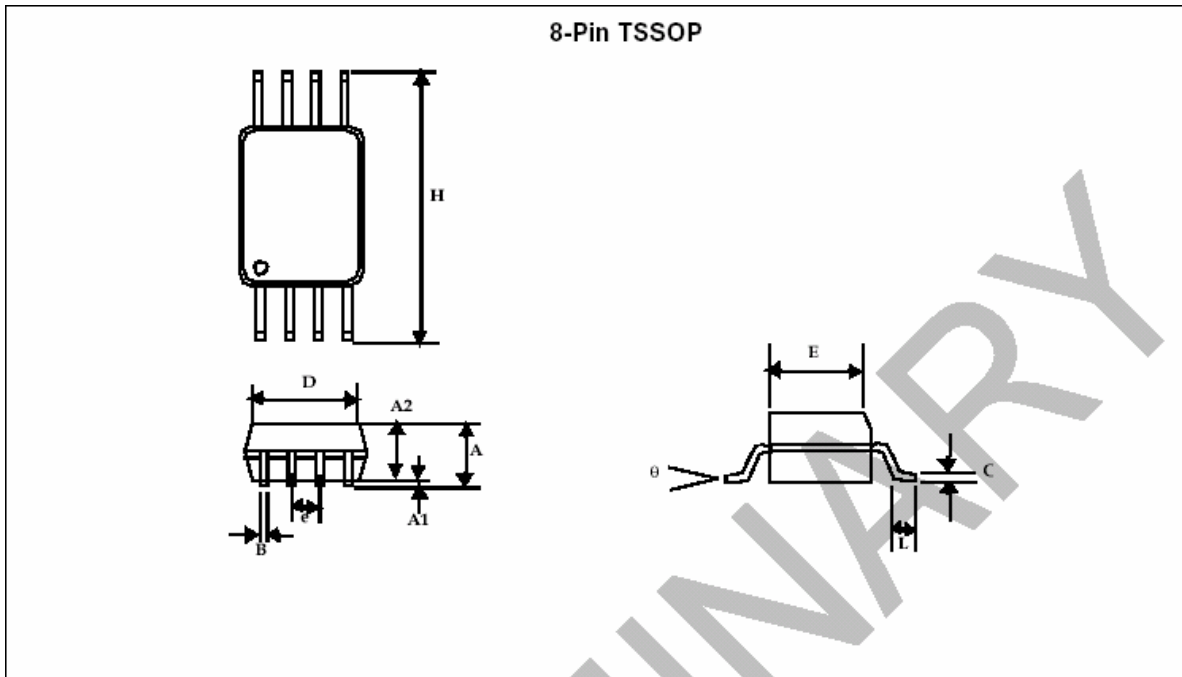


Symbol	Dimensions in inches		Dimensions in millimeters	
	Min	Max	Min	Max
A	0.057	0.071	1.45	1.80
A1	0.004	0.010	0.10	0.25
A2	0.053	0.069	1.35	1.75
B	0.012	0.020	0.31	0.51
C	0.004	0.01	0.10	0.25
D	0.186	0.202	4.72	5.12
E	0.148	0.164	3.75	4.15
E	0.050 BSC		1.27 BSC	
H	0.224	0.248	5.70	6.30
L	0.012	0.028	0.30	0.70
theta	0°	8°	0°	8°

Note: Controlling dimensions are millimeters.
 SOIC: 0.074 grams unit weight.



Package Dimensions



Symbol	Dimensions in inches		Dimensions in millimeters	
	Min	Max	Min	Max
A	0.047		1.10	
A1	0.002	0.006	0.05	0.15
A2	0.031	0.041	0.80	1.05
B	0.007	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	0.244	0.260	6.20	6.60
L	0.018	0.030	0.45	0.75
θ	0°	8°	0°	8°

Note: Controlling dimensions are millimeters.
TSSOP: 0.034 grams unit weight.



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