ON Semiconductor®

ASM3P2579A

Peak EMI Reducing Solution

Features

- Generates an EMI optimized clock signal at the output.
- Integrated loop filter components.
- Operates with a 3.3 / 2.5V Supply.
- Operating current less than 4mA.
- CMOS design.
- Input frequency range: 12MHz to 30MHz for 2.5V
  12MHz to 30MHz for 3.3V
- Generates a 1X low EMI spread spectrum clock of the input frequency.
- Spread Spectrum Enable Control.
- Frequency deviation: ±1% @ 24MHz
- Available in 6L-TSOP (6L-TSOT-23).

Product Description

The ASM3P2579A is a versatile spread spectrum frequency modulator designed specifically for a wide range of clock frequencies. The ASM3P2579A reduces electromagnetic interference (EMI) at the clock source, allowing system wide reduction of EMI of all clock dependent signals. The ASM3P2579A allows significant system cost savings by reducing the number of circuit board layers, ferrite beads and shielding that are traditionally required to pass EMI regulations.

-The ASM3P2579A uses the most efficient and optimized modulation profile approved by the FCC and is implemented by using a proprietary all digital method.

The ASM3P2579A 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 result 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.'

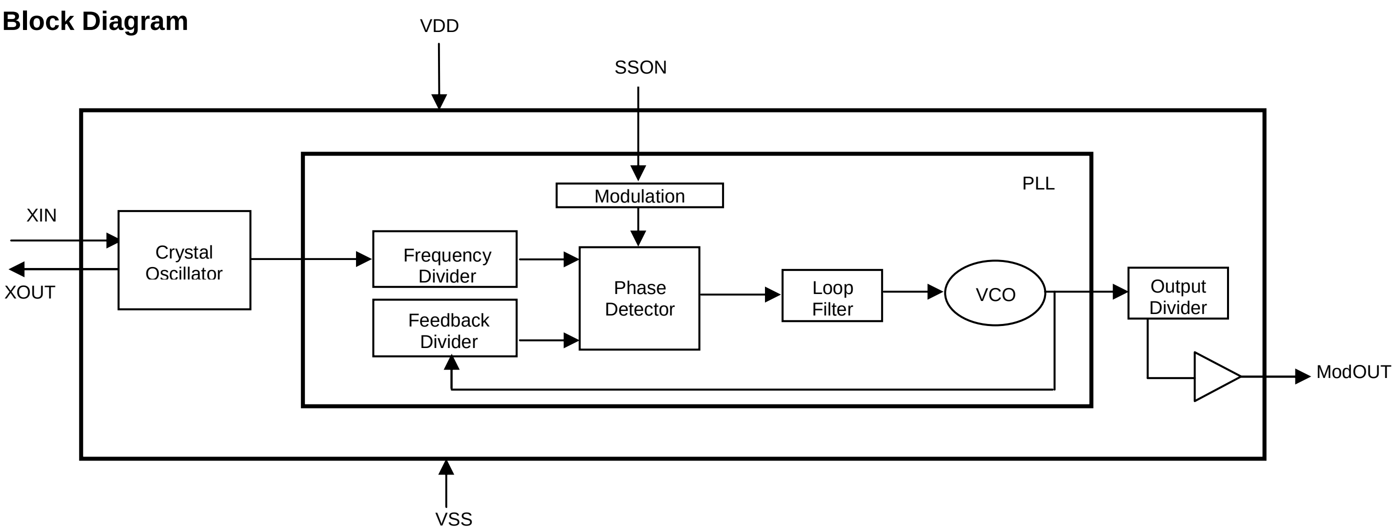
Applications

The ASM3P2579A is targeted towards all portable devices like MP3 players and digital still cameras.

Key Specifications

Description	Specification
Supply voltages	VDD = 3.3V/2.5V
Cycle-to-Cycle Jitter	±200pS (Typ)
Output Duty Cycle	45/55% (worst case)
Modulation Rate Equation	F_{IN}/640
Frequency Deviation	±1% @ 24MHz

Block Diagram



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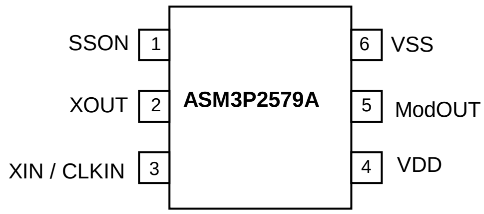
Publication Order Number:
ASM3P2579/D

Pin Configuration (6L-TSOP)



Pin Description

Pin#	Pin Name	Type	Description
1	SSON	I	When SSON is HIGH, the spread spectrum is enabled and when LOW, it turns off the spread spectrum. Connect the pin to ground when Spread Spectrum feature is not required.
2	XOUT	O	Crystal connection. If using an external reference, this pin must be left unconnected.
3	XIN / CLKIN	I	Crystal connection or external reference frequency input. This pin has dual functions. It can be connected either to an external crystal or an external reference clock.
4	VDD	P	Power supply for the entire chip.
5	ModOUT	O	Spread spectrum clock output.
6	VSS	P	Ground connection.

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
VDD, V_{IN}	Voltage on any pin with respect to Ground	-0.5 to +4.6	V
T_{STG}	Storage temperature	-65 to +125	℃
T_s	Max. Soldering Temperature (10 sec)	260	℃
T_J	Junction Temperature	150	℃
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	2.375	3.6	V
T_A	Operating Temperature (Ambient Temperature)	-40	+85	℃
C_L	Load Capacitance		15	pF
C_{IN}	Input Capacitance		7	pF

DC Electrical Characteristics for 2.5V Supply

Symbol	Parameter	Min	Typ	Max	Unit
V_{IL}	Input low voltage	VSS-0.3		0.8	V
V_{IH}	Input high voltage	2.0		VDD+0.3	V
I_{IL}	Input low current			-35	µA
I_{IH}	Input high current			35	µA
I_{XOL}	XOUT output low current (@ 0.5V, VDD = 2.5V)		3		mA
I_{XOH}	XOUT output high current (@ 1.8V, VDD = 2.5V)		3		mA
V_{OL}	Output low voltage (VDD = 2.5V, I_{OL} = 8mA)			0.6	V
V_{OH}	Output high voltage (VDD = 2.5V, I_{OH} = 8mA)	1.8			V
I_{DD}	Static supply current[1]		1.1		mA
I_{CC}	Dynamic supply current (2.5V, 24MHz and no load)		3.5		mA
VDD	Operating Voltage	2.375	2.5	2.625	V
t_{ON}	Power-up time (first locked cycle after power-up)			5	mS
Z_{OUT}	Output impedance		50		Ω

Note: 1. XIN / CLKIN is made low.

AC Electrical Characteristics for 2.5V Supply

Symbol	Parameter		Min	Typ	Max	Unit
CLKIN	Input frequency		12		30	MHz
ModOUT	Output frequency		12		30	MHz
f_d	Frequency Deviation	Input Frequency = 12MHz		±1.65		%
		Input Frequency = 30MHz		±0.80		
t_{LH}[1]	Output rise time (measured from 0.7V to 1.7V)		0.7	1.5	1.9	nS
t_{HL}[1]	Output fall time (measured from 1.7V to 0.7V)		0.4	1.0	1.1	nS
t_{JC}	Jitter (cycle-to-cycle)			±200		pS
t_D	Output duty cycle		45	50	55	%

Note: 1. t_{LH} and t_{HL} are measured into a capacitive load of 15pF.

DC Electrical Characteristics for 3.3V Supply

Symbol	Parameter	Min	Typ	Max	Unit
V_{IL}	Input low voltage	VSS-0.3		0.8	V
V_{IH}	Input high voltage	2.0		VDD+0.3	V
I_{IL}	Input low current			-35	µA
I_{IH}	Input high current			35	µA
I_{XOL}	XOUT output low current (@ 0.4V, VDD = 3.3V)		3		mA
I_{XOH}	XOUT output high current (@ 2.5V, VDD = 3.3V)		3		mA
V_{OL}	Output low voltage (VDD = 3.3V, I_{OL} = 8mA)			0.4	V
V_{OH}	Output high voltage (VDD = 3.3V, I_{OH} = 8mA)	2.5			V
I_{DD}	Static supply current[1]		1.2		mA
I_{CC}	Dynamic supply current (3.3V, 24MHz and no load)		4.0		mA
VDD	Operating Voltage	2.7	3.3	3.6	V
t_{ON}	Power-up time (first locked cycle after power-up)			5	mS
Z_{OUT}	Output impedance		45		Ω
Note: 1. XIN / CLKIN is made low.					

AC Electrical Characteristics for 3.3V Supply

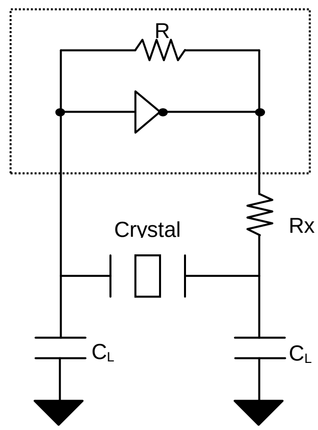
Symbol	Parameter		Min	Typ	Max	Unit
CLKIN	Input frequency		12		30	MHz
ModOUT	Output frequency		12		30	MHz
f_d	Frequency Deviation	Input Frequency = 12MHz		±1.65		%
		Input Frequency = 30MHz		±0.80		
t_{LH}[1]	Output rise time (measured from 0.8 to 2.0V)		0.5	1.4	1.7	nS
t_{HL}[1]	Output fall time (measured at 2.0V to 0.8V)		0.4	1.0	1.2	nS
t_{JC}	Jitter (cycle-to-cycle)			±200		pS
t_D	Output duty cycle		45	50	55	%
Note: 1. t_{LH} and t_{HL} are measured into a capacitive load of 15pF.						

Typical Crystal Specifications

Fundamental AT cut parallel resonant crystal	
Nominal frequency	14.31818MHz
Frequency tolerance	± 50 ppm or better at 25℃
Operating temperature range	-25℃ to +85℃
Storage temperature	-40℃ to +85℃
Load capacitance(C_P)	18pF
Shunt capacitance	7pF maximum
ESR	25 Ω

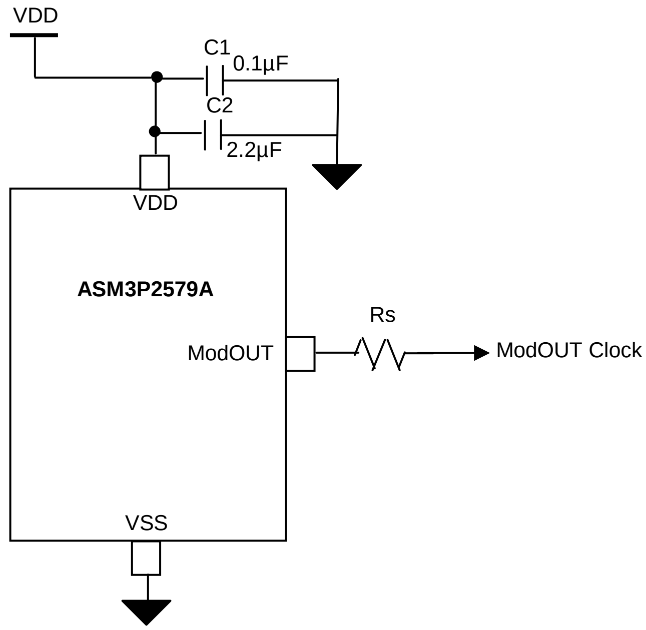
Note: Note: C_L is Load Capacitance and Rx is used to prevent oscillations at overtone frequency of the Fundamental frequency.

Typical Crystal Interface Circuit



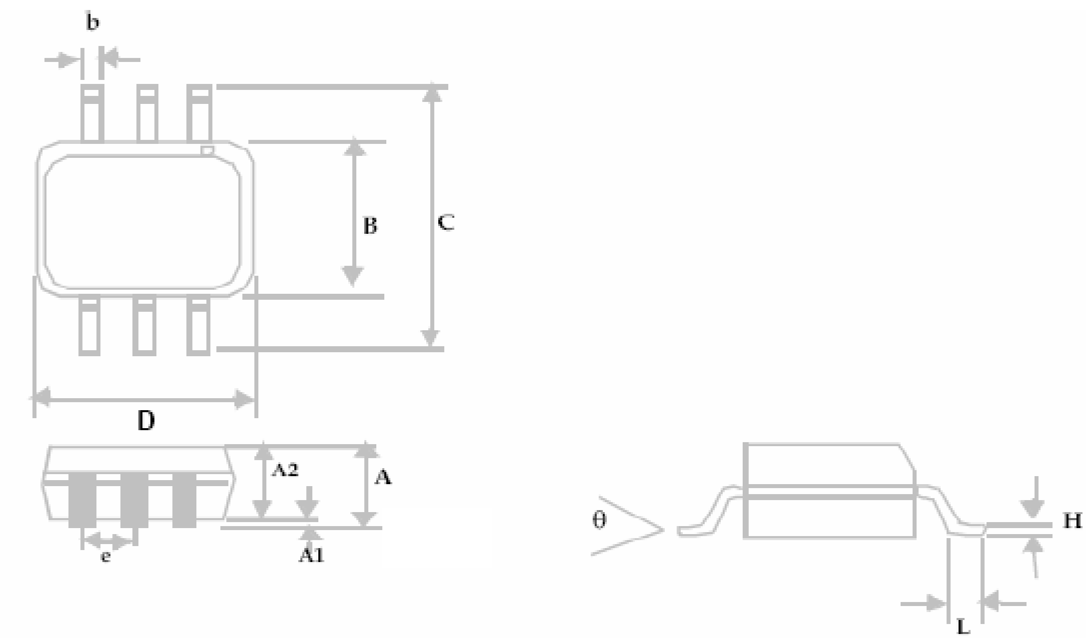
$C_L = 2*(C_P – C_S)$,
Where C_P = Load capacitance of crystal
C_S = Stray capacitance due to $C_{IN,}$ PCB, Trace etc.

Typical Application Schematic



Package Information

6L-TSOP



Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A		0.04		1.00
A1	0.00	0.004	0.00	0.10
A2	0.033	0.036	0.84	0.90
b	0.012	0.02	0.30	0.50
H	0.005 BSC		0.127 BSC	
D	0.114 BSC		2.90 BSC	
B	0.06 BSC		1.60 BSC	
e	0.0374 BSC		0.950 BSC	
C	0.11 BSC		2.80 BSC	
L	0.0118	0.02	0.30	0.50
θ	0°	4°	0°	4°

Ordering Information

Part Number	Marking	Package Type	Temperature
ASM3I2579AF-06OR	S5L	6L-TSOP (6L-TSOT-23), TAPE & REEL, Pb Free	-40℃ to +85℃

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.

Licensed under US Patent #5,488,627 and #5,631,921.

Note: This product utilizes US Patent #6,646,463 Impedance Emulator Patent issued to PulseCore Semiconductor, dated 11-11-2003.

PUBLICATION ORDERING INFORMATION

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