ASM3P2590A

Low Power Peak EMI Reducing Solution

Features

- Generates a 1X low EMI optimized clock signal at the output.
- Integrated loop filter components.
- Operates with a 3.3 / 2.5V Supply.
- Operating current less than 5mA.
- Low power CMOS design.
- Input frequency range
  60MHz to 120MHz for 2.5V
  60MHz to 120MHz for 3.3V
- Frequency deviation: ±0.75% (Typ) @85MHz Output frequency.
- Available in 6-pin TSOT-23 Package.

Product Description

The ASM3P2590A is a versatile spread spectrum frequency modulator designed specifically for a wide range of clock frequencies. The ASM3P2590A reduces electromagnetic interference (EMI) at the clock source, allowing system wide reduction of EMI of all clock dependent signals. The ASM3P2590A allows significant system cost savings by reducing the number of circuit board layers ferrite beads, shielding that are traditionally required to pass EMI regulations.

The ASM3P2590A uses the most efficient and optimized modulation profile approved by the FCC and is implemented by using a proprietary all digital method.

The ASM3P2590A 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'.

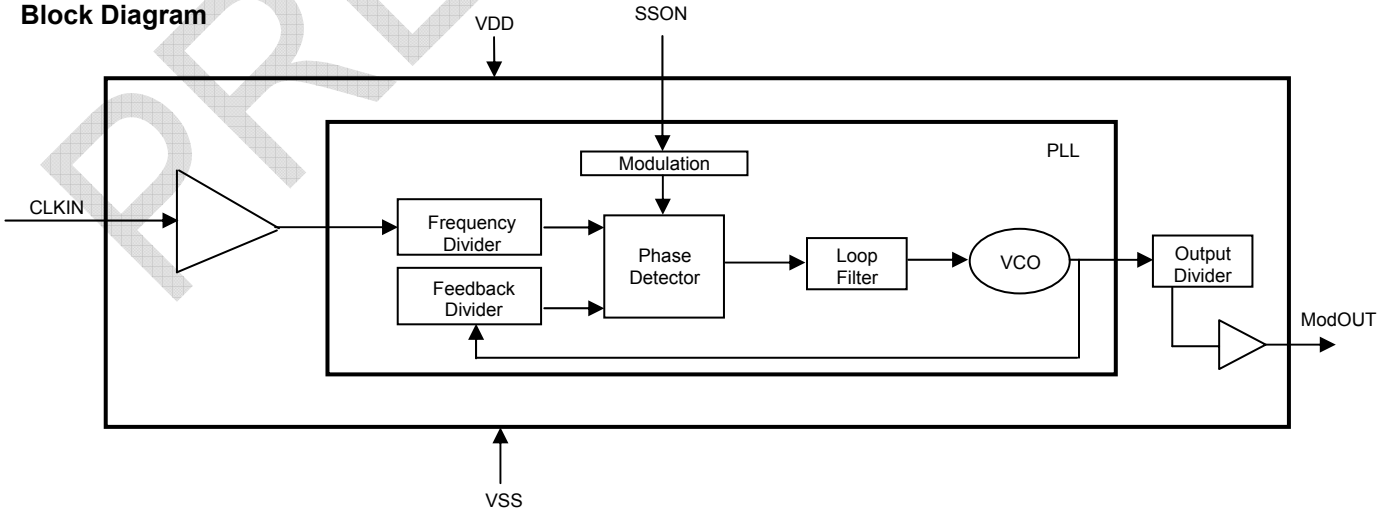
Applications

The ASM3P2590A is targeted towards all portable devices with very low power requirements like MP3 players,MFP, LCD Panel Module and digital still cameras.

Key Specifications

Description	Specification
Supply voltages	VDD = 3.3V / 2.5V
Cycle-to-Cycle Jitter	360pS (Typ)
Output Duty Cycle	45/55%
Modulation Rate Equation	F_{IN}/2560
Frequency Deviation	±0.75% (Typ) @85MHz Output

Block Diagram



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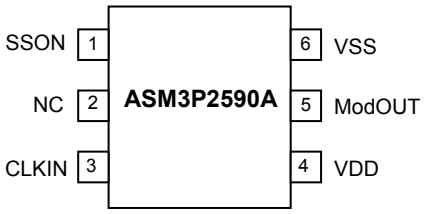
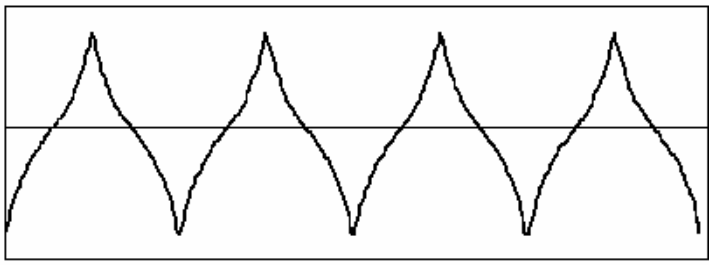
Pin Configuration (6-pin TSOT- 23 Package)



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	NC	-	No Connect
3	CLKIN	I	Clock Input
4	VDD	P	Power supply for the entire chip.
5	ModOUT	O	Spread spectrum clock output.
6	VSS	P	Ground connection.

Modulation Profile



Specifications

Description		Specification
Frequency Range	For 2.5V Supply	60MHz < CLKIN < 120MHz
	For 3.3V Supply	60MHz < CLKIN < 120MHz
Modulation Equation		$F_{IN}/2560$
Frequency Deviation		±0.75% (Typ) @ 85MHz Output

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	°C
T_A	Operating temperature	-40 to +85	°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.

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
V_{OL}	Output low voltage (VDD = 2.5V, I_{OL} = 8 mA)	–	–	0.6	V
V_{OH}	Output high voltage (VDD = 2.5V, I_{OH} = 8 mA)	1.8	–	–	V
IDD	Static supply current*	–	1.8	–	mA
I_{CC}	Dynamic supply current (2.5V, 85MHz and no load)	–	4.0	–	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

* CLKIN pin is pulled low

AC Electrical Characteristics for 2.5V Supply

Symbol	Parameter		Min	Typ	Max	Unit
CLKIN	Input frequency		60	–	120	MHz
ModOUT	Output frequency		60	–	120	MHz
f_d	Frequency Deviation	Input Frequency = 60MHz	–	±0.85	–	%
		Input Frequency = 120MHz	–	±0.60	–	
t_{LH}*	Output rise time (measured from 0.7V to 1.7V)		0.7	1.8	2.6	nS
t_{HL}*	Output fall time (measured from 1.7V to 0.7V)		0.4	0.9	1.1	nS
t_{JC}	Jitter (Cycle to cycle)		–	360	–	pS
t_D	Output duty cycle		45	50	55	%

* 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
V_{OL}	Output low voltage (VDD = 3.3V, I_{OL} = 8 mA)	–	–	0.4	V
V_{OH}	Output high voltage (VDD = 3.3V, I_{OH} = 8 mA)	2.5	–	–	V
IDD	Static supply current*	–	2.2	–	mA
I_{CC}	Dynamic supply current (3.3V, 85MHz and no load)	–	4.5	–	mA
VDD	Operating voltage	3.0	3.3	3.6	V
t_{ON}	Power-up time (first locked cycle after power-up)	–	–	5	mS
Z_{OUT}	Output impedance	–	45	–	Ω

* CLKIN pin is pulled low

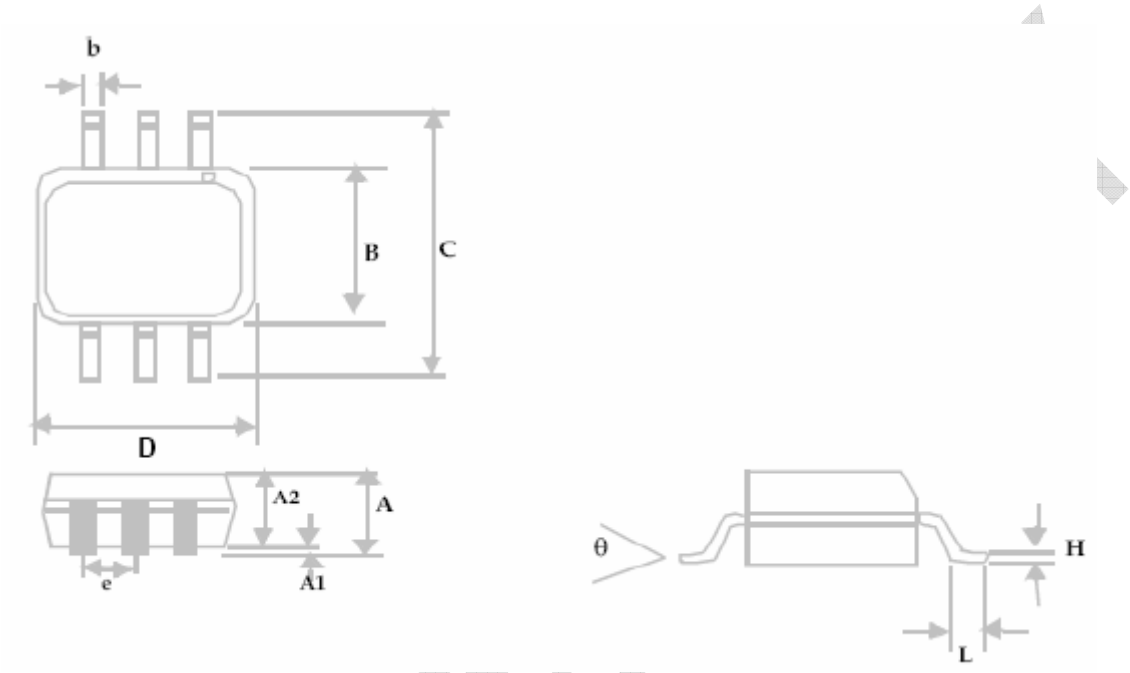
AC Electrical Characteristics for 3.3V Supply

Symbol	Parameter		Min	Typ	Max	Unit
CLKIN	Input frequency		60	–	120	MHz
ModOUT	Output frequency		60	–	120	MHz
f_d	Frequency Deviation	Input Frequency = 60MHz	–	±0.85	–	%
		Input Frequency = 120MHz	–	±0.60	–	
t_{LH}*	Output rise time (measured from 0.8 to 2.0V)		0.5	1.2	1.8	nS
t_{HL}*	Output fall time (measured at 2.0V to 0.8V)		0.3	0.8	1.1	nS
t_{JC}	Jitter (cycle to cycle)		–	360	–	pS
t_D	Output duty cycle		45	50	55	%

*t_{LH} and t_{HL} are measured into a capacitive load of 15pF

Package Information

6-pin TSOT-23 Package

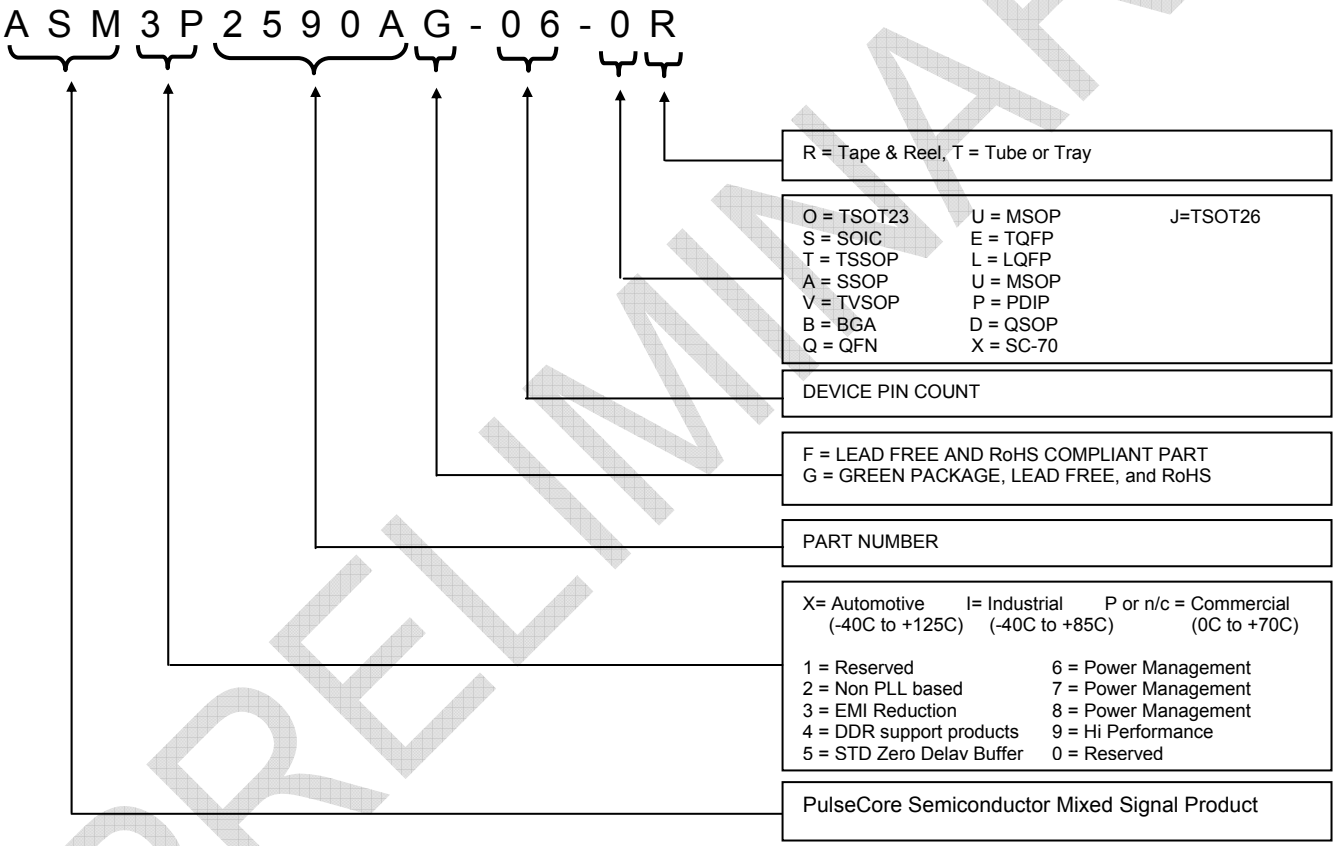


Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A		0.04		1.00
A1	0.00	0.004	0.00	0.10
A2	0.033	0.036	0.84	0.90
b	0.012	0.02	0.30	0.50
H	0.005 BSC		0.127 BSC	
D	0.114 BSC		2.90 BSC	
B	0.06 BSC		1.60 BSC	
e	0.0374 BSC		0.950 BSC	
C	0.11 BSC		2.80 BSC	
L	0.0118	0.02	0.30	0.50
θ	0°	4°	0°	4°

Ordering Information

Part Number	Marking	Package Type	Temperature
ASM3P2590AF-06-OR	Y4	6-Pin TSOT-23, TAPE & REEL, Pb Free	Commercial
ASM3P2590AG-06-OR	Y3	6-Pin TSOT-23, TAPE & REEL, Green	Commercial
ASM3I2590AF-06-OR	Y5	6-Pin TSOT-23, TAPE & REEL, Pb Free	Industrial
ASM3I2590AG-06-OR	Y6	6-Pin TSOT-23, TAPE & REEL, Green	Industrial

Device Ordering Information



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