

### Peak EMI Reducing Solution

#### Features

- Generates an EMI optimized clock at the output.
- Input frequency: 25MHz.
- Frequency outputs:
  - 60MHz (unmodulated)
  - 2 x 48MHz (unmodulated)
  - 66.6MHz (modulated): -1.7% down spread
- Modulation rate: 30KHz.
- Supply voltage range: 3.3V ± 0.3V.
- Available in 8-pin SOIC Package.
- Commercial and Industrial Temperature range.
- RoHS Compliant

allows significant system cost savings by reducing the number of circuit board layers and shielding that are required to pass EMI regulations. The ASM3P2111B modulates the output of PLL in order to spread the bandwidth of a synthesized clock, thereby decreasing 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 clock generators. Lowering EMI by increasing a signal's bandwidth is called spread spectrum clock generation.

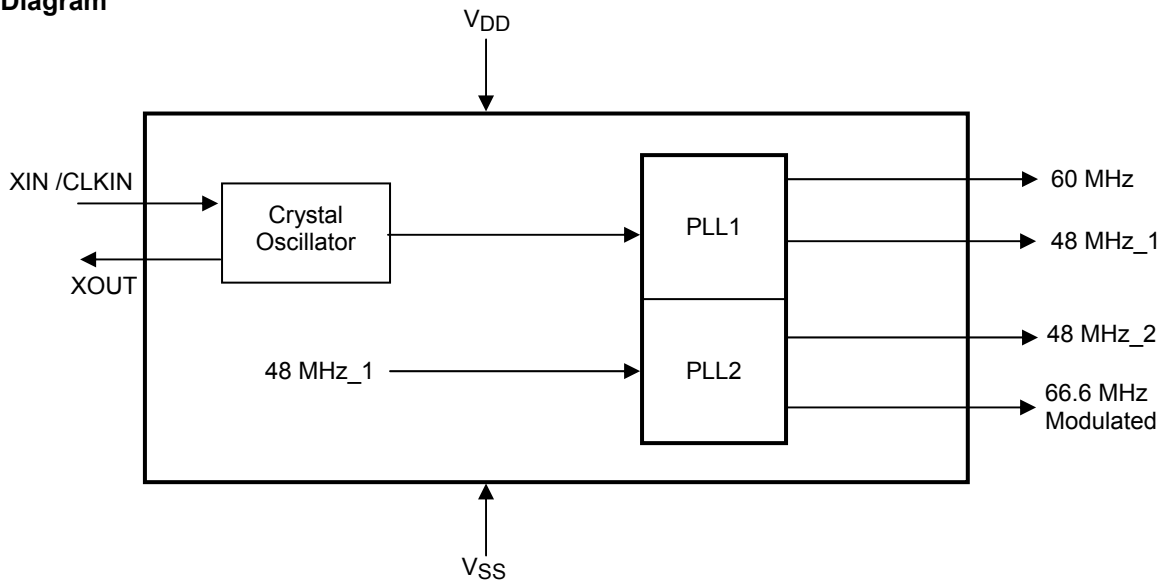
#### Product Description

The ASM3P2111B is a versatile spread spectrum frequency modulator that reduces electromagnetic interference (EMI) at the clock source. The ASM3P2111B

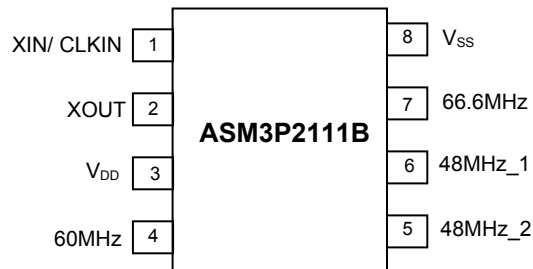
#### Applications

ASM3P2111B 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	Connection to crystal
2	XOUT	O	Connection to crystal
3	V <sub>DD</sub>	P	Power supply for the analog and digital blocks (+3.3V)
4	60MHz	O	Clock output-1 60MHz un-modulated
5	48MHz_2	O	Clock output-2 48MHz_2 un-modulated
6	48MHz_1	O	Clock output-3 48MHz_1 un-modulated
7	66.6MHz	O	Clock output-4 66.6MHz modulated
8	V <sub>SS</sub>	P	Ground to entire chip. Connect to System Ground

### Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
V <sub>DD</sub> , V <sub>IN</sub>	Voltage on any pin with respect to Ground	-0.5 to +4.6	V
T <sub>STG</sub>	Storage temperature	-65 to +125	°C
T <sub>A</sub>	Operating temperature	-40 to +85	°C
T <sub>s</sub>	Max. Soldering Temperature (10 sec)	260	°C
T <sub>J</sub>	Junction Temperature	150	°C
T <sub>DV</sub>	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

Symbol	Parameter	Condition / Description	Min	Typ	Max	Unit
V <sub>DD</sub>	Supply Voltage	3.3V ± 0.3V	3	3.3	3.6	V
F <sub>XIN</sub>	Crystal Resonator Frequency		25	-	-	MHz
C <sub>L</sub>	Output Driver Load Capacitance		-	-	15	pF

DC Electrical Characteristics

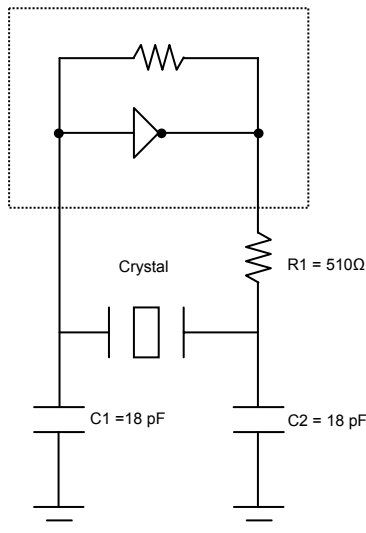
Parameter	Symbol	Conditions / Description	Min	Typ	Max	Unit
<b>Overall</b>						
Supply Current, Dynamic	$I_{DD}$	$V_{DD}=3.3V, F_{CLK}=25MHz, C_L=15pF$	41	48	62	mA
Supply Current, Static	$I_{DDL}$	$V_{DD}=3.3V, \text{Clock Input}=0$	20	25	35	mA
<b>All input pins</b>						
High-Level Input Voltage	$V_{IH}$	$V_{DD}=3.3V$	2.0	-	$V_{DD}+0.3$	V
Low-Level Input Voltage	$V_{IL}$	$V_{DD}=3.3V$	$V_{SS}-0.3$	-	0.8	V
High-Level Input Current	$I_{IH}$		-1	-	1	$\mu A$
Low-Level Input Current (pull-up)	$I_{IL}$		-20	-36	-80	$\mu A$
High-Level Output Source Current	$I_{xOH}$	$V_{DD}=V(XIN)=3.3V, V_O=0.4V$	-	3	-	mA
Low-Level Output Sink Current	$I_{xOL}$	$V_{DD}=3.3V, V(XIN)=V_O=2.5V$	-	3	-	mA
<b>Clock Outputs</b>						
High-Level Output Source Current	$I_{OH}$	$V_O=2.5V$	-	-20	-	mA
Low-Level Output Sink Current	$I_{OL}$	$V_O=0.4V$	-	23	-	mA
Output Impedance	$Z_{OH}$	$V_O=0.5 V_{DD}; \text{output driving high}$	-	29	-	$\Omega$
	$Z_{OL}$	$V_O=0.5 V_{DD}; \text{output driving low}$	-	27	-	

AC Electrical Characteristics

Parameter	Symbol	Conditions/ Description	Min	Typ	Max	Unit
Rise Time	$t_r$	$V_O = 0.8V \text{ to } 2.0V;$ $C_L = 15pF$	300	800	900	pS
Fall Time	$t_f$	$V_O = 2.0V \text{ to } 0.8V;$ $C_L = 15pF$	360	800	900	pS
Clock Duty Cycle		Ratio of pulse width (as measured from rising edge to next falling edge at $V_{DD}/2$ ) to one clock period	45	-	55	%

\*  $C_L = 15 \text{ pF}$ , Input clock frequency = 25MHz

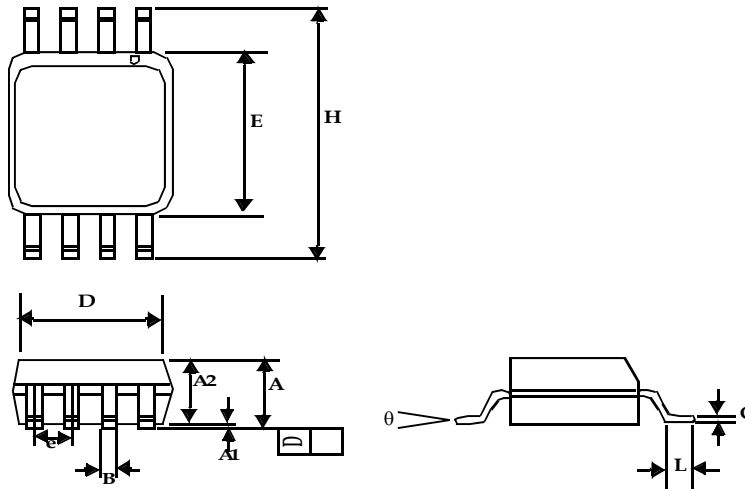
**Typical Crystal Oscillator Circuit**



**Typical Crystal Specifications**

<b>Fundamental AT cut parallel resonant crystal</b>	
Nominal frequency	25MHz
Frequency tolerance	± 50 ppm or better at 25°C
Operating temperature range	-25°C to +85°C
Storage temperature	-40°C to +85°C
Load capacitance	18pF
Shunt capacitance	7pF maximum
ESR	25Ω

8-lead (150-mil) SOIC Package

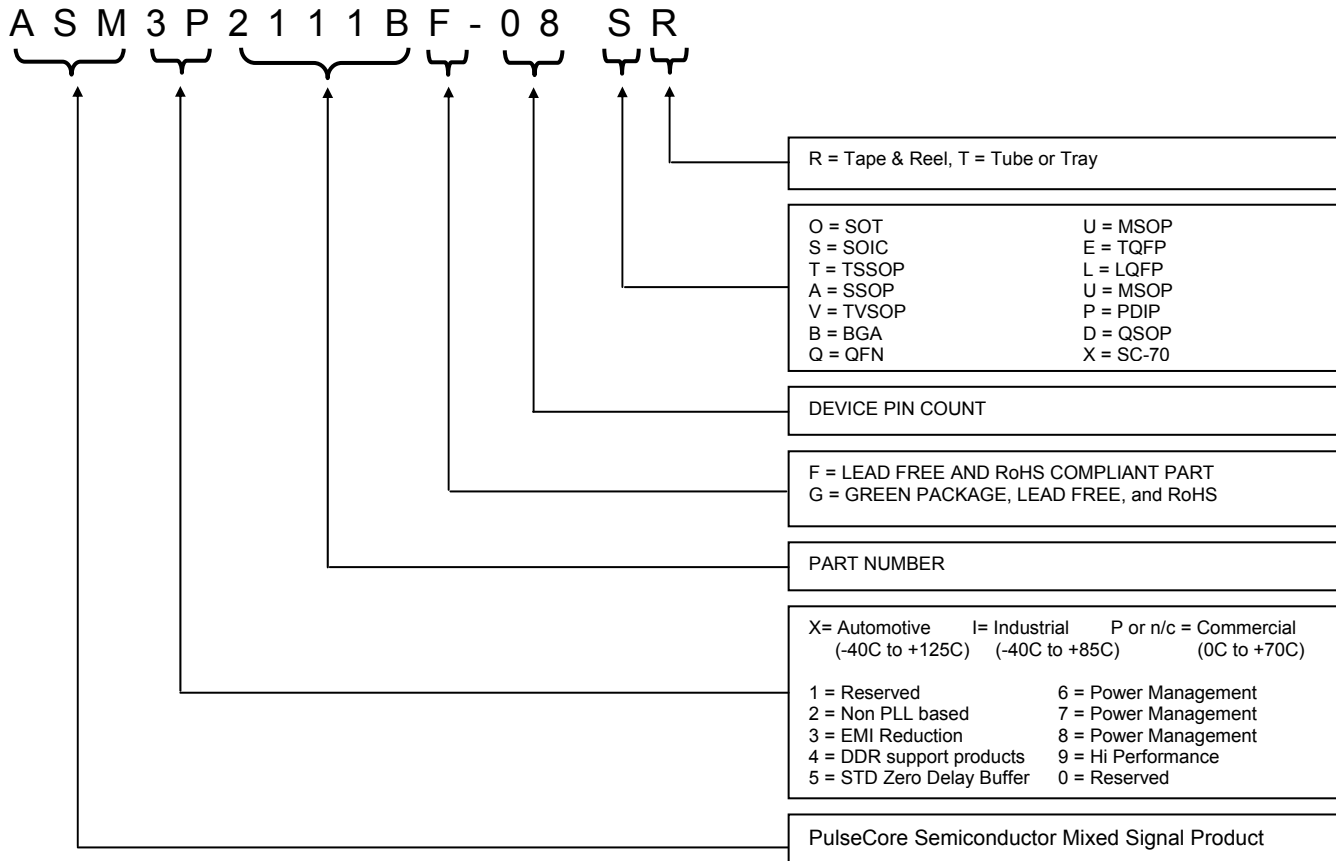


Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A1	0.004	0.010	0.10	0.25
A	0.053	0.069	1.35	1.75
A2	0.049	0.059	1.25	1.50
B	0.012	0.020	0.31	0.51
C	0.007	0.010	0.18	0.25
D	0.193 BSC		4.90 BSC	
E	0.154 BSC		3.91 BSC	
e	0.050 BSC		1.27 BSC	
H	0.236 BSC		6.00 BSC	
L	0.016	0.050	0.41	1.27
θ	0°	8°	0°	8°

Ordering Codes

Part number	Marking	Package Configuration	Temperature Range
ASM3P2111BF-08ST	3P2111BF	8-pin SOIC TUBE, Pb Free	Commercial
ASM3P2111BF-08SR	3P2111BF	8-pin SOIC TAPE & REEL, Pb Free	Commercial
ASM3I2111BF-08ST	3I2111BF	8-pin SOIC TUBE, Pb Free	Industrial
ASM3I2111BF-08SR	3I2111BF	8-pin SOIC TAPE & REEL, Pb Free	Industrial
ASM3P2111BG-08ST	3P2111BG	8-pin SOIC TUBE, Green	Commercial
ASM3P2111BG-08SR	3P2111BG	8-pin SOIC TAPE & REEL, Green	Commercial
ASM3I2111BG-08ST	3I2111BG	8-pin SOIC TUBE, Green	Industrial
ASM3I2111BG-08SR	3I2111BG	8-pin SOIC TAPE & REEL, Green	Industrial

Ordering Information



Licensed under US patent #5,488,627, #6,646,463 and #5,631,920.



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

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