#### **ON Semiconductor**<sup>®</sup>



# ASM3P2111B

# **Peak EMI Reducing Solution**

#### Features

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

#### **Product Description**

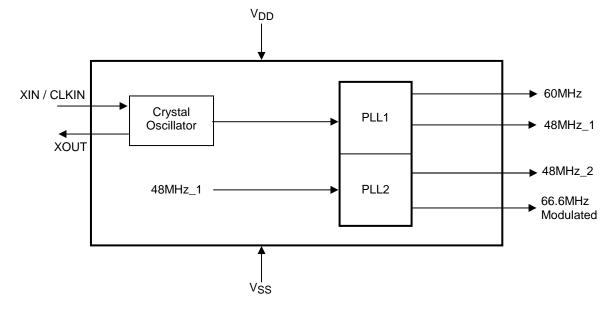
The ASM3P2111B is a versatile spread spectrum frequency modulator that reduces electromagnetic interference (EMI) at the clock source. The ASM3P2111B allows significant system cost savings by reducing the

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.

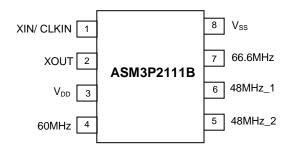
#### Applications

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	Туре	Description		
1	XIN / CLKIN	l	Connection to crystal		
2	XOUT	0	Connection to crystal		
3	V <sub>DD</sub>	Р	Power supply for the analog and digital blocks (+3.3V)		
4	60MHz	0	Clock output-1 60MHz un-modulated		
5	48MHz_2	0	Clock output-2 48MHz_2 un-modulated		
6	48MHz_1	0	Clock output-3 48MHz_1 un-modulated		
7	66.6MHz	0	Clock output-4 66.6MHz modulated		
8	V <sub>SS</sub>	Р	Ground to entire chip. Connect to System Ground		

#### Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit			
$V_{\text{DD}},V_{\text{IN}}$	Voltage on any pin with respect to Ground	-0.5 to +4.6	V			
T <sub>STG</sub>	Storage temperature	-65 to +125	C			
Ts	Max. Soldering Temperature (10 sec)	260	C			
TJ	Junction Temperature	150	C			
T <sub>DV</sub> Static Discharge Voltage (As per JEDEC STD22- A114-B) 2 KV						
Note: These are s device relia	stress ratings only and are not implied for functional use. Exposure to absolute maximum ratings f ability.	or prolonged periods of time	may affect			

### **Operating Conditions**

Symbol	Parameter		Тур	Max	Unit
V <sub>DD</sub>	Supply Voltage		3.3	3.6	V
F <sub>XIN</sub>	Crystal Resonator Frequency		25		MHz
T <sub>A</sub>	Operating Temperature			+85	C
CL	Output Driver Load Capacitance			15	рF

#### **DC Electrical Characteristics**

Parameter	Symbol	Conditions / Description	Min	Тур	Max	Unit
Overall						
Supply Current, Dynamic	I <sub>DD</sub>	$V_{DD}$ = 3.3V, $F_{CLK}$ = 25MHz, $C_{L}$ = 15pF	41	48	62	mA
Supply Current, Static	I <sub>DDL</sub>	$V_{DD}$ = 3.3V, Clock Input = 0	20	25	35	mA
All input pins						
High-Level Input Voltage	V <sub>IH</sub>	$V_{DD} = 3.3V$	2.0		V <sub>DD</sub> +0.3	V
Low-Level Input Voltage	VIL	V <sub>DD</sub> =3.3V	V <sub>SS</sub> -0.3		0.8	V
High-Level Input Current	I <sub>IH</sub>		-1		1	μA
Low-Level Input Current (pull-up)			-20	-36	-80	μA
High-Level Output Source Current	I <sub>xOH</sub>	$I_{xOH}$ $V_{DD} = V (XIN) = 3.3V, V_{O} = 0.4V$		3		mA
Low-Level Output Sink Current	I <sub>xOL</sub>	$V_{DD}$ = 3.3V, V (XIN) = $V_{O}$ = 2.5V		3		mA
Clock Outputs						
High-Level Output Source Current	I <sub>ОН</sub>	V <sub>0</sub> = 2.5V		-20		mA
Low-Level Output Sink Current	I <sub>OL</sub>	V <sub>0</sub> = 0.4V		23		mA
Output Impedance	Z <sub>OH</sub> Z <sub>OL</sub>	$V_{O} = 0.5 V_{DD}$ ; output driving high $V_{O} = 0.5 V_{DD}$ ; output driving low		29 27		Ω

### AC Electrical Characteristics

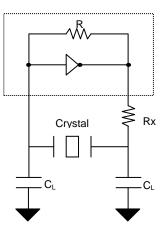
Parameter	Symbol	Conditions / Description	Min	Тур	Max	Unit
Rise Time	tr	$V_{O} = 0.8V$ to 2.0V; $C_{L} = 15pF$	300	800	900	pS
Fall Time	t <sub>f</sub>	$V_{O} = 2.0V$ to 0.8V; $C_{L} = 15pF$	360	800	900	pS
Clock Duty Cycle Ratio of pulse width (as measured from rising edge to next falling edge at V <sub>DD</sub> /2) to one clock period			45		55	%
Note: 1. C <sub>L</sub> = 15pF, Input clock frequency = 25MHz.						

## **Typical Crystal Specifications**

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

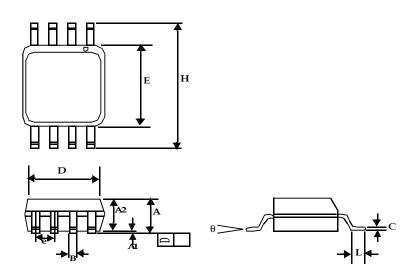
Note: Note: CL is Load Capacitance and Rx is used to prevent oscillations at overtone frequency of the Fundamental frequency.

#### **Typical Crystal Interface Circuit**



#### **Package Information**

8-lead (150-mil) SOIC Package



	Dimensions					
Symbol	Inc	hes	Millimeters			
	Min	Max	Min	Мах		
A1	0.004	0.010	0.10	0.25		
А	0.053	0.069	1.35	1.75		
A2	0.049 0.059		1.25	1.50		
В	B 0.012		0.31	0.51		
С	0.007	0.010	0.18	0.25		
D	0.193 BSC		4.90 BSC			
E	0.154 BSC		3.91 BSC			
е	0.050 BSC		1.27 BSC			
н	0.236 BSC		6.00	BSC		
L	0.016	0.050	0.41	1.27		
θ	0°	8°	0°	8°		

# ASM3P2111B

#### **Ordering Codes**

Part number	Marking	Package Configuration	Temperature Range
ASM3P2111BG-08SR	AEI	8-pin SOIC TAPE & REEL, Green	0℃ to +70℃

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, #6,646,463 and #5,631,920.

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

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