ASM3P2187A/B

rev 0.1

Spread Spectrum Clock Generator for Mobile Applications

Features

- Generates a 4X EMI optimized clock signal at the Output.
- Input frequency : 12.5MHz to 20MHz
- Output frequency : 50MHz to 80MHz
- REFOUT is same as input frequency
- Selectable Centre Spread : ± 0.5%, ± 1.0%
- Low power CMOS design
- 3.3V ± 0.3V Operating Voltage
- Available in Industrial Temperature range (-40to 85°C)
- Available in 8-pin TSSOP
- Drop-in replacement for MB88155-412 Device

Product Description

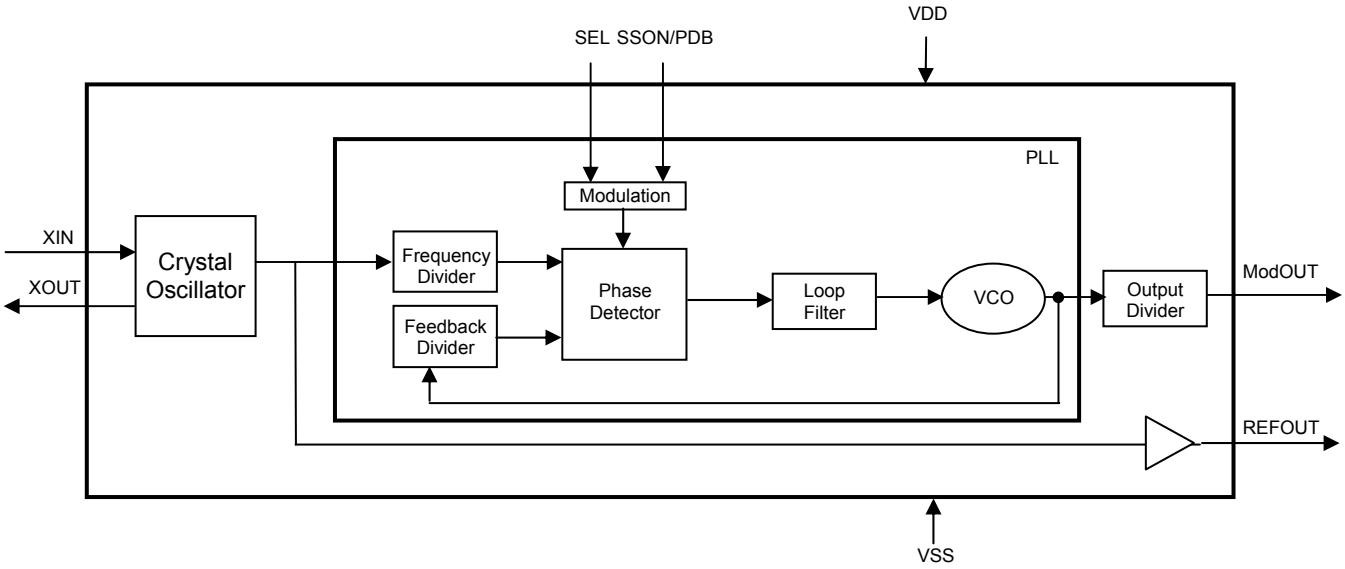
The ASM3P2187A/B is a versatile spread spectrum frequency modulator designed specifically for a wide range of clock frequencies. The ASM3P2187A/B reduces electromagnetic interference (EMI) at the clock source, allowing system wide reduction of EMI of all clock dependent signals. The ASM3P2187A/B allows significant system cost savings by reducing the number of circuit board layers ferrite beads, shielding that are traditionally required to pass EMI regulations.

ASM3P2187A device has an option of Spread ON/OFF and ASM3P2187B device has Powerdown option

Applications

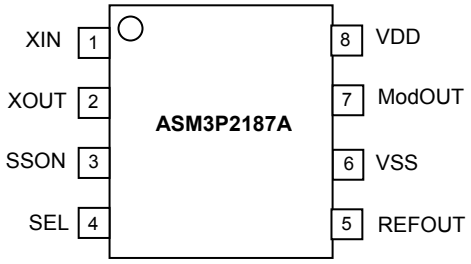
The ASM3P2187A/B is targeted towards mobile phones, mobile audio players and PDAs.

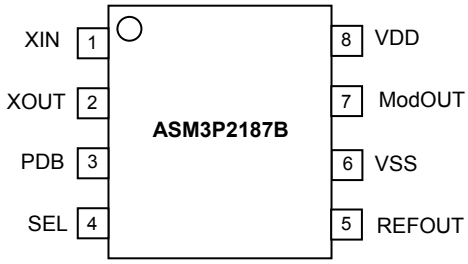
Block Diagram



PulseCore Semiconductor Corporation
1715 S. Bascom Ave Suite 200, Campbell, CA 95008 • Tel: 408-879-9077 • Fax: 408-879-9018
www.pulsecoresemi.com

Pin Configurations





Pin Description

Pin#	Pin Name	Type	Description
1	XIN	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.
2	XOUT	O	Crystal connection. If using an external reference, this pin must be left unconnected.
3	SSON / PDB*	I	Modulation enable pin/ Power down pin. Has an Internal pull up resistor
4	SEL	I	Modulation rate setting pin Centre spread, SEL = "L" : Frequency Deviation ± 0.5% Centre spread, SEL = "H" : Frequency Deviation ± 1.0% Has an Internal pull up resistor.
5	REFOUT	O	Non-modulated clock output pin. The Frequency is same as input frequency. This pin becomes to "L" at power-down.
6	VSS	P	Ground Connection. Connect to system ground.
7	ModOUT	O	Modulated clock output pin This pin becomes to"L" at power-down.
8	VDD	P	Power Supply Voltage Pin. Connect to +3.3V.

* SSON Pin is available in ASM3P2187A Device and PDB Pin is available in ASM3P2187B Device

Modulation Enable Setting Table

SSON	Modulation
L	No Modulation
H	Modulation

Power down Status Table

PDB	Status
L	Power Down Status
H	Operating Status

Spread Range Selection Table

SEL	Spreading Range
L	± 0.50%
H	± 1.00%

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
VDD	Supply Voltage pin with respect to Ground	-0.5 to +4.6	V
V_{IN}	Input Voltage pin with respect to Ground	VSS-0.5 to VSS+0.5	V
V_{OUT}	Output Voltage pin with respect to Ground	VSS-0.5 to VSS+0.5	V
T_{STG}	Storage temperature	-55 to +125	°C
T_A	Operating temperature	-40 to +85	°C
T_s	Max. Soldering Temperature (10 sec)	260	°C
T_J	Junction Temperature	-40 to +125	°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

(Test condition: All parameters are measured at -40°C to +85°C, 3.3V ± 0.3V , VSS =0V , unless otherwise stated)

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}	X_{OUT} output low current (V_{XOL} @ 0.4V, VDD = 3.3V)		-	3	-	mA
I_{XOH}	X_{OUT} output high current (V_{XOH} @ 2.5V, VDD = 3.3V)		-	3	-	mA
V_{OL}	Output low voltage	For ModOUT, I_{OL} = 4mA	VSS	-	0.4	V
		For REFOUT, I_{OL} = 3mA				
V_{OH}	Output high voltage	For ModOUT, I_{OH} = -4mA	VDD-0.5	-	VDD	V
		For REFOUT, I_{OH} = -3mA				
I_{CC}	Dynamic supply current , TBD MHz Output, no load			TBD	TBD	mA
I_{DD}	Static supply current standby mode			TBD		uA
VDD	Operating voltage		3.3	3.3	3.6	V
t_{ON}	Power up time (first locked clock cycle after power up)		-	2	5	mS
Z_{OUT}	Clock output impedance	For ModOUT	-	TBD	-	Ω
		For REFOUT	-	TBD	-	Ω
C_{IN}	Input Capacitance, Ta=25°C, VDD=VIN=0V, f =1MHz		-	-	16	pF
C_L	Load Capacitance	REFOUT 12.5MHz to 50MHz	-	-	15	pF
		ModOUT 12.5MHz to 50MHz	-	-	15	
		ModOUT 50MHz to 80MHz	-	-	7	

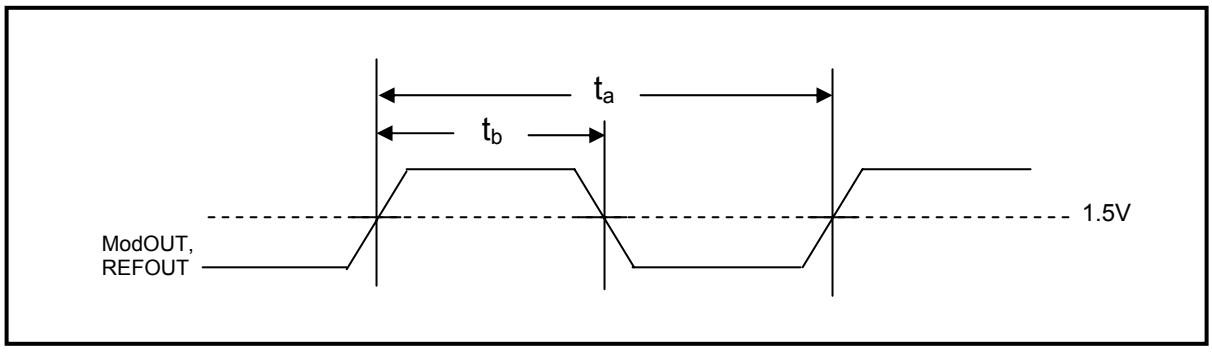
AC Electrical Characteristics

(Test condition: All parameters are measured at -40°C to +85°C, 3.3V ± 0.3V , VSS =0V , unless otherwise stated)

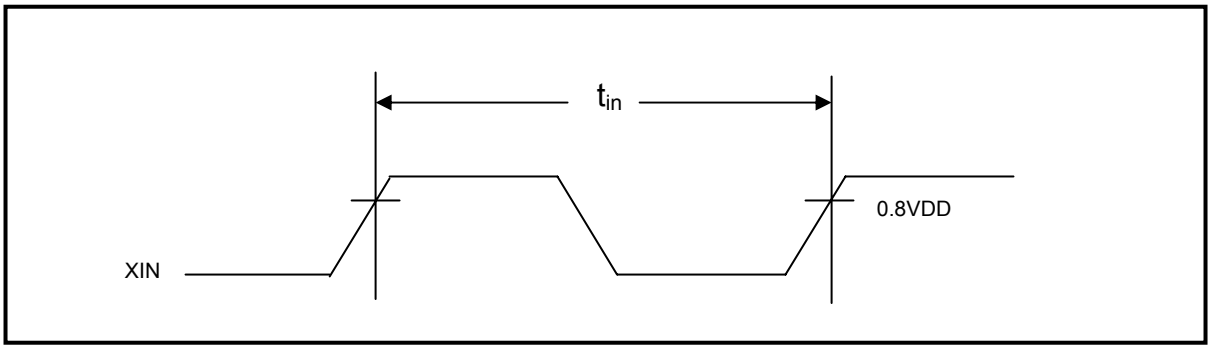
Symbol	Parameter		Min	Typ	Max	Unit
f_{IN}	Input frequency		12.5	-	20	MHz
f_{OUT}	Output frequency	ModOUT	50	-	80	MHz
		REFOUT	12.5	-	20	
t_{LH}*	Output rise time (Measured from 0.8V to 2.0V)		-	TBD	-	nS
t_{HL}*	Output fall time (Measured from 2.0V to 0.8V)		-	TBD	-	nS
t_{JC}	Jitter (Cycle to cycle), Ta=25°C and VDD=3.3V No Load Capacitance		-	-	TBD	pS
t_D	Output duty cycle		40	50	60	%
M_F	Modulation Frequency , Input Frequency =12.5MHz			32.4		KHz

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

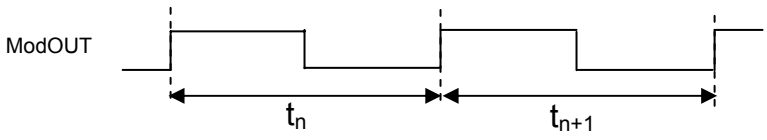
OUT PUT CLOCK DUTY CYCLE (t_D, $t_{DCR} = t_b / t_a$)



INPUT FREQUENCY ($f_{IN} = 1/t_{IN}$)

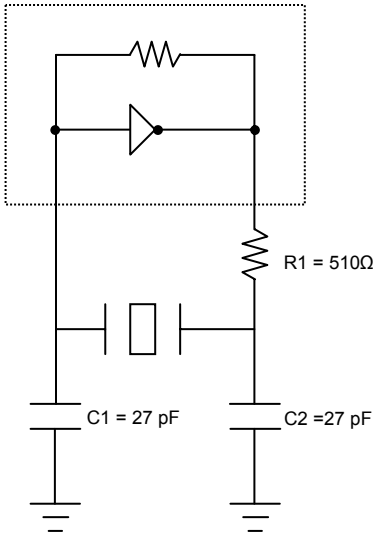


CYCLE -- CYCLE JITTER ($t_{JC} = [t_n - t_n + 1]$)



Note: Cycle-cycle jitter indicates the difference between a certain cycle and the immediately succeeding (or preceding) cycle

Typical Crystal Oscillator Circuit

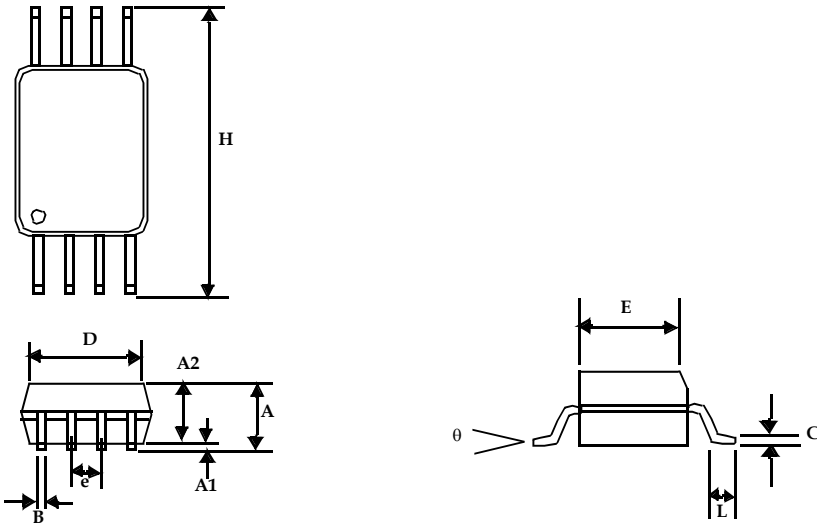


Typical Crystal Specifications

Fundamental AT cut parallel resonant crystal	
Nominal frequency	14.31818MHz
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

Package Information

Mechanical Package Outline 8-Pin TSSOP



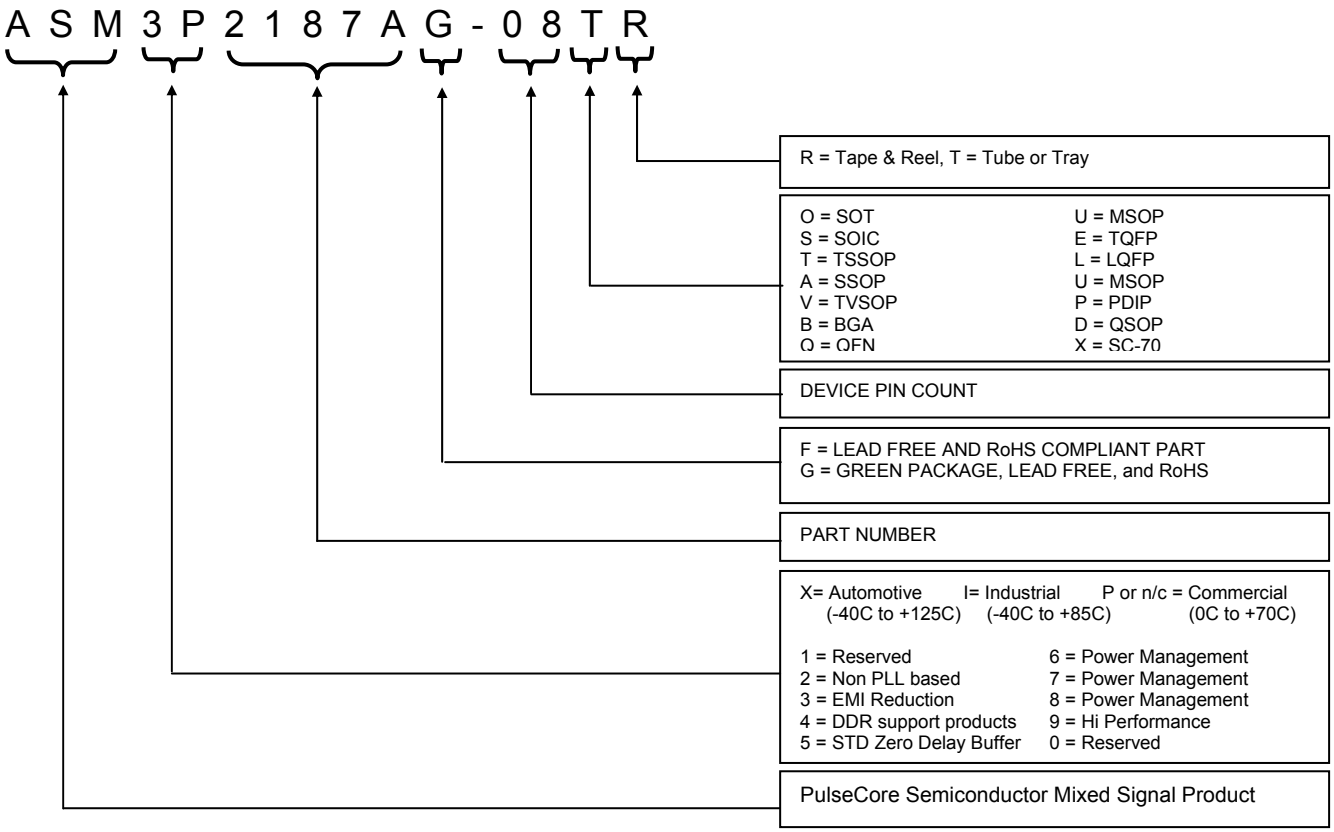
Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A		0.043		1.10
A1	0.002	0.006	0.05	0.15
A2	0.033	0.037	0.85	0.95
B	0.008	0.012	0.19	0.30
c	0.004	0.008	0.09	0.20
D	0.114	0.122	2.90	3.10
E	0.169	0.177	4.30	4.50
e	0.026 BSC		0.65 BSC	
H	0.252 BSC		6.40 BSC	
L	0.020	0.028	0.50	0.70
θ	0°	8°	0°	8°

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

Ordering Codes

Part Number	Marking	Package Type	Temperature
ASM3P2187AG-08TT	3P2187AG	8-Pin TSSOP, TUBE, Green	Commercial
ASM3P2187AG-08TR	3P2187AG	8-Pin TSSOP, TAPE & REEL, Green	Commercial
ASM3I2187AG-08TT	3I2187AG	8-Pin TSSOP, TUBE, Green	Industrial
ASM3I2187AG-08TR	3I2187AG	8-Pin TSSOP, TAPE & REEL, Green	Industrial
ASM3P2187BG-08TT	3P2187BG	8-Pin TSSOP, TUBE, Green	Commercial
ASM3P2187BG-08TR	3P2187BG	8-Pin TSSOP, TAPE & REEL, Green	Commercial
ASM3I2187BG-08TT	3I2187BG	8-Pin TSSOP, TUBE, Green	Industrial
ASM3I2187BG-08TR	3I2187BG	8-Pin TSSOP, TAPE & REEL, Green	Industrial

Device Ordering Information



PulseCore Semiconductor Corporation
1715 S. Bascom Ave Suite 200
Campbell, CA 95008
Tel: 408-879-9077
Fax: 408-879-9018
www.pulsecoresemi.com

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