Peak Reducing EMI Solution

Features

- Generates a 1x EMI optimized clock output.
- Input frequency: 6MHz - 10MHz
                   18MHz - 30MHz
- Output frequency: 6MHz - 10MHz
                    18MHz - 30MHz
- Two selectable down spread options.
- Selectable frequency range.
- Integrated loop filter components.
- Operates with a 3.3V supply.
- Low-power CMOS design.
- Commercial temperature range
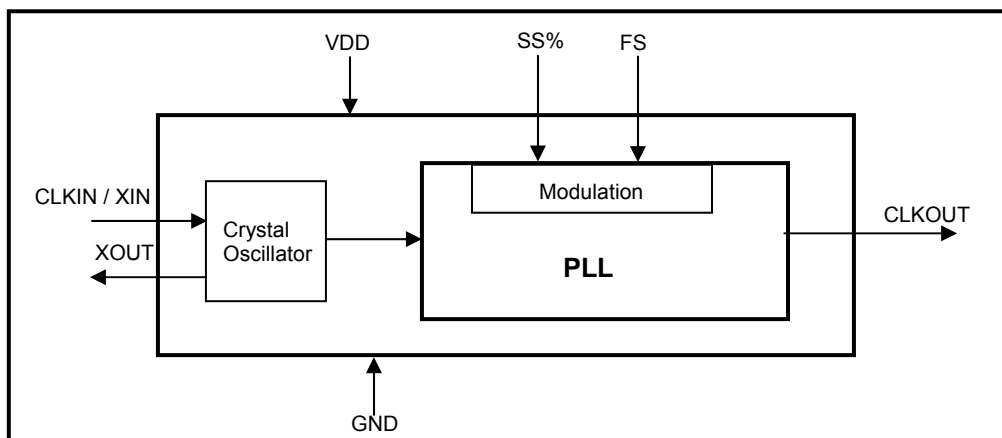- 8-pin SOIC and 8-pin TSSOP packages.

Product Description

The ASM3P2180A is a versatile spread spectrum frequency modulator designed specifically for a wide range of clock frequencies. ASM3P2180A reduces electromagnetic interference (EMI) at the clock source, allowing system wide reduction of EMI of down stream clock and data dependent signals. ASM3P2180A allows significant system cost savings by reducing the number of circuit board layers, and shielding that are traditionally required to pass EMI regulations. ASM3P2180A modulates the output of a single 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. ASM3P2180A uses the most efficient and optimized modulation profile approved by the FCC and is implemented by using a proprietary all-digital method.
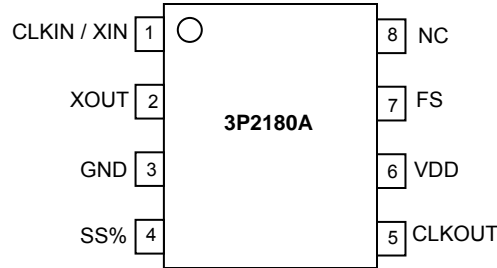
Applications

The ASM3P2180A is targeted towards notebook LCD displays, other displays using an LVDS interface, PC peripheral devices and embedded systems.

Block Diagram

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Pin Diagram


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CLKIN / XIN  1  ◯              8  NC
     XOUT    2                 7  FS
                  3P2180A
      GND    3                 6  VDD
      SS%    4                 5  CLKOUT
```

Pin Description

Pin#	Pin Name	Type	Description
1	CLKIN / XIN	I	Crystal connection or external reference clock input.
2	XOUT	O	Connection for an external crystal. If using an external reference, this pin must be left unconnected.
3	GND	P	Ground to entire chip.
4	SS%	I	Spread Selection Input. Has an internal pull-up resistor.
5	CLKOUT	O	Modulated Clock Output.
6	VDD	P	Power supply for the entire chip.
7	FS	I	Frequency selection bit. This pin selects the frequency range of operation. (*Refer to the Frequency Range Selection Table*). Has an internal pull-up resistor.
8	NC	-	No connect.

Frequency Range Selection

FS	Frequency Range (MHz)
0	6 -10
1	18-30

Spread Selection table

SS%	Frequency (MHz)		Deviation (%) (typ)
	FS=0	FS=1	
0	6	18	-2
	8	24	-1.5
	10	30	-1
1	6	18	-4
	8	24	-3
	10	30	-2

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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_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

| Symbol	Parameter	Min	Typ	Max	Unit
V_{IL}	Input low voltage	GND – 0.3		0.8	V
V_{IH}	Input high voltage	2.0		V_{DD} + 0.3	V
I_{IL}	Input low current (pull-up resistors on inputs SS%, FS)			-27	µA
I_{IH}	Input high current			18	µA
I_{XOL}	X_{OUT} output low current (@ 0.4V, V_{DD} = 3.3V)		3		mA
I_{XOH}	X_{OUT} output high current (@2.5V, V_{DD} = 3.3V)		4		mA
V_{OL}	Output low voltage (V_{DD} = 3.3V, I_{OL} = 4mA)			0.4	V
V_{OH}	Output high voltage (V_{DD} = 3.3V, I_{OH} = 4mA)	2.5			V
I_{CC}	Dynamic supply current normal mode (3.3V and 10pF loading)	10	15	25	mA
I_{DD} *	Static supply current standby mode			7	mA
V_{DD}	Operating voltage	2.8	3.3	3.7	V
t_{ON}	Power up time (first locked clock cycle after power up)		0.18		mS
Z_{OUT}	Clock output impedance		50		Ω
*CLKIN pin pulled to GND					

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AC Electrical Characteristics

Symbol	Parameter		Min	Typ	Max	Unit
CLKIN	Input frequency	FS=0	6		10	MHz
		FS=1	18		30	
CLKOUT	Output frequency	FS=0	6		10	MHz
		FS=1	18		30	
t_{LH}*	Output rise time (measured at 0.8V to 2.0V)		1.2	1.3	1.4	nS
t_{HL}*	Output fall time (measured at 2.0V to 0.8V)		0.8	0.9	1.0	nS
t_{JC}	Jitter (cycle to cycle)			325		pS
t_D	Output duty cycle		45	50	55	%
*t_{LH} and t_{HL} are measured into a capacitive load of 15pF						

Typical Test Circuit

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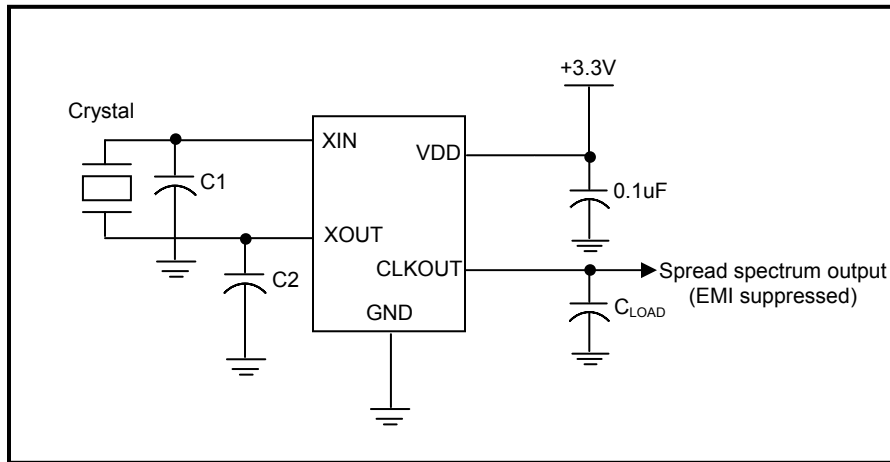
Package Information
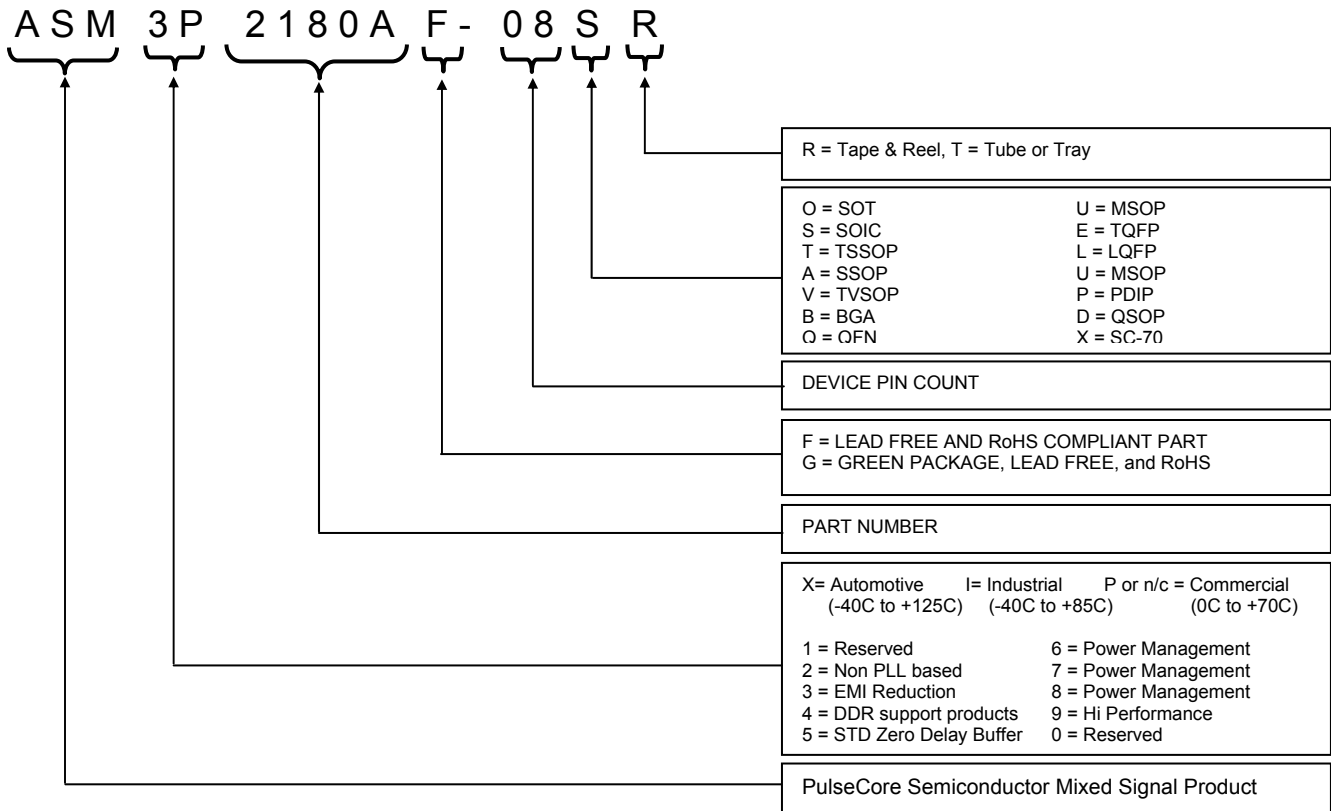
8-Pin SOIC Package
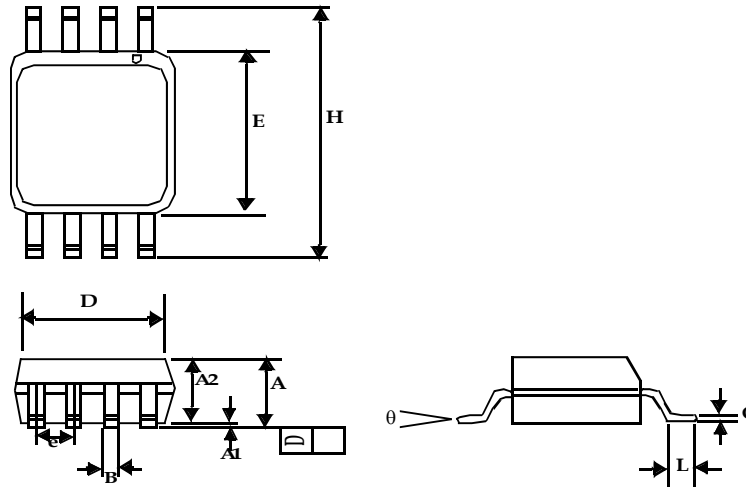
Symbol	Dimensions			
	Inches		**Millimeters**	
	Min	**Max**	**Min**	**Max**
A1	0.004	0.010	0.10	0.25
A	0.053	0.069	1.35	1.75
A2	0.049	0.059	1.25	1.50
B	0.012	0.020	0.31	0.51
C	0.007	0.010	0.18	0.25
D	0.193 BSC		4.90 BSC	
E	0.154 BSC		3.91 BSC	
e	0.050 BSC		1.27 BSC	
H	0.236 BSC		6.00 BSC	
L	0.016	0.050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

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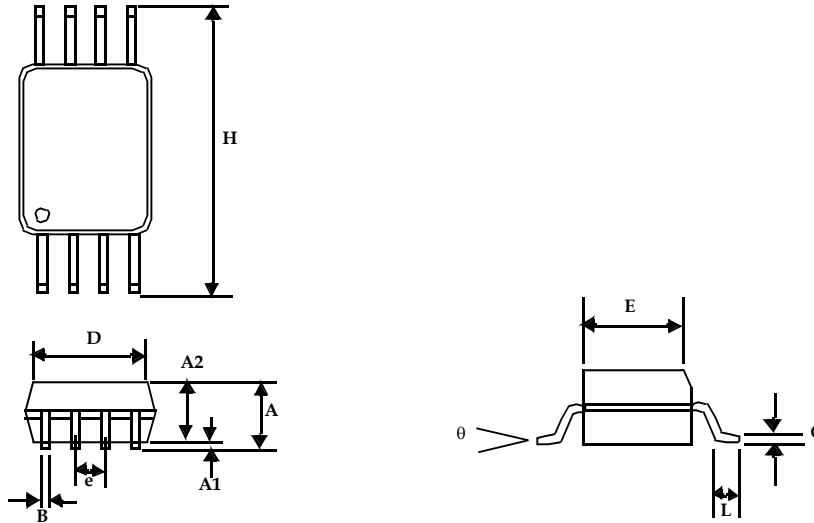
Symbol	Dimensions			
	Inches		**Millimeters**	
	Min	**Max**	**Min**	**Max**
A		0.043		1.10
A1	0.002	0.006	0.05	0.15
A2	0.033	0.037	0.85	0.95
B	0.008	0.012	0.19	0.30
c	0.004	0.008	0.09	0.20
D	0.114	0.122	2.90	3.10
E	0.169	0.177	4.30	4.50
e	0.026 BSC		0.65 BSC	
H	0.252 BSC		6.40 BSC	
L	0.020	0.028	0.50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

PulseCore

Giving you the edge

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Ordering Codes

Part number	Marking	Package Type	Temperature
ASM3P2180AF-08ST	ASM3P2180AF	8-pin SOIC, tube, Pb Free	Commercial
ASM3P2180AF-08SR	ASM3P2180AF	8-pin SOIC, tape and reel, Pb Free	Commercial
ASM3P2180AF-08TT	ASM3P2180AF	8-pin TSSOP, tube, Pb Free	Commercial
ASM3P2180AF-08TR	ASM3P2180AF	8-pin TSSOP, tape and reel, Pb Free	Commercial
ASM3P2180AG-08ST	ASM3P2180AG	8-pin SOIC, tube, Green	Commercial
ASM3P2180AG-08SR	ASM3P2180AG	8-pin SOIC, tape and reel, Green	Commercial
ASM3P2180AG-08TT	ASM3P2180AG	8-pin TSSOP, tube, Green	Commercial
ASM3P2180AG-08TR	ASM3P2180AG	8-pin TSSOP, tape and reel, Green	Commercial

Device Ordering Information

A S M 3 P 2 1 8 0 A F - 0 8 S R

R = Tape & Reel, T = Tube or Tray

O = SOT   U = MSOP
S = SOIC   E = TQFP
T = TSSOP   L = LQFP
A = SSOP   U = MSOP
V = TVSOP   P = PDIP
B = BGA   D = QSOP
Q = QFN   X = SC-70

DEVICE PIN COUNT

F = LEAD FREE AND RoHS COMPLIANT PART
G = GREEN PACKAGE, LEAD FREE, and RoHS

PART NUMBER

X= Automotive   I= Industrial   P or n/c = Commercial
   (-40C to +125C)   (-40C to +85C)   (0C to +70C)

1 = Reserved   6 = Power Management
2 = Non PLL based   7 = Power Management
3 = EMI Reduction   8 = Power Management
4 = DDR support products 9 = Hi Performance
5 = STD Zero Delay Buffer 0 = Reserved

PulseCore Semiconductor Mixed Signal Product

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

Peak Reducing EMI Solution

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

Note: This product utilizes US Patent # 6,646,463 Impedance Emulator Patent issued to PulseCore Semiconductor, dated 11-11-2003
Many PulseCore Semiconductor products are protected by issued patents or by applications for patent

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