LCD Panel EMI Reduction IC

Features

- FCC approved method of EMI attenuation.
- Provides up to 15dB EMI reduction.
- Generates a 1X low EMI spread spectrum clock of the input frequency.
- Input frequency range: 6MHz to 70 MHz.
- Internal loop filter minimizes external components and board space.
- Spread option: Center Spread.
- 2 spread frequency deviation selections:
  - ±0.625% or ±1.875%
- Low inherent cycle-to-cycle jitter.
- 3.3V operating voltage range.
- Low power CMOS design.
- Supports notebook VGA and other LCD timing controller applications.
- Product available for industrial temperature range.
- Available in 8-pin SOIC and TSSOP.

Product Description

The ASM3P2184A is a versatile spread spectrum frequency modulators designed specifically for a wide range of input clock frequencies from 6MHz to 70MHz. *(Refer Input Frequency and Modulation Rate Table)*. The ASM3P2184A can generate an EMI reduced clock from an OSC or a system generated clock. The ASM3P2184A offers a Center Spread clock with 2 percentage deviations; ±0.625% and ±1.675%.

The ASM3P2184A reduces electromagnetic interference (EMI) at the clock source, allowing system wide reduction of EMI of down stream clock and data dependent signals. The ASM3P2184A allows significant system cost savings by reducing the number of circuit board layers ferrite beads, shielding and other passive components that are traditionally required to pass EMI regulations.

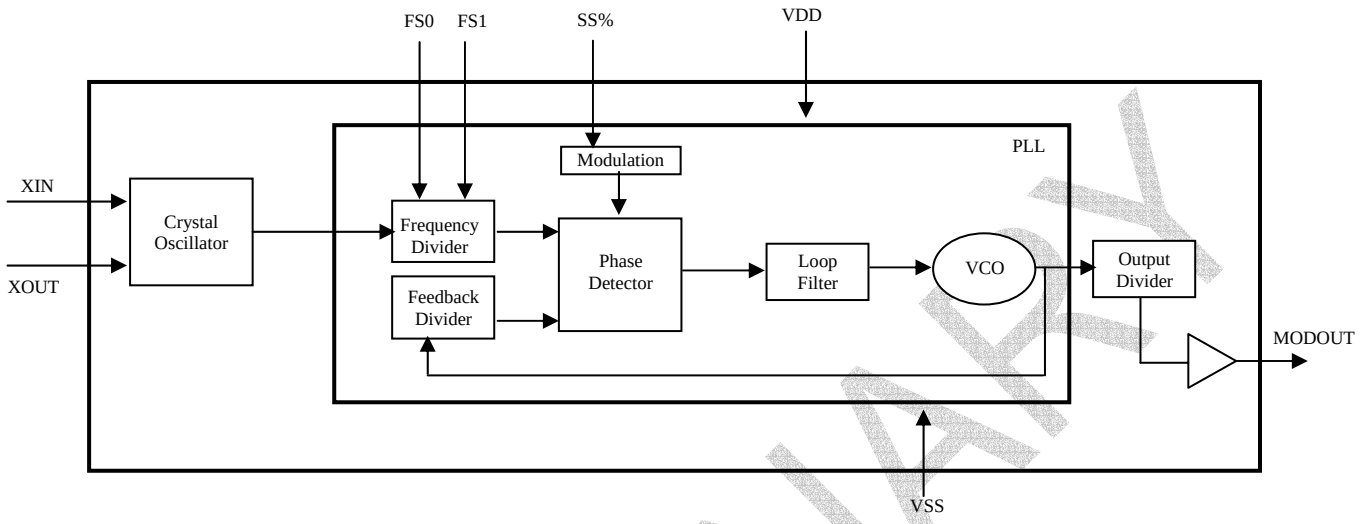
The ASM3P2184A uses the most efficient and optimized modulation profile approved by the FCC and is implemented in a proprietary all digital method.

The ASM3P2184A 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'.

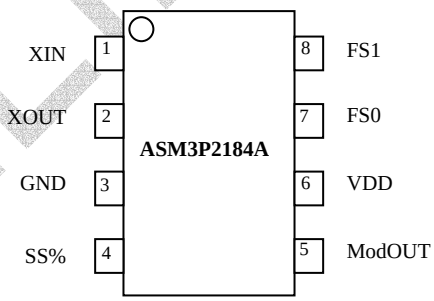
Applications

The ASM3P2184A is targeted towards EMI management for memory and LVDS interfaces in mobile graphic chipsets and 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	I	Crystal connection or external frequency input. This pin has dual functions. It can be connected to either an external crystal or an external reference clock.
2	XOUT	I	Crystal connection. Input 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 range select. Digital logic input used to select frequency deviation (Refer *Spread Deviation Selection Table*). This pin has an internal pull-up resistor.
5	ModOUT	O	Spread spectrum low EMI output.
6	VDD	P	Power supply for the entire chip (3.3V).
7	FS0	I	Frequency range select. Digital logic input used to select frequency range (*Refer Input Frequency and Modulation Rate Table*). This pin has an internal pull-up resistor.
8	FS1	I	Frequency range select. Digital logic input used to select frequency range (*Refer Input Frequency and Modulation Rate Table*). This pin has an internal pull-up resistor.

Input Frequency and Modulation Rate Table

FS1 (pin 8)	FS0 (pin 7)	Frequency Range
0	0	6 MHz to 13 MHz
0	1	12 MHz to 25 MHz
1	0	18 MHz to 35 MHz
1	1	40 MHz to 70 MHz

Spread Deviation Selection Table

Part Number	SS% (pin 4)	Spread Deviation (%)
ASM3P2184A	0	± 0.625
	1	± 1.875

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
V_{DD}, V_{IN}	Voltage on any pin with respect to GND	-0.5 to + 7.0	V
T_{STG}	Storage temperature	-65 to +125	°C
T_A	Operating temperature	0 to 70	°C
Note: These are stress ratings only and functional operation is not implied. Exposure to absolute maximum ratings for extended periods may affect device reliability.			

DC Electrical Characteristics

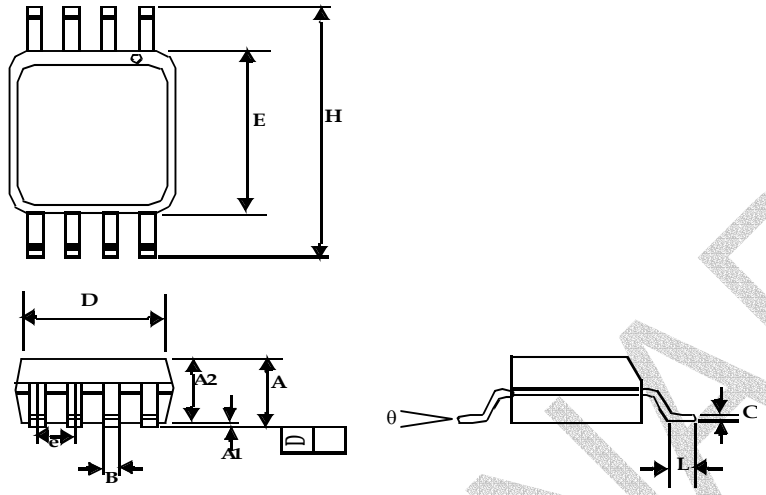
Symbol	Parameter	Min	Typ	Max	Unit
V_{IL}	Input low voltage	GND – 0.3	-	0.8	V
V_{IH}	Input high voltage	2.0	-	V_{DD} + 0.3	V
I_{IL}	Input low current	-	-	-35	µA
I_{IH}	Input high current	-	-	35	µA
I_{XOL}	XOUT Output low current (@ 0.4V, V_{DD} = 3.3V)	-	TBD	-	mA
I_{XOH}	XOUT Output high current (@ 2.5V, V_{DD} = 3.3V)	-	TBD	-	mA
V_{OL}	Output low voltage (V_{DD} = 3.3V, I_{OL} = 20mA)	-	-	0.4	V
V_{OH}	Output high voltage (V_{DD} = 3.3V, I_{OH} = 20mA)	2.5	-	-	V
I_{CC}	Dynamic supply current Normal mode (3.3V and 10pF loading)	8.46	12	17.78	mA
I_{DD}	Static supply current Standby mode		0.6		mA
V_{DD}	Operating voltage	2.7	3.3	3.7	V
t_{ON}	Power up time (first locked clock cycle after power up)	-	0.18	-	mS
Z_{OUT}	Clock out impedance	-	50	-	Ω

AC Electrical Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
XIN	Input frequency	6	-	70	MHz
ModOUT	Output frequency	6	-	70	MHz
t_{LH}*	Output rise time (measured at 0.8V to 2.0V)	0.7	0.9	1.1	ns
t_{HL}*	Output fall time (measured at 2.0V to 0.8V)	0.6	0.8	1.0	ns
t_{JC}	Jitter (cycle to cycle)	-	-	200	ps
T_D	Output duty cycle	45	50	55	%
t_{LH} and t_{HL} are measured into a capacitive load of 15pF					

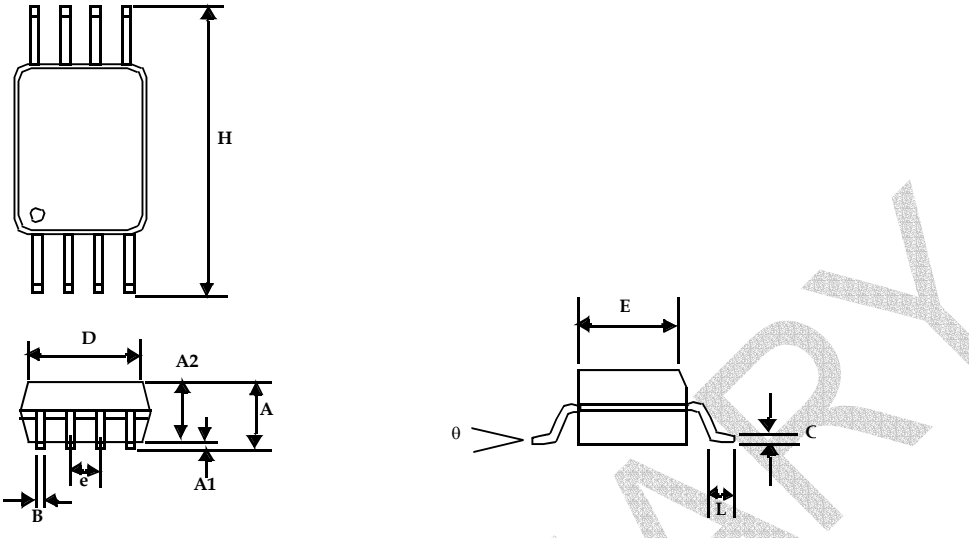
Package Information

8-Pin SOIC



Symbol	Dimensions in inches		Dimensions in millimeters	
	Min	Max	Min	Max
A	0.057	0.071	1.45	1.80
A1	0.004	0.010	0.10	0.25
A2	0.053	0.069	1.35	1.75
B	0.012	0.020	0.31	0.51
C	0.004	0.01	0.10	0.25
D	0.186	0.202	4.72	5.12
E	0.148	0.164	3.75	4.15
e	0.050 BSC		1.27 BSC	
H	0.224	0.248	5.70	6.30
L	0.012	0.028	0.30	0.70
□	0°	8°	0°	8°

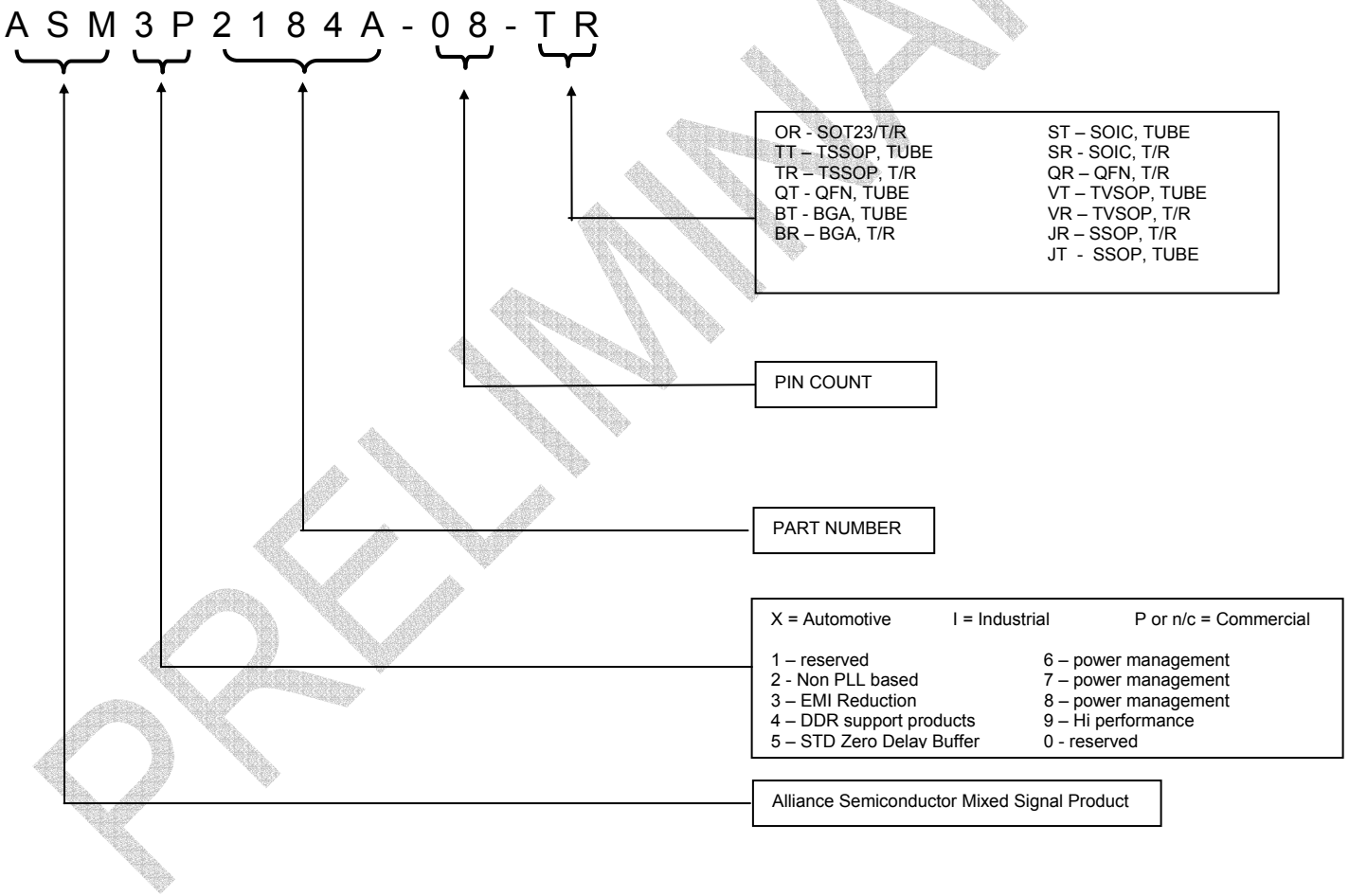
8-Pin TSSOP



	Dimensions in inches		Dimensions in millimeters	
Symbol	**Min**	**Max**	**Min**	**Max**
A	0.047			1.10
A1	0.002	0.006	0.05	0.15
A2	0.031	0.041	0.80	1.05
B	0.007	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	0.244	0.260	6.20	6.60
L	0.018	0.030	0.45	0.75
θ	0°	8°	0°	8°

Ordering Information

Ordering Code	Package Name	Package Type
ASM3P2184A-08ST	8-Pin SOIC	Tube
ASM3P2184A-08SR	8-Pin SOIC	Tape and Reel
ASM3P2184A-08TT	8-Pin TSSOP	Tube
ASM3P2184A-08TR	8-Pin TSSOP	Tape and Reel



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Preliminary Information
Part Number: ASM3P2184A
Document Version: v1.0