Features

- FCC approved method of EMI attenuation.
- Generates a low EMI spread spectrum of the input clock frequency.
- Optimized for input frequency range between 35MHz – 55MHz.
- Internal loop filter minimizes external components and board space.
- Frequency Deviation: ±1.65%.
- Low inherent cycle-to-cycle jitter.
- 3.3 V or 5 V operating voltage.
- CMOS/TTL compatible inputs and outputs.
- Ultra low power CMOS design: 5.50 mA @3.3 V.
- Supports notebook VGA and other LCD timing controller applications.
- Available in 8-pin SOIC and TSSOP.

Product Description

The ASM3P2531A is a versatile spread spectrum frequency modulator designed specifically for a wide range of clock frequencies. It reduces electromagnetic interference (EMI) at the clock source allowing system-wide reduction of EMI of downstream clock and data dependent signals. It allows significant system cost savings by reducing the number of circuit board layers and shielding traditionally required to pass EMI regulations.
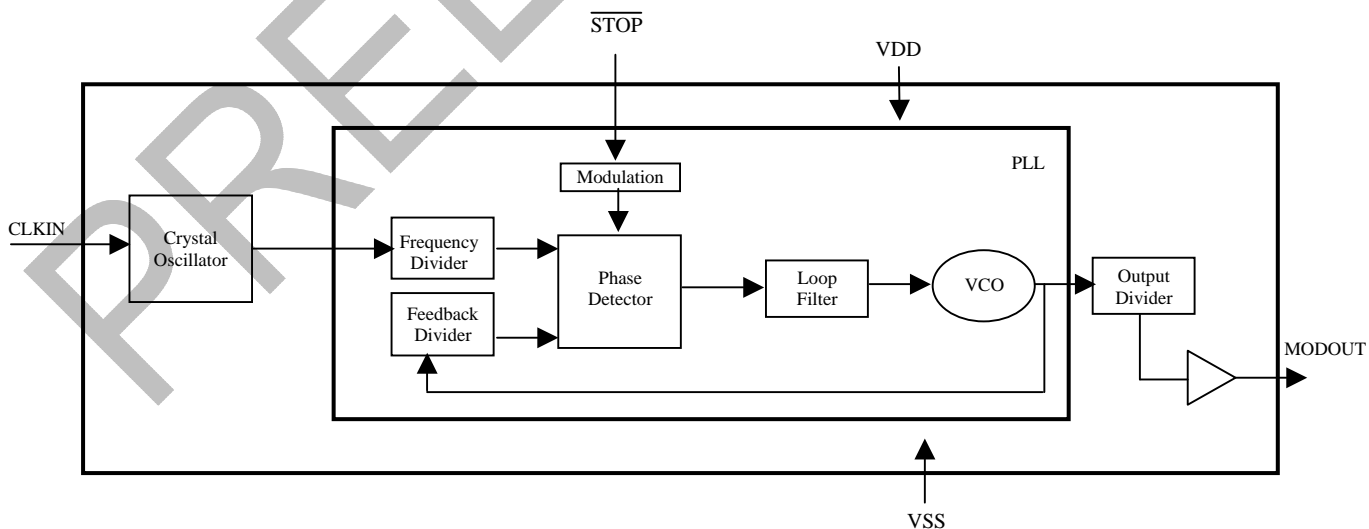
The ASM3P2531A modulates the output of a single PLL in order to spread the bandwidth of a synthesized clock, thereby decreasing the peak amplitudes of its harmonics. This results in significantly lower system EMI compared to the typical narrow band signal produced by oscillators and most clock generators. Lowering EMI by increasing a signal's bandwidth is called spread spectrum clock generation.

The ASM3P2531A uses the most efficient and optimized modulation profile approved by the FCC and is implemented by using a proprietary all-digital method.

Applications

The ASM3P2531A is targeted toward the notebook VGA chip and other displays using an LVDS interface, PC peripheral devices, and embedded systems
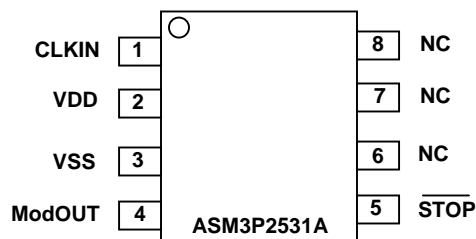
Block Diagram

Pin Configuration

```
            ┌──○────────┐
   CLKIN ─┤1│            │8├─ NC
     VDD ─┤2│            │7├─ NC
     VSS ─┤3│            │6├─ NC
  ModOUT ─┤4│ ASM3P2531A │5├─ STOP
            └────────────┘
```

Spread Range Selection, VDD = 3.3 V

CLKIN frequency	Spreading range	Modulation rate
35 MHz – 55 MHz	±1.65%	(CLKIN/1280) KHz

Pin Description

Pin#	Pin Name	Type	Description
1	CLKIN	I	External reference frequency input.
2	VDD	P	Power supply for the entire chip.
3	VSS	P	Ground to entire chip.
4	ModOUT	O	Spread spectrum clock output or reference output. *Refer Standby Mode Selection.*
5	$\overline{STOP}$	I	Active LOW signal. When HIGH, enables ModOUT and when LOW, ModOUT would be LOW.
6	NC	-	No connect.
7	NC	-	No connect.
8	NC	-	No connect.

Schematic for a Typical Application

Input clock 35MHz – 55MHz

0.1µF

Ferrite Bead

VDD

ASM3P3531A	
1 CLKIN	NC 8
2 VDD	NC 7
3 VSS	NC 6
4 ModOUT	$\overline{\text{STOP}}$ 5

EMI reduced clock output
35MHz – 55MHz

VDD

0Ω

0Ω

Use either pull-up or pull-down resistors with 0Ω
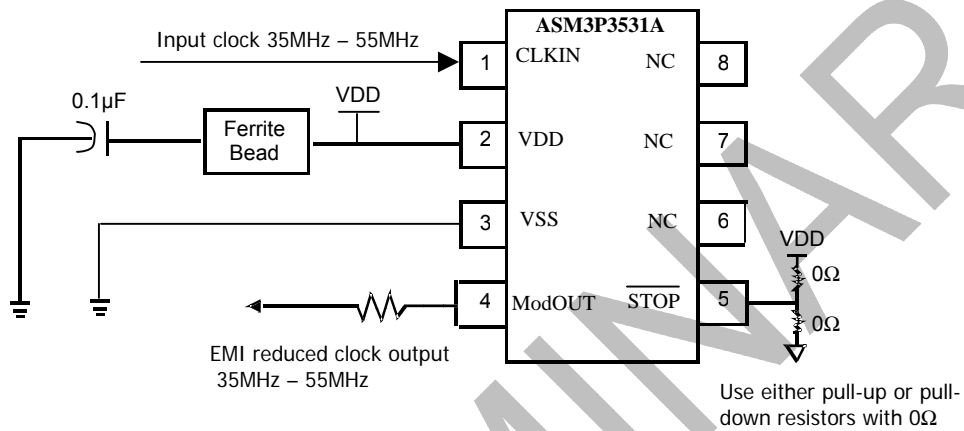
Absolute Maximum Ratings

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

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		VDD + 0.3	V
I_{IL}	Input low current				-35	µA
I_{IH}	Input high current				35	µA
V_{OL}	Output low voltage	V_{DD} = 3.3 V, I_{OL} = 20 mA			0.4	V
		V_{DD} = 5.0 V, I_{OL} = 20 mA				V
V_{OH}	Output high voltage	V_{DD} = 3.3 V, I_{OL} = 20 mA	2.5			V
		V_{DD} = 5.0 V, I_{OL} = 20 mA	4.5			V
I_{DD}	Static supply current standby mode			0.6		mA
I_{CC}	Dynamic supply current	Normal mode	f_{IN}-min	f_{IN}-typ	f_{IN}-max	
		3.3 V and 10 pF loading	3.2		7.0	mA
		5.0 V and 10 pF loading	6.2		13.6	mA
V_{DD}	Operating voltage		2.7	3.3	5.5	V
t_{ON}	Power-up time (first locked cycle after power up)			0.18		mS
Z_{OUT}	Clock output impedance			50		Ω

AC Electrical Characteristics

Symbol	Parameter		Min	Typ	Max	Unit
f_{IN}	Input frequency		35		55	MHz
f_{OUT}	Output frequency		35		55	MHz
t_{LH} [1]	Output rise time	Measured at 0.8 V to 2.0 V	0.7	0.9	1.1	ns
		Measured at 1.2 V to 3.75 V		0.75		ns
t_{HL} [1]	Output fall time	Measured at 2.0 V to 0.8 V	0.6	0.8	1.0	ns
		Measured at 1.2 V to 3.75 V		0.75		ns
t_{JC}	Jitter (cycle to cycle)				360	ps
T_D	Output duty cycle		45	50	55	%

Package Information

8-Pin SOIC
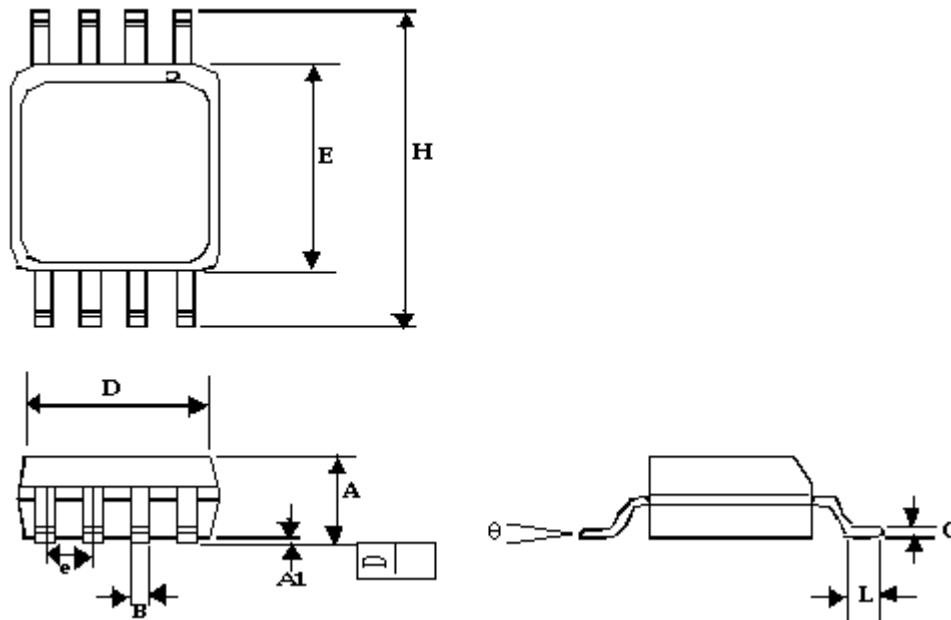
Symbol	Dimensions in inches		Dimensions in millimeters	
	Min	Max	Min	Max
A	0.053	0.069	1.35	1.75
A1	0.004	0.010	0.10	0.25
B	0.013	0.022	0.33	0.53
C	0.007	0.012	0.18	0.27
D	0.188	0.197	4.78	5.00
E	0.150	0.158	3.80	4.01
H	0.228	0.244	5.80	6.20
e	0.050 BSC		1.27 BSC	
L	0.016	0.035	0.40	0.89
θ	0°	8°	0°	8°

Notice: The information in this document is subject to change without notice.

Package Information

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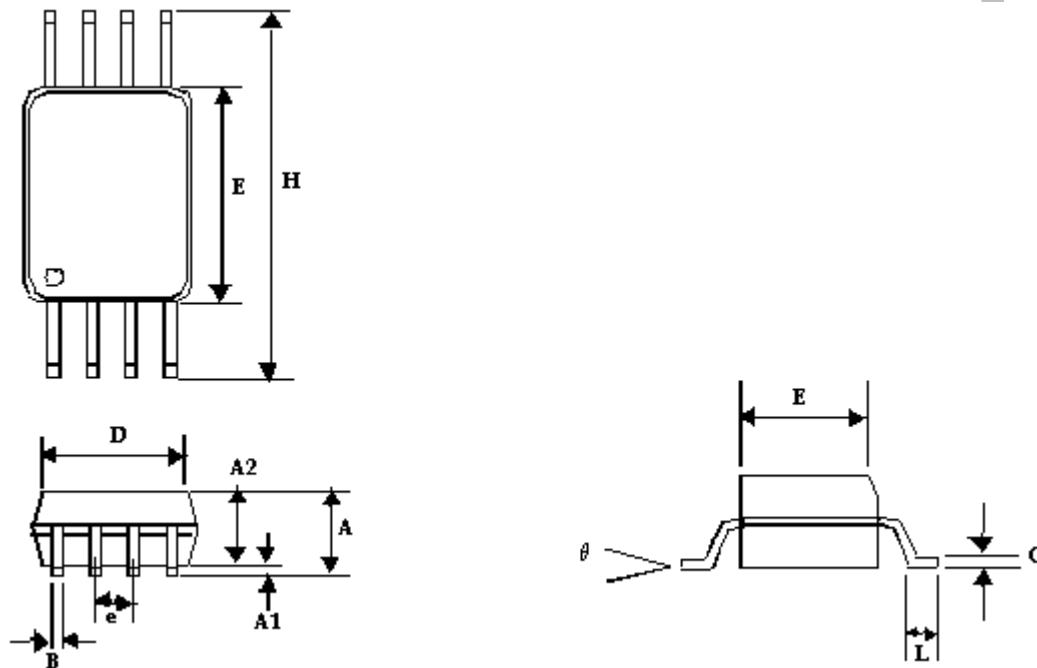
Symbol	Dimensions in inches		Dimensions in millimeters	
	Min	**Max**	**Min**	**Max**
A	-	0.043	-	1.10
A1	0.002	0.006	0.05	0.15
A2	0.033	0.037	0.85	0.95
B	0.008	0.012	0.19	0.30
C	0.004	0.008	0.09	0.20
D	0.114	0.122	2.90	3.10
H	0.252 BSC		6.40 BSC	
E	0.169	0.177	4.30	4.50
e	0.026 BSC		0.65 BSC	
L	0.020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

Notice: The information in this document is subject to change without notice.

Ordering Information

Ordering Code	Package Type	Operating Range
ASM3P2531A-08ST	8-pin 150mil SOIC -TUBE	Commercial
ASM3P2531A-08SR	8-pin 150-mil SOIC -TAPE & REEL	Commercial
ASM3I2531A-08ST	8-pin 150mil SOIC -TUBE	Industrial
ASM3I2531A-08SR	8-pin 150-mil SOIC -TAPE & REEL	Industrial
ASM3P2531A-08TT	8-pin 4.4mm TSSOP -TUBE	Commercial
ASM3P2531A-08TR	8-pin 4.4mm TSSOP -TAPE & REEL	Commercial
ASM3I2531A-08TT	8-pin 4.4mm TSSOP -TUBE	Industrial
ASM3I2531A-08TR	8-pin 4.4mm TSSOP - TAPE & REEL	Industrial

Ordering Information

A S M 3 P 2 5 3 1 A - 0 8 T R

OR - SOT23/T/R	SR - SOIC, T/R
TT – TSSOP, TUBE	QR – QFN, T/R
TR - TSSOP, T/R	QT - QFN, TUBE
VT – TVSOP, TUBE	BT - BGA, TUBE
VR – TVSOP, T/R	BR – BGA, T/R
ST – SOIC, TUBE	

PIN COUNT

PART NUMBER

X = Automotive	I = Industrial	P or n/c = Commercial
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

Alliance Semiconductor Mixed Signal Product

Notice: The information in this document is subject to change without notice.

Alliance Semiconductor Corporation
2595, Augustine Drive,
Santa Clara, CA 95054
Tel# 408-855-4900
Fax: 408-855-4999
www.alsc.com

Copyright © Alliance Semiconductor
All Rights Reserved
Preliminary Information
Part Number: ASM3P2531A
Document Version: v1.0

Low Frequency EMI Reduction

8 of 8

Notice: The information in this document is subject to change without notice.