



## rev 1.0

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## 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:  $\pm 1.65\%$ .
- 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.

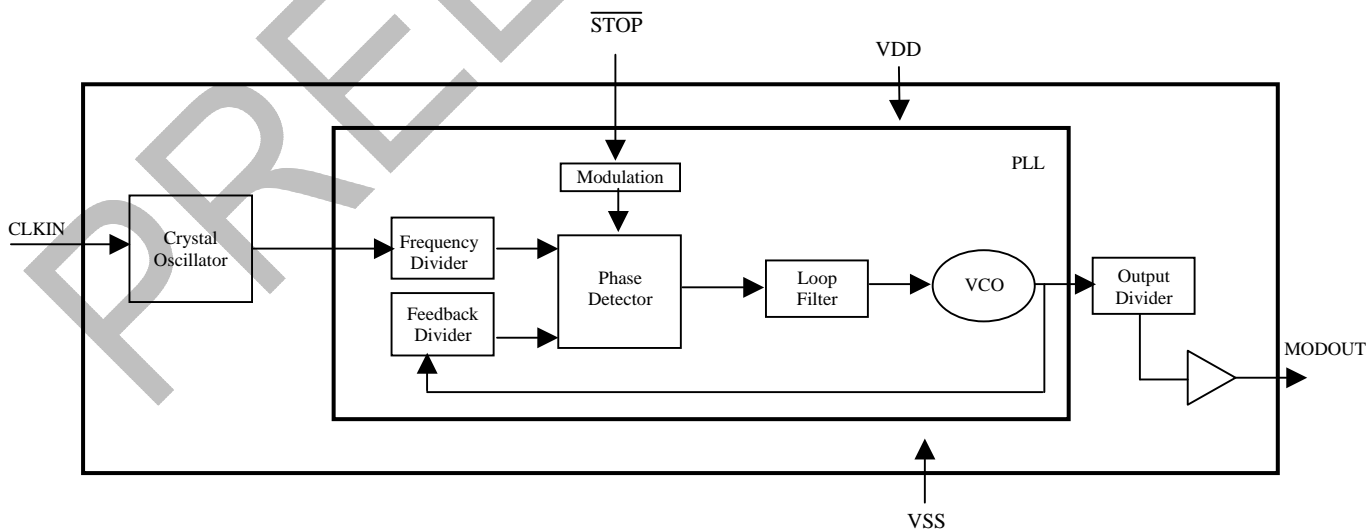
The ASM3P2531A modulates the output of a single PLL in order to spread the bandwidth of a synthesized clock, thereby decreasing the peak amplitudes of its harmonics. This results in significantly lower system EMI compared to the typical narrow band signal produced by oscillators and most clock generators. 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

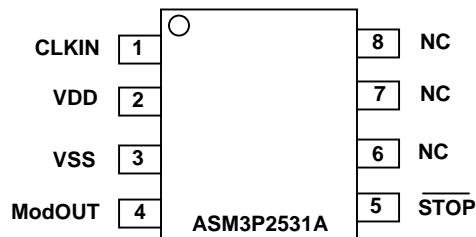




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## Pin Configuration



## Spread Range Selection, VDD = 3.3 V

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

## Pin Description

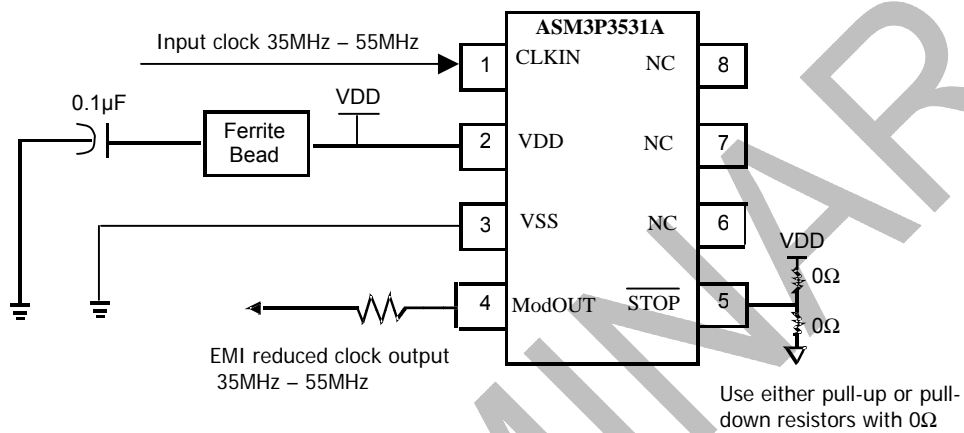
Pin#	Pin Name	Type	Description
1	CLKIN	I	External reference frequency input.
2	VDD	P	Power supply for the entire chip.
3	VSS	P	Ground to entire chip.
4	ModOUT	O	Spread spectrum clock output or reference output. <i>Refer Standby Mode Selection.</i>
5	STOP	I	Active LOW signal. When HIGH, enables ModOUT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



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## Schematic for a Typical Application





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**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		$V_{DD} + 0.3$	V	
$I_{IL}$	Input low current			-35	μA	
$I_{IH}$	Input high current			35	μA	
$V_{OL}$	Output low voltage	$V_{DD} = 3.3\text{ V}, I_{OL} = 20\text{ mA}$		0.4	V	
		$V_{DD} = 5.0\text{ V}, I_{OL} = 20\text{ mA}$			V	
$V_{OH}$	Output high voltage	$V_{DD} = 3.3\text{ V}, I_{OL} = 20\text{ mA}$	2.5		V	
		$V_{DD} = 5.0\text{ V}, I_{OL} = 20\text{ mA}$	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	%	

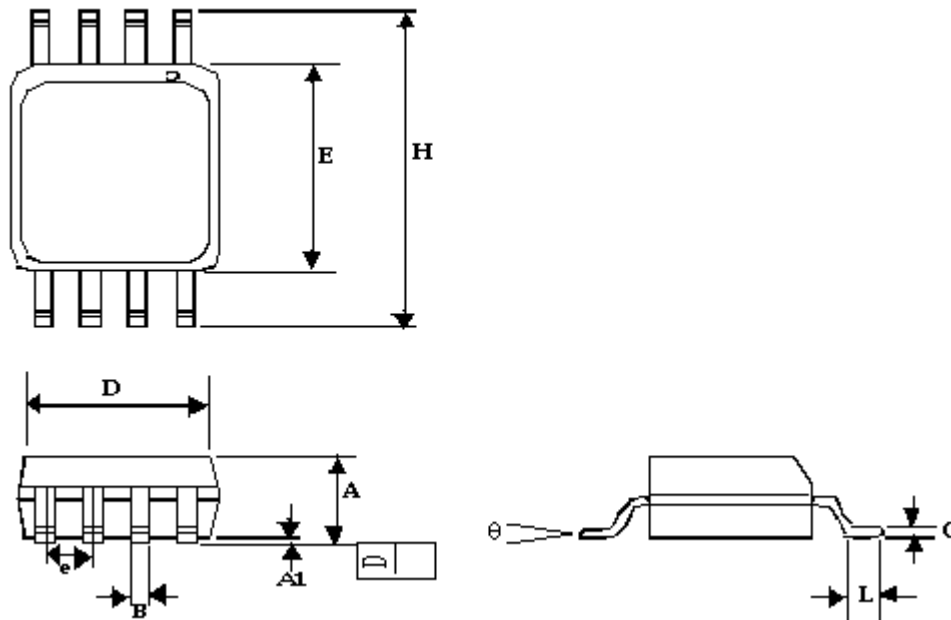


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## Package Information

## 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
$\theta$	0°	8°	0°	8°

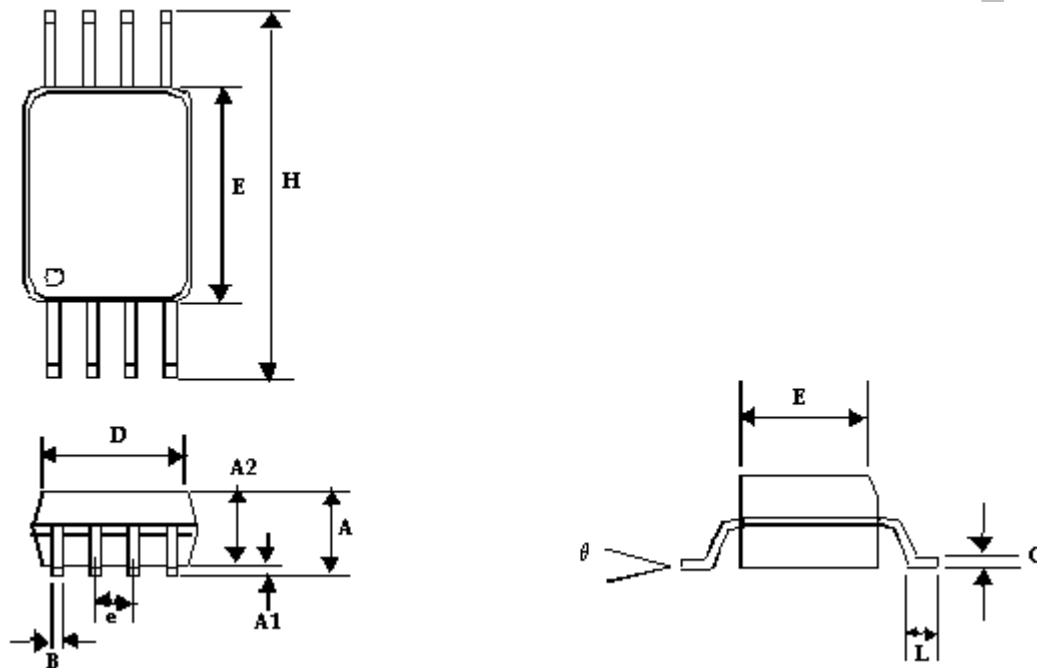


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Package Information

8-Pin TSSOP



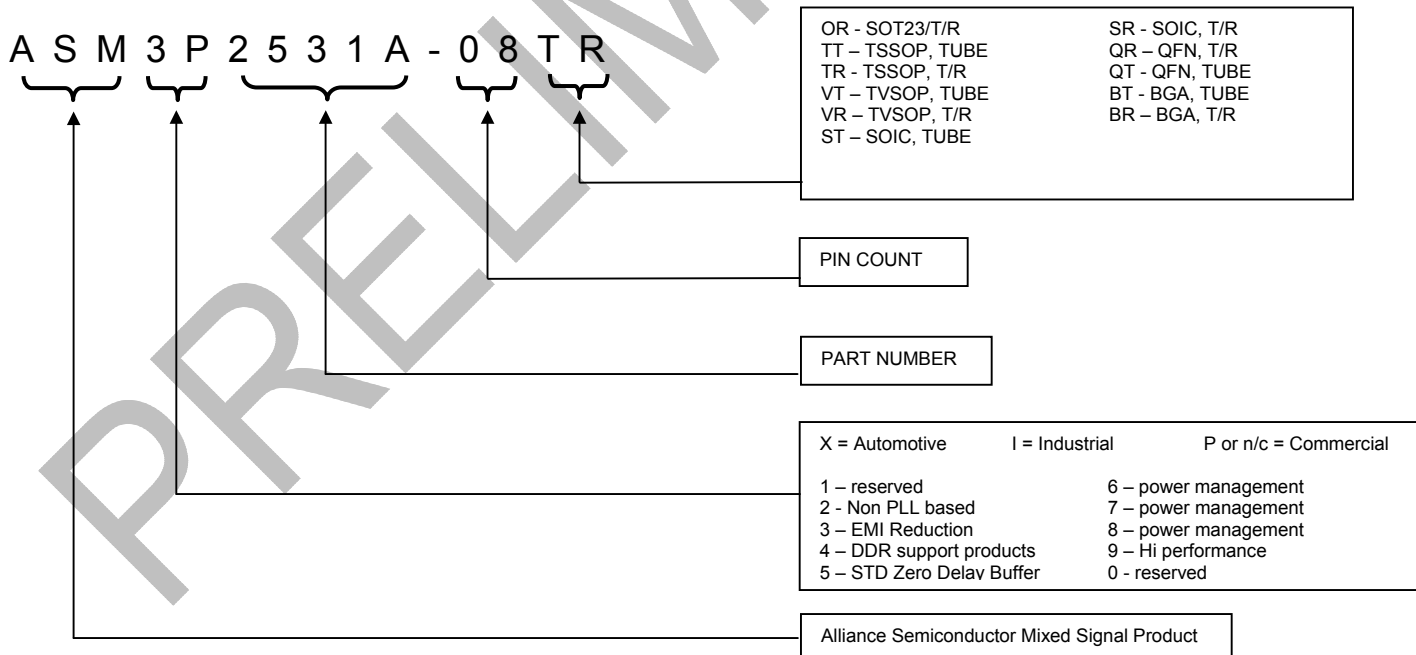
Symbol	Dimensions in inches		Dimensions in millimeters	
	Min	Max	Min	Max
A	-	0.043	-	1.10
A1	0.002	0.006	0.05	0.15
A2	0.033	0.037	0.85	0.95
B	0.008	0.012	0.19	0.30
C	0.004	0.008	0.09	0.20
D	0.114	0.122	2.90	3.10
H	0.252 BSC		6.40 BSC	
E	0.169	0.177	4.30	4.50
e	0.026 BSC		0.65 BSC	
L	0.020	0.028	0.50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



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

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