ABE0121

Low EMI Spread Spectrum Multiplier Clock

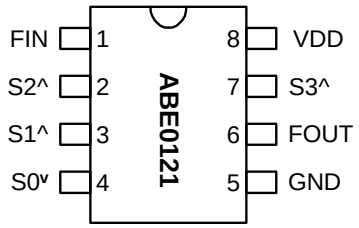
FEATURES

- Spread Spectrum Clock Generator with selectable SST mode.
- Output frequency ranges: 24MHz to 200MHz.
- Selectable Center Spread Modulation.
- TTL/CMOS compatible outputs.
- 3.3V Operating Voltage.
- Low short-term jitter.
- Available in 8-Pin 150mil SOIC.

DESCRIPTION

The ABE0121 is a Spread Spectrum Clock Generator designed for the purpose of reducing EMI in high-speed digital systems, with selectable Center Spread modulation magnitude (see table below). The device operates over a very wide range of input frequencies and provides a 1x modulated clock output.

PIN CONFIGURATION



FIN = 24 ~ 200 Mhz

Note: v: 30kΩ Internal Pull down. ^: 30kΩ Internal Pull up.

SST BY-PASS SELECTOR

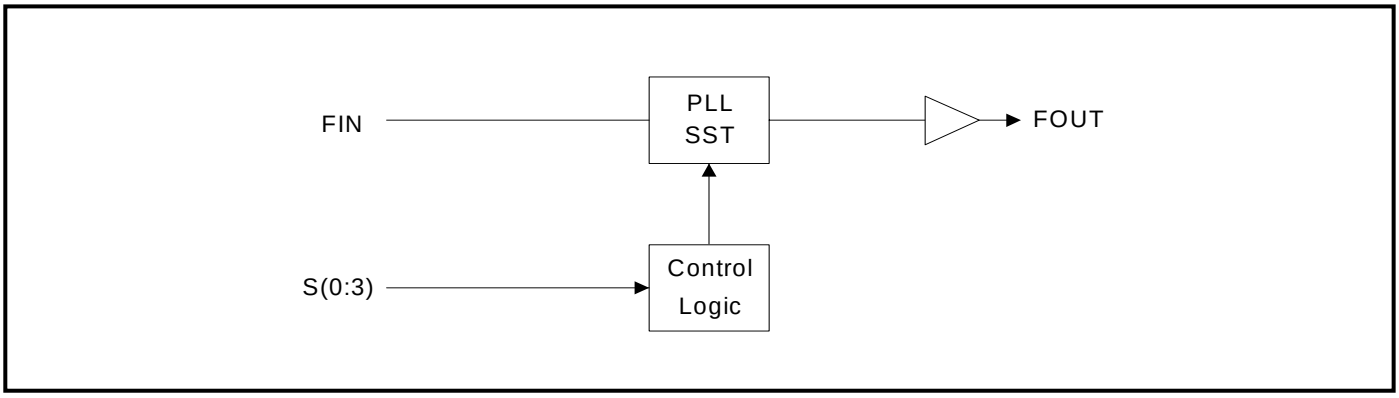
S3	Spread Spectrum Mode
0	OFF
1	ON (See below) Default

Note: S3 has an internal Pull Up. Default="1"

MODULATION MAGNITUDE SELECTION

S2	S1	S0	FIN Range (MHz)	FOUT	Spread Spectrum Modulation	
					Frequency	Magnitude
0	0	0	24 - 200	X1	Fin / 1024	±0.75%
0	0	1	24 - 200	X1		±1.00%
0	1	0	24 - 200	X1		±1.25%
0	1	1	24 - 200	X1		±0.125%
1	0	0	24 - 200	X1		±0.25%
1	0	1	24 - 200	X1		±0.50%
1	1	0	24 - 200	X1		±0.375%
1	1	1	24 - 200	X1		±0.625%

BLOCK DIAGRAM



PIN DESCRIPTIONS

Name	Number	Type	Description
FIN	1	I	Input Clock Frequency. 24MHz to 200MHz.
S2	2	I	Digital control input for SST modulation magnitude selection. Has internal pull-up.
S1	3	I	Digital control input for SST modulation magnitude selection. Has internal pull-up.
S0	4	I	Digital control input for SST modulation magnitude selection. Has internal pull-up.
GND	5	P	Ground.
FOUT	6	O	SST Modulated Clock Frequency Output.
S3	7	I	SST By-Pass Selector. S3 has internal pull-up. Default ="1"
VDD	8	P	3.3V Power Supply.

ELECTRICAL SPECIFICATIONS

1. Absolute Maximum Ratings

PARAMETERS	SYMBOL	MIN.	MAX.	UNITS
Supply Voltage	V_{DD}		4.6	V
Input Voltage, dc	V_I	-0.5	V_{DD}+0.5	V
Output Voltage, dc	V_O	-0.5	V_{DD}+0.5	V
Storage Temperature	T_S	-65	150	°C
Ambient Operating Temperature*	T_A	-40	85	°C
Junction Temperature	T_J		125	°C
Lead Temperature (soldering, 10s)			260	°C
ESD Protection, Human Body Model			2	kV

Exposure of the device under conditions beyond the limits specified by Maximum Ratings for extended periods may cause permanent damage to the device and affect product reliability. These conditions represent a stress rating only, and functional operations of the device at these or any other conditions above the operational limits noted in this specification is not implied.

* Note: Operating Temperature is guaranteed by design for all parts (COMMERCIAL and INDUSTRIAL), but tested for COMMERCIAL grade only.

2. DC/AC Specifications

PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Supply Voltage	V_{DD}		2.97		3.63	V
Input High Voltage	V_{IH}		0.7* V_{DD}			V
Input Low Voltage	V_{IL}				0.3* V_{DD}	V
Input High Current	I_{IH}				100	μA
Input Low Current	I_{IL}				100	μA
Output High Voltage	V_{OH}	I_{OH}=5mA, V_{DD} =3.3V	2.4			V
Output Low Voltage	V_{OL}	I_{OL}=6mA, V_{DD} =3.3V			0.4	V
Input Frequency	F_{IN}		24		200	MHz
Maximum interruption of F_{IN}					100	μs
Input Capacitance	C_{in1}			4		pF
Pull-up Resistor	R_{pu}	PIN 2, 3, 7		30		kΩ
Pull-down Resistor	R_{pd}	PIN 4		30		kΩ
Short Circuit Current	I_{sc}			50		mA
3.3V Dynamic Supply Current	I_{CC}	No Load		20		mA

3. TIMING CHARACTERISTICS

PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Rise Time	T_r	Measured at 0.8V ~ 2.0V @ 3.3V	0.8	0.95	1.1	ns
Fall Time	T_f	Measured at 2.0V ~ 0.8V @ 3.3V	0.78	0.85	0.9	ns
Output Duty Cycle	D_T		45	50	55	%
Input to Output Delay			2		4	ns
Cycle to Cycle Jitter	$T_{cyc-cyc}$	Over output frequency range @ 3.3V			100	ps

FUNCTIONAL DESCRIPTION

Selectable spread spectrum and modulation rates

The ABE0121 provides Center Spread modulation, as well as a selectable modulation magnitude. Selection is made by connecting pins 2 (S2), 3 (S1) and 4 (S0) to a logical “zero” or “one”, according to the modulation magnitude selection table on page 1.

Default values for S(0:3) through internal pull-up and pull-down resistor

Selection pin 4 (S0) has an internal pull-down resistor of 30kΩ while pins 2, 3 and 7 (S2, S1 and S3) have an internal pull-up resistor of 30kΩ. This internal pull-down (or pull-up) resistor will pull the input value to a logical “zero” (or “one” respectively) by default, i.e. when no connection is made between the pin and VDD (GND respectively). In order to override the internal pull-down (pull-up), the pin has to be connected to VDD (GND respectively).

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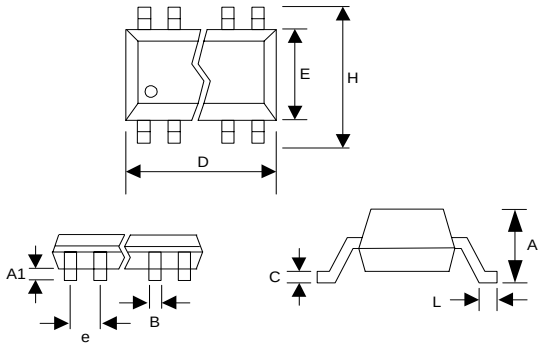
PACKAGE INFORMATION

8 PIN Narrow SOIC (mm)

	SOIC	
Symbol	Min.	Max.
A	1.47	1.73
A1	0.10	0.25
B	0.33	0.51
C	0.19	0.25
D	4.80	4.95
E	3.80	4.00
H	5.80	6.20
L	0.38	1.27
e	1.27 BSC	



ORDERING INFORMATION

For part ordering, please contact our Sales Department:
30332 Esperanza., Rancho Santa Margarita, Ca 92688
Ph: 949-546-8000 Fax: 949-546-8001

PART NUMBER

The order number for this device is a combination of the following:
Device number, Package type and Operating temperature range

ABE0121 S C

PART NUMBER

TEMPERATURE
C=COMMERCIAL
I=INDUSTRIAL

PACKAGE TYPE
S=SOIC

Order Number	Marking	Package Option
ABE0121SC-T	ABE0121SC	SOIC -Tape and Reel
ABE0121SC	ABE0121SC	SOIC -Tube