ABRACON CORPORATION

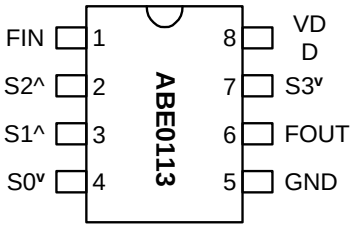
ABE0113

Low EMI Spread Spectrum Multiplier Clock

FEATURES

- Spread Spectrum Clock Generator with selectable multiplier (1x, 2x and 4x).
- Output frequency ranges: 24MHz to 240MHz.
- Selectable Down Spread Modulation.
- TTL/CMOS compatible outputs.
- 3.3V Operating Voltage.
- Low short term jitter.
- Available in 8-Pin 150mil SOIC.

PIN CONFIGURATION



FIN = 24 ~ 120 Mhz

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

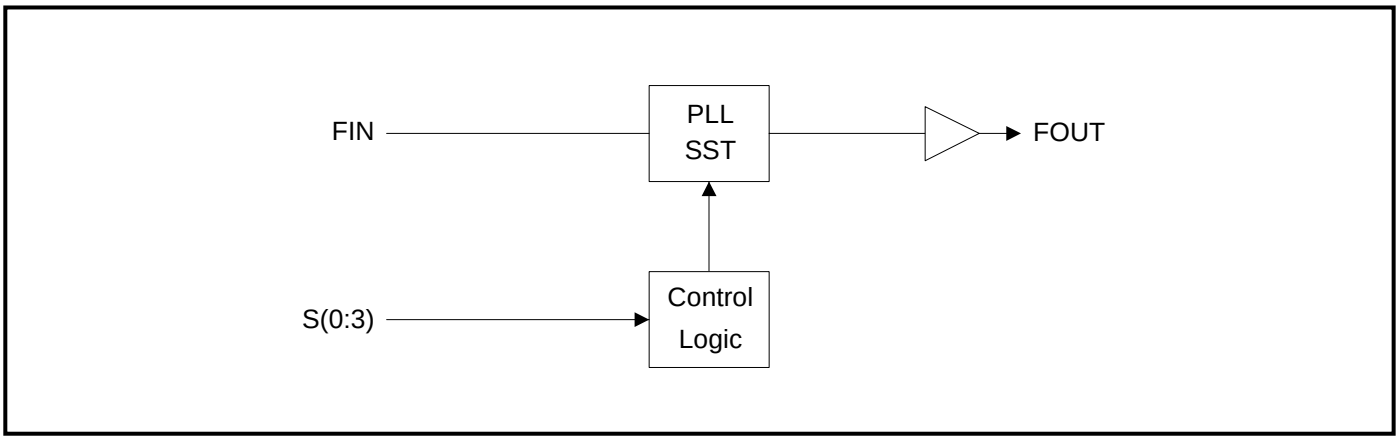
DESCRIPTION

The ABE0113 is a Spread Spectrum Clock Generator designed for the purpose of reducing EMI in high-speed digital systems. The selectable Down Spread modulation magnitude (see table below) permits EMI reduction without over-clocking the output. The device operates over a very wide range of input frequencies and provides 1x to 4x modulated clock outputs.

OUTPUT CLOCK (FOUT) SELECTION

S3	S2	S1	S0	FIN Range (MHz)	FOUT	Spread Spectrum Modulation	
						Frequency	Magnitude
0	0	0	0	24 - 60	X1	Fin / 1024	-1.5%
0	0	0	1	24 - 60	X1		-2.0%
0	0	1	0	24 - 60	X1		-2.5%
0	0	1	1	24 - 60	X1		-3.0%
0	1	0	0	24 - 60	X2		-0.5%
0	1	0	1	24 - 60	X2		-1.0%
0	1	1	0	24 - 60	X2		-1.5%
0	1	1	1	24 - 60	X2		-2.0%
1	0	0	0	24 - 60	X2		-2.5%
1	0	0	1	24 - 60	X2		-3.0%
1	0	1	0	24 - 60	X4		-0.5%
1	0	1	1	24 - 60	X4		-1.0%
1	1	0	0	60 - 120	X1		-0.5%
1	1	0	1	60 - 120	X1		-1.0%
1	1	1	0	60 - 120	X1		-1.5%
1	1	1	1	60 - 120	X1		-2.0%

BLOCK DIAGRAM



PIN DESCRIPTIONS

Name	Number	Type	Description
FIN	1	I	Input Clock Frequency, 24MHz to 120MHz.
S2	2	I	Digital control input to select multiplication factor and SST modulation amplitude. Has internal pull-up.
S1	3	I	Digital control input to select multiplication factor and SST modulation amplitude. Has internal pull-up.
S0	4	I	Digital control input to select multiplication factor and SST modulation amplitude. Has internal pull-down.
GND	5	P	Ground.
FOUT	6	O	SST Modulated Clock Frequency Output. The frequency before modulation is synthesized by multiplying the input frequency by 1X, 2X, or 4X, depending on S(0:3).
S3	7	I	Digital control input to select multiplication factor and SST modulation amplitude. Has internal pull-down.
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}	IOH=5mA, V_{DD} =3.3V	2.4			
Output Low Voltage	V_{OL}	IOL=6mA, V_{DD} =3.3V			0.4	
Input Frequency	F_{IN}		24		120	MHz
Maximum interruption of FIN					none	μs
Input Capacitance	C_{in1}			4		pF
Pull-up Resistor	R_{pu}	PIN 2, 3		30		kΩ
Pull-down Resistor	R_{pd}	PIN 4, 7		30		kΩ
Short Circuit Current	Isc			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	Tr	Measured at 0.8V ~ 2.0V @ 3.3V	0.8	0.95	1.1	ns
Fall Time	Tf	Measured at 2.0V ~ 0.8V @ 3.3V	0.78	0.85	0.9	ns
Output Duty Cycle	DT		45	50	55	%
Input to Output Delay			2		4	ns
Cycle to Cycle Jitter	Tcyc-cyc	Over output frequency range @ 3.3V			100	ps

FUNCTIONAL DESCRIPTION

Selectable spread spectrum and modulation rates

The ABE0113 provides selectable multiplication factor, as well as selectable modulation rate. Selection is made by connecting pins 2 (S2), 3 (S1), 4 (S0), and 7 (S3) to a logical “zero” or “one”, according to the output clock selection table on page 1.

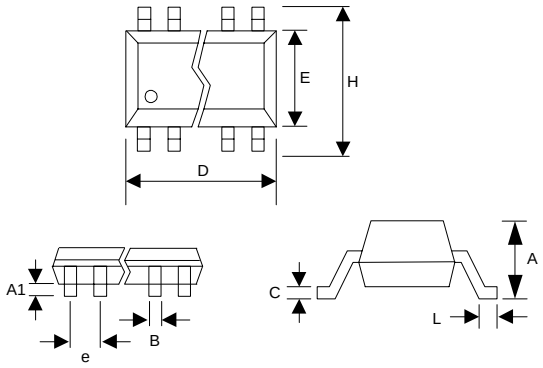
Default values for S(0:3) through internal pull-up and pull-down resistor

Selection pins S0 and S3 have an internal pull-down resistor of 30kΩ, pins 2 and 3 (S1 and S2) 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 the pin is not connected to GND (VDD respectively). In order to override the internal pull-up (pull-down), the pin has to be connected to VDD (GND respectively).

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

ABE0113 S C

PART NUMBER

TEMPERATURE
C=COMMERCIAL
I=INDUSTRIAL

PACKAGE TYPE
S=SOIC

Order Number	Marking	Package Option
ABE0113SC-T	ABE0113SC	SOIC -Tape and Reel
ABE0113SC	ABE0113SC	SOIC –Tube