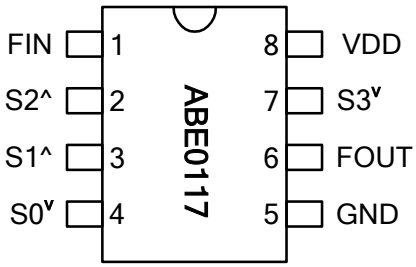
ABE0117

Low EMI Spread Spectrum Multiplier Clock

FEATURES

- Spread Spectrum Clock Generator with selectable multiplier (1x, 2x, 2.94x and 4x).
- Output frequency ranges: 16MHz to 200MHz.
- Center Spread Modulation.
- TTL/CMOS compatible outputs.
- 3.3V Operating Voltage.
- Low short term jitter.
- Available in 8-Pin 150mil SOIC.

PIN CONFIGURATION



FIN = 16 ~ 60 Mhz

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

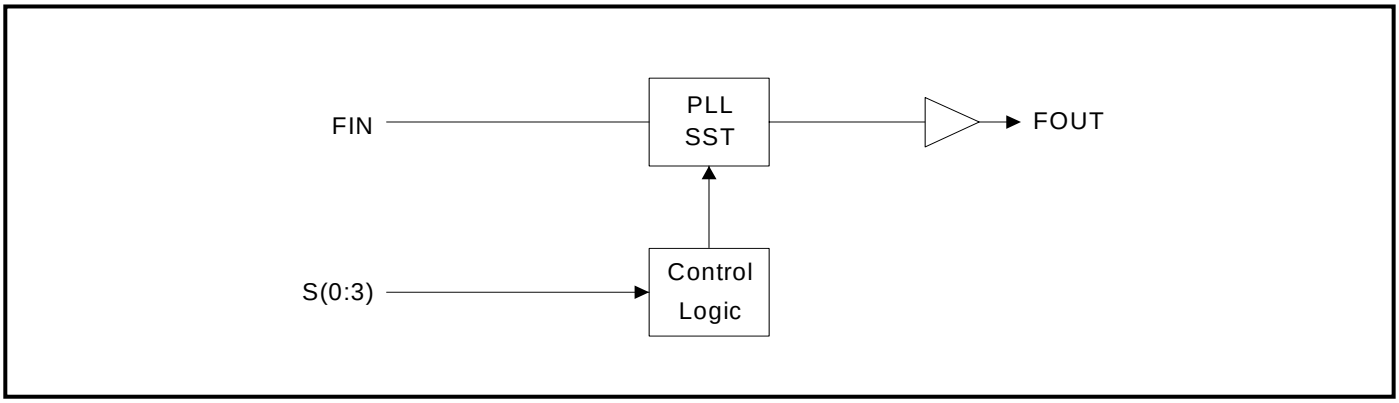
DESCRIPTION

The ABE0117 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 multiplication factor can be selected from 4 multiplier modes. The device operates over a wide range of input frequencies and provides 1x, 2x. 2.94x and 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	16 - 40	X1	Fin / 512	±0.75%
0	0	0	1	16 - 40	X1		±1.00%
0	0	1	0	16 - 40	X1		±1.25%
0	0	1	1	16 - 40	X1		±1.50%
0	1	0	0	16 - 40	X2		±0.25%
0	1	0	1	16 - 40	X2		±0.50%
0	1	1	0	16 - 40	X2		±0.75%
0	1	1	1	16 - 40	X2		±1.00%
1	0	0	0	24 - 60	X2	Fin / 1024	±1.25%
1	0	0	1	24 - 60	X2		±1.50%
1	0	1	0	24 - 50	X4		±0.25%
1	0	1	1	24 - 50	X4		±0.50%
1	1	0	0	16 - 40	X2.94	Fin / 1000	±0.25%
1	1	0	1	16 - 40	X2.94		±0.50%
1	1	1	0	16 - 40	X2.94		±0.75%
1	1	1	1	16 - 40	X2.94		±1.00%

BLOCK DIAGRAM



PIN DESCRIPTIONS

Name	Number	Type	Description
FIN	1	I	Input Clock connection. 16MHz to 60MHz.
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 connection.
FOUT	6	O	SST Modulated Clock Output. The frequency before modulation is synthesized by multiplying the input frequency by 1X, 2X, 2.94Xor 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 connection.

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
Supply Current	I_{DD}	15pF Load, FOUT=16MHz		9		mA
		5pF Load, FOUT=200MHz		25		mA
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			
Output Low Voltage	V_{OL}	I_{OL}=6mA, V_{DD} =3.3V			0.4	
Input Frequency	F_{IN}	S3=0 or S3-S2=1-1	16		40	MHz
		S3-S2-S1=1-0-1	24		50	MHz
		S3-S2-S1=1-0-0	24		60	MHz
Recovery from interruption of F_{IN}				1		ms
Input Capacitance	C_{in1}			3		pF
Pull-up Resistor	R_{pu}	PIN 2, 3		30		kΩ
Pull-down Resistor	R_{pd}	PIN 4, 7		30		kΩ
Short Circuit Current	I_{sc}			50		mA
3.3V Dynamic Supply Current	I_{DD}	No Load, FOUT=16MHz		7		mA
		No Load, FOUT=200MHz		21		mA

3. TIMING CHARACTERISTICS

PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Rise Time	T_r	10%~90%VDD, 15pF Load, FOUT≤100MHz		2	3	ns
		10%~90%VDD, 10pF Load, FOUT≤150MHz		1.5	2	ns
		10%~90%VDD, 5pF Load, FOUT≤200MHz		1	1.5	ns
Fall Time	T_f	90%~10%VDD, 15pF Load, FOUT≤100MHz		2	3	ns
		90%~10%VDD, 10pF Load, FOUT≤150MHz		1.5	2	ns
		90%~10%VDD, 5pF Load, FOUT≤200MHz		1	1.5	ns
Output Duty Cycle	D_T	Measured at 50%VDD	45	50	55	%
Cycle to Cycle Jitter	$T_{cyc-cyc}$	Over output frequency range @ 3.3V			100	ps peak

FUNCTIONAL DESCRIPTION

Selectable spread spectrum and modulation frequency and magnitude

The ABE0117 provides selectable spread spectrum modulation frequency, as well as selectable modulation magnitude. 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).

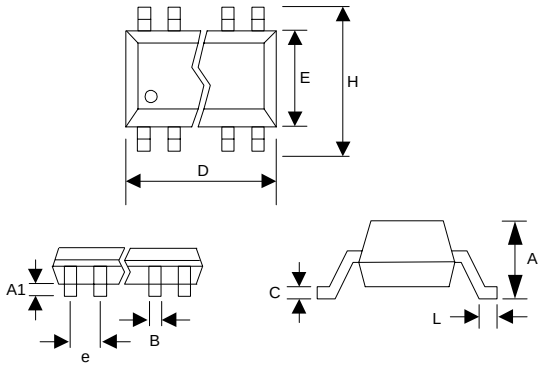
Default values for S(0:3) through internal pull-up and pull-down resistor

Selection pins 4 and 7 (S0 and S3) have an internal pull-down resistor of 30kΩ while 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 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).

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

ABE0117 S C

PART NUMBER

TEMPERATURE
C=COMMERCIAL
I=INDUSTRIAL

PACKAGE TYPE
S=SOIC

Order Number	Marking	Package Option
ABE0117SC-T	ABE0117SC	SOIC -Tape and Reel
ABE0117SC	ABE0117SC	SOIC -Tube

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