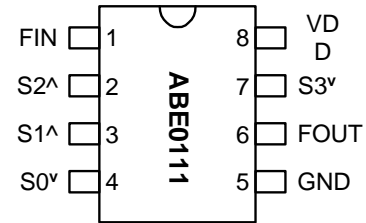


## Low EMI Spread Spectrum Multiplier Clock

### FEATURES

- Spread Spectrum Clock Generator with selectable multiplier ( 1x, 2x and 4x ).
- Output frequency ranges: 24MHz to 240MHz.
- Selectable center spread modulation rate.
- 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

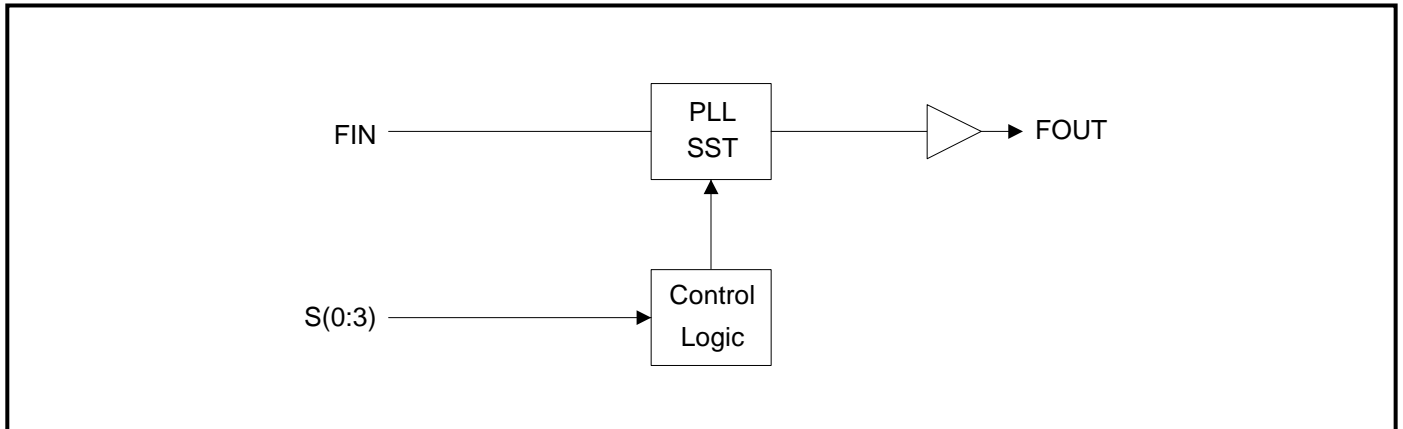
The ABE0111 is a Spread Spectrum Clock Generator designed for the purpose of reducing EMI in high-speed digital systems, with the selectable Center Spread modulation amplitude (see table below). The output frequency is selected by programming 4 multiplier modes. The device operates over a very wide range 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	±0.75%
0	0	0	1	24 - 60	X1		±1.00%
0	0	1	0	24 - 60	X1		±1.25%
0	0	1	1	24 - 60	X1		±1.50%
0	1	0	0	24 - 60	X2		±0.25%
0	1	0	1	24 - 60	X2		±0.50%
0	1	1	0	24 - 60	X2		±0.75%
0	1	1	1	24 - 60	X2		±1.00%
1	0	0	0	24 - 60	X2		±1.25%
1	0	0	1	24 - 60	X2		±1.50%
1	0	1	0	24 - 60	X4		±0.25%
1	0	1	1	24 - 60	X4		±0.50%
1	1	0	0	60 - 120	X1		±0.25%
1	1	0	1	60 - 120	X1		±0.50%
1	1	1	0	60 - 120	X1		±0.75%
1	1	1	1	60 - 120	X1		±1.00%

## Low EMI Spread Spectrum Multiplier Clock

### 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.

## Low EMI Spread Spectrum Multiplier Clock

### 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	$V_{IH}$		$0.7 \cdot V_{DD}$			V
Input Low Voltage	$V_{IL}$				$0.3 \cdot V_{DD}$	V
Input High Current	$I_{IH}$				100	$\mu A$
Input Low Current	$I_{IL}$				100	$\mu A$
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	$F_{IN}$		24		120	MHz
Maximum interruption of $F_{IN}$					none	$\mu s$
Input Capacitance	$C_{in1}$			4		pF
Pull-up Resistor	$R_{pu}$	PIN 2, 3		30		$k\Omega$
Pull-down Resistor	$R_{pd}$	PIN 4, 7		30		$k\Omega$
Short Circuit Current	$I_{sc}$			50		mA
3.3V Dynamic Supply Current	$I_{CC}$	No Load		20		mA

## Low EMI Spread Spectrum Multiplier Clock

### 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 ABE0111 provides selectable spread spectrum modulation, as well as selectable modulation rate. Selection is made by connecting specific pins to a logical "zero" or "one", according to the output clock selection table and modulation rate selection table on page 1.

Pins 2 (S2), 3 (S1), 4 (S0), and 7 (S3) are used as inputs to select the spread spectrum modulation and multiplication factor as shown on the output clock selection table (page 1).

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

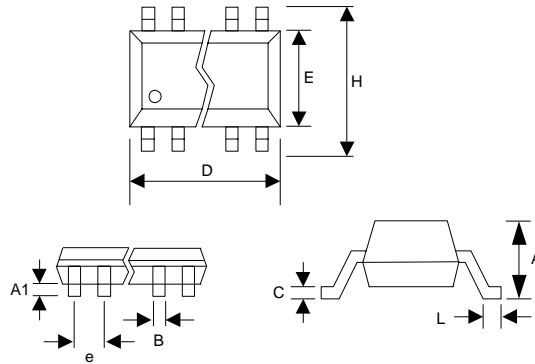
Selection pins S0 and S3 have an internal pull-down resistor of 30k $\Omega$ , pins 2 and 3 (S1 and S2) have an internal pull-up resistor of 30k $\Omega$ . This internal pull-up (or pull-down) resistor will pull the input value to a logical "one" (or "zero" respectively) by default, i.e. when no resistive load is connected between the pin and GND (VDD respectively). In order to override the internal pull-up (pull-down), the pin has to be connected to GND (VDD respectively).

## Low EMI Spread Spectrum Multiplier Clock

### PACKAGE INFORMATION

8 PIN Narrow SOIC ( mm )

Symbol	SOIC	
	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	

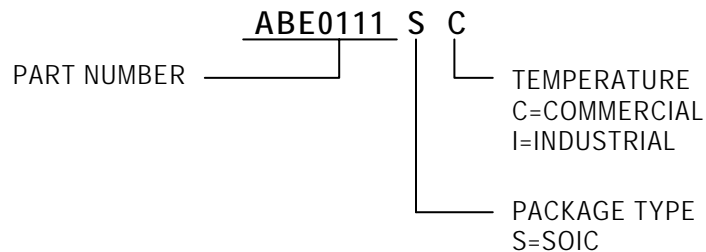


### ORDERING INFORMATION

*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



Order Number	Marking	Package Option
ABE0111SC-T	ABE0111SC	SOIC -Tape and Reel
ABE0111SC	ABE0111SC	SOIC -Tube

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