FS6312-71
Three-PLL Clock Generator IC

May 2000

1.0   Features

- Three PLLs with deep reference, feedback, and post dividers to provide precision clock frequencies

- Multiple outputs provide several clocking options

- Outputs may be individually tristated for board testing by the OE_x pins

- SUSPEND# pin completely powers down entire device

- Package: 16-pin, 5.3mm (0.209") SSOP

- Custom frequency patterns, pinouts, and packages are available. Contact your local AMI Sales Representative for more information.

2.0   Description

The FS6312 is a ROM-based CMOS clock generator IC designed to minimize cost and component count in a variety of electronic systems.

Three low-jitter phase-locked loops (PLLs) drive up to five clock outputs to provide a high degree of flexibility. The device is packaged in a 16-pin SOIC to minimize board space.

High-resolution divider capability permits generation of desired frequencies.
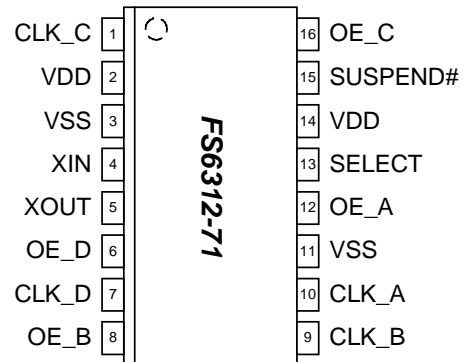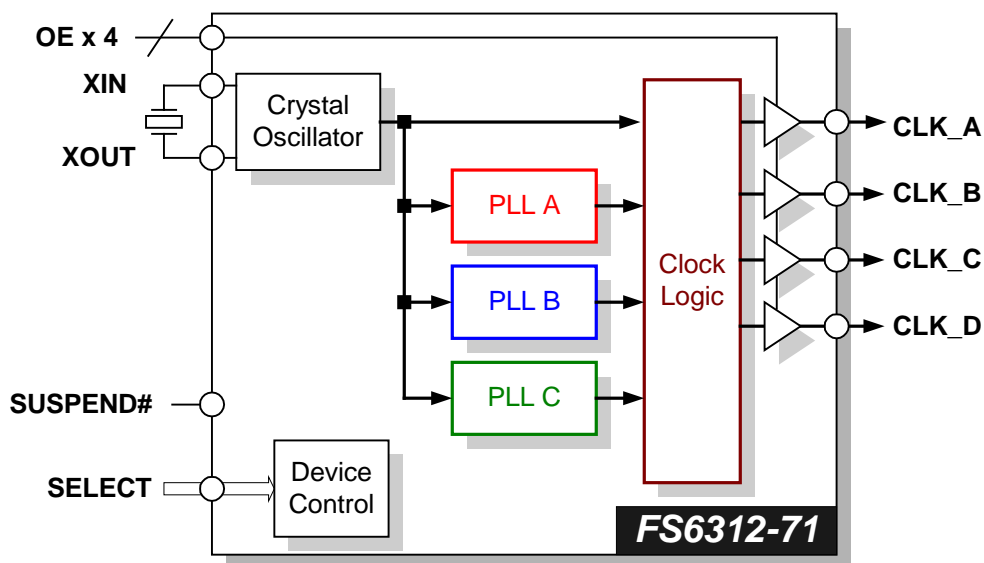
Figure 1: Pin Configuration

Pin				Pin
CLK_C	1		16	OE_C
VDD	2		15	SUSPEND#
VSS	3		14	VDD
XIN	4	FS6312-71	13	SELECT
XOUT	5		12	OE_A
OE_D	6		11	VSS
CLK_D	7		10	CLK_A
OE_B	8		9	CLK_B

Figure 2: Block Diagram

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Table 1: Pin Descriptions

Key: AI = Analog Input; AO = Analog Output; DI = Digital Input; DI^U = Input with Internal Pull-Up; DI$_D$ = Input with Internal Pull-Down; DIO = Digital Input/Output; DI-3 = Three-Level Digital Input, DO = Digital Output; P = Power/Ground; # = Active Low pin

PIN	TYPE	NAME	DESCRIPTION
1	DO	CLK_C	C clock output
2	P	VDD	Power supply (3.3V)
3	P	VSS	Ground
4	AI	XIN	Crystal oscillator feedback
5	AO	XOUT	Crystal oscillator drive
6	DI	OE_D	CLK_D output enable
7	DO	CLK_D	D clock output
8	DI	OE_B	CLK_B output enable
9	DO	CLK_B	A clock output
10	DO	CLK_A	B clock output
11	P	VSS	Ground
12	DI	OE_A	CLK_A output enable
13	DI	SELECT	Frequency select control input (see Table)
14	P	VDD	Power supply (3.3V)
15	DI	SUSPEND#	Device SUSPEND (power-down) control; when low (logic 0) device is shut-down
16	DI	OE_C	CLK_C output enable

Table 2: Frequency Table – FS6312-71 (3.3volt)

SELECT	FREF (MHz)	CLK_A (MHz) (pin 10)	CLK_B (MHz) (pin 9)	CLK_C (MHz) (pin 1)	CLK_D (MHz) (pin 7)
0	14.31818	36.000	6.000	11.000	14.31818
1	14.31818	36.000	6.000	11.000	17.734475 (F_{REF} * 706 / 570)

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3.0   Electrical Specifications

Table 3: Absolute Maximum Ratings

Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. These conditions represent a stress rating only, and functional operation of the device at these or any other conditions above the operational limits noted in this specification is not implied. Exposure to maximum rating conditions for extended conditions may affect device performance, functionality, and reliability.

PARAMETER	SYMBOL	MIN.	MAX.	UNITS
Supply Voltage, dc (V_{SS} = ground)	V_{DD}	V_{SS}-0.5	7	V
Input Voltage, dc	V_I	V_{SS}-0.5	V_{DD}+0.5	V
Output Voltage, dc	V_O	V_{SS}-0.5	V_{DD}+0.5	V
Input Clamp Current, dc ($V_I < 0$ or $V_I > V_{DD}$)	I_{IK}	-50	50	mA
Output Clamp Current, dc ($V_I < 0$ or $V_I > V_{DD}$)	I_{OK}	-50	50	mA
Storage Temperature Range (non-condensing)	T_S	-65	150	°C
Ambient Temperature Range, Under Bias	T_A	-55	125	°C
Junction Temperature	T_J		150	°C
Lead Temperature (soldering, 10s)			260	°C
Input Static Discharge Voltage Protection (MIL-STD 883E, Method 3015.7)			2	kV

CAUTION: ELECTROSTATIC SENSITIVE DEVICE

Permanent damage resulting in a loss of functionality or performance may occur if this device is subjected to a high-energy electrostatic discharge.

Table 4: Operating Conditions

PARAMETER	SYMBOL	CONDITIONS/DESCRIPTION	MIN.	TYP.	MAX.	UNITS
Supply Voltage	V_{DD}	3.3V ± 10%	3	3.3	3.6	V
Ambient Operating Temperature Range	T_A		0		70	°C
Output Load Capacitance	C_L				25	pF

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Table 5: DC Electrical Specifications

Unless otherwise stated, V_{DD} = 3.3V, no load on any output, and ambient temperature range T_A = 0°C to 70°C. Parameters denoted with an asterisk (*) represent nominal characterization data and are not production tested to any specific limits. Where given, MIN and MAX characterization data are $\pm3\sigma$ from typical. Negative currents indicate current flows out of the device.

PARAMETER	SYMBOL	CONDITIONS/DESCRIPTION	MIN.	TYP.	MAX.	UNITS
Overall						
Supply Current, Dynamic, with Loaded Outputs	I_{DD}			25		mA
Crystal Oscillator						
Crystal Loading Capacitance	$C_{L(xtal)}$	As seen by a crystal connected to XIN and XOUT		16		pF
Clock Outputs (CLK_x)						
High-Level Output Source Current *	I_{OH}	$V_O = V_{DD} - 0.8V$		-21		mA
Low-Level Output Sink Current *	I_{OL}	$V_O = 0.4V$		+10		mA
Short-Circuit Output Source Current *	I_{OH}	$V_O = 0V$		-30		mA
Short-Circuit Output Sink Current *	I_{OL}	$V_O = V_{DD}$		+25		mA

Table 6: AC Timing Specifications

Unless otherwise stated, V_{DD} = 3.3V, no load on any output, and ambient temperature range T_A = 0°C to 70°C. Parameters denoted with an asterisk (*) represent nominal characterization data and are not production tested to any specific limits. Where given, MIN and MAX characterization data are $\pm3\sigma$ from typical.
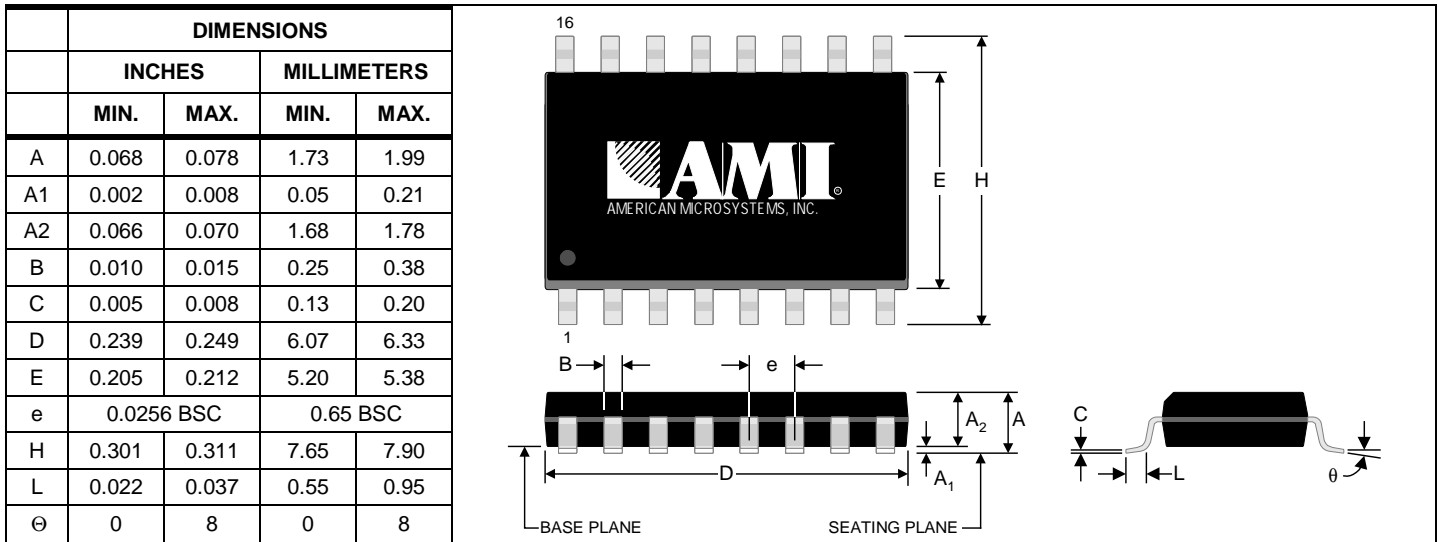
PARAMETER	SYMBOL	CONDITIONS/DESCRIPTION	MIN.	TYP.	MAX.	UNITS
Clock Outputs (CLK_x)						
Duty Cycle *		Ratio of high pulse width (as measured from rising edge to next falling edge at $V_{DD}/2$) to one clock period	45		55	%
Jitter, Period (1 sigma) *	$t_{j(\Delta P)}$	From rising edge to next rising edge at $V_{DD}/2$		80		ps
Rise Time *	t_r	V_{DDO} = 3.3V; V_O = 0.4V to 2.4V; C_L = 10pF		1.0		ns
Fall Time *	t_f	V_{DDO} = 3.3V; V_O = 2.4V to 0.4V; C_L = 10pF		1.0		ns

4.0   Package Information

Table 7: 16-pin 5.3mm (0.209") SSOP Package Dimensions

	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	0.068	0.078	1.73	1.99
A1	0.002	0.008	0.05	0.21
A2	0.066	0.070	1.68	1.78
B	0.010	0.015	0.25	0.38
C	0.005	0.008	0.13	0.20
D	0.239	0.249	6.07	6.33
E	0.205	0.212	5.20	5.38
e	0.0256 BSC		0.65 BSC	
H	0.301	0.311	7.65	7.90
L	0.022	0.037	0.55	0.95
Θ	0	8	0	8

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5.0   Ordering Information

ORDERING CODE	DEVICE NUMBER	PACKAGE TYPE	OPERATING TEMPERATURE RANGE	SHIPPING CONFIGURATION
11825-806	FS6312-71	16-Pin 5.3mm (0.209") SSOP	0° C to 70° C (Commercial)	Tape and Reel
11825-816	FS6312-71	16-Pin 5.3mm (0.209") SSOP	0° C to 70° C (Commercial)	Tubes

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