



OPTi Notebook Frequency Generator

General Description

The AV9154A-06/60 is a low cost frequency generator designed for general purpose PC and disk drive applications. Its CPU clocks provide all necessary frequencies for 286, 386 and 486 systems, including support for the latest speeds of processors. The standard devices use a 14.318 MHz crystal to generate the CPU and peripheral clocks for integrated desktop and notebook motherboards.

The AV9154A-06 and AV9154A-60 are specifically designed for use with OPTi core logic chip sets. The only noticeable difference between the two parts is in their CPU clock selection tables as shown on page three.

The AV9154A-06 and AV9154A-60 can operate at $5.0V \pm 10\%$ or $3.3V \pm 10\%$, but the CPU frequencies are limited (see the asterisks on the selection tables on page three) during 3.3V operation. The parts have two power-down pins. One shuts off the CPU clock to a low state when the power-down pin is taken high, and the other turns off the 14.318 MHz output in the same manner.

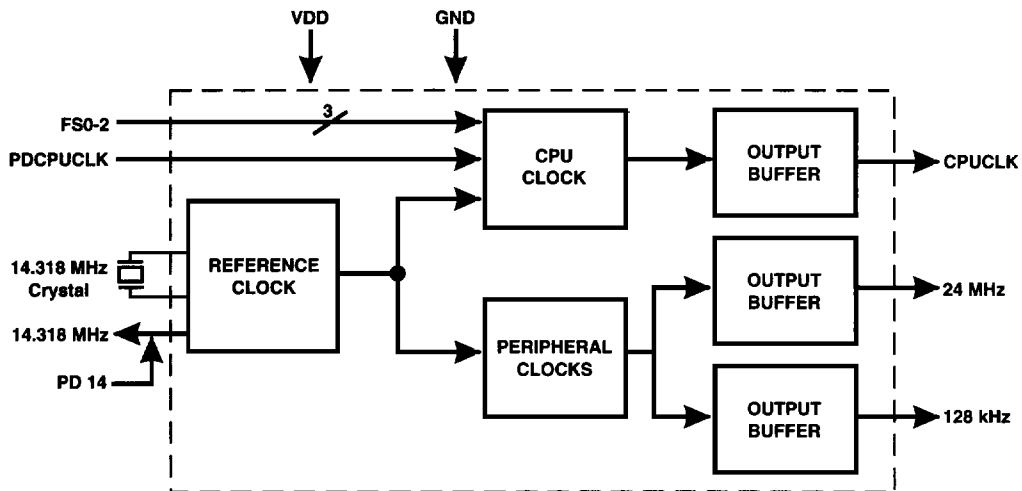
Features

- Compatible with 286, 386, and 486 CPUs
- Up to 66.6 MHz (-60) or 80 MHz (-06) CPU clocks
- All loop filter components internal
- 3V and 5V operation
- 16-pin 150 mil SOIC
- Power-down control of CPU clock

Applications

Computer Motherboards: The AV9154A-06/60 replaces crystals and oscillators, saving board space, component cost, part count and inventory costs. It produces switchable CPU clock and up to four fixed clocks to drive floppy disk, communications, super I/O, bus and/or keyboard devices. The small package and 3V operation is perfect for handheld computers.

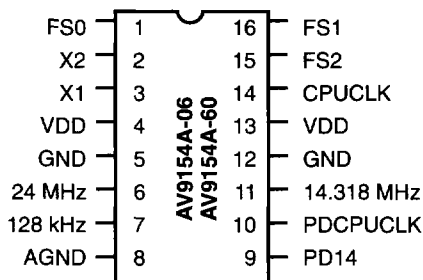
Block Diagram



AV9154A-06 AV9154A-60



Pin Configuration



**16-Pin SOIC
K-6**

Clock Tables for AV9154A-06/60

(in MHz)

FS(2:0)	-06 CPUCLK	-60 CPUCLK
0	16	8
1	20	16
2	25	20
3	33.33	25
4	40	33.33
5	50	40*
6	66.66	50*
7	80*	66.66*

Actual Output Frequencies

(in MHz)

FS(2:0)	-06 CPUCLK	-60 CPUCLK
0	16.11	8.182
1	20.05	16.11
2	25.06	20.05
3	33.24	25.06
4	40.09	33.24
5	50.11	40.09*
6	66.48	50.11*
7	80.18*	66.48*

Pin Descriptions

PIN NUMBER	PIN NAME	TYPE	DESCRIPTION
1	FS0	I	Frequency Select 0 for CPUCLK
2	X2	O	Crystal out. Connect a 14.318 MHz crystal to this pin.
3	X1	I	Crystal in. Connect a 14.318 MHz crystal to this pin.
4	VDD	P	Digital Power (+3.3V or +5V)
5	GND	P	Digital Ground
6	24 MHz	O	24 MHz clock output
7	128 kHz	O	128 kHz clock output
8	AGND	P	Analog Ground
9	PD14	I	Power-down 14.318 MHz output (active high)
10	PDCPUCLK	I	Power-down CPU clock (active high)
11	14.318 MHz	O	14.318 MHz reference clock output
12	GND	P	Digital Ground
13	VDD	P	Digital Power (+3.3V or +5V)
14	CPUCLK	O	CPU Clock output determined by status of FS0 - FS2
15	FS2	I	Frequency Select 2 for CPUCLK
16	FS1	I	Frequency Select 1 for CPUCLK

NOTE:

No internal pull-ups on any Inputs.



Absolute Maximum Ratings

- VDD referenced to GND 7V
- Operating temperature under bias 0°C to +70°C
- Storage temperature -40°C to +150°C
- Voltage on I/O pins referenced to GND. GND -0.5V to VDD +0.5V
- Power dissipation 0.5 Watts

Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect product reliability.



Electrical Characteristics at 5V

VDD =+5V±10%, TA=0°C to 70°C unless otherwise stated

DC Characteristics						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Input Low Voltage	VIL	VDD=5V			0.8	V
Input High Voltage	VIH	VDD=5V	2.0			V
Input Low Current	IIL	VIN=0V			-5	µA
Input High Current	IIH	VIN=VDD			5	µA
Output Low Voltage	VOL	IOL=4mA			0.4	V
Output High Voltage	VOH	IOH=-1mA	VDD-.4V			V
Output High Voltage	VOH	IOH=-4mA	VDD-.8V			V
Output High Voltage	VOH	IOH=-8mA	2.4			V
Supply Current	IDD	No load ¹		25	40	mA
Output Frequency Change over Supply and Temperature	FD	With respect to typical frequency		0.002	0.01	%
Short circuit current	ISC	Each output clock	25	40		mA
Input Capacitance	CI	Except X1, X2			10	pF
Load Capacitance	CL	Pins X1, X2		20		pF
Supply Current, lowest	IDDSTBY	When powered-down		20		mA

NOTE:

- 1 All clocks on AV9154A-06 or -60 running at highest possible frequencies.

AV9154A-06
AV9154A-60



Electrical Characteristics at 5V

V_{DD} = +5V±10%, T_A = 0°C to 70°C unless otherwise stated

AC Characteristics						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Input Clock Rise Time	t _{Cr}				20	ns
Input Clock Fall Time	t _{Cf}				20	ns
Output Rise time, 0.8 to 2.0V	t _r	15pf load	-	1	2	ns
Rise time, 20% to 80% V _{DD}	t _r	15pf load	-	2	4	ns
Output Fall time, 2.0 to 0.8V	t _f	15pf load	-	1	2	ns
Fall time, 80% to 20% V _{DD}	t _f	15pf load	-	2	4	ns
Duty cycle	d _t	15pf load	40/60	48/52	60/40	%
Duty cycle, reference clock	d _t	15pf load	40/60	43/57	60/40	%
Duty cycle, CPU clock -06	d _t	15pf load	40/60	42/58	60/40	%
Jitter, one sigma	T _{jls}	As compared with clock period		±0.8	±2.5	%
Jitter, absolute	T _{jab}			±2	±5	%
Jitter, absolute	T _{jab}	16-80 MHz clocks			700	ps
Input Frequency	f _i			14.318		MHz
Frequency Transition time	t _{ft}	from 16 to 80 MHz		15	20	ms
Power-up time	t _{pu}	from off to 50 MHz		15		ms

NOTE:

1 All clocks on AV9154A-06 or -60 running at highest possible frequencies.



Electrical Characteristics at 3.3V

Operating $V_{DD} = +3.0V$ to $+3.7V$, $T_A = 0^{\circ}C$ to $70^{\circ}C$ unless otherwise stated

DC Characteristics						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Input Low Voltage	V_{IL}		-	-	$0.15V_{DD}$	V
Input High Voltage	V_{IH}		$0.7V_{DD}$	-	-	V
Input Low Current	I_{IL}	$V_{IN}=0V$	-5	-	5	μA
Input High Current	I_{IH}	$V_{IN}=V_{DD}$	-5	-	5	μA
Output Low Voltage	V_{OL}	$I_{OL}=8mA$	-	-	0.1	V
Output High Voltage	V_{OH}	$I_{OH}=-4mA$	$V_{DD}-1V$	-	-	V
Supply Current	I_{DD}	Note 1	-	15		mA
Output Frequency Change over Supply and Temperature	F_d	With respect to typical frequency	-	0.002	0.01	%
Input Capacitance	C_i	Except X1, X2			10	pF
Load Capacitance	C_L	Pins X1, X2		20		pF
Supply Current, lowest	I_{DDL}	When powered-down		14		mA
Short Circuit Current	I_{SC}			30		mA

Note 1: AV9154A with no load, with 14.318 MHz crystal input, and CPULCK running at 33 MHz. Power supply current varies with frequency. Consult ICS for actual current at different frequencies.

Electrical Characteristics at 3.3V

(Operating $V_{DD} = +3.0V$ to $+3.7V$, $T_A = 0^{\circ}C$ to $70^{\circ}C$ unless otherwise stated)

AC Characteristics						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Input Clock Rise Time	t_{ICr}				20	ns
Input Clock Fall Time	t_{ICf}				20	ns
Rise time	t_r	15 pf load	-	-	4	ns
Fall time	t_f	15 pf load	-	-	4	ns
Duty cycle, fixed clocks	d_t	15 pf load	40/60	48/52	60/40	%
Duty cycle, CPU clock -06	d_t	15 pf load	40/60	42/58	60/40	%
Duty cycle, reference clock	d_t	15 pf load	40/60	43/57	60/40	%
Jitter, one sigma	T_{j1s}	All frequencies		± 0.5	± 2	%
Jitter, absolute	T_{jabs}	All frequencies		± 3	± 5	%
Frequency Transition time	t_{ft}	from 8 to 33 MHz			20	ms
Power-up time	t_{pu}	from off to 50 MHz		15		ms
Output Frequency	f_o	Will operate up to 50 MHz for -06 version	2		33	MHz
Input Frequency	f_i			14.318		MHz

Note 1: AV9154A with no load, with 14.318 MHz crystal input, and CPULCK running at 33 MHz. Power supply current varies with frequency. Consult ICS for actual current at different frequencies.

AV9154A-06
AV9154A-60



Ordering Information

AV9154A-06CS16 or AV9154A-60CS16

Example:

ICS XXXX-PPP M X#W

