1.8V/3.0V Single-PLL Clock Generator

AK8150B

Features

- **Input Frequency:**
  36 MHz (1.8V or 3.0V)
- **PLL Output Frequency:**
  12 MHz (1.8V or 3.0V)
- **REF Output Frequency:**
  36 MHz or 18 MHz (1.8V or 3.0V)
- **Low Jitter Performance:**
  Cycle to Cycle : 200 ps max
  Period : 120 ps max
- **Low Current Consumption:**
  7 mW Typ. (REF=18MHz)
- **Output Load:**
  30 pF Max
- **Supply Voltage:**
  VDD : 1.8V±0.1V
  VDDO1,2 : 1.8V±0.1V or 3.0V±0.3V
- **Operating Temperature Range:**
  -20 to +85℃
- **Package:**
  8-pin USON (2.0mm x 2.0mm)

Description

The AK8150B is a single-PLL clock generator IC with two outputs. The high performance PLL locks to the master clock input, generating a low jitter, highly accurate clock output without an external crystal.

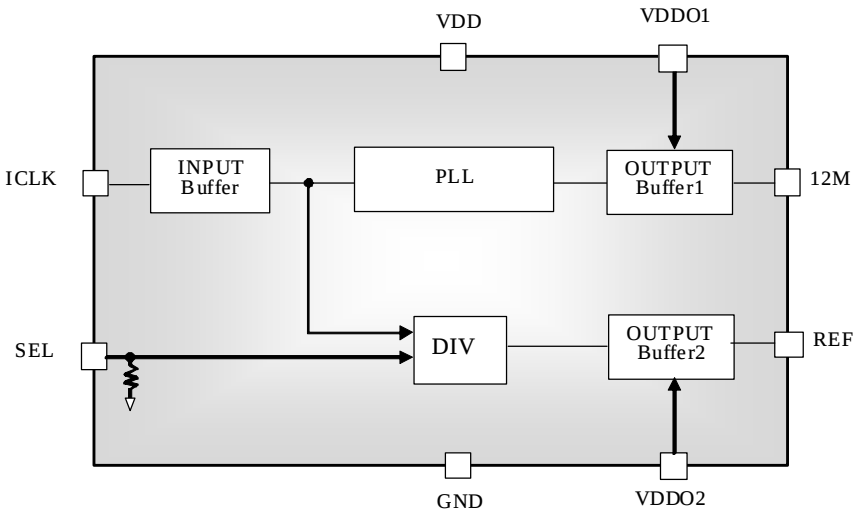
The integrated PLL generates 12MHz with 36 MHz input clock. The device has another output, REF which is to be ICLK or ICLK divided by two.

The AK8150B has two kinds of voltage supply pins. One is for the core and the other is for each of the two output buffers. The core requires 1.8V supply and the output buffers require 1.7V - 1.9V or 2.7V - 3.3V supply. Not only the output but also the input accepts 1.8V or 3.0V input clock from Crystal Oscillator.

Applications

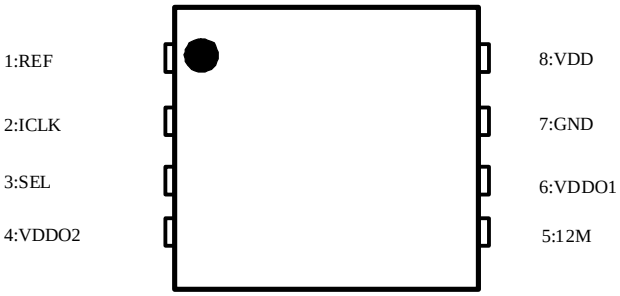
- Digital Still Camera
- Digital Video Camera

Block Diagram



AK8150B Single PLL with Two Outputs Clock Generator

PIN DESCRIPTION



Package: 8-Pin USON (Top View)

Pin No.	Pin Name	Pin Type	Description	
1	REF	OUT	Reference output of ICLK or ICLK/2. One of which is selected by SEL pin.	
2	ICLK	IN	36 MHz input. 1.8V or 3.0V available.	
3	SEL	IN	Select pin for REF Output Frequency. 1.8V or 3.0V available. "L" : ICLK "H" : ICLK/2	(1)
4	VDDO2	--	Power supply of Output Buffer for REF	
5	12M	OUT	12MHz output.	
6	VDDO1	--	Power supply of Output Buffer for 12M	
7	VSS	--	Ground	
8	VDD	--	Power supply	

(1) Internal pull down 200kΩ (Typ.)

Ordering Information

Part Number	Marking	Shipping Packaging	Package	Temperature Range
AK8150BU	150B	Tape and Reel	8-pin USON	-20 to 85 ℃

Absolute Maximum Rating

Over operating free-air temperature range unless otherwise noted (1)

Items	Symbol	Ratings	Unit
Supply Voltage	VDD	-0.3 to 4.6	V
Input Voltage	Vin	VSS-0.3 to 3.6	V
Input Current (any pins except supplies)	I_{IN}	±10	mA
Storage Temperature	Tstg	-55 to 130	°C

Note

(1) Stress beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only. Functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to absolute-maximum-rating conditions for extended periods may affect device reliability. Electrical parameters are guaranteed only over the recommended operating temperature range.

ESD Sensitive Device

This device is manufactured on a CMOS process, therefore, generically susceptible to damage by excessive static voltage. Failure to observe proper handling and installation procedures can cause damage. AKEMD recommends that this device is handled with appropriate precautions.

Recommended Operation Conditions

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Operating Temperature	Ta		-20		85	°C
Supply Voltage 1	VDD		1.7	1.8	1.9	V
Supply Voltage 2	VDDO1 VDDO2	1.8V output	1.7	1.8	1.9	V
		3.0V output	2.7	3.0	3.3	
Input Clock Frequency	Fin			36.0		MHz
Input Clock Duty Cycle				50		%
Output Load Capacitance	Cp	Pin: 12M, REF			30	pF

DC Characteristics

All specifications at VDD: 1.7 to 1.9V, VDDO1,2: 2.7 to 3.3V, Ta: -20 to +85℃, unless otherwise noted

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
High level input voltage	V_{IH}	Pin: ICLK, SEL VDDI: 1.7-1.9V or 2.7-3.0V	0.8*VDDI			V
Low level input voltage	V_{IL}				0.2*VDDI	V
Input leakage current 1	I_L 1	Pin: ICLK	-10		+10	µA
Input leakage current 2	I_L 2	Pin: SEL	-10		+40	µA
High level output voltage	V_{OH}	12M IOH= -5mA	0.8*VDDO1			V
		REF IOH= -5mA	0.8*VDDO2			
Low level output voltage	V_{OL}	12M IOH= +5mA			0.2*VDDO1	V
		REF IOH= +5mA			0.2*VDDO2	
Power Consumption	W	No load VDD=1.8V, VDDO1,2 = 3.0V			12	mW

VDDI: Power Supply for Input clock generator such as Crystal Oscillator.

AC Characteristics

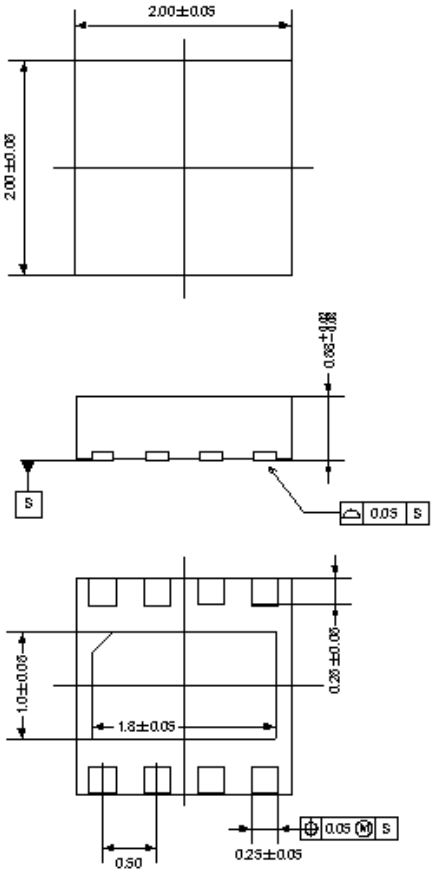
All specifications at VDD: 1.7 to 1.9V, VDDO1,2: 2.7 to 3.3V, Ta: -20 to +85℃, unless otherwise noted

Parameter	Symbol	Conditions	MIN	TYP	MAX	Unit
Output Clock Frequency 1	fo1	Pin: 12M		12		MHz
Output Clock Frequency 2	fo2	Pin: REF SEL=L		36		MHz
		Pin: REF SEL=H		18		MHz
Output Clock Duty Cycle 1(2) (3)		Pin: 12M Cp=30pF	45	50	55	%
Output Clock Duty Cycle 2(2) (3)		Pin: REF SEL=L, Cp=30pF Input clock duty = 50%	40	50	60	%
		Pin: REF SEL=H, Cp=30pF	45	50	55	%
Output Clock Rise Time(2) (3)	t_{rise}	Pin: 12M, REF 0.2VDD to 0.8VDD, Cp=30pF			4.0	ns
Output Clock Fall Time(2) (3)	t_{fall}	Pin: 12M, REF 0.2VDD to 0.8VDD, Cp=30pF			4.0	ns
Period Jitter (2) (3)	Jit	Pin: 12M, REF 1000 cycle, Cp=30pF			120	ps
Cycle to Cycle Jitter (2) (3)	Jit	Pin: 12M, REF 1000 cycle, Cp=30pF			200	ps
Output Lock Time(1)	t_{lock}	Power-up			3	ms

(1) The time that output reaches the target frequency within accuracy of ±0.1% from the point that the power supply reaches VDD
(2) With the load capacitance specified by the recommended operation conditions
(3) Design value

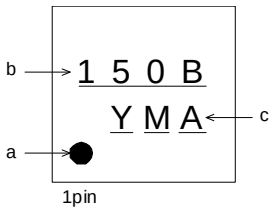
Package Information

- **Mechanical data (Units:mm)**



- **Marking**

a: #1 Pin Index
b: Part number
c: Date code (3 digits)



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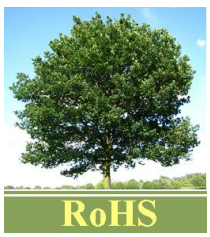
- **RoHS Compliance**



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(*) RoHS compliant products from AKEMD are identified with "Pb free" letter indication on product label posted on the anti-shield bag and boxes.

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