



# 1.8V Single Clock Generator

## AK8170B

### Features

- **Output Frequency Range:**  
38.0MHz / 45.0MHz (Selectable)
- **Input Frequency:**  
27MHz
- **Low Jitter Performance:**  
15 ps (Typ.) Period,  $1\sigma$
- **Low Current Consumption:**  
2.4 mA (Typ.)
- **Output Load:**  
15pF (max.)
- **Supply Voltage:**  
1.7 – 1.9V
- **Operating Temperature Range:**  
-20°C to +85°C
- **Package:**  
6-pin USON (lead-free)  
Body Size 1.4mm x 1.4mm

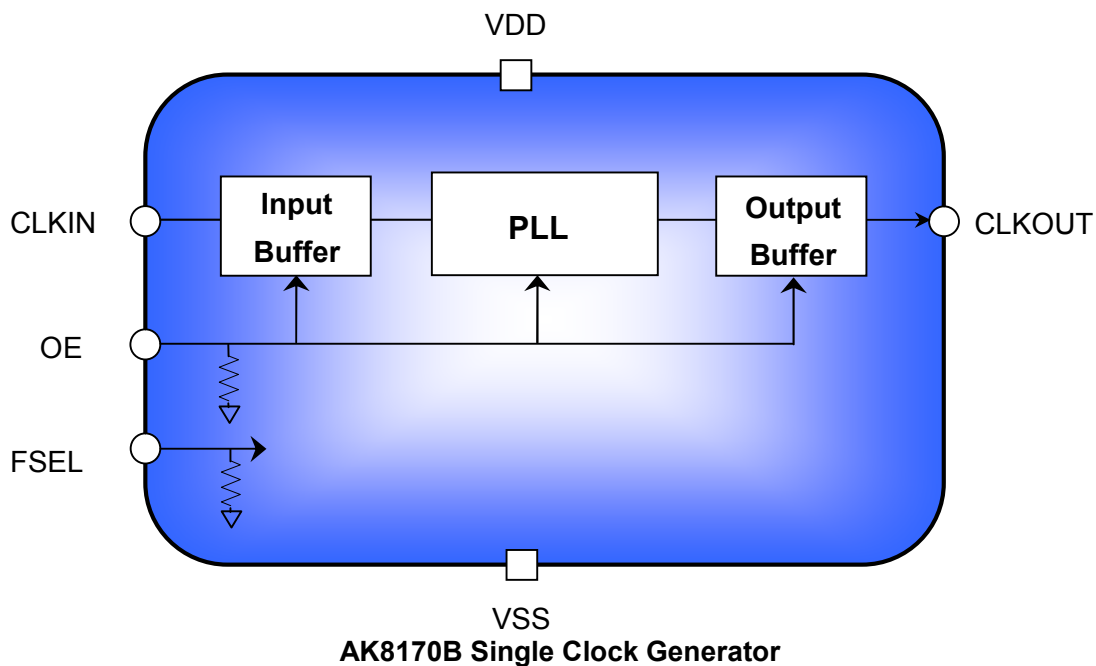
### Description

The AK8170B is a single clock generator IC with an integrated PLL. It can generate either a 38.0MHz or 45.0MHz clock from a 27MHz master clock input frequency. Through pin control, the output can be enabled or disabled, and the frequency can be changed. The high performance PLL locks to the master clock input, generating a low jitter, highly accurate clock output without an external crystal.

### Applications

- Digital Still Camera

### Block Diagram



**Pin Descriptions**



Pin No.	Pin Name	Pin Type	Description
1	VDD	--	Power Supply
2	VSS	--	Ground
3	CLKOUT	OUT	Clock output Output clock frequency is selectable to 38.0MHz or 45.0MHz by setting the FSEL pin. In power down mode (OE = "L"), this pin is "L".
4	OE	IN	CLKOUT output enable control "L": CLKOUT="L" and power down. "H": active (1)
5	FSEL	IN	Clock frequency select "L": 38.0MHz, "H": 45.0MHz (1)
6	CLKIN	IN	Clock input (27MHz) Place the AK8170B in power down (OE = "L") mode when an input clock is not supplied. Unstable input to the CLKIN causes the unstable CLKOUT signal. DC input to the CLKIN also causes the unstable CLKOUT signal.

(1) The pin must be connected to either H or L. Pull-up/pull-down resistor is not built into.

**Ordering Information**

Part Number	Marking	Shipping Packaging	Package	Temperature Range
AK8170BU	70B(AK8170B)	Tape and Reel	6-pin USON (1.4mm x 1.4mm)	-20 to 85 °C

## Absolute Maximum Rating

Over operating free-air temperature range unless otherwise noted <sup>(1)</sup>

Items	Symbol	Ratings	Unit
Supply Voltage	VDD	-0.3 to 4.6	V
Input Voltage	V <sub>in</sub>	VSS-0.3 to VDD+0.3	V
Input Current (any pins except supplies)	I <sub>IN</sub>	±10	mA
Storage Temperature	T <sub>stg</sub>	-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. AKM recommends that this device is handled with appropriate precautions.

## Recommended Operation Conditions

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Operating Temperature	T <sub>a</sub>		-20		85	°C
Supply Voltage	VDD		1.7	1.8	1.9	V
Input Clock Frequency	F <sub>in</sub>			27		
Input Clock Duty Cycle		At VDD/2.	40	50	60	
Output Load Capacitance	C <sub>p1</sub>	Pin: CLKOUT			15	pF

## DC Characteristics

All specifications at VDD: over 1.7 to 1.9V, Ta: -20 to +85°C, Input Frequency: 27MHz, unless otherwise noted

Parameter	Symbol	Conditions	MIN	TYP	MAX	Unit
High Level Input Voltage	V <sub>IH</sub>	Pin: CLKIN, FSEL, OE	0.7VDD			V
Low Level Input Voltage	V <sub>IL</sub>	Pin: CLKIN, FSEL, OE			0.3VDD	V
Input Current 1	I <sub>L1</sub>	Pin: CLKIN	-10		+10	μA
High Level Output Voltage	V <sub>OH</sub>	Pin: CLKOUT I <sub>OH</sub> =-3mA (VDD=1.8V, Ta=25 °C)	0.8VDD			V
Low Level Output Voltage	V <sub>OL</sub>	Pin: CLKOUT I <sub>OL</sub> =+3mA (VDD=1.8V, Ta=25 °C)			0.2VDD	V
Current Consumption1	I <sub>DD1</sub>	FSEL=L, No load (VDD=1.8V, Ta=25 °C)		2.4		mA
Current Consumption2	I <sub>DD2</sub>	FSEL=H, No load (VDD=1.8V, Ta=25 °C)		2.7		
Power down current	I <sub>pd</sub>	OE="L", FSEL="L" (VDD=1.8V, Ta=25 °C)		0	10	μA

## AC Characteristics

All specifications at VDD: over 1.7 to 1.9V, Ta: -20 to +85 °C, Input Frequency: 27MHz, unless otherwise noted

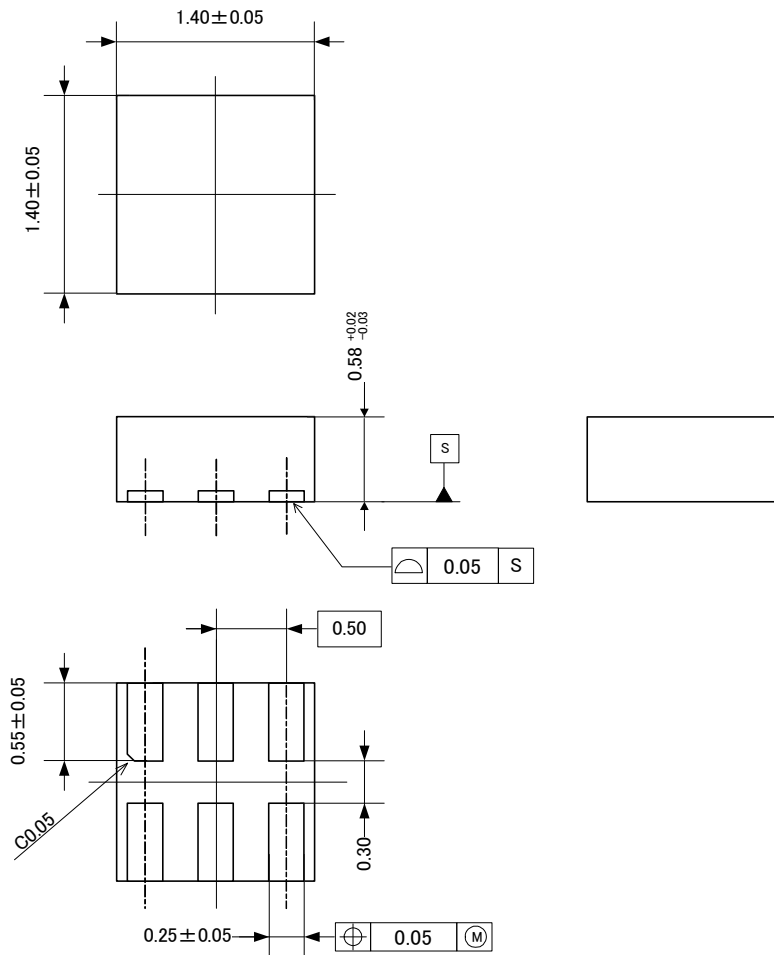
Parameter	Symbol	Conditions	MIN	TYP	MAX	Unit
Output Clock Duty Cycle <sup>(2) (3)</sup>		At VDD/2.	45	50	55	%
Output Clock Rise Time <sup>(2) (3)</sup>	t <sub>rise</sub>	0.2VDD to 0.8VDD			4.0	ns
Output Clock Fall Time <sup>(2) (3)</sup>	t <sub>fall</sub>	0.2VDD to 0.8VDD			4.0	ns
Output Clock Jitter <sup>(2) (3)</sup>	Jit	Period, 1σ		15		ps
Output Lock Time <sup>(1)</sup>	t <sub>lock</sub>	Power-up		1		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

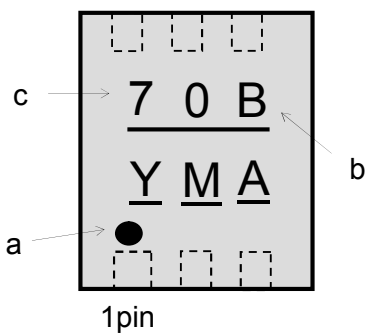
**Package Information**

<6pin-USON>

• **Mechanical data (Units:mm)**



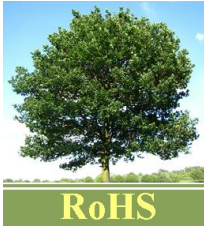
• **Marking**



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

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

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