

Clock generator for HDD

BU2191F

The BU2191F is a clock generator IC for hard disk drives, and uses a single crystal resonator to generate the three clock signals needed for hard disk drives.

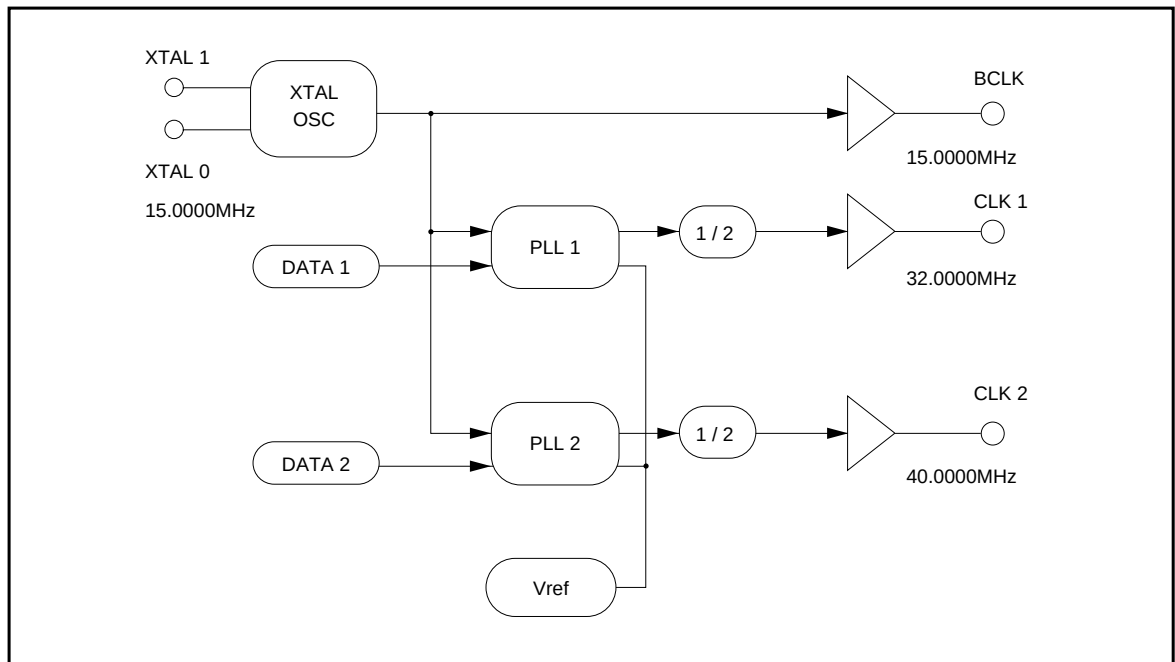
●Applications

Hard disk drives

●Features

- 1) Clock signals of three different frequencies can be generated with a single attached crystal resonator.
- 2) Internal loop filter, eliminating the need for an attached loop.
- 3) Single 5.0V power supply.
- 4) SOP 8-pin package.

●Block diagram



●Pin descriptions

Pin No.	Pin name	Function	Circuit
1	CLK2	Clock output 2 (f2 = 40MHz)	A
2	GND	Ground	—
3	XTALI	Reference oscillation input	B
4	XTALO	Reference oscillation output	B
5	BCLK	Reference oscillation buffer output (fBCLK = 15MHz)	A
6	CLK1	Clock output 1 (f1 = 32MHz)	A
7	V _{DD}	V _{DD}	—
8	AV _{DD}	Analog power supply	—

●Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Applied voltage	V _{DD}	− 0.5 ~ + 7.0	V
Input voltage	V _{IN}	− 0.5 ~ V _{DD} + 0.5	V
Storage temperature	T _{stg}	− 30 ~ + 125	°C
Power dissipation	P _D	450	mW

* Does not represent guaranteed performance

* Reduced by 4.5mW for each increase in Ta of 1°C over 25°C.

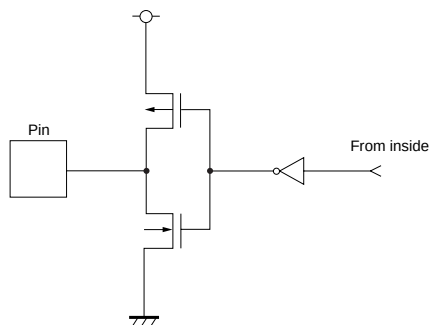
○ Not designed for radiation resistance.

●Recommended operating conditions (Ta = 25°C)

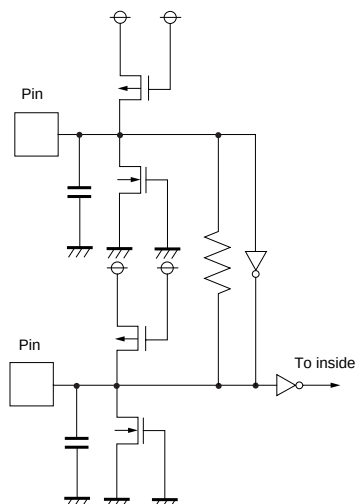
Parameter	Symbol	Limits	Unit
Power supply voltage	V _{DD}	4.5 ~ 5.5	V
Input high level voltage	V _{IH}	0.8V _{DD} ~ V _{DD}	V
Input low level voltage	V _{IL}	0.0 ~ 0.2V _{DD}	V
Operating temperature	T _{opr}	− 5 ~ + 70	°C
Output load	CL	15 (Max.)	pF

● Input / output circuits

Type A

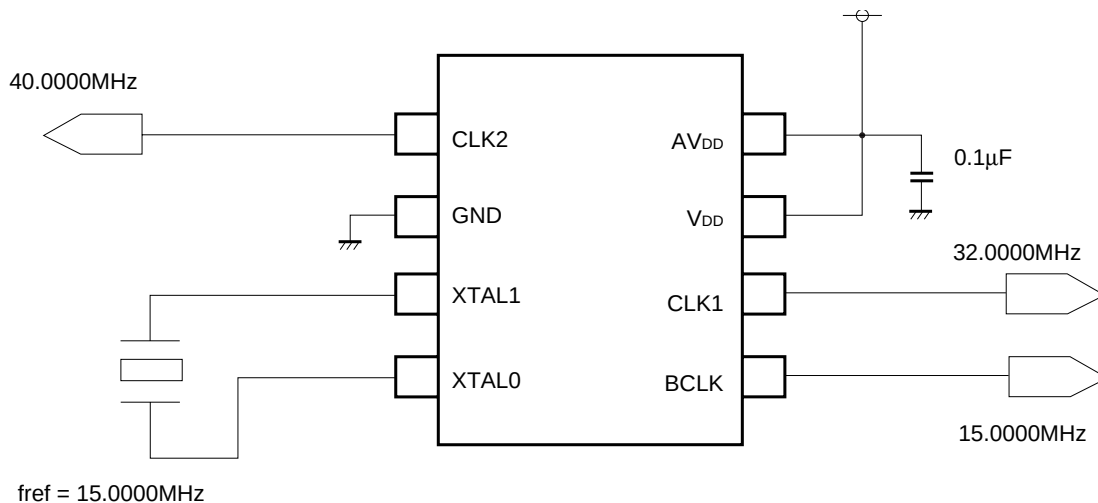


Type B

● Electrical characteristics (unless otherwise noted, $T_a = 25^\circ\text{C}$, $AV_{DD} = 5.0\text{V}$, $DV_{DD} = 5.0\text{V}$)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Output low level voltage	V_{OL}	—	—	0.4	V	$I_{OL} = 4.0\text{mA}$
Output high level voltage	V_{OH}	$V_{DD} - 0.5$	—	—	V	$I_{OL} = -4.0\text{mA}$
Operating supply current	I_{DD}	—	30	50	mA	$f_{XTAL} = 15.0000\text{MHz}$, no load
Reference frequency (1)	f_{REF}	—	15.0000	—	MHz	
Output frequency (1)	f_{BCK}	14.997	15.0000	15.003	MHz	
Output frequency (2)	f_1	31.994	32.0000	32.006	MHz	$f_{REF} \times 128 / 15 / 4$
Output frequency (3)	f_2	39.992	40.0000	40.008	MHz	$f_{REF} \times 16 / 3 / 2$
Rise time	t_R	—	—	5	nsec	$V_{DD} \times 0.2$ to $V_{DD} \times 0.8$
Fall time	t_F	—	—	5	nsec	$V_{DD} \times 0.8$ to $V_{DD} \times 0.2$
Jitter	J_{cy}	-250	—	250	psec	
Jitter 3s	J_{3s}	—	—	1	nsec	
Power up time	t_{PT}	—	—	10	msec	
Duty	Duty	45	50	55	%	Measure at 1.4V (V_{th})

●Application example



* This IC should be used mounted on a PC board. If mounted in a socket, characteristics of the IC may be adversely affected.

●Attached components

(1) Crystal resonator

A crystal resonator with an oscillation frequency of 15,000MHz is usually sufficient. However, if f_0 precision is necessary, adjust by attaching a capacitor to each end of the crystal resonator.

(2) Power supply

VDD bypass capacitor.

●External dimensions (Units: mm)

