

Clock generator

BU2185F

This IC generates the different clock used for DVD. Generates clocks for CD use, sound use, and MPEG use.

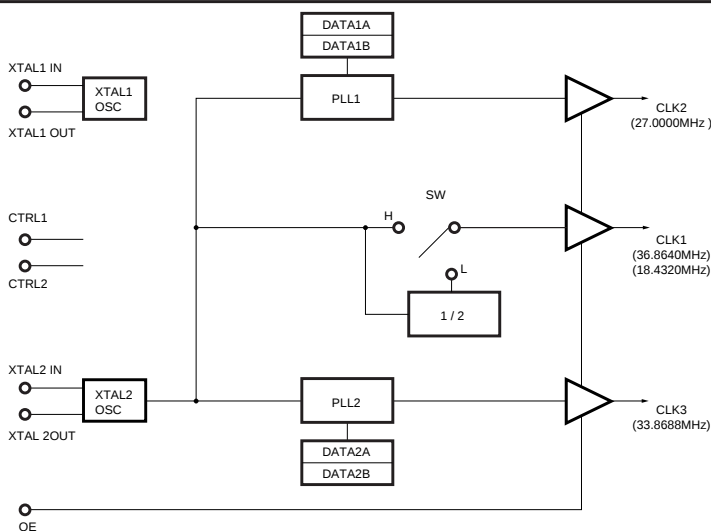
●Applications

DVD players

●Features

- 1) By connecting a crystal oscillating element, the different clock signals are generated.
- 2) Enables selection of the reference clock directly or with 1 / 2 output.
- 3) SOP 16-pin package.
- 4) Single 3.3V power supply.
- 5) With the standard clock output, an independent 5V power supply can be applied for a 5V output.

●Block diagram



CTRL1	CTRL2	SW	PLL1	PLL2
H	L	H	DATA1A	DATA2A
L	L	L	DATA1A	DATA2A
H	H	H	DATA1B	DATA2B
L	H	L	DATA1B	DATA2B

$$\begin{aligned}
 \text{DATA1A} &= \text{XTAL2} * 375 / 128 / 4 \\
 \text{DATA1B} &= \text{XTAL2} * 375 / 64 / 4 \\
 \text{DATA2A} &= \text{XTAL2} * 147 / 40 / 4 \\
 \text{DATA2B} &= \text{XTAL2} * 147 / 20 / 4
 \end{aligned}$$

● 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
Power dissipation	P _d	450*	mW
Storage temperature	T _{stg}	− 30 ~ + 125	°C

○ Does not represent guaranteed performance.

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

○ Not designed for radiation resistance.

● Recommended operating conditions (Ta = 25°C)

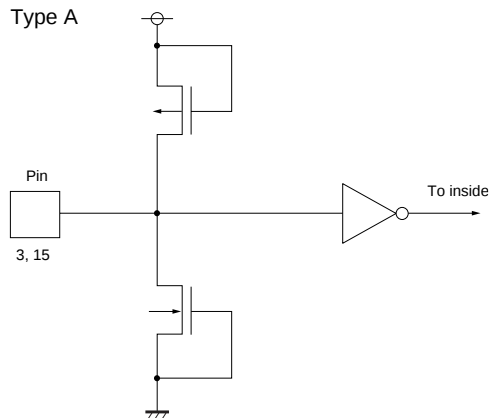
Parameter	Symbol	Limits	Unit
Power supply voltage	V _{DD}	3.0 ~ 3.6	V
Input high level voltage	V _{IH}	0.8 × V _{DD} ~ V _{DD}	V
Input low level voltage	V _{IL}	0.0 ~ 0.2 × V _{DD}	V
Operating temperature	T _{opr}	− 5 ~ + 70	°C
Output load	C _L	15 (Max.)	pF

● Pin descriptions

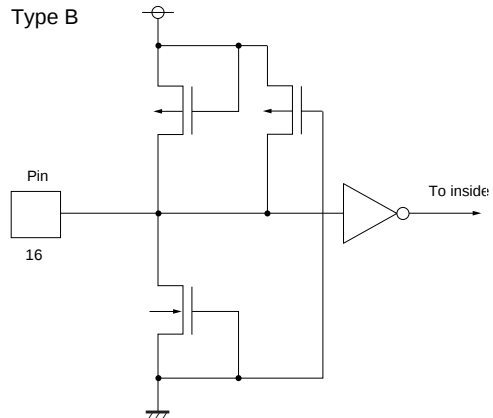
Pin No.	Pin name	Pin descriptions	Circuit
1	XTAL1-IN	Reference oscillation input 1 (not used)	D
2	XTAL1-OUT	Reference oscillation output 1	D
3	CTRL2	XTAL setting (Low: XTAL = 36.8MHz mode; High: XTAL = 18.4MHz mode)	A
4	AGND	Analog GND	—
5	DGND	Digital GND	—
6	DV _{DD}	Independent power supply for XTAL2-IN and XTAL2-OUT pins	—
7	XTAL2-IN	Reference oscillation input 2 (36.864MHz or 18.432MHz)	D
8	XTAL2-OUT	Reference oscillation output 2	D
9	CLK1	Reference clock output (36.864MHz or 18.432MHz)	C
10	DV _{DD}	Independent power supply for CLK1 output buffer	—
11	CLK2	Clock output 2 (27.000MHz)	C
12	DV _{DD}	Digital V _{DD}	—
13	AV _{DD}	Analog V _{DD}	—
14	CLK3	Clock output 3 (33.8688MHz)	C
15	CTRL1	CLK1 output selector (High: 36.864MHz; Low: 18.432MHz)	A
16	OE	Output enable (High: enable; Low: disable)	B

● Input / output circuits

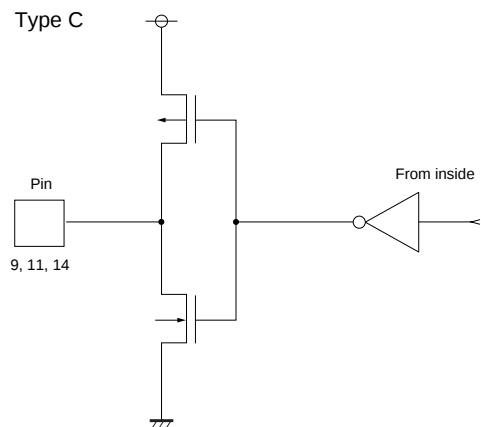
Type A



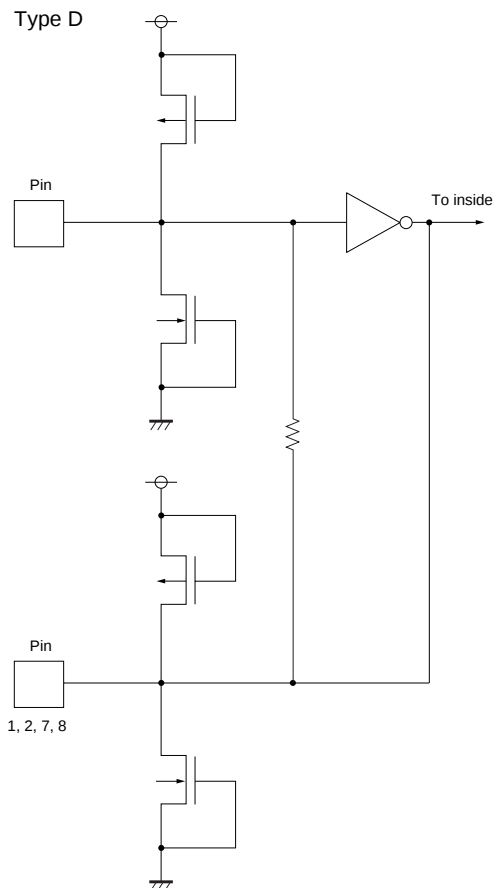
Type B



Type C



Type D



- Electrical characteristics (unless otherwise noted, Ta = 25°C, V_{DD} (AV_{DD}) = 3.3V, CL ≤ 15pF, XTAL1 = shorted to GND, XTAL2 = 36.864MHz, 18.43MHz)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input low level voltage	V _{IL}	—	—	0.3 × V _{DD}	V	CTRL1, CTRL2, OE
Input high level voltage	V _{IH}	0.7 × V _{DD}	—	—	V	CTRL1, CTRL2, OE
Output low level voltage	V _{OL}	—	—	0.4	V	I _{OL} = 4.0mA CLK1, CLK2, CLK3
Output high level voltage	V _{OH}	2.4	—	—	V	I _{OH} = − 4.0mA CLK1, CLK2, CLK3
Output low level voltage	V _{OL}	—	—	0.4	V	I _{OL} = 0.5mA XTAL1OUT, XTAL2OUT
Output high level voltage	V _{OH}	DV _{DD} -0.5	—	—	V	I _{OH} = − 0.5mA XTAL1OUT, XTAL2OUT
Operating circuit current	I _{DD}	—	40	60	mA	No load

〈When XTAL2 = 36.864MHz〉 (XTAL1 is shorted to GND)

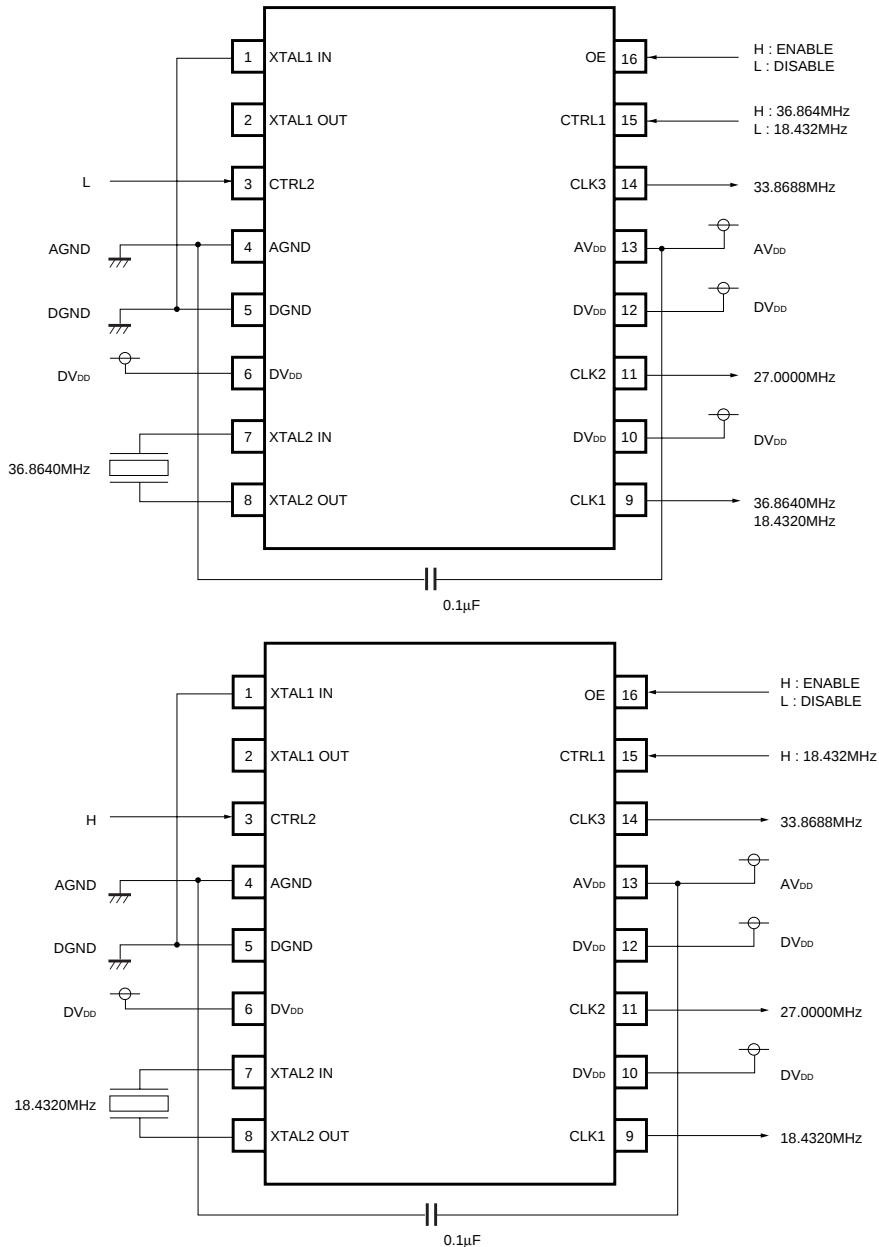
CLK1 frequency1	CLK1-1	—	36.8640	—	MHz	XTAL2 output CTRL1 = H, CTRL2 = L
CLK1 frequency2	CLK1-2	—	18.4320	—	MHz	XTAL2 1 / 2 output CTRL1 = L, CTRL2 = L
CLK2 frequency	CLK2	—	27.0000	—	MHz	XTAL2 × 375 / 128 / 4 — CTRL2 = L
CLK3 frequency	CLK3	—	33.8688	—	MHz	XTAL2 × 147 / 40 / 4 — CTRL2 = L

〈When XTAL2 = 18.432MHz〉 (XTAL1 is shorted to GND)

CLK1 frequency1	CLK1	—	18.4320	—	MHz	XTAL2 output CTRL1 = H, CTRL2 = H
CLK2 frequency	CLK2	—	27.0000	—	MHz	XTAL2 × 375 / 64 / 4 — CTRL2 = H
CLK3 frequency	CLK3	—	33.8688	—	MHz	XTAL2 × 147 / 20 / 4 — CTRL2 = H

DUTY	DUTY	45	50	55	%	1 / 2V _{DD}
JITTER	J1s	—	100	—	psec	Reference value (1sigma)
JITTER	Jabs	—	600	—	psec	Reference value (min.-to-max. width for jitter)
27MHz S / N	CLK2SN	—	65	—	dB	27MHz ± 20kHz RBW = 1kHz, SPAN = 200kHz

●Application example



●Attached components

Since high frequencies are handles, use this IC mounted on a PC board. If used mounted by a socket, the proper characteristics may not be able to be obtained. Be sure to connect a 0.1μF capacitor between the analog power supply and analog GND.

● External dimensions (Units: mm)

