Clock generator IC

BU2286FV

BU2286FV is an IC that generates multiple clocks from the built-in 2ch PLL of the external crystal oscillator used for DVD system. This IC creates six kinds of signals for video, audio, and low jitter system.

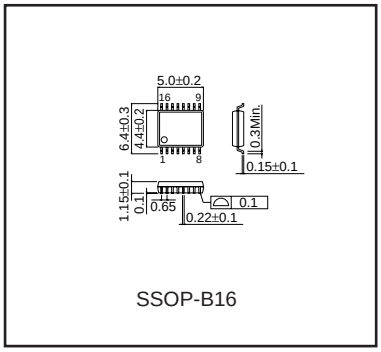
●Applications

DVD sets

●Features

1) Can generate clock signals needed for DVD by a single chip
2) All output low jitter (No load 30psec)
3) Built-in PLL loop filter, No external components needed
4) 3.3V signal power supply
5) Small SSOP-B16 package

●External dimensions (Unit : mm)



SSOP-B16

●Absolute maximum ratings (Ta=25°C)

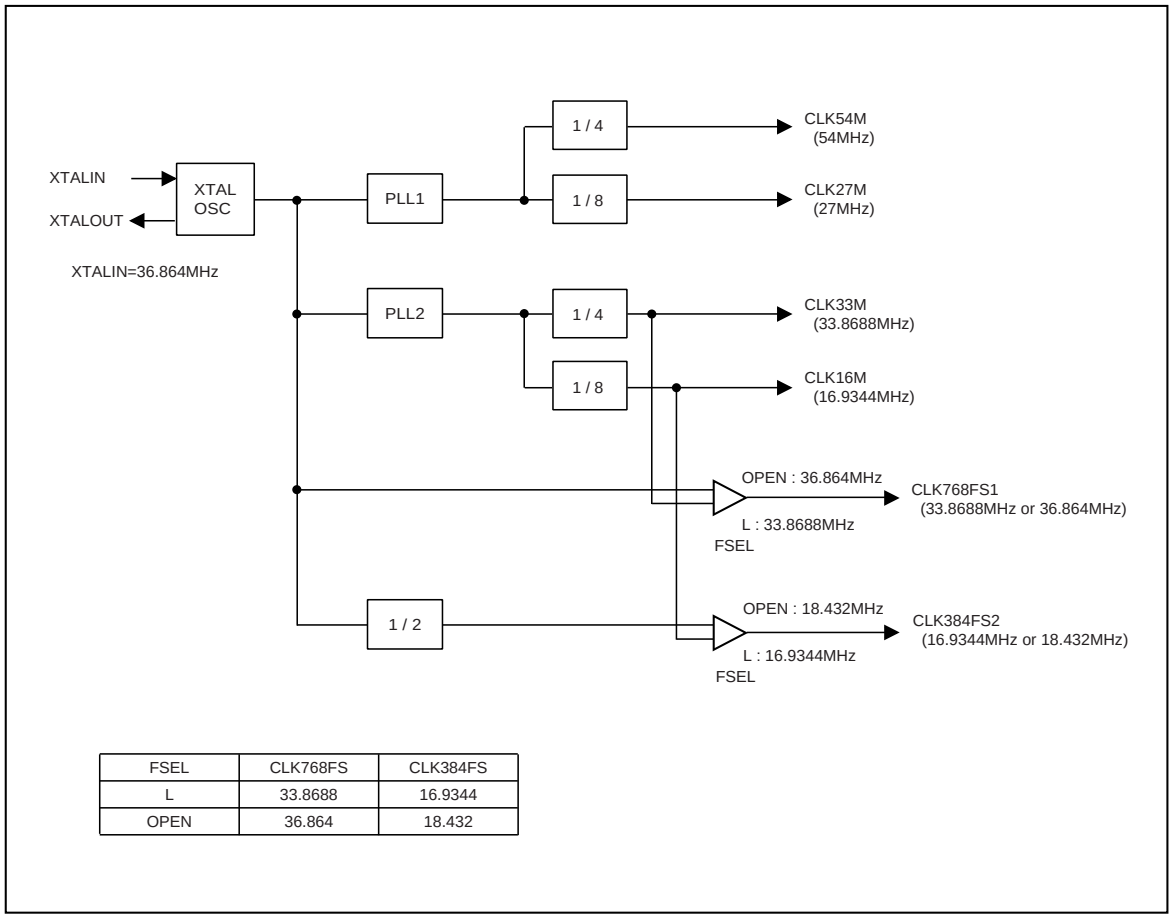
Parameter	Symbol	Limits	Unit
Applied voltage	V_{DD}	–0.5 to +7.0	V
Input voltage	V_{IN}	–0.5 to V_{DD}+0.5	V
Storage temperature range	Tstg	–30 to +125	°C
Power dissipation	Pd	450	mW

∗An operation is not guaranteed.
∗ In case it is used at Ta=25°C or more, 4.5mW is reduced at every 1°C.
∗Radiation resistance design is not used.
∗Power dissipation is measured when BU2286FV is placed on the board.

●Recommended operating conditions (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	V_{DD}	3.0	–	3.6	V
Input "H" voltage range	V_{IH}	0.8V_{DD}	–	V_{DD}	V
Input "L" voltage range	V_{IL}	0	–	0.2V_{DD}	V
Operating temperature range	Topr	–10	–	70	°C
Output maximum load	C_L	–	–	15	pF

●**Block diagram**

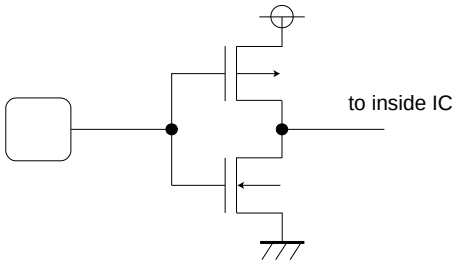
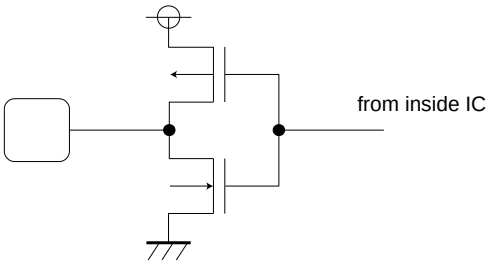
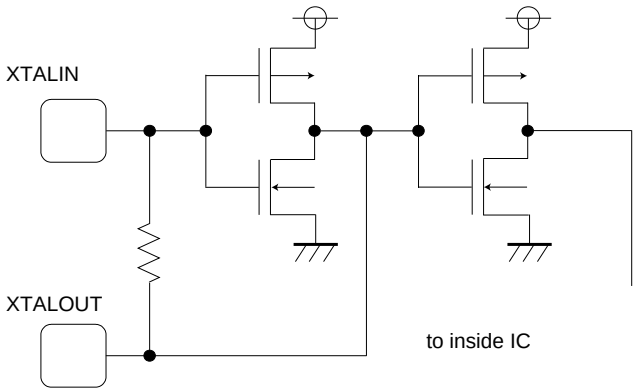


FSEL	CLK768FS	CLK384FS
L	33.8688	16.9344
OPEN	36.864	18.432

●Pin descriptions

Pin No.	Pin name	Functions
1	$V_{DD}2$	Digtal V_{DD} for 27.54MHz clock output
2	$V_{SS}2$	Digtal GND for 27.54MHz clock output
3	CLK54M	54MHz clock output
4	CLK27M	27MHz clock output
5	AV_{DD}	Analog V_{DD}
6	AV_{SS}	Analog GND
7	$XTAL_{IN}$	Standard crystal input
8	$XTAL_{OUT}$	Standard crystal input
9	384FS2	FSEL=OPEN : 18.432MHz, FSEL=LOW : 16.9344MHz
10	768FS1	FSEL=OPEN : 36.864MHz, FSEL=LOW : 33.8688MHz
11	DV_{SS}	Digtal GND
12	DV_{DD}	Digtal V_{DD}
13	CLK16M	16.9344MHz clock output
14	FSEL	Output select : with pull-up OPEN : 18.432MHz (Pin9), 36.864MHz (Pin10) L : 16.9344MHz (Pin9), 33.8688MHz (Pin10)
15	CLK33M	33.8688MHz clock output
16	OE	Output Enable (OPEN : enable, LOW : disable) : with pull-up

●**Input output circuits**

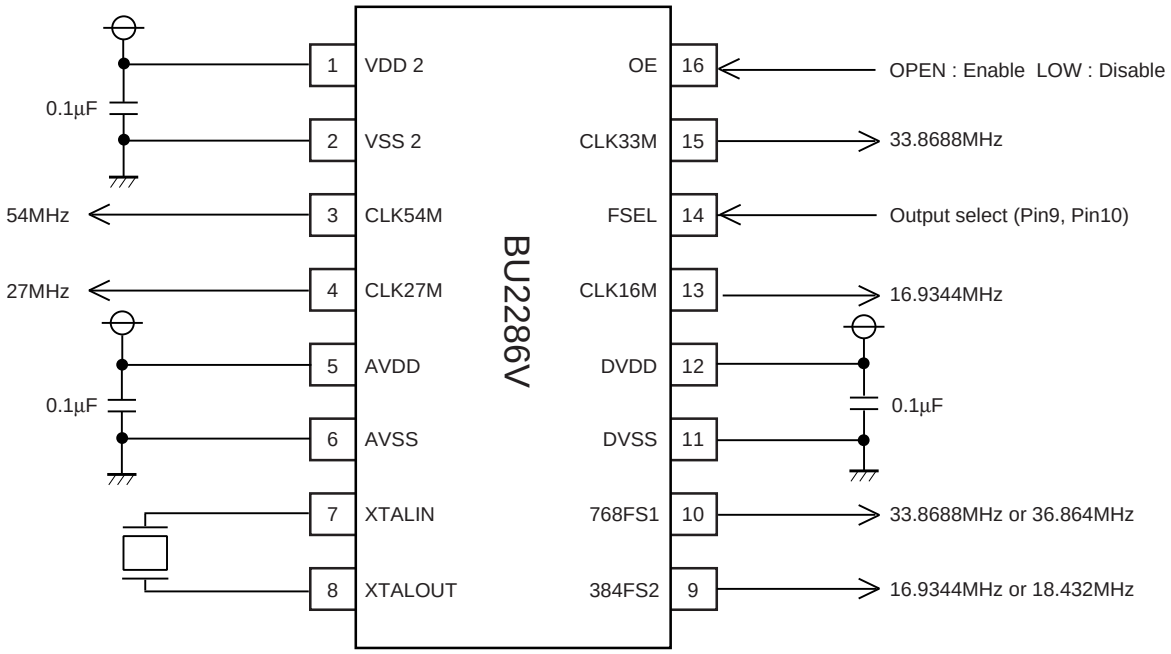
Pin No.	Equivalent circuit
Input Pin 14, 16 pull_up resistance about 250kΩ	
Output Pin 3, 4, 9, 10, 13, 15	
Crystal Pin 7, 8	

●**Electrical characteristics** (Unless specified otherwise Ta=25°C, VDD=3.3V, crystal frequency=36.864MHz)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Output "L" voltage	VOL	–	–	0.4	V	IOL=4.0mA
Output "H" voltage	VOH	2.4	–	–	V	IOH=–4.0mA
Power supply current	IDD	–	30	50	mA	no load
CLK54M	CLK54M	–	54	–	MHz	XTAL × 375 / 64 / 4
CLK27M	CLK27M	–	27	–	MHz	XTAL × 375 / 64 / 8
CLK33M	CLK33M	–	33.8688	–	MHz	XTAL × 147 / 40 / 4
CLK16M	CLK16M	–	16.9344	–	MHz	XTAL × 147 / 40 / 8
CLK768FS1	CLK768_H	–	36.864	–	MHz	FSEL=OPEN, XTAL output
	CLK768_L	–	33.8688	–	MHz	FSEL=L, XTAL × 147 / 40 / 4
CLK384FS2	CLK384_H	–	18.432	–	MHz	FSEL=OPEN, XTAL / 2 output
	CLK384_L	–	16.9344	–	MHz	FSEL=L, XTAL × 147 / 40 / 8
Duty	Duty	45	50	55	%	1/2VDD test
Jitter1	Jstd1	–	50	–	psec	Jitter 1sigma
Jitter2	Jstd2	–	300	–	psec	MIN-MAX level
Rise time	tr	–	2.5	–	nsec	Time between 0.2VDD to 0.8VDD
Fall time	tf	–	2.5	–	nsec	Time between 0.8VDD to 0.2VDD
Output LOCK time	tLOCK	–	–	1	msec	∗1
S/N 27M	S/N 27M	56	66	–	dB	∗2
S/N 33M	S/N 33M	50	60	–	dB	∗2

Jitter is meen value when using Time Interval Analyzer with 10000 sampling.
∗1) Time between voltage supply lead to 3.0V and output clock get stable. Start up time of power supply sources satisfy this rated value at every time, case.
∗2) Measure condition is (SPAN : 100kHz, RBW : 1kHz, VBW : 100Hz), and measure points are center of noise width at (27MHz±20kHz), (33.8688MHz±20kHz).

●**Application example**



●**Operating notes**

The BU2286FV is basically placed on the board.

Decoupling capacitance (0.1μF) need to be placed between Pin5 (AV_{DD}) and Pin6 (AV_{SS}).

Also Decoupling capacitance (0.1μF) need to be placed between Pin1 ($V_{DD}2$) and Pin2 ($V_{SS}2$), Pin11 (DV_{SS}) and Pin12 (DV_{DD}).

To obtain accurate frequency , capacitance(pF) need to be placed between Pin7 (XTALIN) and Pin6 (AV_{SS}), Pin8 ($XTALOUT$) and Pin6 (AV_{SS}).

Tantalum capacitance (10 ~100μF) ,ferrite beads may need to be placed to prevent power supply drop in certain boards case.

To reduce high frequency noise ,selected bypass capacitors (≤1Ω at problem high frequency) maybe used for power pin as close to BU2286FV as possible.