

DIGITAL AUDIO

2-Channel 8-times Oversampling Digital Filter

YM3434 AFUDF

■ OUTLINE

The digital filter's own system clock rate must be considerably faster than the input bit clock rate and at the same time synchronism is required in the system as a whole. Thus what is normally required is a high-speed clock which is synchronous with the signal handling pre-processor. Then the major application problem is how to interface these different clock rates.

YM3434 is a high quality 2-channel 8-times oversampling digital filter which has been developed to solve such problems. It can be used easily as an interface in a wide range of digital audio systems. Its filtering capabilities are equivalent to the YM3414.

Since the system clock of this LSI can be different from the serial input signal and it operates normally at any clock rate above 400 clocks for each input sampling frequency (f_s), it is not necessary to change the clock rate even if the sampling frequency is changed.

For example, by connecting a 20MHz crystal oscillator, there is no need to change the clock rate even when the sampling frequency is changed to 32KHz, 44.1KHz or 48KHz.

■ FEATURES

- Operation at an independent system clock from the serial input signal
- Input signals can be handled at any of the following input bit clock rates without adding any circuit: 32fs, 48fs, 64fs, 80fs, 96fs, 112fs, 128fs, 144fs, 160fs, 176fs, and 192fs,
- Capable to cope with sampling frequencies 32KHz, 44.1KHz and 48KHz.
- Linear phase FIR type filters connected in three vertical stages
 - 1st filter : 225-order FIR filter
 - 2nd filter : 41-order FIR filter
 - 3rd filter : 21-order FIR filter
- Built-in 19×18 bit multiplier, floating point calculation with a coefficient of 18 bits
- Built-in overflow limiter
- Filter characteristics (at 8-times)
 - Pass band ripple : Within $\pm 0.0001\text{dB}$ at 0 to $0.4535 \times f_s$
 - Stop band attenuation : At least 100dB at $0.5465 \times f_s$ to $7.4535 \times f_s$
- Output data switchable between 16 bit and 18 bit (directly connectable to PCM56 and PCM58).
- Switchable between 1 DAC (4-times) and 2 DAC (8-times).
- CMOS process, Single 5V power supply, 16-pin DIP package.

■ ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

Item	Symbol	Minimum	Maximum	Unit
Power supply voltage	VDD	-0.3	+7.0	V
Input voltage	VI	-0.3	VDD+0.5	V
Working temperature	Top	-20	+75	°C
Storage temperature	Tstg	-50	+125	°C

Recommended Operating Conditions

Item	Symbol	Minimum	Typical	Maximum	Unit
Power supply voltage	VDD	4.75	5.00	5.25	V
Clock frequency	XIN	12.2	(400 Fa)	20.0	MHz
Working temperature	Top	0	25	+70	°C

Electrical Characteristics

Item	Symbol	Conditions	Minimum	Typical	Maximum	Unit
Power consumption	W	V _{VI} = +5V			300	mW
Input voltage H level (X1, 18/18, ST) (BC1, SDSY, SDI)	V _{IH}		3.5 2.7		V _{DD} V _{DD}	V V
Input voltage L level	V _{IL}		0		0.8	V
Output voltage H level	V _{OH}		2.4		V _{DD}	V
Output voltage L level	V _{OL}		0		0.4	V
DLO, DRO setup time			15			ns
DLO, DRO hold time			15			ns
Input data setup time (Rise of BCI)			50			ns
Input data hold time (Rise of BCI)			20			ns
X1 ON/OFF time (Duty)				50		%
BC1 ON/OFF time (Duty)				50		%