

MN3870S

NTSC-Compatible CCD Comb Filter with Built-in 1 H Video Signal Delay Element

■ Overview

The MN3870S is a $4 f_{SC}$ CMOS CCD comb filter with a built-in $4 f_{SC}$ CMOS CCD signal delay element for video signal processing applications.

It contains such components as a fourfold-frequency circuit, a shift register clock driver, a CCD analog shift register switchable between 911, 1 and 908 / 906 stages, and a resampling output amplifier.

It samples the input using the supplied clock signal with a frequency of four times the color signal subcarrier frequency (3.58 MHz) and subtracts between the 911- and 1-stage CCD output signals to produce the color signal comb characteristics for the NTSC system.

It also uses this fourfold frequency to drive a 908- or 906-stage CCD and samples the input to produce, after adding in the attached filter delay, a delay of 1 H (the horizontal scan period) when the SW pin is left open.

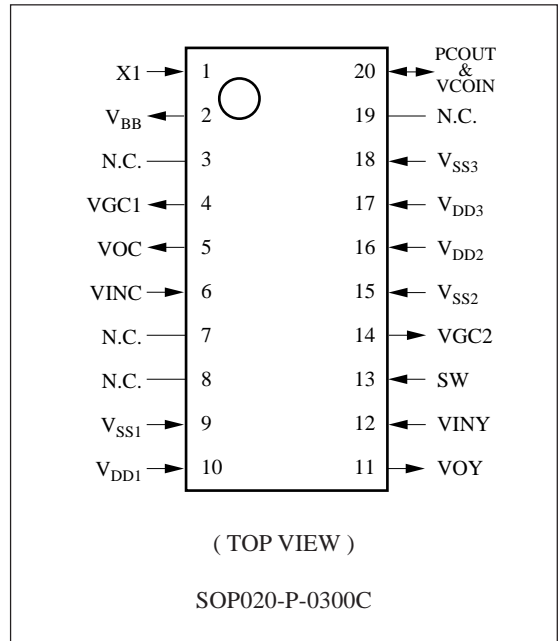
■ Features

- Single 5.0 V power supply
- Low power consumption based on CMOS process
- Low EMI levels from clock during driving
- True comb filter produced by the subtraction of the through signal and the 1 H delay signal

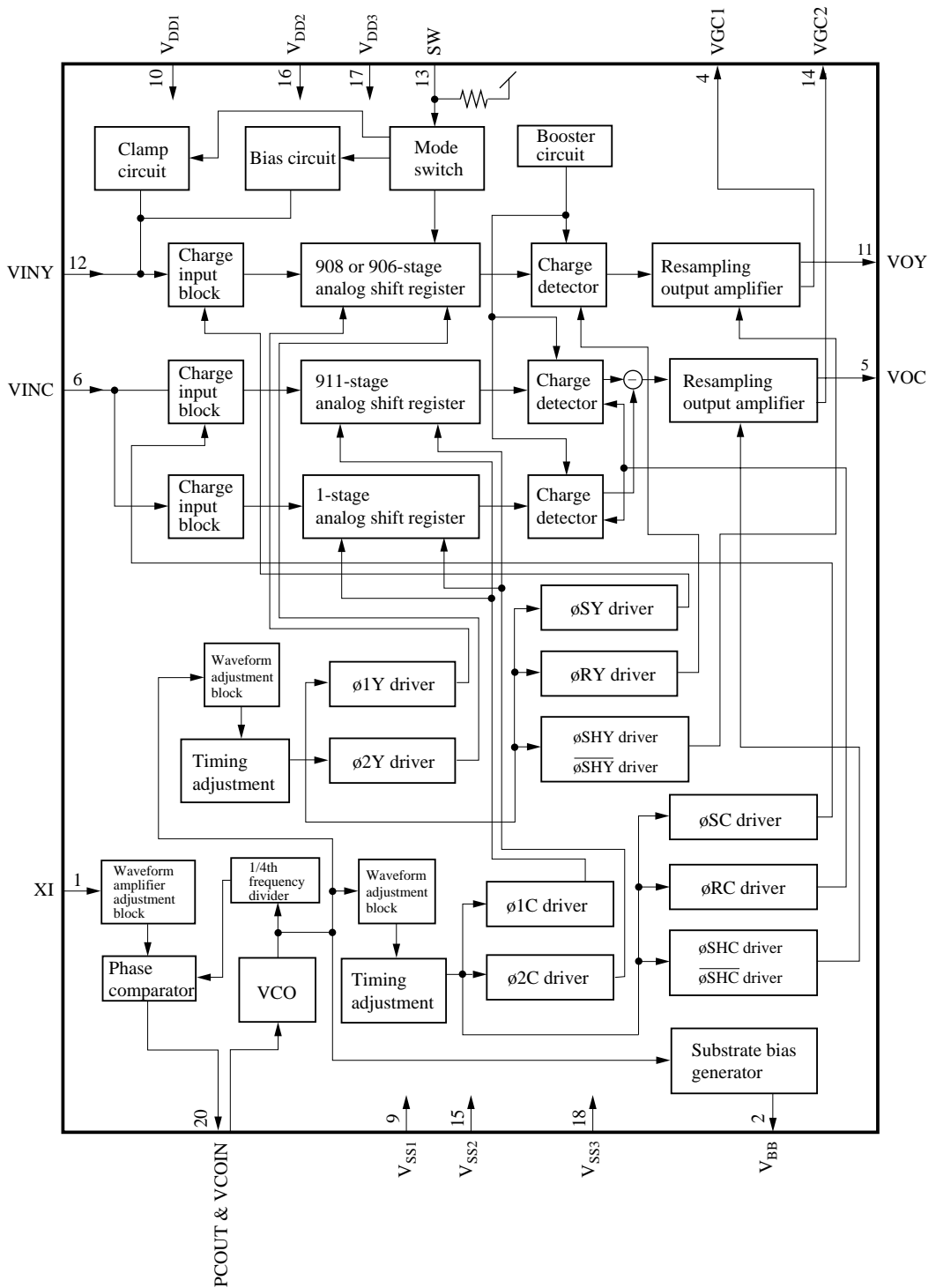
■ Applications

- VCRs, Video cameras

■ Pin Assignment



■ Block Diagram



■ Pin Descriptions

Pin No.	Symbol	Pin Name	Remarks
1	XI	3.58 MHz clock input	
2	V _{BB}	Substrate connection	
4	VGC1	Output gate connection (1)	
5	VOC	C signal output	
6	VINC	C signal input	
9	V _{SS1}	GND (1)	Ground for analog circuits
10	V _{DD1}	Power supply (1)	For analog circuits
11	VOY	Y signal output	
12	VINY	Y signal input	
13	SW	Switch controlling number of stages for Y signal delay	
14	VGC2	Output gate connection (2)	
15	V _{SS2}	GND (2)	Ground for digital signals
16	V _{DD2}	Power supply (2)	For digital signals
17	V _{DD3}	Power supply (3)	For phase-locked loop
18	V _{SS3}	GND (3)	Ground for phase-locked loop
20	PCOUT &VCOIN	Phase comparator output and voltage controlled oscillator input	

Note: Leave pin 13 open.

■ Operating Conditions

Parameter	Symbol	min	typ	max	Unit
Power supply voltage	V_{DD}	4.75	5.00	5.25	V
Input clock frequency	f_{ck}		3.579545		MHz
Input clock amplitude (sine wave)	V_{ck}	0.25	0.3	1.0	V_{P-P}
Ambient temperature	T_a	-20		60	°C

■ Electrical Characteristics

$V_{DD}=5.0V$, $V_{ck}=0.3V_{P-P}$ (sine wave), $V_{in}=0.5V_{P-P}$ (sine wave), $f_{ck}=3.579545MHz$, $f=196.7kHz$, $T_a=25^\circ C$

Parameter	Symbol	Conditions	min	typ	max	Unit
Power supply voltage	I_{DD}	Average current		55	80	mA
Insertion gain for VOC pin	IG	$f_{sig}=3.579545MHz$	-9	-5.5	-2	dB
Total harmonic distortion for VOC pin	THD	$f_{sig}=3.26486MHz$		0.5	2.5	%
Signal-to-noise ratio for VOC pin	S/N	3.264 86 MHz output (V_{P-P})/ noise output (rms)	48	56		dB
Output impedance for VOC pin	Z_O			300	600	Ω
Comb characteristics for VOC pin	Com1	3.571678MHz/3.579545MHz ($f_{sc}-1/2f_H$) / (f_{sc})		-35	-25	dB
		3.256993MHz/3.264860MHz ($f_{sc}-20.5f_H$) / ($f_{sc}-20f_H$)		-30	-20	dB
	Com2	3.902097MHz/3.894230MHz ($f_{sc}-20.5f_H$) / ($f_{sc}-20f_H$)		-30	-20	dB
Clock leak for VOC pin	NC1	3.58-MHz component/main signal in output signal		-50	-40	dB
	NC2	14.32-MHz component/main signal in output signal		-30	-20	dB
Signal bandwidth for VOY pin	BW	-3 dB for 196.7 kHz	2.5	5.5		MHz
Insertion gain for VOY pin	IG	$f_{sig}=196.7kHz$	-1.5	1.5	4.5	dB
Total harmonic distortion for VOY pin	THD	$f_{sig}=196.7MHz$		1	4.5	%
Signal-to-noise ratio for VOY pin	S/N	Signal output (P-P)/noise output (rms)	48	56		dB
Clock leak for VOY pin	NC3	3.58-MHz component/main signal in output signal		-50	-40	dB
	NC4	14.32-MHz component/main signal in output signal		-20	-10	dB
Delay for VOY pin	τ_D			63.46		μs
Output impedance for VOY pin	Z_O			250	500	Ω
Crosstalk	CT	$f_{sig}=196.7kHz$			-32	dB

■ Package Dimensions (Unit:mm)

SOP020-P-0300C

