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NMOS multichannel detector head

C8892

Integrated low-noise driver/amplifier circuit for NMOS linear image sensor

The C8892 is multichannel detector head incorporating low-noise driver/amplifier circuit developed for HAMAMATSU NMOS linear image sensors. The C8892 is designed especially for compactness, having an overall length as short as 40 mm or less.
In addition, the C8892 is designed for ease of use. It is provided with circular flange for connection to monochrometer and adjustment mechanism for optical alignment for NMOS linear image sensor. The flange is interchangeable, thus facilitating connection to various models of monochrometer. The housing case also provides a shielding effect against external noise. As useful options, peripheral devices are available for driving the C8892, and for the output signal processing.

Features

- **Low noise**
- **Wide dynamic range**
- **Operatable with simple input signals (Only a master start pulse, a master clock pulse, ±15 V are required.)**
- **Interchangeable flange**
- **Simple electrical and optical adjustments**

Applications

- **Multichannel spectrophotometry**
- **Optical spectrum analysis**
- **Time-resolved photometry**

Compatible NMOS linear image sensors

Type no.*1	Number of pixels	Pixel size (pixel pitch × height)
S3901-128Q, S8380-128Q	128	50 µm × 2.5 mm
S3901-256Q/F, S8380-256Q	256	
S3901-512Q/F, S8380-512Q	512	
S3902-128Q	128	50 µm × 0.5 mm
S3902-256Q/F	256	
S3902-512Q/F	512	
S3903-256Q	256	25 µm × 0.5 mm
S3903-512Q/F	512	
S3903-1024Q/F	1024	
S3904-256Q, S8381-256Q	256	25 µm × 2.5 mm
S3904-512Q/F, S8381-512Q	512	
S3904-1024Q/F, S8381-1024Q	1024	

*1: The suffix of type number indicates:
Q: quartz window, F: fiber optic window

Absolute maximum ratings

Parameter	Symbol	Value	Unit
Supply voltage (analog)	Va	±18	V
Operating temperature	Topr	0 to +50*2	°C
Storage temperature	Tstg	-10 to +60*2	°C

*2: No dew condensation
When there is a temperature difference between a product and the surrounding area in high humidity environment, dew condensation may occur on the product surface. Dew condensation on the product may cause deterioration in characteristics and reliability.

Note: Exceeding the absolute maximum ratings even momentarily may cause a drop in product quality. Always be sure to use the product within the absolute maximum ratings.

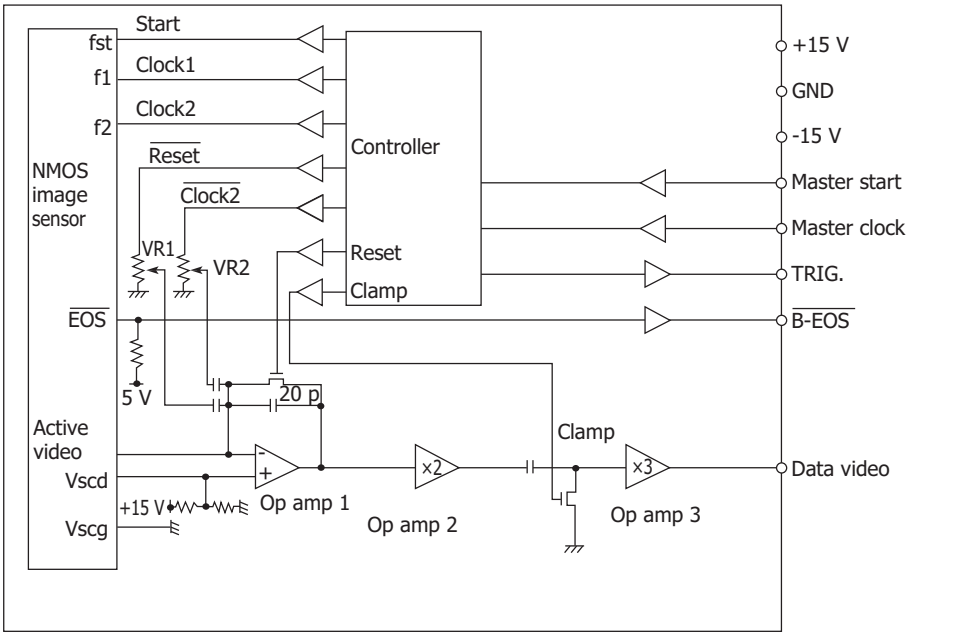
Electrical characteristics (Ta=25 °C)

Parameter			Symbol	Min.	Typ.	Max.	Unit
Input	Supply voltage	Analog	Va	±14.5	±15.0	±15.5	V
	Master start pulse (ϕms)	Voltage	Vms(H)	2.0	5.0	-	V
			Vms(L)	0	-	0.8	
		Width	tpwϕms	1/fϕmc	-	-	s
		Rise/fall Time	trϕms, tfϕms	-	-	500	ns
	Master clock pulse (ϕmc)	Voltage	Vmc(H)	2.0	5.0	-	V
			Vmc(L)	0	-	0.8	
		Frequency	fϕmc	-	-	375	kHz
		Width*3	tpwϕmc	30	-	-	ns
		Rise/fall time	trϕmc, tfϕmc	-	-	500	ns
Output*4	Start pulse (ϕst)	Voltage	Vst(H)	4.75	5.0	-	V
			Vst(L)	0	-	0.4	
		Rise/fall time	trϕst, tfϕst	-	-	100	ns
		Width	tpwϕst	-	2/fϕmc	-	s
	Clock pulse (ϕ1, ϕ2)	Voltage	V1(H), V2(H)	4.75	5.0	-	V
			V1(L), V2(L)	0	-	0.4	
		Rise/fall time	trϕ1, trϕ2	-	-	100	ns
			tfϕ1, tfϕ2				
	Clock pulse (ϕ1) width		tpwϕ1	-	3/fϕmc	-	s
	Clock pulse (ϕ2) width		tpwϕ2	-	3/fϕmc	-	s
	End of scan pulse	Voltage	Veos(H)	4.75	5.0	-	V
			Veos(L)	-	-	0.4	
		Rise/fall time	treos, tfeos	-	-	100	ns
		Width	tpweos	-	3/fϕmc	-	s
	Trigger pulse	Voltage	Vtrig(H)	4.0	5.0	-	V
			Vtrig(L)	0	-	0.4	
		Rise/fall time	trtrig, tftrig	-	-	100	ns

*3: The operation of duty ratio 50% typ. is recommended.

*4: The outputs of start-pulse and clock-pulse are to be obtained from a front part where an image sensor is installed. The outputs of end-of-scan and trigger-pulse are to be obtained from a back-side part where a connector for input/output signal is fixed.

Block diagram



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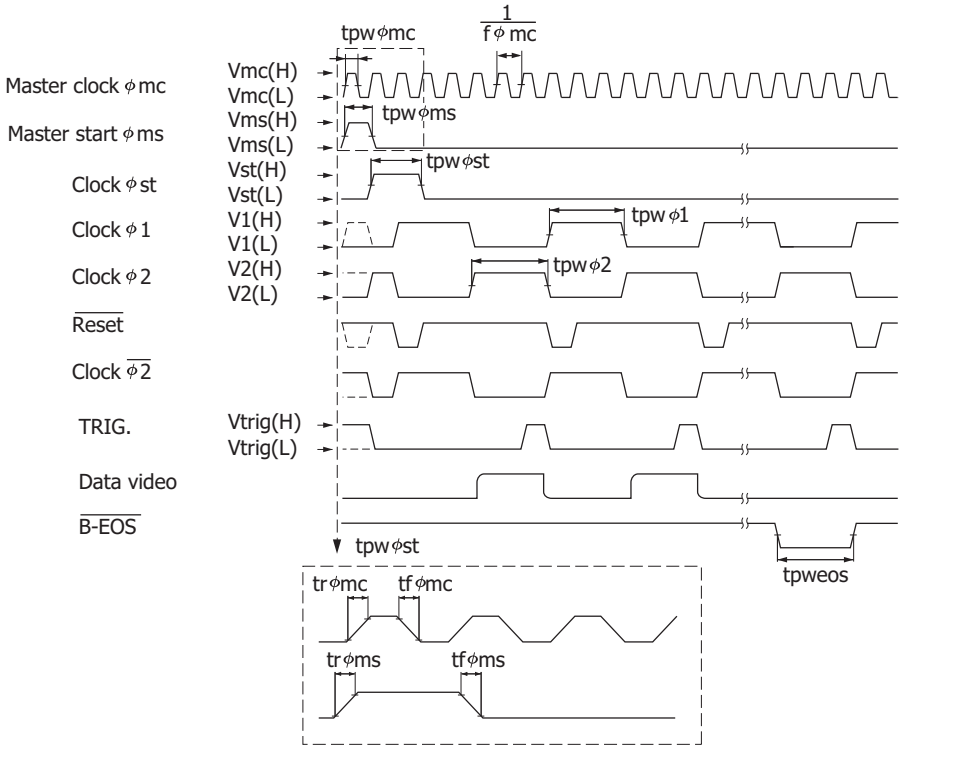
Timing chart



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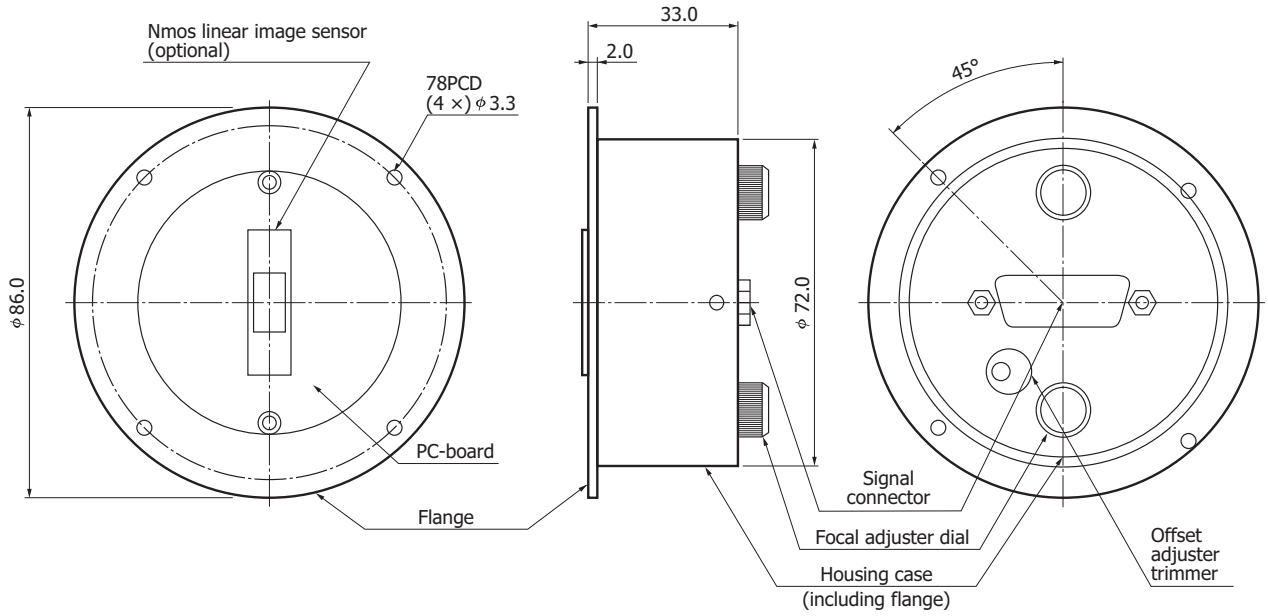
Dimensional outline (unit: mm)



Front view | Side view | Rear view

The focal position can be adjusted backward within the range from 0 to 4.5 mm (circuit stroke length) with a focal adjustment dial.

Weight: approx. 0.16 kg

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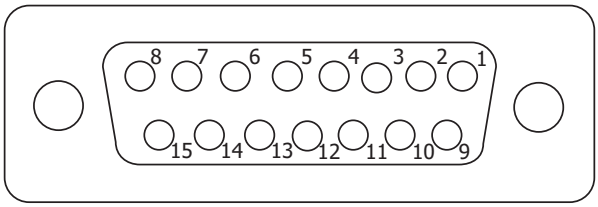
Pin assignment of "Signal I/O" connector (15-pin D-sub socket type)



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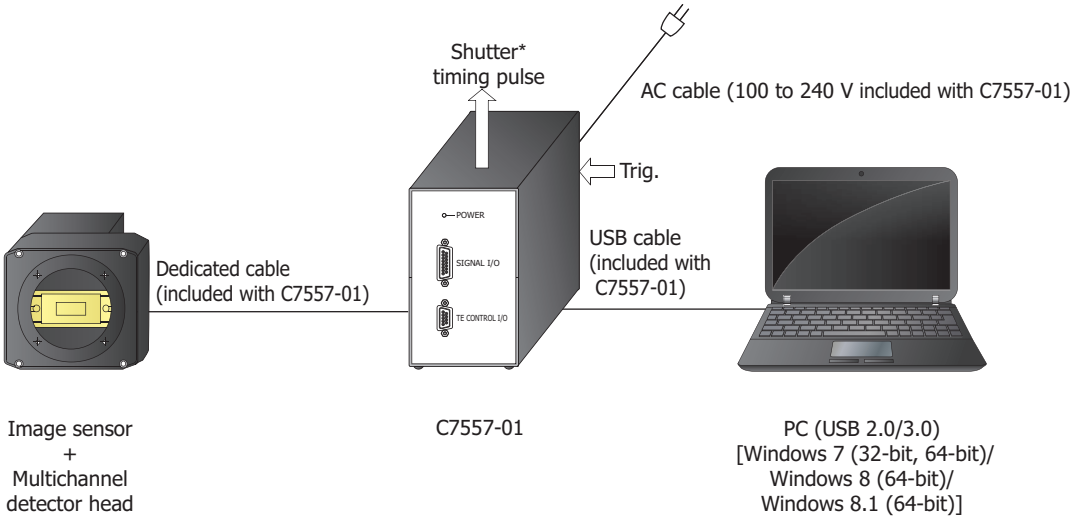
Terminal no.	Terminal name	Description
1	NC	No connection
2	Data video	Analog video signal output; positive polarity
3	+15 V	Positive power supply (25 mA)
4	-15 V	Negative power supply (15 mA)
5	NC	No connection
6	Start	Digital input signal for initializing the circuit; positive logic. Interval of these pulses equals the integration time of the sensor.
7	CLK	Digital input signal for operating the circuit at the rising edge
8	EOS	Digital output signal indicating end of scan, negative logic
9	A.GND	Analog ground
10	A.GND	Analog ground
11	Shield	Case shield
12	D.GND	Digital ground
13	D.GND	Digital ground
14	D.GND	Digital ground
15	Trigger	Digital output signal for A/D conversion; positive logic

- Video data rate is 1/6 of master clock frequency (62.5 kHz max.).
- The operation of circuit stroke length below 4.5 mm is recommended.
- The relation between data video output voltage and output charges from NMOS image sensor can be expressed by the following formula.

$$\text{Vout [V]} = 3 \times \frac{\text{Output charge}}{10 \times 10^{-12}\ \text{[F]}}$$

Note: Amplifier saturation voltage is 10 V.

Connection example



* Shutter, etc. are not available.

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Precautions

When operating the C8892 with the C7557-01, always be sure to attach the MOS adapter (supplied) to the C7557-01 main unit. If the the C8892 is connected and the power is turned on without attaching the adapter, the power supply in the C7557-01 main unit may be damaged.

Related information

www.hamamatsu.com/sp/ssd/doc_en.html

■ Precautions
· Disclaimer

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