HAMAMATSU

Driver circuit for InGaAs linear image sensor

C10820

Driver circuit for InGaAs linear image sensor (G9494 series)

The C10820 is a driver circuit designed for the G9494 series high-speed InGaAs linear image sensors. The C10820 generates clock signal and reset signal needed to drive the InGaAs linear image sensor, and amplifies and outputs the video signal of the InGaAs linear image sensor while subtracting the offset from the video signal.

Features

- **Simple signal input operation (only digital signal inputs for START and M-CLK pulses, and +5 V and +15 V power supplies required)**
- **High gain setting suitable for low-level-light**
- **Compact size**

Applications

- **Control and data acquisition of InGaAs linear image sensor (G9494 series)**

Absolute maximum ratings (Ta=25 °C)

Parameter	Symbol	Value	Unit
Analog supply voltage	+VA	+18	V
	-VA	-18	V
Digital supply voltage	+VD	+7	V
Digital input voltage	-	+VD	V
Operating temperature*1	Topr	0 to +50	°C
Storage temperature*1	Tstg	-20 to +70	°C

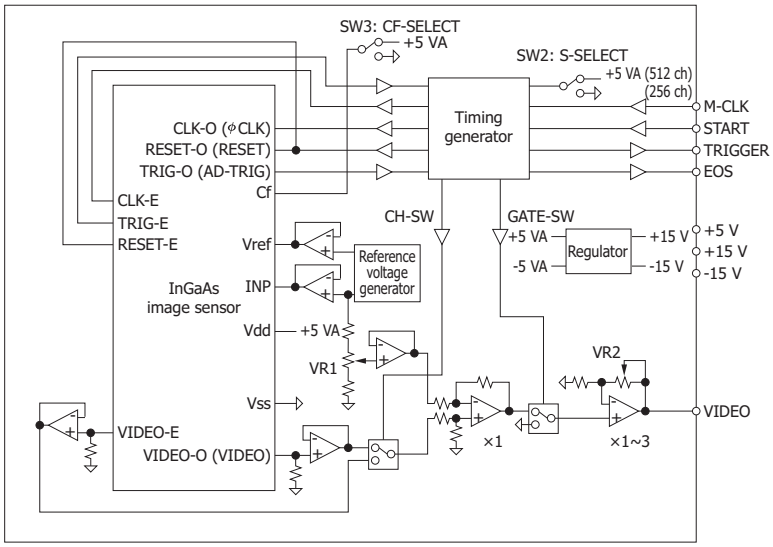
*1: No condensation

Specifications (Ta=25 °C)

Parameter		Symbol	Min.	Typ.	Max.	Unit
Analog supply voltage		±VA	±14.5	±15.0	±15.5	V
Analog supply current		+IA	-	70*2/120*3	120*2/180*3	mA
		-IA	-	-30	-40	mA
Digital supply voltage		+VD	4.75	5.0	5.25	V
Digital supply current		+ID	-	3	5	mA
Digital input	High level	VIH	3.5	-	5.5	V
	Low level	VIL	0	-	1.5	
Start pulse width		Tpwst	125	-	-	ns
Clock frequency		fM-CLK	0.01	2	4	MHz
Digital rise/fall times		tTLH/tTHL	-	14	25	ns
Date rate		fV	-	2	4	MHz
VIDEO saturation output		Vsat	-	-	4	V

*2: When mounted with the G9494-256D
*3: When mounted with the G9494-512D

Block diagram



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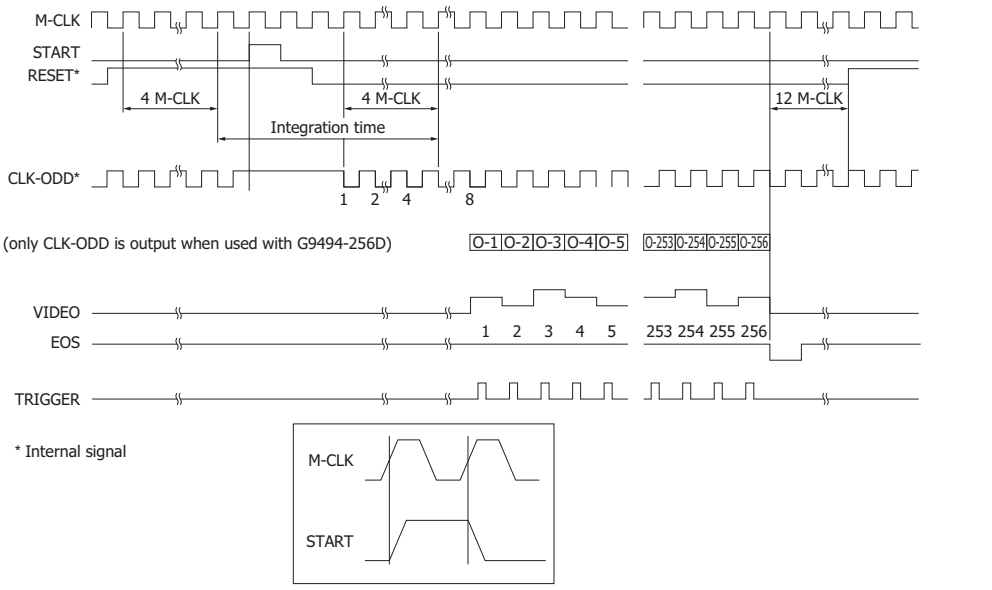
Timing chart

G9494-256D



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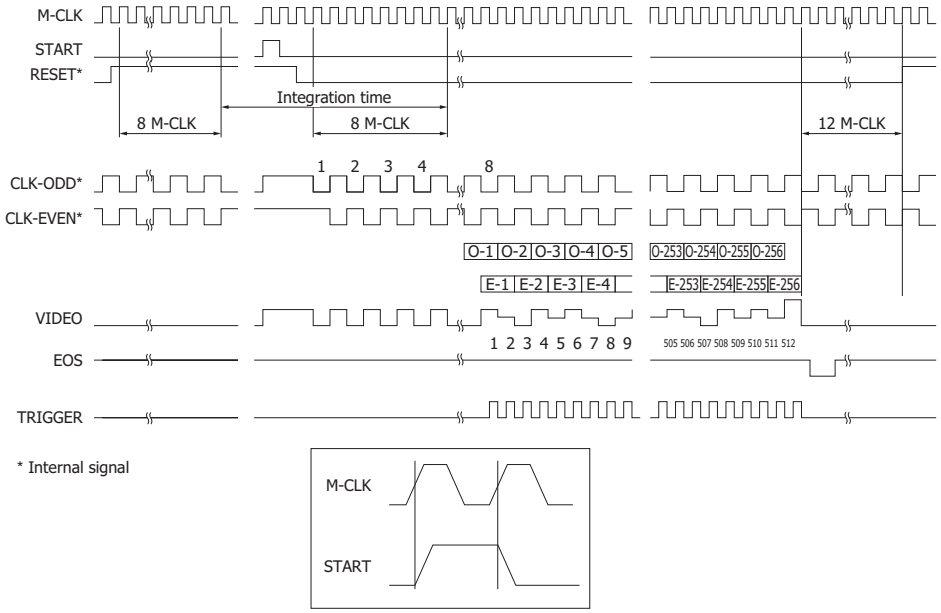
G9494-512D



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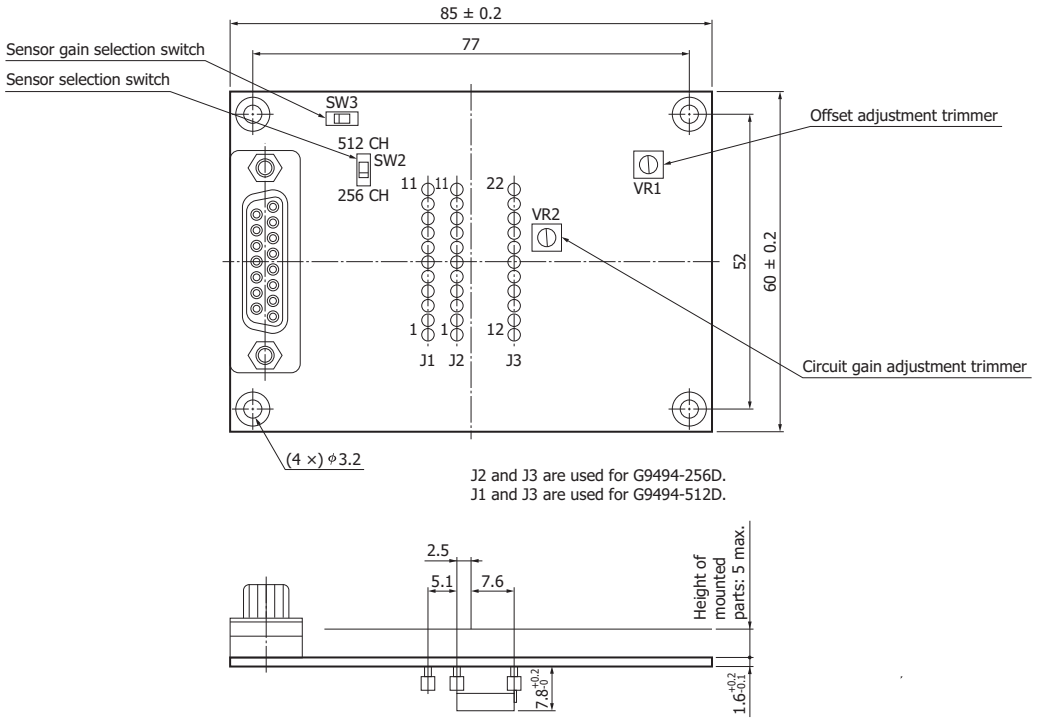
Note: When used with the G9494-256D, M-CLK equals CLK-ODD. When used with the G9494-512D, M-CLK is divided by 2, and CLK-ODD and CLK-EVEN are generated with complementary timing and output while each is shifted by half the CLK period. This means that the G9494-256D and 9494-512D operate at the same data rate when a same frequency M-CLK is input.

Dimensional outline (unit: mm, unless otherwise noted: ±0.3)



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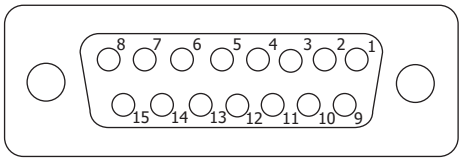
Pin assignment of I/O connector

15-pin D-sub connector socket type



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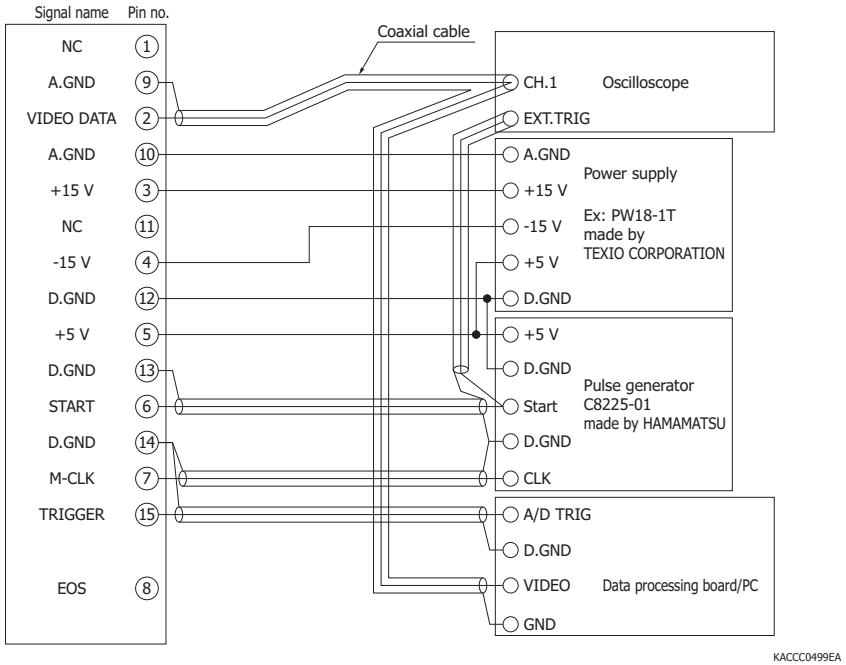
Pin no.	Terminal name	I/O	Description
1	NC	-	No connection
2	Video data	O	Analog video output signal: 0 to approx. 4 V
3	VA1+ (+15 V)	I	Analog power supply
4	VA1- (-15 V)	I	Analog power supply
5	VD1 (+5 V)	I	Digital power supply
6	Start	I	Circuit initialization signal, H-CMOS compatible, positive logic
7	M-CLK	I	Circuit synchronization signal, H-CMOS compatible
8	EOS	O	Sensor end-of-scan signal, H-CMOS compatible, negative logic
9	A.GND	-	Analog ground
10	A.GND	-	Analog ground
11	NC	-	No connection
12	D.GND	-	Digital signal
13	D.GND	-	Digital signal
14	D.GND	-	Digital signal
15	Trigger	O	For A/D conversion, H-CMOS compatible, positive logic

Connection

I/O connector: D-sub 15-pin type



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Adjustment methods

- Circuit DC offset adjustment: VR1
  Use the VR1 trimmer to adjust the DC offset of the VIDEO signal. The active area of the InGaAs linear image sensor must be light-shielded during this adjustment. Turn the trimmer clockwise to increase the offset, or turn it counterclockwise to reduce the offset. In either case, adjust the offset so that the VIDEO signal becomes higher than GND.

- Circuit gain adjustment: VR2
  Use the VR2 trimmer to adjust the circuit gain according to the incident light level. Turn the trimmer clockwise to increase the gain, or turn it counterclockwise to reduce the gain. Note that the DC offset also varies when the gain is changed by VR2, so readjustment to the circuit DC offset might be required.

- Sensor gain selection: SW3
  The integration amplifiers in the InGaAs linear image sensor have a function to select the integration capacitance (Cf). This selection is done by SW3 on the driver circuit. Switching SW3 to the left side selects the low gain, and switching it to the right side selects the high gain. The high gain is approx. 8 times higher than the low gain. Please note that the VIDEO signal from the driver circuit becomes saturated at approx. 4 V.

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