Fast Preamplifier Electronics for Hamamatsu CMOS Linear Image Sensors S11639 and S13496

DZA-S11639

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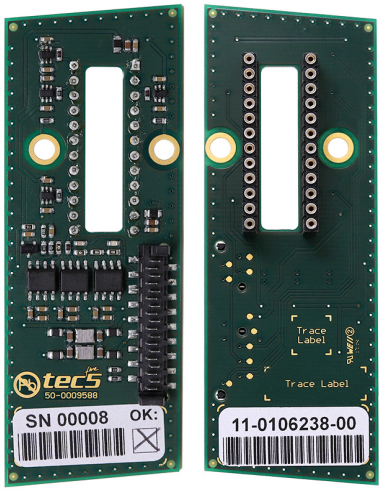


Short Description

- Fast preamplifier electronics for Hamamatsu CMOS Linear Image Sensor types S11639 and S13496
- Pixel frequency up to 10 MPixel per second
- For 16 bit readout
- Sensor chip socket for direct insertion on PCB
- Device input: sensor chip
- Device output: tec5 16 bit Front End or Compact Electronics with sensor interface *‚Sensor_U3'*
- PCB dimensions: 82.44 mm x 25.50 mm

General

The preamplifier electronics DZA-S11639 serves as an adapter between the Hamamatsu CMOS Linear Image Sensors of series S11639 and S13496 and the Front End Electronics (FEE) board of a tec5 operating electronics. Typically the CMOS array is plugged directly into the DIL-24 socket mounted to the soldering side of the PCB. It is designed for a readout rate of up to 10 MPixel per second and operated e.g. with the tec5 FEE-1M /NMOS-1 The interface to the FEE complies to the tec5 specification *‚Sensor_U3'* (MICS-18 with pin contact, video signal ‚differential').

Description of Operation

The preamplifier board provides connectivity and signal conditioning for the CMOS sensor chip. The analog video signal is preamplified and forwarded differentially while digital control signals are buffered and reshaped.

The attached scan control electronics has to provide the clock signals START and CLK according to the timing specification of the CMOS array. At the end of the readout sequence, the CMOS array produces an End-OfScan pulse.
The video output signal is differential. Dark condition results in a level of 0V on both outputs and full light generates +4V at the positive and –4V at the inverted output.

Technical Data

Diode arrays:	Hamamatsu CMOS arrays of types S11639 and S13496
Number of pixels:	2048 or 4096
CLK frequency:	Up to 10 MHz
Readout time (2048):	approx. 2.05 ms at 1 MHz
Analog Range:	
Output signal:	0 ... 8 V (differential)

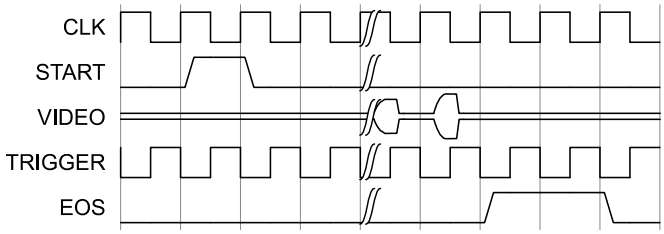
Digital Input Control Signals (HC level):

START:	Start of readout cycle, 89 clock cycles after 'START' falling edge.
CLK:	Master Clock for the array. The pixel frequency is the CLK frequency.

Digital Output Control Signals (HC level):

EOS:	EndOfScan, Signal EOS is HIGH during readout procedure. At the end of the scan the Sensor produces an EndOf-Scan LOW pulse.
TRIGGER:	Pulse train, signaling the sampling instant for the video signal for each pixel during readout (active high, duration: one CLOCK pulse).

Signal Behavior:



For further details refer to the array's data sheet.

Power consumption (S11639, 1 MHz):
+5 V: typically < 76 mA
-5 V: typically < 59 mA

Ambient Conditions:

Operating temperature range:	0 °C ... 65 °C
Storage temperature range:	-40 °C...+70 °C
Humidity (@25 °C, non condensing):	10 % ... 90 %

Product Versions

The DZA-S11639 supports the compatible CMOS arrays in a single product version: DZA-S11639 /STD

Note: The unit is designed and specified for optimum operation at clock frequencies in the range between 1 and 10 MHz. While slower operation is possible, the preamplifier cannot be operated at readout rates faster than specified.

Board Layout

CON110
MICS18

PCB DZA-S11639, component side

PCB DZA-S11639, soldering / sensor side

Mechanical Interfacing

Board dimensions:	82.44 mm x 29.50 mm
Connector for PDA:	DIL socket on soldering side of the board
Mounting of board:	2 mounting holes as shown on drawing

Electronic Interfaces

Type: tec5 specification *‚Sensor_U3'*
Interface Connector : MICS-18

Pin Assignment MICS-18 Connector:

Pin	Designation	Pin	Designation
1	TRIGGER	2	START – Start of Scan
3	PHI2 (not used)	4	CLK - Master Clock
5	I_RES (not used)	6	EOS - End of Scan
7	0V - Digital Ground	8	-5V – Supply
9	0V - Digital Ground	10	+5V – Supply
11	DOUT1 (not used)	12	DOUT2 (not used)
13	I2C-SDA (not used)	14	I2C-SCL (not used)
15	0V – Analog Ground	16	Video Out (inverted)
17	0V – Analog Ground	18	Video Out (non inverted)

Example System Data

System data, realized with tec5 16 bit Operating Electronics based on FEE-1M /NMOS-1 and sensor type S13496 (4096 pixels):

Integration time:	4.3 ms
Clock frequency:	1 MHz
Intensity resolution:	16 bits
Ambient temperature:	+25 °C
Resulting single pixel dark noise:	< 15 counts rms

User Information

General
The information in this data sheet has been checked carefully. However, no responsibility is assumed for inaccuracies. tec5 reserves the right to make changes to any portion of this document without notice.
Each product is tested carefully before being shipped. If, however, problems should occur while initial operation or during later operation, please first check your specific settings and correct installation (connectors).

Warranty
The warranty period for this product is 12 months. The warranty begins on the day of delivery. Within the warranty period, tec5 will repair free of charge any faulty functioning of the product resulting from faulty design or defective material. All other claims are excluded, in particular consequential damage.

Handling
The electronics is partly constructed in CMOS technology and is thus sensitive against electrostatic discharge. Take appropriate precautions whenever handling the component. Please switch off the power before connecting or disconnecting the product.