

DAVIS 346

346 x 260



- Prototype DAVIS sensor in 180nm CIS technology
- Concurrent QVGA+ resolution event and frame output from single sensor
- Event output with up to 120dB dynamic range, sub 1 μ s latency, 1 μ s temporal resolution and up to 12 million events per second throughput
- 6-axis IMU, up to 8k Hz sampling rate
- Supports multi-camera time synchronization via daisy chain connection and external event injection
- Consumes less than 180mA at 5V power supply
- Anodized aluminium case with CS lens mount, 4-side mounting options, screw-locked USB port and fully isolated multi-camera sync ports

Specifications

Event output

Spatial resolution	346 x 260
Temporal resolution ¹	1 μ s
Max throughput	12 MEPS
Typical latency ²	<1 ms
Dynamic range	Approx. 120 dB (0.1-100k lux with 50% of pixels respond to 80% contrast)
Contrast Sensitivity	14.3% (on), 22.5% (off) (with 50% of pixels respond)

Frame output

Spatial resolution	346 x 260
Frame rate	40 FPS
Dynamic range	55 dB
FPN	4.2 %

Dark signal	18000 e ⁻ /s
Readout noise	55 e ⁻
IMU	
6-axis (Gyro + Accelerometer), up to 8k Hz sampling rate	
Multi-camera sync	
Supports multi-camera time synchronization via daisy chain connection and external event injection	
Other attributes	
Dimensions [mm]	H 40 x W 60 x D 25
Weight	100 g without lens
Lens mount	CS-mount
Case material	Anodized aluminum
Mounting options	4-side Whitworth 1/4"-20 female and M3 mounting points
Connectors	USB 3.0 micro B port with locking screws, fully isolated sync input and output connectors
Power consumption	<180 mA @ 5 VDC (USB)
Sensor technology	0.18 μm 1P6M MIM CIS
Pixel pitch [μm]	18.5μm
Sensor supply voltage	1.8 V and 3.3 V
Certifications	CE certified

Specifications not guaranteed. All specifications subject to change without notice

¹ The temporal resolution is characterized by the timestamp unit. In fact, a timestamp unit of 1 μs offers minimum gain over a timestamp unit of 200 μs. For more explanation, please refer to our [white paper](#).

² Nominal figure; can be improved with strong lighting/optimised biases.

Limitations:

- In APS GlobalShutter mode, bursts of DSV events can be caused by the capture of an APS frame.
- Due to bandwidth limitations, the DVS event output tends to follow a scanning pattern when under high load.
- The frame output has below average performance in terms of image quality compared to conventional image sensors.
- Color frames are not calibrated, and thus do not faithfully reproduce the real observed color.
- The event output can be destabilized if a strong light source impacts a sensitive spot outside the photosensitive pixel array.

Physical dimensions

The DAVIS 346 camera is housed in an anodized aluminum case. The case dimensions are depicted below.

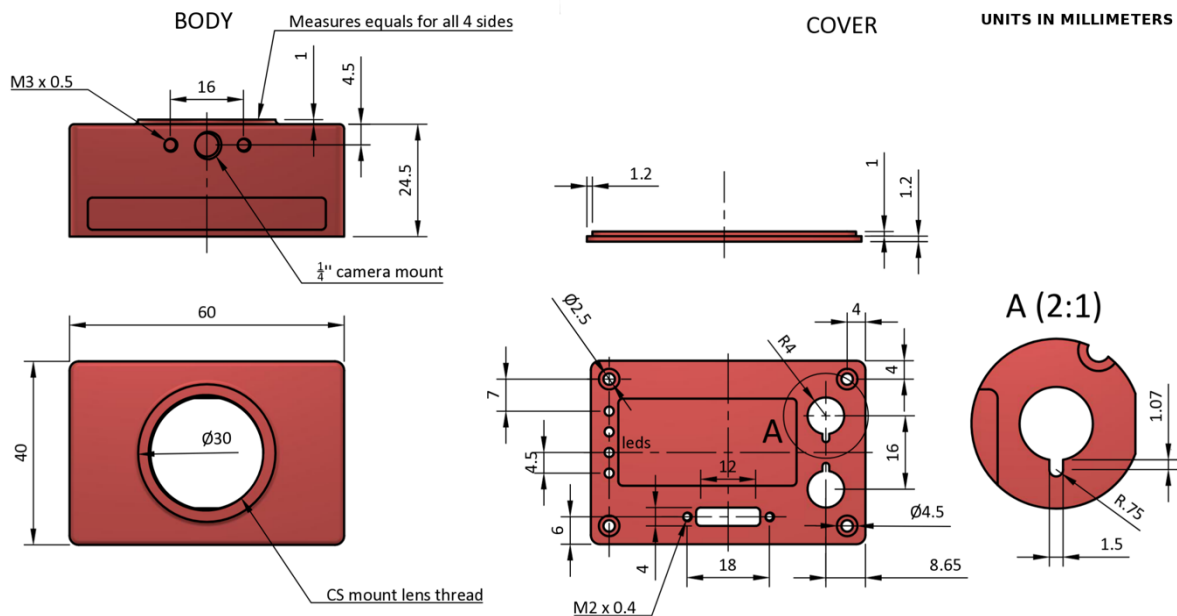


Figure 1 Dimensions of the DAVIS 346 camera case

Connectors

DAVIS 346 has three connectors on the back. One USB 3.0 connector for data and power, and two sync ports for syncing the camera with other cameras or external trigger devices



Figure 2 Connectors on the back of DAVIS 346

USB 3.0 connector

The USB 3.0 connector is used for data and power. Any USB 3.0 or USB 2.0 cable with micro B connector can be used. However, USB 3.0 speeds are only supported when using a USB 3.0 cable. Usage of cables with appropriate locking screws are recommended for a more secure and robust connection.

Sync connectors

The synchronization connectors are HiRose HR10A-7R-4P (male, SYNC OUTPUT) and HR10A-7R-4S (female, SYNC INPUT) connectors. Cables should use the matching connectors HR10A-7P-4S (female) and HR10A-7P-4P (male).

Please note that to keep full electrical isolation between different cameras, the cable should not be shielded, or if it is, the shield should not connect one end of the cable to the other.

Input signals can be 3.3V or 5V, depending on the VDD_IN supplied externally, output signals are 5V, as is VDD_OUT. If you chain cameras together for synchronization, the clock and VDD will be 5V, for example.



Figure 3 Sync connector pinouts on DAVIS 346

Synchronization connectors pinout is shown in the image above. Please note that all the pins in the SYNC IN ports are isolated from the SYNC OUT ports.

Optics

The camera lens mount is designed to accommodate CS-mount lenses. Other lenses can be accommodated by using adapters. The standard lens shipped with the camera is a C-mount lens and ships with an adapter. The chip requires a lens designed for 1/3-inch imagers.

The field of view (FOV) depends on the focal length L of the lens and the size W of the pixel array. It is computed from geometrical optics, not accounting for any lens distortion. The angular field of view ($AFOV$) is given by:

$$AFOV = 2 \tan^{-1} \left(\frac{W}{2L} \right)$$

The linear FOV ($LFOV$) at a distance D from the lens is given by

$$LFOV = D * W/L$$

The pixel array has a resolution of 346 x 260 and measures:

- Width: 346 pixels x 18.5 um/pixel = 6.4 mm
- Height: 260 pixels x 18.5 um/pixel = 4.81 mm

The following table shows the horizontal and vertical field of view in degrees and its size at various distances for different common focal lengths.

Computations of Field of View

Lens focal length [mm]		2.1	3.5	4.5	6	12
Angular field of view horizontal [deg]		113	84.9	70.8	56.2	29.9
Angular field of view vertical [deg]		97.7	69	56.2	43.7	22.7
Angular field of view diagonal [deg]		125	97.7	83.3	67.4	36.9
Linear field of view horizontal [cm]	dist. 10 cm	30.5	18.3	14.2	10.7	5.33
	dist. 30 cm	91.4	54.9	42.7	32	16
	dist. 100 cm	305	183	142	107	53.3

Software

DAVIS 346 is compatible with DV software platform. Go to www.inivation.com to access the newest version of the software and SDK.

Serial number

The serial number of the device can be found on the case, usually a four-digit number printed on a black label located at the top of the camera case.

Package contents

DAVIS 346 ships with the following items

- DAVIS 346 camera
- USB 3.0 cable, 1m with locking screws
- Varifocal C mount lens
- CS to C mount lens adapter

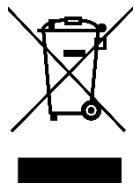
Safety information

To prevent damage to property or injury to yourself or to others, read this safety information in its entirety before using this product.

- This product is intended to be used in a laboratory and for industrial applications under controlled conditions
- We strongly recommend that you only use high quality USB cables, like the one provided by iniVation. Using low quality USB cables could cause damages to the device.
- Keep the product dry. Do not handle the product with wet hands. Do not handle the plug with wet hands. Do not operate the camera near water. This could cause damage to the device.
- Handling: Handle your product with care. It is made of metal, glass, and plastic and has sensitive electronic components inside. The product can be damaged if dropped, burned, punctured, or crushed, or if it comes in contact with liquid. If you suspect damage to the product, please contact iniVation.
- Repairing: Do not open the product and do not attempt to repair the product yourself. Disassembling the product may damage it and will void your warranty. If your product is damaged or malfunctions, please contact iniVation.
- Do not disassemble or modify this product.
- Do not touch internal parts that become exposed as the result of a fall or other accident.
- Keep this product out of reach of children. Should a child swallow any part of this product, seek immediate medical attention.
- Use travel converters or adapters designed to convert from one voltage to another or with DC-to-AC inverters.
- Explosive and other atmospheric conditions. Connecting or using the product in any area with a potentially explosive atmosphere, such as areas where the air contains high levels of flammable chemicals, vapors, or particles (such as grain, dust, or metal powders), may be hazardous. Exposing the product to environments which have high concentrations of industrial chemicals, including near evaporating liquified gasses such as helium, may damage or impair the product's functionality.

- Turn this product off when its use is prohibited.
- Do not leave the product where it will be exposed to elevated temperatures for an extended period such as in an enclosed automobile or in direct sunlight. This can lead to malfunction.

Correct disposal



This product and its electronic accessories should not be disposed of with other household waste.

If you are unable to dispose of this item safely please return it to iniVation AG.

CE certified



iniVation declares that this device is CE certified.

This product is not ATEX approved.

CE20

EU DECLARATION OF CONFORMITY

No.: 20EMC1808WH03

Manufacturer:

Company name: iniVation AG
Street: Thurgauerstrasse 40
City: Zürich
Postal Code: 8050
State/County/Province: Zürich
Country: Switerland

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Object of the declaration:

DAVIS346

The object of the declaration described above is in conformity with the relevant Community harmonization legislation:

- *Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits (in short "the Low Voltage Directive" or "the Low Voltage Equipment Directive")*
- *Directive 2014/30/EU of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (recast)(in short referred to as "the EMC Directive")*
- *Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (in short referred to as "the RoHS Directive" or "2011/65/EU")*

References to the relevant harmonised standards used or references to the specifications in relation to which conformity is declared:

EN 55032:2015/AC:2016

Signed for and on behalf of iniVation AG

Zürich, 21.08.2020



Dr. Kynan Eng, CEO