

U30-CAM-IMX678 User Manual



1 Description

8MP 4K USB3.0 UVC Fixed Focus Camera Module – Genuine Sony IMX678 STARVIS 2

BUELEC The U30-CAM-IMX678 uses the **authentic Sony IMX678 STARVIS 2 sensor** with high-quality 95° HFoV distortion-free fixed-focus lens, providing the highest low-light performance and smoothest 4K@60fps. Fully UVC compliant, USB3.0 full-bandwidth stable transmission, driver-free on every platform. The module is now in mass production and ready for immediate shipment.

The U30-CAM-IMX678 is a professional-grade 8-megapixel (4K) USB3.0 UVC camera module built around the **genuine original Sony IMX678 Exmor RS stacked CMOS sensor with STARVIS 2 technology and large 2.0µm pixels**. Thanks to the larger 1/1.8" sensor format and 2.0µm pixel size, Equipped with a 95° horizontal field of view (HFoV), ultra-low distortion (<1%) fixed-focus lens it delivers class-leading low-light sensitivity, ultra-low noise, excellent dynamic range, and true high-speed 4K@60fps performance – significantly outperforming smaller-sensor alternatives in challenging lighting conditions. Fully compliant with UVC over USB 3.0 (5 Gbps) interface, it is truly driver-free plug-and-play across Windows, Linux, Android, macOS, Raspberry Pi, Jetson, Rockchip, and all major embedded platforms. USB3.0 bandwidth guarantees rock-solid 4K@60fps MJPEG with zero frame drops — perfect for high-speed industrial inspection, security & surveillance, AI vision, machine vision, sports/motion analysis, and any application demanding smooth high-framerate 4K video.

2 Key Features

1. **Genuine Sony IMX678 8MP Sensor** – 1/1.8" STARVIS 2 back-illuminated CMOS, large 2.0µm pixel for superior low-light performance & minimal noise
2. **True High-Speed 4K@60fps** – Ultra-smooth 60fps at full 4K resolution (MJPEG), ideal for motion capture & high-speed applications
3. **True USB3.0 UVC 1.5 Plug-and-Play** – Full 5 Gbps bandwidth, no drivers needed on any major OS or embedded platform
4. **Best-in-Class Low-Light Sensitivity** – STARVIS 2 technology, 0.5 lux minimum illumination, 73dB dynamic range, outstanding night vision capability
5. **95° Wide-Angle Distortion-Free Lens** – Ultra-low distortion (<1%), 95° horizontal FOV, sharp wide field of view without barrel effect

6. **Industrial-Grade Design & Compatibility** – Larger 1/1.8" sensor in compact 38×38mm board, 4×M2.5 mounting holes (32mm centers), wide temperature-hardened, full parameter control

3 Specifications

3.1. Sensor & Image Quality

Parameter	Specification
Image Sensor	Genuine Sony IMX678 Exmor RS stacked CMOS (STARVIS 2 technology)
Sensor Size	1/1.8" (diagonal ≈9.09mm)
Active Pixels	3840(H) × 2160(V) – 8.3 Megapixels
Pixel Size	2.00μm × 2.00μm
SNR	39.9 dB
Dynamic Range	73 dB
Sensitivity	1.4 V/lux-sec @550nm
Minimum Illumination	0.5 lux (color)
Center Resolution	≥800 LW/PH

3.2. Focus & Optics

Parameter	Specification
Focus Type	Fixed Focus (sharp from ~50 cm to infinity)
Lens Type	95° HFoV ultra-low distortion fixed-focus lens
Horizontal Field of View (HFoV)	95° (±3°)
Total Field of View (DFoV)	≈108° (diagonal)
Optical Distortion	< 1% (TV distortion < 0.5%)
Relative Illumination	≥ 75% (corner brightness)

Lens Format	1/1.8 inch (16:9)
F-number	F2.0 (typical)
Chief Ray Angle (CRA)	Compatible with IMX678 sensor CRA
Shutter Type	Rolling Shutter

3.3. Video Output & Performance

Parameter	Specification
Output Formats	MJPEG / YUY2 (YUYV)
Supported Resolutions & Frame Rates (USB3.0)	3840×2160 @60fps MJPEG / @15fps YUY2 2592×1944 @60fps MJPEG / @30fps YUY2 2560×1440 @60fps MJPEG / @30-60fps YUY2 1920×1080 @60fps MJPEG / @60fps YUY2 1280×720 @60fps MJPEG / @60fps YUY2 640×480 @60fps MJPEG / @60fps YUY2

3.4. Interface & Controls

Parameter	Specification
Interface	USB 3.0 Type-C (5 Gbps, backward compatible USB2.0)
Protocol	UVC 1.5 (full compliance, driver-free plug-and-play)
AEC / AWB / AGC	Fully supported
Adjustable Parameters	Brightness, Contrast, Hue, Saturation, Sharpness, Gamma, White Balance, Exposure, Gain, Backlight Compensation, Power Line Frequency, Flip, Mirror, etc.

3.5. Power & Electrical

Parameter	Specification
Power Supply	USB 5V bus power
Operating Current	80mA – 200mA
Standby Current	≤10 mA

3.6. Environmental & Physical

Parameter	Specification
Operating Temperature	0°C to +60°C
Storage Temperature	-30°C to +85°C
PCB Dimensions	38mm × 38mm square board (DECCIN-3007V1)

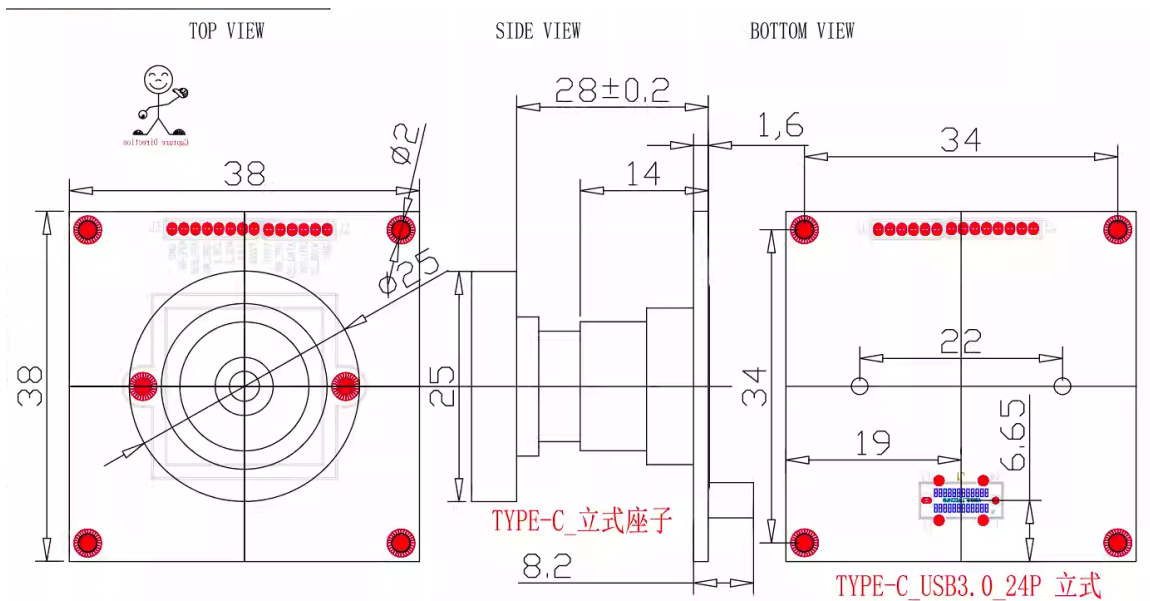
Total Height with Lens	≈28 mm (±0.2 mm)
Mounting Holes	4 × M2.5, 32 mm center-to-center distance
Weight	≈18–20 g
Standard Cable	1 meter USB3.0 cable
Optional Cables	2m / 3m / 5m shielded USB3.0 cables, aluminum housing, tripod

3.7. Compatibility

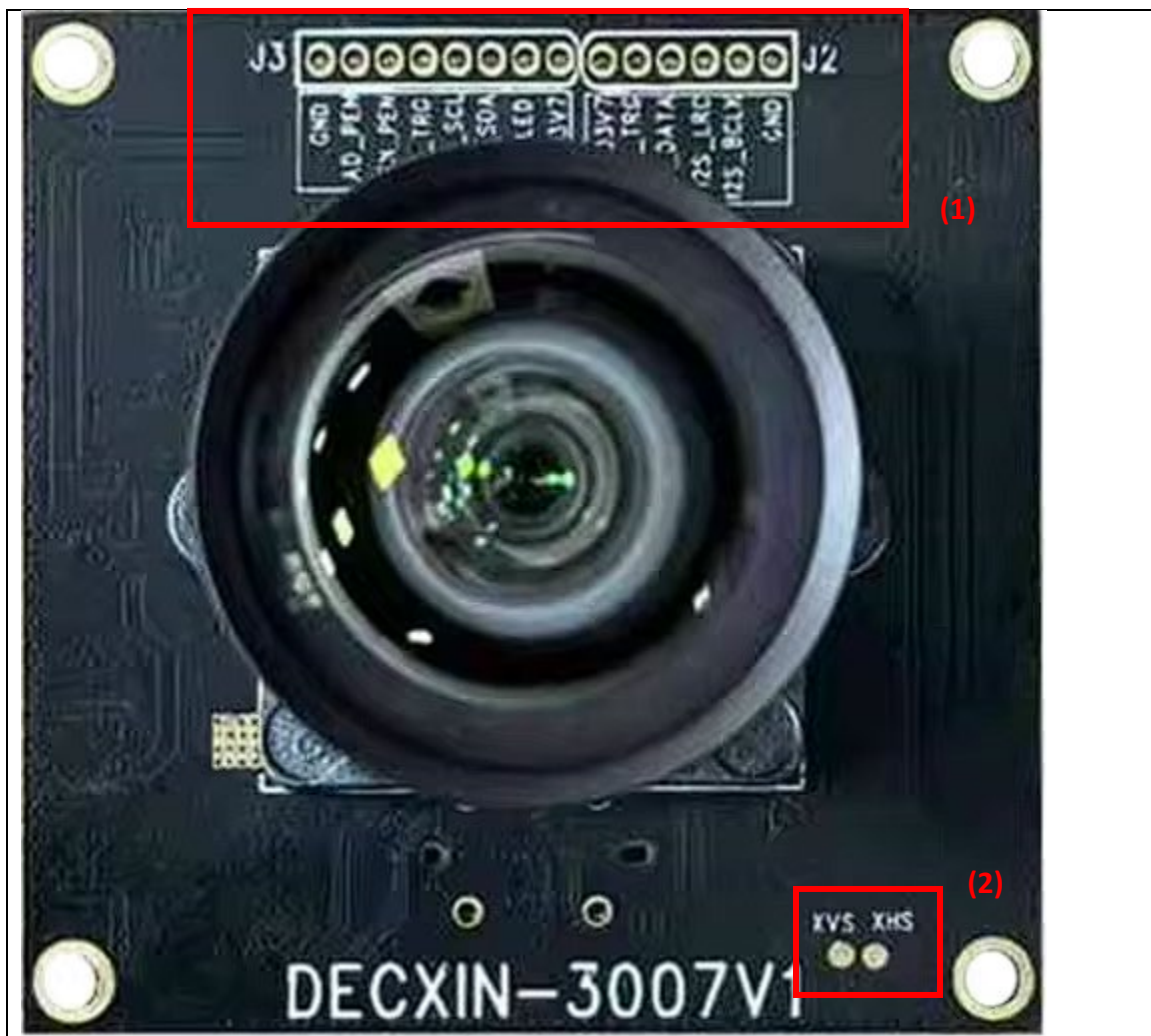
Parameter	Specification
Supported OS	Windows XP/Vista/7/8/10/11 Linux (UVC kernel 2.6.26+) macOS 10.4.8+ Android 4.0+ with UVC support Raspberry Pi, Jetson Nano/Xavier/Orin, Rockchip RK series, NVIDIA Orin, etc.

3 Hardware

3.1 Size information



3.2 Pins Out



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AVDD(Analog VDD): 2.8V

DVDD(Digital VDD): 1.1V

DOVDD(Digital Output VDD): 1.8V

4 Software

Category	Software/Tool	Link & Description
GUI Viewers	gucvview	https://gucvview.sourceforge.net/ The most classic & stable Linux UVC viewer, full controls, recording, rock-solid
GUI Viewers	QtCAM	https://github.com/econsystems/QtCAM Beautiful modern Qt interface, best for 4K/8K high-res modules, excellent color tuning
GUI Viewers	Cheese	https://wiki.gnome.org/Apps/Cheese Simple GNOME webcam app – perfect for quick photos/videos
CLI / Debug Tools	v4l2-ctl (v4l-utils)	https://linuxtv.org/wiki/index.php/V4l-utils The #1 must-have tool – query formats, adjust every UVC control (exposure, focus, WB, etc.)
CLI Snapshot	fswebcam	https://www.sanslogic.co.uk/fswebcam/ One-line photo capture, banners, timestamps, overlays
Streaming Server	mjpg-streamer	https://github.com/jacksonliam/mjpg-streamer Still the king in 2025 – ultra-low latency MJPEG/HTTP stream, Raspberry Pi favorite
Surveillance / NVR	Motion / MotionEye	https://github.com/Motion-Project/motion Best motion-detection recording system + beautiful web UI (MotionEye)
Surveillance / NVR	ZoneMinder	https://zoneminder.com/ Professional-grade NVR, supports hundreds of cameras, ONVIF, AI detection

Development Libraries	libuvc	https://github.com/libuvc/libuvc Cross-platform UVC core library (C) – foundation of OpenCV, ROS, AndroidUSBCamera
Android Development	AndroidUSBCamera	https://github.com/jiangdongguo/AndroidUSBCamera Best Android UVC library in 2025 – multi-cam preview/recording, zero lag
Universal Recording/Transcoding	FFmpeg	https://ffmpeg.org/ God-tier tool – record raw UVC stream with one command, any format conversion
Computer Vision / AI	OpenCV	https://opencv.org/ VideoCapture(0) instantly opens any UVC camera for AI/projects