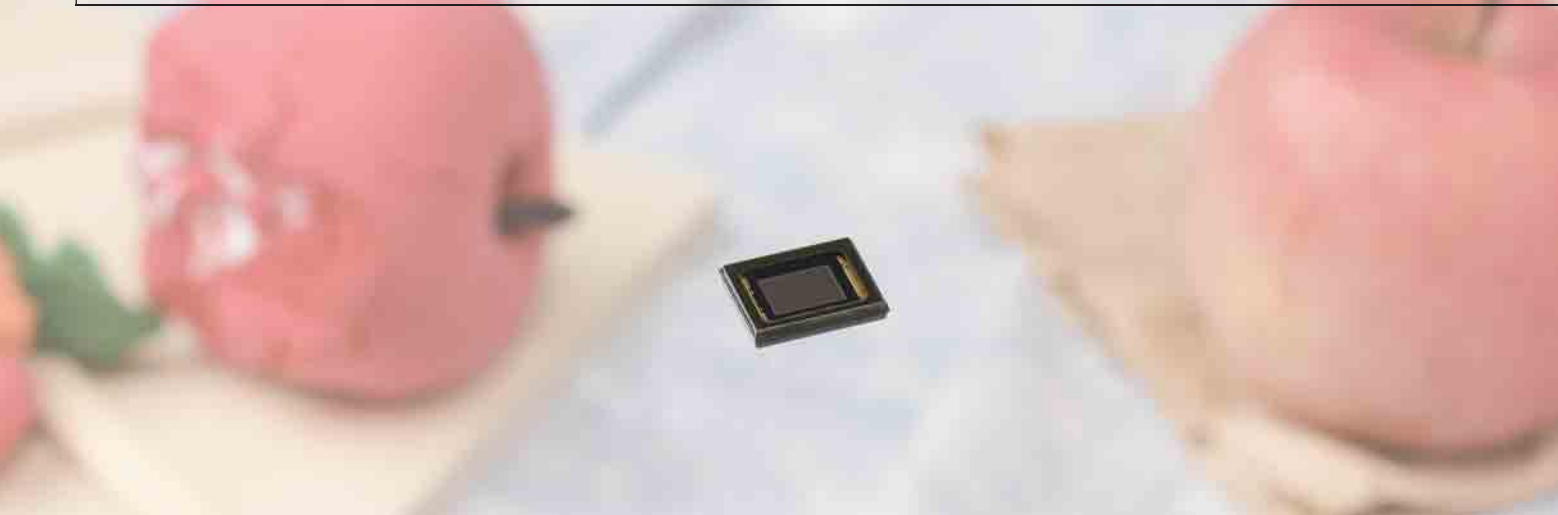
IMX117CQT

Diagonal 7.81 mm (Type 1/2.3) Approx. 12.40M-Effective Pixel High-Speed, High-Sensitivity Back-Illuminated Color CMOS Image Sensor for Consumer Digital Still Cameras and Camcorders



In the compact consumer digital still camera and camcorder field, there is now a greater demand for video for sports cameras, which means that image sensor are required to meet a greater variety of needs.
Sony has now released the IMX117CQT, a Type 1/2.3 approx. 12.40M-effective pixel, back-illuminated CMOS image sensor. Thanks to its high-speed and high-picture quality features as well as excellent optical characteristics and low power consumption is able to meet those demands.
Equipped with the 4K mode and multiple other scanning modes will further broaden the potential of the abundant visual expression.

- Diagonal 7.81 mm (Type 1/2.3) approx. 12.40M-effective pixels (4072H × 3046V)
- Pixel size: 1.55 µm unit pixel
- Supports 12.40M-pixel imaging at approx. 35 frame/s
- Back-illuminated CMOS image sensor featuring high sensitivity, high dynamic range and low noise
- Provides 4K video mode (4096H × 2160V, 60 frame/s)

Exmor R™

* "Exmor R" is a trademark of Sony Corporation. The "Exmor R" is a Sony's CMOS image sensor with significantly enhanced imaging characteristics including sensitivity and low noise by changing fundamental structure of "Exmor" pixel adopted column-parallel A/D converter to back-illuminated type.

Improved Picture Quality

With approx. 12.40M-effective pixels, the IMX117CQT supports 4K and full HD output mode. Technical evolution for even greater picture quality and high speed has brought the optimum characteristics that high-quality compact digital still cameras, camcorders and sports cameras require.
Full use of Sony's back-illumination process and fine pixel processing technology has increased the electron count ratio of saturation signal level by approx. 35% over the current Sony product, the IMX078CQK (1.55µm unit pixel, Type 1/2.3, 12.40M-effective pixel, see the New Products section in CX-NEWS, Volume 63). These technical advances produce cameras with better image quality. (See photograph 1.)
The light collecting characteristics of the IMX117CQT has been optimized to maximize the light collecting efficiency of the back-illuminated structure. As a result, it has half the shading of Sony's current product, the IMX078CQK, at the same angle of inclination, which widens incident light angle. (See figure 1.) Optical characteristics of this magnitude mean that the sensor can handle bright lenses (higher sensitivity with a lower f-number) and high power zoom lenses. Characteristics at this high level will improve compatibility with set lenses and help reduce set size.

High Speed and Low Power Consumption

The frame rate in all-pixel scan mode for the IMX117CQT is about 1.8 times greater than that of the current IMX078CQK, which enables the image sensor to output approx. 12.40M-effective pixels at 35 frame/s. (See table 3.) While the image sensor ensures high speed, the structure of the column-parallel A/D converter was reconfigured to reduce power consumption by about 35% compared to the current IMX078CQK, both in all-pixel scan mode (12 bits) and at full HD scan mode. (See table 2.)
These improvements increase video recording time and the number of shots that can be recorded, and make the camera battery size smaller. Especially, this contributes to a power supply design that enables the high-speed processing that video imaging requires.

A Variety of Readout Modes

Sony's unique high-speed readout technology makes it possible to select high-definition still images, high-speed video imaging or whatever other drive mode that best suits the purpose. (See table 3.) For example, the Type 1/2.5, approx. 9.03M-pixel (approx. 17:9) sensor enables video recording of 4K 60 frame/s makes this image sensor capable of the next-generation 4K format. Also, the image sensor comes not only with full HD at 60 frame/s (mode 1) but is capable of slow-motion shooting with HD at 240 frame/s (mode 4) and has plenty of other video functions.

V O I C E

The IMX117CQT possesses the ideal picture quality for high-quality compact digital still cameras and camcorders. Low power consumption and a variety of readout modes make the IMX117CQT the perfect sensor for the increasingly popular sports camera.
Be sure to try Sony's next step in the high speed and high picture quality evolution for your next product line.

Photograph 1 12.40M pixels Sample Image (ISO 80 equivalent)

Figure 1 Incident Light Angle Characteristics

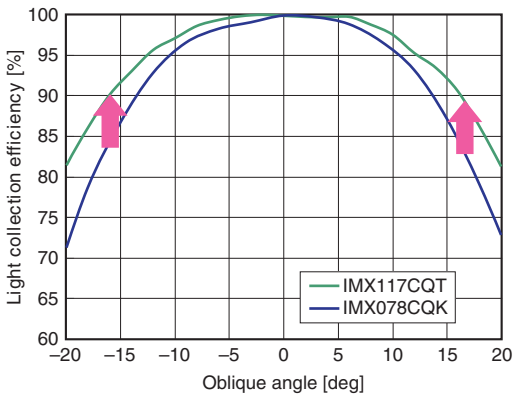


Table 1 Device Structure

Item		IMX117CQT
Image size		Diagonal 7.81 mm (Type 1/2.3) aspect ratio 4:3 Diagonal 7.22 mm (Type 1/2.5) aspect ratio approx. 17:9 Diagonal 4.14 mm (Type 1/4.4) aspect ratio 16:9
Fabrication process		Back-illuminated CMOS image sensor
Output format		Digital 10-bit/12-bit 10 ch Sub-LVDS, 576 Mbps serial output
Total number of pixels		4168H × 3062V, Approx. 12.76M
Number of effective pixels		4072H × 3046V, Approx. 12.40M
Number of active pixels		4024H × 3036V, Approx. 12.22M
Unit cell size		1.55 µm (H) × 1.55 µm (V)
Optical blacks	Horizontal	Front: 48 pixels, rear: 0 pixels
	Vertical	Front: 16 pixels, rear: 0 pixels
Power supply specifications	Analog	2.8 V
	Digital	1.2 V
	I/O	1.8 V
PGA		27 dB
Input clock frequency		72 MHz
Package size		12.8 mm (H) × 10.5 mm (V) × 1.95 mm (t)

Table 2 Image Sensor Characteristics

Item	IMX117CQT characteristic values	Compared to IMX078CQK	Remarks
Sensitivity (F5.6)	976 digits (Typ.) *1	1.02 *2	1/30 s accumulation, G signal
Saturation signal	2799 digits (Min.) *1	1.34 *2	Ta = 60°C
Power consumption	417 mW	0.65	All-pixel scan mode (12 bits) *3 Rolling shutter (at 0 dB and AD-Fullcount)
	350 mW	0.65	Full HD at 60 frame/s (at 0 dB and AD-Fullcount)

*1 1 digit ≈ 0.1992 [mV]

*2 Electron count comparison

*3 IMX117CQT: 35 [frame/s], IMX078CQK: 20 [frame/s]

Table 3 Readout Modes

Drive mode	Operation using Type 1/2.3, approx. 12.40M pixels (4:3)			Operation using Type 1/2.5, approx. 9.03M pixels (approx. 17:9)		
	Number of recommended recording pixels	Frame rate [frame/s]	Number of A/D conversion bits [bit]	Number of recommended recording pixels	Frame rate [frame/s]	Number of A/D conversion bits [bit]
All-pixel scan (12 bits)	4000H × 3000V, 12.00M pixels	35	12	4096H × 2160V, Approx. 8.85M pixels	48	12
All-pixel scan (10 bits)	4000H × 3000V, 12.00M pixels	40	10	4096H × 2160V, Approx. 8.85M pixels	60	10
Mode 1 *1 *2	2000H × 1126V, Approx. 2.25M pixels	60	10	2048H × 1080V, Approx. 2.21M pixels	60	10
Mode 2 *1 *2	1332H × 998V, Approx. 1.33M pixels	60	10	1364H × 720V, Approx. 0.98M pixels	60	10
Mode 3 *1	1332H × 1000V, Approx. 1.33M pixels	120	10	1364H × 720V, Approx. 0.98M pixels	120	10
Mode 4	2000H × 750V, 1.5M pixels	240	10	—	—	—
Mode 5 *1 *2	1332H × 332V, Approx. 0.44M pixels	240	10	1364H × 240V, Approx. 0.33M pixels	240	10
Mode 6 *1 *2	1332H × 174V, Approx. 0.23M pixels	480	10	1364H × 124V, Approx. 0.17M pixels	720	10

*1: With horizontal addition

*2: With vertical addition

Note: This device was designed for use in consumer digital still cameras or camcorders and may not be appropriate for other applications. Contact your Sony representative for consultation when considering this product for use in other applications.