

APS Size Diagonal 28.4 mm (Type 1.8)
6.15M Effective Pixels Color CCD Image Sensor

ICX413AQ

As part of Sony's commitment to improving picture quality in digital photography, Sony has continually worked at improving the characteristics of the CCD image sensor, the critical device in the digital still camera.

Now, Sony has applied unique new technologies to develop the ICX413AQ diagonal 28.4 mm (Type 1.8) 6.15M effective pixels color CCD image sensor. This new device not only achieves picture quality comparable to that of conventional silver chloride film cameras, but also allows photographers to take advantage of their existing 35mm SLR camera lenses.

The ICX413AQ is the first Sony CCD that adopts the 3:2 image format used in 35mm cameras.

In addition to the high resolution and high picture quality provided by the CCD's 6.15M effective pixels, a newly-developed package improves the device characteristics even further.

- Primary color filters
- High resolution
6.15M effective pixels (3040 × 2024)
- Superlative basic characteristics
- Newly-developed plastic package (DIP)

The ICX413AQ is a diagonal 28.4 mm (Type 1.8) 6.15M effective pixels CCD image sensor that was developed for use in consumer digital SLR cameras. Adopting an imaging area size essentially the same as that of the APS film format means that optical systems used by existing conventional silver chloride film cameras can be shared easily. This CCD can capture high-resolution images by using a mechanical shutter. Table 1 presents the structure of the ICX413AQ device.

■ High Resolution

Sony developed a new 7.8 μm unit pixel to achieve a diagonal 28.4 mm (Type 1.8) 6.15M effective pixels (3040 × 2024) CCD image sensor. This allows this device to achieve resolutions of approx. 1600 TV lines in both the horizontal and vertical directions. (See photograph 1.)

■ Superlative Basic Characteristics

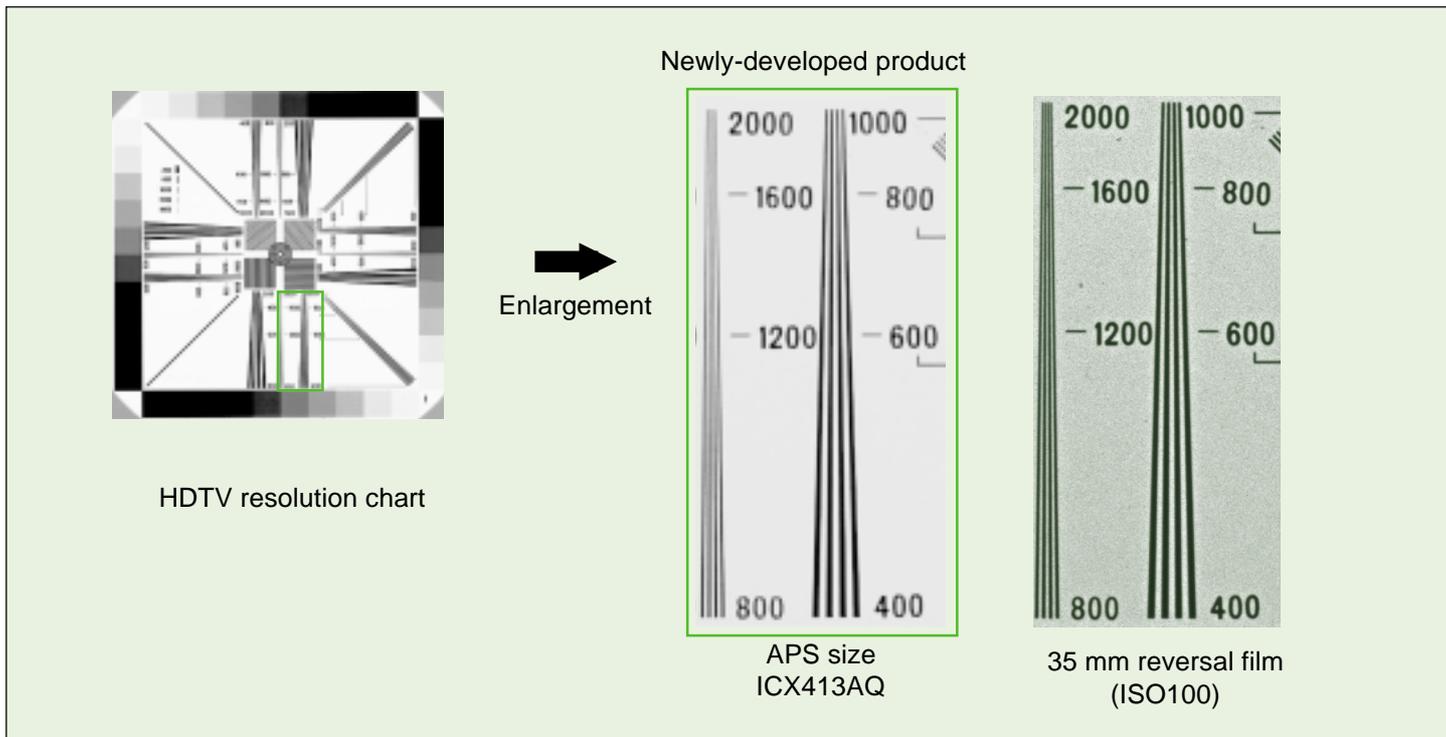
Sony has applied unique newly-developed technologies in the development of the ICX413AQ, and the result is a device that achieves a saturation signal of 900 mV and a smear level of -100 dB. Sony also optimized the on-chip microlenses and the structure of the sensor itself to achieve the high sensitivity of 1060 mV. Compared to Sony's Type 2/3 sensor with the largest number of pixels, a 5.07 M-pixel device, the ICX413AQ achieves a saturation signal improved by approx. +6 dB, smear improved by approx. -10 dB, and sensitivity improved by approx. +12 dB. The wide dynamic range and high signal-to-noise ratio achieved by this device will contribute to achieving higher picture quality in end products.

■ Newly-Developed Plastic Package

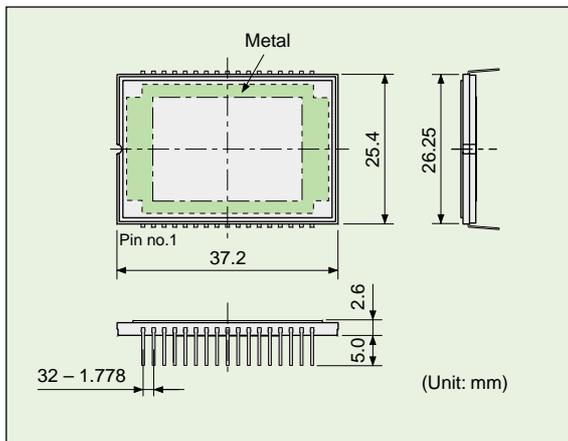
To allow this device to be used in digital SLR cameras, Sony developed a new high-precision plastic package. (See figure 1.) This unified metal body plastic package also provides superlative thermal dissipation to prevent image degradation due to heating and to contribute to improved image quality.

V O I C E

We have developed the first 6.15M pixels CCD for consumer cameras. This will allow consumer digital still cameras to provide resolution and picture quality equivalent to that of silver chloride film cameras. This is truly a device that can provide the highest picture quality in both high-end consumer cameras and digital single-lens reflex cameras as well. I strongly recommend that you look into this product.



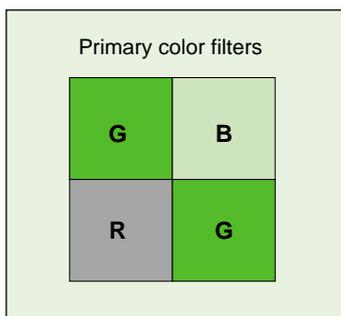
■ Photograph 1 Resolution Chart and Comparison with Film Resolution



■ Figure 1 New Plastic Package

■ Table 1 Device Structure

Item	ICX413AQ
Image size	Diagonal 28.4 mm (Type 1.8)
Format	3 : 2
Transfer method	Frame readout interline transfer method
Total number of pixels	Approx. 6.31 M (3110H × 2030V)
Number of effective pixels	Approx. 6.15 M (3040H × 2024V)
Number of active pixels	Approx. 6.11 M (3032H × 2016V)
Number of recommended recording pixels	6.00 M (3000H × 2000V)
Unit cell size	7.8 μm (H) × 7.8 μm (V)
Horizontal drive frequency	25.0 MHz
Package	34-pin DIP (Plastic)



■ Figure 2 Color Filter Arrangement

■ Table 2 Image Sensor Characteristics

Item	Typical values	Remarks
Sensitivity	1060 mV	3200K, 706 cd/m ² , F5.6, 1/30 s accumulation
Saturation signal	900 mV	During frame readout
Smear	-100 dB	None when a mechanical shutter is used
Frame rate	3.08 frame/s	Effective 2024 line output