

# High-Sensitivity Diagonal 4.5 mm (Type 1/4) 250K/290K-Effective Pixel Color CCDs Super HAD CCDs for Security Cameras

## ICX642AKA ICX643AKA

Sony has developed two new image sensors to respond to the increasing demands for superb imaging characteristics in the Type 1/4 CCD, which along with the Type 1/3 CCD is becoming the mainstream optical system in the security camera market. Compared to Sony's existing ICX226AK and ICX227AK\*1, the ICX642AKA and ICX643AKA of this release feature significantly improved sensitivity achieved through improved condensing and optimized spectral sensitivity characteristics.

- Diagonal 4.5 mm (Type 1/4)
- ICX642AKA: NTSC, 250K-effective pixels  
ICX643AKA: PAL, 290K-effective pixels
- High sensitivity (+6 dB over existing Sony products)  
New spectral sensitivity characteristics
- Low supply voltage support:  
V<sub>DD</sub> = 12 V, V<sub>L</sub> = -5 V
- Pin compatible with existing Sony products

\*1 Refer to CX-NEWS Vol. 20.

The ICX642AKA and ICX643AKA are products mainly designed for security camera, interphone and similar applications and are diagonal 4.5 mm (Type 1/4) 250K/290K-pixel color CCDs.

These products provide improved characteristics compared to the existing ICX226AK and ICX227AK.

These new devices provide significant improvements in the sensitivity characteristics, which are critical for security camera applications, while maintaining the same smear level characteristics as the existing products.

Furthermore the saturation signal levels in both the ICX642AKA and ICX643AKA were improved by 1000 mV as compared to the existing products (ICX226AK: 900 mV, ICX227AK: 810 mV).

### ■ High Sensitivity and New Spectral Sensitivity Characteristics

The ICX642AKA and ICX643AKA of this release provide a significantly improved condensing efficiencies by improvements to the upper section structure and photodiode structure. Also, by adopting new complementary color pigments in the color filters, Sony increased the sensitivity to the blue end of the spectrum (shorter wavelengths) and achieved well-balanced spectral sensitivity characteristics. (See figure 1.)

The combination of these technological improvements results in a significant increase in the sensitivity characteristics that totals +6 dB. When one compares actual images, one can clearly see that the sensitivity has been improved significantly. (See photograph 1.)

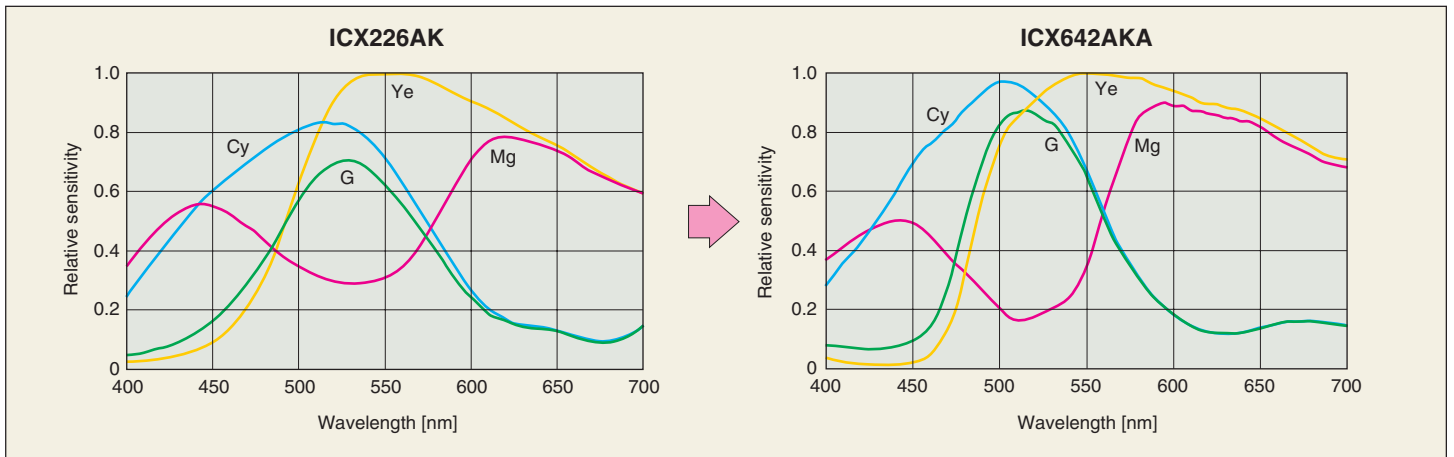
Note that the adoption of these new color filters also results in a significant improvement in light resistance compared to the existing products (the ICX226AK and ICX227AK). This means that fading of the color filters when exposed to strong light for long periods is less likely to occur, making these devices appropriate for applications such as interphones used outside.

### ■ Compatibility with Existing Sony Products

In these new products, Sony has achieved compatibility by making the image size, pixel count, drive timing, package, and pin configuration the same as the existing products (the ICX226AK and ICX227AK). These devices also feature a 12 V supply voltage and a -5 V vertical clock bias, and have a power consumption of approximately 65 mW, which is equivalent to that of the existing products.

## V O I C E

In developing this device, we focused on the sensor sensitivity, which is seen as one of the most important characteristics for security cameras. As a result of the product team working together and striving for improvements from a variety of standpoints, we were able to achieve characteristics that we were satisfied with. I strongly suggest that you look into this product.



■ Figure 1 Spectral Sensitivity Characteristics Comparison



■ Photograph 1 Sensitivity Characteristics Comparison (Using the Sony CXD3172AR)

■ Table 1 Device Structure

Item	ICX642AKA	ICX226AK	ICX643AKA	ICX227AK	
Image size	Diagonal 4.5 mm (Type 1/4)	←	←	←	
TV format	NTSC	←	PAL	←	
Transfer method	Interline transfer method	←	←	←	
Total number of pixels	Approx. 270K pixels (537H × 505V)	←	Approx. 320K pixels (537H × 597V)	←	
Number of effective pixels	Approx. 250K pixels (510H × 492V)	←	Approx. 290K pixels (500H × 582V)	←	
Chip size	4.34 mm(H) × 3.69 mm(V)	←	←	←	
Unit cell size	7.15 μm(H) × 5.55 μm(V)	←	7.30 μm(H) × 4.70 μm(V)	←	
Optical blacks	Horizontal	Front: 2 pixels, rear: 25 pixels	←	Front: 7 pixels, rear: 30 pixels	←
	Vertical	Front: 12 pixels, rear: 1 pixel	←	Front: 14 pixels, rear: 1 pixel	←
Number of dummy bits	Horizontal: 16 Vertical: 1 (Even fields only)	←	←	←	
Horizontal drive frequency	9.54562 MHz	←	9.4581 MHz	←	
Package	14-pin DIP (Plastic)	←	←	←	
Supply voltages V <sub>DD</sub> /V <sub>L</sub> (Typ.)	12V/-5V	←	←	←	

■ Table 2 Imaging Characteristics

Item	ICX642AKA	ICX226AK	Characteristics improvement	ICX643AKA	ICX227AK	Characteristics improvement	Remarks
Sensitivity (F5.6)	Typ. 1950 mV	900 mV	+6 dB or greater	1850 mV	880 mV	+6 dB or greater	3200K, 706cd/m <sup>2</sup>
Saturation signal	Min. 1000 mV	900 mV	+100 mV	1000 mV	810 mV	+190 mV	T <sub>a</sub> = 60°C
Smear (F5.6)	Typ. -105 dB	←	Equivalent	-105 dB	←	Equivalent	V/10 method