

# New Generation EXview HAD CCD Ultrahigh-Sensitivity Near Infrared Structure Diagonal 6 mm (Type 1/3) 380K/440K-Effective Pixel CCD Image Sensors

EXview HAD CCD™

## ICX658AKA(NTSC), ICX658ALA(EIA) ICX659AKA(PAL), ICX659ALA(CCIR)

Higher sensitivity is a never-ending theme, especially in image sensors for surveillance cameras.

Until now, to respond to these needs, Sony has provided a lineup of EXview HAD CCD image sensors that displayed the industry's top level of sensor sensitivity.

Sony has refined this EXview HAD CCD technology even further and has succeeded in developing technologies that improve sensitivity, especially sensitivity in the near infrared, significantly.

Now, Sony has developed the ICX658/659 image sensors that adopt these leading edge Sony technologies as CCD image sensors for surveillance cameras, especially day/night cameras.

- Diagonal 6 mm (Type 1/3)
- Near infrared sensitivity: +4.5 dB higher than earlier Sony products at the 950 nm wavelength
- Excellent compatibility with earlier Sony products

\*: EXview HAD CCD is a trademark of Sony Corporation.

The ICX658AKA/659AKA and ICX658ALA/659ALA (ICX658/659) are diagonal 6 mm (Type 1/3) 380K/440K-effective pixel color and B/W CCD image sensors developed for use in surveillance cameras.

The ICX658/659 image sensors were developed with the particular goal of increasing the near infrared sensitivity. It is in day/night cameras that the ICX658/659 can exhibit the true value of their high near infrared sensitivity.

Furthermore, these image sensors are ap-

propriate for imaging with LED and other near infrared light sources. See table 2 for a comparison of imaging characteristics.

### ■ High Near Infrared Sensitivity

In the ICX658/659, Sony improved on the conventional photodiode and developed a structure with an even higher photoelectric conversion efficiency. This structure succeeds in capturing even more of the near infrared region light that escapes to the substrate side in normal CCD image sensors.

The result is that the existing EXview HAD CCD technology, which had the industry's top level of high sensitivity for surveillance CCDs has been evolved even further, and these devices feature increased sensitivity not only to visible light, but in the near infrared region as well. Compared to Sony's conventional ICX258/259 products, the ICX658/659 achieve increased sensitivities of +10% in the visible range, and +4.5 dB in the near infrared (wavelength: 950 nm). (See photograph 1.)

We hope the ICX658/659, which can make effective use of the near infrared light invisible to the human eye, will make new applications possible in the image sensing field.

Figure 1 presents a comparison of the

ICX658/659 spectral sensitivity characteristics and figure 2 shows the spectral characteristics of the increases in sensitivity provided by the ICX658/659 with the ICX258/259.

### ■ Excellent Compatibility with Conventional Sony Products

The ICX658/659 were designed to minimize as much as possible any difficulties in their use as replacements for the ICX258/259. In particular, the image size, pixel counts, recommended drive timings, pin configuration, and package are all identical. (See table 1.)

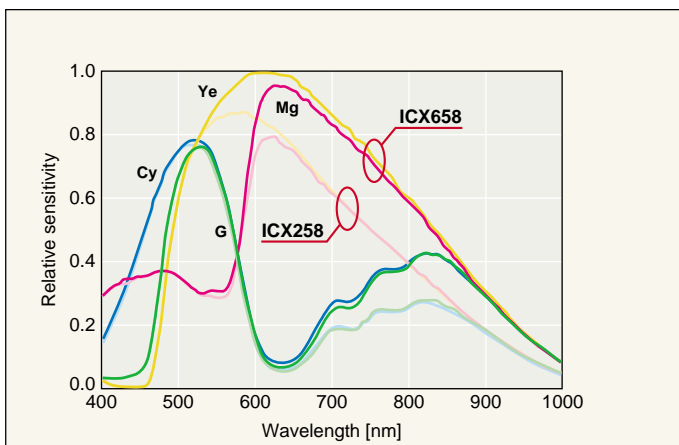
We strongly recommend that customers currently using the ICX258/259 look into the performance of the new generation EXview HAD CCD ICX658/659 image sensors.

## V O I C E

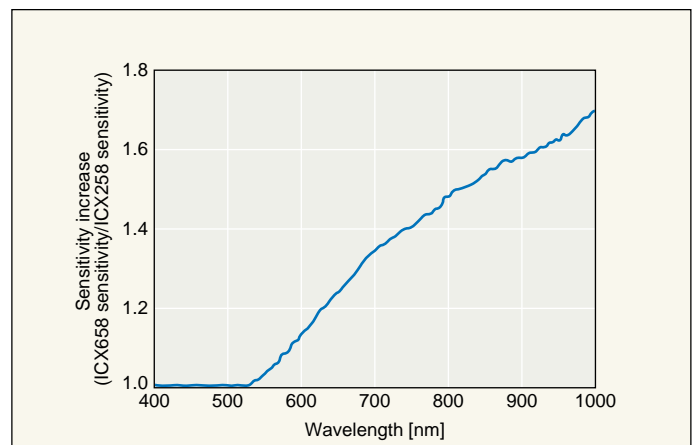
The performance of the CCD image sensors used in monitoring applications is directly linked to the performance of these crime-prevention cameras. Thus I found this a rewarding development effort, since it may lead to a social contribution in improved crime prevention. I was just one of the many people involved in this project. I strongly urge that you take advantage of the superb performance of the ICX658/659, which incorporate the enthusiasm and spirit of many of us here at Sony.



■ Photograph 1 Image Comparison



■ Figure 1 Spectral Sensitivity Characteristics Comparison



■ Figure 2 Spectral Analysis of the Increased Sensitivity

■ Table 1 Device Structure Comparison

| Item                       | ICX258AK/AL                                      | ICX658AKA/ALA                    | ICX259AK/AL                | ICX659AKA/ALA |
|----------------------------|--|----------------------------------|----------------------------|---------------|
| Image size                 | Diagonal 6 mm (Type 1/3)                         | ←                                | ←                          | ←             |
| TV format                  | NTSC/EIR   | ←                                | PAL/CCIR                   | ←             |
| Transfer method            | Interline transfer                               | ←                                | ←                          | ←             |
| Total number of pixels     | Approx. 410K (811H × 508V)                       | ←                                | Approx. 470K (795H × 596V) | ←             |
| Number of effective pixels | Approx. 380K (768H × 494V)                       | ←                                | Approx. 440K (752H × 582V) | ←             |
| Number of active pixels    | Approx. 370K (754H × 485V)                       | ←                                | Approx. 420K (738H × 575V) | ←             |
| Chip size                  | 6.00 mm (H) × 4.96 mm (V)                        | ←                                | ←                          | ←             |
| Unit cell size             | 6.35 μm (H) × 7.40 μm (V)                        | ←                                | 6.50 μm (H) × 6.25 μm (V)  | ←             |
| Optical black              | Horizontal                                       | Front: 3 pixels, rear: 40 pixels | ←                          | ←             |
|                            | Vertical   | Front: 12 pixels, rear: 2 pixels | ←                          | ←             |
| Number of dummy bits       | Horizontal: 22<br>Vertical: 1 (Even fields only) | ←                                | ←                          | ←             |
| Horizontal drive frequency | 14.3182 MHz                                      | ←                                | 14.1875 MHz                | ←             |
| Package                    | 16-pin DIP (Plastic)                             | ←                                | ←                          | ←             |

■ Table 2 Imaging Characteristics Comparison

**Color Products**

| Item               | ICX258AK | ICX658AKA | Improvement   |
|--------------------|----------|-----------|---|
| Sensitivity (F5.6) | 1100 mV  | 1200 mV   | <b>+0.8 dB</b><br>At a wavelength of 950 nm<br><b>+4.5 dB</b> |
| Saturation signal  | 1000 mV  | 1000 mV   | Equivalent to above   |
| Smear (F5.6)       | -115 dB  | -115 dB   | Equivalent to above   |

**B/W Products**

| Item              | ICX258AL | ICX658ALA | Improvement   |
|-------------------|----------|-----------|---|
| Sensitivity (F8)  | 1000 mV  | 1100 mV   | <b>+0.8 dB</b><br>At a wavelength of 950 nm<br><b>+4.5 dB</b> |
| Saturation signal | 1000 mV  | 1000 mV   | Equivalent to above   |
| Smear (F8)        | -115 dB  | -115 dB   | Equivalent to above   |