Drive Current Switching Function Added to High-Speed Low-Power CCD Image Sensor Output Drive Buffer IC for Digital Still Cameras

CXA3741UR

In 2005, Sony developed and released the CXA3691EN high-speed low-power CCD image sensor output drive buffer IC ("buffer IC") that was fabricated in Sony's unique high-speed, high-voltage handling complementary bipolar process. This buffer IC was highly regarded by digital still camera designers.
To respond to desires for even higher power efficiency, Sony is now releasing the new CXA3741UR buffer IC, which adds switching functions for both the output drive current and input sink current. This product achieves even higher levels of power savings by reducing current consumption at times other than tripping shutter.

- **Reduced power consumption: 24 mW*1**
- **Output drive current switching control (new function)**
- **Input sink current switching control (new function)**
- **Miniature QFN package (2.3 mm square)**

*1: When used with a 15 V power supply, at room temperature, and with 220 kΩ external resistors connected to IDRV0/1.

Push-Pull Drive

Conventionally, a discrete emitter follower circuit such as that shown in figure 1(a) has been used for the CCD image sensor output buffer. Since the constant-current value in the pull direction limits the slew rate in this circuit, the waveform can be degraded, and noise and distortion introduced. (See figure 2.) To maintain the waveform, the constant-current value, that is, the current consumption, must be increased.
In contrast, this Sony CCD buffer IC adopts a push-pull drive structure (figure 1(b)) and thus the drive current in both the push and pull directions changes according to the input waveform. As a result, the current consumption can be held to the absolute minimum required. This can resolve the strong tradeoff limitation between the length of the flexible PC board the CCD image sensor is mounted on and the power consumption.

Output Drive Current Switching Control (new function)

In response to strong desires from users, Sony added an output drive current switching function to the CXA3741UR. This makes even further power reductions possible by switching the current in response to intermittent operation or dynamic clock rate switching.
In the CXA3691EN, the output drive current was determined by an external resistor, while in contrast, two external resistors can be connected to the CXA3741UR. (These are the external resistors connected to the IDRV0 and IDRV1 pins shown in figure 3.) The resistor used is selected with the logic state input to the DRVCNT pin.

Input Sink Current Switching Control (new function)

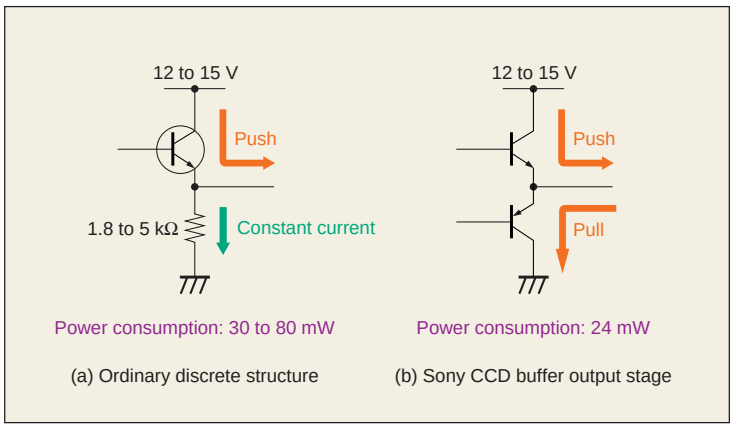
The CXA3691EN provides an input pin sink current for open source output type CCD image sensors. The CXA3741UR adds a switching function for this input sink current. This is controlled in a similar manner to the output drive current switching function. (The SFCNT pin selects between the two resistors connected to the ISF0 and ISF1 pins.)

Miniature QFN package (2.3 mm square)

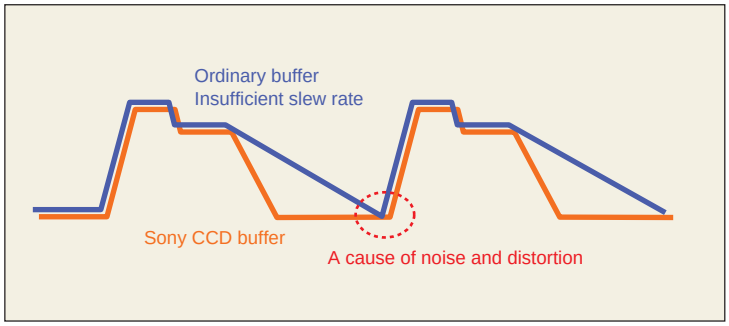
All of these functions are integrated in a 2.3 mm square QFN package. This is a size that can be easily mounted along with the peripheral components on the flexible PC board that mounts the CCD image sensor.

V O I C E

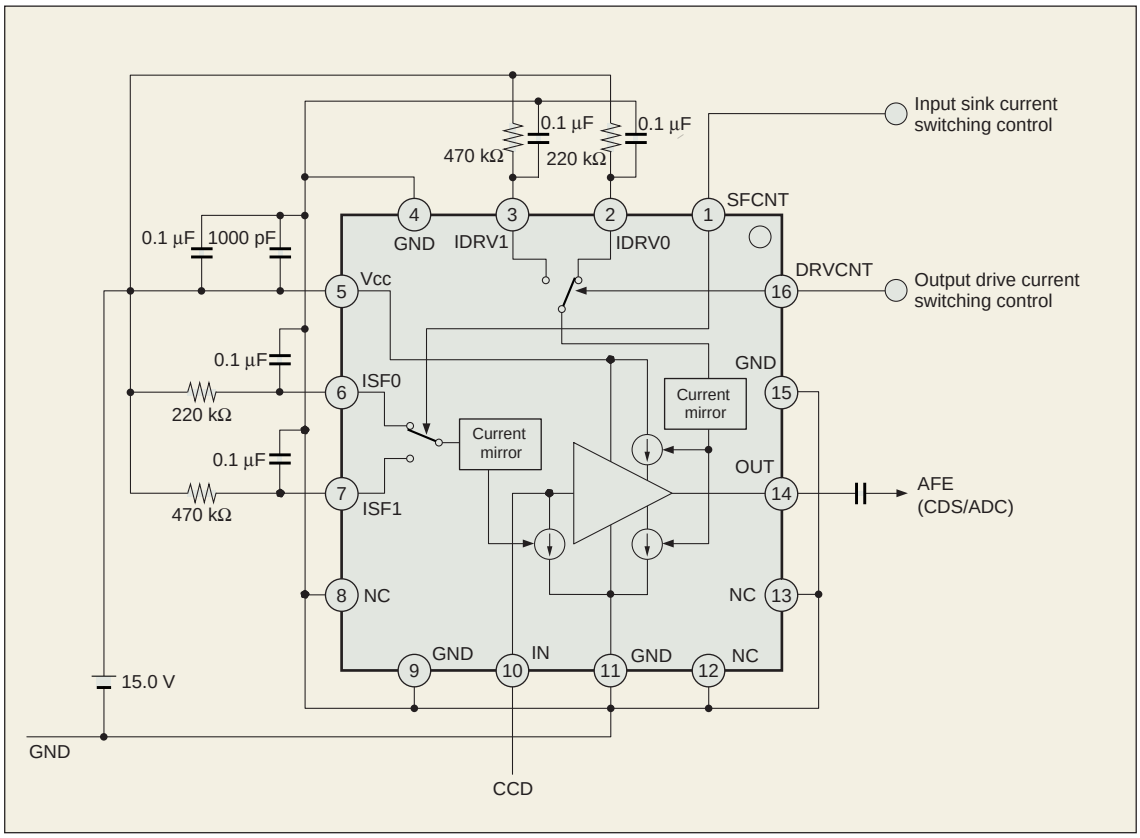
Although progress has been steady in reducing the power requirements in semiconductor products for use in digital still cameras, the CCD image sensor buffer circuit was the last remaining impediment to power reduction. Thus I strongly recommend that you try the CXA3741UR. If you don't need the current switching function, I recommend the CXA3691EN.



■ **Figure 1 CCD Buffer Circuit Structure Comparison**



■ **Figure 2 Buffered CCD Image Sensor Output Waveform**



■ **Figure 3 Function Blocks and Application Circuit Example**