

## **Application Note**

### **Migration to the Blue Plus Sensors: KAF-1600 and KAF-0400**

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## Introduction

Image Sensor Solutions introduced the Blue Plus series of full-frame sensors in 1998. These sensors have improved sensitivity and broader spectral response compared to the previously offered full-frame devices. The improvement is the result of a new manufacturing process that utilizes a transparent gate electrode as a replacement for one of the standard polysilicon gate electrodes. The new Blue Plus sensors are mostly compatible with the original full-frame sensors. The purpose of this document is to detail the operational differences between the two families of sensors.

## 1.0 General Operating Conditions

The recommended operating voltages have been updated in the specifications. These changes are partly the result of a consolidation of operating inputs across the family of full frame designs in combination with recommending voltages for the widest range of applications (e.g. binning 2x2 of large signals, slow scan cooled operation, room temperature fast read outs, etc). The voltages that were updated for this reason are Vss, Vrd, Vguard and ØR. Other changes to the input requirements are necessary for correct operation using the new manufacturing technology. Two input signals of note are Vog and the ØV clocks. The recommended Vog voltage has been increased from a nominal of 3 volts to 4 volts. Charge transfer inefficiency may result if the Vog potential is not at an adequate positive potential. The low level of the ØV clocks is reduced from -8 volts to -10 volts. This is required to achieve a low and uniform dark current in the photoactive area.

## 2.0 KAF-0401E

The Blue Plus KAF-0401E is mostly mechanically and electrically compatible with the older KAF-0400 sensor. Some minor differences are described below.

### 2.1 Focal Plane Position

The silicon substrates used in the manufacture of the KAF-0401 and KAF-0401E sensors are thicker than those used in the manufacture of the KAF-0400. The same package is used for all of these sensors therefore the focal plane on the new sensors has moved closer to the top of the package and cover glass by 6 mils (125 microns).



## 2.2 Additional Vsub connection

There is Vsub connection on pin 11. This is from an internal package connection and was incorrectly identified as a "No connect" in prior documentation.

## 3.0 KAF-1602E

The Blue Plus KAF-0401E is mostly mechanically and electrically compatible with the older KAF-1600 sensor. Some minor differences are described below.

### 3.1 Package Modifications

The KAF-1602E package has been modified to accept the thicker silicon die to preserve the focal plane position with respect to the top surface of the package. The pin spacing and functions remain the same. The ceramic body of the package was modified to be more compact. The thinner package protrusion or 'wings' on the KAF-1600 have been removed to produce a package that is more similar to the other dual in line packages used for Kodak image sensors.

### 3.2 Additional Vsub Connection

There is Vsub connection on pin 11. This is from an internal package connection and was incorrectly identified as a "No connect" in prior documentation.

## 4.0 Spectral Response

The improvement in the spectral response is shown in figures 1 and 2 for the one hundred percent fill factor and the anti-blooming versions of the full-frame sensors.



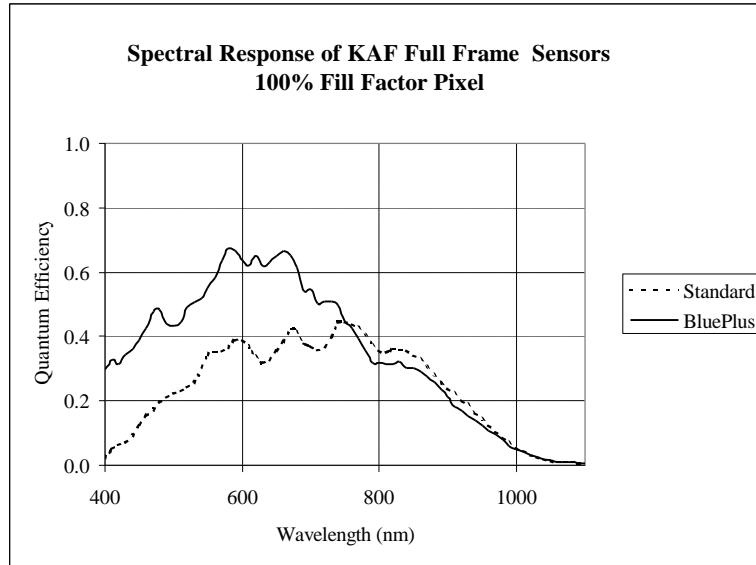


Figure 1: Spectral Response - 100% Fill Factor Full-Frame Sensors.

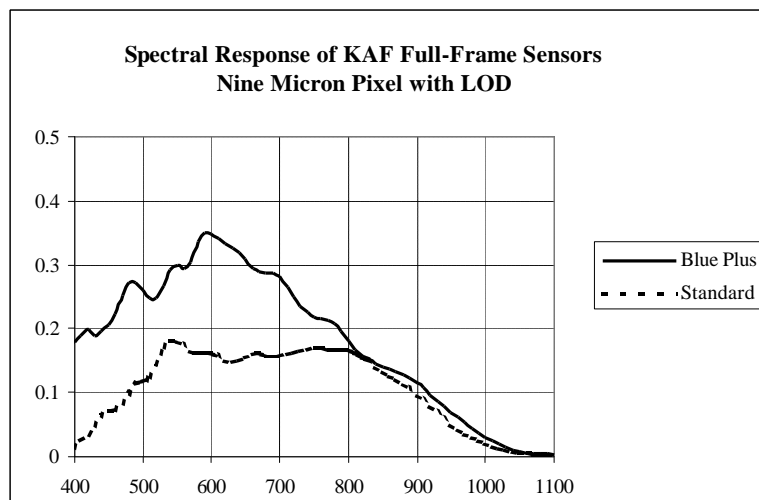


Figure 2: Spectral Response - Full-Frame Sensors with Anti-Blooming.



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