



Outgoing Defect Specification

MT9T031

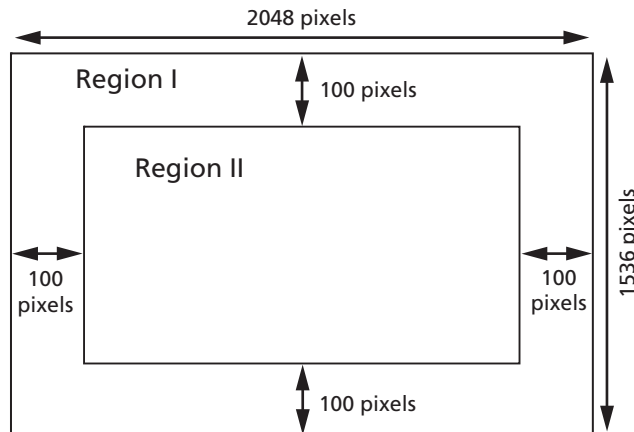
Introduction

This document defines outgoing defect specifications for Micron’s MT9T031 CMOS digital image sensor. The sensor defect regions, as well as types of pixel and cluster defects, are defined.

Sensor Defect Specifications

The sensor array is partitioned into two regions: Region I and Region II. These dimensions are defined in Figure 1.

Figure 1: Sensor Array





Defect Specifications

Table 1 specifies the allowable number of defects for each of the regions defined in Figure 1 on page 1.

Table 1: Defect Specification with Defect Correction Disabled (Bayer Format)
Operating condition $T_j = 25^\circ\text{C} (\pm 3^\circ\text{C})$

Defect Definition	Number of Defects		Definition Number ¹
	Region I	Region II	
Very hot, very bright, or very dark pixel defects	Total ≤ 75		1, 3, 5
Hot or bright pixel defects	Total ≤ 100		2, 4
Dark pixel defects	Total ≤ 75		6
Dark row defects	0	0	10
Dark or very dark clusters	0	0	8, 7
Row defects	0	0	9

Notes: 1. For definitions of defects, see "Defect Definitions in Bayer Format" on page 3.



Defect Definitions in Bayer Format

Defect definitions with no defect correction are defined in this section.

Definition 1: Very Hot Pixel Defect

A very hot pixel defect is defined as any single pixel that is 80 least significant bits (LSB) above the mean value of the array when the sensor is operated under no illumination. (Analog gain = 1X; exposure time = 65ms)

Definition 2: Hot Pixel Defect

A hot pixel is defined as any single pixel that is 50 LSBs above the mean value of the array when the sensor is operated under no illumination. (Analog gain = 1X; exposure time = 65ms)

Definition 3: Very Bright Pixel Defect

The sensor is illuminated to midlevel condition, about 400 LSBs to 700 LSBs. Within a color plane, each pixel is compared to the mean of the neighboring 11 x 11 pixels. If the pixel value is 25 percent or more above the mean, it is considered a very bright pixel defect. (Analog gain = 1X; exposure time = 65ms)

Definition 4: Bright Pixel Defect

The sensor is illuminated to midlevel condition, about 400 LSBs to 700 LSBs. Within a color plane, each pixel is compared to the mean of the neighboring 11 x 11 pixels. If the pixel value is between 15 percent and 25 percent above the mean, it is considered a bright pixel defect. (Analog gain = 1X; exposure time = 65ms)

Definition 5: Very Dark Pixel Defect

The sensor is illuminated to midlevel condition, about 400 LSBs to 700 LSBs. Within a color plane, each pixel is compared to the mean of the neighboring 11 x 11 pixels. If the pixel value is 25 percent or more below the mean, it is considered a very dark pixel defect. (Analog gain = 1X; exposure time = 65ms)

Definition 6: Dark Pixel Defect

The sensor is illuminated to midlevel condition, about 400 LSBs to 700 LSBs. Within a color plane, each pixel is compared to the mean of the neighboring 11 x 11 pixels. If the pixel value is between 15 and 25 percent below the mean, it is considered a dark pixel defect. (Analog gain = 1X; exposure time = 65ms)

Definition 7: Very Dark Cluster

Using the definition 6 results, the defects within each color plane are examined. If any two adjacent pixels that are considered very dark pixel defects are detected, they are then defined as a very dark cluster.

Definition 8: Dark Cluster

Using the definition 7 results, the defects within each color plane are examined. If any two adjacent pixels that are considered dark pixel defects are detected, they are then defined as a dark cluster.



Definition 9: Row Defect

The sensor is illuminated to midlevel condition, about 400 LSBs to 700 LSBs. An array row is considered defective if the mean of the row is greater than 4 LSBs or less than 4 LSBs of the mean of either of the immediately adjacent rows of the same color plane. (Analog gain = 1X; row-wise black level correction turned on, exposure time = 65ms)

Definition 10: Dark Row Defect

An array row is considered defective if the mean of the row is greater than 4 LSBs or less than 4 LSBs of the mean of either of the immediately adjacent rows of the same color plane under no illumination. (Analog gain = 1X; row-wise black level correction turned on, exposure time = 65ms)



Cluster Defects

Figure 2 and Figure 3 represent the same sub-area of pixels. Figure 2 represents the raw pixel output; Figure 3 represents the pixel output separated by color plane.

Clusters are analyzed by looking at one particular pixel and its surrounding eight adjacent pixels within the same color plane, as seen in Figure 3. For example, if the center pixel is a very dark pixel and any of its surrounding eight pixels within the same color plane are very dark pixels, then it is defined as a very dark cluster.

For definitions 1–10 (“Defect Definitions in Bayer Format” on page 3), each of red, greenR, greenB, and blue color planes shown in Figure 3 are analyzed.

Figure 2: Raw Pixel Output

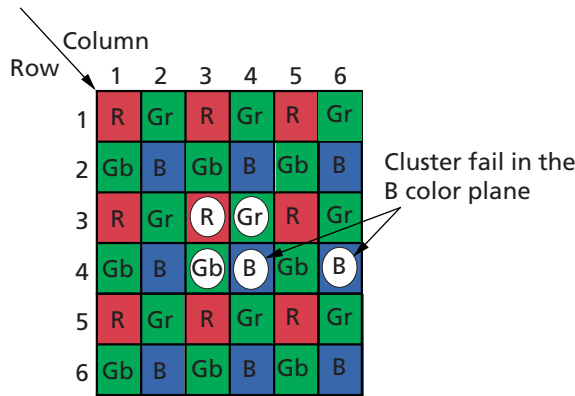
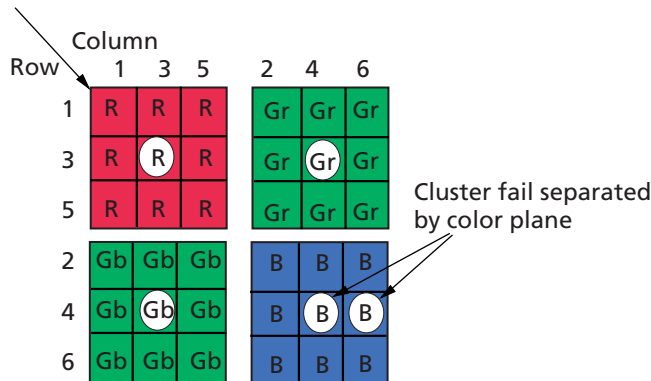


Figure 3: Raw Pixel Output Separated by Color Plane



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Revision History

Rev. A 02/14/2007

- Initial release