Outgoing Defect Specification

MT9V032 Bayer Color
Part Number: MT9V032C12STC

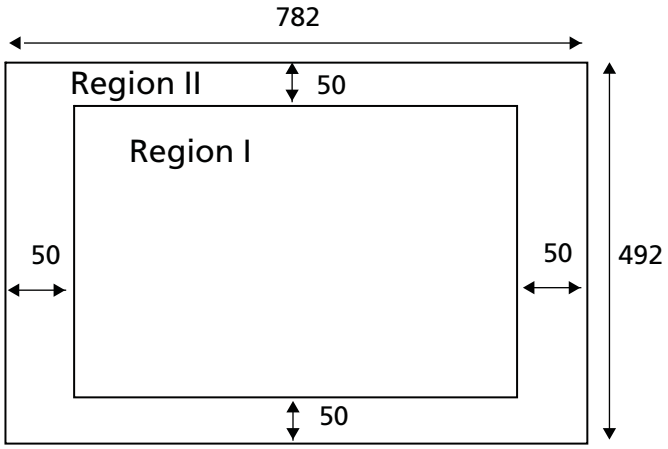
Introduction

This document defines outgoing defect specifications for the Micron® MT9V032 Bayer color image sensor. It applies specifically to the MT9V032C12STC sensor. The sensor defect regions as well as types of pixel cluster defects are defined.

Sensor Defects

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 summarizes the defect correction.

Table 1: Defect Specification

Defect Definition	Region		Test Number
	I	II	
Very Hot, Very Bright, or Very Dark pixel defect	Total ≤ 30		1, 3, 5
Hot or Bright pixel defect	Total ≤ 30		2, 4
Dark pixel defect	Total ≤ 30		6
Slow Saturating pixel defects	Total ≤ 30		7
Bright cluster	0	0	8
Dark clusters	0	0	9
Total defect of all types	Total ≤ 30		

Note: All specifications address operation is at T_A = 25°C (±3°C) and supply voltage = 3.3V. Image sensor is tested without a lens. Multiple images are captured and analyzed. Setup: V_{DD} = V_{AA} = VAAPIX = VAAPLL = $LVDSV_{DD}$ = 3.3V. Testing is done with default register settings and default frame timing.

Defect Definitions in Bayer Format

Test 1: Very Hot Pixel Defect

A very hot pixel defect is defined as any single pixel that is greater than 500 LSBs above the mean value of the array when the sensor is operated under no illumination. (Analog gain = 4x; exposure time = 20ms)

Test 2: Hot Pixel Defect

A hot pixel is defect is defined as any single pixel that is greater than 120 LSBs above the mean value of the array when the sensor is operated under no illumination. (Analog gain = 4x; exposure time = 20ms)

Test 3: Very Bright Pixel Defect

The sensor is illuminated to midlevel, average light intensity about 512 LSBs. Within a color plane, each pixel is compared to the mean of the neighboring 11 x 11 pixels. If the pixel value is more than 25 percent above the mean, it is considered a very bright pixel defect.
(Analog gain = 1; exposure time = 1ms)

Test 4: Bright Pixel Defect

The sensor is illuminated to midlevel, average light intensity about 512 LSBs. Within a color plane, each pixel is compared to the mean of the neighboring 11 x 11 pixels. If the pixel value is more than 15 percent but less than 25 percent above the mean, it is considered a bright pixel defect.
(Analog gain = 1; exposure time = 1ms)

Test 5: Very Dark Pixel Defect

The sensor is illuminated to midlevel, average light intensity about 512 LSBs. Within a color plane, each pixel is compared to the mean of the neighboring 11 x 11 pixels. If the pixel value is more than 25 percent below the mean, it is considered a very dark pixel defect.
(Analog gain = 1; exposure time = 1ms)

Test 6: Dark Pixel Defect

The sensor is illuminated to midlevel, average light intensity about 512 LSBs. Within a color plane, each pixel is compared to the mean of the neighboring 11 x 11 pixels. If the pixel value is more than 15 percent but less than 25 percent below the mean, it is considered a dark pixel defect.
(Analog gain =1; exposure time = 1ms)

Test 7: Slow Saturating Pixel Defect

The sensor is illuminated to near saturation, about 900 LSBs. Within the green color planes, each pixel is compared to the mean of both green planes. If the pixel value is more than 10 percent below the mean, it is considered a slow saturating pixel defect.
(Analog gain =1; exposure time = 1ms)

Test 8: Bright Cluster

Using Test 3 and 4 results, the defects within each color plane are examined. If any two adjacent pixels that are considered bright or very bright pixel defects are detected, they are then defined as a bright cluster.

Test 9: Dark Cluster

Using Test 5 and 6 results, the defects within each color plane are examined. If any two adjacent pixels that are considered dark or very dark pixel defects are detected, they are then defined as a dark cluster.

Cluster Defects

The figures below represent the same sub-area of pixels. The 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 8 pixels within the same color plane are very dark pixels then it is defined as a very dark cluster.

For the defect definitions in "Defect Definitions in Bayer Format" on page 2, each of R, Gr, Gb, B color planes shown in Figure 3 are analyzed.

Figure 2: Raw Pixel Data

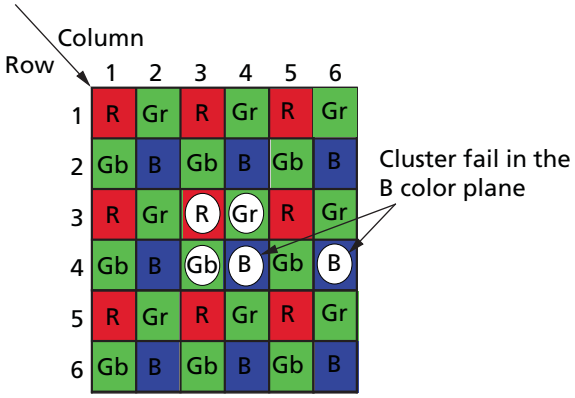
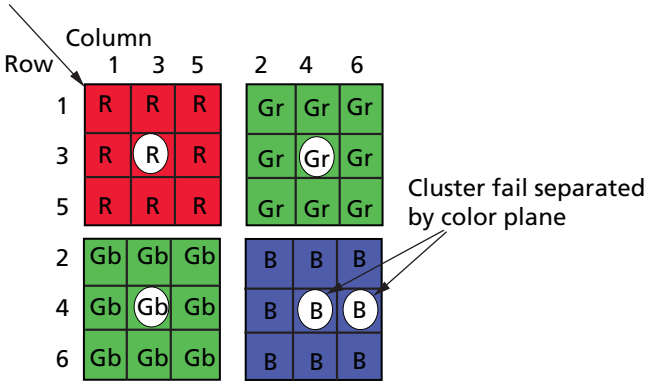


Figure 3: Pixel Output Separated by Color Plane



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Revision History

Rev. A 4/30/2007

- Initial release