



# Outgoing Defect Specification

## MT9V022

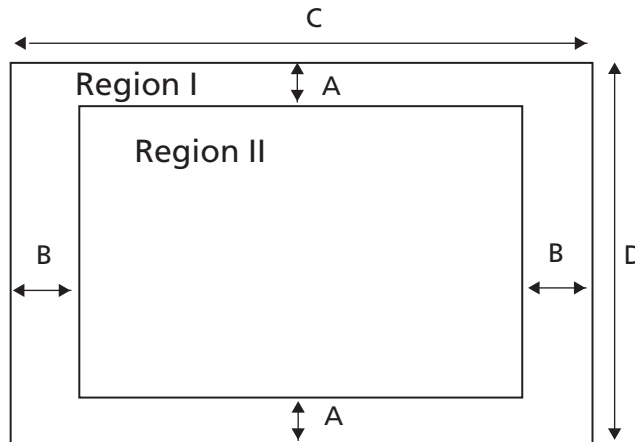
### Introduction

This document defines outgoing defect specifications for the Micron® MT9V022 image sensor. The sensor defect regions as well as types of pixel and 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**



Note: A = 50 pixels (vertical spacing of Region I to Region II).  
 B = 50 pixels (horizontal spacing of Region I to Region II).  
 C = 782 pixels.  
 D = 492 pixels.



## Defect Specifications

Table 1 summarizes each type of defect.

**Table 1: Defect Specification**

Defect Types	Region		Test Number
	I	II	
Very hot pixel defect	Total $\leq 10$		1
Hot pixel defect	Total $\leq 30$		2
Very bright pixel defect	Total $\leq 10$		3
Bright pixel defect	Total $\leq 30$		4
Very dark pixel defect	Total $\leq 10$		5
Dark pixel defect	Total $\leq 30$		6
Slow saturating pixel defect	Total $\leq 30$		7
Bright cluster	0	0	8
Dark cluster	0	0	9

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

## Defect Definitions

### 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, about 512 LSBs. Each pixel is compared to the mean of the neighboring 11 x 11 pixels. If the pixel value is more than 22 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, about 512 LSBs. Each pixel is compared to the mean of the neighboring 11 x 11 pixels. If the pixel value is more than 11 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, about 512 LSBs. Each pixel is compared to the mean of the neighboring 11 x 11 pixels. If the pixel value is more than 22 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, about 512 LSBs. Each pixel is compared to the mean of the neighboring 11 x 11 pixels. If the pixel value is more than 11 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 925 LSBs. Each pixel is compared to the mean of the entire active array. 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 4 results, the defects are examined. If any two adjacent pixels that are considered bright pixel defects are detected, they are then defined as a bright cluster.

**Test 9: Dark Cluster**

Using Test 6 results, the defects are examined. If any two adjacent pixels that are considered dark pixel defects are detected, they are then defined as a dark cluster.

## Document Change History

**Table 2: Document Change History**

Revision	Effective Date	Description
D	8/15/06	Table 1 simplified, Test 7 added, typos fixed.
C	11/25/05	Preliminary release of Rev C. Converted document to standard format.
B	3/23/05	Changed defect definitions 1 and 2 to "gain = 4".
A	3/8/05	Preliminary release of document.



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