Outgoing Defect Specification

MT9M002 (Monochrome Format)

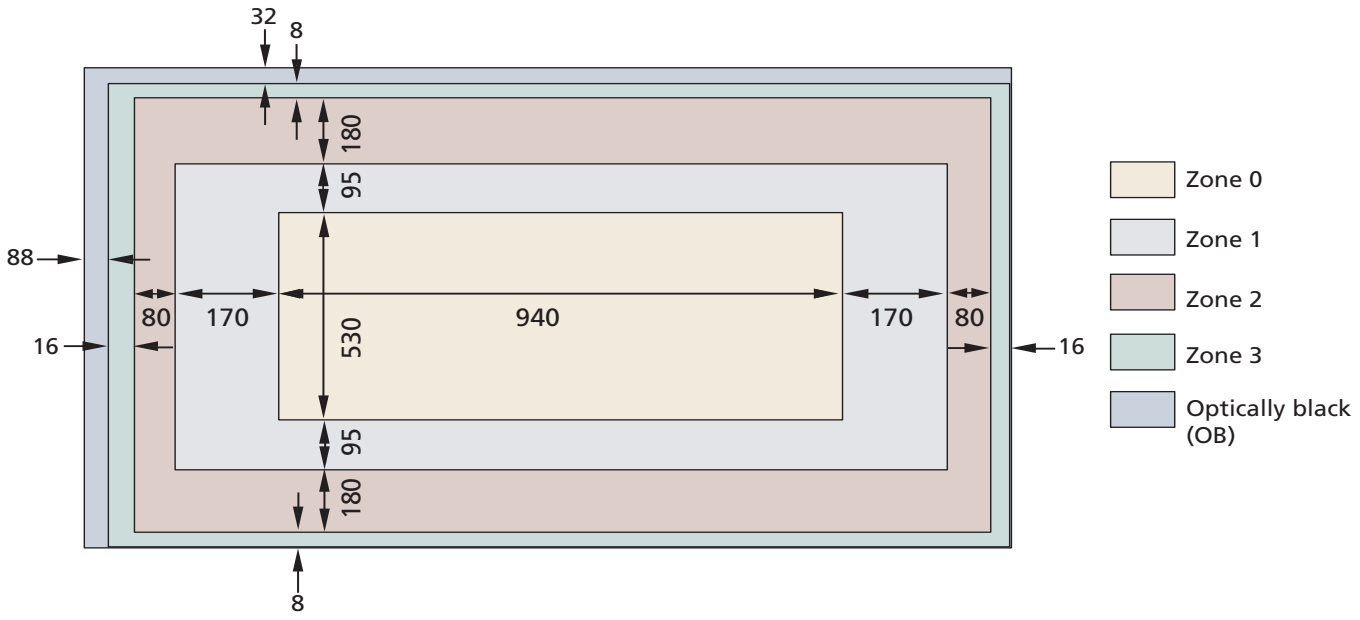
Introduction

This document defines outgoing defect specifications for Micron's MT9M002I12STM and MT9M002I12STMU monochrome format image sensors. The sensor defect regions, as well as types of pixel and cluster defects, are defined.

Sensor Array Zones

The sensor array is partitioned into five zones: Zone 0, Zone 1, Zone 2, Zone 3, and OB (optically black). These dimensions are defined in Figure 1. The center of Zone 0 is the center of the active pixel area.

Figure 1: Sensor Array



Defect Specifications

Table 1 specifies the allowable number of defects for each of the zones defined in Figure 1 on page 1, for the MT9M002I12STM and MT9M002I12STMU monochrome format image sensors.

Note:

Table 1: Grade A Defect Specification (Monochrome Format)

Defect Definition	Number of Defects					Test Number
	Zone 0	Zone 1	Zone 2	Zone 3	OB	
Very (hot) pixel defect	3	3	5	–	–	1
(Hot) pixel defect	15	15	20	–	–	2
(Warm) pixel defect	25	25	30	–	–	3
Very (bright) pixel defect	6	6	10	–	–	4
(Bright) pixel defect	10	10	15	–	–	5
Very (dark) pixel defect	6	6	10	–	–	6
(Dark) pixel defect	10	10	15	–	–	7
Cluster	0	0	0	–	–	8

Note: All specifications address operation at V_{AA}/V_{AA_PIX}/V_{DD_PLL}/ V_{DD_IO} = 2.8V and V_{DD} = 1.8V and 12-bit ADC. Image sensor is tested without a lens. Multiple images are captured and analyzed in monochrome format. The sum total number of very hot, hot, and warm defects is not to exceed 128 total defects.

Defect Definitions in Monochrome Format

Test 1: Very Hot Pixel Defect

A very hot pixel defect is defined as any single pixel that is greater than 1280 LSBs above the dark pedestal when the sensor is operated under no illumination.
(Analog gain = 8x; exposure time = 33ms, T_J = 55ºC)

Test 2: Hot Pixel Defect

A hot pixel is defined as any single pixel that is greater than 204 LSBs and less than or equal to 1280 LSBs above the dark pedestal when the sensor is operated under no illumination. (Analog gain = 8x; exposure time = 33ms, T_J = 55ºC)

Test 3: Warm Pixel Defect

A warm pixel is defined as any single pixel that is greater than 120 LSBs and less than or equal to 204 LSBs above the dark pedestal when the sensor is operated under no illumination. (Analog gain = 8x; exposure time = 33ms, T_J = 55ºC)

Test 4: Very Bright Pixel Defect

The sensor is illuminated to approximately one fourth saturation, about 1024 LSBs. Each pixel is compared to the mean of the neighboring 11 x 11 pixels. If the pixel value is greater than 9 percent above the mean, it is considered a very bright pixel defect.
(Analog gain = 1; exposure time = 33ms, T_J = 40ºC)

Test 5: Bright Pixel Defect

The sensor is illuminated to approximately one fourth saturation, about 1024 LSBs. Each pixel is compared to the mean of the neighboring 11 x 11 pixels. If the pixel value is greater than 7 percent or less than 9 percent or more above the mean, it is considered a bright pixel defect.
(Analog gain = 1; exposure time = 33ms, T_J = 40ºC)

Test 6: Very Dark Pixel Defect

The sensor is illuminated to approximately one fourth saturation, about 1024 LSBs. Each pixel is compared to the mean of the neighboring 11 x 11 pixels. If the pixel value is greater than 9 percent below the mean, it is considered a very dark pixel defect.
(Analog gain = 1; exposure time = 33ms, Tj = 40ºC)

Test 7: Dark Pixel Defect

The sensor is illuminated approximately one fourth saturation, about 1024 LSBs. Within a color plane, each pixel is compared to the mean of the neighboring 11 x 11 pixels. If the pixel value is greater than 7 percent and less than 9 percent below the mean, it is considered a dark pixel defect. (Analog gain = 1; exposure time = 33ms, T_J = 40ºC)

Test 8: Cluster

Any two adjacent defective pixels that are under the same illumination conditions, as defined in Tests 1 through 3, or Tests 4 through 7 above, are defined as a cluster.

Revision History

- **Rev. A 05/21/2007**
  - Initial release

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