Mimosa32 N1 & N2

Mimosa32_N Quick description

- 32 blocks of 64 rows x 16 columns
- Goals: study of noises thermal and RTN
- 3T pixels with NMOS and PMOS Source-Follower in each pixel
  - (effect mainly visible on small transistor size)
- N1 with diodes and N2 without diodes

![Circuit Diagram]

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Sensor steering signals
(Same pinout that mimosa32Ter)

Power
The analog GND are not display here

Analog Ref

Array Address: static

Digital Inputs

Analog 1.8 Volts

Digital

Pads output

For diode pad protection

Analog Data Outputs (*16)

Outputs markers

*signal or alimentation not need for this sensor
Pixels proposal:

- 3 sizes of L: 0.18, 0.36, 0.72
- 3 sizes of W: 0.5, 1.0, 2.0
- 3 sizes of H shapes: 0.09, 0.18, 0.32
- 3 sizes of new enclosed: 0.0, 0.05, 0.2
- 1 standard ELT
- 1 regular MOS, ELT equivalent

9 types of pixels

2048 pixels each

1024 pixels

1024 pixels

Eq. 32 sub-arrays of 1024 pixels
## Pixel Liste

<table>
<thead>
<tr>
<th>Pixel Type Number</th>
<th>Pixel Type</th>
<th>Array Number</th>
<th>Diode Type (see page 6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>L=0.18u/W=0.5u</td>
<td>Arr1</td>
<td>LargeAA</td>
</tr>
<tr>
<td>2</td>
<td>L=0.18u/W=1.0u</td>
<td>Arr2</td>
<td>LargeAA</td>
</tr>
<tr>
<td>3</td>
<td>L=0.18u/W=2.0u</td>
<td>Arr3-Arr4</td>
<td>LargeAA</td>
</tr>
<tr>
<td>4</td>
<td>L=0.36u/W=0.5u</td>
<td>Arr5-Arr6</td>
<td>MediumLargeAA</td>
</tr>
<tr>
<td>5</td>
<td>L=0.36u/W=1.0u</td>
<td>Arr7-Arr8</td>
<td>MediumLargeAA</td>
</tr>
<tr>
<td>6</td>
<td>L=0.36u/W=2.0u</td>
<td>Arr9-Arr10</td>
<td>MediumSmallAA</td>
</tr>
<tr>
<td>7</td>
<td>L=0.72u/W=0.5u</td>
<td>Arr11-Arr12</td>
<td>MediumSmallAA</td>
</tr>
<tr>
<td>8</td>
<td>L=0.72u/W=1.0u</td>
<td>Arr13-Arr14</td>
<td>SmallAA</td>
</tr>
<tr>
<td>9</td>
<td>L=0.72u/W=2.0u</td>
<td>Arr15-Arr16</td>
<td>SmallAA</td>
</tr>
<tr>
<td>10</td>
<td>H shape d=0.05u</td>
<td>Arr17-Arr18</td>
<td>SmallAA</td>
</tr>
<tr>
<td>11</td>
<td>H shape d=0.1u</td>
<td>Arr19-Arr20</td>
<td>SmallAA</td>
</tr>
<tr>
<td>12</td>
<td>H shape d=0.2u</td>
<td>Arr21-Arr22</td>
<td>MediumSmallAA</td>
</tr>
<tr>
<td>13</td>
<td>square shape d=0.0u</td>
<td>Arr23-Arr24</td>
<td>MediumSmallAA</td>
</tr>
<tr>
<td>14</td>
<td>square shape d=0.05u</td>
<td>Arr25-Arr26</td>
<td>MediumLargeAA</td>
</tr>
<tr>
<td>15</td>
<td>square shape d=0.15u</td>
<td>Arr27-Arr28</td>
<td>MediumLargeAA</td>
</tr>
<tr>
<td>16</td>
<td>ELT</td>
<td>Arr29-Arr30</td>
<td>LargeAA</td>
</tr>
<tr>
<td>17</td>
<td>regular ELT equivalent</td>
<td>Arr31-Arr32</td>
<td>LargeAA</td>
</tr>
</tbody>
</table>
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The diode area is 10.9 µm²
With an octagonal shape

Some variation were done
On the STI layer covering
The diode

Large AA

Medium Large AA

Medium Small AA

Small AA
Sensor specificity

* Each pixel has two output via an Nmos or Pmos Source Follower transistor. You can choose which output to read with the Vclamping pad:
  - 0 Volt Pmos
  - 1.8 Volt Nmos
* To control the Pmos and Nmos « line_select » transistor we need a signal and its Complement, the Clp signal is used for this (set Clp at 1)

(see Mimosa32N1/2 User manual Add-On)

Read-Out

In this sensor all the sub_matrices are source follower with a 3T structure
We have 2 way to read it:
- The Self_Bias mode the reset transistor is permantly ON, (permanently reloading) [Global reset set at 1] see page 8-9
- The 3T mode where we need a reset phase (one frame) [Global reset at 0 and the reset is control by Line_Reset] see page 10-11
SF pixel array steering (clock frequency : 2 MHz)

Individual Pixel Array:
16 columns x 64 rows (lines)

Selection between Nmos or Pmos output (see Mimosa32N1/2 User manual Add-On)

Analog_out_bus (x16)
Self-bias mode (Grst=1, Lrst=0): 3T reset transistors in diode setting (permanently “on”)

Integration time (64 clock pulses)

First row

Last row, next frame

Out may be shorted to In on the PCB

The CDS is done by subtracting two consecutive frames
Line-reset mode (Grst=0,): 3T reset transistors activated during line addressing by Lrst pulse. One frame is used to reset all the matrix’s pixel.

Integration time (64 clock pulses)

First row

Last row

First row, next frame

Clock

Example of CDS implementation using Lrst function
Signal = Frame2-Frame1, Frame5-Frame4 etc.