DES-0028.8 – Die ID location on wafer and Foundry label.

- Rules and Conventions -

Issued Date: January 14th 2008
This document contains information about DALSA Semiconductor Inc.’s Die ID location on wafer and Foundry label.

- Rules and Conventions -

This document will be revised and reissued as necessary. DALSA Semiconductor Inc. reserves the right to make changes herein at any time without notice. DALSA Semiconductor Inc. does not assume any responsibility or liability arising out of the application or use of any information contained herein. It's expressly agreed that DALSA Semiconductor Inc. shall in no event be liable for indirect, incidental or consequential damages of any nature whatsoever.
TABLE OF CONTENT

1 INTRODUCTION 4
2 SCOPE 4
3 DEFINITIONS 4
4 REFERENCES 4
5 REQUIRED INFORMATION FOR DIE LOCATION GENERATION 5
  5.1 Introduction 5
  5.2 Die location box area calculation 5
  5.3 Die location box coordinates 6
  5.4 General information 7
  5.5 Die labeling order and special requirements 7
6 LABEL RULES AND TYPE 8
  6.1 Type L1, DALSA Standard 8
  6.2 Type L2, SEMI P23 Standard (floating area) 9
  6.3 Type L3, SEMI P23 Standard (no floating area) 10
  6.4 Type L4, Anisotropics Wet Etch Standard 11
  6.5 Type L5, DALSA for CCD 0.5µm 12

ANNEX A: CHARACTER FONT USED FOR DIE LOCATION REPRESENTATION 13

ANNEX B: DIE LOCATION LABEL ATTRIBUTION 14

ANNEX C: EQUIVALENT ROW NUMBERING TO DALSA LETTER CONVENTION 15
1 Introduction

The purpose of this document is to describe the methodology and conventions used by DALSA Semiconductor to attribute die locations on wafers (4” or 6”), when at least one 1X mask is used and to describe the different alpha numeric pattern type use for labeling during design or mask data preparation at DALSA Semiconductor.

2 Scope

The procedures defined in this document apply to all products received at DALSA Semiconductor that require die locations on wafers (4” or 6”). It enables traceability of each product die position on wafers during manufacturing, subsequent assembly, test steps and potential failures in the field.

The procedure also defined the different alpha numeric pattern type use for traceability. The different pattern design insured proper reading of the information written at each process step.

Please refer to DES-0002 for data submission form and die labelling detail instruction.

3 Definitions

Die ID: label representing product code placed on product die.

Location ID: label placed on product die representing die location on wafer.

Spacing box: box placed around a character to create a spacing with adjacent character.

Die location box: box required to drop-in a label representing a die location on wafer.

4 References

DALSA Semiconductor Document References:

- DES-0001 Terms and conditions for submitting databases to DALSA Semiconductor.
- DES-0002 Required information for submitting databases to DALSA Semiconductor.
- DES-0052 Mask data preparation label type definition.

External Document References:

5 Required information for die location generation

5.1 Introduction

Die locations defining the array position of a product die on the wafer layout are generated using DALSA Semiconductor standard alphanumeric label cells. Letters are used for row identification and numbers for columns. Note that letters I, O, Q, S, X and Z are not used for labelling. By default, labels are drawn on physical layout using metal 1 drawing layer.

Row letters: A B C D E F G H J K L M N P R T U V W Y

Column numbers: 0 1 2 3 4 5 6 7 8 9

5.2 Die location box area calculation

A die location box (rectangle area) must be reserved to receive die location labels. Depending on the number of rows and columns of dies on the wafer (dependent of die size), the required die location box size varies according to table 1.

<table>
<thead>
<tr>
<th>Max Columns</th>
<th>Max Rows</th>
<th>Box X (µm)</th>
<th>Box Y (µm)</th>
<th>Max label</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>20</td>
<td>39.0</td>
<td>30.0</td>
<td>9Y</td>
</tr>
<tr>
<td>99</td>
<td>20</td>
<td>57.0</td>
<td>30.0</td>
<td>99Y</td>
</tr>
<tr>
<td>99</td>
<td>400</td>
<td>78.0</td>
<td>30.0</td>
<td>99YY</td>
</tr>
<tr>
<td>999</td>
<td>400</td>
<td>96.0</td>
<td>30.0</td>
<td>999YY</td>
</tr>
</tbody>
</table>

Table 1: box size calculation
5.3 Die location box coordinates

Specify the coordinates of the center of the die location box relative to a single die cell centered at (0, 0).

In the figure #1 the die location box would have is origin at X = 75.0\,\mu m, Y = 80.0\,\mu m and a size of 40.0\,\mu m by 30.0\,\mu m.
### 5.4 General information

Character font for die location labels can be seen in Annex A.

Labels are attributed to dies as described in Annex B.

Equivalent row numbering to DALSA convention can be seen in Annex C.

### 5.5 Die labeling order and special requirements

For die labelling order and any changes necessary versus DALSA’s Rules and Conventions, please provide us with your specific requirements by completing the "Database Submission Form" section in the DES-0002 document.
6 Label Rules and Type

Every label type can be resized to match minimum feature size and space for a given level.
Final feature size and space: (Base feature or space size * Magnification) * 10

E.g.: A label with a base feature size of 0.1 µm and a magnification of 1:

\[(0.1 \mu m \times 1) \times 10 = 1 \mu m \text{ final feature and space size}\]

6.1 Type L1, DALSA Standard

- This label type is the standard DALSA Semiconductor label.
- Base feature size is 0.1µm and standard spacing is 0.1µm.
- Label contain non Manhatan angles.
- Label contain floating island.

Figure 1: Type L1 label example

L K J I H G F E D C B A
Z Y X W V U T S R Q P O N M
. = - + 9 8 7 6 5 4 3 2 1 0
6.2 Type L2, SEMI P23 Standard (floating area)

- This label type based on SEMI P23-0200 standard (page 19)
- Base feature size is 0.1µm and standard spacing is 0.1µm.
- Label contain only Manhattan angles.
- Label contain floating island.

**Figure 2: Type L2 label example**

```
S T U V W X Y Z . = + -
E F G H I J K L M N O P Q R
0 1 2 3 4 5 6 7 8 9 A B C D
```
6.3 Type L3, SEMI P23 Standard (no floating area)

- This label type based on SEMI P23-0200 standard (page 19)
- Base feature size is 0.1µm and standard spacing is 0.1µm.
- Label contain only Manhattan angles.
- Label contain no floating island.

Figure 3: Type L3 label example
6.4 Type L4, Anisotropics Wet Etch Standard

- This label type based on SEMI P23-0200 standard (page 19)
- Base feature size is 0.1µm and standard spacing is 0.1µm.
- Label contain only Manhatan angles.
- Label contain floating island.
- Those label are to be used with anisotropics wet etch.

Figure 4: Type L4 label example
6.5 Type L5, DALSA for CCD 0.5µm

- This label type is specific for certain layer of the CCD 0.5µm process.
- Base feature size is 0.1µm and standard spacing is 0.1µm.
- Label contain only Manhatan angles.
- Label contain no floating island.

Figure 5: Type L5 label example

```
STUVWXYZ
EFGHIJKLMNOP
QRSTUVWXYZ
```
Annex A: Character font used for die location representation

The standard character font used for die labeling correspond to internal DALSA Semiconductor Type 1 label. Label shown in figure 2 are for reference only and can be modified without notice. Other labels are available upon request for specific applications. Please contact your DALSA Semiconductor representative.

Figure 2: Character font example
Annex B: die location label attribution

Columns are labelled from 1 starting with the leftmost die on the wafer.

Rows are labelled from A starting with the lowest die on the wafer. After row Y, the labelling continues with row AA, AB, to a maximum of YY (400 rows).
In case of die rotation and/or label orientation other then 0° it is possible that the rows and columns label could be inverted. Ex: rows label 1 to 999 and columns A to YY.
Annex C: equivalent row numbering to DALSA letter convention

<table>
<thead>
<tr>
<th>ROW INDEX</th>
<th>ROW NUMBER</th>
<th>ROW INDEX</th>
<th>ROW NUMBER</th>
<th>ROW INDEX</th>
<th>ROW NUMBER</th>
<th>ROW INDEX</th>
<th>ROW NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>B</td>
<td>2</td>
<td>C</td>
<td>3</td>
<td>D</td>
<td>4</td>
</tr>
<tr>
<td>E</td>
<td>5</td>
<td>F</td>
<td>6</td>
<td>G</td>
<td>7</td>
<td>H</td>
<td>8</td>
</tr>
<tr>
<td>J</td>
<td>9</td>
<td>K</td>
<td>10</td>
<td>L</td>
<td>11</td>
<td>M</td>
<td>12</td>
</tr>
<tr>
<td>N</td>
<td>13</td>
<td>P</td>
<td>14</td>
<td>R</td>
<td>15</td>
<td>T</td>
<td>16</td>
</tr>
<tr>
<td>U</td>
<td>17</td>
<td>V</td>
<td>18</td>
<td>W</td>
<td>19</td>
<td>Y</td>
<td>20</td>
</tr>
<tr>
<td>AA</td>
<td>21</td>
<td>AB</td>
<td>22</td>
<td>AC</td>
<td>23</td>
<td>AD</td>
<td>24</td>
</tr>
<tr>
<td>AE</td>
<td>25</td>
<td>AF</td>
<td>26</td>
<td>AG</td>
<td>27</td>
<td>AH</td>
<td>28</td>
</tr>
<tr>
<td>AJ</td>
<td>29</td>
<td>AK</td>
<td>30</td>
<td>AL</td>
<td>31</td>
<td>AM</td>
<td>32</td>
</tr>
<tr>
<td>AN</td>
<td>33</td>
<td>AP</td>
<td>34</td>
<td>AR</td>
<td>35</td>
<td>AT</td>
<td>36</td>
</tr>
<tr>
<td>AU</td>
<td>37</td>
<td>AV</td>
<td>38</td>
<td>AW</td>
<td>39</td>
<td>AW</td>
<td>40</td>
</tr>
<tr>
<td>BA</td>
<td>41</td>
<td>BB</td>
<td>42</td>
<td>BC</td>
<td>43</td>
<td>BD</td>
<td>44</td>
</tr>
<tr>
<td>BE</td>
<td>45</td>
<td>BF</td>
<td>46</td>
<td>BG</td>
<td>47</td>
<td>BH</td>
<td>48</td>
</tr>
<tr>
<td>BJ</td>
<td>49</td>
<td>BK</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>