

858AZ

Reticle Design Description

General Description:

The 858AZ is a Dual Damascene Etch Development Reticle set consisting of two levels, Via-1 and Metal-2. This design includes "Line"; "T"; and Metal-2 Hole structures. Each of these structures are nominally 200um tall and 4000um wide.

This reticle set is designed for damascene development, therefore the Metal-2 reticle is dark field, that is, the Metal-2 lines, T's, and Holes actually print as spaces on the wafer.

Both the Via-1 and Metal-2 level reticles were manufactured targeting 0.25um features.

The die size is 20mm x 20mm. The Floorplan is detailed in Figure 1 and the overall Die per level is pictured in Figure 1a and 1b. It consists of two identical halves.

Each of the halves contain Line, T and Hole structures. See Figure 2a and 2b.

The open area of the Via-1 reticle is 4.0%, the Metal-2 is 17.0%

Since the dual damascene etch development is very depended on the precise overlay of the Metal-2 trench on the underlying Via, all of the structures except the Metal-2 holes have three copies with overlay bracketing in the Y direction. This assures that even though the die may not have zero overlay error in the Y direction, one of the three structures will be usable for etch development. See figures 3a, 3b and 3c for examples of this overlay bracketing. The bracketing shifts the Via by a 0.05um offset in each direction.

Structure Descriptions:

Line:

The Line structures consist of a series of Metal-2 lines with Vias along the length of the line. The widths of these metal lines, and Vias are shown in Table 1.

The Vias in these structures are staggered to permit easy cleaving.

A typical structure detail is shown in Figure 4.

"T":

The "T" structures are similar to the Line structures, except they offer Metal-2 trenches that have corners and T's. The widths of these metal-2 "T's" and underlying Vias are shown in table 1. This permits the study of the etch using structures which are not simple lines.

A typical structure detail is shown in Figure 5.

Metal-2 Hole:

The Metal-2 Hole structures are included to study the difference in etch behavior between the Metal-2 trenches and T's; and these holes. The sizes of these holes are shown in table 1. Note that there are no Vias underlying these holes. A typical structure detail is shown in Figure 6. Note that due to limitations of Lithography, these holes will not resolve with the same sizes as the Metal-2 lines.

Table 1

Note that this table contains “DESIGN SIZES” which do not necessarily reflect the sizes printed on the wafer.

Structure Type	Metal-2 Line Width	Via Size
Line	0.3	0.2
Line	0.4	0.2
Line	0.4	0.225
Line	0.4	0.25
Line	0.45	0.3
Line	0.5	0.35
Line	0.5	0.4
Line	0.6	0.5
“T”	0.3	0.2
“T”	0.4	0.2
“T”	0.4	0.225
“T”	0.4	0.25
“T”	0.45	0.3
“T”	0.5	0.35
“T”	0.5	0.4
	Metal-2 Hole Size	
Metal-2 Holes	0.2	N/A
Metal-2 Holes	0.225	N/A
Metal-2 Holes	0.25	N/A
Metal-2 Holes	0.3	N/A
Metal-2 Holes	0.35	N/A
Metal-2 Holes	0.40	N/A
Metal-2 Holes	0.50	N/A
Metal-2 Holes	1.00	N/A

858AZ Floorplan

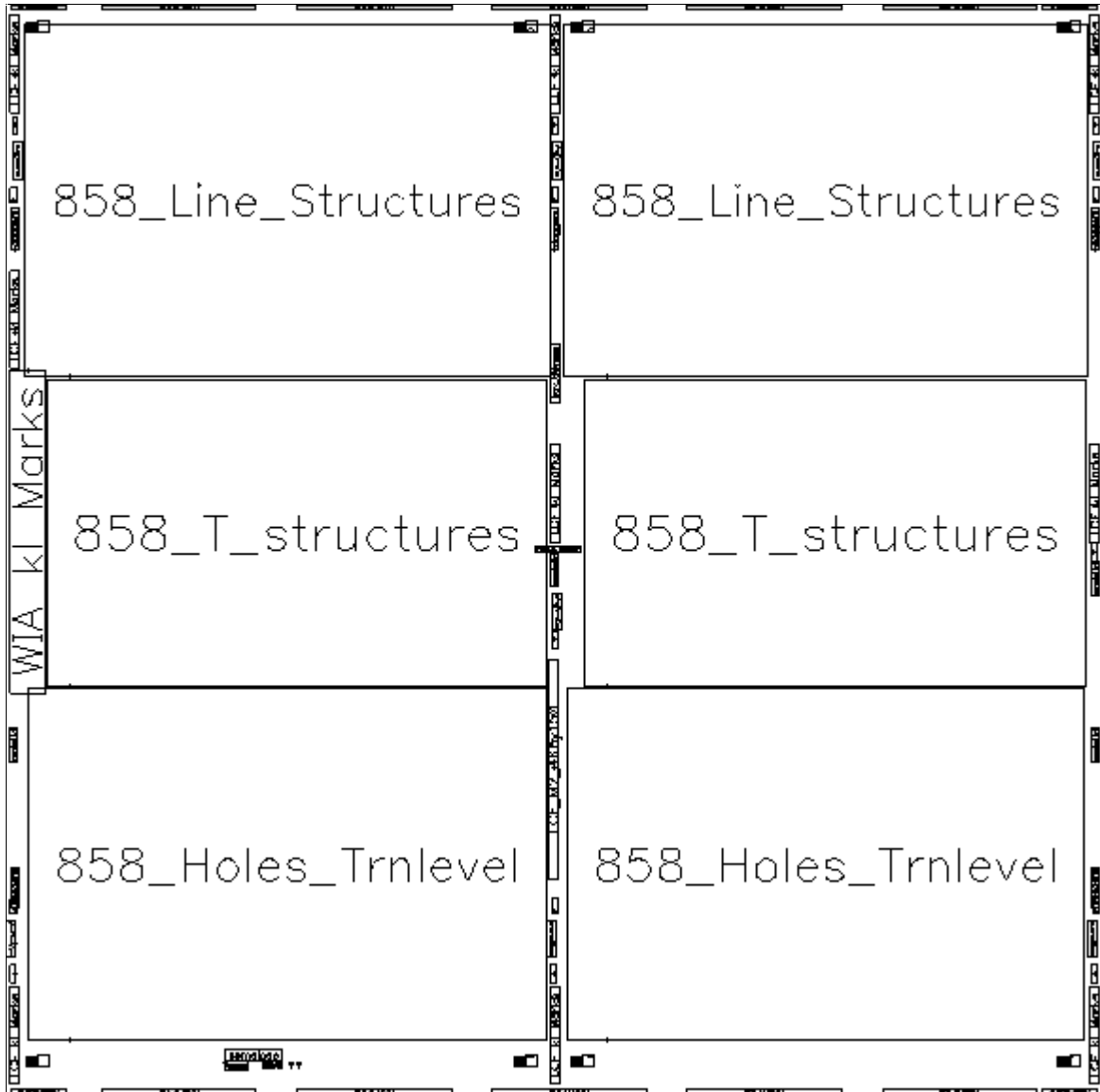


FIGURE 1

850AZ VIA-1 Level

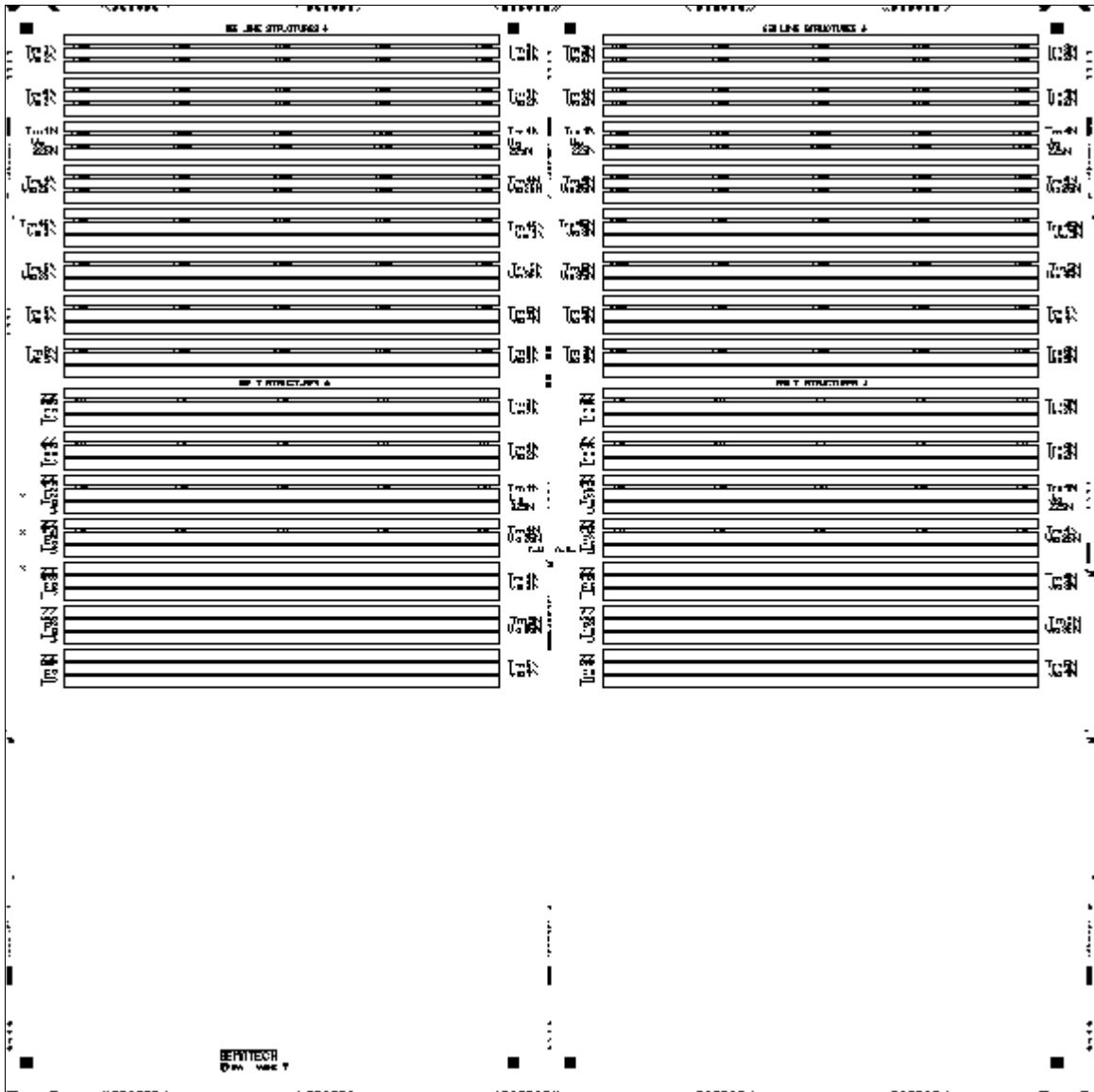


FIGURE 1A

858AZ Metal-2 Level

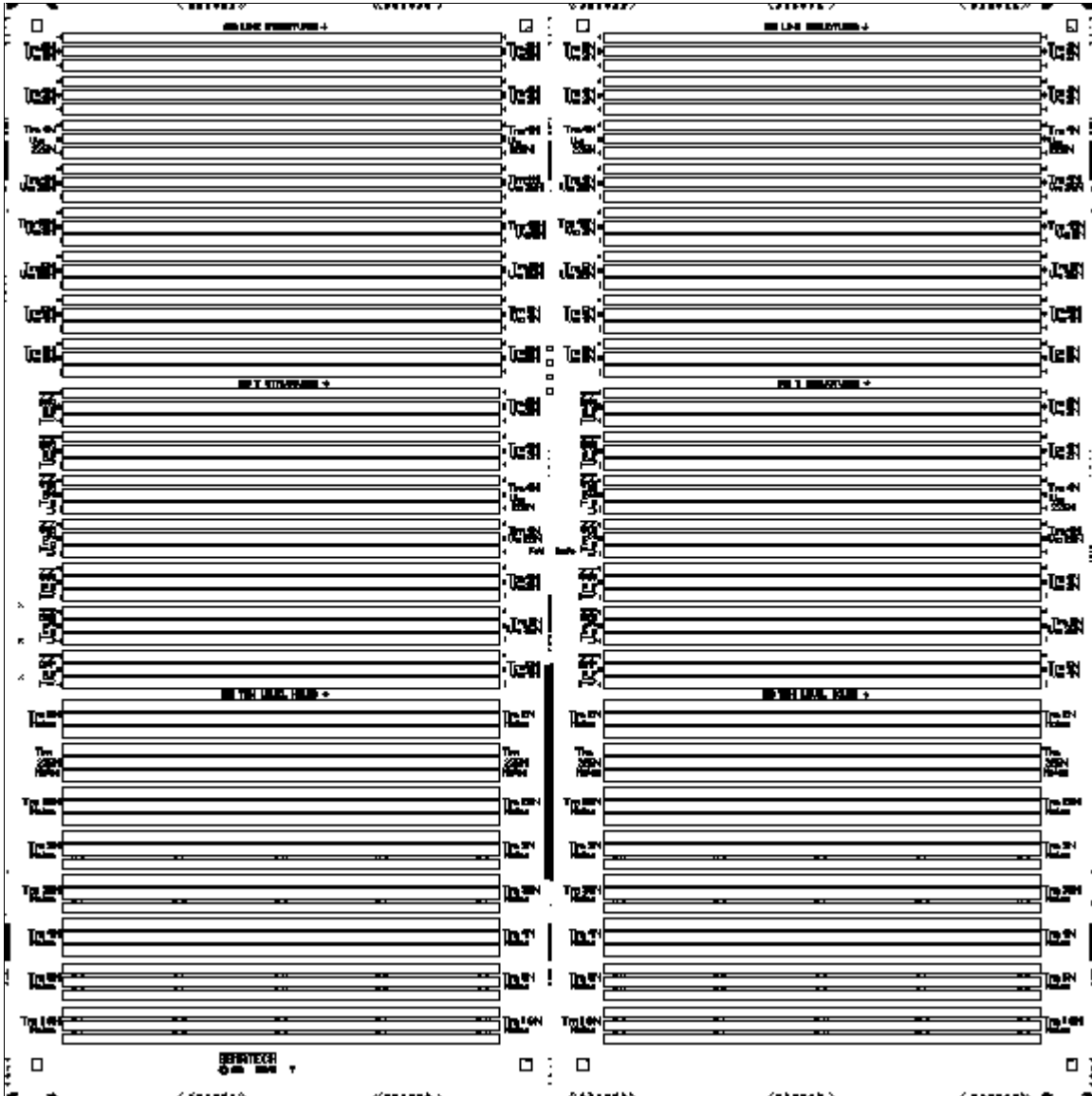


FIGURE 1B

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 Half Die
 VIA-1 Level

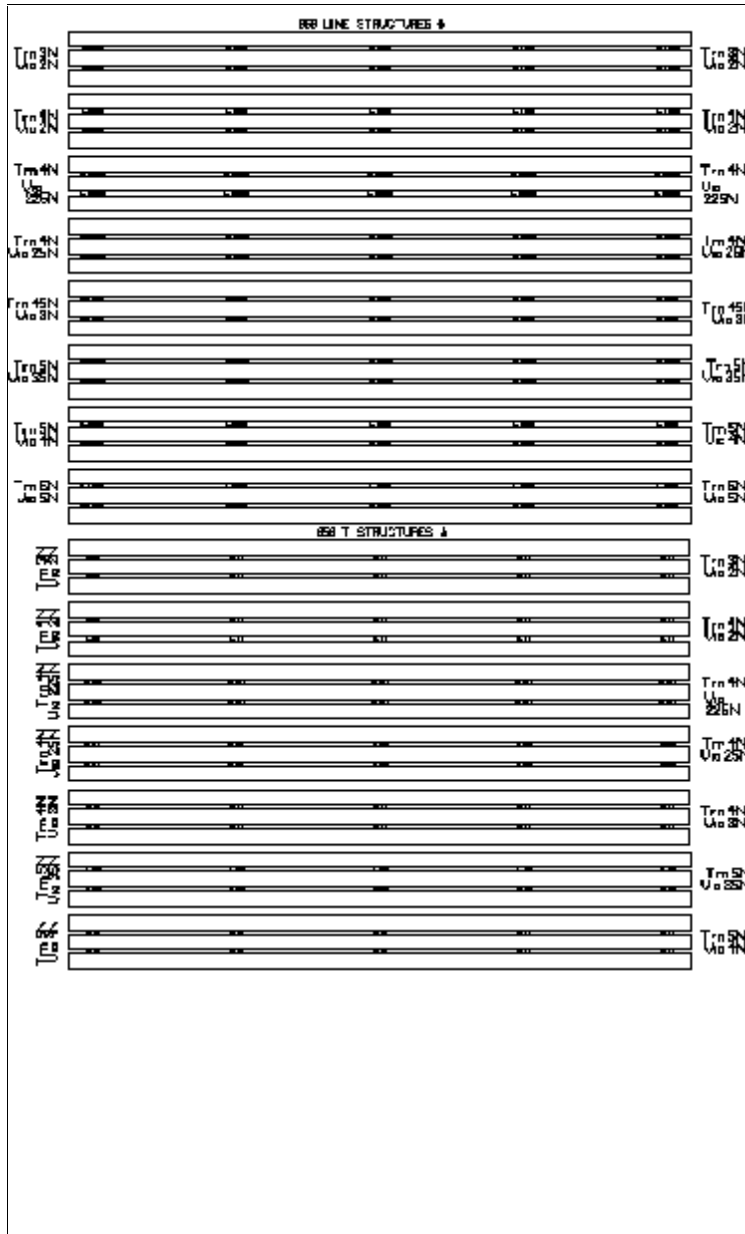


FIGURE 2A

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Half Die
Metal-2 Level

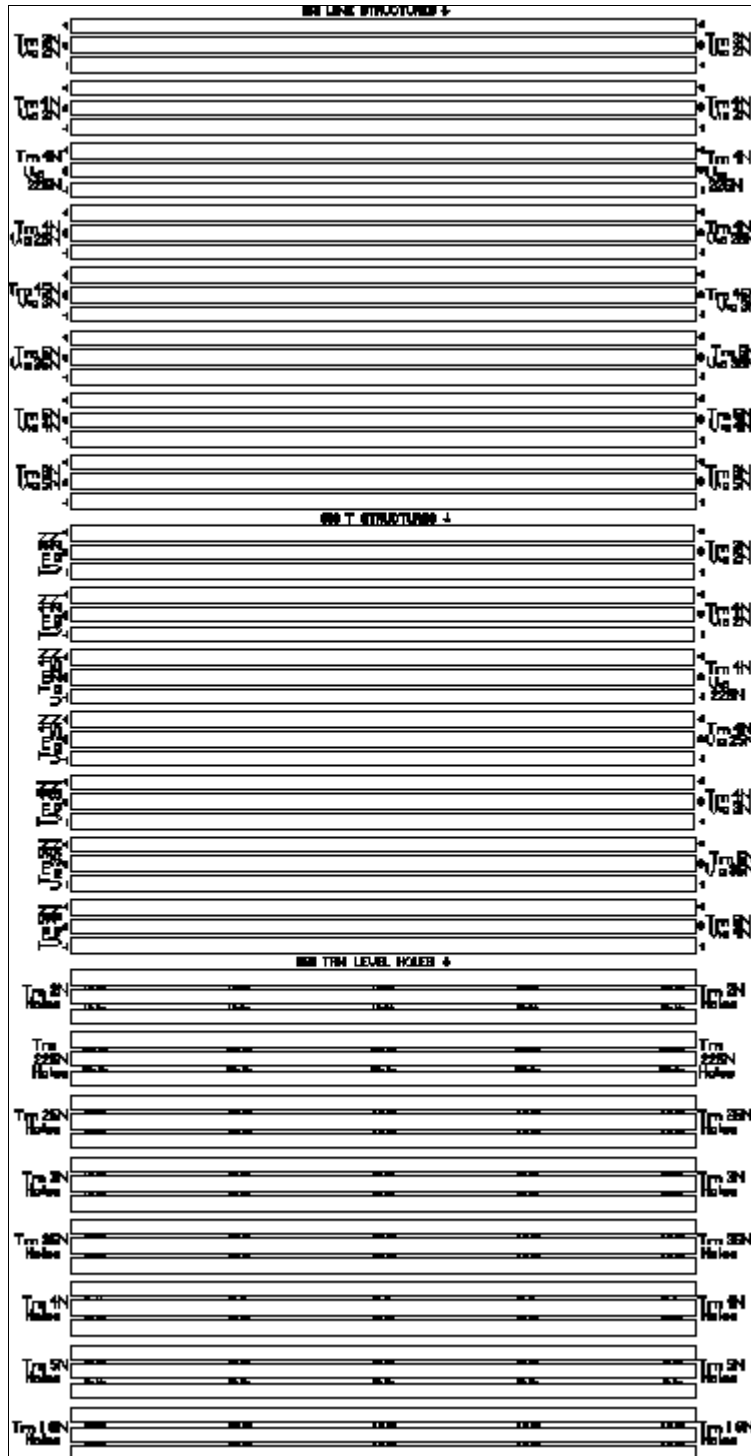
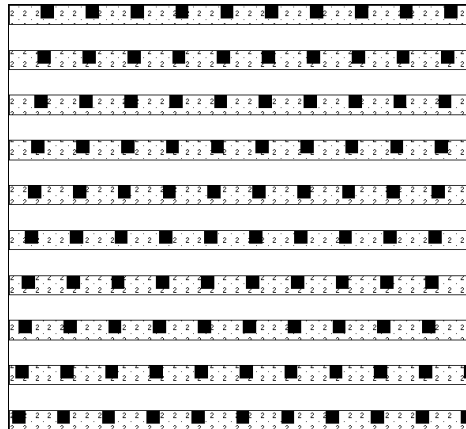
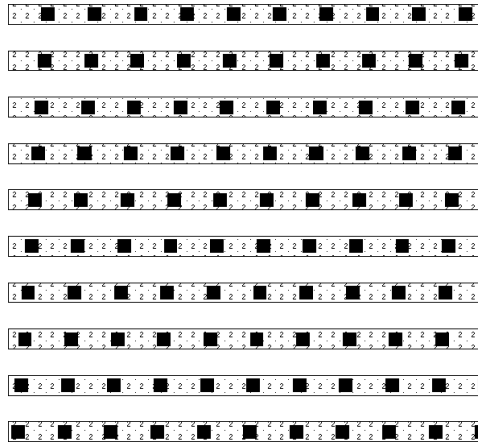


FIGURE 2B

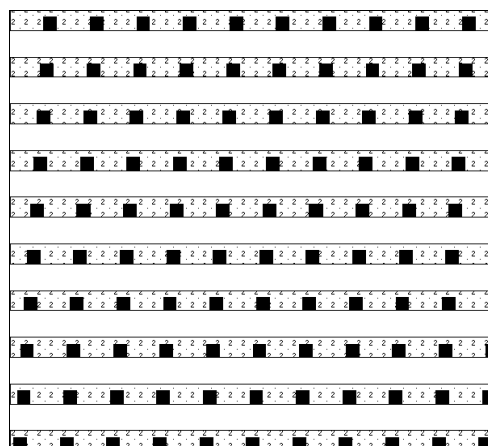
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“+ 1” Overlay



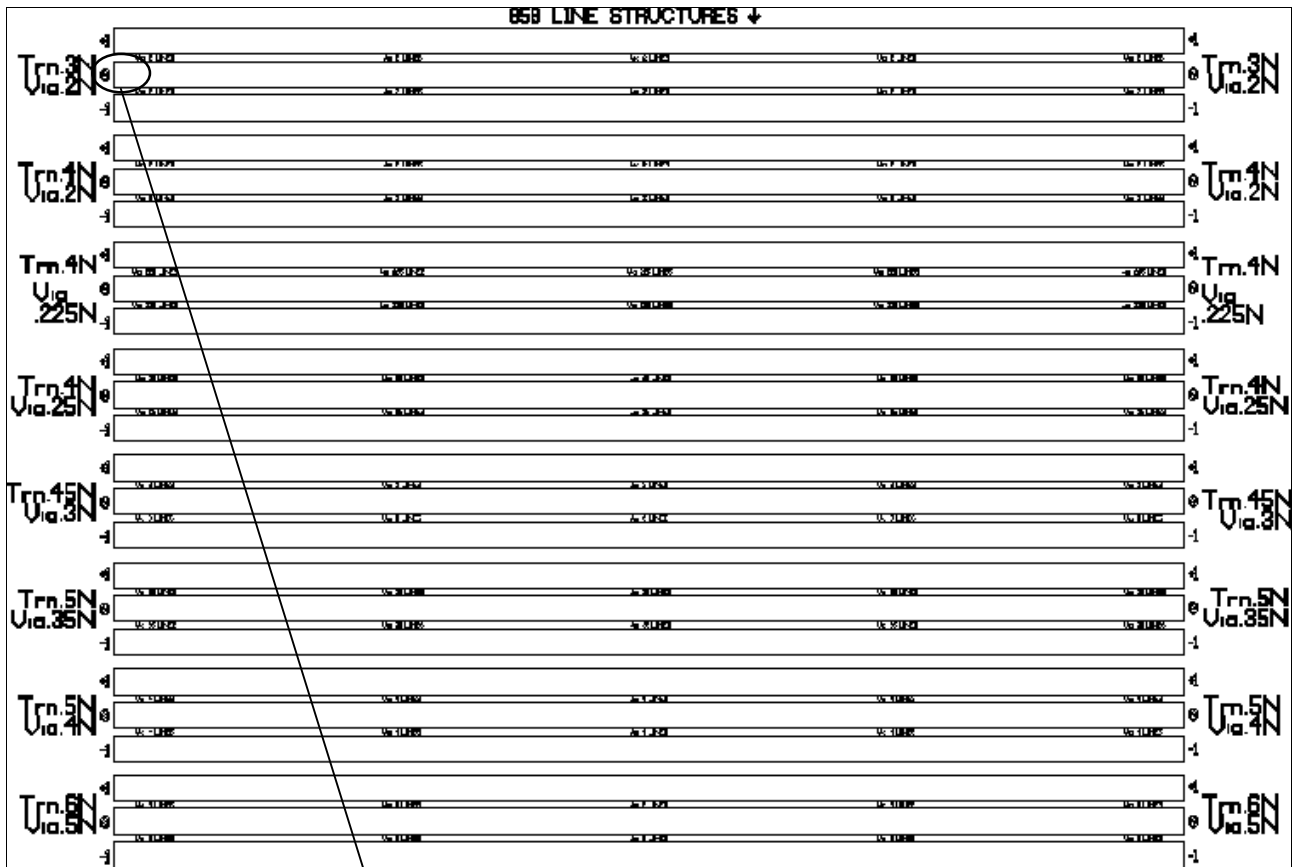
“0” Overlay



“- 1” Overlay

FIGURE 3

858AZ LINE STRUCTURE



Detail View:

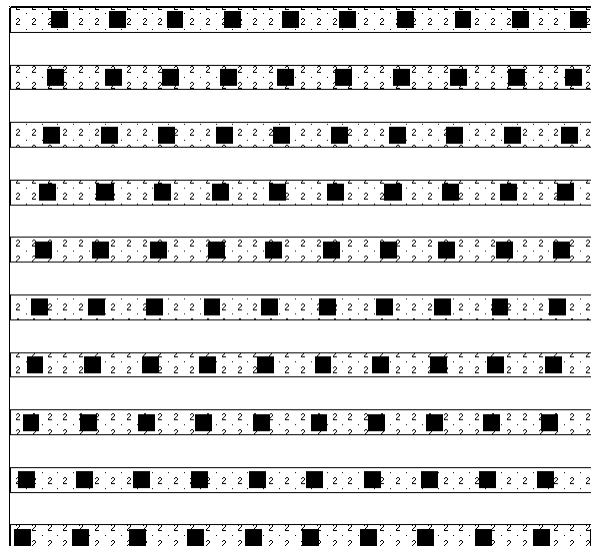
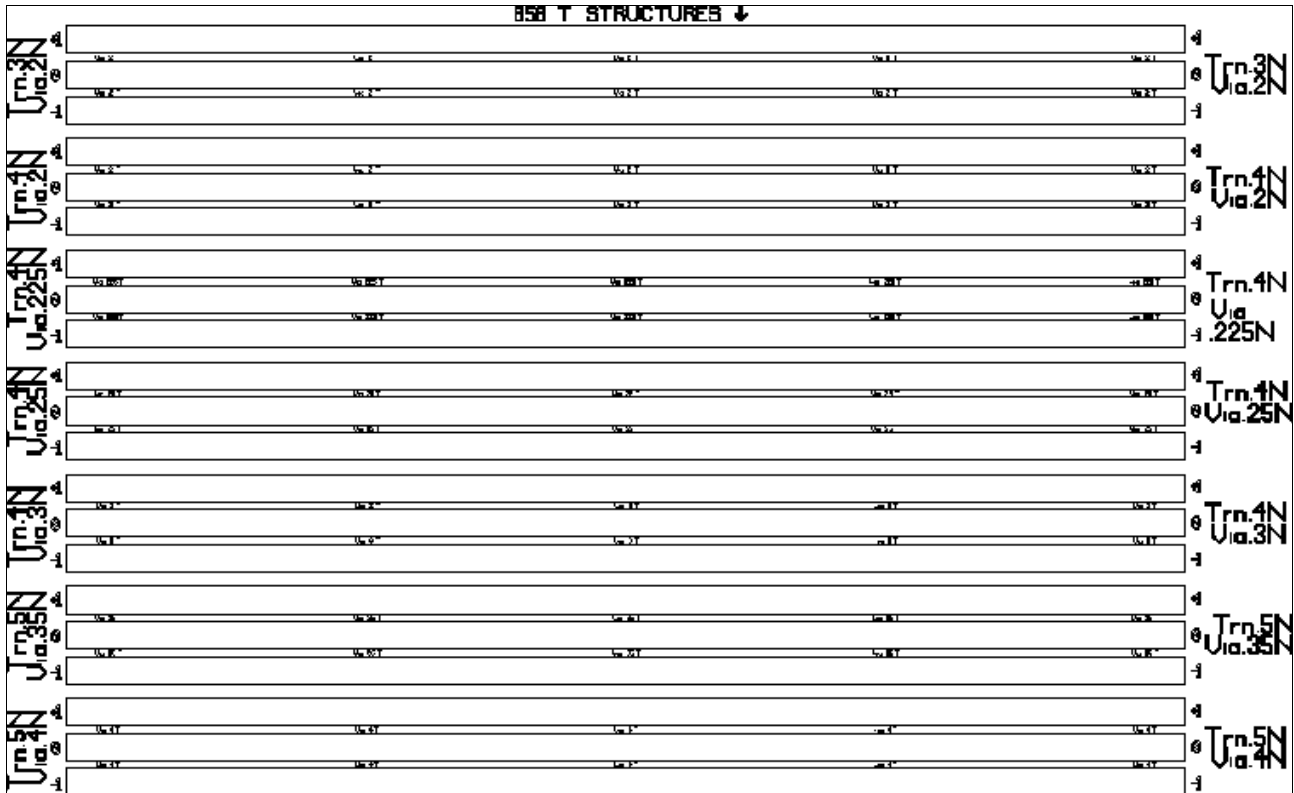


FIGURE 4

858AZ "T" Structures



Detail View:

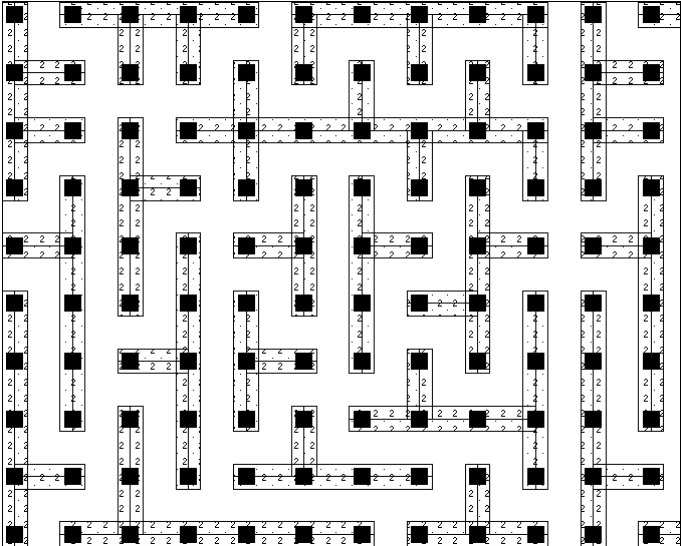
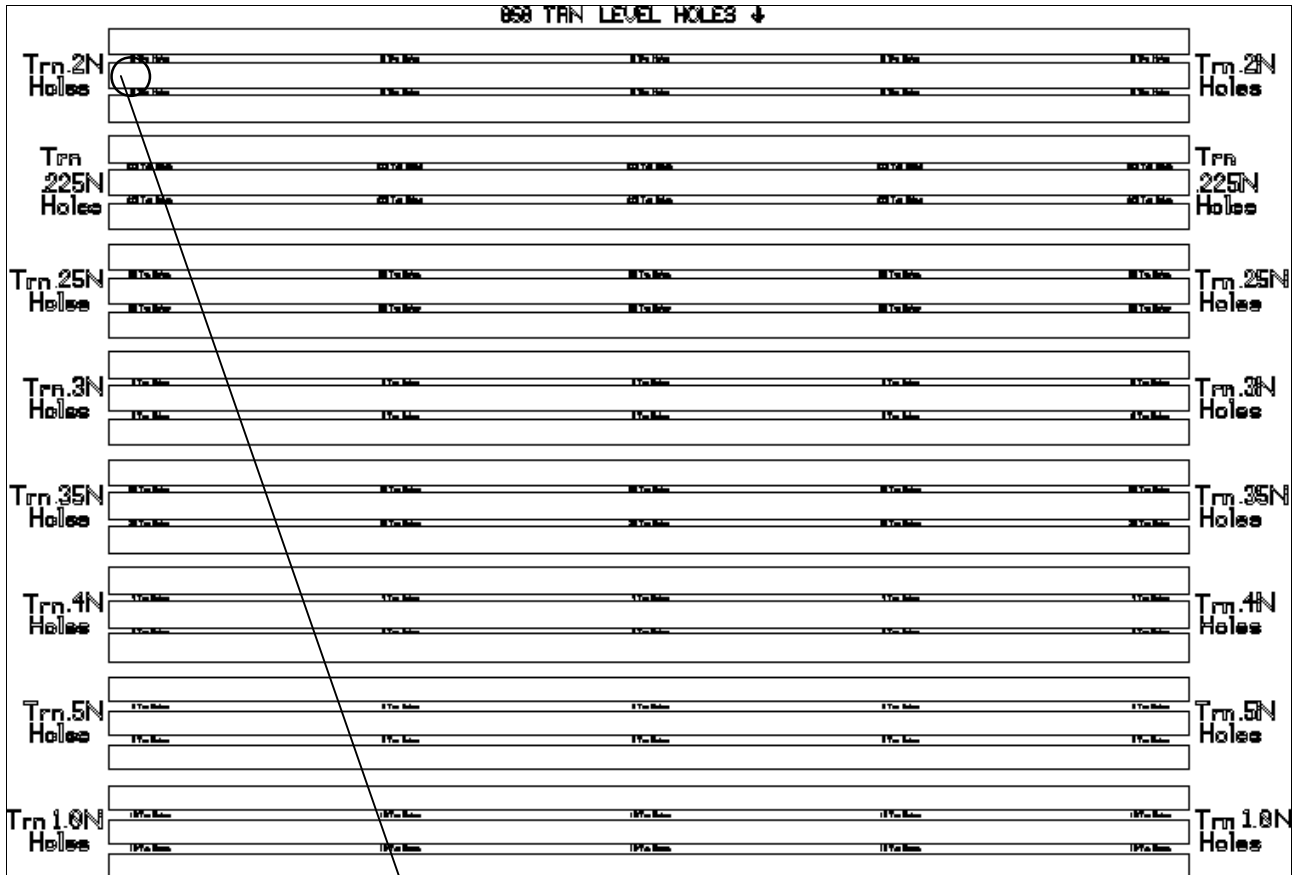


FIGURE 5

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Metal-2 Holes



Detail View:

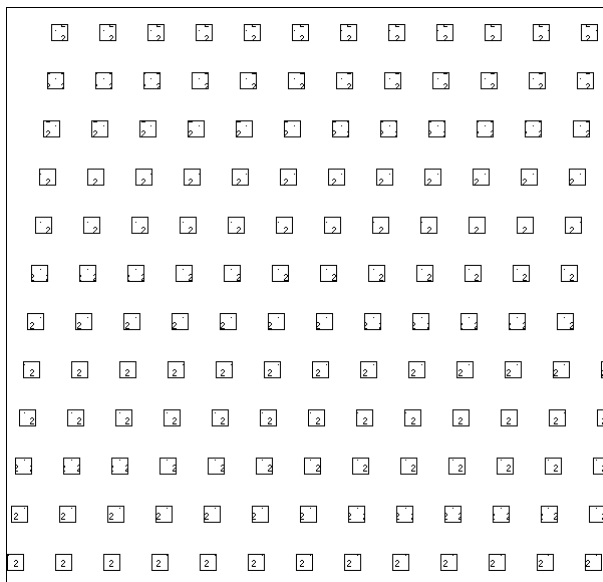


FIGURE 6