

CLAIMS

1. A target for use in the measurement of misregistration between at least a first layer and a second layer formed on a wafer in the manufacture of functional semiconductor devices on the wafer, the functional semiconductor devices including functional device structures (FDSTs), the target comprising:
- 5 a plurality of measurement structures (MSTs), said plurality of MSTs being part of said first layer and said second layer; and
- a plurality of device-like structures (DLSTs), said plurality of DLSTs being part of at least one of said first layer and said second layer,
- 10 said DLSTs sharing at least one characteristic with said FDSTs; and
- said MSTs not sharing said at least one characteristic with said FDSTs.
2. The target according to claim 1 and wherein said at least one characteristic includes at least one of:
- 15 a degree of magnitude of a typical smallest dimension;
- a shape; and
- a degree of magnitude of packing density.
- 20 3. The target according to claim 1 or claim 2 and wherein said DLSTs are formed on both of said first layer and said second layer.
4. The target according to any of claims 1 – 3 and wherein said DLSTs are formed between said MSTs.
- 25 5. The target according to any of claims 1 – 4 and wherein a packing density of said DLSTs is greater than 0.5.
6. The target according to claim 1 and wherein said characteristic is a degree of magnitude of typical smallest dimension and wherein:
- 30 a ratio of a typical smallest dimension of said MSTs to a typical smallest dimension of said FDSTs is at least 1.7; and

a ratio of a typical smallest dimension of said DLSTs to said typical smallest dimension of said FDSTs is between 0.5 – 1.5.

7. The target according to claim 1 and wherein said characteristic is a degree
5 of magnitude of packing density and wherein said MSTs define measurement spaces (MSPs) formed therebetween, said FDSTs define functional device spaces (FDSPs) formed therebetween and said DLSTs define device-like spaces (DLSPs) therebetween and wherein:

a ratio of a typical smallest dimension of said MSPs to a typical smallest
10 dimension of said FDSPs is at least 1.7; and

a ratio of a typical smallest dimension of said DLSPs to said typical smallest dimension of said FDSPs is between 0.5 – 1.5.

8. The target according to any of claims 1 – 7 and wherein said DLSTs are
15 rotated relative to said MSTs in a plane generally parallel to a plane defined by said first layer.

9. The target according to any of claims 1 – 8 and wherein each of said MSTs
comprises:

20 a plurality of segments; and
a plurality of corresponding segment spaces.

10. The target according to claim 9 and wherein a ratio of a typical smallest
dimension of said segments to a typical smallest dimension of said DLSTs is at least 1.1.

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11. The target according to claim 9 or claim 10 and wherein a ratio of a typical
smallest dimension of spaces between said segments to a typical smallest dimension of
spaces between said DLSPs is at least 1.1.

30 12. The target according to any of claims 9 – 11 and wherein said DLSTs are
rotated relative to said segments in a plane generally parallel to a plane defined by said
first layer.

13. The target according to any of claims 1 – 12 and wherein said target is formed within a die of said wafer, said die comprising said functional semiconductor devices.
- 5 14. The target according to any of claims 1 – 12 and wherein said target is formed in a scribe line of said wafer, said scribe line being generally free of said functional semiconductor devices.
- 10 15. The target according to any of claims 1 – 14 and wherein said MSTs are formed as part of at least one of:
- an advanced imaging metrology in-die (AIMid) target;
 - an advanced imaging metrology (AIM) target;
 - a Box-in-Box (BiB) target;

15 a blossom target;

a Moiré target;

a scatterometry target;

an electron beam target;

a hybrid scatterometry-electron beam target;

20 a hybrid imaging-electron beam target; and

a target useful in the measurement of misregistration between three or more layers formed on said wafer.
16. A method of measuring misregistration between at least one first layer and
- 25 at least one second layer formed on a wafer in the manufacture of functional semiconductor devices, the functional semiconductor devices including functional device structures (FDSTs), the method comprising:
- providing said wafer on which is formed a target comprising:
 - a plurality of measurement structures (MSTs), said plurality of MSTs

30 being part of said first layer and said second layer; and

 - a plurality of device-like structures (DLSTs), said plurality of DLSTs being part of at least one of said first layer and said second layer and said DLSTs sharing

at least one characteristic with said FDSTs and said MSTs not sharing said characteristic with said FDSTs;

measuring said target with a misregistration measurement tool, thereby generating an output signal; and

- 5 analyzing said output signal, thereby generating a misregistration value between said layers of said target.

17. The method according to claim 16 and wherein said MSTs are resolvable by said misregistration metrology tool.

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18. The method according to claim 16 or claim 17 and wherein spaces between said MSTs are resolvable by said misregistration metrology tool.

19. The method according to any of claims 16 – 18 and wherein said DLSTs are not resolvable by said misregistration metrology tool.

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20. The method according to any of claims 16 – 19 and wherein spaces between said DLSTs are not resolvable by said misregistration metrology tool.