

Alignment mark architecture effect on alignment signal behavior in advanced lithography

The downscaling of CMOS technology becomes a challenge to the scanner alignment system since overlay and alignment accuracy becomes tighter. Such a tight overlay requirement requires a very stable alignment performance. A stable alignment performance is indicated by a stable alignment signal generation. Hence, it is important to perform process characterization in order to choose an alignment mark, which generates the most stable signals. Different alignment mark type may show a different behavior in signal generation. In this paper, the signals behavior will be explored by experimenting using two different alignment mark architecture. This architecture can be further divided into three, which is AH32, AH53, and AH74. Based from the results, AH32 mark shows a significant trend difference between contact and metal mark. This is due to the fact AH32 contact mark is the easiest to be deformed since its feature size is the biggest compared to AH53 and AH74. AH53 and AH74 alignment signal performance between contact and metal mark are comparable.