

PHASE-SHIFT MASK WITH ASSIST PHASE REGIONS

ABSTRACT

A phase-shift mask having a checkerboard array and a surrounding sub-resolution assist pattern. The checkerboard array comprises alternating phase-shift regions R that have a relative phase difference of 180 degrees. The sub-resolution assist phase regions R' reside adjacent corresponding phase-shift regions R and have a relative phase difference of 180 degrees thereto. The sub-resolution assist phase regions R' are configured to mitigate undesirable edge effects when photolithographically forming photoresist features. Methods of forming LEDs using the phase-shift mask are also disclosed.

(Fig. 8A)