

ABSTRACT

A method of manufacturing a semiconductor device includes forming a plurality of reference patterns and a peripheral pattern on a feature layer by using a first material such that the peripheral pattern is connected to end portions of the plurality of reference patterns; forming a plurality of first spacers on both sidewalls of each of the plurality of reference patterns by using a second material; removing the plurality of reference patterns; forming a plurality of second spacers on both sidewalls of each of the plurality of first spacers by using the first material; removing the plurality of first spacers so that the plurality of second spacers and the peripheral pattern remain on the feature layer; and patterning the feature layer by using the plurality of second spacers and the peripheral pattern as an etch mask.

FIG. 13