

ABSTRACT

MAKING SEMICONDUCTOR DEVICES BY STACKING STRATA OF MICRO LEDS

A stack of strata containing LEDs is fabricated by repeatedly bonding unpatterned epitaxial structures. Because the epitaxial structures are unpatterned (e.g., not patterned into individual micro LEDs), requirements on alignment are significantly relaxed. One example is an integrated multi-color LED display panel, in which arrays of micro LEDs are integrated with corresponding driver circuitry. Multiple strata of micro LEDs are stacked on top of a base substrate that includes the driver circuitry. In this process, each stratum is fabricated as follows. An unpatterned epitaxial structure is bonded on top of the existing device. The epitaxial structure is then patterned to form micro LEDs. The stratum is filled and planarized to allow the unpatterned epitaxial structure of the next stratum to be bonded. This is repeated to build up the stack of strata.

FIG. 1B