



## ABSTRACT

HIGHLY REFLECTIVE CONTACTS FOR  
LIGHT EMITTING SEMICONDUCTOR DEVICES

Light emitting diodes with highly reflective contacts and methods for fabricating them are described. In a first preferred embodiment of the present invention, LEDs with reflective contacts are formed using a laser to create small alloyed dots in a highly reflective metal evaporated on the top and bottom surface of the LED chip. Using this technique, most of the bottom surface remains highly reflective, and only those portions of the bottom surface where the laser struck become absorbing. Typically, only 1% of the bottom surface is formed into contacts, leaving 99% of the bottom surface to serve as a reflecting surface. The 1% of the surface, however, provides an adequate low resistance ohmic contact. LEDs fabricated with this technique allow photons to bounce off the rear surface more than 20 times before there is a 50% chance of absorption. In a second embodiment of the present invention, an application of compound semiconductor wafer bonding techniques permits the fabrication of LEDs with a plurality of these small, micro-alloyed contacts without the use of a laser.

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